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ALL INDIA COORDINATED RESEARCH NETWORK ON UNDERUTILIZED CROPS

ANNUAL REPORT 2013



NATIONAL BUREAU OF PLANT GENETIC RESOURCES

PUSA CAMPUS, NEW DELHI 110 012

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ANNUAL REPORT 2013

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Cover page photographs:

Front cover photograph : Cultivation of Grain amaranth

Back cover photograph : Seed production of Grain amaranth

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PREAMBLE

I. PREAMBLE

Living in close contact with the nature, human beings learnt to use plants for food, fodder, fibre, medicine and other economic purposes. Since the dawn of agriculture, domestication and necessity based gathering of plant species have helped in the evolution of specially useful plant species. Over the years, these biological resources have been generously exploited for the benefit of mankind and the dependence of human kind on plant resources is likely to continue in the foreseeable future. So far, out of the estimated global wealth of 80,000 edible plant species, only about 150 have been widely used and of these only about 30 species provide 90 per cent of the food for the world's population. Consequently, a large number of plant species still remain under / unutilized. This has resulted in narrowing down of our food basket and restricted the options for unforeseen times that may arise from the unpredictable global climatic changes and other natural catastrophes in future. Therefore, the underutilized plant species of economic importance are the key to sustainable agriculture in most of the developing countries facing acute resource crunch as well as rapid depletion of natural resources due to ever-increasing population, rapid industrialization and urbanization. The population experts have predicted that the world population will grow by an unprecedented 90 million people per year, which is equivalent to Mexico's entire population in 1995. Unfortunately, changing land use patterns, rapidly increasing pressure on land both for agriculture and forestry, massive development projects as well as expanding demand for industrial and urban sectors have posed serious threat to the existing agro-biodiversity, including the underutilized plant species that hold immense potential for the future.

These plant species do not require high input technology and can be raised with comparatively lower management cost on marginal, submarginal, degraded and various categories of wastelands on a sustainable basis. There are about 158 million hectares of wastelands of different kinds in India such as sand dunes, ravines, saline, alkali and acidic soils, marshy and marginal lands, which are unfit for supporting cultivation of high input demanding elite crops. Such lands can easily be put to use for growing low-input requiring underutilized crops

to diversify present day agriculture in order to support ever-increasing population and to cater to the fast changing human needs.

The Consultative Group on International Agricultural Research (CGIAR) sponsored Workshop on the Role of Underutilized Crops in Enlarging the Basis of Food Security held at MSSRF, Chennai during 1999 which also underlined the need to widen the species composition in the food basket and conserve important food and other plants for posterity.

Underutilized crops or crops for the future constitute those plant species that occur as life support species in extreme environmental conditions or threatened habitats, having appropriate genetic make up to survive under such adverse situations and also possess promising nutritional or industrial utility for a variety of purposes for the present as well as future needs of human kind. Their cultivation is restricted to specialized geographical pockets in different agro-ecological regions mainly by the poor farming communities, who have little access to modern agro-inputs and well organized marketing and communication infrastructure. Having superior nutritional quality, these crops provide household food and nutritional security to the millions of impoverished people living in remote corners of the country often in inhospitable terrains, where public food distribution system is not yet strong.

Recognizing the need for organized research effort on less common, under exploited crops, the All India Coordinated Research Project on Under Utilized and Under Exploited Plants was initiated during 1982 by ICAR. The Project was later redesignated as AICRP on Underutilized Crops and recently rechristened as AICRN on Underutilized Crops. At present, the network is conducting research on 14 crops of food, fodder and industrial value through 13 main, 6 cooperating and 3 voluntary centres located in diverse agro-climatic zones of the country. So far, 34 varieties in different crops have been released/identified in this project, besides identifying desirable genetic donors and accumulating indigenous and exotic germplasm collections. Planned multi-locational evaluation of the germplasm and breeding lines is a continuous process for developing high yielding superior genotypes and their improved production technologies suitable for various agro-ecological situations representing high mountains to the desert

plains. Quality analysis of selected germplasm and breeding lines are also undertaken to facilitate crop improvement programme.

The present report embodies results of research work undertaken on germplasm evaluation, breeding and agronomic aspects, quality evaluation and other studies in various underutilized crops at different centres during *rabi* 2012-13 and *kharif* 2013. The compiled report is an outcome of the concerted efforts made by the scientists of AICRN, cooperating and voluntary centres. I express my sincere thanks to Drs. J.C. Rana, Sheela Mary, M.C. Singh, T.V.Prasad, M. Khabiruddin Dr H.L. Raiger the Principal Investigators for PGR management, Crop Improvement, Crop Production, Crop Protection, Quality Analysis and Documentation and Database Management, respectively for compilation of results and preparation of the report

I would like to acknowledge with reverence and gratitude the encouragement and guidance received on all aspects of management and functioning of the project from Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR; Prof. S.K. Datta, DDG (Crop Science), ICAR; Dr. R.P. Dua, ADG (FFC), ICAR, Dr.J.S. Chuahan,ADG(Seeds), ICAR and Dr. K.C. Bansal, Director, NBPGR.

I wish to record my appreciation to Mrs. Amita and Mr. Ranvir Singh for neatly typing the report.

B.S.Phogat
Network Coordinator

PLANT BREEDING

II. PLANT BREEDING

Based on the regional economic importance, area covered by the crop, specific adaptive advantage and future potential, the work on underutilized crops have been prioritized for hill as well as for the plain areas of the country. These include food and fodder crops, energy and industrial plants and crop species suitable for problematic areas. Among the economically important indigenous as well as introduced plant species, the promising lines are included in the coordinated testing programme. Apart from Initial Varietal Trial (IVT) and Advanced Varietal Trials (AVT-I & II) in important crops like grain amaranth, buckwheat, rice bean and faba bean, the Observational Rows and Germplasm Evaluation were carried out in different crops. The results of the experiments conducted during *Rabi* 2012-2013 in the plains and during *Kharif* 2013 in the hills as well as plains are enumerated below:

2.1 HILLS

The crops included in the hill areas are the pseudocereals (grain amaranth and buckwheat); grain legumes (rice bean and faba bean). These crops are grown during kharif season in hills of North-Western and North-Eastern Himalayas. Replicated data were received from the centres. Statistical analysis was carried out to estimate mean, CD (at 5% level) and CV (%). For overall comparison, mean over locations has been calculated. For the varieties qualifying for consideration of identification on the basis of three years performance, the weighted means in respect of grain yield and maturity have been given in the Annexures.

2.1.1 GRAIN AMARANTH (*Amaranthus* spp.)

Grain amaranth is an important crop in mid and high altitude regions of North-Western Himalaya. It is a dual purpose crop grown for its green foliage and grain. Its seeds being rich in protein and essential amino acids (lysine), are used for various confectionary items and other nutritious food products.

An IVT and AVT on grain amaranth were conducted during kharif, 2013. Although many species of grain amaranth are economically important, but three

species, namely, *A. hypochondriacus*, *A. caudatus* and *A. edulis*, being the important grain yielding types, are included in the testing programmes.

2.1.1.1 Initial Varietal Trial and Advanced Varietal Trial (IVT & AVT-I)

In this trial, nine entries in IVT and two entries in AVT-I along with three checks were tested at four locations. The data were received from only three centres. The performance of the entries as compared to the checks has been given in Table 1. Based on the overall mean performance in respect of grain yield over three locations, in IVT and AVT-I, no entry showed yield superiority over the entry, IC 038129 (23.58 q/ha).

Significant differences were observed among the entries for seed yield at all the locations (Table 2). Seed yield level was high at Shimla (24.65 q/ha) and moderate at Almora (13.98 q/ha) and Ranichauri (13.02 q/ha). Based on the average performance over locations, entry, IC 038129 was the highest yielder (23.58 q/ha) followed by entry AMHP-1 (22.17 q/ha).

Average plant height of the entries (Table 3) was the highest at Shimla (235.91 cm) followed by at Almora (155.69 cm). It was the lowest at Ranichauri (127.31 cm) centre. The plant height at Shimla ranged from 186.67 cm to 265.13 cm and at Almora from 113.67 cm to 183.67 cm. Based on average performance over four locations the entry IC 038129 had highest plant height (203.75 cm).

Flowering time showed considerable variation among locations as well as the entries. The mean flowering time was shortest (61.54 days) at Ranichauri while it was longest (83.79 days) at Shimla (Table 4). The variation in flowering time among the entries was wider at Shimla (71.00– 98.67 days). The entry VL-101 showed consistency for early flowering over the locations and ranked first (64.89 days) based on the overall performance.

The average maturity period of the entries over the locations was 114.67 days (Table 5). The entry, Almora-VL-102 was the earliest in maturity (103.11 days). The average maturity period was the minimum at Almora (97.56 days) while, it was the longest at Ranichauri (129.53 days).

The length of inflorescence (Table 6) of the entries was the highest at Shimla (77.27 cm) followed by at Almora (61.41 cm). Inflorescence length was lowest (45.14cm) at Ranichauri. Based on the average over four locations, the entry, IC 038129 had the longest inflorescence (75.01 cm).

Number of fingers per inflorescence (Table 7) was the highest at Almora (71.67) followed by at Ranichauri centre (31.01). Based on the average over the locations the entry IC 038256 had the highest number of fingers (59.77).

Test weight (Table 8) expressed in terms of weight of 10 ml seed recorded at three centres showed that it was the highest at Ranichauri (10.55 g) and very low at Almora (8.67 g). The variation among the entries was relatively low. Based on the average over three locations the entry, Shimla A-3 (9.68 g) showed the highest test weight.

2.1.2 BUCKWHEAT (*Fagopyrum* spp.)

Buckwheat is a multi-utility pseudocereal crop grown extensively in the higher hills and is a catch crop in the foot hills. In addition to its foliage and grain, it produces a glucoside called *rutin* that has important medicinal value against cardio-vascular ailments.

2.1.2.1 Initial Varietal Trial and Advanced Varietal Trial (IVT and AVT-I)

A combined trial of Initial Varietal Trial (10 entries) and Advanced Varietal Trial-I (1 entry) with four checks was conducted at four locations viz. Shimla, Ranichauri, Almora and Sangla, data were received from three locations only. The summary performance of various entries in respect of grain yield and other important traits as compared to the checks has been given in Table 9. The check variety Sangla B-1 was found superior in yield.

Data on grain yield have been presented in Table 10. Significant differences were observed among the entries with respect to grain yield at three locations. Seed yields at Ranichauri (1.86 q/ha) was comparatively very low. Highest seed yield was recorded at Almora (6.18 q/ha).

Average plant height (Table 11) was recorded to be the highest at Almora (144.07 cm) followed by at Ranichauri (115.96 cm). The entry, IC 202226 was the tallest (148.53 cm) entry.

Flowering time varied from 45.67 to 64.00 days at Shimla, 28.67 to 58.33 days at Ranichauri and 21.00 to 38.00 days at Almora centre (Table 12). Mean flowering time was the earliest at Almora (30.84 days) followed by at Ranichauri (44.62 days).

Maturity period (Table 13) also showed similar trend as that of flowering time. Average maturity period was the earliest at Almora (69.27 days) followed by at Shimla (11.84 days). On the basis of average over three locations the check variety VL-7 was earliest in maturity (68.94 days).

The average test weight was recorded to be higher at Ranichauri (2.77 g) than at other centres (Table 14). On the basis of average over three locations the check variety VL-7 possessed the highest (2.75 g) test weight.

2.1.3 RICE BEAN (*Vigna umbellata*)

Rice bean is an important grain legume crop of low and mid Himalayan regions having multifarious utility. It is mainly suitable for mid hill regions where traditional pulses like black gram and green gram cannot be grown successfully. A trial comprising Initial Varietal Trial and AVT-I entries was conducted during the year 2013.

2.1.3.1 Initial Varietal Trial and Advanced Varietal Trial (IVT & AVT-I)

The IVT and AVT-I comprising 16 entries and four checks was conducted at six locations. Results have been received from all centres. The summary performance of the entries has been presented in Table 15.

Significant variations were observed among the entries with respect to seed yield at six locations (Table 16). Yield level at Shimla centre was the highest with an average yield of 22.63 q/ha while it was the lowest at Ranichauri (3.14 q/ha) centre. The crop at Ranichauri was destroyed due to poor seed setting and high rainfall. The yield levels at Shillong (9.97 q/ha) centre was moderate. On the basis of average over six locations the entry RBHP-102 (12.65 q/ha) was the highest yielder followed by IC 026973 (13.79 q/ha).

Plant height (Table 17) was maximum at Shimla with an average height of 179.55 cm, while it was the lowest at Palampur (58.90 cm) centre. On the basis

of average over six locations Shillong RB-1 showed the highest plant height (129.22).

Flowering time was minimum at Shillong (52.10 days) and maximum at Shimla (91.85 days) showing more than 40 days difference between the two centres (Table 18). On the basis of average over six locations IC 007537 (68.94 days) and IC 019781 (69.33 days) were recorded to be earliest in flowering.

Maturity period was shortest at Almora (100.86 days) and it was longest (155.92 days) at Shimla (Table 19). There was a difference of about 55 days in maturity between Almora and Shimla centres. Based on the average over six locations, entry, RBHP-038 was earliest in maturity (127.72 days).

The mean 100-seed weight was the highest at Palampur (8.12 g) centre and lowest at Almora (5.23 g) centre (Table 20). On the basis of average over six locations, Shillong RB-1 had the highest seed weight (8.74 g) followed by RBHP-105 (7.98 g).

2.1.4 FABA BEAN (*Vicia faba*)

Faba bean is grown in the hills mainly for its protein rich green pods which are used as vegetable. An Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT-I & II) were proposed to be conducted at Palampur and Ranichauri and results have been received from both centres.

2.1.4.1 Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT-I & II)

The IVT and AVT-I & II comprising 13 entries and two checks was conducted at two locations. Results have been received from all centres. The summary performance of the entries has been presented in Table 21.

Significant variations were observed among the entries with respect to seed yield at two locations (Table 22). Yield level at Ranichauri centre was the highest with an average yield of 23.99 q/ha while it was the lowest at Palampur (7.47 q/ha) centre. On the basis of average over two locations the entry HPFB-1 (31.95 q/ha) was the highest yielder followed by HPFB-2 (30.56 q/ha).

Plant height (Table 23) was maximum at Palampur with an average height of 111.45 cm, while it was the lowest at Ranichauri (46.05 cm) centre. On the

basis of average over two locations HB-82 showed the highest plant height (118.75).

Flowering time was minimum at Palampur (65.13 days) and maximum at Ranichauri (82.27 days) showing more than 17 days difference between the two centres (Table 24). On the basis of average over two locations HB-186 (62.25 days) was recorded to be earliest in flowering.

Maturity period was shortest at Palampur (162.70 days) and it was longest (168.00 days) at Ranichauri (Table 25). Based on the average over two locations, entry, HPFB-2 was earliest in maturity (156.00 days).

The mean 100-seed weight was the highest at Palampur (31.24 g) centre and lowest at Ranichauri (27.16 g) centre (Table 27). On the basis of average over two locations, HPFB-2 had the highest seed weight (36.53 g) followed by HPFB-1 (35.60 g).

Table 1. Performance of grain amaranth entries in Initial and Advanced Varietal Trials (IVT & AVT) during Kharif 2013 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 10ml seed (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check		
				Mean	Location	Rank	Annapurna	Durga	PRA 3
IVT									
1	AMHP-1	106.11	9.48	22.17	3	2	38.36	9.83	36.05
2	IC038129	126.50	9.24	23.58	2	1	47.13	16.79	44.68
3	IC038192	118.45	8.90	15.35	3	11	-4.23	-23.98	-5.83
4	IC038256	119.78	9.17	17.71	3	6	10.55	-12.25	8.70
5	IC038373	107.00	9.45	20.69	3	3	29.15	2.52	27.00
6	IC038378	118.67	9.21	15.07	3	12	-5.93	-25.33	-7.50
7	Shimla-A-1	118.11	8.79	14.30	3	13	-10.77	-29.17	-12.26
8	Shimla-A-2	119.44	9.01	16.05	3	9	0.17	-20.49	-1.50
9	Shimla-A-3	120.67	9.68	10.23	3	14	-36.17	-49.34	-37.24
AVT-I									
10-	VL-101	103.78	8.95	17.11	3	7	6.79	-15.24	5.00
11	VL-102	103.11	9.52	19.44	3	5	21.29	-3.72	19.27
12	Annapurna (C)	119.44	9.31	16.02	3	10	-	-20.62	-1.67
13	Durga (C)	103.67	8.54	20.19	3	4	25.98	-	23.88
14	PRA 3 (C)	120.67	8.68	16.30	3	8	1.70	-19.28	-
Mean		114.67	9.14	17.44					

Table 2. Grain yield (q/ha) in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013(Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank	Location	Frequency
IVT								
1	AMHP-1	23.27	17.53	25.71	22.17	2	3	0/3
2	IC038129		16.08	31.08	23.58	1	2	0/2
3	IC038192	10.41	9.25	26.38	15.35	11	3	0/3
4	IC038256	10.47	17.37	25.31	17.71	6	3	0/3
5	IC038373	21.40	17.50	23.18	20.69	3	3	0/3
6	IC038378	10.31	10.50	24.41	15.07	12	3	0/3
7	Shimla-A-1	8.24	14.17	20.48	14.30	13	3	0/3
8	Shimla-A-2	11.04	17.76	19.35	16.05	9	3	0/3
9	Shimla-A-3	9.01	4.60	17.07	10.23	14	3	0/3
AVT-I								
10	VL-101	15.94	6.22	29.17	17.11	7	3	0/3
11	VL-102	20.57	13.09	24.65	19.44	5	3	0/3
12	Annapurna (C)	10.26	7.50	30.32	16.02	10	3	
13	Durga (C)	22.94	12.22	25.40	20.19	4	3	
14	PRA 3 (C)	7.81	18.50	22.58	16.30	8	3	
	Mean	13.98	13.02	24.65	17.44			
	CD (0.05)	2.82	0.25	2.65				
	CV (%) Error	11.98	1.15	6.40				

Table3. Plant height(cm) in Initial and Advanced Varietal Trials (IVT& AVT) on grain amaranth:Kharif 2013(Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	AMHP-1	145.00	147.53	221.37	171.30	9
2	IC038129		148.60	258.90	203.75	1
3	IC038192	169.00	116.60	255.37	180.32	7
4	IC038256	162.67	123.47	257.37	181.17	6
5	IC038373	150.00	131.53	186.67	156.07	11
6	IC038378	156.00	133.20	265.13	184.78	4
7	Shimla-A-1	164.00	115.40	255.83	178.41	8
8	Shimla-A-2	183.67	139.20	266.77	196.54	2
9	Shimla-A-3	192.00	118.53	265.73	192.09	3
AVT-I						
10	VL-101	113.67	105.53	202.27	140.49	14
11	VL-102	128.33	123.80	191.27	147.80	13
12	Annapurna (C)	152.67	125.40	225.53	167.87	10
13	Durga (C)	137.67	123.20	204.15	155.01	12
14	PRA 3 (C)	169.33	130.33	246.43	182.03	5
	Mean	155.69	127.31	235.91	174.12	
	CD (0.05)	30.66		2.41		
	CV (%) Error	11.71		0.61		

Table 4. Days to 50% flowering in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	AMHP-1	70.67	60.00	75.33	68.67	5
2	IC038129	75.33		90.67	83.00	14
3	IC038192	79.67	65.00	89.00	77.89	10
4	IC038256	78.67	65.00	90.67	78.11	11
5	IC038373	70.00	60.00	71.67	67.22	4
6	IC038378	77.67	63.33	81.33	74.11	6
7	Shimla-A-1	76.67	58.33	89.33	74.78	7
8	Shimla-A-2	77.00	62.67	88.67	76.11	8
9	Shimla-A-3	78.67	71.00	98.67	82.78	13
AVT-I						
10	VL-101	71.67	52.00	71.00	64.89	1
11	VL-102	72.33	50.67	75.00	66.00	3
12	Annapurna (C)	77.00	65.33	86.00	76.11	8
13	Durga (C)	63.67	60.00	73.67	65.78	2
14	PRA 3 (C)	78.33	66.67	92.00	79.00	12
	Mean	74.81	61.54	83.79	73.89	
	CD (0.05)		1.80	2.38		
	CV (%) Error		1.74	1.69		

Table 5. Days to maturity in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank	Location	Frequency
IVT								
1	AMHP-1	92.33	126.67	99.33	106.11	4	3	1/3
2	IC038129		129.33	123.67	126.50	14	2	0/2
3	IC038192	106.00	133.67	115.67	118.45	7	3	0/3
4	IC038256	103.00	132.67	123.67	119.78	11	3	0/3
5	IC038373	92.33	125.00	103.67	107.00	5	3	0/3
6	IC038378	102.33	132.67	121.00	118.67	8	3	0/3
7	Shimla-A-1	98.00	130.33	126.00	118.11	6	3	0/3
8	Shimla-A-2	101.67	131.00	125.67	119.44	9	3	1/3
9	Shimla-A-3	106.00	132.67	123.33	120.67	12	3	2/3
AVT-I								
10	VL-101	83.00	127.67	100.67	103.78	3	3	1/3
11	VL-102	82.33	128.33	98.67	103.11	1	3	2/3
12	Annapurna (C)	105.67	132.00	120.67	119.44	9	3	
13	Durga (C)	90.33	118.67	102.00	103.67	2	3	
14	PRA 3 (C)	105.33	132.67	124.00	120.67	12	3	
	Mean	97.56	129.53	114.86	114.67			
	CD (0.05)	2.08		2.50				
	CV (%) Error	1.27		1.30				

Table 6. Inflorescence length (cm) in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	AMHP-1	54.33	45.93	81.37	60.54	9
2	IC038129		58.73	91.28	75.01	1
3	IC038192	66.67	43.19	80.67	63.51	7
4	IC038256	66.00	48.73	93.97	69.57	2
5	IC038373	60.67	42.87	60.07	54.53	11
6	IC038378	68.33	55.87	72.97	65.72	5
7	Shimla-A-1	71.00	38.07	89.67	66.25	4
8	Shimla-A-2	67.67	46.53	84.73	66.31	3
9	Shimla-A-3	68.33	38.40	82.80	63.18	8
AVT-I						
10	VL-101	45.33	37.40	63.80	48.84	14
11	VL-102	52.67	40.20	58.17	50.34	13
12	Annapurna (C)	61.00	47.13	86.70	64.94	6
13	Durga (C)	52.33	39.40	68.57	53.43	12
14	PRA 3 (C)	64.00	49.53	67.07	60.20	10
	Mean	61.41	45.14	77.27	61.60	
	CD (0.05)	16.27		1.91		
	CV (%) Error	15.75		1.47		

Table 7. No. of fingers per inflorescence in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Mean	Rank
IVT					
1	AMHP-1	68.67	31.80	50.23	8
2	IC038129		34.40	34.40	14
3	IC038192	62.67	25.40	44.03	12
4	IC038256	79.33	40.20	59.77	1
5	IC038373	82.33	25.20	53.77	6
6	IC038378	72.67	36.30	54.48	4
7	Shimla-A-1	67.00	23.40	45.20	10
8	Shimla-A-2	58.33	24.50	41.42	13
9	Shimla-A-3	76.67	26.40	51.53	7
AVT-I					
10	VL-101	65.00	24.60	44.80	11
11	VL-102	71.00	28.40	49.70	9
12	Annapurna (C)	74.67	40.30	57.48	3
13	Durga (C)	79.67	28.60	54.13	5
14	PRA 3 (C)	73.67	44.60	59.13	2
	Mean	71.67	31.01	50.01	
	CD (0.05)	24.39			
	CV (%) Error	20.23			

Table 8. Seed weight (g/10ml) in Initial and Advanced Varietal Trials (IVT & AVT) on grain amaranth: Kharif 2013 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	AMHP-1	10.00	10.05	8.38	9.48	3
2	IC038129		10.07	8.41	9.24	6
3	IC038192	8.00	11.00	7.69	8.90	11
4	IC038256	8.67	11.02	7.83	9.17	8
5	IC038373	9.33	11.01	8.02	9.45	4
6	IC038378	8.67	11.03	7.92	9.21	7
7	Shimla-A-1	8.00	10.07	8.29	8.79	12
8	Shimla-A-2	8.67	10.06	8.31	9.01	9
9	Shimla-A-3	9.33	11.02	8.69	9.68	1
AVT-I						
10	VL-101	9.33	10.09	7.44	8.95	10
11	VL-102	10.00	10.07	8.48	9.52	2
12	Annapurna (C)	8.67	11.03	8.24	9.31	5
13	Durga (C)	7.33	10.09	8.20	8.54	14
14	PRA 3 (C)	6.67	11.05	8.33	8.68	13
	Mean	8.67	10.55	8.16	9.14	
	CD (0.05)	1.70		0.41		
	CV (%) Error	11.64		3.00		

Table 9. Performance of buckwheat entries in Initial and Advanced Varietal Trials (IVT & AVT) during Kharif 2013 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 100 seed (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check			
				Mean	Location	Rank	Himpriya	PRB-1	Shimla-B-1	VL-7
IVT										
1	EC288737	97.89	2.54	2.85	3	13	-45.61	-1.25	-61.84	-17.23
2	EC323730	96.67	2.59	5.22	3	3	-0.45	80.73	-30.17	51.48
3	IC108514	102.55	1.99	3.04	3	10	-42.14	5.05	-59.41	-11.95
4	IC014889	105.22	1.95	3.35	3	9	-36.08	16.05	-55.16	-2.74
5	IC202226	97.61	2.19	2.81	3	14	-46.41	-2.71	-62.41	-18.45
6	Sangla-B-301	104.44	2.21	3.54	3	7	-32.46	22.63	-52.62	2.78
7	Shillong-1	98.28	1.82	3.69	3	6	-29.75	27.54	-50.72	6.89
8	Shimla-B-1	104.94	2.14	3.81	3	4	-27.30	31.99	-49.00	10.62
9	Shimla-B-2	98.28	2.40	3.71	3	5	-29.27	28.41	-50.38	7.63
10	Shimla-B-3	99.33	2.24	2.32	3	15	-55.88	-19.89	-69.05	-32.86
AVT-I										
11	Sangla B-214	100.89	2.26	2.86	3	12	-45.57	-1.18	-61.82	-17.18
12	Himpriya (C)	113.33	1.90	5.25	3	2	-	81.55	-29.85	52.17
13	PRB-1 (C)	108.72	2.12	2.89	3	11	-44.92	-	-61.36	-16.19
14	Shimla-B-1 (C)	73.33	2.00	7.48	3	1	42.55	158.81	-	116.92
15	VL-7 (C)	68.94	2.75	3.45	3	8	-34.28	19.31	-53.90	-
Mean		98.03	2.21	3.75						

Table 10. Grain yield (q/ha) in Initial and Advanced Varietal Trials (IVT & AVT) on buckwheat: Kharif 2013(Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank	Location	Frequency
IVT								
1	EC288737	3.52	1.76	3.28	2.85	13	3	0/3
2	EC323730	8.70	1.66	5.31	5.22	3	3	0/3
3	IC108514	5.65	1.65	1.81	3.04	10	3	0/3
4	IC014889	2.50	1.68	5.88	3.35	9	3	1/3
5	IC202226	4.26	1.54	2.63	2.81	14	3	0/3
6	Sangla-B-301	6.20	1.65	2.77	3.54	7	3	0/3
7	Shillong-1	8.61	1.33	1.12	3.69	6	3	0/3
8	Shimla-B-1	7.32	1.39	2.73	3.81	4	3	0/3
9	Shimla-B-2	7.13	1.27	2.73	3.71	5	3	0/3
10	Shimla-B-3	2.82	1.44	2.68	2.32	15	3	0/3
AVT-I								
11	Sangla B-214	3.70	1.39	3.48	2.86	12	3	0/3
12	Himpriya (C)	6.85	3.62	5.27	5.25	2	3	
13	PRB-1 (C)	2.80	3.17	2.70	2.89	11	3	
14	Shimla-B-1 (C)	14.63	2.70	5.11	7.48	1	3	
15	VL-7 (C)	8.06	1.62	0.67	3.45	8	3	
	Mean	6.18	1.86	3.21	3.75			
	CD(0.05)	1.93	0.32	0.13				
	CV(%) Error	4.84	10.26	2.47				

Table 11. Plant height (cm) in Initial and Advanced Varietal Trials (IVT & AVT) on buckwheat: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	EC288737	147.00	142.07	113.95	134.34	5
2	EC323730	143.67	134.67	131.95	136.76	3
3	IC108514	142.67	72.60	67.10	94.12	14
4	IC014889	129.33	115.93	92.62	112.63	10
5	IC202226	150.33	150.53	144.73	148.53	1
6	Sangla-B-301	134.00	99.07	81.90	104.99	12
7	Shillong-1	143.67	82.63	90.95	105.75	11
8	Shimla-B-1	153.33	96.33	92.40	114.02	9
9	Shimla-B-2	142.67	147.67	112.02	134.12	6
10	Shimla-B-3	152.00	143.53	114.02	136.52	4
AVT-I						
11	Sangla B-214	142.67	81.67	73.32	99.22	13
12	Himpriya (C)	140.00	79.07	58.00	92.36	15
13	PRB-1 (C)	151.67	131.67	114.17	132.50	7
14	Shimla-B-1 (C)	175.67	126.33	128.75	143.58	2
15	VL-7 (C)	112.33	135.67	116.65	121.55	8
	Mean	144.07	115.96	102.17	120.73	
	CD(0.05)	16.24		1.80		
	CV(%) Error	8.45		1.05		

Table 12. Days to 50% flowering in Initial and Advanced Varietal Trials (IVT & AVT) on buckwheat:Kharif 2013(Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	EC288737	24.33	45.67	51.00	40.33	6
2	EC323730	23.00	43.67	51.67	39.45	2
3	IC108514	36.00	46.33	63.00	48.44	14
4	IC014889	37.00	44.00	64.00	48.33	13
5	IC202226	26.00	42.67	51.67	40.11	4
6	Sangla-B-301	36.33	48.67	58.00	47.67	11
7	Shillong-1	34.00	45.67	54.33	44.67	8
8	Shimla-B-1	38.00	45.33	55.67	46.33	9
9	Shimla-B-2	24.67	43.00	53.00	40.22	5
10	Shimla-B-3	26.67	44.67	51.67	41.00	7
AVT-I						
11	Sangla B-214	36.67	43.33	59.33	46.44	10
12	Himpriya (C)	36.00	58.33	63.33	52.55	15
13	PRB-1 (C)	29.00	52.67	61.67	47.78	12
14	Shimla-B-1 (C)	34.00	36.67	48.00	39.56	3
15	VL-7 (C)	21.00	28.67	45.67	31.78	1
	Mean	30.84	44.62	55.47	43.64	
	CD(0.05)	0.89		2.95		
	CV(%) Error	1.01		3.17		

Table 13. Days to maturity in Initial and Advanced Varietal Trials (IVT & AVT) on buckwheat: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank	Location	Frequency
IVT								
1	EC288737	63.33	120.33	110.00	97.89	5	3	0/3
2	EC323730	60.00	117.33	112.67	96.67	3	3	0/3
3	IC108514	73.33	122.33	112.00	102.55	10	3	0/3
4	IC014889	85.67	119.00	111.00	105.22	13	3	0/3
5	IC202226	64.00	116.50	112.33	97.61	4	3	0/3
6	Sangla-B-301	70.67	124.33	118.33	104.44	11	3	0/3
7	Shillong-1	69.33	121.50	104.00	98.28	6	3	0/3
8	Shimla-B-1	80.67	119.50	114.67	104.94	12	3	0/3
9	Shimla-B-2	62.67	117.50	114.67	98.28	6	3	0/3
10	Shimla-B-3	66.67	119.33	112.00	99.33	8	3	0/3
AVT-I								
11	Sangla B-214	70.33	118.33	114.00	100.89	9	3	0/3
12	Himpriya (C)	86.00	128.33	125.67	113.33	15	3	
13	PRB-1 (C)	68.67	126.50	131.00	108.72	14	3	
14	Shimla-B-1 (C)	62.67	65.33	92.00	73.33	2	3	
15	VL-7 (C)	55.00	58.50	93.33	68.94	1	3	
	Mean	69.27	112.98	111.84	98.03			
	CD(0.05)	4.16		4.69				
	CV(%) Error	3.13		2.50				

Table 14.100 seed weight (g) in Initial and Advanced Varietal Trials (IVT & AVT) on buckwheat: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Ranichauri	Shimla	Mean	Rank
IVT						
1	EC288737	2.05	2.90	2.66	2.54	3
2	EC323730	2.44	3.00	2.34	2.59	2
3	IC108514	1.67	2.70	1.59	1.99	12
4	IC014889	1.40	2.40	2.05	1.95	13
5	IC202226	1.88	2.60	2.07	2.19	8
6	Sangla-B-301	1.81	2.90	1.92	2.21	7
7	Shillong-1	1.39	2.70	1.38	1.82	15
8	Shimla-B-1	1.75	2.80	1.89	2.14	9
9	Shimla-B-2	2.26	2.60	2.34	2.40	4
10	Shimla-B-3	1.99	2.50	2.23	2.24	6
AVT-I						
11	Sangla B-214	1.75	3.20	1.82	2.26	5
12	Himpriya (C)	1.50	2.50	1.70	1.90	14
13	PRB-1 (C)	1.61	2.80	1.96	2.12	10
14	Shimla-B-1 (C)	1.73	2.90	1.38	2.00	11
15	VL-7 (C)	2.67	3.00	2.59	2.75	1
	Mean	1.86	2.77	2.00	2.21	
	CD(0.05)	0.27		0.11		
	CV(%) Error	1.23		3.21		

Table 15. Performance of rice bean entries in Initial and Advanced Varietal Trials (IVT & AVT) during Kharif 2013 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 100 seed (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check			
				Mean	Location	Rank	PRR-1	PRR-2	RBL-6	VRB-3
IVT										
1	IC007537-C	133.83	7.74	11.08	6	13	0.32	18.24	8.01	-17.45
2	IC018563	135.50	7.72	13.57	6	3	22.86	44.81	32.28	1.10
3	IC019336	133.47	7.17	11.54	6	10	4.48	23.14	12.48	-14.03
4	IC019781	135.89	7.68	13.48	6	4	22.04	43.84	31.39	0.42
5	IC026973	134.58	7.63	13.79	6	2	24.89	47.20	34.46	2.77
6	LRB-545	135.17	7.31	9.84	6	18	-10.89	5.03	-4.06	-26.68
7	LRB-553	133.08	7.04	11.32	6	12	2.45	20.75	10.30	-15.70
8	LRB-554	133.19	7.40	11.07	6	14	0.24	18.15	7.92	-17.51
9	RBHP-102	131.92	7.62	12.65	6	7	14.57	35.04	23.35	-5.72
10	RBHP-105	130.36	7.98	14.30	6	1	29.51	52.64	39.43	6.57
11	Shillong RB-1	144.10	8.74	7.03	6	20	-36.34	-24.97	-31.47	-47.62
12	Shimla RB-1	133.39	7.31	12.40	6	8	12.25	32.30	20.85	-7.64
13	Shimla RB-2	136.06	7.11	12.09	6	9	9.45	29.00	17.84	-9.94
AVT-I										
14	IC395028	136.95	7.97	9.90	6	17	-10.34	5.68	-3.47	-26.22
15	LRB-479	136.78	7.60	13.08	6	6	18.45	39.61	27.52	-2.54
16	RBHP-038	127.72	7.30	11.41	6	11	3.35	21.81	11.26	-14.96
17	PRR-1 (C)	133.47	7.44	11.05	6	15	-	17.87	7.66	-17.71
18	PRR-2 (C)	133.95	7.59	9.37	6	19	-15.16	-	-8.66	-30.19
19	RBL-6 (C)	129.72	7.34	10.26	6	16	-7.12	9.48	-	-23.57
20	VRB-3 (C)	130.95	7.38	13.42	6	5	21.53	43.24	30.84	-
Mean		134.00	7.55	11.63						

Table 16. Grain yield (q/ha) in Initial and Advanced Varietal Trials (IVT & AVT) on rice bean: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Bhowali	Palampur	Ranichuari	Shillong	Shimla	Mean	Rank	Location	Frequency
IVT											
1	IC007537-C	11.04	14.01	8.88	2.60	10.71	19.24	11.08	13	6	0/6
2	IC018563	10.08	15.50	8.70	2.49	12.46	32.19	13.57	3	6	0/6
3	IC019336	10.74	14.00	9.07	3.38	9.26	22.79	11.54	10	6	0/6
4	IC019781	11.26	15.40	14.07	3.36	9.18	27.60	13.48	4	6	1/6
5	IC026973	11.52	14.30	10.92	2.76	15.53	27.74	13.79	2	6	0/6
6	LRB-545	11.52	8.00	7.57	3.33	7.07	21.57	9.84	18	6	0/6
7	LRB-553	12.65	9.33	8.70	2.77	14.53	19.91	11.32	12	6	0/6
8	LRB-554	16.41	9.83	7.13	2.59	5.45	25.03	11.07	14	6	0/6
9	RBHP-102	12.13	12.00	14.81	2.72	13.42	20.84	12.65	7	6	1/6
10	RBHP-105	20.48	13.33	15.55	3.23	7.41	25.82	14.30	1	6	2/6
11	Shillong RB-1	0.00	7.17	6.75	2.72	16.16	9.39	7.03	20	6	1/6
12	Shimla RB-1	10.56	10.00	11.30	2.45	7.88	32.20	12.40	8	6	0/6
13	Shimla RB-2	13.28	10.33	11.11	2.30	11.66	23.85	12.09	9	6	0/6
AVT-I											
14	IC395028	9.30	12.00	8.05	2.62	8.68	18.78	9.90	17	6	0/6
15	LRB-479	18.04	11.50	8.15	3.47	7.73	29.61	13.08	6	6	0/6
16	RBHP-038	10.93	12.33	15.83	2.77	9.51	17.12	11.41	11	6	0/6
17	PRR-1 (C)	13.04	9.17	7.41	4.45	13.62	18.59	11.05	15	6	
18	PRR-2 (C)	11.69	10.67	11.61	4.67	4.46	13.13	9.37	19	6	
19	RBL-6 (C)	12.24	13.33	7.78	4.42	9.07	14.71	10.26	16	6	
20	VRB-3 (C)	17.46	9.17	12.22	3.60	5.56	32.52	13.42	5	6	
Mean		12.22	11.57	10.28	3.14	9.97	22.63	11.63			
CD(0.05)		2.92	6.18	1.05	0.17	1.95	2.03				
CV(%) Error		5.21	33.40	6.38	3.47	12.20	5.62				

Table 17. Plant height (cm) in Initial and Advanced Varietal Trials (IVT & AVT) on rice bean: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Bhowali	Palampur	Ranichuari	Shillong	Shimla	Mean	Rank
IVT									
1	IC007537-C	120.33	168.33	60.90	88.67	69.59	204.92	118.79	9
2	IC018563	115.67	174.20	64.47	89.67	115.61	190.30	124.99	4
3	IC019336	124.33	159.00	56.27	79.33	64.32	171.93	109.20	17
4	IC019781	109.67	191.07	59.47	68.33	129.20	147.92	117.61	11
5	IC026973	128.67	173.93	66.83	87.67	106.64	192.25	126.00	3
6	LRB-545	118.33	124.67	60.00	92.33	104.38	170.45	111.69	15
7	LRB-553	107.33	84.40	56.00	87.67	117.16	158.93	101.92	20
8	LRB-554	125.67	145.13	54.80	53.33	114.98	147.12	106.84	19
9	RBHP-102	140.00	158.60	54.20	91.67	107.89	196.03	124.73	6
10	RBHP-105	114.67	179.33	53.23	92.33	126.04	183.12	124.79	5
11	Shillong RB-1	125.00	202.20	52.97	80.27	150.10	164.78	129.22	1
12	Shimla RB-1	102.00	137.40	65.70	77.80	94.88	206.20	114.00	13
13	Shimla RB-2	109.00	181.33	63.77	78.80	130.15	205.12	128.03	2
AVT-I									
14	IC395028	111.33	179.67	53.27	99.33	101.81	165.40	118.47	10
15	LRB-479	129.67	144.87	53.33	99.33	105.99	198.43	121.94	8
16	RBHP-038	116.00	165.03	57.73	102.67	136.07	165.48	123.83	7
17	PRR-1 (C)	119.67	126.33	59.90	105.33	66.23	170.47	107.99	18
18	PRR-2 (C)	98.33	132.73	63.40	107.67	78.83	182.25	110.54	16
19	RBL-6 (C)	110.67	143.33	62.50	97.33	88.70	170.58	112.19	14
20	VRB-3 (C)	122.67	133.67	59.20	85.67	87.85	199.23	114.71	
	Mean	117.45	155.26	58.90	88.26	104.82	179.55	117.37	
	CD(0.05)	24.88	41.31	3.06		37.38	2.29		
	CV(%) Error	14.35	16.63	3.25		22.28	0.80		

Table 18. Days to 50% flowering in Initial and Advanced Varietal Trials (IVT & AVT) on rice bean: Kharif 2013(Hills)

S. No.	Genotypes	Almora	Bhowali	Palampur	Ranichuari	Shillong	Shimla	Mean	Rank
IVT									
1	IC007537-C	56.67	68.67	64.00	87.33	49.33	87.67	68.94	1
2	IC018563	58.33	67.33	73.00	85.67	52.00	88.33	70.78	7
3	IC019336	57.67	66.33	79.67	86.33	48.67	91.00	71.61	8
4	IC019781	57.67	68.67	65.00	88.67	46.33	89.67	69.33	2
5	IC026973	56.33	69.67	80.00	88.67	52.33	88.00	72.50	10
6	LRB-545	55.00	68.33	67.00	87.67	50.33	87.67	69.33	2
7	LRB-553	56.67	66.67	76.67	85.67	53.00	82.33	70.17	6
8	LRB-554	55.67	68.00	79.00	86.33	48.00	80.33	69.56	4
9	RBHP-102	59.00	71.67	69.33	85.33	57.33	95.33	73.00	13
10	RBHP-105	59.00	69.67	69.67	90.67	57.67	94.00	73.45	15
11	Shillong RB-1	64.67	71.33	81.33	88.67	57.33	97.00	76.72	20
12	Shimla RB-1	56.67	67.00	78.67	87.33	57.67	94.33	73.61	16
13	Shimla RB-2	58.00	70.33	69.67	90.67	54.67	92.33	72.61	11
AVT-I									
14	IC395028	65.00	72.00	79.33	87.67	59.33	92.00	75.89	19
15	LRB-479	60.67	72.67	77.33	90.67	56.67	94.00	75.33	18
16	RBHP-038	57.33	68.33	80.33	89.67	46.67	95.67	73.00	14
17	PRR-1 (C)	56.33	66.33	65.67	86.67	46.67	98.00	69.95	5
18	PRR-2 (C)	54.67	69.33	70.00	87.67	49.33	99.00	71.67	9
19	RBL-6 (C)	58.33	71.00	81.00	85.67	46.33	95.00	72.89	12
20	VRB-3 (C)	56.33	69.33	80.00	88.67	52.33	95.33	73.67	17
	Mean	58.00	69.13	74.33	87.79	52.10	91.85	72.20	
	CD(0.05)	2.87	3.65	2.10		2.89	1.57		
	CV(%) Error	2.35	3.30	1.77		3.46	1.07		

Table 19. Days to maturity in Initial and Advanced Varietal Trials (IVT & AVT) on rice bean: Kharif 2013(Hills)

S. No.	Genotypes	Almora	Bhowali	Palampur	Ranichuari	Shillong	Shimla	Mean	Rank	Location	Frequency
IVT											
1	IC007537-C	101.67	135.00	134.67	170.33	103.00	158.33	133.83	11	6	1/6
2	IC018563	105.00	135.00	136.00	170.67	107.67	158.67	135.50	15	6	0/6
3	IC019336	100.67	133.17	132.33	169.67	113.33	151.67	133.47	9	6	0/6
4	IC019781	105.00	135.00	127.00	173.67	113.33	161.33	135.89	16	6	0/6
5	IC026973	97.33	129.50	132.00	175.67	116.33	156.67	134.58	13	6	0/6
6	LRB-545	96.00	131.00	137.67	172.67	114.00	159.67	135.17	14	6	0/6
7	LRB-553	94.67	129.50	130.00	168.67	116.00	159.67	133.08	6	6	1/6
8	LRB-554	97.33	129.50	130.67	170.33	118.00	153.33	133.19	7	6	0/6
9	RBHP-102	102.33	140.87	107.33	169.33	116.33	155.33	131.92	5	6	1/6
10	RBHP-105	104.00	128.83	106.33	173.67	112.67	156.67	130.36	3	6	0/6
11	Shillong RB-1		151.17	129.33	172.67	110.00	157.33	144.10	20	5	0/5
12	Shimla RB-1	97.00	127.67	137.00	171.33	114.67	152.67	133.39	8	6	0/6
13	Shimla RB-2	105.67	134.67	134.67	174.67	112.67	154.00	136.06	17	6	0/6
AVT-I										0	0/0
14	IC395028	109.67	138.33	129.67	172.67	114.67	156.67	136.95	19	6	0/6
15	LRB-479	103.33	130.67	135.33	176.67	118.00	156.67	136.78	18	6	0/6
16	RBHP-038	101.67	130.67	105.67	174.67	102.33	151.33	127.72	1	6	2/6
17	PRR-1 (C)	95.33	133.17	135.67	170.67	109.67	156.33	133.47	9	6	0/6
18	PRR-2 (C)	97.67	135.00	131.33	172.67	108.67	158.33	133.95	12	6	0/6
19	RBL-6 (C)	100.67	135.00	108.00	169.67	114.00	151.00	129.72	2	6	0/6
20	VRB-3 (C)	101.33	131.00	108.33	175.67	116.67	152.67	130.95	4	6	0/6
Mean		100.86	133.74	126.45	172.30	112.60	155.92	134.00			
CD(0.05)		6.01	8.56	2.27		4.02	4.29				
CV(%) Error		3.84	4.00	1.12		2.23	1.72				

Table 20. 100 seed weight (g) in Initial and Advanced Varietal Trials (IVT & AVT) on rice bean: Kharif 2013 (Hills)

S. No.	Genotypes	Almora	Bhowali	Palampur	Ranichuari	Shillong	Shimla	Mean	Rank
IVT									
1	IC007537-C	5.90	7.80	8.77	7.80	7.11	7.23	7.74	4
2	IC018563	5.98	8.42	8.37	7.40	7.35	7.06	7.72	5
3	IC019336	5.67	6.98	7.48	8.10	6.96	6.33	7.17	18
4	IC019781	5.77	7.86	8.07	7.20	7.95	7.33	7.68	6
5	IC026973	5.45	7.97	7.93	8.30	7.02	6.94	7.63	7
6	LRB-545	5.14	6.86	8.24	8.60	6.67	6.20	7.31	15
7	LRB-553	4.90	6.64	7.45	6.80	7.69	6.61	7.04	20
8	LRB-554	5.32	7.13	7.72	8.00	8.13	6.01	7.40	12
9	RBHP-102	5.80	7.79	8.40	7.30	7.75	6.86	7.62	8
10	RBHP-105	6.05	8.10	8.77	7.90	7.52	7.62	7.98	2
11	Shillong RB-1	0.00	10.41	8.30	7.50	9.12	8.37	8.74	1
12	Shimla RB-1	5.00	6.79	8.66	7.60	7.23	6.26	7.31	16
13	Shimla RB-2	4.87	7.12	7.99	8.20	6.13	6.13	7.11	19
AVT-I									
14	IC395028	6.61	8.08	9.40	6.90	7.82	7.67	7.97	3
15	LRB-479	5.94	8.09	8.52	8.00	6.41	6.98	7.60	9
16	RBHP-038	4.99	7.38	8.44	7.70	6.80	6.17	7.30	17
17	PRR-1 (C)	4.97	6.58	7.92	8.30	7.21	7.20	7.44	11
18	PRR-2 (C)	5.30	7.03	8.23	8.60	7.52	6.54	7.59	10
19	RBL-6 (C)	5.41	7.35	6.77	8.90	7.36	6.30	7.34	14
20	VRB-3 (C)	5.63	7.74	7.00	8.50	6.75	6.90	7.38	13
	Mean	5.23	7.61	8.12	7.88	7.33	6.83	7.55	
	CD(0.05)	0.59	0.93	0.72		0.19	0.63		
	CV(%) Error	1.61	7.60	5.51		1.65	5.80		

Table 21. Performance of Faba bean entries in Initial and Advanced Varietal Trial (IVT & AVT) during rabi 2012-13 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 100 seed (g)	Mean seed yield over locations (q/ha)			Percent increase / decrease over check	
				Mean	Location	Rank	Vikrant	Local
IVT								
1	HB-193	158.50	32.40	10.56	2	14	-22.95	-62.94
2	HB-194	156.50	31.50	14.99	2	10	9.39	-47.38
3	HB-195	162.50	30.18	15.26	2	9	11.40	-46.41
4	HB-212	169.50	29.90	12.97	2	12	-5.33	-54.46
5	HB-214	167.50	30.85	16.55	2	6	20.79	-41.89
6	HPFB-2	156.00	36.53	30.56	2	2	123.03	7.29
AVT-I								
7	HB-82	167.00	29.75	9.95	2	15	-27.35	-65.05
8	HB-122	169.50	28.80	15.94	2	7	16.36	-44.03
9	HB-184	161.00	31.35	12.14	2	13	-11.37	-57.36
10	HB-186	159.50	29.60	15.40	2	8	12.41	-45.92
11	NDF-10	167.50	31.05	21.81	2	5	59.16	-23.44
AVT-II								
12	HB-73	161.50	30.88	25.84	2	4	88.58	-9.29
13	HPFB-1	157.50	35.60	31.95	2	1	133.18	12.17
14	Vikrant (c)	165.50	29.70	13.70	2	11	-	-51.91
15	Local (c)	161.00	30.45	28.48	1	3	107.85	-
Mean		162.70	31.24	18.40				

Table 22. Grain yield (q/ha) in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
IVT							
1	HB-193	15.42	5.70	10.56	14	2	0/2
2	HB-194	24.17	5.81	14.99	10	2	0/2
3	HB-195	25.00	5.52	15.26	9	2	0/2
4	HB-212	21.26	4.68	12.97	12	2	0/2
5	HB-214	27.78	5.32	16.55	6	2	1/2
6	HPFB-2	30.56		30.56	2	2	0/2
AVT-I							
7	HB-82	15.28	4.63	9.95	15	2	0/2
8	HB-122	26.39	5.49	15.94	7	2	0/2
9	HB-184	18.89	5.40	12.14	13	2	0/2
10	HB-186	25.56	5.25	15.40	8	2	0/2
11	NDF-10	21.81		21.81	5	2	0/2
AVT-II							
12	HB-73	25.84	-	25.84	4	2	0/2
13	HPFB-1	31.95	-	31.95	1	2	0/2
14	Vikrant (c)	21.53	5.87	13.70	11	2	
15	Local (c)	28.48	-	28.48	3	1	
	Mean	23.99	5.37	18.40			
	CD (0.05)	4.11	3.97				
	CV (%) Error	10.71	0.97				

Table 23. Plant height (cm) in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
IVT					
1	HB-193	115.50	39.87	115.50	3
2	HB-194	110.00	45.63	110.00	9
3	HB-195	116.25	49.07	116.25	2
4	HB-212	107.75	42.30	107.75	12
5	HB-214	114.75	47.27	114.75	5
6	HPFB-2	115.50		115.50	3
AVT-I					
7	HB-82	118.75	37.73	118.75	1
8	HB-122	112.50	42.20	112.50	6
9	HB-184	106.75	47.07	106.75	15
10	HB-186	107.50	42.60	107.50	13
11	NDF-10	109.25		109.25	10
AVT-II					
12	HB-73	107.00	-	107.00	14
13	HPFB-1	111.00	-	111.00	8
14	Vikrant (c)	111.25	4.80	111.25	7
15	Local (c)	108.00	-	108.00	11
Mean		111.45	39.85	111.45	
CD (0.05)		3.20			
CV (%) Error		1.79			

Table 24. Days to 50% flowering in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
IVT					
1	HB-193	67.00	86.33	67.00	12
2	HB-194	66.00	82.67	66.00	11
3	HB-195	65.00	79.33	65.00	7
4	HB-212	64.75	84.33	64.75	5
5	HB-214	64.75	80.67	64.75	5
6	HPFB-2	63.00		63.00	3
AVT-I					
7	HB-82	63.25	83.67	63.25	4
8	HB-122	65.50	88.67	65.50	9
9	HB-184	65.50	79.33	65.50	9
10	HB-186	62.25	86.67	62.25	1
11	NDF-10	65.00		65.00	7
AVT-II					
12	HB-73	67.00	-	67.00	12
13	HPFB-1	67.25	-	67.25	14
14	Vikrant (c)	62.75	85.33	62.75	2
15	Local (c)	68.00	-	68.00	15
	Mean	65.13	83.70	65.13	
	CD (0.05)	1.98			
	CV (%) Error	1.90			

Table 25. Days to maturity in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
IVT							
1	HB-193	158.50	171.33	158.50	4	2	1/2
2	HB-194	156.50	167.67	156.50	2	2	0/2
3	HB-195	162.50	164.33	162.50	9	2	0/2
4	HB-212	169.50	169.33	169.50	14	2	0/2
5	HB-214	167.50	165.67	167.50	12	2	0/2
6	HPFB-2	156.00		156.00	1	2	1/2
AVT-I							
7	HB-82	167.00	168.67	167.00	11	2	0/2
8	HB-122	169.50	173.67	169.50	14	2	0/2
9	HB-184	161.00	164.33	161.00	6	2	0/2
10	HB-186	159.50	171.67	159.50	5	2	1/2
11	NDF-10	167.50		167.50	12	2	0/2
AVT-II							
12	HB-73	161.50	-	161.50	8	2	0/2
13	HPFB-1	157.50	-	157.50	3	2	0/2
14	Vikrant (c)	165.50	170.33	165.50	10	2	
15	Local (c)	161.00	-	161.00	6	1	
	Mean	162.70	168.70	162.70			
	CD (0.05)	1.52					
	CV (%) Error	0.58					

Table 26. Pod yield (q/ha) in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
IVT					
1	HB-193	86.25	7.29	86.25	10
2	HB-194	84.72	6.36	84.72	12
3	HB-195	100.56	6.00	100.56	5
4	HB-212	100.97	7.33	100.97	4
5	HB-214	105.85	6.84	105.85	3
6	HPFB-2	109.72		109.72	2
AVT-I					
7	HB-82	88.19	7.51	88.19	9
8	HB-122	73.61	7.28	73.61	15
9	HB-184	90.42	6.87	90.42	8
10	HB-186	75.00	7.19	75.00	13
11	NDF-10	95.28		95.28	7
AVT-II					
12	HB-73	85.56	-	85.56	11
13	HPFB-1	118.06	-	118.06	1
14	Vikrant (c)	74.86	7.27	74.86	14
15	Local (c)	95.83	-	95.83	6
	Mean	92.32	6.99	92.32	
	CD (0.05)	12.97	4.53		
	CV (%) Error	8.78	9.19		

Table 27. 100 seed weight (g) in Initial and Advanced Varietal Trial (IVT & AVT) on Faba bean: Rabi 2012-13 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
IVT					
1	HB-193	32.40	26.40	32.40	3
2	HB-194	31.50	27.20	31.50	4
3	HB-195	30.18	25.30	30.18	10
4	HB-212	29.90	26.20	29.90	11
5	HB-214	30.85	24.60	30.85	8
6	HPFB-2	36.53		36.53	1
AVT-I					
7	HB-82	29.75	29.30	29.75	12
8	HB-122	28.80	27.30	28.80	15
9	HB-184	31.35	27.50	31.35	5
10	HB-186	29.60	28.30	29.60	14
11	NDF-10	31.05		31.05	6
AVT-II					
12	HB-73	30.88	-	30.88	7
13	HPFB-1	35.60	-	35.60	2
14	Vikrant (c)	29.70	26.20	29.70	13
15	Local (c)	30.45	-	30.45	9
	Mean	31.24	26.83	31.24	
	CD (0.05)	0.98			
	CV (%) Error	1.96			

GERMPLASM EVALUATION

III. GERmplasm EVALUATION

3.1 HILLS

Multilocational germplasm screening nurseries were planned to be conducted on grain amaranth, buckwheat, chenopods, faba bean, adzuki bean, *Coix* and *Perilla*. The germplasm accessions were evaluated in augmented design with standard check cultivars.

3.1.1 GRAIN AMARANTH (*Amaranthus* spp.)

Germplasm screening nursery consisting of 50 accessions supplied by NBPGR, Shimla was planned to be evaluated at four locations viz. Ranichauri, Sangla, Almora and Shimla. The results were received from all locations. The checks used were PRA 2, PRA 3, Annapurna and Durga. The list of promising lines for all the characters has been presented in Table 73 and the range and means in Table 75.

At UUFH, Ranichauri a set of 50 genotypes alongwith four checks were evaluated for 8 characters. The longest inflorescence (82.40 cm) was recorded in the genotype IC423466 followed by IC042402 (77.40 cm). The check variety Durga was found earlier in flowering (61.40 days) and maturity (116.80 days) as compare to other genotype. The maximum plant height was observed in the entry IC095250 (206.80 cm) followed by IC519523 (194.80 cm). The genotype IC095308 was observed as the highest yield per plant with 116.67 g.

A set of 50 genotypes and four checks were screened at NBPGR, Shimla for 10 quantitative and 12 qualitative characters (Table 74). The genotype EC524457 (64.00 days) was earlier to the check variety Durga (64.50 days) for days to 50% flowering while IC095247 was earliest in maturity (134.00 days). Maximum plant height (332.55 cm) was recorded in the IC042353. The longest inflorescence was recorded in the genotype, IC429874 (93.10 cm) followed by IC042421 (92.30 cm). The genotypes IC423466 (130.80 g) and IC093946 (100.20 g) were found superior to the best check variety in respect of grain yield per plant.

A set of 50 genotypes and four checks were screened at Almora for 11 quantitative characters. The genotype IC042356 and IC042357 (42.00 days) were found superior to the check variety for days to 50% flowering. Maximum plant height (177.00 cm) was recorded in the genotype, IC042352. The check variety Durga (30.15 g) was found superior to the genotype in respect of seed yield per plant.

The performance of entries based on adjusted value and average over the locations has been summarized in the following paragraphs:

Significant differences were observed among the accessions for seed yield per plant at all centres. Seed yield per plant (g) was low at Almora (11.18 g) and very high at Shimla (62.97 g). Based on average the genotype IC423466 (80.24 g) was the highest seed yielder followed by genotype IC095247 (75.74 g).

Plant height was the highest at Shimla (289.55 cm) and lowest at Almora (144.29 cm) on the basis of average over the four locations, the entry EC519523 had the highest plant height (226.10 cm).

Flowering time showed considerable variation among the locations and high variation among the accessions within a location. The mean flowering time was the lowest (50.57 days) at Almora while it was the longest (100.55 days) at Shimla. The entry EC524457 showed consistency for early flowering over the locations and ranked first (62.67 days) based on the overall performance.

Maturity period was the earliest at Almora (87.10 days) followed by at Ranichauri (130.64 days). The entry, IC095247 (216.22 days) was earliest maturing line based on average over four locations.

The length of inflorescence of the accessions was the highest at Shimla (76.32 cm) followed by at Almora (54.03 cm). Based on the average over two locations, the entry IC423466 had the longest inflorescence (80.60cm).

Test weight expressed in terms of weight of 1000 seed in g recorded at two centres showed that it was the highest at Shimla (0.75 g) and low at Almora (0.72 g). Based on the average over two locations, the check variety Durga (0.87 g) showed the highest test weight.

3.1.2 BUCKWHEAT (*Fagopyrum* spp.)

A set of 25 accessions was planned to be screened at four locations viz. Shimla, Ranichauri and Almora along with four checks Himpriya, VL 7, PRB 1 and Shimla B-1. The results were received from all locations. The list of promising accessions for all the characters have been presented in Table 76 and mean and range in Table 78.

At NBPGR, Shimla a set of 25 accessions was evaluated for fourteen quantitative characters along with four checks Himpriya, PRB 1, Shimla B-1 and VL-7. The entry, EC256521 was superior to the check variety in flowering (53.00 days). The same set of 25 accessions was also characterized for 10 qualitative traits (Table 77).

A set of 25 genotypes and four checks Himpriya, VL-7, PRB 1 and Shimla B-1 were evaluated at Ranichauri for yield and its related characters. The check variety was superior to the entry VL-7 in flowering (30.50 days) while check variety VL-7 (62.50 days) in maturity. Maximum plant height (118.00 cm) was recorded in the genotype IC026598 while maximum seed yield (6.08 G) was observed in the check variety, PRB-1.

At Almora a set of 25 accessions was evaluated for thirteen quantitative characters along with four checks Himpriya, PRB 1, Shimla B-1 and VL-7. No entry was superior to the check variety in flowering and the maturity entry EC28652 is the earliest (54.00 days). The maximum plant height (160.00 cm) was found in genotype IC026598 while RSR/SKS-41 showed highest seed yield per plant (6.40 g).

The performance of the accessions as compared to the checks over locations viz. Almora, Ranichauri and Shimla has been summarized below.

Significant difference was observed among the entries for seed yield per plant at three locations. Mean seed yield per plant was high at Ranichauri (3.48 g) but very low at Almora (2.34 g). Based on the average over locations, the entry RSR/SKS-41 (4.23 g) was superior to the check variety.

Average plant height of the entries was the highest at Almora (126.06 cm) followed by at Ranichauri (99.69 cm). Based on average over three locations, entry EC321798 was taller than the check variety (166.38 cm).

Flowering time varied from centre to centre but mean flowering time was the earliest at Almora (31.72 days) followed by at Ranichauri (51.43 days). On the basis of average over three locations no accession was found superior to the best check.

Maturity period also showed similar trend to that of the flowering time. Average maturity period was the earliest at Almora (65.30 days) followed by at Ranichauri (115.54 days). On the basis of average over the locations, no entry was found superior to the best check variety.

3.1.3 CHENOPODS (*Chenopodium* spp.)

Twenty five genotypes were planned for screening at three locations viz. Shimla and Ranichauri along with two local checks. Data were received from only two centres. The list of promising lines for all the characters have been presented in Table 79 and mean and range in Table 81.

Twenty five genotypes along with three local checks were evaluated for seven quantitative and eleven qualitative characters at Shimla (Table 80). No entry was significantly superior to the check varieties in flowering and maturity. The entry NIC-2251 (218.63 cm) was recorded for maximum plant height and maximum seed yield per plant was observed in genotype NIC-22500 (39.12 g).

Twenty five genotypes along with three local checks were evaluated for eight quantitative and ten qualitative characters at Shimla. The entry IC415477 (49.00 days) was superior to the check varieties in flowering but IC415477 (113.00 days) was earliest genotype in maturity. The entry IC108819 (328.35 cm) was recorded for maximum plant height and maximum seed yield per plant was observed in genotype NIC-2250 (75.35 g).

Twenty five genotypes along with three local checks were evaluated for eight quantitative and ten qualitative characters at Ranichauri. The entry IC109249 (66.50 days) was superior to the check varieties in flowering but IC415493 (124.10 days) was earliest genotype in maturity. The entry NIC-2252 (137.40 cm) was recorded for maximum plant height and maximum seed yield per plant was observed in genotype NIC-9891 (3.50 g).

The performance of the accessions as compared to the checks over locations viz. Shimla and Ranichauri has been summarized below.

Significant difference was observed among the entries for seed yield per plant at two locations. Mean seed yield per plant was high at Shimla (29.06 g) but very low at Ranichauri (2.98 g). Based on the average over locations, the entry NIC-22500 (39.12 g) was superior to the check variety.

Average plant height of the entries was the highest at Shimla (258.06 cm) followed by at Ranichauri (100.33 cm). Based on average over two locations, entry NIC-2251 was taller than the check variety (218.63 cm).

Mean flowering time was the earliest at Shimla (66.08 days) followed by at Ranichauri (75.48 days). On the basis of average over two locations the entry IC415477 (60.25 days) was found superior to the best check.

Maturity period also showed similar trend to that of the flowering time. Average maturity period was the earliest at Ranichauri (134.29 days) followed by at Shimla (138.76 days). On the basis of average over the locations, the entry IC415477 (120.60 days) was found superior to the best check variety.

3.1.4 RICE BEAN (*Vigna umbellata*)

A set of twenty five genotypes along with four standard checks viz. PRR 1, PRR 2, RBL 1 and RBL 6 were planned for evaluation at six locations viz. Almora, Shimla, Ranichauri, Palampur, Bhowali and Shillong. The results have been received from all centres. The list of promising lines for all characters have been presented in Table 82 and mean and range in Table 84.

A total of 25 genotypes were evaluated for eight yield related characters at Ranichauri. The genotype IC039401 (79.00 days) and IC411730 (160.00 days) was found superior to the check variety in flowering and maturity respectively. Pod length was longest in the entry IC419518 (12.40 cm). Maximum plant height (97.20 cm) was found in the genotype IC524084. Maximum seed yield per plant was recorded in IC524074 (54.80 g) followed by in IC538870 (44.40 g).

A total of 25 genotypes were screened for nine quantitative and nine qualitative (Table 85) characters at Palampur and it was found that IC137189 and IC538983 were early flowering (76.00 days) as compared to check PRR-2 (79.20 days). Early maturity was observed (126.00 days) in genotype IC419602. Highest seed yield per plant (g) was recorded in the genotypes IC419806 and IC524082 (30.00 g) followed by IC394537 (28.00 g).

A set of 25 genotypes was screened for qualitative (Table 83) and quantitative characters at Shimla. The genotype IC097862 (88.00 days) and IC419489 (131.00 days) were superior to check variety in flowering and maturity respectively. Longest pod (15.10 cm) was recorded in the genotype IC524549. Maximum 100 seed weight (9.90 g) was recorded for the genotype IC243512 followed by IC137189 (9.73 g). The highest plant height (205.65 cm) was observed in the genotype IC137189. The genotype IC108864 (104.17 g) was superior to check variety in seed yield per plant (g).

A set of 25 genotypes and four checks were screened for eight quantitative and qualitative characters (Table 83) at Almora. The check PRR-2 was observed to be early in flowering (59.00 days) and maturity (103.00 days). The genotypes IC524074 (18.80 g) and IC394201 (16.00 g) were recorded to have high seed yield per plant. Longest pod was observed in the genotype IC419518 (12.50 cm) followed by IC524549 (11.90 cm). Maximum 100 seed weight was observed in the genotype IC419489 (9.96 g) followed by IC394537 (9.36 g). The maximum plant height (152.00 cm) was found in the genotype IC394201 followed by IC524549 (151.00 cm).

A set of 25 genotypes was screened for eleven quantitative characters at NBPGR, Shillong. The check PRR-1 was observed to be early in flowering (51.00 days) while early maturity in the genotype, IC419489 (116.00 days). Longest pod (10.74 cm) was recorded in the genotype IC421875 followed by IC538983 (10.34 cm). Maximum 100 seed weight (13.24 g) was recorded with the genotype IC524074 followed by IC524549 (12.34 g). The highest plant height (132.65) was observed in the genotype IC421875. The highest seed yield was recorded in IC524074 (12.19 q/ha) followed by IC524549 (12.19 q/ha).

Summary performance of accessions based on average over the locations has been given below:

Seed yield per plant was highest at Shimla (42.21 g) and very low at Almora (8.74 g). On the basis of average over five locations, the entry IC524074 (36.53 g) was superior to check variety PRR-2 (35.71 g).

The mean flowering time was the earliest at Shillong (60.79 days) and delayed at Shimla (95.17 days). Based on the average over five locations, no entry was superior to check variety in flowering.

Maturity period showed wide variation among the locations. The earliest maturity was observed at Almora (108.66 days) while it was late at Ranichauri (168.83 days). On the basis of five locations, the entry IC419489 (127.40 days) was superior to the best check in maturity.

Plant height showed extreme variation ranging from 73.05 cm to 177.68 cm. Plant height was the highest at Shimla (177.68 cm) followed by Shillong (105.57 cm) centre. The lowest plant height was observed at Ranichauri (73.05 cm). Based on the average over six locations, the entry IC524085 (124.86 cm) was the tallest.

100 seed weight (g) recorded at five centres showed that it was the highest at Shillong (9.41 g) and lowest at Palampur (7.20 g). Based on the average over five locations entry IC524074 (9.53 g) showed the highest test weight.

Pod length (cm) showed considerable variation among the locations and ranged from 8.82 cm to 12.09 cm. On the basis of average over five locations, entry IC419518 (11.22 cm) showed the longest pod length.

3.1.5 ADZUKI BEAN (*Vigna angularis*)

A set of 25 accessions supplied by NBPGR, Shimla was planned to be evaluated along with two local checks at three locations viz. NBPGR, Shimla; UUHF, Ranichauri and CSK HPKV, Palampur. Data have been received from all the locations. The list of promising accessions for all the characters has been presented in Table 85 and the mean and range in Table 87.

At Ranichauri twenty five accessions including exotics were evaluated along with check HPU 51 and Totru Local. Early flowering (47.67 days) was recorded in the check Totru Local whereas early maturity (97.67 days) was

recorded in the check Totru Local. Maximum number of pods per plant (10.33 cm) was found in the EC000249. No entry was superior to check variety as the seed yield per plant.

A total of 25 genotypes were evaluated along with checks HPU 51 and Totru Local at NBPGR, Shimla for twelve qualitative (Table 86) and ten quantitative characters. The tallest plant (110.45 cm) was found in the genotype EC015257. Early flowering (56.00 days) was recorded in the genotype, EC015257 whereas early maturity (98.00 days) was recorded in the genotype EC080850. Maximum 100 seed weight (17.65 g) was found in the EC000248. The entry EC340254 was observed as the highest seed yield per plant (45.25 g).

At Palampur twenty five accessions were evaluated along with checks HPU 51 and Totru Local for seven yield related characters and eleven qualitative characters (Table 86). The entry EC095257 (36.67 days) was superior to best check variety in flowering while no entry was early maturing to check variety. The IC030270 was found to be the longest pod length (7.93 cm) followed by genotype EC018257 (7.80 cm). The maximum plant height (77.77 cm) was found in the genotype EC340245 followed by EC018257 (76.23 cm).

The performance of the entries based on three centres (Ranichauri, Shimla and Palampur) has been summarized as under:

Flowering time varied from, 47.67 to 62.67 days at Ranichauri, 36.67 to 74.67 days at Palampur and from 56.00 to 67.00 days at Shimla. Mean flowering time was the earliest at Palampur (46.81 days) followed by at Ranichauri (58.52 days). On the basis of average over three locations, no entry was the earliest in flowering from best check.

Average maturity period was the earliest at Palampur (91.93 days) and longest at Ranichauri (107.30 days). The genotype EC008707 (98.33 days) was superior to the check variety based on average over three locations.

Average plant height was recorded to be the highest at Shimla (71.58 cm) followed by at Palampur (52.07 cm) and Ranichauri (43.17 cm). Based on average over three locations, the EC340245 was the tallest (81.15 cm) entry.

3.1.6 FABIA BEAN (*Vicia faba*)

Germplasm screening nursery consisting of 50 accessions supplied by NBPGR, Shimla was planned to be evaluated at two locations viz. Ranichauri and Palampur. The results were received from Palampur centre (Rabi 2012-13). The list of promising genotypes has been presented in Table 88 and the mean and range in Table 89.

At Palampur, a set of 53 germplasm lines including three checks were evaluated in Rabi 2012-13 for ten quantitative characters and fourteen qualitative character (Table 90). The genotype HB-19 (57.00 days) was early in flowering while EC243608 (158.00 days) was earliest in maturity. Maximum plant height (162.00 cm) was observed in the genotype EC323588. The entry EC117726 (35.50 g) was most superior for 100 seed weight while highest seed yield per plant (12.00 g) was found in genotype EC267648.

At Ranichauri, a set of 53 germplasm lines including three checks were evaluated in Rabi 2012-13 for ten quantitative characters and fourteen qualitative character (Table 90). The genotype HB-18 (77.00 days) was early in flowering while HB-18 (162.00 days) was earliest in maturity. Maximum plant height (86.50 cm) was observed in the genotype EC329681. The entry HB-19 (28.40 g) was most superior for 100 seed weight while highest seed yield per plant (24.40 g) was found in genotype HB-19.

The performance of the entries based on two centres (Ranichauri and Palampur) has been summarized as under:

Mean flowering time was the earliest at Palampur (64.17 days) followed by at Ranichauri (86.13 days). On the basis of average over two locations, the entry HB-18 (68.50 days) was the earliest in flowering from best check.

Average maturity period was the earliest at Palampur (162.03 days) and longest at Ranichauri (171.46 days). The genotype HB-16 (160.50 days) was superior to the check variety based on average over two locations.

Average plant height was recorded to be the highest at Palampur (121.45 cm) followed by at Ranichauri (37.29 cm). Based on average over two locations, the EC329681 was the tallest (100.75 cm) entry.

3.1.7 JOB'S TEAR (*Coix lacryma-jobi*)

Germplasm lines comprising 25 accessions were planned to be evaluated at two locations viz. Shillong and Ranichauri. The results have been received from both the locations. The list of promising genotypes has been presented in Table 91 and the mean and range in Table 92.

Ten yield related characters were recorded at NBPGR, Shillong. The highest seed yield per plant was found to be 38.11 g in the check Pollin. Early flowering was found in the genotype IC360791 (65.33 days) while early maturity in the genotype IC089389 (140.00 days). The highest plant height was found in the genotype IC521340 (297.78 cm) followed by IC416971 (296.67 cm).

Four yield related characters were recorded at UUHF, Ranichauri. The highest seed yield per plant was found to be 4.72 g in the genotype IC417053. Early flowering was found in the genotype IC521340 (72.67 days) while early maturity in the genotype IC203934 (188.33 days). The highest plant height was found in the genotype IC203983 (242.40 cm).

The performance of the entries based on two centres (Ranichauri and Shillong) has been summarized as under:

Mean flowering time was the earliest at Shillong (75.86 days) followed by at Ranichauri (80.10 days). On the basis of average over two locations, the entry IC360791 (65.33 days) was the earliest in flowering from best check.

Average maturity period was the earliest at Shillong (150.70 days) and longest at Ranichauri (191.63 days). The genotype IC089389 (140.00 days) was superior to the check variety based on average over two locations.

Average plant height was recorded to be the highest at Shillong (273.52 cm) followed by at Ranichauri (220.60 cm). Based on average over two locations, the IC416868 was the tallest (283.33 cm) entry.

3.1.8 PERILLA (*Perilla frutescens*)

Germplasm lines comprising 25 accessions were planned to be evaluated at two locations viz. Shillong and Ranichauri. The results have been received from both the locations. The list of promising genotypes has been presented in Table 93 and the mean and range in Table 94.

Twelve yield related characters were recorded at NBPGR, Shillong. The highest seed yield per plant was found to be 16.95 g in the genotype IC526660. Highest inflorescence length was found in the genotype IC521286 (15.77 cm). The highest plant height was found in the genotype IC003942 (159.21 cm) followed by IC521284 (158.53 cm).

Six yield related characters were recorded at UUHF, Ranichauri. The highest seed yield was found to be 4.32 g in the check BDS-165. Early flowering was found in the genotype IC526701 (107.50 days) while early maturity in the genotype IC416861 (113.50 days). The highest plant height was found in the genotype IC526660 (85.40 cm) followed by IC521286 (84.20 cm).

The performance of the entries based on two centres has been summarized as under:

Mean flowering time was varied at both the centres at Ranichauri (116.10 days) and Shillong (129.44 days). On the basis of average over two locations, no entry was earliest in flowering.

Average maturity period also showed same trend as of flowering at Ranichauri (170.96 days) and Shillong (176.06 days). The genotype IC41686 (143.08 days) was superior to the check variety based on average over two locations.

Average plant height was recorded to be the highest at Shillong (133.15 cm) followed by at Ranichauri (63.06 cm). Based on average over two locations, no entry was taller to check variety.

Average seed yield per plant was recorded to be the highest at Shillong (13.25 g) and very low at Ranichauri (3.22 g). Based on average over two locations, the check variety Shillong was the highest seed yielder (16.86 g).

Table 72. Promising lines in grain amaranth germplasm for various characters at various locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Almora (Accessions 50)				
1.	Days to 50% flowering	42.00-62.00	IC042356, IC042357, IC042407, IC095286, IC095316, IC095292, IC095315, IC095250, IC095304, IC094661, IC042353, IC042421, IC043715, IC094656, IC095299, IC095339, IC107144, IC047436, IC095284, EC146543, IC042776-2, IC082625, IC093946, IC095249, IC095253, EC146546, IC042346-6, IC095247, IC095321, IC095334, IC095251, IC095302, IC095322, IC095330 (≤ 52.00 days)	Durga & PRA-3 (52.00 days)
2.	Days to maturity	81.00-98.00	IC094661, IC042356, IC042357, IC043715, IC095247, IC095316 (≤ 83.00 days)	Durga (83.00 days)
3.	Plant height (cm)	105.00-177.00	IC042352, IC095279, IC095247, IC093946, EC519523, IC047434, IC095302, IC042346-6, IC042353, IC082625, IC095299, IC042776-2, IC042987-4, IC095301, EC519556, IC095315 (> 152.00 cm)	Durga (149.50 cm)
4.	Inflorescence length (cm)	39.00-75.00	IC042346-6, IC042352, IC093946, IC095279, IC042353, IC095302, IC095339, IC095299, IC095247, IC095313, IC047434, IC095253, IC095301, IC042356, IC082625, IC095308, IC095334, IC042357, IC095250, IC095315, EC519512, IC042407, IC047436, IC042987-4, IC095249, IC095251, IC095277, IC095304, IC107127, IC107144 (> 53.00 cm)	PRA-2 & PRA-3 (53.50 cm)
5.	Leaf length (cm)	10.40-17.80	IC042352, IC095247 (> 17.50 cm)	Durga (17.30 cm)
6.	Leaf width (cm)	5.30-10.70	IC095247 (=10.70 cm)	Durga (10.45 cm)
7.	Petiole length (cm)	4.60-13.50	IC095247 (=13.50 cm)	Durga (12.80 cm)
8.	Seed yield (q/ha)	-	-	-
9.	1000 seed weight (g)	0.64-0.84	IC095308 (=0.84 g)	Durga (0.83 g)
10.	Seed yield per plant (g)	4.80-30.15	-	Durga (30.15 g)

S. No.	Characters	Range	Promising lines	Value of best check
Ranichauri (Accessions 50)				
1.	Days to 50% flowering	61.40-82.00	-	Durga (61.40 days)
2.	Days to maturity	116.80-137.00	-	Durga (116.80 days)
3.	Plant height (cm)	76.40-206.80	IC095250, EC519523, IC095247, IC093946, IC423466, IC042402, IC095299, IC042415, IC095313, IC043715, IC095279, IC094656, IC095249, IC107127 (> 166.50 cm)	PRA-3 (164.52 cm)
4.	Inflorescence length (cm)	-		
5.	Ear length (cm)	25.20-82.40	IC423466, IC042402, IC042415, IC095250, IC095247, IC427762, IC043715, IC042397, IC095251, IC082625, IC094656, IC095279, IC042353, IC095313, IC042434, IC095308, IC095249, IC095277, IC095315, IC095321 (>55.00 cm)	Durga (53.68 cm)
6.	Finger length (cm)	5.40-26.40	IC095277, IC042415 (> 23.00 cm)	Durga (21.76 cm)
7.	No. of finger per plant	17.00-63.40	IC095313, IC095253, IC095286, IC095304, IC095292, IC095277, IC107144, IC095308, IC095251, IC095302, IC095250, IC095315, EC519512, IC095284, IC095301, IC095334, IC094656, IC095249, IC095322, IC093946 (>47.70)	PRA-3 (47.52)
8.	No. of leaves per plant	23.40-43.20	IC095284, EC519523, IC095292, IC095250, IC095249, IC095277, EC146543, IC042415, IC093946, IC095304, IC095253, IC095279, IC095247, IC095301, IC095299, IC09528 (> 37.00)	PRA-2 (37.00)
9.	Seed yield per plant (g)	10.33-116.67	IC095308 (=116.67 g)	PRA-2 (116.00 g)
10.	Seed volume weight (g/10 ml)	9.09-11.04	IC095247, IC095330, IC043715, IC095277, IC095302, IC095315 (>11.00 g/10ml)	Annapurna (10.62 g/10ml)
Shimla (Accession 50)				
1.	Days to 50% flowering	64.00-114.00	EC524457 (=64.00 days)	Durga (64.00 days)
2.	Days to maturity	134.00-186.00	IC095247 (= 134.00 days)	Durga (135.00 days)

S. No.	Characters	Range	Promising lines	Value of best check
3.	Plant height (cm)	255.95-332.55	IC042353, IC107144 (>321.00 cm)	PRA-2 (321.38 cm)
4.	Inflorescence length (cm)	8.13-93.10	IC429874, IC042421, IC042356, IC427762, IC043715, IC047436, IC107127, IC423466, IC042397, EC519512, IC094656, IC095250, IC042353, IC042358, IC095304, IC107144, IC042352, IC095312, IC094661, IC095313 (>82.00 cm)	PRA-3 (81.85 cm)
5.	Leaf length (cm)	16.00-32.00	IC082625, EC524457, IC042352, IC095313, IC095284, IC095330, IC427762, IC095301, IC095326, IC043715 (>25.30 cm)	Durga (24.90 cm)
6.	Petiole length (cm)	8.80-21.10	IC095247, EC524457 (>20.30 cm)	Durga (19.60 cm)
7.	Stem thickness (mm)	1.66-3.40	IC043715, IC042421, IC095253 (>=3.20 mm)	PRA-2 (3.32 mm)
8.	Lateral spikelet length (cm)	1.20-26.20	IC423466, IC042402, IC107144, IC095249 (>17.60 cm)	PRA-2 (17.50 cm)
9.	1000 seed weight (g)	0.55-0.90	EC524457, IC047434, IC095299, IC095313, IC095322, IC429874 (>=0.90 g)	Durga (0.90 g)
10.	Seed yield per plant (g)	32.09-130.80	IC423466, IC093946, IC042353, IC095247, IC095293, IC095312, IC042352, IC095253, IC042358 (> 81.75 g)	Durga (80.64 g)
Best entries over locations				
1.	Days to 50% flowering	59.30-85.00	-	Durga (59.30 days)
2.	Days to maturity	111.77-133.67	-	Durga (111.77 days)
3.	Plant height (cm)	155.25-226.10	EC519523, IC095247, IC095299, IC427762, IC095279, IC423466, IC082625, IC047434, IC093946 (>207.20 cm)	PRA-3 (207.34 cm)
4.	Inflorescence length (cm)	31.16-80.60	IC423466, IC042352, IC042353, IC042356, IC429874, IC093946, IC095339, IC047436, IC042397, IC095250, IC095313, IC107127, EC519512, IC095279, IC427762, IC095302, IC095304, IC107144, IC094656, IC042358, IC095308, IC095334, IC095315 (> 67.60 cm)	PRA-3 (67.68 cm)
5.	Leaf length (cm)	13.95-24.18	IC042352, IC082625, EC524457, IC095313 (>21.60)	Annapurna (18.63 cm)

S. No.	Characters	Range	Promising lines	Value of best check
6.	Lateral spikelet length (cm)			
7.	Petiole length (cm)	8.15-17.30	IC095247 (=17.30)	Durga (16.20 cm)
8.	Seed volume weight (g/10 ml)			
9.	Seed yield per plant (g)	20.54-80.24	IC423466, IC095247 (> 75.70 g)	PRA-2 (69.03 g)
10.	1000 seed weight (g)	0.60-0.87	-	Durga (0.87 g)

Table 73. Characterization of germplasm lines in grain amaranth at Shimla - Hills (2013)

S.No.	Accession No.	Shimla											
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed transparency	Seed colour
1	EC146543	3	1	5	11	5	2	2	4	4	3	2	1
2	EC146546	3	1	5	11	5	2	2	4	4	3	2	1
3	EC519512	3	1	5	11	5	2	2	4	4	3	2	1
4	EC519523	3	1	5	11	5	2	2	4	4	5	2	1
5	EC519556	3	1	5	9	5	2	2	4	2	7	2	1
6	EC524457	3	1	5	6	5	2	2	4	2	3	2	1
7	IC042352	3	1	5	11	5	2	2	4	4	5	2	1
8	IC042353	3	1	5	11	5	2	2	4	4	5	2	1
9	IC042356	3	1	5	11	5	5	2	4	4	4	2	1
10	IC042358	3	1	5	11	5	2	2	4	4	3	2	1
11	IC042397	3	1	5	9	5	5	2	4	4	3	2	1
12	IC042402	3	1	5	9	5	5	2	4	4	3	2	1
13	IC042415	3	1	5	11	5	2	2	4	4	3	2	1
14	IC042421	3	1	5	11	5	2	2	4	4	3	2	1
15	IC043715	3	1	5	11	5	2	2	4	4	3	2	1
16	IC047434	3	1	5	11	5	2	2	4	4	3	2	1
17	IC047436	3	1	5	9	5	5	2	4	4	3	2	1
18	IC082625	3	1	5	11	5	5	2	4	4	3	2	1
19	IC093946	3	1	5	11	5	2	2	4	4	3	2	1
20	IC094656	3	1	5	11	5	2	2	4	4	3	2	1
21	IC094661	3	1	5	6	5	2	2	4	4	3	2	1
22	IC095247	3	1	5	9	5	4	2	4	2	7	2	1
23	IC095249	3	1	5	11	5	2	2	4	4	4	2	1
24	IC095250	3	1	5	9	5	5	2	4	4	4	2	1
25	IC095251	3	1	5	11	5	2	2	4	4	4	2	1
26	IC095253	3	1	5	11	5	2	2	4	4	4	2	1

S.No.	Accession No.	Shimla											
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed transparency	Seed colour
27	IC095277	3	1	5	11	5	2	2	4	4	4	2	1
28	IC095279	3	1	5	11	5	2	2	4	5	4	1	1
29	IC095284	3	1	5	6	5	2	2	4	2	3	2	1
30	IC095286	3	1	5	11	5	5	2	4	4	3	2	1
31	IC095292	3	1	5	11	5	2	2	4	4	3	2	1
32	IC095299	3	1	5	11	5	2	2	4	4	3	2	1
33	IC095301	3	1	5	11	5	2	2	4	4	3	2	1
34	IC095302	3	1	5	11	5	2	2	4	4	3	2	1
35	IC095304	3	1	5	9	5	5	2	4	4	3	2	1
36	IC095308	3	1	5	11	5	2	2	4	4	3	2	1
37	IC095313	3	1	5	11	5	2	2	4	4	3	2	1
38	IC095315	3	1	5	11	5	2	2	4	4	5	2	1
39	IC095316	3	1	5	9	5	5	2	4	4	3	2	1
40	IC095321	3	1	5	11	5	2	2	4	4	3	2	1
41	IC095322	3	1	5	11	5	2	2	4	4	3	2	1
42	IC095326	3	1	5	11	5	2	2	4	4	3	2	1
43	IC095330	3	1	5	11	5	2	2	4	4	3	2	1
44	IC095334	3	1	5	6	5	2	2	4	4	3	2	1
45	IC095339	3	1	5	11	5	2	2	4	4	3	2	1
46	IC107127	3	1	5	11	5	2	2	4	4	3	2	1
47	IC107144	3	1	5	9	5	5	2	4	4	3	1	1
48	IC423466	3	1	5	11	5	2	2	4	4	4	2	1
49	IC427762	3	1	5	11	5	2	2	4	4	5	2	1
50	IC429874	3	1	5	11	5	2	2	4	4	3	2	1
Mean for check variety													
	Annapurna (C)	3	1	5	11	5	2	2	4	4	3	2	2
	IC35407 Durga (C)	3	1	5	6	5	2	2	4	2	7	2	1
	PRA-2 (C)	3	1	5	11	5	2	2	4	4	5	2	1
	PRA-3 (C)	3	1	5	11	5	2	2	4	4	3	2	1

S.No.	Accession No.	Shimla												
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed transparency	Seed colour	
	Minimum	3	1	5	6	5	2	2	4	2	3	1	1	
	Maximum	3	1	5	11	5	5	2	4	5	7	2	2	
	Mode	3	1	5	11	5	2	2	4	4	3	2	1	

Qualitative characters : *Early plant vigour:* 1-Poor, 2-Good, 3-Very good; *Plant growth habit:* 1-Erect, 2-Spreading, 3-Drooping, 99-Others; *Leaf colour:* 1-Yellow, 2-Yellowish orange, 3-Yellowish green, 4-Orange, 5-Green, 6-Greenish orange, 7-Pink, 8-Pinkish green, 9-Reddish yellow, 10-Reddish green, 11-Red, 12-Dark red, 99-Others; *Seed colour:* 1-White, 2-Creamish, 3-Pale yellow, 4-Pink, 5-Red, 6-Brown, 7-Black, 8-Golden, 99-Others; *Inflorescence colour:* 1-Light yellow, 2-Yellow, 3-Yellowish orange, 4-Yellowish green, 5-Orange, 6-Pink, 7-Pinkish green, 8-Purple, 9-Red, 10-Reddish green, 11-Green, 99-Others; *Inflorescence compactness:* 3-Lax, 5-Intermediate, 7-Dense, 99-Others; *Inflorescence shape:* 1-Globose, 2-Semi drooping, 3-Completely drooping, 4-Straight, 99-Others; *Inflorescence spininess:* 1-Smooth, 2-Glabrous, 3-Prickly, 4-Spiny, 99-Others; *Stem colour:* 1-Yellow, 2-Yellowish green, 3-Orange, 4-Pink, 5-Red, 6-Reddish green, 7-Reddish orange, 99-Others; *Stem surface:* 1-Smooth, 2-Ridged, 99-Others; *Seed shattering:* 3-Low (%), 5-Intermediate (10-50%), 7-High (50%), 99-Others; *Popping ability of seed:* 3-Poor, 5-Medium, 7-Good, 99-Others

Table 74. Multilocation evaluation of germplasm lines in grain amaranth at different locations- Hills (2013)

S.No.	Accession No.	Days to 50 % flowering				Days to 80% maturity				Plant height (cm)			
		Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
1	EC146543	50.00	79.00	114.00	81.00	86.00	131.00	178.00	131.67	150.00	116.40	281.10	182.50
2	EC146546	51.00	76.00	109.00	78.67	85.00	130.00	175.00	130.00	136.00	142.00	286.70	188.23
3	EC519512	54.00	80.00	108.00	80.67	85.00	132.00	173.00	130.00	140.00	134.60	255.95	176.85
4	EC519523	62.00	79.00	114.00	85.00	94.00	129.00	169.00	130.67	169.00	194.80	314.50	226.10
5	EC519556	53.00	81.00	98.00	77.33	85.00	132.00	168.00	128.33	151.00	161.60	289.50	200.70
6	EC524457	54.00	70.00	64.00	62.67	84.00	124.00	136.00	114.67	132.00	134.60	270.60	179.07
7	IC042352	53.00	82.00	98.00	77.67	91.00	135.00	162.00	129.33	177.00	76.40	300.15	184.52
8	IC042353	48.00	77.00	106.00	77.00	86.00	131.00	162.00	126.33	162.00	126.40	332.55	206.98
9	IC042356	42.00	78.00	99.00	73.00	82.00	132.00	163.00	125.67	142.00	106.80	292.85	180.55
10	IC042358	53.00	76.00	92.00	73.67	85.00	131.00	163.00	126.33	127.00	84.20	281.60	164.27
11	IC042397	42.00	75.00	99.00	72.00	82.00	129.00	164.00	125.00	117.00	159.40	298.70	191.70
12	IC042402	44.00	78.00	101.00	74.33	84.00	132.00	163.00	126.33	131.00	176.40	290.15	199.18
13	IC042415	53.00	76.00	99.00	76.00	86.00	130.00	165.00	127.00	128.00	175.40	259.30	187.57
14	IC042421	48.00	78.00	98.00	74.67	94.00	132.00	162.00	129.33	105.00	97.80	262.95	155.25
15	IC043715	48.00	76.00	98.00	74.00	82.00	130.00	166.00	126.00	121.00	173.40	286.10	193.50
16	IC047434	57.00	78.00	107.00	80.67	93.00	133.00	163.00	129.67	166.00	151.20	305.70	207.63
17	IC047436	49.00	80.00	104.00	77.67	86.00	135.00	164.00	128.33	141.00	120.20	281.90	181.03
18	IC082625	50.00	77.00	104.00	77.00	84.00	132.00	165.00	127.00	162.00	163.40	298.15	207.85
19	IC093946	50.00	78.00	105.00	77.67	85.00	130.00	165.00	126.67	170.00	184.00	268.20	207.40
20	IC094656	48.00	77.00	101.00	75.33	84.00	132.00	168.00	128.00	149.00	171.00	274.70	198.23
21	IC094661	47.00	78.00	89.00	71.33	81.00	133.00	165.00	126.33	133.00	143.00	311.00	195.67
22	IC095247	51.00	70.00	68.00	63.00	83.00	124.00	134.00	113.67	172.00	190.06	286.60	216.22
23	IC095249	50.00	76.00	103.00	76.33	86.00	130.00	166.00	127.33	141.00	170.40	293.70	201.70
24	IC095250	46.00	77.00	99.00	74.00	85.00	132.00	169.00	128.67	135.00	206.80	273.90	205.23
25	IC095251	52.00	75.00	101.00	76.00	93.00	130.00	170.00	131.00	143.00	160.60	283.10	195.57
26	IC095253	50.00	74.00	100.00	74.67	91.00	128.00	168.00	129.00	147.00	154.40	297.50	199.63

S.No.	Accession No.	Inflorescence length (cm)			Leaf length (cm)			Petiole length (cm)			1000 seed weight (g)		
		Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean
1	EC146543	53.00	77.23	65.12	13.50	21.00	17.25	6.50	10.20	8.35	0.67	0.75	0.71
2	EC146546	50.00	78.70	64.35	12.40	22.90	17.65	6.30	13.20	9.75	0.70	0.80	0.75
3	EC519512	55.00	85.70	70.35	13.10	17.10	15.10	6.90	13.00	9.95	0.64	0.70	0.67
4	EC519523	41.00	76.30	58.65	13.80	22.60	18.20	8.40	16.70	12.55	0.74	0.80	0.77
5	EC519556	47.00	62.65	54.83	14.50	22.00	18.25	9.60	14.40	12.00	0.65	0.80	0.73
6	EC524457	39.00	68.40	53.70	14.40	31.00	22.70	8.80	20.40	14.60	0.71	0.90	0.81
7	IC042352	69.00	84.70	76.85	17.80	30.55	24.18	8.00	13.05	10.53	0.69	0.80	0.75
8	IC042353	63.00	85.50	74.25	14.10	23.20	18.65	9.40	19.30	14.35	0.72	0.80	0.76
9	IC042356	57.00	91.50	74.25	13.30	22.60	17.95	8.60	14.80	11.70	0.79	0.70	0.75
10	IC042358	52.00	85.50	68.75	13.80	20.30	17.05	8.00	11.70	9.85	0.65	0.55	0.60
11	IC042397	56.00	85.80	70.90	10.50	19.20	14.85	8.00	9.40	8.70	0.69	0.80	0.75
12	IC042402	55.00	79.90	67.45	11.80	20.40	16.10	7.50	10.60	9.05	0.75	0.70	0.73
13	IC042415	50.00	80.20	65.10	11.80	21.60	16.70	6.80	14.70	10.75	0.67	0.70	0.69
14	IC042421	41.00	92.30	66.65	10.40	24.50	17.45	4.60	15.20	9.90	0.69	0.70	0.70
15	IC043715	44.00	89.20	66.60	10.50	25.40	17.95	7.00	15.10	11.05	0.81	0.85	0.83
16	IC047434	58.00	76.50	67.25	14.50	24.50	19.50	7.30	14.40	10.85	0.77	0.90	0.84
17	IC047436	55.00	87.70	71.35	14.40	23.20	18.80	6.60	14.00	10.30	0.71	0.70	0.71
18	IC082625	57.00	76.50	66.75	15.60	32.00	23.80	8.40	18.05	13.23	0.73	0.65	0.69
19	IC093946	65.00	78.80	71.90	12.60	20.50	16.55	6.60	12.70	9.65	0.74	0.80	0.77
20	IC094656	53.00	85.70	69.35	12.50	20.10	16.30	7.40	10.80	9.10	0.73	0.70	0.72
21	IC094661	43.00	82.30	62.65	12.10	23.50	17.80	6.20	17.00	11.60	0.67	0.65	0.66
22	IC095247	59.00	74.90	66.95	17.60	22.40	20.00	13.50	21.10	17.30	0.74	0.70	0.72
23	IC095249	54.00	80.70	67.35	12.00	24.00	18.00	7.30	16.40	11.85	0.75	0.70	0.73
24	IC095250	56.00	85.70	70.85	11.90	16.00	13.95	7.50	8.80	8.15	0.68	0.70	0.69
25	IC095251	54.00	78.70	66.35	11.10	23.80	17.45	6.80	16.00	11.40	0.81	0.80	0.81
26	IC095253	58.00	8.13	33.07	15.80	24.00	19.90	7.40	13.70	10.55	0.68	0.70	0.69

S.No.	Accession No.	Seed yield/plant (g)				Almora		Ranichauri					Shimla	
		Almora	Ranichauri	Shimla	Mean	No. of plants harvested	Leaf width (cm)	Ear length (cm)	Finger length (cm)	No. of finger per plant	No. of leaves per plant	10ml seed weight (g)	Stem thickness	Lateral spikelet length (cm)
1	EC146543	11.70	11.67	74.05	32.47	21.00	8.30	53.20	10.60	32.80	40.20	10.06	2.34	8.60
2	EC146546	9.50	33.33	55.69	32.84	20.00	6.50	38.40	10.80	43.80	27.30	10.05	2.50	11.00
3	EC519512	9.40	25.00	46.00	26.80	20.00	7.40	39.20	10.40	53.40	25.40	10.09	2.09	10.15
4	EC519523	11.50	16.67	45.46	24.54	15.00	6.10	50.20	12.00	47.00	42.20	10.04	2.64	1.20
5	EC519556	11.70	25.00	42.00	26.23	19.00	7.50	36.20	5.40	28.60	32.40	10.07	2.67	12.68
6	EC524457	11.60	50.00	52.06	37.89	23.00	9.40	37.60	8.00	30.60	35.20	10.03	2.03	7.00
7	IC042352	11.70	16.67	82.42	36.93	21.00	7.60	42.40	9.40	17.00	26.60	9.09	3.23	8.20
8	IC042353	14.80	30.00	97.73	47.51	23.00	8.40	61.20	14.00	34.00	25.80	10.05	3.11	15.20
9	IC042356	9.10	33.33	55.03	32.49	22.00	6.90	45.10	12.00	30.20	25.80	10.08	2.78	13.20
10	IC042358	10.90	25.00	81.78	39.23	24.00	8.10	46.25	11.00	33.50	27.00	10.06	2.90	14.20
11	IC042397	10.80	83.33	65.14	53.09	19.00	6.30	67.20	18.60	32.80	28.00	10.03	2.54	12.20
12	IC042402	11.40	75.00	50.97	45.79	22.00	6.90	77.40	19.20	36.60	29.40	10.07	2.62	19.70
13	IC042415	13.00	66.67	50.71	43.46	20.00	6.50	73.20	23.20	46.80	40.00	10.05	3.01	6.25
14	IC042421	6.80	12.33	66.98	28.70	24.00	5.30	44.80	10.28	35.40	23.40	10.09	3.38	9.20
15	IC043715	10.30	33.33	45.17	29.60	23.00	6.90	69.00	19.80	41.20	31.40	11.01	3.40	12.20
16	IC047434	15.20	21.67	47.71	28.19	21.00	6.60	57.80	14.00	39.60	25.80	10.09	2.79	6.35
17	IC047436	11.00	16.67	52.68	26.78	22.00	7.40	48.10	17.60	32.80	27.80	10.07	2.77	10.20
18	IC082625	12.50	66.67	37.68	38.95	12.00	8.30	65.40	19.40	40.00	30.00	10.03	2.69	6.45
19	IC093946	11.60	33.33	100.20	48.38	24.00	8.10	49.20	7.20	47.80	40.00	10.08	2.56	6.90
20	IC094656	10.10	45.00	52.00	35.70	15.00	7.00	64.40	10.80	49.80	36.60	10.06	2.41	8.15
21	IC094661	4.80	10.33	46.48	20.54	22.00	6.00	49.00	7.20	44.20	35.00	10.03	2.57	3.60
22	IC095247	22.10	108.33	96.80	75.74	27.00	10.70	72.40	8.80	45.40	38.20	11.04	2.89	4.10
23	IC095249	6.40	58.33	67.86	44.20	24.00	6.10	56.00	10.20	49.00	41.60	11.00	2.51	17.65
24	IC095250	9.50	100.00	57.75	55.75	27.00	6.70	73.20	18.80	54.40	41.80	10.07	2.33	11.70
25	IC095251	11.60	66.67	57.17	45.15	21.00	7.10	67.00	12.40	55.20	37.00	10.05	3.16	8.45
26	IC095253	13.60	41.67	82.09	45.79	20.00	8.40	53.60	17.40	62.40	39.20	10.08	3.32	13.40

S.No.	Accession No.	Days to 50 % flowering				Days to 80% maturity				Plant height (cm)			
		Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
27	IC095277	54.00	77.00	99.00	76.67	92.00	131.00	169.00	130.67	137.00	144.80	282.70	188.17
28	IC095279	59.00	78.00	108.00	81.67	98.00	133.00	169.00	133.33	173.00	171.40	280.60	208.33
29	IC095284	49.00	70.00	92.00	70.33	85.00	125.00	171.00	127.00	139.00	143.60	286.20	189.60
30	IC095286	44.00	77.00	99.00	73.33	84.00	130.00	170.00	128.00	132.00	145.60	304.65	194.08
31	IC095292	45.00	72.00	107.00	74.67	86.00	127.00	174.00	129.00	139.00	147.00	298.70	194.90
32	IC095299	48.00	77.00	106.00	77.00	86.00	132.00	176.00	131.33	159.00	175.80	313.20	216.00
33	IC095301	53.00	78.00	108.00	79.67	90.00	133.00	171.00	131.33	154.00	164.00	274.15	197.38
34	IC095302	52.00	75.00	101.00	76.00	92.00	129.00	168.00	129.67	165.00	135.00	271.00	190.33
35	IC095304	46.00	76.00	106.00	76.00	84.00	131.00	170.00	128.33	128.00	154.80	319.90	200.90
36	IC095308	54.00	77.00	109.00	80.00	88.00	132.00	169.00	129.67	142.00	155.80	284.35	194.05
37	IC095313	54.00	79.00	110.00	81.00	88.00	134.00	174.00	132.00	145.00	174.40	258.60	192.67
38	IC095315	45.00	80.00	106.00	77.00	88.00	135.00	178.00	133.67	151.00	154.80	281.90	195.90
39	IC095316	44.00	75.00	96.00	71.67	83.00	130.00	170.00	127.67	127.00	156.60	312.00	198.53
40	IC095321	51.00	76.00	92.00	73.00	86.00	131.00	174.00	130.33	133.00	159.00	288.25	193.42
41	IC095322	52.00	78.00	110.00	80.00	84.00	133.00	176.00	131.00	135.00	145.00	291.85	190.62
42	IC095326	54.00	80.00	101.00	78.33	84.00	135.00	175.00	131.33	132.00	145.80	291.00	189.60
43	IC095330	52.00	82.00	109.00	81.00	85.00	137.00	178.00	133.33	141.00	151.00	278.50	190.17
44	IC095334	51.00	79.00	99.00	76.33	88.00	133.00	173.00	131.33	147.00	144.60	273.10	188.23
45	IC095339	48.00	75.00	112.00	78.33	86.00	128.00	186.00	133.33	150.00	151.00	280.20	193.73
46	IC107127	56.00	80.00	110.00	82.00	92.00	132.00	175.00	133.00	137.00	166.60	304.70	202.77
47	IC107144	48.00	77.00	95.00	73.33	86.00	130.00	173.00	129.67	137.00	161.00	322.00	206.67
48	IC423466	51.00	76.00	97.00	74.67	93.00	130.00	163.00	128.67	162.00	180.00	282.50	208.17
49	IC427762	50.00	77.00	100.00	75.67	89.00	131.00	163.00	127.67	157.00	158.60	316.70	210.77
50	IC429874	53.00	77.00	106.00	78.67	94.00	131.00	165.00	130.00	155.00	149.60	260.15	188.25
Mean for check variety													
	Annapurna	55.00	71.80	99.00	75.27	89.00	126.40	172.00	129.13	134.00	142.40	281.78	186.06
	Durga	52.00	61.40	64.50	59.30	83.00	116.80	135.50	111.77	149.50	162.80	281.98	198.09
	PRA-2	54.00	75.40	104.50	77.97	90.50	129.60	174.50	131.53	143.00	153.12	321.38	205.83
	PRA-3	52.00	76.00	105.50	77.83	88.00	129.80	176.00	131.27	141.00	164.52	316.50	207.34

S.No.	Accession No.	Inflorescence length (cm)			Leaf length (cm)			Petiole length (cm)			1000 seed weight (g)		
		Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean
27	IC095277	54.00	8.32	31.16	13.40	21.10	17.25	7.70	9.50	8.60	0.69	0.70	0.70
28	IC095279	65.00	75.30	70.15	15.70	23.00	19.35	9.30	11.40	10.35	0.70	0.65	0.68
29	IC095284	48.00	66.40	57.20	13.10	27.20	20.15	7.80	13.40	10.60	0.73	0.80	0.77
30	IC095286	48.00	56.10	52.05	12.80	19.00	15.90	6.20	11.20	8.70	0.73	0.75	0.74
31	IC095292	47.00	81.40	64.20	11.10	24.50	17.80	7.10	14.00	10.55	0.70	0.80	0.75
32	IC095299	60.00	51.10	55.55	12.90	19.40	16.15	6.40	13.20	9.80	0.74	0.90	0.82
33	IC095301	58.00	69.10	63.55	13.20	25.70	19.45	7.50	11.70	9.60	0.75	0.80	0.78
34	IC095302	62.00	77.50	69.75	13.70	23.20	18.45	7.40	16.60	12.00	0.71	0.70	0.71
35	IC095304	54.00	85.30	69.65	11.20	22.00	16.60	5.70	12.30	9.00	0.69	0.70	0.70
36	IC095308	57.00	79.40	68.20	12.40	16.40	14.40	6.40	14.50	10.45	0.84	0.65	0.75
37	IC095313	59.00	82.30	70.65	13.80	29.60	21.70	7.50	18.00	12.75	0.68	0.90	0.79
38	IC095315	56.00	79.40	67.70	13.30	20.50	16.90	7.40	14.60	11.00	0.72	0.60	0.66
39	IC095316	53.00	76.40	64.70	12.50	17.50	15.00	7.30	13.00	10.15	0.70	0.70	0.70
40	IC095321	46.00	82.50	64.25	12.70	19.60	16.15	6.20	14.00	10.10	0.73	0.70	0.72
41	IC095322	50.00	78.70	64.35	12.60	17.00	14.80	6.90	11.80	9.35	0.76	0.90	0.83
42	IC095326	53.00	81.25	67.13	11.80	25.70	18.75	7.50	15.20	11.35	0.72	0.70	0.71
43	IC095330	51.00	76.75	63.88	13.10	27.00	20.05	7.10	14.20	10.65	0.71	0.65	0.68
44	IC095334	57.00	79.15	68.08	11.70	19.40	15.55	7.40	15.20	11.30	0.73	0.70	0.72
45	IC095339	62.00	81.75	71.88	10.80	20.60	15.70	6.80	16.70	11.75	0.76	0.85	0.81
46	IC107127	54.00	87.05	70.53	12.70	19.40	16.05	6.80	12.20	9.50	0.76	0.75	0.76
47	IC107144	54.00	85.15	69.58	13.50	18.60	16.05	7.10	11.70	9.40	0.72	0.70	0.71
48	IC423466	75.00	86.20	80.60	15.60	20.25	17.93	10.10	11.20	10.65	0.79	0.70	0.75
49	IC427762	50.00	90.20	70.10	14.40	27.00	20.70	7.20	13.10	10.15	0.75	0.80	0.78
50	IC429874	54.00	93.10	73.55	12.40	23.00	17.70	7.20	13.00	10.10	0.64	0.90	0.77
Mean for check variety													
	Annapurna	50.50	80.45	65.48	12.60	24.65	18.63	7.35	14.90	11.13	0.72	0.80	0.76
	Durga	49.00	68.20	58.60	17.30	24.90	21.10	12.80	19.60	16.20	0.83	0.90	0.87
	PRA-2	53.50	41.51	47.51	12.05	22.10	17.08	6.85	16.70	11.78	0.75	0.80	0.78
	PRA-3	53.50	81.85	67.68	12.45	22.10	17.28	6.10	16.70	11.40	0.78	0.75	0.76

S.No.	Accession No.	Seed yield/plant (g)				Almora		Ranichauri					Shimla	
		Almora	Ranichauri	Shimla	Mean	No. of plants harvested	Leaf width (cm)	Ear length (cm)	Finger length (cm)	No. of finger per plant	No. of leaves per plant	10ml seed weight (g)	Stem thickness	Lateral spikelet length (cm)
27	IC095277	10.20	58.53	42.99	37.24	22.00	7.00	56.00	26.40	56.10	40.80	11.01	2.78	2.35
28	IC095279	13.90	50.00	32.09	32.00	19.00	8.70	64.40	15.40	47.40	38.40	11.00	2.49	6.50
29	IC095284	10.00	83.33	78.81	57.38	21.00	8.30	51.00	16.00	52.20	43.20	11.00	2.94	12.50
30	IC095286	8.20	41.67	48.33	32.73	19.00	7.40	47.60	19.80	62.20	37.20	10.00	2.78	14.30
31	IC095292	7.00	25.00	84.02	38.67	20.00	7.00	55.00	13.20	56.40	42.00	10.06	2.57	6.25
32	IC095299	12.20	58.33	47.56	39.36	23.00	7.00	42.20	19.00	47.00	37.80	10.08	2.50	4.60
33	IC095301	14.10	100.00	50.17	54.76	25.00	8.20	52.80	15.00	52.20	38.00	10.03	1.66	6.25
34	IC095302	10.50	83.33	43.98	45.94	22.00	7.00	49.20	17.80	55.20	36.00	11.01	2.30	5.40
35	IC095304	5.70	108.33	66.45	60.16	20.00	6.70	47.20	15.20	59.60	39.80	10.06	2.07	12.45
36	IC095308	8.20	116.67	64.03	62.97	23.00	6.10	57.80	17.00	55.40	32.40	10.08	2.28	9.35
37	IC095313	9.70	58.33	41.47	36.50	15.00	7.20	58.40	13.80	63.40	34.40	10.05	1.69	10.60
38	IC095315	11.00	33.33	68.20	37.51	21.00	7.40	55.20	13.40	54.00	29.20	11.01	2.62	15.40
39	IC095316	6.20	100.00	48.42	51.54	20.00	7.70	49.40	20.20	47.20	30.00	10.07	1.96	11.15
40	IC095321	12.00	50.00	82.49	48.16	14.00	8.00	55.20	15.80	38.60	29.60	10.01	2.62	8.65
41	IC095322	7.40	41.67	77.63	42.23	19.00	7.00	49.00	13.80	48.60	27.20	10.04	2.16	10.60
42	IC095326	6.70	28.33	58.40	31.14	21.00	6.20	47.00	8.20	32.20	31.80	10.09	2.37	15.80
43	IC095330	8.80	29.33	60.05	32.73	21.00	7.80	45.00	13.00	41.20	28.60	11.02	2.06	6.25
44	IC095334	7.50	45.00	53.52	35.34	13.00	6.10	25.20	10.60	50.20	25.60	10.05	2.52	3.15
45	IC095339	9.50	41.67	80.03	43.73	16.00	6.70	51.40	13.80	36.80	31.20	10.03	2.17	8.35
46	IC107127	9.10	33.33	45.83	29.42	18.00	7.10	49.00	10.20	42.80	25.20	10.04	2.66	4.75
47	IC107144	7.90	58.33	68.98	45.07	20.00	7.50	48.00	14.00	55.60	32.40	10.07	2.33	18.30
48	IC423466	26.60	83.33	130.80	80.24	20.00	9.20	82.40	20.00	44.00	33.40	10.02	2.98	26.20
49	IC427762	16.90	33.33	58.08	36.10	24.00	7.10	72.20	19.60	42.40	27.00	10.00	2.78	12.10
50	IC429874	9.60	20.00	58.05	29.22	26.00	6.70	51.00	14.40	30.20	25.80	10.04	2.66	3.25
Mean for check variety														
	Annapurna	8.60	36.60	72.42	39.21	21.50	7.30	50.72	11.88	41.02	35.36	10.62	3.10	9.53
	Durga	30.15	50.20	80.64	53.66	18.50	10.45	53.68	21.76	39.26	31.60	10.25	2.68	5.65
	PRA-2	12.55	116.00	78.55	69.03	21.50	6.80	52.56	13.92	46.06	37.00	10.25	3.32	17.50
	PRA-3	10.85	98.33	68.84	59.34	19.50	6.75	53.64	15.84	47.52	36.68	10.45	3.19	11.55

S.No.	Accession No.	Days to 50 % flowering				Days to 80% maturity				Plant height (cm)			
		Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
	Minimum	42.00	61.40	64.00	59.30	81.00	116.80	134.00	111.77	105.00	76.40	255.95	155.25
	Maximum	62.00	82.00	114.00	85.00	98.00	137.00	186.00	133.67	177.00	206.80	332.55	226.10
	Mean	50.57	76.55	100.55	75.89	87.10	130.64	167.67	128.47	144.29	152.48	289.55	195.44
	CD(0.05)	-	3.17	-	-	-	3.10	-	-	-	74.52	-	-
	CV(%) Error	-	1.67	-	-	-	0.92	-	-	-	17.92	-	-
	CV(%) Phenotypic	8.01	4.42	10.24	-	4.43	2.47	5.69	-	10.46	16.31	6.22	-

S.No.	Accession No.	Inflorescence length (cm)			Leaf length (cm)			Petiole length (cm)			1000 seed weight (g)		
		Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean	Almora	Shimla	Mean
	Minimum	39.00	8.13	31.16	10.40	16.00	13.95	4.60	8.80	8.15	0.64	0.55	0.60
	Maximum	75.00	93.10	80.60	17.80	32.00	24.18	13.50	21.10	17.30	0.84	0.90	0.87
	Mean	54.03	76.32	65.17	13.16	22.57	17.86	7.53	14.15	10.84	0.72	0.75	0.74
	CD(0.05)	-	-	-	-	-	-	-	-	-	-	-	-
	CV(%) Error	-	-	-	-	-	-	-	-	-	-	-	-
	CV(%) Phenotypic	12.56	21.72	-	12.87	15.84	-	19.72	19.58	-	6.29	11.19	-

S.No.	Accession No.	Seed yield/plant (g)				Almora		Ranichauri					Shimla	
		Almora	Ranichauri	Shimla	Mean	No. of plants harvested	Leaf width (cm)	Ear length (cm)	Finger length (cm)	No. of finger per plant	No. of leaves per plant	10ml seed weight (g)	Stem thickness	Lateral spikelet length (cm)
	Minimum	4.80	10.33	32.09	20.54	12.00	5.30	25.20	5.40	17.00	23.40	9.09	1.66	1.20
	Maximum	30.15	116.67	130.80	80.24	27.00	10.70	82.40	26.40	63.40	43.20	11.04	3.40	26.20
	Mean	11.18	51.64	62.97	41.93	20.63	7.35	53.88	14.40	44.61	33.16	10.22	2.62	9.94
	CD(0.05)	-	59.53	-	-	-	-	34.12	32.22	23.58	13.64	1.61	-	-
	CV(%) Error	-	29.62	-	-	-	-	24.27	76.13	20.32	14.53	5.79	-	-
	CV(%) Phenotypic	40.47	57.85	29.84	-	15.62	14.30	20.78	31.08	22.34	17.14	3.86	15.60	49.07

Table 75. Promising lines in buckwheat germplasm for various characters at various locations (Hills)

S.No.	Characters	Range	Promising lines	Value of best check
Almora (Accessions 50)				
1.	Days to 50% flowering	20.00-42.00	-	VL-7 (20.00 days)
2.	Days to maturity	54.00-76.00	EC286521, IC412762 (=54.00 days)	VL-7 (54.00 days)
3.	Plant height (cm)	87.00-160.00	IC026598, EC321798, EC288737, IC026596, IC109309, IC329403, IC026600, EC278739, EC286521 (>138.00 cm)	PRB-1 (136.50 cm)
4.	No. of primary branches	4.00-8.00	IC013446, IC013510, IC013531, IC013533, IC036914, IC109309, IC134858, IC412786, IC013507, IC013544, IC026599, IC036805, IC037265, EC278739, IC107988, IC310043, IC329194 (=6.00)	Himpriya (6.00)
5.	Number of nodes per plant	11.50-25.00	IC036914, IC036805, IC037265, IC108516, IC109309, IC329403, IC026598, IC042426, IC107988, IC329495 (>23.00)	Himpriya (20.50)
6.	Length of cyme (cm)	1.20-2.50	IC013446, IC013533, EC321798, IC109309, IC134858 (>2.40 cm)	Shimla-B1 (2.40 cm)
7.	Seed yield per plant (g)	0.40-6.40	RSR/SKS-41, IC412733, IC013510, IC013533, IC412762, IC013446 (>4.00 g)	VL-7 (3.80 g)
8.	1000 seed weight (g)	7.90-27.70	-	VL-7 (27.70 g)
Ranichauri (Accessions 50)				
1.	Days to 50% flowering	30.50-64.50	-	VL-7 (33.50 days)
2.	Days to maturity	62.50-131.50	-	VL-7 (62.50 days)
3.	Plant height (cm)	75.50-118.00	IC026598, IC026599, RSR/SKS-106 (>116.30 cm)	Himpriya (115.50 cm)
4.	No. of leaves per plant	15.00-30.50	IC026599, RSR/SKS-106, IC521305, IC276627, RSR/SKS-71 (>=27.50)	Himpriya (26.50)
5.	No. of primary branches	2.40-5.50	IC026600, IC294344, IC274429, IC394881, IC341661, IC412762, IC107988, IC026599, IC037265, IC109309, IC329200, IC329403, IC412733, RSR/SKS-84, RSR/SKS-41, RSR/SKS-71 (>=3.50)	PRB-1 & Shimla-B1 (3.50)

S.No.	Characters	Range	Promising lines	Value of best check
6.	No. of secondary branches	2.40-4.60	IC026600, IC026596, IC026598, IC109309, IC294344, RSR/SKS-104, RSR/SKS-41, RSR/SKS-71 (≥ 4.50)	Shimla-B1 (4.50)
7.	Seed yield per plant	2.64-6.08	-	PRB-1 (6.08 g)
8.	100 seed weight (g)	2.10-3.60	-	PRB-1 (3.60 g)
Shimla (Accessions 50)				
1.	Days to 50% flowering	53.00 72.00	EC286521, EC321798 (≤ 54.00 days)	Shimla-B-1 (54.00 days)
2.	Days to maturity	89.00 143.00	-	Shimla-B-1 (89.00 days)
3.	Plant height (cm)	2.70 182.75	EC321798, IC521322, RSR/SKS-106, RSR/SKS-41 (> 150.10 cm)	Shimla-B-1 (144.55 cm)
4.	Leaf length (cm)	5.95 16.10	IC026600, EC276627, EC286521, IC412762, IC037265, IC274435 (> 10.40)	VL-7 (10.30 cm)
5.	Leaf width (cm)	6.10 17.20	IC026600, EC276627, IC109309, IC329403, IC013446, EC286521 (> 10.60 cm)	Himpriya (10.55 cm)
6.	Petiole length (cm)	2.15 15.60	IC026600, IC026596, IC329403, IC109309, EC286521, IC204020, IC274429, IC026597 (> 8.70 cm)	Himpriya (8.40 cm)
7.	No. of leaves per plant	5.00 21.00	IC026597, EC286396, IC026599, IC264881, IC521322, EC288737, IC310043, IC026598, IC036914, IC329403, EC276627, IC013510, IC109309, IC026600, RSR/SKS-104 (> 17.50)	VL-7 (17.00)
8.	No. of primary branches	2.00 11.50	IC521322, IC310043, EC288737, IC108516, IC264881, IC274429, EC278739, EC286396, EC321798, IC013533, IC026599, IC037265, IC204020, IC329495, IC521302, RSR/SKS-84, EC286521, IC013454, IC013458, IC013510, IC109309, IC329194, IC329200, IC341661 (> 4.00)	Himpriya (4.00)
9.	Length of cyme (cm)	2.00 34.50	IC013507, IC274429, IC013544, IC026600, IC274435, EC288737, IC109309, IC204020, EC286521, IC310043, EC276627, IC013454, IC013533, IC037265, RSR/SKS-71 (≥ 6.25)	PRB-1 (6.25cm)
10.	No. of inflorescence per plant	7.55 48.00	IC310043, IC013510, IC521302, IC013533, IC026596, IC026599, EC321798, IC013454, IC013507, IC521322, IC108516, IC109309, EC286396, IC264881, IC036914, RSR/SKS-104, EC276627, IC294344,	VL-7 (18.50)

S.No.	Characters	Range	Promising lines	Value of best check
			IC013446, EC286521, IC013458, IC037265, IC042426, IC204020, IC412786, EC288737, IC329194, IC329403 (>21.75)	
11.	No. of internodes	10.50 21.50	IC026597, EC286396, IC026599, EC288737, IC264881, IC310043, IC329403, IC026598, IC521322, EC276627, IC013510, IC026600, IC109309(>=17.00)	VL-7 (17.00)
14.	Seed yield per plant (g)	0.80 5.82	IC310043, IC026599, IC013533, EC276627, IC013510, IC521302, IC026596, IC108516, IC109309, IC521322, IC037265, EC321798, IC521305, RSR/SKS-104 (>2.70 g)	VL-7 (2.75 g)
15.	1000 seed weight (g)	12.80 26.80	IC274435, IC026600 (>26.30)	VL-7 (25.90 g)
Best entries over locations				
1.	Days to 50% flowering	35.17- 71.00	-	VL-7 (35.17 days)
2.	Days to maturity	70.17- 139.00	-	VL-7 (70.17 days)
3.	Plant height (cm)	44.33- 166.38	EC321798, EC288737, IC026600, EC286521, RSR/SKS-41 (.125.50 cm)	Shimla-B-1 (125.35 cm)
4.	No. of primary branches	2.00- 7.00	IC521322, EC288737, IC310043, IC274429, IC013533, EC286396, IC013531, IC109309, IC394881, IC013458, IC026599, IC037265, IC013446, IC013510, EC286521, IC036914, IC108516, IC341661, IC107988, EC278739, EC321798, IC026600 (>= 4.50)	Himpriya (4.47)
5.	Length of cyme (cm)	2.00- 19.50	IC274429, IC013507, IC274435, IC013544, IC026600, IC394881, IC521322, IC521305, IC109309, EC288737, IC204020, EC286521, IC310043, IC013533, IC013454, EC276627, IC294344, IC037265 (>4.25 cm)	PRB-1 (4.25 cm)
6.	1000 seed weight (g)	15.00- 28.20	IC026600 (=28.20 g)	VL-7 (27.53 g)
7.	Seed yield per plant (g)	1.10- 4.23	RSR/SKS-41, IC013533, IC013510, EC276627, IC412733, IC521302 (>3.55 g)	VL-7 (3.54 g)

Table 76. Characterization of germplasm lines in buckwheat at Shimla - Hills (2013)

S.No.	Accession No.	Shimla										
		Early plant vigour	Plant growth habit	Flower colour	Leaf colour	Leaf margin colour	Leaf blade shape	Stem colour	Seed shattering	Seed per inflorescence	Seed shape	Seed colour
1	EC276627	3	3	5	3	5	2	7	3	6	1	5
2	EC278739	3	3	1	3	5	2	7	3	6	2	5
3	EC286396	3	3	5	3	5	2	7	3	5	2	5
4	EC286521	3	3	5	3	5	2	7	3	4	2	5
5	EC288737	3	3	5	3	5	2	7	3	4	2	5
6	EC321798	3	3	1	3	5	2	7	3	5	1	3
7	IC013446	3	3	1	3	5	2	7	3	5	2	5
8	IC013454	3	3	1	3	5	2	7	3	5	3	5
9	IC013458	3	3	1	3	5	2	7	3	8	2	5
10	IC013507	3	3	1	3	5	2	7	3	6	2	5
11	IC013510	3	3	1	3	5	2	7	3	6	2	5
12	IC013531	-	-	-	-	-	-	-	-	-	-	-
13	IC013533	3	3	1	3	5	2	7	3	7	3	5
14	IC013544	3	3	1	3	5	2	7	3	7	2	5
15	IC026596	3	3	1	3	3	2	7	3	6	2	3
16	IC026597	3	3	1	3	3	2	7	3	6	2	3
17	IC026598	3	3	1	3	3	2	7	3	5	2	3
18	IC026599	3	3	1	3	5	2	7	3	7	1	5
19	IC026600	3	3	1	3	5	2	3	3	5	1	5
20	IC036805	3	3	1	3	5	2	7	3	6	2	5
21	IC036914	3	3	1	3	5	2	7	3	6	2	5
22	IC037265	3	3	1	3	5	2	7	3	6	2	3
23	IC042426	3	3	1	3	5	2	7	3	5	2	3
24	IC107988	3	3	1	3	5	2	7	3	4	3	5
25	IC108516	3	3	1	3	5	2	7	3	5	2	5

S.No.	Accession No.	Shimla										
		Early plant vigour	Plant growth habit	Flower colour	Leaf colour	Leaf margin colour	Leaf blade shape	Stem colour	Seed shattering	Seed per inflorescence	Seed shape	Seed colour
26	IC109309	3	3	1	3	5	2	7	3	5	2	5
27	IC204020	3	3	1	3	5	2	7	3	6	2	5
28	IC213685	3	3	1	3	5	2	7	3	7	2	3
29	IC274429	3	3	5	3	5	2	7	3	5	1	5
30	IC274435	3	3	5	3	5	2	7	3	5	1	5
31	IC294344	3	3	5	3	5	2	7	3	4	1	5
32	IC310043	3	3	1	3	5	2	7	3	7	2	5
33	IC329194	3	3	1	3	5	2	7	3	5	2	5
34	IC329200	3	3	1	3	5	2	7	3	5	2	5
35	IC329403	3	3	1	3	5	2	7	3	5	2	5
36	IC329495	3	3	1	3	5	2	7	3	6	2	5
37	IC341661	3	3	1	3	5	2	7	3	5	2	5
38	IC394881	3	3	5	3	5	2	7	3	5	1	5
39	IC412733	3	3	5	3	5	2	7	3	5	1	5
40	IC412762	3	3	5	3	5	2	7	3	4	1	5
41	IC412786	3	3	1	3	5	2	7	3	6	1	5
42	IC521302	3	3	1	3	5	2	7	3	7	3	5
43	IC521305	3	3	5	3	5	2	7	3	6	1	5
44	IC521322	3	3	5	3	5	2	7	3	5	1	5
45	RSR/SKS-41	3	3	5	3	5	2	7	3	5	1	5
46	RSR/SKS-71	3	3	5	3	5	2	7	3	5	1	5
47	RSR/SKS-84	3	3	5	3	5	2	7	3	4	1	5
48	RSR/SKS-104	3	3	1	3	5	2	7	3	7	3	5
49	RSR/SKS-106	3	3	5	3	5	2	7	3	5	1	5
Mean for check variety												
	Himpriya (C)	3	3	1	3	5	2	7	3	3	2	3
	PRB-1 (C)	3	3	5	3	5	2	7	3	4	1	5
	Shimla-B-1 (C)	3	3	1	3	5	2	7	3	7	1	3
	VL-7 (C)	3	3	5	3	5	2	7	3	6	1	5

S.No.	Accession No.	Shimla										
		Early plant vigour	Plant growth habit	Flower colour	Leaf colour	Leaf margin colour	Leaf blade shape	Stem colour	Seed shattering	Seed per inflorescence	Seed shape	Seed colour
	Minimum	3	3	1	3	3	2	3	3	3	1	3
	Maximum	3	3	5	3	5	2	7	3	8	3	5
	Mode	3	3	1	3	5	2	7	3	5	2	5

Qualitative characters:- *Early plant vigour:* 1-Poor, 2-Good, 3-Very good; *Plant growth habit:* 3-Erect, 5-Semi-erect, 7-Spreading, 99-Others; *Flower colour:* 1-White, 3-Greenish yellow, 5-Pink, 7-Red, 99-Others; *Leaf colour:* 3-Green, 5-Pink, 7-Red, 99-Others; *Leaf margin colour:* 3-Green, 5-Pink, 7-Red, 99-Others; *Leaf blade shape:* 1-Ovate, 2-Hastate, 3-Sagittate, 4-Coradate, 99-Others; *Stem colour:* 3-Green, 5-Pink, 7-Red, 99-Others; *Seed shattering:* 0-Non-shattering, 3-Low, 5-Moderate, 7-High, 99-Others; *Seed shape:* 1-Triangular, 2-Ovate, 3-Conodial, 99-Others; *Seed colour:* 3-Grey, 5-Brown, 7-Black, 9-Mottled, 99-Others; *Biotic stress susceptibility:* 1-Very low or Visible sing of susceptibility, 3-Low, 5-Intermediate, 7-High, 9-Very high

Table 77. Multilocation evaluation of germplasm lines in buckwheat at different locations- Hills (2013)

S.No.	Accession No.	Days to 50% flowering				Days to 80% maturity				Plant height (cm)			
		Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
1	EC276627	22.00	48.50	56.00	42.17	56.00	119.50	125.00	100.17	129.00	97.50	142.65	123.05
2	EC278739	34.00	62.50	67.00	54.50	72.00	123.50	127.00	107.50	139.00	103.50	86.50	109.67
3	EC286396	25.00	-	56.00	40.50	56.00	-	127.00	91.50	135.00	-	104.80	119.90
4	EC286521	23.00	-	53.00	38.00	54.00	-	128.00	91.00	139.00	-	119.20	129.10
5	EC288737	24.00	-	58.00	41.00	58.00	-	125.00	91.50	147.00	-	143.50	145.25
6	EC321798	31.00	-	54.00	42.50	65.00	-	123.00	94.00	150.00	-	182.75	166.38
7	IC013446	38.00	55.50	68.00	53.83	70.00	113.00	117.00	100.00	128.00	85.00	4.00	72.33
8	IC013454	35.00	54.50	59.00	49.50	67.00	118.50	115.00	100.17	104.00	100.50	7.20	70.57
9	IC013458	36.00	52.00	64.00	50.67	66.00	116.50	115.00	99.17	130.00	97.50	3.25	76.92
10	IC013507	37.00	58.00	63.00	52.67	68.00	125.50	116.00	103.17	113.00	95.50	3.25	70.58
11	IC013510	34.00	55.50	59.00	49.50	66.00	120.50	114.00	100.17	129.00	102.00	5.05	78.68
12	IC013531	35.00	53.00	-	44.00	65.00	112.50	-	88.75	121.00	105.50	-	113.25
13	IC013533	35.00	56.50	57.00	49.50	66.00	115.00	115.00	98.67	138.00	97.00	94.95	109.98
14	IC013544	37.00	54.50	62.00	51.17	67.00	107.50	116.00	96.83	118.00	105.50	2.70	75.40
15	IC026596	34.00	54.50	64.00	50.83	72.00	110.50	123.00	101.83	146.00	89.00	59.40	98.13
16	IC026597	33.00	63.50	63.00	53.17	69.00	118.50	120.00	102.50	87.00	97.50	55.30	79.93
17	IC026598	35.00	60.50	65.00	53.50	76.00	114.50	121.00	103.83	160.00	118.00	84.25	120.75
18	IC026599	26.00	52.50	60.00	46.17	64.00	119.00	132.00	105.00	138.00	117.50	91.75	115.75
19	IC026600	32.00	58.50	62.00	50.83	72.00	131.50	139.00	114.17	140.00	110.00	142.40	130.80
20	IC036805	35.00	62.50	64.00	53.83	74.00	128.50	126.00	109.50	122.00	103.50	58.40	94.63
21	IC036914	36.00	60.00	68.00	54.67	68.00	113.00	129.00	103.33	130.00	106.50	64.70	100.40
22	IC037265	36.00	63.50	64.00	54.50	67.00	118.50	123.00	102.83	127.00	101.00	93.80	107.27
23	IC042426	36.00	64.50	72.00	57.50	68.00	127.50	141.00	112.17	130.00	93.00	74.30	99.10
24	IC107988	42.00	62.50	65.00	56.50	75.00	125.00	132.00	110.67	135.00	103.50	76.50	105.00
25	IC108516	31.00	64.50	68.00	54.50	62.00	118.00	128.00	102.67	135.00	97.50	83.80	105.43
26	IC109309	34.00	55.00	60.00	49.67	66.00	120.00	128.00	104.67	145.00	87.00	95.60	109.20
27	IC204020	36.00	58.50	62.00	52.17	69.00	122.50	121.00	104.17	133.00	100.50	82.90	105.47
28	IC213685	-	-	71.00	71.00	-	-	139.00	139.00	-	-	94.50	94.50

S.No.	Accession No.	Number of primary branches				Cyme length (cm)			Seed yield per plant (g)				1000 grain weight (g)			
		Almora	Ranichauri	Shimla	Mean	Almora	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
1	EC276627	5.00	3.40	3.50	3.97	1.70	7.20	4.45	3.20	4.04	4.34	3.86	24.00	27.00	25.60	25.53
2	EC278739	6.00	2.50	5.00	4.50	1.90	3.20	2.55	2.00	2.97	0.80	1.92	17.70	26.00	17.10	20.27
3	EC286396	5.00	-	5.00	5.00	2.30	5.70	4.00	0.80	-	2.44	1.62	10.70	-	19.30	15.00
4	EC286521	5.00	-	4.50	4.75	2.10	7.30	4.70	2.00	-	2.17	2.09	21.40	-	21.50	21.45
5	EC288737	5.00	-	6.00	5.50	2.20	8.30	5.25	4.00	-	1.90	2.95	21.20	-	20.60	20.90
6	EC321798	4.00	-	5.00	4.50	2.50	4.20	3.35	2.40	-	2.92	2.66	17.30	-	16.80	17.05
7	IC013446	8.00	2.40	4.00	4.80	2.50	4.00	3.25	4.40	3.08	1.77	3.08	12.70	26.00	13.60	17.43
8	IC013454	5.00	3.20	4.50	4.23	2.00	7.20	4.60	2.80	3.06	2.66	2.84	14.50	28.00	14.00	18.83
9	IC013458	7.00	3.00	4.50	4.83	2.50	3.25	2.88	2.40	3.67	2.68	2.92	12.90	31.00	13.20	19.03
10	IC013507	6.00	3.20	4.00	4.40	2.30	34.50	18.40	2.00	2.70	2.62	2.44	13.90	28.00	12.80	18.23
11	IC013510	7.00	2.80	4.50	4.77	1.50	5.05	3.28	5.20	2.91	4.25	4.12	14.20	27.00	16.90	19.37
12	IC013531	7.00	3.00	-	5.00	2.30	-	2.30	2.80	3.46	-	3.13	14.90	24.00	-	19.45
13	IC013533	7.00	3.40	5.00	5.13	2.50	6.85	4.68	5.20	2.95	4.45	4.20	14.40	26.00	15.50	18.63
14	IC013544	6.00	2.40	2.50	3.63	2.20	18.50	10.35	1.60	3.56	1.69	2.28	15.20	30.00	13.00	19.40
15	IC026596	4.00	3.40	4.00	3.80	2.30	3.80	3.05	1.20	2.90	3.58	2.56	14.30	21.00	16.50	17.27
16	IC026597	5.00	2.80	4.00	3.93	1.20	3.65	2.43	-	3.68	2.32	3.00	-	24.00	18.30	21.15
17	IC026598	4.00	3.40	3.50	3.63	2.10	3.50	2.80	0.80	4.10	1.48	2.13	13.10	26.00	18.30	19.13
18	IC026599	6.00	3.50	5.00	4.83	2.00	5.70	3.85	0.40	2.74	5.51	2.88	19.50	29.00	22.00	23.50
19	IC026600	4.00	5.50	4.00	4.50	2.10	16.30	9.20	-	3.42	2.72	3.07	-	30.00	26.40	28.20
20	IC036805	6.00	3.00	3.50	4.17	2.00	3.50	2.75	1.20	2.64	1.75	1.86	17.80	26.00	16.00	19.93
21	IC036914	7.00	3.40	3.50	4.63	2.30	3.40	2.85	2.00	3.42	2.23	2.55	14.40	27.00	17.50	19.63
22	IC037265	6.00	3.50	5.00	4.83	2.20	6.30	4.25	1.20	2.67	3.10	2.32	18.30	25.00	20.40	21.23
23	IC042426	5.00	3.00	4.00	4.00	2.30	5.10	3.70	1.20	4.54	2.45	2.73	15.80	30.00	19.90	21.90
24	IC107988	6.00	3.60	4.00	4.53	2.30	3.40	2.85	0.80	3.42	1.98	2.07	14.20	27.00	20.50	20.57
25	IC108516	5.00	3.20	5.50	4.57	2.30	3.40	2.85	1.60	4.21	3.42	3.08	19.50	28.00	19.20	22.23
26	IC109309	7.00	3.50	4.50	5.00	2.50	8.20	5.35	2.80	3.02	3.32	3.05	19.70	26.00	19.80	21.83
27	IC204020	4.00	3.20	5.00	4.07	2.10	7.40	4.75	0.80	4.00	2.20	2.33	12.30	21.00	15.00	16.10
28	IC213685	-	-	2.00	2.00	-	2.00	2.00	-	-	1.10	1.10	-	-	20.60	20.60

S.No.	Accession No.	Almora	Ranichauri		Shimla					
		Number of nodes per plant	No. of secondary branches per plant	No of leaves per plant	No. of inflorescence per plant	Leaf length (cm)	Leaf width (cm)	No. of leaves	No. of internodes	Petiole length (cm)
1	EC276627	20.00	4.20	27.50	27.50	13.40	15.45	18.00	17.50	6.60
2	EC278739	20.00	3.20	21.50	8.50	7.30	10.10	15.00	14.50	8.30
3	EC286396	19.00	-	-	31.50	9.40	9.70	20.50	19.50	6.30
4	EC286521	19.00	-	-	25.50	11.40	10.80	17.50	16.50	9.70
5	EC288737	22.00	-	-	22.50	10.10	7.75	19.50	18.50	7.30
6	EC321798	19.00	-	-	35.50	7.79	9.35	16.50	15.50	5.10
7	IC013446	21.00	3.50	16.50	26.55	10.20	11.75	17.50	16.50	5.50
8	IC013454	16.00	2.60	21.50	34.50	7.65	9.35	16.50	15.00	7.00
9	IC013458	20.00	3.50	19.50	25.50	5.95	7.35	13.00	12.00	6.00
10	IC013507	16.00	3.50	22.50	34.50	6.80	9.75	15.95	15.75	5.20
11	IC013510	18.00	3.40	20.50	41.50	6.00	7.45	18.00	17.50	5.50
12	IC013531	19.00	3.60	21.00	-	-	-	-	-	-
13	IC013533	19.00	3.50	23.00	38.50	8.25	9.35	15.55	14.00	7.20
14	IC013544	17.00	3.20	20.50	18.50	6.00	8.40	14.50	13.50	5.40
15	IC026596	20.00	4.50	19.00	38.00	7.35	9.30	14.10	13.00	11.50
16	IC026597	12.00	3.60	24.50	21.50	7.50	9.15	21.00	21.50	8.80
17	IC026598	23.00	4.50	25.50	17.00	7.30	10.00	19.00	18.00	8.30
18	IC026599	22.00	4.20	30.50	36.00	8.25	7.40	20.10	19.00	5.70
19	IC026600	16.00	4.60	21.50	21.50	16.10	17.20	17.75	17.00	15.60
20	IC036805	24.00	3.50	22.50	18.00	9.30	9.40	16.00	15.50	6.10
21	IC036914	25.00	3.20	20.00	28.50	7.10	8.80	18.50	13.50	7.30
22	IC037265	24.00	4.20	21.50	25.50	11.20	9.30	15.50	14.50	8.40
23	IC042426	23.00	2.50	18.00	25.00	6.30	7.90	14.00	13.00	7.80
24	IC107988	23.00	3.20	24.00	18.00	6.90	7.80	15.00	14.50	6.90
25	IC108516	24.00	4.20	19.50	32.50	8.20	9.50	16.50	15.00	4.60
26	IC109309	24.00	4.50	22.50	32.50	10.10	12.20	18.00	17.00	10.20
27	IC204020	21.00	4.20	21.50	24.50	8.40	10.60	15.50	14.00	9.40
28	IC213685	-	-	-	7.55	8.25	8.25	13.00	12.50	6.30

S.No.	Accession No.	Days to 50% flowering				Days to 80% maturity				Plant height (cm)			
		Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
29	IC274429	-	45.50	64.00	54.75	-	119.50	117.00	118.25	-	108.50	3.80	56.15
30	IC274435	-	37.50	62.00	49.75	-	117.00	114.00	115.50	-	82.90	5.75	44.33
31	IC294344	-	35.50	64.00	49.75	-	115.50	115.00	115.25	-	96.00	4.35	50.18
32	IC310043	33.00	63.50	60.00	52.17	64.00	124.50	131.00	106.50	129.00	102.50	91.30	107.60
33	IC329194	35.00	60.50	70.00	55.17	67.00	126.50	141.00	111.50	105.00	106.50	72.20	94.57
34	IC329200	36.00	64.50	71.00	57.17	68.00	124.50	142.00	111.50	130.00	102.50	60.40	97.63
35	IC329403	36.00	55.50	70.00	53.83	74.00	126.00	140.00	113.33	144.00	99.00	86.40	109.80
36	IC329495	36.00	62.00	71.00	56.33	68.00	120.50	139.00	109.17	136.00	85.50	88.60	103.37
37	IC341661	37.00	58.00	72.00	55.67	69.00	122.50	132.00	107.83	115.00	100.50	71.30	95.60
38	IC394881	-	37.00	65.00	51.00	-	112.50	129.00	120.75	-	102.00	141.75	121.88
39	IC412733	24.00	35.00	58.00	39.00	56.00	108.00	115.00	93.00	107.00	98.50	134.25	113.25
40	IC412762	22.00	33.50	58.00	37.83	54.00	116.50	117.00	95.83	120.00	97.50	124.75	114.08
41	IC412786	37.00	54.00	58.00	49.67	70.00	109.50	116.00	98.50	113.00	77.00	3.50	64.50
42	IC521302	-	35.50	63.00	49.25	-	114.00	117.00	115.50	-	95.50	109.65	102.58
43	IC521305	-	62.50	60.00	61.25	-	114.50	113.00	113.75	-	75.50	127.65	101.58
44	IC521322	-	56.50	64.00	60.25	-	111.00	141.00	126.00	-	92.50	152.85	122.68
45	RSR/SKS-41	21.00	33.50	58.00	37.50	56.00	105.50	115.00	92.17	119.00	107.50	150.15	125.55
46	RSR/SKS-71	21.00	32.00	58.00	37.00	56.00	109.00	114.00	93.00	106.00	97.00	132.65	111.88
47	RSR/SKS-84	22.00	33.00	58.00	37.67	56.00	112.50	117.00	95.17	114.00	102.00	92.65	102.88
48	RSR/SKS-104	36.00	34.50	60.00	43.50	70.00	109.50	109.00	96.17	97.00	108.50	99.55	101.68
49	RSR/SKS-106	21.00	31.00	58.00	36.67	58.00	107.00	117.00	94.00	104.00	116.50	152.85	124.45
Mean for check variety													
	Himpriya (C)	35.00	53.50	71.00	53.17	70.50	123.50	143.00	112.33	124.50	115.50	82.65	107.55
	PRB-1 (C)	29.00	57.50	64.00	50.17	64.00	128.50	136.00	109.50	136.50	98.50	132.85	122.62
	Shimla-B-1 (C)	34.50	35.50	54.00	41.33	66.00	66.50	89.00	73.83	134.00	97.50	144.55	125.35
	VL-7 (C)	20.00	30.50	55.00	35.17	54.00	62.50	94.00	70.17	90.50	105.50	129.65	108.55
	Minimum	20.00	30.50	53.00	35.17	54.00	62.50	89.00	70.17	87.00	75.50	2.70	44.33
	Maximum	42.00	64.50	72.00	71.00	76.00	131.50	143.00	139.00	160.00	118.00	182.75	166.38
	Mean	31.72	51.43	62.50	49.50	65.30	115.54	123.42	103.54	126.06	99.69	85.64	102.98
	CV(%) Phenotypic	18.87	22.24	8.25	-	9.53	10.86	9.32	-	12.73	9.31	57.59	-

S.No.	Accession No.	Number of primary branches				Cyme length (cm)			Seed yield per plant (g)				1000 grain weight (g)			
		Almora	Ranichauri	Shimla	Mean	Almora	Shimla	Mean	Almora	Ranichauri	Shimla	Mean	Almora	Ranichauri	Shimla	Mean
29	IC274429	-	4.80	5.50	5.15	-	19.50	19.50	-	4.00	1.98	2.99	-	27.00	20.70	23.85
30	IC274435	-	3.20	2.50	2.85	-	13.55	13.55	-	2.80	1.98	2.39	-	27.00	26.80	26.90
31	IC294344	-	5.40	2.50	3.95	-	4.35	4.35	-	3.76	2.40	3.08	-	29.00	21.90	25.45
32	IC310043	6.00	3.20	7.00	5.40	2.10	7.30	4.70	0.40	3.57	5.82	3.26	15.60	26.00	17.40	19.67
33	IC329194	6.00	2.50	4.50	4.33	2.30	4.30	3.30	0.80	4.77	2.15	2.57	14.70	23.00	18.00	18.57
34	IC329200	5.00	3.50	4.50	4.33	2.30	3.10	2.70	2.00	3.72	1.48	2.40	17.80	24.00	16.60	19.47
35	IC329403	5.00	3.50	4.00	4.17	2.00	4.80	3.40	0.40	4.83	2.13	2.45	7.90	26.00	15.90	16.60
36	IC329495	5.00	3.00	5.00	4.33	2.10	4.10	3.10	0.80	3.69	1.79	2.09	16.30	28.00	16.30	20.20
37	IC341661	5.00	4.20	4.50	4.57	2.20	4.40	3.30	0.80	3.46	1.20	1.82	17.90	30.00	20.60	22.83
38	IC394881	-	4.50	5.50	5.00	-	6.15	6.15	-	2.92	2.28	2.60	-	31.00	15.10	23.05
39	IC412733	4.00	3.50	3.00	3.50	1.50	4.45	2.98	6.00	3.48	2.00	3.83	25.80	27.00	20.50	24.43
40	IC412762	4.00	3.80	4.00	3.93	1.60	5.25	3.43	4.80	3.02	1.80	3.21	26.40	26.00	20.30	24.23
41	IC412786	7.00	2.50	3.50	4.33	1.80	3.50	2.65	3.60	4.00	1.86	3.15	14.40	30.00	14.20	19.53
42	IC521302	-	3.40	5.00	4.20	-	3.75	3.75	-	3.05	4.10	3.57	-	28.00	14.60	21.30
43	IC521305	-	2.80	3.00	2.90	-	5.85	5.85	-	3.07	2.90	2.99	-	30.00	24.70	27.35
44	IC521322	-	2.50	11.50	7.00	-	6.05	6.05	-	3.42	3.13	3.27	-	27.00	19.90	23.45
45	RSR/SKS-41	4.00	3.50	2.00	3.17	2.40	5.50	3.95	6.40	4.10	2.20	4.23	26.20	30.00	21.00	25.73
46	RSR/SKS-71	5.00	3.50	2.00	3.50	1.90	6.25	4.08	3.60	2.94	2.46	3.00	23.70	31.00	24.00	26.23
47	RSR/SKS-84	4.00	3.50	5.00	4.17	1.80	3.80	2.80	2.00	3.82	1.30	2.37	20.90	27.00	15.40	21.10
48	RSR/SKS-104	5.00	3.20	3.50	3.90	1.20	4.10	2.65	1.20	2.92	2.80	2.31	12.90	26.00	14.00	17.63
49	RSR/SKS-106	4.00	3.00	2.50	3.17	1.50	2.85	2.18	2.80	3.70	2.23	2.91	22.20	27.00	22.70	23.97
Mean for check variety																
	Himpriya (C)	6.00	3.40	4.00	4.47	2.30	3.15	2.73	1.60	5.30	1.93	2.94	15.55	31.00	18.60	21.72
	PRB-1 (C)	5.00	3.50	3.50	4.00	2.25	6.25	4.25	1.80	6.08	0.97	2.95	18.10	36.00	19.70	24.60
	Shimla-B-1 (C)	5.50	3.50	3.00	4.00	2.40	4.30	3.35	3.20	4.43	1.90	3.18	17.30	28.00	17.19	20.83
	VL-7 (C)	4.00	2.50	3.50	3.33	1.40	4.00	2.70	3.80	4.06	2.75	3.54	27.70	29.00	25.90	27.53
	Minimum	4.00	2.40	2.00	2.00	1.20	2.00	2.00	0.40	2.64	0.80	1.10	7.90	21.00	12.80	15.00
	Maximum	8.00	5.50	11.50	7.00	2.50	34.50	19.50	6.40	6.08	5.82	4.23	27.70	36.00	26.80	28.20
	Mean	5.37	3.34	4.23	4.29	2.07	6.38	4.61	2.34	3.58	2.49	2.79	17.33	27.44	18.70	21.32
	CV(%) Phenotypic	20.30	19.89	34.91	-	16.82	84.48	-	67.11	20.13	41.88	-	25.94	9.89	19.38	-

S.No.	Accession No.	Almora	Ranichauri		Shimla					
		Number of nodes per plant	No. of secondary branches per plant	No of leaves per plant	No. of inflorescence per plant	Leaf length (cm)	Leaf width (cm)	No. of leaves	No. of internodes	Petiole length (cm)
29	IC274429	-	3.50	25.00	19.50	8.25	9.05	14.50	13.50	9.00
30	IC274435	-	4.20	23.50	13.55	10.50	9.25	16.00	15.00	4.20
31	IC294344	-	4.50	20.50	27.50	9.40	7.20	13.50	12.50	5.20
32	IC310043	21.00	3.40	20.50	48.00	7.10	8.30	19.50	18.50	6.80
33	IC329194	20.00	2.50	24.00	22.50	6.20	7.70	16.00	15.50	5.60
34	IC329200	20.00	3.50	19.50	18.00	6.20	7.50	11.50	10.50	8.40
35	IC329403	24.00	4.20	21.50	22.50	10.40	12.10	18.50	18.20	11.50
36	IC329495	23.00	3.50	19.50	18.50	6.40	9.10	15.50	14.50	6.80
37	IC341661	18.00	3.50	21.00	12.00	7.80	9.00	14.50	14.00	5.50
38	IC394881	-	3.50	19.50	30.55	7.45	6.75	19.55	18.50	3.00
39	IC412733	13.00	3.40	18.50	19.50	10.05	8.25	14.50	13.50	2.60
40	IC412762	13.00	2.50	20.50	16.50	11.25	9.75	14.00	13.00	6.00
41	IC412786	19.00	2.40	19.50	22.55	7.45	7.40	14.50	13.50	4.40
42	IC521302	-	3.50	15.00	40.00	6.10	7.35	16.55	15.50	3.85
43	IC521305	-	2.80	28.50	19.50	8.55	7.95	15.50	14.00	2.15
44	IC521322	-	3.40	22.50	32.55	10.15	10.05	19.55	18.00	6.25
45	RSR/SKS-41	14.00	4.50	21.50	21.75	10.05	8.05	14.00	13.00	3.20
46	RSR/SKS-71	13.00	4.50	27.50	20.50	9.75	7.25	16.00	15.00	4.05
47	RSR/SKS-84	13.00	3.50	23.50	21.55	7.05	7.02	15.50	14.50	5.85
48	RSR/SKS-104	16.00	4.50	21.50	28.50	7.55	8.05	17.55	16.50	6.00
49	RSR/SKS-106	12.00	3.40	29.50	19.50	8.00	6.10	13.50	12.50	3.70
Mean for check variety										
	Himpriya (C)	22.50	4.40	26.50	16.50	9.45	10.55	15.50	14.50	8.40
	PRB-1 (C)	18.00	4.20	17.50	12.50	9.05	9.01	5.00	15.00	8.15
	Shimla-B-1 (C)	16.00	4.50	24.50	16.55	7.00	9.35	15.50	14.00	3.80
	VL-7 (C)	11.50	3.50	20.50	18.50	10.30	10.05	17.00	17.00	2.20
	Minimum	11.50	2.40	15.00	7.55	5.95	6.10	5.00	10.50	2.15
	Maximum	25.00	4.60	30.50	48.00	16.10	17.20	21.00	21.50	15.60
	Mean	18.96	3.68	22.00	24.53	8.54	9.14	16.06	15.28	6.51
	CV(%) Phenotypic	20.25	17.03	14.76	35.47	23.50	21.67	16.53	14.61	39.09

Table 78. Promising lines in chenopodium germplasm for various characters at various locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Ranichauri (Accession 25)				
1.	Days to 50% flowering	66.50-82.50	IC109249, NIC-50229, IC415493, IC415477, IC275421, NIC-22500 (<7=72.50 days)	NIC-22503 (72.50 days)
2.	Days to maturity	124.10-142.50	IC415493, NIC-50229, IC109249, IC415477, NIC-22500, IC275421, NIC-22489 (<=113.50 days)	NIC-22503 (113.50 days)
3.	Plant height (cm)	67.50-137.40	NIC-22529, NIC-22518, NIC-22500, NIC-22525, NIC-22498, NIC-50229, NIC-22489, NIC-98233, NIC-98616 (>108.00 cm)	PRC-9801 (105.40 cm)
4.	Ear length (cm)	8.40-12.60	NIC-22518, NIC-22529, NIC-22500, IC108819, NIC-98233, NIC-98616 (>11.50 cm)	PRC-9801 (11.20)
5.	No. of finger per plant	4.80-9.20	NIC-22500 (=9.20)	PRC-9801 (9.20)
6.	No. of leaves per plant	18.40-35.40	NIC-22498, NIC-58617, IC415477, NIC-98233, IC341704, NIC-22489, NIC-98616, IC275421, IC415493, IC258332, NIC-22500, NIC-50229, EC349447, EC359449, IC108817, IC109731, NIC-22529, NIC-22518 (>=25.20)	PRC-9801 (25.20)
7.	Seed yield per plant (g)	2.32-3.72	-	PRC-9801 (3.72 g)
8.	Seed volume weight (g/10 ml)	5.42-6.89	IC108819, IC109235, NIC-22489, IC415477, NIC-22529, NIC-22525 (>6.30 g/10ml)	PRC-9801 (6.22 g/10ml)
Shimla(Accession 25)				
1.	Days to 50% flowering	49.00-76.00	IC415477, IC341704, IC108817, NIC-58233, NIC-22518, IC109249, IC275421, NIC-22500 (= <65.00 days)	NIC-22503 (65.00 days)
2.	Days to maturity	113.00-150.00	IC415477 (=113.00)	NIC-22503 (130.00 days)
3.	Plant height (cm)	182.45-328.35	IC108819, IC109249, IC275421, NIC-22518, IC415493 (>296.00 cm)	NIC-22503 (296.80 cm)
4.	Inflorescence length (cm)	42.25-73.00	NIC-22518, IC415493, NIC-22525 (>63.00 cm)	PRC-9801 (63.10 cm)

S. No.	Characters	Range	Promising lines	Value of best check
5.	Leaf length (cm)	5.20-16.40	EC359449, NIC-22529, IC415493, EC359444, IC108819, NIC-22518, IC109249, IC275421, IC415477, NIC-50229, IC109235, IC108080, IC258332, NIC-58617, NIC-22498, IC109731, NIC-22500 (>9.30 cm)	PRC-9801 (9.10 cm)
6.	Leaf width (cm)	1.30-10.60	IC109249, EC359449, IC275421, NIC-22518, IC108080, IC109731, NIC-22529, NIC-50229, NIC-22525, IC108819, IC415493, IC258332, NIC-58617, NIC-22498, IC109235, EC359444, NIC-22500 (>=5.10 cm)	PRC-9801 (5.10 cm)
7.	100 seed weight (g)	0.50-1.00	IC415477, NIC-58616, NIC-22500, NIC-22518(=>0.90 g)	PRC-9801(0.90 g)
8.	Seed yield per plant (g)	7.80-75.35	NIC-22500, NIC-22518, NIC-22529, IC108819, NIC-22525, EC359449, IC275421, IC258332, NIC-58233, IC109235, EC359444 (>27.50 g)	PRC-9801 (26.55 g)
Best entries over locations (Accession 25)				
1.	Days to 50% flowering	60.25-82.50	IC415477, IC341704, IC109249, IC108817, IC415493, NIC-50229, NIC-22518, IC275421, NIC-22500 (<=68.75 days)	NIC-22503 (68.75 days)
2.	Days to maturity	120.60-142.75	IC415477 (= 120.60 days)	NIC-22503 (130.25 days)
3.	Plant height (cm)	99.20-218.63	NIC-22518, NIC-22529, IC415493 (> 199.60 cm)	NIC-22503 (199.50)
4.	Seed yield per plant (g)	2.78-39.12	NIC-22500, NIC-22518, NIC-22529, IC108819, NIC-22525, EC359449, IC275421, IC258332, NIC-58233, IC109235, EC359444 (>15.10 g)	PRC-9801 (15.14 g)

Table 79. Characterization of germplasm lines in chenopodium at Shimla locations - Hills (2013)

S.No.	Accession No.	Shimla									
		Early plant vigour	Plant growth habit	Inflorescence colour	Inflorescence shape	Stem drafting	Stem colour	Leaf colour	Leaf tip	Leaf shape	Seed colour
1	EC349447	-	-	-	-	-	-	-	-	-	-
2	EC359444	3	1	3	2	1	3	1	1	6	4
3	EC359448	-	-	-	-	-	-	-	-	-	-
4	EC359449	3	1	2	2	1	3	1	2	2	3
5	IC108080	3	1	1	2	1	3	1	2	2	4
6	IC108817	3	1	1	2	3	3	1	1	2	4
7	IC108819	3	1	1	2	1	1	1	2	2	4
8	IC109235	3	1	1	2	1	1	1	1	6	4
9	IC109249	3	1	3	2	1	3	1	2	2	4
10	IC109731	3	1	1	2	1	1	1	2	2	4
11	IC258332	3	1	1	2	1	1	1	2	2	4
12	IC275421	3	1	3	2	1	3	1	2	2	3
13	IC341704	3	1	1	2	1	1	1	1	1	4
14	IC415477	3	1	1	1	1	1	1	1	6	4
15	IC415493	3	1	3	2	1	3	1	2	2	4
16	NIC-22489	3	1	3	1	1	1	1	1	2	4
17	NIC-22498	3	1	3	2	1	1	1	1	2	4
18	NIC-22500	3	1	3	2	1	1	1	1	6	3
19	NIC-22518	3	1	3	2	1	1	1	2	2	4
20	NIC-22525	3	1	3	2	1	1	1	2	2	4
21	NIC-22529	3	1	3	2	1	3	1	2	2	4
22	NIC-50229	3	1	3	2	1	3	1	2	2	4
23	NIC-58233	3	1	1	2	1	3	1	1	2	4
24	NIC-58616	3	1	3	2	1	3	1	2	2	3
25	NIC-58617	3	1	1	2	1	3	1	1	2	4

S.No.	Accession No.	Shimla									
		Early plant vigour	Plant growth habit	Inflorescence colour	Inflorescence shape	Stem drafting	Stem colour	Leaf colour	Leaf tip	Leaf shape	Seed colour
Mean for check variety											
	EC-507741 (C)	3	1	1	2	1	3	1	1	2	4
	NIC-22503 (C)	3	1	3	2	1	3	1	2	2	4
	PRC-9801 (C)	3	1	1	1	1	1	1	1	1	3
	Minimum	3	1	3	2	3	3	1	2	6	4
	Maximum	3	1	3	2	1	3	1	2	2	4
	Mode	3	1	3	2	1	3	1	2	2	4

Table 80. Multilocation evaluation of germplasm lines in chenopodium at different locations - Hills (2013)

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			Seed yield per plant (g)		
		Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean
1	EC349447	82.50	-	82.50	142.50	-	142.50	99.20	-	99.20	3.00	-	3.00
2	EC359444	80.50	68.00	74.25	140.50	140.00	140.25	97.60	251.05	174.33	2.42	28.00	15.21
3	EC359448	78.50	-	78.50	137.50	-	137.50	102.40	-	102.40	2.78	-	2.78
4	EC359449	74.00	73.00	73.50	133.50	141.00	137.25	95.20	288.15	191.68	2.94	40.08	21.51
5	IC108080	75.50	74.00	74.75	135.50	150.00	142.75	74.60	267.15	170.88	3.20	22.33	12.76
6	IC108817	79.50	53.00	66.25	138.40	139.00	138.70	72.60	196.25	134.43	3.20	10.18	6.69
7	IC108819	77.50	-	77.50	135.50	136.00	135.75	67.50	328.35	197.93	3.07	45.44	24.26
8	IC109235	79.50	67.00	73.25	138.50	139.00	138.75	76.00	269.70	172.85	2.70	30.05	16.37
9	IC109249	66.50	65.00	65.75	127.20	139.00	133.10	75.00	313.50	194.25	2.92	17.08	10.00
10	IC109731	76.50	73.00	74.75	135.10	145.00	140.05	79.00	242.10	160.55	2.72	7.80	5.26
11	IC258332	73.00	67.00	70.00	132.50	142.00	137.25	89.30	242.10	165.70	3.07	37.80	20.44
12	IC275421	72.50	65.00	68.75	130.50	143.00	136.75	72.70	309.70	191.20	3.12	38.00	20.56
13	IC341704	74.50	51.00	62.75	133.40	139.00	136.20	87.40	182.45	134.93	3.01	14.02	8.51
14	IC415477	71.50	49.00	60.25	128.20	113.00	120.60	97.20	221.65	159.43	3.16	15.66	9.41
15	IC415493	68.50	67.00	67.75	124.10	140.00	132.05	102.40	297.00	199.70	3.02	25.26	14.14
16	NIC-22489	73.50	72.00	72.75	130.50	137.00	133.75	117.20	211.55	164.38	2.62	10.78	6.70
17	NIC-22498	74.50	71.00	72.75	134.50	140.00	137.25	122.40	239.60	181.00	2.93	13.44	8.18
18	NIC-22500	72.50	65.00	68.75	129.40	138.00	133.70	132.60	253.90	193.25	2.88	75.35	39.12
19	NIC-22518	74.00	63.00	68.50	133.50	134.00	133.75	137.20	300.05	218.63	3.42	71.25	37.34
20	NIC-22525	76.50	66.00	71.25	136.50	140.00	138.25	125.40	233.50	179.45	2.32	41.67	22.00
21	NIC-22529	73.00	69.00	71.00	132.50	144.00	138.25	137.40	271.65	204.53	2.97	51.12	27.05
22	NIC-50229	68.00	68.00	68.00	126.50	139.00	132.75	119.20	223.05	171.13	2.77	16.73	9.75
23	NIC-58233	80.50	62.00	71.25	140.40	139.00	139.70	110.40	265.15	187.78	2.89	36.02	19.46
24	NIC-58616	78.50	76.00	77.25	136.50	141.00	138.75	108.20	211.85	160.03	3.50	18.75	11.12
25	NIC-58617	82.50	70.00	76.25	142.50	139.00	140.75	100.40	264.15	182.28	2.70	13.04	7.87

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			Seed yield per plant (g)		
		Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean	Ranichauri	Shimla	Mean
Mean for check variety													
	EC-507741 (C)	79.50	-	79.50	138.50	-	138.50	103.20	-	103.20	3.40	-	3.40
	NIC-22503 (C)	72.50	65.00	68.75	130.50	130.00	130.25	102.20	296.80	199.50	3.07	20.07	11.57
	PRC-9801 (C)	77.50	67.00	72.25	135.50	142.00	138.75	105.40	271.00	188.20	3.72	26.55	15.14
	Minimum	66.50	49.00	60.25	124.10	113.00	120.60	67.50	182.45	99.20	2.32	7.80	2.78
	Maximum	82.50	76.00	82.50	142.50	150.00	142.75	137.40	328.35	218.63	3.72	75.35	39.12
	Mode	75.48	66.08	71.74	134.29	138.76	136.57	100.33	258.06	170.81	2.98	29.06	14.63
	CV(%) Phenotypic	5.56	10.33	-	3.56	4.70	-	20.15	14.78	-	10.35	61.89	-

S.No.	Accession No.	Ranichauri			Shimla				
		Ear length (cm)	No. of finger per plant	No. of leaves per plant	10 ml test weight (g)	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	100 seed weight (g)
1	EC349447	9.60	6.60	26.40	6.17	-	-	-	-
2	EC359444	9.40	6.60	22.10	6.08	47.10	12.30	5.40	0.60
3	EC359448	8.40	5.73	22.10	6.08	-	-	-	-
4	EC359449	9.20	7.20	26.40	6.04	52.10	16.40	10.20	0.70
5	IC108080	9.70	8.00	23.40	6.00	49.25	10.25	9.20	0.55
6	IC108817	9.60	7.73	26.20	6.12	49.20	5.20	2.10	0.70
7	IC108819	11.70	7.70	22.10	6.89	62.65	12.20	7.30	0.60
8	IC109235	9.40	6.00	20.20	6.78	42.25	10.50	5.55	0.60
9	IC109249	9.70	6.50	18.40	5.42	62.15	11.80	10.60	0.50
10	IC109731	10.00	7.80	26.20	6.07	51.75	9.70	9.10	0.65
11	IC258332	10.80	7.00	29.60	5.92	51.75	10.20	7.00	0.80
12	IC275421	10.90	6.60	32.40	6.01	62.65	11.50	9.70	0.80
13	IC341704	10.00	5.20	33.20	6.14	61.20	5.40	2.20	0.70
14	IC415477	10.20	7.50	35.20	6.67	62.95	11.20	3.00	1.00
15	IC415493	8.80	4.80	32.40	6.07	66.20	12.60	7.30	0.80
16	NIC-22489	10.20	6.73	33.20	6.77	60.10	9.20	1.30	0.50
17	NIC-22498	8.90	6.20	35.40	6.07	59.15	9.75	6.25	0.80
18	NIC-22500	11.80	9.20	29.20	5.99	62.25	9.35	5.10	0.90
19	NIC-22518	12.60	8.40	25.20	5.98	73.00	12.15	9.70	0.90
20	NIC-22525	11.00	7.60	22.10	6.34	63.20	9.20	7.65	0.80
21	NIC-22529	12.00	8.40	26.20	6.60	51.20	13.10	8.00	0.60
22	NIC-50229	10.40	7.20	28.20	6.00	58.20	11.20	7.85	0.50
23	NIC-58233	11.70	8.40	34.40	6.09	59.25	8.20	4.70	0.70
24	NIC-58616	11.60	7.20	32.60	6.07	57.10	8.65	5.05	1.00
25	NIC-58617	8.70	6.40	35.40	6.00	53.20	10.10	6.30	0.60

S.No.	Accession No.	Ranichauri			Shimla				
		Ear length (cm)	No. of finger per plant	No. of leaves per plant	10 ml test weight (g)	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	100 seed weight (g)
Mean for check variety									
	EC-507741 (C)	10.40	8.10	22.40	6.04	-	-	-	-
	NIC-22503 (C)	10.40	8.40	21.60	6.02	52.88	8.00	3.70	0.85
	PRC-9801 (C)	11.20	9.20	25.20	6.22	63.10	9.10	5.10	0.90
	Minimum	8.40	4.80	18.40	5.42	42.25	5.20	1.30	0.50
	Maximum	12.60	9.20	35.40	6.89	73.00	16.40	10.60	1.00
	Mode	10.30	7.23	27.41	6.17	57.35	10.29	6.37	0.72
	CV(%) Phenotypic	10.75	15.33	18.93	5.08	12.25	23.02	41.51	21.07

Table 81. Promising lines in rice bean germplasm for various characters at different locations (Hills)

S.No.	Characters	Range	Promising lines	Value of best check
Almora (Accessions 25)				
1.	Days to 50% flowering	59.00-70.00	-	PRR-2 (59.00 days)
2.	Days to maturity	103.00-114.00	-	PRR-2 (103.00 days)
3.	Plant height (cm)	38.00-152.00	IC394201, IC524549, IC419602, IC524084, IC524085, IC137189, IC524074, IC369282, IC524522, IC524075, IC524070, IC411730, IC524076, IC394537, IC419518, IC419806 (>105.00 cm)	PRR-1 (102.00 cm)
4.	No. of primary branches	2.00-4.00	IC419489, IC419806, IC524084, IC524522 (=4.00)	RBL-1 (4.00)
5.	Pod length (cm)	5.70-12.50	IC419518, IC524549, IC538983, IC394201, IC524522 (>11.20 cm)	PRR-2 (11.20 cm)
6.	No. of seed per pod	5.00-10.00	IC419518, IC524522, IC538983 (=10.00)	PRR-2 (10.00)
7.	Seed yield per plant (g)	0.80-18.80	IC524074, IC394201, IC419518, IC524070 (>13.10 g)	PRR-2 (12.00 g)
8.	100 seed weight (g)	6.08-9.96	IC419489, IC394537, IC411730, IC524085, IC524068, IC137189, IC524522, IC524070, IC524549, IC419518, IC524074, IC419806, IC538983, IC394201, IC524076, IC524080, IC421926 (>7.35)	RBL-6 (7.32 g)
Palampur (Accessions 25)				
1.	Days to 50% flowering	76.00-80.00	IC137189, IC538983, IC369282, IC419489, IC421926, IC524082, IC524084, IC538878, IC394201, IC524045 (<79.00 days)	PRR-2 (79.20 days)
2.	Days to maturity	126.00-134.00	IC419602 (=126.00 days)	PRR-2 & RBL-1 (127.00 days)
4.	Plant height (cm)	78.00-94.00	IC411730, IC524045, IC419806, IC524070, IC243512, IC524085, IC419518, IC524522, IC524068 (>88.00 cm)	PRR-2 (86.74 cm)
5.	No. of primary branches	2.00-3.00	IC524068, IC524045, IC243512, IC524076, IC524074, IC538878, IC394201, IC524082 (>2.70)	RBL-6 (2.60)

S.No.	Characters	Range	Promising lines	Value of best check
6.	Pod length (cm)	8.20-9.80	IC538878, IC524085, IC421875, IC419518 (>9.10 cm)	PRR-2 (9.02 cm)
7.	No. of pods per plant	44.00-70.00	IC538878, IC421875, IC411730, IC524068, IC538983, IC137189, IC524084, IC538870, IC524045, IC419602, IC524522, IC419489, IC524085, IC524076, IC524549, IC421926 (>=58.00)	PRR-2 (57.60)
8.	Seed yield per plant (g)	12.00-30.00	IC419806, IC524082, IC394537, IC524068, IC538983, IC524074, IC419518, IC524070 (>=25.00 g)	RBL-1 (23.20 g)
9.	100 seed weight (g)	6.00-8.40	IC524070, IC419518, IC394201 (>=8.20 g)	RBL-6 (8.04 g)
10.	Seed yield(q/ha)	2.78-5.67	IC137189, IC538870, IC524076, IC243512 (>5.10 q/ha)	PRR-2 (4.82 q/ha)
Ranichauri (Accessions 25)				
1.	Days to 50% flowering	79.00-88.00	IC039401, IC419518, IC419806, IC411730, IC524076, IC538878, IC421926, IC524085, IC369282, IC524082, IC243512, IC394537, IC524074, IC538870 (<86.00 days)	PRR-2 (86.00 days)
2.	Days to maturity	160.00-174.00	IC411730, IC419806, IC419518, IC524076, IC538878, IC369282, IC421926, IC524085, IC524082, IC538870, IC394537, IC524074 (<170.00 days)	PRR-2 (170.33 days)
3.	Plant height(cm)	40.40-97.20	IC524084 (=97.20 cm)	PRR-1 (96.77 cm)
4.	Pod length (cm)	8.00-12.40	IC419518, IC419806, IC538870, IC538878 (>11.50 cm)	PRR-1 (11.40 cm)
5.	No. of pods per plant	7.60-19.20	IC411730, IC137189 (>16.70)	PRR-2 (15.47)
6.	No. of seed per pod	7.20-11.40	IC419518, IC419806, IC538878, IC524082, IC538870 (>=10.40)	PRR-1 (10.27)
7.	No. of leaves per plant	22.40-37.40	IC524075 (=37.40)	PRR-2 (37.33)
8.	100 seed weight (g)	6.60-9.30	IC524549, IC538983, IC524068, IC524074 (>=9.00 g)	PRR-2 (9.00 g)
9.	Seed yield per plant (g)	10.90-54.80	IC524074, IC538870, IC524085, IC524549 (>37.50 g)	PRR-2 (37.57 g)

S.No.	Characters	Range	Promising lines	Value of best check
Shillong (Accession 25)				
1.	Days to 50% flowering	51.00-68.00	-	PRR-1 (51.00 days)
2.	Days to 80% maturity	116.00-149.00	IC419489, IC394537, IC524549, IC524076, IC524074, IC137189, IC524070, IC369282, IC538870, IC538983, IC419806, IC394201, IC411730, IC524084, IC524085, IC538878, IC419518, IC419602, IC524075 (>130.00 days)	PRR-1 (133.00 days)
3.	Plant height (cm)	81.62-132.65	IC421875, IC524082, IC524076, IC243512 (>121.40 cm)	PRR-1 (115.16 cm)
6.	No. of primary branches	3.36-7.64	IC524074, IC524084, IC524070, IC524075, IC419489, IC137189, IC524085, IC419518 (>6.30)	RBL-6 (5.64)
5.	Stem thickness (mm)	0.45-1.06	IC394201, IC419489, IC394537, IC524082, IC524076, IC524549, IC524074, IC524085, IC524070 (>0.85 mm)	PRR-1 (0.83 mm)
6.	Pod length (cm)	7.62-10.74	IC421875, IC538983, IC411730, IC524074 (>10.20 cm)	RBL-1 (10.14 cm)
7.	No. of seed per pod	6.24-10.24	IC419806, IC137189, IC421875, IC411730 (>8.80)	PRR-1 (8.65)
8.	No. of pods per cluster	2.35-4.45	IC421926, IC419602, IC538870, IC524075, IC369282 (>4.35)	PRR-2 (4.32)
9.	No. of pods per plant	98.62-229.80	IC524522, IC524074, IC524549, IC421875, IC419602, IC524085, IC538870, IC524068, IC524076, IC394201, IC411730, IC524084, IC243512, IC421926, IC524070, IC419518, IC394537, IC538878, IC419806 (>124.50)	RBL-1 (124.34)
10.	100 seed weight (g)	7.24-13.24	IC524074, IC524549, IC419489, IC524075, IC524070, IC394201, IC524076, IC524522, IC411730, IC419518, IC394537, IC538870, IC524082, IC369282 (>9.22 g)	PRR-1 (9.12)
11.	Seed yield per plant (g)	12.62-75.59	IC419518, IC524070, IC524549, IC524522, IC394537 (42.52 g)	PRR-2 (38.64 g)
12.	Seed yield (q/ha)	2.95-12.19	IC421926, IC524082, IC243512, IC538983, IC419518, IC369282 (>8.30 q/ha)	PRR-2 (7.87 q/ha)
Shimla (Accession 25)				
1.	Days to 50% flowering	88.00-100.00	IC097862, IC108861 (=88.00 days)	PRR-1 (89.00 days)

S.No.	Characters	Range	Promising lines	Value of best check
2.	Days to 80% maturity	110.00-170.00	IC419489, IC108867, IC137171, IC118114-3-1, IC137206, IC24190, IC248733, IC165987, IC248806, IC176563, IC097862, IC173983, IC248804, IC108862, IC185653, IC200087, IC421875, IC419518, IC524068, IC075081-1, IC108861 (<161.00 days)	PRR-2 (161.50 days)
3.	Plant height (cm)	127.50-205.65	IC137189, IC394201, IC394537, IC369282, IC524085, IC243512, IC524068, IC075061, IC504082 (>192.20 cm)	PRR-1 (191.45 cm)
4.	No. of primary branches	2.50-5.50	IC248806, IC075061, IC248804, IC524070, IC108859, IC108866, IC108867, IC137206, IC248733, IC369282, IC419489, IC504075, IC504082, IC528878 (>4.00)	PRR-2 (4.00)
5.	Pod length (cm)	8.30-15.10	IC524549, IC394201, IC165987, IC528983, IC524085, IC075061, IC137189, IC419518 (>13.08 cm)	RBL-1 (12.88 cm)
6.	Stem thickness (mm)	5.97-13.45	IC524070, IC165987, IC176563, IC075081-1, IC524085, IC394201, IC411730, IC504075, IC137206, IC369282, IC419806, IC200087, IC108866, IC524074, IC24190, IC419602, IC075061, IC248804, IC248733, IC524522, IC108863 (>=9.14 mm)	PRR-2 (9.14 mm)
7.	No. of seed per pods	1.00-14.00	IC524549, IC524085, IC165987, IC419518 (>11.40)	PRR-1 (11.25)
8.	100 seed weight (g)	5.54-9.90	IC243512, IC137189, IC504075, IC524070, IC176563, IC524074, IC394201, IC394537, IC075061, IC137171, IC524085, IC528983, IC24190, IC524522, IC200087, IC524068, IC108860, IC108863, IC173983, IC419602, IC504082, IC108859, IC165987, IC419489, IC524549, IC118114-3-1, IC411730, IC369282, IC137206, IC108858, IC421875, IC421926, IC419518, IC097862 (>=6.86 g)	RBL-1 (6.86 g)
9.	Seed yield per plant (g)	9.16-104.17	IC108864, IC108860 (>97.10 g)	PRR-1 (86.70 g)
Best entries over location				
1.	Days to 50% flowering	73.76-80.00	-	PRR-1 (73.76 days)
2.	Days to 80% maturity	127.40-144.00	IC419489 (=127.46 days)	RBL-6 (133.28)
3.	Plant height (cm)	95.98-124.86	IC524085, IC137189, IC394201, IC524070 (>117.30 cm)	PRR-1 (116.88 cm)

S.No.	Characters	Range	Promising lines	Value of best check
4.	Pod length (cm)	8.94-11.22	IC419518, IC394201, IC524549, IC538983 (>10.60 cm)	PRR-2 (10.29 cm)
5.	No. of primary branches	2.99-4.50	IC524070, IC524084, IC524074, IC419489, IC524075, IC524522 (>3.88)	RBL-1 (3.82)
6.	Stem thickness (mm)	3.91-7.16	IC524070, IC524085, IC394201, IC411730, IC524075, IC369282, IC524074, IC419806, IC419602, IC524522, IC243512, IC524080, IC394537 (>4.90 mm)	PRR-2 (4.90 mm)
7.	No. of pods per plant	55.68-102.33	IC524522, IC524074 (>97.10)	RBL-1 (90.67)
8.	No. of seed per pods	7.59-10.20	IC419518 (=10.20)	PRR-1 (9.79)
9.	100 seed weight (g)	6.85-9.53	IC524074, IC394201, IC524070, IC524549, IC419489, IC394537, IC524075, IC137189, IC524068, IC419518, IC538983, IC411730, IC524080, IC524085, IC243512, IC524522 (>7.85 g)	PRR-1 (7.81 g)
10.	Seed yield per plant (g)	17.79-36.53	IC524074 (=36.53)	PRR-2 (35.71 g)
11.	Seed yield (q/ha)	3.70-8.60	IC421926, IC524080, IC243512, IC538983, IC369282 (6.65 q/ha)	PRR-2 (6.35 q/ha)

Table 83. Multilocation evaluation of germplasm lines in rice bean at different locations- Hills (2013)

S.No.	Accession No.	Days to 50% flowering						Days to 80% maturity					
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Palampur	Ranichauri	Shillong	Shimla	Mean
1	IC137189	66.00	76.00	79.00	57.00	99.00	75.40	109.00	130.00	174.00	126.00	165.00	140.80
2	IC243512	69.00	80.00	86.00	63.00	96.00	78.80	112.00	130.00	170.00	133.00	170.00	143.00
3	IC369282	67.00	77.00	85.00	60.00	95.00	76.80	113.00	130.00	170.00	126.00	163.00	140.40
4	IC394201	69.00	78.00	84.00	60.00	98.00	77.80	109.00	129.00	167.00	129.00	162.00	139.20
5	IC394537	68.00	80.00	85.00	60.00	94.00	77.40	112.00	129.00	169.00	116.00	167.00	138.60
6	IC411730	70.00	79.00	82.00	60.00	97.00	77.60	112.00	129.00	160.00	129.00	166.00	139.20
7	IC419489	60.00	77.00	87.00	53.00	99.00	75.20	109.00	131.00	171.00	116.00	110.00	127.40
8	IC419518	68.00	80.00	79.00	63.00	96.00	77.20	112.00	134.00	163.00	129.00	159.00	139.40
9	IC419602	64.00	79.00	88.00	63.00	92.00	77.20	111.00	126.00	172.00	129.00	166.00	140.80
10	IC419806	68.00	79.00	79.00	60.00	94.00	76.00	105.00	130.00	162.00	127.00	161.00	137.00
11	IC421875	70.00	80.00	87.00	63.00	93.00	78.60	112.00	131.00	172.00	133.00	158.00	141.20
12	IC421926	70.00	77.00	83.00	52.00	99.00	76.20	114.00	134.00	167.00	133.00	161.00	141.80
13	IC524068	66.00	78.00	86.00	68.00	100.00	79.60	112.00	130.00	170.00	149.00	159.00	144.00
14	IC524070	61.00	80.00	87.00	57.00	96.00	76.20	105.00	130.00	170.00	126.00	163.00	138.80
15	IC524074	68.00	79.00	85.00	68.00	100.00	80.00	105.00	130.00	169.00	124.00	161.00	137.80
16	IC524075	61.00	79.00	87.00	63.00	96.00	77.20	105.00	130.00	172.00	129.00	166.00	140.40
17	IC524076	67.00	79.00	82.00	64.00	93.00	77.00	109.00	129.00	166.00	123.00	164.00	138.20
18	IC524080	65.00	77.00	84.00	63.00	90.00	75.80	109.00	129.00	168.00	133.00	167.00	141.20
19	IC524084	61.00	77.00	86.00	60.00	93.00	75.40	106.00	132.00	170.00	129.00	169.00	141.20
20	IC524085	61.00	79.00	83.00	60.00	92.00	75.00	105.00	132.00	167.00	129.00	168.00	140.20
21	IC524522	62.00	79.00	87.00	60.00	96.00	76.80	106.00	128.00	172.00	149.00	165.00	144.00
22	IC524549	62.00	80.00	87.00	63.00	94.00	77.20	106.00	129.00	172.00	116.00	163.00	137.20
23	IC538870	70.00	79.00	85.00	60.00	99.00	78.60	109.00	132.00	168.00	126.00	162.00	139.40
24	IC538878	67.00	77.00	82.00	60.00	100.00	77.20	105.00	130.00	166.00	129.00	164.00	138.80
25	IC538983	65.00	76.00	86.00	63.00	93.00	76.60	112.00	130.00	170.00	126.00	161.00	139.80
Mean for check variety													
	PRR-1 (C)	62.00	79.80	87.00	51.00	89.00	73.76	108.00	128.20	171.00	133.00	162.50	140.54
	PRR-2 (C)	59.00	79.20	86.00	63.00	92.00	75.84	103.00	127.00	170.33	133.00	161.50	138.97
	RBL-1 (C)	62.00	79.40		63.00	93.50	74.48	108.00	127.00		133.00	166.50	133.63
	RBL-6 (C)	62.00	79.40		63.00	91.50	73.98	108.00	128.60		133.00	163.50	133.28

S.No.	Accession No.	Days to 50% flowering						Days to 80% maturity					
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Palampur	Ranichauri	Shillong	Shimla	Mean
	Minimum	59.00	76.00	79.00	51.00	89.00	73.76	103.00	126.00	160.00	116.00	110.00	127.40
	Maximum	70.00	80.00	88.00	68.00	100.00	80.00	114.00	134.00	174.00	149.00	170.00	144.00
	Mode	65.17	78.58	84.59	60.79	95.17	76.72	108.66	129.82	168.83	129.17	161.86	139.18
	CD(0.05)	-	1.61	-	-	-	-	-	1.08	-	-	-	-
	CV(%) Error	-	1.47	-	-	-	-	-	0.61	-	-	-	-
	CV(%) Phenotypic	5.44	1.63	3.13	6.50	3.31	-	2.84	1.41	1.95	5.75	6.44	-

S.No.	Accession No.	Plant height (cm)						Number of primary branches				
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Palampur	Shillong	Shimla	Mean
1	IC137189	136.00	86.70	85.60	109.45	205.65	124.68	3.00	2.20	6.34	3.50	3.76
2	IC243512	76.00	90.00	63.40	121.41	195.85	109.33	2.00	2.80	5.41	4.00	3.55
3	IC369282	129.00	80.00	69.10	101.31	197.05	115.29	3.00	2.60	4.34	4.50	3.61
4	IC394201	152.00	78.50	73.60	103.42	201.65	121.83	3.00	2.80	5.00	4.00	3.70
5	IC394537	111.00	85.50	45.00	98.63	198.25	107.68	3.00	2.40	3.62	3.50	3.13
6	IC411730	118.00	94.00	85.20	95.84	175.30	113.67	3.00	2.40	4.67	4.00	3.52
7	IC419489	103.00	84.10	55.60	101.64	165.85	102.04	4.00	2.10	6.34	4.50	4.24
8	IC419518	108.00	89.20	86.00	104.52	156.85	108.91	3.00	2.20	6.32	3.00	3.63
9	IC419602	142.00	85.20	49.20	105.45	175.20	111.41	3.00	2.60	4.30	3.50	3.35
10	IC419806	106.00	90.00	45.00	111.89	165.25	103.63	4.00	2.20	4.62	4.00	3.71
11	IC421875	38.00	86.00	62.00	132.65	172.80	98.29	2.00	2.20	5.21	3.50	3.23
12	IC421926	83.00	85.10	87.00	82.45	177.63	103.04	3.00	2.60	3.36	3.50	3.12
13	IC524068	88.00	92.00	82.20	113.64	195.25	114.22	3.00	2.80	3.64	3.50	3.24
14	IC524070	120.00	88.20	96.40	104.52	177.80	117.38	3.00	3.00	7.00	5.00	4.50
15	IC524074	133.00	90.00	40.40	93.61	156.75	102.75	3.00	2.60	7.64	4.00	4.31
16	IC524075	124.00	82.00	76.40	89.74	177.00	109.83	3.00	2.80	6.60	4.50	4.23
17	IC524076	112.00	85.00	89.20	121.47	156.90	112.91	3.00	2.80	4.62	3.50	3.48
18	IC524080	67.00	78.00	88.60	128.33	192.25	110.84	2.00	2.80	5.34	4.50	3.66
19	IC524084	141.00	78.00	97.20	81.62	186.20	116.80	4.00	2.60	7.34	4.00	4.49
20	IC524085	140.00	90.00	92.20	105.86	196.25	124.86	3.00	2.40	6.34	3.00	3.69
21	IC524522	126.00	88.20	68.20	100.34	178.65	112.28	4.00	2.00	5.61	4.00	3.90
22	IC524549	151.00	80.00	46.60	109.34	168.50	111.09	3.00	2.40	4.35	3.00	3.19
23	IC538870	89.00	85.60	52.80	109.87	169.25	101.30	3.00	2.40	3.36	3.50	3.07
24	IC538878	62.00	80.00	72.80	108.62	156.50	95.98	2.00	2.80	4.30	4.50	3.40
25	IC538983	93.00	82.00	73.60	104.00	176.70	105.86	2.00	2.60	4.36	3.00	2.99
Mean for check variety												
	PRR-1 (C)	102.00	83.97	96.77	110.23	191.45	116.88	3.00	2.48	4.40	3.10	3.25
	PRR-2 (C)	94.00	86.74	92.20	115.16	158.30	109.28	3.00	2.40	5.38	4.00	3.70
	RBL-1 (C)	70.00	86.32		100.72	157.73	103.69	4.00	2.52	5.00	3.75	3.82
	RBL-6 (C)	45.00	84.36		95.84	169.90	98.78	3.00	2.60	5.64	4.00	3.81

S.No.	Accession No.	Plant height (cm)						Number of primary branches				
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Palampur	Shillong	Shimla	Mean
	Minimum	38.00	78.00	40.40	81.62	156.50	95.98	2.00	2.00	3.36	3.00	2.99
	Maximum	152.00	94.00	97.20	132.65	205.65	124.86	4.00	3.00	7.64	5.00	4.50
	Mode	105.48	85.33	73.05	105.57	177.68	109.81	3.00	2.52	5.19	3.81	3.63
	CD(0.05)	-	3.03	-	-	-	-	-	0.27	-	-	-
	CV(%) Error	-	2.58	-	-	-	-	-	7.80	-	-	-
	CV(%) Phenotypic	29.21	5.00	24.85	11.13	8.70	-	19.92	9.97	22.60	14.07	-

S.No.	Accession No.	Pod length (cm)						No. of seeds/pods				
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Ranichauri	Shillong	Shimla	Mean
1	IC137189	9.70	8.60	9.60	9.12	13.10	10.02	9.00	9.30	9.62	9.50	9.36
2	IC243512	9.30	8.40	9.20	9.82	12.80	9.90	9.00	8.00	8.62	7.50	8.28
3	IC369282	10.40	9.00	9.20	8.94	12.78	10.06	9.00	8.20	8.30	9.25	8.69
4	IC394201	11.50	9.00	11.00	9.31	14.30	11.02	9.00	9.20	8.42	11.00	9.41
5	IC394537	10.10	9.00	8.60	9.50	12.40	9.92	8.00	7.20	7.42	8.50	7.78
6	IC411730	10.30	9.00	8.80	10.32	11.80	10.04	8.00	7.40	8.84	8.50	8.19
7	IC419489	11.10	8.50	8.80	9.00	11.90	9.86	9.00	7.40	6.62	10.00	8.26
8	IC419518	12.50	9.20	12.40	8.89	13.10	11.22	10.00	11.40	7.89	11.50	10.20
9	IC419602	10.80	8.70	10.00	9.78	10.60	9.98	9.00	9.40	7.32	7.50	8.31
10	IC419806	9.20	8.60	12.00	9.45	10.75	10.00	8.00	11.20	10.24	8.50	9.49
11	IC421875	9.00	9.50	9.60	10.74	11.90	10.15	7.00	8.50	9.46	10.50	8.87
12	IC421926	10.40	8.20	9.60	8.62	12.40	9.84	9.00	8.40	7.45	11.00	8.96
13	IC524068	8.70	8.70	8.00	9.62	12.15	9.43	7.00	8.20	6.64	8.50	7.59
14	IC524070	9.10	8.60	10.40	8.64	11.25	9.60	9.00	9.20	7.32	9.00	8.63
15	IC524074	9.40	9.00	9.60	10.21	10.15	9.67	8.00	8.40	8.34	7.50	8.06
16	IC524075	9.20	9.00	9.60	7.62	11.10	9.30	8.00	8.40	6.24	9.00	7.91
17	IC524076	10.10	8.60	10.00	9.62	11.55	9.97	9.00	9.40	8.21	11.00	9.40
18	IC524080	5.70	8.50	11.00	8.36	11.15	8.94	5.00	10.40	7.24	9.00	7.91
19	IC524084	11.10	9.00	8.60	8.68	11.55	9.79	9.00	7.20	6.64	10.50	8.34
20	IC524085	9.60	9.60	8.60	8.54	13.40	9.95	8.00	7.40	7.34	13.00	8.94
21	IC524522	11.30	8.40	9.20	8.74	11.75	9.88	10.00	8.20	7.20	10.00	8.85
22	IC524549	11.90	8.60	9.00	9.42	15.10	10.80	9.00	8.00	8.00	14.00	9.75
23	IC538870	7.80	8.50	11.80	8.63	12.40	9.83	7.00	10.40	8.64	11.00	9.26
24	IC538878	9.60	9.80	11.60	8.56	11.35	10.18	9.00	10.50	8.64	9.50	9.41
25	IC538983	11.60	8.60	9.20	10.34	13.50	10.65	10.00	8.20	8.45	11.00	9.41
Mean for check variety												
	PRR-1 (C)	9.10	8.80	11.40	9.34	10.30	9.79	9.00	10.27	8.65	11.25	9.79
	PRR-2 (C)	11.20	9.02	10.33	9.18	11.70	10.29	10.00	9.27	7.10	10.75	9.28
	RBL-1 (C)	9.00	8.70		10.14	12.88	10.18	8.00		7.62	10.00	8.54
	RBL-6 (C)	9.30	8.72		8.41	11.40	9.46	8.00		7.84	10.25	8.70

S.No.	Accession No.	Pod length (cm)						No. of seeds/pods				
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Almora	Ranichauri	Shillong	Shimla	Mean
	Minimum	5.70	8.20	8.00	7.62	10.15	8.94	5.00	7.20	6.24	7.50	7.59
	Maximum	12.50	9.80	12.40	10.74	15.10	11.22	10.00	11.40	10.24	14.00	10.20
	Mode	9.93	8.82	9.89	9.23	12.09	9.99	8.52	8.85	7.94	9.95	8.81
	CD(0.05)	-	0.63	-	-	-	-	-	-	-	-	-
	CV(%) Error	-	5.22	-	-	-	-	-	-	-	-	-
	CV(%) Phenotypic	13.83	4.19	11.99	7.79	9.53	-	12.79	13.73	12.03	15.51	-

S.No.	Accession No.	No. of pod per plant				Stem thickness (mm)			Seed yield per plant (g)					
		Palampur	Ranichauri	Shillong	Mean	Shillong	Shimla	Mean	Almora	Palampur	Ranichauri	Shillong	Shimla	Mean
1	IC137189	65.00	11.40	120.36	65.59	0.73	8.73	4.73	8.40	15.00	11.20	25.62	42.73	20.59
2	IC243512	54.00	16.80	145.62	72.14	0.76	9.12	4.94	0.80	15.00	13.00	33.21	40.22	20.45
3	IC369282	44.00	12.80	110.25	55.68	0.76	10.47	5.62	6.40	20.00	12.60	34.64	28.04	20.34
4	IC394201	50.00	15.00	160.24	75.08	1.06	11.15	6.11	16.00	15.00	12.50	20.31	25.16	17.79
5	IC394537	45.00	12.00	132.62	63.21	0.96	8.85	4.91	9.20	28.00	30.50	42.56	22.96	26.64
6	IC411730	65.00	19.20	154.62	79.61	0.66	10.99	5.83	12.00	20.00	17.20	12.62	38.06	19.98
7	IC419489	60.00	12.40	98.62	57.01	0.96	7.19	4.08	11.20	20.00	27.50	32.56	47.87	27.83
8	IC419518	54.00	14.60	135.64	68.08	0.60	7.90	4.25	16.00	25.00	13.90	75.59	39.59	34.02
9	IC419602	63.00	9.00	180.80	84.27	0.80	9.52	5.16	7.60	20.00	17.60	21.47	25.12	18.36
10	IC419806	56.00	15.20	124.56	65.25	0.45	10.14	5.30	7.20	30.00	15.00	28.64	27.09	21.59
11	IC421875	68.00	12.40	188.74	89.71	0.66	8.84	4.75	2.00	15.00	17.80	24.62	44.28	20.74
12	IC421926	58.00	12.40	144.25	71.55	0.63	8.22	4.43	2.40	20.00	14.70	26.36	30.08	18.71
13	IC524068	63.00	12.80	171.20	82.33	0.73	7.09	3.91	10.00	22.00	12.60	35.45	42.26	24.46
14	IC524070	65.00	12.20	142.36	73.19	0.86	13.45	7.16	13.20	25.00	16.20	68.95	35.15	31.70
15	IC524074	51.00	11.20	229.20	97.13	0.90	9.82	5.36	18.80	25.00	54.80	35.62	48.45	36.53
16	IC524075	55.00	14.80	114.56	61.45	0.73	10.86	5.80	12.00	25.00	24.40	14.62	33.13	21.83
17	IC524076	58.00	14.20	162.34	78.18	0.93	7.68	4.31	10.80	20.00	10.90	21.36	41.73	20.96
18	IC524080	52.00	11.40	120.34	61.25	0.93	8.90	4.92	2.80	30.00	18.70	24.35	29.71	21.11
19	IC524084	64.00	13.80	146.78	74.86	0.56	8.20	4.38	10.80	20.00	14.70	24.65	43.60	22.75
20	IC524085	59.00	12.60	180.64	84.08	0.86	11.46	6.16	8.00	15.00	38.00	18.25	53.42	26.53
21	IC524522	62.00	15.20	229.80	102.33	0.76	9.26	5.01	10.80	22.00	17.40	47.52	49.20	29.38
22	IC524549	58.00	12.20	189.65	86.62	0.90	8.49	4.70	10.00	20.00	37.70	52.62	29.56	29.98
23	IC538870	64.00	7.60	178.96	83.52	0.76	8.16	4.46	8.40	12.00	44.40	18.69	36.02	23.90
24	IC538878	70.00	10.60	126.35	68.98	0.83	8.42	4.63	6.00	20.00	17.20	20.24	41.27	20.94
25	IC538983	65.00	12.20	112.36	63.19	0.73	7.33	4.03	1.20	25.00	19.10	20.32	57.93	24.71
Mean for check variety														
	PRR-1 (C)	54.60	14.53	112.34	60.49	0.83	7.38	4.10	6.80	23.20	35.03	22.62	86.70	34.87
	PRR-2 (C)	57.60	15.47	108.62	60.56	0.66	9.14	4.90	12.00	19.40	37.57	38.64	70.94	35.71
	RBL-1 (C)	57.00		124.34	90.67	0.80	8.92	4.86	9.60	23.20		21.34	46.10	25.06
	RBL-6 (C)	54.40		120.65	87.53	0.70	8.14	4.42	3.20	20.60		20.34	67.67	27.95

S.No.	Accession No.	No. of pod per plant				Stem thickness (mm)			Seed yield per plant (g)					
		Palampur	Ranichauri	Shillong	Mean	Shillong	Shimla	Mean	Almora	Palampur	Ranichauri	Shillong	Shimla	Mean
	Minimum	44.00	7.60	98.62	55.68	0.45	7.09	3.91	0.80	12.00	10.90	12.62	22.96	17.79
	Maximum	70.00	19.20	229.80	102.33	1.06	13.45	7.16	18.80	30.00	54.80	75.59	86.70	36.53
	Mode	58.33	13.11	147.13	74.60	0.78	9.10	4.94	8.74	21.05	22.30	30.48	42.21	25.01
	CD(0.05)	10.32	-	-	-	-	-	-	-	4.89	-	-	-	-
	CV(%) Error	13.38	-	-	-	-	-	-	-	16.41	-	-	-	-
	CV(%) Phenotypic	11.06	18.08	23.71	-	17.37	16.21	-	51.78	21.54	52.50	49.30	34.72	-

S.No.	Accession No.	100 seed weight (g)						Seed yield (q/ha)			Ranichauri	Shillong
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Palampur	Shillong	Mean	No. of leaves per plant	No. of pods/cluster
1	IC137189	8.35	7.50	8.00	8.40	9.73	8.40	5.67	6.47	6.07	32.20	2.35
2	IC243512	6.27	6.90	8.00	8.70	9.90	7.95	5.11	11.41	8.26	28.20	3.64
3	IC369282	6.58	8.00	7.20	9.24	7.23	7.65	5.00	8.36	6.68	22.60	4.36
4	IC394201	7.72	8.20	8.30	10.82	9.08	8.82	4.56	4.72	4.64	29.40	3.42
5	IC394537	9.36	8.00	7.90	9.68	8.66	8.72	4.11	3.94	4.03	26.20	2.65
6	IC411730	9.24	7.30	6.70	10.23	7.31	8.16	2.78	6.37	4.57	24.30	3.64
7	IC419489	9.96	7.00	7.00	12.24	7.56	8.75	4.72	4.62	4.67	29.40	2.82
8	IC419518	7.94	8.20	8.20	10.12	6.97	8.29	3.61	8.70	6.15	30.20	2.67
9	IC419602	7.18	6.50	7.90	7.24	7.66	7.30	4.44	5.36	4.90	32.40	4.45
10	IC419806	7.87	6.00	7.60	8.24	5.54	7.05	4.44	7.77	6.11	25.40	3.36
11	IC421875	6.08	7.00	6.80	7.24	7.13	6.85	4.44	7.19	5.82	26.40	4.21
12	IC421926	7.36	6.60	8.00	7.25	7.12	7.27	5.00	12.19	8.60	31.60	4.45
13	IC524068	8.88	7.00	9.00	8.96	7.69	8.31	4.17	7.76	5.97	35.60	2.64
14	IC524070	8.26	7.40	7.70	11.24	9.46	8.81	4.44	6.69	5.57	37.10	3.44
15	IC524074	7.88	8.40	9.00	13.24	9.13	9.53	3.89	5.36	4.63	32.60	4.21
16	IC524075	7.09	6.00	8.40	11.25	9.56	8.46	4.44	2.95	3.70	37.40	4.40
17	IC524076	7.63	6.50	8.20	10.25	5.97	7.71	5.44	4.11	4.78	33.40	3.21
18	IC524080	7.63	7.00	8.70	9.63	7.65	8.12	4.44	12.19	8.32	32.20	3.82
19	IC524084	7.23	7.40	8.00	8.97	6.83	7.69	4.17	3.87	4.02	26.60	3.98
20	IC524085	9.15	6.50	8.10	8.61	8.11	8.09	4.72	5.32	5.02	29.40	3.82
21	IC524522	8.32	6.50	6.60	10.24	7.81	7.89	4.44	7.20	5.82	32.40	3.20
22	IC524549	8.01	7.00	9.30	12.34	7.39	8.81	3.78	4.87	4.32	36.20	3.84
23	IC538870	7.01	7.50	6.90	9.64	6.48	7.51	5.56	5.37	5.47	22.40	4.42
24	IC538878	7.10	6.00	8.70	8.24	6.72	7.35	4.56	4.64	4.60	28.40	4.00
25	IC538983	7.73	7.80	9.20	8.40	8.08	8.24	4.72	10.26	7.49	36.40	2.82
Mean for check variety												
	PRR-1 (C)	6.84	7.70	8.67	9.12	6.72	7.81	3.80	5.36	4.58	36.47	3.56
	PRR-2 (C)	6.43	7.24	9.00	7.36	5.84	7.17	4.82	7.87	6.35	37.33	4.32
	RBL-1 (C)	6.88	7.76		8.41	6.86	7.48	4.02	5.16	4.59		3.84
	RBL-6 (C)	7.32	8.04		7.54	6.10	7.25	4.32	7.19	5.76		3.42

S.No.	Accession No.	100 seed weight (g)						Seed yield (q/ha)			Ranichauri	Shillong
		Almora	Palampur	Ranichauri	Shillong	Shimla	Mean	Palampur	Shillong	Mean	No. of leaves per plant	No. of pods/cluster
	Minimum	6.08	6.00	6.60	7.24	5.54	6.85	2.78	2.95	3.70	22.40	2.35
	Maximum	9.96	8.40	9.30	13.24	9.90	9.53	5.67	12.19	8.60	37.40	4.45
	Mode	7.70	7.20	8.04	9.41	7.60	7.98	4.47	6.66	5.57	30.82	3.62
	CD(0.05)	-	0.60	-	-	-	-	1.31	-	-	-	-
	CV(%) Error	-	5.64	-	-	-	-	22.41	-	-	-	-
	CV(%) Phenotypic	12.51	9.66	9.78	17.04	15.86	-	13.55	36.99	-	14.89	17.35

Table 82. Characterization of germplasm lines in rice bean at different locations - Hills (2013)

S.No.	Accession No.	Early plant vigour				Plant growth habit				Plant habit			Flower colour				Leaflet shape				Leaflet size				Pod shattering				Pod colour				Seed shape			Shimla
		Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Palampur	Shimla	Mode	Flowering behaviour
1	IC137189	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
2	IC243512	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
3	IC369282	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
4	IC394201	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
5	IC394537	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
6	IC411730	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
7	IC419489	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
8	IC419518	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
9	IC419602	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
10	IC419806	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
11	IC421875	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
12	IC421926	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
13	IC524068	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
14	IC524070	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
15	IC524074	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
16	IC524075	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
17	IC524076	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
18	IC524080	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
19	IC524084	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
20	IC524085	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
21	IC524522	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
22	IC524549	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
23	IC538870	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	
24	IC538878	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1	
25	IC538983	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1	

S.No.	Accession No.	Early plant vigour				Plant growth habit				Plant habit			Flower colour				Leaflet shape				Leaflet size				Pod shattering				Pod colour				Seed shape			Shimla		
		Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Almora	Palampur	Shimla	Mode	Palampur	Shimla	Mode	Flowering behaviour		
Mean for check variety																																						
	PRR-1 (C)	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1
	PRR-2 (C)	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1
	RBL-1 (C)	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1
	RBL-6 (C)	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1
	Minimum	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	3	5	1	1	1	1	2	4	2	2	1	1	1	1
	Maximum	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1
	Mode	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	5	5	5	5	1	1	1	1	2	4	2	2	1	1	1	1

Qualitative characters : **Early plant vigour:** 1 - Poor, 2 - Good, 3 - Very good, 99 - Others; **Plant growth habit:** 1 - Erect, 2 Spreading, 3 - Tralling, 99 - Others; **Plant habit:** 1 - Determinate, 2 - Semi- determinate, 3 - Indeterminate, 99 - Others; **Flower colour:** 1 - White, 2 - Violet, 3 - Yellow, 4 - Red, 5 - Pink, 6 - Light brown, 7 - Dark brown, 99 - Others; **Leaflet shape:** 1 - Narrow (elongate), 2 - Intermediate (sub elliptic), 3 - Round (sub orbicular), 99 - Others; **Leaflet size :** 3 - Small, 5 - Medium 7 - Large, 99 - Others; **Pod shattering:** 0 - Absent, 1 - Present; **Pod colour:** 1 - Light yellow, 2 - Brown, 3 - Dark brown, 4 - Black, 99 - Others; **Seed shape:** 1 - Cylindrical, 2 - Round, 3 - Flattened, 99 - Others; **Biotic stress susceptibility :** 1 - Very low or Visible sing of susceptibility, 3 - Low, 5 - Intermediate, 7 - High, 9 - Very high

Table 84. Promising lines in adzukibean germplasm for various characters at various locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Palampur (Accession 25)				
1.	Days to 50% flowering	36.67-74.67	EC095257, EC087896, EC059489 (<41.00 days)	Totru Local (42.33 days)
2.	Days to maturity	88.33-109.67	-	Totru Local (88.33 days)
3.	Plant height (cm)	35.23-77.77	EC340245, EC018257, EC087815, EC340254, EC036070, EC008707, EC000249, EC034264, EC281186, IC108857, IC030270, EC340288, EC059489, EC087071, EC340287, EC095257, EC080850, IC341944, IC108854, IC341941 (> 47.10 cm)	HPU-51 (45.03 cm)
4.	No. of primary branches per plant	1.87-3.07	IC341944, EC087896, EC080850, EC000372, EC340254, EC000249, EC281186 (>2.50)	Totru Local (2.47)
5.	Pod length (cm)	6.97-7.93	IC030270, EC018257, IC024522, EC000372, EC008707, EC000248, EC059489, IC341941, IC108857 (>=7.50 cm)	Totru Local (7.50)
6.	Pod width (cm)	0.30-0.43	EC095257 (=0.43 cm)	HPU-51 (0.43 cm)
7.	No. of seed per pod	5.80-9.00	EC018257, IC108857, EC036070, EC087815, EC000372, EC059489, EC000249, IC108854, EC340286, EC034264, EC340254, EC340287, EC340288, IC341944, IC341941, IC024522, EC008707, EC080850, EC000248, EC340245, EC087071, IC030270, EC281186, EC087896 (>6.45)	HPU-51 (6.20)
8.	No. of clusters per plant	4.33-13.00	EC034264, EC000249, EC087815, EC340254, EC059489, IC030270, EC281186, EC008707, EC000248, EC018257, EC036070, EC340245, IC108857, EC095257, EC080850, EC340288, IC341944, IC108854, IC341941, IC024522, EC087071, EC087896 (> 7.30)	HPU-51 (7.00)
9.	No. of pods per clusters	7.93-22.53	EC036070, EC340254, EC000248, EC087815, IC341941, EC034264, IC024522, EC008707, EC281186, EC059489, EC095257, EC018257, IC030270, IC108854, EC000372, IC108857 (>13.99)	HPU-51 (13.67)
10.	100 seed weight(g)	6.84-9.99	-	HPU-51 (9.99 g)

S. No.	Characters	Range	Promising lines	Value of best check
11.	Seed yield per plant (g)	0.02-0.13	EC340254, EC036070, IC341941, IC341944 (>0.11 g)	HPU-51 (0.10 g)
Ranichauri (Accession 25)				
1.	Days to 50% flowering	47.67-62.67	-	Totru Local (47.67 days)
2.	Days to maturity	97.67-112.67	-	Totru Local (97.67)
3.	Plant height (cm)	24.23-64.67	EC000249, EC281186, EC000248, EC340245, IC341944, EC000372, EC340254, IC024522, EC087071, EC087896 (>44.70 cm)	Totru Local (44.47)
5.	Pod length (cm)	5.67-10.33	IC024522, EC087815, EC340245, EC340287, EC340286 (>9.65 cm)	Totru Local (9.67)
6.	No. of pods per plant	5.00-13.33	IC108857, EC087071, EC340254 (>10.70)	HPU-51 (10.73)
7.	No. of seeds per plant	4.47-9.47	IC024522 (=9.47)	Totru Local (8.73)
8.	No. of leaves per plant	17.67-31.43	EC008770, EC340245, EC000372, EC087815, EC281186 (>26.50)	Totru Local (26.07)
10.	100 seed weight(g)	8.76-16.23	EC087896, EC340245, EC000372, EC087815, IC341944, EC340287, EC340254, EC087071, EC015257, EC281186, EC000248, EC000249, EC340288, EC340286, EC080850, EC059489, EC018257 (>11.25 g)	HPU-51 (10.64)
11.	Seed yield per plant (g)	2.67-4.31	-	HPU-51 (4.31 g)
Shimla (Accession 25)				
1.	Days to 50% flowering	56.00-67.00	EC015257, EC000249, IC030270 (<=58.00 days)	Toru Local (58.00 days)
2.	Days to maturity	98.00-120.00	EC080850, EC034264, EC087071, EC087815, EC340254, EC008707, EC036070, EC087896, EC340245, EC340286, EC000249, EC000372, EC281186, EC059489, EC015257, EC000248, IC024522, IC341944 (<111.00 days)	HPU-51 (111.00 days)
3.	Plant height (cm)	28.25-110.45	EC015257, EC340287, EC340245, IC108854, EC034264, EC340254, EC000249, EC008707, EC087815, EC340288, EC000372, IC024522,	HPU-51 (63.55 cm)

S. No.	Characters	Range	Promising lines	Value of best check
			IC108857, IC341941, IC341944, EC036070, EC018257, EC059489, EC281186 (>63.90 cm)	
4.	No. of primary branches per plant	1.00-3.33	EC340288, IC108854, EC340254, EC087815, EC281186, EC340245, EC340287, IC030270, IC108857, EC034264, EC000249, EC000372, EC018257, EC059489, IC024522, IC341941, IC341944, EC080850 (>1.60)	HPU-51 (1.33)
5.	No. of cluster per plant	5.66-13.00	EC340254, IC341941, EC018257, EC340245 (>=12.50)	HPU-51 (12.50)
6.	No. of pod per cluster	2.00-4.50	IC108854, EC087815, EC000372, EC008707, EC015257, EC036070, EC080850, EC087071, IC030270, IC341941 (>=3.50)	HPU-51 (3.50)
7.	No. of pod per plant	11.66-42.85	EC340254, IC341941, EC018257, EC087815, EC000372, EC087071 (>35.70)	HPU-51 (35.00)
8.	No. of seed per pod	6.50-9.55	IC341944, EC080850, EC087071, EC340287, IC024522, IC108857 (>=9.50)	Totru local (9.50)
9.	100 seed weight(g)	4.49-17.65	EC000248, EC034264, EC281186, EC008707, EC340254, IC108857, EC087896, IC341941, EC036070(>11.25 g)	HPU-51 (11.20 g)
10.	Seed yield per plant (g)	7.59-45.25	EC340254, EC000248, IC341941, EC087071 (>37.95 g)	HPU-51 (35.91 g)
Best entries over location				
1.	Days to 50% flowering	49.33-66.45	-	Totru Local (49.33 days)
2.	Days to maturity	98.33-112.45	EC008707, EC080850, EC087815, EC000249, EC087071, EC340254 (<99.60 days)	Totru Local (99.67)
3.	Plant height (cm)	36.37-81.15	EC340245, EC000249, EC340254, EC015257, EC340287, EC034264, EC281186, IC108854, EC018257, EC087815, IC108857, IC341944, EC008707, EC340288, EC000372, IC024522, EC036070, IC030270, EC087071, EC059489, IC341941 (>49.70 cm)	HPU-51 (49.64)
4.	No. of primary branches per plant	1.60-2.77	EC340288, IC108854, EC340254, IC341944, EC281186, EC034264, EC000372, EC087815, IC030270, IC108857, EC000249, IC024522, EC340245, EC340287, EC018257, EC080850, EC059489, IC341941, EC087896, EC015257 (>=1.90)	Totru Local (1.90)
5.	Pod length (cm)	6.49-9.05	IC024522 (=9.05 cm)	Totru Local (8.59)

S. No.	Characters	Range	Promising lines	Value of best check
6.	No. of pods per plant	9.00-26.79	EC340254, IC341941, EC087071, EC000372, EC018257 (> 22.90)	HPU-51 (22.87)
7.	No. of seed per pod	6.29-8.66	IC024522, EC087815 (8.18)	Totru Local (8.14)
8.	No. of cluster per plant	6.42-12.00	EC340254, EC018257, EC340245, EC087815, EC000248, EC034264, EC281186, IC030270, EC000249, IC341941 (>10.15)	HPU-51 (9.75)
9.	No. of pod per cluster	5.50-13.02	EC036070, EC087815, EC340254, IC341941, EC000248, EC034264, IC024522, EC008707, EC015257, EC059489, EC281186, EC018257, IC108854, IC030270, EC000372 (>9.20)	HPU-51 (8.58)
10.	100 seed weight (g)	7.17-12.52	EC000248, EC281186, EC087896, EC034264, IC341944, EC340254, EC000372, EC340287 (> 10.60 g)	HPU-51 (10.61 g)
11.	Seed yield per plant (g)	3.59-16.08	EC340254, EC000248, IC341941, EC087071 (>13.55 g)	HPU-51 (13.44 g)

Table 86. Multilocation evaluation of germplasm lines in adzuki bean at different locations- Hills Kharif :2013

S.No.	Accession. No.	Days to 50% flowering				Days to 80% maturity				Plant height (cm)			
		Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean
1	EC000248	52.67	59.67	66.00	59.45	90.33	107.67	107.00	101.67	36.70	62.33	41.60	46.88
2	EC000249	46.33	56.67	58.00	53.67	92.00	104.33	102.00	99.44	56.67	64.67	86.10	69.15
3	EC000372	47.00	58.67	60.00	55.22	90.33	106.67	102.00	99.67	41.83	47.47	72.80	54.03
4	EC008707	46.00	56.33	59.00	53.78	90.67	104.33	100.00	98.33	57.13	25.33	84.30	55.59
5	EC015257	36.67	60.67	56.00	51.11	93.00	108.67	106.00	102.56	48.87	38.47	110.45	65.93
6	EC018257	74.67	58.67	66.00	66.45	109.67	107.67	120.00	112.45	76.23	36.33	64.50	59.02
7	EC034264	48.33	60.33	63.00	57.22	91.67	109.67	99.00	100.11	56.33	42.33	90.90	63.19
8	EC036070	48.67	58.67	62.00	56.45	93.00	107.67	100.00	100.22	60.77	33.47	64.60	52.95
9	EC059489	42.00	56.67	59.00	52.56	91.00	105.33	105.00	100.44	50.40	35.73	64.15	50.09
10	EC080850	47.67	60.33	66.00	58.00	89.67	108.67	98.00	98.78	48.87	38.33	49.60	45.60
11	EC087071	47.33	62.67	59.00	56.33	88.67	110.67	99.00	99.45	50.33	45.47	54.75	50.18
12	EC087815	44.67	57.67	59.00	53.78	93.00	105.33	99.00	99.11	73.27	24.23	74.10	57.20
13	EC087896	37.67	60.33	61.00	53.00	92.67	109.67	100.00	100.78	36.13	44.73	28.25	36.37
14	EC281186	48.00	58.67	61.00	55.89	92.00	106.33	102.00	100.11	55.20	63.23	64.00	60.81
15	EC340245	42.67	61.33	67.00	57.00	90.67	109.67	100.00	100.11	77.77	59.67	106.00	81.15
16	EC340254	49.00	58.67	60.00	55.89	92.00	107.67	99.00	99.56	63.53	47.47	90.50	67.17
17	EC340286	45.33	60.33	59.00	54.89	90.33	109.67	101.00	100.33	44.40	37.27	46.35	42.67
18	EC340287	47.00	58.67	60.00	55.22	91.67	106.33	117.00	105.00	48.93	38.47	109.55	65.65
19	EC340288	45.33	62.33	66.00	57.89	91.00	111.67	113.00	105.22	52.60	38.33	73.96	54.96
20	IC024522	45.67	55.67	59.00	53.45	91.33	105.33	109.00	101.89	40.13	47.40	72.50	53.34
21	IC030270	43.00	62.33	58.00	54.44	92.00	112.67	111.00	105.22	53.57	41.80	60.60	51.99
22	IC108854	48.00	58.67	66.00	57.56	92.00	107.33	113.00	104.11	47.30	37.73	92.20	59.08
23	IC108857	47.00	56.67	61.00	54.89	92.33	105.67	111.00	103.00	53.93	43.60	70.20	55.91

S.No.	Accession. No.	Days to 50% flowering				Days to 80% maturity				Plant height (cm)			
		Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean
24	IC341941	47.00	60.33	60.00	55.78	91.33	110.33	116.00	105.89	47.20	32.40	69.65	49.75
25	IC341944	46.67	58.67	59.00	54.78	91.67	107.67	110.00	103.11	47.50	54.63	64.85	55.66
Mean for check variety													
	HPU-51 (C)	47.33	52.67	60.00	53.33	89.67	102.67	111.00	101.11	45.03	40.33	63.55	49.64
	Totru Local (C)	42.33	47.67	58.00	49.33	88.33	97.67	113.00	99.67	35.23	44.47	62.60	47.43
	Minmum	36.67	47.67	56.00	49.33	88.33	97.67	98.00	98.33	35.23	24.23	28.25	36.37
	Maximum	74.67	62.67	67.00	66.45	109.67	112.67	120.00	112.45	77.77	64.67	110.45	81.15
	Mean	46.81	58.52	61.04	55.46	91.93	107.30	106.04	101.75	52.07	43.17	71.58	55.61
	CD(0.05)	2.33	-	-	-	2.17	-	-	-	3.43	-	-	-
	CV(%) Error	3.11	-	-	-	1.48	-	-	-	4.12	-	-	-
	CV(%) Phenotypic	13.88	5.33	5.09	-	4.08	2.85	6.25	-	21.35	24.27	27.93	-

S.No.	Accession. No.	Number of primary branches			Pod length (cm)			No. of pods per plant			No. of seed per pod			
		Palampur	Shimla	Mean	Palampur	Ranichauri	Mean	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean
1	EC000248	1.93	1.33	1.63	7.57	8.73	8.15	9.73	33.00	21.37	7.00	6.73	7.50	7.08
2	EC000249	2.53	2.00	2.27	7.03	8.07	7.55	9.07	16.00	12.54	7.47	6.07	7.00	6.85
3	EC000372	2.73	2.00	2.37	7.73	8.73	8.23	10.33	36.50	23.42	7.60	8.47	6.50	7.52
4	EC008707	1.87	1.33	1.60	7.67	8.07	7.87	8.43	27.75	18.09	7.00	7.33	6.50	6.94
5	EC015257	2.47	1.33	1.90	7.27	8.73	8.00	8.27	24.50	16.39	5.80	6.07	7.00	6.29
6	EC018257	2.40	2.00	2.20	7.80	8.33	8.07	7.33	38.50	22.92	9.00	6.33	7.50	7.61
7	EC034264	2.47	2.30	2.38	7.30	7.73	7.52	7.43	16.50	11.97	7.33	5.73	8.50	7.19
8	EC036070	2.40	1.00	1.70	6.97	9.07	8.02	9.40	28.50	18.95	7.93	8.33	7.50	7.92
9	EC059489	2.33	2.00	2.17	7.53	7.33	7.43	5.00	25.65	15.33	7.53	5.73	8.00	7.09
10	EC080850	2.73	1.66	2.20	7.40	6.73	7.07	6.07	27.50	16.79	7.00	5.33	9.50	7.28
11	EC087071	2.27	1.33	1.80	7.30	5.67	6.49	13.00	35.75	24.38	6.87	4.73	9.50	7.03
12	EC087815	2.40	2.33	2.37	7.30	9.73	8.52	6.73	38.25	22.49	7.73	8.33	8.55	8.20
13	EC087896	2.80	1.33	2.07	7.00	7.07	7.04	6.33	11.66	9.00	6.47	6.33	8.50	7.10
14	EC281186	2.53	2.33	2.43	7.13	6.33	6.73	5.07	25.75	15.41	6.53	5.47	8.50	6.83
15	EC340245	2.13	2.33	2.23	7.13	9.73	8.43	9.73	29.50	19.62	6.93	7.73	6.55	7.07
16	EC340254	2.73	2.66	2.70	7.00	8.67	7.84	10.73	42.85	26.79	7.13	7.53	8.50	7.72
17	EC340286	2.27	1.33	1.80	7.23	9.67	8.45	7.47	17.00	12.24	7.33	7.73	7.50	7.52
18	EC340287	2.13	2.33	2.23	7.37	9.73	8.55	7.47	23.85	15.66	7.13	7.33	9.50	7.99
19	EC340288	2.20	3.33	2.77	7.37	7.67	7.52	8.43	18.65	13.54	7.07	6.33	8.50	7.30
20	IC024522	2.47	2.00	2.23	7.77	10.33	9.05	9.23	15.50	12.37	7.00	9.47	9.50	8.66
21	IC030270	2.33	2.33	2.33	7.93	8.43	8.18	9.13	29.50	19.32	6.80	6.67	8.00	7.16
22	IC108854	2.07	3.33	2.70	7.30	7.43	7.37	7.67	28.20	17.94	7.47	5.07	8.50	7.01
23	IC108857	2.33	2.33	2.33	7.50	7.33	7.42	13.33	27.50	20.42	8.07	5.73	9.50	7.77

S.No.	Accession. No.	Number of primary branches			Pod length (cm)			No. of pods per plant			No. of seed per pod			
		Palampur	Shimla	Mean	Palampur	Ranichauri	Mean	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean
24	IC341941	2.13	2.00	2.07	7.50	6.47	6.99	9.33	42.50	25.92	7.07	4.47	8.50	6.68
25	IC341944	3.07	2.00	2.53	7.20	7.33	7.27	7.73	20.50	14.12	7.07	5.47	9.55	7.36
Mean for check variety														
	HPU-51 (C)	2.27	1.33	1.80	7.17	7.73	7.45	10.73	35.00	22.87	6.20	6.33	9.00	7.18
	Totru Local (C)	2.47	1.33	1.90	7.50	9.67	8.59	9.73	18.00	13.87	6.20	8.73	9.50	8.14
	Minmum	1.87	1.00	1.60	6.97	5.67	6.49	5.00	11.66	9.00	5.80	4.47	6.50	6.29
	Maximum	3.07	3.33	2.77	7.93	10.33	9.05	13.33	42.85	26.79	9.00	9.47	9.55	8.66
	Mean	2.39	1.96	2.17	7.37	8.17	7.77	8.63	27.20	17.91	7.14	6.65	8.26	7.35
	CD(0.05)	0.36	-	-	0.48	-	-	-	-	-	0.36	-	-	-
	CV(%) Error	9.54	-	-	4.09	-	-	-	-	-	3.12	-	-	-
	CV(%) Phenotypic	11.38	30.65	-	3.55	14.74	-	23.57	31.80	-	8.97	19.64	12.25	-

S.No.	Accession. No.	No. of cluster per plant			No. of pod per cluster			Seed yield per plant (g)				100 seed weight (g)				Pod width (cm)	No. of leaves per plant
		Palampur	Shimla	Mean	Palampur	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri
1	EC000248	9.67	11.50	10.58	21.27	2.50	11.88	0.05	2.80	44.05	15.63	7.67	12.24	17.65	12.52	0.40	22.43
2	EC000249	11.67	8.75	10.21	10.67	2.00	6.33	0.09	3.01	11.75	4.95	8.29	12.22	10.51	10.34	0.37	21.07
3	EC000372	6.00	8.00	7.00	15.00	3.50	9.25	0.06	3.15	24.07	9.09	7.56	14.39	10.65	10.87	0.37	28.73
4	EC008707	9.67	8.00	8.83	18.67	3.50	11.08	0.10	2.67	15.96	6.24	7.91	10.32	12.95	10.39	0.33	31.43
5	EC015257	8.33	7.66	8.00	17.60	3.50	10.55	0.08	2.79	11.87	4.92	6.84	12.31	7.14	8.76	0.43	20.33
6	EC018257	9.33	12.50	10.92	17.00	3.00	10.00	0.08	3.11	29.84	11.01	9.75	11.27	10.61	10.54	0.40	17.67
7	EC034264	13.00	8.00	10.50	20.33	2.50	11.42	0.11	3.25	20.94	8.10	8.17	10.34	15.16	11.22	0.40	23.33
8	EC036070	9.33	9.50	9.42	22.53	3.50	13.02	0.12	3.12	30.76	11.33	8.58	8.76	11.29	9.54	0.40	21.43
9	EC059489	10.33	8.50	9.42	17.67	3.00	10.33	0.10	2.74	17.60	6.81	7.73	11.31	8.45	9.16	0.40	22.07
10	EC080850	8.00	9.00	8.50	11.00	3.50	7.25	0.04	3.09	25.30	9.48	7.86	11.36	10.12	9.78	0.40	19.53
11	EC087071	7.33	11.50	9.42	7.93	3.50	5.72	0.06	2.69	37.98	13.57	7.75	12.33	11.18	10.42	0.30	25.43
12	EC087815	11.33	10.40	10.87	21.13	4.00	12.57	0.10	2.90	28.07	10.36	8.67	14.38	8.60	10.55	0.37	27.07
13	EC087896	7.33	5.66	6.50	13.60	2.33	7.97	0.05	3.00	11.62	4.89	7.29	16.23	11.72	11.75	0.37	23.67
14	EC281186	10.33	10.50	10.42	18.07	2.50	10.28	0.09	3.20	33.21	12.17	8.48	12.26	14.54	11.76	0.37	26.53
15	EC340245	9.33	12.50	10.92	10.00	2.00	6.00	0.05	2.95	14.68	5.90	7.09	15.47	7.94	10.17	0.40	29.33
16	EC340254	11.00	13.00	12.00	21.40	3.00	12.20	0.13	2.87	45.25	16.08	8.06	12.42	12.55	11.01	0.40	22.43
17	EC340286	7.00	6.50	6.75	13.33	2.33	7.83	0.11	3.04	12.87	5.34	8.48	11.37	9.64	9.83	0.33	24.07
18	EC340287	6.67	8.50	7.58	8.00	3.00	5.50	0.02	2.74	25.65	9.47	7.43	13.38	11.18	10.66	0.37	22.43
19	EC340288	7.67	8.50	8.08	9.33	3.00	6.17	0.09	3.01	17.89	6.99	8.55	11.76	11.09	10.47	0.40	21.73
20	IC024522	7.33	6.50	6.92	19.60	3.00	11.30	0.05	2.71	15.04	5.93	8.31	9.68	10.82	9.60	0.37	22.33
21	IC030270	10.33	10.50	10.42	15.33	3.50	9.42	0.07	3.10	16.51	6.56	7.70	10.36	7.02	8.36	0.37	20.33
22	IC108854	7.33	7.00	7.17	15.33	4.50	9.92	0.11	2.75	25.79	9.55	7.52	9.74	10.80	9.35	0.37	24.67
23	IC108857	8.33	9.00	8.67	14.00	3.00	8.50	0.07	3.05	33.45	12.19	8.07	10.32	12.02	10.14	0.37	19.43

S.No.	Accession. No.	No. of cluster per plant			No. of pod per cluster			Seed yield per plant (g)				100 seed weight (g)				Pod width (cm)	No. of leaves per plant
		Palampur	Shimla	Mean	Palampur	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri	Shimla	Mean	Palampur	Ranichauri
24	IC341941	7.33	13.00	10.17	20.67	3.50	12.08	0.12	3.05	41.57	14.91	7.38	9.26	11.36	9.33	0.37	20.47
25	IC341944	7.67	8.50	8.08	12.67	2.50	7.58	0.12	3.20	21.07	8.13	7.91	14.34	11.14	11.13	0.37	25.33
Mean for check variety																	
	HPU-51 (C)	7.00	12.50	9.75	13.67	3.50	8.58	0.10	4.31	35.91	13.44	9.99	10.64	11.20	10.61	0.43	23.47
	Totru Local (C)	4.33	8.50	6.42	9.67	2.50	6.08	0.06	3.12	7.59	3.59	7.71	9.32	4.49	7.17	0.33	26.07
	Minmum	4.33	5.66	6.42	7.93	2.00	5.50	0.02	2.67	7.59	3.59	6.84	8.76	4.49	7.17	0.30	17.67
	Maximum	13.00	13.00	12.00	22.53	4.50	13.02	0.13	4.31	45.25	16.08	9.99	16.23	17.65	12.52	0.43	31.43
	Mean	8.63	9.41	9.02	15.39	3.04	9.22	0.08	3.02	24.31	9.14	8.03	11.77	10.81	10.20	0.38	23.44
	CD(0.05)	1.58	-	-	1.69	-	-	0.04	-	-	-	0.79	-	-	-	0.07	-
	CV(%) Error	11.47	-	-	6.85	-	-	31.8	-	-	-	6.12	-	-	-	12.10	-
	CV(%) Phenotypic	22.61	22.58	-	29.21	20.0	-	34.9	10.3	44.21	-	8.82	16.52	24.29	-	8.07	13.93

Table 85. Characterization of germplasm lines in adzuki bean at Palampur and Shimla - Hills Kharif :2013

S.No.	Accession. No.	Early plant vigour		Plant growth habit		Leaf colour		Leaf surface		Leaflet shape		Flower colour		Stem color		Stem surface		Pod angle		Pod surface		Seed coat color		Plant habit
		Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Shimla
1	EC000248	1	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	3	2
2	EC000249	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	3	2
3	EC000372	1	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
4	EC008707	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
5	EC015257	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	3	2
6	EC018257	2	3	1	1	1	2	1	2	1	1	2	2	2	3	2	2	2	1	1	1	4	4	2
7	EC034264	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	2	2	2
8	EC036070	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
9	EC059489	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	99	2
10	EC080850	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
11	EC087071	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
12	EC087815	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	2	2	2
13	EC087896	1	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	99	2
14	EC281186	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
15	EC340245	1	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	2	2	2
16	EC340254	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
17	EC340286	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
18	EC340287	1	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
19	EC340288	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
20	IC024522	1	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
21	IC030270	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	99	2
22	IC108854	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2
23	IC108857	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2

S.No.	Accession. No.	Early plant vigour		Plant growth habit		Leaf colour		Leaf surface		Leaflet shape		Flower colour		Stem colour		Stem surface		Pod angle		Pod surface		Seed coat color		Plant habit	
		Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Palampur	Shimla	Shimla	
24	IC341941	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2	
25	IC341944	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	4	4	2	
Mean for check variety																									
	HPU-51 (C)	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	4	4	2
	Totru Local (C)	2	3	1	1	1	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	1	99	2
	Minmum	1	3	1	1	1	2	1	2	1	1	2	2	2	3	2	2	2	1	1	1	1	1	2	2
	Maximum	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	4	99	2
	Mode	2	3	1	1	3	2	1	2	1	1	2	2	3	3	2	2	2	1	1	1	1	4	4	2

Qualitative Descriptors: **Early plant vigour:** 1-poor, 2-good, 3-very good; **Plant habit:** 1-determinate, 2-indeterminate, 99-others; **Plant growth habit:** 1-erect, 2-spreading, 99-others; **Leaf colour:** 1-yellowish green, 2-green, 3-dark green, 99-others; **Leaf surface:** 1-glabrous, 2-pubescent, 99-others; **Leaflet shape:** 1-entire, 2-lobed, 99-others; **Flower colour:** 1-light yellow, 2-yellow, 3-orange, 99-others; **Stem colour:** 1-light yellow, 2-purple, 3-green, 99-others; **Stem surface:** 1-glabrous, 2-pubescent, 99-others; **Pod angle:** 1-erect, 2-pendent, 99-others; **Pod surface:** 1-glabrous, 2-pubescent, 99-others; **Seed coat colour:** 1-green, 2-brown, 3-maroon, 4-red, 99-others.

Table 87. Promising lines in fababean germplasm (Rabi 2011-12) for various characters at various locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Palampur (Accession 50)				
1.	Days to 50% flowering	57.00-70.00	HB-19, EC117705, EC117726, EC329681, HB-17, EC243624, HB-18, EC329604, HB-57, HB-69, EC243608, HB-30, HB-34, IC267939, IC331561, EC024312, EC243770, EC247679, EC287710, IC348948 (<64.00 days)	HPFB-2 (64.60 days)
2.	Days to maturity	158.00-166.00	EC243608, HB-16, EC267640, EC327677, HB-07 (=158.00 days)	HPFB-3 (158.00 days)
3.	Plant height (cm)	99.00-162.00	EC323588, HB-26, EC243756, EC253793, EC327734, HB-18, EC032976, HB-87, EC263820, IC348948, EC247679, EC329668, IC263624, HB-17, EC024312, HB-62, EC117739, HB-69(>124.00 cm)	HPFB-1 (121.00)
4.	No. of primary branches per plant	2.80-5.20	IC263624, HB-78, HB-87, EC329668, HB-34, EC034399, EC253793, HB-32, EC267640, EC243756, HB-17, EC024312, EC117726, EC287710, EC029085, HB-58, EC243770, HB-30 (> 4.50)	HPFB-2 (4.24)
5.	Pod length (cm)	4.40-7.80	HB-17, EC117726, IC331561 (=7.80 cm)	HPFB-3 (7.60 cm)
6.	Pod width (mm)	0.70-1.00	EC287710, EC243770, EC117739, EC327677, EC323588, HB-57 (=1.00 mm)	HPFB-1 (0.92 mm)
7.	No. of pods per plant	26.00-56.00	HB-30, HB-67, EC287710, EC029085, HB-78, HB-87, HB-16, EC329668, EC024312, EC253793, HB-17, EC243756, EC243770, EC117739, EC117705, IC263624, HB-32, HB-62, HB-19, EC117726, HB-07 (>38.00)	HPFB-3 (37.60)
8.	No. of seeds per pod	2.00-4.00	EC267648, EC247679, HB-17, EC323588, HB-16, EC243756, EC329662 (>3.30)	HPFB-2 (3.05)
9.	100 seed weight (g)	21.00-35.50	EC117726, EC034399, HB-36, HB-67, EC253793, HB-32, HB-34, HB-57, HB-58, EC329604, EC117739, IC331561 (>32.00 g)	HPFB-3 (31.00 g)
10.	Seed yield per plant (g)	4.00-12.00	EC267648, EC024312, HB-57, IC331561, HB-32, EC267640, EC243608 (=12.00 g)	HPFB-1 (11.00 g)
11.	Seed yield (q/ha)	0.67-8.61	EC117705, HB-62, EC267648, EC329668 (>3.60 q/ha)	HPFB-2 (3.52 q/ha)
Ranichauri (Accession 50)				
1.	Days to 50% flowering	77.00-96.00	HB-18, HB-32, HB-50, HB-62, HB-16, HB-76, EC243770, EC329681, EC243624, HB-19, HB-26, HB-58 (<83.00 days)	Vikrant (85.80 days)

S. No.	Characters	Range	Promising lines	Value of best check
2.	Days to maturity	162.00-180.00	HB-18, HB-16, HB-76, HB-50, EC329681, HB-32, HB-58, EC243624, EC243770, HB-19, HB-26, HB-17 (<170.00 days)	Vikrant (170.40 days)
3.	Plant height (cm)	21.40-86.50	EC329681, EC243770, HB-36, EC263820, HB-16, IC287710 (>44.75 cm)	Vikrant (44.68 cm)
5.	Pod length (cm)	4.20-6.40	EC263820, HB-17, HB-87, HB-18, HB-19, HB-16, EC243596, EC243624, HB-32, HB-76 (>5.90 cm)	Vikrant (5.68 cm)
7.	No. of seeds per pod	2.40-3.40	EC024312, EC329609, EC331564, IC247679 (=3.40)	Vikrant (3.32)
8.	No. of pods per plant	5.00-12.20	HB-19, HB-20, HB-17, EC039085, HB-87, IC331561, HB-26, IC247679, EC024312, HB-32, HB-36, EC267640, HB-30, HB-69, EC329662, EC329668, HB-16, HB-76, EC243608, HB-18 (>7.18)	Vikrant (7.04)
9..	No. of leaves per plant	12.80-26.72	-	Vikrant (26.72)
10.	100 seed weight (g)	17.60-28.40	HB-19, IC287710, EC039085, IC348945, EC329662, EC024312, IC247679, EC323588, HB-18, HB-78 (< 25.15 g)	Vikrant (24.68 g)
11.	Seed yield per plant (g)	11.60-24.40	HB-19, HB-20, HB-17, EC024312, EC039085, EC253793, EC267640, EC329662, IC331561, EC243608, EC032976, IC247679, EC323588, EC331564, HB-32, HB-50, HB-69, HB-87, HB-26, HB-36, HB-58 (>15.55 g)	Vikrant (15.56 g)
Best entries over location				
1.	Days to 50% flowering	68.50-81.00	HB-18, EC329681, HB-19, EC243624, EC243770, HB-16, HB-62, EC117705, HB-17, HB-32, HB-57, HB-58, HB-76, HB-26, HB-30, HB-50, IC267939, EC024312, EC329609, HB-69, EC243596, EC267640, HB-34, IC331561 (<76.00 days)	Vikrant (75.20 days)
2.	Days to maturity	160.50-172.00	HB-16, HB-18, HB-76, EC329681, HB-32, HB-50, HB-58, EC243624, EC327677, EC267640, HB-19, HB-30, EC243770, HB-26, HB-57 (<166.00 days)	Vikrant (166.00 days)
3.	Plant height (cm)	65.70-100.75	EC329681, EC323588, HB-26, EC243756, EC253793, HB-18, EC263820, IC247679, HB-87 (>85.85 cm)	Vikrant (85.74 cm)
5.	Pod length (cm)	4.30-7.10	HB-17, IC331561, EC117726, HB-87, IC247679, HB-18, IC348945, EC263820, HB-69, IC263634, HB-19, EC024312, EC243770, HB-34, HB-58, EC032976, EC243596, EC243999, EC331564, HB-36, EC253793, HB-32, EC117705, EC329681, HB-79 (>5.65 cm)	Vikrant (5.65)

S. No.	Characters	Range	Promising lines	Value of best check
4.	No. of pods per plant	16.40 31.80	HB-30, EC039085, HB-67, IC287710, HB-87, HB-79, HB-16, HB-17, EC329668, EC024312, HB-19, EC253793, EC243756, HB-32, EC243770, IC263634, EC117705, EC117739, HB-62, HB-76, EC267640, EC117726 (>22.55)	Vikrant (22.52)
7.	No. of seeds per pod	2.50 3.60	IC247679, EC267648, EC323588, EC024312, HB-17, EC263820 (>3.15)	Vikrant (3.12)
8.	100 seed weight (g)	22.30 28.80	EC243999, HB-36, HB-18, EC117739, HB-19, IC348945 (>28.40 g)	Vikrant (28.38 g)
9.	Seed yield per plant (g)	8.70 17.20	HB-19, EC024312, HB-20, EC267640, IC331561, EC243608, EC039085, HB-32, EC253793, EC032976, HB-50, HB-69, HB-87, HB-17, EC329662, HB-58, HB-57, EC267648, EC329609, HB-36, EC323588, EC331564, HB-62, IC287710, HB-26, EC117726, HB-79 (>11.69 g)	Vikrant (11.68 g)

Table 88. Characterization of germplasm lines in faba bean at Palampur - Hills : Rabi 2012-13

S.No.	Accession No.	Palampur														
		Early plant vigour	Plant habit	Flower ground colour	Wing petal colour	Leaflet shape	Leaflet size	Stem colour	Stem pigmentation	Pod angle/attitude	Pod colour	Pod shape	Hilum colour	Seed coat colour	Seed shape	
1	EC024312	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
2	EC032976	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
3	EC039085	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
4	EC117705	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
5	EC117726	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
6	EC117739	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
7	EC243596	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
8	EC243608	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
9	EC243624	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
10	EC243756	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
11	EC243770	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
12	EC243999	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
13	EC253793	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
14	EC263820	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
15	EC267640	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
16	EC267648	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
17	EC323588	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
18	EC327677	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
19	EC327724	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
20	EC329609	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
21	EC329662	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
22	EC329668	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
23	EC329681	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
24	EC331564	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
25	HB-16	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
26	HB-17	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
27	HB-18	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
28	HB-19	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
29	HB-20	2	2	1	2	2	5	1	0	1	2	3	1	7	1	

S.No.	Accession No.	Palampur														
		Early plant vigour	Plant habit	Flower ground colour	Wing petal colour	Leaflet shape	Leaflet size	Stem colour	Stem pigmentation	Pod angle/attitude	Pod colour	Pod shape	Hilum colour	Seed coat colour	Seed shape	
30	HB-26	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
31	HB-30	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
32	HB-32	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
33	HB-34	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
34	HB-36	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
35	HB-50	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
36	HB-57	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
37	HB-58	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
38	HB-62	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
39	HB-67	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
40	HB-69	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
41	HB-76	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
42	HB-78	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
43	HB-79	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
44	HB-87	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
45	IC247679	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
46	IC263634	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
47	IC267939	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
48	IC287710	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
49	IC331561	2	2	1	2	2	5	1	0	1	2	3	1	7	1	
50	IC348945	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
Mean for check variety																
	Vikrant (C)	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
	Minimum	1	2	1	2	2	5	1	0	1	2	3	1	7	1	
	Maximum	3	2	1	2	2	5	1	0	1	2	3	1	7	1	
	Mean	3	2	1	2	2	5	1	0	1	2	3	1	7	1	

Qualitative characters : **Early plant vigour :** 1-Poor, 2-Good, 3-Very good, 99-Others; **Plant habit :** 1-Determinate, 2-Semi determinate, 3-Indeterminate, 99-Others; **Flower ground colour :** 1-White, 2-Yellow, 3-Violet, 4-Pink, 5-Red, 6-Light brown, 7-Dark brown, 99-Others; **Wing petal colour :** 1-Uniformly white, 2-Spotted, 3-Uniformly coloured, 99-Others; **Leaflet shape :** 1-Narrow (elongate), 2-Intermediate (sub-elliptic), 3-Rounded (sub orbicular), 99-Others; **Leaflet size :** 3-Small, 5-Medium, 7-Large, 99-Others; **Stem colour :** 1-Light green, 2-Dark green, 99-Others; **Stem pigmentation :** 0-Absent, 1-Weak, 2-Intermediate, 3-Strong, 99-Others; **Pod angle/attitude :** 1-Erect, 2-Horizontal, 3-Pendent, 99-Others; **Pod colours :** 1-Light yellow, 2-Dark (brown/black), 99-Others; **Pod distribution on the stem :** 1-Mainly basal, 2-Uniform, 3-Mainly terminal, 99-Others; **Pod shape :** 1-Flattened non constricted, 2-Flattened constricted, 3-Sub cylindrical, 99-Others; **Seed coat colour :** 1-White, 2-Yellow, 3-Grey, 4-Violet, 5-Light green, 6-Dark green, 7-Light brown, 8-Dark brown, 9-Red, 10-Black, 99-Others; **Hilum colour :** 1-Black, 99-Others; **Seed shape :** 1-Flattened, 2-Round 3-Angular, 99-Others

Table 90. Promising lines in job's tear (coix) germplasm for various characters at different locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Ranichauri (Accession 25)				
1.	Days to 50% flowering	72.67-85.67	IC521340, IC001274, IC374506, IC417053, IC540267, IC203983, IC419466, IC419448 (<79.00 days)	Mayeun (79.67 days)
2.	Days to maturity	188.33-194.67	IC203934, IC419448, IC203983, IC416831, IC089390, IC374506, IC416971 (<191.00 days)	Mayeun (190.97 days)
3.	Plant height (cm)	190.07-242.40	IC203983 (=242.40 cm)	Pollin (242.40)
4.	No. of tillers per plant	1.07-3.73	IC001274, IC419466, IC036667, IC374506, IC416884, IC521340 (>=2.73)	Pollin (2.73)
5.	Fresh forage yield (q/ha)	12.67-32.67	IC417053, IC022280, IC419448, IC001274, IC089390, IC203934, IC416831, IC036667, IC416971, IC374506, IC419466, IC416829, IC416884 (>=14.00)	Mayeun (14.00 q/ha)
6.	Dry forage yield (q/ha)	44.44-122.22	IC417053, IC022280, IC419448, IC001274, IC089390, IC036667, IC203934, IC416831, IC416971, IC419466, IC416829, IC374506 (>=51.85 q/ha)	Mayeun (51.85 q/ha)
7.	Seed yield per plant (g)	1.11-4.72	IC417053, IC022280, IC419448, IC001274, IC089390, IC203934 (>1.48 g)	Mayeun (1.47 g)
Shillong (Accession 25)				
1.	Days to 50% flowering	65.33-82.67	IC360791, IC077150, IC419466, IC416831, IC416971, IC203983, IC540236, IC540267, IC416824, IC416868, IC022280, IC089390, IC334314, IC419448 (<77.00 days)	Pollin (77.00 days)
2.	Days to maturity	140.00-161.33	IC089389, IC374506, IC360791 (<142.00 days)	Pollin (142.00 days)
3.	Plant height (cm)	248.33-297.78	IC521340, IC416971, IC416829, IC416831, IC419466, IC416868, IC524631, IC077150, IC036667, IC360791, IC419448, IC416884	Mayeun (274.44 cm)

S. No.	Characters	Range	Promising lines	Value of best check
			(>277.70 cm)	
4.	Leaf length (cm)	64.43 78.96	IC089389, PL, IC077150, IC416829, IC203983, IC417053, IC089390, IC089393, IC521340, IC360791, IC416971, IC334314, IC416831, IC416824 (>72.10 cm)	Pollin (71.84 cm)
5.	Leaf width (cm)	4.67 5.94	IC419466, IC416971 (=5.94 cm)	Mayeun (5.68 cm)
6.	No. of tillers per hill	1.44 3.44	IC416824, IC360791, IC077150, IC001274, IC022280, IC203983 (> 3.00)	Mayeun (2.89)
7.	No. of nodes per tillers	6.44 8.00	IC416831, IC416971, IC416868, IC203934, IC089389, IC540267, IC203983, IC360791, IC077150 (>7.40)	Pollin (7.11)
8.	100 seed weight (g)	8.71 14.38	IC416971, IC540236, IC521340, IC077150, IC089393, IC203983, IC419448, IC419466, IC540267, IC374506, IC360791 (>11.29 g)	Pollin (11.28 g)
9.	Seed yield per plant (g)	11.18 38.11	-	Pollin (38.11 g)
Best entries over locations				
1.	Days to 50% flowering	65.33 83.84	IC360791, IC077150, IC419466, IC540236, IC416824, IC416868, IC521340, IC203983, IC416971, IC540267, IC334314, IC374506, IC524631, IC417053, IC001274, IC089389, IC419448, IC416831 (<79.00 days)	Pollin (78.84 days))
2.	Days to maturity	140.00 176.67	IC089389, IC360791, IC089393, IC334314, IC416824, IC416868, IC540236, IC077150, IC524631, IC374506, IC022280, IC419448, IC540267 (< 169.00 days)	Pollin (168.34 days)
3.	Plant height (cm)	225.59 283.33	IC416868, IC524631, IC077150, IC360791, IC416824, IC416829, IC089393, IC089389, IC540236, IC334314, IC419466, IC203983, IC521340, IC036667 (>255.90 cm)	Mayun (255.32)
4.	Seed yield per plant (g)	6.34 19.71	-	Pollin (19.71 g)

Table 91. Evaluation of germplasm lines in job's tear (coix) at Ranichauri and Shillong - Hills : Kharif 2013

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			Seed yield per plant (g)		
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean
1	IC001274	76.67	78.33	77.50	192.33	151.00	171.67	199.60	270.00	234.80	1.63	12.53	7.08
2	IC022280	83.67	76.33	80.00	193.33	142.67	168.00	190.07	261.11	225.59	1.73	15.10	8.42
3	IC036667	81.67	77.00	79.34	192.33	154.33	173.33	232.40	279.44	255.92	1.45	12.72	7.09
4	IC077150	-	69.00	69.00	-	155.33	155.33	-	282.22	282.22	-	13.73	13.73
5	IC089389	-	77.67	77.67	-	140.00	140.00	-	265.56	265.56	-	14.71	14.71
6	IC089390	82.67	76.67	79.67	190.67	151.00	170.84	214.60	265.56	240.08	1.51	11.18	6.34
7	IC089393	-	82.67	82.67	-	149.33	149.33	-	266.11	266.11	-	13.40	13.40
8	IC203934	85.67	82.00	83.84	188.33	152.67	170.50	200.33	261.67	231.00	1.49	13.27	7.38
9	IC203983	78.33	72.67	75.50	189.67	153.67	171.67	242.40	272.22	257.31	1.11	12.51	6.81
10	IC334314	-	76.67	76.67	-	149.33	149.33	-	261.11	261.11	-	17.53	17.53
11	IC360791	-	65.33	65.33	-	141.33	141.33	-	278.33	278.33	-	16.52	16.52
12	IC374506	76.67	77.00	76.84	190.67	140.33	165.50	212.40	250.00	231.20	1.16	20.53	10.84
13	IC416824	-	75.00	75.00	-	149.67	149.67	-	273.89	273.89	-	12.40	12.40
14	IC416829	81.50	80.67	81.08	192.67	152.00	172.34	242.20	292.22	267.21	1.17	11.70	6.44
15	IC416831	85.67	71.00	78.34	189.67	153.00	171.34	218.33	288.89	253.61	1.48	12.92	7.20
16	IC416868	-	75.33	75.33	-	150.00	150.00	-	283.33	283.33	-	16.30	16.30
17	IC416884	83.33	77.67	80.50	192.67	153.33	173.00	219.20	277.78	248.49	1.13	12.39	6.76
18	IC416971	81.33	71.33	76.33	190.67	157.00	173.84	198.33	296.67	247.50	1.37	13.09	7.23
19	IC417053	76.67	77.33	77.00	192.67	158.67	175.67	217.60	275.00	246.30	4.72	19.79	12.25
20	IC419448	78.67	76.67	77.67	189.33	147.33	168.33	232.33	277.78	255.05	1.64	15.97	8.80
21	IC419466	78.33	70.33	74.33	194.33	149.00	171.67	229.60	286.67	258.13	1.34	13.16	7.25
22	IC521340	72.67	78.00	75.34	192.33	161.00	176.67	216.20	297.78	256.99	1.11	12.92	7.01
23	IC524631	-	77.00	77.00	-	161.33	161.33	-	282.22	282.22	-	14.54	14.54
24	IC540236	-	74.67	74.67	-	151.00	151.00	-	264.44	264.44	-	15.37	15.37
25	IC540267	78.00	74.67	76.33	192.33	144.33	168.33	226.67	248.33	237.50	1.18	16.96	9.07
Mean for check variety													
	Mayun(C)	79.67	80.33	80.00	190.67	158.33	174.50	236.20	274.44	255.32	1.47	18.36	9.92
	Pollin (C)	80.67	77.00	78.84	194.67	142.00	168.34	242.40	252.22	247.31	1.30	38.11	19.71

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			Seed yield per plant (g)		
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean
	Minimum	72.67	65.33	65.33	188.33	140.00	140.00	190.07	248.33	225.59	1.11	11.18	6.34
	Maximum	85.67	82.67	83.84	194.67	161.33	176.67	242.40	297.78	283.33	4.72	38.11	19.71
	Mean	80.10	75.86	77.10	191.63	150.70	164.18	220.60	273.52	255.80	1.56	15.47	10.74
	CD (0.05)	-	3.58	-	-	3.40	-	-	16.79	-	-	7.14	-
	CV (%) Error	-	2.95	-	-	1.41	-	-	3.84	-	-	28.85	-
	CV (%) Phenotypic	4.30	5.17	-	0.91	4.02	-	7.35	4.86	-	52.29	33.25	-

S.No.	Accession No.	Ranichauri	Ranichauri	Ranichauri	Shillong	Shillong	Shillong	Shillong	Shillong
		No. of tillers per plant	Fresh forage yield (q/ha)	Dry forage yield (q/ha)	Leaf length (cm)	Leaf width (Cm)	No. of tillers per hill	No. of nodes/ tillers	100 seed weight (g)
1	IC001274	3.73	23.33	85.19	67.04	5.40	3.22	7.00	9.23
2	IC022280	1.73	25.33	92.59	69.67	5.41	3.22	7.33	9.10
3	IC036667	3.27	21.33	81.48	71.24	5.39	2.56	7.22	9.38
4	IC077150	-	-	-	75.99	5.28	3.33	7.44	12.86
5	IC089389	-	-	-	78.96	5.50	3.00	7.56	9.09
6	IC089390	1.73	22.67	85.19	73.71	5.24	2.78	7.11	11.27
7	IC089393	-	-	-	73.43	4.67	2.44	7.11	12.71
8	IC203934	2.27	22.00	81.48	68.12	5.50	2.78	7.67	9.48
9	IC203983	2.33	12.67	48.15	74.58	5.41	3.11	7.56	12.25
10	IC334314	-	-	-	72.31	5.00	2.56	7.33	10.31
11	IC360791	-	-	-	72.49	5.02	3.44	7.44	11.30
12	IC374506	3.27	16.00	51.85	67.74	5.46	2.89	7.00	11.67
13	IC416824	-	-	-	72.11	5.59	3.44	7.00	10.22
14	IC416829	1.87	14.67	55.56	74.77	5.57	2.78	7.33	11.11
15	IC416831	1.70	22.00	81.48	72.14	5.54	2.11	8.00	9.92
16	IC416868	-	-	-	71.20	5.66	2.78	7.67	10.73
17	IC416884	2.73	14.00	48.15	66.15	4.94	2.67	6.44	8.71
18	IC416971	2.27	16.67	59.26	72.40	5.94	2.78	7.78	14.38
19	IC417053	2.60	32.67	122.22	74.30	5.43	2.33	7.22	10.16
20	IC419448	1.07	24.00	88.89	64.43	5.41	2.56	7.33	11.81
21	IC419466	3.67	16.00	59.26	70.97	5.94	3.00	6.67	11.80
22	IC521340	2.73	12.67	48.15	72.57	5.49	2.67	7.33	12.90
23	IC524631	-	-	-	69.06	4.92	3.00	6.56	10.23
24	IC540236	-	-	-	71.43	5.08	1.56	7.00	13.55
25	IC540267	1.87	12.67	44.44	70.33	5.47	3.00	7.56	11.74
Mean for check variety									
	Mayun(C)	2.60	14.00	51.85	71.06	5.68	2.89	7.11	10.20
	Pollin (C)	2.73	12.67	48.15	71.84	5.04	1.44	7.11	11.28

S.No.	Accession No.	Ranichauri	Ranichauri	Ranichauri	Shillong	Shillong	Shillong	Shillong	Shillong
		No. of tillers per plant	Fresh forage yield (q/ha)	Dry forage yield (q/ha)	Leaf length (cm)	Leaf width (Cm)	No. of tillers per hill	No. of nodes/ tillers	100 seed weight (g)
	Minimum	1.07	12.67	44.44	64.43	4.67	1.44	6.44	8.71
	Maximum	3.73	32.67	122.22	78.96	5.94	3.44	8.00	14.38
	Mean	2.45	18.63	68.52	71.48	5.37	2.75	7.26	11.01
	CD (0.05)	-	-	-	6.17	0.48	0.88	0.63	1.27
	CV (%) Error	-	-	-	5.40	5.61	20.03	5.46	7.20
	CV (%) Phenotypic	29.66	30.75	31.80	4.36	5.63	17.60	4.97	13.43

Table 92. Promising lines in Perilla germplasm for various characters at different locations (Hills)

S. No.	Characters	Range	Promising lines	Value of best check
Ranichauri (Accession 25)				
1.	Days to 50% flowering	107.50-122.50	IC526701, IC521292, IC003942, IC374609, IC419477, IC374494, IC216268, IC521284, IC416861, IC204185, IC419475, IC334313, IC419706, IC334813, IC399449, IC211608, IC335408, IC374593 (<119.00 days)	BDS-1650 (118.50 days)
2.	Days to maturity	113.50-181.50	IC416861, IC526701, IC521292, IC003942, IC374609, IC419477, IC374494, IC216268, IC521284, IC204185, IC419475, IC334313, IC419706, IC334813, IC374593, IC399449, IC211608, IC335408 (<176.00 days)	BDS-1650 (175.50 days)
3.	Plant height (cm)	45.20-85.40	IC526660, IC521286, IC211608, IC335408, IC010240, IC419706, IC334813, IC204185, IC374593, IC521284 (>68.38 cm)	BDS-1650 (67.40 cm)
4.	No. of primary branches	4.70-9.60	IC521292, IC006447, IC521284, IC419598, IC334813, IC335408, IC334313, IC419475 (>=9.00)	BDS-1650 (9.00)
5.	Ear length (cm)	4.40-10.40	IC526701, IC334313, IC521284, IC334813, IC204185, IC419706, IC521292, IC419598, IC521286, IC521291, IC010240 (>7.58 cm)	BDS-1650 (7.40 cm)
6.	100 seed weight (g)	0.21-0.27	IC216268, IC003942, IC399449, IC419706, IC374609, IC521286 (>=0.26 g)	BDS-1650 (0.26 g)
7.	Seed yield per plant (g)	2.67-4.32	-	BDS-1650 (4.32 g)
Shillong (Accession 25)				
1.	Days to 50% flowering	122.33-144.33	IC521286, IC521291, IC335408, IC419598 (<124.00 days)	Shillong (123.67 days)
2.	Days to maturity	167.00-188.00	IC521291, IC526701, IC006447 (<170.00 days)	Jaintia(169.67 days)
3.	Plant height (cm)	104.95-159.21	IC003942, IC521284 (> 158.50 cm)	Jaintia (152.67 cm)
4.	No. of primary branches	10.23-20.12	IC419475, IC521286, IC003942, IC216268, IC334313, IC335408, IC526660, IC419706, IC211608, IC521291, IC419477, IC526701 (>16.00)	Jaintia (14.62)

S. No.	Characters	Range	Promising lines	Value of best check
5.	Leaf length (cm)	7.99-15.44	IC419706, IC374593, IC419477, IC003942, IC419598, IC419475, IC526660, IC003955, IC335408, IC526701 (>11.40 cm)	Jaintia (11.17 cm)
6.	Leaf width (cm)	6.62-12.67	IC526660, IC419475, IC419477, IC374593, IC419706, IC526701, IC374494, IC374609, IC003955, IC003942, IC334313, IC521284, IC211608, IC521292, IC010240, IC369449, IC521286, IC416861, IC335408, IC419598 (> 8.30 cm)	Jaintia (8.28 cm)
7.	Petiole length (cm)	2.59-6.61	IC419706, IC419475, IC526660, IC003955, IC374593, IC419598, IC526701, IC335408, IC334813 (>5.00)	Jaintia(4.82 cm)
8.	Inflorescence length (cm)	8.00-15.77	IC521286, IC003942, IC526701, IC216268, IC003955, IC335408, IC521291 (> 11.70 cm)	Shillong (11.73 cm)
9.	No. of inflorescence per plant	56.40-123.58	IC521284, IC419475, IC010240, IC334813, IC416861, IC204185, IC521292, IC216268, IC003942, IC369449, IC335408, IC003955, IC526660, IC334313 (> 97.80)	Shillong (96.73)
10.	100 seed weight (g)	1.26-2.08	IC003942, IC526660, IC374593, IC521286, IC003955 (≥ 0.19 g)	Shillong (0.19 g)
11.	Seed yield per plant (g)	8.58-16.95	IC526660 (= 16.95 g)	Shillong (16.86 g)
12.	Seed yield (q/ha)	3.24-9.35	-	Jaintia (9.35 q/ha)
Best entries over locations				
1.	Days to 50% flowering	118.25-144.33	IC003942 (=118.25 days)	BDS-1650 (118.50 days)
2.	Days to maturity	143.08-188.00	IC416861, IC526701, IC521292, IC374609 (<170.00 days)	Jaintia (169.67 days)
3.	Plant height (cm)	67.40-152.67	-	Jaintia (152.67 cm)
4.	No. of primary branches	8.22-14.62	-	Jaintia (14.62)
5.	100 seed weight (g)	0.15-0.26	-	BDS-1650 (0.26 g)
6.	Seed yield (q/ha)	4.32-16.86	-	Shillong (16.86 q/ha)

Table 93. Evaluation of germplasm lines in Perilla at Ranichauri and Shillong - Hills : Kharif 2013

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			No. of primary branches per plant		
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean
1	IC003942	110.50	126.00	118.25	167.50	179.00	173.25	54.90	159.21	107.06	7.80	18.43	13.11
2	IC003955	120.00	128.33	124.17	177.00	186.67	181.83	64.90	134.89	99.90	6.90	10.50	8.70
3	IC006447	120.50	138.67	129.58	177.50	169.67	173.58	48.90	132.55	90.73	9.40	13.13	11.27
4	IC010240	120.50	127.00	123.75	176.50	173.00	174.75	72.40	117.23	94.82	7.20	12.75	9.97
5	IC204185	115.00	127.67	121.33	172.00	180.33	176.17	69.20	133.27	101.24	6.20	10.23	8.22
6	IC211608	118.50	127.00	122.75	175.50	171.67	173.58	81.40	120.95	101.17	8.00	16.57	12.28
7	IC216268	113.50	126.00	119.75	170.50	177.33	173.92	65.40	137.27	101.34	6.40	18.23	12.32
8	IC334313	115.50	129.67	122.58	172.50	170.33	171.42	64.20	127.30	95.75	9.20	18.20	13.70
9	IC334813	116.50	125.00	120.75	173.50	170.67	172.08	69.90	125.76	97.83	9.20	13.13	11.17
10	IC335408	118.50	122.67	120.58	175.50	182.00	178.75	79.20	119.23	99.22	9.20	17.63	13.41
11	IC369449	118.50	135.33	126.92	175.50	170.00	172.75	55.20	133.29	94.24	7.10	13.05	10.08
12	IC374494	113.50	127.00	120.25	170.50	171.00	170.75	64.40	109.95	87.17	6.00	14.43	10.22
13	IC374593	118.50	141.33	129.92	174.50	175.00	174.75	69.00	145.60	107.30	8.30	14.36	11.33
14	IC374609	110.50	133.00	121.75	167.50	171.67	169.58	49.20	134.67	91.94	6.50	14.06	10.28
15	IC416861	113.50	126.33	119.92	113.50	172.67	143.08	53.40	143.71	98.56	5.30	13.36	9.33
16	IC419475	115.50	134.00	124.75	172.00	177.00	174.50	46.40	140.52	93.46	9.00	20.12	14.56
17	IC419477	112.50	129.00	120.75	169.50	186.00	177.75	47.90	147.19	97.54	4.70	16.48	10.59
18	IC419598	119.00	123.67	121.33	176.00	184.67	180.33	53.20	139.38	96.29	9.20	12.67	10.93
19	IC419706	116.50	136.00	126.25	173.50	176.33	174.92	71.40	105.91	88.66	8.40	16.84	12.62
20	IC521284	113.50	125.00	119.25	171.50	183.00	177.25	68.40	158.53	113.47	9.20	12.56	10.88
21	IC521286	122.50	122.33	122.42	181.50	171.33	176.42	84.20	138.88	111.54	7.50	19.38	13.44
22	IC521291	120.50	122.33	121.42	178.50	167.00	172.75	46.90	141.17	94.04	8.20	16.57	12.38
23	IC521292	108.50	140.00	124.25	165.50	173.00	169.25	45.20	150.36	97.78	9.60	13.54	11.57
24	IC526660	120.50	124.00	122.25	178.50	187.00	182.75	85.40	104.95	95.17	6.60	17.11	11.85
25	IC526701	107.50	129.67	118.58	163.50	169.67	166.58	61.50	108.80	85.15	6.00	16.03	11.01
Mean for check variety													
	BDS-1650 (C)	118.50	-	118.50	175.50	-	175.50	67.40	-	67.40	9.00	-	9.00
	Jaintia (C)	-	144.33	144.33	-	169.67	169.67	-	152.67	152.67	-	14.62	14.62
	Shillong (C)	-	123.67	123.67	-	188.00	188.00	-	131.87	131.87	-	12.41	12.41

S.No.	Accession No.	Days to 50% flowering			Days to 80% maturity			Plant height (cm)			No. of primary branches per plant		
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean
	Minimum	107.50	122.33	118.25	113.50	167.00	143.08	45.20	104.95	67.40	4.70	10.23	8.22
	Maximum	122.50	144.33	144.33	181.50	188.00	188.00	85.40	159.21	152.67	9.60	20.12	14.62
	Mean	116.10	129.44	123.21	170.96	176.06	173.78	63.06	133.15	99.76	7.70	15.05	11.47
	CD (0.05)	-	3.27	-	-	4.83	-	-	39.78	-	-	3.41	-
	CV (%) Error	-	1.58	-	-	1.71	-	-	18.67	-	-	14.14	-
	CV(%) Phenotypic	3.48	4.81	-	7.29	3.66	-	19.24	11.44	-	18.51	17.68	-

S.No.	Accession No.	100 seed weight (g)			Seed yield per plant (g)			Ranichauri	Shillong					
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ear length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Inflorescence length (cm)	No. of Inflorescence per plant	Seed yield (q/ha)
1	IC003942	0.26	0.21	0.23	3.70	12.47	8.08	4.40	13.33	9.42	4.60	14.01	102.19	7.66
2	IC003955	0.24	0.19	0.22	2.84	15.55	9.20	6.90	12.05	10.05	6.08	12.36	99.78	6.75
3	IC006447	0.22	0.15	0.19	3.02	8.58	5.80	7.00	7.99	7.07	2.66	9.10	56.40	3.24
4	IC010240	0.25	0.16	0.20	2.67	10.01	6.34	7.60	11.07	8.88	4.65	8.73	121.21	3.49
5	IC204185	0.23	0.13	0.18	3.32	12.29	7.80	8.50	10.27	7.87	4.18	10.66	111.27	5.24
6	IC211608	0.25	0.17	0.21	3.10	9.14	6.12	6.40	9.94	9.08	3.72	10.56	77.53	4.84
7	IC216268	0.27	0.15	0.21	3.05	14.44	8.74	6.70	9.58	6.62	3.44	13.52	102.59	6.56
8	IC334313	0.24	0.15	0.20	3.20	8.84	6.02	9.50	10.16	9.32	4.22	9.37	97.82	5.29
9	IC334813	0.24	0.16	0.20	3.92	13.78	8.85	8.60	10.32	8.19	5.03	9.38	118.86	5.80
10	IC335408	0.21	0.15	0.18	3.54	13.43	8.48	7.00	11.47	8.37	5.23	12.25	101.10	3.92
11	IC369449	0.26	0.16	0.21	3.39	13.46	8.43	5.40	9.28	8.81	2.59	9.31	101.19	6.95
12	IC374494	0.25	0.17	0.21	3.32	10.11	6.71	6.50	9.77	10.63	3.06	9.40	82.93	4.16
13	IC374593	0.23	0.21	0.22	3.55	16.11	9.83	6.50	13.90	10.95	5.90	10.47	96.03	6.33
14	IC374609	0.26	0.13	0.20	3.56	16.63	10.09	6.60	10.70	10.06	4.28	9.57	79.29	7.39
15	IC416861	0.24	0.13	0.18	2.81	13.34	8.08	6.10	11.13	8.48	3.94	9.58	112.24	6.13
16	IC419475	0.23	0.15	0.19	2.87	13.43	8.15	6.40	12.59	12.00	6.28	8.00	123.27	4.98
17	IC419477	0.24	0.16	0.20	2.87	13.72	8.29	5.40	13.77	11.78	3.59	9.12	91.58	6.46
18	IC419598	0.25	0.17	0.21	3.23	11.28	7.25	8.10	13.23	8.36	5.79	9.69	83.29	5.13
19	IC419706	0.26	0.18	0.22	2.90	12.73	7.81	8.30	15.44	10.92	6.61	11.68	90.30	5.76
20	IC521284	0.24	0.18	0.21	3.10	16.20	9.65	9.30	10.16	9.17	3.45	10.41	123.58	5.21
21	IC521286	0.26	0.19	0.23	3.66	16.05	9.85	7.90	10.86	8.78	4.10	15.77	85.60	3.89
22	IC521291	0.25	0.17	0.21	2.81	10.73	6.77	7.80	9.26	6.71	4.44	12.02	91.27	4.74
23	IC521292	0.24	0.17	0.20	2.93	10.93	6.93	8.10	9.98	8.94	2.81	10.06	109.88	6.37
24	IC526660	0.24	0.21	0.22	3.02	16.95	9.99	6.50	12.21	12.67	6.17	9.17	98.66	6.95
25	IC526701	0.25	0.18	0.22	3.00	14.37	8.68	10.40	11.42	10.77	5.61	13.90	81.27	5.48
Mean for check variety														
	BDS-1650 (C)	0.26	-	0.26	4.32	-	4.32	7.40	-	-	-	-	-	-
	Jaintia (C)	-	0.15	0.15	-	16.37	16.37	-	11.17	8.28	4.82	9.47	82.73	9.35
	Shillong (C)	-	0.19	0.19	-	16.86	16.86	-	10.37	8.23	4.43	11.73	96.73	6.26

S.No.	Accession No.	100 seed weight (g)			Seed yield per plant (g)			Ranichauri	Shillong					
		Ranichauri	Shillong	Mean	Ranichauri	Shillong	Mean	Ear length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Inflorescence length (cm)	No. of Inflorescence per plant	Seed yield (q/ha)
	Minimum	0.21	0.13	0.15	2.67	8.58	4.32	4.40	7.99	6.62	2.59	8.00	56.40	3.24
	Maximum	0.27	0.21	0.26	4.32	16.95	16.86	10.40	15.44	12.67	6.61	15.77	123.58	9.35
	Mean	0.25	0.17	0.20	3.22	13.25	8.55	7.28	11.16	9.27	4.51	10.71	96.99	5.72
	CD (0.05)	-	0.16	-	-	5.95	-	-	1.79	1.70	1.03	2.15	33.93	1.71
	CV (%) Error	-	6.09	-	-	28.04	-	-	10.00	11.44	14.26	12.54	21.86	18.74
	CV(%) Phenotypic	5.69	13.25	-	12.28	19.69	-	18.70	15.18	16.75	25.76	17.85	16.40	24.21

3.2 PLAINS

Germplasm evaluation was planned to be conducted on grain amaranth, rice bean, faba bean, winged bean, kalingada, kankoda, jatropha, tumba and simarouba. The germplasm accessions were evaluated in augmented design with standard check cultivars.

3.2.1 Grain Amaranth

3.2.1.1 Rabi 2012-13

Germplasm screening nursery consisting of 100 lines along with four checks was planned to be evaluated at eight locations. The results were received from seven locations. The checks used were GA-1 and GA-2, BGA-2 and Suvarna at all locations. The list of promising accessions for all characters has been presented in Table 95 and statistical parameters for all the characters of different locations have been presented in Table 96.

A set of 100 accessions and four checks were evaluated for twelve quantitative and twelve qualitative characters (Table 97) at S.K. Nagar. Accession SKGPA-061 (32.20 g/plant) was observed highest yielder. The maximum plant height (154.90 cm) was observed in the genotype SKGPA105. The maximum seed weight was recorded in accession IC095251 (8.70 g) followed by IC095406 (8.30 g). The longest inflorescence (80.50 cm) was recorded in the genotype SKGPA105. Accession SKGPA-061 (31.00 days) was earliest in flowering while SKGPA065 was early in maturing (92.00 days).

A total of 50 accessions and four checks were also evaluated at OUA&T, Bhubaneswar for seven quantitative characters. Accessions IC095244 (31.00 days) were earliest in flowering while IC095244 was early in maturity (74.00 days). The entry SKGPA-98 (10.97 g) followed by SKGPA-86 (10.87 g) had the highest grain yield per plant. The highest plant height was observed in SKGPA-99 (150.00 cm). The highest seed volume weight was observed in accession SKGPA-85 (8.62 g) followed by SKGPA-101 (8.56 g).

A set of 100 genotypes and four checks were screened for six yield related attributes at SKRAU, Mandor. Accessions IC035635 (31.00 days) was found earlier to the check variety in flowering and IC081698-B (117.00 days) was

earliest for maturity. The maximum height (149.00 cm) was found in the accession IC035633 followed by IC035638 (143.00 cm), and IC095430 (28.10 g) was found superior to the check in yield per plant. The highest test weight (6.32 g) was observed in the genotype IC120689.

A set of 56 genotypes and four check varieties were screened for six yield related attributes at NDUA&T, Faizabad. Accessions SKGPA-90 (35.00 days) were found earlier to the check variety in flowering while SKGPA-96 was early in maturing (103.00 days). The maximum height (105.00 cm) was found in the accessions SKGPA-89 and SKGPA-92. The SKGPA-92 was superior to the check for seed yield per plant (20.00 g). The highest inflorescence length (49.00 cm) was found in the accession SKGPA-96.

A total of 100 genotypes were also evaluated at Ranchi for ten yield attributes. IC095382-B (57.00 days) was earliest in flowering and SKGPA-79 was found superior to check variety in maturity (126.00 days). Maximum plant height (98.30 cm) was observed in check variety GA-2 while highest seed yield (34.00 g/plant) was observed in genotype IC094661. The highest inflorescence length (40.00 cm) was noted in the accession SKGPA-90.

At Rahuri, a set of 100 genotypes and four checks were evaluated for eleven quantitative characters. The entry SKGPA-98 (155.00 cm) was superior as compared to check variety for plant height. IC021938 (39.00 days) was earliest in flowering and SKGPA-96 (108.00 days) was found superior to the check variety in maturity. The highest yield per plant (24.00 g) was observed in the genotype IC035651.

At Akola, a set of 100 genotypes and four checks were evaluated for eleven quantitative characters. The entry IC095371 (147.20 cm) was superior as compared to check variety for plant height. SKGPA-086 (48.00 days) was earliest in flowering and IC021937 (140.00 days) was found superior to the check variety in maturity. The highest yield per plant (72.28 g) was observed in the genotype IC035711.

A total of 100 accessions and four checks were also evaluated at NBPGR, New Delhi for twelve quantitative characters and nine qualitative characters (Table 97). Accessions SKGPA-81 (51.00 days) was earliest in flowering while

SKGPA-63 was earliest in maturity (133.00 days). The longest inflorescence length was found in SKNA-105 (49.58 cm) followed by SKGPA-76 (50.02 cm). The entry SKNA-103 (9.70 g) followed by SKGPA-82 (9.50 g) had the highest test weight.

The performance of entries based on adjusted value and average over the locations has been summarized in the following paragraphs:

Significant differences were observed among the accessions for seed yield per plant at seven centres. Seed yield per plant (g) was low at Bhubaneswar (7.14 g) and high at Delhi (26.78 g). The check GA-1 (41.69 g) was the highest seed yielder.

Plant height was the highest at S.K. Nagar (103.27 cm) and lowest at Ranchi (51.87 cm) on the basis of average over the seven locations. The genotype ic035615 had the highest plant height (122.33 cm).

Flowering time showed considerable variation among the locations as well as among the accessions within a location. The mean flowering time was the lowest (41.40 days) at Faizabad while it was the longest (73.90 days) at Ranchi. The variety IC035635 showed consistency for early flowering over the locations and ranked first (43.50 days) based on the overall performance.

Maturity period was the earliest at Bhubaneswar (88.21 days) followed by S.K. Nagar (98.88 days). The entry IC021937 (102.67 days) was the earliest maturing line based on seven locations.

The length of inflorescence of the accessions was the highest at Rahuri (63.00 cm) and lowest at Akola (15.70 cm). Based on the average over seven locations, the check GA-1 had the longest inflorescence (53.15 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at six centres showed that it was the highest at Ranchi (9.41 g/10ml) and low at Mandor (5.14 g/10ml). Based on the average over six locations, the entry SKGPA-107 showed the highest test weight as compare to check variety GA-1 (9.10 g/10ml).

3.2.1.2 Kharif 2013

Germplasm screening nursery consisting of 100 lines was planned to be evaluated at two locations. The results were received from both the centres. The list of promising accessions for all characters has been presented in Table 98 and statistical parameters for all the characters of different locations have been presented in Table 99.

A set of 100 accessions along with four checks were evaluated for thirteen quantitative and eleven qualitative characters (Table 99) at UAS, Bangalore. The check BGA-2 (37.16 g/plant) was observed highest yielder. The maximum plant height (165.00 cm) was observed in the genotype SKGPA-66. Accession IC035642 (30.00 days) was earliest in flowering and IC035713 in maturity (83.00 days).

A total of 100 accessions with four checks were also evaluated at TNAU, Mettupalayam for five quantitative characters. Accession SKGPA-079 (38.00 days) was earliest in flowering while SKGPA-103 was earliest in maturity (65.00 days). The entry SKGPA-080 (222.00 cm) followed by SKGPA-081 (217.00 cm) had the highest plant height. The highest grain yield per plant was observed in SKGPA-074 (22.10 g).

The performance of entries based on adjusted value and average over the locations has been summarized in the following paragraphs:

Significant differences were observed among the accessions for seed yield per plant at two centres. Seed yield per plant (g) was low at Mettupalayam (11.10 g) and high at Bangalore (21.92 g). The genotype MGA-10 (24.10 g) was the highest seed yielder followed by genotype SKGPA-74 (21.80 g).

Plant height was the highest at Mettupalayam (167.40 cm) and lowest at Bangalore (129.67 cm) on the basis of average over the two locations. The genotype SKGPA-81 had the highest plant height (185.50 cm).

The mean flowering time was the lowest (42.40 days) at Bangalore while it was the longest (51.20 days) at Mettupalayam. The variety SKGPA-100 showed consistency for early flowering over the locations and ranked first (36.50 days) based on the overall performance.

Maturity period was the earliest at Mettupalayam (82.40 days) followed by Bangalore (91.67 days). The entry SKGPA-82 (75.00 days) was the earliest maturing line based on two locations.

3.2.2 Rice bean (*Vigna umbellata*)

In rice bean 50 genotypes along with four checks supplied by NBPGR, Shimla were planned to be evaluated at six locations viz. PAU Ludhiana; OUA&T Bhubaneswar; UAS, Bangalore; NBPGR, New Delhi; MPKV, Rahuri and TNAU, Mettupalayam. The list of promising accessions for all characters has been presented in Table 100 and statistical parameters for all the characters have been presented in Table 101. The qualitative characters were recorded at three locations Bangalore, Ludhiana and Mettupalayam (Table 102).

A total of 50 genotypes and four checks RBL-1, RBL-6, RBL-35 and RBL-50 were screened for three characters in Augmented Design at UAS, Bangalore. Genotypes IC014075 flowered in 35.00 days early as compared to check variety KBR-1 (41.20 days). The accessions IC014075 (70.00 days) was superior to check variety KBR-1 (76.20 days) in maturity. The highest seed yield per plant (10.50 g) was recorded in the genotypes IC018556.

A total of 50 accessions and four checks were screened for ten characters in Augmented Design at MPKV Rahuri. Entry IC002909 (39.00 days) was earliest in flowering while IC002909 was earliest in maturity (87.00 days). The maximum plant height (104.33 cm) was observed in EC012436 followed by IC521081 (101.00 cm). The longest pod (9.83 cm) was observed in the genotypes IC019336. The top seed yielder genotype was IC002909 (42.67 g/plant).

A total of 50 accessions and four checks were screened in Augmented Design at PAU Ludhiana. Entry IC007537 (52.00 days) was earliest in flowering while IC008565 was earliest in maturity (101.00 days). The maximum plant height (161.30 cm) was observed in IC248733 followed by EC018171 (160.00 cm). The genotype EC018171 (6.30 g) had the highest seed weight. The longest pod (9.10 cm) was observed in the genotypes IC026973 & IC521081. The top seed yielder genotype was EC016136 (29.17 q/ha).

A total of 50 accessions and four checks were screened for seven characters in Augmented Design at FCRI, Mettupalayam. The entry EC000262 (45.00 days) was earlier to check variety in flowering while IC016751 was earliest in maturity (70.00 days). The maximum plant height (66.00 cm) was observed in IC520892 followed by IC521144 (65.00 cm). The genotype EC018771 (5.00) had the highest number of No. of branches. The top seed yielder check was RBL-6 (7.90 g/plant).

The performance of the entries based on average over the six locations has been given as below.

The mean flowering time was the earliest at Bangalore (42.65 days), while it was very late at Ludhiana (59.42 days). On the basis of average over four locations, the check RBL-50 (45.87 days) was the earliest in flowering.

Maturity period was also of same trend as flowering, the earliest at Mettupalayam (74.33 days) and delayed at Ludhiana (107.84 days). There was a difference of about 33 days between Mettupalayam and Ludhiana. Based on the average over four locations check RBL-50 (85.47 days) was the earliest in maturity.

Mean plant height was highest at Ludhiana (109.37 cm) and very less at Mettupalayam (60.93 cm). Based on the average over the three locations the entry IC521148 (105.00 cm) was found superior to check variety.

The grain yield per plant recorded at three locations showed that Rahuri centre had the highest seed yield per plant (23.50 g) followed by Bangalore (7.77 g). Based on average over the three locations, the entry EC018556 (19.97 g) had the highest grain yield per plant.

100 seed weight was observed at two locations. It showed that highest seed weight was at Rahuri (5.73 g) followed by Ludhiana (5.46 g). Based on average over two locations, the entry IC019336 (7.39 g) was superior to check variety.

3.2.3 Fababean (*Vicia faba*)

Germplasm screening nursery was evaluated at three locations viz. Hisar, New Delhi and Faizabad. The results were received from all the locations. The

checks used were PRT-7, PRT-12 and Vikrant and the list of promising genotypes of the all centres has been presented in Table 104 and statistical parameters for all the characters of different locations have been presented in Table 105.

At CCS HAU, Hisar, a set of 51 including checks was evaluated for ten quantitative and nine qualitative characters. The genotype HB-79 (43.00 days) were earlier in flowering while HB-26 (141.00 days) for maturity. Maximum plant height (165.40 cm) was observed in the genotype HB-19 followed by HB-18 (160.00 cm). The longest pod (6.20 cm) was recorded in HB-76. The entry EC243624 (32.20 g) had the highest 100 seed weight while the genotype HB-30 (96.80 g) had the highest seed yield per plant.

A total of 53 genotypes including three checks were evaluated in Augmented Design at NBPGR, New Delhi for twelve quantitative and five qualitative characters (Table-105). Early flowering was observed (64.00 days) in the genotype EC247679 whereas early maturity was observed (140.00 days) in the genotype HB-21, HB-57, HB-30 and HB-62. Highest seed yield per plant (138.66) were observed in the genotype EC005873. Maximum plant height (86.80 cm) was recorded in the genotype HB-76. The maximum seed yield per plant (138.66 g) was produced by the genotype HB-76.

At Faizabad, a set of 53 including checks was evaluated for eight quantitative characters. The genotype EC327724 (33.00 days) was earlier in flowering, while HB-62 (140.00 days) was earlier in maturity. Maximum plant height (105.50 cm) was observed in the genotype HB-19. The genotype IC348945 (28.80 g) had the highest 100 seed weight while the genotype HB-78 (24.20 g/plant) had the highest seed yield.

The performance of the entries based on average over the locations has been given as below.

The mean flowering time was the earliest at Faizabad (39.40 days), while it was late at Hisar (56.10 days) and Delhi (68.56 days). On the basis of average over three locations, the entry HB-87 (49.33 days) was superior to the check varieties in flowering.

Maturity period was the earliest at Delhi (144.13 days) and delayed at Hisar (156.57 days). There was a difference of about 12 days between Hisar and

Delhi. Based on the average over three locations entry HB-32 (142.33 days) was the earliest in maturity.

Mean plant height was highest at Hisar (120.46 cm) and very low at Faizabad (92.05 cm). Based on the average over the locations the entry HB-19 (134.97 cm) was found superior to check variety.

The grain yield per plant recorded at three locations showed that Delhi centre had the very highest seed yield per plant (27.20 g) followed by Faizabad (27.12 g). Based on average over the three locations, the entry HB-30 (46.57 g) had the highest grain yield per plant.

100 seed weight was observed at three locations. It showed that highest seed weight was at Hisar (28.52 g) followed by Faizabad (25.46 g). Based on average over three locations, the entry HB-30 (27.40 g) was superior to check variety.

3.2.4 Winged bean (*Psophocarpus tetragonlogus*)

Germplasm screening nursery was evaluated at only one location at Ranchi. List of promising genotypes of the centres has been presented in Table 106 and statistical parameters for all the characters of different locations have been presented in Table 107.

A set of 101 genotype along with one check were evaluated at BAU, Ranchi for nine characters. Early flowering (60.00 days) was observed in genotype EC038821-P4-2 while EC178302 was early maturing (145.10 days). The height plant height (401.60 cm) was recorded in the genotype EC178286 while the entry IC015018 (1680 q/ha) was superior to check variety for seed yield.

3.2.5 Kalingada

Germplasm screening nursery consisting of 20 genotypes supplied by SDAU, S.K. Nagar was evaluated at two locations viz. SDAU, S.K. Nagar and CAZRI, Jaisalmer. The data were received from both the centres. The check used was GK-1. The list of promising entries has been presented in Table 108 and statistical parameters for all the characters of different locations have been presented in Table 109.

At SDAU, S.K. Nagar, a set of 20 genotypes with one check were evaluated for twelve characters. The test weight (g) was highest in the genotypes SKGPK-33 (8.04 g). Large fruit length (21.00 cm) was recorded in the genotype SKGPK-27, while the seed yield was highest in the genotype SKGPK-27 (2.80 q/ha)

A total of 20 genotypes with one check were evaluated at CAZRI, Jaisalmer for six characters. The seed yield (q/ha) was recorded in genotype SKGPK-22 (11.30 q/ha) followed by SKGPK-21 (10.00 q/ha). The entry SKGPK-29 had the highest number of fruit per plant (11.00). The 100 seed weight (g) was recorded highest in the genotype SKGPK-24 (7.95 g).

The performance of the entries based on average over the locations has been given as below.

The mean days to fruit setting time was the earliest at Jaisalmer (39.62 days), while it was late at S.K. Nagar (45.19 days). On the basis of average over two locations, the entry SKGPK-26 (37.00 days) was superior to the check varieties in flowering.

Seed yield levels were highest at Jaisalmer (7.23 q/ha) and lowest at S.K. Nagar (1.56 q/ha). Based on two locations the entry, SKGPK-22 was the highest yielder (6.35 q/ha).

Fruit yield was the highest at Jaisalmer (209.61 q/ha) and lowest at S.K. Nagar (48.38 q/ha) centre. Based on average SKGPK-24 (171.52 q/ha) was the highest fruit yielder.

100 seed weight recorded at two centres showed that it was the highest at Jaisalmer (7.36 g) and low at S.K. Nagar (6.95 g). Based on the average over two locations, the entry SKGPK-33 (7.97 g) showed the highest test weight.

3.2.6 Kankoda

Germplasm screening nursery consisting of 20 genotypes was evaluated at two locations Ambikapur and MPKV, Rahuri. The data were received from both the centres. The check used was Indira Kankoda. The list of promising entries has been presented in Table 110.

At Ambikapur, a set of 20 genotypes with one check were evaluated for twelve characters. The seed weight (g) was highest in the genotypes RMF-1 (11.95 g). Green fruit yield (1.33 kg/plant) was recorded in the genotype Pratapur (Mani), while the No. of green fruits per plant was highest in the genotype Pratapur (Mani) (146.00) and statistical parameters for all the characters of different locations have been presented in Table 111.

A total of 20 genotypes with one check were evaluated at MPKV, Rahuri for six characters. The fruit yield (kg/plant) was recorded in genotype RKG-09-29 (0.33 kg/plant) followed by RKG-09-49 (0.32 kg/plant). The entry RKG-09-8 had the highest number of fruit per plant (22.00). The fruit weight (g) was recorded highest in the genotype RKG-09-20 (21.90 g) and statistical parameters for all the characters of different locations have been presented in Table 112.

3.2.7 Tumba

Germplasm consisting of 34 accessions without check were maintained at SKRAU, Mandor centre. The list of promising genotypes for all the characters and data have been presented in Tables 113 and 114, respectively.

The entries IC281143 and IC281157 (200.00 g) had the highest seed yield per plant followed by IC281126 (130.00 g). The maximum number of fruit per plant was recorded in the genotypes IC281143 (22.00). The entry IC281157 (3700 g) had the highest fruit yield per plant. The highest diameter of fruit was recorded in the genotype IC282661 (8.80 cm). The entry IC373439 (3.08 g) had the maximum 100 seed weight (g).

3.2.8 Simarouba

Simarouba genotypes were planned for maintaining the germplasm at only one centre. The list of promising genotypes for all the characters has been presented in Table 115.

A set of 36 female genotypes along with 18 male genotypes was maintained at MPKV Rahuri. The maximum seed yield per plant was observed in genotype PS-2003-45 (9.56 kg/tree) and genotype PS-2003-29 (198.00 g) had the highest seed weight. The highest plant height was observed in genotype PS-

2003-7 (7.00 cm) and genotype PS-2003-5 (615.20 g) had the highest fruit weight (Tables 117 and 118).

A set of 36 female genotypes along with 18 male genotypes was maintained at S.K. Nagar. The maximum seed yield per plant was observed in plant No. L12P13 (5.20 kg) (Tables 119).

A set of 36 female genotypes along with 18 male genotypes was maintained at Mandor. The maximum seed yield per plant was observed in plant No. 4 (2.40 kg) and plant No. 1 (138.80 g) had the highest seed weight. The highest stem girth was observed in plant No. 4 (85.00 cm) (Tables 116).

Table 95. Promising lines in grain amaranth germplasm (Rabi, 2012-13) for various characters at different locations (Plains)

S. No.	Characters	Range	Promising lines	Value of best check
Akola (Accessions 50)				
1.	Days to 50% flowering	48.00-71.00	SKGPA 086, SKGPA 096, SKGPA 103, SKGPA 079, SKGPA 087, SKGPA 081, SKGPA 092, SKGPA 083, IC021938, SKGPA 084, SKGPA 066, SKGPA 077 , SKGPA 075, IC035635, IC021937, SKGPA 067, SKGPA 065 , SKGPA 082, SKGPA 110, SKGPA 093, IC120649, IC094654, SKGPA 069, IC035711, IC120668, SKGPA 064, SKGPA 072, IC094661, IC035717, IC120689, IC120621, SKGPA 097, SKGPA 068, SKGPA 078 , IC095371, IC035713, SKGPA 070, IC032186, IC081698-B, IC035701, IC120670, IC035651, IC035661, SKGPA 102, SKGPA 085, SKGPA 098, IC095556, IC095204, SKGPA 088, SKGPA 108, IC095383, SKGPA 073, IC021803 A, IC035716, IC032190, IC095430, SKGPA 100, SKGPA 062, IC035665, IC035415, IC035719, IC432086, IC095251, IC095498, IC032193, IC035642, SKGPA 101, SKGPA 104, SKGPA 063, SKGPA 061 , IC035742, SKGPA 105, IC095516, IC095389, IC095244, SKGPA 089, SKGPA 076, SKGPA 109, SKGPA 091, SKGPA 090, SKGPA 074, IC095248, IC095382 B, IC035735, IC095391, IC035404, IC095406, SKGPA 095 (<60.00 days)	GA -2 (61.00 days)
2.	Days to maturity	40.00-120.00	IC021937, IC035635, SKGPA 066, SKGPA 067, SKGPA 064, SKGPA 065, SKGPA 096, SKGPA 069, SKGPA 075, SKGPA 103, SKGPA 101, IC035742, SKGPA 094, SKGPA 099, SKGPA 100, SKGPA 090, IC035716, SKGPA 077, SKGPA 110, SKGPA 068, SKGPA 095, SKGPA 083, IC081698-B, IC095204, IC035735, SKGPA 072 , SKGPA 074, IC035661, IC035717, SKGPA 085, SKGPA 070, IC095244, IC095248, IC120689, IC021938, IC035702, SKGPA 084, SKGPA 073, SKGPA 079, SKGPA 086, SKGPA 102, IC032193, IC432086, IC032186, IC032195, SKGPA 062, IC120649, IC094654, IC035665, SKGPA 087, SKGPA 071, SKGPA 109, IC095251, IC035719, IC035713, SKGPA 088, IC021803 A, IC095516, SKGPA 061, SKGPA 081, SKGPA 078, IC120621, IC095383, SKGPA 080, SKGPA 108, SKGPA 063, SKGPA 082, IC120670, SKGPA 097, IC095406, IC035404, IC032190, IC094661, IC120668 (<105 days)	Suvarna (106.33 days)
3.	Plant height (cm)	51.18-147.20	IC095371, SKGPA 080, IC095383, SKGPA 087, IC021937, SKGPA 088, SKGPA 105, SKGPA 092, SKGPA 085, SKGPA 091, SKGPA 065, IC032186, SKGPA 069, SKGPA 084, SKGPA 109, IC095510, SKGPA 106, IC095382 B, SKGPA 066 (>118.00 cm)	GA-2 (117.19 cm)

S. No.	Characters	Range	Promising lines	Value of best check
4.	Inflorescence length (cm)	3.60-32.06	SKGPA 082, SKGPA 094, SKGPA 079, SKGPA 066, SKGPA 067, , SKGPA 081, IC035635, SKGPA 096, SKGPA 064, SKGPA 083, SKGPA 099, IC021937, IC032186, SKGPA 065, , SKGPA 069, SKGPA 100, IC035642, IC120649, SKGPA 078 , IC081698-B, IC021938, SKGPA 086, IC035661, SKGPA 075, IC032190, SKGPA 092, IC120621, SKGPA 090, IC035717, IC035716, , IC035702, IC094654, IC035651, IC094661, IC035719, SKGPA 084, IC035713, SKGPA 073, SKGPA 085, IC095391, IC095516, SKGPA 103, SKGPA 077, SKGPA 098, IC095510, SKGPA 110, IC035711, SKGPA 104, SKGPA 068, IC095204, IC120670, IC095556, IC095383, SKGPA 076, , SKGPA 102, SKGPA 080 ,SKGPA 106, SKGPA 097,IC035633,IC095382B, IC095430, IC095406, IC095251, SKGPA 101, SKGPA 108, IC035415, IC095389, SKGPA 070 , IC035665, IC035735, IC120668, IC095498, SKGPA 089, IC035404, IC035701 ,IC095244, IC095248, IC035742, SKGPA 072, , IC032195, SKGPA 091 , SKGPA 088, IC120689, , IC021803 A, SKGPA 061 , IC095371, IC035638, IC032193, SKGPA 062, IC035615, SKGPA 087 (>7.50 cm)	GA -2 (7.37 cm)
5.	Seed yield per plant (g)	1.72-280.91	IC035711, SKGPA 110, SKGPA 088, IC095383, SKGPA 089, SKGPA 098, SKGPA 068, SKGPA 091, SKGPA 086, SKGPA 078, SKGPA 077, SKGPA 084, IC021937, SKGPA 081, SKGPA 064, SKGPA 085, SKGPA 093, SKGPA 095, IC032193, SKGPA 072, SKGPA 070, SKGPA 062, IC095371, SKGPA 066, SKGPA 090, IC035717, SKGPA 087, IC094654, IC094661, SKGPA 082, SKGPA 075, IC035719, IC032186, IC120670, IC095556, IC035404, IC035665, SKGPA 065, IC035735, IC021803 A, SKGPA 096, IC095382 B, IC095251, IC032195, IC095498, SKGPA 092, IC035633, SKGPA 073, IC035716, IC095204, SKGPA 083, SKGPA 080, IC035701, IC120621, IC021938, SKGPA 067 , IC095248, IC120668 (>8.00 cm)	GA -2 (8.45 g)
6.	Leaf length (cm)	8.66-22.80	SKGPA 084, SKGPA 080, SKGPA 062, SKGPA 071, SKGPA 098, SKGPA 085, SKGPA 105, SKGPA 075, SKGPA 063, SKGPA 068, IC094661 (>18.00 cm)	Suvarna (18.40 cm)
7.	Petiole length (cm)	4.20-14.88	SKGPA 080, SKGPA 071, SKGPA 084, SKGPA 106, SKGPA 087, SKGPA 063, SKGPA 062, SKGPA 086, SKGPA 091, SKGPA 090, SKGPA 066, SKGPA 085, SKGPA 061 (>9.00 cm)	Suvarna (9.18 cm)
8.	Stem thickness (cm)	4.52-29.23	SKGPA 095, SKGPA 084, SKGPA 080, SKGPA 062, SKGPA 085, , SKGPA 098, SKGPA 063 , SKGPA 088, SKGPA 105, SKGPA 068, SKGPA 074, SKGPA 083, SKGPA 086, SKGPA 071, SKGPA 066, , SKGPA 067, SKGPA 070, SKGPA 082, IC035638, SKGPA 065, , SKGPA 091, SKGPA 077,	GA -2 (13.86 cm)

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA 075, SKGPA 061, SKGPA 087, IC035633, SKGPA 069, SKGPA 090, SKGPA 072 , IC032193, IC021937 (>14.00 cm)	
9.	Number of Branches per plant	1.00-5.60	SKGPA 067, SKGPA 073, SKGPA 085, SKGPA 088, SKGPA 068, , SKGPA 066, SKGPA 065 , IC021803 A, SKGPA 083, SKGPA 080, SKGPA 082, IC432086, SKGPA 084, SKGPA 061, , SKGPA 089, SKGPA 062, SKGPA 086, SKGPA 070, SKGPA 087, SKGPA 072, SKGPA 064, SKGPA 095, SKGPA 063, SKGPA 075, IC095391, IC095556, SKGPA 077 , SKGPA 081, IC021938, IC095244, SKGPA 079, SKGPA 092, IC095516, SKGPA 078, SKGPA 100, IC095389, IC120670, IC035702, SKGPA 097, IC035651, SKGPA 098, SKGPA 091, SKGPA 069, IC021937 (>1.50)	GA -2 (2.00)
10.	Lateral Spikelet length (cm)	2.10-24.32	SKGPA 094, SKGPA 082, SKGPA 096, SKGPA 066, SKGPA 067, , SKGPA 081, SKGPA 099, IC032186, SKGPA 085, SKGPA 100, SKGPA 086, IC035633, SKGPA 079, SKGPA 064, IC081698-B, SKGPA 090, SKGPA 083, SKGPA 065, SKGPA 069, SKGPA 078, , IC035635, SKGPA 073, SKGPA 068, IC021937, SKGPA 075, SKGPA 084, IC095391, IC120649, SKGPA 070 , IC035665, SKGPA 098, SKGPA 077, , IC095516, SKGPA 089, IC032190, IC035716, SKGPA 088, IC095383, SKGPA 101, SKGPA 102, IC095556, IC035642, IC120670, IC035651, SKGPA 093, IC035719, IC035638, IC094654, SKGPA 103, IC095510, , IC035717, SKGPA 104, IC021938, SKGPA 106, IC095204, IC095244, IC095382 B, SKGPA 091 , IC120621, IC095406, IC095248, IC094661, SKGPA 072, , IC035713, IC035702, IC032195, IC095389, SKGPA 076, , IC095498, SKGPA 092, IC035661, SKGPA 110, IC095251, IC035415, IC120689, IC095430, SKGPA 097, IC120668, SKGPA 108, IC035711, SKGPA 062, IC035735, SKGPA 061 , SKGPA 080, IC035742, IC035404, IC035615, SKGPA 105, IC035701, SKGPA 087, IC095371, IC021803 A, IC032193 (>5.00 cm)	Suvarna (4.79 cm)
11.	100 seed weight (g)	0.36-52.00	SKGPA 100, SKGPA 093, SKGPA 103, SKGPA 066 , SKGPA 094, IC035651, SKGPA 089, SKGPA 084, SKGPA 065, SKGPA 096, SKGPA 092, IC035713, IC035642, SKGPA 082, IC120670, IC095204, SKGPA 101, SKGPA 110, SKGPA 088, SKGPA 086, IC094654, IC035719, IC035701, SKGPA 070 , SKGPA 083, IC120621, IC081698-B, SKGPA 097, SKGPA 098, SKGPA 081, SKGPA 085, IC095371, SKGPA 090, SKGPA 067, IC095248, SKGPA 102, SKGPA 078, IC035717, IC094661, SKGPA 063, IC120689, IC120649, SKGPA 095, SKGPA 075, IC095382 B, SKGPA 069, SKGPA 099, SKGPA 079, IC035415, IC035661, SKGPA 106, SKGPA 061 , SKGPA 064, SKGPA 072, IC095556, SKGPA 080, IC035702, IC095510, SKGPA 108, IC035615, IC095383, SKGPA 068, SKGPA 091, SKGPA 077,	GA -2 (0.52 g)

S. No.	Characters	Range	Promising lines	Value of best check
			IC021937, IC032193, SKGPA 087, IC035665, IC021803 A, IC095251, IC035633, SKGPA 073, IC120668, IC432086, IC095516, SKGPA 071, IC035742, SKGPA 062, IC032195, IC095389 (>0.50 g)	
Bhubaneswar (Accessions 50)				
1.	Days to 50% flowering	31.00-56.20	IC095244, IC035651, IC035635, IC035642, SKGPA-75, SKGPA-81, SKGPA-82, SKGPA-83, SKGPA-85, SKGPA-86, SKGPA-100, SKGPA-101, SKGPA-87, SKGPA-96, SKGPA-99, SKGPA-103, SKGPA-106, SKGPA-110, IC094654, IC120670, SKGPA-76, SKGPA-78, IC021938, IC035415, IC035701, IC035713, IC081698-B, IC095430, SKGPA-65, SKGPA-66, SKGPA-67, SKGPA-73, SKGPA-109 (<42.50 days)	BGA-2 (48.20 days)
2.	Days to maturity	74.00-97.40	IC095244, IC035635, SKGPA-81, SKGPA-82, SKGPA-83, IC035633, IC035642, SKGPA-85, SKGPA-100, SKGPA-75, SKGPA-87, IC035651, SKGPA-78, SKGPA-86, SKGPA-110, SKGPA-76, SKGPA-99, SKGPA-101, SKGPA-106, IC120670, SKGPA-96, SKGPA-103 (<84.50 days)	BGA-2 (89.60 days)
3.	Plant height (cm)	68.60-150.00	SKGPA-99, SKGPA-98, SKGPA-85 (>132.50 cm)	BGA-2 (109.38 cm)
3.	Inflorescence length (cm)	32.20-69.60	SKGPA-67, SKGPA-81, SKGPA-99, SKGPA-103, SKGPA-86, SKGPA-82, SKGPA-98, SKGPA-87, SKGPA-78, SKGPA-91, SKGPA-74, SKGPA-100, SKGPA-73, SKGPA-66, SKGPA-83, SKGPA-85, SKGPA-106 (>50.70 cm)	BGA-2 (46.58 cm)
4.	Seed volume weight (g/10 ml)	6.08-8.62	SKGPA-85, SKGPA-101, SKGPA-110 (>8.00 ml)	BGA-2 (8.08 ml)
5.	Grain yield per plant (g)	3.35-10.97	SKGPA-98, SKGPA-86, SKGPA-109, SKGPA-68, SKGPA-99, SKGPA-70, IC120621, SKGPA-106, SKGPA-83, SKGPA-64, IC035651 (>9.00 g)	BGA-2 (7.60 g)
6.	Grain yield per plot (g)	140.00-670.00	IC120670, SKGPA-91, SKGPA-70, SKGPA-83, SKGPA-68, SKGPA-98, SKGPA-86, SKGPA-109, SKGPA-106, IC095370, SKGPA-74 (>469.50 g)	BGA-2 (396.00 g)
Delhi (Accessions 100)				
1.	Days to 50% flowering	51.00-75.00	SKGPA-81, SKGPA-75, SKGPA-77, SKGPA-94, SKGPA-65, SKGPA-67, SKGPA-87, SKGPA-96, SKGPA-61, SKGPA-66, SKGPA-86, SKGPA-89, SKGPA-99, SKNA-106, SKGPA-72, SKGPA-78, SKGPA-83, SKGPA-97, SKNA-110, SKGPA-62, SKGPA-69, SKGPA-70, SKGPA-82, SKGPA-84, SKGPA-100, SKNA-103, SKGPA-64, SKGPA-85, SKGPA-101, SKGPA-68, SKGPA-73, SKGPA-88 (<57.50 days)	GA-2 (59.33 days)
2.	Days to maturity	133.00-162.00	SKGPA-63, SKGPA-88, SKGPA-61, SKGPA-89, SKGPA-97, SKGPA-94, SKGPA-83, SKGPA-82, SKNA-108, SKGPA-66, SKGPA-73, SKGPA-79,	GA-1 (149.17 days)

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA-95, SKGPA-87, SKNA-106, SKGPA-78, SKGPA-81, SKGPA-67, SKGPA-96, SKGPA-86, SKGPA-62, SKNA-103, SKGPA-74, SKGPA-65, SKGPA-99, SKGPA-68, SKNA-109, SKNA-104, SKGPA-77, SKGPA-70, SKGPA-101, SKGPA-98, SKGPA-91, SKGPA-75, SKGPA-100, SKGPA-85, SKNA-105, SKGPA-92 (<148.50 days)	
3.	Plant height (cm)	32.00-115.60	SKGPA-71, SKGPA-74 (>110.00 cm)	GA-2 (110.20 cm)
4.	No. of primary branches per plant	0.00-11.00	SKGPA-74, SKGPA-87, SKGPA-84, SKGPA-95, SKGPA-92, SKGPA-78, SKGPA-85, SKGPA-88, SKGPA-100, SKGPA-71, SKGPA-72, SKNA-104, SKGPA-77, SKGPA-86, SKNA-103, SKGPA-98, SKGPA-67, SKGPA-61, SKGPA-75 (>5.00)	Suvarna (5.30)
5.	Leaf length (cm)	6.60-22.70	SKGPA-84, SKGPA-71, SKGPA-85, SKGPA-80 (>18.00 cm)	GA-2 (17.66 cm)
6.	Petiole length (cm)	2.96-11.38	SKGPA-80, SKGPA-71, SKGPA-74, SKGPA-85 (>8.50 cm)	GA-2 (8.74 cm)
7.	Inflorescence length (cm)	16.44-61.00	SKGPA-95, SKGPA-84, SKGPA-100, SKGPA-76, SKNA-105 (>49.50 cm)	GA-2 (49.40 cm)
8.	Lateral spikelet length (cm)	2.10-17.50	SKGPA-100, SKNA-103, SKGPA-95, SKGPA-94, SKGPA-96, SKGPA-89, SKNA-110, SKGPA-88, SKGPA-84, SKGPA-99, SKGPA-83, SKGPA-76, SKGPA-86, SKGPA-85, SKGPA-92, SKNA-106, SKGPA-87, SKGPA-67, SKGPA-75, SKNA-104 (>9.50 cm)	GA-2 (9.36 cm)
9.	Stem thickness (cm)	7.83-26.26	SKGPA-84, SKGPA-85, SKGPA-69, SKGPA-74, SKGPA-99, SKGPA-100, SKGPA-92, SKGPA-87, SKGPA-72, SKGPA-78, SKGPA-89, SKGPA-81 (>16.50 cm)	GA-2 (16.47 cm)
10.	Seed yield per plant (g)	0.16-220.00	SKGPA-91 (=220.00 g)	GA-2 (194.47 g)
11.	Plot yield (g)	2.00-440.00	SKGPA-91 (=440.00 g)	GA-1 (422.67 g)
12.	1000 seed weight (g)	6.90-9.70	SKNA-103, SKGPA-82, SKGPA-64, SKGPA-85, SKGPA-83, SKGPA-88, SKGPA-61, SKNA-106, SKGPA-101, SKGPA-77, SKGPA-76, SKGPA-70, SKGPA-91, SKGPA-98, SKGPA-65, SKNA-107, SKGPA-96, SKGPA-95 (>8.00 g)	GA-2 (8.07 g)
Faizabad (Accessions 56)				
1.	Days to 50% flowering	35.00-48.00	SKGPA-90, SKGPA-64, SKGPA-85, SKGPA-89, SKGPA-63, SKGPA-84, SKGPA-88, SKGPA-93, SKGPA-100, SKGPA-101, SKGPA-108, SKGPA-104,	Suvarna (41.80 days)

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA-61, , SKGPA-65, SKGPA-82, SKGPA-86, SKGPA-94, SKGPA-103, SKGPA-110, SKGPA-66 (<40.50 days)	
2.	Days to maturity	103.00-119.00	SKGPA-96, SKGPA-90, SKGPA-97, SKGPA-109, SKGPA-64, SKGPA-94,, SKGPA-65, SKGPA-70, SKGPA-93, SKGPA-95, , SKGPA-83, , SKGPA-92, SKGPA-110 (<108.50 days)	GA-2 (109.60 days)
3.	Plant height (cm)	61.00-105.00	SKGPA-89, SKGPA-92, SKGPA-110, SKGPA-64, SKGPA-91, , SKGPA-88, SKGPA-82, SKGPA-87 (>93.50 cm)	Suvarna (92.55 cm)
4.	Inflorescence length (cm)	28.60-49.00	SKGPA-96, SKGPA-105, SKGPA-108, SKGPA-82, SKGPA-94, SKGPA-100, SKGPA-102, SKGPA-109, SKGPA-104, SKGPA-101, SKGPA-84, SKGPA-83 SKGPA-91, SKGPA-99 (>44.50 cm)	GA-1 (43.75 cm)
5.	Seed volume weight (g/10 ml)	7.40-9.30	SKGPA-109, SKGPA-66, SKGPA-67, SKGPA-91, SKGPA-108, , SKGPA-69, SKGPA-107 (>8.00 ml)	BGA-2 (8.13 ml)
6.	Seed yield per plant (g)	8.00-20.00	SKGPA-92, SKGPA-69, SKGPA-83, SKGPA-96, SKGPA-67, SKGPA-81, , SKGPA-85, SKGPA-99, SKGPA-84, SKGPA-65, SKGPA-90, SKGPA-94, SKGPA-103, SKGPA-104, SKGPA-88, SKGPA-107 (>13.00 g)	GA-1 (13.33 g)
Mandor (Accessions 100)				
1.	Days to 50% flowering	31.00-64.00	IC035635, SKGPA-75, SKGPA-86, SKGPA-67, SKGPA-79, SKGPA-82, SKGPA-83, SKGPA-85, SKGPA-89, SKGPA-94, SKGPA-96, SKGPA-100, SKGPA-103, SKGPA-106, SKGPA-64, SKGPA-65, SKGPA-66, SKGPA-81, SKGPA-99, SKGPA-101, SKGPA-108, SKGPA-110, IC035661, SKGPA-68, SKGPA-69, SKGPA-78, SKGPA-88, SKGPA-63, SKGPA-70, SKGPA-91, IC035702, SKGPA-72, SKGPA-73, SKGPA-90, IC035701, SKGPA-61, SKGPA-62, SKGPA-76, SKGPA-77, IC035716, IC095382-B, IC095391, IC095556, IC021803-A, SKGPA-105, IC005251, IC021938, IC032186, IC032193, IC035404, IC081698-B, IC095248, IC095383, IC095389, IC095430, IC095516, IC120649, SKGPA-102, SKGPA-104, IC032195, IC035415, IC095371, IC120689, SKGPA-87, SKGPA-98, SKGPA-109 (<50.50 days)	GA-2 (52.73 days)
2.	Days to maturity	117.00-135.00	IC081698-B, IC032195, IC095498, IC095556, SKGPA-63, SKGPA-67, SKGPA-73, SKGPA-77, SKGPA-83, SKGPA-90, SKGPA-96, SKGPA-103, SKGPA-105, SKGPA-61, SKGPA-62, IC005251, IC032186, IC032193, IC035702, IC035716, IC095248, IC095371, IC095391, IC095510, IC120649, IC120689, SKGPA-66, SKGPA-78, SKGPA-79, SKGPA-82, , IC021937, IC035404, IC035701, IC095202, IC095382-B, IC095406,	GA-2 (133.00 days)

S. No.	Characters	Range	Promising lines	Value of best check
			IC095430, IC095516, IC432086, SKGPA-64, SKGPA-68, SKGPA-70, SKGPA-81, SKGPA-86, SKGPA-88, SKGPA-91, SKGPA-94, SKGPA-98, SKGPA-101, SKGPA-104, SKGPA-106, IC021803-A, IC021938, IC035635, IC095383, IC095389, SKGPA-65, SKGPA-72, SKGPA-76, SKGPA-85, SKGPA-89, SKGPA-102, SKGPA-109, SKGPA-110, SKGPA-69, SKGPA-108, IC035415, IC035615, IC035661, IC035665, SKGPA-80, SKGPA-99, SKGPA-71, SKGPA-75, IC035633, SKGPA-74, SKGPA-100, IC035638 (<132.50 days)	
3.	Plant height (cm)	54.00-149.00	IC035633, IC035638 (>142.50 cm)	Suvarna (138.18 cm)
4.	Inflorescence length (cm)	27.00-81.00	IC095498, SKGPA-99, IC095430, IC120689, SKGPA-90, IC432086, SKGPA-98, SKGPA-104, IC035633, IC120649, SKGPA-91, IC095391 (>66.50)	GA-1 (66.55 cm)
5.	Seed yield per plant (g)	5.00-28.10	IC095430, SKGPA-78, IC095389, IC035404, IC035633, IC021938, SKGPA-85, IC035415, IC035716, SKGPA-98, IC021937, IC095202, IC032193, IC035638, IC081698-B, IC432086, IC035615, SKGPA-66 (>18.00 cm)	GA-1 (17.60 g)
6.	Seed weight (g/10 ml)	4.07-6.32	IC120689, IC035638, SKGPA-81, IC432086, IC095498, IC035633, IC095516, IC035615, SKGPA-99, SKGPA-91, SKGPA-105, SKGPA-73, IC095510, SKGPA-85, IC035404, IC035661, IC095371, IC021803-A, IC095556, SKGPA-70, IC035701, SKGPA-69, SKGPA-96, IC120649, SKGPA-72, SKGPA-108, IC035716 (>5.00 ml)	GA-1 (5.31 ml)
Rahuri (Accessions 100)				
1.	Days to 50% flowering	39.00-59.00	IC021938, IC035642, IC081698-B, SKGPA-69, SKGPA-96, IC035635, IC035651, IC094654, IC095383, SKGPA-67, SKGPA-89, SKGPA-101, IC035661, IC095244, IC095516, SKGPA-80, SKGPA-81, IC021803-A, IC035701, IC095248, IC095510, SKGPA-66, SKGPA-110, IC035716, IC095406, IC095498, IC120649, SKGPA-61, SKGPA-65, SKGPA-68, SKGPA-75, SKGPA-85, SKGPA-94, SKGPA-100, SKGPA-104, SKGPA-106, SKGPA-108, IC094661, IC095251, SKGPA-70, SKGPA-99, SKGPA-103, IC095204, IC095371, IC120670, SKGPA-73, SKGPA-76, IC021937, IC035742, IC095382-B, IC095389, IC120668, SKGPA-64, SKGPA-77, SKGPA-78, SKGPA-98, IC032186, IC035702, IC035713, IC035717, IC035735, IC095391, IC095556, IC120689, SKGPA-72, SKGPA-82, SKGPA-88, SKGPA-109, SKGPA-86, SKGPA-105, IC032190, IC035719, IC095430, IC120621, IC432086, SKGPA-71, IC032195, SKGPA-91,	GA-1 (53.20 days)

S. No.	Characters	Range	Promising lines	Value of best check
			IC035415, IC035665, IC035711, SKGPA-83 (<52.50 days)	
2.	Days to maturity	108.00-139.00	SKGPA-96, SKGPA-69, SKGPA-101, IC095383, SKGPA-67, SKGPA-80, IC094654, IC095510, IC095516, SKGPA-66, SKGPA-81, SKGPA-89, IC035716, IC095244, IC095498, IC081698-B, IC095406, IC120649, SKGPA-65, SKGPA-75, IC021803-A, IC095248, SKGPA-61, SKGPA-68, SKGPA-76, SKGPA-85, SKGPA-100, IC035635, IC035651, IC095251, IC095371, SKGPA-70, SKGPA-94, IC021938, IC035661, IC035701, IC035702, IC035735, IC035742, SKGPA-77, IC032186, IC035642, IC035713, IC094661, IC095382-B, IC095391, IC095556, IC120670, SKGPA-78, SKGPA-99, SKGPA-106, SKGPA-110, IC032190, IC035717, IC095389, IC120668, SKGPA-104, SKGPA-105, IC021937, IC095204, IC120689, SKGPA-64, SKGPA-98, SKGPA-103, SKGPA-108, IC035719, IC120621, IC432086, SKGPA-109, IC095430, SKGPA-73, SKGPA-72, IC032195, IC035665, SKGPA-82, SKGPA-86, IC032193, IC035415, IC035711, SKGPA-71, SKGPA-88, IC035404, SKGPA-91, (<131.50 days)	GA-1 (133.00 days)
3.	Plant height (cm)	33.00-155.00	SKGPA-98, IC035615, IC021937, IC432086, IC095371 (>139.50 cm)	GA-2 (138.94 cm)
4.	Inflorescence length (cm)	26.60-95.20	IC120689, IC432086, SKGPA-108, IC021937, IC035615, SKGPA-89, IC120670, SKGPA-67, IC094661, IC032186, SKGPA-101, IC035713, IC032195, IC095556, SKGPA-86, IC035642, IC095406, IC035716, IC120668, IC095510, IC120621 (>72.50 cm)	GA-2 (72.50 cm)
5.	Leaf length (cm)	5.50-19.50	SKGPA-80, SKGPA-91, IC035701, IC035615, SKGPA-71 (>15.00 cm)	GA-2 (14.82 cm)
6.	Leaf width (cm)	2.70-8.50	SKGPA-74, IC095556, SKGPA-109, SKGPA-110 (>7.50 cm)	Suvarna (7.68 cm)
7.	Petiole length (cm)	3.00-13.30	SKGPA-91, IC095251, SKGPA-71, SKGPA-78, IC035701, IC095556, IC432086 (>11.00 cm)	GA-2 (10.64 cm)
8.	Stem thickness (cm)	0.80-2.70	SKGPA-91, IC035615, SKGPA-80, IC035638, IC095244, SKGPA-78, SKGPA-110, IC095251 (>1.90 cm)	GA-2 (1.98 cm)
9.	Lateral spikelet length (cm)	6.50-42.00	SKGPA-67, IC095248, IC432086, IC120689, IC021937, IC035635, IC094661, SKGPA-85, IC035713, IC035642, IC035742, IC095244, IC120649, SKGPA-91, IC035717, IC120621, SKGPA-108, SKGPA-98 (>26.50 cm)	GA-2 (26.48 cm)
10.	Seed yield per plant (g)	1.00-	IC035651, IC035661, IC095556, IC095389, IC021937, IC035635,	BGA-2 (14.92)

S. No.	Characters	Range	Promising lines	Value of best check
		24.00	IC035404, IC035615, IC035701, IC095371, IC032193, IC095430, IC035638, IC081698-B, IC035642, IC094661, IC095382-B, IC095516, IC120649 (>14.80 g)	g)
11.	Seed weight (g/10 ml)	4.07-8.92	IC120689, IC035404 (>8.50 cm)	GA-1 (8.54 ml)
Ranchi (Accessions 100)				
1.	Days to 50% flowering	57.00-95.20	IC093382-B, SKGPA-75, SKGPA-100, SKGPA-92, SKGPA-105, SKGPA-107, SKGPA-66, SKGPA-87, SKGPA-93, SKGPA-65, SKGPA-89, SKGPA-99, SKGPA-106, SKGPA-69, SKGPA-91, SKGPA-86, SKGPA-90, IC035702, SKGPA-81, SKGPA-83, SKGPA-96, IC094654, SKGPA-82, SKGPA-79, SKGPA-85, SKGPA-101, SKGPA-103, IC022186, IC035717, IC035719, SKGPA-80, SKGPA-95, SKGPA-110, IC035635, IC035711, IC035716, SKGPA-67, IC035661, IC120689, SKGPA-68, SKGPA-70, SKGPA-104, IC094661, IC021938, IC035651, IC035735, IC081698-B, IC095204, IC035701, IC035713, IC095251, SKGPA-78, IC035665, IC035642, IC035742, IC095371, IC095406, SKGPA-76, SKGPA-98, SKGPA-108, IC095391, IC095516, SKGPA-73, SKGPA-77, IC021803-A, IC035415, SKGPA-62, SKGPA-64, SKGPA-97, IC095510, SKGPA-72, SKGPA-88, IC032195, IC120670, SKGPA-63, IC021937, IC095244, IC120668, IC035404, IC095248, IC095389, IC095430, IC120621, IC095498, IC432086, IC032190, IC095383, IC033193, IC120649, IC095556, IC035638, SKGPA-61, IC035633 (<89.00 days)	GA-2 (90.00 days)
2.	Days to maturity	126.00-170.00	SKGPA-79, SKGPA-101, SKGPA-69, IC035642, IC035665, SKGPA-100, SKGPA-107, SKGPA-92, SKGPA-103, SKGPA-108, IC120670, SKGPA-106, IC120668, IC035635, SKGPA-68, SKGPA-93, IC093382-B, IC095516, SKGPA-67, SKGPA-74, SKGPA-91, SKGPA-99, IC035651, SKGPA-64, SKGPA-65, SKGPA-75, SKGPA-70, SKGPA-72, SKGPA-73, SKGPA-76, SKGPA-77, IC120649, SKGPA-66, IC095556, IC035716, IC035717, IC035719, IC095391, IC432086, SKGPA-61, IC035713, IC081698-B, IC094661, IC095406, SKGPA-110, IC094654, IC095251, IC120621, SKGPA-85, SKGPA-89, IC021937, IC035711, IC095371, SKGPA-82, SKGPA-86, SKGPA-90, IC095204, IC095244, IC095248, SKGPA-83, SKGPA-104, IC095383, IC095498, IC095510, IC095389, IC120689, SKGPA-87, IC095430, IC022186, IC035661, IC035701, SKGPA-63, , SKGPA-62, SKGPA-78, SKGPA-97, SKGPA-105, IC035638, IC035702, IC021938, IC033193, IC035735, SKGPA-80, SKGPA-88, SKGPA-98, ,	Suvarna (157.60 days)

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA-81, IC032195, SKGPA-96 (<156.50 days)	
3.	Plant height (cm)	14.00-98.30	-	GA-2 (98.30 cm)
4.	No. of primary branches per plant	1.00-8.00	IC095406, IC120621, SKGPA-80, SKGPA-98, IC095383, IC095389, SKGPA-64, SKGPA-78, SKGPA-89, SKGPA-91 (>6.50)	GA-2 (7.00)
5.	Inflorescence length (cm)	12.50-40.00	SKGPA-90, SKGPA-98, IC095510, SKGPA-104, IC035651 (>34.50 cm)	GA-2 (35.00 cm)
6.	Leaf length (cm)	3.00-15.00	SKGPA-99, IC094654, SKGPA-98, IC095556, SKGPA-88, SKGPA-91 (>12.50 cm)	GA-2 (13.00 cm)
7.	Leaf width (cm)	2.00-8.00	SKGPA-107, SKGPA-64, SKGPA-66, SKGPA-77, SKGPA-80, SKGPA-99, IC032190, IC033193, IC095510, SKGPA-76, IC035661, IC035735, IC094661, IC095371, IC095383, IC095391, IC095498, IC095516, SKGPA-74, SKGPA-78, SKGPA-88, SKGPA-91, SKGPA-93, SKGPA-95, SKGPA-105, SKGPA-106 (>5.50 cm)	GA-2 (6.00 cm)
8.	Petiole length (cm)	2.00-12.00	SKGPA-80, IC095556, IC120621, SKGPA-91, SKGPA-99, SKGPA-106, SKGPA-107 (>8.60 cm)	GA-2 (9.00 cm)
9.	Seed yield per plant (g)	9.50-34.00	IC094661, SKGPA-106, IC035713, IC035735, IC120689, SKGPA-101, IC021937, IC095516, IC095248, IC021803-A, SKGPA-80, SKGPA-105, SKGPA-88, SKGPA-72, IC035651, IC095389, SKGPA-98, IC432086, IC095371, SKGPA-73, IC095406, SKGPA-63, IC120621, IC095204, IC035742, IC035717, IC095510, SKGPA-64, SKGPA-78, IC035415, IC035638 (>23.00 g)	GA-2 (23.00 g)
10.	Seed volume weight (g/10 ml)	6.10-10.48	IC021803-A, IC035642, IC095244, IC120670, IC033193, SKGPA-64, IC120689, SKGPA-79, IC035638, IC035661, IC095516, SKGPA-66, IC035713, IC035735, IC095556, IC035651, IC035404, SKGPA-104, SKGPA-107, SKGPA-106, IC032195, IC035719, IC120649, SKGPA-74, IC094654, IC120621, SKGPA-93, IC035717, IC035742, IC095371, IC095510, IC021938, SKGPA-99, IC432086, SKGPA-65, SKGPA-108, IC095406, SKGPA-70, IC022186, IC093382-B, IC095498, SKGPA-77, IC095248, SKGPA-100, SKGPA-67, SKGPA-92, IC035665, IC035711, SKGPA-69, IC095430, SKGPA-73, IC095204, IC095251, SKGPA-75, IC035633, IC081698-B, SKGPA-89, IC094661, IC095383, SKGPA-91, SKGPA-97, IC120668, IC032190, IC095391, SKGPA-62, SKGPA-101, IC035635, IC035702, IC021937, SKGPA-72, SKGPA-78, SKGPA-68, IC035716, IC035415, IC035615, IC035701, IC095389, SKGPA-61,	GA-2 (9.12 ml)

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA-76, SKGPA-98 (>9.00 ml)	
S.K. Nagar (Accessions 100)				
1.	Days to 50% flowering	31.00-59.00	SKGPA061, IC035635, IC035651, SKGPA082, SKGPA067, SKGPA099, SKGPA066, SKGPA110, IC021937, SKGPA103, IC035665, SKGPA100, SKGPA106, SKGPA064, SKGPA087, SKGPA081, IC035642, SKGPA094, SKGPA085, SKGPA065, SKGPA079, SKGPA098, SKGPA062, IC035702, SKGPA068, SKGPA095, IC035713, SKGPA083, SKGPA078, IC021803-A, SKGPA086, SKGPA096, SKGPA070, SKGPA101, IC120670, IC032186, SKGPA105, SKGPA109, IC035701, SKGPA091, IC095510, IC021938, SKGPA075, IC035661, SKGPA077, IC081698-B, IC035711, IC035719, SKGPA072, IC032190, SKGPA069, IC120668, IC095406, IC094654, IC035404, IC032193, IC095248, IC095383, SKGPA104, , IC035735, IC095391, IC094661, IC035716, SKGPA076, SKGPA063, SKGPA090, IC095430, IC032195, IC120621, IC120689, IC095251, IC095516, IC035717, IC095244, IC095371, IC035742, IC432086 (<46.50 days)	GA-2 (47.60 days)
2.	Days to maturity	92.00-105.00	SKGPA065, SKGPA101, SKGPA066, SKGPA077, SKGPA072, SKGPA076, SKGPA067, SKGPA070, SKGPA106, SKGPA079, SKGPA098, SKGPA068, SKGPA095, IC021803-A, SKGPA086, SKGPA069, IC094654, SKGPA104, IC035735, SKGPA073, SKGPA080, IC035651, SKGPA064, IC035642, SKGPA105, SKGPA091, IC081698-B, IC035711, SKGPA090, IC035717, IC035742, IC035638, SKGPA061, SKGPA110, SKGPA094, IC035633, IC035635, SKGPA103, SKGPA100, SKGPA087, IC035702, IC035713, IC095510, IC035719, IC035404, IC095204, IC021937, IC035665, SKGPA096, IC120670, IC032186, IC095406, IC032193, IC095383, IC095371, SKGPA099, SKGPA085, SKGPA078, SKGPA109, IC035701, IC021938, SKGPA075, IC035661, IC032190, IC120668, IC095430, IC032195, IC120621, IC120689, IC095251, IC095516, IC120649, IC095556, SKGPA088, IC095498, IC095389 (<100.50 days)	BGA-2 (101.50 days)
3.	Plant height (cm)	63.40-154.90	SKGPA105, IC035615, SKGPA080, SKGPA098, SKGPA071 (>141.00 cm)	GA-2 (141.38 cm)
4.	Inflorescence length (cm)	30.70-80.50	SKGPA105, SKGPA098 (>79.00 cm)	GA-2 (75.22 cm)
5.	No. of primary branches per plant	2.00-6.00	SKGPA096, IC035701, SKGPA069, SKGPA083, IC035642, SKGPA095, SKGPA068, IC021803-A, SKGPA070, SKGPA081, IC035651, SKGPA109, IC095510, IC120670, SKGPA082, IC095498, IC035661, IC095389,	-

S. No.	Characters	Range	Promising lines	Value of best check
			SKGPA086, IC035665, SKGPA065, IC120689, SKGPA094, SKGPA079, SKGPA091, SKGPA106, IC035635, SKGPA064, SKGPA085, SKGPA066, IC035702, SKGPA077, SKGPA072, IC021938, IC120668, SKGPA099, SKGPA101, SKGPA100 (>1.00)	
6.	Leaf length (cm)	9.20-31.20	SKGPA080, IC035633, SKGPA109, IC021937 (>25.50 cm)	GA-2 (24.41 CM)
7.	Petiole length (cm)	2.60-12.60	SKGPA080, IC021937, IC035633 (>9.50 cm)	GA-2 (9.71 cm)
8.	Stem thickness (cm)	1.60-5.50	IC035615, SKGPA080, SKGPA071 (>5.00 cm)	Suvarna (5.17 cm)
9.	Lateral spikelet length (cm)	8.00-46.60	SKGPA096, SKGPA085, SKGPA083, SKGPA105, SKGPA103, SKGPA087, SKGPA100, SKGPA106, SKGPA099, SKGPA082, SKGPA088, SKGPA101, SKGPA095, SKGPA086, SKGPA090, IC035642, SKGPA081, IC095510, IC035701, IC432086, IC035635, SKGPA094, IC035716, IC035651, SKGPA104, IC095391, IC035717, IC035665, IC095371, SKGPA091 (>24.00 cm)	GA-2 (24.36 cm)
10.	Seed weight (g/10 ml)	7.22-8.70	IC095251, IC095406, IC035702, IC035661, SKGPA061, SKGPA103, SKGPA105, SKGPA091, IC095516, IC035716, IC095204, IC095510, SKGPA096, IC095383, SKGPA066, SKGPA106, IC095498, IC032186, IC035719, IC095382-B, SKGPA064, SKGPA062, IC120649, IC094661, IC081698-B, IC035415, IC035665 (>8.00 ml)	GA-2 (8.19 ml)
11.	Seed yield per plant (g)	2.40-32.20	SKGPA061, IC021937, SKGPA087, SKGPA095, SKGPA082, IC035404, SKGPA062, IC035651, SKGPA106, IC035633, SKGPA078, IC032190, IC035635, SKGPA080, IC120649, IC035415, SKGPA073, IC035642, IC095430, SKGPA096, IC095406, SKGPA075, IC032195, IC035735 (>15.50 g)	GA-2 (15.60 g)
12.	Straw weight per plant (g)	10.60-117.20	SKGPA098, SKGPA109, SKGPA068, IC095406, SKGPA080, SKGPA095, SKGPA062, IC021937, IC032190, SKGPA063, IC035615 (>72.50 g)	GA-2 (72.68 g)
Best entries over location				
1.	Days to 50% flowering	43.50-64.00	IC035635, SKGPA-94, SKGPA-75, SKGPA-100, SKGPA-66, SKGPA-86, SKGPA-81, SKGPA-82, SKGPA-96, SKGPA-99, SKGPA-65, SKGPA-67, SKGPA-103, SKGPA-110, SKGPA-85, SKGPA-101, SKGPA-83, SKGPA-89, SKGPA-84, IC035651, SKGPA-69, SKGPA-106, IC094654, SKGPA-87, IC035702, SKGPA-90, SKGPA-64, IC021938, IC035661, SKGPA-93, SKGPA-68, IC035642, SKGPA-79, SKGPA-102, SKGPA-109, SKGPA-78,	GA-1 (56.44 days)

S. No.	Characters	Range	Promising lines	Value of best check
			IC035701, IC095382-B, SKGPA-61, SKGPA-70, IC081698-B, IC035716, SKGPA-105, IC095244, IC032186, SKGPA-62, SKGPA-104, SKGPA-77, SKGPA-88, IC120689, IC021803-A, IC035713, IC021937, IC095251, SKGPA-91, IC035719, SKGPA-76, IC094661, IC120670, IC095383, SKGPA-108, IC095516, IC035711, IC095204, SKGPA-72, SKGPA-73, IC095391, SKGPA-63, IC095248, IC095371, IC095406, IC035717, SKGPA-98, IC095430, IC120649, SKGPA-92, IC035742, IC120668, IC035665, IC035735, SKGPA-107, IC095556, SKGPA-95, IC095389, IC032195, IC032190, IC035404, IC095510, IC120621 (<56.00 days)	
2.	Days to maturity	102.67-130.67	IC021937, IC095244, IC035635, IC035642, IC094654, IC120670, IC035651, IC081698-B, IC035713, IC035716, IC035719, SKGPA-101, IC035735, IC120668, IC095516, SKGPA-102, IC095248, IC120649, IC094661, IC035742, SKGPA-66, SKGPA-90, IC095251, IC095406, IC095556, IC120689, IC120621, SKGPA-67, IC095204, SKGPA-65, IC095391, SKGPA-103, SKGPA-109, IC035665, IC035717, IC095383, SKGPA-94, SKGPA-100, IC095371, IC095382-B, IC021938, IC032186, IC035702, IC432086, SKGPA-96, SKGPA-70, SKGPA-64, IC021803-A, SKGPA-61, SKGPA-99, SKGPA-75, IC035701, SKGPA-73, IC035711, IC035661, SKGPA-68, SKGPA-85, SKGPA-106, SKGPA-110, IC032190, IC032195, SKGPA-76, IC032193, IC095389, IC095430, SKGPA-83, SKGPA-86, SKGPA-62, SKGPA-93, SKGPA-79, SKGPA-81, SKGPA-78, SKGPA-82, SKGPA-69, SKGPA-77, IC095510, SKGPA-104, IC035404, SKGPA-91, SKGPA-105, IC095498, SKGPA-87, SKGPA-95, SKGPA-84, SKGPA-80, SKGPA-98, SKGPA-74, IC035638, SKGPA-63, IC035415 (<121.00 days)	GA-1 (121.54 days)
3.	Plant height (cm)	49.42-122.33	IC035615, SKGPA-80, SKGPA-98 (>116.00 cm)	GA-2 (114.95 cm)
4.	Inflorescence length (cm)	24.18-53.15	-	GA-1 (53.15 cm)
5.	No. of primary branches per plant	0.67-6.25	SKGPA-84, SKGPA-92, SKGPA-89, SKGPA-74, SKGPA-107 (>4.50)	BGA-2 (4.87)
6.	Leaf length (cm)	8.56-22.75	SKGPA-84, SKGPA-80 (>18.50 cm)	GA-2 (17.29 cm)
7.	Leaf width (cm)	3.00-	SKGPA-107, SKGPA-109, SKGPA-74, SKGPA-66, SKGPA-91, SKGPA-78,	GA-2 (6.63 cm)

S. No.	Characters	Range	Promising lines	Value of best check
		8.00	SKGPA-80 (>6.50 cm)	
8.	Petiole length (cm)	4.13-12.07	SKGPA-80, SKGPA-84 (>9.50 cm)	GA-2 (9.31 cm)
9.	Stem thickness (cm)	3.14-27.13	SKGPA-84, SKGPA-95, SKGPA-92, SKGPA-80, SKGPA-62, SKGPA-63, SKGPA-102, SKGPA-85, SKGPA-93, SKGPA-107, SKGPA-74, SKGPA-69, SKGPA-98, SKGPA-89, SKGPA-71, SKGPA-87, SKGPA-88, SKGPA-86 (>9.00 cm)	GA-2 (9.31 cm)
10.	Lateral spikelet length (cm)	5.50-25.84	SKGPA-85, SKGPA-96, IC035635, SKGPA-90, IC035642, SKGPA-67, SKGPA-100, SKGPA-99, IC432086, SKGPA-82, IC021937, IC095248, SKGPA-94, IC035717, SKGPA-86, IC035716, SKGPA-83, IC094661, IC035665, SKGPA-101, IC120621, IC120649, SKGPA-106, IC035701, IC095510, IC035651, IC120689, SKGPA-103, IC032186, IC095406, IC095244, IC095371, IC035713, IC081698-B, IC095391, SKGPA-105, IC095204, SKGPA-81, IC095556, SKGPA-88, SKGPA-91, IC094654, IC120670, IC021938, IC035742, SKGPA-89, SKGPA-95, IC035615, IC032190, SKGPA-98, IC095251, IC095383, IC095516, SKGPA-110, IC035702 (>16.00 cm)	GA-2 (16.18 cm)
11.	Seed yield per plant (g)	7.10-41.69	-	GA-1 (41.69 g)
12.	Seed volume weight (g/10 ml)	6.21-9.10	SKGPA-107, SKGPA-93, SKGPA-97, SKGPA-92, IC035713, IC035742, IC035717, IC095244, IC094661, IC035642, IC032190, IC035711, IC120689, IC120621, IC035651, IC035719, IC120670, IC120668, IC035735, IC094654, IC035638, SKGPA-64, SKGPA-95, IC021803-A, IC035661, IC095556, IC432086, IC095251, IC035404, IC095516, SKGPA-66, IC021938, SKGPA-79, IC095371, SKGPA-67, IC095510, IC120649, IC035716, IC095204, SKGPA-99, SKGPA-62, IC095248, IC095430, IC035665, SKGPA-84, IC095406, IC095498, SKGPA-108, IC032186, IC032193 (>7.50 ml)	GA-2 (7.71 ml)
13.	100 seed weight (g)	0.44-0.87	SKGPA-103, SKGPA-107, SKGPA-82 (>0.75 g)	GA-1 & BGA-2 (0.80 g)

Table 97. Characterization of germplasm lines in grain amaranth at different locations : Rabi 2012-13 (Plains)

S.No.	Accession No.	Early plant vigour				Plant growth habit					Leaf colour at flowering stage					Inflorescence colour					Inflorescence compactness					Stem colour								
		Akola	Rahuri	Ranchi	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode					
1	IC021803-A	2	2	2	2	1	-	1	2	1	2	5	-	5	5	3	5	11	-	11	11	2	11	5	-	5	3	5	2	-	2	3	1	3
2	IC021937	3	2	3	3	1	-	1	2	1	2	10	-	10	10	10	10	6	-	6	9	9	9	5	-	7	3	7	6	-	6	3	4	6
3	IC021938	3	3	3	3	1	-	1	2	1	2	10	-	10	10	10	10	6	-	6	9	9	9	5	-	7	3	7	6	-	6	3	4	6
4	IC032186	2	2	2	2	1	-	1	2	1	2	10	-	6	8	10	10	6	-	6	6	9	9	5	-	5	3	5	6	-	4	3	4	6
5	IC032190	2	3	3	3	1	-	1	1	1	1	10	-	6	2	10	10	6	-	6	6	9	9	5	-	3	2	5	6	-	6	5	4	6
6	IC032193	2	2	3	3	1	-	1	1	1	1	5	-	5	5	3	5	11	-	11	11	1	11	5	-	5	3	5	2	-	2	1	1	2
7	IC032195	2	2	3	3	1	-	1	1	1	1	5	-	5	5	3	5	11	-	11	11	2	11	5	-	5	3	5	2	-	2	1	1	2
8	IC035404	2	2	3	3	1	-	1	1	1	1	5	-	5	5	5	5	11	-	11	11	2	11	5	-	5	3	5	2	-	2	1	2	2
9	IC035415	3	2	3	3	1	-	1	1	1	1	5	-	5	5	5	5	11	-	11	11	2	11	5	-	5	2	5	2	-	2	1	2	2
10	IC035615	3	2	3	3	1	-	1	1	1	1	5	-	5	5	5	5	11	-	11	11	4	11	3	-	5	3	5	2	-	2	1	2	2
11	IC035633	2	1	3	3	1	-	1	1	1	1	5	-	5	5	1	5	11	-	11	11	2	11	3	-	5	3	5	2	-	2	1	2	2
12	IC035635	2	2	2	2	1	-	2	1	1	2	5	-	3	5	10	10	4	-	3	11	6	11	5	-	3	3	5	4	-	7	4	4	7
13	IC035638	2	3	3	3	1	-	1	1	1	1	5	-	5	8	3	8	11	-	11	6	2	11	3	-	5	3	5	2	-	2	2	2	2
14	IC035642	2	2	1	2	1	-	1	1	1	1	5	-	3	3	9	9	4	-	3	6	6	6	5	-	3	2	5	4	-	4	3	4	4
15	IC035651	2	2	2	2	1	-	1	1	1	1	5	-	3	3	1	5	4	-	3	2	2	4	5	-	5	1	5	4	-	4	5	4	5
16	IC035661	2	3	2	3	1	-	1	2	1	2	5	-	6	5	1	6	6	-	6	11	9	11	5	-	3	2	5	4	-	4	6	4	6
17	IC035665	2	1	1	2	1	-	1	1	1	1	5	-	5	3	10	10	11	-	11	1	9	11	3	-	7	3	7	2	-	2	2	4	4
18	IC035701	2	3	3	3	1	-	1	2	1	2	8	-	10	8	10	10	6	-	6	6	9	9	3	-	5	3	5	4	-	4	6	4	6
19	IC035702	2	2	3	3	1	-	1	2	1	2	8	-	6	11	10	11	6	-	6	9	9	9	5	-	5	3	5	4	-	4	6	4	6
20	IC035711	3	2	2	3	1	-	1	2	1	2	8	-	11	10	10	11	6	-	6	9	9	9	5	-	5	3	5	4	-	5	4	4	5
21	IC035713	2	3	2	3	1	-	1	1	1	1	8	-	6	7	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	4	3	4	4
22	IC035716	3	3	1	3	1	-	1	2	1	2	8	-	6	8	10	10	6	-	6	6	9	9	5	-	3	3	5	4	-	4	6	4	6
23	IC035717	3	2	1	3	1	-	1	2	1	2	8	-	6	8	10	10	6	-	6	6	9	9	5	-	3	3	5	4	-	4	6	4	6
24	IC035719	3	2	3	3	1	-	1	1	1	1	8	-	6	10	10	10	6	-	6	9	9	9	5	-	5	3	5	4	-	4	3	4	4
25	IC035735	3	2	3	3	1	-	1	1	1	1	8	-	10	8	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	4	4	4	4
26	IC035742	2	1	3	3	1	-	1	1	1	1	8	-	3	8	10	10	6	-	6	6	9	9	5	-	3	3	5	4	-	4	5	4	5
27	IC081698-B	3	3	3	3	1	-	1	1	1	1	8	-	2	8	10	10	6	-	6	6	9	9	5	-	3	3	5	4	-	7	4	4	7

S.No.	Accession No.	Early plant vigour				Plant growth habit					Leaf colour at flowering stage					Inflorescence colour					Inflorescence compactness					Stem colour								
		Akola	Rahuri	Ranchi	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode
28	IC094654	2	3	1	3	1	-	1	1	1	1	8	-	6	8	10	10	6	-	6	6	9	9	5	-	3	3	5	4	-	7	4	4	7
29	IC094661	2	3	2	3	1	-	1	2	1	2	8	-	10	2	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	7	5	4	7
30	IC095204	3	3	2	3	1	-	1	2	1	2	8	-	6	2	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	7	3	4	7
31	IC095244	3	3	2	3	1	-	1	2	1	2	8	-	6	2	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	7	4	4	7
32	IC095248	3	3	2	3	1	-	1	2	1	2	8	-	6	2	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	7	3	4	7
33	IC095251	3	3	2	3	1	-	1	2	1	2	8	-	6	2	10	10	6	-	6	6	9	9	5	-	5	3	5	4	-	7	4	4	7
34	IC095371	3	3	3	3	1	-	1	1	1	1	8	-	11	2	10	11	6	-	6	9	9	9	3	-	7	3	7	4	-	7	5	4	7
35	IC095382-B	3	2	3	3	1	-	1	1	1	1	5	-	5	2	1	5	4	-	11	9	2	11	5	-	5	3	5	2	-	2	5	1	5
36	IC095383	3	3	3	3	1	-	1	1	1	1	8	-	10	8	10	10	6	-	6	6	9	9	5	-	5	2	5	6	-	6	4	4	6
37	IC095389	3	2	2	3	1	-	1	1	1	1	5	-	5	1	3	5	4	-	11	2	2	11	5	-	5	3	5	2	-	2	1	2	2
38	IC095391	2	2	2	2	1	-	1	1	1	1	5	-	6	8	10	10	6	-	6	6	9	9	5	-	5	2	5	6	-	6	4	4	6
39	IC095406	3	2	2	3	1	-	1	1	1	1	5	-	6	8	10	10	6	-	6	6	9	9	5	-	5	3	5	6	-	4	4	4	6
40	IC095430	3	2	3	3	1	-	1	1	1	1	5	-	5	1	1	5	4	-	11	2	2	11	5	-	5	2	5	2	-	2	1	2	2
41	IC095498	3	1	3	3	1	-	1	1	1	1	5	-	5	1	1	5	4	-	11	2	2	11	5	-	5	3	5	2	-	2	1	1	2
42	IC095510	3	3	3	3	1	-	1	1	1	1	8	-	11	7	10	11	6	-	6	9	9	9	5	-	5	3	5	6	-	7	4	4	7
43	IC095516	2	3	1	3	1	-	1	2	1	2	5	-	5	1	1	5	4	-	11	2	2	11	5	-	5	3	5	2	-	2	1	1	2
44	IC095556	2	3	2	3	1	-	1	1	1	1	8	-	10	8	1	10	6	-	6	9	2	9	5	-	7	3	7	6	-	6	6	2	6
45	IC120621	2	3	1	3	1	-	1	1	1	1	5	-	5	1	3	5	4	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
46	IC120649	2	3	1	3	1	-	1	1	1	1	5	-	5	1	3	5	4	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
47	IC120668	3	3	1	3	1	-	1	1	1	1	5	-	5	1	1	5	4	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
48	IC120670	2	3	1	3	1	-	1	1	1	1	5	-	5	3	1	5	4	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
49	IC120689	2	2	1	2	1	-	1	1	1	1	5	-	5	1	3	5	4	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
50	IC432086	2	3	1	3	1	-	1	1	1	1	5	-	5	1	3	5	11	-	11	2	2	11	5	-	3	3	5	2	-	2	1	2	2
51	SKGPA-61	3	-	2	3	1	1	-	1	1	1	8	8	-	3	10	10	6	6	-	9	6	9	5	3	5	3	5	6	6	-	1	4	6
52	SKGPA-62	2	-	3	3	1	1	-	1	1	1	5	8	-	8	10	10	6	6	-	9	9	9	5	5	7	3	7	6	6	-	6	4	6
53	SKGPA-63	1	-	2	2	1	1	-	2	1	2	8	8	-	5	10	10	8	6	-	9	9	9	3	3	5	2	5	6	4	-	2	4	6
54	SKGPA-64	2	3	1	3	1	1	2	1	1	2	5	5	5	3	3	5	4	1	11	1	2	11	5	5	7	3	7	2	1	2	2	2	2
55	SKGPA-65	2	-	1	2	2	1	-	1	1	2	5	5	-	3	3	5	4	1	-	1	2	4	5	5	7	3	7	2	1	-	2	2	2
56	SKGPA-66	1	3	1	3	1	1	2	1	1	2	8	5	10	8	10	10	6	4	6	9	6	9	5	7	3	2	7	6	1	6	7	4	7
57	SKGPA-67	2	2	1	2	2	1	2	1	2	2	8	8	11	8	10	11	6	7	7	9	6	9	5	7	3	2	7	6	6	7	4	2	7
58	SKGPA-68	2	2	1	2	1	1	1	1	1	1	5	8	5	1	3	8	4	6	11	1	2	11	5	3	7	3	7	2	2	2	2	2	2

S.No.	Accession No.	Early plant vigour				Plant growth habit					Leaf colour at flowering stage					Inflorescence colour					Inflorescence compactness					Stem colour								
		Akola	Rahuri	Ranchi	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar
59	SKGPA-69	2	1	1	2	1	1	2	1	1	2	5	7	5	3	1	7	4	6	11	1	2	11	5	5	7	2	7	2	6	2	2	2	6
60	SKGPA-70	2	1	1	2	1	1	1	1	1	1	5	3	5	3	3	5	4	3	11	1	2	11	5	5	7	3	7	2	1	2	2	2	
61	SKGPA-71	3	3	2	3	1	1	1	1	2	2	5	5	5	8	3	8	7	7	7	7	12	12	3	3	5	2	5	2	2	2	1	2	
62	SKGPA-72	1	3	1	3	1	1	1	1	1	1	5	5	5	3	3	5	4	4	11	1	2	11	5	7	7	3	7	6	2	2	2	6	
63	SKGPA-73	2	2	1	2	1	1	1	1	1	1	5	3	5	3	3	5	11	1	11	1	2	11	5	3	7	3	7	2	2	2	2	2	
64	SKGPA-74	3	3	3	3	1	1	1	3	1	3	5	5	5	5	3	5	11	4	6	11	2	11	3	5	7	2	7	2	2	2	2	2	
65	SKGPA-75	2	3	1	3	1	1	2	1	1	2	5	5	5	3	3	5	4	4	11	4	4	11	5	3	7	2	7	2	2	2	2	2	
66	SKGPA-76	2	2	1	2	1	1	1	1	1	1	5	5	5	3	1	5	11	1	11	4	2	11	5	3	7	3	7	2	2	2	2	2	
67	SKGPA-77	1	2	1	2	1	1	1	1	1	1	5	5	5	3	3	5	11	1	11	4	2	11	5	7	7	3	7	2	2	2	2	2	
68	SKGPA-78	2	1	2	2	1	1	1	1	1	1	5	5	10	2	6	10	6	6	7	7	6	7	5	3	5	1	5	2	2	7	2	4	
69	SKGPA-79	1	-	1	1	2	1	-	1	1	2	5	5	-	3	5	5	4	1	-	4	2	4	5	7	3	2	7	2	1	-	2	2	
70	SKGPA-80	2	3	2	3	1	1	2	1	1	2	8	7	11	8	11	11	8	6	6	9	9	9	3	5	5	3	5	6	4	7	5	4	
71	SKGPA-81	2	1	1	2	5	1	2	2	1	5	1	4	5	5	3	5	11	1	4	11	2	11	3	7	5	2	7	2	1	2	2	2	
72	SKGPA-82	1	1	1	1	1	1	1	2	1	2	5	4	5	5	3	5	4	1	11	11	2	11	5	3	3	2	5	2	2	2	1	2	
73	SKGPA-83	1	1	1	1	1	1	1	2	1	2	5	10	10	5	10	10	4	6	6	11	9	11	5	7	7	1	7	2	6	6	2	6	
74	SKGPA-84	1	-	-	1	1	1	-	-	-	1	5	10	-	-	-	10	4	6	-	-	-	6	5	7	-	7	2	6	-	-	-	6	
75	SKGPA-85	2	3	2	3	1	1	2	2	1	2	5	10	10	5	10	10	4	6	6	11	9	11	5	3	7	2	7	6	6	7	1	2	
76	SKGPA-86	2	2	1	2	1	1	1	2	1	2	5	3	5	5	10	10	4	1	11	11	9	11	5	7	7	2	7	2	2	2	1	2	
77	SKGPA-87	2	1	1	2	1	1	1	2	1	2	5	7	10	3	10	10	11	6	11	11	9	11	5	5	5	1	5	2	6	6	1	6	
78	SKGPA-88	2	2	2	2	1	1	1	1	1	1	5	3	10	5	10	10	4	10	7	11	6	11	5	3	5	1	5	2	2	6	2	6	
79	SKGPA-89	1	3	2	3	1	1	1	1	-	1	5	7	10	3	-	10	11	6	6	4	-	11	3	7	5	-	7	2	6	6	2	-	
80	SKGPA-90	2	-	2	2	1	-	-	2	1	2	5	-	-	8	3	8	11	-	-	6	2	11	3	-	7	3	7	2	-	-	6	2	
81	SKGPA-91	2	2	3	3	1	1	1	1	1	1	8	10	10	8	10	10	6	6	6	9	6	9	5	3	7	3	7	6	2	7	3	6	
82	SKGPA-92	1	-	1	1	1	1	-	1	-	1	8	7	-	8	-	8	6	6	-	9	-	9	5	3	5	-	5	6	2	-	5	-	
83	SKGPA-93	1	-	1	1	1	-	-	1	-	1	8	-	-	8	-	8	6	-	-	7	-	7	3	-	5	-	5	6	-	-	5	-	
84	SKGPA-94	1	2	-	2	1	1	2	-	2	2	8	10	10	-	10	10	6	6	6	-	6	6	5	7	-	7	6	6	6	-	6	6	
85	SKGPA-95	1	-	3	3	2	1	-	1	1	2	5	7	-	8	10	10	11	6	-	6	9	11	3	5	5	2	5	2	6	-	4	6	
86	SKGPA-96	3	3	2	3	1	1	2	2	2	2	8	7	10	10	10	10	6	6	6	9	6	9	5	7	7	3	7	6	6	7	4	6	
87	SKGPA-97	1	-	1	1	1	1	-	1	-	1	8	10	-	8	-	10	6	6	-	9	-	9	5	5	5	-	5	6	6	-	5	-	
88	SKGPA-98	1	3	3	3	1	1	1	1	1	1	8	10	10	8	3	10	6	6	6	9	7	9	5	5	7	3	7	6	6	6	6	2	
89	SKGPA-99	1	3	2	3	1	1	2	1	1	2	8	10	10	3	10	10	6	6	6	9	9	9	5	3	5	3	5	6	2	7	2	4	

S.No.	Accession No.	Early plant vigour				Plant growth habit					Leaf colour at flowering stage					Inflorescence colour					Inflorescence compactness					Stem colour								
		Akola	Rahuri	Ranchi	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode					
90	SKGPA-100	1	2	1	2	1	1	2	1	1	2	5	10	5	3	3	10	4	6	11	1	2	11	5	5	7	3	7	2	1	2	2	1	2
91	SKGPA-101	1	3	1	3	1	1	1	1	1	1	5	3	5	3	1	5	4	1	4	1	1	4	3	3	7	2	7	2	1	2	2	2	2
92	SKGPA-102	1	-	-	1	1	-	-	-	-	1	5	-	-	-	5	11	-	-	-	-	11	3	-	-	-	3	2	-	-	-	-	2	2
93	SKGPA-103	2	2	1	2	1	1	1	2	1	2	8	5	5	5	3	8	6	11	11	11	2	11	5	7	7	3	7	6	2	2	2	2	6
94	SKGPA-104	1	1	2	2	1	1	3	3	2	3	5	3	3	5	3	5	4	1	4	2	2	4	5	7	3	1	7	2	2	2	1	2	2
95	SKGPA-105	2	2	2	2	1	1	1	3	2	3	5	3	5	5	9	9	6	6	11	9	9	11	5	7	3	1	7	6	6	2	5	4	6
96	SKGPA-106	1	2	1	2	1	1	1	1	1	1	5	7	5	3	3	7	11	6	11	1	4	11	5	7	7	3	7	6	5	2	2	1	6
97	SKGPA-107	-	-	1	1	-	1	-	1	-	1	-	5	-	3	-	5	-	11	-	1	-	11	-	7	7	-	7	-	1	-	2	-	2
98	SKGPA-108	1	2	1	2	1	1	2	1	-	2	5	5	11	3	-	11	11	11	6	1	-	11	5	5	7	-	7	2	2	6	2	-	6
99	SKGPA-109	2	2	-	2	1	1	1	-	1	1	5	5	5	-	3	5	11	4	11	-	4	11	5	3	-	3	5	2	2	2	-	2	2
100	SKGPA-110	1	3	1	3	1	1	2	2	1	2	5	5	10	5	3	10	4	1	6	11	1	11	5	5	5	3	5	2	2	7	2	2	7
Mean for check variety																																		
	BGA-2 (C)	-	3	3	3	-	1	1	3	1	3	-	3	5	5	3	5	-	1	11	11	2	11	-	5	7	2	7	-	2	2	3	2	3
	GA-1 (C)	-	3	-	3	-	1	1	-	1	1	-	3	5	-	3	5	-	11	11	-	2	11	-	5	-	3	5	-	2	2	-	2	2
	GA-2 (C)	2	3	2	3	1	1	1	1	1	1	5	8	10	10	10	10	8	6	6	9	9	9	4	5	3	3	5	4	6	4	6	7	7
	Suvarna (C)	3	3	3	3	1	1	1	3	1	3	5	3	5	5	3	5	11	1	11	11	2	11	3	5	7	2	7	2	2	2	1	2	2
	Minimum	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	5	4	1	3	1	1	4	3	3	3	1	3	2	1	2	1	1	2
	Maximum	3	3	3	3	5	1	3	3	2	5	10	10	11	11	11	11	11	11	11	11	12	12	5	7	7	3	7	6	6	7	7	7	7
	Mean	2	3	1	3	1	1	1	1	1	1	5	5	5	8	10	10	6	6	6	9	2	11	5	5	5	3	5	2	2	2	2	2	2

Qualitative characters:- Early plant vigour : 1 - Poor, 2 - Good, 3 - Very good; Plant growth habit: 1-Erect, 2-Spreading, 3-Drooping, 4-Other; Inflorescence colour: 1-Light yellow, 2-Yellow, 3-Yellowish orange, 4-Yellowish green, 5-Orange, 6-Pink, 7-Pinkish green, 8-Purple, 9-Red, 10-Redish Green, 11-Green, 12-Yellow with red tip on all spiklets, 99-Other; Inflorescence compactness: 1-Lax, 2-Intermediate, 3-Dense, 99-Others; Inflorescence spininess: 1-Smooth, 2-Glabrous, 3-Prickly, 4-Spiny, 99-Others; Leaf colour at flowering stage: 1-Yellow, 2-Yellowish orange, 3-Yellowish green, 4-Orange, 5-Green, 6-Greenish orange, 7-Pink, 8-Pinkish green, 9-Redish yellow, 10-Redish Green, 11-Red, 12-Dark red 99-Other; Stem colour: 1-Yellow, 2-Yellowish green, 3-Orange, 4-Pink, 5-Red, 6-Redish green, 7-Redish orange, 99-Other;

S.No.	Accession No.	Stem surface						Inflorescence shape						Inflorescence spininess					Seed colour			S.K. Nagar			
		Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Ranchi	S.K. Nagar	Mode	Delhi	S.K. Nagar	Mode	Seed shattering	Seedling colour at initial stage	Seedling vigour	
1	IC021803-A	2	-	1	2	2	2	2	-	4	4	4	4	3	-	3	2	3	-	1	1	1	1	1	3
2	IC021937	2	-	1	1	2	2	4	-	4	4	4	4	3	-	3	2	3	-	1	1	1	1	3	3
3	IC021938	2	-	1	1	2	2	4	-	4	1	4	4	4	-	3	2	4	-	1	1	1	2	2	3
4	IC032186	2	-	1	1	2	2	2	-	4	1	4	4	3	-	3	2	3	-	1	1	1	1	3	3
5	IC032190	2	-	1	2	2	2	2	-	4	4	4	4	3	-	2	2	3	-	1	1	1	1	3	3
6	IC032193	2	-	1	1	2	2	2	-	4	4	4	4	4	-	4	2	4	-	1	1	1	1	1	2
7	IC032195	2	-	1	1	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	1	3
8	IC035404	2	-	1	1	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	1	3
9	IC035415	2	-	1	1	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	1	3
10	IC035615	2	-	1	1	2	2	4	-	4	4	4	4	3	-	3	2	3	-	1	1	1	1	1	3
11	IC035633	2	-	1	1	2	2	2	-	4	4	4	4	3	-	3	2	3	-	1	1	1	1	1	3
12	IC035635	2	-	1	2	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	3	3
13	IC035638	2	-	1	1	2	2	4	-	4	4	4	4	3	-	3	2	3	-	1	1	1	1	1	3
14	IC035642	2	-	1	1	2	2	4	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	3	2
15	IC035651	2	-	1	1	2	2	4	-	4	2	4	4	4	-	3	2	4	-	1	1	1	1	3	3
16	IC035661	2	-	1	2	2	2	2	-	4	4	4	4	3	-	2	2	3	-	7	7	1	1	2	2
17	IC035665	2	-	1	1	2	2	2	-	4	4	4	4	3	-	3	2	3	-	1	1	1	2	2	3
18	IC035701	2	-	1	1	2	2	2	-	4	4	4	4	4	-	2	2	4	-	1	1	1	1	2	3
19	IC035702	2	-	1	1	2	2	2	-	4	4	4	4	3	-	2	2	3	-	1	1	1	1	2	3
20	IC035711	2	-	1	1	2	2	2	-	4	4	4	4	4	-	2	2	4	-	1	1	1	1	2	3
21	IC035713	2	-	1	1	2	2	2	-	4	2	4	4	4	-	2	2	4	-	1	1	1	1	2	2
22	IC035716	2	-	1	2	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	2	3
23	IC035717	2	-	1	2	2	2	2	-	4	4	4	4	4	-	3	2	4	-	1	1	1	1	2	2
24	IC035719	2	-	1	1	2	2	2	-	4	4	4	4	3	-	2	2	3	-	1	1	1	1	2	3
25	IC035735	2	-	1	1	2	2	2	-	4	4	4	4	4	-	2	2	4	-	1	1	1	1	2	3
26	IC035742	2	-	1	1	2	2	2	-	2	4	4	4	4	-	2	2	4	-	1	1	1	1	2	3
27	IC081698-B	2	-	1	2	2	2	2	-	4	4	4	4	4	-	2	2	4	-	1	1	1	2	2	3

S.No.	Accession No.	Stem surface						Inflorescence shape						Inflorescence spininess					Seed colour			S.K. Nagar			
		Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Ranchi	S.K. Nagar	Mode	Delhi	S.K. Nagar	Mode	Seed shattering	Seedling colour at initial stage	Seedling vigour	
28	IC094654	2	-	1	2	2	2	2	-	4	4	4	4	4	-	2	2	4	-	1	1	1	1	2	3
29	IC094661	2	-	1	2	2	2	2	-	4	2	4	4	4	4	-	2	2	4	-	1	1	1	2	3
30	IC095204	2	-	1	2	2	2	2	-	4	2	4	4	4	3	-	2	2	3	-	7	7	3	2	3
31	IC095244	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	7	7	1	3	2
32	IC095248	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	7	7	1	3	3
33	IC095251	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	7	7	1	3	3
34	IC095371	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	1	1	1	3	3
35	IC095382-B	2	-	1	1	2	2	2	-	4	4	4	4	4	4	-	3	2	4	-	1	1	1	1	3
36	IC095383	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	1	1	1	3	2
37	IC095389	2	-	1	1	2	2	2	-	4	4	4	4	4	4	-	3	2	4	-	1	1	1	1	3
38	IC095391	2	-	1	2	2	2	4	-	4	4	4	4	4	4	-	2	2	4	-	1	1	1	3	3
39	IC095406	2	-	1	2	2	2	2	-	4	4	4	4	4	3	-	2	2	3	-	1	1	1	3	2
40	IC095430	2	-	1	1	2	2	4	-	4	4	4	4	4	3	-	3	2	3	-	1	1	1	1	2
41	IC095498	2	-	1	1	2	2	4	-	4	4	4	4	4	4	-	3	2	4	-	1	1	1	1	3
42	IC095510	2	-	1	2	2	2	2	-	4	4	4	4	4	4	-	2	2	4	-	1	1	1	2	3
43	IC095516	2	-	1	2	2	2	2	-	2	2	4	4	4	3	-	3	2	3	-	1	1	1	1	2
44	IC095556	2	-	1	2	2	2	2	-	2	4	4	4	4	4	-	2	2	4	-	1	1	2	1	3
45	IC120621	2	-	1	1	2	2	2	-	4	4	4	4	4	4	-	3	2	4	-	1	1	2	1	3
46	IC120649	2	-	1	1	2	2	2	-	4	4	4	4	4	4	-	3	2	4	-	1	1	1	1	2
47	IC120668	2	-	1	1	2	2	2	-	4	4	4	4	4	3	-	3	2	3	-	1	1	1	1	3
48	IC120670	2	-	1	1	2	2	2	-	4	4	4	4	4	3	-	3	2	3	-	1	1	1	1	3
49	IC120689	2	-	1	1	2	2	2	-	4	4	4	4	4	3	-	3	2	3	-	6	6	1	1	3
50	IC432086	2	-	1	1	2	2	2	-	4	4	4	4	4	3	-	3	2	3	-	1	1	1	1	3
51	SKGPA-61	2	2	-	1	2	2	2	4	-	4	4	4	4	3	3	3	2	3	3	1	3	1	3	3
52	SKGPA-62	2	2	-	1	2	2	4	4	-	2	4	4	4	3	3	1	2	3	3	1	3	1	3	3
53	SKGPA-63	2	2	-	2	2	2	2	4	-	2	1	4	2	2	3	3	1	3	3	1	3	1	2	2
54	SKGPA-64	2	1	1	1	2	2	2	4	2	4	4	4	4	3	3	3	2	3	8	1	8	1	1	3
55	SKGPA-65	2	1	-	1	2	2	4	4	-	4	4	4	4	4	3	3	2	4	3	1	3	1	1	2
56	SKGPA-66	2	1	1	1	2	2	2	4	99	4	4	99	3	3	3	2	3	3	1	3	1	1	2	2
57	SKGPA-67	2	1	1	1	2	2	2	4	4	4	4	4	3	3	3	2	3	2	1	2	2	1	2	3
58	SKGPA-68	2	2	1	2	2	2	4	4	4	4	4	4	4	3	3	2	4	3	1	3	1	1	1	3

S.No.	Accession No.	Stem surface						Inflorescence shape						Inflorescence spininess					Seed colour			S.K. Nagar		
		Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Ranchi	S.K. Nagar	Mode	Delhi	S.K. Nagar	Mode	Seed shattering	Seedling colour at initial stage	Seedling vigour
59	SKGPA-69	2	1	1	2	2	2	4	4	4	4	4	4	3	4	3	2	4	3	1	3	1	1	2
60	SKGPA-70	2	1	1	2	2	2	4	4	4	4	4	4	3	3	3	2	3	3	1	3	1	1	2
61	SKGPA-71	2	2	1	1	2	2	2	4	4	4	2	2	2	4	4	2	4	3	1	3	1	1	3
62	SKGPA-72	2	2	1	2	2	2	4	4	4	2	4	4	3	3	3	1	3	3	1	3	1	1	3
63	SKGPA-73	2	2	1	2	2	2	2	4	4	4	2	4	3	3	3	2	3	3	1	3	1	1	3
64	SKGPA-74	2	2	1	1	2	2	2	4	4	2	1	1	2	4	2	2	2	3	1	3	1	1	3
65	SKGPA-75	2	2	1	2	2	2	4	4	4	4	4	4	3	3	3	1	3	3	1	3	1	1	2
66	SKGPA-76	2	2	1	2	2	2	2	4	2	4	4	4	3	3	3	2	3	8	1	3	1	1	3
67	SKGPA-77	2	2	1	2	2	2	2	4	4	4	4	4	3	4	3	2	4	3	1	3	1	1	3
68	SKGPA-78	2	2	1	1	2	2	4	4	2	4	1	4	4	3	2	2	4	3	1	3	1	1	2
69	SKGPA-79	2	1	-	2	2	2	4	4	-	4	4	4	3	3	3	2	3	3	1	3	1	1	2
70	SKGPA-80	2	2	1	2	2	2	2	4	4	1	1	4	2	4	2	2	4	3	1	3	2	2	3
71	SKGPA-81	2	1	2	2	2	2	4	4	2	1	4	4	3	3	3	3	3	8	1	3	1	1	2
72	SKGPA-82	2	2	1	2	2	2	4	4	4	3	4	4	3	3	3	3	3	3	1	3	1	1	2
73	SKGPA-83	2	2	1	2	2	2	4	4	2	1	4	4	2	3	3	3	3	8	1	3	2	2	1
74	SKGPA-84	2	2	-	-	-	2	2	4	-	-	-	4	3	3	-	-	3	3	-	3	-	-	-
75	SKGPA-85	2	2	1	2	2	2	4	4	2	1	4	4	3	3	3	2	3	8	1	3	1	3	2
76	SKGPA-86	2	2	1	2	2	2	2	4	4	4	4	4	3	3	3	2	3	8	1	3	1	3	2
77	SKGPA-87	2	2	1	2	2	2	2	4	4	4	1	4	3	3	3	1	3	3	1	3	1	3	2
78	SKGPA-88	2	2	1	1	2	2	4	4	4	4	4	4	3	3	1	2	3	3	1	3	2	3	3
79	SKGPA-89	2	2	1	1	-	2	2	4	99	4	-	99	3	3	2	-	3	3	-	3	-	-	-
80	SKGPA-90	2	-	-	2	-	2	4	-	-	4	4	4	3	-	2	-	3	-	-	0	-	2	2
81	SKGPA-91	2	2	1	1	2	2	4	4	2	4	4	4	3	3	3	2	3	3	1	3	1	3	3
82	SKGPA-92	2	2	-	2	-	2	4	4	-	4	-	4	3	3	3	-	3	2	-	2	-	-	-
83	SKGPA-93	2	-	-	2	-	2	4	-	-	4	-	4	3	-	3	-	3	-	-	0	-	-	-
84	SKGPA-94	2	1	1	-	2	2	4	4	4	-	4	4	-	4	-	2	4	8	1	3	2	3	3
85	SKGPA-95	2	2	-	2	2	2	2	4	-	4	4	4	2	3	3	2	3	8	1	3	1	3	2
86	SKGPA-96	2	2	2	2	2	2	4	4	2	4	4	4	3	3	3	2	3	3	1	3	1	3	3
87	SKGPA-97	2	2	-	1	-	2	4	4	-	4	-	4	3	4	2	-	4	3	-	3	-	-	-
88	SKGPA-98	2	2	2	1	2	2	4	4	4	4	4	4	4	3	2	2	4	3	1	3	1	1	3
89	SKGPA-99	2	2	2	2	2	2	2	4	2	4	4	4	3	4	3	2	4	3	1	3	2	3	2

S.No.	Accession No.	Stem surface						Inflorescence shape						Inflorescence spininess					Seed colour			S.K. Nagar		
		Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mode	Akola	Delhi	Ranchi	S.K. Nagar	Mode	Delhi	S.K. Nagar	Mode	Seed shattering	Seedling colour at initial stage	Seedling vigour
90	SKGPA-100	2	2	1	2	2	2	2	4	2	4	4	4	3	3	3	2	3	3	1	3	2	1	1
91	SKGPA-101	2	2	1	2	2	2	2	4	4	4	4	4	3	3	2	4	8	1	8	1	1	3	
92	SKGPA-102	2	2	-	-	-	2	2	-	-	-	-	3	-	-	-	3	-	-	0	-	-	-	
93	SKGPA-103	2	1	2	2	2	2	4	4	4	1	4	3	4	3	2	4	3	1	3	1	1	3	
94	SKGPA-104	2	2	2	1	2	2	2	3	4	3	3	2	3	2	1	3	6	1	6	2	1	2	
95	SKGPA-105	2	2	2	1	2	2	2	3	99	2	3	2	4	2	1	4	6	4	6	2	2	3	
96	SKGPA-106	2	2	2	2	2	2	4	4	99	4	4	4	4	3	2	4	3	1	3	1	1	2	
97	SKGPA-107	-	1	-	2	-	2	-	4	-	4	-	-	2	3	-	3	3	-	3	-	-	-	
98	SKGPA-108	2	1	2	2	-	2	2	4	4	4	-	4	3	3	-	4	3	-	3	-	-	-	
99	SKGPA-109	2	2	1	-	2	2	2	4	2	-	4	4	3	-	2	4	8	1	8	1	1	3	
100	SKGPA-110	2	1	2	2	2	2	4	4	4	1	4	4	4	3	2	4	3	1	3	1	1	2	
Mean for check variety																	0			0				
	BGA-2 (C)	-	2	1	1	2	2	-	4	99	1	1	4	-	4	2	2	4	6	1	6	1	3	3
	GA-1 (C)	-	2	1	-	2	2	-	4	2	-	4	4	-	3	-	2	3	3	1	3	1	1	3
	GA-2 (C)	2	2	2	2	2	2	4	4	4	1	4	4	3	3	2	2	3	3	1	3	1	2	3
	Suvarna (C)	2	2	1	1	2	2	2	4	99	1	1	4	2	4	2	2	4	6	1	6	1	3	3
	Minimum	2	1	1	1	2	2	2	3	2	1	1	2	2	2	1	1	0	2	1	0	1	1	1
	Maximum	2	2	2	2	2	2	4	4	99	4	4	99	4	4	4	3	4	8	7	8	3	3	3
	Mean	2	2	1	2	2	2	2	4	4	4	4	4	3	3	3	2	3	3	1	1	1	1	3

Qualitative characters:- **Inflorescence shape:** 1-Globose, 2-Semi drooping, 3-Completely drooping, 4-Straght, 99-Other; **Stem surface:** 1-Smooth, 2-Ridged, 99- Others; **Seed shattering:** 1-Low (<10%), 2-Intermediate (10-50%), 3-High (>50%), 99-Others; **Seed Colour:** 1-Ivory (dull white), 2-Creamish, 3-Pale yellow, 4-Pink, 5-Red, 6-Brown, 7-Black, 8-Golden, 9-White, 99-Others; **Popping ability of seed:** 1-Poor, 2-Medium, 3-Good, 99-Others

Table 96. Multilocation evaluation of germplasm lines in grain amaranth at different locations : Rabi 2012-13 (Plains)

S.No.	Accession No.	Days to 50% flowering								
		Akola	Bhubneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
1	IC021803-A	57.00	47.00	-	-	48.00	43.00	78.00	42.00	52.50
2	IC021937	50.00	44.00	-	-	54.00	47.00	81.00	40.00	52.67
3	IC021938	49.00	43.00	-	-	49.00	39.00	73.00	44.00	49.50
4	IC032186	56.00	47.00	-	-	49.00	48.00	68.00	43.00	51.83
5	IC032190	57.00	44.00	-	-	-	50.00	84.00	44.00	55.80
6	IC032193	58.00	49.00	-	-	49.00	54.00	85.00	45.00	56.67
7	IC032195	61.00	44.00	-	-	51.00	52.00	80.00	46.00	55.67
8	IC035404	60.00	45.00	-	-	49.00	54.00	82.00	45.00	55.83
9	IC035415	58.00	43.00	-	-	51.00	53.00	78.00	57.00	56.67
10	IC035615	68.00	48.00	-	-	58.00	56.00	93.00	59.00	63.67
11	IC035633	71.00	48.00	-	-	60.00	59.00	90.00	52.00	63.33
12	IC035635	50.00	37.00	-	-	31.00	40.00	69.00	34.00	43.50
13	IC035638	61.00	47.00	-	-	62.00	59.00	89.00	58.00	62.67
14	IC035642	58.00	37.00	-	-	-	39.00	76.00	40.00	50.00
15	IC035651	56.00	36.00	-	-	-	40.00	73.00	36.00	48.20
16	IC035661	56.00	48.00	-	-	38.00	42.00	70.00	44.00	49.67
17	IC035665	58.00	49.00	-	-	53.00	53.00	75.00	40.00	54.67
18	IC035701	56.00	43.00	-	-	43.00	43.00	74.00	44.00	50.50
19	IC035702	52.00	47.00	-	-	41.00	48.00	65.00	42.00	49.17
20	IC035711	54.00	47.00	-	-	-	53.00	69.00	44.00	53.40
21	IC035713	56.00	43.00	-	-	-	48.00	74.00	42.00	52.60
22	IC035716	57.00	44.00	-	-	47.00	44.00	69.00	46.00	51.17
23	IC035717	55.00	-	-	-	-	48.00	68.00	46.00	54.25
24	IC035719	58.00	44.00	-	-	-	50.00	68.00	44.00	52.80
25	IC035735	60.00	47.00	-	-	-	48.00	73.00	46.00	54.80
26	IC035742	59.00	44.00	-	-	-	47.00	76.00	47.00	54.60
27	IC081698-B	56.00	43.00	-	-	49.00	39.00	73.00	44.00	50.67

S.No.	Accession No.	Days to 50% flowering								
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
28	IC094654	53.00	40.00	-	-	-	40.00	66.00	45.00	48.80
29	IC094661	55.00	47.00	-	-	-	45.00	72.00	46.00	53.00
30	IC095204	57.00	44.00	-	-	53.00	46.00	73.00	48.00	53.50
31	IC095244	59.00	31.00	-	-	-	42.00	81.00	46.00	51.80
32	IC095248	60.00	44.00	-	-	49.00	43.00	82.00	45.00	53.83
33	IC095251	58.00	44.00	-	-	49.00	45.00	74.00	46.00	52.67
34	IC095371	56.00	47.00	-	-	51.00	46.00	76.00	47.00	53.83
35	IC095382-B	60.00	44.00	-	-	47.00	47.00	57.00	48.00	50.50
36	IC095383	57.00	44.00	-	-	49.00	40.00	84.00	45.00	53.17
37	IC095389	59.00	47.00	-	-	49.00	47.00	82.00	48.00	55.33
38	IC095391	60.00	44.00	-	-	47.00	48.00	77.00	46.00	53.67
39	IC095406	60.00	44.00	-	-	54.00	44.00	76.00	45.00	53.83
40	IC095430	57.00	43.00	-	-	49.00	50.00	82.00	46.00	54.50
41	IC095498	58.00	-	-	-	53.00	44.00	83.00	48.00	57.20
42	IC095510	52.00	-	-	-	62.00	43.00	79.00	44.00	56.00
43	IC095516	59.00	47.00	-	-	49.00	42.00	77.00	46.00	53.33
44	IC095556	57.00	44.00	-	-	47.00	48.00	87.00	48.00	55.17
45	IC120621	55.00	48.00	-	-	-	50.00	82.00	46.00	56.20
46	IC120649	53.00	48.00	-	-	49.00	44.00	85.00	48.00	54.50
47	IC120668	54.00	47.00	-	-	-	47.00	81.00	44.00	54.60
48	IC120670	56.00	40.00	-	-	-	46.00	80.00	43.00	53.00
49	IC120689	55.00	44.00	-	-	51.00	48.00	70.00	46.00	52.33
50	IC432086	58.00	49.00	-	-	53.00	50.00	83.00	47.00	56.67
51	SKGPA-61	59.00	44.00	54.00	40.00	43.00	44.00	89.00	31.00	50.50
52	SKGPA-62	58.00	44.00	56.00	42.00	43.00	-	78.00	42.00	51.86
53	SKGPA-63	59.00	-	60.00	38.00	39.00	-	80.00	46.00	53.67
54	SKGPA-64	54.00	44.00	57.00	37.00	37.00	47.00	78.00	40.00	49.25
55	SKGPA-65	50.00	43.00	53.00	40.00	37.00	44.00	62.00	40.00	46.13
56	SKGPA-66	50.00	43.00	54.00	41.00	37.00	43.00	61.00	38.00	45.88
57	SKGPA-67	50.00	43.00	53.00	42.00	35.00	40.00	69.00	37.00	46.13

S.No.	Accession No.	Days to 50% flowering								
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
58	SKGPA-68	56.00	47.00	58.00	43.00	38.00	44.00	70.00	42.00	49.75
59	SKGPA-69	54.00	-	56.00	45.00	38.00	39.00	63.00	44.00	48.43
60	SKGPA-70	56.00	48.00	56.00	48.00	39.00	45.00	70.00	43.00	50.63
61	SKGPA-71	52.00	47.00	62.00	-	64.00	50.00	92.00	52.00	59.86
62	SKGPA-72	54.00	-	55.00	-	41.00	48.00	79.00	44.00	53.50
63	SKGPA-73	57.00	43.00	58.00	-	41.00	46.00	77.00	53.00	53.57
64	SKGPA-74	60.00	47.00	75.00	-	60.00	59.00	91.00	56.00	64.00
65	SKGPA-75	50.00	37.00	52.00	-	33.00	44.00	59.00	44.00	45.57
66	SKGPA-76	59.00	40.00	60.00	-	43.00	46.00	76.00	46.00	52.86
67	SKGPA-77	50.00	-	52.00	-	43.00	47.00	77.00	44.00	52.17
68	SKGPA-78	56.00	40.00	55.00	-	38.00	47.00	74.00	42.00	50.29
69	SKGPA-79	48.00	-	60.00	-	35.00	-	67.00	40.00	50.00
70	SKGPA-80	69.00	48.00	64.00	-	60.00	42.00	68.00	56.00	58.14
71	SKGPA-81	49.00	37.00	51.00	47.00	37.00	42.00	65.00	40.00	46.00
72	SKGPA-82	50.00	37.00	56.00	40.00	35.00	48.00	66.00	36.00	46.00
73	SKGPA-83	49.00	37.00	55.00	42.00	35.00	53.00	65.00	42.00	47.25
74	SKGPA-84	50.00	-	56.00	38.00	-	-	-	-	48.00
75	SKGPA-85	57.00	37.00	57.00	37.00	35.00	44.00	67.00	40.00	46.75
76	SKGPA-86	48.00	37.00	54.00	40.00	33.00	49.00	64.00	42.00	45.88
77	SKGPA-87	49.00	39.00	53.00	42.00	51.00	56.00	61.00	40.00	48.88
78	SKGPA-88	57.00	-	58.00	38.00	38.00	48.00	79.00	48.00	52.29
79	SKGPA-89	59.00	-	54.00	37.00	35.00	40.00	62.00	-	47.83
80	SKGPA-90	60.00	-	-	35.00	41.00	-	64.00	46.00	49.20
81	SKGPA-91	60.00	47.00	73.00	44.00	39.00	52.00	63.00	44.00	52.75
82	SKGPA-92	49.00	-	64.00	45.00	-	-	60.00	-	54.50
83	SKGPA-93	50.00	-	-	38.00	-	-	61.00	-	49.67
84	SKGPA-94	51.00	-	52.00	40.00	35.00	44.00	-	40.00	43.67
85	SKGPA-95	61.00	-	60.00	45.00	-	-	68.00	42.00	55.20
86	SKGPA-96	48.00	39.00	53.00	46.00	35.00	39.00	65.00	43.00	46.00
87	SKGPA-97	55.00	-	55.00	47.00	-	-	78.00	-	58.75

S.No.	Accession No.	Days to 50% flowering								
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
88	SKGPA-98	57.00	47.00	60.00	-	51.00	47.00	76.00	42.00	54.29
89	SKGPA-99	51.00	39.00	54.00	42.00	37.00	45.00	62.00	38.00	46.00
90	SKGPA-100	57.00	37.00	56.00	38.00	35.00	44.00	59.00	40.00	45.75
91	SKGPA-101	58.00	37.00	57.00	38.00	37.00	40.00	67.00	43.00	47.13
92	SKGPA-102	56.00	-	-	45.00	49.00	-	-	-	50.00
93	SKGPA-103	48.00	39.00	56.00	40.00	35.00	45.00	67.00	40.00	46.25
94	SKGPA-104	58.00	47.00	62.00	39.00	49.00	44.00	71.00	46.00	52.00
95	SKGPA-105	59.00	48.00	62.00	42.00	48.00	49.00	60.00	44.00	51.50
96	SKGPA-106	66.00	39.00	54.00	-	35.00	44.00	62.00	40.00	48.57
97	SKGPA-107	-	-	60.00	45.00	-	-	60.00	-	55.00
98	SKGPA-108	57.00	-	67.00	38.00	37.00	44.00	76.00	-	53.17
99	SKGPA-109	59.00	43.00	60.00	45.00	51.00	48.00	-	44.00	50.00
100	SKGPA-110	50.00	39.00	55.00	40.00	37.00	43.00	68.00	39.00	46.38
Mean for check variety										
	BGA-2 (C)	-	48.20	74.00	42.80	64.00	55.20	93.00	58.20	62.20
	GA-1 (C)	-	56.20	74.17	43.00	60.09	53.20	-	52.00	56.44
	GA-2 (C)	61.00	54.60	59.33	42.40	52.73	55.20	90.00	47.60	57.86
	Suvarna (C)	62.00	50.20	72.67	41.80	64.00	54.40	95.20	56.40	62.08
	Minimum	48.00	31.00	51.00	35.00	31.00	39.00	57.00	31.00	43.50
	Maximum	71.00	56.20	75.00	48.00	64.00	59.00	95.20	59.00	64.00
	Mean	56.01	43.81	58.51	41.40	45.52	46.69	73.90	44.67	52.30
	CD(0.05)	-	4.68	-	6.08	2.78	6.66	-	0.90	-
	CV(%) Error	-	3.35	-	5.36	2.02	4.57	-	1.83	-
	CV(%) Phenotypic	8.19	10.08	10.52	7.75	19.15	10.51	12.39	11.44	-

S.No.	Accession No.	Days to 80% maturity								
		Akola	Bhubneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
1	IC021803-A	102.00	89.00	-	-	125.00	115.00	159.00	95.00	114.17
2	IC021937	40.00	89.00	-	-	123.00	120.00	144.00	100.00	102.67
3	IC021938	97.00	86.00	-	-	125.00	117.00	155.00	101.00	113.50
4	IC032186	99.00	92.00	-	-	121.00	118.00	151.00	100.00	113.50
5	IC032190	106.00	86.00	-	-	-	119.00	164.00	101.00	115.20
6	IC032193	98.00	92.00	-	-	121.00	130.00	155.00	100.00	116.00
7	IC032195	99.00	87.00	-	-	119.00	129.00	157.00	101.00	115.33
8	IC035404	105.00	90.00	-	-	123.00	131.00	161.00	99.00	118.17
9	IC035415	115.00	86.00	-	-	128.00	130.00	166.00	102.00	121.17
10	IC035615	120.00	90.00	-	-	128.00	135.00	170.00	98	128.60
11	IC035633	119.00	81.00	-	-	131.00	136.00	170.00	98.00	122.50
12	IC035635	88.00	80.00	-	-	125.00	116.00	134.00	99.00	107.00
13	IC035638	110.00	93.00	-	-	133.00	135.00	154.00	97.00	120.33
14	IC035642	112.00	81.00	-	-	-	118.00	128.00	97.00	107.20
15	IC035651	110.00	83.00	-	-	-	116.00	136.00	97.00	108.40
16	IC035661	96.00	96.00	-	-	128.00	117.00	151.00	101.00	114.83
17	IC035665	100.00	93.00	-	-	128.00	129.00	128.00	100.00	113.00
18	IC035701	109.00	86.00	-	-	123.00	117.00	151.00	101.00	114.50
19	IC035702	97.00	93.00	-	-	121.00	117.00	154.00	99.00	113.50
20	IC035711	109.00	94.00	-	-	-	130.00	144.00	97.00	114.80
21	IC035713	102.00	86.00	-	-	-	118.00	141.00	99.00	109.20
22	IC035716	94.00	90.00	-	-	121.00	113.00	140.00	102.00	110.00
23	IC035717	96.00	-	-	-	-	119.00	140.00	97.00	113.00
24	IC035719	102.00	88.00	-	-	-	121.00	140.00	99.00	110.00
25	IC035735	95.00	90.00	-	-	-	117.00	155.00	95.00	110.40
26	IC035742	93.00	89.00	-	-	-	117.00	163.00	97.00	111.80
27	IC081698-B	95.00	88.00	-	-	117.00	114.00	141.00	97.00	108.67

S.No.	Accession No.	Days to 80% maturity								
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
28	IC094654	100.00	86.00	-	-	-	112.00	143.00	95.00	107.20
29	IC094661	106.00	90.00	-	-	-	118.00	142.00	102.00	111.60
30	IC095204	95.00	91.00	-	-	123.00	120.00	146.00	99.00	112.33
31	IC095244	96.00	74.00	-	-	-	113.00	146.00	102.00	106.20
32	IC095248	96.00	88.00	-	-	121.00	115.00	146.00	103.00	111.50
33	IC095251	101.00	91.00	-	-	121.00	116.00	143.00	101.00	112.17
34	IC095371	109.00	90.00	-	-	121.00	116.00	144.00	100.00	113.33
35	IC095382-B	112.00	90.00	-	-	123.00	118.00	135.00	102.00	113.33
36	IC095383	104.00	91.00	-	-	125.00	111.00	147.00	100.00	113.00
37	IC095389	112.00	91.00	-	-	125.00	119.00	148.00	101.00	116.00
38	IC095391	107.00	87.00	-	-	121.00	118.00	140.00	102.00	112.50
39	IC095406	105.00	89.00	-	-	123.00	114.00	142.00	100.00	112.17
40	IC095430	109.00	88.00	-	-	123.00	126.00	149.00	101.00	116.00
41	IC095498	115.00	-	-	-	119.00	113.00	147.00	101.00	119.00
42	IC095510	110.00	-	-	-	121.00	112.00	147.00	99.00	117.80
43	IC095516	103.00	93.00	-	-	123.00	112.00	135.00	101.00	111.17
44	IC095556	107.00	89.00	-	-	119.00	118.00	139.00	101.00	112.17
45	IC120621	104.00	92.00	-	-	-	121.00	143.00	101.00	112.20
46	IC120649	100.00	95.00	-	-	121.00	114.00	138.00	101.00	111.50
47	IC120668	106.00	94.00	-	-	-	119.00	133.00	101.00	110.60
48	IC120670	105.00	85.00	-	-	-	118.00	132.00	100.00	108.00
49	IC120689	96.00	87.00	-	-	121.00	120.00	148.00	101.00	112.17
50	IC432086	98.00	96.00	-	-	123.00	122.00	140.00	102.00	113.50
51	SKGPA-61	103.00	91.00	136.00	112.00	120.00	115.00	140.00	98.00	114.38
52	SKGPA-62	99.00	86.00	144.00	111.00	120.00	-	152.00	102.00	116.29
53	SKGPA-63	104.00	-	133.00	113.00	119.00	-	151.00	102.00	120.33
54	SKGPA-64	90.00	88.00	152.00	106.00	123.00	120.00	136.00	97.00	114.00
55	SKGPA-65	90.00	90.00	145.00	107.00	125.00	114.00	136.00	92.00	112.38
56	SKGPA-66	89.00	86.00	142.00	114.00	121.00	112.00	138.00	93.00	111.88
57	SKGPA-67	90.00	88.00	144.00	117.00	119.00	111.00	135.00	94.00	112.25

S.No.	Accession No.	Days to 80% maturity								Mean
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	
58	SKGPA-68	94.00	94.00	145.00	119.00	123.00	115.00	134.00	95.00	114.88
59	SKGPA-69	92.00	-	162.00	111.00	126.00	110.00	127.00	95.00	117.57
60	SKGPA-70	96.00	92.00	146.00	107.00	123.00	116.00	137.00	94.00	113.88
61	SKGPA-71	100.00	94.00	154.00	-	129.00	130.00	167.00	103	129.00
62	SKGPA-72	95.00	-	153.00	-	125.00	128.00	137.00	93.00	121.83
63	SKGPA-73	97.00	86.00	142.00	-	119.00	127.00	137.00	95.00	114.71
64	SKGPA-74	95.00	94.00	144.00	-	131.00	139.00	135.00	102.00	120.00
65	SKGPA-75	92.00	82.00	147.00	-	129.00	114.00	136.00	101.00	114.43
66	SKGPA-76	107.00	84.00	150.00	-	125.00	115.00	137.00	93.00	115.86
67	SKGPA-77	94.00	-	146.00	-	119.00	117.00	137.00	93.00	117.67
68	SKGPA-78	104.00	83.00	143.00	-	121.00	118.00	152.00	101.00	117.43
69	SKGPA-79	98.00	-	142.00	-	121.00	-	126.00	95.00	116.40
70	SKGPA-80	104.00	93.00	151.00	-	128.00	111.00	155.00	96.00	119.71
71	SKGPA-81	104.00	80.00	144.00	112.00	123.00	112.00	156.00	104.00	116.88
72	SKGPA-82	105.00	80.00	141.00	116.00	121.00	129.00	145.00	103.00	117.50
73	SKGPA-83	95.00	80.00	141.00	108.00	119.00	134.00	146.00	105.00	116.00
74	SKGPA-84	97.00	-	152.00	110.00	-	-	-	-	119.67
75	SKGPA-85	96.00	81.00	148.00	110.00	125.00	115.00	143.00	101.00	114.88
76	SKGPA-86	98.00	83.00	144.00	111.00	123.00	129.00	145.00	95.00	116.00
77	SKGPA-87	100.00	82.00	143.00	111.00	135.00	135.00	148.00	99.00	119.13
78	SKGPA-88	102.00	-	134.00	114.00	123.00	130.00	155.00	101.00	122.71
79	SKGPA-89	113.00	-	139.00	113.00	125.00	112.00	143.00	-	124.17
80	SKGPA-90	94.00	-	-	105.00	119.00	-	145.00	97.00	112.00
81	SKGPA-91	109.00	92.00	146.00	114.00	123.00	132.00	135.00	97.00	118.50
82	SKGPA-92	111.00	-	149.00	108.00	-	-	130.00	-	124.50
83	SKGPA-93	108.00	-	-	107.00	-	-	134.00	-	116.33
84	SKGPA-94	94.00	-	141.00	106.00	123.00	116.00	-	98.00	113.00
85	SKGPA-95	94.00	-	142.00	107.00	-	-	158.00	95.00	119.20
86	SKGPA-96	92.00	85.00	144.00	103.00	119.00	108.00	157.00	100.00	113.50
87	SKGPA-97	105.00	-	139.00	105.00	-	-	153.00	-	125.50

S.No.	Accession No.	Days to 80% maturity								
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
88	SKGPA-98	110.00	90.00	146.00	-	123.00	120.00	155.00	95.00	119.86
89	SKGPA-99	94.00	84.00	145.00	110.00	128.00	118.00	135.00	101.00	114.38
90	SKGPA-100	94.00	81.00	147.00	110.00	131.00	115.00	128.00	99.00	113.13
91	SKGPA-101	92.00	84.00	146.00	110.00	123.00	110.00	126.00	92.00	110.38
92	SKGPA-102	98.00	-	-	111.00	125.00	-	-	-	111.33
93	SKGPA-103	92.00	85.00	144.00	112.00	119.00	120.00	130.00	99.00	112.63
94	SKGPA-104	111.00	94.00	145.00	110.00	123.00	119.00	146.00	95.00	117.88
95	SKGPA-105	110.00	91.00	148.00	111.00	119.00	119.00	153.00	97.00	118.50
96	SKGPA-106	110.00	84.00	143.00	-	123.00	118.00	132.00	95.00	115.00
97	SKGPA-107	-	-	150.00	113.00	-	-	129.00	-	130.67
98	SKGPA-108	104.00	-	141.00	112.00	126.00	120.00	131.00	-	122.33
99	SKGPA-109	100.00	88.00	145.00	105.00	125.00	125.00	-	101.00	112.71
100	SKGPA-110	94.00	83.00	151.00	109.00	125.00	118.00	142.00	98.00	115.00
Mean for check variety										
	BGA-2 (C)	-	89.60	157.67	112.00	135.00	134.60	161.00	101.50	127.34
	GA-1 (C)	-	97.40	149.17	113.60	133.55	133.00	-	102.50	121.54
	GA-2 (C)	111.00	96.80	149.33	109.60	133.00	133.20	160.00	102.33	124.41
	Suvarna (C)	106.33	92.60	160.33	113.80	135.00	133.60	157.60	103.50	125.35
	Minimum	40.00	74.00	133.00	103.00	117.00	108.00	126.00	92.00	102.67
	Maximum	120.00	97.40	162.00	119.00	135.00	139.00	170.00	105.00	130.67
	Mean	100.80	88.21	145.79	110.45	123.90	120.21	144.53	98.88	115.48
	CD(0.05)	-	3.98	-	9.11	3.56	7.33	-	3.58	-
	CV(%) Error	-	1.58	-	3.04	1.16	2.05	-	3.81	-
	CV(%) Phenotypic	9.37	5.32	3.93	3.12	3.41	6.24	7.32	3.09	-

S.No.	Accession No.	Plant height (cm)									Number of Branches per plant				
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Ranchi	S.K. Nagar	Mean
1	IC021803-A	75.18	76.60	-	-	87.00	112.10	61.70	103.20	85.96	4.00	-	2.50	4.00	3.50
2	IC021937	139.76	91.80	-	-	96.00	146.50	51.00	131.60	109.44	2.00	-	3.50	-	2.75
3	IC021938	106.32	89.60	-	-	88.00	110.50	74.30	130.30	99.84	2.40	-	5.00	2.00	3.13
4	IC032186	123.02	99.00	-	-	84.00	121.50	75.40	102.60	100.92	1.80	-	3.50	-	2.65
5	IC032190	94.10	87.40	-	-	-	114.00	89.40	114.20	99.82	1.80	-	2.00	-	1.90
6	IC032193	96.90	89.00	-	-	83.00	100.50	79.70	98.80	91.32	1.00	-	1.00	-	1.00
7	IC032195	94.36	95.40	-	-	81.00	120.00	78.70	98.90	94.73	1.60	-	2.00	-	1.80
8	IC035404	105.84	94.60	-	-	110.00	105.20	98.00	113.20	104.47	1.80	-	2.50	-	2.15
9	IC035415	105.70	89.20	-	-	88.00	96.50	84.80	110.20	95.73	1.40	-	1.00	-	1.20
10	IC035615	112.06	102.20	-	-	137.00	150.10	78.60	154.00	122.33	1.60	-	2.50	-	2.05
11	IC035633	87.42	104.00	-	-	149.00	104.10	78.60	115.80	106.49	1.60	-	2.50	-	2.05
12	IC035635	67.74	68.60	-	-	87.00	83.00	65.10	109.80	80.21	-	-	2.00	3.00	2.50
13	IC035638	87.86	91.60	-	-	143.00	128.00	83.80	94.0	106.85	1.40	-	1.00	-	1.20
14	IC035642	68.72	74.60	-	-	-	99.50	23.00	83.80	69.92	1.40	-	4.00	5.00	3.47
15	IC035651	57.36	78.80	-	-	-	88.50	32.00	111.60	73.65	2.20	-	5.00	4.00	3.73
16	IC035661	82.10	98.20	-	-	83.00	114.50	77.40	105.90	93.52	1.80	-	1.50	4.00	2.43
17	IC035665	88.34	92.00	-	-	91.00	106.00	55.00	98.20	88.42	1.80	-	5.00	4.00	3.60
18	IC035701	81.46	92.00	-	-	122.00	115.00	75.20	120.60	101.04	1.40	-	1.00	5.00	2.47
19	IC035702	70.90	90.40	-	-	85.00	93.00	70.20	102.40	85.32	2.20	-	1.00	3.00	2.07
20	IC035711	100.16	96.00	-	-	-	102.00	70.60	108.10	95.37	1.60	-	5.00	-	3.30
21	IC035713	90.14	88.40	-	-	-	109.50	46.00	110.40	88.89	2.00	-	5.00	-	3.50
22	IC035716	87.30	93.00	-	-	102.00	102.40	40.00	105.60	88.38	1.80	-	4.00	-	2.90
23	IC035717	103.06	-	-	-	-	107.50	52.00	106.0	87.52	1.80	-	5.00	-	3.40
24	IC035719	103.22	91.00	-	-	-	101.20	75.20	110.50	96.22	1.20	-	1.00	-	1.10
25	IC035735	94.96	83.60	-	-	-	116.50	81.10	115.90	98.41	1.80	-	3.00	-	2.40
26	IC035742	99.16	97.20	-	-	-	110.00	82.30	110.20	99.77	2.00	-	2.00	-	2.00
27	IC081698-B	85.72	91.60	-	-	83.00	113.50	35.00	102.80	85.27	-	-	4.00	-	4.00

S.No.	Accession No.	Plant height (cm)									Number of Branches per plant				
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Ranchi	S.K. Nagar	Mean
28	IC094654	116.84	83.40	-	-	-	88.00	50.00	108.70	89.39	-	-	6.00	-	6.00
29	IC094661	105.40	101.00	-	-	-	131.00	39.00	115.50	98.38	1.40	-	4.00	-	2.70
30	IC095204	84.22	99.60	-	-	54.00	114.50	45.00	90.40	81.29	1.80	-	5.00	-	3.40
31	IC095244	76.46	87.60	-	-	-	120.00	39.00	83.00	81.21	2.40	-	4.00	-	3.20
32	IC095248	97.56	86.40	-	-	87.00	118.30	40.00	91.20	86.74	1.40	-	5.00	-	3.20
33	IC095251	105.66	78.60	-	-	88.00	114.10	41.00	92.00	86.56	1.80	-	5.00	-	3.40
34	IC095371	147.20	103.80	-	-	109.00	140.00	52.00	126.20	113.03	1.40	-	5.00	-	3.20
35	IC095382-B	119.44	96.40	-	-	86.00	107.00	31.00	86.00	87.64	1.80	-	3.00	-	2.40
36	IC095383	142.52	97.80	-	-	-	115.40	80.00	100.80	107.30	1.60	-	7.00	-	4.30
37	IC095389	98.18	75.00	-	-	86.00	106.20	31.50	79.60	79.41	2.20	-	7.00	4.00	4.40
38	IC095391	102.56	104.00	-	-	96.00	102.50	55.50	104.00	94.09	2.80	-	6.00	-	4.40
39	IC095406	107.10	81.00	-	-	-	117.00	59.00	105.40	93.90	1.80	-	8.00	-	4.90
40	IC095430	89.62	80.00	-	-	97.00	101.00	33.50	103.60	84.12	1.80	-	5.00	-	3.40
41	IC095498	95.44	-	-	-	104.00	65.00	45.20	103.60	82.65	1.80	-	5.00	4.00	3.60
42	IC095510	120.00	-	-	-	-	104.00	66.00	118.20	102.05	1.20	-	3.00	4.00	2.73
43	IC095516	96.56	97.00	-	-	108.00	96.00	34.00	94.00	87.59	2.40	-	6.00	-	4.20
44	IC095556	103.18	111.20	-	-	109.00	135.50	81.20	105.40	107.58	2.80	-	5.00	-	3.90
45	IC120621	106.15	86.60	-	-	-	112.00	43.00	98.80	89.31	2.00	-	8.00	-	5.00
46	IC120649	82.44	95.40	-	-	96.00	100.50	39.00	108.20	86.92	1.80	-	6.00	-	3.90
47	IC120668	91.70	97.00	-	-	-	114.00	36.00	95.00	86.74	1.40	-	6.00	2.00	3.13
48	IC120670	94.82	97.80	-	-	-	108.00	40.00	97.00	87.52	2.20	-	6.00	4.00	4.07
49	IC120689	82.70	75.40	-	-	111.00	120.00	45.00	92.00	87.68	1.80	-	3.00	4.00	2.93
50	IC432086	88.70	92.60	-	-	88.00	145.00	51.00	100.20	94.25	3.60	-	5.00	-	4.30
51	SKGPA-61	90.28	102.00	87.40	78.00	108.00	74.50	46.00	128.40	89.32	3.40	5.40	5.00	-	4.60
52	SKGPA-62	87.18	95.00	44.25	85.00	99.00	-	33.20	117.10	80.10	3.20	4.25	6.00	-	4.48
53	SKGPA-63	114.40	-	52.00	90.50	97.00	-	48.10	122.80	87.47	3.00	-	5.00	-	4.00
54	SKGPA-64	86.68	100.40	51.00	100.00	83.00	96.00	36.00	98.80	81.49	3.20	3.20	7.00	3.00	4.10
55	SKGPA-65	123.86	82.20	36.80	79.60	78.00	58.80	21.00	63.40	67.96	4.00	3.20	4.00	4.00	3.80
56	SKGPA-66	119.00	112.40	32.00	61.00	78.00	106.00	21.50	90.00	77.49	4.00	3.00	5.00	3.00	3.75
57	SKGPA-67	115.62	91.40	46.50	74.00	79.00	88.00	19.30	83.60	74.68	5.60	5.50	4.00	-	5.03

S.No.	Accession No.	Plant height (cm)									Number of Branches per plant				
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Ranchi	S.K. Nagar	Mean
58	SKGPA-68	95.34	103.40	69.00	77.00	89.00	72.00	19.00	110.00	79.34	4.00	4.80	4.00	4.00	4.20
59	SKGPA-69	121.91	-	47.00	79.60	85.00	74.40	30.00	97.80	76.53	2.00	3.00	3.00	5.00	3.25
60	SKGPA-70	99.16	97.20	40.30	61.00	86.00	95.50	32.30	114.60	78.26	3.20	-	6.00	4.00	4.40
61	SKGPA-71	88.14	118.00	115.60	-	129.00	129.00	69.10	141.40	112.89	1.40	6.40	4.50	-	4.10
62	SKGPA-72	109.24	-	64.00	-	89.00	87.00	28.50	99.40	79.52	3.20	6.00	5.00	3.00	4.30
63	SKGPA-73	102.26	100.20	59.80	-	93.00	102.50	26.00	116.20	85.71	4.40	3.80	5.00	-	4.40
64	SKGPA-74	115.46	118.80	110.60	-	117.00	88.00	63.20	96.70	101.39	-	11.00	4.00	-	7.50
65	SKGPA-75	101.98	98.60	68.80	-	72.00	93.20	29.30	107.00	81.55	2.80	5.40	3.00	-	3.73
66	SKGPA-76	83.50	86.40	86.60	-	76.00	89.50	36.50	88.80	78.19	2.00	0.60	6.00	-	2.87
67	SKGPA-77	109.20	-	52.00	-	89.00	59.60	22.00	85.50	69.55	2.60	6.00	4.00	3.00	3.90
68	SKGPA-78	95.72	86.00	66.00	-	96.00	97.00	45.00	111.50	85.32	2.20	6.67	7.00	-	5.29
69	SKGPA-79	51.18	-	50.50	-	67.00	-	14.00	64.40	49.42	2.40	3.00	4.00	4.00	3.35
70	SKGPA-80	145.70	108.60	98.00	-	118.00	132.70	77.00	150.70	118.67	3.60	5.20	8.00	-	5.60
71	SKGPA-81	105.46	86.80	44.20	88.00	70.00	43.50	46.00	71.10	69.38	2.60	4.00	6.50	4.00	4.28
72	SKGPA-82	92.10	93.80	51.20	95.00	85.00	72.20	73.50	79.20	80.25	3.60	4.60	-	4.00	4.07
73	SKGPA-83	75.22	101.40	63.60	85.00	88.00	33.00	47.10	75.90	71.15	3.80	3.00	4.00	5.00	3.95
74	SKGPA-84	121.90	-	107.00	80.00	-	-	-	-	102.97	3.50	9.00	-	-	6.25
75	SKGPA-85	128.12	133.00	87.00	82.50	85.00	95.10	63.10	69.60	92.93	4.20	6.60	4.00	3.00	4.45
76	SKGPA-86	88.20	82.00	50.00	77.90	90.00	82.00	60.10	69.60	74.98	3.20	5.80	2.50	4.00	3.88
77	SKGPA-87	141.96	120.60	83.00	94.00	97.00	78.00	54.00	108.40	97.12	3.20	9.50	2.00	-	4.90
78	SKGPA-88	135.86	-	62.40	96.80	77.00	67.00	49.00	83.60	81.67	4.20	6.60	5.00	-	5.27
79	SKGPA-89	109.20	-	63.20	105.00	88.00	110.50	35.00	-	85.15	3.40	4.80	7.00	-	5.07
80	SKGPA-90	114.58	-	-	79.40	101.00	-	66.80	89.70	90.30	-	-	6.50	-	6.50
81	SKGPA-91	126.74	115.80	68.60	100.00	106.00	135.50	72.00	116.30	105.12	2.00	5.00	7.00	3.00	4.25
82	SKGPA-92	129.14	-	61.00	105.00	-	-	24.00	-	79.79	2.40	7.00	6.00	-	5.13
83	SKGPA-93	75.63	-	-	83.60	-	-	30.00	-	63.08	1.80	-	4.00	-	2.90
84	SKGPA-94	86.58	-	61.00	82.20	54.00	65.00	-	69.90	69.78	2.00	5.00	-	4.00	3.67
85	SKGPA-95	102.20	-	91.00	91.20	-	-	79.70	96.50	92.12	3.00	9.00	2.50	4.00	4.63
86	SKGPA-96	110.16	89.80	67.20	74.40	68.00	95.00	61.20	75.60	80.17	1.60	4.40	2.00	6.00	3.50
87	SKGPA-97	78.80	-	48.00	71.30	-	-	29.00	-	56.78	2.20	3.00	4.00	-	3.07

S.No.	Accession No.	Plant height (cm)									Number of Branches per plant				
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Ranchi	S.K. Nagar	Mean
88	SKGPA-98	110.42	142.20	78.50	-	107.00	155.00	72.00	149.50	116.37	2.00	5.75	8.00	-	5.25
89	SKGPA-99	112.00	150.00	100.80	88.60	128.00	87.00	33.00	85.00	98.05	-	5.00	6.00	2.00	4.33
90	SKGPA-100	62.26	73.40	72.00	84.80	56.00	64.50	24.00	79.60	64.57	2.20	6.50	5.00	2.00	3.93
91	SKGPA-101	78.52	97.80	71.40	84.80	80.00	108.00	31.00	71.50	77.88	-	4.60	4.00	2.00	3.53
92	SKGPA-102	99.68	-	-	68.20	90.00	-	-	-	85.96	-	-	-	-	-
93	SKGPA-103	85.60	86.00	65.00	76.20	86.00	63.50	59.70	80.20	75.28	-	5.80	4.50	-	5.15
94	SKGPA-104	106.20	91.60	69.40	91.20	103.00	98.30	56.00	124.70	92.55	-	6.00	3.00	-	4.50
95	SKGPA-105	131.96	115.80	103.20	74.40	108.00	136.00	72.20	154.90	112.06	1.80	5.00	5.00	-	3.93
96	SKGPA-106	119.50	111.20	44.00	-	72.00	70.40	28.00	84.70	75.69	-	2.25	5.00	3.00	3.42
97	SKGPA-107	-	-	41.00	88.60	-	-	49.00	-	59.53	-	4.00	6.00	-	5.00
98	SKGPA-108	109.84	-	45.00	76.20	67.00	85.00	16.00	-	66.51	-	2.00	4.00	-	3.00
99	SKGPA-109	121.20	110.00	54.75	87.00	97.00	55.00	-	131.70	93.81	-	2.75	-	4.00	3.38
100	SKGPA-110	109.02	69.20	60.60	105.00	74.00	114.00	42.20	85.20	82.40	-	3.80	3.50	-	3.65
Mean for check variety															
	BGA-2 (C)	-	109.38	98.73	86.85	132.09	112.90	77.00	116.25	104.74	-	3.73	6.00	-	4.87
	GA-1 (C)	-	103.24	105.63	82.13	121.91	111.40	-	129.09	108.90	-	2.47	-	-	2.47
	GA-2 (C)	117.19	105.44	110.20	86.64	121.55	138.94	98.30	141.38	114.95	2.00	1.27	7.00	-	3.42
	Suvarna (C)	109.11	106.04	101.27	92.55	138.18	100.80	77.76	112.49	104.78	-	5.30	4.20	-	4.75
	Minimum	51.18	68.60	32.00	61.00	54.00	33.00	14.00	63.40	49.42	1.00	0.60	1.00	2.00	1.00
	Maximum	147.20	150.00	115.60	105.00	149.00	155.00	98.30	154.90	122.33	5.60	11.00	8.00	6.00	7.50
	Mean	101.12	96.05	68.78	84.53	94.21	101.80	51.87	103.27	88.72	2.37	4.90	4.43	3.66	3.71
	CD(0.05)	-	13.64	-	14.56	18.76	54.60	-	15.18	-	-	-	-	-	-
	CV(%) Error	-	4.82	-	6.26	6.38	17.63	-	13.26	-	-	-	-	-	-
	CV(%) Phenotypic	19.04	15.07	32.85	12.52	20.97	23.20	40.70	19.38	-	38.76	42.21	39.85	25.64	-

S.No.	Accession No.	Inflorescence length (cm)									Leaf length (cm)					
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean
1	IC021803-A	10.48	36.00	-	-	49.00	60.30	21.00	48.10	37.48	14.54	-	12.50	7.50	23.10	14.41
2	IC021937	22.48	42.80	-	-	50.00	88.00	32.00	65.90	50.20	16.42	-	10.10	10.50	25.60	15.66
3	IC021938	20.78	42.00	-	-	56.00	59.10	30.00	60.60	44.75	16.90	-	7.60	10.00	20.70	13.80
4	IC032186	22.44	44.60	-	-	57.00	80.50	22.50	48.80	45.97	15.28	-	12.40	7.00	17.30	13.00
5	IC032190	20.02	34.60	-	-	-	63.20	17.00	51.70	37.30	14.04	-	9.80	11.00	19.30	13.54
6	IC032193	9.34	36.00	-	-	51.00	57.10	30.00	50.00	38.91	14.58	-	5.90	9.00	20.70	12.55
7	IC032195	11.00	39.40	-	-	51.00	76.10	22.50	51.30	41.88	16.20	-	7.50	8.50	18.20	12.60
8	IC035404	12.06	38.20	-	-	63.00	58.10	16.50	53.00	40.14	14.32	-	12.20	10.50	23.50	15.13
9	IC035415	13.48	40.80	-	-	57.00	59.80	13.00	51.40	39.25	16.78	-	9.00	7.00	22.50	13.82
10	IC035615	8.12	36.40	-	-	63.00	85.00	23.00	62.70	46.37	15.76	-	15.30	6.50	22.10	14.92
11	IC035633	14.04	40.40	-	-	68.00	60.00	23.00	51.20	42.77	16.62	-	13.40	6.50	26.80	15.83
12	IC035635	24.76	41.60	-	-	50.00	61.00	25.00	30.70	38.84	11.12	-	9.80	8.00	23.70	13.16
13	IC035638	9.41	37.80	-	-	65.00	71.20	13.00	53.70	41.69	16.08	-	12.90	4.80	20.30	13.52
14	IC035642	21.64	43.40	-	-	-	74.50	14.00	52.70	41.25	10.62	-	8.60	5.00	15.90	10.03
15	IC035651	18.58	45.20	-	-	-	67.20	35.00	65.60	46.32	9.90	-	9.30	7.00	17.30	10.88
16	IC035661	20.38	34.40	-	-	53.00	65.00	25.90	54.70	42.23	11.94	-	9.00	9.50	17.00	11.86
17	IC035665	13.02	41.60	-	-	63.00	70.00	20.00	61.20	44.80	15.70	-	11.10	6.00	18.10	12.73
18	IC035701	11.94	41.80	-	-	65.00	66.30	31.00	63.80	46.64	13.50	-	15.50	9.50	17.10	13.90
19	IC035702	18.78	40.60	-	-	65.00	58.50	21.50	61.70	44.35	14.30	-	10.10	10.50	17.20	13.03
20	IC035711	15.76	40.60	-	-	-	59.00	28.50	54.20	39.61	14.56	-	9.60	8.50	16.30	12.24
21	IC035713	18.08	34.00	-	-	-	76.20	25.00	54.80	41.62	14.92	-	10.50	7.00	18.70	12.78
22	IC035716	18.96	44.40	-	-	58.00	74.00	19.00	55.80	45.03	14.20	-	9.40	5.00	19.60	12.05
23	IC035717	19.40	-	-	-	-	70.50	31.00	45.80	41.68	15.10	-	11.10	7.00	20.10	13.33
24	IC035719	18.28	50.20	-	-	-	66.20	31.00	53.70	43.88	14.72	-	9.50	9.50	22.00	13.93
25	IC035735	12.84	41.40	-	-	-	72.00	22.00	60.00	41.65	14.86	-	8.40	12.50	17.80	13.39
26	IC035742	11.64	46.80	-	-	-	69.20	23.00	54.60	41.05	15.58	-	11.50	7.50	19.70	13.57
27	IC081698-B	20.88	45.60	-	-	59.00	70.00	25.00	54.20	45.78	16.12	-	12.00	10.00	16.50	13.66

S.No.	Accession No.	Inflorescence length (cm)								Leaf length (cm)						
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean
28	IC094654	18.70	41.40	-	-	-	68.00	29.00	54.10	42.24	13.16	-	9.20	14.00	20.30	14.17
29	IC094661	18.34	37.20	-	-	-	82.00	30.00	58.40	45.19	18.50	-	8.60	10.00	16.10	13.30
30	IC095204	15.16	49.00	-	-	30.00	60.50	16.00	51.10	36.96	15.98	-	12.30	7.00	15.30	12.65
31	IC095244	11.66	43.80	-	-	-	69.50	15.00	45.40	37.07	15.12	-	13.90	9.00	17.00	13.76
32	IC095248	11.66	43.60	-	-	51.00	72.10	25.00	49.70	42.18	15.24	-	14.20	8.00	20.00	14.36
33	IC095251	13.66	36.80	-	-	55.00	66.30	13.50	48.50	38.96	14.88	-	14.50	9.20	15.50	13.52
34	IC095371	9.98	44.20	-	-	59.00	67.20	28.10	59.20	44.61	15.32	-	13.50	11.20	20.20	15.06
35	IC095382-B	14.02	45.20	-	-	62.00	67.40	20.00	46.10	42.45	14.76	-	9.60	3.50	17.50	11.34
36	IC095383	14.50	41.00	-	-	-	63.20	33.40	48.20	40.06	15.00	-	11.50	11.00	17.70	13.80
37	IC095389	13.36	43.80	-	-	62.00	50.50	13.30	40.60	37.26	15.04	-	10.80	5.00	15.20	11.51
38	IC095391	17.38	49.20	-	-	67.00	63.00	31.00	59.80	47.90	13.64	-	12.10	10.00	14.20	12.49
39	IC095406	13.82	39.80	-	-	-	74.20	17.00	57.60	40.48	12.92	-	11.00	11.00	13.10	12.01
40	IC095430	13.96	42.60	-	-	73.00	65.50	18.20	52.70	44.33	13.74	-	11.80	5.00	17.80	12.09
41	IC095498	12.76	-	-	-	81.00	52.00	29.00	51.20	45.19	14.76	-	9.80	8.00	14.40	11.74
42	IC095510	16.02	-	-	-	-	73.20	38.00	62.10	47.33	14.84	-	10.20	12.00	19.20	14.06
43	IC095516	16.52	45.80	-	-	64.00	59.00	25.00	47.30	42.94	15.12	-	12.40	9.00	16.20	13.18
44	IC095556	14.88	44.40	-	-	63.00	75.50	27.00	52.90	46.28	16.60	-	12.60	13.00	21.10	15.83
45	IC120621	19.90	40.20	-	-	-	73.00	34.00	50.90	43.60	13.26	-	6.90	10.00	17.90	12.02
46	IC120649	21.14	46.40	-	-	68.00	68.00	22.00	57.00	47.09	13.70	-	9.50	9.00	14.40	11.65
47	IC120668	12.80	44.00	-	-	-	73.50	22.00	46.70	39.80	13.78	-	13.00	8.00	16.10	12.72
48	IC120670	15.08	40.20	-	-	-	83.00	17.00	50.10	41.08	13.20	-	9.60	10.00	14.10	11.73
49	IC120689	10.52	34.60	-	-	72.00	95.20	20.00	50.40	47.12	12.68	-	13.20	6.00	12.10	11.00
50	IC432086	6.72	44.80	-	-	69.00	90.00	25.00	51.20	47.79	15.00	-	13.60	11.00	17.50	14.28
51	SKGPA-61	10.18	44.20	48.40	36.00	62.00	40.50	22.00	65.40	41.09	17.86	16.38	14.70	6.00	23.80	15.75
52	SKGPA-62	9.24	49.00	17.43	30.00	62.00	-	25.00	64.10	36.68	20.16	9.65	-	10.00	22.10	15.48
53	SKGPA-63	4.80	-	19.50	28.60	54.00	-	19.00	55.60	30.25	18.73	12.20	-	7.00	18.50	14.11
54	SKGPA-64	23.60	48.80	29.24	38.00	53.00	69.40	29.00	59.20	43.78	15.34	9.82	9.50	12.00	15.10	12.35
55	SKGPA-65	22.36	46.00	29.70	35.00	53.00	45.00	18.00	49.20	37.28	13.22	8.38	7.50	7.00	16.40	10.50
56	SKGPA-66	26.00	53.00	24.40	34.00	49.00	68.00	28.00	52.20	41.83	16.90	6.60	12.40	10.00	21.60	13.50
57	SKGPA-67	26.00	69.60	27.50	38.00	47.00	83.00	27.00	54.40	46.56	15.14	9.20	8.40	8.00	16.40	11.43

S.No.	Accession No.	Inflorescence length (cm)								Leaf length (cm)						
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean
58	SKGPA-68	15.42	48.60	32.26	39.00	52.00	52.00	23.00	60.40	40.34	18.68	16.54	9.60	8.00	22.50	15.06
59	SKGPA-69	22.12	-	23.50	40.00	50.00	68.00	28.00	47.60	39.89	16.62	8.80	8.90	9.00	18.20	12.30
60	SKGPA-70	13.10	50.40	16.44	39.60	55.00	60.50	28.10	54.20	39.67	17.96	13.76	9.50	9.00	18.10	13.66
61	SKGPA-71	5.84	44.20	46.44	-	54.00	47.00	15.00	46.20	36.95	19.76	18.60	15.20	8.50	18.90	16.19
62	SKGPA-72	11.02	-	36.00	-	54.00	47.50	24.00	53.40	37.65	16.20	15.50	9.50	9.50	18.50	13.84
63	SKGPA-73	17.84	53.20	30.48	-	50.00	42.50	16.00	58.60	38.37	16.24	15.28	11.80	9.00	19.80	14.42
64	SKGPA-74	5.68	53.60	41.86	-	54.00	26.60	28.00	42.30	36.01	17.36	17.26	13.50	11.00	19.80	15.78
65	SKGPA-75	20.10	44.80	43.94	-	48.00	51.00	22.00	58.70	41.22	18.76	14.24	11.20	10.00	17.50	14.34
66	SKGPA-76	14.48	44.40	50.02	-	46.00	54.00	19.40	55.60	40.56	13.30	17.02	10.10	12.00	16.00	13.68
67	SKGPA-77	16.10	-	30.78	-	49.00	46.00	19.00	54.60	35.91	16.12	10.18	5.50	10.00	18.00	11.96
68	SKGPA-78	20.90	54.80	35.00	-	63.00	59.50	32.20	54.50	45.70	17.74	12.30	11.50	9.00	9.20	11.95
69	SKGPA-79	26.80	-	25.60	-	49.00	-	21.00	47.20	33.92	10.38	11.00	-	7.00	19.00	11.85
70	SKGPA-80	14.26	36.60	36.48	-	59.00	63.00	28.00	53.50	41.55	22.72	18.10	19.50	3.00	31.20	18.90
71	SKGPA-81	25.44	64.20	28.88	40.00	49.00	34.00	24.50	53.00	39.88	16.32	11.32	6.50	7.00	11.00	10.43
72	SKGPA-82	32.06	59.40	33.20	48.00	56.00	51.00	23.50	60.20	45.42	13.88	13.04	7.50	8.50	12.10	11.00
73	SKGPA-83	23.58	52.80	39.38	45.00	56.00	28.50	20.00	54.50	39.97	14.56	12.20	6.70	7.50	10.70	10.33
74	SKGPA-84	18.20	-	61.00	46.40	-	-	-	-	41.87	22.80	22.70	-	-	-	22.75
75	SKGPA-85	17.68	52.20	45.52	38.00	50.00	59.50	31.00	51.20	43.14	18.98	18.16	13.10	7.50	12.00	13.95
76	SKGPA-86	20.56	62.00	31.78	38.60	58.00	75.00	12.50	46.40	43.11	17.38	12.54	7.90	8.50	12.50	11.76
77	SKGPA-87	7.78	55.20	41.05	41.00	59.00	29.50	13.00	57.00	37.94	16.76	17.23	7.60	7.00	23.70	14.46
78	SKGPA-88	10.80	-	36.08	35.60	51.00	55.50	31.00	52.70	38.95	15.88	16.24	9.50	13.00	18.20	14.56
79	SKGPA-89	12.36	-	43.36	38.30	59.00	85.00	17.00	-	42.50	13.18	12.86	10.20	7.00	-	10.81
80	SKGPA-90	19.70	-	-	40.20	70.00	-	40.00	53.70	44.72	18.12	-	-	6.50	16.12	13.58
81	SKGPA-91	10.88	54.00	33.96	45.00	68.00	66.00	21.00	63.00	45.23	18.18	14.22	16.70	13.00	18.40	16.10
82	SKGPA-92	19.98	-	33.00	36.00	-	-	18.00	-	26.75	12.86	13.90	-	7.00	-	11.25
83	SKGPA-93	7.23	-	-	41.30	-	-	24.00	-	24.18	8.66	-	-	9.00	-	8.83
84	SKGPA-94	32.02	-	37.45	48.00	27.00	60.50	-	51.90	42.81	12.70	11.45	7.60	-	9.30	10.26
85	SKGPA-95	3.60	-	61.00	37.00	-	-	18.50	56.90	35.40	11.50	12.25	-	7.50	15.30	11.64
86	SKGPA-96	23.76	50.00	45.00	49.00	51.00	69.00	23.50	55.10	45.80	16.98	15.34	10.40	9.50	12.30	12.90
87	SKGPA-97	14.10	-	28.00	40.00	-	-	15.00	-	24.28	8.78	11.90	-	5.00	-	8.56

S.No.	Accession No.	Inflorescence length (cm)									Leaf length (cm)					
		Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean
88	SKGPA-98	16.04	55.60	40.00	-	69.00	71.20	40.00	79.30	53.02	19.24	13.66	14.80	14.00	14.60	15.26
89	SKGPA-99	22.60	63.80	44.94	45.00	75.00	61.00	20.00	53.00	48.17	16.40	12.08	8.40	15.00	12.90	12.96
90	SKGPA-100	21.66	53.40	50.55	48.00	38.00	48.00	25.00	61.10	43.21	9.36	16.05	6.50	8.00	15.50	11.08
91	SKGPA-101	13.64	47.80	41.86	47.00	49.00	77.00	25.00	50.90	44.03	11.30	15.60	10.20	8.00	12.70	11.56
92	SKGPA-102	14.34	-	-	48.00	55.00	-	-	-	39.11	11.54	-	-	-	-	11.54
93	SKGPA-103	16.32	63.20	44.60	40.00	53.00	35.10	21.50	62.60	42.04	13.92	12.12	8.90	7.00	16.40	11.67
94	SKGPA-104	15.60	32.20	34.04	47.20	69.00	48.00	38.00	71.00	44.38	12.68	13.00	9.80	9.00	16.70	12.24
95	SKGPA-105	7.18	37.60	49.58	48.60	61.00	56.00	25.00	80.50	45.68	18.94	15.42	10.00	12.00	18.90	15.05
96	SKGPA-106	14.12	51.00	32.83	-	51.60	49.50	19.00	59.30	39.62	18.14	7.70	7.50	10.00	12.20	11.11
97	SKGPA-107	-	-	32.00	38.30	-	-	27.00	-	32.43	-	13.20	-	12.00	-	12.60
98	SKGPA-108	13.52	-	29.00	48.30	45.00	89.50	17.00	-	40.39	15.04	12.80	7.90	7.00	-	10.69
99	SKGPA-109	4.45	48.60	30.13	47.30	64.00	34.50	-	73.60	43.23	10.96	12.20	14.40	-	25.80	15.84
100	SKGPA-110	15.76	43.80	43.80	36.30	48.00	64.00	24.50	47.60	40.47	13.58	13.50	11.40	5.50	17.50	12.30
Mean for check variety																
	BGA-2 (C)	-	46.58	41.61	40.50	54.73	54.30	25.00	48.81	44.50	-	15.14	13.34	11.50	23.40	15.85
	GA-1 (C)	-	43.06	47.52	43.75	66.55	59.34	-	58.70	53.15	-	16.02	11.50	-	23.01	16.84
	GA-2 (C)	7.37	42.80	49.40	42.00	64.91	72.50	35.00	75.22	48.65	16.58	17.66	14.82	13.00	24.41	17.29
	Suvarna (C)	6.32	41.26	33.46	39.04	55.64	52.44	21.10	44.43	36.71	18.40	11.91	14.30	9.40	24.23	15.65
	Minimum	3.60	32.20	16.44	28.60	27.00	26.60	12.50	30.70	24.18	8.66	6.60	5.50	3.00	9.20	8.56
	Maximum	32.06	69.60	61.00	49.00	81.00	95.20	40.00	80.50	53.15	22.80	22.70	19.50	15.00	31.20	22.75
	Mean	15.70	45.48	37.04	41.07	56.94	63.00	23.80	54.91	41.59	15.19	13.61	10.79	8.80	18.03	13.24
	CD(0.05)	-	4.05	-	4.64	12.87	30.25	-	2.12	-	-	-	5.49	-	1.54	-
	CV(%) Error	-	3.49	-	4.21	9.30	19.00	-	4.08	-	-	-	15.25	-	7.05	-
	CV(%) Phenotypic	37.49	16.47	26.79	12.67	16.18	22.19	26.86	14.10	-	17.53	23.07	24.53	27.07	22.17	-

S.No.	Accession No.	Leaf width (cm)			Petiole length (cm)						Stem thickness (cm)				
		Rahuri	Ranchi	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	S.K. Nagar	Mean
1	IC021803-A	6.60	3.50	5.05	7.10	-	5.40	5.50	8.70	6.68	7.98	-	1.30	3.80	4.36
2	IC021937	4.90	4.00	4.45	7.62	-	5.40	5.00	10.60	7.16	14.23	-	1.80	4.70	6.91
3	IC021938	3.20	4.50	3.85	7.34	-	3.50	6.50	7.00	6.09	12.09	-	1.40	4.40	5.96
4	IC032186	3.70	5.00	4.35	7.48	-	8.20	7.50	5.80	7.25	9.79	-	1.40	2.80	4.66
5	IC032190	6.10	6.50	6.30	6.48	-	7.50	6.00	5.90	6.47	8.50	-	0.90	2.80	4.07
6	IC032193	2.70	6.50	4.60	6.18	-	3.10	5.50	7.40	5.55	14.26	-	1.10	4.40	6.59
7	IC032195	3.20	4.00	3.60	6.90	-	4.70	4.50	6.80	5.73	10.65	-	1.60	4.20	5.48
8	IC035404	5.70	5.00	5.35	6.80	-	8.40	6.00	8.90	7.53	9.27	-	1.20	4.10	4.86
9	IC035415	3.70	3.50	3.60	7.44	-	4.90	7.30	7.00	6.66	11.82	-	1.40	3.90	5.71
10	IC035615	7.20	3.50	5.35	6.82	-	3.50	5.00	8.30	5.91	11.68	-	2.20	5.50	6.46
11	IC035633	5.90	3.50	4.70	7.66	-	7.00	5.00	9.80	7.37	14.46	-	1.90	4.60	6.99
12	IC035635	5.00	4.00	4.50	7.78	-	7.20	6.00	9.50	7.62	7.79	-	0.90	3.80	4.16
13	IC035638	5.80	5.00	5.40	7.36	-	9.10	6.30	7.50	7.57	15.11	-	2.10	4.70	7.30
14	IC035642	5.00	2.00	3.50	5.94	-	9.10	3.00	7.30	6.34	5.97	-	0.80	3.00	3.26
15	IC035651	4.30	4.00	4.15	6.36	-	10.50	6.00	7.50	7.59	4.52	-	1.20	3.70	3.14
16	IC035661	4.50	6.00	5.25	6.00	-	6.20	6.00	6.20	6.10	5.80	-	1.40	2.90	3.37
17	IC035665	5.50	4.50	5.00	9.06	-	7.40	6.00	7.20	7.42	10.96	-	1.30	2.80	5.02
18	IC035701	7.40	4.00	5.70	6.98	-	11.50	6.00	7.20	7.92	7.79	-	1.50	4.60	4.63
19	IC035702	4.00	4.50	4.25	6.90	-	5.50	5.00	6.40	5.95	8.53	-	0.90	3.00	4.14
20	IC035711	4.90	5.00	4.95	7.12	-	6.30	3.50	5.50	5.61	8.69	-	1.50	2.80	4.33
21	IC035713	5.20	3.00	4.10	7.80	-	5.10	4.00	7.20	6.03	8.06	-	1.80	3.70	4.52
22	IC035716	4.60	3.00	3.80	6.86	-	3.50	2.00	6.90	4.82	10.96	-	1.20	3.00	5.05
23	IC035717	4.40	4.00	4.20	7.36	-	8.30	4.00	7.30	6.74	10.14	-	0.80	2.80	4.58
24	IC035719	4.60	4.00	4.30	7.42	-	6.70	5.00	8.40	6.88	10.65	-	1.20	2.80	4.88
25	IC035735	4.60	6.00	5.30	7.36	-	7.20	6.50	6.50	6.89	11.60	-	1.40	3.00	5.33
26	IC035742	5.20	2.00	3.60	8.34	-	6.70	3.50	7.90	6.61	12.33	-	1.20	3.70	5.74
27	IC081698-B	4.80	5.00	4.90	7.34	-	6.50	5.00	5.90	6.19	12.20	-	0.80	3.60	5.53

S.No.	Accession No.	Leaf width (cm)			Petiole length (cm)						Stem thickness (cm)				
		Rahuri	Ranchi	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	S.K. Nagar	Mean
28	IC094654	5.40	5.00	5.20	5.76	-	8.10	7.00	7.60	7.12	11.34	-	0.90	3.80	5.35
29	IC094661	3.40	6.00	4.70	8.40	-	6.00	6.00	6.40	6.70	13.51	-	1.70	4.50	6.57
30	IC095204	5.70	3.00	4.35	8.06	-	6.90	4.00	5.20	6.04	9.74	-	1.30	5.10	5.38
31	IC095244	7.00	5.20	6.10	7.14	-	7.20	5.00	5.60	6.24	11.98	-	2.10	3.40	5.83
32	IC095248	6.20	4.20	5.20	7.92	-	8.30	5.50	7.60	7.33	12.07	-	1.40	2.90	5.46
33	IC095251	7.50	4.00	5.75	7.04	-	12.20	5.30	6.20	7.69	10.38	-	2.00	2.80	5.06
34	IC095371	6.90	6.00	6.45	8.08	-	8.50	8.00	7.30	7.97	13.80	-	1.90	2.90	6.20
35	IC095382-B	3.80	3.00	3.40	7.62	-	5.70	2.20	7.10	5.66	13.65	-	1.20	3.80	6.22
36	IC095383	4.70	6.00	5.35	7.68	-	7.60	8.00	7.10	7.60	13.50	-	1.20	2.90	5.87
37	IC095389	4.30	3.00	3.65	7.34	-	4.60	3.50	5.20	5.16	9.79	-	1.50	2.90	4.73
38	IC095391	5.50	6.00	5.75	6.98	-	8.00	7.00	5.00	6.75	12.19	-	1.50	2.80	5.50
39	IC095406	6.50	5.00	5.75	6.70	-	10.30	6.00	5.10	7.03	11.64	-	1.40	2.90	5.31
40	IC095430	5.30	4.00	4.65	6.28	-	7.90	3.50	6.90	6.15	11.34	-	1.70	2.90	5.31
41	IC095498	4.90	6.00	5.45	6.76	-	7.50	5.00	5.40	6.17	10.65	-	1.50	3.30	5.15
42	IC095510	5.50	6.20	5.85	7.44	-	5.70	7.00	7.40	6.89	12.33	-	1.30	3.60	5.74
43	IC095516	4.70	6.00	5.35	7.94	-	7.50	5.00	6.10	6.64	9.32	-	1.50	4.50	5.11
44	IC095556	8.20	5.00	6.60	8.06	-	11.50	9.00	8.00	9.14	8.50	-	1.90	3.50	4.63
45	IC120621	5.70	4.00	4.85	5.90	-	6.40	9.00	6.20	6.88	10.32	-	1.50	2.90	4.91
46	IC120649	4.40	4.00	4.20	6.82	-	6.70	5.00	5.60	6.03	10.39	-	0.80	3.90	5.03
47	IC120668	6.40	4.00	5.20	6.64	-	8.70	5.00	6.50	6.71	10.08	-	1.50	4.10	5.23
48	IC120670	5.40	4.00	4.70	6.88	-	7.80	5.00	5.90	6.40	8.87	-	1.40	3.60	4.62
49	IC120689	6.90	5.00	5.95	6.28	-	9.50	4.00	4.70	6.12	8.69	-	1.90	2.70	4.43
50	IC432086	7.10	4.00	5.55	7.24	-	11.20	5.00	6.10	7.39	10.39	-	1.80	3.90	5.36
51	SKGPA-61	6.90	3.00	4.95	9.22	8.58	7.40	4.00	8.50	7.54	14.85	16.05	1.60	4.20	9.17
52	SKGPA-62	-	4.00	4.00	9.78	5.78	-	7.00	7.90	7.61	23.02	11.54	-	2.40	12.32
53	SKGPA-63	-	4.00	4.00	9.80	5.30	-	8.00	6.40	7.38	19.82	11.08	-	5.10	12.00
54	SKGPA-64	6.00	7.00	6.50	6.50	4.26	6.50	7.00	6.40	6.13	11.64	10.47	1.80	3.80	6.93
55	SKGPA-65	4.50	4.00	4.25	6.76	2.96	5.90	4.00	6.90	5.30	15.06	11.20	1.50	2.70	7.61
56	SKGPA-66	7.40	7.00	7.20	9.40	3.20	10.20	8.00	8.40	7.84	16.53	12.36	1.50	3.10	8.37
57	SKGPA-67	4.80	5.00	4.90	7.60	5.45	6.50	5.20	5.70	6.09	16.29	10.72	1.10	2.00	7.53

S.No.	Accession No.	Leaf width (cm)			Petiole length (cm)						Stem thickness (cm)				
		Rahuri	Ranchi	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	S.K. Nagar	Mean
58	SKGPA-68	4.60	3.50	4.05	8.72	6.38	5.30	4.00	7.70	6.42	18.05	13.73	0.90	4.00	9.17
59	SKGPA-69	5.80	5.20	5.50	7.12	7.90	4.30	5.00	6.60	6.18	14.39	21.16	1.00	4.10	10.16
60	SKGPA-70	4.70	5.00	4.85	7.72	5.50	5.30	4.00	6.40	5.78	15.34	9.03	1.60	3.80	7.44
61	SKGPA-71	7.50	4.50	6.00	11.54	9.46	12.10	6.10	7.00	9.24	16.66	15.15	1.80	5.20	9.70
62	SKGPA-72	5.10	5.00	5.05	6.28	6.50	5.80	6.40	7.00	6.40	14.31	18.36	1.50	2.40	9.14
63	SKGPA-73	7.20	5.00	6.10	7.58	5.68	8.50	3.00	7.30	6.41	10.39	12.46	1.20	3.70	6.94
64	SKGPA-74	8.50	6.00	7.25	8.24	9.26	6.70	8.00	6.30	7.70	17.98	19.66	1.70	4.50	10.96
65	SKGPA-75	6.90	5.00	5.95	7.84	7.72	7.20	6.00	5.50	6.85	14.86	11.20	1.40	3.80	7.82
66	SKGPA-76	5.90	6.10	6.00	6.22	7.36	6.80	6.00	4.10	6.10	10.53	13.48	1.50	3.50	7.25
67	SKGPA-77	3.50	7.00	5.25	8.21	4.52	3.20	5.00	6.90	5.57	14.86	12.32	1.40	2.80	7.85
68	SKGPA-78	7.50	6.00	6.75	8.24	6.35	11.80	7.00	3.60	7.40	11.87	17.69	2.10	1.60	8.32
69	SKGPA-79	-	3.00	3.00	5.12	4.88	-	4.00	7.30	5.32	10.59	13.23	-	1.90	8.57
70	SKGPA-80	6.50	7.00	6.75	14.88	11.38	9.50	12.00	12.60	12.07	27.19	15.86	2.20	5.20	12.61
71	SKGPA-81	4.10	3.50	3.80	8.28	5.00	3.50	4.20	3.00	4.80	10.42	16.75	1.00	3.80	7.99
72	SKGPA-82	6.50	4.50	5.50	6.42	5.76	4.50	5.50	3.60	5.16	15.18	12.38	1.00	3.60	8.04
73	SKGPA-83	3.40	4.00	3.70	7.40	5.96	4.50	5.20	2.60	5.13	17.59	12.29	0.90	3.40	8.54
74	SKGPA-84	-	-	-	11.50	8.20	-	-	-	9.85	28.00	26.26	-	-	27.13
75	SKGPA-85	3.70	4.50	4.10	9.38	8.78	3.00	5.00	3.90	6.01	20.07	22.07	1.50	3.20	11.71
76	SKGPA-86	4.00	3.50	3.75	9.68	6.74	4.30	5.10	3.60	5.88	17.09	15.89	1.90	2.90	9.45
77	SKGPA-87	5.10	3.50	4.30	10.10	8.48	5.70	4.50	9.50	7.66	14.62	18.52	1.40	4.00	9.63
78	SKGPA-88	5.40	6.00	5.70	7.76	7.66	6.50	7.00	6.80	7.14	18.88	14.54	1.10	3.90	9.60
79	SKGPA-89	7.10	5.00	6.05	6.78	7.20	6.60	6.00	-	6.65	10.34	17.11	1.80	-	9.75
80	SKGPA-90	-	4.00	4.00	9.48	-	-	5.00	6.10	6.86	14.34	-	-	3.90	9.12
81	SKGPA-91	7.60	6.00	6.80	9.56	6.80	13.30	9.00	6.90	9.11	14.97	15.00	2.70	3.90	9.14
82	SKGPA-92	-	4.00	4.00	8.16	7.20	-	3.00	-	6.12	10.48	18.55	-	-	14.52
83	SKGPA-93	-	6.00	6.00	5.17	-	-	5.00	-	5.09	11.65	-	-	-	11.65
84	SKGPA-94	3.60	-	3.60	7.96	5.10	4.50	-	3.00	5.14	12.23	11.60	1.50	2.60	6.98
85	SKGPA-95	-	6.00	6.00	8.50	6.50	-	6.50	5.40	6.73	29.23	14.50	-	4.20	15.98
86	SKGPA-96	6.90	4.50	5.70	6.60	7.44	7.30	5.00	3.70	6.01	12.21	12.21	1.20	3.20	7.21
87	SKGPA-97	-	5.00	5.00	4.20	5.20	-	3.00	-	4.13	7.09	7.83	-	-	7.46

S.No.	Accession No.	Leaf width (cm)			Petiole length (cm)						Stem thickness (cm)				
		Rahuri	Ranchi	Mean	Akola	Delhi	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Rahuri	S.K. Nagar	Mean
88	SKGPA-98	6.20	5.00	5.60	9.00	5.72	10.20	7.00	4.40	7.26	19.89	15.38	1.90	3.20	10.09
89	SKGPA-99	5.70	7.00	6.35	7.38	5.32	7.50	9.00	5.10	6.86	11.66	19.29	1.70	3.70	9.09
90	SKGPA-100	3.40	4.00	3.70	4.78	7.40	4.50	6.00	5.50	5.64	11.26	18.78	1.20	3.20	8.61
91	SKGPA-101	6.80	4.00	5.40	4.62	6.22	7.40	5.00	5.10	5.67	7.76	14.27	1.40	3.60	6.76
92	SKGPA-102	-	-	-	4.88	-	-	-	-	4.88	11.84	-	-	-	11.84
93	SKGPA-103	6.60	4.00	5.30	5.42	6.52	4.20	4.50	7.00	5.53	4.85	11.56	1.20	4.30	5.48
94	SKGPA-104	4.60	4.00	4.30	4.44	5.02	5.30	5.00	5.40	5.03	12.61	13.64	1.50	5.00	8.19
95	SKGPA-105	3.80	6.00	4.90	8.04	4.52	4.30	7.00	7.00	6.17	18.80	11.88	1.80	4.20	9.17
96	SKGPA-106	5.40	6.00	5.70	10.48	3.45	4.60	9.00	3.10	6.13	7.87	9.48	1.30	3.90	5.64
97	SKGPA-107	-	8.00	8.00	-	6.20	-	9.00	-	7.60	-	11.34	-	-	11.34
98	SKGPA-108	6.40	3.00	4.70	7.76	4.70	5.20	4.00	-	5.42	8.09	10.95	1.70	-	6.91
99	SKGPA-109	7.90	-	7.90	5.72	6.75	4.30	-	9.00	6.44	9.45	13.31	1.40	3.60	6.94
100	SKGPA-110	7.90	3.50	5.70	6.16	8.26	10.00	4.00	6.90	7.06	7.50	12.83	2.10	3.80	6.56
Mean for check variety															
	BGA-2 (C)	7.36	5.00	6.18	-	7.84	8.76	8.30	7.93	8.21	-	16.29	1.94	4.80	7.68
	GA-1 (C)	5.26	-	5.26	-	8.04	8.14	-	8.82	8.33	-	13.51	1.74	4.77	6.67
	GA-2 (C)	7.26	6.00	6.63	8.48	8.74	10.64	9.00	9.71	9.31	13.86	16.47	1.98	4.91	9.31
	Suvarna (C)	7.68	5.42	6.55	9.18	5.83	9.74	7.60	9.59	8.39	13.65	15.08	1.76	5.17	8.92
	Minimum	2.70	2.00	3.00	4.20	2.96	3.00	2.00	2.60	4.13	4.52	7.83	0.80	1.60	3.14
	Maximum	8.50	8.00	8.00	14.88	11.38	13.30	12.00	12.60	12.07	29.23	26.26	2.70	5.50	27.13
	Mean	5.56	4.72	5.12	7.51	6.49	7.03	5.70	6.62	6.68	12.55	14.44	1.48	3.64	7.34
	CD(0.05)	4.47	-	-	-	-	7.30	-	1.54	-	-	-	1.19	0.45	-
	CV(%) Error	24.32	-	-	-	-	29.35	-	18.59	-	-	-	24.12	10.09	-
	CV(%) Phenotypic	24.74	25.53	-	20.94	26.24	33.35	30.78	26.33	-	35.32	24.95	25.53	22.18	-

S.No.	Accession No.	Lateral spikelet length (cm)					Seed yield per plant (g)								
		Akola	Delhi	Rahuri	S.K. Nagar	Mean	Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean
1	IC021803-A	5.48	-	19.20	18.90	14.53	10.40	3.63	-	-	11.30	6.50	28.60	15.00	12.57
2	IC021937	13.98	-	31.00	23.40	22.79	18.16	4.21	-	-	21.40	22.00	30.20	32.00	21.33
3	IC021938	10.60	-	21.50	19.80	17.30	8.64	4.53	-	-	25.50	11.50	22.00	15.00	14.53
4	IC032186	17.76	-	25.20	14.60	19.19	11.92	4.84	-	-	17.50	12.50	15.10	8.00	11.64
5	IC032190	12.14	-	18.60	19.20	16.65	5.26	5.18	-	-	-	14.00	21.30	20.00	13.15
6	IC032193	5.40	-	25.60	11.70	14.23	15.60	7.80	-	-	21.20	20.00	20.10	11.00	15.95
7	IC032195	9.30	-	20.30	18.00	15.87	9.97	4.70	-	-	13.20	13.00	22.60	16.00	13.25
8	IC035404	6.68	-	15.30	19.60	13.86	11.26	5.94	-	-	26.30	21.00	14.10	22.00	16.77
9	IC035415	8.80	-	20.50	18.10	15.80	6.80	7.58	-	-	22.80	12.00	23.90	19.00	15.35
10	IC035615	6.58	-	19.20	24.30	16.69	5.62	3.35	-	-	18.90	21.00	15.50	15.00	13.23
11	IC035633	17.50	-	14.50	14.50	15.50	9.39	4.51	-	-	25.70	1.00	18.20	20.00	13.13
12	IC035635	14.90	-	30.50	29.80	25.07	6.37	6.67	-	-	16.70	22.00	21.30	19.60	15.44
13	IC035638	11.36	-	20.10	16.10	15.85	4.97	8.16	-	-	20.50	18.00	23.30	9.00	13.99
14	IC035642	11.80	-	29.00	32.70	24.50	6.42	6.67	-	-	-	16.00	18.30	17.20	12.92
15	IC035651	11.52	-	18.50	28.40	19.47	5.83	9.52	-	-	-	24.00	27.40	20.80	17.51
16	IC035661	9.10	-	18.80	16.00	14.63	6.50	5.44	-	-	14.30	23.00	22.50	5.60	12.89
17	IC035665	12.92	-	22.00	26.50	20.47	10.89	8.51	-	-	13.60	10.00	16.50	13.60	12.18
18	IC035701	6.38	-	21.60	30.90	19.63	8.89	4.43	-	-	13.60	21.00	12.80	14.00	12.45
19	IC035702	9.38	-	19.10	20.10	16.19	7.26	8.80	-	-	15.20	11.00	19.40	13.00	12.44
20	IC035711	7.68	-	14.20	15.90	12.59	72.28	8.23	-	-	-	7.00	22.30	12.00	24.36
21	IC035713	9.40	-	29.50	17.80	18.90	7.68	6.79	-	-	-	6.50	32.50	14.00	13.49
22	IC035716	12.14	-	23.60	28.80	21.51	8.93	8.34	-	-	22.10	3.00	14.50	8.00	10.81
23	IC035717	10.82	-	27.80	26.60	21.74	13.45	-	-	-	-	14.00	24.80	6.00	14.56
24	IC035719	11.36	-	19.20	17.30	15.95	12.36	8.54	-	-	-	4.50	11.80	15.00	10.44
25	IC035735	7.60	-	17.10	17.10	13.93	10.53	7.71	-	-	-	11.00	31.60	15.60	15.29
26	IC035742	6.82	-	28.70	16.30	17.27	6.61	8.52	-	-	-	6.50	25.20	12.40	11.85
27	IC081698-B	16.68	-	21.50	17.60	18.59	7.58	8.53	-	-	20.00	18.00	21.60	15.00	15.12

S.No.	Accession No.	Lateral spikelet length (cm)					Seed yield per plant (g)									
		Akola	Delhi	Rahuri	S.K. Nagar	Mean	Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	
28	IC094654	11.10	-	17.30	24.30	17.57	13.24	6.68	-	-	-	7.00	17.80	12.60	11.46	
29	IC094661	9.66	-	30.50	22.50	20.89	13.17	5.46	-	-	-	15.00	34.00	12.00	15.93	
30	IC095204	10.34	-	19.60	23.90	17.95	8.91	7.72	-	-	21.40	12.00	25.40	8.00	13.91	
31	IC095244	10.34	-	28.50	18.10	18.98	7.76	5.59	-	-	-	10.00	22.40	12.00	11.55	
32	IC095248	9.70	-	39.10	19.00	22.60	8.52	4.02	-	-	6.50	14.00	29.50	6.60	11.52	
33	IC095251	8.82	-	21.40	19.10	16.44	10.09	4.77	-	-	13.30	10.00	13.70	10.20	10.34	
34	IC095371	5.70	-	25.50	25.70	18.97	14.12	6.88	-	-	16.00	21.00	26.80	10.00	15.80	
35	IC095382-B	10.12	-	15.60	19.20	14.97	10.18	5.23	-	-	12.30	15.00	18.70	10.00	11.90	
36	IC095383	11.94	-	19.80	17.50	16.41	24.60	5.81	-	-	14.30	9.50	16.00	7.00	12.87	
37	IC095389	9.22	-	14.20	18.60	14.01	5.47	6.65	-	-	26.70	22.50	27.40	13.00	16.95	
38	IC095391	13.18	-	15.40	27.10	18.56	6.61	8.32	-	-	10.70	12.50	18.50	10.00	11.11	
39	IC095406	9.80	-	24.50	23.10	19.13	7.28	3.66	-	-	16.70	5.80	26.40	16.00	12.64	
40	IC095430	8.42	-	17.10	19.30	14.94	7.97	7.68	-	-	28.10	19.00	22.30	17.00	17.01	
41	IC095498	9.20	-	20.00	15.60	14.93	9.92	-	-	-	15.80	3.00	9.80	8.00	9.30	
42	IC095510	10.94	-	16.60	31.30	19.61	6.42	-	-	-	16.70	8.00	24.70	14.00	13.96	
43	IC095516	12.46	-	22.50	14.20	16.39	8.21	5.98	-	-	15.00	15.00	29.80	9.00	13.83	
44	IC095556	11.82	-	24.50	17.00	17.77	11.68	7.74	-	-	10.70	23.00	21.00	6.00	13.35	
45	IC120621	9.90	-	27.40	22.70	20.00	8.78	9.84	-	-	-	9.50	25.50	12.00	13.12	
46	IC120649	13.16	-	28.50	17.70	19.79	5.08	6.74	-	-	12.90	15.00	14.00	19.00	12.12	
47	IC120668	8.20	-	23.10	15.80	15.70	8.46	8.26	-	-	-	6.00	23.00	10.00	11.14	
48	IC120670	11.72	-	21.10	19.50	17.44	11.75	9.01	-	-	-	11.80	17.00	13.00	12.51	
49	IC120689	8.58	-	31.50	17.80	19.29	7.01	4.13	-	-	16.40	4.00	30.40	7.00	11.49	
50	IC432086	3.78	-	35.00	30.30	23.03	8.22	5.21	-	-	20.00	11.50	27.00	15.00	14.49	
51	SKGPA-61	7.24	8.68	10.60	18.40	11.23	2.52	9.20	56.00	12.20	7.80	5.00	15.60	32.20	17.57	
52	SKGPA-62	7.64	3.93	-	18.40	9.99	14.32	5.31	5.67	8.60	17.30	-	19.40	22.00	13.23	
53	SKGPA-63	4.06	2.10	-	13.70	6.62	7.03	-	0.36	8.20	10.90	-	26.00	13.00	10.91	
54	SKGPA-64	17.10	7.50	15.10	14.20	13.48	17.90	9.60	1.56	9.50	12.50	4.00	24.60	9.00	11.08	
55	SKGPA-65	15.90	5.18	17.00	18.90	14.25	10.85	3.91	14.00	15.00	13.20	5.20	18.40	5.00	10.70	
56	SKGPA-66	21.86	8.50	13.50	20.80	16.17	14.06	6.91	0.67	8.00	18.20	3.50	17.00	13.00	10.17	
57	SKGPA-67	20.86	10.00	42.00	22.20	23.77	8.59	8.63	2.14	15.60	9.00	3.00	22.00	7.00	9.50	

S.No.	Accession No.	Lateral spikelet length (cm)					Seed yield per plant (g)									
		Akola	Delhi	Rahuri	S.K. Nagar	Mean	Akola	Bhubneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	
58	SKGPA-68	14.14	6.58	13.00	18.10	12.96	21.02	10.21	8.00	12.20	16.70	4.00	19.50	15.00	13.33	
59	SKGPA-69	15.52	6.20	21.50	15.80	14.76	8.39	-	6.38	17.00	14.30	1.00	11.50	11.00	9.94	
60	SKGPA-70	12.94	4.40	16.60	19.10	13.26	15.26	9.88	1.70	11.20	15.40	2.00	16.40	12.00	10.48	
61	SKGPA-71	3.52	5.30	16.50	14.80	10.03	6.85	7.49	0.16	-	5.00	10.00	15.90	12.40	8.26	
62	SKGPA-72	9.64	8.50	21.00	17.90	14.26	15.32	-	2.40	-	12.00	11.20	27.80	8.00	12.79	
63	SKGPA-73	14.62	8.02	16.00	17.80	14.11	8.95	5.11	37.33	-	14.30	9.50	26.50	18.00	17.10	
64	SKGPA-74	4.26	5.06	6.50	12.90	7.18	4.19	8.01	5.30	-	7.10	1.70	17.80	5.60	7.10	
65	SKGPA-75	13.54	10.00	16.20	15.30	13.76	12.46	8.79	21.25	-	11.10	3.00	13.20	16.00	12.26	
66	SKGPA-76	9.22	11.70	18.30	17.10	14.08	5.66	7.92	19.93	-	8.10	3.70	14.00	9.00	9.76	
67	SKGPA-77	12.56	8.08	20.50	14.60	13.94	18.48	-	2.17	-	10.40	1.50	18.60	12.00	10.52	
68	SKGPA-78	15.14	9.07	19.10	8.00	12.83	19.24	8.70	7.22	-	27.30	2.00	24.20	20.00	15.52	
69	SKGPA-79	17.14	7.53	-	22.60	15.76	7.63	-	1.67	-	7.10	-	21.00	9.00	9.28	
70	SKGPA-80	6.82	5.96	23.70	22.70	14.80	8.90	8.54	10.25	-	9.00	8.00	28.50	19.00	13.17	
71	SKGPA-81	20.64	8.62	10.60	31.70	17.89	18.11	6.88	28.00	15.50	10.00	2.50	22.10	11.00	14.26	
72	SKGPA-82	23.56	9.18	23.00	36.20	22.99	12.98	7.32	8.75	12.50	16.50	2.00	18.90	23.00	12.74	
73	SKGPA-83	16.50	11.78	11.30	44.40	21.00	8.90	9.64	4.89	16.00	16.70	3.00	15.90	14.00	11.13	
74	SKGPA-84	13.20	12.50	-	-	12.85	18.36	-	23.75	15.40	-	-	-	-	19.17	
75	SKGPA-85	17.62	10.64	29.90	45.20	25.84	17.28	7.83	21.91	15.50	24.00	11.00	19.20	14.00	16.34	
76	SKGPA-86	17.54	11.48	24.00	33.80	21.71	19.24	10.87	-	9.50	14.30	1.50	18.50	15.00	12.70	
77	SKGPA-87	5.78	10.05	7.00	40.00	15.71	13.29	8.66	15.00	10.00	14.30	1.50	15.90	29.00	13.46	
78	SKGPA-88	12.00	13.32	9.50	36.10	17.73	24.68	-	49.40	13.50	14.30	12.00	28.30	10.00	21.74	
79	SKGPA-89	12.26	14.04	25.00	-	17.10	23.64	-	-	12.20	10.00	6.00	20.50	-	14.47	
80	SKGPA-90	16.52	-	-	32.70	24.61	13.58	-	-	15.00	10.30	-	19.20	5.80	12.78	
81	SKGPA-91	10.00	7.70	28.20	24.50	17.60	20.36	8.94	220.00	10.20	17.10	2.00	18.90	12.40	38.74	
82	SKGPA-92	9.12	10.50	-	-	9.81	9.52	-	43.00	20.00	-	-	20.30	-	23.21	
83	SKGPA-93	11.46	-	-	-	11.46	17.12	-	-	8.20	-	-	22.30	-	15.87	
84	SKGPA-94	24.32	14.50	20.10	29.30	22.06	7.78	-	36.00	15.00	14.30	3.50	-	15.00	15.26	
85	SKGPA-95	2.10	15.30	-	33.90	17.10	16.07	-	6.75	12.50	-	-	11.10	28.00	14.88	
86	SKGPA-96	21.96	14.08	18.80	46.60	25.36	10.26	6.48	43.40	16.00	14.80	11.50	14.40	16.00	16.61	
87	SKGPA-97	8.42	8.50	-	-	8.46	4.90	-	1.00	11.50	-	-	13.40	-	7.70	

S.No.	Accession No.	Lateral spikelet length (cm)					Seed yield per plant (g)									
		Akola	Delhi	Rahuri	S.K. Nagar	Mean	Akola	Bhubsneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	
88	SKGPA-98	12.58	6.45	26.80	20.30	16.53	21.74	10.97	4.36	-	22.10	10.00	27.20	10.80	15.31	
89	SKGPA-99	19.98	12.28	23.50	39.00	23.69	8.12	9.99	-	15.50	7.10	5.00	21.50	7.20	10.63	
90	SKGPA-100	17.56	17.50	20.50	39.40	23.74	5.58	6.71	4.53	10.20	9.00	2.00	16.50	2.40	7.11	
91	SKGPA-101	11.88	8.16	25.20	36.00	20.31	5.76	8.36	41.00	12.60	8.00	10.00	30.40	10.00	15.77	
92	SKGPA-102	11.84	-	-	-	11.84	7.96	-	-	11.00	10.00	-	-	-	9.65	
93	SKGPA-103	11.06	16.62	9.20	40.10	19.25	7.09	8.61	5.50	14.00	12.70	2.20	15.30	15.00	10.05	
94	SKGPA-104	10.68	9.66	15.20	28.30	15.96	3.12	3.95	0.68	14.00	7.10	1.50	22.50	10.00	7.86	
95	SKGPA-105	6.44	6.48	20.50	40.30	18.43	1.72	7.48	37.75	12.50	7.80	1.00	28.40	14.00	13.83	
96	SKGPA-106	10.40	10.23	19.10	39.20	19.73	3.72	9.82	30.00	-	11.40	3.50	33.40	20.00	15.98	
97	SKGPA-107	-	5.50	-	-	5.50	-	-	12.00	13.50	-	-	9.50	-	11.67	
98	SKGPA-108	8.10	5.50	27.40	-	13.67	6.18	-	1.25	10.60	15.00	3.20	14.60	-	8.47	
99	SKGPA-109	2.40	7.63	19.00	18.50	11.88	2.65	10.26	3.94	10.80	13.50	2.00	-	11.00	7.74	
100	SKGPA-110	8.88	13.46	23.50	19.00	16.21	2.80	7.33	5.17	11.60	8.20	1.00	18.80	9.00	7.99	
Mean for check variety																
	BGA-2 (C)	-	5.27	14.60	17.04	12.31	-	7.60	37.87	13.23	10.03	14.92	20.60	9.60	16.26	
	GA-1 (C)	-	8.81	16.38	20.49	15.23	-	5.18	189.68	13.33	17.60	12.58	-	11.78	41.69	
	GA-2 (C)	4.54	9.36	26.48	24.36	16.18	8.45	5.60	194.97	9.78	14.28	12.46	23.30	15.60	35.55	
	Suvarna (C)	4.79	4.47	10.96	16.13	9.09	5.84	6.86	10.64	12.70	8.43	13.48	21.56	11.10	11.33	
	Minimum	2.10	2.10	6.50	8.00	5.50	1.72	3.35	0.16	8.00	5.00	1.00	9.50	2.40	7.10	
	Maximum	24.32	17.50	42.00	46.60	25.84	72.28	10.97	220.00	20.00	28.10	24.00	34.00	32.20	41.69	
	Mean	11.29	9.06	20.90	23.07	16.73	10.96	7.14	26.78	12.65	14.68	9.46	21.00	13.33	13.90	
	CD(0.05)	-	-	12.63	2.70	-	-	1.72	-	3.73	8.69	0.94	-	3.18	-	
	CV(%) Error	-	-	27.65	15.12	-	-	10.23	-	11.41	30.18	2.62	-	28.84	-	
	CV(%) Phenotypic	41.33	37.89	31.34	36.64	-	73.19	26.94	180.15	21.34	37.04	69.62	26.92	42.00	-	

S.No.	Accession No.	Seed volume weight (g/10 ml)							100 seed weight (g)			Straw weight per plant (g)
		Bhubsneswar	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Mean	S.K. Nagar
1	IC021803-A	7.78	-	5.44	8.21	10.48	8.18	8.02	0.56	-	0.56	35.00
2	IC021937	7.71	-	5.15	7.44	9.45	8.15	7.58	0.56	-	0.56	78.00
3	IC021938	7.82	-	5.13	8.53	9.85	8.12	7.89	0.52	-	0.52	71.00
4	IC032186	7.56	-	5.07	8.08	9.80	8.24	7.75	0.52	-	0.52	31.00
5	IC032190	7.97	-	-	8.15	9.50	8.18	8.45	0.52	-	0.52	76.00
6	IC032193	7.51	-	4.93	8.05	10.30	7.92	7.74	0.56	-	0.56	15.00
7	IC032195	7.48	-	4.80	8.04	9.97	8.09	7.67	0.54	-	0.54	32.00
8	IC035404	7.30	-	5.46	8.84	10.00	8.05	7.93	0.44	-	0.44	54.00
9	IC035415	7.92	-	4.46	7.88	9.36	8.20	7.56	0.60	-	0.60	41.00
10	IC035615	7.78	-	5.53	7.22	9.27	8.11	7.58	0.58	-	0.58	73.00
11	IC035633	7.50	-	5.60	7.65	9.62	8.12	7.70	0.56	-	0.56	70.00
12	IC035635	7.37	-	4.68	7.97	9.48	7.87	7.47	0.52	-	0.52	43.40
13	IC035638	7.96	-	6.01	8.02	10.10	8.08	8.03	0.52	-	0.52	50.00
14	IC035642	7.64	-	-	7.61	10.46	8.18	8.47	0.72	-	0.72	32.80
15	IC035651	7.46	-	-	7.90	10.03	7.94	8.33	0.74	-	0.74	42.20
16	IC035661	7.82	-	5.45	8.21	10.10	8.29	7.97	0.60	-	0.60	13.40
17	IC035665	8.12	-	5.10	7.90	9.74	8.19	7.81	0.56	-	0.56	26.40
18	IC035701	7.83	-	5.38	7.06	9.27	7.99	7.51	0.68	-	0.68	56.00
19	IC035702	7.88	-	4.93	7.91	9.48	8.29	7.70	0.58	-	0.58	43.00
20	IC035711	7.74	-	-	8.02	9.73	8.14	8.41	0.48	-	0.48	31.00
21	IC035713	7.91	-	-	8.28	10.08	8.17	8.61	0.72	-	0.72	63.00
22	IC035716	7.92	-	5.32	8.27	9.38	8.27	7.83	0.50	-	0.50	36.00
23	IC035717	-	-	-	7.75	9.90	7.96	8.54	0.62	-	0.62	16.00
24	IC035719	7.78	-	-	7.31	9.96	8.24	8.32	0.68	-	0.68	22.00
25	IC035735	7.62	-	-	7.35	10.08	7.87	8.23	0.52	-	0.52	52.40
26	IC035742	8.28	-	-	8.11	9.90	7.98	8.57	0.56	-	0.56	50.60
27	IC081698-B	7.17	-	5.23	7.65	9.62	8.20	7.58	0.66	-	0.66	42.00

S.No.	Accession No.	Seed volume weight (g/10 ml)							100 seed weight (g)			Straw weight per plant (g)
		Bhubsneswar	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Mean	S.K. Nagar
28	IC094654	7.50	-	-	7.31	9.92	7.91	8.16	0.68	-	0.68	55.40
29	IC094661	7.94	-	-	8.14	9.60	8.21	8.47	0.62	-	0.62	38.00
30	IC095204	7.92	-	5.20	8.10	9.66	8.27	7.83	0.70	-	0.70	32.00
31	IC095244	7.88	-	-	7.53	10.42	8.16	8.50	0.52	-	0.52	25.00
32	IC095248	7.84	-	5.22	8.25	9.78	7.99	7.82	0.64	-	0.64	36.40
33	IC095251	7.74	-	5.31	8.31	9.64	8.70	7.94	0.56	-	0.56	51.60
34	IC095371	7.58	-	5.44	8.32	9.89	8.13	7.87	0.64	-	0.64	50.00
35	IC095382-B	7.65	-	5.14	7.43	9.80	8.22	7.65	0.60	-	0.60	66.00
36	IC095383	8.09	-	5.11	6.73	9.60	8.25	7.55	0.56	-	0.56	49.00
37	IC095389	8.11	-	5.21	6.96	9.26	8.13	7.53	0.54	-	0.54	57.00
38	IC095391	7.68	-	4.77	8.06	9.50	8.10	7.62	0.50	-	0.50	50.60
39	IC095406	8.13	-	4.98	7.74	9.82	8.30	7.79	0.52	-	0.52	85.00
40	IC095430	8.13	-	5.06	8.02	9.68	8.17	7.81	0.48	-	0.48	61.00
41	IC095498	-	-	5.63	7.51	9.80	8.24	7.79	0.50	-	0.50	50.00
42	IC095510	-	-	5.47	7.80	9.86	8.26	7.85	0.58	-	0.58	55.00
43	IC095516	8.15	-	5.57	7.50	10.10	8.27	7.92	0.56	-	0.56	47.00
44	IC095556	8.03	-	5.44	8.26	10.05	7.99	7.95	0.58	-	0.58	33.00
45	IC120621	7.88	-	-	7.66	9.92	7.89	8.34	0.66	-	0.66	71.00
46	IC120649	8.22	-	5.36	7.46	9.95	8.21	7.84	0.62	-	0.62	63.20
47	IC120668	7.49	-	-	7.99	9.55	8.12	8.29	0.56	-	0.56	70.00
48	IC120670	7.86	-	-	7.75	10.40	7.22	8.31	0.70	-	0.70	43.00
49	IC120689	8.32	-	6.32	8.92	10.26	8.14	8.39	0.62	-	0.62	43.00
50	IC432086	8.10	-	5.64	8.04	9.84	8.11	7.95	0.56	-	0.56	26.00
51	SKGPA-61	8.04	7.50	5.03	8.14	9.20	8.28	7.70	0.60	0.89	0.75	58.00
52	SKGPA-62	8.30	8.10	4.98	-	9.50	8.21	7.82	0.54	0.76	0.65	78.40
53	SKGPA-63	-	8.00	4.92	-	9.02	7.98	7.48	0.62	0.72	0.67	74.20
54	SKGPA-64	8.14	8.10	5.28	8.14	10.28	8.22	8.03	0.58	0.93	0.76	21.80
55	SKGPA-65	7.97	7.90	5.20	7.01	9.84	8.17	7.68	0.72	0.83	0.78	20.20
56	SKGPA-66	7.80	9.10	4.95	7.15	10.10	8.25	7.89	0.74	0.75	0.75	37.00
57	SKGPA-67	8.06	8.60	4.45	8.33	9.75	7.95	7.86	0.64	0.77	0.71	19.00

S.No.	Accession No.	Seed volume weight (g/10 ml)							100 seed weight (g)			Straw weight per plant (g)
		Bhubsneswar	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Mean	S.K. Nagar
58	SKGPA-68	7.72	7.90	4.71	8.02	9.40	8.08	7.64	0.56	0.78	0.67	87.00
59	SKGPA-69	-	8.20	5.38	7.12	9.72	8.02	7.69	0.60	0.79	0.70	69.00
60	SKGPA-70	8.01	7.90	5.40	6.59	9.82	8.09	7.63	0.66	0.84	0.75	46.00
61	SKGPA-71	7.10	-	5.00	6.98	8.10	7.89	7.01	0.56	0.75	0.66	59.20
62	SKGPA-72	-	-	5.34	7.68	9.45	7.95	7.61	0.58	0.76	0.67	49.60
63	SKGPA-73	6.13	-	5.49	7.97	9.67	8.10	7.47	0.56	0.77	0.67	60.00
64	SKGPA-74	6.28	-	4.77	7.39	9.95	7.76	7.23	0.48	0.79	0.64	36.40
65	SKGPA-75	6.85	-	5.23	7.71	9.64	7.99	7.48	0.60	0.73	0.67	46.00
66	SKGPA-76	6.08	-	5.30	6.98	9.20	8.06	7.12	0.40	0.85	0.63	27.00
67	SKGPA-77	-	-	4.07	7.59	9.80	7.98	7.36	0.56	0.87	0.72	36.00
68	SKGPA-78	6.11	-	5.13	7.36	9.43	8.08	7.22	0.62	0.76	0.69	30.00
69	SKGPA-79	-	-	5.19	-	10.26	8.18	7.88	0.60	0.78	0.69	18.60
70	SKGPA-80	6.08	-	5.19	7.34	9.07	7.98	7.13	0.58	0.72	0.65	83.00
71	SKGPA-81	6.25	7.80	5.68	7.62	7.10	7.86	7.05	0.64	0.78	0.71	10.60
72	SKGPA-82	6.37	8.00	5.09	8.03	8.10	8.16	7.29	0.70	0.95	0.83	23.00
73	SKGPA-83	7.76	7.90	5.28	7.68	7.60	7.95	7.36	0.66	0.92	0.79	33.60
74	SKGPA-84	-	7.80	-	-	-	-	7.80	0.72	0.74	0.73	-
75	SKGPA-85	8.62	7.50	5.46	7.71	8.20	8.08	7.60	0.64	0.92	0.78	26.00
76	SKGPA-86	7.59	7.90	5.04	6.95	7.60	8.04	7.19	0.68	0.70	0.69	27.20
77	SKGPA-87	6.55	7.80	5.20	7.55	7.40	7.86	7.06	0.56	0.78	0.67	67.00
78	SKGPA-88	-	8.00	4.40	7.82	9.00	8.13	7.47	0.68	0.91	0.80	66.00
79	SKGPA-89	-	7.40	4.99	7.04	9.62	-	7.26	0.72	0.75	0.74	-
80	SKGPA-90	-	7.80	5.31	-	7.50	7.98	7.15	0.64	-	0.64	52.20
81	SKGPA-91	6.34	8.40	5.50	7.60	9.58	8.27	7.62	0.56	0.83	0.70	49.60
82	SKGPA-92	-	7.70	-	-	9.75	-	8.73	0.72	0.76	0.74	-
83	SKGPA-93	-	7.80	-	-	9.92	-	8.86	0.76	-	0.76	-
84	SKGPA-94	-	7.70	4.81	8.09	-	8.17	7.19	0.74	0.76	0.75	55.00
85	SKGPA-95	-	8.10	-	-	7.80	8.17	8.02	0.60	0.81	0.71	82.00
86	SKGPA-96	6.42	7.90	5.38	7.75	6.90	8.25	7.10	0.72	0.82	0.77	52.00
87	SKGPA-97	-	8.00	-	-	9.58	-	8.79	0.66	0.69	0.68	-

S.No.	Accession No.	Seed volume weight (g/10 ml)							100 seed weight (g)			Straw weight per plant (g)
		Bhubsneswar	Faizabad	Mandor	Rahuri	Ranchi	S.K. Nagar	Mean	Akola	Delhi	Mean	S.K. Nagar
88	SKGPA-98	6.28	-	5.03	7.12	9.20	7.98	7.12	0.64	0.83	0.74	117.20
89	SKGPA-99	7.81	7.90	5.52	7.90	9.85	7.95	7.82	0.60	0.72	0.66	62.80
90	SKGPA-100	7.25	7.80	4.49	7.66	9.76	7.98	7.49	0.78	0.80	0.79	17.60
91	SKGPA-101	8.56	7.80	5.05	6.09	9.50	8.17	7.53	0.70	0.88	0.79	26.00
92	SKGPA-102	-	8.00	4.42	-	-	-	6.21	0.64	-	0.64	-
93	SKGPA-103	7.12	7.50	5.06	4.07	7.60	8.28	6.60	0.76	0.97	0.87	47.00
94	SKGPA-104	8.38	8.10	4.31	7.43	10.00	7.96	7.70	0.44	0.79	0.62	46.00
95	SKGPA-105	7.98	7.90	5.50	7.54	8.00	8.28	7.53	0.36	0.77	0.57	46.00
96	SKGPA-106	7.15	-	4.09	7.99	9.98	8.25	7.49	0.60	0.89	0.75	36.00
97	SKGPA-107	-	8.20	-	-	10.00	-	9.10	-	0.83	0.83	-
98	SKGPA-108	-	8.30	5.32	7.63	9.83	-	7.77	0.58	0.72	0.65	-
99	SKGPA-109	7.85	9.30	4.76	7.55	-	7.88	7.47	0.52	0.77	0.65	91.00
100	SKGPA-110	8.44	7.90	4.77	7.85	6.70	7.98	7.27	0.68	0.71	0.70	27.00
Mean for check variety												
	BGA-2 (C)	8.08	8.13	5.17	7.20	6.10	7.98	7.11	-	0.80	0.80	46.50
	GA-1 (C)	7.63	7.98	5.31	8.54	-	8.15	7.52	-	0.80	0.80	70.20
	GA-2 (C)	7.92	7.98	5.29	7.76	9.12	8.19	7.71	0.52	0.81	0.66	72.68
	Suvarna (C)	7.89	7.93	5.05	6.91	8.18	7.99	7.33	0.50	0.75	0.63	46.04
	Minimum	6.08	7.40	4.07	4.07	6.10	7.22	6.21	0.36	0.69	0.44	10.60
	Maximum	8.62	9.30	6.32	8.92	10.48	8.70	9.10	0.78	0.97	0.87	117.20
	Mean	7.62	7.99	5.14	7.67	9.41	8.10	7.75	0.60	0.80	0.65	47.99
	CD(0.05)	0.33	0.27	0.67	0.23	-	0.16	-	-	-	-	12.87
	CV(%) Error	1.59	1.25	5.65	1.13	-	2.11	-	-	-	-	23.85
	CV(%) Phenotypic	8.16	4.50	7.48	8.02	9.45	2.09	-	13.85	8.55	-	42.39

Table 98. Promising lines in grain amaranth germplasm (Kharif, 2012) for various characters at different locations (Plains)

S. No.	Characters	Range	Promising lines	Value of best check
Bangalore (Accessions 105)				
1.	Days to 50% flowering	30.00-44.00	IC035642, SKGPA-83, SKGPA-89, SKGPA-92, SKGPA-106, SKGPA-67, IC035635, IC094654, IC094661, SKGPA-87, SKGPA-97, SKGPA-100, SKGPA-103, SKGPA-110, IC035661, IC035702, IC120621, IC120649, IC120670, SKGPA-61, SKGPA-70, SKGPA-75, SKGPA-84, SKGPA-88, SKGPA-93, SKGPA-101, SKGPA-107, SKGPA-108, IC021938, IC081698-B, SKGPA-78, SKGPA-81, IC021937, IC032186, IC032190, IC035665, IC035713, IC035716, IC035717, IC035735, IC035742, IC095244, IC095248, IC095382-B, IC095389, IC095406, IC095430, IC095498, IC095510, IC120689, KBGA-3, SKGPA-62, SKGPA-69, SKGPA-94, IC035701, SKGPA-90, SKGPA-91, SKGPA-95, SKGPA-96, SKGPA-99, SKGPA-102, SKGPA-109, IC035370, IC035711, IC095251, IC095383, IC095391, SKGPA-63, SKGPA-65, IC035404, IC095371, IC095516, SKGPA-73, SKGPA-76, IC021803-A, IC032193, IC032195, IC035415, IC035651, IC095204, IC095556, IC120668, SKGPA-64, SKGPA-72, SKGPA-85, SKGPA-86, KBGA-2, MGA-10, SKGPA-66, SKGPA-74, SKGPA-77, SKGPA-80, SKGPA-98, SKGPA-104, SKGPA-105, VL-344 (<41.50 days)	Suvarna (42.00 days)
2.	Days to maturity	83.00-100.00	IC035713, IC081698-B, IC035702, IC035742, IC094654, SKGPA-97, SKGPA-110, IC035711, SKGPA-106, IC035661, IC035735, IC094661, IC035370, IC035404, IC095516, SKGPA-63, SKGPA-70, SKGPA-75, SKGPA-87, SKGPA-92, SKGPA-96, SKGPA-109 (<86.50 days)	KBGA-1 (87.00 days)
3.	Plant height (cm)	85.00-165.00	SKGPA-66, SKGPA-65, SKGPA-81, SKGPA-84, SKGPA-83, IC035415, IC035713, SKGPA-67, SKGPA-80, SKGPA-104, IC035701, SKGPA-108, SKGPA-90, IC032190, IC035711, IC095251, SKGPA-61 (>139.50 cm)	Suvarna (138.80 cm)
4.	Leaf length (cm)	8.50-33.00	SKGPA-63, IC035633, IC095383, IC035615, IC035735, IC095382-B, IC095389, IC035742, IC021938, IC035665, IC095371, SKGPA-62, SKGPA-79, SKGPA-93, IC035711, SKGPA-88 (>20.50 cm)	Suvarna (20.80 cm)
5.	Leaf width (cm)	2.30-7.50	IC035415, IC095430, SKGPA-105, SKGPA-84, SKGPA-103, SKGPA-87, IC035665, IC095382-B, SKGPA-71, SKGPA-74, SKGPA-77, SKGPA-83, SKGPA-92, VL-344, IC021937, IC035638, IC035735, IC095498,	GA-2 (5.44 cm)

S. No.	Characters	Range	Promising lines	Value of best check
			IC120621, IC094661, SKGPA-110, , IC035651, IC035661, KBGA-2, KBGA-3, SKGPA-69, SKGPA-76, SKGPA-85, SKGPA-98, SKGPA-64 (>5.00 cm)	
6.	Petiole length (cm)	0.90-12.20	IC021803-A, IC035735, IC035633, SKGPA-98, IC035713, IC035665, KBGA-3, SKGPA-84, IC035638, IC035661, IC035370, IC094661, IC120670, SKGPA-79, SKGPA-75, SKGPA-100, SKGPA-61, SKGPA-68, IC095204, IC095382-B, IC035415, IC035701, IC095391, IC095498, IC120649, SKGPA-62, SKGPA-74, SKGPA-83, IC095430, IC094654, IC095383, IC095556, SKGPA-91, IC035615, IC035635, SKGPA-85, IC021937, IC095371, SKGPA-65, SKGPA-80, SKGPA-66, IC035404, KBGA-2 (>5.50 cm)	GA-2 (5.86 cm)
7.	Inflorescence length (cm)	32.00-68.00	SKGPA-64, SKGPA-68, SKGPA-66, IC035719, IC035735, IC095383, SKGPA-70, SKGPA-108, SKGPA-65, SKGPA-80, SKGPA-87, SKGPA-91, IC032186, IC035415, SKGPA-63, SKGPA-67, SKGPA-74, SKGPA-86, SKGPA-95, SKGPA-99, SKGPA-103 (>55.50 cm)	BGA-2 (55.60 cm)
8.	Stem thickness (mm)	1.25-3.80	IC035742, SKGPA-100, IC032193, IC095391, SKGPA-88, SKGPA-91, SKGPA-108, IC021938, IC032195, IC035701, SKGPA-83, MGA-10, KBGA-3, SKGPA-63, SKGPA-66, SKGPA-62, SKGPA-65, IC035615, IC035665, IC035711, IC095251, IC120621, KBGA-2, SKGPA-77, SKGPA-79, SKGPA-99, SKGPA-109, IC035719, IC095389, IC120649, SKGPA-70, SKGPA-72, SKGPA-84, SKGPA-101, SKGPA-110, IC035370, IC035642, IC120668 (>2.50 mm)	Suvarna (2.98 mm)
9.	Seed yield per plant (g)	2.00-37.16	-	BGA-2 (37.16 g)
10.	Seed weight (g/10 ml)	11.00-55.74	-	BGA-2 (55.74 ml)
Mettupalayam (Accessions 100)				
1.	Days to 50% flowering	38.00-59.00	SKGPA079 (=38.00 days)	Annapurna (38.00 days)
2.	Days to maturity	65.00-95.00	SKGPA103, SKGPA102, SKGPA104, SKGPA079, SKGPA101, IC035635, SKGPA084, IC021938 (<73.50 days)	Annapurna (75.00 days)
3.	Plant height (cm)	95.00-	SKGPA080, SKGPA081, SKGPA074, SKGPA071, SKGPA085, SKGPA073,	BGA2 (207.00)

S. No.	Characters	Range	Promising lines	Value of best check
		222.00	SKGPA084 (>206.50 cm)	cm)
4.	Seed yield per plant (g)	4.50-22.10	SKGPA074, SKGPA071, SKGPA065, SKGPA078, SKGPA064, SKGPA063 (>18.00 g)	Suvarna (18.50 g)
5.	Ear head height (cm)	36.00-86.00	SKGPA085, SKGPA066, SKGPA065, SKGPA073, IC021803A, SKGPA086, SKGPA099, SKGPA077, SKGPA078, IC035404, IC035661, IC032195, IC035713, SKGPA075, SKGPA082, IC035701, SKGPA098, SKGPA079, SKGPA109, SKGPA083, IC021937, SKGPA106, SKGPA087, SKGPA096, IC120621, SKGPA095, SKGPA069, SKGPA091, SKGPA102, IC035638, SKGPA068, IC120670, SKGPA076, SKGPA103, IC035651, SKGPA064, SKGPA072, IC032193, SKGPA093, SKGPA088, SKGPA070, SKGPA067, IC032186, SKGPA092, IC035635, IC120689, SKGPA094, SKGPA101, IC032190, SKGPA089, IC021938, IC095510, SKGPA100, IC035716, SKGPA071, SKGPA090, IC095389, IC035719, IC095430, IC095371, SKGPA074, SKGPA107, IC432086, SKGPA110, SKGPA080, SKGPA084, IC120649, SKGPA063, IC095516 (>53.50 cm)	Suvarna (53.00 cm)
6.	Seed volume weight (ml)	6.90-7.70	-	Suvarna (7.70 ml)
Best entries over locations				
1.	Days to 50% flowering	36.50-59.00	SKGPA-100, IC035665, KBGA-3, SKGPA-103, SKGPA-106, SKGPA-89, SKGPA-93 (<37.00 days)	Annapurna (38.00 days)
2.	Days to maturity	75.00-96.00	SKGPA-82 (=75.00 days)	Annapurna (75.00 days)
3.	Plant height (cm)	95.00-185.50	SKGPA-81, SKGPA-80, SKGPA-84, SKGPA-66, SKGPA-74, SKGPA-65, SKGPA-82, SKGPA-78 (>168.50 cm)	GA-1 (169.00 cm)
4.	Seed yield per plant (g)	4.30-26.28	-	BGA-2 (26.28 g)
5	Seed volume weight (g/10 ml)	7.00-36.15	MGA-10 (=36.00 ml)	BGA-2 (31.67 ml)

**Table 99. Characterization & evaluation of germplasm lines in grain amaranth at Bangalore & Mettupalayam :
Kharif 2013 (Plain)**

S.No	Accession No.	Qualitative characters										Quantitative characters									
		Bangalore										Days to 50% flowering			Days to maturity			Plant height (cm)			
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed colour	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean
1	IC021803-A	2	1	3	4	5	2	1	1	3	1	3	41.00	58.00	49.50	90.00	81.00	85.50	116.00	197.00	156.50
2	IC021937	2	1	8	8	2	3	1	4	3	5	3	37.00	50.00	43.50	88.00	79.00	83.50	115.00	195.00	155.00
3	IC021938	2	1	8	8	3	5	1	1	3	1	3	36.00	51.00	43.50	94.00	74.00	84.00	113.00	185.00	149.00
4	IC032186	2	1	5	8	3	6	2	1	1	5	3	37.00	50.00	43.50	92.00	76.00	84.00	135.00	157.00	146.00
5	IC032190	2	1	8	7	5	4	2	1	3	3	3	37.00	51.00	44.00	93.00	82.00	87.50	143.00	169.00	156.00
6	IC032193	3	1	5	11	3	2	2	2	3	1	3	41.00	57.00	49.00	91.00	83.00	87.00	126.00	157.00	141.50
7	IC032195	2	1	5	11	5	2	2	4	3	5	3	41.00	52.00	46.50	93.00	82.00	87.50	124.00	188.00	156.00
8	IC035370	2	1	5	11	5	2	1	1	3	3	3	39.00	-	39.00	87.00	-	87.00	135.00	-	135.00
9	IC035404	1	1	5	11	2	2	2	2	3	1	3	40.00	50.00	45.00	87.00	83.00	85.00	132.00	193.00	162.50
10	IC035415	2	1	5	11	5	2	2	4	3	3	3	41.00	54.00	47.50	96.00	85.00	90.50	150.00	155.00	152.50
11	IC035615	1	2	3	11	2	2	2	2	3	5	3	44.00	53.00	48.50	94.00	92.00	93.00	118.00	143.00	130.50
12	IC035633	2	2	3	11	2	2	2	2	3	1	3	44.00	45.00	44.50	94.00	93.00	93.50	132.00	189.00	160.50
13	IC035635	1	1	6	7	3	4	1	4	3	3	3	32.00	48.00	40.00	89.00	70.00	79.50	116.00	203.00	159.50
14	IC035638	1	2	5	11	2	2	1	4	3	3	3	44.00	49.00	46.50	100.00	84.00	92.00	119.00	179.00	149.00
15	IC035642	3	1	6	3	2	4	1	1	1	5	3	30.00	52.00	41.00	88.00	76.00	82.00	124.00	151.00	137.50
16	IC035651	1	1	6	4	2	4	1	1	3	1	3	41.00	47.00	44.00	96.00	77.00	86.50	135.00	177.00	156.00
17	IC035661	2	1	8	7	3	4	1	4	3	5	3	35.00	50.00	42.50	86.00	84.00	85.00	124.00	185.00	154.50
18	IC035665	1	1	5	4	2	2	1	2	3	3	3	37.00	-	37.00	95.00	85.00	90.00	98.00	160.00	129.00
19	IC035701	3	1	8	8	3	6	1	1	1	5	3	38.00	50.00	44.00	94.00	82.00	88.00	145.00	162.00	153.50
20	IC035702	3	1	6	8	5	4	2	1	1	1	3	35.00	52.00	43.50	84.00	84.00	84.00	133.00	119.00	126.00
21	IC035711	3	1	8	8	3	4	2	1	1	3	3	39.00	51.00	45.00	85.00	93.00	89.00	143.00	170.00	156.50
22	IC035713	3	1	6	7	3	6	1	1	3	1	3	37.00	52.00	44.50	83.00	85.00	84.00	150.00	171.00	160.50
23	IC035716	2	1	6	7	5	6	2	4	1	5	3	37.00	43.00	40.00	90.00	86.00	88.00	115.00	143.00	129.00

S.No	Accession No.	Qualitative characters											Quantitative characters								
		Bangalore											Days to 50% flowering			Days to maturity			Plant height (cm)		
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed colour	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean
24	IC035717	1	1	6	7	2	6	1	4	3	3	3	37.00	52.00	44.50	88.00	85.00	86.50	134.00	147.00	140.50
25	IC035719	1	1	5	8	5	6	1	1	3	1	3	44.00	54.00	49.00	91.00	83.00	87.00	116.00	168.00	142.00
26	IC035735	3	1	6	7	5	3	1	1	1	5	3	37.00	53.00	45.00	86.00	83.00	84.50	112.00	162.00	137.00
27	IC035742	3	1	6	7	5	6	2	1	1	3	3	37.00	52.00	44.50	84.00	95.00	89.50	135.00	138.00	136.50
28	IC081698-B	2	1	5	7	5	4	1	4	3	5	3	36.00	45.00	40.50	83.00	94.00	88.50	124.00	130.00	127.00
29	IC094654	2	1	5	7	2	6	2	4	3	1	3	32.00	46.00	39.00	84.00	95.00	89.50	119.00	136.00	127.50
30	IC094661	3	3	6	8	3	6	1	2	3	1	3	32.00	52.00	42.00	86.00	93.00	89.50	116.00	142.00	129.00
31	IC095204	2	1	5	7	5	6	2	4	3	1	3	41.00	51.00	46.00	89.00	85.00	87.00	105.00	115.00	110.00
32	IC095244	2	1	6	7	5	4	2	1	3	5	3	37.00	52.00	44.50	88.00	92.00	90.00	132.00	146.00	139.00
33	IC095248	2	1	5	7	5	4	2	1	1	3	3	37.00	50.00	43.50	90.00	94.00	92.00	134.00	151.00	142.50
34	IC095251	2	1	8	8	5	6	2	1	1	3	3	39.00	51.00	45.00	89.00	93.00	91.00	143.00	155.00	149.00
35	IC095371	3	1	6	8	3	6	2	4	1	3	3	40.00	52.00	46.00	92.00	95.00	93.50	115.00	168.00	141.50
36	IC095382-B	2	3	3	4	2	2	2	4	3	1	3	37.00	48.00	42.50	92.00	94.00	93.00	127.00	171.00	149.00
37	IC095383	2	1	7	8	5	5	1	1	3	1	3	39.00	46.00	42.50	95.00	86.00	90.50	135.00	166.00	150.50
38	IC095389	1	3	3	4	2	2	2	4	3	5	3	37.00	45.00	41.00	97.00	85.00	91.00	137.00	169.00	153.00
39	IC095391	1	3	7	8	5	5	2	4	3	3	3	39.00	53.00	46.00	95.00	87.00	91.00	125.00	156.00	140.50
40	IC095406	1	3	6	8	2	4	2	4	3	1	3	37.00	47.00	42.00	96.00	88.00	92.00	128.00	145.00	136.50
41	IC095430	3	1	3	4	2	1	1	4	1	1	3	37.00	44.00	40.50	94.00	86.00	90.00	125.00	168.00	146.50
42	IC095498	2	1	3	4	2	1	2	4	1	5	3	37.00	46.00	41.50	97.00	87.00	92.00	124.00	155.00	139.50
43	IC095510	2	1	8	8	2	4	2	1	3	3	3	37.00	48.00	42.50	94.00	92.00	93.00	113.00	173.00	143.00
44	IC095516	2	1	3	4	2	2	1	1	3	3	3	40.00	49.00	44.50	87.00	86.00	86.50	135.00	164.00	149.50
45	IC095556	3	1	3	11	2	2	2	1	3	1	3	41.00	51.00	46.00	94.00	87.00	90.50	118.00	158.00	138.00
46	IC120621	2	1	5	4	2	2	2	1	3	1	3	35.00	46.00	40.50	97.00	86.00	91.50	123.00	165.00	144.00
47	IC120649	3	1	5	4	2	2	2	1	3	1	3	35.00	51.00	43.00	94.00	76.00	85.00	125.00	166.00	145.50
48	IC120668	3	1	6	3	5	2	2	2	3	1	3	41.00	48.00	44.50	93.00	86.00	89.50	126.00	157.00	141.50
49	IC120670	3	1	5	4	3	2	2	1	3	5	3	35.00	52.00	43.50	93.00	85.00	89.00	135.00	180.00	157.50

S.No	Accession No.	Qualitative characters											Quantitative characters								
		Bangalore											Days to 50% flowering			Days to maturity			Plant height (cm)		
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed colour	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean
50	IC120689	3	1	5	4	3	2	2	1	3	5	3	37.00	48.00	42.50	92.00	84.00	88.00	112.00	163.00	137.50
51	IC432086	-	-	-	-	-	-	-	-	-	-	-	-	52.00	52.00	-	92.00	92.00	-	165.00	165.00
52	KBGA-2	1	1	8	8	3	6	1	1	3	1	3	42.00	-	42.00	95.00	-	95.00	134.00	-	134.00
53	KBGA-3	1	1	8	8	5	6	2	4	1	5	3	37.00	-	37.00	90.00	-	90.00	126.00	-	126.00
54	MGA-10	2	1	5	4	2	2	2	1	1	1	3	42.00	-	42.00	96.00	-	96.00	108.00	-	108.00
55	SKGPA-61	1	1	5	4	5	4	2	1	3	3	3	35.00	58.00	46.50	96.00	90.00	93.00	140.00	147.00	143.50
56	SKGPA-62	2	1	3	4	5	2	1	4	3	5	3	37.00	54.00	45.50	97.00	93.00	95.00	120.00	146.00	133.00
57	SKGPA-63	3	1	6	8	5	6	2	1	1	1	3	39.00	48.00	43.50	87.00	95.00	91.00	123.00	173.00	148.00
58	SKGPA-64	3	1	3	4	5	2	1	1	3	3	3	41.00	46.00	43.50	100.00	90.00	95.00	135.00	171.00	153.00
59	SKGPA-65	1	1	5	7	3	2	1	4	3	3	3	39.00	55.00	47.00	88.00	88.00	88.00	156.00	185.00	170.50
60	SKGPA-66	1	1	5	11	5	2	1	4	3	5	3	42.00	49.00	45.50	94.00	90.00	92.00	165.00	184.00	174.50
61	SKGPA-67	2	1	6	6	3	4	2	1	3	3	3	31.00	53.00	42.00	92.00	91.00	91.50	150.00	163.00	156.50
62	SKGPA-68	2	1	5	11	5	2	2	1	3	3	3	44.00	55.00	49.50	90.00	92.00	91.00	135.00	187.00	161.00
63	SKGPA-69	2	1	3	4	5	2	1	4	3	1	3	37.00	54.00	45.50	95.00	91.00	93.00	102.00	181.00	141.50
64	SKGPA-70	3	1	3	4	5	2	2	4	3	5	3	35.00	53.00	44.00	87.00	90.00	88.50	95.00	174.00	134.50
65	SKGPA-71	3	1	3	3	5	3	2	1	1	1	3	44.00	52.00	48.00	93.00	87.00	90.00	112.00	212.00	162.00
66	SKGPA-72	2	1	3	11	5	2	2	4	3	3	3	41.00	51.00	46.00	95.00	82.00	88.50	105.00	167.00	136.00
67	SKGPA-73	1	1	5	4	5	2	2	4	3	5	3	40.00	52.00	46.00	96.00	83.00	89.50	112.00	208.00	160.00
68	SKGPA-74	2	1	3	1	2	2	2	1	1	3	3	42.00	50.00	46.00	93.00	85.00	89.00	130.00	214.00	172.00
69	SKGPA-75	1	1	5	4	5	2	1	4	3	3	3	35.00	49.00	42.00	87.00	76.00	81.50	135.00	195.00	165.00
70	SKGPA-76	1	1	5	1	5	2	2	4	3	3	3	40.00	48.00	44.00	96.00	92.00	94.00	132.00	174.00	153.00
71	SKGPA-77	1	1	3	4	5	2	2	4	3	5	3	42.00	49.00	45.50	96.00	76.00	86.00	120.00	201.00	160.50
72	SKGPA-78	1	1	5	4	2	2	2	4	3	1	3	36.00	51.00	43.50	94.00	75.00	84.50	135.00	203.00	169.00
73	SKGPA-79	1	2	3	11	3	2	99	4	1	3	3	44.00	38.00	41.00	96.00	70.00	83.00	95.00	185.00	140.00
74	SKGPA-80	1	1	8	8	5	5	2	4	3	3	3	42.00	52.00	47.00	94.00	82.00	88.00	148.00	222.00	185.00
75	SKGPA-81	1	1	3	4	2	2	1	1	3	1	3	36.00	45.00	40.50	92.00	76.00	84.00	154.00	217.00	185.50

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		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed colour	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean
76	SKGPA-82	-	-	-	-	-	-	-	-	-	-	-	39.00	39.00	-	75.00	75.00	-	170.00	170.00	
77	SKGPA-83	1	1	3	4	2	2	2	4	3	3	3	30.00	50.00	40.00	90.00	76.00	83.00	152.00	175.00	163.50
78	SKGPA-84	1	1	6	11	2	2	2	4	3	3	3	35.00	50.00	42.50	92.00	74.00	83.00	154.00	207.00	180.50
79	SKGPA-85	3	1	3	11	5	2	2	1	3	5	3	41.00	51.00	46.00	92.00	76.00	84.00	123.00	208.00	165.50
80	SKGPA-86	2	1	5	11	5	2	1	4	3	1	3	41.00	50.00	45.50	94.00	77.00	85.50	126.00	190.00	158.00
81	SKGPA-87	2	1	6	7	3	4	1	1	3	1	3	32.00	53.00	42.50	87.00	85.00	86.00	130.00	174.00	152.00
82	SKGPA-88	3	1	6	6	3	3	2	1	1	1	3	35.00	54.00	44.50	88.00	86.00	87.00	132.00	185.00	158.50
83	SKGPA-89	3	1	5	8	5	2	2	1	3	1	3	30.00	45.00	37.50	94.00	85.00	89.50	128.00	160.00	144.00
84	SKGPA-90	3	1	5	7	2	6	1	4	3	3	3	38.00	48.00	43.00	91.00	86.00	88.50	144.00	171.00	157.50
85	SKGPA-91	3	1	8	8	3	6	1	1	3	5	3	38.00	58.00	48.00	89.00	84.00	86.50	134.00	175.00	154.50
86	SKGPA-92	3	1	3	6	2	4	2	4	3	1	3	30.00	49.00	39.50	87.00	83.00	85.00	136.00	155.00	145.50
87	SKGPA-93	2	1	5	8	3	7	1	3	2	5	3	35.00	40.00	37.50	90.00	82.00	86.00	123.00	147.00	135.00
88	SKGPA-94	1	1	5	11	3	2	1	4	3	3	3	37.00	42.00	39.50	88.00	87.00	87.50	118.00	125.00	121.50
89	SKGPA-95	2	1	5	4	2	2	2	1	3	5	3	38.00	40.00	39.00	93.00	84.00	88.50	125.00	186.00	155.50
90	SKGPA-96	2	1	7	8	3	6	2	4	3	1	3	38.00	42.00	40.00	87.00	83.00	85.00	85.00	162.00	123.50
91	SKGPA-97	2	1	6	8	2	4	2	4	1	1	3	32.00	48.00	40.00	84.00	87.00	85.50	135.00	143.00	139.00
92	SKGPA-98	2	1	8	8	3	6	2	4	3	3	3	42.00	52.00	47.00	91.00	92.00	91.50	115.00	190.00	152.50
93	SKGPA-99	2	1	8	8	5	6	2	4	3	3	3	38.00	42.00	40.00	93.00	94.00	93.50	116.00	179.00	147.50
94	SKGPA-100	2	1	3	11	5	2	2	1	3	3	3	32.00	41.00	36.50	90.00	79.00	84.50	118.00	152.00	135.00
95	SKGPA-101	2	1	3	4	2	2	2	1	1	5	3	35.00	45.00	40.00	89.00	70.00	79.50	128.00	191.00	159.50
96	SKGPA-102	1	1	5	4	3	2	99	4	3	3	3	38.00	41.00	39.50	88.00	68.00	78.00	118.00	170.00	144.00
97	SKGPA-103	1	1	5	4	2	2	1	1	3	1	3	32.00	42.00	37.00	96.00	65.00	80.50	125.00	125.00	125.00
98	SKGPA-104	1	3	3	4	5	2	2	3	1	5	3	42.00	43.00	42.50	92.00	69.00	80.50	146.00	141.00	143.50
99	SKGPA-105	1	3	3	7	3	5	1	3	1	3	3	42.00	48.00	45.00	94.00	82.00	88.00	135.00	145.00	140.00
100	SKGPA-106	2	1	5	11	2	2	1	4	3	3	3	30.00	44.00	37.00	85.00	82.00	83.50	126.00	179.00	152.50
101	SKGPA-107	1	1	5	5	3	2	1	1	2	5	3	35.00	43.00	39.00	96.00	83.00	89.50	115.00	180.00	147.50

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		Bangalore											Days to 50% flowering			Days to maturity			Plant height (cm)		
		Early plant vigour	Plant growth habit	Leaf colour	Inflorescence colour	Inflorescence compactness	Stem colour	Stem surface	Inflorescence shape	Inflorescence spininess	Seed shattering	Seed colour	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean
102	SKGPA-108	3	3	5	4	3	2	1	4	3	3	3	35.00	48.00	41.50	91.00	84.00	87.50	145.00	150.00	147.50
103	SKGPA-109	1	1	5	11	5	2	1	4	3	3	3	38.00	47.00	42.50	87.00	85.00	86.00	135.00	179.00	157.00
104	SKGPA-110	3	1	3	4	2	2	1	1	3	5	3	32.00	46.00	39.00	84.00	83.00	83.50	95.00	158.00	126.50
105	VL-344	2	1	5	4	2	2	2	1	1	1	3	42.00	-	42.00	94.00	-	94.00	123.00	-	123.00
Mean for check variety																					
	Annapurna (C)	-	-	-	-	-	-	-	-	-	-	-	-	38.00	38.00	-	75.00	75.00	-	95.00	95.00
	BGA-2 (C)	3	1	5	4	5	2	2	1	1	5	3	42.40	50.00	46.20	94.00	76.00	85.00	125.40	207.00	166.20
	GA-1 (C)	-	-	-	-	-	-	-	-	-	-	-	-	59.00	59.00	-	90.00	90.00	-	169.00	169.00
	GA-2 (C)	2	1	8	8	5	4	2	4	3	5	3	42.80	59.00	50.90	89.00	93.00	91.00	124.80	170.00	147.40
	Suvarna (C)	3	1	3	1	2	2	2	1	3	5	3	42.00	50.00	46.00	92.00	78.00	85.00	138.80	196.00	167.40
	Minimum	1	1	3	1	2	1	1	1	1	1	3	30.00	38.00	36.50	83.00	65.00	75.00	85.00	95.00	95.00
	Maximum	3	3	8	11	5	7	99	4	3	5	3	44.00	59.00	59.00	100.00	95.00	96.00	165.00	222.00	185.50
	Mean	2	1	5	4	5	2	2	1	3	3	3	37.82	49.12	43.38	91.31	84.21	87.80	126.93	169.00	147.39
	CD(0.05)	-	-	-	-	-	-	-	-	-	-	-	2.37	-	-	-	-	-	36.95	-	-
	CV(%) Error	-	-	-	-	-	-	-	-	-	-	-	2.14	-	-	-	-	-	11.03	-	-
	CV(%) Phenotypic	-	-	-	-	-	-	-	-	-	-	-	9.73	9.29	-	4.32	8.15	-	11.21	13.72	-

Qualitative characters : **Early plant vigour** : 1-Poor, 2-Good, 3-Very good; **Plant growth habit** : 1-Erect, 2-Spreading, 3-Drooping, 99-Others; **Leaf colour** : 1-Yellow, 2-Yellowish orange, 3-Yellowish green, 4-Orange, 5-Green, 6-Greenish orange, 7-Pink, 8-Pinkish green, 9-Reddish yellow, 10-Reddish green, 11-Red, 12-Dark red, 99-Others; **Inflorescence colour** : 1-Light yellow, 2-Yellow, 3-Yellowish orange, 4-Yellowish green, 5-Orange, 6-Pink, 7-Pinkish green, 8-Purple, 9-Red, 10-Reddish green, 11-Green, 99-Others; **Inflorescence compactness** : 3-Lax, 5-Intermediate, 7-Dense, 99-Others; **Stem colour** : 1-Yellow, 2-Yellowish green, 3-Orange, 4-Pink, 5-Red, 6-Reddish green, 7-Reddish orange, 99-Others; **Stem surface** : 1-Smooth, 2-Ridged, 99-Others; **Inflorescence shape** : 1-Globose, 2-Semi drooping, 3-Completely drooping, 4-Straight, 99-Others; **Inflorescence spininess** : 1-Smooth, 2-Glabrous, 3-Prickly, 4-Spiny, 99-Others; **Seed shattering** : 3-Low (%), 5-Intermediate (10-50%), 7-High (50%), 99-Others; **Seed colour** : 1-White, 2-Creamish, 3-Pale yellow, 4-Pink, 5-Red, 6-Brown, 7-Black, 8-Golden, 99-Others; **Popping ability of seed** : 3-Poor, 5-Medium, 7-Good, 99-Others

S.No	Accession No.	Quantitative characters											
		Seed volume weight (g/10 ml)			Seed yield per plant (g)			Bangalore					Mettupalayam
		Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Stem thickness (mm)	Ear head height (cm)
1	IC021803-A	22.05	7.40	14.73	14.70	5.50	10.10	43.00	12.50	3.10	12.20	2.10	81.00
2	IC021937	18.30	7.50	12.90	5.25	7.40	6.33	45.00	14.50	6.30	6.20	2.30	73.00
3	IC021938	23.40	7.20	15.30	15.60	7.50	11.55	54.00	22.00	5.20	5.60	3.50	61.00
4	IC032186	27.15	7.00	17.08	18.10	10.30	14.20	56.00	13.50	2.50	5.60	1.25	65.00
5	IC032190	16.50	7.20	11.85	7.07	10.00	8.54	45.00	16.50	4.30	5.40	2.50	62.00
6	IC032193	19.13	7.40	13.26	12.75	12.40	12.58	35.00	16.40	3.10	5.30	3.60	67.00
7	IC032195	20.82	7.00	13.91	13.88	11.50	12.69	38.00	13.50	2.50	5.40	3.50	78.00
8	IC035370	23.40	-	23.40	15.60	-	15.60	53.00	16.40	4.20	7.80	3.00	-
9	IC035404	20.25	7.20	13.73	8.93	7.50	8.22	48.00	17.50	3.90	5.90	1.56	79.00
10	IC035415	17.25	7.30	12.28	8.83	6.50	7.67	56.00	19.20	7.50	6.50	2.80	42.00
11	IC035615	15.15	7.30	11.23	6.08	4.50	5.29	48.00	25.00	3.60	6.35	3.20	40.00
12	IC035633	16.80	7.20	12.00	11.20	5.60	8.40	45.00	26.00	3.50	9.50	2.80	52.00
13	IC035635	14.70	7.20	10.95	4.20	15.60	9.90	42.00	13.50	4.50	6.30	2.50	63.00
14	IC035638	16.05	7.30	11.68	6.80	5.60	6.20	32.00	13.20	6.30	7.90	2.65	70.00
15	IC035642	23.10	7.40	15.25	15.40	16.50	15.95	43.00	15.20	2.50	4.90	3.00	53.00
16	IC035651	17.25	7.40	12.33	7.40	17.00	12.20	35.00	15.40	5.60	-	2.32	67.00
17	IC035661	18.60	7.10	12.85	8.00	16.20	12.10	35.00	17.50	5.60	7.90	2.80	79.00
18	IC035665	22.01	7.20	14.60	14.67	5.30	9.99	42.00	22.00	6.50	8.50	3.20	53.00
19	IC035701	25.50	7.30	16.40	17.00	5.80	11.40	35.00	15.30	4.30	6.50	3.50	76.00
20	IC035702	20.13	7.40	13.77	13.42	6.90	10.16	48.00	15.40	2.30	5.60	2.30	51.00
21	IC035711	27.86	7.30	17.58	18.57	7.40	12.99	43.00	21.50	3.20	5.60	3.20	47.00
22	IC035713	17.57	7.20	12.38	11.71	6.50	9.11	52.00	18.60	3.50	8.90	2.30	78.00
23	IC035716	31.05	7.30	19.18	20.70	4.50	12.60	43.00	17.50	3.80	5.60	2.50	59.00

S.No	Accession No.	Quantitative characters											
		Seed volume weight (g/10 ml)			Seed yield per plant (g)			Bangalore					Mettupalayam
		Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Stem thickness (mm)	Ear head height (cm)
24	IC035717	36.30	7.40	21.85	24.20	5.60	14.90	54.00	18.60	4.50	5.60	2.30	51.00
25	IC035719	29.49	7.30	18.40	19.66	6.40	13.03	60.00	12.30	3.90	4.60	3.10	58.00
26	IC035735	28.35	7.20	17.78	18.90	5.40	12.15	60.00	23.50	6.30	9.80	2.50	52.00
27	IC035742	18.86	7.10	12.98	12.57	6.40	9.49	53.00	22.40	5.30	5.60	3.80	41.00
28	IC081698-B	33.24	7.20	20.22	22.16	7.60	14.88	54.00	12.50	2.30	4.50	2.10	49.00
29	IC094654	30.87	7.30	19.09	20.58	6.80	13.69	43.00	16.50	3.50	6.40	1.90	51.00
30	IC094661	22.37	7.40	14.88	14.91	5.70	10.31	44.00	19.80	6.10	7.60	1.80	45.00
31	IC095204	38.40	7.50	22.95	25.60	6.80	16.20	46.00	19.50	5.30	6.70	2.50	36.00
32	IC095244	48.50	7.40	27.95	32.33	7.90	20.12	54.00	12.35	5.40	5.30	2.10	45.00
33	IC095248	15.90	7.20	11.55	10.60	7.20	8.90	44.00	13.31	2.30	5.60	2.30	49.00
34	IC095251	14.10	7.30	10.70	5.50	6.90	6.20	32.00	15.65	3.20	5.40	3.20	49.00
35	IC095371	19.62	7.30	13.46	13.08	6.50	9.79	53.00	22.00	3.40	6.20	1.80	57.00
36	IC095382-B	21.75	7.40	14.58	11.00	7.50	9.25	43.00	23.50	6.50	6.70	2.60	47.00
37	IC095383	20.85	7.20	14.03	13.90	6.40	10.15	60.00	25.60	3.50	6.40	2.90	53.00
38	IC095389	20.63	7.10	13.86	13.75	11.50	12.63	32.00	23.00	4.50	5.60	3.10	58.00
39	IC095391	14.40	7.20	10.80	6.50	6.40	6.45	48.00	15.20	4.60	6.50	3.60	46.00
40	IC095406	15.15	7.30	11.23	5.41	6.20	5.81	43.00	15.50	4.50	3.46	2.90	47.00
41	IC095430	22.50	7.30	14.90	15.00	6.30	10.65	32.00	15.60	7.50	6.43	2.80	58.00
42	IC095498	15.30	7.40	11.35	4.90	7.90	6.40	48.00	15.40	6.30	6.50	2.60	51.00
43	IC095510	16.50	7.10	11.80	11.00	5.40	8.20	54.00	13.20	4.50	4.50	2.40	61.00
44	IC095516	28.35	7.00	17.68	18.90	8.60	13.75	42.00	15.80	3.50	3.50	2.50	54.00
45	IC095556	29.85	7.10	18.48	19.90	6.70	13.30	54.00	16.20	3.60	6.40	2.80	50.00
46	IC120621	16.95	7.20	12.08	11.33	8.50	9.92	53.00	17.50	6.30	5.60	3.20	72.00
47	IC120649	25.80	7.00	16.40	17.20	5.90	11.55	54.00	15.60	3.50	6.50	3.10	55.00
48	IC120668	18.12	7.00	12.56	12.08	8.90	10.49	42.00	12.50	4.00	4.60	3.00	53.00
49	IC120670	11.00	7.10	9.05	7.33	7.30	7.32	32.00	14.20	3.10	7.50	2.50	68.00

S.No	Accession No.	Quantitative characters											
		Seed volume weight (g/10 ml)			Seed yield per plant (g)			Bangalore					Mettupalayam
		Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Stem thickness (mm)	Ear head height (cm)
50	IC120689	26.25	7.10	16.68	17.50	6.60	12.05	53.00	16.50	5.40	0.90	2.50	63.00
51	IC432086	-	7.00	7.00	-	6.50	6.50	-	-	-	-	-	56.00
52	KBGA-2	27.60	-	27.60	18.60	-	18.60	46.00	13.50	5.60	5.90	3.20	-
53	KBGA-3	25.50	-	25.50	17.00	-	17.00	53.00	15.20	5.60	8.50	3.30	-
54	MGA-10	36.15	-	36.15	24.10	-	24.10	35.00	14.60	2.30	5.70	3.40	-
55	SKGPA-61	15.00	7.40	11.20	6.10	12.50	9.30	48.00	16.00	4.80	7.00	2.45	45.00
56	SKGPA-62	12.00	7.30	9.65	3.80	16.10	9.95	55.00	22.00	4.65	6.50	3.25	41.00
57	SKGPA-63	30.00	7.20	18.60	20.00	18.50	19.25	56.00	33.00	5.20	4.20	3.30	54.00
58	SKGPA-64	20.70	7.30	14.00	13.80	19.20	16.50	68.00	16.00	5.50	3.80	2.44	67.00
59	SKGPA-65	14.25	7.20	10.73	8.16	21.00	14.58	59.00	15.20	4.30	6.20	3.25	85.00
60	SKGPA-66	17.25	7.00	12.13	11.50	17.20	14.35	62.00	17.50	3.55	6.10	3.30	86.00
61	SKGPA-67	28.20	6.90	17.55	18.80	14.50	16.65	56.00	8.50	3.50	5.20	2.45	65.00
62	SKGPA-68	15.60	7.10	11.35	10.40	15.40	12.90	65.00	9.50	3.80	7.00	2.10	68.00
63	SKGPA-69	32.85	7.30	20.08	21.90	14.70	18.30	52.00	11.50	5.60	5.60	2.80	71.00
64	SKGPA-70	39.75	7.40	23.58	26.50	9.20	17.85	60.00	19.00	4.50	5.20	3.10	65.00
65	SKGPA-71	31.05	7.20	19.13	20.70	21.30	21.00	52.00	17.00	6.50	4.60	2.85	58.00
66	SKGPA-72	15.45	7.30	11.38	6.60	7.50	7.05	53.00	9.00	4.20	4.20	3.10	67.00
67	SKGPA-73	18.75	7.40	13.08	12.50	14.60	13.55	38.00	14.60	5.20	4.20	2.65	82.00
68	SKGPA-74	32.25	7.40	19.83	21.50	22.10	21.80	56.00	15.53	6.50	6.50	2.20	56.00
69	SKGPA-75	22.95	7.30	15.13	15.30	10.00	12.65	43.00	15.20	5.20	7.20	2.60	77.00
70	SKGPA-76	17.10	7.30	12.20	9.40	11.50	10.45	38.00	14.50	5.60	5.60	2.90	68.00
71	SKGPA-77	12.45	7.40	9.93	3.10	17.40	10.25	35.00	16.23	6.50	4.90	3.20	80.00
72	SKGPA-78	14.55	7.50	11.03	4.90	19.50	12.20	46.00	13.00	4.50	5.80	2.44	79.00
73	SKGPA-79	12.30	7.40	9.85	2.00	14.50	8.25	38.00	22.00	4.20	7.50	3.20	75.00
74	SKGPA-80	12.60	7.30	9.95	4.75	18.20	11.48	59.00	16.50	4.30	6.20	2.90	55.00
75	SKGPA-81	14.10	7.40	10.75	7.00	10.50	8.75	53.00	17.20	4.20	3.50	2.80	52.00

S.No	Accession No.	Quantitative characters											
		Seed volume weight (g/10 ml)			Seed yield per plant (g)			Bangalore					Mettupalayam
		Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Stem thickness (mm)	Ear head height (cm)
76	SKGPA-82	-	7.20	7.20	-	14.30	14.30	-	-	-	-	-	77.00
77	SKGPA-83	15.00	7.00	11.00	7.50	10.50	9.00	38.00	15.50	6.50	6.50	3.50	74.00
78	SKGPA-84	21.60	7.10	14.35	6.20	14.50	10.35	38.00	16.60	7.30	8.50	3.10	55.00
79	SKGPA-85	31.35	7.20	19.28	2.90	10.00	6.45	53.00	15.56	5.60	6.30	2.60	86.00
80	SKGPA-86	12.45	7.10	9.78	3.70	7.00	5.35	56.00	16.50	4.20	4.20	2.80	81.00
81	SKGPA-87	14.55	7.30	10.93	9.70	10.50	10.10	59.00	19.50	7.00	4.60	2.30	73.00
82	SKGPA-88	25.50	7.00	16.25	17.00	7.50	12.25	53.00	21.00	4.50	5.30	3.60	66.00
83	SKGPA-89	16.50	7.10	11.80	7.28	5.60	6.44	54.00	15.20	4.20	5.20	2.60	62.00
84	SKGPA-90	25.80	7.20	16.50	17.20	6.50	11.85	38.00	12.00	3.50	5.20	2.90	58.00
85	SKGPA-91	21.30	7.30	14.30	14.20	5.50	9.85	58.00	17.50	4.50	6.40	3.60	71.00
86	SKGPA-92	21.45	7.40	14.43	14.33	10.40	12.37	42.00	16.50	6.50	3.65	2.10	65.00
87	SKGPA-93	27.75	7.50	17.63	-	9.50	9.50	46.00	22.00	4.30	5.63	2.50	67.00
88	SKGPA-94	12.38	7.30	9.84	8.25	13.10	10.68	34.00	11.50	5.20	5.56	1.90	63.00
89	SKGPA-95	12.50	7.40	9.95	8.33	7.50	7.92	56.00	8.50	4.20	5.36	1.80	71.00
90	SKGPA-96	13.50	7.20	10.35	5.80	6.70	6.25	54.00	17.50	3.90	5.36	2.30	73.00
91	SKGPA-97	15.30	7.10	11.20	6.71	7.30	7.01	35.00	16.00	4.50	5.36	2.80	48.00
92	SKGPA-98	18.00	7.30	12.65	8.20	6.80	7.50	52.00	18.50	5.60	9.23	2.80	75.00
93	SKGPA-99	15.60	7.40	11.50	6.50	10.50	8.50	56.00	16.00	5.30	4.50	3.20	81.00
94	SKGPA-100	30.30	7.10	18.70	20.20	8.60	14.40	53.00	15.20	4.50	7.20	3.80	61.00
95	SKGPA-101	14.25	7.00	10.63	4.30	7.50	5.90	45.00	15.60	4.60	5.30	3.10	62.00
96	SKGPA-102	17.55	7.10	12.33	7.50	7.60	7.55	35.00	12.50	3.20	3.50	2.60	71.00
97	SKGPA-103	29.70	7.20	18.45	19.80	4.50	12.15	56.00	18.60	7.20	3.40	2.80	68.00
98	SKGPA-104	13.50	7.30	10.40	3.00	5.60	4.30	43.00	15.20	3.90	5.60	2.30	47.00
99	SKGPA-105	16.20	7.10	11.65	6.78	6.00	6.39	54.00	13.60	7.50	3.60	1.80	46.00
100	SKGPA-106	15.90	7.20	11.55	6.71	14.00	10.36	38.00	19.50	4.20	4.50	1.90	73.00
101	SKGPA-107	24.00	7.30	15.65	-	9.50	9.50	35.00	8.50	3.90	4.90	2.60	56.00

S.No	Accession No.	Quantitative characters											
		Seed volume weight (g/10 ml)			Seed yield per plant (g)			Bangalore					Mettupalayam
		Bangalore	Mettupalayam	Mean	Bangalore	Mettupalayam	Mean	Inflorescence length (cm)	Leaf length (cm)	Leaf width (cm)	Petiole length (cm)	Stem thickness (mm)	Ear head height (cm)
102	SKGPA-108	13.35	7.40	10.38	6.70	6.20	6.45	60.00	9.60	4.50	5.30	3.60	45.00
103	SKGPA-109	24.30	7.20	15.75	16.20	6.20	11.20	45.00	15.40	3.80	5.60	3.20	75.00
104	SKGPA-110	20.10	7.30	13.70	10.90	8.40	9.65	53.00	14.50	5.80	5.30	3.10	56.00
105	VL-344	30.60	-	30.60	20.40	-	20.40	45.00	15.20	6.50	4.60	2.80	-
Mean for check variety													
	Annapurna (C)	-	7.30	7.30	-	7.10	7.10	-	-	-	-	-	47.00
	BGA-2 (C)	55.74	7.60	31.67	37.16	15.40	26.28	55.60	16.19	4.64	5.70	2.68	50.00
	GA-1 (C)	-	7.40	7.40	11.38	6.50	8.94	-	-	-	-	-	49.00
	GA-2 (C)	20.54	7.50	14.02	14.88	8.00	11.44	47.40	15.60	5.44	5.86	2.81	52.00
	Suvarna (C)	36.39	7.70	22.05	24.26	18.50	21.38	49.00	20.80	4.62	5.29	2.98	53.00
	Minimum	11.00	6.90	7.00	2.00	4.50	4.30	32.00	8.50	2.30	0.90	1.25	36.00
	Maximum	55.74	7.70	36.15	37.16	22.10	26.28	68.00	33.00	7.50	12.20	3.80	86.00
	Mean	21.84	7.25	14.77	12.80	9.72	11.40	47.78	16.47	4.69	5.84	2.75	61.18
	CD(0.05)	5.36	-	-	8.08	-	-	22.71	8.85	2.99	5.07	1.24	-
	CV(%) Error	5.93	-	-	14.20	-	-	18.04	18.58	23.16	35.22	17.37	-
	CV(%) Phenotypic	36.93	2.07	-	53.08	45.84	-	18.01	24.23	27.35	26.40	18.82	20.02

Table 100. Promising lines in rice bean germplasm (Kharif, 2013) for various characters at different locations (Plains)

S. No.	Characters	Range	Promising lines	Highest value of best check
Bangalore (Accessions 48)				
1.	Days to 50% flowering	35.00-49.00	EC014075, EC097882, EC016136, IC19781-2, EC037226, IC521061, EC012436, EC018222, IC019336 (<40.00 days)	RBL-1 (41.20 days)
2.	Days to maturity	70.00-85.00	EC014075, EC097882, EC016136, IC19781-2, EC037226, IC521061, EC012436, EC018222, EC114076, IC019336 (<75.00 days)	RBL-1 (76.20 days)
3.	Seed yield per plant (g)	5.00-10.50	EC018556, EC014075 (>9.50 g)	RBL-6 (9.51 g)
Ludhiana (Accessions 50)				
1.	Days to 50% flowering	52.00-74.00	IC007537, EC000262, EC078228, EC087989 (<54.00 days)	RBL 35 (55.50 days)
2.	Days to maturity	101.00-117.00	IC008565, IC018452, EC018260, EC000262, EC018222, EC037226, EC098453, IC007537, IC018183, IC2002567, EC018563, EC087989, EC098452, EC108887-A, IC002909, IC015640, IC020074 (<=105.00 days)	RBL 35 (105.00 days)
3.	Plant height (cm)	62.70-161.30	IC248733, EC018171, IC521148, IC521049, EC016136, IC018563, EC018184, IC019336, IC019781-2, EC078228, IC026973, EC001843, EC018181, EC012436, IC520892, IC521144 (>118.90 cm)	RBL 6 (116.02 cm)
4.	Primary branches per plant	1.00-4.30	IC248733, IC520892, IC018563, IC521049, EC012436, IC026973, IC521068, IC521081, IC521144, EC016136, IC019336, IC176563 (>2.90)	RBL 35 (2.86)
5.	Pod length (cm)	5.00-9.10	IC026973, IC521081, EC014075, IC248733, IC521049, IC019781-2, IC521068, EC012436, EC048452, IC520892, EC018222 (>8.55 cm)	RBL 35 (8.56 cm)
6.	No. of pods per plant	20.70-106.00	IC026973, IC521148, IC521061, EC016136, IC248733, IC018563, IC521068, EC037226, EC000262, IC019336, EC012436, IC521049, IC521144, IC520892 (>71.80)	RBL 35 (71.74)
7.	Number of seeds per pod	6.20-9.50	EC012436, IC019781-2, IC521144, IC521081, EC018171, EC016136, IC026973, IC521068, EC048452 (>8.20)	RBL 6 (8.18)

S. No.	Characters	Range	Promising lines	Highest value of best check
8.	100 seed weight (g)	4.30-6.30	EC018171, IC018563, IC520892, IC521049, IC521068, IC016342, IC2002567, EC018181, IC176563, IC248733, IC018183, EC087989, IC019336, IC521144, EC001843, IC521081 (>5.75 g)	RBL 1 (5.78 g)
9.	Seed yield (q/ha)	2.50-29.17	EC016136, IC248733, IC521148, IC026973, IC018563, EC012436, IC011723, IC521144 (>20.80 q/ha)	RBL 6 (19.50 q/ha)
Mettupalayam (Accessions 50)				
1.	Days to 50% flowering	45.00-55.00	EC000262, IC016751 (<=45.00 days)	RBL-50 (46.00 days)
2.	Days to maturity	70.00-80.00	IC016751, EC018184, IC018452, IC016767, IC521061, EC018222, IC019781-2, IC521049, EC012416, EC018260, EC018563, EC097882, EC018771, IC521081, IC002909, IC521144, IC002567, IC019336, IC5176563, EC087898, IC018563, IC520892, IC521068, EC001843, EC098452, EC098453, EC078228, IC007537-C, IC521148, EC016136, EC181185, IC248733, EC018181, IC018183 (<75.00 days)	RBL-1 (75.00 days)
3.	Plant height (cm)	55.00-66.00	IC520892, IC521144, EC098452 (>=65.00 cm)	RBL-35 (65.00 cm)
4.	Primary branches per plant	2.00-5.00	EC018771, IC520892, IC521144, EC098452 (>=4.00)	RBL-35 & RBL-50 (4.00)
5.	Number of pods per plant	10.00-32.00	IC007537-C, IC008565-3, IC002074, IC002567, IC011723, IC015640, IC016342 (>20.80)	RBL-50 (20.00)
6.	Seed yield per plant (g)	4.50-7.90	-	RBL-6 (7.90 g)
Rahuri (Accessions 50)				
1.	Days to 50% flowering	39.00-59.00	IC002909, EC018260, EC018556, EC018563, EC114076, EC108887-A, EC016136, EC018184, IC008565-3, EC018171, EC018181, EC018771, EC181185 (>46.00 days)	RBL-6 (46.00 days)
2.	Days to maturity	87.00-111.00	IC002909, EC018260, EC018556, EC114076, IC008565-3, EC018184, EC018563, EC108887-A, IC002074, EC000262, EC016136, EC018171 (<95.00 days)	RBL-35 (95.60 days)
3.	Plant height (cm)	50.00-104.33	EC012436, IC521081, EC012416, EC037228, IC521148, EC108887-A, EC114076, IC521068, EC087989, EC048452, IC521061, EC018181, EC018556, EC097882, EC001843, EC181185 (>91.80 cm)	RBL-1 (91.07 cm)

S. No.	Characters	Range	Promising lines	Highest value of best check
4.	Primary branches per plant	2.67-4.33	EC018171, EC018563, EC000262, EC012416, EC016136, EC018260, EC037226, EC087989, EC097882, EC098452, EC181185, IC007537-C, IC018183, IC256700 (≥ 4.00)	RBL-6 (4.00)
5.	Stem thickness (cm)	0.53-1.53	IC018563, IC019781-2, IC019336, IC002074 (> 1.05 cm)	RBL-35 (1.01 cm)
6.	Pod length (cm)	5.50-9.83	IC019336, EC018771, EC181185, IC016767, EC018171, EC018563, EC037226, EC001843, IC521144, IC002074, EC114076, IC019781-2, EC078228, EC016136, EC018181, EC018556, IC521148, EC018222, IC521068, EC018260, EC087989, EC097882, IC026973, IC002909, IC018183, IC521081, EC012436, IC018563, EC108887-A (≥ 8.07)	RBL-1 (8.07 cm)
7.	Number of seeds per pod	6.33-9.33	EC018771, IC016767, IC019336, EC001843, EC181185, IC002074, IC521144, IC521148, EC016136, EC018171, EC018260, EC018563, EC048452, EC078228, IC002909, IC521068, IC521081, EC000262, EC012416, EC012436, EC018181, EC018222, EC018556, EC037226, EC098453, EC108887-A, EC087989, EC097882, EC114076, IC018183, IC019781-2, IC026973 (> 7.95)	RBL-1 & RBL-6 (7.73)
8.	Number of pods per cluster	3.00-5.00	IC002909, IC015640, IC018183, IC256700, EC087989, EC097882, IC002074, IC008565-3, IC011723, IC016751, IC019781-2, IC176563, IC248733, IC520892, EC000262, EC014075, EC018556, EC018771, EC098453, EC114076, IC016767, IC019336, IC521061, IC521144, EC012436, EC018222, EC018260, EC037226, EC078228, EC098452, EC181185, IC016342, IC018452, IC026973, IC521049, IC521081 (< 3.95)	RBL-6 (3.93)
9.	100 seed weight (g)	3.54-8.87	IC019336, EC097882, EC018181, IC176563, EC087989, EC000262, IC018452, EC016136, EC108887-A, EC037228, IC521068, EC018556, EC012416 (> 6.08 g)	RBL-6 (6.07 g)
10.	Seed yield per plant (g)	4.68-42.67	IC002909, EC018556, EC097882, EC114076, EC037226, EC048452, EC098452, IC026973, EC016136, EC108887-A, IC520892 (> 33.80 g)	RBL-50 (32.34 g)
Best entries over locations				
1.	Days to 50% flowering	45.87 54.33	-	RBL-50 (45.87 days)
2.	Days to maturity	85.47 97.00	-	RBL-50 (85.47)

S. No.	Characters	Range	Promising lines	Highest value of best check
3.	Plant height (cm)	65.68 105.00	IC521148, EC018171, IC248733, IC521049, EC012436, EC016136, IC018563, EC001843, EC018181, EC012416, IC521144, IC520892, EC018184 (>91.00 cm)	RBL-6 (88.64)
4.	Primary branches per plant	2.33 3.90	-	RBL-50 (3.90)
5.	Pod length (cm)	6.07 9.07	IC019336, IC016767, IC019781-2, IC026973, IC521144, IC521081, EC018171, IC521068, EC018563, EC181185, EC016136, EC018771, EC018222, EC014075, EC012436, EC001843, EC097882, EC114076, IC521148, EC018181, IC002074, EC048452 (>8.22 cm)	RBL-1 (8.19 cm)
6.	Number of seeds per pod	6.77 9.00	IC521144, EC012436, IC016767, IC521081, EC018771, IC019336, EC018171, EC016136, IC521068, EC181185, IC019781-2, IC521148, EC048452, EC001843, IC002074, IC026973, EC018181, EC018222, EC037226, EC018260, EC012416, IC002909, EC097882, EC078228, IC521061 (>7.93)	RBL-6 (7.90)
7.	Number of pods per plant	16.35 59.50	IC026973, IC521148, IC521061, EC016136, IC248733, IC018563, IC521068, IC019336 (44.64)	RBL-6 (44.37)
8.	100 seed weight (g)	4.17 7.39	IC019336, EC097882, EC018181, IC176563, EC087989, EC016136, IC521068, IC018452, IC521049, EC000262, IC002567, EC018171 (>5.90 g)	RBL-50 (5.86 g)
9.	Seed yield per plant (g)	6.13 19.97	EC018556, EC097882, IC002909, EC037226, EC114076, EC098452, EC048452, IC026973, EC016136 (>16.55 g)	RBL-50 (16.40 g)

Table 103. Characterization of germplasm lines in rice bean at different locations : Kharif 2013 (Plains)

S.No	Accession No.	Early plant vigour			Plant growth habit			Plant habit			Flower colour			Leaflet shape			Leaflet size			Rahuri			
		Bangalore	Rahuri	Mode	Rahuri	Bangalore	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Pod shattering	Pod colour	Seed shape	Biotic stress susceptibility
1	EC000262	1	2	2	1	1	1	1	1	1	3	3	3	1	2	2	3	5	5	1	1	1	3
2	EC001843	1	3	3	2	1	2	1	1	1	3	3	3	3	2	3	5	3	5	1	2	1	3
3	EC012416	1	2	2	2	1	2	1	1	1	3	3	3	2	2	2	5	3	5	1	2	1	3
4	EC012436	3	2	3	2	2	2	2	1	2	3	3	3	1	2	2	3	3	3	1	1	1	5
5	EC014075	3	2	3	2	1	2	2	1	2	3	3	3	2	1	2	7	3	7	1	3	1	3
6	EC016136	2	3	3	1	1	1	1	1	1	3	3	3	1	2	2	5	5	5	1	1	1	3
7	EC018171	2	3	3	2	1	2	1	1	1	3	3	3	1	3	3	7	5	7	1	1	1	3
8	EC018181	3	3	3	2	2	2	3	1	3	3	3	3	3	2	3	7	3	7	1	3	1	5
9	EC018184	3	2	3	2	2	2	3	1	3	3	3	3	2	2	2	7	5	7	1	3	1	3
10	EC018222	3	2	3	2	1	2	1	1	1	3	3	3	3	2	3	7	5	7	1	2	1	3
11	EC018260	3	3	3	2	2	2	3	1	3	3	3	3	2	2	2	7	5	7	1	2	1	3
12	EC018556	3	2	3	2	1	2	2	1	2	3	3	3	1	1	1	5	3	5	1	2	1	3
13	EC018563	3	3	3	2	1	2	1	1	1	3	3	3	1	2	2	5	5	5	1	3	1	5
14	EC018771	2	2	2	2	1	2	1	1	1	3	3	3	3	2	3	7	3	7	1	3	1	3
15	EC037226	2	1	2	2	1	2	1	1	1	3	3	3	1	2	2	3	3	3	1	1	1	5
16	EC037228	3	3	3	2	1	2	2	1	2	3	3	3	2	3	3	7	5	7	1	2	1	3
17	EC048452	1	3	3	2	1	2	1	1	1	3	3	3	2	3	3	5	3	5	1	3	1	3
18	EC078228	1	3	3	1	1	1	1	1	1	3	3	3	3	3	3	7	5	7	1	2	1	3
19	EC087989	3	2	3	2	2	2	2	1	2	3	3	3	2	3	3	7	5	7	1	2	1	3
20	EC097882	2	3	3	2	1	2	1	1	1	3	3	3	3	3	3	5	5	5	1	1	1	3
21	EC098452	1	2	2	2	1	2	1	1	1	3	3	3	2	2	2	3	3	3	1	1	1	3
22	EC098453	2	3	3	2	2	2	2	1	2	3	3	3	2	2	2	5	5	5	1	2	1	3
23	EC108887-A	2	3	3	2	1	2	1	1	1	3	3	3	2	1	2	5	3	5	1	2	1	3
24	EC114076	1	2	2	2	1	2	1	1	1	3	3	3	2	1	2	3	3	3	1	2	1	5
25	EC181185	1	3	3	2	1	2	1	1	1	3	3	3	2	1	2	3	5	5	1	1	1	3
26	IC002074	2	1	2	2	1	2	1	1	1	3	3	3	2	2	2	5	5	5	1	1	1	5

S.No	Accession No.	Early plant vigour			Plant growth habit			Plant habit			Flower colour			Leaflet shape			Leaflet size			Rahuri			
		Bangalore	Rahuri	Mode	Rahuri	Bangalore	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Pod shattering	Pod colour	Seed shape	Biotic stress susceptibility
27	IC002567	3	2	3	2	1	2	1	1	1	3	3	3	2	2	2	7	3	7	1	2	1	3
28	IC002909	3	2	3	2	1	2	1	1	1	3	3	3	2	2	2	7	3	7	1	2	1	5
29	IC007537-C	2	2	2	2	1	2	1	1	1	3	3	3	2	1	2	3	5	5	1	1	1	3
30	IC008565-3	3	2	3	1	2	2	2	1	2	3	3	3	2	3	3	5	3	5	1	3	1	3
31	IC011723	1	2	2	2	1	2	1	1	1	3	3	3	2	1	2	3	3	3	1	3	1	3
32	IC015640		2	2	2		2		1	1		3	3	3	3	1	3	3	1	3	1	5	
33	IC016342	2	2	2	2	2	2	2	1	2	3	3	3	1	2	2	5	5	5	1	2	1	3
34	IC016751		2	2	2		2		1	1		3	3	3	3	1	3	3	1	2	1	5	
35	IC016767	2	1	2	2	1	2	2	1	2	3	3	3	1	2	2	3	5	5	1	3	1	3
36	IC018183	3	2	3	2	1	2	1	1	1	3	3	3	1	2	2	7	5	7	1	1	1	5
37	IC018452	2	2	2	2	2	2	2	1	2	3	3	3	3	2	3	7	3	7	1	3	1	3
38	IC018563	2	2	2	2	1	2	1	1	1	3	3	3	2	1	2	3	3	3	1	3	1	5
39	IC019336	1	2	2	2	1	2	1	1	1	3	3	3	2	1	2	3	5	5	1	2	1	5
40	IC019781-2	1	2	2	2	1	2	1	1	1	3	3	3	1	2	2	5	3	5	1	1	1	5
41	IC026973	2	2	2	2	2	2	2	1	2	3	3	3	1	2	2	3	5	5	1	2	1	3
42	IC176563	1	1	1	1	1	1	2	1	2	3	3	3	99	2	99	7	5	7	1	2	1	3
43	IC248733	3	2	3	2	2	2	3	1	3	3	3	3	99	2	99	7	5	7	1	2	1	3
44	IC520892	3	2	3	2	2	2	2	1	2	3	3	3	3	1	3	7	3	7	1	2	1	5
45	IC521049	2	2	2	2	1	2	1	1	1	3	3	3	3	1	3	5	3	5	1	3	1	3
46	IC521061	1	2	2	2	1	2	1	1	1	3	3	3	1	2	2	3	5	5	1	2	1	3
47	IC521068		2	2	2		2		1	1		3	3	3	3	1	3	3	1	2	1	5	
48	IC521081	1	2	2	2	1	2	1	1	1	3	3	3	1	2	2	3	5	5	1	3	1	5
49	IC521144	3	2	3	2	1	2	1	1	1	3	3	3	99	1	99	7	3	7	1	1	1	5
50	IC521148	3	2	3	2	2	2	2	1	2	3	3	3	1	2	2	3	5	5	1	2	1	3
Mean for check variety																							
	RBL-1 (C)	3	2	3	1	1	1	1	1	1	3	3	3	2	2	2	7	5	7	1	4	1	3
	RBL-6 (C)	3	1	3	2	1	2	1	2	2	3	3	3	2	2	2	5	5	5	1	4	1	3
	RBL-35 (C)	2	2	2	2	1	2	1	2	2	3	3	3	2	1	2	7	5	7	1	4	1	3
	RBL-50 (C)	2	2	2	1	1	1	1	1	1	3	3	3	2	1	2	5	5	5	1	2	1	3

S.No	Accession No.	Early plant vigour			Plant growth habit			Plant habit			Flower colour			Leaflet shape			Leaflet size			Rahuri			
		Bangalore	Rahuri	Mode	Rahuri	Bangalore	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Bangalore	Rahuri	Mode	Pod shattering	Pod colour	Seed shape	Biotic stress susceptibility
	Minimum	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	3	3	3	1	1	1	3
	Maximum	3	3	3	2	2	2	3	2	3	3	3	3	99	3	99	7	5	7	1	4	1	5
	Mode	3	2	3	2	1	2	1	1	1	3	3	3	2	2	2	7	5	5	1	2	1	3

Qualitative characters : *Early plant vigour* : 1-Poor, 2-Good, 3-Very good, 99-Others; *Plant growth habit* : 1-Erect, 2-Spreading, 3-Tralling, 99-Others; *Plant habit* : 1-Determinate, 2-Semi-determinate, 3-Indeterminate, 99-Others; *Flower colour* : 1-White, 2-Violet, 3-Yellow, 4-Red, 5-Pink, 6-Light brown, 7-Dark brown, 99-Others; *Leaflet shape* : 1-Narrow (elongate), 2-Intermediate (sub elliptic), 3-Round (sub orbicular), 99-Others; *Leaflet size* : 3-Small, 5-Medium 7-Large, 99-Others; *Pod shattering* : 0-Absent, 1-Present; *Pod colour* : 1-Light yellow, 2-Brown, 3-Dark brown, 4-Black, 99-Others; *Seed shape* : 1-Cylindrical, 2-Round, 3-Flattened, 99-Others; *Biotic stress susceptibility* : 1-Very low or Visible sing of susceptibility, 3-Low, 5-Intermediate, 7-High, 9-Very high

Table 102. Multilocation evaluation of germplasm lines in rice bean at different locations : Kharif 2013 (Plains)

S.No	Accession No.	Days to 50% flowering					Days to 80% maturity					Plant height (cm)			
		Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Rahuri	Mean
1	EC000262	44.00	53.00	45.00	46.00	47.00	79.00	104.00	75.00	94.00	88.00	104.00	59.00	58.67	73.89
2	EC001843	43.00	55.00	46.00	47.00	47.75	78.00	106.00	74.00	96.00	88.50	129.00	62.00	92.67	94.56
3	EC012416	46.00	59.00	49.00	59.00	53.25	81.00	109.00	73.00	108.00	92.75	113.70	64.00	100.33	92.68
4	EC012436	39.00	63.00	52.00	49.00	50.75	74.00	107.00	75.00	99.00	88.75	126.70	63.00	104.33	98.01
5	EC014075	35.00	62.00	51.00	50.00	49.50	70.00	108.00	76.00	102.00	89.00	103.00	60.00	72.33	78.44
6	EC016136	37.00	63.00	49.00	44.00	48.25	72.00	112.00	74.00	94.00	88.00	154.70	58.00	81.00	97.90
7	EC018171	46.00	61.00	51.00	45.00	50.75	85.00	107.00	76.00	94.00	90.50	160.00	64.00	88.67	104.22
8	EC018181	43.00	64.00	50.00	45.00	50.50	78.00	110.00	74.00	97.00	89.75	127.30	63.00	93.33	94.54
9	EC018184	47.00	61.00	49.00	44.00	50.25	82.00	112.00	70.00	93.00	89.25	132.70	59.00	81.33	91.01
10	EC018222	39.00	59.00	47.00	47.00	48.00	74.00	104.00	72.00	95.00	86.25	85.00	58.00	64.67	69.22
11	EC018260	42.00	61.00	46.00	41.00	47.50	77.00	103.00	73.00	92.00	86.25	90.00	59.00	84.67	77.89
12	EC018556	45.00	55.00	53.00	42.00	48.75	80.00	106.00	75.00	92.00	88.25	91.70	57.00	93.33	80.68
13	EC018563	42.00	56.00	46.00	42.00	46.50	77.00	105.00	73.00	93.00	87.00	107.70	58.00	86.67	84.12
14	EC018771	42.00	56.00	47.00	45.00	47.50	77.00	107.00	73.00	96.00	88.25	111.70	56.00	86.33	84.68
15	EC037226	38.00	58.00	52.00	46.00	48.50	73.00	104.00	77.00	97.00	87.75	102.30	55.00	88.67	81.99
16	EC037228	44.00	55.00	51.00	49.00	49.75	81.00	107.00	78.00	100.00	91.50	99.70	61.00	97.67	86.12
17	EC048452	43.00	62.00	52.00	50.00	51.75	78.00	106.00	78.00	100.00	90.50	109.70	62.00	94.00	88.57
18	EC078228	45.00	53.00	48.00	47.00	48.25	80.00	107.00	74.00	97.00	89.50	129.30	58.00	73.00	86.77
19	EC087989	45.00	53.00	49.00	48.00	48.75	80.00	105.00	73.00	98.00	89.00	92.00	57.00	94.33	81.11
20	EC097882	35.00	74.00	46.00	54.00	52.25	70.00	106.00	73.00	106.00	88.75	103.30	63.00	93.00	86.43
21	EC098452	42.00	63.00	47.00	59.00	52.75	77.00	105.00	74.00	111.00	91.75	105.00	65.00	89.00	86.33
22	EC098453	43.00	56.00	48.00	46.00	48.25	78.00	104.00	74.00	98.00	88.50	89.00	60.00	88.33	79.11
23	EC108887-A	45.00	56.00	49.00	43.00	48.25	80.00	105.00	75.00	93.00	88.25	62.70	56.00	96.33	71.68
24	EC114076	42.00	72.00	48.00	42.00	51.00	75.00	107.00	75.00	92.00	87.25	107.00	57.00	96.00	86.67
25	EC181185	41.00	56.00	49.00	45.00	47.75	76.00	110.00	74.00	95.00	88.75	97.00	61.00	92.00	83.33
26	IC002074	46.00	59.00	50.00	46.00	50.25	81.00	105.00	75.00	93.00	88.50	87.30	58.00	87.67	77.66

S.No	Accession No.	Days to 50% flowering					Days to 80% maturity					Plant height (cm)			
		Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Rahuri	Mean
27	IC002567	45.00	58.00	48.00	46.00	49.25	80.00	104.00	73.00	95.00	88.00	81.00	63.00	53.67	65.89
28	IC002909	46.00	56.00	47.00	39.00	47.00	81.00	105.00	73.00	87.00	86.50	82.70	62.00	54.00	66.23
29	IC007537-C	46.00	52.00	49.00	49.00	49.00	84.00	104.00	74.00	98.00	90.00	79.00	61.00	57.33	65.78
30	IC008565-3	48.00	56.00	52.00	44.00	50.00	83.00	101.00	77.00	92.00	88.25	84.70	60.00	52.33	65.68
31	IC011723	49.00	61.00	53.00	51.00	53.50	84.00	109.00	78.00	97.00	92.00	98.30	58.00	79.33	78.54
32	IC015640		55.00	52.00	56.00	54.33		105.00	77.00	103.00	95.00	90.70	61.00	73.33	75.01
33	IC016342	46.00	56.00	52.00	51.00	51.25	81.00	107.00	76.00	97.00	90.25	86.00	62.00	90.67	79.56
34	IC016751	42.00	58.00	45.00	50.00	48.75	77.00	111.00	70.00	98.00	89.00	109.00	60.00	83.33	84.11
35	IC016767	43.00	56.00	46.00	49.00	48.50	78.00	112.00	72.00	97.00	89.75	88.00	59.00	74.33	73.78
36	IC018183	42.00	56.00	52.00	51.00	50.25	77.00	104.00	74.00	99.00	88.50	101.70	58.00	50.00	69.90
37	IC018452	41.00	57.00	46.00	50.00	48.50	76.00	102.00	72.00	99.00	87.25	75.30	62.00	85.00	74.10
38	IC018563	43.00	61.00	50.00	52.00	51.50	78.00	113.00	73.00	101.00	91.25	139.00	64.00	89.67	97.56
39	IC019336	39.00	57.00	49.00	47.00	48.00	75.00	110.00	73.00	96.00	88.50	131.00	63.00	65.33	86.44
40	IC019781-2	37.00	56.00	48.00	54.00	48.75	72.00	106.00	72.00	103.00	88.25	129.70	62.00	52.33	81.34
41	IC026973	41.00	61.00	55.00	55.00	53.00	76.00	107.00	76.00	105.00	91.00	129.30	61.00	66.00	85.43
42	IC176563	42.00	63.00	49.00	57.00	52.75	77.00	112.00	73.00	106.00	92.00	116.00	62.00	84.33	87.44
43	IC248733	42.00	63.00	50.00	46.00	50.25	77.00	116.00	74.00	95.00	90.50	161.30	64.00	86.33	103.88
44	IC520892	46.00	65.00	52.00	51.00	53.50	81.00	117.00	73.00	100.00	92.75	126.00	66.00	81.33	91.11
45	IC521049	43.00	61.00	49.00	57.00	52.50	78.00	115.00	72.00	104.00	92.25	155.00	61.00	86.00	100.67
46	IC521061	38.00	64.00	47.00	53.00	50.50	73.00	114.00	72.00	102.00	90.25	92.70	62.00	94.00	82.90
47	IC521068		61.00	46.00	51.00	52.67		116.00	74.00	101.00	97.00	105.30	63.00	96.00	88.10
48	IC521081	43.00	63.00	47.00	47.00	50.00	78.00	108.00	73.00	97.00	89.00	97.30	64.00	101.00	87.43
49	IC521144	41.00	69.00	48.00	49.00	51.75	76.00	110.00	73.00	99.00	89.50	119.00	65.00	90.00	91.33
50	IC521148	45.00	62.00	49.00	48.00	51.00	82.00	113.00	74.00	96.00	91.25	160.00	58.00	97.00	105.00
Mean for check variety															
	RBL-1 (C)	41.20	60.50	49.00	46.60	49.33	76.20	109.33	75.00	96.80	89.33	108.92	63.00	91.07	87.66
	RBL-6 (C)	44.00	55.50	47.00	46.00	48.13	79.00	105.00	78.00	95.80	89.45	112.06	64.00	89.87	88.64
	RBL-35 (C)	42.20	61.33	48.00	46.40	49.48	77.20	109.17	80.00	95.60	90.49	116.02	65.00	81.33	87.45
	RBL-50 (C)	43.40		46.00	48.20	45.87	78.80		80.00	97.60	85.47		64.00	77.67	70.83

S.No	Accession No.	Days to 50% flowering					Days to 80% maturity					Plant height (cm)			
		Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Bangalore	Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Rahuri	Mean
	Minimum	35.00	52.00	45.00	39.00	45.87	70.00	101.00	70.00	87.00	85.47	62.70	55.00	50.00	65.68
	Maximum	49.00	74.00	55.00	59.00	54.33	85.00	117.00	80.00	111.00	97.00	161.30	66.00	104.33	105.00
	Mean	42.65	59.42	48.91	48.36	49.87	77.85	107.84	74.33	97.74	89.50	109.37	60.93	82.61	84.06
	CD(0.05)	5.12			11.26		5.67			12.83				29.29	
	CV(%) Error	4.49			9.01		2.73			4.98				12.91	
	CV(%) Phenotypic	7.25	7.66	4.82	9.31		4.34	3.54	2.92	4.62		21.15	4.50	17.14	

S.No	Accession No.	No. of primary branches per plant				No. of pods per plant			No. of seeds per pod			Pod length (cm)		
		Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Mean	Ludhiana	Rahuri	Mean	Ludhiana	Rahuri	Mean
1	EC000262	2.70	4.00	4.00	3.57	75.30	12.00	43.65	6.50	8.33	7.42	7.40	8.03	7.72
2	EC001843	1.70	3.00	3.00	2.57	54.30	14.00	34.15	7.50	9.00	8.25	7.90	8.90	8.40
3	EC012416	2.30	3.00	4.00	3.10	61.00	13.00	37.00	7.80	8.33	8.07	8.00	7.90	7.95
4	EC012436	3.30	3.00	3.33	3.21	73.30	14.00	43.65	9.50	8.33	8.92	8.70	8.13	8.42
5	EC014075	2.70	4.00	3.33	3.34	68.70	16.00	42.35	8.20	7.00	7.60	9.00	7.93	8.47
6	EC016136	3.00	4.00	4.00	3.67	92.70	17.00	54.85	8.40	8.67	8.54	8.40	8.70	8.55
7	EC018171	1.70	2.00	4.33	2.68	44.30	14.00	29.15	8.50	8.67	8.59	7.90	9.37	8.64
8	EC018181	1.70	3.00	3.33	2.68	65.30	16.00	40.65	8.00	8.33	8.17	8.10	8.67	8.39
9	EC018184	2.30	3.00	3.67	2.99	56.00	15.00	35.50	7.20	7.33	7.27	7.20	7.50	7.35
10	EC018222	2.70	3.00	3.33	3.01	40.00	13.00	26.50	8.00	8.33	8.17	8.60	8.43	8.52
11	EC018260	1.30	4.00	4.00	3.10	43.30	12.00	27.65	7.50	8.67	8.09	7.50	8.33	7.92
12	EC018556	1.30	3.00	3.33	2.54	46.70	14.00	30.35	6.50	8.33	7.42	7.60	8.50	8.05
13	EC018563	1.00	4.00	4.33	3.11	32.30	12.00	22.15	7.00	8.67	7.84	7.90	9.23	8.57
14	EC018771	1.70	5.00	3.67	3.46	57.00	10.00	33.50	8.00	9.33	8.67	7.30	9.80	8.55
15	EC037226	2.00	4.00	4.00	3.33	75.70	12.00	43.85	8.00	8.33	8.17	7.10	9.03	8.07
16	EC037228	2.30	3.00	3.67	2.99	40.00	15.00	27.50	7.80	7.67	7.74	7.90	6.97	7.44
17	EC048452	2.30	2.00	3.00	2.43	56.00	17.00	36.50	8.30	8.67	8.49	8.70	7.77	8.24
18	EC078228	1.30	3.00	3.67	2.66	38.00	18.00	28.00	7.20	8.67	7.94	7.10	8.77	7.94
19	EC087989	1.00	2.00	4.00	2.33	34.00	15.00	24.50	7.00	8.00	7.50	7.30	8.30	7.80
20	EC097882	1.70	3.00	4.00	2.90	32.30	16.00	24.15	8.00	8.00	8.00	8.50	8.30	8.40
21	EC098452	1.30	4.00	4.00	3.10	32.70	14.00	23.35	8.00	7.00	7.50	7.30	7.87	7.59
22	EC098453	1.00	3.00	3.33	2.44	29.30	13.00	21.15	7.00	8.33	7.67	7.70	7.87	7.79
23	EC108887-A	1.00	4.00	3.67	2.89	20.70	12.00	16.35	7.00	8.33	7.67	7.30	8.07	7.69
24	EC114076	1.30	3.00	3.67	2.66	31.30	14.00	22.65	7.50	8.00	7.75	8.00	8.80	8.40
25	EC181185	1.70	2.00	4.00	2.57	44.30	15.00	29.65	8.00	9.00	8.50	7.40	9.73	8.57
26	IC002074	2.30	3.00	3.67	2.99	44.70	25.00	34.85	7.40	9.00	8.20	7.70	8.87	8.29

S.No	Accession No.	No. of primary branches per plant				No. of pods per plant			No. of seeds per pod			Pod length (cm)		
		Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Mean	Ludhiana	Rahuri	Mean	Ludhiana	Rahuri	Mean
27	IC002567	1.70	4.00	4.00	3.23	38.70	24.00	31.35	6.80	7.33	7.07	6.80	7.74	7.27
28	IC002909	2.30	3.00	3.00	2.77	37.00	18.00	27.50	7.40	8.67	8.04	7.70	8.27	7.99
29	IC007537-C	2.00	4.00	4.00	3.33	32.70	32.00	32.35	7.50	7.00	7.25	6.80	7.43	7.12
30	IC008565-3	1.70	4.00	3.67	3.12	33.30	26.00	29.65	6.20	7.33	6.77	5.50	7.60	6.55
31	IC011723	2.30	3.00	3.00	2.77	46.30	23.00	34.65	6.80	7.00	6.90	8.50	7.33	7.92
32	IC015640	2.70	3.00	3.33	3.01	49.70	22.00	35.85	7.40	7.00	7.20	7.60	7.03	7.32
33	IC016342	2.00	4.00	3.67	3.22	36.30	21.00	28.65	7.80	6.33	7.07	7.40	6.70	7.05
34	IC016751	2.30	3.00	3.33	2.88	53.70	20.00	36.85	8.00	7.33	7.67	5.00	7.13	6.07
35	IC016767	1.70	4.00	3.67	3.12	42.30	18.00	30.15	8.20	9.33	8.77	8.50	9.43	8.97
36	IC018183	2.30	3.00	4.00	3.10	42.00	17.00	29.50	7.50	8.00	7.75	7.00	8.27	7.64
37	IC018452	2.30	4.00	3.33	3.21	45.30	16.00	30.65	7.60	7.33	7.47	6.70	8.00	7.35
38	IC018563	3.70	3.00	3.33	3.34	81.70	19.00	50.35	8.00	7.67	7.84	7.90	8.10	8.00
39	IC019336	3.00	4.00	3.33	3.44	74.30	15.00	44.65	8.00	9.33	8.67	8.30	9.83	9.07
40	IC019781-2	2.30	4.00	3.67	3.32	64.70	14.00	39.35	9.00	8.00	8.50	8.80	8.80	8.80
41	IC026973	3.30	3.00	3.67	3.32	106.00	13.00	59.50	8.40	8.00	8.20	9.10	8.30	8.70
42	IC176563	3.00	3.00	3.67	3.22	55.30	15.00	35.15	8.00	7.67	7.84	8.30	7.33	7.82
43	IC248733	4.30	3.00	3.67	3.66	86.00	15.00	50.50	7.80	6.33	7.07	9.00	5.50	7.25
44	IC520892	4.00	4.00	3.33	3.78	72.00	14.00	43.00	8.00	7.00	7.50	8.70	6.23	7.47
45	IC521049	3.70	4.00	3.33	3.68	73.00	12.00	42.50	8.20	6.67	7.44	8.90	6.20	7.55
46	IC521061	2.70	3.00	2.67	2.79	97.70	13.00	55.35	8.20	7.67	7.94	8.40	7.93	8.17
47	IC521068	3.30	4.00	3.67	3.66	77.70	14.00	45.85	8.40	8.67	8.54	8.80	8.37	8.59
48	IC521081	3.30	3.00	3.67	3.32	65.30	16.00	40.65	8.80	8.67	8.74	9.10	8.27	8.69
49	IC521144	3.30	4.00	3.33	3.54	73.00	14.00	43.50	9.00	9.00	9.00	8.50	8.90	8.70
50	IC521148	2.70	4.00	3.67	3.46	102.00	13.00	57.50	8.00	9.00	8.50	8.30	8.47	8.39
Mean for check variety														
	RBL-1 (C)	2.42	4.00	3.47	3.30	59.14	16.00	37.57	8.04	7.73	7.89	8.32	8.07	8.19
	RBL-6 (C)	2.86	3.50	4.00	3.45	71.74	17.00	44.37	8.08	7.73	7.90	8.56	7.63	8.10
	RBL-35 (C)	2.34	4.00	3.47	3.27	59.86	18.00	38.93	8.18	7.20	7.69	8.04	7.35	7.69
	RBL-50 (C)		4.00	3.80	3.90		20.00	20.00		7.67	7.67		7.79	7.79

S.No	Accession No.	No. of primary branches per plant				No. of pods per plant			No. of seeds per pod			Pod length (cm)		
		Ludhiana	Mettupalayam	Rahuri	Mean	Ludhiana	Mettupalayam	Mean	Ludhiana	Rahuri	Mean	Ludhiana	Rahuri	Mean
	Minimum	1.00	2.00	2.67	2.33	20.70	10.00	16.35	6.20	6.33	6.77	5.00	5.50	6.07
	Maximum	4.30	5.00	4.33	3.90	106.00	32.00	59.50	9.50	9.33	9.00	9.10	9.83	9.07
	Mean	2.30	3.42	3.61	3.12	55.96	16.17	35.73	7.79	8.02	7.91	7.89	8.11	8.00
	CD(0.05)			0.91						2.01			2.50	
	CV(%) Error			9.22						9.92			12.17	
	CV(%) Phenotypic	35.01	19.23	9.78		36.44	25.54		8.39	9.73		10.65	10.92	

S.No	Accession No.	100 seed weight (g)			Seed yield per plant (g)				Grain yield (q/ha)	Rahuri	
		Ludhiana	Rahuri	Mean	Bangalore	Mettupalayam	Rahuri	Mean	Ludhiana	No. of pods per cluster	Stem thickness (cm)
1	EC000262	5.00	7.01	6.01	5.00	7.20	6.72	6.31	10.00	4.33	0.57
2	EC001843	5.80	5.80	5.80	8.50	7.10	16.00	10.53	12.92	3.00	0.80
3	EC012416	5.60	6.09	5.85	6.50	7.20	4.68	6.13	15.00	3.33	0.83
4	EC012436	5.10	4.98	5.04	7.00	7.40	17.33	10.58	20.83	4.00	0.60
5	EC014075	5.60	5.80	5.70	10.00	7.60	17.83	11.81	17.71	4.33	0.90
6	EC016136	5.50	6.94	6.22	7.00	7.80	34.88	16.56	29.17	3.33	0.80
7	EC018171	6.30	5.52	5.91	7.50	7.20	25.17	13.29	15.83	3.33	0.53
8	EC018181	6.10	7.20	6.65	7.00	7.90	12.11	9.00	17.92	3.33	0.87
9	EC018184	5.00	5.10	5.05	7.50	6.50	16.63	10.21	17.08	3.00	0.63
10	EC018222	5.70	5.40	5.55	7.20	6.80	32.33	15.44	5.00	4.00	0.63
11	EC018260	5.60	5.20	5.40	8.50	6.30	26.33	13.71	4.17	4.00	0.77
12	EC018556	5.30	6.10	5.70	10.50	7.40	42.00	19.97	10.42	4.33	0.80
13	EC018563	5.30	5.94	5.62	8.50	7.60	30.50	15.53	12.50	3.67	0.73
14	EC018771	4.60	5.40	5.00	7.00	7.50	26.17	13.56	17.71	4.33	0.87
15	EC037226	4.80	4.80	4.80	8.00	7.30	37.17	17.49	15.00	4.00	0.77
16	EC037228	5.30	6.20	5.75	7.50	7.20	22.17	12.29	8.75	3.67	1.00
17	EC048452	5.30	5.71	5.51	7.00	7.40	36.33	16.91	17.50	3.33	0.80
18	EC078228	4.50	5.80	5.15	9.50	7.10	12.80	9.80	7.08	4.00	0.60
19	EC087989	5.90	7.10	6.50	8.50	7.40	21.33	12.41	4.17	4.67	0.87
20	EC097882	5.60	7.94	6.77	9.50	7.50	42.00	19.67	5.00	4.67	0.83
21	EC098452	4.30	5.22	4.76	7.50	7.60	36.33	17.14	3.96	4.00	0.80
22	EC098453	4.70	5.78	5.24	6.50	5.50	28.67	13.56	2.50	4.33	0.83
23	EC108887-A	4.60	6.71	5.66	8.50	5.60	34.33	16.14	2.92	3.67	0.73
24	EC114076	5.00	5.27	5.14	7.00	5.70	39.33	17.34	4.58	4.33	0.77
25	EC181185	4.60	5.80	5.20	7.50	5.40	25.45	12.78	8.96	4.00	0.73
26	IC002074	5.00	4.80	4.90	6.00	6.50	6.48	6.33	12.71	4.67	1.07

S.No	Accession No.	100 seed weight (g)			Seed yield per plant (g)				Grain yield (q/ha)	Rahuri	
		Ludhiana	Rahuri	Mean	Bangalore	Metupalayam	Rahuri	Mean	Ludhiana	No. of pods per cluster	Stem thickness (cm)
27	IC002567	6.20	5.70	5.95	8.50	5.40	19.50	11.13	11.67	5.00	0.90
28	IC002909	4.80	3.54	4.17	6.50	4.50	42.67	17.89	9.17	5.00	0.90
29	IC007537-C	5.00	5.20	5.10	7.50	5.60	14.47	9.19	5.00	3.67	0.90
30	IC008565-3	5.60	5.00	5.30	7.50	6.80	19.08	11.13	6.67	4.67	0.90
31	IC011723	4.90	4.77	4.84	7.00	4.80	15.33	9.04	20.83	4.67	0.87
32	IC015640	5.60	5.10	5.35		6.80	9.00	7.90	7.92	5.00	0.73
33	IC016342	6.20	5.20	5.70	6.50	7.10	11.00	8.20	12.50	4.00	0.63
34	IC016751	5.10	6.00	5.55	9.50	7.20	18.00	11.57	12.92	4.67	0.60
35	IC016767	5.00	4.80	4.90	8.00	6.50	23.17	12.56	15.42	4.33	0.73
36	IC018183	6.00	5.40	5.70	8.50	6.80	27.50	14.27	10.00	5.00	0.83
37	IC018452	5.30	7.00	6.15	7.50	6.50	24.33	12.78	17.08	4.00	0.93
38	IC018563	6.30	5.10	5.70	7.00	5.90	23.33	12.08	22.08	3.67	1.53
39	IC019336	5.90	8.87	7.39	7.50	4.50	30.33	14.11	17.92	4.33	1.13
40	IC019781-2	5.70	5.40	5.55	8.50	6.20	21.67	12.12	18.33	4.67	1.27
41	IC026973	5.70	4.82	5.26	7.00	7.10	36.33	16.81	22.92	4.00	0.93
42	IC176563	6.10	7.20	6.65	9.00	6.40	15.78	10.39	13.33	4.67	0.97
43	IC248733	6.10	5.10	5.60	7.00	6.80	29.17	14.32	29.17	4.67	0.83
44	IC520892	6.30	4.10	5.20	7.50	6.90	33.83	16.08	20.00	4.67	0.77
45	IC521049	6.30	5.90	6.10	6.50	5.80	22.17	11.49	15.83	4.00	0.83
46	IC521061	4.90	4.80	4.85	7.00	5.90	15.54	9.48	18.75	4.33	0.87
47	IC521068	6.30	6.12	6.21		6.30	9.42	7.86	16.67	3.67	0.80
48	IC521081	5.80	5.70	5.75	7.50	7.50	13.40	9.47	16.67	4.00	0.83
49	IC521144	5.90	5.40	5.65	6.90	7.30	18.67	10.96	20.83	4.33	0.83
50	IC521148	5.40	6.00	5.70	8.30	7.20	23.17	12.89	25.42	3.33	0.73
Mean for check variety											
	RBL-1 (C)	5.78	5.78	5.78	8.76	6.90	30.67	15.44	19.33	3.74	0.84
	RBL-6 (C)	5.56	6.07	5.81	9.51	7.90	18.35	11.92	18.42	3.93	1.00
	RBL-35 (C)	5.54	5.72	5.63	8.89	7.50	19.97	12.12	19.50	3.73	1.01
	RBL-50 (C)		5.86	5.86	9.25	7.60	32.34	16.40		3.87	1.01

S.No	Accession No.	100 seed weight (g)			Seed yield per plant (g)				Grain yield (q/ha)	Rahuri	
		Ludhiana	Rahuri	Mean	Bangalore	Metupalayam	Rahuri	Mean	Ludhiana	No. of pods per cluster	Stem thickness (cm)
	Minimum	4.30	3.54	4.17	5.00	4.50	4.68	6.13	2.50	3.00	0.53
	Maximum	6.30	8.87	7.39	10.50	7.90	42.67	19.97	29.17	5.00	1.53
	Mean	5.46	5.73	5.60	7.77	6.73	23.50	12.67	14.03	4.10	0.84
	CD(0.05)		1.31		4.00		10.21			0.75	0.26
	CV(%) Error		8.37		16.44		15.10			7.33	9.93
	CV(%) Phenotypic	10.03	16.07		14.23	12.78	41.97		47.40	12.80	20.34

Table 104. Promising lines in Fababean germplasm for various characters at different locations : Rabi 2012-13 (Plains)

S. No.	Characters	Range	Promising lines	Value of best check
Delhi (Accessions 50)				
1.	Days to 50% flowering	64.00-75.00	EC247679, EC287710, EC243770, EC323588, EC591675, EC117726, EC253793, EC267648, EC327724, IC348945, EC117705, EC267640, EC327677, EC329662, HB-69, HB-87, IC263634 (<66.00 days)	Vikrant (65.00 days)
2.	Days to 80% maturity	139.00-150.00	HB-21, HB-57, HB-30, HB-62, EC243770, EC327677, HB-50, HB-58, HB-18, HB-32, HB-26, HB-16, EC323588, HB-67, EC287710, EC253793, EC343999, HB-17, HB-19, HB-34, EC329681, HB-36 (<144.00 days)	Vikrant (143.80 days)
3.	Number of branch per plant	4.00-6.40	EC243608, HB-57, HB-17, EC024312, HB-21, HB-18, IC267939, EC591675, EC327724, EC267640, HB-87, HB-50, IC348945, HB-78, HB-58, EC329609, EC032976, EC243624 (>5.00)	Vikrant (5.16)
4.	Number of pods per plant	12.00-55.80	HB-16, HB-17PRT-12, HB-34, HB-18, EC024312, EC243624, IC331561, EC329668, HB-78, EC117726, HB-69, HB-79, HB-19, EC343999, EC243608, HB-30 (>24.00)	Vikrant (24.20)
5.	Number of seeds per pod	2.80-4.60	HB-18, HB-34, HB-69, EC024312, IC263634, HB-16, EC263820, HB-57, HB-17, HB-26, IC267939, IC331561, EC267648, HB-19, HB-32, HB-87PRT-12, EC243770, HB-79, HB-21, HB-76, IC348945 (>3.50)	PRT-12 (3.60)
6.	Plant height (cm)	82.80-135.60	HB-21, HB-19, HB-32, HB-78, HB-30, HB-18, HB-34PRT-12, HB-17, HB-87, HB-26, HB-79, HB-57, HB-50, IC263634, EC243770, IC331561, HB-58, HB-76, HB-16, EC117705, IC267939, HB-67, EC039085, HB-36, EC331564, EC343999, HB-62, EC243596, HB-69, EC329609, EC591675, EC117739, EC243608 (>103.00 cm)	Vikrant (103.08 cm)
7.	Pod length (mm)	39.04-67.02	HB-19, HB-36, HB-18, HB-26, HB-30, HB-67, IC267939, HB-21PRT-12, HB-34, HB-57, HB-87, HB-17, IC331561, HB-69, HB-50, IC348945, HB-76, EC243608, HB-16, EC117739, HB-62, HB-32, HB-79 (>53.00 mm)	Vikrant (52.84 mm)
8.	Pod width (mm)	7.76-11.11	IC263634, HB-19, HB-30, HB-50, HB-36, HB-57, HB-32, HB-16, EC329609, EC327724, EC591675, HB-87, EC117705PRT-12, HB-34, HB-17, HB-26, EC331564, EC243770, IC267939, EC253793, EC329668, HB-79, HB-67, HB-21, HB-62, HB-76, HB-18, HB-69, IC348945, EC247679, EC329681, EC024312, IC331561, HB-58 (>9.00 mm)	PRT-12 (9.00 mm)

S. No.	Characters	Range	Promising lines	Value of best check
9.	Seed yield per plant	23.14-150.32	HB-76, EC591675, HB-58, HB-19, HB-50, IC331561, EC329668, HB-30, EC263820, EC243608, HB-17, EC243596, EC243624, HB-62, HB-36 (>82.50)	Vikrant (81.19)
10.	100 Seed weight (g)	14.84-36.04	EC591675, EC243770, HB-50, EC267648, IC263634, EC327724, EC243596, HB-30, HB-36, HB-19PRT-12, HB-58, EC243624, HB-62, EC329609, HB-79, HB-57, EC243756, EC343999, HB-78, HB-67, HB-87, HB-18, HB-17, EC331564, EC263820, HB-76, HB-16, EC253793, EC117739, EC287710, EC247679, IC331561, HB-21, EC267640, HB-26, EC117705, EC329668, IC267939, HB-34 (>19.00 g)	Vikrant (19.13 g)
Faizabad (Accessions 50)				
1.	Days to 50% flowering	33.00 - 47.00	EC327724, EC243624, EC39085, EC243596, EC247679, EC323588, EC327677, HB-19, HB-30, HB-87, EC329662, HB-57, HB-62, HB-67, HB-76, EC24312, EC267640, HB-17, HB-26, HB-58, IC331561, EC253793, EC329681, HB-21, HB-50, IC348945 (<40.00 days)	Vikrant (39.89 days)
2.	Days to maturity	140.00-160.00	HB-62, HB-21, HB-32, HB-50, HB-58, HB-67, HB-69, HB-78, EC117739, EC263820, HB-57, HB-76, EC327724, EC243756, EC247679, EC243624, HB-30, EC243770, HB-79, IC263634, IC331561, EC117726, EC331564, HB-19, HB-26, HB-34, HB-87 (<152.00 days)	Vikrant (152.44 days)
3.	No. of branches / Plant	3.00 6.00	HB-21, IC263634, EC323588, EC239609, EC331564, HB-17, HB-16, EC267640, EC329668, HB-69, EC117726, HB-62, HB-50, HB-57, HB-67, HB-78, EC247679, HB-26, HB-30, HB-36, EC243999, HB-58, EC117705, EC329681, HB-87 (>4.00)	Vikrant (4.07)
4.	No. of seed/ pod	2.60 - 3.40	HB-87, EC243596, EC243624, EC243770, EC329681, HB-26, HB-30, HB-79, EC117726, EC117739, EC243999, EC267648, EC267939, EC287710, EC327677, EC329662, EC331564, HB-16, HB-21, HB-32, HB-62, HB-67, HB-69, HB-76, HB-78, IC331561 (>2.80)	Vikrant (2.94)
5.	No. of pods/ plant	16.00 - 40.00	EC32976, EC331564, EC267640, EC117726, EC117739, EC239609, HB-16, EC243596, EC243756, EC329662, IC263634, EC243624, EC117705, EC24312, EC243608, HB-32, HB-58, EC327724, HB-78, EC329681, EC243999, EC267648, HB-17, HB-57, HB-67, EC323588, HB-50, IC348945 (>24.50)	Vikrant (24.58)

6.	Plant height (cm)	72.50 - 105.50	HB-19, HB-21, HB-26, HB-32, EC24312, EC243624, EC287710, EC267648, EC239609, HB-34, EC323588, HB-30, IC331561, IC263634, IC348945, EC253793, EC39085, EC243756, EC243999, EC247679, EC331564, HB-16, HB-18, HB-57, HB-62, EC243608, EC267939, HB-17 (>93.50 cm)	Vikrant (93.28 cm)
7.	Seed yield / plant (g)	18.00 - 33.00	HB-78, EC267640, IC263634, IC348945, EC243756, EC263820, EC327724, HB-36, EC243624, EC243770, EC267648, HB-18, HB-79, EC117705, EC39085, HB-19, EC24312, EC323588, EC329668, EC287710, HB-17, HB-50, EC243596, EC243608, EC243999 (>27.50 g)	Vikrant (27.52 g)
8.	100 seed weight (g)	22.50 - 28.80	IC348945, IC263634, EC24312, EC329662, EC239609, EC243756, HB-76, EC243770, EC247679, EC267640, EC117739, EC243999, EC287710, IC331561, HB-30, HB-87, EC263820, EC329681, EC32976, EC39085, HB-21, HB-26, HB-32, HB-58, HB-78, EC243624, EC267939, EC323588, HB-34 (>25.00 g)	Vikrant (25.49 g)
Hisar (Accessions 50)				
1	Days to 50% flowering	43.00- 69.00	HB-79, HB-26, HB-36, HB-87, EC243624, EC329662, EC331564, HB-32, EC117726, HB-30, HB-50, EC329668, EC351999, HB-19, HB-57, HB-76, HB-16, HB-58, EC247640, HB-18, IC263634 (<54.00 days)	Vikrant (54.00 days)
2	Days to maturity	141.00- 176.00	HB-26, EC329662, HB-19, HB-36, EC117726, EC243624, HB-16, HB-30, EC247640, EC267679, HB-32, EC329668, EC331564, HB-50, HB-87, HB-76, HB-79, HB-18, HB-62, EC287710, EC351999, HB-57, IC263634, HB-17, HB-58 (<158.00 days)	Vikrant (157.00 days)
3	Plant height (cm)	84.90- 165.40	HB-19, HB-18, HB-26, EC024312, HB-34, EC243770, EC032976, HB-17, EC329609 (>137.00 cm)	Vikrant (137.40 cm)
4	Number of primary branches	2.00- 8.00	HB-30, HB-32, HB-62, HB-69, HB-16, HB-18, HB-78 (>4.50)	Vikrant (5.00)
5	Clusters per plant	4.00- 27.00	HB-30, HB-69, HB-62, EC243624, EC032976, HB-18, EC329668, HB-32, HB-78 (>14.50)	Vikrant (15.00)
6	Pods per plant	17.00- 87.00	HB-30, HB-69, HB-62, EC032976, EC243624, HB-78, EC329668, HB-32, IC331561, EC024312, EC243756, HB-18, HB-58, EC331564, HB-87, EC329662, EC117739, EC243770, HB-50, HB-76, EC025085, HB-36, HB-79, HB-19 (>40.50)	Vikrant (41.00)

7	Pod length (cm)	4.10-6.20	HB-76, EC243820, HB-34, HB-50, EC117705, EC243608, HB-17, HB-26, HB-30, HB-57, HB-67, IC331561, EC329681, EC351999, EC243756, EC247640, EC267648, HB-36, HB-62, EC327724, EC329588, EC329668, EC331564, HB-16, HB-18, HB-69, IC263634, EC117739, EC243770, EC025085, EC287710, EC327677, HB-21, HB-78, HB-87, EC253793 (>4.50 cm)	Vikrant (4.90 cm)
8	Seeds per pod	3.00-4.00	HB-18, HB-19, HB-30, HB-76, HB-79, EC117705, EC117726, EC117739, EC024312, EC243596, EC243608, EC243624, EC243756, EC243770, EC243820, EC247640, EC025085, EC253793, EC267648, EC267679, EC287710, EC327677, EC327724, EC329588, EC329609, EC329662, EC329668, EC329681, EC032976, EC331564, EC351999, HB-16, HB-17, HB-21, HB-26, HB-32, HB-34, HB-36, HB-50, HB-57, HB-58, HB-62, HB-67, HB-69, HB-78, HB-87, IC263634, IC267939, IC331561, IC348945 (>2.50)	Vikrant (3.00)
9	100 seed weight (g)	25.10-32.20	EC243624, EC331564, HB-67, HB-36, HB-16, HB-30, EC243756, EC267648, HB-34, HB-79, HB-87, EC024312, EC117739, EC329681, EC287710, EC329609, HB-32, IC348945, EC243608, EC243596, EC329662, HB-50, EC243820, HB-58, EC032976, EC329668, EC351999, HB-57, HB-78, HB-69, HB-26, EC117726, EC247640, HB-17, EC243770, HB-76, IC267939, EC267679, EC329588, HB-18, IC331561, EC025085 (>25.50 g)	Vikrant (25.90 g)
10	Seed yield per plant (g)	7.40-96.80	HB-30, HB-69, EC243624, HB-18, EC032976, HB-62, HB-76, HB-78, HB-79, EC243756, HB-32, EC329668, EC024312, IC348945, EC331564, HB-87, HB-19, IC331561, HB-58, EC329662, HB-57 (>29.00 g)	Vikrant (29.10 g)

Best entries over location				
1	Days to 50% flowering	49.33-63.00	HB-87, EC243624, HB-79, EC329662, HB-19, HB-26, HB-57, EC117726, EC267648, HB-76, HB-30, HB-50, EC263820, HB-32, HB-58, IC263634, EC287710, EC327724, EC329668, EC331564, EC343999 (<54.00 days)	Vikrant (53.76 days)
2	Days to 80% maturity	142.33-159.00	HB-32, HB-50, HB-26, HB-30, HB-62, EC267648, HB-19, EC117726, HB-16, HB-58, HB-76, HB-57, EC243624, EC331564, HB-21, HB-36, HB-79, EC263820, HB-87, EC329662, HB-18, HB-69, HB-78, EC343999, HB-67 (<152.00 days)	Vikrant (151.08 days)

3	Plant height (cm)	85.30-134.97	HB-19, HB-18, HB-26, HB-21, HB-32, HB-34, HB-30, HB-17, EC243770, IC331561, EC024312, EC329609, IC267939, HB-16, IC263634, HB-78, EC331564 (>111.50 cm)	Vikrant (110.75 cm)
4	Number of primary branch per plant	3.53-5.70	HB-30, HB-32, HB-62, HB-21, HB-17, HB-69, HB-78, HB-18, HB-57, HB-16 (>4.50)	Vikrant (4.74)
5	Pod length (cm)	4.47-5.89	HB-76, HB-36, HB-26, HB-30, HB-19, HB-67, HB-34, HB-18, HB-57, HB-50, HB-17, IC331561, HB-21, EC243608, HB-69, HB-87, HB-62, IC267939, EC343999, HB-16, EC117739, EC117705, EC263820, IC348945, EC327724 (>5.00)	Vikrant (5.09 cm)
6	Number of pods per plant	20.70-44.40	HB-30, HB-69, EC032976, EC243624, HB-16, HB-78, HB-62, EC024312, HB-32, EC329668, IC331561, HB-58, HB-18, EC331564, EC243756, HB-17, EC117739, EC263820, HB-79, HB-50, HB-19 (>29.50)	Vikrant (29.63)
7	Number of seeds per pod	2.93-3.80	HB-18, HB-79, HB-76, HB-19, HB-30, HB-69, IC267939, EC024312, HB-16, HB-26, HB-34, HB-87, EC243624, EC243770, EC263820, IC263634, IC331561, EC327677, EC329681, EC343999, HB-17, HB-21, HB-32, HB-57 (>3.00)	Vikrant (3.18)
8	100 Seed weight (g)	21.31-27.40	HB-30, EC243770, EC243624, HB-50, EC329609, EC243756, EC267648, EC243596, HB-36, HB-87, HB-58, HB-79, EC343999, EC117739, IC263634, EC287710, HB-78, EC024312, EC263820, HB-57, HB-67, HB-76, EC253793, EC331564, EC327724, HB-34, HB-32, HB-16, EC329681, EC267640, HB-26, HB-62, HB-18, HB-19, IC348945, IC331561, HB-17, EC243608, EC329668, EC329662, EC032976, EC117726, HB-21, EC267679 (>23.00)	Vikrant (23.50 g)
9	Seed yield per plant	13.38-46.57	HB-30, HB-69, EC243624, HB-76, HB-18, HB-19, EC329668, HB-58, HB-62, EC243756, HB-79, HB-78, EC032976, IC348945, HB-50, HB-32, IC331561, HB-36 (>24.00)	Vikrant (24.28)

**Table 105. Multilocation Characterization & Evaluation of germplasm lines in faba bean at different locations (Plains)
: Rabi 2012-13**

S.No.	Accession No.	Qualitative characters					Quantitative characters							
		Delhi					Days to 50% flowering				Days to 80% maturity			
		Number of leaflets per leaf	Pod colour	Pod shape	Seed coat colour	Seed shape	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
1	EC024312	5	2	3	7	2	69.00	38.00	62.00	56.33	147.00	158.00	163.00	156.00
2	EC032976	5	2	3	8	3	70.00	40.00	63.00	57.67	148.00	159.00	168.00	158.33
3	EC039085	5	2	3	7	2	69.00	34.00	60.00	54.33	146.00	155.00	162.00	154.33
4	EC117705	4	2	3	7	3	67.00	40.00	65.00	57.33	146.00	155.00	176.00	159.00
5	EC117726	4	2	3	7	3	66.00	41.00	49.00	52.00	144.00	151.00	144.00	146.33
6	EC117739	4	2	3	7	3	68.00	44.00	62.00	58.00	145.00	145.00	169.00	153.00
7	EC243596	5	2	3	7	3	70.00	35.00	59.00	54.67	147.00	159.00	160.00	155.33
8	EC243608	4	2	3	8	3	70.00	47.00	64.00	60.33	150.00	158.00	162.00	156.67
9	EC243624	5	2	3	8	3	68.00	34.00	48.00	50.00	148.00	149.00	144.00	147.00
10	EC243756	5	2	3	4	3	73.00	42.00	64.00	59.67	146.00	148.00	168.00	154.00
11	EC243770	5	2	3	5	3	65.00	41.00	65.00	57.00	141.00	150.00	164.00	151.67
12	EC267679	5	2	3	7	3	64.00	39.00	65.00	56.00	145.00	153.00	171.00	156.33
13	EC253793	5	2	3	7	3	66.00	41.00	65.00	57.33	143.00	145.00	169.00	152.33
14	EC263820	4	2	3	7	3	68.00	38.00	53.00	53.00	145.00	155.00	145.00	148.33
15	EC267640	5	2	3	7	3	67.00	47.00	61.00	58.33	146.00	160.00	159.00	155.00
16	EC267648	5	2	3	7	3	66.00	35.00	55.00	52.00	144.00	148.00	145.00	145.67
17	EC287710	5	2	3	5	3	64.00	40.00	57.00	53.67	143.00	160.00	155.00	152.67
18	EC323588	4	2	3	8	3	65.00	36.00	64.00	55.00	142.00	160.00	172.00	158.00
19	EC327677	5	2	3	7	3	67.00	36.00	64.00	55.67	141.00	155.00	168.00	154.67
20	EC327724	5	2	3	2	3	66.00	33.00	62.00	53.67	145.00	147.00	165.00	152.33
21	EC329609	4	2	3	2	3	68.00	40.00	63.00	57.00	144.00	160.00	160.00	154.67

S.No.	Accession No.	Qualitative characters					Quantitative characters							
		Delhi					Days to 50% flowering				Days to 80% maturity			
		Number of leaflets per leaf	Pod colour	Pod shape	Seed coat colour	Seed shape	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
22	EC329662	5	2	3	8	2	67.00	37.00	48.00	50.67	147.00	159.00	143.00	149.67
23	EC329668	5	2	3	7	3	68.00	43.00	50.00	53.67	148.00	160.00	146.00	151.33
24	EC329681	5	2	3	8	3	70.00	39.00	59.00	56.00	143.00	160.00	162.00	155.00
25	EC331564	5	2	3	7	3	71.00	42.00	48.00	53.67	144.00	151.00	146.00	147.00
26	EC343999	5	2	3	8	3	68.00	43.00	50.00	53.67	143.00	155.00	155.00	151.00
27	HB-16	4	2	3	7	2	73.00	42.00	52.00	55.67	141.00	154.00	144.00	146.33
28	HB-17	4	2	3	7	3	68.00	38.00	62.00	56.00	143.00	159.00	157.00	153.00
29	HB-18	4	2	3	2	3	71.00	41.00	53.00	55.00	141.00	157.00	152.00	150.00
30	HB-19	5	2	3	7	3	69.00	36.00	50.00	51.67	143.00	151.00	143.00	145.67
31	HB-21	5	2	3	7	3	68.00	39.00	55.00	54.00	140.00	141.00	160.00	147.00
32	HB-26	5	2	3	7	3	72.00	38.00	45.00	51.67	141.00	151.00	141.00	144.33
33	HB-30	6	2	3	7	3	73.00	36.00	49.00	52.67	140.00	149.00	144.00	144.33
34	HB-32	5	2	3	2	3	71.00	41.00	48.00	53.33	141.00	141.00	145.00	142.33
35	HB-34	4	2	3	7	3	69.00	42.00	57.00	56.00	143.00	151.00	160.00	151.33
36	HB-36	5	2	3	7	3	75.00	45.00	45.00	55.00	143.00	155.00	143.00	147.00
37	HB-50	5	2	3	5	3	70.00	39.00	49.00	52.67	141.00	141.00	146.00	142.67
38	HB-57	5	2	3	2	3	68.00	37.00	50.00	51.67	140.00	145.00	155.00	146.67
39	HB-58	5	2	3	2	3	70.00	38.00	52.00	53.33	141.00	141.00	157.00	146.33
40	HB-62	4	2	3	2	3	74.00	37.00	55.00	55.33	140.00	140.00	154.00	144.67
41	HB-67	5	2	3	7	3	69.00	37.00	60.00	55.33	142.00	142.00	169.00	151.00
42	HB-69	5	2	3	8	2	67.00	47.00	59.00	57.67	144.00	142.00	164.00	150.00
43	HB-76	4	2	3	7	2	68.00	37.00	51.00	52.00	145.00	145.00	149.00	146.33
44	HB-78	5	2	3	7	3	69.00	42.00	60.00	57.00	145.00	142.00	163.00	150.00
45	HB-79	5	2	3	7	3	68.00	40.00	43.00	50.33	144.00	150.00	149.00	147.67
46	HB-87	5	2	3	7	2	67.00	36.00	45.00	49.33	147.00	151.00	147.00	148.33

S.No.	Accession No.	Qualitative characters					Quantitative characters							
		Delhi					Days to 50% flowering				Days to 80% maturity			
		Number of leaflets per leaf	Pod colour	Pod shape	Seed coat colour	Seed shape	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
47	IC263634	4	2	3	7	3	67.00	40.00	53.00	53.33	149.00	150.00	155.00	151.33
48	IC267939	6	2	3	7	2	68.00		58.00	63.00	147.00		165.00	156.00
49	IC331561	5	2	3	4	3	69.00	38.00	69.00	58.67	146.00	150.00	165.00	153.67
50	IC348945	5	2	3	7	3	66.00	39.00	62.00	55.67	149.00	160.00	160.00	156.33
Mean for check variety														
	Vikrant (C)	5	2	3	7	3	67.40	39.89	54.00	53.76	143.80	152.44	157.00	151.08
	Minimum	4	2	3	2	2	64.00	33.00	43.00	49.33	140.00	140.00	141.00	142.33
	Maximum	6	2	3	8	3	75.00	47.00	69.00	63.00	150.00	160.00	176.00	159.00
	Mean	5	2	3	7	3	68.56	39.40	56.10	54.84	144.13	151.51	156.57	150.77
	CV (%) Phenotypic	-	-	-	-	-	3.55	8.41	12.10	-	1.85	4.23	6.16	-

Qualitative Characters :- Pod colour :- 1-White yellow, 2- Brown, 3-Dark brown, 4-Black, 99-Others; **Seed shape :-** 1-Cylindrical, 2-Round, 3-Flattened, 99-Others; **Pod shape :-** 1 - Flattened non constricted, 2 - Flattened constricted, 3 - Sub -cylindrical, 99 - Others; **Seed coat colour :-** 1 - White, 2 - Yellow, 3 - Grey, 4 - Violet, 5 - Light green, 6 - Dark green, 7 - Light brown, 8 - Dark brown, 9 - Red, 10 - Black, 99 - Others;

S.No.	Accession No.	Quantitative characters														
		Plant height (cm)				Number of primary branch per plant				Pod length (cm)			Number of pods per plant			
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
1	EC024312	97.40	102.00	146.10	115.17	5.80	4.00	4.00	4.60	5.14	4.10	4.62	27.60	28.00	51.00	35.53
2	EC032976	97.40	92.00	142.60	110.67	5.20	3.00	4.00	4.07	4.63	4.70	4.67	22.20	40.00	64.00	42.07
3	EC039085	110.60	96.00	98.70	101.77	5.00	4.00	4.00	4.33	4.93	5.00	4.96	19.20	16.00	43.00	26.07
4	EC117705	113.00	80.00	120.20	104.40	4.60	4.20	3.00	3.93	5.04	5.40	5.22	14.60	28.50	19.00	20.70
5	EC117726	93.40	88.50	97.50	93.13	5.00	4.80	3.00	4.27	4.99	4.70	4.85	25.20	32.50	31.00	29.57
6	EC117739	103.20	79.50	127.50	103.40	4.80	3.50	4.00	4.10	5.45	5.00	5.22	16.20	32.00	44.00	30.73
7	EC243596	106.60	90.80	92.60	96.67	4.60	4.00	2.00	3.53	5.01	4.40	4.70	22.80	30.00	19.00	23.93
8	EC243608	103.20	94.00	103.00	100.07	6.40	3.00	3.00	4.13	5.50	5.40	5.45	24.40	28.00	33.00	28.47
9	EC243624	94.60	102.00	97.10	97.90	5.20	3.80	4.00	4.33	4.37	4.70	4.54	27.60	29.00	63.00	39.87
10	EC243756	92.60	95.00	109.30	98.97	4.00	4.00	4.00	4.00	4.90	5.20	5.05	15.40	30.00	50.00	31.80
11	EC243770	115.80	86.00	145.40	115.73	5.00	4.00	4.00	4.33	5.02	5.00	5.01	12.60	24.00	44.00	26.87
12	EC267679	87.00	96.00	132.40	105.13	4.40	3.40	4.00	3.93	5.19	4.90	5.04	22.80	23.00	22.00	22.60
13	EC253793	87.40	88.00	104.50	93.30	4.20	4.00	3.00	3.73	3.90	6.10	5.00	15.40	20.00	30.00	21.80
14	EC263820	83.20	72.50	100.20	85.30	5.00	5.00	3.00	4.33	5.15	5.20	5.17	19.20	35.00	37.00	30.40
15	EC267640	82.80	100.50	105.30	96.20	5.60	3.60	3.00	4.07	4.05	5.20	4.62	19.00	26.00	36.00	27.00
16	EC267648	87.40	95.00	123.50	101.97	4.80	4.50	3.00	4.10	4.54	4.40	4.47	22.40	18.00	23.00	21.13
17	EC287710	100.60	102.00	129.40	110.67	4.60	3.80	3.00	3.80	4.23	5.00	4.61	16.40	19.60	35.00	23.67
18	EC323588	83.40	99.50	125.40	102.77	4.20	5.80	3.00	4.33	4.49	5.10	4.80	19.60	25.00	25.00	23.20
19	EC327677	87.40	80.50	110.90	92.93	5.00	4.00	4.00	4.33	4.79	5.00	4.89	18.20	19.00	35.00	24.07
20	EC327724	90.20	92.20	110.20	97.53	5.60	4.00	4.00	4.53	5.09	5.10	5.09	19.60	27.00	35.00	27.20
21	EC329609	105.60	100.00	137.40	114.33	5.20	5.60	3.00	4.60	5.12	4.50	4.81	14.80	32.00	40.00	28.93

S.No.	Accession No.	Quantitative characters														
		Plant height (cm)				Number of primary branch per plant				Pod length (cm)			Number of pods per plant			
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
22	EC329662	99.40	87.50	105.40	97.43	4.60	3.50	3.00	3.70	4.43	4.80	4.61	12.00	30.00	45.00	29.00
23	EC329668	98.40	78.50	107.50	94.80	4.40	5.00	4.00	4.47	4.50	5.10	4.80	26.00	21.00	53.00	33.33
24	EC329681	83.00	76.00	118.20	92.40	4.00	4.20	3.00	3.73	4.62	5.30	4.96	12.80	26.20	29.00	22.67
25	EC331564	108.80	95.00	131.70	111.83	4.60	5.60	4.00	4.73	4.38	5.10	4.74	15.00	35.80	48.00	32.93
26	EC343999	108.20	95.00	117.50	106.90	4.20	4.40	2.00	3.53	5.25	5.30	5.28	24.40	26.00	30.00	26.80
27	HB-16	114.40	95.00	131.50	113.63	4.00	5.40	5.00	4.80	5.45	5.10	5.27	55.80	31.00	30.00	38.93
28	HB-17	119.20	94.00	142.60	118.60	5.80	5.60	4.00	5.13	5.72	5.40	5.56	37.40	26.00	30.00	31.13
29	HB-18	123.40	95.00	160.00	126.13	5.60	4.00	5.00	4.87	6.12	5.10	5.61	33.80	16.80	49.00	33.20
30	HB-19	134.00	105.50	165.40	134.97	4.60	3.60	4.00	4.07	6.70	4.70	5.70	24.60	24.00	41.00	29.87
31	HB-21	135.60	105.00	130.40	123.67	5.60	6.00	4.00	5.20	5.93	5.00	5.46	16.20	17.00	35.00	22.73
32	HB-26	118.20	104.00	150.20	124.13	4.80	4.50	3.00	4.10	6.06	5.40	5.73	18.40	18.00	28.00	21.47
33	HB-30	129.80	99.50	135.40	121.57	4.60	4.50	8.00	5.70	6.04	5.40	5.72	24.20	22.00	87.00	44.40
34	HB-32	133.80	103.50	130.90	122.73	5.00	4.00	8.00	5.67	5.34	4.60	4.97	19.80	28.00	53.00	33.60
35	HB-34	122.40	99.80	145.90	122.70	4.60	4.00	4.00	4.20	5.81	5.50	5.65	34.40	17.00	29.00	26.80
36	HB-36	109.00	92.00	110.00	103.67	4.60	4.50	4.00	4.37	6.31	5.20	5.76	20.20	20.00	43.00	27.73
37	HB-50	116.80	89.50	117.40	107.90	5.40	4.60	4.00	4.67	5.64	5.50	5.57	21.20	25.00	44.00	30.07
38	HB-57	117.80	95.00	89.60	100.80	6.00	4.60	4.00	4.87	5.77	5.40	5.59	18.00	26.00	40.00	28.00
39	HB-58	115.60	89.50	126.10	110.40	5.20	4.40	4.00	4.53	5.01	4.80	4.90	22.80	28.00	49.00	33.27
40	HB-62	107.60	95.00	124.00	108.87	4.40	4.80	7.00	5.40	5.43	5.20	5.32	21.20	24.00	66.00	37.07
41	HB-67	111.20	88.00	107.60	102.27	5.00	4.60	3.00	4.20	5.97	5.40	5.68	22.20	26.00	38.00	28.73
42	HB-69	105.80	82.50	125.20	104.50	4.00	5.00	6.00	5.00	5.69	5.10	5.40	24.80	20.40	82.00	42.40
43	HB-76	114.80	78.00	103.50	98.77	5.00	3.00	4.00	4.00	5.57	6.20	5.89	20.60	21.50	44.00	28.70
44	HB-78	130.80	81.00	125.40	112.40	5.20	4.60	5.00	4.93	4.38	5.00	4.69	25.80	26.50	59.00	37.10
45	HB-79	118.20	82.00	84.90	95.03	4.00	3.80	3.00	3.60	5.31	4.50	4.91	24.80	23.60	42.00	30.13
46	HB-87	118.40	77.00	84.90	93.43	5.40	4.20	4.00	4.53	5.74	5.00	5.37	16.80	22.50	47.00	28.77

S.No.	Accession No.	Quantitative characters														
		Plant height (cm)				Number of primary branch per plant				Pod length (cm)			Number of pods per plant			
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Hisar	Mean	Delhi	Faizabad	Hisar	Mean
47	IC263634	116.00	98.50	124.00	112.83	5.00	6.00	2.00	4.33	5.07	5.10	5.09	19.60	30.00	17.00	22.20
48	IC267939	112.60		115.60	114.10	5.60		3.00	4.30	5.93	4.70	5.31	22.40		32.00	27.20
49	IC331561	115.80	99.00	132.00	115.60	5.00	3.60	4.00	4.20	5.72	5.40	5.56	27.40	19.60	53.00	33.33
50	IC348945	95.60	97.00	105.80	99.47	5.40	4.00	4.00	4.47	5.61	4.70	5.15	15.60	25.00	39.00	26.53
Mean for check varieties																
	Vikrant (C)	103.08	93.28	135.90	110.75	5.16	4.07	5.00	4.74	5.28	4.90	5.09	23.32	24.58	41.00	29.63
	Minimum	82.80	72.50	84.90	85.30	4.00	3.00	2.00	3.53	3.90	4.10	4.47	12.00	16.00	17.00	20.70
	Maximum	135.60	105.50	165.40	134.97	6.40	6.00	8.00	5.70	6.70	6.20	5.89	55.80	40.00	87.00	44.40
	Mean	107.07	92.05	120.46	106.67	4.92	4.32	3.90	4.38	5.22	5.06	5.14	21.90	25.28	41.22	29.48
	CV (%) Phenotypic	13.43	9.27	15.60	-	11.5	17.3	31.7	-	11.86	7.68	-	33.10	21.12	35.18	-

S.No.	Accession No.	Quantitative characters													
		Number of seeds per pod				100 Seed weight (g)				Seed yield per plant				Clusters per plant	Pod width (mm)
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Hisar	Delhi
1	EC024312	4.20	2.80	3.00	3.33	17.78	28.80	30.30	25.63	8.90	28.60	34.80	24.10	12.00	8.85
2	EC032976	3.20	2.80	3.00	3.00	17.16	26.00	28.90	24.02	10.66	24.60	42.40	25.89	17.00	8.67
3	EC039085	3.40	2.80	3.00	3.07	17.48	26.00	26.10	23.19	8.21	29.00	20.80	19.34	10.00	8.75
4	EC117705	3.00	2.80	3.00	2.93	19.40	24.50	25.60	23.17	4.63	29.00	8.90	14.18	7.00	9.52
5	EC117726	2.80	3.00	3.00	2.93	18.54	25.00	28.10	23.88	10.08	22.50	14.50	15.69	8.00	7.88
6	EC117739	3.40	3.00	3.00	3.13	20.90	26.60	30.20	25.90	11.34	25.50	26.80	21.21	11.00	8.58
7	EC243596	3.00	3.20	3.00	3.07	25.84	24.80	29.50	26.71	17.88	27.70	10.60	18.73	4.00	8.44
8	EC243608	3.60	2.60	3.00	3.07	18.78	24.60	29.60	24.33	19.04	27.60	21.40	22.68	7.00	8.28
9	EC243624	3.60	3.20	3.00	3.27	23.94	25.50	32.20	27.21	16.97	30.50	46.50	31.32	17.00	7.90
10	EC243756	3.60	2.60	3.00	3.07	22.84	27.50	30.50	26.95	12.33	32.50	35.70	26.84	12.00	8.66
11	EC243770	3.60	3.20	3.00	3.27	27.24	27.00	27.80	27.35	14.50	30.00	23.90	22.80	11.00	9.34
12	EC267679	3.40	2.80	3.00	3.07	20.44	24.50	25.70	23.55	8.74	24.00	7.40	13.38	8.00	8.96
13	EC253793	3.00	2.80	3.00	2.93	21.20	26.00	29.00	25.40	14.50	31.00	12.70	19.40	7.00	9.30
14	EC263820	4.00	2.80	3.00	3.27	21.58	27.00	28.00	25.53	19.75	33.00	17.70	23.48	8.00	8.62
15	EC267640	3.20	3.00	3.00	3.07	19.96	23.70	30.50	24.72	11.05	30.00	19.80	20.28	8.00	8.36
16	EC267648	3.80	2.60	3.00	3.13	26.46	27.00	26.80	26.75	15.65	18.00	10.90	14.85	5.00	8.53
17	EC287710	3.00	3.00	3.00	3.00	20.58	26.60	30.00	25.73	6.66	28.00	21.40	18.69	8.00	8.76
18	EC323588	3.60	2.80	3.00	3.13	16.12	25.50	26.70	22.77	7.64	28.60	12.50	16.25	8.00	8.68
19	EC327677	3.60	3.00	3.00	3.20	14.84	24.00	25.10	21.31	5.71	27.00	20.80	17.84	7.00	8.65
20	EC327724	3.20	2.80	3.00	3.00	26.10	24.00	25.10	25.07	12.91	31.00	19.20	21.04	8.00	9.79
21	EC329609	3.20	2.80	3.00	3.00	23.40	27.50	30.00	26.97	9.56	25.60	22.40	19.19	8.00	9.83

S.No.	Accession No.	Quantitative characters													
		Number of seeds per pod				100 Seed weight (g)				Seed yield per plant				Clusters per plant	Pod width (mm)
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Hisar	Delhi
22	EC329662	3.40	3.00	3.00	3.13	15.04	27.60	29.50	24.05	5.52	27.00	29.70	20.74	10.00	8.63
23	EC329668	3.40	2.80	3.00	3.07	19.26	25.00	28.50	24.25	20.45	28.30	35.30	28.02	15.00	9.25
24	EC329681	3.40	3.20	3.00	3.20	18.00	26.00	30.20	24.73	5.60	27.00	21.50	18.03	6.00	8.88
25	EC331564	3.20	3.00	3.00	3.07	21.60	23.00	31.20	25.27	13.13	25.50	31.90	23.51	13.00	9.39
26	EC343999	3.60	3.00	3.00	3.20	22.70	26.60	28.50	25.93	15.20	27.60	15.90	19.57	6.00	8.54
27	HB-16	4.00	3.00	3.00	3.33	21.20	22.50	30.90	24.87	14.81	25.50	18.80	19.70	9.00	9.83
28	HB-17	3.80	2.80	3.00	3.20	21.90	23.10	28.00	24.33	18.33	28.00	19.50	21.94	11.00	9.43
29	HB-18	4.60	2.80	4.00	3.80	22.00	25.10	26.40	24.50	12.24	30.00	46.10	29.45	16.00	9.03
30	HB-19	3.60	2.80	4.00	3.47	24.24	23.40	25.70	24.45	23.72	29.00	31.70	28.14	13.00	10.30
31	HB-21	3.60	3.00	3.00	3.20	20.32	26.00	25.20	23.84	8.94	26.00	27.40	20.78	10.00	9.18
32	HB-26	3.80	3.20	3.00	3.33	19.84	26.00	28.20	24.68	13.93	21.30	11.80	15.68	7.00	9.43
33	HB-30	3.20	3.20	4.00	3.47	25.10	26.50	30.60	27.40	20.40	22.50	96.80	46.57	27.00	10.17
34	HB-32	3.60	3.00	3.00	3.20	19.10	26.00	30.00	25.03	14.20	26.10	35.70	25.33	15.00	9.87
35	HB-34	4.20	2.80	3.00	3.33	19.16	25.50	30.50	25.05	10.52	18.00	21.90	16.81	8.00	9.44
36	HB-36	3.40	2.80	3.00	3.07	24.48	24.50	31.10	26.69	16.55	31.00	26.10	24.55	11.00	9.93
37	HB-50	3.20	2.80	3.00	3.00	27.10	24.90	29.50	27.17	21.55	28.00	26.90	25.48	11.00	10.06
38	HB-57	3.80	2.80	3.00	3.20	23.00	25.00	28.50	25.50	7.36	27.50	29.10	21.32	10.00	9.92
39	HB-58	3.40	2.80	3.00	3.07	24.06	26.00	29.00	26.35	24.68	26.00	30.50	27.06	12.00	8.80
40	HB-62	3.40	3.00	3.00	3.13	23.68	24.20	25.80	24.56	16.64	24.50	39.50	26.88	19.00	9.10
41	HB-67	3.40	3.00	3.00	3.13	22.44	22.80	31.20	25.48	13.25	27.50	22.90	21.22	11.00	9.24
42	HB-69	4.20	3.00	3.00	3.40	15.36	23.50	28.30	22.39	12.35	26.60	55.70	31.55	24.00	9.00
43	HB-76	3.60	3.00	4.00	3.53	21.28	27.50	27.50	25.43	27.73	25.50	37.80	30.34	11.00	9.08
44	HB-78	3.00	3.00	3.00	3.00	22.50	26.00	28.40	25.63	14.58	24.20	37.80	26.19	15.00	7.76
45	HB-79	3.60	3.20	4.00	3.60	23.12	24.50	30.50	26.04	13.33	29.10	36.40	26.28	10.00	9.24
46	HB-87	3.60	3.40	3.00	3.33	22.44	26.50	30.50	26.48	12.46	20.80	31.80	21.69	13.00	9.52

S.No.	Accession No.	Quantitative characters													
		Number of seeds per pod				100 Seed weight (g)				Seed yield per plant				Clusters per plant	Pod width (mm)
		Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Faizabad	Hisar	Mean	Hisar	Delhi
47	IC263634	4.00	2.80	3.00	3.27	26.18	27.5	25.50	25.84	14.38	32.90	7.50	18.26	4.00	11.11
48	IC267939	3.80		3.00	3.40	19.24		27.20	23.22	11.53		15.70	13.62	8.00	9.33
49	IC331561	3.80	3.00	3.00	3.27	20.32	26.60	26.30	24.41	21.16	23.80	30.90	25.29	13.00	8.82
50	IC348945	3.60	2.80	3.00	3.13	18.84	28.8	30.00	24.42	10.30	32.55	34.50	25.78	12.00	9.00
Mean for check varieties															
	Vikrant (C)	3.60	2.94	3.00	3.18	19.13	25.49	25.90	23.51	16.24	27.52	29.10	24.29	15.00	8.80
	Minimum	2.80	2.60	3.00	2.93	14.84	22.50	25.10	21.31	4.63	18.00	7.40	13.38	4.00	7.76
	Maximum	4.60	3.40	4.00	3.80	27.24	28.80	32.20	27.40	27.73	33.00	96.80	46.57	27.00	11.11
	Mean	3.53	2.93	3.10	3.19	21.24	25.46	28.52	25.05	13.68	27.12	27.20	22.57	10.90	9.11
	CV (%) Phenotypic	10.23	5.97	9.69	-	14.71	5.61	6.91	-	38.21	12.65	54.14	-	41.68	7.14

Table 106. Promising lines in winged bean germplasm for various characters at different locations (Plains) Kharif 2013

S. No.	Characters	Range	Promising lines	Value of best check
Ranchi (Accessions 100)				
1.	Days to 50% flowering	60.00 - 96.00	EC038821-P4-2, EC142662, EC178337, EC178289, EC130184-2, EC178301, EC038821-P1, IC015018, IC026940-A1, EC178292, IC026940-A2, EC038956, EC142661, EC178267, EC178275, EC251020, IC017009, IC095221, EC027885-2, EC038821-2, EC038825, EC142653-1, EC178295, EC178310, EC178318, IC017002, EC178277, EC178314, EC178317, EC178331, EC178291, EC178304, EC178308, EC178340, EC038954-A, EC038955-B, EC116887, EC178282, EC178288, EC178287, EC178299, EC178311, EC142666-1, EC142667, IC026904 (< =83.00 days)	AKWB-1 (83.00 days)
2.	Days to maturity	15.10 - 174.00	EC178302, EC178332, IC026940-A2, EC038821-B, EC038956-1, EC116887, EC178327, EC178334, IC026904, EC178278, IC026940-A1, EC038955-B, EC038957-B, EC178265, EC178301, EC178313, IC026944-1 (< =150.00)	AKWB-1 (150.00 days)
3.	Plant height (cm)	2.80 - 401.60	EC178286, EC178284, EC178277, EC178289-4-2, EC178296, EC178268, EC142667-1, EC178295, EC178272, EC178299, EC178291, IC095221, EC178287, EC142654-4, EC178340, EC142653-1, EC178293, IC017006, EC178288, EC142666-1, EC178297, IC026170-1, EC178269, EC116887, EC178282, EC178302, EC142661 (>336.00 cm)	AKWB-1 (336.60 cm)
4.	No. of primary branches	1.30 - 4.60	EC178267, EC178269, EC178277, EC178291, IC095221, EC027885-2, EC178282, EC178288, EC178313, EC130184-2, EC038821-P4-2, EC038956, EC142654-4, EC142667-1, EC178268, EC178284, EC178286, EC178287, EC178289, EC178289-4-2, EC178293, EC178295, EC178296, EC178308, EC178314, EC178331, EC178332, EC178337, EC178340, IC017005-2, IC026170-1, IC026940-A2, EC178301, EC027886-A3, EC038821-P4-3, EC038825, EC121919-A, EC142666-1, EC142667, EC178272, EC178299, EC178304, EC178309, EC178311, EC178315, EC178319, EC178340-1, IC017005, IC017005, IC017006, IC017009, IC026904, IC026940-A1, IC095229, EC038821-2, EC038821-P4-1, EC038957-A, EC116887, EC121921, EC142661, EC178278, EC178297, EC178310, EC178327 (>2.00)	AKWB-1 (2.00)

S. No.	Characters	Range	Promising lines	Value of best check
5.	Number of pods	3.60 - 18.60	IC095221, EC178282, EC178295, IC026940-A1, EC178269, EC178308, IC026940-A2, EC178268, IC017005, EC027885-2, EC178277, EC178267, EC178279, IC017005-2, IC017009, EC178291, EC178284, EC178289-4-2, EC178297, EC178299, EC178334, IC095229, EC038821-P1, EC038957-B, EC178309, IC017006, EC027886-A3, EC178286, EC121919-1, EC038821-P4-1, EC121921, IC017002, EC038821-B, EC130184-2, EC142667, EC178287, EC178293, EC178296, EC178337, EC178340, EC038821-P4-3, EC038825, EC121919-2, EC121919-A, EC142654-4, EC142667-1, IC026170-1, IC026904, IC026904 (>=9.00)	AKWB-1 (9.00)
6.	Number of seeds per pod	6.00 - 14.30	IC026940-A2, EC178291, EC121921, EC178337, EC178282, EC178295, EC178318, EC121919-A, EC178299, IC017005, IC017005-2, IC017009, EC027885-2, EC038957-A, EC142666-1, EC178297, EC178308, EC178313, IC026904, EC116887, EC121919-1, EC130184-2, EC178310, IC026944-1, EC178334, EC178340-1, IC026940-A1, IC095221, EC038956-1, EC038956-3, EC142653-1, EC178314, EC178317, EC178331, IC017002, IC095237-1, EC178302, EC178311, EC178335, EC178340, EC178341, IC095239, EC142654-4, EC038821-P4-3, EC121919-2, EC178284, EC178286, EC178309, EC178309, EC178312, EC178336, IC026170-1, EC178319 (>10.00)	AKWB-1 (10.00)
7.	Pod length (cm)	10.00 - 17.60	EC178337, EC178314, EC178291, EC178295, IC026940-A2, IC017002, EC178318, EC178269, EC178282, EC178292, EC178297, EC027885-2, EC178299, IC017005-2, EC121921, EC178287, EC178289, EC142653-1, EC142666-1, EC178268, EC178286, EC178308, EC178313, IC017009, EC178331, EC178340-1, IC017005, IC026904, EC038821-P4-2, EC038957-A, EC251020, EC121919-A, EC038821-P4-1, EC142667, EC178279, EC178302, EC178310, EC178340, IC026944-1, IC015018, EC116887, EC178277, EC178289-4-2, EC178293, EC178296, EC178301, EC178311, IC095221, IC095221, EC130184-2, EC178317 (>13.60 cm)	AKWB-1 (13.60 cm)
8.	100 seed weight (g)	14.80 - 39.28	IC017005, IC095239 (>35.02 g)	AKWB-1 (35.02 g)
9.	Seed yield (q /ha)	7.60 - 16.80	IC015018 (>14.60 q/ha)	AKWB-1 (14.60 q/ha)

Table 107. Multilication evaluation of germplasm lines in winged bean at Ranchi : Kharif 2013 (Plain)

S. No.	Accession No.	Quantitative characters									
		Days to 50% flowering	Days to maturity	Plant height (cm)	No. of branches	Number of pods	Number of seeds per pod	Pod length (cm)	100 seed weight (g)	Seed yield (q/ha)	Plant stand count
1	EC027885-2	76.00	158.00	333.30	3.30	13.60	12.20	15.60	29.96	8.50	8.00
2	EC027886-1	93.00	161.00	195.00	1.60	5.30	9.60	12.60	28.26	13.50	9.00
3	EC027886-A	93.00	162.00	233.00	1.60	5.60	7.30	11.30	18.47	11.20	6.00
4	EC027886-A3	86.00	150.00	258.30	2.60	10.60	8.60	11.00	28.79	10.50	6.00
5	EC038821-2	76.00	164.00	164.00	2.30	5.60	9.00	13.10	26.40	10.70	3.00
6	EC038821-B	85.00	147.00	288.30	2.00	10.00	8.30	11.00	28.80	9.40	8.00
7	EC038821-P1	68.00	151.00	200.00	2.00	11.00	8.30	10.90	27.30	8.40	10.00
8	EC038821-P2	86.00	153.00	335.00	2.00	9.00	8.60	11.30	29.25	7.90	7.00
9	EC038821-P2-1	84.00	156.00	301.00	1.60	8.30	9.30	13.00	30.00	11.00	9.00
10	EC038821-P4-1	84.00	154.00	315.00	2.30	10.30	10.00	14.30	26.95	9.10	11.00
11	EC038821-P4-2	60.00	166.00	140.00	3.00	8.00	6.00	14.50	25.23	12.60	13.00
12	EC038821-P4-3	94.00	163.00	273.30	2.60	9.30	10.30	13.60	18.15	12.40	14.00
13	EC038825	76.00	160.00	286.60	2.60	9.30	9.00	11.60	19.22	10.30	6.00
14	EC038825-P3-4	83.00	158.00	175.00	1.30	6.60	7.60	12.60	27.31	10.40	8.00
15	EC038954-A	80.00	170.00	89.00	1.30	4.30	8.00	12.50	30.38	9.20	9.00
16	EC038955-B	80.00	149.00	280.00	2.00	7.60	8.30	11.50	27.93	9.20	5.00
17	EC038956	74.00	150.00	268.00	3.00	6.00	9.00	11.10	28.40	7.80	7.00
18	EC038956-1	84.00	147.00	185.00	1.60	8.60	11.00	13.30	27.70	12.40	4.00
19	EC038956-3	94.00	151.00	200.00	2.00	8.00	11.00	12.50	28.65	11.60	5.00
20	EC038957-A	89.00	154.00	231.30	2.30	9.00	12.00	14.50	18.81	8.40	9.00
21	EC038957-B	86.00	149.00	206.30	2.00	11.00	9.30	11.30	17.28	9.40	12.00
22	EC116887	80.00	147.00	345.30	2.30	9.00	11.60	14.00	18.63	10.50	14.00
23	EC121919-1	91.00	160.00	211.60	2.00	10.50	11.60	13.60	27.44	13.70	10.00
24	EC121919-2	90.00	161.00	243.30	2.00	9.30	10.30	12.60	28.05	10.80	4.00
25	EC121919-A	88.00	155.00	210.00	2.60	9.30	12.30	14.40	27.75	12.70	8.00
26	EC121921	87.00	157.00	300.00	2.30	10.30	13.30	15.30	18.28	8.30	8.00
27	EC130184-2	65.00	158.00	310.00	3.20	10.00	11.60	13.90	28.18	12.60	10.00
28	EC142653-1	76.00	153.00	355.00	2.00	7.00	11.00	15.00	18.30	13.40	10.00

S. No.	Accession No.	Quantitative characters									
		Days to 50% flowering	Days to maturity	Plant height (cm)	No. of branches	Number of pods	Number of seeds per pod	Pod length (cm)	100 seed weight (g)	Seed yield (q/ha)	Plant stand count
29	EC142654-4	87.00	155.00	360.00	3.00	9.30	10.50	12.50	17.30	10.50	11.00
30	EC142661	74.00	157.00	338.60	2.30	8.60	9.00	13.00	25.30	12.70	9.00
31	EC142662	60.00	163.00	183.00	1.60	6.00	9.00	13.50	25.20	12.50	9.00
32	EC142666-1	82.00	152.00	349.60	2.60	7.30	12.00	15.00	18.30	10.80	9.00
33	EC142667	82.00	153.00	327.30	2.60	10.00	9.30	14.30	16.30	12.40	8.00
34	EC142667-1	84.00	152.00	385.00	3.00	9.30	8.30	12.60	27.30	9.40	5.00
35	EC178265	86.00	149.00	241.60	1.60	7.00	9.00	13.30	17.30	11.60	4.00
36	EC178267	74.00	150.00	333.30	4.60	13.30	8.60	13.60	18.30	13.40	15.00
37	EC178268	90.00	160.00	386.00	3.00	15.00	9.30	15.00	19.30	11.70	17.00
38	EC178269	92.00	152.00	347.00	4.00	15.60	9.60	16.30	19.60	9.70	16.00
39	EC178272	83.00	156.00	373.60	2.60	6.60	8.00	13.30	18.80	8.40	17.00
40	EC178275	75.00	164.00	180.60	2.00	8.30	9.00	12.60	18.70	11.10	11.00
41	EC178277	78.00	157.00	400.00	4.00	13.60	8.60	14.00	16.80	8.30	7.00
42	EC178278	94.00	148.00	280.60	2.30	8.00	7.00	12.30	28.30	11.40	8.00
43	EC178279	83.00	157.00	296.60	1.30	13.30	9.30	14.30	30.50	9.70	12.00
44	EC178282	80.00	158.00	342.60	3.30	16.30	13.00	16.30	29.80	13.40	16.00
45	EC178284	83.00	163.00	401.00	3.00	11.60	10.30	13.00	20.50	14.00	12.00
46	EC178286	95.00	162.00	401.60	3.00	10.60	10.30	15.00	22.50	9.60	10.00
47	EC178287	81.00	163.00	367.00	3.00	10.00	9.00	15.10	27.90	8.30	2.00
48	EC178288	80.00	153.00	353.30	3.30	8.60	9.30	13.30	28.30	10.40	18.00
49	EC178289	63.00	163.00	195.00	3.00	6.00	9.00	15.10	16.80	9.10	17.00
50	EC178289-4-2	86.00	153.00	389.00	3.00	11.30	9.00	14.00	17.70	9.20	20.00
51	EC178291	79.00	151.00	370.00	4.00	12.00	13.60	17.00	17.90	7.80	14.00
52	EC178292	73.00	169.00	175.30	2.00	5.00	8.00	15.90	18.00	11.90	3.00
53	EC178293	85.00	162.00	355.00	3.00	10.00	8.30	14.00	14.80	11.60	11.00
54	EC178295	76.00	153.00	378.30	3.00	16.30	13.00	17.00	16.90	8.40	10.00
55	EC178296	94.00	156.00	387.50	3.00	10.00	8.30	14.00	27.10	9.40	14.00
56	EC178297	91.00	163.00	349.00	2.30	11.30	12.00	15.60	16.50	8.30	10.00
57	EC178299	81.00	157.00	372.00	2.60	11.30	12.30	15.60	18.80	12.60	12.00
58	EC178301	67.00	149.00	266.60	2.60	6.60	10.00	14.00	18.60	13.40	9.00
59	EC178302	84.00	15.10	339.30	2.00	8.30	10.60	14.30	17.90	10.50	11.00

S. No.	Accession No.	Quantitative characters									
		Days to 50% flowering	Days to maturity	Plant height (cm)	No. of branches	Number of pods	Number of seeds per pod	Pod length (cm)	100 seed weight (g)	Seed yield (q/ha)	Plant stand count
60	EC178304	79.00	153.00	335.60	2.60	5.60	8.60	12.30	27.30	12.70	8.00
61	EC178308	79.00	150.00	258.30	3.00	15.60	12.00	15.00	17.40	13.70	10.00
62	EC178309	95.00	152.00	315.00	2.60	11.00	10.30	13.30	18.00	10.80	15.00
63	EC178310	77.00	153.00	228.30	2.30	7.00	11.60	14.30	18.70	12.40	13.00
64	EC178311	81.00	155.00	263.30	2.60	9.00	10.60	14.00	30.10	9.80	12.00
65	EC178312	87.00	157.00	231.30	2.00	6.30	10.30	13.00	32.00	11.60	8.00
66	EC178313	93.00	149.00	286.60	3.30	7.00	12.00	15.00	29.20	13.10	7.00
67	EC178314	78.00	166.00	280	3.00	7.00	11.00	17.50	28.40	12.10	8.00
68	EC178315	95.00	155.00	259.00	2.60	6.30	8.00	12.00	30.10	11.40	10.00
69	EC178317	78.00	166.00	145.50	1.50	4.50	11.00	13.90	30.80	10.20	8.00
70	EC178318	77.00	162.00	200.00	2.00	5.00	13.00	16.50	28.80	8.50	3.00
71	EC178319	86.00	150.00	321.60	2.60	7.60	10.10	11.30	28.60	13.60	10.00
72	EC178327	96.00	147.00	288.00	2.30	9.00	9.60	13.60	19.80	7.80	7.00
73	EC178331	78.00	154.00	285.30	3.00	8.30	11.00	14.60	16.80	9.40	8.00
74	EC178332	96.00	146.00	290.00	3.00	9.00	9.00	13.00	28.20	8.60	10.00
75	EC178334	93.00	147.00	281.60	2.30	11.30	11.30	12.60	28.40	12.40	9.00
76	EC178335	90.00	164.00	311.60	2.00	8.00	10.60	13.60	28.90	8.50	9.00
77	EC178336	94.00	150.00	246.60	2.00	7.30	10.30	13.30	17.90	13.50	6.00
78	EC178337	62.00	174.00	220.00	3.00	10.00	13.30	17.60	18.40	11.90	9.00
79	EC178340	79.00	154.00	356.60	3.00	9.60	10.60	14.30	18.20	10.50	9.00
80	EC178340-1	96.00	150.00	273.30	2.60	5.30	11.30	14.60	18.30	9.40	11.00
81	EC178341	96.00	165.00	236.60	2.00	4.30	10.60	13.60	18.60	10.20	9.00
82	EC251020	75.00	166.00	172.50	1.50	4.00	9.50	14.50	17.40	9.50	2.00
83	EC251021	87.00	151.00	218.30	2.00	3.60	8.00	12.00	18.90	7.70	10.00
84	EC251022	88.00	157.00	176.60	1.60	7.60	8.00	10.60	29.50	12.50	9.00
85	EC251025	96.00	163.00	146.60	1.30	7.30	7.00	10.00	30.10	9.80	5.00
86	IC015018	71.00	174.00	162.30	2.00	5.50	9.00	14.10	28.00	16.80	3.00
87	IC017002	77.00	153.00	261.30	2.00	10.30	11.00	16.60	31.80	7.60	15.00
88	IC017005	85.00	155.00	326.30	2.60	14.60	12.30	14.60	39.28	9.40	13.00
89	IC017005-2	87.00	157.00	306.40	3.00	13.00	12.30	15.60	28.60	7.80	11.00
90	IC017006	91.00	159.00	355.00	2.60	11.00	10.00	12.30	30.11	10.20	9.00

S. No.	Accession No.	Quantitative characters									
		Days to 50% flowering	Days to maturity	Plant height (cm)	No. of branches	Number of pods	Number of seeds per pod	Pod length (cm)	100 seed weight (g)	Seed yield (q/ha)	Plant stand count
91	IC017009	75.00	152.00	282.60	2.60	12.60	12.30	15.00	29.20	8.90	8.00
92	IC026170-1	92.00	150.00	348.60	3.00	9.30	10.30	13.00	30.28	7.70	14.00
93	IC026904	82.00	147.00	291.30	2.60	9.30	12.00	14.60	31.20	12.50	9.00
94	IC026940-A1	72.00	148.00	256.50	2.60	16.30	11.30	13.30	28.36	9.80	7.00
95	IC026940-A2	73.00	146.00	321.00	3.00	15.60	14.30	16.80	34.88	7.80	13.00
96	IC026944-1	92.00	149.00	216.60	1.60	5.60	11.60	14.30	28.95	13.60	8.00
97	IC095221	75.00	155.00	368.30	3.60	18.60	11.30	14.00	29.42	8.50	11.00
98	IC095229	91.00	157.00	240.00	2.60	11.30	9.30	12.60	27.20	9.60	9.00
99	IC095237-1	92.00	158.00	206.60	1.60	6.60	11.00	13.60	32.22	11.40	8.00
100	IC095239	83.00	157.00	266.60	2.30	8.60	10.60	13.60	38.24	9.50	7.00
Mean for check variety											
	AKWB-1	83.00	150.00	336.60	2.00	9.00	10.00	13.60	35.02	14.60	13.00
	Minimum	60.00	15.10	2.80	1.30	3.60	6.00	10.00	14.80	7.60	2.00
	Maximum	96.00	174.00	401.60	4.60	18.60	14.30	17.60	39.28	16.80	20.00
	Mean	82.99	154.48	277.77	2.47	9.23	10.14	13.77	24.64	10.64	9.53
	CV(%) Phenotypic	10.43	9.95	27.69	26.19	33.80	16.46	11.51	23.90	18.56	38.18

**Table 108. Promising lines in kalingada germplasm for various characters at different locations (Plains):
Kharif 2013**

S. No.	Characters	Range	Promising lines	Value of best check
Jaisalmer (Accessions 20)				
1.	Days to fruit setting	34.00-46.00	SKGPK-26, SKGPK-33, MGPK-10-2 , MGPK-10-3, SKGPK-25, SKGPK-34, SKGPK-23, SKGPK-32, SKGPK-35 (≤ 40.00 days)	GK-1 (40.00 days)
2.	Number of fruits per plant	6.20 - 11.00	SKGPK-29, SKGPK-22, SKGPK-24, MGPK-10-4, SKGPK-27, MGPK-10-2 , SKGPK-34, MGPK-10-5, SKGPK-32, SKGPK-30, MGPK-10-1 (≥ 7.60)	GK-1 (7.60)
3.	Fruit size (cm)	37.80-44.80	MGPK-10-1, MGPK-10-3, SKGPK-35, SKGPK-21, SKGPK-23, MGPK-10-2 , SKGPK-28, SKGPK-30, SKGPK-25, SKGPK-29, SKGPK-34, SKGPK-24, SKGPK-31 (> 41.60 cm)	GK-1 (41.60)
4.	100-seed weight (g)	6.37 - 7.95	SKGPK-24, SKGPK-23, SKGPK-33, MGPK-10-5, SKGPK-32 (> 7.70 g)	GK-1 (7.70 g)
5.	Fruit yield (q/ha)	152.90-293.70	SKGPK-24, SKGPK-22, SKGPK-29, MGPK-10-1, MGPK-10-2 , SKGPK-27, MGPK-10-5, SKGPK-30, SKGPK-34, SKGPK-32, SKGPK-23, MGPK-10-4, SKGPK-35, SKGPK-28, SKGPK-21, SKGPK-25 (> 179.60 q/ha)	GK-1 (179.60 q/ha)
6.	Seed yield (q/ha)	3.80 - 11.30	SKGPK-22, SKGPK-21, SKGPK-27, SKGPK-34, SKGPK-31, MGPK-10-4, MGPK-10-5, MGPK-10-2 , SKGPK-28, SKGPK-23, SKGPK-30, SKGPK-24 (> 6.80 q/ha)	GK-1 (6.80 q/ha)
S.K. Nagar (Accessions 20)				
1.	Days to first male flower opening	29.00-41.00	SKGPK-22, SKGPK-26, SKGPK-23, SKGPK-31, SKGPK-32, SKGPK-33, MGPK-10-2 (≤ 33.00 days)	GK-1 (33.00 days)
2.	Days to first female flower opening	38.00 - 57.00	SKGPK-26, SKGPK-27, SKGPK-31, SKGPK-23, SKGPK-22, SKGPK-24, SKGPK-28, SKGPK-21, SKGPK-32, SKGPK-25, SKGPK-29, SKGPK-30 (< 43.00 days)	GK-1 (43.00 days)
3.	Days to 50 % maturity	79.00 - 86.00	SKGPK-25, SKGPK-27, SKGPK-21, SKGPK-23, SKGPK-24, SKGPK-29, SKGPK-30, SKGPK-33, SKGPK-34, SKGPK-22, SKGPK-26, SKGPK-28, SKGPK-31, SKGPK-32, SKGPK-35 (< 83.00 days)	GK-1 (83.00 days)
4.	Days to fruit setting	40.00 - 59.00	SKGPK-26, SKGPK-27, SKGPK-31, SKGPK-23, SKGPK-22, SKGPK-24, SKGPK-28, SKGPK-21, SKGPK-32, SKGPK-25, SKGPK-29, SKGPK-30, SKGPK-33 (< 46.00 days)	GK-1 (46.00 days)
5.	Fruit length (cm)	15.10 - 21.00	SKGPK-27, MGPK-10-5, SKGPK-35, SKGPK-30, SKGPK-24 (> 18.60 cm)	GK-1 (18.60 cm)

S. No.	Characters	Range	Promising lines	Value of best check
6.	Fruit diameter (cm)	31.20 - 39.00	-	GK-1 (39.00 cm)
7.	Vine length (m)	2.91 - 4.72	SKGPK-26 (> 4.25 m)	GK-1 (4.25 m)
8.	Seed yield (q/ha)	0.66 - 2.79	SKGPK-27, SKGPK-26, SKGPK-24 (> 2.40 q/ha)	GK-1 (2.39q/ha)
9.	Fruit weight (q/ha)	21.66-83.33	-	GK-1 (83.33 q/ha)
10.	100 seed weight (g)	6.14 - 8.04	SKGPK-33, SKGPK-27, SKGPK-23, SKGPK-24, SKGPK-34, SKGPK-29, SKGPK-31, MGPK-10-5 (> 7.00 g)	GK-1 (7.10 g)
Best entries over locations				
1.	Days to fruit setting	37.00 - 49.50	SKGPK-26, SKGPK-23, SKGPK-33, SKGPK-25, SKGPK-31, SKGPK-32, SKGPK-21, SKGPK-24, SKGPK-34, SKGPK-22, SKGPK-28, MGPK-10-2 , SKGPK-35 (< 43.00 days)	GK-1 (43.00 days)
2.	Fruit weight (q/ha)	87.28 - 171.51	SKGPK-24, MGPK-10-2 , SKGPK-22, SKGPK-27, SKGPK-29, MGPK-10-5, SKGPK-25, SKGPK-30 (> 131.47 q/ha)	GK-1 (131.46 q/ha)
3.	100-seed weight (g)	6.31 - 7.96	SKGPK-33, SKGPK-23, SKGPK-24, SKGPK-27, MGPK-10-5, SKGPK-34, SKGPK-31 (> 7.40 g)	GK-1 (7.40 g)
4.	Seed yield (q/ha)	2.81 - 6.34	SKGPK-22, SKGPK-27, SKGPK-21, SKGPK-34, MGPK-10-2 , SKGPK-24, MGPK-10-5, SKGPK-26 (>4.60 q/ha)	GK-1 (4.59 q/ha)

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S.No.	Accession No.	Days to fruit setting			Fruit weight (q/ha)			100-seed weight (g)			Seed yield (q/ha)		
		Jaisalmer	S.K.Nagar	Mean	Jaisalmer	S.K.Nagar	Mean	Jaisalmer	S.K.Nagar	Mean	Jaisalmer	S.K.Nagar	Mean
1	SKGPK-21	40.00	43.00	41.50	197.40	54.33	125.87	7.67	6.63	7.15	10.00	1.40	5.70
2	SKGPK-22	42.00	42.00	42.00	250.30	43.33	146.82	6.79	6.33	6.56	11.30	1.40	6.35
3	SKGPK-23	38.00	41.00	39.50	211.40	43.33	127.37	7.93	7.69	7.81	7.10	1.33	4.22
4	SKGPK-24	41.00	42.00	41.50	293.70	49.33	171.52	7.95	7.47	7.71	6.90	2.53	4.72
5	SKGPK-25	37.00	44.00	40.50	194.80	71.00	132.90	7.20	7.08	7.14	3.80	2.13	2.97
6	SKGPK-26	34.00	40.00	37.00	159.10	73.33	116.22	6.49	6.14	6.32	6.50	2.73	4.62
7	SKGPK-27	46.00	40.00	43.00	229.80	62.00	145.90	7.43	7.93	7.68	9.80	2.80	6.30
8	SKGPK-28	42.00	42.00	42.00	202.00	43.33	122.67	7.68	6.26	6.97	7.60	1.37	4.48
9	SKGPK-29	42.00	44.00	43.00	244.00	47.00	145.50	6.93	7.36	7.15	6.10	1.57	3.83
10	SKGPK-30	44.00	44.00	44.00	220.40	42.67	131.53	6.43	6.20	6.32	7.10	1.37	4.23
11	SKGPK-31	42.00	40.00	41.00	157.30	33.67	95.48	7.59	7.26	7.43	8.00	1.13	4.57
12	SKGPK-32	39.00	43.00	41.00	212.30	34.33	123.32	7.76	6.92	7.34	4.80	1.17	2.98
13	SKGPK-33	35.00	45.00	40.00	152.90	21.67	87.28	7.89	8.04	7.97	6.60	0.93	3.77
14	SKGPK-34	37.00	46.00	41.50	218.20	43.33	130.77	7.41	7.46	7.44	8.80	1.33	5.07
15	SKGPK-35	39.00	46.00	42.50	202.80	43.67	123.23	7.37	6.48	6.93	6.30	1.20	3.75
16	MGPK-10-1	40.00	59.00	49.50	237.90	25.00	131.45	7.52	6.79	7.16	4.80	0.83	2.82
17	MGPK-10-2	36.00	48.00	42.00	230.90	81.67	156.28	6.94	6.46	6.70	7.70	2.30	5.00
18	MGPK-10-3	36.00	50.00	43.00	172.80	23.67	98.23	6.37	6.75	6.56	5.80	0.67	3.23
19	MGPK-10-4	40.00	48.00	44.00	208.80	42.67	125.73	7.62	6.44	7.03	8.00	0.80	4.40
20	MGPK-10-5	42.00	56.00	49.00	225.40	53.33	139.37	7.84	7.24	7.54	8.00	1.28	4.64
Mean for check variety													
	GK-1 (C)	40.00	46.00	43.00	179.60	83.33	131.47	7.70	7.10	7.40	6.80	2.40	4.60
	Minum	34.00	40.00	37.00	152.90	21.67	87.28	6.37	6.14	6.32	3.80	0.67	2.82
	Maximum	46.00	59.00	49.50	293.70	83.33	171.52	7.95	8.04	7.97	11.30	2.80	6.35
	Mean	39.62	45.19	42.40	209.61	48.38	128.99	7.36	6.95	7.16	7.23	1.56	4.39
	CD(0.05)	-	6.54		44.93	21.37		-	0.07		1.23	0.73	
	CV(%) Error	-	6.92		10.28	21.14		-	0.45		8.15	22.59	
	CV(%) Phenotypic	7.72	10.97		16.27	36.35		6.88	8.25		24.84	41.92	

S.No.	Accession No.	Jaisalmer		S.K.Nagar					
		Number of fruits per plant	Fruit size (cm)	Days to first male flower opening	Days to first female flower opening	Days to 50 % maturity	Fruit length (cm)	Fruit diameter (cm)	Vine length (m)
1	SKGPK-21	7.50	43.80	34.00	41.00	81.00	15.90	32.52	4.14
2	SKGPK-22	10.90	39.90	29.00	40.00	82.00	17.30	33.52	3.82
3	SKGPK-23	7.00	43.70	31.00	39.00	81.00	15.50	31.30	2.91
4	SKGPK-24	10.70	42.20	33.00	40.00	81.00	18.80	35.72	3.59
5	SKGPK-25	7.20	43.00	33.00	42.00	79.00	17.70	33.74	3.59
6	SKGPK-26	6.20	37.80	29.00	38.00	82.00	18.20	36.56	4.72
7	SKGPK-27	10.40	40.20	33.00	38.00	79.00	21.00	36.78	3.62
8	SKGPK-28	7.30	43.40	34.00	40.00	82.00	17.20	34.60	4.11
9	SKGPK-29	11.00	42.60	33.00	42.00	81.00	16.40	33.96	3.75
10	SKGPK-30	9.00	43.40	34.00	42.00	81.00	18.90	37.06	4.02
11	SKGPK-31	6.80	42.20	31.00	38.00	82.00	16.30	33.32	3.80
12	SKGPK-32	9.10	41.40	31.00	41.00	82.00	16.40	32.40	3.99
13	SKGPK-33	6.70	41.40	31.00	43.00	81.00	18.00	35.80	4.10
14	SKGPK-34	9.40	42.50	34.00	44.00	81.00	18.10	36.10	4.04
15	SKGPK-35	7.30	44.00	33.00	44.00	82.00	19.20	37.00	4.06
16	MGPK-10-1	8.70	44.80	41.00	57.00	85.00	16.10	31.70	3.83
17	MGPK-10-2	9.80	43.60	31.00	46.00	83.00	16.30	33.50	3.62
18	MGPK-10-3	6.50	44.20	34.00	47.00	83.00	15.10	31.20	3.96
19	MGPK-10-4	10.70	41.60	41.00	46.00	86.00	17.70	35.00	4.02
20	MGPK-10-5	9.40	41.40	41.00	54.00	85.00	20.00	37.80	3.88
Mean for check variety									
	GK-1 (C)	7.60	41.60	33.00	43.00	83.00	18.60	39.00	4.25
	Minum	6.20	37.80	29.00	38.00	79.00	15.10	31.20	2.91
	Maximum	11.00	44.80	41.00	57.00	86.00	21.00	39.00	4.72
	Mean	8.53	42.32	33.52	43.10	82.00	17.56	34.69	3.90
	CD(0.05)	-	-	5.17	6.57	3.42	2.28	2.95	0.20
	CV(%) Error	-	-	7.39	7.29	1.99	6.22	4.07	2.49
	CV(%) Phenotypic	19.13	3.94	10.40	11.39	2.15	8.74	6.45	8.88

Table 110. Promising lines in Kankoda germplasm for various characters at Rahuri (Plains): Kharif 2013

S. No.	Characters	Range	Promising lines	Value of best check
Ambikapur (Accessions 28)				
1.	Days to first picking	26.00 -52.00	PK-28Jagdalpur (Besraguda)PK-46PK-9PK-27Raigarh (Local)SKNKK-501PK-5RMF-1 (< 38.00 days)	Indira Kankoda (38.00)
2.	No. of green fruits per plant	5.00 -146.00	Pratapur(Mani)PK-9RMF-17PK-46> 100.00	Indira Kankoda (100.00)
3.	100 Seed weight (g)	6.05 -11.95	RMF-1NDM-1NDM-1Jagdalpur (Jamawada,Nangur)PK-13Phule MD-05-2PK-33PK-9Pratapur(Mani)PK-27PK-8Raigarh (Local)Premnager (Maheshpur)PK-28PK-5PK-46SKNKK-501PK-35Phule MD-05-1 (> 9.20 g)	Indira Kankoda (9.20 g)
4.	Green fruit yield (kg per plant)	0.05 -1.33	Pratapur(Mani)PK-49PK-9RMF-17KrishnapurPK-46 (>1.03 kg/plant)	Indira Kankoda (1.02 kg/plant)
Rahuri (Accessions 30)				
1.	Days to picking first	70.00 -110.00	RKG-09-8, RKG-09-43, RKG-09-50, RKG-09-21 (< 74.00 days)	-
2.	Days to picking last	102.00 -141.00	RKG-09-43, RKG-09-8, RKG-09-6, RKG-09-10 (<1 12.00 days)	-
3.	No. of fruits/ plant	3.00 -22.00	RKG-09-33, RKG-09-49, RKG-09-29, RKG-09-6 (> 13.00)	-
4.	Fruit weight (g)	8.40 -21.90	RKG-09-20, RKG-09-29, RKG-09-10, RKG-09-49 (> 19.50 g)	-
5.	Fruit girth (cm)	7.50 -109.00	RKG-09-9, RKG-09-29, RKG-09-34, RKG-09-14 (> 11.20 cm)	-
6.	Fruit length (cm)	3.10 -6.90	RKG-09-45, RKG-09-50, RKG-09-26, RKG-09-29 (> 6.20 cm)	-
7.	Fruit yield/plant (kg)	0.04 -0.33	RKG-09-29, RKG-09-49, RKG-09-33, RKG-09-10 (> .27 kg)	-

Table 111. Evaluation of germplasm lines in Kankoda at Ambikapur - Kharif 2013 (Plain)

S.No.	Accession No.	Quantitative characters			
		Days to first picking	No. of green fruits per plant	100 Seed weight (g)	Green fruit yield (kg per plant)
1	Jagdalpur (Besraguda)	31.00	27.00	7.50	0.32
2	Jagdalpur (Jamawada,Nangur)	46.00	64.00	11.45	0.52
3	Krishnapur	44.00	93.00	9.15	1.09
4	NDM-1	39.00	22.00	11.50	0.19
5	NDM-1	50.00	69.00	11.85	0.62
6	Phule MD-05-1	41.00	40.00	9.30	0.60
7	Phule MD-05-2	42.00	5.00	11.15	0.05
8	PK-13	46.00	45.00	11.15	0.43
9	PK-27	33.00	85.00	9.95	0.91
10	PK-28	26.00	86.00	9.80	0.90
11	PK-33	46.00	74.00	11.05	0.34
12	PK-34	41.00	13.00	9.20	0.16
13	PK-35	39.00	44.00	9.50	0.42
14	PK-46	32.00	108.00	9.50	1.07
15	PK-49	52.00	100.00	9.05	1.22
16	PK-5	38.00	45.00	9.75	0.53
17	PK-8	48.00	9.00	9.95	0.06
18	PK-9	32.00	131.00	10.85	1.18
19	Pratapur(Mani)	49.00	146.00	10.05	1.33
20	Premnager (Maheshpur)	41.00	70.00	9.85	0.61
21	Raigarh (Local)	34.00	62.00	10.05	0.58
22	RMF 7-P-1	42.00	24.00	7.70	0.18
23	RMF-1	38.00	25.00	11.95	0.19
24	RMF-17	41.00	113.00	6.75	1.17
25	RMF-27	48.00	21.00	7.55	0.19
26	RMF-P-4	44.00	53.00	6.05	0.41
27	SKNKK-501	35.00	62.00	9.50	0.45
28	Wadarafnager (Balangi)	40.00	39.00	8.25	0.33
Mean for check variety					
	Indira Kankoda (C)	38.00	100.00	9.20	1.03
	Minimum	26.00	5.00	6.05	0.05
	Maximum	52.00	146.00	11.95	1.33
	Mean	40.55	61.21	9.61	0.59
	CV (%) Phenotypic	15.63	61.37	15.56	66.10

Table 112. Evaluation of germplasm lines in Kankoda at Rahuri - Kharif 2013 (Plain)

S.No.	Accession No.	Quantitative characters						
		Days to picking first	Days to picking last	No. of fruits/plant	Fruit weight (g)	Fruit girth (cm)	Fruit length (cm)	Fruit yield/plant (kg)
1	RKG-09-3	75.00	125.00	8.00	15.50	9.20	5.00	0.13
2	RKG-09-4	88.00	124.00	9.00	12.90	10.00	4.30	0.12
3	RKG-09-5	80.00	131.00	7.00	19.50	8.30	3.10	0.14
4	RKG-09-6	85.00	109.00	14.00	19.20	9.70	4.50	0.27
5	RKG-09-8	70.00	105.00	7.00	13.40	9.20	6.20	0.10
6	RKG-09-9	80.00	137.00	8.00	15.40	109.00	4.80	0.12
7	RKG-09-10	75.00	109.00	13.00	20.80	10.50	5.80	0.28
8	RKG-09-11	90.00	135.00	10.00	8.40	8.80	5.40	0.08
9	RKG-09-13	74.00	112.00	13.00	16.80	9.40	5.50	0.23
10	RKG-09-14	80.00	128.00	10.00	12.00	11.30	5.20	0.12
11	RKG-09-20	74.00	120.00	10.00	21.90	11.20	5.50	0.23
12	RKG-09-21	73.00	119.00	4.00	13.20	8.40	4.60	0.05
13	RKG-09-23	90.00	130.00	10.00	13.40	9.60	6.20	0.14
14	RKG-09-25	89.00	121.00	12.00	12.40	8.30	4.90	0.15
15	RKG-09-26	95.00	138.00	9.00	13.50	11.00	6.40	0.12
16	RKG-09-27	75.00	115.00	13.00	15.80	8.50	4.50	0.21
17	RKG-09-29	82.00	129.00	15.00	21.90	12.10	6.30	0.33
18	RKG-09-30	78.00	130.00	8.00	13.80	10.90	4.50	0.12
19	RKG-09-33	85.00	135.00	22.00	12.40	9.30	4.60	0.28
20	RKG-09-34	83.00	132.00	3.00	17.20	11.40	6.10	0.05
21	RKG-09-37	110.00	138.00	11.00	10.90	7.90	4.50	0.12
22	RKG-09-38	107.00	141.00	5.00	13.70	8.50	4.50	0.07
23	RKG-09-41	88.00	127.00	7.00	12.60	8.50	4.20	0.08
24	RKG-09-43	70.00	102.00	4.00	12.20	8.40	4.80	0.04
25	RKG-09-44	86.00	130.00	5.00	12.40	11.10	4.40	0.06
26	RKG-09-45	77.00	129.00	12.00	15.40	10.70	6.90	0.19
27	RKG-09-47	75.00	125.00	10.00	11.60	9.80	5.10	0.12
28	RKG-09-48	80.00	125.00	8.00	10.50	7.50	4.50	0.08
29	RKG-09-49	75.00	127.00	16.00	20.40	10.40	5.10	0.32
30	RKG-09-50	72.00	123.00	7.00	13.40	9.20	6.80	0.09
	Minimum	70.00	102.00	3.00	8.40	7.50	3.10	0.04
	Maximum	110.00	141.00	22.00	21.90	109.00	6.90	0.33
	Mean	82.03	125.03	9.67	14.75	12.94	5.14	0.15
	CV(%) Phenotypic	11.89	8.05	42.03	23.86	140.56	17.09	56.22

Table 113. Promising lines in tumba germplasm for various characters at Mandor (Plains): Kharif 2012

S. No.	Characters	Range	Promising lines	Value of best check
Mandor (Accessions 28)				
1.	No. of fruits per plant	0.30 -22.00	IC281143, IC281169, IC262409, IC281126 (> 12.00)	-
2.	Fruit diameter (cm)	5.00 -8.80	IC282661, IC373439, IC262410, IC281178, IC281157, IC281126 (> 7.80 cm)	-
3.	Single fruit weight (g)	100.00 -375.00	IC282661, IC373439, IC281157, IC281178, IC281126, IC262410 (> 238.50 g)	-
4.	Fruit yield per plant (kg)	0.06 -3.70	IC281157, IC281126, IC281143, IC281169, IC373506, IC262409 (> 1.80 kg)	-
5.	Seed yield per plant (g)	7.00 -200.00	IC281143, IC281157, IC281126, IC281169, IC373506, IC262409 (> 90.00 g)	-
6.	100 seed weight (g)	1.41 -3.08	IC373439, IC281176, IC281174, IC262410, IC281169, IC281190 (> 2.69 g)	-

Table 114. Evaluation of germplasm lines in tumba at Mandor - Kharif 2013 (Plain)

S. No.	Accession No.	Quantitative characters					
		No. of fruits per plant	Fruit diameter (cm)	Single fruit weight (g)	Fruit yield per plant (kg)	Seed yield per plant (g)	100 seed weight (g)
1	IC262407	7.00	5.50	114.30	0.80	60.00	2.47
2	IC262408	2.00	6.20	100.00	0.20	15.00	2.37
3	IC262409	16.00	5.70	112.50	1.80	90.00	2.57
4	IC262410	6.50	8.10	238.50	1.55	45.00	2.79
5	IC281122	4.00	6.50	187.50	0.75	40.00	2.37
6	IC281125	9.00	6.70	177.80	1.60	70.00	2.29
7	IC281126	13.00	7.80	276.90	3.60	130.00	2.32
8	IC281143	22.00	6.70	150.00	3.30	200.00	1.83
9	IC281157	12.00	7.90	308.30	3.70	200.00	2.51
10	IC281160	6.00	6.60	150.00	0.90	40.00	2.37
11	IC281169	17.00	7.20	158.80	2.70	120.00	2.75
12	IC281174	0.30	7.50	200.00	0.07	7.00	2.84
13	IC281176	1.00	6.00	150.00	0.15	15.00	2.91
14	IC281177	6.00	6.40	191.70	1.15	45.00	2.62
15	IC281178	6.00	8.00	283.30	1.70	75.00	2.66
16	IC281190	2.00	7.40	225.00	0.45	20.00	2.69
17	IC281193	5.00	6.70	150.00	0.75	35.00	1.93
18	IC281201	2.00	5.20	100.00	0.20	20.00	1.79
19	IC281202	2.30	6.60	228.60	0.53	27.00	2.11
20	IC281203	5.00	7.00	220.00	1.10	50.00	2.30
21	IC281206	4.00	6.40	187.50	0.75	40.00	1.72
22	IC281208	1.00	6.90	150.00	0.15	10.00	2.03
23	IC281209	4.50	6.70	222.20	1.00	50.00	1.88
24	IC281234	5.70	6.70	164.70	0.93	43.00	1.93
25	IC282661	4.00	8.80	375.00	1.50	75.00	2.62
29	IC370485	2.30	5.80	128.60	0.30	12.00	2.51
30	IC370505	1.00	5.00	100.00	0.10	10.00	1.42
26	IC373439	3.00	8.20	333.30	1.00	50.00	3.08
27	IC373493	5.50	7.70	181.80	1.00	35.00	2.11
28	IC373506	12.00	6.80	166.70	2.00	100.00	2.34
	Minimum	0.30	5.00	100.00	0.07	7.00	1.42
	Maximum	22.00	8.80	375.00	3.70	200.00	3.08
	Mean	6.24	6.82	191.10	1.19	57.63	2.34
	CV(%) Phenotypic	85.00	13.44	36.65	85.20	86.77	17.00

Table 115. Promising lines in Simarouba germplasm for various characters at different locations (Plains)

S.No.	Characters	Range	Promising lines
Mandor (Accessions 5)			
1.	Stem girth (cm)	63.00-85.00	Plant No. 4, Plant No. 3, Plant No. 1, Plant No. 2, Plant No. 5 (>62.00 cm)
2.	Seed yield per plant (kg)	1.00-2.40	Plant No. 4, Plant No. 1, Plant No. 5, Plant No. 2, Plant No. 3 (≥1.00 kg)
3.	100 seed weight (g)	112.00-138.80	Plant No. 1, Plant No. 4, Plant No. 3, Plant No. 2, Plant No. 5 (>111.00 g)
Rahuri – Male Paradise tree (Accessions 18)			
1.	Flowering span (days)	32.00-49.00	PS-2003-24, PS-2003-22, PS-2003-40, PS-2003-50, PS-2003-9, PS-2003-32, PS-2003-37, PS-2003-2, PS-2003-6, PS-2003-34, PS-2003-10, PS-2003-58, PS-2003-44, PS-2003-12, PS-2003-36, PS-2003-11, PS-2003-15, PS-2003-18, PS-2003-53, PS-2003-56, PS-2003-60, PS-2003-65 (<50.00 days)
2.	Plant height (m)	3.70-7.10	PS-2003-10, PS-2003-12, S-2003-6, PS-2003-15, PS-2003-24, PS-2003-37, PS-2003-58, PS-2003-18, PS-2003-22, PS-2003-40, PS-2003-2, PS-2003-11, PS-2003-32, PS-2003-34, PS-2003-44, PS-2003-53, PS-2003-60, PS-2003-50, PS-2003-56, PS-2003-65, PS-2003-9, PS-2003-36 (>3.60 cm)
3.	Trunk girth (cm)	48.50-102.00	PS-2003-32, PS-2003-34, PS-2003-15, PS-2003-10, PS-2003-36, PS-2003-6, PS-2003-24, PS-2003-37, PS-2003-40, PS-2003-58, PS-2003-18, PS-2003-12, PS-2003-22, PS-2003-53, PS-2003-2, PS-2003-44, PS-2003-11, PS-2003-60, PS-2003-65, PS-2003-56, PS-2003-50, PS-2003-9 (>48.40 cm)
4.	Primary branches per plant	2.00-4.00	PS-2003-10, PS-2003-12, PS-2003-22, PS-2003-37, PS-2003-2, PS-2003-6, PS-2003-9, PS-2003-11, PS-2003-15, PS-2003-24, PS-2003-32, PS-2003-36, PS-2003-50, PS-2003-56, PS-2003-18, , PS-2003-34, PS-2003-40, PS-2003-44, PS-2003-53, PS-2003-58, PS-2003-60, PS-2003-65 (>1.00)

Rahuri – Female Paradise tree (Accessions 36)			
1.	Plant height (m)	4.10-7.00	PS-2003-7, PS-2003-4, PS-2003-29, PS-2003-59, PS-2003-5, PS-2003-23, PS-2003-39, PS-2003-45, PS-2003-41, PS-2003-14, PS-2003-8, PS-2003-21, PS-2003-35, PS-2003-47, PS-2003-48, PS-2003-26, PS-2003-62, PS-2003-20, PS-2003-42, PS-2003-3, PS-2003-30, PS-2003-49, PS-2003-67, PS-2003-66, PS-2003-63, PS-2003-25, PS-2003-1, PS-2003-46 (>4.09 m)
2.	Seed Yield (kg/tree)	0.04-9.56	PS-2003-45, PS-2003-20, S-2003-49, PS-2003-4, PS-2003-7, PS-2003-47, PS-2003-3, PS-2003-48, PS-2003-1, PS-2003-63, PS-2003-21, PS-2003-5, PS-2003-66, PS-2003-29, PS-2003-35, PS-2003-46, PS-2003-62, PS-2003-8, PS-2003-67, PS-2003-41, PS-2003-26, PS-2003-39, PS-2003-14, PS-2003-30, PS-2003-42, PS-2003-23, PS-2003-25, PS-2003-59 (>0.03 kg/tree)
3.	Primary branches per plant	2.00-6.00	PS-2003-48, PS-2003-35, PS-2003-49, PS-2003-1, PS-2003-3, PS-2003-4, PS-2003-20, PS-2003-21, PS-2003-30, PS-2003-42, PS-2003-45, PS-2003-47, PS-2003-63, PS-2003-66, PS-2003-5, PS-2003-7, PS-2003-8, PS-2003-25, PS-2003-26, PS-2003-39, PS-2003-41, PS-2003-59, PS-2003-62, PS-2003-14, PS-2003-23, PS-2003-29, PS-2003-46, PS-2003-67 (>1.00)
5.	Trunk girth (cm)	37.20-121.00	PS-2003-3, PS-2003-4, PS-2003-5, PS-2003-35, PS-2003-29, PS-2003-7, PS-2003-41, PS-2003-8, PS-2003-26, PS-2003-59, PS-2003-23, PS-2003-20, PS-2003-21, PS-2003-39, PS-2003-45, PS-2003-42, PS-2003-46, PS-2003-48, PS-2003-63, PS-2003-67, PS-2003-47, PS-2003-66, PS-2003-62, PS-2003-49, PS-2003-1, PS-2003-30, PS-2003-25, PS-2003-14 (>37.10 cm)
6.	No. of drupelets per plant	2.00-135.00	PS-2003-45, PS-2003-3, PS-2003-4, PS-2003-1, PS-2003-20, PS-2003-5, PS-2003-7, PS-2003-49, PS-2003-47, PS-2003-66, PS-2003-46, PS-2003-21, PS-2003-29, PS-2003-48, PS-2003-63, PS-2003-62, PS-2003-35, PS-2003-67, PS-2003-8, PS-2003-26, PS-2003-30, PS-2003-41, PS-2003-42, PS-2003-14, PS-2003-23, PS-2003-25, PS-2003-39, PS-2003-59 (>1.00)
7.	No. of fruits per drupelets	10.00-72.00	PS-2003-48, PS-2003-63, PS-2003-35, PS-2003-49, PS-2003-41, PS-2003-39, PS-2003-47, PS-2003-62, PS-2003-7, PS-2003-66, PS-2003-45, PS-2003-1, PS-2003-8, PS-2003-14, PS-2003-20, PS-2003-21, PS-2003-46, PS-2003-4, PS-2003-3, PS-2003-5, PS-2003-29, PS-2003-67, PS-2003-30, PS-2003-23 PS-2003-42, PS-2003-26, PS-2003-25, PS-2003-59 (>9.00)

S.No.	Characters	Range	Promising lines
8.	100 mature fruit weight (g)	350.60-615.20	PS-2003-5, PS-2003-20, PS-2003-29, PS-2003-26, PS-2003-59, PS-2003-23, PS-2003-3, PS-2003-63, PS-2003-14, PS-2003-39, PS-2003-25, PS-2003-30, PS-2003-42, PS-2003-35, PS-2003-8, PS-2003-4, PS-2003-21, PS-2003-47, PS-2003-1, PS-2003-67, PS-2003-46, PS-2003-66, PS-2003-7, PS-2003-45, PS-2003-62, PS-2003-41, PS-2003-48, PS-2003-49 (>350.50 g)
9.	100 dry seed weight (g)	115.00-198.00	PS-2003-29, PS-2003-42, PS-2003-39, PS-2003-21, PS-2003-20, PS-2003-23, PS-2003-8, PS-2003-30, PS-2003-25, PS-2003-26, PS-2003-7, PS-2003-14, PS-2003-3, PS-2003-59, PS-2003-63, PS-2003-4, PS-2003-5, PS-2003-47, PS-2003-35, PS-2003-45, PS-2003-67, PS-2003-66, PS-2003-62, PS-2003-41, PS-2003-48, PS-2003-1, PS-2003-49, PS-2003-46 (>114.90)
S.K. Nagar – Female Paradise tree (Accessions 19)			
1.	Seed yield per plant (kg)	0.20-5.20	L12P13, L10P7, L11P18, L13P5, L12P1, L13P11, L11P2, L8P3, L11P7, L12P9, L13P12, L15P4, L8P9, L11P4, L15P17, L5P9, L14P9, L1P9, L2P4 (>0.10)

Table 116. Evaluation of germplasm lines in Simarouba at Mandor : 2013 (Plain)

Plant No.	Stem girth (cm)	Seed yield per plant (kg)	100 seed weight (g)
1	80.00	1.80	138.80
2	74.00	1.00	113.30
3	83.00	1.00	120.70
4	85.00	2.40	121.30
5	63.00	1.20	112.00
Minimum	63.00	1.00	112.00
Maximum	85.00	2.40	138.80
Mean	77.00	1.48	121.22

Table 117. Evaluation of germplasm lines of male paradise tree (Simarouba) at Rahuri : 2013 (Plain)

S.No.	Genotypes	Date of flower initiation	Days to flowering span	Plant height (m)	Trunk girth (cm)	No. of primary branches
1	PS-2003-2	10.12.2013	40.00	5.25	66.00	3.00
2	PS-2003-6	01.12.2012	41.00	6.85	83.00	3.00
3	PS-2003-9	10.01.2013	38.00	4.15	48.50	3.00
4	PS-2003-10	05.12.2013	42.00	7.10	84.00	4.00
5	PS-2003-11	No flowering	-	5.10	58.00	3.00
6	PS-2003-12	06.01.2013	46.00	6.90	77.00	4.00
7	PS-2003-15	No flowering	-	6.85	90.00	3.00
8	PS-2003-18	No flowering	-	6.20	78.20	2.00
9	PS-2003-22	16.01.2013	35.00	5.65	75.50	4.00
10	PS-2003-24	19.01.2013	32.00	6.55	82.00	3.00
11	PS-2003-32	10.01.2013	38.00	5.10	102.00	3.00
12	PS-2003-34	07.01.2013	41.00	5.10	93.00	2.00
13	PS-2003-36	18.01.2013	49.00	3.70	84.00	3.00
14	PS-2003-37	16.12.2012	39.00	6.40	82.00	4.00
15	PS-2003-40	15.12.2012	35.00	5.60	80.00	2.00
16	PS-2003-44	10.12.2012	44.00	5.10	58.50	2.00
17	PS-2003-50	28.12.2013	35.00	4.40	49.00	3.00
18	PS-2003-53	No flowering	-	5.10	68.20	2.00
19	PS-2003-56	No flowering	-	4.35	52.00	3.00
20	PS-2003-58	25.12.2012	43.00	6.30	80.00	2.00
21	PS-2003-60	No flowering	-	4.70	58.00	2.00
22	PS-2003-65	No flowering	-	4.20	57.30	2.00
	Minimum		32.00	3.70	48.50	2.00
	Maximum		49.00	7.10	102.00	4.00
	Mean		39.87	5.48	73.01	2.82
	CV(%) Phenotypic		0.12	0.19	0.21	0.26

Table 118. Evaluation of germplasm lines of female paradise tree (Simarouba) at Rahuri : 2013 (Plains)

S.No.	Genotypes	Flowering initiation date	Days to maturity	Seed yield (kg/tree)	Plant height (cm)	No. of primary branches	Trunk girth (cm)	No. of drupelets/plant	No. of fruits/drupelets	100 mature fruit weight (g)	100 dry seed weight (g)
1	PS-2003-1	10.12.2012	10.03.2013	5.80	4.10	4.00	52.00	125.00	40.00	450.40	118.00
2	PS-2003-3	09.12.2012	07.03.2013	6.58	5.20	4.00	121.00	134.00	33.00	560.60	151.00
3	PS-2003-4	03.12.2012	04.03.2013	7.50	6.90	4.00	120.00	133.00	39.00	495.80	148.00
4	PS-2003-5	10.12.2012	10.04.2013	5.15	6.70	3.00	104.00	113.00	31.00	615.20	148.00
5	PS-2003-7	23.12.2012	05.04.2013	7.50	7.00	3.00	95.50	112.00	45.00	408.10	154.00
6	PS-2003-8	31.12.2012	26.03.2013	2.35	5.90	3.00	93.20	32.00	40.00	502.30	168.00
7	PS-2003-14	26.01.2013	20.05.2013	0.61	6.10	2.00	37.20	10.00	40.00	530.00	152.00
8	PS-2003-20	19.12.2012	04.04.2013	8.24	5.30	4.00	85.10	122.00	40.00	610.20	171.00
9	PS-2003-21	10.01.2013	07.04.2013	5.23	5.90	4.00	84.90	75.00	40.00	495.30	175.00
10	PS-2003-23	16.01.2013	10.04.2013	0.40	6.70	2.00	85.50	8.00	25.00	560.70	169.00
11	PS-2003-25	13.01.2013	29.04.2013	0.26	4.40	3.00	45.00	8.00	12.00	525.30	164.00
12	PS-2003-26	18.01.2013	10.04.2013	0.95	5.50	3.00	92.00	30.00	19.00	570.60	164.00
13	PS-2003-29	23.01.2013	10.04.2013	4.16	6.90	2.00	97.00	70.00	30.00	598.30	198.00
14	PS-2003-30	26.01.2013	29.04.2013	0.60	5.20	4.00	50.70	13.00	27.00	512.10	167.00
15	PS-2003-35	11.12.2012	10.03.2013	3.90	5.80	5.00	97.50	40.00	67.00	510.20	145.00
16	PS-2003-39	31.12.2012	20.03.2013	0.75	6.40	3.00	84.00	7.00	60.00	528.70	176.00
17	PS-2003-41	01.01.2013	11.04.2013	1.02	6.30	3.00	94.00	13.00	65.00	370.80	125.00
18	PS-2003-42	09.01.2013	10.04.2013	0.55	5.30	4.00	74.00	13.00	23.00	510.30	181.00
19	PS-2003-45	28.12.2012	18.03.2013	9.56	6.40	4.00	79.00	135.00	44.00	408.10	142.00
20	PS-2003-46	15.12.2012	20.03.2013	3.60	4.10	2.00	73.00	78.00	40.00	413.90	115.00
21	PS-2003-47	09.12.2012	10.03.2013	7.50	5.80	4.00	64.50	85.00	60.00	490.70	147.00

S.No.	Genotypes	Flowering initiation date	Days to maturity	Seed yield (kg/tree)	Plant height (cm)	No. of primary branches	Trunk girth (cm)	No. of drupelets/plant	No. of fruits/drupelets	100 mature fruit weight (g)	100 dry seed weight (g)
22	PS-2003-48	10.12.2012	07.03.2013	6.30	5.80	6.00	67.00	70.00	72.00	370.10	125.00
23	PS-2003-49	03.12.2013	11.03.2013	8.15	5.10	5.00	53.00	105.00	67.00	350.60	116.00
24	PS-2003-59	03.12.2012	05.03.2013	0.04	6.90	3.00	86.50	2.00	10.00	570.40	150.00
25	PS-2003-62	06.01.2013	10.04.2013	3.05	5.40	3.00	54.00	48.00	50.00	391.70	127.00
26	PS-2003-63	04.01.2013	07.04.2013	5.40	4.80	4.00	67.00	51.00	70.00	545.20	150.00
27	PS-2003-66	22.01.2013	02.04.2013	4.65	4.90	4.00	59.00	80.00	45.00	409.10	129.00
28	PS-2003-67	13.02.2013	29.04.2013	1.36	5.00	2.00	65.00	34.00	28.00	418.70	138.00
	Minimum			0.04	4.10	2.00	37.20	2.00	10.00	350.60	115.00
	Maximum			9.56	7.00	6.00	121.00	135.00	72.00	615.20	198.00
	Mean			3.97	5.71	3.46	77.88	62.36	41.50	490.12	150.46
	CV(%) Phenotypic			75.19	14.96	28.85	27.80	73.91	41.72	15.89	14.16

Table 119. Evaluation of germplasm lines in of female paradise tree (Simarouba) at S. K. Nagar : 2013 (Plain)

S.No	Plant No.	Location of Plantation	Age of the plant (Year)	Seed yield per plant (kg)
1	L1P9	D-21 Plot	7.90	0.30
2	L2P4	D-21 Plot	7.90	0.20
3	L5P9	D-21 Plot	7.90	0.63
4	L8P3	D-21 Plot	7.90	1.40
5	L8P9	D-21 Plot	7.90	1.15
6	L10P7	D-21 Plot	7.90	3.50
7	L11P2	D-21 Plot	7.90	1.50
8	L11P4	D-21 Plot	7.90	1.00
9	L11P7	D-21 Plot	7.90	1.30
10	L11P18	D-21 Plot	7.90	3.00
11	L12P1	D-21 Plot	7.90	2.30
12	L12P9	D-21 Plot	7.90	1.30
13	L12P13	D-21 Plot	7.90	5.20
14	L13P5	D-21 Plot	7.90	2.70
15	L13P11	D-21 Plot	7.90	1.70
16	L13P12	D-21 Plot	7.90	1.20
17	L14P9	D-21 Plot	7.90	0.60
18	L15P4	D-21 Plot	7.90	1.20
19	L15P17	D-21 Plot	7.90	1.00
	Minimum			0.20
	Maximum			5.20
	Mean			1.64

AGRONOMY

IV. AGRONOMY

A total of twelve agronomic experiments were formulated to be conducted at fourteen locations in 37 trials. These comprised of three studies on amaranth, one each on fababean, jatropha and kalingada, five on rice bean and one on underutilized crops in general. Out of these, results of twelve experiments were received from eleven locations in 30 trials, four experiments at six location(s) were taken up during Rabi 2012-13 while seven (out of thirty seven) were not reported. Centre-wise details of experiments are presented in Table 120 and the findings are as follows:

Experiment 1: Chemical weed control in grain amaranth

The objective of this experiment was to work out chemical weed control practice for grain amaranth. This experiment was conducted at two centres each (Ranichauri and Bangalore) during kharif 2013 and S.K. Nagar, Bhubaneswar during Rabi 2012-13.

Results:

At Ranichauri (Table 121& 121a), Bangalore (Table 122) and Bhubaneswar (Table 123) weed free control resulted in maximum seed yield (11.06 q/ha, 13.31 q/ha and 14.25 q/ha) followed by two manual weeding at 3 and 5 weeks after sowing (10.70 q/ha at Ranichauri and 9.94 q/ha at Bangalore). While Oxyflurofen @ 50 g/ha pre-emergent + one hand weeding at 5 WAS at Bhubaneswar (12.91 q/ha) Chemical weed control treatments resulted in significantly poor grain yield as compared to manual weeding.

At Bhubaneswar (Table123), weed free control recorded maximum seed yield (14.25q/ha) followed by application of Oxyflurofen @50 g/ha pre-emergent + one hand weeding at 5 WAS (12.91q/ha).

At S.K. Nagar (Table 124), 8 treatments were applied for weed control, the maximum grain yield (16.82 q/ha) was also recorded in two manual weeding at 3 & 5 weeks followed by one manual weeding at 30 days (16.04 q/ha).

Experiment 2: Organic farming in grain amaranth

In order to develop cultivation practices for organic farming of grain amaranth, the crop of grain amaranth was subjected to eleven manurial treatments at Mettupalayam, Bangalore, Ranichauri, Cooch Behar and Palampur during Kharif 2013 and S.K. Nagar during Rabi 2012-13. The experiment was laid out in RBD with three replications.

Results:

The amaranth crop fertilized with 50 % RDF + vermi-compost @5 t/ha gave the highest grain yield (T_7) at Palampur, Mettupalayam and S.K. Nagar Centres. While the treatment 100 % RDF gave highest grain yield (19.37 q/ha) at Ranicharui (Table 125 & 125a) and S.K. Nagar (11.30 q/ha). Based on the average performance over locations, application of 50 % RDF + vermi compost @ 5 t/ha) gave maximum yield (10.90q/ha).

Experiment 3: Performance of amaranth varieties at different locations

To identify amaranth varieties suitable for changing climate, this experiment was started at four centres in hills and two centres in plain during kharif 2013 and four centres in plain during Rabi 2012-13. Data have been received from one centre from hill (Palampur) and six centres from plains.

In this trial, thirteen varieties were tested. The performance of the entries as compared to the mean has been given in (Table 126). Based on the overall mean performance in respect of grain yield over seven locations, the variety GA-1 showed highest seed yield.

Significant differences were observed among the varieties for seed yield at all three locations (Table 126 a). Seed yield level was high at Mandor (15.50 q/ha) followed by Bhubaneswar (11.91 q/ha) and very low at Palampur (0.65 q/ha). Based on the overall mean performance in respect of grain yield over seven locations, the variety GA-1 showed highest seed yield.

Average plant height of the varieties (Table 126 b) was the highest at Mettupalayam (164.43cm) followed by at S.K. Nagar (118.62 cm). It was the

lowest at Delhi (87.74 cm) centre. Based on average performance over seven locations the variety RMA-7 had highest plant height (160.18 cm).

The mean flowering time was shortest (44.53 days) at Bhubaneswar while it was longest (67.33 days) at Palampur. The variety PRA-3 showed consistency for early flowering over the locations and ranked first (44.21 days) based on the overall performance (Table 126 c).

The average maturity period of the varieties over the locations was 111.12 days. The variety, PRA-3 was the earliest in maturity (100.60 days). The average maturity period was the minimum at Mettupalayam (81.21 days) while, it was the longest at Delhi (148.79.39 days) (Table 126 d).

Test weight expressed in terms of weight of 10 ml seed recorded at seven centres. The variation among the varieties was relatively low. Based on the average over seven locations the variety, Durga (7.71 g) showed the highest test weight (Table 126 f).

Experiment 4: Performance of different rice bean genotypes

To find out suitable rice bean genotypes for northern part of West Bengal, several genotypes namely, RBL-1, RBL-6, RBL-35, RBL-50, RRB-11, RRB-13 and local check were grown in RBD with three replications at Cooch Behar.

Results:

The maximum seed yield was observed in genotype RBL-6 (13.25 q/ha) followed by RBL-50 (11.61 q/ha). The maximum plant height (132.60 cm) was found in local while the longest pod in RBL-6 (7.90 cm). The genotype RBL-6 had bold seeds (6.90 g) at Cooch Behar (Table 127).

Experiment 5: Intercropping study in rice bean during kharif 2013

This experiment was taken up at Cooch Behar and Mettupalalyam with the objective to identify appropriate intercrop system for rice bean in different parts of the West Bengal. The experiment was laid out in Randomized Block Design with three replications. Centre-wise details of intercrop treatment are as follows:

Treatments:

S. No.	Cooch Behar	Mettupalayam
1	Rice bean sole	Rice bean (Trailing type) Sole crop
2	Maize sole	Rice bean (Trailing type) Sole crop
3	Niger sole	Rice bean (Bush type) Sole crop
4	Sesame sole	Maize Sole crop
5	Maize + rice bean (1:2)	Rice bean (Trailing type) + Maize 2:2
6	Niger + rice bean (1:2)	Rice bean (Trailing type) + Maize 2:2
7	Sesame + rice bean (1:2)	Rice bean (Bush type) + Maize 2:2
8	Maize + rice bean (2:2)	
9	Niger + rice bean (2:2)	
10	Sesame + rice bean (2:2)	

Results:

Intercropping Maize sole crop resulted in the highest seed yield (32.28 q/ha) at Mettupalayam (Table 128 b). On the other hand, maize + rice bean (2:2) gave highest seed yield (10.67 q/ha) at Cooch Behar (Table 128a). The maize sole crop at Bangalore (Table 128c) gave the highest yield and rice bean equivalent yield

Experiment 6: Fertilizer management in rice bean based intercrop

To work out fertilizer requirements of rice bean based intercrop (rice bean + pigeonpea and rice bean + maize), five fertilizer doses were applied in split plot with three replications at Bhubaneswar and rice bean + maize and rice bean + grain amaranth at Ranichauri. The data received only from Ranichauri Centre.

Results:

Highest yields of rice bean as well as the intercrops were obtained by applying 100% sole crop recommendations of the component crops and decreased with decrease in fertilizer dose (Table 129). Also, the grain yields of maize intercrop (I_1) were higher than that of grain amaranth (I_2) at all levels of fertilizer application at Ranichauri.

Experiment 7: Organic manurial studies in rice bean

With a view to standardize a suitable dose of organic fertilizer in combination with biofertilizer for rice bean, nine manurial treatments were given to rice bean in RBD with three replications at Palampur and Ranichauri. Details of treatments are given below:

- Treatments** :
- (i) FYM @2.5 t/ha
 - (ii) FYM @5 t/ha
 - (iii) FYM @7.5 t/ha
 - (jv) VC @2.5 t/ha
 - (v) VC @5 t/ha
 - (vi) VC @7.5 t/ha
 - (vii) RDF @50% + VC @2.5 t/ha
 - (viii) 100% RDF
 - (xi) Control

Results:

Application of 100% RDF recorded maximum seed yield of rice bean at Ranichauri (11.14q/ha) while application of FYM @7.5t/ha is more profitable (B:C ratio, 1.33, Table 130 a) and application of vermi-compost @ 5.0 t/ha gave highest yield (11.48q/ha) at Palampur (Table 130). Based on average performance of two locations, application of vermi-compost @ 5.0 t/ha gave maximum seed yield (10.22q/ha).

Experiment 8: Chemical weed control in rice bean

The objective of this experiment was to find out chemical weed control practice for rice bean. This experiment was allotted to three centres Bhubaneswar, Cooch Behar and Bangalore in kharif 2013. Data have been received only from two centre Cooch Behar and Bangalore.

Results:

At Cooch Behar (Table 131), the application of weed free control recorded maximum seed yield (12.49q/ha) followed by application of Pendimethain (30%) 1 kg/ha pre-emergent + one hand weeding at 30 DAS (10.25q/ha).

At Bangalore (Table 132), 12 treatments were applied for weed control, the maximum yield was recorded in weed free control field (15.31q/ha) followed by application of Pendimethalin (30% EC) 1kg ai/ha pre emergence + one weeding 5 WAS (14.54q/ha).

Experiment 9: Effect of planting geometry, fertilizer dose and plants/hill of kalingada under rainfed conditions

This experiment was started at S.K. Nagar during 2010 to find out the spatial, manurial and plants/hill requirements of kalingada. The experiment was laid out in Factorial Randomized Block Design with three replications. The treatments comprised three levels of spacing viz. 3x1 m (S_1), 3x1.5 m (S_2) and 3x2 m (S_3); two doses of fertilizer, namely, $N_{20}P_{40}$ (F_1) and $N_{40}P_{80}$ (F_2) and, two levels of plants/hill i.e. 1 and 2.

Results:

The perusal of results in Table 133 revealed that all the three factors affected the seed and green fruit yield of kalingada significantly. Maximum seed yield was obtained by growing the crop in 3x1 m spacing (S_1), applying fertilizer dose of $N_{40}P_{80}$ and by maintaining two plants/hill. Interaction among the factors was also significant with $S_1F_2P_2$ resulting in highest seed and $S_1F_2P_1$ gave the maximum green fruit yield followed by those obtained under different treatments for seed ($S_1F_2P_2$) and green fruit ($S_3F_1P_1$) yields. Pulp ratio, on the other hand, was observed to be the highest under $S_1F_2P_1$.

Experiment 10: Intercropping studies on underutilized crops with different tree crops

This experiment was started at Mettupalayam and Rahuri during 2010 to find out suitable underutilized crops for different tree crops. Results were received from Mettupalayam centre only. Grain Amaranth intercropping resulted in the highest grain yield in both Pungam and Simarouba tree crop (Table 134).

Experiment 11: Intercropping studies on underutilized crops in Jatropha

This experiment was taken up at Hisar with the objective to find out suitable underutilized crops for intercropping in Jatropha in different parts of the

country. The experiment was laid out in Randomized Block Design with three replications. The details of intercrop treatment are as follows:

- Treatments** :
- (i) Jatropha (Sole)
 - (ii) Jatropha + Wheat
 - (iii) Jatropha + Barley
 - (iv) Jatropha + Gram
 - (v) Jatropha + Mustard
 - (vi) Jatropha + Faba bean

Results:

Pooled data of two crop season in (Table 135) showed that Jatropha seed yield was decreased by 1.75, 2.15 and 2.65 q/ha when it was intercropped with mustard, fababean, barley, wheat and crops. The seed yield of Jatropha was not reduced much with the inclusion of gram and bakla as intercrops. The economics of different treatments were largely influenced by the prices of the grain and byproduct of the individual crops and the values of gross returns were almost double compared to Jatropha sole crop. The gross returns of Rs. 67175 and Jatropha equivalent yield (q/ha) of 34.91 were recorded maximum in the Jatropha + Gram and it was followed by Jatropha + Wheat (Gross returns; Rs.59520 and JEY; 30.93 q/ha).

Experiment 12: Effect of fertilizer doses on fababean genotypes

This experiment was taken up at Hisar with the objective to find out optional during of fertilizer for fababean genotypes in the pipe line. The experiment was laid out in Randomized Block Design with three replications. The details of intercrop treatment are as follows:

Results:

Perusal of the data in Table 136 showed that among all the genotypes the grain yield was significantly increased up to highest level of $N_{40}P_{40}K_{20}$. The yield was increased to the tune of 26.1 and 43.6 per cent with the $N_{20}P_{20}K_{20}$ and $N_{40}P_{40}K_{20}$ levels of fertilizer doses than control. All the genotypes showed variable response to different doses of fertilizers, however, the genotype HB 40 with grain yield of 24.13 q/ha was the highest producer and it was followed by HB 516 and HB 39. All the genotypes produced significantly higher grain yield than the national check Vikrant.

Table 120: Centre-wise details of agronomic experiments allotted/conducted on different underutilized crops.

S. No.	Experiments	Delhi	Ranchi	Mandor	Hisar	Rahuri	Bhubaneswar	S.K. Nagar	Cooch Behar	Bangalore	Mettupalayam	Palamapur	Ranichauri	Shimla	Almora	Total
1	Chemical weed control in grain amaranth						1(1)	1(1)		1(1)			1(1)			4(4)
2	Organic farming in grain amaranth							1(1)	1(1)	1(1)	1(1)	1(1)	1(1)			6(6)
3	Performance of amaranth varieties at different locations	1(1)	1(0)	1(1)		1(1)	1(1)	1(1)		1(1)	1(1)	1(1)	1(0)	1(0)	1(0)	12(8)
4	Chemical weed control in rice bean						1(0)		1(1)	1(1)						3(2)
5	Fertilizer management in rice bean based intercrops.						1(0)						1(1)			2(1)
6	Intercropping study of rice bean								1(1)		1(1)					2(2)
7	Organic manurial studies in rice bean											1(1)	1(1)			2(2)
8	Performance of different rice bean genotypes								1(1)							1(1)
9	Intercropping studies on underutilized crops in Jatropha				1(1)											1(1)
10	Effect of plant geometry, fertilizer and plant/hill of kalingada							1(1)								1(1)
11	Effect of fertilizer doses on fababean genotypes				1(1)											1(1)
12	Intercropping studies on underutilized intercrops with different tree crops					1(0)					1(1)					2(1)
	No. of trial allotted	1(1)	1(0)	1(1)	2(2)	2(1)	4(2)	4(4)	4(4)	4(4)	4(4)	3(3)	5(4)	1(0)	1(0)	37(30s)

() = conducted; Without () = allotted

Table 121: Chemical weed control in grain amaranth during Kharif 2013 at Ranichauri.

S. No.	Treatment	Grain yield (q/ha)	Weed count /m ²	Weed dry wt. (g)/m ²
1	T ₁ : Weedy check	5.09	228.36	80.19
2	T ₂ : Weed free	11.06	0.00	0.00
3	T ₃ : Phenoxy prop ethyl 50g/ha post emergent (3WAS)	6.02	157.41	41.91
4	T ₄ : Clodinofof ethyl 50g/ha post emergent (3WAS)	5.86	175.56	47.52
5	T ₅ : Oxyfluorfen 50g/ha pre-emergent	5.67	142.56	39.93
6	T ₆ : Oxyfluorfen 50g/ha pre-emergent + one hand weeding (5WAS)	9.41	87.45	23.10
7	T ₇ : Oxadirgyl 50 g/ha post - emergent (3WAS)	5.36	141.24	37.95
8	T ₈ : Two manual weeding 3 and 5 WAS	10.70	30.36	10.89
9	T ₉ : One manual weeding (30DAS)	7.98	97.02	26.07
10	T ₁₀ : Pendimethalin 1 kg a.i./ha pre-emergence	5.67	156.09	142.56
	Mean	7.28	121.61	45.01
	CD (.05)	0.99	69.27	14.66
	CV (%) Error	7.95	33.22	19.00

WAS = Week after sowing

DAS = Days after sowing

Table 121a: Effect of Chemical weed control treatments on economics of grain amaranth at Ranichauri.

S. No.	Treatments	Cost of cultivation (Rs/ha)	Grain yield (kg/ha)	Cost of produce (Rs.)	Net profit (Rs./ha)	B:C ratio
1	T ₁ : Weedy check	14382.20	508.75	15262.50	880.33	1.06
2	T ₂ : Weed free	28382.20	1105.50	33165.00	4782.83	1.17
3	T ₃ : Phenoxy prop ethyl 50g/ha post emergent (3WAS)	15819.80	602.25	18067.50	2247.74	1.14
4	T ₄ : Clodinofof ethyl 50g/ha post emergent (3WAS)	15757.20	585.75	17572.50	1815.33	1.12
5	T ₅ : Oxyfluorfen 50 g/ha pre-emergent	15307.60	566.50	16995.00	1687.39	1.11

S. No.	Treatments	Cost of cultivation (Rs/ha)	Grain yield (kg/ha)	Cost of produce (Rs.)	Net profit (Rs./ha)	B:C ratio
6	T ₆ : Oxyfluorfen 50 g/ha pre-emergent + one hand weeding (5WAS)	19307.60	940.50	28215.00	8907.39	1.46
7	T ₇ : Oxadirgyl 50 g/ha post-emergent (3WAS)	15467.70	536.25	16087.50	619.79	1.04
8	T ₈ : Two manual weeding 3 and 5 WAS	21382.00	1069.75	32092.50	10710.50	1.50
9	T ₉ : One manual weeding (30DAS)	18382.20	797.50	23925.00	5542.83	1.30
10	T ₁₀ : Pendimethalin 1 kg a.i./ha pre-emergence	15394.20	567.27	17018.10	1623.93	1.11

Sale price: Rs. 30/kg

Table 122: Chemical weed control in grain amaranth during Kharif 2013 at Bangalore.

S. No.	Treatments	Weed count/m ² at 20 DAS	Weed count/m ² at harvest	Weed dry weight at harvest (g/m ²)	Weed control efficiency (%)	Grain Yield (kg/ha)
1	Weedy Check	68.00	66.67	237.50		2.50
2	Weed Free Control	12.00	13.33	12.50	94.83	13.31
3	Phenoxyprop ethyl (9% EC) 50 g ai/ha Post emergent (3 WAS)	62.00	56.00	103.50	57.42	4.60
4	Quizlofop-p- ethyl (5% EC) 50 g ai/ha Post emergent (3 WAS)	61.33	54.67	82.50	65.47	4.98
5	Oxyflurofen (23.54 EC) 50 g ai/ha Pre emergent	22.00	25.33	96.50	59.83	4.58
6	Oxyflurofen (23.54 EC) 50 g ai/ha Pre emergent + one hand weeding at 5WAS	26.00	17.33	66.50	72.51	6.30
7	Oxadirigyl (80% wp) 50g ai/ha post emergent (3 WAS)	63.33	59.33	212.00	10.57	2.81
8	Two manual weeding at 3rd & 5th WAS	60.67	19.33	48.00	79.87	9.94
9	One manual weeding at 30 days after sowing	65.33	20.67	68.00	71.76	6.81

10	Pendimethaline 1 kg/ha (38.7 EC) Pre emergent	24.00	24.00	87.50	63.28	3.69
11	Pendimethaline 1 kg/ha (38.7 EC) Pre emergent + one hand weeding 5 WAS	20.67	16.67	33.00	86.20	4.66
	Mean	44.12	33.94	95.23	66.17	5.83
	SE	4.71	2.24	11.75	5.29	0.67
	CD (.05)	9.85	4.68	24.55	11.06	1.40
	CV (%) Error	13.09	8.08	15.11	9.80	14.02

Table 123: Chemical weed control in grain amaranth at Bhubaneswar during Rabi 2012-13.

S. No.	Treatments	Weed dry weight (g/m ²)	WCE (Weed control efficiency) (%)	Seed yield (q/ha)
1	Weedy check	367.00	-	4.62
2	Weed free control	3.70	98.99	14.25
3	Phenoxy prop ethyl @ 50 g/ha (post emergent) (3 WAS) (Whipsuper)	131.70	64.11	11.36
4	Quizalofop ethyl @ 50 g/ha (post emergence) (3WAS) (Targasuper)	137.00	62.67	10.20
5	Oxyflurofen @ 50 g/ha pre-emergent (Zargon)	76..80	79.07	12.35
6	Oxyflurofen @ 50 g/ha pre-emergent + one hand weeding at 5 WAS (Zargon)	63.50	82.69	12.91
7	Oxadirgyl @ 50 g/ha post-emergent (3 WAS) (Topstar)	111.90	69.50	11.10
8	Two manual weeding at 3 and 5 WAS	91.80	74.98	10.90
9	One manual weeding at 30 DAS	169.80	53.73	9.75
	Mean	134.55	73.22	10.83
	CD (0.05)	31.11		2.13
	CV (%) Error	14.30		11.55

Table 124: Chemical weed control in grain amaranth at S.K. Nagar during Rabi 2012-13.

S. No.	Treatment	Plant height (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Straw yield (q/ha)
1	Weed Check	173.00	80.00	13.52	57.40
2	Weed Free Control	165.00	71.00	14.45	66.12
3	Phenoxy prop ethyl @ 50 g/ha (post emergent) (3 WAS) (Whipsuper)	174.00	76.00	13.76	50.00
4	Oxyglurofen @ 50 g/ha pre-emergent (Zargon)	172.00	78.00	14.35	62.96
5	Oxyflurofen @ 50 g/ha pre-emergent + one hand weeding 5 WAS (Zargon)	175.00	87.00	13.43	66.12
6	Oxadirygl @ 50 g/ha post-emergent (3 WAS) (Topstar)	164.00	75.00	12.32	52.13
7	Two manual weeding 3 & 5 WAS	167.00	75.00	16.82	59.26
8	One manual weeding 30 days after sowing	172.00	61.00	16.04	57.41
	Mean	170.25	75.38	14.34	58.93
	CD (0.05)			0.00	1.17
	CV (%) Error				8.05

Table 125: Organic farming in grain amaranth at different location during Kharif 2013.

S. No.	Treatments	Grain Yield (q/ha)						Mean
		Ranichuari	Palampur	Cooch behar	Mettupalayam	S.K. Nagar	Bangalore	
1	FYM @ 5 t/ha	12.33	1.13	7.08	8.76	10.24	11.49	8.50
2	FYM @ 7.5 t/ha	13.33	1.43	7.92	9.74	10.19	13.16	9.30
3	FYM @ 10 t/ha	14.97	1.43	8.25	9.52	10.30	14.00	9.74
4	Vermicompost @ 5 t/ha	13.83	1.36	7.75	8.97	10.00	12.62	9.09
5	Vermicompost @ 7.5 t/ha	14.63	1.46	8.37	9.56	10.16	14.20	9.73
6	Vermicompost @ 10 t/ha	16.10	1.48	8.65	9.95	10.42	14.54	10.19
7	RDF @ 50 % + Vermicompost @ 5 t/ha	18.07	2.26	8.90	10.66	14.60	13.25	11.29

8	RDF @ 100% (N60, P40, K20, S20, Zn15)	19.37	1.42	9.21	8.64	11.30	15.45	10.90
9	RDF 75 %	18.98			8.42		12.61	13.34
10	50 % RDF	13.56			8.21		12.13	11.30
11	Control	10.50	0.70	4.77	4.30	9.14	5.93	5.89
	Mean	15.06	1.41	7.88	8.79	10.71	12.67	9.42
	CD (0.05)	2.03	0.08	0.25	0.52	1.07	3.49	
	CV (%) Error	7.90	3.37		3.47	10.01	16.14	

Table 125 a: Effect of various treatments on economics of grain amaranth at Ranichuari.

S. No.	Treatments	Cost of Cultivation (Rs.)	Yield kg/ha	Gross return (Rs.)	Net return (Rs.)	B:C ratio
1	FYM @ 5t/ha	14900.00	1233.33	37374.00	22474.00	2.51
2	FYM @ 7.5 t/ha	16500.00	1333.33	40404.00	23904.00	2.45
3	FYM @ 10 t/ha	18100.00	1496.67	45353.00	27253.00	2.51
4	Vermicompost @ 5 t/ha	36900.00	1383.33	41919.00	5019.00	1.14
5	Vermicompost @ 7.5 t/ha	49600.00	1463.34	44343.00	-5257.00	0.89
6	Vermicompost @ 10 t/ha	62100.00	1610.00	48788.00	-13312.00	0.79
7	RDF @ 50 % + Vermicompost @ 5 t/ha	38104.00	1806.67	54748.00	16644.00	1.44
8	RDF @ 100% (N60, P40, K20, S20, Zn15)	14105.00	1936.67	58687.00	44582.00	4.16
9	RDF 75 %		1897.50			
10	50 % RDF		1356.30			
11	Control	11400.00	1050.00	31818.00	20418.00	2.79

Table 126: Performance of grain amaranth released varieties.

S. No.	Varieties	Mean maturity duration (days)	Mean weight of 10ml seed (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over Trial Mean
				Mean	Location	Rank	
1	Annapurana	109.06	7.47	7.72	7	13	-25.66
2	BGA-2	116.39	7.35	11.23	7	5	8.11
3	Durga	114.00	7.71	11.74	7	3	13.09
4	GA-1	109.74	7.59	13.00	6	1	25.21
5	GA-2	116.41	7.66	12.64	8	2	21.72
6	GA-3	116.95	7.41	11.25	7	4	8.29
7	PRA-1	103.39	7.61	10.94	7	7	5.39
8	PRA-2	107.50	7.65	8.04	8	12	-22.62
9	PRA-3	100.60	7.48	8.44	7	11	-18.70
10	RMA-4	111.02	20.67	8.93	6	10	-14.01
11	RMA-7	114.45	7.62	10.58	6	8	1.90
12	Suvarna	112.38	7.48	11.01	8	6	6.01
13	VL-44	112.62	7.50	9.48	8	9	-8.73
	Mean	111.12	8.55	10.38			

Table 126 a: Grain yield (q/ha) in released varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	S.K. Nagar	Mandor	Rahuri	Bangalore	Delhi	Mean	Rank
1	Annapurana		8.56	0.45	6.60	7.28	11.64	4.93	7.31	7.72	13
2	BGA-2	13.60	9.73		7.10	18.21	8.09	12.60	9.25	11.23	5
3	Durga		8.98	0.89	10.81	18.83	11.61	13.36	6.87	11.74	3
4	GA-1	13.80	7.53		13.78	20.68	11.28	10.94		13.00	1
5	GA-2	12.00	7.36	0.61	13.52	20.99	12.76	11.67	10.18	12.64	2
6	GA-3	12.30	7.40		11.90	17.90	13.16	9.95	6.10	11.25	4
7	PRA-1	10.70	9.93	0.85	7.55	21.91	11.3	4.27		10.94	7
8	PRA-2	11.60	9.73	0.83	5.90	8.43	12.47	3.75	4.36	8.04	12
9	PRA-3	10.10	8.67	0.72	7.13	9.60	11.48	3.67		8.44	11
10	RMA-4	11.31	7.69		6.85	10.65	9.09	7.98		8.93	10
11	RMA-7	11.65	6.77		5.80	20.99	6.46	11.82		10.58	8
12	Suvarna	12.10	10.37	0.32	5.60	13.58	9.76	14.18	11.47	11.01	6
13	VL-44	11.90	8.29	0.50	7.72	12.65	4.24	12.27	9.28	9.48	9
	Mean	11.91	8.54	0.65	8.48	15.52	10.26	9.34	7.81	10.38	
	CD (0.05)	1.74	0.00	0.07	1.09	3.63	2.72	1.76	5.71		
	CV (%) Error	8.63	2.32	6.45	13.25	19.50	14.75	11.20	45.65		

Table 126 b: Plant height (cm) in released varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	S.K.Nagar	Rahuri	Mandor	Bangalore	Delhi	Mean	Rank
1	Annapurana	-	107.93	89.70	72.00	141	52.10	57.60	75.20	89.88	10
2	BGA-2	135.40	158.23	-	149.00	139.8	150.30	140.13	102.20	147.54	6
3	Durga	-	178.20	125.33	142.00	148.5	129.70	135.80	105.47	148.51	5
4	GA-1	131.60	188.23	-	157.00	139.5	145.90	115.07	-	158.94	2
5	GA-2	125.40	175.70	89.97	169.00	171.5	140.30	114.27	96.00	140.02	7
6	GA-3	127.30	190.53	-	142.00	128.3	123.30	97.80	88.07	153.28	3
7	PRA-1	47.20	124.80	58.63	69.00	138.7	151.00	66.93	-	74.91	13
8	PRA-2	46.90	116.23	101.33	76.00	142.3	51.80	79.27	78.73	85.12	11
9	PRA-3	45.90	112.00	103.67	67.00	139.7	52.80	81.00	-	82.14	12
10	RMA-4	110.00	213.10	-	125.00	103.8	50.10	103.47	-	149.37	4
11	RMA-7	119.00	228.53	-	133.00	137.8	135.70	120.33	-	160.18	1
12	Suvarna	130.10	167.50	115.97	121.00	142.3	141.40	142.60	101.60	133.64	8
13	VL-44	120.80	176.57	79.17	120.00	97	136.50	141.13	116.67	124.13	9
	Mean	103.60	164.43	95.47	118.62	136.2	112.40	107.34	89.74	126.74	
	CD (0.05)	34.59	0.00	36.96	-	-	13.30	17.86	32.90	-	-
	CV (%) Error	20.14	4.92	22.05	-	-	7.00	9.89	22.91	-	-

Table 126 c: Days to 50% flowering in released Varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	Rahuri	Mandor	Delhi	Mean	Rank
1	Annapurana	-	45.00	79.33	43.67	30.70	54.00	50.54	4
2	BGA-2	50.00	52.00	-	57.67	64.70	61.67	57.21	8
3	Durga	-	57.33	54.00	53	64.00	58.67	57.40	11
4	GA-1	51.00	68.00	-	55.67	54.30	-	57.24	10
5	GA-2	52.00	64.67	74.67	54	47.70	61.00	59.01	12
6	GA-3	51.00	65.33	-	46.67	47.70	63.67	54.87	6
7	PRA-1	25.40	45.33	71.33	44	53.00	-	47.81	3
8	PRA-2	26.40	45.67	73.67	45.67	32.30	61.33	47.51	2
9	PRA-3	26.00	45.67	72.67	45	31.70	-	44.21	1
10	RMA-4	50.60	64.67	-	65.33	32.00	-	53.15	5
11	RMA-7	51.40	64.67	-	65.67	55.00	-	59.18	13
12	Suvarna	55.00	50.33	56.33	55.67	65.30	59.00	56.94	7
13	VL-44	51.00	50.67	56.67	54.67	66.30	64.00	57.22	9
	Mean	44.53	55.33	67.33	52.82	49.59	60.38	55.00	-
	CD (0.05)	0.73	0.00	2.80	-	2.04	11.20	-	-
	CV (%) Error	0.95	0.95	2.37	-	2.44	11.59	-	-

Table 126 d: Days to maturity in released varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	Rahuri	Mandor	Delhi	Mean	Rank
1	Annapurana	-	59.00	106.67	121.67	111.30	146.67	109.06	4
2	BGA-2	92.30	74.67	-	135.33	132.30	147.33	116.39	11
3	Durga	-	74.00	86.00	130.67	128.00	151.33	114.00	9
4	GA-1	92.30	89.67	-	133	124.00	-	109.74	5
5	GA-2	92.80	90.33	105.67	131.67	128.30	149.67	116.41	12
6	GA-3	91.70	90.67		124.67	127.70	150.00	116.95	13
7	PRA-1	87.00	74.33	104.67	123.67	127.30	-	103.39	2
8	PRA-2	87.00	74.67	100.33	124.67	113.30	145.00	107.50	3
9	PRA-3	87.00	75.67	100.00	124.33	116.00	-	100.60	1
10	RMA-4	90.40	95.67	-	141.33	116.70	-	111.02	6
11	RMA-7	91.50	95.67	-	142.33	128.30	-	114.45	10
12	Suvarna	92.00	84.67	85.67	132.67	132.30	147.00	112.38	7
13	VL-44	91.00	76.67	91.33	131.67	131.70	153.33	112.62	8
	Mean	90.45	81.21	97.54	130.59	124.40	148.79	111.12	-
	CD (0.05)	0.59	0.00	2.17	-	4.35	9.13	-	-
	CV (%) Error	0.39	0.73	1.27	-	2.07	3.79	-	-

Table 126 e: Inflorescence length (cm) in released varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	S.K. Nagar	Rahuri	Mandor	Bangalore	Delhi	Mean	Rank
1	Annapurana		57.27	17.27	50.00	53.70	36.90	44.40	46.94	43.03	10
2	BGA-2	50.80	42.40		48.00	52.00	60.70	41.60	53.75	50.78	5
3	Durga		47.20	24.13	41.00	55.00	50.70	40.80	56.32	43.61	9
4	GA-1	50.50	51.30		75.00	62.00	77.10	50.07		63.18	1
5	GA-2	46.70	40.23	13.60	77.00	66.80	64.60	49.13	52.78	51.49	4
6	GA-3	48.00	59.20		70.00	59.00	68.90	46.60	49.49	61.02	3
7	PRA-1	17.50	61.30	14.60	48.00	60.70	75.10	46.47		46.20	7
8	PRA-2	20.70	56.33	12.40	52.00	56.70	36.50	47.80	46.85	39.11	13
9	PRA-3	18.10	61.27	13.07	48.00	59.00	38.10	53.47		39.59	12
10	RMA-4	41.80	69.50		57.00	47.30	35.70	45.93		50.26	6
11	RMA-7	44.40	66.07		61.00	61.70	75.80	49.13		61.79	2
12	Suvarna	48.90	42.77	25.40	46.00	43.00	57.40	46.67	48.41	43.91	8
13	VL-44	46.30	42.43	24.07	50.00	39.00	54.60	44.73	58.01	42.73	11
	Mean	39.43	53.64	18.07	55.62	55.06	56.30	46.68	49.78	46.35	
	CD (0.05)	2.80	0.00	3.78			10.70	6.95	11.90		
	CV (%) Error	4.26	5.07	11.93			11.30	8.86	14.94		

Table 126 f: Seed weight (g/10ml) released varieties of grain amaranth.

S. No.	Varieties	Bhubaneswar	Mettupalayam	Palampur	Bangalore	Mandor	Rahuri	Delhi	Mean	Rank
1	Annapurana	-	7.53	8.52	7.83	5.27	8.38	7.28	7.47	10
2	BGA-2	8.00	7.57	-	7.83	5.48	7.21	8.00	7.35	13
3	Durga	-	7.73	8.64	7.67	5.67	8.43	8.10	7.71	1
4	GA-1	8.20	7.50	-	7.67	5.98	8.62		7.59	6
5	GA-2	7.90	7.43	8.40	8.00	5.88	7.85	8.12	7.66	2
6	GA-3	7.80	7.30	-	7.67	5.47	8.6	7.63	7.41	11
7	PRA-1	7.50	7.57	8.90	7.83	6.05	7.83		7.61	5
8	PRA-2	7.90	7.57	9.23	7.67	5.48	8.59	7.11	7.65	3
9	PRA-3	7.80	7.53	8.37	7.50	5.57	8.09	-	7.48	9
10	RMA-4	7.40	7.43	-	7.83	5.65	8.43	-	7.35	12
11	RMA-7	7.60	7.53	-	8.17	6.14	8.64	-	7.62	4
12	Suvarna	7.80	7.77	8.60	8.17	5.95	6.87	7.20	7.48	8
13	VL-44	7.80	7.33	8.84	7.50	5.53	8.02	7.48	7.50	7
	Mean	7.79	7.52	8.69	7.79	5.70	8.12	13.20	7.53	-
	CD (0.05)	0.34	0.00	0.57	0.76	0.50	-	-	-	-
	CV (%) Error	2.55	0.73	3.72	5.81	5.00	-	-	-	-

Table 127: Performance of different rice bean genotypes during Kharif 2013 at Cooch Behar.

S. No.	Genotypes	Plant height (Cm)	Branches/	Days to first flowering	Days to 50% flowering	Days to maturity	Pods/plant	Pod length (cm)	Seeds/pod	100 seed weight (gm)	Yield (q/ha)
1	RBL-1	70.7	4	60	75	126	42.4	6.8	5.5	5.8	10.19
2	RBL-6	83.1	5	62	77	123	57.6	7.9	8.8	6.9	13.25
3	RBL-35	72.9	4	59	74	130	44.3	7.6	5.5	6.3	10.78
4	RBL-50	72.5	4	58	73	129	55.7	7.6	7.1	6.2	11.61
5	RRB-11	85.2	4	63	78	128	48.9	7.7	7.2	5.9	10.29
6	RRB-13	91.3	3	61	76	132	55.7	7.8	6	5.6	11.12
7	Local	132.6	6	67	85	145	52.5	6.2	5.2	5.4	8.98
	Mean	86.90	4.29	61.43	76.86	130.43	51.01	7.37	6.47	6.01	10.89
	C.D. (0.05)	4.21									0.73

Table 128 a: Intercropping study in rice bean during kharif 2013 at Cooch behar.

S. No.	Treatments	Rice bean yield (q/ha)	Intercrop yield (q/ha)	Mean
1	T ₁ .Rice bean sole	11.87	-	11.87
2	T ₂ . Maize sole	-	15.72	15.72
3	T ₃ . Niger sole	-	8.86	8.86
4	T ₄ . Sesame sole	-	10.63	10.63
5	T ₅ . Maize + rice bean (1:2)	8.91	9.45	9.18
6	T ₆ . Niger + rice bean (1:2)	7.65	5.14	6.40
7	T ₇ .Sesame + rice bean (1:2)	8.12	6.58	7.35
8	T ₈ . Maize + rice bean (2:2)	10.19	11.14	10.67
9	T ₉ . Niger + rice bean (2:2)	9.91	6.71	8.31
10	T ₁₀ .Sesame + rice bean (2:2)	9.05	7.65	8.35
	Mean	8.97	9.10	9.03
	C.D. (0.05)	0.64	0.89	

Table 128 b: Intercropping study in rice bean during kharif 2013 at Mettupalayam.

S. No.	Treatments	Rice bean yield (q/ha)	Intercrop yield (q/ha)	Mean
1	Rice Bean (Trailing type) Sole crop	6.13	-	6.13
2	Rice Bean (Trailing type) Sole crop	7.10	-	7.10
3	Rice Bean (Bush type) Sole crop	5.52	-	5.52
4	Maize Sole crop	32.28	-	32.28
5	Rice Bean (Trailing type) + Maize 2:2	3.05	14.60	8.83
6	Rice Bean (Trailing type) + Maize 2:2	3.73	14.60	9.16
7	Rice Bean (Bush type) + Maize 2:2	2.88	13.18	8.03
	Mean	9.09	14.13	11.61
	C.D. (0.05)	-	-	-

Table 128 c: Intercropping study in rice bean during kharif 2013 at Bangalore.

S. No.	Treatments	Seed yield (q/ha)			
		Rice bean	Intercrop	Mean	Rice bean equivalent yield
1	Rice Bean Bushy type Sole Crop (KBR-1)	15.13	-	15.13	15.13
2	Rice Bean Triling type Sole Crop (RBL-35)	14.52	-	14.52	14.52
3	Pigeonpea Sole Crop	-	10.78	10.78	11.50
4	Maize Sole Crop	-	60.63	60.63	24.26
5	Rice Bean Bushy type + Pigeonpea (2:2)	8.01	7.87	7.94	16.40
6	Rice Bean Bushy type + Maize (2:2)	5.51	34.55	20.03	19.30
7	Rice Bean triling type + Pigeonpea (2:2)	8.31	7.06	7.68	15.75
8	Rice Bean triling type + Maize (2:2)	7.87	32.63	20.25	20.92
	Mean	9.89	25.59	19.62	17.22
	CD (.05)	-	-	-	2.04
	CV (%) Error	-	-	-	8.06

Table 129: Fertilizer management in rice bean based intercrops at Ranichauri during Kharif 2013.

S. No.	Notation	Treatments	Rice bean yield (kg/ha)	Intercrop yield (kg/ha)	Mean	Rice bean equivalent yield	B:C ratio
1	I ₁ F ₁	100 % RDF to main crop (ricebean) + 100 % RDF to intercrop (amaranth)	871.11	1976.33	1423.72	3423.95	
2	I ₁ F ₂	75 % RDF to main crop (ricebean) + 50 % RDF to intercrop(amaranth)	680.55	1823.88	1252.22	3080.64	
3	I ₁ F ₃	50 % RDF to main crop (ricebean) + 50 % RDF to intercrop(amaranth)	609.77	1502.66	1056.22	2689.41	
4	I ₁ F ₄	50 % RDF to main crop (ricebean) + 25 % RDF to intercrop (amaranth)	533.55	1448.22	990.89	2394.70	
5	I ₁ F ₅	25 % RDF to main crop (ricebean) + 25 % RDF to intercrop (amaranth)	441.00	1317.55	879.28	2155.64	
6	I ₂ F ₁	100 % RDF to main crop (ricebean) + 100 % RDF to intercrop (maize)	1029.00	3244.88	2136.94	2881.81	
7	I ₂ F ₂	75 % RDF to main crop (ricebean) + 50 % RDF to intercrop(maize)	860.22	3054.33	1957.28	2570.11	
8	I ₂ F ₃	50 % RDF to main crop (ricebean) + 50 % RDF to intercrop(maize)	767.66	2646.00	1706.83	2176.40	
9	I ₂ F ₄	50 % RDF to main crop(ricebean) + 25 % RDF to intercrop maize)	702.33	2368.33	1535.33	2060.04	
10	I ₂ F ₅	25 % RDF to main crop (ricebean) + 25 % RDF to intercrop (maize)	598.88	2183.22	1391.05	1834.08	
		Mean of intercrop					
		IC 1	627.20	1613.73	1120.46	2748.87	3.00
		IC 2	791.62	2699.35	1745.49	2304.49	3.10
		Mean of Fertilizer					
		F 1	950.06	2610.61	1780.33	3152.88	3.53
		F 2	770.39	2439.11	1604.75	2825.38	3.35

		F 3	688.72	2074.33	1381.52	2432.91	2.70
		F 4	617.94	1908.28	1263.11	2227.37	2.46
		F 5	519.94	1750.39	1135.16	1994.86	2.27
		CD (0.05)					
		Intercrop	245.67	115.95		166.10	
		Fertilizer	101.32	406.53		337.20	
		CV (%) Error	11.43	15.09			

Table 130: Organic manurial studies in rice bean during Kharif 2013.

S. No.	Treatment	Seed yield (q/ha)		
		Ranichauri	Palampur	Mean
T ₁	FYM @ 2.5 t/ha	6.88	5.18	6.03
T ₂	FYM @ 5.0 t/ha	7.34	8.33	7.84
T ₃	FYM @ 7.5 t/ha	8.44	7.78	8.11
T ₄	Vermicompost @ 2.5 t/ha	7.84	7.96	7.90
T ₅	Vermicompost @ 5.0 t/ha	8.97	11.48	10.22
T ₆	Vermicompost @ 7.5 t/ha	10.31	8.33	9.32
T ₇	RDF @ 50% + Vermicompost @ 2.5 t/ha	10.86	7.59	9.23
T ₈	100% RDF	11.14	8.15	9.64
T ₉	75 % RDF	8.37	4.44	6.41
T ₁₀	50 % RDF	5.88		5.88
T ₁₁	Control	4.73		4.73
	Mean	8.25	7.69	7.97
	CD(0.05)	1.18	0.98	1.08
	CV(%) Error	8.38	7.34	

Table 130 a: Effect of different chemical weed control treatments on economic of rice bean at Ranichuari Kharif 2013.

	Treatments	Cost of cultivations (Rs.)	Seed yield (q/ha)	Cost of produce (Rs.)	Net Profit (Rs.)	B:C ratio
T ₁	FYM @ 2.5 t/ha	17299.00	6.88	22000.00	4701.00	1.27
T ₂	FYM @ 5.0 t/ha	18800.00	7.34	23496.00	4696.00	1.25
T ₃	FYM @ 7.5 t/ha	20300.00	8.44	27016.00	6716.00	1.33
T ₄	Vermicompost @ 2.5 t/ha	28300.00	7.84	25080.00	-3220.00	0.89
T ₅	Vermicompost @ 5.0 t/ha	40800.00	8.97	28688.00	-	0.70
T ₆	Vermicompost @ 7.5 t/ha	53300.00	10.31	33000.00	-	0.62
T ₇	RDF @ 50% + Vermicompost @ 2.5 t/ha	29200.00	10.86	34760.00	5560.00	1.19
T ₈	100% RDF	17600.00	11.14	35640.00	18040.00	2.03
T ₉	75 % RDF	16800.00	8.37	26787.55	9987.55	1.59
T ₁₀	50 % RDF	16000.00	5.88	18807.36	2807.36	1.18
T ₁₁	Control	15800.00	4.73	15136.07	-663.93	0.96

Sale price of rice bean: Rs. 32/kg

Table 131: Chemical weed control in rice bean at Cooch behar during Kharif 2013.

S. No.	Treatments	Weed dry weight at harvest (g/m ²)	Seed yield (kg/ha)
1	T ₁ =Weedy check	23.46	418.37
2	T ₂ = Weed free control	0.89	1249.28
3	T ₃ =Phenoxy prop ethyl 50g/ha post-emergent	11.18	743.56
4	T ₃ = eth50g/ha post-emergent		
5	T ₄ = Oxyfluorfen 50 g/ha pre-emergent	11.37	781.21
6	T ₅ = Oxyfluorfen 50 g/ha pre- emergent + one hand weeding 5 WAS	9.45	930.51
7	T ₆ = Pendimethalin (30%) 1 kg/ha pre-emergent	9.13	810.79
8	T ₇ = Pendimethalin (30 %) 1 kg/ha pre-emergent + one hand weeding	5.81	1024.84
9	T ₈ = Two manual weeding 3 and 5 WAS	10.25	940.35
10	T ₉ = One manual weeding 30days after sowing	11.05	863.79
	Mean	10.29	862.52
	CD (0.05)	1.21	95.12
	CV (%) Error	6.86	6.43

Table 132: Chemical weed control in rice bean during Kharif 2013 at Bangalore.

S. No.	Treatments	Weed count /m ² at 20 DAS	Weed count /m ² at harvest	Weed dry weight at harvest (g/m ²)	Weed control efficiency (%)	Grain yield (kg/ha)
1	Weedy Check	70.67	59.33	205.33		4.06
2	Weed Free Control	11.33	17.33	14.67	92.87	15.31
3	Phenoxyprop ethyl (9% EC) 50g ai/ha Post emergent (3 WAS)	67.33	40.00	109.33	46.13	10.27
4	Quizlofop-p- ethyl (5% EC) 50g ai/ha Post emergent (3 WAS)	66.67	46.00	120.67	41.51	8.57
5	Oxyfluorfen (23.54 EC) 50 g ai/ha Pre emergent	36.00	45.33	122.67	40.86	8.44
6	Oxyfluorfen (23.54 EC) 50 g ai/ha Pre emergent + one hand weeding at 5WAS	26.67	34.00	48.00	76.82	14.48
7	Oxadirigyl (80% wp) 50g ai/ha post emergent (3 WAS)	65.33	52.67	158.00	23.31	5.09
8	Pendimethaline (30% EC) 1 kg ai/ha Pre emergent	39.33	45.33	98.67	51.84	9.46

9	Pendimethaline (30% EC) 1 kg ai/ha Pre emergent + one weeding at 5 WAS	36.67	31.33	30.00	85.44	14.54
10	Two manual weeding at 3rd & 5th WAS	62.67	41.33	42.00	79.15	9.90
11	One manual weeding at 30 days after sowing	60.00	42.67	74.00	63.23	7.46
12	Alachlor (50% EC) at 1kg ai/ha Pre emergent	34.00	41.33	108.00	47.55	8.69
	Mean	48.06	41.39	94.28	58.97	9.69
	CD(0.05)	10.05	8.80	24.29	9.06	2.36
	CV (%) Error	12.37	12.57	15.25	9.09	14.42

Table 133: Effect of plant geometry, fertilizer and plants/hill on kalingada under rainfed condition during Kharif 2013.

S. No.	Treatment	Seed yield (kg/ha)	Green fruit weight (kg/ha)	Pulp ratio
1	S1 F1 P1	156.00	6754.00	1.02
2	S1 F1 P2	240.00	8703.00	1.03
3	S1 F2 P1	144.00	6574.00	1.02
4	S1 F2 P2	246.00	8240.00	1.03
5	S2 F1 P1	140.00	5277.00	1.03
6	S2 F1 P2	167.00	6018.00	1.03
7	S2 F2 P1	143.00	6203.00	1.02
8	S2 F2 P2	161.00	6666.00	1.02
9	S3 F1 P1	112.00	5277.00	1.02
10	S3 F1 P2	126.00	5278.00	1.02
11	S3 F2 P1	125.00	3194.00	1.04
12	S3 F2 P2	142.00	3014.00	1.05
	Mean	158.50	5933.17	1.03
	Mean of spacing			
	S1	196.50	7567.75	1.03
	S2	152.75	6041.00	1.03
	S3	126.25	4190.75	1.03
	Mean of fertilizer			
	F1	156.83	6217.83	1.03
	F2	160.17	5648.50	1.03
	Mean of plants/hill			
	P1	136.67	5546.50	1.03
	P2	180.33	6319.83	1.03
CD (0.05)	Spacing	36.50		
	Fertilize	38.00		
	Plant	31.20		
	S x F	31.20		
	F x P	54.70		
	S x P	54.70		
	S x F x P	76.80		
	C.V%	12.17		

Table 134: Intercropping studies on underutilized crops with different tree crops at Mettupalayam.

S. No.	Trees	Genotypes	Grain yield q/ha	Days to 50 % flowering	Days to maturity	Plant height (cm)
1	Karanj	Grain Amaranth	4.21	63.50	116.00	157.75
2	Karanj	Rice Bean	2.21	61.50	97.75	44.50
3	Karanj	Cowpea	3.79	53.50	119.25	49.00
4	Simarouba	Grain Amaranth	2.96	64.00	118.75	135.50
5	Simarouba	Rice Bean	1.82	59.00	108.25	43.75
6	Simarouba	Cowpea	2.96	56.50	121.50	47.75
		Mean	2.99	59.67	113.58	79.71
		CD (0.05)	0.18	1.07	1.63	3.78
		CV (%) Error	3.42	1.03	0.82	2.73

Table 135: Effect of intercropping systems on yield and economics of different crops in Jatropha (Rabi 2012-13).

S. No.	Treatments	Jatropha Grain/Seed yield (q/ha)			Intercrops Seed/grain yield			Intercrops Byproduct Yield (q/ha)			Total gross returns (Rs/ha)			Jatropha equivalent yield (q/ha)		
		2011-12	2012-13	Mean	2011-12	2012-13	Mean	2011-12	2012-13	Mean	2011-12	2012-13	Mean	2011-12	2012-13	Mean
1	Jatropha (Sole)	14.50	12.80	13.65	--	--	--	--	--	--	21750.00	20480.00	21115.00	14.50	12.80	13.65
2	Jatroppha + Wheat	12.00	11.00	11.50	15.50	14.50	15.00	17.00	16.50	16.75	45720.00	73320.00	59520.00	30.48	31.38	30.93
3	Jatroppha + Barley	12.50	11.30	11.90	20.00	18.20	19.10	23.00	21.40	22.20	46650.00	68235.00	57443.00	31.10	29.79	30.44
4	Jatroppha + Gram	14.00	13.20	13.60	8.50	6.50	7.50	12.00	11.40	11.70	51425.00	82925.00	67175.00	34.28	35.55	34.91
5	Jatroppha + Raya	11.50	10.50	11.00	7.50	7.90	7.70	16.50	16.70	16.60	40725.00	49447.50	45086.00	27.15	29.23	28.19
6	Jatroppha + Bakla	14.50	11.50	13.00	12.00	13.50	12.75	20.00	17.50	18.75	43750.00	55000.00	49375.00	29.17	28.10	28.64

Price Rate (Rs/q)

Crops	Grain		Byproduct	
	2011-12	2012-13	2011-12	2012-13
Jatropha	1500	1600	--	--
Wheat	1240	1350	500	600
Barley	1050	1050	300	350
Gram	2450	3200	800	1000
Raya	2800	3000	150	200
Bakla	1500	1500	200	200

Table 136: Effect of graded level of NPK on grain yield (q/ha) in genotypes of fababean at Hisar Rabi 2013-14.

S. No.	Fertilizer levels/Genotypes	Vikrant	HB-39	HB 40	HB 504	HB 516	Mean
1	N0P0K0	15.36	17.75	20.28	16.46	17.47	17.46
2	N20P20K20	18.60	21.53	24.62	21.36	23.98	22.02
3	N40P40K20	21.41	24.97	27.50	24.84	26.67	25.08
	Mean	18.46	21.42	24.13	20.89	22.71	
	CD(0.05)						
	Factors						
	Fertilizer levels	1.91					
	Genotypes	1.68					
	Genotypes at same level of fertilizer dose	N.S.					
	Fertilizer dose at same level of Genotypes	N.S					

QUALITY ANALYSIS

V. QUALITY ANALYSIS

The seeds of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the seven underutilized crops were planned for quality analysis at three centres viz. MPKV, Rahuri (Kalingada, Tumba & Kankoda); CSK HPKV, Palampur (Buckwheat, Chenopod and Adzuki bean) and CCS HAU, Hisar (Grain Amaranth Hills & Plain, Faba bean, Perilla & Rice bean). The quality analysis was done at three centres and seed was supplied by concerned centres of the entries while Chemical Analysis of Tumba, at MPKV Rahuri Centre and Chemical Analysis of perilla at Hisar centre were not done due to non availability of seed. The crop-wise details of quality traits are given below:

5.1 Grain amaranth

5.1.1 Germplasm, Kharif 2013 seed supply by Shimla Centre (Hills)

Fifty four genotypes along with four standard check varieties from Shimla centre were analysed for protein, oil, phenols, Ca, Fe and Zn content.. Protein and Oil content varied from 9.6 to 15.3 percent, and 4.3 to 9.2 with an average value of 12.5 and 6.4 % respectively. Phenol content ranged from 0.048 to 0.069 with an average value of 0.059 percent. Ca, Fe and Zn content ranged from 266 to 365, 8.1 to 24.3 and 3.5 to 7.4 with an average value of 314, 14.4 and 5.1 mg/100g respectively (Table 137). The promising genotypes were:

Genotypes	Protein (%)	Genotypes	Oil (%)	Genotypes	Phenol (%)
IC-94661	15.3	IC-95308	9.2	IC-95301	0.048
IC-82625	14.4	IC-42353	8.5	IC-42415	0.051
IC-95250	14.3	IC-95304	8.4	IC-95308	0.051
EC-519526	14.1	IC-42346-6	8.3	IC-95293	0.052
PRA-3(C)	13.6	Annapurna(C)	8.7	PRA-3(C)	0.058

Genotypes	Ca (mg/100 g)	Genotypes	Fe (mg/100g)	Genotypes	Zn (mg/100g)
IC-94661	365	IC-82625	24.3	IC-107127	7.4
IC-42402	358	IC-47436	23.2	IC-107144	7.2
IC-82625	352	IC-95247	22.6	IC-95339	7.1
EC-146543	346	IC-43715	20.9	EC-524457	6.5
PRA-3(C)	327	PRA-3(C)	11.8	PRA-3(C)	6.0

5.1.2 AVT-I , AVT-II and Germplasm Rabi 2012-13 seed supply by S.K. Nagar Centre (Plain)

Thirty genotypes (2 AVT-I, 5 AVT-II and 24 Germplasm) from S.K. Nagar centre were analysed for protein, oil, phenols, Ca, Fe and Zn content.. Protein and Oil content varied from 9.60 to 14.40 and 4.70 to 8.70 per cent with an average value of 11.83 and 6.37% respectively. Phenol content ranged from 0.05 to 0.06 with an average value of 0.05 per cent. Ca, Fe and Zn content ranged from 286 to 358, 4.8 to 9.60 and 2.3to 4.80 with an average value of 318.55, 6.94 and 3.49 mg/100g respectively (Table 138). The promising genotypes were:

Genotypes	Protein (%)	Genotypes	Oil (%)	Genotypes	Ca (mg/100g)
IC035635	14.40	SKGPA80	8.70	SKGPA74	358.00
SKGPA74	13.70	IC035716	8.50	SKGPA72	355.00
MGA507	13.60	SKGPA78	8.20	MGA507	348.00
SKGPA91	13.40	IC035711	7.80	IC035635	345.00
IC035415	13.30	IC095516	7.60	IC035415	342.00
IC035651	13.30	SKGPA73	7.40	IC035651	336.00
Suvarna (C)	12.30	GA2 (C)	6.90	Suvarna (C)	327.00

Genotypes	Fe (mg/100g)	Genotypes	Zn (mg/100g)
IC035711	9.60	IC035635	4.80
SKGPA106	9.50	SKGPA74	4.60
SKGPA68	9.30	SKGPA61	4.50
BGA20	9.20	IC035415	4.50
SKGPA72	8.70	BGA3	4.30
Suvarna (C)	8.20	Suvarna (C)	3.80

5.2 Rice bean

5.2.1 Germplasm kharif 2013 seed supply by Shimla Centre (Hill)

Fifty genotypes along with four standard check varieties from Shimla centre were analysed for its protein, Tannin, Ca, Fe and Zn content. Protein content varied from 17.4 to 21.8%, with an average value of 19.7%. Tannin content varied from 543 to 617 with an average value of 584 (mg/100g). Ca, Fe and Zn content ranged from 304 to 374, 4.4 to 8.8 and 2.2 to 5.2 with an average value

of 334, 6.3 and 3.8 mg/100g respectively (Table 139). The promising genotypes were:

S. No.	Genotypes	Protein (%)	Genotypes	Tannin (mg/100g)
1	IC - 137189	21.8	IC - 419806	543
2	IC - 528878	21.8	IC - 137189	545
3	IC - 421875	21.4	IC - 524076	558
4	IC - 419602	21.2	IC - 524082	561
5	RBL-1(C)	19.9	PRR - 2(C)	588

Genotypes	Ca (mg/100 g)	Genotypes	Fe (mg/100g)	Genotypes	Zn (mg/100g)
IC-524549	374	IC-248733	8.6	IC-419806	5.2
IC-528878	368	IC-108862	8.3	IC-421875	4.7
IC-524085	365	IC-97882	8.2	IC-176563	4.7
IC-419602	364	IC-185653	7.8	IC-241990	4.6
RBL-1(C)	355	PRR-1(C)	8.8	PRR-2(C)	4.5

5.2.3 IVT, Kharif 2013 seed supply by Hisar Centre (Plain)

Thirteen genotypes along with four standard check varieties from Hisar centre were analysed for its protein, Tannin, Ca, Fe and Zn content. Protein content varied from 17.7 to 19.3%, with an average value of 18.6 %. Tannin content varied from 542 to 578 (mg/100g) having the mean value of 564 (mg/100g). Ca, Fe and Zn content ranged from 312 to 338, 4.1 to 7.2 and 2.4 to 4.9 with an average value of 327, 5.7 and 3.7 mg/100g respectively (Table 140). The promising genotypes were:

S. No.	Genotypes	Protein (%)	Genotypes	Tannin (mg/100g)
1	BRBM-119	19.3	LRB-545	542
2	LRB-545	19.2	BRBM-119	550
3	RBL-35(C)	19.0	HRB-216	551
4	RRB-38	18.9	RBL-35(C)	564

Genotypes	Ca (mg/100 g)	Genotypes	Fe (mg/100g)	Genotypes	Zn (mg/100g)
RBL-35(C)	338	LRB-554	7.2	BRBM-119	4.9
BRBM-119	337	BRBM-127	6.6	RBL-1(C)	4.7
HRB-216	335	HRB-216	6.4	BRBM-127	4.5
RBL-6(C)	334	RBL-50(C)	6.4	RRB-14	4.2

5.3 Fababean

5.3.1 IVT, AVT-I, AVT-II and Germplasm Rabi 2012-13 seed supply by Hisar Centre (Plain)

Sixty three genotypes (9 IVT, 9 AVT-I, AVT-II and Germplasm) from Hisar centre along with Check variety were analysed for its protein, vicine-convicine, and phenol content. Protein content varied from 20.90 to 27.70 %, vicine-convicine content varied from 0.71 to 0.93% with an average value of 24.54 and 0.80 % respectively. Phenol content varied from 0.22 to 0.28% with an average value of 0.25% (Table 141). The promising genotypes having high protein content, low vicine-convicine, low phenol content and lower cooking time (min.) were:

Genotypes	Protein (%)	Genotypes	Vicine-convicine (%)	Genotypes	Total Phenols (%)
HB184	27.70	HB - 22	0.71	HB - 20	0.22
HB65	26.80	HB - 21	0.73	HB - 21	0.23
HB - 30	26.70	HB - 4	0.74	HB - 14	0.23
HB082	26.10	HB - 18	0.74	HB - 6	0.23
HB - 36	26.10	HB - 10	0.74	HB - 17	0.23
HB-195	25.70	HB - 29	0.74	HB - 19	0.23
HB - 16	25.70	HB - 11	0.74	HB - 3	0.23
HB - 33	25.60	HB - 14	0.75	HB- 214	0.23
HB - 15	25.50	HB - 37	0.75	HB - 27	0.23
HB - 23	25.50	HB - 6	0.75	HB39	0.23
HB - 31	25.50	HB - 12	0.75	Vikrant	0.25
HB - 40	25.50	Vikrant	0.82		
Vikrant	24.30				

5.4 Buckwheat

5.4.1 IVT, AVT and Germplasm, Kharif 2013 seed supply by Shimla Centre (Hills)

The crude protein, total phenols, calcium, iron, potassium and sodium content in buckwheat genotypes varied from 10.5 to 14.0%, total phenols 130 to 270 mg/100, 56.8 to 98.5 mg/100, 3.0 to 7.6 mg/100, 1.2 to 3.4 mg/100 and 1.9 to 4.8 mg/100, respectively (Table 142).

The genotype(s) PRB-1 & VL-7 in crude protein; EC-341661 & IC-276627, in total phenols; IC-329194, EC-329495 & IC-026598 in calcium; IC- 036914 & EC-329495 in iron; IC-286396 & EC- 329200 in potassium & VL-7; EC-329200 in sodium content were adjudged superior over the rest.

5.5 Chenopod

5.5.1 Germplasm, Kharif 2013 seed supply by Shimla Centre (Hills)

Average range of crude protein, calcium, iron, potassium and sodium content in chenopod genotypes were found to be 14.0 to 17.8%, 166 to 506 mg/100, 277.7, 5.4 and 2.9 mg/100g in that order. The minimum and maximum values for crude protein, calcium, iron, sodium and potassium content in chenopod genotypes were observed in 14.0 (IC-258332) to 17.8% (NC-58233), 166 (IC-109249) to 506 (IC-109235), 7.3 (NIC-22489) to 13.0 mg/100g (IC-341704), 1.6 (EC-359449) to 3.2 mg/100g (NIC-22498) and 1.5 (NIC-22489) to 7.7 mg/100g (IC-109235) in that order (Table 143)

5.6 Adzuki bean

5.6.1 Germplasm, Kharif 2012 seed supply by Shimla Centre (Hills)

The crude protein and total phenol content in adzuki bean genotypes ranged from 20.5 to 23.6% and 140 to 275 mg/100g, accordingly. The genotype(s) IC-087071, IC-000249, IC-080850 & IC-340245, IC-341941 in total phenol and IC-008707, IC- 000249 & EC-340245 in crude protein emerged promising genotypes over others, in that order. Average crude protein and total phenol content in adzuki bean genotypes was found to be 23.6% and 275 mg/100g, respectively (Table 144).

As such based on the above biochemical analysis it is evident that promising genotypes for individual quality parameters of dietary significance among buckwheat, chenopods and adzukibean genotypes have been identified for further crop improvement purpose.

5.7 Kalingada

5.4.1 IVT, AVT and Germplasm, Kharif 2013 seed supply by CAZRI Jaisalmer

32 genotypes from CAZRI RS Jaisalmer centre were analysed for protein, oil, Cu, Ca, Fe, Mg, K and Zn content. Protein and Oil content varied from 36.40 to 50.90 and 27.40 to 40.30 per cent with an average value of 43.85 and 32.63 respectively (Table 145). The promising genotypes were:

Entries	Fe (g/kg)	Entries	Zn (g/kg)	Entries	Cu (g/kg)	Entries	Ca (g/kg)
SKNK-1004	0.11	SKGPK-31	0.08	SKNK-1102	0.02	MGPK-45-3	1.60
SKGPK-21	0.11	MGPK-10-1	0.07	SKNK-1101	0.02	SKNK-0903	1.52
SKNK-1101	0.11	MGPK-10-2	0.07	SKGPK-33	0.02	SKNK-1101	1.35
SKNK-1103	0.11	GK-1 (C)	0.04	SKGPK-35	0.02	SKGPK-24	1.29
MGPK-10-2	0.11			SKGPK-30	0.02	SKGPK-28	1.21
SKGPK-33	0.11			SKGPK-27	0.02	SKGPK-31	1.20
GK-1 (C)	0.04			GK-1 (C)	0.01	GK-1 (C)	1.12

Entries	Mg (g/kg)	Entries	K (%)	Entries	Protein (%)	Entries	Oil (%)
SKNK-1002	5.08	SKGPK-22	1.08	CAZJK-13-1	50.90	MGPK-10-1	40.30
SKGPK-26	5.07	SKNK-1002	1.05	SKNK-1103	50.90	CAZJK-13-2	39.30
MGPK-10-2	5.06	SKNK-0903	1.05	MGPK-10-5	50.90	MGPK-10-3	35.70
SKGPK-23	5.04	SKGPK-21	1.05	MGPK-10-3	50.90	CAZJK-13-1	35.60
GK-1 (C)	4.63	MGPK-1	1.05	SKGPK-21	46.60	MGPK-10-2	35.40
		SKGPK-25	1.04	MGPK-10-2	46.60	SKNK-1004	35.10
		GK-1 (C)	0.98	GK-1 (C)	43.60	GK-1 (C)	34.60

Table 137: Grain Amaranth Germplasm (Hill) Shimla Centre.

S. No.	Genotypes	Protein	Oil (%)	Phenols (%)	Ca (mg/10g)	Fe (mg/100g)	Zn (mg/100g)
1	EC146543	14.00	6.10	0.05	346.00	11.80	5.50
2	EC146546	13.00	5.80	0.06	324.00	12.40	5.90
3	EC519512	11.60	5.70	0.07	311.00	13.70	5.00
4	EC519523	12.90	6.40	0.06	302.00	13.40	4.90
5	EC519526	14.10	5.50	0.06	326.00	17.30	6.20
6	EC524457	13.70	7.60	0.07	328.00	14.20	6.50
7	IC042346-6	9.60	8.30	0.06	266.00	8.10	4.50
8	IC042352	13.00	7.60	0.07	294.00	9.20	4.80
9	IC042353	12.20	8.50	0.06	288.00	10.10	4.90
10	IC042356	12.30	8.10	0.07	321.00	10.70	4.70
11	IC042358	11.20	7.20	0.06	341.00	11.10	4.20
12	IC042397	12.30	5.30	0.06	329.00	10.40	4.90
13	IC042402	13.50	5.40	0.06	358.00	11.00	5.00
14	IC042415	12.40	4.70	0.05	321.00	10.00	4.40
15	IC042421	10.90	5.80	0.06	288.00	13.70	3.80
16	IC042776-2	11.50	6.40	0.05	318.00	14.10	4.10
17	IC042987-4	11.10	6.50	0.06	336.00	18.80	4.30
18	IC043715	12.80	4.30	0.07	321.00	20.90	4.60
19	IC047434	13.60	4.60	0.06	319.00	18.20	4.80
20	IC047436	13.10	6.50	0.06	341.00	23.20	4.90
21	IC082625	14.40	5.80	0.06	352.00	24.30	5.80
22	IC093946	13.70	6.20	0.06	316.00	19.90	4.50
23	IC094656	12.70	5.80	0.06	321.00	19.40	3.70
24	IC094661	15.30	4.50	0.06	365.00	20.00	4.00
25	IC095247	12.60	8.10	0.05	298.00	22.60	4.40
26	IC095250	14.30	5.10	0.07	329.00	18.30	4.60
27	IC095251	12.90	4.90	0.07	315.00	15.90	3.70
28	IC095253	11.90	5.70	0.07	288.00	16.80	3.50
29	IC095277	11.50	8.20	0.07	302.00	14.20	5.10
30	IC095279	12.90	7.50	0.06	314.00	16.40	6.00
31	IC095284	11.50	6.40	0.06	306.00	14.10	5.40
32	IC095286	13.30	5.80	0.06	335.00	18.90	5.70
33	IC095293	12.50	6.80	0.05	297.00	17.20	5.10

S. No.	Genotypes	Protein	Oil (%)	Phenols (%)	Ca (mg/10g)	Fe (mg/100g)	Zn (mg/100g)
34	IC095299	11.50	6.70	0.06	298.00	15.30	5.30
35	IC095301	12.70	5.60	0.05	317.00	19.90	4.80
36	IC095302	11.10	6.10	0.06	289.00	12.10	4.90
37	IC095304	12.20	8.40	0.05	294.00	10.40	4.70
38	IC095308	11.20	9.20	0.05	296.00	13.00	6.00
39	IC095313	12.30	4.80	0.06	306.00	12.30	4.80
40	IC095315	13.10	4.60	0.07	336.00	14.00	4.80
41	IC095316	11.90	6.50	0.05	285.00	12.30	4.60
42	IC095321	12.90	6.70	0.06	311.00	9.40	4.70
43	IC095322	11.80	5.40	0.06	296.00	10.80	4.40
44	IC095326	11.60	4.80	0.06	291.00	12.20	4.70
45	IC095330	11.20	6.40	0.07	302.00	12.20	5.30
46	IC095334	13.10	5.80	0.06	308.00	12.40	6.00
47	IC095339	12.70	7.20	0.05	321.00	12.30	7.10
48	IC098249	13.70	6.20	0.06	312.00	18.50	4.50
49	IC107127	10.70	8.30	0.06	286.00	12.10	7.40
50	IC107144	11.30	6.40	0.06	298.00	12.60	7.20
51	Annapurna	13.20	8.70	0.07	321.00	10.00	6.20
52	Durga	12.10	7.60	0.06	317.00	10.00	5.70
53	PRA2	10.90	6.70	0.07	308.00	11.10	5.80
54	PRA3	13.60	6.30	0.06	327.00	11.80	6.00
	Minimum	9.60	4.30	0.05	266.00	8.10	3.50
	Maximum	15.30	9.20	0.07	365.00	24.30	7.40
	Mean	12.46	6.40	0.06	313.61	14.35	5.08

Table 138: Grain Amaranth AVT-I and AVT-II and Germplasm of Grain amaranth (Plain) S.K. Nagar Centre.

S. No.	Genotypes	Protein (%)	Oil (%)	Phenol (%)	Ca (mg/100 g)	Fe (mg/100 g)	Zn (mg/100 g)
AVT-I							
1	SKNA808	12.50	5.70	0.05	311.00	6.80	3.40
2	SKNA809	11.90	6.10	0.05	301.00	5.70	3.10
AVT-II							
1	BGA3	12.70	5.40	0.05	308.00	7.20	4.30

S. No.	Genotypes	Protein (%)	Oil (%)	Phenol (%)	Ca (mg/100 g)	Fe (mg/100 g)	Zn (mg/100 g)
2	BGA9	12.90	5.80	0.05	315.00	5.40	4.10
3	BGA14	12.80	5.20	0.05	332.00	6.50	3.80
4	BGA20	11.70	6.50	0.06	307.00	9.20	2.70
5	MGA507	13.60	5.40	0.05	348.00	5.80	2.80
Germplasm							
1	SKGPA68	10.20	5.60	0.06	317.00	9.30	3.20
2	SKGPA72	11.70	6.20	0.05	355.00	8.70	2.50
3	SKGPA74	13.70	5.10	0.05	358.00	6.10	4.60
4	SKGPA86	12.30	5.40	0.05	324.00	5.40	3.80
5	SKGPA91	13.40	5.20	0.05	316.00	5.30	3.90
6	SKGPA61	9.60	7.30	0.06	334.00	8.20	4.50
7	SKGPA62	10.80	6.80	0.06	305.00	7.30	3.10
8	SKGPA69	10.90	6.40	0.06	312.00	6.80	2.70
9	SKGPA73	10.10	7.40	0.06	316.00	9.50	3.40
10	SKGPA78	10.10	8.20	0.06	321.00	8.20	3.20
11	SKGPA80	11.40	8.70	0.05	306.00	6.40	3.80
12	SKGPA87	11.60	6.50	0.05	309.00	5.80	3.60
13	SKGPA95	12.40	5.80	0.05	328.00	6.30	3.70
14	SKGPA106	10.30	6.90	0.06	310.00	9.50	2.60
15	IC032190	12.70	4.70	0.05	325.00	7.50	4.20
16	IC035404	12.50	5.60	0.05	321.00	6.80	4.70
17	IC035415	13.30	5.80	0.05	342.00	5.30	4.50
18	IC035633	10.80	7.10	0.06	288.00	6.40	2.60
19	IC035635	14.40	5.30	0.05	345.00	5.10	4.80
20	IC035651	13.30	6.50	0.06	336.00	4.80	3.90
21	IC035711	9.90	7.80	0.06	298.00	9.60	2.30
22	IC035713	11.70	6.90	0.06	286.00	6.30	2.60
23	IC035716	10.10	8.50	0.05	312.00	7.20	2.40
24	IC095516	11.50	7.60	0.05	289.00	6.80	3.50
	GA2	11.80	6.90	0.06	312.00	6.30	2.60
	Suvena	12.30	6.20	0.06	327.00	8.20	3.80
	BGA2	10.90	6.80	0.05	310.00	8.10	2.10
	Minimum	9.60	4.70	0.05	286.00	4.80	2.30
	Maximum	14.40	8.70	0.06	358.00	9.60	4.80
	Mean	11.83	6.37	0.05	318.55	6.94	3.49

Table 139: Rice bean Germplasm (Hill) Shimla Centre.

S. No.	Genotypes	Protein (%)	Tannin (mg/100g)	Ca (mg/100g)	Fe (mg/100g)	Zn (mg/100g)
1	IC075061	19.20	564.00	345.00	4.40	2.60
2	IC750811	19.30	587.00	332.00	5.10	3.40
3	IC097882	18.90	588.00	318.00	8.20	2.60
4	IC108858	20.70	598.00	345.00	7.40	3.80
5	IC108859	19.30	611.00	327.00	5.20	3.90
6	IC108860	19.40	614.00	321.00	5.60	4.10
7	IC108861	17.40	598.00	305.00	6.80	3.20
8	IC108862	17.80	617.00	311.00	8.30	2.50
9	IC108863	19.80	589.00	314.00	6.50	3.10
10	IC108864	19.70	592.00	326.00	6.10	4.20
11	IC108865	18.80	584.00	335.00	6.60	4.10
12	IC108866	18.90	568.00	321.00	7.10	3.70
13	IC108867	20.10	594.00	322.00	5.40	3.40
14	IC118114-3	19.50	597.00	304.00	5.80	4.50
15	IC137171	19.80	604.00	310.00	6.30	3.50
16	IC137206	19.50	587.00	332.00	5.80	4.30
17	IC165984	18.60	576.00	307.00	7.60	2.80
18	IC173983	18.80	586.00	304.00	7.30	3.30
19	IC176563	20.10	594.00	341.00	4.70	4.70
20	IC185653	18.30	588.00	321.00	7.80	4.20
21	IC200087	19.40	588.00	306.00	6.50	3.90
22	IC241990	19.40	574.00	316.00	6.80	4.60
23	IC248733	17.40	595.00	305.00	8.60	3.20
24	IC248804	18.30	586.00	326.00	7.40	2.50
25	IC248806	18.60	564.00	321.00	6.40	2.80
26	IC137189	21.80	545.00	344.00	5.20	3.60
27	IC243512	18.50	584.00	317.00	6.80	2.20
28	IC369282	19.80	591.00	351.00	6.10	4.10
29	IC394201	19.30	578.00	336.00	5.60	3.20
30	IC394537	19.50	588.00	349.00	5.40	3.10
31	IC419489	19.30	594.00	332.00	4.70	2.80
32	IC419518	20.90	598.00	358.00	5.30	3.80

S. No.	Genotypes	Protein (%)	Tannin (mg/100g)	Ca (mg/100g)	Fe (mg/100g)	Zn (mg/100g)
33	IC419602	21.20	568.00	364.00	5.10	4.60
34	IC419806	20.70	543.00	341.00	6.20	5.20
35	IC421875	21.40	612.00	358.00	5.10	4.70
36	IC421926	20.90	562.00	336.00	6.50	3.80
37	IC524068	20.10	558.00	345.00	7.10	4.30
38	IC524075	19.80	586.00	336.00	6.30	3.60
39	IC524076	20.10	558.00	345.00	5.20	4.30
40	IC524082	20.70	561.00	354.00	5.40	2.80
41	IC524084	20.40	588.00	362.00	6.20	4.30
42	IC524085	20.50	589.00	365.00	5.50	4.60
43	IC524549	20.90	568.00	374.00	6.30	4.40
44	IC528870	20.70	566.00	354.00	5.40	3.80
45	IC528878	21.80	574.00	368.00	5.30	4.60
46	IC538983	20.70	563.00	351.00	7.20	3.80
47	PRR-1(C)	18.90	596.00	335.00	8.80	4.20
48	PRR2(C)	19.10	588.00	329.00	6.30	4.50
49	RBL1(C)	19.90	598.00	355.00	6.80	4.10
50	RBL6(C)	19.90	602.00	331.00	7.20	4.20
	Minimum	17.40	543.00	304.00	4.40	2.20
	Maximum	21.80	617.00	374.00	8.80	5.20
	Mean	19.68	584.02	334.10	6.29	3.75

Table 140: Ricebean (IVT 2013-14), Hisar Centre.

S. No.	Genotypes	Protein (%)	Tannin (mg/100g)	Ca (mg/100g)	Fe (mg/100g)	Zn (mg/100g)
1	LRB545	19.20	542.00	325.00	4.10	2.70
2	LRB553	18.70	574.00	312.00	4.50	2.40
3	LRB554	17.80	577.00	328.00	7.20	2.80
4	HRB216	18.40	551.00	335.00	6.40	3.80
5	BRBM119	19.30	550.00	337.00	6.20	4.90
6	BRBM127	18.60	563.00	317.00	6.60	4.50
7	RRB14	17.70	552.00	326.00	4.80	4.20
8	RRB15	18.40	565.00	318.00	5.30	3.50
9	RRB38	18.90	568.00	335.00	5.50	3.20
10	RBL1(C)	18.60	578.00	316.00	5.10	4.70

S. No.	Genotypes	Protein (%)	Tannin (mg/100g)	Ca (mg/100g)	Fe (mg/100g)	Zn (mg/100g)
11	RBL6(C)	18.10	576.00	334.00	6.30	4.10
12	RBL35(C)	19.00	564.00	338.00	6.10	3.80
13	RBL50(C)	18.60	572.00	328.00	6.40	3.70
	Minimum	17.70	542.00	312.00	4.10	2.40
	Maximum	17.70	542.00	312.00	4.10	2.40
	Mean	18.56	564.00	326.85	5.73	3.72

Table 141: Fababean (IVT AVT-I AVT-II & Germplasm Rabi 2012-13), Hisar Centre.

S. No.	Genotypes	Protein (%)	Vicine-convicine (%)	Total Phenols (%)
IVT				
1	HB- 193	24.50	0.83	0.24
2	HB- 194	23.90	0.88	0.25
3	HB- 212	25.10	0.93	0.24
4	HB- 214	24.90	0.82	0.23
5	HB-195	25.70	0.84	0.26
6	NDF- 12	24.90	0.85	0.27
7	RFB - 5	23.50	0.78	0.25
8	RFB- 6	22.40	0.76	0.24
9	RFB -7	23.90	0.79	0.25
AVT-I				
1	DFB101	24.90	0.85	0.26
2	DFB102	22.10	0.79	0.24
3	DFB103	24.50	0.81	0.25
4	HB082	26.10	0.86	0.26
5	HB122	22.80	0.85	0.25
6	HB184	27.70	0.82	0.26
7	HB186	24.90	0.78	0.24
8	HB187	22.80	0.76	0.24
9	NDF10	23.50	0.85	0.25
AVT-II				
1	HB39	23.20	0.84	0.23
2	HB40	23.40	0.81	0.25
3	HB48	24.40	0.78	0.24
4	HB65	26.80	0.81	0.25
5	NDF8	20.90	0.76	0.24

S. No.	Genotypes	Protein (%)	Vicine-convicine (%)	Total Phenols (%)
Germplasm				
1	HB - 1	24.20	0.79	0.25
2	HB - 2	25.40	0.83	0.26
3	HB - 3	24.10	0.78	0.23
4	HB - 4	24.70	0.74	0.24
5	HB - 5	24.80	0.76	0.26
6	HB - 6	23.80	0.75	0.23
7	HB - 7	25.10	0.83	0.27
8	HB - 8	24.40	0.78	0.25
9	HB - 9	25.00	0.79	0.24
10	HB - 10	23.80	0.74	0.26
11	HB - 11	23.10	0.74	0.24
12	HB - 12	23.40	0.75	0.24
13	HB - 13	25.20	0.79	0.26
14	HB - 14	24.40	0.75	0.23
15	HB - 15	25.50	0.83	0.28
16	HB - 16	25.70	0.78	0.25
17	HB - 17	24.30	0.76	0.23
18	HB - 18	23.90	0.74	0.24
19	HB - 19	24.70	0.78	0.23
20	HB - 20	23.90	0.76	0.22
21	HB - 21	23.80	0.73	0.23
22	HB - 22	23.10	0.71	0.24
23	HB - 23	25.50	0.84	0.26
24	HB - 24	25.10	0.82	0.28
25	HB - 25	25.10	0.78	0.26
26	HB - 26	25.30	0.87	0.25
27	HB - 27	25.40	0.83	0.23
28	HB - 28	25.20	0.85	0.27
29	HB - 29	23.30	0.74	0.25
30	HB - 30	26.70	0.86	0.26
31	HB - 31	25.50	0.85	0.25
32	HB - 32	25.00	0.86	0.26
33	HB - 33	25.60	0.88	0.28
34	HB - 34	25.10	0.79	0.24
35	HB - 35	24.60	0.76	0.24

S. No.	Genotypes	Protein (%)	Vicine-convicine (%)	Total Phenols (%)
36	HB - 36	26.10	0.88	0.26
37	HB - 37	23.90	0.75	0.24
38	HB - 38	25.20	0.84	0.25
39	HB - 39	25.00	0.84	0.26
40	HB - 40	25.50	0.87	0.27
	Vikrant	24.30	0.82	0.25
	Minimum	20.90	0.71	0.22
	Maximum	27.70	0.93	0.28
	Mean	24.54	0.80	0.25

Table 142: Germplasm Kharif 2013 of Buckwheat seed supply by Shimla.

Genotypes	Crude - protein (%)	Calcium (mg/100 g)	Iron (mg/100 g)	Sodium (mg/100g)	Potassium (mg/100g)	Phenols (mg/100g)
IC -026600	12.5	87.5	5.8	2.0	2.9	145
IC-026596	12.2	92.4	4.6	2.3	1.7	200
IC -026597	13.0	89.2	4.5	2.3	2.8	210
IC -026598	12.3	97.5	6.0	2.5	2.2	130
IC -026599	11.9	62.3	5.6	1.9	2.6	185
IC -036805	12.4	76.9	6.4	3.6	2.6	250
IC -036914	13.2	83.4	7.6	3.0	1.2	190
IC -037265	12.6	98.4	4.3	2.4	2.8	140
IC -042426	12.4	82.6	6.7	3.8	3.2	130
IC -107988	11.2	89.9	5.4	2.6	2.5	260
IC -108516	12.4	86.9	6.8	3.0	2.2	200
IC -109309	12.6	94.2	3.4	3.0	2.6	150
IC -204020	13.3	72.6	3.2	2.7	2.0	230
IC -276627	12.9	68.6	6.8	2.9	1.4	265
IC - 278739	11.8	82.0	3.0	3.4	2.1	120
IC - 286396	12.3	98.2	5.2	2.5	3.4	240
IC - 286521	12.7	95.0	3.8	2.7	1.6	170
IC -288737	11.2	85.4	6.5	3.0	1.8	240
IC - 310043	11.0	90.4	5.2	2.5	2.3	190
EC -321798	10.5	57.5	6.6	3.4	1.7	230
EC -329194	12.8	98.5	6.0	3.7	2.3	155
EC -329200	12.0	93.4	5.4	4.6	3.3	200
EC -329403	11.8	89.5	4.2	2.9	2.2	210
EC -329495	12.5	98.4	7.0	3.2	2.6	140
EC- 341661	11.6	56.8	6.5	3.9	2.2	270
ECHimpriya	12.7	68.5	5.2	2.0	2.5	240
Shimla-B1	11.4	76.2	4.8	2.5	3.2	255

Genotypes	Crude - protein (%)	Calcium (mg/100 g)	Iron (mg/100 g)	Sodium (mg/100g)	Potassium (mg/100g)	Phenols (mg/100g)
VL-7	13.3	82.9	4.6	4.8	2.8	190
PRB-1	14.0	78.5	5.1	2.6	1.2	230
Minimum	10.5	56.8	3.0	1.9	1.2	120
Maximum	12.5	98.5	7.6	4.8	3.4	270
Mean	12.59	83.91	5.38	2.95	2.34	198.79

Table 143: Germplasm Kharif 2013 of Chenopods seed supply by Shimla.

Genotypes	Crude protein (%)	Calcium (mg/100 g)	Iron (mg/100 g)	Sodium (mg/100 g)	Potassium (mg/100 g)
PRC-9801	14.2	296.0	10.5	2.4	3.9
NIC-22489	15.1	332.0	7.3	2.8	1.5
NIC-22498	16.0	246.0	9.0	3.2	3.9
NIC-22500	15.9	282.0	9.5	2.5	4.0
NIC-22503	17.2	398.0	8.2	2.2	5.6
NIC-22518	16.3	298.0	11.0	2.6	4.6
NIC-22525	15.0	434.0	9.6	3.0	5.6
NIC-22529	14.6	296.0	11.9	2.3	3.8
NIC-50229	14.0	332.0	12.5	1.7	4.6
NC-58233	17.8	200.0	12.0	1.9	3.3
NC-58616	16.9	438.0	9.0	2.6	4.0
NC-58617	15.4	250.0	11.6	2.3	5.0
IC-108080	14.9	434.0	10.7	2.6	3.3
IC-108817	16.3	474.0	12.6	2.9	6.4
IC-108819	14.2	410.0	9.7	2.6	3.5
IC-109235	16.8	506.0	8.1	2.5	7.7
IC-109249	15.3	166.0	13.0	2.9	6.3
IC-109731	16.5	314.0	12.5	3.1	5.3
IC-258332	14.0	232.0	10.5	1.9	6.8
IC-275421	15.5	434.0	10.3	3.2	2.8
IC-341704	17.0	426.0	12.8	3.1	2.7
EC-359444	16.0	330.0	9.5	2.9	3.6
EC-359447	15.5	424.0	11.0	2.3	4.4
EC-359448	14.0	400.0	10.4	1.8	3.4
EC-359449	16.8	374.0	12.6	1.6	6.0
IC-415477	16.0	434.0	12.0	2.4	5.4
IC-415493	16.0	415.8	11.2	2.1	6.3
EC-507741	14.5	332.0	12.6	2.3	7.3
Minimum	14.0	166	7.3	1.6	1.5
Maximum	17.8	506	13.0	3.2	7.7
Mean	15.63	353.85	10.77	2.48	4.67

Table 144: Germplasm Kharif 2013 of Adzuki bean seed supply by Shimla.

Genotypes	Crude protein (%)	Phenol (mg/100g)
IC-000248	20.2	153
IC-000249	23.5	265
IC-000372	21.2	200
IC-008707	23.6	240
IC-015257	20.5	140
IC-018257	21.4	180
IC-030270	23.0	220
IC-034264	22.4	160
IC-036070	21.4	245
IC-059489	20.2	200
IC-080850	22.4	260
IC-087071	21.2	275
IC-087815	22.4	210
IC-087896	23.0	230
IC-108854	20.6	175
IC-108857	21.8	205
IC-281186	20.0	180
IC-340245	23.6	155
IC-340254	21.4	240
IC-340286	22.4	165
IC-340287	23.2	190
IC-340288	21.2	250
IC-341941	23.4	230
IC-341944	22.4	170
HPU-51	23.4	250
Totru-local	21.4	200
Minimum	20.0	140
Maximum	23.6	275
Mean	21.96	207.23

Table 145: IVT, AVT and Germplasm of Kalingada Kharif 2013 seed supply by CAZRI Jaisalmer.

S. No.	Entries	Fe (g/kg)	Zn (g/kg)	Cu (g/kg)	Ca (g/kg)	Mg (g/kg)	K (%)	Protein (%)	Oil (%)
IVT									
1	SKNK-1101	0.11	0.03	0.02	1.35	4.60	0.95	36.40	28.50
2	SKNK-1102	0.04	0.01	0.02	0.92	4.66	0.60	45.30	32.40
3	SKNK-1103	0.11	0.06	0.01	0.91	4.81	0.85	50.90	34.80

4	MGPK-10-1	0.08	0.07	0.01	1.18	4.81	0.80	44.60	40.30
S. No.	Entries	Fe (g/kg)	Zn (g/kg)	Cu (g/kg)	Ca (g/kg)	Mg (g/kg)	K (%)	Protein (%)	Oil (%)
5	MGPK-10-2	0.11	0.07	0.01	1.08	4.90	0.85	46.60	35.40
6	CAZJK-13-1	0.09	0.06	0.01	1.09	4.69	0.95	50.90	35.60
7	CAZJK-13-2	0.04	0.06	0.00	1.07	4.79	0.95	36.40	39.30
AVT									
8	SKNK-1004	0.11	0.06	0.01	0.95	4.80	0.90	39.00	35.10
9	SKNK-1002	0.05	0.05	0.00	1.08	5.08	1.05	45.30	29.70
10	MGPK-45-3	0.04	0.04	0.01	1.60	4.98	0.85	45.30	27.60
11	SKNK-0903	0.06	0.05	0.01	1.52	4.95	1.05	36.40	33.70
12	MGPK-1	0.07	0.04	0.01	1.13	4.62	1.05	44.60	31.80
Germplasm									
13	SKGPK-21	0.11	0.04	0.01	1.14	4.78	1.05	46.60	30.50
14	SKGPK-22	0.10	0.05	0.01	0.88	4.63	1.08	44.60	29.30
15	SKGPK-23	0.10	0.05	0.01	0.89	5.04	1.03	39.00	33.40
16	SKGPK-24	0.07	0.04	0.01	1.29	4.46	1.00	44.00	29.70
17	SKGPK-25	0.05	0.04	0.01	0.91	4.63	1.04	45.30	33.50
18	SKGPK-26	0.06	0.04	0.01	1.08	5.07	1.00	45.30	34.20
19	SKGPK-27	0.06	0.04	0.02	0.98	4.71	0.80	45.30	31.80
20	SKGPK-28	0.05	0.05	0.01	1.21	4.55	0.70	44.60	31.40
21	SKGPK-29	0.06	0.06	0.01	0.92	4.61	0.75	44.60	32.60
22	SKGPK-30	0.10	0.06	0.02	0.86	4.71	0.80	36.40	34.50
23	SKGPK-31	0.10	0.08	0.01	1.20	4.56	0.75	44.60	29.80
24	SKGPK-33	0.11	0.05	0.02	1.06	4.98	0.80	45.30	28.40
25	SKGPK-34	0.05	0.04	0.01	0.71	4.41	0.80	36.40	29.40
26	SKGPK-35	0.05	0.04	0.02	1.11	4.56	0.90	45.30	29.80
27	MGPK-10-1	0.05	0.04	0.01	0.91	4.65	0.80	44.60	30.40
28	MGPK-10-2	0.04	0.04	0.02	1.10	5.06	0.85	45.30	33.60
29	MGPK-10-3	0.05	0.06	0.01	1.06	4.67	0.80	50.90	35.70
30	MGPK-10-4	0.05	0.04	0.01	0.71	4.71	0.85	39.00	32.70
31	MGPK-10-5	0.05	0.04	0.01	0.61	4.67	0.80	50.90	34.50
32	GK-1 (C)	0.04	0.04	0.01	1.12	4.63	0.98	43.60	34.60
	Minimum	0.04	0.01	0.00	0.61	4.41	0.60	36.40	27.60
	maximum	0.11	0.08	0.02	1.60	5.08	1.08	50.90	40.30
	Mean	0.07	0.05	0.01	1.05	4.74	0.89	43.85	32.63

VALUE ADDITION

VI VALUE ADDITION

6.1 Introduction

Neglected or underutilized crops have the potential to play a number of roles in the improvement of food security. Himachal Pradesh is the home for certain underutilized crops which are grown particularly in the tribal areas and have very good nutritional profile yet, in spite of high nutritional and medicinal properties these under-utilized crops are at the verge of extinction. Many underutilized species are nutritionally rich and adapted to low input agriculture. They complement significantly the diet based on few staple crops by providing important vitamins and minerals. Hence, emphasis should thus be given to utilize those species having comparative advantages in providing better food, being affordable by the poor and more available both in time and space.

Among the different under-utilized crops, ricebean is one of such underutilized pulse crops, which could be utilized in the future farming system especially covering regulated and poor soils in Himachal Pradesh and other parts of India. It possesses immense potential because of its rich genetic diversity, wider adaptability, high nutritional quality, storage quality, high grain yield and its multipurpose usage as food, animal feed, cover crop, green manure and as soil enricher. Its young immature pods occasionally used as vegetable exhibit satisfactory nutritional quality on account of its high proteins and appreciable quantities of limiting amino acids viz. tryptophan and methionine as compared to other traditional pulses. The dry mature seeds of the crop are rich in important nutrients like proteins, carbohydrates, minerals and water soluble vitamins. Thus, the suitability of rice bean both for food and fodder make it dual purpose crop.

Similarly, buckwheat is one of the traditional crops with promising economic and medicinal value and found in high altitude regions of Himachal Pradesh. Traditionally, milled buckwheat can be used for pasta, blended bread and other types of flour products. Buckwheat is also used in mixtures with wheat flour for bread, noodles, spaghetti, macaroni, ready to eat breakfast flakes, health foods, and ethnic dishes. Buckwheat is rich in essential amino acids. In recent years interest has been increased in amaranth grain because of its high

nutritional value, high glycemic index as well as some agricultural advantages. The protein in amaranth grain contains acceptable levels of essential amino acids, particularly lysine, tryptophan and methionine which are found in low concentrations in cereals and leguminous grains of common usage.

Attempts have been made to evaluate the product development potential of buckwheat, ricebean and amaranths. Effect of packaging materials and storage conditions on the nutritional and sensory attributes of the supplemented products has also been assessed. Special emphasis was given for standardization of extruded snacks like kurkure and extruded ready to eat breakfast cereals with chocolate coating. The extruded snacks prepared by using buckwheat and amaranths were evaluated for specific quality characteristics. Following type of samples were used for value addition studies:

Buckwheat (mixtures)	: <i>Ogla, fafra</i>
Amaranths	: Suvarna
Rice bean	: PRR-1, PRR-2, RBL-1, RBL-6 BRS-1 and BRS-2

For the value addition studies this year bulk samples of Buckwheat (*ogla and fafra*), Suvarna variety of Amaranths were procured from University Research Station, Sangla and different genotypes as well as mixture of ricebean were procured from the Department of Organic Agriculture, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur.

6.2 Technical Plan of Work:

The research activities pertaining to the nutritional quality and value addition were carried out under following sub-heads:

6.2.1 Formulations/Methodologies for preparation of value added products including extruded products with better nutritional profile.

Methodologies for preparation of extruded snacks (*kurkure* type product) and ready to eat chocolate coated breakfast cereals were standardised. Regarding the extrusion parameters the temperature was set as 150°C, moisture 14 per cent and the screw speed as 500 rpm. The buckwheat flour (*ogla and fafra*) and amaranth flour made from popped seeds were used in combination

with rice flour in varying proportions viz. 00:100, 20:80, 40:60 and 60:40 respectively.

The results of study revealed that addition of base flour (B1) lowered the density while other base flours (B2 and A3) increased the density of product. In terms of density, product with 60% base flour (B1) was best. WAI and WSI showed non-linear relationship with addition of base flour. Addition of 60 per base flour (A3) showed highest WSI whereas highest WAI was observed in product containing 60 per cent base flour (B2). Incremental addition of base flour resulted in brighter products. Addition of base flour resulted in decreased density. Products with 60 % base flour produced lighter products except with A3 type base flour. WAI was not affected greatly by addition of base flour. WSI was markedly increased with addition of base flour, highest value being observed at 60 per cent base flour (A3). Colour of the product was not significantly affected by addition of base flour.

Table 146: Effect of blending proportions on the specific parameters of extruded ready to eat breakfast cereals and Extruded snacks
Extruded ready to eat breakfast cereals

S. No.	Level	Moisture	Density (g/ml)	WAI (g/g)	WSI (%)	L	a*	b*	Hue Angle (°)
Sample B1									
S1	0	5.85	0.184	4.21	26.52	54.39	6.73	12.66	62.01
S2	20	5.96	0.184	4.69	27.48	62.95	6.74	14.06	64.39
S3	40	5.50	0.178	4.10	30.40	64.30	6.16	14.46	66.94
S4	60	5.16	0.147	4.93	27.92	61.24	6.42	13.60	64.73
Sample B2									
S5	20	5.95	0.203	4.18	27.44	65.2	6.03	14.06	66.81
S6	40	5.50	0.204	4.70	19.96	58.76	7.31	14.19	62.76
S7	60	5.44	0.183	5.36	21.96	47.56	6.72	12.59	61.91
Sample A3									
S8	20	5.77	0.202	3.76	17.28	57.24	7.07	13.69	62.69
S9	40	6.19	0.206	3.73	32.16	59.44	7.2	15.38	64.92
S10	60	5.73	0.203	3.02	40.92	58.54	7.15	16	65.94

Extruded snacks (*Kurkure* type product)

S. No.	Level	Moisture	Density (g/ml)	WAI (g)	WSI (%)	L	a*	b*	Hue angle (°)
Sample B1									
K1	0	-	0.093	5.39	32.5	80.135	-0.98	10.29	- 84.57
K2	20	-	0.097	5.88	34.81	79.595	1.125	12.375	- 84.81
K3	40	-	0.084	5.78	39.05	77.76	-1.31	13.12	- 84.30
K4	60	-	0.083	5.32	41.81	74.18	1.045	14.4	85.86
Sample B2									
K5	20	-	0.092	5.36	36.56	74.815	0.75	10.845	86.05
K6	40	-	0.089	5.35	35.18	77.64	0.545	10.505	87.04
K7	60	-	0.082	5.26	37.99	75.015	1.355	10.87	82.90
Sample A3									
K8	20	-	0.087	4.22	50.18	78.115	0.51	12.8	87.73
K9	40	-	0.089	3.37	66.56	76.255	1.275	15.25	85.23
K10	60	-	0.098	2.50	66.97	72.755	2.48	16.49	81.45

It was observed that density of product was slightly affected with addition of buckwheat flour. In terms of density, product with 60% buckwheat flour was best (0.147g/ml). Water absorption and solubility index showed varying degree of relationship with amount of buckwheat flour added. WAI (4.10-4.93g/g) and WSI (26.52-30.40%) showed non-linear relationship with addition of buckwheat flour. It was observed that the WSI increased with increase in amount of buckwheat flour in the snacks. Highest values of WSI were obtained at maximum proportion (60%) of buckwheat flour of all types. The L values (54.39-64.30) were slightly decreased with addition of buckwheat flour whereas no linear relationship was observed between addition of buckwheat flour between a* and b* values. The extruded products were also evaluated for nutritional profile and consumer's acceptability using approved methods.

The ricebean genotypes PRR-1, PRR-2, RBL-1, RBL-6 BRS-1 and BRS-2 were analysed for specific constituents viz. calcium, iron, zinc, lysine, methionine, tryptophan, phenolic compounds, tannins and trypsin inhibitor

activity. The product development potential of all the genotypes was assessed. *Sepu bari* which is a traditional nugget usually prepared from black gram is considered as delicacy. Attempts were made to standardize *sepu bari* from rice bean dal genotypes. Other traditional products standardized were *halwa*, ricebean *aloo bhujjia*, *pappad* and *boondi*. Some potential commercial products standardized earlier were selected and subjected to storage stability studies with special reference to different packaging materials.

Viewing the importance of minerals such as calcium, iron and zinc in the human nutrition as protective nutrients the seeds of rice bean genotypes/ varieties were evaluated and the data pertaining to these parameters are presented in Figures below. The iron content in different genotypes of rice bean seeds was observed to vary from 3.65 to 5.36 mg/100g. The calcium content varied significantly from 323 to 373 mg/100g whereas the zinc content ranged from 3.01 to 3.85 mg/100g.

The lysine content of rice bean varieties ranged between 5.29 to 5.73 per cent and methionine content between 0.80 to 0.88 g/100g protein.

Rice bean genotypes contained 0.741 to 0.784 per cent total phenol content, 0.564 to 0.579 per cent tannin content, 402.90 to 416.32 mg/100g phytic acid and 28.97 to 29.56 mg/g trypsin inhibitor content.

6.2.2 Determination of shelf life of selected under-utilized based food products in relation to packaging material and storage intervals

The prepared products viz. *halwa*, *aloo bhujjia*, *boondi* and *pappad* extruded products were stored in polythene bags and stored at ambient conditions for a period of 6 months whereas the *sepubari* was stored for one month only in polythene bags. The products remained safe for the stipulated time periods.

6.2.3 Nutritional profile of developed/standardized under-utilized crops based food recipes and preparation of booklet

For the commercialization of the products it is mandatory to get the samples analysed from a certified lab for specific parameters as per nutrition labelling. The standardized extruded products have been sent to FICCI FRAC

Laboratory, a NABL accredited laboratory at Dwarka, New Delhi for analysis and the results are awaited. In the next phase of the project, some more products will be analysed from the same laboratory for commercialization. A booklet entitled "**Exploitation of underutilized crops for preparation of potential commercial products**" has been published in this year for popularization of the products at small scale for industrial application.

6.2.4 Trainings for the farmers/entrepreneurs/self help groups for income supplementation and nutritional security in the target areas

Three on campus training were organized for skill up gradation of tribal women at College of Home Science, CSKHPKV, Palampur under which demonstrations on utilization of underutilized crops in the form of value added products viz. pinni, cake, biscuits, pappads, Sevian, extruded products were given. Links have been established with the local bakers/ entrepreneurs for commercialization of underutilized crops based.

6.2.5 Commercialization of technologies/value added products, marketing linkages and entrepreneurship development

A special budget for Commercialization of technologies/value added products, marketing linkages and entrepreneurship development is required and due to scarcity of funds this could not be accomplished in the present phase.

6.3 Sensory profile of supplemented products based on underutilized crops evaluated on nine point hedonic scale

To gauge the effect of supplementation of buckwheat and amaranth flours on the sensory attributes of the standardized ready to eat extruded breakfast cereals and extruded snacks, the prepared products were got evaluated by a panel of ten judges for organoleptic acceptability on nine point hedonic scale. The value of various sensory attributes viz. colour, flavour, taste, texture, overall acceptability ranged between liked moderately to like very much.

6.4 Conclusion and Recommendations

Based on the studies conducted during the report period, in the Department of Food Science, Nutrition and Technology, CSK HPKV, Palampur the summary of the findings is as under:

- In present study six genotypes of sample of ricebean, one of amaranths and buckwheat (*ogla*) each were procured and evaluated for various chemical and nutritional constituents by using standard procedures. Attempts were made to standardize *sepu bari* from rice bean dal genotypes. Other traditional products standardized were *halwa*, ricebean *aloo bhujjia*, *pappad* and *boondi*. Some potential commercial products standardized earlier were selected and subjected to storage stability studies with special reference to different packaging materials.
- Acceptable quality extruded snacks can be prepared from blends containing different levels of buckwheat (up to 60%). Incremental addition of buckwheat flour resulted in brighter products having better nutritional profile and consumer's acceptability. The buckwheat based extruded products have industrial applications and can be commercialized as health foods.
- The value of various sensory attributes viz. colour, flavour, taste, texture, overall acceptability of extruded ready to eat breakfast cereals and extruded snacks ranged between liked moderately to like very much.
- For commercialization, the standardized extruded products have been sent to FICCI FRAC Laboratory, a NABL accredited laboratory at Dwarka, New Delhi for analysis and the results are awaited. In the next phase of the project, some more products for commercialization will also be analyzed from the same laboratory.

CENTRE REPORT

VII. CENTRE REPORT

7.1 Hills

7.1.1 CSK HPKV, Palampur

Hybridization programme of rice bean : Ten Fresh crosses were attempted among the local genotypes of H.P. namely RBHP-38, RBHP-43, RBHP-61, RBHP-104, RBHP-105, RBHP-101 with early maturing genotype PRR-2007-2 and PRR-2007-2 crossed with RBHP-38, RBHP-36, RBHP-43 during 2013 and F₁ seed was harvested.

F₂ plant evaluation in Rice bean: Nine back crosses in their F₂ generation were evaluated in the field along with the check during Kharif 2013 and BC₁ and F₂ seed was harvested (PRR-2007-2 xRBHP-101, PRR-2007-2xRBHP-101, PRR-2007-2 xRBHP-43, RBHP-102 x PRR-2007-2, PRR-2007-2 xRBHP-61, RBHP-61xPRR-2007-2, RBHP-43xPRR-2007-2, RBHP-38xPRR-2007-2, PRR-2007-2 xRBHP-36).

F₃ plant evaluation in Rice bean: F₃ generation of six crosses was evaluated in the field for yield and related traits (RBHP-36xPRR-2007-2, RBHP-43xPRR-2007-2, RBHP-101 x PRR-2007-2, RBHP-35xPRR-2007-2, RBHP-38xPRR-2007-2, RBHP-61xPRR-2007-2)

Inter-specific hybridization in Rice bean: Following inter-specific crosses among genotypes of mash, mung and ricebean were also attempted and F₁ seed was harvested.(Palampur-93x RBHP-104 , Palampur-93x PRR-2, Palampur-93 x PRR-2007-2, PRR-2007-2 x Palampur-93 , Pusa Baisakhi x RBHP-61, Him mash 1x PRR-2007-2)

Hybridization programme of amaranth Fresh crosses were attempted among PRA-3, Annapurna, PRA-2, VL-44, Durga and local landraces. F₁ and F₂ seed which was sown at Sangla for advancement got destroyed due to heavy rains and flooding in the university farm.

Hybridization programme of buckwheat: All the F₁ and F₂ generation seed was destroyed whereas fresh crosses were attempted involving local lines with Shimla B-1 and Sangla B-1 genotypes.

Local collections : Different local germplasm lines/landraces of underutilized crops were collected and evaluated under field conditions during the Kharif season.

Crop	No. of Lines	Place of collection
Ricebean	4	Distt. Mandi of H.P.
Faba bean	3	Disstt. Kangra of H.P.

Seed Multiplication : Seed of different varieties of underutilized crops was produced on the experimental farm of Deptt. of Organic Agriculture, CSKHPKV, Palampur during the reporting period.

S. No.	Crop	Varieties	Quantity (kg)
1	Amaranthus	Durga	1
2.	Ricebean	RBHP-43	10
		PRR-1	10
		PRR-2	15
		Other genotypes	35
3.	Adzukibean	Local Totru	1
	Adzukibean	HPU-51	2
4.	Fababean	HPFB-1	5
		Vikrant	10
		HPFB-2	10

7.1.2 UUHF, Ranichauri

Seed Multiplication: Seed of different varieties of underutilized crops was produced on the experimental farm at Ranichauri Campus and sub-Research Station Gaja during Kharif 2013 at Ranichauri Campus and Sub Research Station Gaja during *Kharif* 2013.

S. No.	Crop	Variety	Seed quantity (Kg)		
			Ranichauri Campus	Sub Research Station, Gaja	
1.	Grain Amaranth	PRA 1	6.00	---	
		PRA 2	5.50	---	
		PRA 3	5.50	150.00	
		DURGA	3.50	38.00	
		ANAPURNA	4.00	---	
		SUVARNA	2.50	---	
S. No.	Crop	Variety	Seed quantity (Kg)		
			Ranichauri Campus	Sub Research Station, Gaja	
2.	Buckwheat	PRB 1	5.00	15.00	
		VL 7	2.00	---	
3.	Ricebean	PRR 1	6.50	---	
		PRR 2	6.50	65.00	

Field Level Demonstrations: 250 farmers field level demonstrations in 8 village were conducted on rice bean (75), grain amaranth (106) and buckwheat (69) in different parts of Uttrakhand.

7.2 Plains

7.2.1 IGKV Ambikapur (C.G.)

Breeding programme in Winged bean : Crosses were made during the year of kharif 2013-2014.

Breeding programme in Spine gourd: Selfing is continued since kharif 2010.

Breeding programme in Faba bean: Crosses were attempted regularly since rabi 2010 and evaluation/selection procedure is continued. Fresh crosses were also attempted during rabi 2013-2014.

Collections : 3 local germplasm lines of Kankoda (Spine gourd) were collected from different places of Chhattisgarh State during kharif 2013 are evaluated and maintained at centre. Three local germplasm of winged bean were collected for higher seed yield, pod length, seed size, early maturity and its other attributing characters from different villages/blocks at Ambikapur (Surguja) district of C.G. during the year of kharif 2013. One local line were also collected during kharif 2013. Two germplasm lines of faba bean were collected from different villages of Ambikapur district. Two promising lines of Grain amaranth were selected and then collected from villages of Ambikapur district during the year of 2013.

Seed production : Pure seeds of spine gourd are producing every year of Indira Kankoda-1 from Ambikapur. Promsing lines of Winged bean, seeds were produced during kharif 2013. These seeds will be supply to the farmers for conducting FLD in next Kharif season.

Front Line Demonstrations: FLD are conducting every year on farmer's field at village-Kalyanpur, Ambikapur since 2010 for vegetable purpose and always sale by farmers on higher prices in the market in comparision to other vegetables.

7.2.2 UAS, GKVK, Bangalore

Seed Production

S. No.	Name of the variety	Quantity (kgs)
1	Grain Amaranth variety 'Suvarna'	200
2	Grain Amaranth variety 'KBGA -1'	40
3	Winged Bean variety 'KHWB-1	30
4	Rice Bean variety 'KBR-1'	40
5	Rice Bean variety 'RBL-50'	8
6	Rice Bean variety 'RBL-6'	5

Breeding material

- **Grain Amaranth** – 25 individual plant selections were made from the trial material which will be evaluated during summer 2014.
- Rice Bean Seven successful Interspecific Hybrids forward to F₂ Generation are :
RBL-1 x Selection-4, KBR-1 x Selection-4, KBR-1 x China Mung
- RBL-50 x BGS-9, RBL-35 x BGS9, RBL-35 x Yellow Mung & RBL-1 x BGS-9.

Extension work carried out

S. No.	Particulars	No.
1	Training /Awareness programmes organized	Organized:2
2	National/symposium/seminars/workshops participated /organized/paper presented:	2
3	TV programmes participated with date	5
4	Radio Programmes	2
5	Special lectures delivered	12
6	No. publications made	3
7	FLDs on Grain Amaranth variety 'Suvarna'	4

7.2.3 NDUAT, Faizabad

Hybridization programme of Fababean: Twenty one crosses (line x tester) were made during Rabi season 2011-12. F₁ crosses will be grown in Rabi 2011-12. **Line** – PRT 7, PRT 12 and Vikrant; **Tester** – IC331540, EC243696,

EC331587, EC117749, EC117755, EC117795, EC117727, EC243764, EC329003, EC329812, HB18, EC117748, EC243782, EC117744 and IC348948.

F2 generation: Vikrant x EC243860 and PRT-12x EC 324677 have been found better than the check variety Vikrant, P R T 7 and P R T 12.

Front Line Demonstrations on Fababean : Various field level demonstrations were conducted at 8 farmers field on Fababean in different villages of Faizabad.

Seed Multiplication 8 kg Seed of Vikrant variety of faba bean crop was produced during the Rabi 2012-13.

Collection: 20 accession of faba bean, 50 accession of grain amaranth and 15 Of kankoda were collected and maintained during 2012-13.

7.2.4 CCSHAU, Hisar

Breeding programme: 70 fresh crosses of faba bean were attempted and F2, F3, F4 and F5 generations were advanced to next generations. And 10 fresh crosses of rice bean were attempted and F2, F3, F4 and F5 generations were advanced to next generations:

1. **Collection:** Seven accession of faba bean were collected
2. **Seed production:** 350 kg of faba bean seed were produced

7.2.5 PAU, Ludhiana

Breeding program

Ricebean breeding material

S. No.	Generation	No. of crosses	No. of progenies evaluated	No. of single plants selected (Progeny bulked)
1	Fresh crosses	15	-	-
2	F ₁	6	-	-
3	F ₂	14	-	41
4	F ₃	14	105	123
5	F ₄	13	60	65
6	F ₅	7	80	59
7	F ₆	11	86	(30) Bulked
	Total	94	331	288

Seed production: Nucleus seed of Ricebean variety RBL 6 (25 kg) produced 150 single plants of RBL 6 selected to produce nucleus seed next year.

Farmers Training: Exhibition of seed samples and charts of ricebean variety RBL 6 for FCRI Mettupalayam.

7.2.6 FCRI, Mettupalayam

Seed production : 24 kg of seeds of Simarouba, 51 kg of Grain amaranth and 5 kg of Rice bean had been produced during the 2013

Demonstration: Training was given to 50 tribal farmers of the Niligiri district through the training program organized by the Department of Horticulture, Government of Tamil Nadu.

7.2.7 MPKV, Rahuri

Initiated mutation breeding programme in Kartoli and Winged bean: In winged bean obtain early (110days) synchronous determinant plant type.

Front Line Demonstrations : Fourteen FLDs were conducted during 2013.

7.2.8 BAU, Ranchi

Hybridization in Faba bean: Eight fresh hybridizations have been attempted with an objective to get some more variability with respect to days to maturity and various yield attributing characters using the parents – RFB6, NDF9, Vikrant, HB195, HB184, DFB109, DFB163, RFB3, HB70 and RFB7. The parents used for hybridization programme were selected on the basis of their early.

Cross combinations	No. of crosses made	No. of pods obtained	Number of seeds
RFB6 x NDF9	30	22	87
Vikrant x HB195	35	10	19
HB184 x DFB109	26	1	23
DFB163 x RFB3	10	3	4
Vikrant x RFB6	31	13	38
RFB7 x Vikrant	12	4	8
HB70 x RFB7	15	3	8
HB195 x Vikrant	10	3	6

Hybridization in Rice bean : Five fresh hybridizations have been attempted with an objective to get some more variability with respect to days to maturity and various yield attributing characters using the parents – RBL 1, RBL 6, RBL 35, RBL 50 and RBLM-1. The parents used for hybridization programme were selected on the basis of their earliness, yield attributes and non-tendrill behaviour.

Cross combinations	No. of crosses made	No. of pods obtained	Number of seeds
RBL 1 x RBL 6	20	11	60
RBL 1 x RBL 35	30	22	88
RBL 1 x RBL 50	36	26	103
RBL 1 x RBLM 1	19	9	30
RBL 6 x RBLM 1	22	8	32

Hybridization in Wingedbean: Two fresh hybridizations have been attempted with an objective to get some more variability with respect to days to maturity and various yield attributing characters using the parents – Ambika-11-3, IC 150118, AKWB-1 and RWB-2. The parents used for hybridization programme were selected on the basis of their earliness.

Cross combinations	No. of crosses made	No. of pods obtained	Number of seeds
Ambika-11-3 x IC 150118	10	6	54
AKWB-1 x RWB-2	9	5	45

DEMONSTRATION IN FARMERS' FIELD

RICEBEAN: 5 front line demonstrations among 11 (Sri Turia Bhagat, Sri Muna Mahto, Sri Selbester Kujur, Sri Parasnath Munda, Sri Prakash Singh, SriTila Oraon, Sri Narayan Mahto, Sri Ropna Oraon, Sri Niraj Oraon, Sri Mahesh Oraon, and Sri Sandip Bhagat) beneficiary farmers on ricebean have been conducted in four villages (Soparam, Banganwa, Murto and Lepser) of Chanho block in Ranchi. The varieties used for demonstration were RBL-1 and RBL-6. Recommended inputs were also given to the farmers along with seeds. Overall performance of these varieties in farmers' field was good compared to their local cultivars. The average yield ranged from 12-15 q/ha in ricebean.

FABABEAN: 5 front line demonstrations among 9 (Sri Dhurva Oraon, Sri Mahadev Oraon, Sri Samel Khalkho, Sri Rajesh Kujur, Sri Nelson Akka, Sri Luise Kujur, Sri Parna Kujur, Sri Prakash Singh and Sri Parasnath Munda) beneficiary farmers on fababean have been conducted in three (Kamati, parsatari and Lepser) villages of Chanho block in Ranchi. Vikrant variety was used for demonstration. The green pod yield ranged from 15-22 q/ha. They sold it in the market @ Rs. 40 per kg in early months of production.

MUTAGEN TREATMENT IN RICEBEAN (RBL-1): Sodium Azide (NaN_3) in 0.05% concentration used treatment on 17th July 2013 on 2300 seeds. 100 seeds were treated for 5 hours. 100 seeds were treated for 7 hours, 2100 seeds were treated for 10 hours. All the seeds were sown on 18th July 2013 in spacing of 30cm x 10 cm. Three plants were identified as determinate and early type; eight plants were identified determinate and late type and one plant were identified determinate and very late type.

TRIBAL SUB PROJECT ON UNDERUTILIZED CROPS (TSP): 3 one day awareness cum training programme on underutilized crops have been organized under TSP in different village of two districts viz. Ranchi and Dumka of Jharkhand during March 2013 (8th, 12th at Ranchi and 14th at Dumka). Response was very good. In some villages number of participation was larger than our expectation. About 40-50 farmers shown interest in sowing the improved varieties of Fababean and Ricebean by demanding the seed for coming season. Altogether 136 farmers (Kamati and Parsatari-49farmers, Murto, Masmano and Lepser-47 farmers and Mortanga, Kundwa and Baskitar-40 farmers) were benefitted from training.

SEED PRODUCTION OF UNDERUTILIZED CROPS:

Crops	Variety	Quantity produced (kg)	Remarks
Fababean	Vikrant	35 kg	Seeds were used for demonstration & multiplication
Ricebean	RBL-1, RBL-6, RBL-35, RBL-50	40 kg	Seeds were used for demonstration and multiplication

7.2.9 S.D.A.U., S.K. Nagar

Breeding materials/programme crop-wise

S. No.	Crop	Germplasm Maintenance/Evaluation	New cross attempted	F ₁ Testing	F ₂ to F ₅	IPS	Bulk
1	Amaranth	350	10	50	48	350	26
2	Karingada	55	10	-	21	30	12
3	Kankoda	15	-	-	-	-	-
4	Jatropha	95	-	-	-	-	-
5	Simarouba	45	-	-	-	25	-
	Total	560	20	50	69	405	38

- **Mutation breeding programme:** In G. Amaranth our released varieties GA-1 and GA-2 are treated with various physical & chemical mutagens and they are evaluated.

Grain Amaranth: From Banaskantha district of Gujarat 23 collection were made during Rabi-2012-13.

Seed production :

S. No.	Crop/Variety	Seed production	Seed sold
1.	Gujarat Amaranthus-1 (GA-1)	77 kg	74 kg
2.	Gujarat Amaranthus-2 (GA-2)		
3.	Gujarat Amaranthus-3 (GA-3)		
3.	Karingda (GK-1)	14 kg	11 kg
4.	Simarouba	160 kg	-

Farmers Training (Awareness /Training Programme under TSP)

Awareness generation programme on " Under Utilized Crops to promote UUCs in tribal areas conducted at Khedbrhma, during 16th March 2013, district Sabarkantha, to gave benefit to the tribal farmers of the Khedbrhma.

Front Line Demonstration: 13 farmers field level demonstrations in 8 village were conducted on grain amaranth (7) and Kalingada (6) in different parts of Gujarat.

SUMMARY

VIII. SUMMARY

A total of 156 experiments were allotted during 2013 which included germplasm evaluation (53), breeding (54), agronomic (37) and quality aspects (12). These were allotted at twenty locations in different agro-climatic zones of the country. Out of these, 130 trials were carried out. A summary of research achievements is given below:

8.1 Plant breeding

Fifty four varietal trials, 16 in hills and 38 in plains, were conducted on eight underutilized crops in order to identify improved varieties of various underutilized crops. Details of trials, entries, number of locations and highest yielding entries are given below in Table 158.

Table 147. Best genotypes in different trials conducted at multilocation during 2013

Crop		Entries	Locations	Top yielder	Yield (q/ha)	Best check yield (q/ha)
HILLS						
Amaranth	IVT	9	3	IC038129	23.58	Durga (20.19)
	AVT-I	2	3	VL-102	19.44	
Buckwheat	IVT	10	3	EC323730	5.22	Shimla-B-1 7.48
	AVT-I	1	3	Sangla-B-214	2.86	
Fababean	IVT	6	2	HPFB-2	30.56	Local 28.48
	AVT-I	5	2	NDF-10	21.81	
	AVT-II	2	2	HPFB-1	31.95	
Rice bean	IVT	13	6	RBHP-105	14.30	VRB-3 (13.42)
	AVT-I	3	6	LRB-479	13.08	
PLAINS						
Amaranth (Rabi 2012-13 & Kharif 2013)	IVT	15	10	Ambika GA-12-1	12.50	Suvarna (11.65)
	AVT-I	11	10	RMA-42	40.11	Suvarna (12.80)
	AVT-II	5	10	BGA-14	12.14	Suvarna (12.80)
Amaranth (Rabi 2012-13)	IVT	15	8	SKNA-403	13.65	GA-2 (13.32)
Amaranth (Kharif 2013)	AVT-I	11	2	SKNA-808	11.14	Suvarna (13.20)
	AVT-II	5	2	MGA-507	11.53	Suvarna (13.20)
Rice bean	IVT	9	5	LRB-545	11.29	RBL-1

Fababean	IVT	9	6	HB-193	19.73	Vikrant (19.01)
	AVT-I	9	6	HB-82	22.45	Vikrant (20.57)
	AVT-II	5	6	HB-48	22.09	
Winged bean	IVT	2	3	Ambika 13-5	17.43	AKWB-1 (11.93)
	AVT-II	2	3	Ambika 11-3	14.70	
Kankoda	IVT	11	2	Ambika-12-3 (Wadarafnagar)	92.83	Indira kankoda (36.23)
Kallingda	IVT	2	2	CAZJK - 13-1	4.41	GK-1 (3.34)
	AVT-I	5	2	SKNK-1103	3.68	
	AVT-II	5	2	SKNK - 903	3.82	
Tumba	-	-	-	-	-	-

Based on the three years data, the best genotype in each crop with respect to yield has been identified and indicated in Table 159.

Table 148. List of promising genotypes based on three years data

Crop	Variety	Seed yield (q/ha)	Maturity (days)	Increase/decrease in yield over check (%) - Best check
PLAIN				
Grain amaranth (Rabi)	BGA-14	13.35	126.52	7.63
Faba bean	HB-040	22.40	145.37	3.74
Wing bean	Ambika WB-11-3	14.56	167.64	13.42

8.2 Germplasm evaluation

About 827 accessions in different crops, some of them tested at more than one location, were evaluated at twenty locations during 2013. Crop-wise number of accessions, locations and promising accessions have been given in Table 160.

Table 149. Performance of germplasm accessions in different crops

Location	Top 5 Accessions (Yield)	Top 5 Accessions (Days to maturity)
HILLS		
Amaranth (50 Accessions)		
Almora	(Durga (> 30.15 g/plant))	IC094661, IC042356, IC042357, IC043715, IC095247, IC095316, (<83.00 days) (Durga) (83.00 days)
Ranichauri	IC095308, (PRA-2) (> 116.00 g/plant)	-

Shimla	IC423466, IC093946, IC042353, IC095247, IC095293 (> 84.02 g/plant) (Durga) (80.64 g/plant)	IC095247 (< 134.00 days), (Durga) (135.50 days)
Based on average over locations	IC423466, IC095247 (> 75.74 g/plant) (PRA-2) (69.03 g/plant)	(Durga) (< 111.77 days)
Buckwheat (50 Accessions)		
Almora	RSR/SKS-41, IC412733, IC013510, IC013533, IC412762 (> 4.80 g/plant) (VL-7 3.80 g/plant)	EC286521, IC412762 (< 54.00 days) (VL-7 54.00 days)
Ranichauri	PRB-1 (6.08 g/plant)	VL-7 (62.50 days)
Shimla	Shimla B1 (> 89.00 g/plant)	IC310043, IC026599, IC013533, EC276627, IC013510 (< 4.25 days), VL-7 (2.75 days)
Based on average over locations	RSR/SKS-41, IC013533, IC013510, EC276627, IC412733 (> 3.83 g/plant) (VL-7) (3.54 g/plant)	(VL-7 (70.17 days)
Chenopodium (25 Accessions)		
Ranichauri	(PRC-9801) (> 3.72 g/plant)	IC415493, NIC-50229, IC109249, IC415477, NIC-22500 (< 129.40 days) (NIC-22503) (130.50 days)
Shimla	NIC-22500, NIC-22518, NIC-22529, IC108819, NIC-22525 (> 41.67 g/plant), (PRC-9801) (26.55 g/plant)	IC415477 (< 113.00 days) (NIC-22503) (130.00 days)
Based on average over locations	NIC-22500, NIC-22518, NIC-22529, IC108819, NIC-22525 (> 22.00 g/plant) (PRC-9801) (15.14 g/plant)	IC415477 (< 120.60 days), (NIC-22503) (130.25 days)
Rice bean (25 Accessions)		
Almora	IC524074, IC394201, IC419518 IC524070, IC411730 (> 12.00 g/plant) (PRR-2) (12.00 g/plant)	(PRR-2) (103.00 days)
Palampur	IC419806, IC524082 (> 30.00 g/plant) (PL) (28.09 g/plant)	(PL) (125.92 days)
Ranichauri	IC524074, IC538870, IC524085 IC524549 (> 37.70 g/plant) (PRR2) (37.57 g/plant)	IC411730, IC419806, IC419518, IC524076, IC538878 (< 166.00 days), (PRR2) (170.33 days)
Shillong	IC419518, IC524070, IC524549, IC524522, IC394537 (> 42.56), (PRR-2) (38.64 g/plant)	IC419489, IC394537, IC524549, IC524076, IC524074 (< 124.00) (PRR-1) (< 133.00 days)
Shimla	IC108864, IC108860 (> 97.15 g/plant) (PRR-1) (> 86.70 g/plant)	IC419489, IC108867, IC137171, IC118114-3-1, IC137206 (< 143.00 days) (PRR-2) (161.50 days)

Based on average over locations	IC524074, (> 36.53 g/plant) (PRR-2) (35.71 g/plant) IC421926, IC524080, IC243512, IC538983, IC369282, (> 6.68 q/ha), (PRR-2) (6.35 q/ha)	IC419489, (> 127.40 days) (RBL-6) (133.28 days)
Adzuki bean (25 Accessions)		
Palampur	EC340254, EC036070, IC341941, IC341944, IC108854 (> 0.11 g/plant) (HPU-51) (0.10 g/plant)	(PL) (86.16 days)
Ranichauri	(HPU-51) (4.31 g/plant)	(Totru Local) (97.67 days)
Shimla	EC340254, EC000248, IC341941, EC087071 (> 37.98 g/plant) (HPU-51) (35.91 g/plant)	EC080850, EC034264, EC087071, EC087815, EC340254 (< 99.00 days) (HPU-51) (111.00 days)
Based on average over locations	EC340254, EC000248, IC341941, EC087071 (> 13.57 g/plant) (HPU-51) (13.44 g/plant)	EC008707, EC080850, EC087815, EC000249, EC087071 (< 99.45 days) (Totru Local) (99.67 days)
Fababean (100 Accessions)		
Palampur	(PL) (13.71 g/plant) (EC117705 (> 8.61 q/ha) (PL) (4.87 q/ha)	(PL) (155.76 days)
Ranichauri	HB-19, HB-20, HB-17, EC024312, EC039085, (> 18.60 g/plant) (Vikrant) (15.56 g/plant)	HB-18, HB-16, HB-76, HB-50, EC329681, (< 165.00 days) (Vikrant) (170.40 days)
Based on average over locations	HB-19, EC024312, HB-20, EC267640, IC331561 (> 14.80 g/plant) (Vikrant) (11.68 g/plant)	HB-16, HB-18, HB-76, EC329681, HB-32 (< 162.50 days) (Vikrant) (166.00 days)
Job's tear (25 Accessions)		
Ranichauri	-	-
Shillong	(PL) (> 45.25 g/plant) (Pollin) (38.11 g/plant)	PL, IC089389, IC374506, IC360791, (< 141.33 days) (Pollin) (142.00 days)
Based on average over locations	(Pollin) (19.71 g/plant)	IC089389, IC360791, IC089393, IC334314, IC416824, (< 149.67 days) (Pollin) (168.34 days)
Perilla (25 Accessions)		
Ranichauri	(BDS-1650) (4.32 g/plant)	IC416861, IC526701, IC521292, IC003942, IC374609 (< 167.50 days) (BDS-1650) (175.50 days)
Shillong	(PL) (22.81 g/plant) (PL) (11.06 q/ha)	(PL) (164.84 days)
Based on average over locations	(Shillong) (16.86 g/plant)	IC416861, IC526701, IC521292, IC374609 (< 169.58 days) (Jaintia) (169.67 days)
PLAINS		

Amaranth (Rabi)		
Bhubaneswar (50 Accession)	SKGPA-98, SKGPA-86, SKGPA-109, SKGPA-68, SKGPA-99 (> 9.99 g/plant) (PL) (9.32 g/plant) IC120670, SKGPA-91, SKGPA-70, SKGPA-83, SKGPA-68 (> 550.00 q/ha) (PL) (466.47 q/ha)	IC095244, IC035635, SKGPA-81, SKGPA-82, SKGPA-83 (80.00 days) (PL) (85.62 days)
Delhi (100 Accession)	SKGPA-91 (> 220.00 g/plant) (GA-2) (194.97 g/plant) SKGPA-91 (> 440.00 g/plot) (GA-1) (422.67 g/plot)	SKGPA-63, SKGPA-88, SKGPA-61, SKGPA-89, SKGPA-97 (< 139.00 days) (GA-1) (149.17 days)
Faizabad (56 Accession)	SKGPA-92 (> 20.00 g/plant) (PL) (17.06 g/plant)	(PL) (100.49 days)
Mandor (100 Accession)	IC095430, SKGPA-78, IC095389, IC035404 (> 26.30) (PL) (26.29 g/plant)	IC081698-B, IC032195, IC095498, IC095556, SKGPA-63 (< 119.00 days) (PL) (129.44 days)
Rahuri (100 Accession)	IC035651, IC035661, IC095556, IC095389, IC021937 (> 22.00 g/plant) (PL) (15.86 g/plant)	SKGPA-96, SKGPA-69, SKGPA-101, IC095383, SKGPA-67 (< 111.00 days) (PL) (125.67 days)
Ranchi (100 Accession)	IC094661, SKGPA-106, IC035713, IC035735, IC120689 (> 30.40 g/plant) (GA-2) (23.30 g/plant)	SKGPA-79, SKGPA-101, SKGPA-69, IC035642, IC035665 (< 128.00 days) (Suvarna) (157.60 days)
S.K. Nagar (100 Accession)	SKGPA061, IC021937, SKGPA087, SKGPA095, SKGPA082 (> 23.00 g/plant) (PL) (18.78 g/plant)	(CD) (0.05) (3.58 days)
Akola (100 Accession)	IC035711, SKGPA 110, SKGPA, IC095383, SKGPA 089 (> 23.64 g/pant) (GA -2) (8.45 g/plant)	IC021937, IC035635, SKGPA 066, SKGPA 067, SKGPA 064 (< 90.00 days) (Suvarna) (106.33 days)
Based on average over locations	(GA-1) (41.69 g/plant)	IC021937, IC095244, IC035635, IC035642, IC094654 (<108 days) (GA-1) (121.54 days)
Amaranth (Kharif) (100 Accession)		
Bangalore	(PL) (13.51 g/plant)	EC014075, EC097882, EC016136, IC19781-2, EC037226 (< 73.00 days) KBR-1 (76.20 days)
Mettupalayam	SKGPA074, SKGPA071, SKGPA065, SKGPA073, IC021803A (> 81.00 g/plant) (Suvarna) (53.00 g/plant)	SKGPA103, SKGPA102, SKGPA104, SKGPA079, SKGPA101 (< 70.00 days) (Annapurna) (75.00 days)
Based on average over locations	(BGA-2) (26.28 g/plant)	(Annapurna) (75.00 days)

Rice bean		
Bangalore (52 Accessions)	EC018556, EC014075 (>10.00 g/plant) (RBL-6) (9.51)	EC014075, EC097882, EC016136, IC19781-2, EC037226 (< 73.00) (KBR-1) (76.20)
Mettupalayam (50 Accessions)	(RBL-6) (7.60 g/plant)	IC016751, EC018184, IC018452, IC016767, IC521061 (< 72.00 days) (RBL -1) (75.00)
Ludhiana (50 Accessions)	EC018171, IC018563, IC520892, IC521049 (6.30 g/plant) (RBL -1) (5.78 g/plant)	IC008565, IC018452, EC018260, EC000262, EC018222 (< 104.00 days) (RBL-35) (105.00)
Rahuri (50 Accessions)	IC002909, EC018556, EC097882, EC114076, EC037226 (> 37.17 g/plant) (RBL-50) (32.34 g/plant)	IC002909, EC018260, EC018556, EC114076, EC008565-3 95.60 days) (RBL-35) (95.60)
Based on average over locations	EC018556, EC097882, IC002909, EC037226, EC114076 (>17.34 g/plant) (RBL-50) (16.40 g/plant)	(RBL-50) (85.47 days)
Fababean (50 Accessions)		
Delhi	HB-76, EC591675, HB-58, HB-19 (> 118.59) (Vikrant) (81.19)	HB-21, HB-57, HB-30, HB-62 (<140.00) (Vikrant) (143.80)
Faizabad	HB-78, EC267640, IC263634, IC348945, EC243756 (> 32.50 g/plant), (Vikrant) (27.52 g/plant)	HB-62, HB-21, HB-32, HB-50, HB-58 (< 141.00 days) (Vikrant) (152.44 days)
Hisar	HB-78, EC267640, IC263634, IC348945, EC243756 (> 32.50) (Vikrant) (27.52)	HB-26, EC329662, HB-19, HB-36, EC17726 (< 144.00) (Vikrant) (157.00 days)
Based on average over locations	HB-30, HB-69, EC243624, HB-76, HB-18 (>29.45 g/plant) (Vikrant) (24.29 g/plant)	HB-32, HB-50, HB-26, HB-30, HB-62 (<144.67 cm) (Vikrant) (151.08 cm)
Winged bean (100 Accessions)		
Ranchi	IC015018 (> 16.80 q/ha) (AKWB-1) (14.60 q/ha)	EC178302, EC178332, IC026940-A2, EC038821-B, EC038956-1 (< 147.00 days)
Kalingada (20 Accessions)		
Jaisalmer	SKGPK-22, SKGPK-21, SKGPK-27, SKGPK-34, SKGPK-31 (>8.00 q/ha) (GK-1) (6.80 q/ha)	SKGPK-26, SKGPK-33, SKGPK-10-2, SKGPK-10-3, SKGPK-25 (<37.00 days) (GK-1) (40.00 days)
S.K. Nagar	SKGPK-27, SKGPK-26, SKGPK-24 (2.53 q/ha) (GK-1) (2.40 q/ha)	SKGPK-25, SKGPK-27, SKGPK-21, SKGPK-23, SKGPK-24 (< 81.00) GK-1 (83.00 days)
Based on average over locations	SKGPK-22, SKGPK-27, SKGPK-21, SKGPK-34, SKGPK-10-2 (>5.00 q/ha) (GK-1) (4.60 q/ha)	SKGPK-26, SKGPK-23, SKGPK-33, SKGPK-25, SKGPK-31 (<41.00 days) (GK-1) (43.00 days)
Kankoda		
Ambikapur (28 Accessions)	Pratapur(Mani), PK-49, PK-9, RMF-17, Krishnapur (> 1.09) (Indira Kankoda) (1.03 kg/plant)	PK-28, Jagdalpur (Besraguda), PK-46, PK-9 (> 32.00 days) Indira Kankoda (38.00 days)

Rahuri (30 Accessions)	RKG-09-29, RKG-09-49, RKG-09-33, RKG-09-10 (>0.27 kg/plant)	RKG-09-8, RKG-09-43, RKG-09-50, RKG-09-21 (<74.00 days)
Tumba (28 Accessions)		
Mandor	IC281143, IC281157, IC281126, IC281169, IC373506 (> 100.00 g/plant)	-
Simarouba		
Mandor (5 ccessions)	Plant No. 1 to 5 (>1.00 kg)	-
Rahuri – Female Paradise tree (22 ccession)	PS-2003-45, PS-2003-20, PS-2003- 49, PS-2003-4, PS-2003-7 (> 7.50 kg/ tree)	
S.K. Nagar (19 accession)	L12P13, L10P7, L11P18, L13P5, L12P1 (>2.30 kg/plant)	

8.3 Quality

The seeds of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the ten underutilized crops from three locations were planned for quality analysis. The crop-wise details of quality traits are given below:

Crops	Superior genotypes
HILLS	
Grain amaranth (Seed supply by Shimla centre) Kharif (2013)	
Germplasm	Protein (IC094661:15.3%, PRA-3: 13.6%)
	Oil (IC95308:9.2%, Annapurna: 8.7%)
	Phenols (95301: 0.048%, PRA-3: 0.058%)
	Ca (IC94661:365 mg/100g, PRA-3:327 mg/100g)
	Fe (IC82625:24.3 mg/100g, PRA-3: 11.8 mg/100g)
	Zn (IC107127:7.4 mg/100g, PRA-3: 6.0 mg/100g)
Rice bean (Seed supply by Shimla) Kharif (2013)	
Germplasm	Protein (IC137189: 21.8%, RBL-1: 19.9%)
	Tannin (419806: 543 mg/100g, PRR-2: 588 mg/100g)
	Ca (IC524549: 374 mg/1000g, RBL-1: 355 mg/100 g.)
	Fe (IC248733: 8.6 MG/100G, PRR-1 8.8 mg/100g)
	Zn (IC41806: 5.2 mg/100 g, PRR-2 4.5 mg/100g)
Adzuki bean (Seed supply by Shimla centre) (Kharif 2011)	
Germplasm	Crude Protein (IC008707: 23.6%, HPU-51: 23.40%)
	Phenol (IC015257: 140 mg/100g), Toturu Local: 200 mg/100g)

Buckwheat (Seed supply by Shimla centre) (Kharif 2011)	
Germplasm	Crude Protein (PRB-1: 14.0%)
	Iron (IC036914: 7.6 mg/100g, Himpriya: 5.2 mg/100g)
	Phenols(IC278739: 120 mg/100ml, VL-7: 190 mg/100ml)
	Ca (EC329194: 98.5 mg/100g, VL-7: 82.9 mg/100g)
	Na (VL-7: 4.8 mg/100g)
	Potassium (IC286396: 3.4 mg/100g, Shimla-B1: 3.2 mg/100g)
Chenopod (Seed supply by Shimla centre) (Kharif 2011)	
Germplasm	Protein (NIC-58233: 17.8%)
	Na (IC-275421: 3.2 mg/100g)
	Ca (IC109235: 506 mg/100g)
	Potassium (IC109235: 7.7 mg/100g)
	Iron (IC-109249: 13.0 mg/100g)
PLAIN	
Grain amaranth (Seed supply by S.K. Nagar centre) Rabi 2012-13	
AVT-I, AVT-II and Germplasm	Protein (IC-35635:14.4%, Suvarna: 12.3%)
	Oil (SKGPA-80: 8.7%, GA 2: 6.9%)
	Ca (SKGPA-74: 358 mg/100g, Suvarna: 327 mg/100g)
	Fe (IC-035711: 9.6 mg/100g, Suvarna: 8.2 mg/100g)
	Zn (IC-035635: 4.8 mg/100g, Suvarna: 3.8 mg/100g)
Rice bean (Seed supply by Hisar centre) (Kharif 2013)	
IVT	Protein (BRBM-119: 19.3%, RBL-35: 19.0%)
	Tannin (LRB-545: 542 mg/100g, RBL-35: 564 mg/100g)
	Zn (BRBM-119: 4.9 mg/100g, RBL-1: 4.2 mg/100g)
	Ca (RBL-35: 338 mg/100 g)
	Fe (LRB-554: 7.2 mg/100g, RBL-50: 6.4 mg/100g)
Fababean (Seed supply by Hisar centre) (Rabi-20112-13)	
IVT, AVT-I, AVT-II & Germplasm	Protein (HB-184: 27.7%, Vikrant: 24.3%)
	Vicine-convicine (HB-22: 0.71%, Vikrant: 0.82%)
	Phenol (HB-20: 0.22%, Vikrant: 0.25%)
Kalingada (Seed supply by CAZRI, RS, Jaisalmer centre) (Kharif 2013)	
IVT, AVT & Germplasm	Crude protein (CAZJK-13-1: 50.9%, GK-1: 43.6%)
	Ca (MGPK-45-3: 106 g/kg, GK-1: 1.12 g/kg)
	Iron (SKNK-1004: 0.11 g/kg, GK-1: 0.04 g/kg)
	Zn (SKGK-31: 0.08 g/kg, GK-1: 0.04 g/kg)
	Cu (SKNK-1102: 0.02 g/kg, GK-1: 0.01 g/kg)
	Mg (SKNK-1002: 5.08 g/kg, GK-1: 4.63 g/kg)
	K (SKGPK-22: 1.08 g/kg, GK-1: 0.98 g/kg)
	Oil (MGPK-10-1: 40.3%, GK-1: 34.6%)

8.4 VALUE ADDITION

Based on the studies conducted during 2013-14, in the Department of Food Science, Nutrition and Technology, CSK HPKV, Palampur the summary of the findings is as under:

- In present study six genotypes of sample of ricebean, one of amaranths and buckwheat (*ogla*) each were procured and evaluated for various chemical and nutritional constituents by using standard procedures. Attempts were made to standardize *sepu bari* from rice bean dal genotypes. Other traditional products standardized were *halwa*, ricebean *aloo bhujjia*, *pappad* and *boondi*. Some potential commercial products standardized earlier were selected and subjected to storage stability studies with special reference to different packaging materials.
- Acceptable quality extruded snacks can be prepared from blends containing different levels of buckwheat (up to 60%). Incremental addition of buckwheat flour resulted in brighter products having better nutritional profile and consumer's acceptability. The buckwheat based extruded products have industrial applications and can be commercialized as health foods.
- The value of various sensory attributes viz. colour, flavour, taste, texture, overall acceptability of extruded ready to eat breakfast cereals and extruded snacks ranged between liked moderately to like very much.
- For commercialization, the standardized extruded products have been sent to FICCI FRAC Laboratory, a NABL accredited laboratory at Dwarka, New Delhi for analysis and the results are awaited. In the next phase of the project, some more products for commercialization will also be analyzed from the same laboratory.

8.5 AGRONOMY

A total of twelve agronomic experiments were formulated to be conducted at thirteen locations in 37 trials. These comprised of three studies on amaranth, one each on *Jatropha*, Faba bean and kalingada, five on rice bean and two on underutilized crops in general during Rabi 2012-13 and Kharif 2013. Out of 37 trials allotted, results of 30 were received. Salient findings are as follows:

S. No.	Experiment	Findings
1.	Chemical weed control in grain amaranth	Pre emergent application of Oxyfluorfen @50 g/ha+ One hand weeding at 5 WAS gave the best results amongst the chemical weed control treatments.
2.	Organic farming in grain amaranth	Based on the average performance over locations, application of 50 % RDF + vermin-compost @ 5 t/ha gave maximum grain yield
3.	Performance of amaranth varieties at different locations	Based on the overall mean performance in respect of grain yield over eight locations, the variety GA-1 showed highest seed yield.
4.	Performance of different rice bean genotypes	The maximum seed yield was observed in genotype RBL-6 (13.25 q/ha) followed by RBL-50 (11.61 q/ha).
5.	Intercropping study of rice bean during Kharif 2013	Intercropping Maize sole crop resulted in the highest seed yield (32.28 q/ha) at Mettupalayam. On the other hand, maize + rice bean (2:2) gave highest seed yield (10.67 q/ha) at Cooch Behar.
6.	Fertilizer management in rice bean based intercrop	Highest yields of rice bean as well as the intercrops were obtained by applying 100% sole crop recommendations of the component crops.
7.	Organic manurial studies in rice bean	Based on average performance of two locations, application of vermi-compost @ 5.0 t/ha gave maximum seed yield (10.22 q/ha).
8.	Chemical weed control in rice bean	Application of Pendimethalin (30%) 1 kg/ha pre-emergent + one hand weeding at 30 DAS recorded maximum seed yield among the chemical weed control treatments, both at Bangalore and Cooch Behar.
9.	Effect of planting geometry, fertilizer dose and plant/hill of kalingada under rainfed conditions	Maximum seed yield was obtained by growing the crop in 3x1 m spacing (S1), applying fertilizer dose of N ₄₀ P ₈₀ and by maintaining two plants/hill.
10.	Intercropping studies on underutilized intercrops with different tree crops	Grain Amaranth intercropping gave the highest grain yield in both Pungam and Simarouba tree plantations.
11.	Intercropping studies on underutilized crops in Jatropha	The gross returns of Rs. 67175 and Jatropha equivalent yield (q/ha) of 34.91 were recorded maximum in the Jatropha + Gram and it was followed by Jatropha + Wheat (Gross returns; Rs.59520 and JEY; 30.93 q/ha).
12.	Effect of fertilizer doses on fababean genotypes	The seed yield significantly increased up to highest level of N ₄₀ P ₄₀ K ₂₀ in all the genotypes

ANNEXURES

Mean seed yield (q/ha) of Faba Bean varieties tested for the last three years :Hill

S. No.	Genotypes	2008-9		2010-11		2012-13		Weighted			Percent increase / decrease over check	
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant (c)	Local (c)
1	HB-73	12.45	1/2	12.60	0/2	25.84	0/2	16.96	1/4		35.59	-18.53
2	HPFB-1	12.16	1/2	12.64	0/2	31.95	0/2	18.92	1/4	II	51.21	-9.15
3	Vikrant (c)	10.23		13.61		13.70		12.51		III		-39.91
4	Local (c)	15.00		18.98		28.48		20.82		I	66.40	-

Mean maturity days of Faba Bean varieties tested for the last three years :Hill

S. No.	Genotypes	2008-9		2010-11		2012-13		Weighted			Percent increase / decrease over check	
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant (c)	Local (c)
1	HB-73	135.50	0/2	145.58	0/2	161.50	0/2	147.53	0/4	I	-0.30	-13.60
2	HPFB-1	136.38	0/2	150.08	0/2	157.50	0/2	147.99	0/4	III	0.01	-13.33
3	Vikrant (c)	139.00		139.42		165.50		147.97		III	-	-13.34
4	Local (c)	181.75		169.50		161.00		170.75			15.40	-

Mean seed yield (q/ha) of grain amaranth (Rabi & Kharif) varieties tested for the last three years

S. No.	Genotypes	Rabi										Kharif										Over All			
		2008-09		2010-11		2012-13		Weighted			Percent increase / decrease over check	2009		2011		2013		Weighted			Percent increase / decrease over check	Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank		GA-2 (C)	Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency		Rank	Suvarna (C)	Mean	
1	BGA-03	10.93	2/9	14.64	2/7	13.36	0/8	12.82	4/24	II	3.40	11.20	0/2	10.64	0/2	10.24	0/2	10.70	0/6		-24.79	12.40	4/30		4.61
2	BGA-09	11.45	2/9	14.19	2/7	13.44	1/8	12.91	5/24		4.15	13.66	0/2	13.70	0/2	9.41	0/2	12.26	0/6	II	-13.79	12.78	5/30	II	7.88
3	BGA-14	11.28	2/7	15.09	1/7	14.15	2/8	13.35	5/22	I	7.63	10.99	0/2	13.74	0/2	10.13	0/2	11.62	0/6		-18.28	13.00	5/28	I	9.71
4	BGA-20	10.60	3/9	15.95	2/7	12.90	1/8	12.93	6/24		4.28	11.09	0/2	15.18	1/2	9.28	0/2	11.85	1/6		-16.67	12.71	7/30	III	7.29
5	MGA-507	8.70	0/9	14.35	0/8	8.06	0/8	10.30	0/25		-16.93	13.28	0/2	15.20	0/2	11.53	0/2	13.34	0/6	II	-6.20	10.89	0/31		-8.11
6	BGA-2 (C)	8.07	9	12.99	8	11.99	8	10.90	25		-12.10	12.76	2	13.24	2	11.72	2	12.57	6		-11.58	11.22	31		-5.29
8	GA-2 (C)	10.02	9	13.34	8	14.14	8	12.40	25	III	-0.01	8.96	2	10.87	2	8.82	2	9.55	6		-32.84	11.85	31		-0.02
9	Suvarna (C)	6.75	9	13.47	8	12.40	8	10.71	25		-13.64	14.52	2	14.94	2	13.20	2	14.22	6	I		11.39	31		-3.90

Mean maturity days of grain amaranth (Rabi & Kharif) varieties tested for the last three years

S. No.	Genotypes	Rabi										Kharif										Over all			
		2008-09		2010-11		2012-13		Weig hted			Parcent increase / decrease over check	2009		2011		2013		Weighted		Parcent increase / decrease over check	Weighted			Parcent increase / decrease over check	
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	GA-2 (C)	Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Suvarna	Mean	Frequency	Rank	BGA-2
1	BGA-03	130.3	2/9	128.7	1/7	127.1	2/8	128.7	3/24		-2.5	95.0	0/2	81.2	0/2	85.7	1/2	87.3	1/6	III	0.6	120.5	4/30		-3.1
2	BGA-09	128.9	2/9	127.9	2/7	124.1	3/8	127.0	7/24	II	-3.9	94.8	1/2	81.8	0/2	87.7	0/2	88.1	1/6		1.5	119.2	8/30	II	-4.1
3	BGA-14	127.0	4/9	127.3	3/7	125.3	2/8	126.5	9/24	I	-4.2	92.6	1/2	80.8	0/2	87.5	0/2	87.0	1/6	II	0.3	118.6	10/30	I	-4.6
4	BGA-20	129.0	3/9	126.7	2/7	125.6	3/8	127.2	8/24	II	-3.7	96.4	0/2	81.2	0/2	87.7	0/2	88.4	0/6		1.9	119.4	8/30	III	-3.9
5	MGA-507	131.5	2/9	131.1	0/8	131.1	0/8	131.3	2/25		-0.6	91.9	0/2	85.2	0/2	89.2	0/2	88.7	0/6		2.3	123.0	2/31		-1.0
6	BGA-2 (C)	134.3	9.0	133.0	8.0	131.5	8.0	133.0	25.0		0.7	95.0	2.0	83.0	2.0	86.4	2.0	88.1	6.0		1.6	124.3	31.0		-
7	GA-2 (C)	134.6	9.0	133.3	8.0	128.2	8.0	132.1	25.0		0.0	99.9	2.0	89.0	2.0	90.0	2.0	93.0	6.0		7.2	124.5	31.0		0.2
8	Suvarna (C)	135.7	9.0	135.5	8.0	132.8	8.0	134.7	25.0		2.0	89.8	2.0	82.5	2.0	88.0	2.0	86.8	6.0	I	-	125.4	31.0		0.9

Mean seed yield (q/ha) of fababean varieties tested for the last three years : Plain

S. No.	Genotypes	2008-09		2010-11		2012-13		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant
1	HB-39	19.72	2/6	25.20	0/6	19.07	1/6	21.33	3/18		-1.20
2	HB-40	21.47	2/6	26.38	1/6	19.34	1/6	22.40	4/18	I	3.74
3	HB-48	19.32	2/6	25.12	0/6	22.09	1/6	22.17	3/18	II	2.71
4	HB-65	20.12	2/6	26.15	0/6	17.93	1/6	21.40	3/18		-0.89
5	NDF-8	19.27	3/6	24.82	0/6	17.91	0/6	20.67	3/18		-4.27
6	Vikrant (C)	18.47	6	25.74	6	20.57	6	21.59		III	0.01

S

Mean maturity days of fababean varieties tested for the last three years : Plain

S. No.	Genotypes	2008-09		2010-11		2012-13		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant
1	HB-39	144.81	0/6	147.36	2/6	144.56	2/6	145.57	4/18	II	0.00
2	HB-40	143.94	1/6	146.92	1/6	145.24	2/6	145.37	4/18		-0.15
3	HB-48	142.56	1/6	147.51	1/6	143.49	2/6	144.52	4/18	I	-0.73
4	HB-65	142.89	1/6	146.50	2/6	145.88	1/6	145.09	4/18	II	-0.34
5	NDF-8	144.00	1/6	147.61	0/6	145.46	2/6	145.69	3/18		0.08
6	Vikrant (C)	144.17	6	147.88	6	144.71	6	145.58			-

Mean seed yield (q/ha) of Winged bean varieties tested for the last three years : Plain

S. No.	Genotypes	2011		2012		2013		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	AKWB-1
1	Ambika WB-11-3	16.84	1/3	12.15	1/3	14.70	0/3	14.56	2/9	I	13.42
2	AKWB-1 (C)	14.54	3	12.04	3	11.93	3	12.84		II	-

Mean maturity days of Winged bean varieties tested for the last three years : Plain

S. No.	Genotypes	2011		2012		2013		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	AKWB-1
1	Ambika WB-11-3	167.08	0/4	167.77	0/4	168.06	2/3	167.64	2/11	II	4.00
2	AKWB-1 (C)	162.17	4	160.33	4	161.19	3	161.23	11	I	-

Number of trials/activities allotted and conducted at various centers AICRP on Underutilized Crops :2013

S. No	Name of Centre	Allotted					Conducted					
		Breeding	Germplasm	Agronomy	Quality	Total	Breeding	Germplasm	Agronomy	Quality	Total	Percentage
(A) Hill												
1	Almora	3	3	1		7	3	3	0		6	85.71
2	Bhowali	1				1	1		0		1	100.00
3	Palampur	2	3	3	3	11	2	3	3	3	11	100.00
4	Ranichauri	4	8	5		17	4	8	4		16	94.12
5	Sangla	2	3			5	0	0			0	0.00
6	Shillong	1	3			4	1	3	0		4	100.00
7	Shimla	3	5	1		9	3	5	0		8	88.89
8	Cooch Behar	0	0	4		4	0	0	4		4	100.00
	Total (A)	16	25	14	3	58	14	22	11	3	50	86.21
(B) Plain												
1	Ambikapur	5	1			6	5	1	0		6	100.00
2	Bangalore	2	2	4		8	2	2	4		8	100.00
3	Bhubaneswar	2	2	4		8	1	1	2		4	50.00
4	Delhi	3	3	1		7	3	3	1		7	100.00
5	Faizabad	4	2			6	4	2	0		6	100.00
6	Hisar	2	2	2	6	12	2	1	2	4	9	75.00
7	Ludhiana	2	1			3	2	1			3	100.00
8	Mandor	3	3	1		7	1	3	1		5	71.43
9	Mattupalayam	2	2	4		8	2	2	4		8	100.00
10	Rahuri	3	2	2	3	10	3	2	1	1	7	70.00
11	Ranchi	4	2	1		7	4	2	0		6	85.71
12	S.K. Nagar	4	3	4		11	2	2	4		8	72.73
14	Akola		1			1		1	0		1	100.00
15	Jaisalmer	2	2			4	1	1	0		2	50.00
	Total (B)	38	28	23	9	98	32	24	19	5	80	81.63
	Grand Total (A+B)	54	53	37	12	156	46	46	30	8	130	83.33
	Percentage of trials conducted						85.19	86.79	81.08	66.67	83.33	

List of Underutilized Crops Identified for Research Work

I. FOOD CROPS

A. PSEUDOCEREALS

Grain amaranth (*Amaranthus* spp.)
Buckwheat (*Fagopyrum* spp.)
Chenopodium (*Chenopodium* spp.)
Job's tear (*Coix lacryma-jobi*)

B. FOOD LEGUMES/ PULSES

Rice bean (*Vigna umbellata*)
Adzuki bean (*Vigna angularis*)
Faba bean (*Vicia faba*)
Winged bean (*Psophocarpus tetragonolobus*)

C. OILSEEDS

Perilla (*Perilla frutescens*)
Paradise tree (*Simarouba glauca*)

D. VEGETABLES

Kankoda (*Momordica dioica*)
Winged bean (*Psophocarpus tetragonolobus*)

II. FODDER CROPS

Amaranth (*Amaranthus* spp.)
Salt bush (*Atriplex* spp.)
Fodder tree species

III. ENERGY, HYDROCARBON AND INDUSTRIAL PLANTS

Jojoba (*Simmondsia chinensis*)
Guayule (*Parthenium argentatum*)
Jatropha (*Jatropha curcas*)
Tumba (*Citrullus colocynthis*)
Paradise Tree (*Siimarouba glauca*)
Perilla (*Perilla frutescens*)

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