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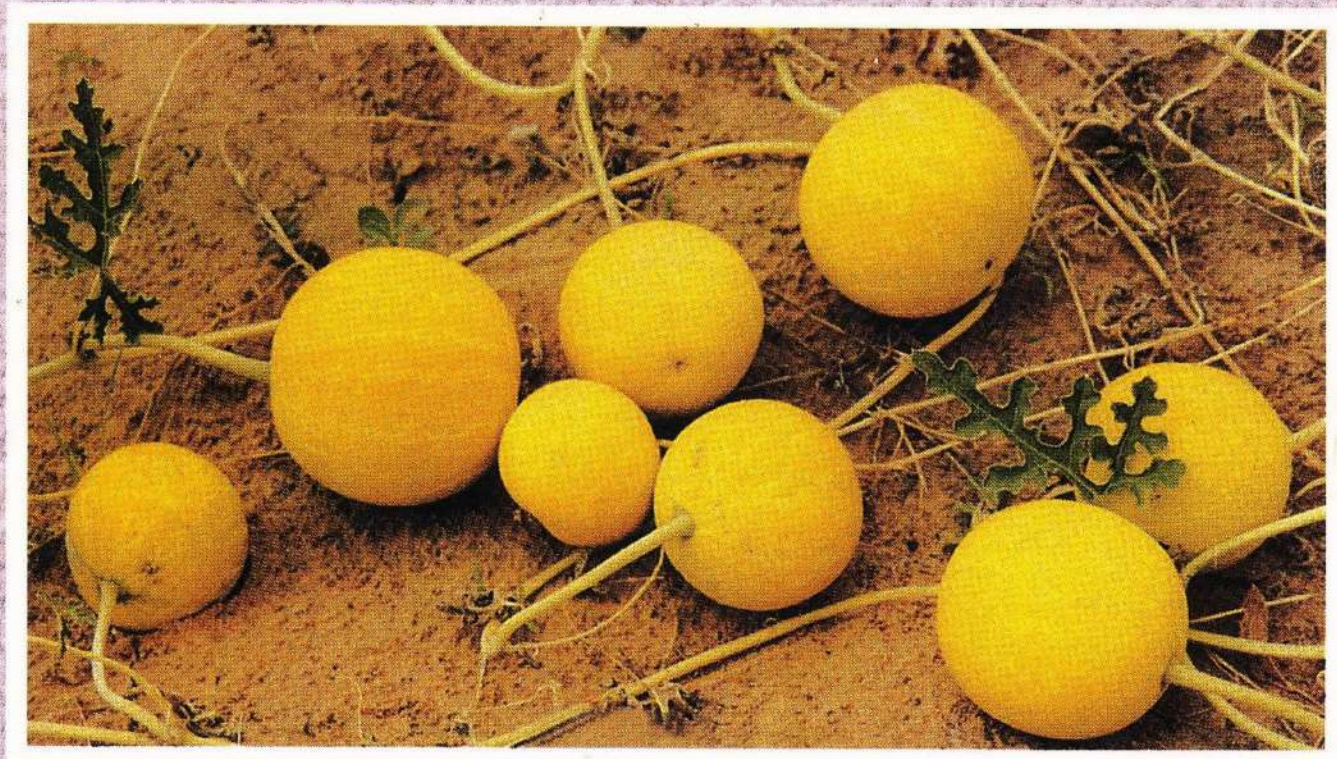
ALL INDIA COORDINATED RESEARCH NETWORK ON UNDERUTILIZED CROPS

ANNUAL REPORT 2004



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National Bureau of Plant Genetic Resources
Pusa Campus, New Delhi - 110 012

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ALL INDIA COORDINATED RESEARCH NETWORK ON UNDERUTILIZED CROPS

PROGRESS REPORT 2004

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FELICITATION

Dr. M.M.C. Bhandari

Dr. M.M.C. Bhandari, Professor, Plant Breeding and Genetics joined teaching faculty of Rajasthan Agricultural University in 1967. He has taught plant breeding , population genetics and quantitative genetics at postgraduate level. He is the author of practicals in plant breeding (Oxford IBH Publication NBT subsidized), 45 research papers and 80 extension review articles.

He has developed varieties like chetak aphim (Opium poppy), RCh-1 (Chilli), RI 89 (Isabgol), RGM 112 surya (Guar) and RMT 59 Mansha Marudhara (Tumba).

He has been Principal Investigator/Co-Investigator of numerous ad-hoc research projects, approved by various agencies like ICAR, Ministry of Non-conventional Energy Sources, State Department of Forestry, Wastelands Development Board and Department of Biotechnology. He was Zonal Director Research at Mandor, RAU for five years.

He was associated with All India Coordinated Research Project on Underutilized Crops since September 1996 at Rajasthan Agricultural University, Agriculture Research Station, Mandor, Jodhpur working in Crop Improvement Programmes of grain amaranth, kalingada, tumba and ratanjot. He is superannuating from his services w.e.f. April 30, 2005.

The AICRP (UC) Unit and Scientists of all the centres wish him and his family a happy post retirement life.

CONTENTS

PREAMBLE

I. PREAMBLE

Underutilized crops 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 the 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 distribution system is yet to reach.

The dependence of human kind on plant resources is inevitable. Since the dawn of agriculture, domestication and necessity based gathering of plant species have helped in the evolution of specially useful plant species. Living in close contact with the nature, human beings have learnt to use plants for food, fodder, fibre, medicine and other economic purposes. Over the years, these biological resources have been generously exploited for the advantage of mankind. 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. This has resulted in narrowing down of our food basket and restricted the options for future unforeseen times that may arise from the unpredictable global climatic changes and other natural catastrophes. 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, increased 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 of 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 future.

These plants 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 also underlined the need to widen the species composition in the food basket and conserve important food and other plants for future posterity.

Recognizing the need for organised 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 presently the project is conducting research on 17 crops of food, fodder and industrial value through 13 main, 6 cooperating and 2 voluntary centres located in diverse agro-climatic zones of the country. About 25 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.

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. The compiled report is an outcome of the concerted efforts made by the scientists of AICRP, Cooperating and Voluntary centres. I express my sincere thanks to Drs. M. Dutta, B.S. Phogat and M.K. Deen, Technical Programme Leaders for Plant Breeding, Agronomy and Quality Analysis for compilation of the report on respective disciplines. I am extremely thankful to Dr. H. Lal, Scientist and Dr. R.S. Rathi, Technical Officer of the unit for helping in preparation of the report.

I would like to acknowledge with reverence and gratitude the encouragement and guidance received, on all aspects of organization and functioning of the project from Dr. Mangala Rai, Director General, ICAR & Secretary, DARE; Dr. G. Kalloo, DDG (CS & Hort.), ICAR; Dr. S.N. Shukla, ADG (FFC), ICAR and Dr. B.S. Dhillon, Director, NBPGR.

I wish to record my appreciation to Mr. Saroj Kumar Jha for typing the report neatly.

R.P. Dua
Nodal Officer

PLANT BREEDING

II. PLANT BREEDING

On the basis of indigenous economic importance, area covered by a crop, specific adaptive advantage and future potential, underutilized crops have been prioritized specifically over the years, for the mountain as well as 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 material are included in the coordinated testing programme. Besides, conducting Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) in important crops like amaranth, buckwheat, rice bean and faba bean, multi-locational Observation Rows and Germplasm Screening Nurseries are also conducted in the crops requiring explorative investigation. An account of the experiments conducted during rabi 2003-2004 in plains and during *kharif* 2004, both in the hills as well as in the plains are enumerated below:

2.1 HILLS

The crops included in the hill areas are the pseudocereals (grain amaranth, buckwheat and chenopods); grain legumes (rice bean, faba bean and adzuki bean); oil-seed crop (*Perilla)* and dual purpose food and fodder crop (*Coix).* These crops are taken up in the kharif season in hill areas 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 comparision, mean over locations have 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 as important crop in mid and high altitude regions of North-Western Himalaya. It is a multipurpose crop grown for its green foliage and grain. Its seeds being rich in protein and essential amino acids are used for various confectionary items and other food products.

A combined Initial Varietal Trial and Advance Varietal Trial and a Germplasm Evaluation Nursery were conducted during kharif, 2004. 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 Advanced Varietal Trial (AVT) and Initial Varietal Trial (IVT)

In this trial 22 entries, including four checks were tested at five locations. The performance of the entries as compared to the checks has been summarized in table 1. No entry showed yield superiority over the best check variety, PRA 2. The identified variety PRA 3 yielded at par with the best check variety, PRA 2.

Significant differences were observed among the entries for seed yield at all the locations (Table 2). Mean seed yield level was high at Ranichauri and Shimla centres while, it was considerably low at Almora, Palampur and Sangla centres. Based on the average over locations the check IC 35407 was the highest yielding entry closely followed by the check variety PRA 2. Based on individual centres, PRA 2 was the highest yielder at Ranichaurhi (49.09 q/ha), Annapurna at Palampur (15.33 q/ha); IC 35407 at Almora (18.36 q/ha); IC 35407 at Shimla (45.85 q/ha) and PRA 3 at Sangla (11.83 q/ha).

Average plant height of entries (Table 3) was highest at Shimla (280.98 cm) followed by Ranichauri (167.92 cm) and Palampur (143.91 cm). It was lowest at Sangla (131.53 cm) centre. The range of plant height at Shimla was 244.57 cm to 315.60 cm and at Ranichauri 148.03 cm to 206.27 cm. Based on average over the five locations RMA 7 had the highest plant height (193.21 cm).

Flowering time showed considerable variation among the locations as well as among the entries within a location. The mean flowering time was the lowest (70.45 days) at Ranichauri centre while it was the longest (93.47 cm) at Sangla centre (Table 4). The variation in flowering time among the entries was also wider at Almora (65.33 – 101.67 days) and Sangla (79.67 – 108.00 days) centre. The entry PLP 1 showed early flowering consistently at all the locations. It ranked first (73.13 days) based on the average over all the locations.

Maturity period also showed similar trend as the flowering time. The average maturity period of the entries over all the locations was 138.49 days (Table 5). The earliest flowering entry, PLP 1 was earliest in maturity also (128.67 days). The average maturity period was the minimum at Ranichauri (129.63 days) while, it was the longest at Shimla (149.91 days).

The length of inflorescence (Table 6) of the entries was the highest at Shimla (69.44 cm) followed by Sangla (54.81 cm) and Palampur (52.15 cm). Inflorescence length was the lowest (55.36 cm) at Almora. Based on the average over five locations PRA 9801 (61.17 cm) had the longest inflorescence and IC 35407 (49.18 cm) the shortest.

Test weight (Table 7) expressed in terms of weight of 10 ml seed recorded at three centres showed that it was the highest at Ranichauri (12.75 g) and low to moderate at Palampur (8.30 g) and Shimla (8.11 g) cnetres. The variation among the entries was relatively low. Based on the average over three locations entry, Sangla A-7 (9.80 g) showed the highest test weight.

Number of fingers per inflorescence (Table 8) was highest at Shimla (72.83) followed by Ranichauri centre (57.07). Based on the average over the locations entry PRA 9801 had the highest number of fingers (60.29).

2.1.2 BUCKWHEAT (*Fagopyrum* spp.)

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

In buckwheat an Initial Varietal Trial and a Germplasm Evaluation Nursery were conducted in the hill locations. Both the cultivated species, *F. esculentum* and *F. tataricum* were included in the Varietal testing programme.

2.1.2.1 Initial Varietal Trial

The Initial Varietal Trial was conducted with nine entries including three checks at four locations viz. Shimla, Ranichauri, Almora and Sangla. The summary of various entries in respect of grain yield and other important traits as

compared to the checks have been given in table 9. No entry was superior to the best check variety, Himpriya.

Data on grain yield have been presented in table 10. Significant differences were observed among the entries with respect to grain yield at all the locations. Seed yield at all the locations was comparatively low but at Ranichauri centre it was very high. Among the four locations Ranichauri centre recorded the highest yield, the average being 20.08 q/ha followed by Sangla (10.70 q/ha) and Almora (7.18 q/ha) centres. Seed yield varied from 5.74 to 42.92 q/ha at Ranichauri. SMLBW 3 was the second highest yielding entry (15.80 q/ha) based on average.

Average plant height (Table 11) was recorded to be the highest at Almora (150.67 cm) followed by at Ranichauri (148.36 cm) and Shimla (147.88 cm). The entry SAGAB 214 was the tallest (140.36 cm) while VL 7 (99.53 cm) was the shortest.

Flowering time varied from 43.00 to 67.00 days at Shimla, from 24.00 to 70.00 days at Ranichauri and 27.00 to 42.33 days at Almora centre (Table 12). Mean flowering time was the earliest at Almora (36.00 days) followed by Ranichauri (48.33 days). On the basis of average over three locations the entry SAGAB 214 was the earliest in flowering (39.83 days).

Maturity period (Table 13) also showed similar trend to that of the flowering time. Average maturity period was the earliest at Almora (101.33 days) followed by Shimla (118.07 days). On the basis of average over the locations the entry Shimla B-1 turned out to be the earliest in maturity (81.50 days) and Himpriya (126.92 days) to be late in maturity.

The average test weight was higher at Sangla (2.66 g) centre than other centres (Table 14). On the basis of average over the locations SAGAB 117 possessed the highest (2.39 g) and SMLBW 3 the lowest (1.53 g) seed weight.

2.1.3 CHENOPODIUM (*Chenopodium* spp.)

In chenopodium two species viz. *C. quinoa* and *C. album* are economically important and hence have been included in the evaluation programme. An Initial

Varietal Trial comprising both the species was proposed to be conducted at four locations.

2.1.3.1 Initial Varietal Trial

The Initial Varietal Trial on eight lines was conducted at three centres. The entries comprised of the lines received from NBPGR Regional Station, Shimla and GBPUAT, Ranichauri. The performance of the entries has been summarized in table 16. The grain yield (Table 17) varied from 1.22 to 2.74 q/ha. SMLCP 5 (2.74 q/ha) was the highest yielding entry followed by SMLCP 1 (2.26 q/ha) and SMLCP 2 (2.13 q/ha).

Average plant height was the highest for SMLCP 2 (157.66 cm) and lowest (139.67 cm) for PRC 9805 (Table 18). Plant height was the highest at Shimla (223.09 cm) and lowest at Ranichauri (97.20 cm).

Flowering time varied from 62.22 to 73.84 days (Table 19) and maturity period from 134.00 to 150.89 days (Table 20). The entry SMLCP 1 (134.00 days) was earliest in maturity. Inflorescence length showed less variation ranging from 22.66 to 27.62 cm (Table 21). The entry, SMLCP 1 (27.62 cm) had longest earhead followed by PRC 9805 (27.19 cm) and SMLCP 3 (27.07 cm).

2.1.4 RICE BEAN (*Vigna umbellata)*

Rice bean is an important grain legume of low and mid hill 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. One Initial Varietal Trial and a germplasm screening nursery were conducted during this year.

2.1.4.1 Initial Varietal Trial

The Initial Varietal Trial comprising 12 entries, including four check varieties, was conducted at 6 locations. Data have been received from all the centres. The summary performance of the entries has been presented in table 22.

Significant variations were observed among the entries with respect to grain yield at all the locations (Table 23). Yield levels at Shimla centre were higher with an average yield of 25.79 q/ha while it was lower (2.37 q/ha) at Almora centre. The yield level at Ranichauri centre was also low. On the basis of average over five locations LRB 355 (14.34 q/ha) was the highest yielder followed by BRS 2 (14.78 q/ha) and PRR 1 (13.63 q/ha).

Plant height (Table 24) was the highest at Shimla showing an average plant height of 198.61 cm while it was the lowest at Shillong (90.65 cm) centre. At Bhowali centre also plant height was considerably high (186.15 cm). On the basis of average over five locations LRB 122 showed the highest plant height (139.45 cm) while Tatru local had the shortest plant height (53.67 cm) based on single location data.

Flowering time was the earliest at Shillong (47.59 days) and extremely delayed at Ranichauri (92.30 days) showing more than 30 days difference between the two centres (Table 25). At other centres moderately delayed flowering was observed. On the basis of average over the locations PRR 9402 (75.33 days) showed the earliest flowering. However, on single location data Tatru local (55.67 days) was the earliest flowering entry.

Maturity period was the earliest at Shillong (100.00 days) while most delayed maturity (162.96 days) was observed at Ranichauri (Table 26). There was a difference of about 62 days between Shillong and Ranichauri centres with respect to maturity period. However, much variation was not observed in maturity period of the entries. Based on the average over locations PRR 2 (124.44 days) was the earliest maturing variety while based on single location data Tatru local (93.00 days) had the earliest maturity.

The mean 100-seed weight was the highest at Ranichauri (8.06 g) centre and the lowest at Almora (4.79 g) centre (Table 27). On the basis of average over six locations PRR 9402 had the largest seed (7.36 g) and Tatru local (5.56 g) the smallest seed based on single location data.

2.1.5 ADZUKIBEAN (*Vigna angularis*)

Adzuki bean is a short duration pulse crop generally grown mixed with rice bean crop in the North-Western Himalayan region. An Initial Varietal Trial was planned to be conducted in adzuki bean at four locations.

2.1.5.1 Initial Varietal Trial and Advance Varieral Trial-II

The Initial Varietal Trial and Advanced Vareital Trial-II comprising 20 lines including one check (HPU 51) was conducted at three locations. Data have been received from all the three locations. The summary of performance of various entries during the year has been presented in table 28.

The average yield (Table 29) levels at Ranichauri (26.75 q/ha) and Shimla centres (20.75 q/ha) were higher than at Palampur (8.20 q/ha). However, the CV of Palampur was quite high and the data were not including in over all mean estimation. The range of variation in yield was also very high at Shimla and Ranichauri. Significant differences were however, observed for seed yield of the entries at all the locations. On the basis of single location data HPU 51 (16.79 q/ha) was the highest yielding entry followed by Shimla 2 (12.83 q/ha). On the basis of two locations data HPAB 51 was the highest yielder (28.18 q/ha) followed by SMLAB 6 (27.24 q/ha) and SMLAB 1 (27.18 q/ha). Among AVT-II entries Shimla-1 was the highest yielder (27.07 q/ha) followed by Shimla-2 (22.87 q/ha).

Plant height (Table 30) was highest at Shimla (103.73 cm) followed by Palampur (84.42 cm) and Ranichauri (43.66 cm). Based on the average over the locations the entry, IC 241041 had the maximum plant height (83.83 cm) followed by SMLAB 5 (83.36 cm) and SMLAB 6 (81.68 cm).

Flowering time (Table 31) was the earliest at Palampur (59.68 days) followed by Ranichauri (64.60 days) and Shimla (72.30 days). Considerable variation was observed in flowering time of the lines at all the centres that ranged from 52.00 to 78.00 days at Shimla, 55.00 to 76.33 days at Ranichauri and 55.67 to 66.33 days at Palampur. Based on the overall average, the entry SMLAB 4 was the earliest in flowering time (57.89 days).

Maturity period (Table 32) of the entries also showed similar trend as was observed for flowering time. Entries took minimum time (104.00 days) to mature at Palampur and Ranichauri but maximum at Shimla (110.67 days). Variation in maturity period of the entries was negligible at all the centres. Based on the average over the locations the entry, Shimla A-1 (99.44 days) was the earliest maturing entry followed by the entry SMLAB 2 (99.86 days).

Test weight (100-seed weight) showed reasonable variation from location to location. The average test weight was 19.56 g at Shimla while it was only 10.58 g at Palampur centre (Table 33). The range of variation in 100 seed weight was also higher at Shimla (14.37 – 25.88 g) as compared to those of the other locations. The entry HPAB 27 (20.25 g) had the highest seed weight based on the average over locations.

Incidence of leaf blight disease was negligible Ranichauri centre during the year.

2.1.6 FABA BEAN (*Vicia faba*)

Faba bean is grown in the hills mainly for its protein rich green pods which are used as vegetable. An Advanced Varietal Trial was proposed to be conducted at Palampur and Ranichauri. But data were not received.

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

Job's tear, widely grown in the North-Eastern Himalayan region, is being exploited as a dual purpose crop both for its seed and forage purposes. Germplasm Evaluation Nursery was proposed to be conducted in this crop at three locations and the data have been presented under germplasm.

2.1.8 PERILLA (*Perilla frutescens*)

Perilla is being exploited as an edible oil yielding underutilized crop which is grown in the hills largely as a spice crop. Its green leaves also contain highly aromatic compounds. In Perilla a Germplasm Evaluation Nursery was proposed to be conducted at two hill locations and the data have been presented under germplasm.

Table 1. Performance of Grain Amaranth entries in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) during 2004 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 10 ml seed (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety			
				Mean	Location	Annapurna	PRA 2	PRA 3	IC 35407
	AVT-I								
1	Sangla A-5	129.87	9.24	15.97	4	-27.10	-30.25	-26.22	-35.26
2	Sangla A-6	130.53	9.11	18.67	4	-14.76	-18.45	-13.74	-24.30
3	Sangla A-7	124.33	9.80	15.02	3	-31.41	-34.38	-30.59	-39.09
4	RGAS 92-10-1	144.00	8.00	6.69	2	-69.45	-70.77	-69.09	-72.87
	IVT								
5	PLP 1	160.83	9.30	14.49	4	-33.83	-36.69	-33.04	-41.24
6	PRA 2004-1	140.93	9.44	18.59	4	-15.14	-18.81	-14.12	-24.64
7	PRA 2004-2	140.33	9.35	16.74	4	-23.57	-26.87	-22.65	-32.12
8	PRA 9801	142.27	9.67	19.84	4	-9.40	-13.32	-8.31	-19.54
9	RMA 7	147.13	9.16	14.29	4	-34.74	-37.56	-33.95	-42.04
10	RMA 8	150.13	8.92	11.16	4	-49.02	-51.23	-48.41	-54.73
11	Shimla A-3	132.07	8.93	14.60	4	-33.33	-36.22	-32.53	-40.79
12	Shimla A-4	134.73	9.13	19.80	4	-9.61	-13.52	-8.53	-19.73
13	Shimla A-5	137.80	9.16	17.45	4	-20.34	-23.79	-19.39	-29.26
14	Shimla A-6	133.33	9.03	12.05	4	-44.96	-47.34	-44.30	-51.12
15	SMLAM 7	138.60	9.40	14.42	4	-34.14	-36.99	-33.35	-41.51
16	SMLAM 8	130.87	9.44	12.67	4	-42.13	-44.63	-41.44	-48.61
17	IC 268367	151.33	9.12	13.34	4	-39.08	-41.72	-38.35	-45.90
18	Phule GA 1004	141.67	7.94	6.34	2	-71.07	-72.32	-70.73	-74.31
19	Annapurna ©	139.73	9.30	21.90	2	0.00	-4.33	1.20	-11.19
20	PRA 2 ©	133.87	8.91	22.89	4	4.52	0.00	5.78	-7.18
21	PRA 3 ©	138.07	9.21	21.64	4	-1.19	-5.46	0.00	-12.25
22	IC 35407 ©	124.34	9.14	24.66	4	12.60	7.73	13.96	0.00
	Trial Mean	**138.49**	**9.12**	**16.06**					

Table 2. Grain Yield (q/ha) in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Palampur*	Almora	Shimla	Sangla	Overall		Location	Frequency
							Mean	Rank		
	AVT-I									
1	Sangla A-5	24.66	7.13	4.73	21.37	13.10	15.97	11	4	0/4
2	Sangla A-6	31.27	12.67	7.69	23.77	11.94	18.67	7	4	0/4
3	Sangla A-7	29.93	10.75	4.89		10.24	15.02	12	3	0/4
4	RGAS 92-10-1		5.63	3.77		9.61	6.69	21	2	0/4
	IVT									
5	PLP 1	14.37	6.75	11.79	23.14	8.66	14.49	14	4	0/4
6	PRA 2004-1	29.85	12.71	9.22	27.74	7.53	18.59	8	4	0/4
7	PRA 2004-2	27.56	13.63	11.91	20.11	7.38	16.74	10	4	0/4
8	PRA 9801	31.49	13.71	7.77	32.19	7.92	19.84	5	4	0/4
9	RMA 7	26.83	7.84	6.87	21.97	1.50	14.29	16	4	0/4
10	RMA 8	14.31	9.49	2.28	21.66	6.41	11.16	20	4	0/4
11	Shimla A-3	23.28	11.25	3.63	21.59	9.90	14.60	13	4	0/4
12	Shimla A-4	34.86	8.50	9.22	26.42	8.68	19.80	6	4	0/4
13	Shimla A-5	24.29	7.25	5.68	28.21	11.60	17.45	9	4	0/4
14	Shimla A-6	20.34	7.47	3.32	17.69	6.87	12.05	19	4	0/4
15	SMLAM 7	27.19	4.96	4.07	21.17	5.26	14.42	15	4	0/4
16	SMLAM 8	17.80	15.67	10.53	15.80	6.56	12.67	18	4	0/4
17	IC 268367	21.90	5.91	3.51	21.74	6.21	13.34	17	4	0/4
18	Phule GA 1004		7.17	3.56		9.11	6.34	22	2	0/4
19	Annapurna ©	31.76	15.33	6.98	39.51	9.34	21.90	3	2	0/4
20	PRA 2 ©	49.09	10.92	4.49	28.95	9.02	22.89	2	4	0/4
21	PRA 3 ©	31.06	8.83	9.76	33.90	11.83	21.64	4	4	0/4
22	IC 35407 ©	24.24	7.42	18.36	45.85	10.20	24.66	1	4	0/4
	Mean	**26.80**	**9.59**	**7.00**	**25.94**	**8.59**	**16.06**			
	C.D. at 5%	**6.49**	**5.28**	**0.88**	**6.80**	**2.76**				
	CV (%)	**15.13**	**34.39**	**7.88**	**16.38**	**20.27**				

*** Data from Palampur not included in the overall mean due to high C.V.**

Table 3. Plant Height (cm) in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Almora	Palampur	Shimla	Overall	
							Mean	Rank
	AVT-I							
1	Sangla A-5	157.73	124.60	122.33	143.73	274.77	164.63	15
2	Sangla A-6	170.83	127.87	134.67	142.13	287.50	172.60	8
3	Sangla A-7	177.08	125.67	146.00	133.80		148.76	21
4	RGAS 92-10-1		136.27	144.33	148.47		139.64	22
	IVT							
5	PLP 1	148.03	132.73	144.00	142.27	254.47	164.30	16
6	PRA 2004-1	183.25	128.93	136.67	154.33	299.07	180.45	4
7	PRA 2004-2	147.05	139.20	142.67	141.93	301.07	174.38	7
8	PRA 9801	187.80	140.67	141.00	147.40	309.63	185.30	2
9	RMA 7	177.23	161.33	169.00	142.87	315.60	193.21	1
10	RMA 8	158.42	134.40	135.33	139.77	311.47	175.88	6
11	Shimla A-3	175.67	111.60	115.00	146.27	279.23	166.26	13
12	Shimla A-4	178.02	119.87	147.67	149.80	268.80	169.94	10
13	Shimla A-5	141.93	132.60	112.00	135.33	271.97	159.10	18
14	Shimla A-6	140.68	125.80	122.67	137.00	268.13	161.64	17
15	SMLAM 7	206.27	141.13	126.67	150.93	270.53	180.99	3
16	SMLAM 8	152.32	134.80	121.33	160.33	280.50	166.26	13
17	IC 268367	177.22	149.13	147.33	142.33	274.77	179.38	5
18	Phule GA 1004		144.00	168.00	138.33		149.51	20
19	Annapurna ©	167.18	121.67	114.67	136.53	279.53	165.97	14
20	PRA 2 ©	182.90	126.33	128.00	146.80	271.73	171.58	9
21	PRA 3 ©	168.42	130.27	133.67	148.93	275.33	168.88	11
22	IC 35407 ©	160.42	104.73	132.00	136.73	244.57	157.12	19
	Mean	**167.92**	**131.53**	**135.68**	**143.91**	**280.98**	**167.99**	
	C.D. at 5%	**27.68**	**21.54**	**38.44**	**23.73**	**27.16**		
	CV (%)	**10.30**	**10.30**	**17.71**	**10.30**	**6.04**		

Table 4. Days to Flowering in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Almora	Palampur	Shimla	Overall	
							Mean	Rank
	AVT-I							
1	Sangla A-5	63.00	87.33	74.00	86.00	79.00	77.87	6
2	Sangla A-6	60.00	85.00	74.67	80.00	80.00	75.93	4
3	Sangla A-7	57.00	86.00	72.67	84.00		75.75	3
4	RGAS 92-10-1		95.33	101.67	90.00		94.00	20
	IVT							
5	PLP 1	67.33	79.67	65.33	84	69.33	73.13	1
6	PRA 2004-1	72.33	92.00	85.33	91.00	92.67	86.67	14
7	PRA 2004-2	74.00	101.33	83.67	93.00	93.67	89.13	15
8	PRA 9801	81.67	108.00	85.67	93.00	96.00	92.87	18
9	RMA 7	88.33	105.00	94.33	95.00	93.33	95.20	22
10	RMA 8	79.67	103.33	101.00	91.00	94.67	93.93	19
11	Shimla A-3	65.33	90.33	77.00	87.33	83.00	80.73	9
12	Shimla A-4	74.67	92.67	77.00	88.00	82.00	82.00	10
13	Shimla A-5	61.67	90.33	76.33	83.67	83.00	79.53	8
14	Shimla A-6	62.33	94.00	70.00	86.33	83.00	79.40	7
15	SMLAM 7	72.33	95.00	77.00	87.67	85.33	82.93	12
16	SMLAM 8	58.67	87.00	64.00	85.00	85.33	77.00	5
17	IC 268367	88.33	98.67	90.00	90.00	85.67	90.53	17
18	Phule GA 1004		95.00	96.00	85.00		94.00	21
19	Annapurna ©	76.00	102.67	86.67	91.00	90.67	89.40	16
20	PRA 2 ©	70.67	94.00	79.00	91.00	85.33	84.00	13
21	PRA 3 ©	75.67	91.00	76.33	91.00	86.33	82.53	11
22	IC 35407 ©	60.00	82.67	69.67	83.33	68.67	73.80	2
	Mean	**70.45**	**93.47**	**80.79**	**88.02**	**85.11**	**84.11**	
	C.D. at 5%	**4.46**	**12.07**	**5.18**	**3.32**	**4.65**		
	CV (%)	**3.96**	**8.08**	**4.01**	**2.35**	**3.41**		

Table 5. Days to Maturity in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Almora	Palampur	Shimla	Overall		Location	Frequency
							Mean	Rank		
	AVT-I									
1	Sangla A-5	116.00	136.00	110.33	137.33	149.67	129.87	4	5	0/5
2	Sangla A-6	120.00	132.33	114.33	138.00	148.00	130.53	5	5	0/5
3	Sangla A-7	116.00	130.33	113.33	138.33		124.33	1	4	0/4
4	RGAS 92-10-1		145.00	148.67	138.00		144.00	19	3	0/3
	IVT									
5	PLP 1	123.00	135.00	100.33	138.00	147.00	128.67	3	5	0/5
6	PRA 2004-1	142.33	140.67	133.33	138.00	150.33	140.93	16	5	0/5
7	PRA 2004-2	130.33	141.67	140.67	137.33	151.67	140.33	15	5	0/5
8	PRA 9801	138.00	140.00	140.33	139.00	154.00	142.27	18	5	0/5
9	RMA 7	154.67	140.67	152.00	139.00	149.33	147.13	20	5	0/5
10	RMA 8	154.67	143.00	163.00	138.33	151.67	150.13	21	5	0/5
11	Shimla A-3	122.33	137.33	115.33	137.67	147.00	132.07	7	5	0/5
12	Shimla A-4	126.67	141.33	115.33	138.33	152.33	134.73	10	5	0/5
13	Shimla A-5	122.33	144.33	133.33	138.00	151.67	137.80	11	5	0/5
14	Shimla A-6	122.67	136.33	117.33	137.33	153.00	133.33	8	5	0/5
15	SMLAM 7	127.00	140.33	142.67	137.33	145.33	138.60	13	5	0/5
16	SMLAM 8	117.67	136.33	113.00	137.67	150.00	130.87	6	5	0/5
17	IC 268367	154.67	144.00	162.33	137.33	157.67	151.33	22	5	0/5
18	Phule GA 1004		138.67	148.00	138.33		141.67	17	3	0/3
19	Annapurna ©	131.67	137.33	141.67	138.33	149.67	139.73	14	5	0/5
20	PRA 2 ©	126.00	137.00	118.00	138.33	150.00	133.87	9	5	0/5
21	PRA 3 ©	131.67	134.67	136.33	138.33	149.67	138.07	12	5	0/5
22	IC 35407 ©	115.00	125.33	103.00	138.00	140.33	124.34	2	5	0/5
	Mean	**129.63**	**138.08**	**130.12**	**138.02**	**149.91**	**137.03**			
	C.D. at 5%	**4.50**	**11.51**	**7.81**	**1.82**	**4.54**				
	CV (%)	**2.18**	**5.22**	**3.75**	**0.83**	**1.89**				

Table 6. Inflorescence Length (cm) in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Almora	Palampur	Shimla	Overall Mean	Rank
	AVT-I							
1	Sangla A-5	41.07	52.67	47.33	48.60	65.16	50.97	20
2	Sangla A-6	46.73	54.00	49.67	50.00	72.43	54.57	13
3	Sangla A-7	55.27	63.27	47.33	46.67		53.52	16
4	RGAS 92-10-1		53.27	40.33	52.93		53.31	17
	IVT							
5	PLP 1	43.47	56.73	52.67	50.87	67.94	54.33	15
6	PRA 2004-1	57.47	54.80	50.67	58.87	65.26	57.41	5
7	PRA 2004-2	43.42	57.07	52.33	69.73	69.44	58.40	4
8	PRA 9801	65.27	62.27	50.33	57.27	70.72	61.17	1
9	RMA 7	60.08	57.47	39.33	46.73	68.46	54.42	14
10	RMA 8	48.13	49.33	41.00	45.93	67.78	50.44	21
11	Shimla A-3	51.02	52.00	48.33	48.20	77.07	56.08	6
12	Shimla A-4	59.65	46.20	50.00	52.00	71.73	55.33	11
13	Shimla A-5	43.82	52.93	49.00	49.07	77.58	55.84	9
14	Shimla A-6	39.45	51.40	49.67	55.87	81.92	54.99	12
15	SMLAM 7	59.82	55.33	49.67	52.53	59.69	55.93	8
16	SMLAM 8	43.67	57.60	48.33	55.13	63.76	52.70	19
17	IC 268367	59.47	57.27	54.33	50.13	69.12	58.62	3
18	Phule GA 1004		67.27	65.33	66.33		58.98	2
19	Annapurna ©	50.00	56.30	53.33	44.33	71.01	55.93	8
20	PRA 2 ©	58.75	56.80	48.33	49.00	65.40	55.71	10
21	PRA 3 ©	52.13	50.67	48.33	49.27	67.58	53.29	18
22	IC 35407 ©	41.82	41.27	43.33	47.73	67.32	49.18	22
	Mean	**51.02**	**54.81**	**49.05**	**52.15**	**69.44**	**55.05**	
	C.D. at 5%	**12.08**	**10.96**	**8.76**	**12.69**			
	CV (%)	**14.79**	**12.62**	**11.16**	**15.21**			

Table 7. Weight of 10 ml Seed (g) in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Palampur	Shimla	Overall Mean	Rank
	AVT-I						
1	Sangla A-5	12.68	8.17	8.24	7.86	9.24	7
2	Sangla A-6	12.24	7.67	8.28	8.25	9.11	13
3	Sangla A-7	13.17	8.00	8.24		9.80	1
4	RGAS 92-10-1		7.83	8.17		8.00	18
	IVT						
5	PLP 1	12.50	8.50	8.10	8.11	9.30	6
6	PRA 2004-1	13.87	7.23	8.34	8.31	9.44	3
7	PRA 2004-2	13.31	8.00	8.36	7.73	9.35	5
8	PRA 9801	13.89	8.50	8.26	8.01	9.67	2
9	RMA 7	12.88	7.67	8.32	7.75	9.16	9
10	RMA 8	12.40	6.83	8.26	8.17	8.92	16
11	Shimla A-3	12.05	7.00	8.40	8.26	8.93	15
12	Shimla A-4	12.26	7.50	8.38	8.39	9.13	11
13	Shimla A-5	12.68	7.50	8.32	8.15	9.16	9
14	Shimla A-6	12.89	6.67	8.49	8.08	9.03	14
15	SMLAM 7	12.72	8.67	8.28	7.94	9.40	4
16	SMLAM 8	12.95	8.00	8.39	8.41	9.44	3
17	IC 268367	12.62	7.13	8.41	8.31	9.12	12
18	Phule GA 1004		7.50	8.37		7.94	19
19	Annapurna ©	12.75	7.83	8.50	8.10	9.30	6
20	PRA 2 ©	12.52	6.97	8.21	7.94	8.91	17
21	PRA 3 ©	12.58	7.77	8.20	8.28	9.21	8
22	IC 35407 ©	12.02	8.40	8.18	7.98	9.14	10
	Mean	**12.75**	**7.70**	**8.30**	**8.11**	**9.12**	
	C.D. at 5%	**0.03**	**1.51**	**0.30**			
	CV (%)	**0.14**	**12.27**	**2.24**			

Table 8. No. of Fingers/inflorescence in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) on Grain Amaranth (AVT): 2004 (Hills)

S. No.	Genotypes	Ranichauri	Sangla	Shimla	Almora	Overall Mean	Rank
	AVT-I						
1	Sangla A-5	41.35	23.60	69.55	47.67	45.54	18
2	Sangla A-6	53.75	19.87	78.66	52.00	51.07	11
3	Sangla A-7	62.40	32.67		45.00	46.69	16
4	RGAS 92-10-1		26.53		48.33	37.43	22
	IVT						
5	PLP 1	38.83	27.93	68.66	43.00	44.61	20
6	PRA 2004-1	75.47	22.47	70.55	56.67	56.29	5
7	PRA 2004-2	49.37	17.33	74.55	52.00	48.31	14
8	PRA 9801	70.80	31.07	79.00	48.67	57.38	4
9	RMA 7	63.28	31.98	79.44	61.67	59.09	1
10	RMA 8	58.40	19.67	82.89	55.33	54.07	8
11	Shimla A-3	61.53	19.13	72.89	60.33	53.47	9
12	Shimla A-4	73.60	17.53	77.55	42.00	52.67	10
13	Shimla A-5	48.73	24.73	69.55	48.00	47.75	15
14	Shimla A-6	32.68	26.87	67.88	52.33	44.94	19
15	SMLAM 7	67.40	30.13	82.78	53.00	58.33	2
16	SMLAM 8	47.60	26.00	74.77	51.33	49.93	12
17	IC 268367	67.60	29.93	68.22	65.33	57.77	3
18	Phule GA 1004		36.27		55.00	45.64	17
19	Annapurna ©	66.13	25.93	62.51	64.33	54.73	6
20	PRA 2 ©	65.68	21.00	77.33	54.33	54.59	7
21	PRA 3 ©	54.27	18.67	72.89	53.00	49.71	13
22	IC 35407 ©	42.42	19.80	54.10	46.33	40.66	21
	Mean	**57.07**	**24.96**	**72.83**	**52.53**	**50.48**	
	C.D. at 5%	**22.09**	**10.49**	**15.90**	**12.87**		
	CV (%)	**24.19**	**26.96**	**13.64**	**15.31**		

Table 9. Performance of Buckwheat entries in Initial Varietal Trial during 2004 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety		
				Mean	Location	Himpriya	VL 7	PRB 1
1	SMLBW 3	122.75	1.53	15.80	4	-14.20	284.33	129.26
2	SAGAB 101	109.34	2.19	9.49	4	-48.43	131.00	37.80
3	SAGAB 117	107.67	2.39	9.65	4	-47.61	134.67	39.99
4	SAGAB 212	109.33	1.83	8.05	4	-56.30	95.76	16.78
5	SAGAB 214	107.33	2.42	4.08	4	-77.85	-0.79	-40.82
6	Shimla B1	81.50	1.74	12.72	4	-30.91	209.47	84.60
7	Himpriya (C)	126.92	2.17	18.41	4	0.00	347.93	167.20
8	VL 7 (C)	124.00	1.75	4.11	1	-77.68	0.00	-40.35
9	PRB-1 (C)	118.43	1.79	6.89	4	-62.57	67.64	0.00
	Trial mean	**111.92**	**1.98**	**9.91**				

Table 10. Grain Yield (q/ha) in Initial Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Almora	Sangla	Overall		Location	Frequency
						Mean	Rank		
1	SMLBW 3	3.76	42.92	6.54	9.97	15.80	2	4	0/4
2	SAGAB 101	1.58	14.50	7.64	14.26	9.49	5	4	0/4
3	SAGAB 117	2.38	14.47	5.97	15.76	9.65	4	4	0/4
4	SAGAB 212	1.33	17.81	6.21	6.83	8.05	6	4	0/4
5	SAGAB 214	3.18	5.74	5.20	2.19	4.08	9	4	0/4
6	Shimla B1	6.73	16.22	4.71	23.22	12.72	3	4	0/4
7	Himpriya (C)	7.43	36.45	12.50	17.28	18.41	1	4	0/4
8	VL 7 (C)				4.11	4.11	8	1	0/1
9	PRB-1 (C)	3.67	12.53	8.70	2.68	6.89	7	4	0/4
	Mean	**3.76**	**20.08**	**7.18**	**10.70**	**9.91**			
	C.D. (5%)	**0.43**	**7.93**	**0.93**	**2.31**				
	CV (%)	**6.59**	**22.50**	**7.38**	**12.49**				

Table 11. Plant Height (cm) in Initial Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Sangla	Ranichauri	Almora	Shimla	Overall	
						Mean	Rank
1	SMLBW 3	146.60	125.82	85.67	115.78	118.47	7
2	SAGAB 101	122.20	99.92	88.33	98.87	102.33	8
3	SAGAB 117	161.60	116.48	97.67	129.38	126.28	6
4	SAGAB 212	109.07	138.27	151.00	159.78	139.53	2
5	SAGAB 214	106.40	145.23	142.67	167.15	140.36	1
6	Shimla B1	107.87	121.15	139.67	184.97	138.41	3
7	Himpriya (C)	149.13	145.35	106.33	122.00	130.70	5
8	VL 7 (C)	99.53				99.53	9
9	PRB-1 (C)	88.60	148.35	150.67	147.88	133.88	4
	Mean	**121.22**	**130.07**	**120.25**	**140.73**	**125.50**	
	C.D. (5%)	**29.15**	**17.83**	**25.45**	**15.46**		
	CV (%)	**13.89**	**7.81**	**12.05**	**6.26**		

Table 12. Days to Flowering in Initial Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Sangla	Ranichauri	Almora	Shimla	Overall	
						Mean	Rank
1	SMLBW 3	77.33	70.00	42.33	67.00	64.17	9
2	SAGAB 101	72.00	59.67	40.67	65.00	59.33	7
3	SAGAB 117	69.67	54.67	40.67	63.67	57.17	6
4	SAGAB 212	55.33	28.67	27.00	51.00	40.50	2
5	SAGAB 214	57.33	24.00	27.00	51.00	39.83	1
6	Shimla B1	53.67	34.33	38.33	43.00	42.33	3
7	Himpriya (C)	77.33	59.67	38.67	65.00	60.17	8
8	VL 7 (C)	54.67				54.67	5
9	PRB-1 (C)	68.33	48.33	38.00	55.00	52.42	4
	Mean	**65.07**	**47.42**	**36.58**	**57.58**	**52.29**	
	C.D. (5%)	**4.31**	**0.80**	**1.05**	**1.11**		
	CV (%)	**3.82**	**0.96**	**1.63**	**1.10**		

Table 13. Days to Maturity in Initial Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Almora	Sangla	Overall		Location	Frequency
						Mean	Rank		
1	SMLBW 3	124.00	138.33	95.00	133.67	122.75	7	4	0/4
2	SAGAB 101	124.67	108.33*	103.67	100.67*	109.34	5	4	2/4
3	SAGAB 117	124.00	105.67*	101.33	99.67*	107.67	3	4	2/4
4	SAGAB 212	124.00	118.00*	94.33	101.00	109.33	4	4	1/4
5	SAGAB 214	124.00	96.00*	94.33	115.00	107.33	2	4	1/4
6	Shimla B1	85.00*	86.33*	68.67	86.00*	81.50	1	4	3/4
7	Himpriya (C)	124.67	145.67	96.00	141.33	126.92	9	4	0/4
8	VL 7 (C)	124.00				124.00	8	1	0/1
9	PRB-1 (C)	124.00	130.33	101.33	118.07	118.43	6	4	0/4
	Mean	**119.82**	**116.08**	**94.33**	**111.93**	**111.92**			
	C.D. (5%)	**0.88**	**3.09**	**7.94**	**8.84**				
	CV (%)	**0.42**	**1.52**	**4.80**	**4.50**				

Table 14. 100 Seed Weight (g) in Initial Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Sangla	Ranichauri	Almora	Shimla	Overall	
						Mean	Rank
1	SMLBW 3	1.67	1.47	1.67	1.32	1.53	9
2	SAGAB 101	3.50	1.65	1.94	1.67	2.19	3
3	SAGAB 117	3.92	1.85	2.05	1.73	2.39	2
4	SAGAB 212	2.50	0.26	2.33	2.24	1.83	5
5	SAGAB 214	3.25	1.82	2.26	2.35	2.42	1
6	Shimla B1	2.42	1.49	1.61	1.43	1.74	8
7	Himpriya (C)	3.17	1.83	1.91	1.75	2.17	4
8	VL 7 (C)	1.75				1.75	7
9	PRB-1 (C)	1.75	1.55	1.96	1.89	1.79	6
	Mean	**2.66**	**1.49**	**1.97**	**1.80**	**1.98**	
	C.D. (5%)	**1.07**	**0.02**	**0.14**	**0.31**		
	CV (%)	**23.22**	**0.86**	**4.00**	**9.68**		

Table 15. No. of branches/plant in Advanced Varietal Trial on Buckwheat: 2004 (Hills)

S. No.	Genotypes	Almora	
		Mean	**Rank**
1	SMLBW 3	6.33	4
2	SAGAB 101	6.67	3
3	SAGAB 117	6.00	5
4	SAGAB 212	5.00	6
5	SAGAB 214	4.67	7
6	Shimla B1	6.00	5
7	Himpriya (C)	8.67	1
8	PRB-1 (C)	8.00	2
	Mean	**6.42**	
	C.D. (5%)	**1.70**	
	CV (%)	**15.07**	

Table 16. Performance of Chenopodium entries in Initial Varietal Trial during 2004 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Plant height (cm)	Mean seed yield over locations (q/ha)		Percent increase/ decrease over check variety
				Mean	Location	Local
1	IC 107297	143.67	142.61	1.65	3	-19.40
2	PRC 9805	150.89	139.67	1.22	3	-40.33
3	SMLCP 1	134.00	133.15	2.26	3	10.14
4	SMLCP 2	135.22	157.66	2.13	3	3.74
5	SMLCP 3	149.11	149.47	1.62	3	-21.08
6	SMLCP 4	139.44	142.26	1.53	3	-25.15
7	SMLCP 5	139.44	156.96	2.74	3	33.60
8	Local	141.83	151.69	2.05	2	0.00
	Trial Mean	**141.70**	**146.68**	**1.90**		

Table 17. Seed yield (q/ha) in Initial Varietal Trial on Chenopodium: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Palampur	Shimla	Overall		Location	Frequency
					Mean	Rank		
1	IC 107297	3.38*	0.02	1.56	1.65	5	3	1/3
2	PRC 9805	1.16	0.31	2.20	1.22	8	3	0/3
3	SMLCP 1	3.24*	0.19	3.34*	2.26	2	3	2/3
4	SMLCP 2	2.46	0.58	3.34*	2.13	3	3	1/3
5	SMLCP 3	3.08	0.41	1.37	1.62	6	3	0/3
6	SMLCP 4	3.31*	0.08	1.21	1.53	7	3	1/3
7	SMLCP 5	2.69	0.70	4.83*	2.74	1	3	1/3
8	Local	0.87		3.22*	2.05	4	2	1/2
	Mean	**2.52**	**0.33**	**2.63**	**1.90**			
	C.D. (5%)	**0.77**	**5.37**	**0.14**				
	CV (%)	**17.27**	**5.39**	**3.09**				

Table 18. Plant height (cm) in Initial Varietal Trial on Chenopodium: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Palampur	Shimla	Overall	
					Mean	Rank
1	IC 107297	120.97	114.40	192.47	142.61	5
2	PRC 9805	128.32	94.97	195.73	139.67	7
3	SMLCP 1	71.22	132.67	195.57	133.15	8
4	SMLCP 2	76.72	133.96	262.30	157.66	1
5	SMLCP 3	120.27	80.87	247.27	149.47	4
6	SMLCP 4	96.40	104.60	225.77	142.26	6
7	SMLCP 5	85.27	144.93	240.68	156.96	2
8	Local	78.45		224.93	151.69	3
	Mean	**97.20**	**115.20**	**223.09**	**146.68**	
	C.D. (5%)	**42.32**	**50.75**	**39.88**		
	CV (%)	**24.80**	**24.75**	**10.18**		

Table 19. Days to flowering in Initial Varietal Trial on Chenopodium: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Palampur	Shimla	Overall	
					Mean	Rank
1	IC 107297	56.33	54.33	94.33	68.33	4
2	PRC 9805	56.00	59.67	96.00	70.56	6
3	SMLCP 1	49.00	55.00	82.67	62.22	1
4	SMLCP 2	53.67	52.67	82.67	63.00	2
5	SMLCP 3	56.33	54.00	94.00	68.11	3
6	SMLCP 4	60.00	56.67	94.67	70.44	5
7	SMLCP 5	61.00	59.67	92.67	71.11	7
8	Local	52.00		95.67	73.84	8
	Mean	**55.54**	**56.00**	**91.58**	**68.45**	
	C.D. (5%)	**2.85**	**5.37**	**1.36**		
	CV (%)	**2.92**	**5.39**	**0.85**		

Table 20. Days to maturity in Initial Varietal Trial on Chenopodium: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Palampur	Shimla	Overall		Location	Frequency
					Mean	Rank		
1	IC 107297	133.00	151.67	146.33	143.67	5	3	0/3
2	PRC 9805	141.00	147.00	164.67	150.89	7	3	0/3
3	SMLCP 1	120.00*	152.00	130.00*	134.00	1	3	2/3
4	SMLCP 2	125.00*	148.33	132.33*	135.22	2	3	2/3
5	SMLCP 3	140.33	146.00	161.00	149.11	6	3	0/3
6	SMLCP 4	121.33*	148.00	149.00	139.44	3	3	1/3
7	SMLCP 5	124.00*	147.00	147.33	139.44	3	3	1/3
8	Local	122.67*		161.00	141.83	4	2	1/2
	Mean	**128.42**	**148.57**	**148.96**	**141.70**			
	C.D. (5%)	**2.89**	**13.15**	**5.95**				
	CV (%)	**1.28**	**4.97**	**2.27**				

Table 21. Inflorescence length (cm) in Initial Varietal Trial on Chenopodium: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Shimla	Overall	
				Mean	Rank
1	IC 107297	19.05	26.27	22.66	8
2	PRC 9805	29.85	24.53	27.19	2
3	SMLCP 1	23.17	32.07	27.62	1
4	SMLCP 2	22.30	29.95	26.13	4
5	SMLCP 3	25.50	28.63	27.07	3
6	SMLCP 4	23.13	28.40	25.77	5
7	SMLCP 5	18.33	28.53	23.43	6
8	Local	19.37	27.35	23.36	7
	Mean	**22.59**	**28.22**	**25.40**	
	C.D. (5%)	**10.11**	**3.70**		
	CV (%)	**25.49**	**7.48**		

Table 22. Performance of Rice bean entries in Initial Varietal Trial during 2004 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety			
				Mean	Location	PRR 1	PRR 2	RBL 6	RBL 1
1	BRS 1	132.50	6.86	8.57	4	-37.14	-25.56	-34.34	-65.38
2	LRB 122	129.06	7.34	11.53	5	-15.42	0.16	-11.66	-53.42
3	LRB 303	128.17	7.00	13.02	5	-4.45	13.15	-0.20	-47.38
4	LRB 354	125.22	7.03	12.59	5	-7.65	9.35	-3.55	-49.14
5	LRB 355	127.11	7.03	14.34	5	5.18	24.56	9.86	-42.07
6	PRR 9402	126.44	7.36	12.48	5	-8.44	8.43	-4.37	-49.58
7	Totru Local	93.00	5.56	7.09	1	-47.98	-38.40	-45.67	-71.35
8	BRS 2	120.78	7.09	14.78	3	8.46	28.44	13.28	-40.27
9	PRR 1 (C)	124.56	6.25	13.63	5	0.00	18.42	4.44	-44.93
10	PRR 2 (C)	124.44	7.18	11.51	5	-15.55	0.00	-11.80	-53.49
11	RBL 6 ©	128.94	6.64	13.05	5	-4.26	13.38	0.00	-47.27
12	RBL 1 ©	110.17	7.03	24.75	1	81.58	115.03	89.66	0.00
	Trial mean	**122.53**	**6.87**	**13.11**					

Table 23. Seed Yield (q/ha) in Initial Varietal Trial on Rice bean: 2004 (Hills)

S. No.	Genotypes	Bhowali	Ranichauri	Almora	Shillong*	Palampur	Shimla	Overall		Location	Frequency
								Mean	Rank		
1	BRS 1		2.89	1.77		9.67	19.94	8.57	11	4	0/4
2	LRB 122	20.32	2.84	3.60	16.50	8.89	22.00	11.53	9	5	0/5
3	LRB 303	20.61	2.87	1.73	14.32	10.42	29.49	13.02	6	5	0/5
4	LRB 354	19.08	2.91	2.06	16.41	9.81	29.07	12.59	7	5	0/5
5	LRB 355	31.91	2.82	2.69	15.45	10.84	23.43	14.34	3	5	0/5
6	PRR 9402	24.01	2.94	1.67	15.55	9.39	24.39	12.48	8	5	0/5
7	Totru Local					7.09		7.09	12	1	0/1
8	BRS 2			3.27		9.09	31.99	14.78	2	3	0/3
9	PRR 1 (C)	21.65	3.10	1.69	7.85	11.27	30.44	13.63	4	5	0/5
10	PRR 2 (C)	22.43	2.42	3.48	13.13	9.61	19.59	11.51	10	5	0/5
11	RBL 6 ©	21.89	2.84	1.73	14.45	11.20	27.58	13.05	5	5	0/5
12	RBL 1 ©	24.75			15.57			24.75	1	1	0/1
	Mean	**22.96**	**2.85**	**2.37**	**14.36**	**9.75**	**25.79**	**13.11**			
	C.D. (5%)	**12.06**	**0.54**	**0.53**	**9.63**	**3.75**	**6.00**				
	CV (%)	**30.35**	**11.72**	**13.34**	**38.62**	**22.55**	**13.48**				

*** The data from Shillong not included in overall mean due to high C.V.**

Table 24. Plant Height (cm) in Initial Varietal Trial on Rice bean: 2004 (Hills)

S. No.	Genotypes	Bhowali	Ranichauri	Almora	Shillong	Palampur	Shimla	Overall	
								Mean	Rank
1	BRS 1		96.73	72.33		111.67	206.67	121.85	11
2	LRB 122	176.33	116.43	128.67	86.83	115.67	212.77	139.45	1
3	LRB 303	216.67	122.70	90.33	90.46	99.67	194.73	135.76	4
4	LRB 354	196.33	116.48	97.33	87.94	110.67	203.47	135.37	5
5	LRB 355	211.33	99.80	93.00	98.15	103.33	204.53	135.02	6
6	PRR 9402	194.33	109.00	81.67	93.08	101.00	195.23	129.05	7
7	Totru Local					53.67		53.67	12
8	BRS 2			111.00		109.67	190.40	137.02	3
9	PRR 1 (C)	175.00	105.82	92.67	83.62	97.00	182.20	122.72	10
10	PRR 2 (C)	149.33	110.50	94.00	90.44	111.33	197.47	125.51	8
11	RBL 6 ©	198.00	130.60	91.67	94.96	115.00	198.63	138.14	2
12	RBL 1 ©	158.00			90.39			124.19	9
	Mean	**186.15**	**112.01**	**95.27**	**90.65**	**102.61**	**198.61**	**124.81**	
	C.D. (5%)	**43.85**	**20.76**	**34.07**	**24.03**	**18.24**	**37.55**		
	CV (%)	**13.61**	**11.50**	**20.86**	**15.32**	**10.42**	**11.03**		

Table 25. Days to Flowering in Initial Varietal Trial on Rice bean: 2004 (Hills)

S. No.	Genotypes	Bhowali	Ranichauri	Almora	Shillong	Palampur	Shimla	Overall	
								Mean	Rank
1	BRS 1		93.00	69.00		81.00	82.33	81.33	12
2	LRB 122	86.67	103.00	70.33	47.67	85.67	87.67	80.17	10
3	LRB 303	83.67	94.00	68.67	47.67	85.33	88.00	77.89	8
4	LRB 354	84.33	93.67	68.33	48.00	83.00	87.00	77.39	7
5	LRB 355	83.67	90.33	66.67	47.33	78.67	89.33	76.00	5
6	PRR 9402	78.67	86.33	69.00	47.67	81.33	89.00	75.33	3
7	Totru Local					55.67		55.67	1
8	BRS 2			67.33		85.00	89.67	80.67	11
9	PRR 1 (C)	84.33	85.33	66.00	47.33	85.00	87.67	75.95	4
10	PRR 2 (C)	82.67	92.00	68.33	47.67	81.00	88.33	76.67	6
11	RBL 6 ©	84.33	93.00	69.67	47.67	88.00	88.30	78.50	9
12	RBL 1 ©	84.67			47.33			66.00	2
	Mean	**83.67**	**92.30**	**68.33**	**47.59**	**80.88**	**87.73**	**75.13**	
	C.D. (5%)	**4.79**	**2.87**	**1.58**	**0.99**	**10.41**	**2.50**		
	CV (%)	**3.31**	**1.93**	**1.34**	**1.20**	**7.54**	**1.66**		

Table 26. Days to Maturity in Initial Varietal Trial on Rice bean: 2004 (Hills)

S. No.	Genotypes	Bhowali	Ranichauri	Almora	Shillong	Palampur	Shimla	Overall		Location	Frequency
								Mean	Rank		
1	BRS 1		163.33	105.00		118.33	143.33	132.50	12	4	0/4
2	LRB 122	125.67	171.33	115.00	98.33	118.67	145.33	129.06	11	5	0/5
3	LRB 303	123.33	166.00	116.33	99.00	118.67	145.67	128.17	9	5	0/5
4	LRB 354	120.00	163.33	105.67	99.33	118.67	144.33	125.22	6	5	0/5
5	LRB 355	121.67	160.33	119.67	100.33	118.00	142.67	127.11	8	5	0/5
6	PRR 9402	122.00	159.00	115.33	100.67	119.33	142.33	126.44	7	5	0/5
7	Totru Local					93.00*		93.00	1	1	1/1
8	BRS 2			106.00		114.00	142.33	120.78	3	3	0/3
9	PRR 1 (C)	121.00	156.00	109.00	101.00	119.00	141.33	124.56	5	5	0/5
10	PRR 2 (C)	120.67	161.33	105.67	100.33	118.33	140.33	124.44	4	5	0/5
11	RBL 6 ©	127.67	166.00	116.33	101.33	119.00	143.33	128.94	10	5	0/5
12	RBL 1 ©	120.67			99.67			110.17	2	1	0/1
	Mean	**122.52**	**162.96**	**111.40**	**100.00**	**115.91**	**143.10**	**122.53**			
	C.D. (5%)	**5.75**	**3.26**	**8.06**	**2.02**	**2.76**	**4.32**				
	CV (%)	**2.71**	**1.24**	**4.22**	**1.17**	**1.40**	**1.76**				

Table 27. 100-Seed Weight (g) in Initial Varietal Trial on Rice bean: 2004 (Hills)

S. No.	Genotypes	Ranichauri	Almora	Bhowali	Shillong	Palampur	Shimla	Overall	
								Mean	Rank
1	BRS 1	8.78	4.33			6.51	7.84	6.86	7
2	LRB 122	8.64	4.65	7.89	8.77	7.25	6.86	7.34	2
3	LRB 303	8.46	5.10	8.19	6.43	7.09	6.76	7.00	6
4	LRB 354	7.85	4.80	8.30	6.97	7.47	6.82	7.03	5
5	LRB 355	7.66	4.81	8.67	6.90	7.26	6.87	7.03	5
6	PRR 9402	8.83	4.68	7.45	7.57	7.67	7.96	7.36	1
7	Totru Local					5.56		5.56	10
8	BRS 2		5.61			7.23	8.44	7.09	4
9	PRR 1 (C)	7.55	3.81	6.72	4.80	6.72	7.92	6.25	9
10	PRR 2 (C)	8.03	5.53	7.65	6.47	7.78	7.61	7.18	3
11	RBL 6 ©	6.90	4.60	7.51	7.00	7.18	6.66	6.64	8
12	RBL 1 ©			8.15	5.90			7.03	5
	Mean	**8.08**	**4.79**	**7.84**	**6.76**	**7.07**	**7.37**	**6.87**	
	C.D. (5%)	**0.04**	**0.36**	**0.59**	**1.10**	**1.69**	**0.03**		
	CV (%)	**0.34**	**4.38**	**4.33**	**9.38**	**14.02**	**0.24**		

Table 28. Performance of Adzuki bean entries in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) during 2004 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety
				Mean	Location	HPU 51
	AVT-II					
1	Shimla-1	99.44	12.37	27.07	2	24.80
2	Shimla-2	101.78	13.63	22.87	2	5.42
3	Shimla-3	103.67	14.08	19.58	2	-9.73
4	Shimla-3-A-1	105.89	15.25	20.57	2	-5.16
	IVT					
5	HPAB 21	107.89	14.51	27.03	2	24.62
6	HPAB 25	104.11	15.66	23.06	2	6.32
7	HPAB 27	110.00	20.25	18.87	2	-13.02
8	HPAB 51	103.44	13.36	28.18	2	29.90
9	SMLAB-1	105.78	13.06	27.13	2	25.06
10	SMLAB-2	99.56	12.61	20.46	2	-5.69
11	SMLAB-3	105.44	14.15	20.41	2	-5.89
12	SMLAB-4	101.56	14.12	23.41	2	7.94
13	SMLAB-5	111.11	14.66	22.89	2	5.52
14	SMLAB-6	102.89	14.76	27.24	2	25.60
15	SMLAB-7	108.00	16.32	23.51	2	8.38
16	SMLAB-8	103.11	13.55	24.64	2	13.58
17	SMLAB-9	106.00	13.85	27.18	2	25.30
18	SMLAB-10	101.11	14.72	24.31	2	12.09
19	IC 241041	105.89	13.17	23.63	2	8.94
20	HPU 51 ©	109.11	16.20	21.69	2	0.00
	Trial mean	**104.79**	**14.51**	**23.69**		

Table 29. Seed Yield (q/ha) in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) on Adzuki bean: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Palampur*	Overall		Location	Frequency
					Mean	Rank		
	AVT-II							
1	Shimla-1	18.46	35.68*	6.88	27.07	5	2	½
2	Shimla-2	19.30	26.43	10.29	22.87	14	2	0/2
3	Shimla-3	14.07	25.09	10.17	19.58	19	2	0/2
4	Shimla-3-A-1	19.80	21.34	7.83	20.57	16	2	0/2
	IVT							
5	HPAB 21	20.65	33.41*	8.08	27.03	6	2	½
6	HPAB 25	22.43	23.69	5.63	23.06	12	2	0/2
7	HPAB 27	13.19	24.54	9.71	18.87	20	2	0/2
8	HPAB 51	24.30	32.05*	10.88	28.18	1	2	½
9	SMLAB-1	25.81	28.44*	8.88	27.13	4	2	½
10	SMLAB-2	15.98	24.93	6.67	20.46	17	2	0/2
11	SMLAB-3	25.87	14.96	6.54	20.41	18	2	0/2
12	SMLAB-4	24.72	22.10	3.75	23.41	11	2	0/2
13	SMLAB-5	14.16	31.61*	10.25	22.89	13	2	½
14	SMLAB-6	29.28*	25.20	8.90	27.24	2	2	½
15	SMLAB-7	16.64	30.38*	11.58	23.51	10	2	½
16	SMLAB-8	25.67	23.60	3.76	24.64	7	2	0/2
17	SMLAB-9	24.13	30.22*	5.88	27.18	3	2	½
18	SMLAB-10	17.18	31.44*	6.79	24.31	8	2	½
19	IC 241041	17.60	29.66*	9.25	23.63	9	2	½
20	HPU 51 ©	23.12	20.26	13.09	21.69	15	2	0/2
	Mean	**20.62**	**26.75**	**8.24**	**23.69**			
	C.D. (5%)	**3.44**	**7.05**	**7.11**				
	CV (%)	**10.44**	**16.46**	**53.89**				

*** Data from Palampur not included in overall mean due to high C.V.**

Table 30. Plant Height (cm) in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) on Adzuki bean: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Palampur	Overall	
					Mean	Rank
	AVT-II					
1	Shimla-1	104.67	40.63	86.47	77.26	9
2	Shimla-2	94.67	38.82	89.40	74.29	16
3	Shimla-3	99.83	45.30	98.67	81.27	4
4	Shimla-3-A-1	101.67	44.50	91.60	79.26	7
	IVT					
5	HPAB 21	109.50	48.95	73.00	77.15	10
6	HPAB 25	101.83	40.88	79.53	74.08	17
7	HPAB 27	76.17	53.15	80.67	69.99	20
8	HPAB 51	81.67	38.87	98.27	72.93	19
9	SMLAB-1	111.67	43.60	75.60	76.96	11
10	SMLAB-2	107.17	36.20	85.13	76.17	12
11	SMLAB-3	108.67	41.22	76.33	75.41	13
12	SMLAB-4	113.83	36.37	72.00	74.07	18
13	SMLAB-5	108.17	45.72	96.20	83.36	2
14	SMLAB-6	111.67	38.98	94.40	81.68	3
15	SMLAB-7	102.00	51.35	79.20	77.52	8
16	SMLAB-8	104.33	43.57	75.40	74.43	15
17	SMLAB-9	99.17	50.55	75.20	74.97	14
18	SMLAB-10	115.17	48.90	75.60	79.89	6
19	IC 241041	114.00	48.62	88.87	83.83	1
20	HPU 51 ©	108.67	37.03	96.93	80.88	5
	Mean	**103.73**	**43.66**	**84.42**	**77.27**	
	C.D. (5%)	**13.05**	**12.42**	**5.20**		
	CV (%)	**7.86**	**17.77**	**3.85**		

Table 31. Days to Flowering in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) on Adzuki bean: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Palampur	Overall	
					Mean	Rank
	AVT-II					
1	Shimla-1	76.00	55.33	59.00	63.44	4
2	Shimla-2	74.67	69.33	56.67	66.89	14
3	Shimla-3	72.00	69.67	55.67	65.78	9
4	Shimla-3-A-1	70.33	76.33	56.00	67.56	15
	IVT					
5	HPAB 21	71.33	64.67	61.00	65.67	8
6	HPAB 25	71.67	60.67	63.00	65.11	7
7	HPAB 27	78.00	70.67	63.00	70.56	17
8	HPAB 51	76.00	60.00	62.00	66.00	10
9	SMLAB-1	76.00	65.33	58.00	66.44	13
10	SMLAB-2	76.33	59.00	59.00	64.78	5
11	SMLAB-3	73.00	64.67	61.00	66.22	11
12	SMLAB-4	52.00	60.67	61.00	57.89	1
13	SMLAB-5	75.00	65.33	63.00	67.78	16
14	SMLAB-6	72.00	70.00	57.00	66.33	12
15	SMLAB-7	76.67	69.00	66.33	70.67	18
16	SMLAB-8	71.00	65.67	58.00	64.89	6
17	SMLAB-9	70.67	59.33	58.00	62.67	3
18	SMLAB-10	71.33	66.00	57.00	64.78	5
19	IC 241041	71.00	55.00	56.00	60.67	2
20	HPU 51 ©	71.00	65.33	63.00	66.44	13
	Mean	**72.30**	**64.60**	**59.68**	**65.53**	
	C.D. (5%)	**15.58**	**1.40**	**1.05**		
	CV (%)	**13.47**	**1.35**	**1.10**		

Table 32. Days to Maturity in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) on Adzuki bean: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Palampur	Overall		Location	Frequency
					Mean	Rank		
	AVT-II							
1	Shimla-1	104.33*	92.00*	102.00*	99.44	1	3	3/3
2	Shimla-2	105.33	100.00*	100.00*	101.78	5	3	2/3
3	Shimla-3	106.00	104.00*	101.00*	103.67	9	3	2/3
4	Shimla-3-A-1	110.67	108.00	99.00*	105.89	13	3	1/3
	IVT							
5	HPAB 21	111.00	106.67*	106.00	107.89	15	3	1/3
6	HPAB 25	112.33	98.00*	102.00*	104.11	10	3	2/3
7	HPAB 27	118.67	109.33*	102.00*	110.00	18	3	2/3
8	HPAB 51	109.33	96.00*	105.00	103.44	8	3	1/3
9	SMLAB-1	111.33	102.00*	104.00	105.78	12	3	1/3
10	SMLAB-2	108.00	96.67*	94.00*	99.56	2	3	2/3
11	SMLAB-3	112.00	104.33*	100.00*	105.44	11	3	2/3
12	SMLAB-4	106.67	96.00*	102.00*	101.56	4	3	2/3
13	SMLAB-5	119.33	112.00	102.00*	111.11	19	3	1/3
14	SMLAB-6	111.33	103.33*	94.00*	102.89	6	3	2/3
15	SMLAB-7	114.33	107.00*	102.67*	108.00	16	3	2/3
16	SMLAB-8	111.00	96.33*	102.00*	103.11	7	3	2/3
17	SMLAB-9	116.67	100.33*	101.00*	106.00	14	3	2/3
18	SMLAB-10	104.33*	98.00*	101.00*	101.11	3	3	3/3
19	IC 241041	111.00	104.67*	102.00*	105.89	13	3	2/3
20	HPU 51 ©	109.67	113.67	104.00	109.11	17	3	0/3
	Mean	**110.67**	**102.42**	**101.28**	**104.79**			
	C.D. (5%)	**4.19**	**3.33**	**0.41**				
	CV (%)	**2.36**	**2.03**	**0.25**				

Table 33. 100-Seed Weight (g) in Advanced Varietal Trial-II (AVT-II) and Initial Varietal Trial (IVT) on Adzuki bean: 2004 (Hills)

S. No.	Genotypes	Shimla	Ranichauri	Palampur	Overall	
					Mean	Rank
	AVT-II					
1	Shimla-1	14.37	13.18	9.57	12.37	20
2	Shimla-2	18.30	13.03	9.54	13.63	14
3	Shimla-3	19.53	13.58	9.12	14.08	12
4	Shimla-3-A-1	21.67	14.16	9.94	15.25	5
	IVT					
5	HPAB 21	18.35	13.66	11.52	14.51	9
6	HPAB 25	18.54	15.17	13.26	15.66	4
7	HPAB 27	25.88	21.04	13.82	20.25	1
8	HPAB 51	16.73	11.45	11.89	13.36	16
9	SMLAB-1	16.77	13.52	8.89	13.06	18
10	SMLAB-2	18.10	11.62	8.10	12.61	19
11	SMLAB-3	19.50	14.66	8.28	14.15	10
12	SMLAB-4	18.53	12.48	11.36	14.12	11
13	SMLAB-5	19.50	13.67	10.82	14.66	8
14	SMLAB-6	22.60	10.35	11.32	14.76	6
15	SMLAB-7	25.20	10.93	12.84	16.32	2
16	SMLAB-8	17.70	13.25	9.71	13.55	15
17	SMLAB-9	17.70	14.05	9.79	13.85	13
18	SMLAB-10	19.77	14.32	10.07	14.72	7
19	IC 241041	18.37	11.95	9.20	13.17	17
20	HPU 51 ©	24.17	11.97	12.45	16.20	3
	Mean	**19.56**	**13.40**	**10.58**	**14.51**	
	C.D. (5%)	**1.06**	**0.04**	**2.11**		
	CV (%)	**3.39**	**0.20**	**12.44**		

2.2 PLAINS

The Varietal Trials and Germplasm Screening Nursery were constituted in grain amaranth, ricebean, faba bean, Kalingada, Kankoda and Tumba. Most of the experiments were conducted during the kharif 2004 season. However, in some crops such as faba bean and grain amaranth, experiments were conducted during the rabi 2003-2004 season at most of the centres in the northern and western India.

2.2.1 GRAIN AMARANTH (*Amaranthus spp.)*

In grain amaranth one Advanced Varietal Trial was constituted for combined multilocational testing in the plains in addition to germplasm evaluation nursery.

2.2.1.1 Advanced Varietal Trial

The Advanced Varietal Trial comprising 29 including four checks entries was proposed to be conducted at 11 locations. The trial was conducted during the rabi season in most of the other centres. Data have been received from 10 centres only. The summary of performance of the entries has been presented in table 34.

Significant differences were observed among the entries for grain yield at all the centres. Seed yield levels were high at S.K. Nagar (13.33 q/ha) and Mandor (13.00 q/ha) centres (Table 35). However, it was low at most of the other centres. The range of variation was quite high at S.K. Nagar (8.52 – 19.07 q/ha) followed by at Mandor (6.88 – 17.09 q/ha). The overall average showed that the entry SMLAM 7 (11.45 q/ha) was the highest yielder based on two locations whereas BGA 2, RMA 2 and Suvarna were better yielder based on the data of more than six locations.

Flowering time was the earliest at Bangalore (42.19 days) followed by at Mettupalayam centre; while it was moderately late at Ranchi and Ambikapur centres (Table 36). On the basis of single location Shimla A-5 (31.00 days) was the earliest flowering line followed by Shimla A-6 (33.75 days).

Maturity period was the earliest at Mettupalayam and Bangalore centres; moderate at Rahuri and late at other centres (Table 37). Shimla A-5 (68.00 days) and Shimla A-6 (68.50 days) were the earliest maturing lines based on single and two locations data respectively. The average maturity period of the entries was 107.75 days.

Plant height was the highest at Mettupalayam (197.90 cm) and the lowest at Ambikapur (32.36 cm) centre (Table 38). Ranchi and Faizabad centres showed low plant height while Bhubaneswar and S.K. Nagar centres showed high plant height. On the basis of average over the locations RMA 8 (208.68 cm) had the highest plant height based on two locations data and Shimla A-5 (62.00 cm) the lowest.

Inflorescence length of the entries showed wide variation ranging from 7.53 cm at Ambikapur to 67.67 cm at New Delhi (Table 39). At other locations low to moderate inflorescence length was observed. Variation among the entries was the highest at S.K. Nagar (38.50 – 91.25 cm) centre followed by Mandor (33.50 – 58.00 cm) centre. Based on the average over locations RMA 4 (49.96 cm) had the longest inflorescence and IC 268367 (8.80 cm) the shortest.

Test weight as measured by the weight of 10 ml seed showed maximum mean value at S.K. Nagar (10.96 g) and minimum at Bangalore (5.20 g) centre (Table 40). Based on the average over locations RAGS 92-10-1 had the highest seed weight (8.20 g).

2.2.2 RICE BEAN (*Vigna umbellata*)

2.2.2.1 Advanced Varietal Trial

The Advanced Varietal Trial on 10 entries and four checks was proposed to be conducted at 9 locations in the plains. Data have been received from all the locations. Summary performance of these entries has been indicated in table 41.

Seed yield level was moderate to high at most of the centres. The average seed yield ranged from 4.88 at New Delhi to 20.75 q/ha at Ludhiana (Table 42). Significant differences were observed among the entries for seed yield at all the locations. The range of variation was higher at Ludhiana (10.20 – 23.00 q/ha) and Bhubaneswar (7.33 – 14.99 q/ha) centres. On the basis of

average over seven locations the entry BRB 1 (11.21 q/ha) was the highest yielder followed by RBL 50 (10.92 q/ha).

Mean flowering time was the earliest at Bhubaneswar (41.91 days) centre closely followed by Mettupalayam (42.45 days) while it was the longest at Faizabad (82.21 days) centre (Table 43). At other locations early to moderate flowering period was observed. Based on the average over locations PRR 9402 (52.33 days) had the earliest flowering followed by RBL 35 (53.39 days).

Maturity period showed wide variation among the locations but very little among the entries. While the earliest maturity was observed at Mettupalayam (64.62 days), it was late at Faizabad (136.70 days) centre (Table 44). The range of variation was relatively higher at Ranchi (103.00 – 131.00 days). On the basis of average over the locations PRR 9302 (100.39 days) and RBL 50 (100.49 days) were the earliest flowering lines.

Plant height showed extreme variation ranging from 38.85 to 128.10 cm at Bangalore and New Delhi centres, respectively (Table 45). At other centres moderate to high (51.50 – 127.53 cm) plant height was observed. Based on the average over the locations the entry PRR 9302 (87.77 cm) had the minimum plant height.

Weight of 100 seeds was comparatively higher at Ludhiana (6.52 g) followed by Ranchi (6.14 g) and Mettupalayam (6.08 g) centres (Table 46). The range of variation was maximum at Mettupalaym (5.55 – 7.23 g) centre. Based on the average over locations LRB 355 (5.82 g) had the boldest seed and RBL 50 (5.09 g) the smallest.

Number of primary branches was recorded at eight centres. The average number of primary branches was the highest at Mettupalayam (5.63) and lowest (1.95) at Bangalore (Table 47).

2.2.3 FABA BEAN (*Vicia faba*)

2.2.3.1 Advanced Varietal Trial

The Advanced Varietal Trial consisting of 18 entries was planned to be conducted at six locations in the plains. Results have been received from all the

centres. The summary of performance of the entries has been presented in table 48.

Significant differences were observed among the entries for seed yield at all the centres. Mean seed yield levels were relatively low at most of the centres (Table 49). The range of variation in seed yield among the entries was from 6.29 to 15.28 q/ha at Hisar. At other centres less variation was recorded. The average over the locations showed that seed yield was the highest in the entry, HB 430 (9.02 q/ha) followed by HB 405 (8.97 q/ha).

Plant height was the highest at Ambikapur (67.35 cm) followed by Ranchi (62.14 cm) centre (Table 50). Moderate plant height was observed at other centres. Variation in plant height was higher at Hisar (38.00 – 60.33 cm) as compared to other centres. Based on the average over the locations HB 193 (59.51 cm) showed the highest plant height.

Flowering time ranged from 58.12 days at Ranchi to 81.45 days at New Delhi centre (Table 51). At Ranchi, Ambikapur and Ludhiana centres flowering was earlier as compared to that of other centres. Based on the average over the locations HB 430 (61.67 days) was the earliest flowering line followed by NDF 1 (61.73 days).

Maturity period varied among the locations with mean maturity period ranging from 130.14 days at Hisar to 162.71 days at Ludhiana centre (Table 52). Little variation was observed among New Delhi, Ambikapur, Faizabad and Ranchi centres with respect to maturity. On the basis of overall mean, HB 115 (137.06 days) had the earliest maturity.

Pod yield recorded at two locations showed wide variation between the centres (Table 53). It was the highest at Ambikapur (28.88 q/ha) and the lowest at Hisar (5.20 q/ha). Based on the average HB 123 (21.25 q/ha) had the highest pod yield.

Number of primary branches recorded at five centres revealed that it was the highest at Faizabad (5.19) and lowest at Ranchi (2.53) centre (Table 54). Based on the average BSH 9 (3.77) had the highest number of primary branches.

Number of pods per plant was high at New Delhi (26.80) and low at Ludhiana (11.94) centre (Table 55). Based on the average the check variety Vikrant (22.85) had the highest number of pods per plant.

Weight of 100 seeds recorded at six locations showed slight variation among the centres. Mean seed weight was the highest at Hisar (30.72 g) and the lowest at Ludhiana (21.44 g) centre (Table 56). Based on the average over the locations HB 131 (27.01 g) had the boldest seed.

2.2.4 WINGED BEAN (*Psophocarpus tetragonolobus*)

2.2.4.1 Observation Rows Trial

The Observation Row consisting of 10 entries mainly from Akola and Bangalore centres was conducted at two locations. The summary of performance of the entries has been given in table 57. Some entries showed superiority over the check variety, AKWB 1.

Seed yield (Table 58) was the highest at Bangalore (17.69 q/ha) followed by Rahuri (16.16 q/ha). The average seed yield over the locations ranged from 13.83 – 19.70 q/ha. The range of variation was the highest (8.85 – 21.87 q/ha) at Bhubaneswar. The entry EC 142665 yielded the highest (19.70 q/ha) and the NBRI Sel. (13.83 q/ha) the lowest.

Pod yield recorded at two centres showed variation between the centres as well as the entries (Table 59). It was the highest in the entry EC 178313 (33.59 q/ha) and the lowest in the check AKWB 1 (18.69 q/ha) based on the average. Pod yield was the highest at Bhubaneswar (26.04 q/ha) and the lowest at Rahuri (22.08 q/ha). The range of variation was also higher at Bhubaneswar (16.67 – 38.54 q/ha).

Plant height was higher at Rahuri (189.40 cm) than at Bangalore (156.23 cm) centre (Table 78). The range of variation was quite high at Rahuri centre (161.00 – 215.00 cm). Based on the average over locations Mysore Local (191.75 cm) had the maximum plant height and EC 38955 (146.75 cm) the minimum.

Flowering time of the entries recorded at three centres ranged from 64.97 to 71.55 days at different centres (Table 61). However, the variation at all the centres was negligible. Based on the average the entry Mysore Local 1 (66.39 days) showed the earliest and the entry, EC 178313 (70.72 days) the longest flowering time.

Maturity period of the entries was recorded at three centres (Table 62). Variation in maturity period was negligible at most of the centres. Maturity was the earliest at Bangalore (149.50 days) and Rahuri (161.50 days), while it was late at Bhubaneswar (178.00 days) centres. The entry Dwarf Mutant was the earliest maturing entry (142.33 days).

Pods per plant showed wide variation among the locations. While it was 69.15 at Rahuri centre but only 24.70 at Bhubaneswar centre (Table 63). EC 142665 had the highest pod per plant (46.57). 100 seed weight was higher at Rahuri (29.73 g) and Bhubaneswar (29.59 g) than at Bangalore centre (Table 64). Based on the average EC 178313 (27.11 g) had the highest seed weight.

2.2.5 KALINGADA (*Citrullus lanatus*)

Kalingada is primarily a vegetable crop grown for its ripe fruits which are used as vegetable. However, its seed yields useful oil. In Kalingada one Advanced Varietal Trial was proposed to be conducted during this year.

2.2.5.1 Observation Rows Trial

The Observation Rows Trial consisting of 14 entries was planned to be conducted at three locations. Results have been received from two locations. The summary of performance of the entries has been given in table 65. Seed yield levels were higher at S.K. Nagar (2.15 q/ha) as compared to those of Mandor (1.00 q/ha) centre (Table 66). The range of variation was also higher at S.K. Nagar (1.67 – 2.73 q/ha). The overall average yield of the entries ranged from 1.19 to 1.94 q/ha. The entry, SKNK 1 was the highest (1.94 q/ha) yielder and SKNK 21 the lowest (1.55 q/ha).

Flowering time recorded at S.K. Nagar centre showed that there was little variation (36.33 – 43.33 days) among the centres (Table 66). GK 1 was the

earliest flowering (36.33 days) line followed by SKNK 3 (38.33 days) and SKNK 2 (38.67 days) having very little difference in flowering period.

Maturity period of the entries was recorded at S.K. Nagar (68.24 days) centre (Table 66). Variation in maturity period was quite low (79.67 – 87.00 days). The entry SKNK 6 (79.67 days) was the earliest maturing one. Weight of green fruit and number of fruits also showed wide variations.

Fruit yield per plot and other yield contributing characters were recorded at Mandor centre (Table 67). There was wide difference among the entries with respect to yield attributes among the centres.

Weight of 100 seed was higher at Mandor (6.14 g) centre and lower at S.K. Nagar (5.98 g) centre (Table 68). The range of variation was higher at S.K. Nagar (4.70 – 6.71 g) as compared to that of Mandor (5.80 – 6.70 g) centre. The average over the locations showed that SKNK 17 (6.61 g) had the highest seed weight followed by GK 1 (6.57 g) and SKNK 11 (6.50 g).

2.2.6 KANKODA (*Momordica dioica*)

Kankoda is an important vegetable crop grown throughout the country. It's green immature fruits are preferred for their delicacy. In Kankoda one Observation Rows Trial was proposed to be conducted.

2.2.6.1 Observation Rows Trial

The Observation Rows Trial on six Kankoda entries was planted at four locations. The results have been received from all the four centres. The performance of the entries has been presented in Table 69.

Fruit yield was the highest at Rahuri centre (22.19 q/ha) and lowest at Bhubaneswar (1.45 q/ha) centre (Table 70). Frunit yield at other centes was moderate. Based on average RMF 1 (11.89 q/ha) was the highest yielder. Considerable variation was observed for days to fruiting (Table 71) at most of the locations (37.56 – 69.33 days). Earliest fruit setting (37.56 days) was observed at S.K. Nagar centre. Based on average RMF 1 (55.29 days) had earliest fruit setting. Number of fruits per plant showed wide variation (9.96 – 73.67) among the centres (Table 72). Highest number of fruits was observed at

Rahuri followed by S.K. Nagar centre. Average fruit number was the highest at RMF 17 (41.25).

There was not much variation among the centres for days taken to first picking (Table 73) and days taken for last picking (Table 74).

2.2.7 TUMBA (*Citrullus colocynthis*)

Tumba is an important crop of the desert region having wide medicinal value. Its seed is used for extracting oil which is used for industrial purposes. In Tumba an Observation Rows Trial was formulated.

2.2.7.1 Observation Rows Trial

In the Observation Rows Trial 10 entries were proposed to be evaluated at two locations. Results have been received from Mandor centre only. The yield attributes of the entries has been given in table 75. The entries did not set fruit yet.

2.2.8 JATROPHA (*Jatropha* spp.)

An Observation Rows Trial was planned to be conducted at seven locations where the plant is widely adapted.

2.2.8.1 Observation Rows Trial

The Observation Rows Trial with eight entries was conducted at five centres. The summary of performance of the entries has been given in table 76. The seed yield recorded in eight genotypes at three locations has been presented in table 77. Seed yield was higher at Rahuri centre as compared to that of other centres. The genotype Phule J-1 (3.57 q/ha) was the highest yielder based on the average over two locations followed by Local (3.47 q/ha) and Urlikanchan (3.38 q/ha).

Plant height was very high at Hisar (352.45 cm), medium at Bhubaneswar (196.06 cm) and S.K. Nagar (190.52 cm) low (190.52 cm) at Mandor (Table 78). Local had the highest plant height (225.66 cm) based on the average over locations.

Stem girth at Hisar was higher (38.84 cm) than that at S.K. Nagar (24.07 cm) or Bhubaneswar (22.51 cm) centre (Table 79). Based on the average performance Local (25.97 cm) had the highest stem girth.

Much variation was observed in test weight among the entries (Table 80) that ranged from 42.56 to 54.07 g. Based on the average Local (49.63 g) had the highest test weight followed by Chhatrapati (49.58 g).

Number of branches per plant (Table 81) recorded at two locations showed marginal variation ranging from 3.43 at Bhubanesar to 4.07 at S.K. Nagar. Based on the average Hansraj had the highest number of branches (4.42).

2.2.9 PARADISE TREE (*Simarouba glauca)*

Mettupalayam, S.K. Nagar, Bangalore and Bhubaneswar centres were entrusted with the responsibility of intensifying research on this species. Experiments are in progress at Mettupalayam, Bangalore, Bhubaneshwar, S.K. Nagar, Faizabad and Akola centres. Results from multilocational trials have not been received from the centres yet.

2.2.10 GUAYULE

Germplasm maintenance and evaluation work were to be carried out at Hisar, S.K. Nagar and Jodhpur centres. Results have not been received from any of the centres.

2.2.11 JOJOBA

Germplasm maintenance was to be conducted at Jodhpur centre. Results have not been received from the centre.

2.2.12 ATRIPLEX

Faizabad, Hisar and Mandor centres were entrusted with the responsibility of initiating work after procuring germplasm lines from NBPGR, Jodhpur. The germplasm accessions sent by NBPGR, Jodhpur did not germinate at Hisar centre.

Table 34. Performance of Grain Amaranth entries in Advanced Varietal Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 10 ml seed weight (g)	Mean yield over locations (q/ha)		Percent increase/decrease over check variety			
				Mean	Location	GA 1	GA 2	Suvarna	Annapurna
1	RMA 3 (AG-114)	123.71	7.43	8.53	10	30.46	15.61	-17.33	-3.59
2	RMA 4	121.35	7.50	9.06	10	38.46	22.70	-12.26	2.32
3	IC 41998	122.50	7.27	9.45	9	44.50	28.05	-8.43	6.78
4	MGA 2 (Rasna-2)	124.26	7.76	6.16	9	-5.78	-16.50	-40.29	-30.37
5	BGA 2	125.41	7.81	10.03	10	53.31	35.86	-2.85	13.29
6	BGA 3	126.75	7.71	9.04	8	38.25	22.51	-12.39	2.16
7	PRA 2004-1	72.88	7.09	9.16	8	40.06	24.12	-11.24	3.50
8	PRA 2004-2	73.38	6.18	9.06	2	38.53	22.76	-12.21	2.37
9	SKNA 21	118.94	7.49	9.36	2	43.12	26.83	-9.30	5.76
10	RMA 7	91.25	6.80	7.72	3	17.99	4.56	-25.23	-12.81
11	RMA 8	101.75	6.24	4.65	2	-28.90	-36.99	-54.94	-47.46
12	Shimla A-3	72.25	6.23	8.56	2	30.89	15.99	-17.05	-3.28
13	Shimla A-4	72.50	6.37	6.92	2	5.81	-6.23	-32.95	-21.81
14	Shimla A-5	68.00	5.48	6.95	1	6.27	-5.83	-32.66	-21.47
15	Shimla A-6	68.50	6.51	8.12	2	24.16	10.03	-21.32	-8.25
16	SMLAM 7	74.13	6.76	11.45	2	75.08	55.15	10.95	29.38
17	SMLAM 8	74.25	6.37	7.30	2	11.54	-1.15	-29.31	-17.57
18	RMA 2	127.39	7.77	10.16	6	55.28	37.60	-1.60	14.75
19	SKNA 7	127.89	7.77	9.61	6	46.88	30.16	-6.92	8.54
20	RAGS 92-10-1	129.87	8.20	8.73	6	33.53	18.33	-15.38	-1.32

S. No.	Genotypes	Mean maturity duration (days)	Mean 10 ml seed weight (g)	Mean yield over locations (q/ha)		Percent increase/decrease over check variety			
				Mean	Location	GA 1	GA 2	Suvarna	Annapurna
21	IC 120588	135.29	7.91	8.24	5	25.97	11.63	-20.17	-6.91
22	IC 35696	135.63	7.88	7.51	5	14.86	1.78	-27.21	-15.12
23	IC 32195	135.79	7.76	7.41	5	13.25	0.36	-28.23	-16.31
24	MGA 1	136.54	7.27	7.18	6	9.83	-2.67	-30.40	-18.84
25	IC 268367	110.00	7.53	4.94	2	-24.54	-33.13	-52.18	-44.24
26	Suvarna (C)	107.54	7.34	10.32	6	57.80	39.84	0.00	16.61
27	Annapurna ©	94.56	6.44	8.85	4	35.32	19.92	-14.24	0.00
28	GA 2 (C)	121.39	6.61	7.38	9	12.84	0.00	-28.49	-16.61
29	GA 1 (C)	131.09	7.75	6.54	8	0.00	-11.38	-36.63	-26.10
	Trial Mean	**107.75**	**7.14**	**8.22**					

Table 35. Grain Yield (q/ha) in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	New Delhi	Ambikapur	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Rahuri	Ranchi	Overall		Location	Frequency
												Mean	Rank		
1	RMA 3 (AG-114)	11.67	5.80	4.53	9.63	7.71*	16.88*	8.45	4.25	12.10	4.30	8.53	14	10	2/10
2	RMA 4	14.07	8.27	1.14	11.96*	7.15	17.09	8.34	5.33	13.09*	4.11	9.06	9	10	2/10
3	IC 41998	10.61		4.39	8.62	7.09	13.96	12.50*	10.03*	14.02*	3.83	9.45	6	9	3/9
4	MGA 2 (Rasna-2)	8.89	2.81	1.80	9.11	4.16	8.33		8.58	7.56	4.22	6.16	27	9	0/9
5	SKNA 21	18.15	9.63*	8.06	10.75*	6.78	13.75	7.70	1.56	12.42	4.80*	9.36	7	10	3/10
6	BGA 2	13.15		6.53	13.94*	4.31	14.58		14.66*	8.76	4.28	10.03	4	8	2/8
7	BGA 3	12.59		3.61	13.93*	5.84	15.00		9.38	7.61	4.37	9.04	10	8	1/8
8	PRA 2004-1							9.95	8.37			9.16	8	2	0/2
9	PRA 2004-2							10.19	7.93			9.06	9	2	0/2
10	RMA 7						6.88	11.11	5.16			7.72	17	3	0/3
11	RMA 8							6.59	2.71			4.65	28	2	0/2
12	Shimla A-3							8.22	8.90			8.56	13	2	0/2
13	Shimla A-4							6.01	7.83			6.92	24	2	0/2
14	Shimla A-5							6.95				6.95	23	1	0/1
15	Shimla A-6							9.43	6.81			8.12	16	2	0/2
16	SMLAM 7							11.05	11.85*			11.45	1	2	½
17	SMLAM 8							8.22	6.37			7.30	21	2	0/2
18	RMA 2	16.57*	6.98	7.50	7.19	7.06	15.63					10.16	3	6	1/6
19	SKNA 7	19.07*	10.12*	4.83	9.27	6.21	12.50				5.24*	9.61	5	6	3/6
20	RAGS 92-10-1	17.72	9.84*	1.72	7.53	5.18	13.55				5.59*	8.73	12	6	2/6
21	IC 120588	11.76		6.86	9.66	5.04	12.09				4.02	8.24	15	5	0/5
22	IC 35696	11.76		4.17	7.31	4.08	13.75				4.00	7.51	18	5	0/5

S. No.	Genotypes	S.K. Nagar	New Delhi	Ambikapur	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Rahuri	Ranchi	Overall		Location	Frequency
												Mean	Rank		
23	IC 32195	8.52		5.70	6.59	5.54	13.96				4.13	7.41	19	5	0/5
24	MGA 1	11.58	2.24	4.30	8.72	5.96	13.96				3.52	7.18	22	6	0/6
25	IC 268367			7.08					2.79			4.94	27	2	0/2
26	Suvarna (C)	11.38		7.78			11.67	10.77	8.92	11.41		10.32	2	6	0/6
27	Annapurna ©						9.79	9.03	5.16	11.40		8.85	11	4	0/4
28	GA 2 (C)		4.35	9.80	9.69	4.95	11.88	7.41	3.37	10.87	4.12	7.38	20	9	0/9
29	GA 1 (C)	15.85	3.17	2.61	6.65	5.40	11.67		2.91		4.07	6.54	25	8	0/8
	Mean	**13.33**	**6.32**	**5.13**	**9.41**	**5.78**	**13.00**	**8.94**	**6.80**	**10.92**	**4.31**	**8.22**			
	CD (5%)	**0.36**	**3.42**	**8.53**	**1.23**	**1.32**	**2.91**	**1.18**	**0.75**	**1.26**	**0.60**				
	CV (%)	**14.45**	**31.55**	**19.01**	**9.43**	**16.47**	**16.14**	**9.57**	**9.48**	**7.94**	**9.92**				

Table 36. Days to Flowering in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	New Delhi	Faizabad	Mandor	Bangalore	Mettupalayam	Bhubaneswar	Ambikapur	Rahuri	Ranchi	Overall	
												Mean	Rank
1	RMA 3 (AG-114)	55.00	82.33	72.75	51.25	58.25	53.25	63.00	85.25	56.25	89.75	66.71	16
2	RMA 4	54.00	83.67	73.00	46.25	52.00	52.75	64.25	86.00	56.00	85.75	65.37	15
3	IC 41998	71.75		95.00	58.50	48.50	45.00	67.50	82.50	50.25	89.25	67.58	20
4	MGA 2 (Rasna-2)	45.00	81.33	84.00	46.50		37.50	66.50	82.00	49.75	70.00	62.51	12
5	SKNA 21	50.00	80.67	70.25	46.75	50.25	52.75	62.75	78.75	56.50	77.75	62.64	13
6	BGA 2	63.50		72.00	58.50		44.75	76.75	83.00	56.00	86.00	67.56	19
7	BGA 3	72.25		89.00	55.50		43.75	76.00	85.50	53.50	86.75	70.28	23
8	PRA 2004-1					36.25	43.75					40.00	8
9	PRA 2004-2					35.25	44.50					39.88	7
10	RMA 7				33.75	49.75	51.25					44.92	9
11	RMA 8					55.00	52.25					53.63	10
12	Shimla A-3					33.75	38.00					35.88	5
13	Shimla A-4					32.75	38.25					35.50	3
14	Shimla A-5					31.00						31.00	1
15	Shimla A-6					32.50	35.00					33.75	2
16	SMLAM 7					34.50	36.75					35.63	4
17	SMLAM 8					34.25	37.00					35.63	4
18	RMA 2	54.50	79.67	75.00	47.00			61.75	82.75			66.78	17
19	SKNA 7	54.25	85.33	72.75	47.00			64.00	83.00		80.75	69.58	22
20	RAGS 92-10-1	47.50	77.33	81.50	47.00			62.75	84.25		75.50	67.98	21

S. No.	Genotypes	S.K. Nagar	New Delhi	Faizabad	Mandor	Bangalore	Mettupalayam	Bhubaneswar	Ambikapur	Rahuri	Ranchi	Overall	
												Mean	Rank
21	IC 120588	70.75		79.75	58.75			70.00	81.75		91.75	75.46	26
22	IC 35696	64.75		86.75	58.50			71.25	82.50		87.50	75.21	25
23	IC 32195	74.25		76.50	58.00			72.00	83.00		90.00	75.63	27
24	MGA 1	72.75	82.67	78.75	55.75			71.00	83.75		89.25	76.27	28
25	IC 268367						51.25		83.00			67.13	18
26	Suvarna (C)	74.75			57.75	46.50	45.25		79.50	53.00		59.46	11
27	Annapurna ©				34.25	37.25	33.50			48.00		38.25	6
28	GA 2 (C)		79.67	77.00	48.00	49.50	52.25	61.50	78.50	57.00	78.75	64.69	14
29	GA 1 (C)	54.75	82.33	82.25	56.75		49.25	64.25	87.50		95.25	71.54	24
	Mean	**61.23**	**81.50**	**79.14**	**50.83**	**42.19**	**44.67**	**67.20**	**82.92**	**53.63**	**84.93**	**57.12**	
	CD (5%)	**1.45**	**2.07**	**3.43**	**1.78**	**1.65**	**3.37**	**3.11**	**2.45**	**3.28**	**4.16**		
	CV (%)	**1.71**	**1.48**	**3.13**	**2.52**	**2.82**	**5.39**	**3.34**	**2.14**	**4.22**	**3.54**		

Table 37. Days to Maturity in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	New Delhi	Ambikapur	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Rahuri	Ranchi	Overall		Location	Frequency
												Mean	Rank		
1	RMA 3 (AG-114)	114.75	139.33	134.00	120.75*	145.25	119.00	95.25	110.00	99.25*	159.50	123.71	18	10	2/10
2	RMA 4	112.25	139.00	131.50	118.75*	141.50*	118.00	90.50	111.00	95.75*	155.25	121.35	15	10	3/10
3	IC 41998	115.00		132.75	137.75	145.50	119.75	90.75	85.00	111.25	164.75	122.50	17	9	0/9
4	MGA 2 (Rasna-2)	105.00	138.33	128.00	137.50	142.50	110.50		82.00	115.00	159.50	124.26	19	9	0/9
5	SKNA 21	110.50	138.67	123.00*	124.00*	141.00*	113.50	90.75	85.00	105.50*	157.50	118.94	14	10	4/10
6	BGA 2	110.50		133.00	141.50	141.25*	119.75		79.75	113.25	164.25	125.41	20	8	1/8
7	BGA 3	115.00		134.25	140.75	145.00	119.50		80.75	114.75	164.00	126.75	21	8	0/8
8	PRA 2004-1							77.75*	68.00*			72.88	5	2	2/2
9	PRA 2004-2							78.75*	68.00*			73.38	6	2	2/2
10	RMA 7						98.50	85.00	90.25			91.25	9	3	0/3
11	RMA 8							93.75	109.75			101.75	11	2	0/2
12	Shimla A-3							76.50*	68.00*			72.25	3	2	2/2
13	Shimla A-4							77.25*	67.75*			72.50	4	2	2/2
14	Shimla A-5							68.00*				68.00	1	1	1/1
15	Shimla A-6							70.25*	66.75*			68.50	2	2	2/2
16	SMLAM 7							81.25	67.00*			74.13	7	2	½
17	SMLAM 8							81.50	67.00*			74.25	8	2	1/2
18	RMA 2	110.00	137.33	131.75	123.00*	148.00	114.25					127.39	22	6	1/6
19	SKNA 7	110.00	138.00	124.50*	123.50*	141.75	113.25				144.25*	127.89	23	6	3/6
20	RAGS 92-10-1	110.50	137.33	124.25*	121.25*	146.50	118.75				150.50*	129.87	24	6	3/6
21	IC 120588	112.50		134.75	133.50	142.50	122.50				166.00	135.29	26	5	0/5

S. No.	Genotypes	S.K. Nagar	New Delhi	Ambikapur	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Rahuri	Ranchi	Overall		Location	Frequency
												Mean	Rank		
22	IC 35696	110.50		133.50	135.00	147.50	121.50				165.75	135.63	27	5	0/5
23	IC 32195	115.00		135.25	132.50	144.00	121.75				166.25	135.79	28	5	0/5
24	MGA 1	118.00	137.00	134.25	141.25	140.50*	119.50				165.25	136.54	29	6	1/6
25	IC 268367			130.00					90.00			110.00	13	2	0/2
26	Suvarna (C)	115.75		127.50			119.75	90.25	75.00	117.00		107.54	12	6	0/6
27	Annapurna ©						98.50	82.50	85.75	111.50		94.56	10	4	0/4
28	GA 2 (C)		138.00	129.25	136.75	143.50	98.50	90.75	85.75	111.50	158.50	121.39	16	9	0/9
29	GA 1 (C)	110.00	137.00	132.75	134.75	144.00	120.50		110.00		159.75	131.09	25	8	0/8
	Mean	**112.20**	**138.00**	**130.79**	**131.41**	**143.77**	**115.12**	**83.57**	**83.45**	**109.48**	**160.07**	**107.75**			
	CD (5%)	**1.21**	**0.80**	**2.17**	**3.64**	**1.85**	**3.07**	**2.06**	**0.66**	**3.22**	**4.57**				
	CV (%)	**0.78**	**0.34**	**1.20**	**2.00**	**0.93**	**1.91**	**1.78**	**0.56**	**2.03**	**2.07**				

Table 38. Plant Height (cm) in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	New Delhi	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Ambikapur	Rahuri	Ranchi	Overall	
												Mean	Rank
1	RMA 3 (AG-114)	154.75	125.61	127.18	59.85	92.50	202.25	217.25	40.30	107.50	52.70	117.99	12
2	RMA 4	147.25	135.22	101.80	58.05	95.50	173.20	241.25	28.70	104.25	39.85	112.51	16
3	IC 41998	114.25		143.15	49.80	102.25	173.20	195.00	30.10	106.50	42.45	106.30	17
4	MGA 2 (Rasna-2)	116.25	188.78	144.33	55.00	93.00		235.75	34.08	99.75	51.15	113.12	15
5	SKNA 21	164.75	143.22	148.53	59.85	134.00	184.25	243.50	42.05	108.50	49.05	127.77	7
6	BGA 2	125.75		150.58	47.65	104.00		202.00	27.35	79.00	48.50	98.10	20
7	BGA 3	121.50		146.65	55.40	101.25		217.00	27.30	76.75	52.55	99.80	19
8	PRA 2004-1						100.75	168.25				134.50	4
9	PRA 2004-2						110.05	154.25				132.15	5
10	RMA 7					47.00	169.85	251.75				156.20	2
11	RMA 8						180.35	237.00				208.68	1
12	Shimla A-3						95.20	153.25				124.23	8
13	Shimla A-4						98.80	148.50				123.65	10
14	Shimla A-5						62.20					62.20	29
15	Shimla A-6						82.35	126.00				104.18	18
16	SMLAM 7						102.15	145.25				123.70	9
17	SMLAM 8						92.90	182.50				137.70	3
18	RMA 2	146.00	116.56	121.58	57.35	89.50			36.30			94.55	22
19	SKNA 7	143.50	117.95	138.35	63.30	82.25			40.00		40.55	89.41	24
20	RAGS 92-10-1	135.75	114.22	101.08	56.95	83.75			28.10		39.65	79.93	28

S. No.	Genotypes	S.K. Nagar	New Delhi	Bhubaneswar	Faizabad	Mandor	Bangalore	Mettupalayam	Ambikapur	Rahuri	Ranchi	Overall	
												Mean	Rank
21	IC 120588	132.00		149.05	59.85	97.00			29.10		46.60	85.60	25
22	IC 35696	127.50		154.03	60.45	89.50			25.70		48.15	84.22	26
23	IC 32195	136.50		151.50	49.00	92.50			26.65		44.53	83.45	27
24	MGA 1	126.00	132.17	148.28	63.55	106.50			28.70		46.80	93.14	23
25	IC 268367							227.50	32.85			130.18	6
26	Suvarna (C)	138.25				97.75	135.05	193.00	36.95	80.75		113.63	14
27	Annapurna ©					48.00	97.95	163.25		77.75		96.74	21
28	GA 2 (C)		129.45	139.38	72.40	105.00	191.30	233.00	36.00	108.25	47.50	118.03	11
29	GA 1 (C)	168.75	130.11	144.30	63.55	118.25		220.75	32.20		49.25	115.90	13
	Mean	**137.42**	**133.33**	**138.11**	**58.25**	**93.66**	**132.46**	**197.90**	**32.36**	**94.90**	**46.62**	**112.67**	
	CD (5%)	**17.96**	**34.18**	**14.27**	**9.26**	**17.41**	**20.42**	**26.74**	**8.53**	**7.21**	**7.75**		
	CV (%)	**9.43**	**14.95**	**7.46**	**11.47**	**13.41**	**11.10**	**9.92**	**19.01**	**5.24**	**12.09**		

Table 39. Inflorescence Length (cm) in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	New Delhi	Faizabad	Mandor	Ambikapur	Overall	
							Mean	Rank
1	RMA 3 (AG-114)	83.00	57.78	20.35	54.50	8.85	44.90	7
2	RMA 4	89.75	75.22	18.80	57.00	9.05	49.96	1
5	IC 41998	43.75		17.85	37.00	6.50	26.28	15
8	MGA 2 (Rasna-2)	71.25	91.44	18.40	40.75	8.50	46.07	3
3	SKNA 21	91.25	67.26	19.70	58.00	10.40	49.32	2
6	BGA 2	42.75		16.20	36.25	5.35	25.14	16
7	BGA 3	39.75		16.80	35.50	6.35	24.60	18
4	RMA 7				37.50		37.50	10
9	RMA 2	88.25	63.00	17.50	54.75	9.60	46.62	4
10	SKNA 7	75.75	74.95	28.05	46.00	10.60	47.07	3
11	RAGS 92-10-1	76.50	64.00	19.80	50.25	7.10	43.53	8
12	IC 120588	48.25		17.30	35.25	5.70	26.63	14
13	IC 35696	42.75		18.20	34.50	3.50	24.74	17
14	IC 32195	38.50		19.90	33.50	3.90	23.95	19
15	MGA 1	47.75	58.78	22.05	36.75	6.40	34.35	12
16	IC 268367					8.80	8.80	20
17	Suvarna (C)	49.75			37.25	9.35	32.12	13
18	Annapurna ©				41.75		41.75	9
19	GA 2 (C)		64.11	22.45	50.50	8.15	36.30	11
20	GA 1 (C)	90.25	60.11	18.95	51.25	7.50	45.61	6
	Mean	**63.70**	**67.67**	**19.52**	**43.59**	**7.53**	**35.76**	
	CD (5%)	**8.18**	**18.86**	**5.67**	**5.03**	**2.36**		
	CV (%)	**9.26**	**16.26**	**20.95**	**8.33**	**22.61**		

Table 34. 10 ml Seed Weight (g) in Advanced Varietal Trial on Grain Amaranth: 2004 (Plains)

S. No.	Genotypes	Mettupalayam	Ambikapur	Bhubaneswar	Bangalore	New Delhi	S.K. Nagar	Rahuri	Mandor	Ranchi	Overall	
											Mean	Rank
1	RMA 3 (AG-114)	8.03	7.16	7.84	5.00	6.11	11.08	6.88	7.10	7.71	7.43	12
2	RMA 4	7.88	7.35	7.66	5.25	6.40	11.15	6.20	7.18	8.47	7.50	10
3	IC 41998	8.08	7.24	6.27	5.40		10.67	6.08	6.95	7.44	7.27	14
4	MGA 2 (Rasna-2)	7.53	7.54	7.11		7.29	10.83	6.69	7.00	8.08	7.76	6
5	SKNA 21	7.88	7.34	7.21	5.18	6.44	11.09	5.92	6.95	9.41	7.49	11
6	BGA 2	7.83	7.40	8.07			10.79	6.10	6.98	7.49	7.81	4
7	BGA 3	8.05	6.34	7.93			10.91	6.33	6.78	7.64	7.71	8
8	PRA 2004-1	8.38			5.80						7.09	15
9	PRA 2004-2	7.18			5.18						6.18	24
10	RMA 7	7.78			5.33				7.28		6.80	16
11	RMA 8	7.38			5.10						6.24	22
12	Shimla A-3	7.50			4.95						6.23	23
13	Shimla A-4	7.78			4.95						6.37	21
14	Shimla A-5				5.48						5.48	25
15	Shimla A-6	7.78			5.23						6.51	19
16	SMLAM 7	8.18			5.33						6.76	17
17	SMLAM 8	7.70			5.03						6.37	21
18	RMA 2		7.44	7.77		5.64	10.90		7.08		7.77	5
19	SKNA 7		7.39	7.28		5.82	10.93		6.73	8.46	7.77	5
20	RAGS 92-10-1		7.54	7.85		6.23	11.13		7.13	9.31	8.20	1

S. No.	Genotypes	Mettupalayam	Ambikapur	Bhubaneswar	Bangalore	New Delhi	S.K. Nagar	Rahuri	Mandor	Ranchi	Overall Mean	Rank
21	IC 120588		7.11	6.91			11.14		6.88	7.51	7.91	2
22	IC 35696		7.76	6.15			11.14		6.98	7.37	7.88	3
23	IC 32195		6.76	6.70			10.86		7.10	7.38	7.76	6
24	MGA 1		6.59	6.32		6.00	10.86		6.65	7.19	7.27	14
25	IC 268367	7.88	7.18								7.53	9
26	Suvarna (C)	8.03	7.09		5.13		10.72	6.19	6.85		7.34	15
27	Annapurna ©	7.40			5.00			5.99	7.38		6.44	20
28	GA 2 (C)	7.58	7.04	6.56	4.98	6.02		5.65	7.15	7.86	6.61	18
29	GA 1 (C)	8.18	7.24	6.54		6.23	11.21		6.90	7.96	7.75	7
	Mean	**7.81**	**7.20**	**7.14**	**5.20**	**6.22**	**10.96**	**6.20**	**7.00**	**7.95**	**7.14**	
	CD (5%)	**0.06**	**0.55**	**0.43**	**0.90**	**0.72**	**1.06**	**0.11**	**0.28**	**0.81**		
	CV (%)	**0.56**	**5.52**	**4.36**	**12.54**	**6.73**	**1.40**	**1.24**	**2.88**	**7.33**		

Table 41. Performance of Rice bean entries in Advanced Varietal Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety			
				Mean	Location	RBL 1	RBL 6	RBL 35	RBL 50
1	BRB 1	110.31	5.28	11.21	7	14.73	4.66	9.61	2.65
2	BRB 2	110.26	5.33	10.86	7	11.12	1.36	6.31	-0.59
3	RBL 99	105.44	5.54	9.73	9	-0.39	-9.13	-4.18	-10.88
4	LRB 303	105.95	5.65	10.77	9	10.26	0.59	5.53	-1.35
5	LRB 330	105.59	5.51	10.44	9	6.86	-2.52	2.43	-4.39
6	LRB 349	105.70	5.37	10.61	9	8.64	-0.90	4.05	-2.80
7	LRB 351	105.07	5.74	9.70	9	-0.67	-9.39	-4.44	-11.13
8	LRB 354	105.16	5.42	10.30	9	5.46	-3.80	1.15	-5.65
9	LRB 355	105.19	5.82	10.41	9	6.57	-2.78	2.17	-4.65
10	PRR 9302	100.39	5.31	8.55	8	-12.45	-20.14	-15.19	-21.67
11	RBL 1 ©	105.14	5.39	9.77	9	0.00	-8.78	-3.83	-10.53
12	RBL 6 ©	105.18	5.35	10.71	9	9.62	0.00	4.95	-1.92
13	RBL 35 ©	100.49	5.36	10.18	9	4.20	-4.95	0.00	-6.78
14	RBL 50 ©	106.72	5.09	10.92	9	11.77	1.96	6.91	0.00
	Trial mean	**105.47**	**5.44**	**10.30**					

Table 42. Seed Yield (q/ha) in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Ludhiana	Mettupalayam	Faizabad	Bhubaneswar	Ambikapur	Bangalore	Rahuri	New Delhi	Ranchi	Overall		Location	Frequency
											Mean	Rank		
1	BRB 1	21.70	6.75	5.70	14.99*	9.72		8.05		11.56	11.21	1	7	1/7
2	BRB 2	22.40	3.68	5.52	15.59*	8.72		10.43*		9.65	10.86	3	7	2/7
3	RBL 99	20.00	8.97	5.09	8.44	9.34	12.37	8.86	4.84	9.68	9.73	12	9	0/9
4	LRB 303	20.00	12.02	5.44	12.62*	10.07	12.74	9.26	5.68	9.13	10.77	4	9	1/9
5	LRB 330	21.20	13.06	5.97	11.06	9.48	10.76	8.00	3.95	10.49	10.44	7	9	0/9
6	LRB 349	18.60	8.01	6.90	12.09*	10.94	11.31	11.08*	5.01	11.60	10.61	6	9	2/9
7	LRB 351	23.00	5.02	6.21	10.68	10.77	10.71	8.34	4.74	7.88	9.70	13	9	0/9
8	LRB 354	22.80	7.75	6.73	10.05	10.66	9.66	11.07*	5.33	8.68	10.30	9	9	1/9
9	LRB 355	24.80	5.02	5.18	10.76	13.14	9.51	11.42*	4.52	9.37	10.41	8	9	1/9
10	PRR 9302	10.20	8.68	5.44	8.11	9.20	9.51	8.03		9.27	8.55	14	8	0/8
11	RBL 1 ©	21.70	5.25	7.25	7.33	10.56	13.57	8.39	4.32	9.55	9.77	11	9	0/9
12	RBL 6 ©	21.90	11.39	6.56	10.07	9.93	11.33	9.38	5.95	9.89	10.71	5	9	0/9
13	RBL 35 ©	20.70	8.74	8.97	9.32	11.21	9.35	8.76	4.79	9.79	10.18	10	9	0/9
14	RBL 50 ©	21.50	12.18	7.94	9.40	10.42	13.10	8.21	4.54	11.01	10.92	2	9	0/9
	Mean	**20.75**	**8.32**	**6.35**	**10.75**	**10.30**	**11.16**	**9.23**	**4.88**	**9.83**	**10.30**			
	C.D. (5%)	**3.20**	**1.41**	**1.04**	**1.68**	**2.06**	**0.89**	**0.56**	**3.12**	**1.76**				
	CV (%)	**10.81**	**12.21**	**11.86**	**11.31**	**14.46**	**5.74**	**4.41**	**27.79**	**10.67**				

Table 43. Days to Flowering in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Ludhiana	Faizabad	Bhubaneswar	Ambikapur	Bangalore	Mettupalayam	Rahuri	New Delhi	Ranchi	Overall	
											Mean	Rank
1	BRB 1	57.00	81.75	40.75	56.50		40.75	55.00		60.00	55.96	9
2	BRB 2	57.00	78.75	41.25	61.00		41.25	51.75		57.00	55.43	5
3	RBL 99	60.00	83.50	41.00	60.50	47.50	38.50	49.50	67.33	62.00	56.65	11
4	LRB 303	57.00	81.50	41.25	58.00	47.25	43.50	58.25	64.00	57.00	56.42	10
5	LRB 330	56.00	78.50	40.75	56.75	46.75	45.25	51.50	67.33	59.67	55.83	7
6	LRB 349	60.00	83.25	42.75	57.50	45.75	45.50	50.00	65.67	52.67	55.90	8
7	LRB 351	52.00	84.25	42.00	59.00	45.75	43.25	52.25	65.33	49.33	54.80	3
8	LRB 354	54.00	81.25	41.25	56.25	46.25	43.50	56.75	65.67	54.00	55.44	6
9	LRB 355	55.00	87.00	41.75	56.75	47.00	44.00	51.00	66.00	50.00	55.39	4
10	PRR 9302	51.00	82.50	42.50	52.75	47.00	42.50	48.75		51.67	52.33	1
11	RBL 1 ©	60.00	82.00	42.75	61.00	46.50	41.75	52.75	67.00	59.67	57.05	12
12	RBL 6 ©	60.00	81.25	44.75	60.00	47.25	41.00	52.50	68.67	63.00	57.60	13
13	RBL 35 ©	52.00	83.00	38.75	54.00	46.75	40.50	54.50	64.33	46.67	53.39	2
14	RBL 50 ©	65.00	82.50	45.25	62.50	47.25	43.00	51.00	70.00	72.67	59.91	14
	Mean	**66.33**	**82.21**	**41.91**	**58.04**	**46.75**	**42.45**	**52.54**	**66.48**	**56.81**	**55.86**	
	CD (5%)		**1.77**	**2.06**	**3.50**	**1.54**	**0.83**	**2.14**	**4.19**	**5.05**		
	CV (%)		**1.55**	**3.54**	**4.35**	**2.37**	**1.42**	**2.94**	**3.69**	**5.29**		

Table 44. Days to Maturity in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Ludhiana	Faizabad	Bangalore	Ambikapur	Mettupalayam	Rahuri	New Delhi	Ranchi	Overall		Location	Frequency
											Mean	Rank		
1	BRB 1	88.50	121.00	139.50		108.75	86.00	98.75		129.67	110.31	14	7	0/7
2	BRB 2	92.50	118.00	135.00		116.00	85.50	97.50		127.33	110.26	13	7	0/7
3	RBL 99	83.25	124.00	136.50	69.75	117.00	87.75	91.75	111.33	127.67	105.44	8	9	0/9
4	LRB 303	78.50	123.00	136.75	72.25	121.25	90.25	95.25	105.33	131.00	105.95	11	9	0/9
5	LRB 330	82.75	124.00	131.50	73.75	120.75	92.00	86.25	115.00	124.33	105.59	9	9	0/9
6	LRB 349	82.50	123.00	140.00	73.00	117.50	89.00	94.00	106.00	126.33	105.70	10	9	0/9
7	LRB 351	80.25	121.00	139.00	73.75	116.25	89.50	95.25	108.67	122.00	105.07	3	9	0/9
8	LRB 354	83.00	121.00	137.75	74.50	114.50	90.25	94.75	107.00	123.67	105.16	5	9	0/9
9	LRB 355	81.25	122.00	137.50	74.50	118.25	85.75	98.50	107.67	121.33	105.19	7	9	0/9
10	PRR 9302	82.75	118.00	137.25	73.50	108.25	86.00	88.00		109.33	100.39	1	8	0/8
11	RBL 1 ©	87.75	123.00	135.00	73.75	118.00	87.50	86.25	106.67	128.33	105.14	4	9	0/9
12	RBL 6 ©	86.50	123.00	130.50	71.50	115.25	85.50	97.00	109.67	127.67	105.18	6	9	0/9
13	RBL 35 ©	80.75	118.00	139.25	70.00	108.25	85.75	94.75	104.67	103.00	100.49	2	9	0/9
14	RBL 50 ©	88.25	125.00	138.25	70.25	116.75	87.00	93.00	112.67	129.33	106.72	12	9	0/9
	Mean	**84.18**	**121.71**	**136.70**	**72.54**	**115.48**	**64.62**	**119.18**	**108.61**	**123.64**	**105.47**			
	C.D. (5%)	**2.82**		**1.42**	**1.67**	**1.62**	**1.40**	**2.22**	**5.11**	**7.25**				
	CV (%)	**2.42**		**0.75**	**1.66**	**1.01**	**1.15**	**1.71**	**2.76**	**3.49**				

Table 45. Plant Height (cm) in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Mettupalayam	Ludhiana	Faizabad	Bhubaneswar	Ambikapur	Bangalore	Rahuri	New Delhi	Ranchi	Overall	
											Mean	Rank
1	BRB 1	47.00	129.00	120.73	85.30	119.60		107.50		116.47	103.66	2
2	BRB 2	41.50	126.00	120.98	82.00	122.45		112.00		108.17	101.87	7
3	RBL 99	46.50	142.00	120.00	79.13	119.05	40.80	103.25	141.40	123.27	101.71	8
4	LRB 303	41.50	130.00	123.30	77.10	146.45	40.05	110.50	116.80	117.80	100.39	9
5	LRB 330	42.75	137.00	130.10	66.45	120.40	45.75	124.00	129.80	124.00	102.25	5
6	LRB 349	42.50	124.00	130.55	76.30	122.55	41.50	105.25	127.00	106.00	97.29	12
7	LRB 351	46.50	137.00	126.63	78.93	109.10	42.75	105.00	121.73	116.90	98.28	11
8	LRB 354	61.25	129.00	127.40	83.65	123.10	31.75	104.00	120.53	118.97	99.96	10
9	LRB 355	52.25	144.00	127.05	90.45	115.40	32.50	126.75	142.67	101.47	103.62	3
10	PRR 9302	42.00	94.00	126.00	74.93	105.20	41.50	107.50		111.00	87.77	14
11	RBL 1 ©	64.00	140.00	133.00	86.13	118.85	41.05	110.00	141.27	117.57	105.76	1
12	RBL 6 ©	65.00	129.00	130.43	81.55	112.60	38.25	128.75	128.27	118.37	103.58	4
13	RBL 35 ©	64.50	82.00	134.55	74.25	113.85	33.00	136.00	116.53	107.37	95.78	13
14	RBL 50 ©	63.75	122.00	134.70	87.65	127.95	37.25	111.50	123.07	112.20	102.23	6
	Mean	**51.50**	**126.07**	**127.53**	**80.27**	**119.75**	**38.85**	**113.71**	**128.10**	**114.25**	**100.30**	
	CD (5%)	**1.22**		**3.73**	**5.59**	**14.23**	**11.97**	**5.76**	**27.59**	**16.67**		
	CV (%)	**1.71**		**2.11**	**5.02**	**8.58**	**22.24**	**3.65**	**12.62**	**8.68**		

Table 46. 100 Seed Weight (g) in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Mettupalayam	Faizabad	Bangalore	Ludhiana	Ambikapur	Rahuri	New Delhi	Ranchi	Overall	
											Mean	Rank
1	BRB 1	5.24	5.55	5.04		6.80	5.34	3.23		5.79	5.28	13
2	BRB 2	5.62	5.80	5.13		6.20	5.13	3.40		6.06	5.33	11
3	RBL 99	5.67	6.75	5.19	4.90	6.30	5.06	3.53	5.91	6.55	5.54	4
4	LRB 303	5.95	7.23	5.30	5.03	6.80	5.13	3.70	5.48	6.23	5.65	3
5	LRB 330	6.47	6.08	5.23	5.18	6.90	5.03	3.43	5.58	5.68	5.51	5
6	LRB 349	5.66	5.65	4.94	5.23	6.40	5.34	2.98	6.03	6.12	5.37	8
7	LRB 351	6.48	6.10	5.39	5.35	6.90	5.23	3.28	5.79	7.13	5.74	2
8	LRB 354	5.32	5.88	5.28	5.20	7.00	5.28	3.30	5.79	5.72	5.42	6
9	LRB 355	6.18	6.83	5.01	5.53	6.70	5.09	4.18	5.91	6.91	5.82	1
10	PRR 9302	5.61	6.05	5.10	5.18	6.00	5.10	3.90		5.58	5.31	12
11	RBL 1 ©	4.83	5.65	5.41	5.28	6.20	5.16	4.28	5.45	6.28	5.39	7
12	RBL 6 ©	5.07	6.10	5.35	4.95	6.50	4.91	3.38	5.87	6.03	5.35	10
13	RBL 35 ©	6.47	5.55	4.99	4.85	6.70	5.23	3.45	4.71	6.30	5.36	9
14	RBL 50 ©	4.89	5.85	4.99	4.83	5.90	4.55	4.08	5.12	5.64	5.09	14
	Mean	**5.68**	**6.08**	**5.17**	**5.12**	**6.52**	**5.11**	**3.58**	**5.60**	**6.14**	**5.44**	
	CD (5%)	**0.40**	**0.10**	**0.20**	**0.60**		**0.36**	**0.59**	**1.25**	**0.58**		
	CV (%)	**5.04**	**1.14**	**2.81**	**8.50**		**5.09**	**11.99**	**13.07**	**5.62**		

Table 47. Number of Primary Branches in Advanced Varietal Trial on Rice bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Mettupalayam	Ludhiana	Ambikapur	Bangalore	Rahuri	New Delhi	Ranchi	Overall	
										Mean	Rank
1	BRB 1	3.38	6.00	2.00	3.25		3.23		2.40	3.38	4
2	BRB 2	3.05	6.25	2.50	3.25		3.40		2.53	3.50	1
3	RBL 99	2.80	5.25	2.00	3.20	1.85	3.53	4.80	2.27	3.21	8
4	LRB 303	2.80	5.00	2.50	3.15	2.05	3.70	4.60	2.53	3.29	6
5	LRB 330	3.00	5.50	2.50	2.85	2.05	3.43	4.13	2.80	3.28	7
6	LRB 349	3.23	5.00	2.00	3.05	1.80	2.98	4.80	2.53	3.17	10
7	LRB 351	2.33	5.75	1.50	2.90	1.70	3.28	4.07	2.60	3.02	12
8	LRB 354	2.55	5.50	2.50	2.80	1.50	3.30	4.33	2.40	3.11	11
9	LRB 355	2.98	5.50	3.00	2.95	1.85	4.18	4.60	2.47	3.44	2
10	PRR 9302	3.03	6.00	2.00	2.65	2.30	3.90		2.53	3.20	9
11	RBL 1 ©	2.93	6.25	2.00	2.85	1.85	4.28	4.20	2.67	3.38	4
12	RBL 6 ©	2.80	6.25	1.50	3.10	2.20	3.38	4.93	3.00	3.39	3
13	RBL 35 ©	3.05	4.75	3.00	3.15	2.20	3.45	4.60	2.40	3.33	5
14	RBL 50 ©	2.98	5.75	2.50	3.25	2.10	4.08	4.07	2.80	3.44	2
	Mean	**2.92**	**5.63**	**2.25**	**3.03**	**1.95**	**3.58**	**4.47**	**2.57**	**3.30**	
	CD (5%)	**0.46**	**1.18**		**0.40**	**0.76**	**0.60**	**0.95**	**0.46**		
	CV (%)	**11.49**	**15.12**		**9.50**	**27.97**	**12.12**	**12.41**	**10.72**		

Table 48. Performance of Faba bean entries in Advanced Varietal Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety
				Mean	Location	Vikrant
1	HB 43	139.42	26.05	6.70	6	3.43
2	HB 115	137.06	25.62	6.39	6	-1.35
3	HB 123	138.65	26.51	7.41	6	14.39
4	HB 131	140.67	27.01	7.44	6	14.75
5	HB 180	141.31	26.95	6.73	6	3.84
6	HB 193	141.42	26.11	6.69	6	3.30
7	HB 405	141.93	26.68	8.97	5	38.49
8	HB 428	140.13	25.12	6.78	5	4.60
9	HB 430	139.13	26.02	9.02	5	39.13
10	HB 504	141.20	25.88	7.29	5	12.43
11	HB 509	137.27	26.58	8.16	5	25.96
12	HB 521	141.20	26.14	7.48	5	15.39
13	BSH 9	139.83	25.80	6.96	6	7.38
14	PRT 7	141.54	26.06	6.73	6	3.86
15	PRT 12	140.96	26.51	6.03	6	-6.98
16	NDF 1	140.27	26.33	6.97	5	7.49
17	ISV 10-2	129.00	24.92	7.73	1	19.34
18	Vikrant ©	140.96	26.18	6.48	6	0.00
	Trial Mean	**139.55**	**26.14**	**7.22**		

Table 49. Seed Yield (q/ha) in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Hisar	Ludhiana	Faizabad	Ambikapur	New Delhi	Ranchi	Overall		Location	Frequency
								Mean	Rank		
1	HB 43	7.87	6.24*	9.22	8.33	4.56	4.00	6.70	13	6	1/6
2	HB 115	8.10	6.90*	8.52	6.71	4.65	3.47	6.39	16	6	1/6
3	HB 123	12.96*	5.73*	9.91	8.19	3.82	3.86	7.41	7	6	2/6
4	HB 131	9.49	5.83*	9.66	9.56	4.78	5.30	7.44	6	6	1/6
5	HB 180	9.95*	6.76*	7.99	8.10	3.64	3.93	6.73	12	6	2/6
6	HB 193	9.49	4.68	11.12*	6.71	3.95	4.21	6.69	14	6	1/6
7	HB 405	15.28*	5.17	11.74*	8.70		3.98	8.97	2	5	2/5
8	HB 428	7.87	5.09	9.45	7.41		4.07	6.78	11	5	0/5
9	HB 430	15.05*	5.93*	8.45	11.02		4.63	9.02	1	5	2/5
10	HB 504	9.95*	5.41*	8.38	8.24		4.44	7.29	8	5	2/5
11	HB 509	13.89*	5.09	8.57	8.10		5.16	8.16	3	5	1/5
12	HB 521	9.26	4.40	10.72*	9.26		3.75	7.48	5	5	1/5
13	BSH 9	7.87	4.40	12.64*	9.82	3.96	3.06	6.96	10	6	1/6
14	PRT 7	7.18	5.73*	8.82	8.56	6.11	3.98	6.73	12	6	1/6
15	PRT 12	6.71	4.81	9.42	6.94	4.60	3.68	6.03	17	6	0/6
16	NDF 1	6.29	4.86	11.91*	8.57		3.20	6.97	9	5	1/5
17	ISV 10-2				7.73			7.73	4	1	0/1
18	Vikrant ©	8.33	4.53	8.45	9.44	4.21	3.90	6.48	15	6	0/6
	Mean	**9.74**	**5.39**	**9.70**	**8.41**	**4.43**	**4.04**	**7.22**			
	C.D. (5%)	**1.22**	**0.66**	**1.72**	**3.20**	**0.87**	**1.82**				
	CV (%)	**7.83**	**7.44**	**11.06**	**23.75**	**13.48**	**28.10**				

Table 50. Plant Height (cm) in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Hisar	Ludhiana	Ambikapur	Faizabad	New Delhi	Ranchi	Overall	
								Mean	Rank
1	HB 43	38.00	53.00	70.33	50.67	51.29	62.20	54.25	10
2	HB 115	45.33	43.00	70.73	48.27	50.50	62.20	53.34	14
3	HB 123	48.67	42.00	75.40	61.27	53.83	63.40	57.43	3
4	HB 131	54.33	39.00	70.13	56.00	48.52	61.13	54.85	9
5	HB 180	59.00	42.00	65.13	51.07	50.72	63.40	55.22	8
6	HB 193	54.67	43.00	67.27	54.67	49.14	66.20	55.82	6
7	HB 405	59.33	45.00	63.20	67.60		62.40	59.51	2
8	HB 428	55.33	38.00	67.53	63.67		57.20	56.35	4
9	HB 430	57.67	41.00	65.40	50.40		61.67	55.23	7
10	HB 504	55.33	31.00	66.27	54.07		67.60	54.85	9
11	HB 509	60.33	38.00	63.40	48.47		57.70	53.58	12
12	HB 521	51.67	38.00	57.27	60.13		59.93	53.40	13
13	BSH 9	48.67	45.00	72.00	55.20	54.69	62.67	56.37	4
14	PRT 7	43.00	38.00	66.33	54.40	49.77	64.63	52.69	17
15	PRT 12	47.33	43.00	66.33	47.80	50.98	62.93	53.06	16
16	NDF 1	45.67	38.00	69.40	53.27		60.00	53.27	15
17	ISV 10-2			60.20				60.20	1
18	Vikrant ©	37.33	41.00	76.00	49.53	58.27	61.10	53.87	11
	Mean	**50.69**	**41.06**	**67.35**	**54.50**	**51.77**	**62.14**	**55.18**	
	C.D. (5%)	**6.87**		**14.16**	**9.68**	**8.66**	**7.70**		
	CV (%)	**8.45**		**13.13**	**11.10**	**11.54**	**7.75**		

Table 51. Days to Flowering in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Ambikapur	Hisar	Ludhiana	Faizabad	New Delhi	Ranchi	Overall	
								Mean	Rank
1	HB 43	61.33	65.33	62.00	73.00	80.25	60.00	66.99	16
2	HB 115	60.00	66.67	62.00	79.00	79.75	54.67	67.01	17
3	HB 123	59.33	66.67	57.00	65.33	81.75	60.67	65.13	10
4	HB 131	59.00	65.67	62.00	74.33	81.50	59.00	66.92	15
5	HB 180	60.67	64.33	59.00	74.67	84.00	57.00	66.61	14
6	HB 193	60.33	65.67	59.00	71.00	83.25	60.33	66.60	13
7	HB 405	58.00	65.00	59.00	77.00		55.33	62.87	6
8	HB 428	60.67	67.00	59.00	66.67		55.67	61.80	4
9	HB 430	57.00	66.67	57.00	69.33		58.33	61.67	2
10	HB 504	58.00	66.00	58.00	72.67		59.67	62.87	6
11	HB 509	56.67	68.33	59.00	71.00		56.00	62.20	5
12	HB 521	59.33	68.00	59.00	68.67		62.00	63.40	7
13	BSH 9	59.67	66.67	57.00	72.33	81.25	59.00	65.99	12
14	PRT 7	57.00	64.67	59.00	67.00	82.50	57.33	64.58	9
15	PRT 12	57.00	66.67	57.00	74.67	79.50	59.33	65.69	11
16	NDF 1	56.00	64.33	57.00	71.00		60.33	61.73	3
17	ISV 10-2	56.33						56.33	1
18	Vikrant ©	58.67	68.33	57.00	69.00	80.75	53.33	64.51	8
	Mean	**58.61**	**66.24**	**58.76**	**71.57**	**81.45**	**58.12**	**64.05**	
	C.D. (5%)	**2.67**	**2.49**		**2.32**	**2.52**	**4.29**		
	CV (%)	**2.85**	**2.35**		**2.03**	**2.13**	**4.62**		

Table 52. Days to Maturity in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Hisar	Ludhiana	Faizabad	Ambikapur	New Delhi	Ranchi	Overall		Location	Frequency
								Mean	Rank		
1	HB 43	121.33*	164.00	138.00	138.67	136.50	138.00	139.42	6	6	1/6
2	HB 115	114.67*	163.00	137.00	133.67	137.00	137.00	137.06	2	6	1/6
3	HB 123	117.00*	165.00	137.67	135.00	138.25	139.00	138.65	4	6	1/6
4	HB 131	135.67*	161.00	137.33	134.00	138.00	138.00	140.67	10	6	1/6
5	HB 180	132.67*	164.00	140.33	135.67	139.50	135.67	141.31	13	6	1/6
6	HB 193	131.67*	165.00	137.33	136.67	138.50	139.33	141.42	14	6	1/6
7	HB 405	132.33*	164.00	140.67	132.67		140.00	141.93	16	5	1/5
8	HB 428	128.67*	161.00	134.67	136.33		140.00	140.13	8	5	1/5
9	HB 430	128.67*	161.00	133.00	132.00*		141.00	139.13	5	5	2/5
10	HB 504	133.33*	162.00	139.00	132.00*		139.67	141.20	12	5	2/5
11	HB 509	125.33*	161.00	132.33	131.00*		136.67	137.27	3	5	2/5
12	HB 521	134.33*	161.00	137.33	132.67		140.67	141.20	12	5	1/5
13	BSH 9	128.00*	164.00	140.67	132.67	138.00	135.67	139.83	7	6	1/6
14	PRT 7	137.00	161.00	141.00	132.67	138.25	139.33	141.54	15	6	0/6
15	PRT 12	140.67	164.00	135.67	130.67*	136.75	138.00	140.96	11	6	1/6
16	NDF 1	130.33*	163.00	139.33	129.67*		139.00	140.27	9	5	2/5
17	ISV 10-2				129.00*			129.00	1	1	1/1
18	Vikrant ©	140.67	162.00	133.33	135.00	135.75	139.00	140.96	11	6	0/6
	Mean	**130.14**	**162.71**	**137.33**	**133.33**	**137.65**	**138.59**	**139.55**			
	C.D. (5%)	**4.73**		**5.64**	**2.47**	**1.56**	**3.37**				
	CV (%)	**2.27**		**2.57**	**1.16**	**0.78**	**1.52**				

Table 53. Pod Yield (q/ha) in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Hisar	Ambikapur	Overall	
				Mean	Rank
1	HB 43	4.73	29.16	16.95	10
2	HB 115	5.24	27.31	16.28	14
3	HB 123	7.09	35.42	21.25	2
4	HB 131	4.99	31.48	18.24	8
5	HB 180	4.82	36.11	20.47	5
6	HB 193	4.74	36.57	20.66	4
7	HB 405	7.51	25.24	16.38	12
8	HB 428	4.33	28.24	16.29	13
9	HB 430	6.83	27.32	17.07	9
10	HB 504	5.27	21.76	13.52	16
11	HB 509	6.34	18.29	12.31	18
12	HB 521	5.35	24.08	14.71	15
13	BSH 9	4.38	37.27	20.83	3
14	PRT 7	4.34	32.41	18.37	7
15	PRT 12	4.01	35.88	19.95	6
16	NDF 1	3.52	29.40	16.46	11
17	ISV 10-2		22.92	22.92	1
18	Vikrant ©	4.91	21.07	12.99	17
	Mean	**5.20**	**28.88**	**17.53**	
	C.D. (5%)	**0.24**	**9.81**		
	CV (%)	**2.91**	**21.22**		

Table 54. Number of Primary Branches in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Ambikapur	New Delhi	Faizabad	Hisar	Ranchi	Overall	
							Mean	Rank
1	HB 43	2.87	3.43	5.20	3.33	2.67	3.50	8
2	HB 115	2.87	3.05	4.87	2.33	2.13	3.05	16
3	HB 123	3.20	3.30	5.87	3.33	2.80	3.70	2
4	HB 131	2.93	4.30	5.07	3.67	2.40	3.67	3
5	HB 180	2.67	3.25	5.67	3.67	2.53	3.56	6
6	HB 193	3.07	3.65	5.53	3.33	2.47	3.61	4
7	HB 405	3.07		4.93	3.00	2.53	3.38	13
8	HB 428	3.13		5.33	3.00	2.33	3.45	10
9	HB 430	3.07		4.07	4.00	2.53	3.42	11
10	HB 504	3.73		4.80	3.00	2.73	3.57	5
11	HB 509	2.87		4.93	3.00	2.60	3.35	14
12	HB 521	3.00		5.20	3.33	2.53	3.52	7
13	BSH 9	3.20	3.70	6.00	3.33	2.60	3.77	1
14	PRT 7	2.13	3.45	5.40	2.67	2.67	3.26	15
15	PRT 12	2.87	3.75	5.13	3.33	2.33	3.48	9
16	NDF 1	3.27		5.67	2.67	2.47	3.52	7
17	ISV 10-2	2.87					2.87	17
18	Vikrant ©	3.00	4.20	4.53	2.67	2.60	3.40	12
	Mean	**2.99**	**3.61**	**5.19**	**3.16**	**2.53**	**3.45**	
	C.D. (5%)	**0.83**	**1.32**	**1.54**	**1.01**	**0.67**		
	CV (%)	**17.42**	**25.16**	**18.55**	**20.02**	**16.62**		

Table 55. Number of Pods/plant in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	New Delhi	Ludhiana	Overall	
				Mean	Rank
1	HB 43	28.25	14.00	21.13	2
2	HB 115	26.00	12.00	19.00	6
3	HB 123	22.63	13.00	17.82	9
4	HB 131	25.45	12.00	18.73	7
5	HB 180	25.25	14.00	19.63	5
6	HB 193	26.35	13.00	19.68	3
7	HB 405		10.00	10.00	15
8	HB 428		14.00	14.00	11
9	HB 430		12.00	12.00	13
10	HB 504		14.00	14.00	11
11	HB 509		12.00	12.00	13
12	HB 521		13.00	13.00	12
13	BSH 9	27.30	12.00	19.65	4
14	PRT 7	29.90	7.00	18.45	8
15	PRT 12	21.55	10.00	15.78	10
16	NDF 1		11.00	11.00	14
17	Vikrant ©	35.30	10.00	22.65	1
	Mean	**26.80**	**11.94**	**16.38**	
	C.D. (5%)	**8.46**			
	CV (%)	**21.85**			

Table 56. 100-seed Weight (g) in Advanced Varietal Trial on Faba bean: 2004 (Plains)

S. No.	Genotypes	Ambikapur	Hisar	Ludhiana	Faizabad	New Delhi	Ranchi	Overall	
								Mean	Rank
1	HB 43	25.02	31.37	20.00	25.50	25.21	29.21	26.05	11
2	HB 115	23.03	28.50	21.90	26.97	23.73	29.62	25.62	15
3	HB 123	23.95	30.50	22.50	26.77	25.05	30.28	26.51	5
4	HB 131	28.18	32.10	20.20	25.17	25.80	30.60	27.01	1
5	HB 180	22.47	31.43	22.70	27.43	27.81	29.83	26.95	2
6	HB 193	22.13	29.60	22.90	25.60	24.77	31.63	26.11	9
7	HB 405	21.82	32.70	20.30	28.23		30.33	26.68	3
8	HB 428	21.18	29.73	21.90	24.83		27.97	25.12	16
9	HB 430	18.07	32.80	23.10	26.83		29.31	26.02	12
10	HB 504	23.48	31.57	18.20	25.50		30.66	25.88	13
11	HB 509	23.20	32.80	21.30	26.00		29.60	26.58	4
12	HB 521	21.22	29.83	23.20	26.03		30.44	26.14	8
13	BSH 9	24.60	28.83	23.00	24.80	25.69	27.89	25.80	14
14	PRT 7	23.62	30.33	20.80	26.03	24.77	30.81	26.06	10
15	PRT 12	22.05	31.37	22.60	26.13	26.89	30.02	26.51	5
16	NDF 1	23.47	28.77	20.70	28.60		30.14	26.33	6
17	ISV 10-2	24.92						24.92	17
18	Vikrant ©	23.13	30.00	19.20	27.03	28.18	29.54	26.18	7
	Mean	**23.08**	**30.72**	**21.44**	**26.32**	**25.79**	**29.87**	**26.14**	
	C.D. (5%)	**0.29**	**0.22**		**3.71**	**2.02**	**2.62**		
	CV (%)	**0.80**	**0.46**		**8.81**	**5.39**	**5.48**		

Table 57. Performance of Winged bean entries in Observation Row Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean seed yield over locations (q/ha)		Percent increase/ decrease over check variety
				Mean	Location	AKWB 1
1	EC 178313	165.67	27.11	15.51	3	0.66
2	EC 178271	163.67	26.36	15.46	3	0.34
3	EC 178331	169.33	27.63	16.22	3	5.23
4	EC 142665	166.33	27.56	19.70	3	27.85
5	EC 38955	167.56	25.85	14.85	3	-3.62
6	IC 26945	163.44	26.50	19.07	3	23.72
7	NBRI Sel.	162.56	25.81	13.83	3	-10.28
8	Mysore Local-1	165.11	25.58	14.98	3	-2.76
9	Dwarf Mutant	142.33	25.80	14.21	3	-7.78
10	AKWB-1 (C)	164.67	26.98	15.41	3	0.00
	Trial mean	**163.07**	**26.52**	**15.92**		

Table 58. Seed yield (q/ha) in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Bangalore	Rahuri	Overall		Location	Frequency
					Mean	Rank		
1	EC 178313	18.43*	16.67	11.44	15.51	4	3	1/3
2	EC 178271	12.92	16.11	17.35*	15.46	5	3	1/3
3	EC 178331	15.62	16.94	16.08*	16.22	3	3	1/3
4	EC 142665	21.87*	20.49	16.75*	19.70	1	3	2/3
5	EC 38955	10.94	18.58	15.04	14.85	8	3	0/3
6	IC 26945	20.62*	19.10	17.48*	19.07	2	3	2/3
7	NBRI Sel.	9.83	14.51	17.14*	13.83	10	3	1/3
8	Mysore Local-1	10.73	15.97	18.25*	14.98	7	3	1/3
9	Dwarf Mutant	8.85	17.01	16.77*	14.21	9	3	1/3
10	AKWB-1 (C)	9.37	21.53	15.34	15.41	6	3	0/3
	Mean	**13.92**	**17.69**	**16.16**	**15.92**			
	CD (5%)		**1.12**	**0.56**				
	CV (%)		**7.69**	**3.20**				

Table 59. Pod yield (q/ha) in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	Overall	
				Mean	Rank
1	EC 178313	30.72	36.46	33.59	1
2	EC 178271	18.18	19.79	18.98	9
3	EC 178331	22.64	25.63	24.13	5
4	EC 142665	17.59	33.96	25.78	3
5	EC 38955	18.52	21.88	20.20	8
6	IC 26945	22.69	38.54	30.61	2
7	NBRI Sel.	26.34	24.58	25.46	4
8	Mysore Local-1	21.61	23.54	22.58	6
9	Dwarf Mutant	21.75	19.38	20.56	7
10	AKWB-1 (C)	20.71	16.67	18.69	10
	Mean	**22.08**	**26.04**	**24.06**	
	CD (5%)	**0.89**			
	CV (%)	**3.70**			

Table 60. Plant Height (cm) in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bangalore	Rahuri	Overall	
				Mean	Rank
1	EC 178313	227.33	165.00	196.17	6
2	EC 178271	216.33	215.00	215.67	2
3	EC 178331	231.33	207.00	219.17	1
4	EC 142665	212.00	172.00	192.00	9
5	EC 38955	227.00	162.50	194.75	7
6	IC 26945	189.00	205.00	197.00	4
7	NBRI Sel.	196.00	191.50	193.75	8
8	Mysore Local-1	185.67	208.00	196.83	5
9	Dwarf Mutant	198.33	163.00	180.67	10
10	AKWB-1 (C)	203.33	210.00	206.67	3
	Mean	**208.63**	**189.90**	**199.27**	
	CD (5%)	**48.96**	**11.99**		
	CV (%)	**13.69**	**2.79**		

Table 61. Days to Flowering in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Bangalore	Rahuri	Overall	
					Mean	Rank
1	EC 178313	72.00	65.67	74.50	70.72	9
2	EC 178271	74.00	63.67	70.00	69.22	7
3	EC 178331	71.00	64.67	68.50	68.06	6
4	EC 142665	75.00	59.67	75.00	69.89	8
5	EC 38955	70.00	65.67	67.00	67.56	4
6	IC 26945	63.00	69.67	70.00	67.56	4
7	NBRI Sel.	61.00	65.67	74.00	66.89	3
8	Mysore Local-1	63.00	64.67	71.50	66.39	1
9	Dwarf Mutant	62.00	64.67	77.00	67.89	5
10	AKWB-1 (C)	66.00	65.67	68.00	66.56	2
	Mean	**67.70**	**64.97**	**71.55**	**68.07**	
	CD (5%)			**4.14**		
	CV (%)			**2.56**		

Table 62. Days to Maturity in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bangalore	Bhubaneswar	Rahuri	Overall		Location	Frequency
					Mean	Rank		
1	EC 178313	155.00	184.00	158.00	165.67	7	3	0/3
2	EC 178271	151.00	183.00	157.00	163.67	4	3	0/3
3	EC 178331	157.00	180.00	171.00	169.33	10	3	0/3
4	EC 142665	151.00	186.00	162.00	166.33	8	3	0/3
5	EC 38955	153.67	184.00	165.00	167.56	9	3	0/3
6	IC 26945	157.33	178.00	155.00*	163.44	3	3	1/3
7	NBRI Sel.	154.67	171.00	162.00	162.56	2	3	0/3
8	Mysore Local-1	153.33	174.00	168.00	165.11	6	3	0/3
9	Dwarf Mutant	104.00*	165.00	158.00	142.33	1	3	1/3
10	AKWB-1 (C)	158.00	175.00	161.00	164.67	5	3	0/3
	Mean	**149.50**	**178.00**	**161.70**	**163.07**			
	CD (5%)	**43.60**		**5.53**				
	CV (%)	**17.01**		**1.51**				

Table 63. Pods per Plant in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bangalore	Bhubaneswar	Rahuri	Overall	
					Mean	Rank
1	EC 178313	23.20	24.00	60.00	35.73	9
2	EC 178271	23.27	27.00	65.50	38.59	7
3	EC 178331	23.43	26.00	75.50	41.64	4
4	EC 142665	33.20	30.00	76.50	46.57	1
5	EC 38955	21.03	23.00	63.50	35.84	8
6	IC 26945	23.47	31.00	74.00	42.82	2
7	NBRI Sel.	31.67	22.00	68.00	40.56	6
8	Mysore Local-1	33.87	22.00	70.00	41.96	3
9	Dwarf Mutant	21.60	20.00	61.00	34.20	10
10	AKWB-1 (C)	25.27	22.00	77.50	41.59	5
	Mean	**26.00**	**24.70**	**69.15**	**39.95**	
	CD (5%)	**11.17**		**13.90**		
	CV (%)	**25.06**		**8.89**		

Table 64. 100-seed Weight (g) in Observation Row Trial on Winged bean: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Bangalore	Rahuri	Overall	
					Mean	Rank
1	EC 178313	31.42	19.67	30.23	27.11	3
2	EC 178271	29.47	20.53	29.07	26.36	6
3	EC 178331	30.05	21.70	31.15	27.63	1
4	EC 142665	33.00	19.60	30.08	27.56	2
5	EC 38955	28.75	20.83	27.97	25.85	7
6	IC 26945	31.40	18.27	29.84	26.50	5
7	NBRI Sel.	25.68	20.60	31.14	25.81	8
8	Mysore Local-1	28.24	20.20	28.31	25.58	10
9	Dwarf Mutant	28.23	20.50	28.68	25.80	9
10	AKWB-1 (C)	29.64	20.50	30.81	26.98	4
	Mean	**29.59**	**20.24**	**29.73**	**26.52**	
	CD (5%)		**3.60**	**1.91**		
	CV (%)		**10.37**	**2.85**		

Table 65. Performance of Kalingada entries in Observation Rows Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)		Percent increase/ decrease over check variety
				Mean	Location	GK 1
1	SKNK 1	83.33	5.61	1.94	2	5.16
2	SKNK 2	81.33	5.85	1.58	2	-14.13
3	SKNK 3	87.00	6.12	1.66	2	-10.05
4	SKNK 4	84.67	5.84	1.78	2	-3.26
5	SKNK 5	84.00	5.45	1.19	2	-35.33
6	SKNK 6	79.67	6.05	1.28	2	-30.43
7	SKNK 11	80.67	6.50	1.43	2	-22.28
8	SKNK 15	86.00	6.12	1.57	2	-14.67
9	SKNK 16	83.33	6.23	1.53	2	-17.12
10	SKNK 17	83.00	6.61	1.70	2	-7.88
11	SKNK 18	84.33	6.16	1.39	2	-24.46
12	SKNK 19	81.33	5.96	1.68	2	-8.97
13	SKNK 21	84.00	5.76	1.55	2	-15.76
14	GK-1 ©	85.00	6.57	1.84	2	0.00
	Trial mean	**83.40**	**6.06**	**1.58**		

Table 66. Seed Yield (q/ha) in Observation Rows Trial on Kalingada: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	Mandor	Overall		Location	Frequency
				Mean	Rank		
1	SKNK 1	3.15*	0.72	1.94	1	2	½
2	SKNK 2	1.94	1.22	1.58	7	2	0/2
3	SKNK 3	2.73	0.58	1.66	6	2	0/2
4	SKNK 4	2.48	1.08	1.78	3	2	0/2
5	SKNK 5	1.68	0.70	1.19	14	2	0/2
6	SKNK 6	1.97	0.59	1.28	13	2	0/2
7	SKNK 11	1.83	1.03	1.43	11	2	0/2
8	SKNK 15	2.05	1.09	1.57	8	2	0/2
9	SKNK 16	2.27	0.78	1.53	10	2	0/2
10	SKNK 17	1.67	1.72*	1.70	4	2	½
11	SKNK 18	1.72	1.06	1.39	12	2	0/2
12	SKNK 19	2.04	1.31*	1.68	5	2	½
13	SKNK 21	1.96	1.14	1.55	9	2	0/2
14	GK-1 ©	2.64	1.03	1.84	2	2	0/2
	Mean	**2.15**	**1.00**	**1.58**			
	C.D. (5%)	**0.13**	**0.23**				
	CV (%)	**10.12**	**13.70**				

Table 67. Yield attributes in Observation Rows Trial on Kalingada: 2004 (Plains)

		Mandor			S.K. Nagar			
S. No.	Genotypes	Fruit Yield (q/ha)	No. of fruits/plot	Fruit circumference (cm)	Days to flowering	Green weight (q/ha)	No. of fruits	Days to maturity
1	SKNK 1	13.52	13.00	21.60	40.33	154.17	175.00	83.33
2	SKNK 2	20.74	11.00	25.20	38.67	76.85	143.52	81.33
3	SKNK 3	12.59	11.00	21.70	38.33	105.09	147.22	87.00
4	SKNK 4	21.11	17.00	24.00	40.67	122.22	126.85	84.67
5	SKNK 5	21.85	9.00	22.80	42.33	91.20	101.19	84.00
6	SKNK 6	10.00	10.00	20.70	43.33	78.70	104.63	79.67
7	SKNK 11	18.52	11.00	24.30	42.33	65.74	121.30	80.67
8	SKNK 15	19.25	13.00	24.80	39.67	71.30	150.93	86.00
9	SKNK 16	13.70	13.00	21.80	39.67	87.50	148.15	83.33
10	SKNK 17	19.63	14.00	25.60	42.67	89.56	97.37	83.00
11	SKNK 18	17.41	11.00	25.40	40.33	62.96	124.07	84.33
12	SKNK 19	28.14	17.00	25.70	39.33	60.65	113.89	81.33
13	SKNK 21	21.48	13.00	25.70	40.67	61.57	134.26	84.00
14	GK-1 ©	19.63	15.00	21.80	36.33	151.39	142.39	85.00
	Mean	**18.40**	**12.71**	**23.65**	**40.33**	**91.35**	**130.77**	**83.40**
	CD (5%)				**3.79**	**10.09**	**7.13**	**3.86**
	CV (%)				**5.59**	**16.75**	**8.97**	**2.75**

Table 68. 100-seed Weight (g) in Observation Rows Trial on Kalingada: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar	Mandor	Overall	
				Mean	Rank
1	SKNK 1	5.22	6.00	5.61	12
2	SKNK 2	5.89	5.80	5.85	9
3	SKNK 3	6.14	6.10	6.12	6
4	SKNK 4	5.77	5.90	5.84	10
5	SKNK 5	4.70	6.20	5.45	13
6	SKNK 6	6.09	6.00	6.05	7
7	SKNK 11	6.30	6.70	6.50	3
8	SKNK 15	5.74	6.50	6.12	6
9	SKNK 16	6.65	5.80	6.23	4
10	SKNK 17	6.71	6.50	6.61	1
11	SKNK 18	6.01	6.30	6.16	5
12	SKNK 19	6.11	5.80	5.96	8
13	SKNK 21	5.51	6.00	5.76	11
14	GK-1 ©	6.83	6.30	6.57	2
	Mean	**5.98**	**6.14**	**6.06**	
	CD (5%)	**0.25**			
	CV (%)	**2.54**			

Table 69. Performance of Kankoda entries in Advanced Varietal Trial during 2004 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean yield over location (q/ha)		Percent increase/ decrease over trial mean
			Mean	Location	
1	RMF 7-P-1	82.05	6.92	3	-29.85
2	RMF 5-P-4	85.50	10.87	3	10.26
3	RMF 1	76.95	11.89	3	20.62
4	RMF 17	79.40	11.88	3	20.44
5	RMF 27	72.05	8.71	3	-11.65
6	RMF 37	83.35	10.87	3	10.23
	Trial mean	**79.88**	**10.19**		

Table 70. Fruit Yield (q/ha) in Advanced Varietal Trial on Kankoda: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	S.K. Nagar*	Faizabad	Overall		Location
						Mean	Rank	
1	RMF 7-P-1	14.19	0.31	14.44	6.25	6.92	5	3
2	RMF 5-P-4	25.67	0.38	5.21	6.57	10.87	3	3
3	RMF 1	26.12	3.15	5.90	6.41	11.89	1	3
4	RMF 17	26.37	2.85	7.92	6.41	11.88	2	3
5	RMF 27	18.35	1.22	6.43	6.57	8.71	4	3
6	RMF 37	22.45	0.78	13.33	9.38	10.87	3	3
	Mean	**22.19**	**1.45**	**8.87**	**6.93**	**10.19**		
	CD (5%)	**1.11**		**NS**	**1.91**			
	CV (%)	**2.80**		**36.40**	**18.34**			

*** Data from S.K. Nagar not included in overall mean due to high CV**

Table 71. Days to Fruit Setting in Advanced Varietal Trial on Kankoda: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	S.K. Nagar	Faizabad	Overall	
						Mean	Rank
1	RMF 7-P-1	63.00	61.00	32.33	67.25	55.90	2
2	RMF 5-P-4	60.00	69.00	45.33	69.50	60.96	6
3	RMF 1	59.00	65.00	31.67	65.50	55.29	1
4	RMF 17	65.00	67.00	37.00	71.75	60.19	5
5	RMF 27	60.00	62.00	41.00	70.50	58.38	3
6	RMF 37	64.00	67.00	38.00	71.50	60.13	4
	Mean	**61.83**	**65.17**	**37.56**	**69.33**	**58.47**	
	CD (5%)	**12.22**		**2.93**	**2.57**		
	CV (%)	**11.11**		**4.28**	**2.47**		

Table 72. No. of Fruits/Plant in Advanced Varietal Trial on Kankoda: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	S.K. Nagar	Faizabad	Overall	
						Mean	Rank
1	RMF 7-P-1	53.00	12.00	55.67	12.00	25.67	6
2	RMF 5-P-4	79.00	13.00	33.00	11.00	34.33	3
3	RMF 1	83.00	18.00	68.00	8.25	36.42	2
4	RMF 17	92.00	22.00	26.67	9.75	41.25	1
5	RMF 27	64.00	9.00	30.33	11.25	28.08	5
6	RMF 37	71.00	11.00	32.67	7.50	29.83	4
	Mean	**73.67**	**14.17**	**41.06**	**9.96**	**32.60**	
	CD (5%)	**18.32**		**NS**	**2.45**		
	CV (%)	**13.97**		**43.12**	**16.36**		

*** Data from S.K. Nagar not included in overall mean due to high CV**

Table 73. Days Taken to First Picking in Advanced Varietal Trial on Kankoda: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	Overall	
				Mean	Rank
1	RMF 7-P-1	70.00	75.00	72.50	3
2	RMF 5-P-4	67.00	80.00	73.50	4
3	RMF 1	66.00	76.00	71.00	1
4	RMF 17	72.00	80.00	76.00	5
5	RMF 27	68.00	75.00	71.50	2
6	RMF 37	74.00	80.00	77.00	6
	Mean	**69.50**	**77.67**	**73.58**	
	CD (5%)	**7.98**			
	CV (%)	**6.45**			

Table 74. Days Taken to Last Picking in Advanced Varietal Trial on Kankoda: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	Faizabad	Overall	
					Mean	Rank
1	RMF 7-P-1	100.00	95.00	87.25	94.08	2
2	RMF 5-P-4	97.00	95.00	89.50	93.83	1
3	RMF 1	95.00	110.00	84.25	96.42	3
4	RMF 17	102.00	115.00	91.75	102.92	6
5	RMF 27	98.00	103.00	90.50	97.17	4
6	RMF 37	104.00	112.00	91.50	102.50	5
	Mean	**99.33**	**105.00**	**89.13**	**97.82**	
	CD (5%)	**4.46**		**2.69**		
	CV (%)	**2.52**		**2.00**		

Table 75. Yield attribues in Advanced Varietal Trial on Tumba: 2004 (Plains) – Mandor

S. No.	Genotypes	No. of plants/plot	Creeper length (cm)
1	RMT 401	3.00	75.30
2	RMT 402	3.00	62.00
3	RMT 403	3.00	89.30
4	RMT 404	3.00	150.00
5	RMT 405	3.00	172.30
6	RMT 406	3.00	51.30
7	RMT 407	3.00	119.70
8	RMT 408	3.00	141.00
9	RMT 409	3.00	138.70
10	RMT 59	3.00	70.70
	Mean	**3.00**	**107.03**

Table 76. Performance of Jatropha entries in Observation Rows Trial during 2004 (Plains)

S. No.	Genotypes	Mean 100 seed weight (g)	Mean yield over location (q/ha)		Percent increase/ decrease over check variety
			Mean	Location	Local
1	Hansaraj	48.42	2.52	3	-27.47
2	S.K. Nagar (Big)	47.00	3.24	3	-6.53
3	Urlikanchan	46.92	3.38	3	-2.59
4	Chhatrapti	49.58	3.34	3	-3.65
5	Local	49.63	3.47	3	0.00
6	Phule J-1	47.98	3.57	2	2.74
7	JH 17	47.51	2.76	2	-20.46
8	SKNJ 4	45.66	1.04	1	-70.03
	Trial mean	**47.84**	**2.91**		

Table 77. Seed yield (q/ha) in Observation Rows Trial on Jatropha species: 2004 (Plains)

S. No.	Genotypes	Bhubaneswar	Rahuri	Hisar	Overall		Location	Frequency
					Mean	Rank		
1	Hansaraj	2.13	2.76	2.66	2.52	7	3	0/3
2	S.K. Nagar (Big)	3.00	4.00	2.73	3.24	5	3	0/3
3	Urlikanchan	3.54	3.60	3.00	3.38	3	3	0/3
4	Chhatrapti	2.71	3.32	4.00*	3.34	4	3	1/3
5	Local	1.79	4.15*	4.46*	3.47	2	3	2/3
6	Phule J-1	2.63	4.50*		3.57	1	2	1/3
7	JH 17	2.96	2.56		2.76	6	2	0/2
8	SKNJ 4	1.04			1.04	8	1	0/1
	Mean	**2.48**	**3.56**	**3.37**	**2.91**			
	CD (5%)		**0.53**	**0.31**				
	CV (%)		**10.12**	**5.90**				

Table 78. Plant height (cm) in Observation Rows Trial on Jatropha species: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	Rahuri	Bhubaneswar	Hisar	Mandor	Overall	
							Mean	Rank
1	Hansaraj	182.67	125.90	216.30	354.50	115.00	198.87	4
2	S.K. Nagar (Big)	193.67	140.80	187.70	325.50	152.50	200.03	3
3	Urlikanchan	180.00	136.90	185.00	364.00	125.00	198.18	5
4	Chhatrapti	185.33	130.60	200.50	357.00	132.50	201.19	2
5	Local	212.67	145.40	183.30	361.25		225.66	1
6	Phule J-1	197.33	150.20	175.40		118.30	160.31	8
7	JH 17		109.00	220.80			164.90	7
8	SKNJ 4	182.00		199.50		113.30	164.93	6
	Mean	**190.52**	**134.11**	**196.06**	**352.45**	**126.10**	**189.26**	
	CD (5%)	**15.42**	**4.63**		**2.23**			
	CV (%)	**4.55**	**2.32**		**14.45**			

Table 79. Stem girth (cm) in Observation Rows Trial on Jatropha species: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	Bhubaneswar	Rahuri	Hisar	Mandor	Overall	
							Mean	Rank
1	Hansaraj	23.68	25.50	8.96	39.95	13.75	22.37	3
2	S.K. Nagar (Big)	24.12	26.50	9.94	40.48	19.00	24.01	2
3	Urlikanchan	23.62	20.00	9.39	34.95	15.00	20.59	5
4	Chhatrapti	20.80	25.50	9.56	33.58	15.00	20.89	4
5	Local	27.11	20.70	10.81	45.25		25.97	1
6	Phule J-1	25.40	21.40	10.95		12.30	17.51	7
7	JH 17		19.00	8.31			13.66	8
8	SKNJ 4	23.75	22.00			13.33	19.69	6
	Mean	**24.07**	**22.58**	**9.70**	**38.84**	**14.73**	**20.59**	
	CD (5%)	**4.95**		**1.11**	**4.69**			
	CV (%)	**11.55**		**7.71**	**7.84**			

Table 80. 100-seed weight (g) in Observation Rows Trial on Jatropha species: 2004 (Plains)

S. No.	Genotypes	Rahuri	Bhubaneswar	S.K. Nagar	Hisar	Overall	
						Mean	Rank
1	Hansaraj	49.07	49.30	44.79	50.50	48.42	3
2	S.K. Nagar (Big)	42.71	45.25	43.18	56.85	47.00	6
3	Urlikanchan	51.17	52.14	36.05	48.31	46.92	7
4	Chhatrapti	50.78	47.32	45.93	54.30	49.58	2
5	Local	41.97	51.35	44.78	60.40	49.63	1
6	Phule J-1	52.21	48.31	43.42		47.98	4
7	JH 17	44.93	50.08			47.51	5
8	SKNJ 4		51.55	39.77		45.66	8
	Mean	**47.55**	**49.41**	**42.56**	**54.07**	**47.84**	
	CD (5%)	**1.57**		**7.51**	**0.64**		
	CV (%)	**2.23**		**9.92**	**0.77**		

Table 81. No. of branches/plant in Observation Rows Trial on Jatropha species: 2004 (Plains)

S. No.	Genotypes	S.K. Nagar	Bhubaneswar	Overall	
				Mean	Rank
1	Hansaraj	4.53	4.30	4.42	1
2	S.K. Nagar (Big)	4.19	3.70	3.95	2
3	Urlikanchan	4.25	3.00	3.63	5
4	Chhatrapti	3.97	3.00	3.49	7
5	Local	3.80	3.30	3.55	6
6	Phule J-1	4.14	3.30	3.72	3
7	JH 17		3.00	3.00	8
8	SKNJ 4	3.61	3.80	3.71	4
	Mean	**4.07**	**3.43**	**3.68**	
	CD (5%)	**0.97**			
	CV (%)	**13.33**			

GERMPLASM EVALUATION

III. GERMPLASM EVALUATION

3.1 HILLS

Multilocational germplasm evaluation was planned to be conducted on grain amaranth, buckwheat, chenopods, rice 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 to be evaluated at three locations viz. GBPUA&T, Ranichauri; CSK HPKVV, Palampur and NBPGR, Shimla. The results were received from all the three locations. The checks used were PRA 2 and Annapurna. At GBPUA&T, Ranichauri a set of 50 genotypes including checks were evaluated for 12 characters. Genotype IC 95301 (68.95 g) and IC 95249 (66.85 g) were found better than the checks in respect of seed yield per plant. Genotype IC 37150 and IC 42265-3 were noted early flowering (54 days) whereas early maturity was observed in IC 95353 and IC 37150 (116 days) followed by IC 137149, IC 42265-3 and IC 38313 (121 days). The longest inflorescence 67.50 cm was recorded in the genotype IC 37146 followed by IC 42284-5 (66.83 cm). The range and mean for all the characters have been presented in table 82.

A total of 50 genotypes were also evaluated at CSK HPKVV, Palampur for three characters only. IC 42265-3 (60 days) was earliest in flowering. Maximum plant height (188.20) cm was observed in the genotype IC 21810 followed by IC 95314 (162.20 cm). The genotype IC 37154 was observed as highest yielder with 690 g seed yield (Table 83).

A set of 52 genotypes including checks were screened at NBPGR, Shimla for 12 qualitative and 10 quantitative characters. None of the genotypes was found superior to check variety for days to 50% flowering. Maximum plant height (258.00 cm) was recorded in genotype IC 41765. The longest inflorescence (95.90 cm) was recorded in the genotype IC 38312 followed by IC 37153, IC 37154 with 93.50 cm and 93.40 cm, respectively. None of the

genotypes was found superior to check variety in respect of seed yield per plant (Table 84 A and B). List of promising lines have been presented in table 85.

3.1.2 BUCKWHEAT (*Fagopyrum* spp.)

A set of 50 accessions were to be screened at three locations viz. NBPGR, Shimla; GBPUA&T, Ranichauri and CSK HPKVV, Palampur along with three checks Himpriya, VL 7 and PRB 1. A set of 48 genotypes including checks Himpriya and PRB 1 were evaluated at GBPUA&T, Ranichauri for yield and its related characters. Early flowering (28 days) and maturity (64 days) were recorded in IC 258232 while none of the genotypes was found better than checks in respect to seed yield per plant (Table 86).

A set of 38 genotypes including one checks were screened for eight yield related attributes at CSK HPKVV, Sangla. Early flowering (49 days) was noted in the genotype IC 280394 followed by IC 341591 (53 days) whereas early maturity (81 days each) was observed in the genotypes IC 382243 and IC 382270. Genotype IC 274439 was recorded as the highest yielder with 7.60 g seed yield per plant followed by IC 310045 with seed yield of 6.80 g per plant. The average yield per plant was recorded very low as 1.73 g per plant (Table 87). Another set of 37 local germplasm lines was also evaluated for eight characters along with check variety Himpriya at Sangla (Table 88).

At NBPGR, Shimla a set of 50 accessions were evaluated for ten qualitative and thirteen quantitative characters along with two national checks Himpriya and PRB 1. The genotype EC 58322 was observed as the early flowering type (36 days) and IC 3419494 was the early maturing type with 58 days maturity (Table 89). Promising lines have been presented in table 90.

3.1.3 CHENOPODS (*Chenopodium* spp.)

Twenty five genotypes were planned for screening at two locations viz. NBPGR, Shimla and GBPUA&T, Ranichauri along with local check. Twenty six genotypes along with local check were evaluated for nine yield contributing characters at GBPUA&T, Ranichauri. The early flowering (64 days) and early maturity (122 days) were observed in the genotypes IC 108086, IC 328878 and IC 329185. Highest inflorescence length (50.30 cm) was recorded in the

genotype IC 107299 followed by IC 107185 (48.30 cm). The genotype IC 107295 was recorded as the top yielding variety with seed yield of 100 g per plant (Table 91).

A total of 28 genotypes were screened in an Augmented Design for qualitative and quantitative traits at NBPGR, Shimla. Early flowering (100 days) and early maturity (159 days) was observed in IC 329470. Genotype IC 341698 was the tallest entry with 294.30 cm height and maximum seed yielder with 21.40 g yield per plant (Table 92). The promising genotypes have been presented in table 93.

3.1.4 RICE BEAN (*Vigna umbellata*)

A set of fifty genotypes along with four standard checks viz. PRR 1, PRR 2, RBL 6 and BRS 1 were planned for germplasm evaluation in Augmented Design at five locations viz. NBPGR, Shimla; GBPUA&T, Ranichauri, CSK HPKVV, Palampur; NBPGR, Bhowali and NBPGR, Shillong. However, the data have been received only from four locations. A total of 52 genotypes were evaluated for eight yield related characters at GBPUA&T, Ranichauri. None of the genotypes was found superior to the check varieties PRR 1 and PRR 2 for flowering, maturity and seed yield (Table 94).

Fifty one genotypes were screened for four major characters at CSK HPKVV, Palampur in Augmented Design and it was found that LRB 38 was early flowering (80 days) similar to check PRR 1. Early maturity was observed (95 days) in genotypes LRB 75-1 and LRB 84. Highest seed yield per plant was recorded (420 g) in the genotype LRB 1 followed by LRB 2 (310 g) (Table 95).

A set of 59 genotypes were screened for qualitative and quantitative characters at NBPGR, Shimla in Augmented Design. Early flowering was observed in the genotype LRB 18 (67 days) while early maturity was recorded in the genotype LRB 1 (120 days). Longer pod 13.60 cm was recorded with the genotype LRB 78. Maximum 100 seed weight per plant (10.10 g) was recorded with the genotype LRB 159 followed by IC 342379 (9.60 g) (Table 96).

Fifty two genotypes were evaluated for nine yield contributing characters at NBPGR, Bhowali. Accession VASHM/PC 3246 was noted as early type with 66

days flowering time. Early maturity was recorded in LRB 6 (126 days) followed by VASHM/PC 3246 (127 days). Longest pod was observed in genotype LRB 23 (11.80 cm) followed by LRB 26 (11.60 cm). Maximum 100 grain weight was recorded (12.70 g) in the genotype IC 3423 followed by IC 3304 (10.90 g) (Table 97). Mean, range, CV (%) and promising lines have been presented in table 98.

3.1.5 ADZUKI BEAN (*Vigna angularis*)

A set consisting of 25 accessions supplied by NBPGR, Shimla was planned to be evaluated along with local check at two locations viz. NBPGR, Shimla and CSK HPKV, Palampur. Twenty eight accessions including exotics were evaluated along with check HPAU 27-9 for four yield related characters. Genotype EC 254 was recorded as early flowering and early maturing type with 54 days and 73 days respectively. EC 341958 was also recorded as early flowering type (Table 99). Local check HPAU 27-9 was found to be the highest seed yielder with 425 g seed yield followed by genotype EC 341960 (308 g).

A total of 27 genotypes were evaluated along with check HPAU 51 in an Augmented Design at NBPGR, Shimla for qualitative and quantitative characters. The tallest plant height (126.50 cm) was found in the genotype EC 15256. Early flowering (66 days) was recorded in the genotype, EC 340271 whereas early maturity (108 days) was recorded in the genotype EC 290251 followed by EC 341940 (114). The maximum seed yield per plant (52.60 g) was observed in the genotype EC 290251 followed by EC 341960 and EC 341955. Maximum number of pods per plant (62.5) was found in the genotype, EC 108080 followed by EC 341955 (Table 100). The promising genotypes have been listed in table 101.

3.1.6 Job's Tear (*Coix lacryma*-jobi)

Germplasm lines comprising 20 accessions were planned to be evaluated at three locations viz. NBPGR, Shillong; GBPUA&T, Ranichauri and CSK HPKVV, Palampur. However, the results have been received from Ranichauri and Palampur. Seven yield related characters were recorded at GBPUA&T, Ranichauri. Accession H 696 was found to be early in flowering (145 days) and maturity (206 days). More number of tillers (9.66), green forage yield (488.00 q/ha) and dry matter yield (68.00 q/ha) were recorded in the genotype, RVN 90

indicating its potential for better forage yield. Highest seed yield (5.07 q/ha) was recorded in the genotype H 557 followed by BDS 1872 (4.95 q/ha). The mean seed yield was found to be 2.65 q/ha (Table 102).

A total of nineteen genotypes were reported only for three characters from CSK HPKV, Palampur. Genotypes BD 3, BDS 1868 and BDS 1870 were observed as early flowering type (101 days). Maximum plant height (281.20 cm) was recorded in the genotype H 3768 followed by H 3026 (276.80 cm). Highest seed yield per plant was also recorded in the genotype H 3026 (230.00 g) followed by H 3768 (210.00 g) (Table 103). The promising lines for flowering time, maturity period and number of tillers per plant have been presented in table 104.

3.1.7 BHANJIRA (*Perilla fruitescense*)

A set of 20 genotypes were to be evaluated at two locations viz. NBPGR, Shillong and GBPUA&T, Ranichauri. Results have been received only from GBPUA&T, Ranichauri on eleven yield contributing characters. The genotypes, BDS 1647, BDS 1650, RD 29 and RD 74 were found early flowering and early maturing type with 170 to 171 days maturity. The maximum number of fingers (88.50) per plant was recorded in the genotype 6/10 followed by RD 029 (85.00). Genotype, H 1644 was observed as the highest seed yielder (60.80 g/plant) followed by H 621 (60.30 g) (Table 105). The promising lines for five characters have been presented in table 106.

Table 82. Evaluation of germplasm lines in grain amaranth, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of finger/ plant	Length of leaf (cm)	Width of leaf (cm)	No. of leaves/ plant	Plant girth of base (cm)	10 ml seed weight (g)	Seed yield/ plant (g)
1	IC 21810	64.00	126.00	165.80	56.48	18.06	55.83	15.31	9.13	31.65	2.73	11.09	56.60
2	IC 37145	80.00	136.00	160.65	49.46	11.80	52.15	12.13	6.65	37.49	2.25	11.20	38.40
3	IC 37146	65.00	142.00	173.50	67.50	13.13	57.65	14.48	8.46	36.13	2.71	11.36	35.36
4	IC 37147	70.00	131.00	172.45	56.13	14.06	47.81	12.00	6.65	29.98	2.33	11.56	40.80
5	IC 37148	75.00	136.00	168.65	52.50	16.66	36.50	13.63	7.96	26.13	2.40	12.10	42.60
6	IC 37149	59.00	121.00	179.15	59.63	18.33	48.81	14.15	8.13	22.30	2.96	11.36	54.75
7	IC 37150	54.00	116.00	155.00	45.11	13.66	41.80	13.30	7.96	21.30	2.33	11.82	25.11
8	IC 37151	70.00	146.00	152.15	48.31	11.00	43.15	13.48	7.98	24.96	2.56	11.70	32.45
8A	Annapurna (C)	70.00	146.00	138.30	28.45	8.45	45.81	11.66	5.80	23.46	2.15	12.50	48.17
8B	PRA 2 (C)	68.00	142.00	143.13	38.65	7.25	39.80	10.83	5.66	22.48	2.27	12.40	55.60
9	IC 37152	80.00	150.00	138.80	35.60	6.88	48.98	12.16	6.46	24.31	2.21	11.30	45.85
10	IC 37153	70.00	147.00	127.81	30.00	7.66	36.15	11.15	5.30	23.98	2.06	12.21	26.80
11	IC 37154	75.00	148.00	134.50	28.85	6.75	30.63	10.13	5.31	19.30	1.96	12.13	20.50
12	IC 37155	64.00	143.00	129.55	29.00	9.65	29.46	9.00	4.65	17.33	1.63	12.16	34.18
13	IC 37156	59.00	131.00	112.66	25.00	6.55	24.48	10.98	5.33	16.33	1.48	10.79	44.70
14	IC 37158	64.00	136.00	120.46	26.75	5.88	36.30	8.50	4.31	18.31	1.80	11.80	22.50
15	IC 37160	66.00	139.00	119.30	25.00	9.33	32.65	10.48	5.33	22.15	1.90	11.85	52.36
16	IC 37314	70.00	132.00	108.16	27.50	8.88	32.31	8.16	4.30	18.98	1.48	12.12	60.62

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of finger/ plant	Length of leaf (cm)	Width of leaf (cm)	No. of leaves/ plant	Plant girth of base (cm)	10 ml seed weight (g)	Seed yield/ plant (g)
17	IC 37316	65.00	126.00	100.48	19.35	6.75	24.46	7.16	3.46	21.50	1.40	11.61	58.60
18	IC 38119	75.00	131.00	95.33	24.00	5.50	34.98	6.98	3.80	15.66	1.00	10.81	35.72
19	IC 38127	66.00	126.00	96.80	29.16	8.66	25.81	8.00	4.15	18.31	1.55	12.10	40.00
20	IC 38312	66.00	126.00	107.85	28.30	6.44	22.65	8.33	4.30	14.61	1.46	11.55	35.18
21	IC 38313	59.00	121.00	120.96	27.30	7.66	25.98	9.66	5.16	18.64	1.56	11.25	24.33
22	IC 38474	70.00	131.00	128.00	31.30	6.95	34.50	11.50	5.80	26.16	1.80	10.60	46.60
23	IC 38483	80.00	136.00	128.66	31.80	6.50	35.98	10.33	4.63	17.98	1.30	10.89	61.85
24	IC 38501	70.00	141.00	119.96	23.40	6.65	30.16	8.31	5.48	22.96	1.46	11.07	52.70
25	IC 38542	70.00	136.00	134.33	30.33	7.75	42.98	11.83	6.16	28.90	2.00	11.57	45.75
26	IC 41765	66.00	131.00	143.48	45.16	6.70	40.16	11.50	6.00	24.46	2.05	12.11	36.12
27	IC 41766	80.00	136.00	162.16	38.00	5.80	49.50	11.33	5.13	27.46	1.81	10.95	22.20
28	IC 41769	64.00	129.00	153.65	43.30	6.66	34.85	11.46	6.45	23.65	2.30	11.20	30.00
29	IC 42006	66.00	136.00	168.81	51.00	7.70	47.41	13.16	7.65	25.80	2.60	11.81	46.45
30	IC 42264-16	66.00	136.00	165.85	49.66	8.06	51.33	11.66	5.83	26.00	2.80	11.92	55.66
31	IC 42265-2	70.00	141.00	163.83	45.85	5.66	49.15	10.45	5.15	26.33	2.20	11.54	25.70
32	IC 42265-3	54.00	121.00	142.50	38.66	6.65	44.33	13.33	8.15	24.50	1.80	10.62	31.18
32A	Annapurna (C)	66.00	138.00	192.00	54.83	8.66	62.30	13.50	8.00	34.25	2.35	12.32	38.58

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of finger/ plant	Length of leaf (cm)	Width of leaf (cm)	No. of leaves/ plant	Plant girth of base (cm)	10 ml seed weight (g)	Seed yield/ plant (g)
32B	PRA 2 (C)	65.00	136.00	186.16	58.40	7.90	54.48	14.65	6.98	31.83	2.96	12.40	40.15
33	IC 42284-5	70.00	135.00	196.66	66.83	6.95	59.33	12.15	7.45	28.66	3.16	11.64	26.20
34	IC 42290-13	70.00	136.00	185.66	60.33	7.60	56.81	13.16	8.46	32.50	2.90	11.82	28.90
35	IC 42311-17	64.00	130.00	190.50	63.66	7.55	73.11	14.45	8.66	36.80	3.10	10.91	47.90
36	IC 95249	68.00	140.00	194.16	60.83	6.13	62.33	16.45	8.50	32.16	2.70	11.55	66.85
37	IC 95251	70.00	144.00	192.16	54.16	5.50	64.65	15.96	8.85	38.66	3.40	11.64	33.60
38	IC 95253	67.00	132.00	200.15	60.48	8.16	66.81	17.63	8.66	37.83	3.80	11.34	41.20
39	IC 95284	64.00	130.00	191.98	58.66	6.70	50.00	16.33	8.80	27.66	2.95	11.55	50.42
40	IC 95288	70.00	136.00	182.66	56.50	7.06	46.13	14.98	8.00	35.00	2.80	12.13	25.66
41	IC 95291	66.00	126.00	178.80	50.00	5.46	38.96	11.96	5.83	22.00	2.38	12.02	21.65
42	IC 95301	70.00	136.00	196.65	48.16	6.45	51.13	13.98	8.31	30.56	2.56	11.36	68.95
43	IC 95302	59.00	125.00	185.50	55.83	5.77	43.65	12.30	7.15	28.16	2.66	12.09	50.44
43A	Annapurna (C)	68.00	140.00	186.33	52.16	5.20	46.00	14.45	8.50	22.81	2.60	12.30	58.74
43B	PRA 2 (C)	66.00	136.00	208.35	64.00	7.00	56.50	13.76	8.00	38.50	3.16	12.38	62.88
44	IC 95308	66.00	126.00	204.50	57.83	5.85	48.33	14.63	8.48	34.65	2.80	11.70	38.25
45	IC 95314	70.00	135.00	214.83	62.33	7.80	66.33	14.48	8.33	44.00	3.66	12.04	22.36
46	IC 95315	70.00	141.00	185.50	51.66	6.86	64.15	15.98	7.33	45.31	2.98	11.71	44.40

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of finger/ plant	Length of leaf (cm)	Width of leaf (cm)	No. of leaves/ plant	Plant girth of base (cm)	10 ml seed weight (g)	Seed yield/ plant (g)
47	IC 95320	64.00	128.00	168.66	57.33	5.80	63.00	13.30	7.50	25.96	3.13	11.38	34.10
48	IC 95341	70.00	135.00	184.66	51.33	6.00	42.30	12.50	5.95	22.83	2.75	11.90	32.20
49	IC 95353	58.00	116.00	153.00	44.00	9.16	41.95	12.30	6.80	24.25	2.20	12.10	24.36
50	IC 95396	64.00	124.00	190.16	48.83	6.68	66.16	12.80	7.00	30.66	2.60	12.33	48.80
	Mean	**67.41**	**133.88**	**158.96**	**45.08**	**8.11**	**45.69**	**12.29**	**6.68**	**26.87**	**2.36**	**11.67**	**40.93**

Table 83. Evaluation of germplasm lines in amaranth, Palampur

S. No.	Line	Days to 50% flowering	Plant height (cm)	Yield (g/plot)
1	IC 21810	94	188.2	275
2	IC 37145	94	145.8	445
3	IC 37146	90	117.6	185
4	IC 37147	95	141.8	390
5	IC 37148	80	142.8	185
6	IC 37149	80	123.0	285
7	IC 37150	6]	133.0	225
8	IC 37151	76	125.0	395
8A	Annapurna@	64	140.2	222
8B	PRA-2 @	94	154.0	295
9	IC 37152	89	149.0	265
10	IC 37153	94	140.2	145
11	IC 37154	94	134.6	690
12	IC 37155	94	128.2	245
13	IC 37156	64	157.8	398
14	IC 37158	95	139.6	110
15	IC 37160	91	123.6	85
16	IC 37314	86	135.0	340
17	IC 37316	91	129.0	345
18	IC 38119	82	134.8	215
19	IC 38127	81	142.4	365
20	IC 38312	93	151.4	340
21	IC 38313	69	133.0	265
22	IC 38474	74	133.2	465
23	IC 38483	94	138.2	395
24	IC 38501	95	141.8	312
25	IC 38542	95	135.4	350
26	IC 41765	95	162.0	312
27	IC 41766	95	148.0	210
28	IC 41769	95	123.4	540
29	IC 42006	95	126.2	302
30	IC 42264	86	143.6	465
31	IC 42265-2	86	114.0	390
32	IC 42265-3	60	128.2	110

S. No.	Line	Days to 50% flowering	Plant height (cm)	Yield (gm)
32A	Annapurna @	90	84.0	175
32B	PRA-2(c)	95	118.0	680
33	IC 42284-5	95	138.6	400
34	IC 42290-13	95	153.6	390
35	IC 42311-17	90	108.0	495
36	IC 95249	86	132.8	365
37	IC 95251	89	157.6	290
38	IC 95253	94	120.8	240
39	IC 95284	91	127.0	290
40	IC 95288	74	147.6	575
41	IC 95291	69	128.8	290
42	IC 95301	89	147.8	400
43	IC 95302	76	118.8	440
43A	Annapurna @	80	157.8	125
43 B	PRA-2@	94	152.8	110
44	IC 95308	91	161.6	380
45	IC 95314	95	162.2	235
46	IC95315	95	144.4	115
47	IC 95320	63	133.4	105
48	IC95314	91	135.6	250
49	IC95353	86	133.8	165
50	IC 95396	89	134.0	140

Table 84A. Germplasm Screening Nursery – Amaranth, Shimla

S. No.	Acc. No	Qualitative											
		Early Plant vigour	Plant growth habit	Leaf colour	Infl. Colour	Infl. Compactness	Stem colour	Stem surface	Infl. Spineness	Infl. Shape	Seed Shattering	Seed transperancy	Seed colour
		1	2	3	4	5	6	7	8	9	10	11	12
1	IC21810	3	1	5	11	5	2	2	4	4	2	2	1
2	IC37145	3	1	5	11	5	2	2	4	4	2	2	1
3	IC37146	3	1	5	9	5	6	2	4	4	2	2	1
4	IC37147	3	1	5	11	5	2	2	4	4	2	2	1
5	IC37148	3	1	5	11	5	2	2	4	4	2	2	1
6	IC37149	3	1	5	6	5	2	2	4	4	2	2	1
7	IC37150	3	1	5	9	5	5	2	2	4	2	2	1
8	IC37151	3	1	5	11	5	2	2	4	4	2	2	1
9	IC37152	3	1	5	11	5	2	2	4	4	2	2	1
10	IC37153	3	1	5	11	5	2	2	4	4	2	2	1
11	IC37154	3	1	5	6	5	2	2	4	4	3	2	1
12	IC37155	3	1	5	11	5	2	2	4	4	3	2	1
13	IC37156	3	1	5	6	5	2	2	2	4	7	2	1
14	IC37158	3	1	5	11	5	2	2	4	4	3	2	1
15	IC37160	3	1	5	11	5	2	2	4	4	3	2	1
16	IC37314	3	1	5	9	5	6	2	4	4	3	2	1
17	IC37316	3	1	5	11	5	2	2	2	4	3	2	1
18	IC38119	3	1	5	9	5	5	2	2	2	7	2	1

		1	2	3	4	5	6	7	8	9	10	11	12
19	IC38127	3	1	5	9	5	6	2	4	4	3	2	1
20	IC38312	3	1	5	9	5	2	2	4	4	3	2	1
21	IC38313	3	1	5	6	5	2	2	2	4	7	2	1
22	IC38474	3	1	5	11	5	2	2	4	4	3	2	1
23	IC38483	3	1	5	11	5	2	2	4	4	3	2	1
24	IC38501	3	1	5	9	5	2	2	4	4	3	2	1
25	IC38542	3	1	5	11	5	2	2	4	4	3	2	1
26	Annapurna	3	1	5	11	5	2	2	2	4	3	2	1
27	IC35407	3	1	5	11	5	2	2	2	4	7	2	1
28	PRA-2	3	1	5	11	5	2	2	4	4	3	2	1
29	IC41765	3	1	5	9	5	6	2	4	4	3	2	1
30	IC41766	3	1	5	11	5	2	2	4	4	3	2	1
31	IC41769	3	1	5	9	5	6	2	4	4	3	2	1
32	IC42006	3	1	5	11	5	2	2	4	4	3	2	1
33	IC42264-16	3	1	5	9	5	6	2	4	4	3	2	1
34	IC42265-2	3	1	5	9	5	2	2	4	4	3	2	1
35	IC42265-3	3	1	5	2	5	2	1	2	4	3	2	1
36	IC42284-5	3	1	5	9	5	6	2	4	4	3	2	1
37	IC42290-17	3	1	5	9	5	6	2	4	4	3	2	1
38	IC42311-7	3	1	5	9	5	6	2	4	4	3	2	1
39	IC95249	3	1	5	9	5	2	2	4	4	3	2	1

		1	2	3	4	5	6	7	8	9	10	11	12
40	IC95251	3	1	5	11	5	2	2	4	4	3	2	1
41	IC95253	3	1	5	11	5	2	2	4	4	3	2	1
42	IC95284	3	1	5	11	5	2	2	2	4	7	2	1
43	IC95288	3	1	5	11	5	2	2	4	4	3	2	1
44	IC95291	3	1	5	11	5	2	2	4	4	3	2	1
45	IC95301	3	1	5	11	5	2	2	2	4	3	2	1
46	IC95302	3	1	5	11	5	2	2	4	4	3	1	1
47	IC95308	3	1	5	11	5	2	2	4	4	3	2	1
48	IC95314	3	1	5	11	5	2	2	4	4	3	2	1
49	IC95315	3	1	5	11	5	2	2	4	4	3	2	1
50	IC95320	3	1	5	9	5	6	2	4	4	3	2	1
51	IC95341	3	1	5	11	5	2	2	4	4	3	2	1
52	IC95353	3	1	5	11	5	2	2	2	4	3	2	1
53	IC95396	3	1	5	9	5	6	2	4	4	3	2	1
54	Annapurna	3	1	5	11	5	2	2	2	4	3	2	1
55	IC35407	3	1	5	6	5	2	2	1	2	7	2	1
56	PRA-2	3	1	5	11	5	2	2	4	4	3	2	1

Table 84B. Germplasm Screening Nursery – Amaranth, Shimla

S. No.	Acc. No	Quantitative									
		Leaf length	Petiole length	Days to 50% flowering	Stem thickness	Plant height (cm)	Lateral spikelets length	Infl. Length (cm)	Days to 80% maturity	Yield/plant (g)	1000 seed wt.
		13	14	15	16	18	19	20	21	22	23
1	IC21810	20.85	9.90	94.00	2.56	183.30	29.35	66.55	145.00	66.89	0.60
2	IC37145	22.45	12.00	98.00	2.67	201.40	6.85	93.95	145.00	38.02	0.50
3	IC37146	22.25	11.55	92.00	2.55	172.15	21.55	71.30	145.00	56.83	0.70
4	IC37147	22.85	12.65	96.00	2.70	183.15	18.95	76.25	144.00	69.19	0.70
5	IC37148	22.30	11.90	105.00	2.42	220.40	22.90	71.25	144.00	59.24	0.70
6	IC37149	24.20	12.60	86.00	3.40	218.05	17.40	89.90	144.00	58.11	0.60
7	IC37150	25.40	16.40	76.00	2.86	205.75	12.70	73.15	140.00	62.94	0.50
8	IC37151	24.40	12.35	92.00	2.72	185.65	12.10	71.25	156.00	57.56	0.60
9	IC37152	24.90	14.15	93.00	3.18	179.55	15.55	57.75	154.00	69.11	0.70
10	IC37153	19.20	12.90	93.00	3.32	248.40	13.30	93.53	146.00	67.34	0.60
11	IC37154	21.85	13.40	96.00	3.12	211.10	93.40	93.40	154.00	80.82	0.80
12	IC37155	22.20	12.35	86.00	2.87	227.55	24.35	91.40	144.00	80.84	0.70
13	IC37156	23.00	21.10	75.00	2.99	225.60	5.85	64.50	135.00	67.74	0.70
14	IC37158	21.80	13.55	83.00	2.71	207.25	14.55	89.80	154.00	81.23	0.60
15	IC37160	18.85	13.35	93.00	2.76	209.35	17.50	79.25	144.00	51.03	0.70
16	IC37314	19.95	12.75	94.00	2.72	214.35	16.85	73.25	146.00	53.94	0.60
17	IC37316	21.85	16.35	85.00	3.42	208.75	11.90	64.25	152.00	80.34	0.60
18	IC38119	15.15	11.20	86.00	1.52	189.45	17.15	65.75	145.00	51.55	0.40

		13	14	15	16	18	19	20	21	22	23
19	IC38127	22.55	14.80	85.00	3.88	182.10	15.00	73.30	144.00	85.38	0.60
20	IC38312	21.35	14.50	86.00	3.67	207.50	26.75	95.90	146.00	86.90	0.60
21	IC38313	24.15	22.25	96.00	2.23	229.35	4.00	71.35	134.00	88.01	0.70
22	IC38474	23.75	14.10	89.00	2.83	194.05	10.20	77.40	152.00	46.20	0.60
23	IC38483	23.80	15.40	94.00	3.67	193.55	15.05	63.55	153.00	74.35	0.80
24	IC38501	23.85	13.80	86.00	2.76	239.25	12.15	78.45	143.00	64.56	0.70
25	IC38542	22.85	13.15	96.00	2.72	181.15	23.40	79.75	153.00	62.64	0.60
26	Annapurna	25.45	13.15	95.00	2.59	177.80	10.40	67.60	147.00	57.99	0.60
27	IC35407	24.55	20.55	71.00	2.79	234.50	5.65	72.25	125.00	70.17	0.80
28	PRA-2	22.45	12.40	93.00	2.63	193.45	22.05	77.00	153.00	60.34	0.70
29	IC41765	22.15	12.10	86.00	2.45	258.00	7.20	80.80	146.00	59.89	0.70
30	IC41766	22.70	13.45	98.00	2.73	212.65	8.70	90.05	153.00	69.12	0.60
31	IC41769	17.20	9.80	93.00	3.47	246.40	14.40	89.05	144.00	64.13	0.50
32	IC42006	19.70	13.05	86.00	2.69	234.55	13.45	87.30	147.00	80.30	0.70
33	IC42264-16	23.00	14.45	87.00	3.05	239.40	27.15	81.55	144.00	55.27	0.60
34	IC42265-2	21.40	13.55	92.00	3.27	212.00	13.75	84.95	142.00	62.49	0.80
35	IC42265-3	25.15	23.80	77.00	3.57	205.50	2.65	75.40	135.00	78.35	0.70
36	IC42284-5	21.30	12.85	93.00	3.39	183.40	14.70	78.40	144.00	69.73	0.70
37	IC42290-17	20.60	12.80	97.00	2.98	189.50	18.15	70.60	143.00	71.60	0.60
38	IC42311-7	20.95	11.65	95.00	3.06	170.45	23.90	88.90	144.00	84.48	0.60
39	IC95249	21.15	12.80	98.00	2.63	184.55	15.55	61.70	153.00	71.43	0.50

		13	14	15	16	18	19	20	21	22	23
40	IC95251	19.90	11.75	96.00	3.57	179.65	19.50	61.55	154.00	80.29	0.60
41	IC95253	21.10	10.67	95.00	2.11	187.00	11.30	76.90	154.00	85.40	0.60
42	IC95284	24.05	11.85	86.00	2.13	214.55	14.00	74.80	146.00	63.62	0.70
43	IC95288	25.65	14.10	97.00	2.29	198.45	10.30	90.40	155.00	83.15	0.60
44	IC95291	23.25	11.95	94.00	3.03	243.40	13.20	77.45	152.00	74.28	0.70
45	IC95301	21.45	13.65	89.00	3.97	193.80	20.10	82.45	152.00	52.88	0.70
46	IC95302	20.10	11.95	85.00	2.13	182.00	20.50	76.20	155.00	80.98	0.60
47	IC95308	21.95	11.90	98.00	2.69	182.50	20.30	83.75	154.00	73.10	0.70
48	IC95314	20.90	13.45	99.00	3.07	206.15	16.70	66.70	152.00	69.51	0.60
49	IC95315	22.95	12.70	100.00	3.42	207.95	11.00	85.10	148.00	56.70	0.60
50	IC95320	23.95	11.85	92.00	3.06	209.05	18.30	74.05	144.00	67.43	0.60
51	IC95341	18.85	9.60	96.00	3.24	237.85	18.30	85.45	148.00	68.80	0.80
52	IC95353	22.35	12.95	85.00	2.87	188.70	10.95	69.55	146.00	42.10	0.60
53	IC95396	19.10	9.85	97.00	2.81	209.90	18.30	81.50	144.00	71.15	0.70
54	Annapurna ©	19.65	10.80	95.00	2.29	236.65	9.90	87.65	146.00	58.57	0.60
55	IC35407 ©	22.20	18.60	70.00	2.78	218.10	8.45	64.30	122.00	92.25	0.80
56	PRA-2 ©	22.00	13.85	97.00	2.76	213.15	12.15	83.50	147.00	105.05	0.70

Table 85. Promising lines in amaranth germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	54.00-80.00	IC 37150, IC 42265-3, IC 95353, IC 37149, IC 371546, IC 38313, IC 95302, IC 21810, IC 37155, IC 37158, IC 41769 (<64 days)
2	Days to maturity (days)	116.00-150.00	IC 95353, IC 37150, IC 37149, IC 38313, IC 42265-3, IC 95396, IC 21810, IC 37316, IC 38127, IC 38312 (<126 days)
3	Inflorescence length (cm)	19.35-67.50	IC 37146, IC 42284-5, IC 42311-17, IC 95314, IC 95249, IC 95253, IC 42290-13, IC 37149, IC 95284, IC 95308 (>57.83 cm)
4	Seed yield/plant (g)	20.50-68.95	IC 95301, IC 95249, IC 38483, IC 37314, IC 37316, IC 21810, IC 42264-16, IC 37149, IC 37160, IC 95302 (>50.44 g)
Palampur			
1	Days to 50% flowering (days)	60.00-95.00	IC 42265-3, IC 37150, IC 38474, IC 37151, IC 95288, IC 95302 (<76 days)
2	Plant height (cm)	84.00-188.20	IC 21810, IC 95314, IC 95308, IC 37156, IC 95251 (>157.60 cm)
3	Seed yield/plot (g)	85.00-690.00	IC 37154, IC 95288, IC 41769, IC 42311-17, IC 42264, IC 38474 (>465.00 g)
Shimla			
1	Days to 50% flowering (days)	70.00-105.00	IC 35407, IC 37156, IC 37150, IC 42265-5 (<77 days)
2	Days to maturity (days)	122.00-154.00	IC 35407, IC 38316, IC 37156, IC 42265-5 (<135 days)
3	Plant height (cm)	170.50-258.00	IC 41765, IC 37153, IC 41769, IC 95291 (>243.40 CM)
4	Inflorescence length (cm)	57.80-95.90	IC 38312, IC 37145, IC 37153, IC 37154, IC 37155 (>91.40 cm)
5	Seed yield/plant (g)	38.00-105.10	None entry found better than check for seed yield

Table 86. Evaluation of germplasm lines in buckwheat, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of primary branches	No. of secondary branches	No. of leaves/ plant	Plant girth at base (cm)	No. of tiller	100 seed weight (g)	Seed yield/ plant (g)
1	IC 258232	28.00	64.00	128.70	4.60	4.75	35.90	0.75	18.00	1.76	65.60
2	IC 274424	53.00	105.00	138.80	4.20	5.40	46.70	1.00	26.00	1.89	82.70
3	IC 274429	43.00	120.00	170.10	5.90	5.30	51.30	1.10	30.20	0.97	90.85
4	IC 274431	53.00	110.00	143.20	5.80	6.60	45.70	1.00	24.40	0.86	64.70
5	IC 274436	59.00	121.00	145.60	4.50	4.75	25.40	0.75	23.80	1.30	125.10
6	IC 274438	59.00	118.00	138.90	4.60	5.50	37.50	0.60	26.30	1.28	105.20
7	IC 274439	60.00	120.00	150.40	4.80	4.90	41.00	0.95	21.30	0.88	95.85
8	IC 278957	23.00	75.00	133.60	5.00	5.80	19.80	0.80	18.30	0.35	58.00
9	IC 280349	23.00	75.00	100.40	3.90	4.70	17.30	0.50	15.80	0.83	38.50
10	IC 280394	33.00	90.00	76.00	3.75	4.30	13.80	0.65	7.80	0.62	72.40
11	IC 310045	53.00	105.00	136.70	5.80	6.70	42.70	0.70	28.30	1.09	41.90
12	IC 310095	54.00	110.00	131.50	4.00	5.50	50.35	0.80	21.30	0.32	59.80
13	IC 310104	38.00	96.00	132.70	4.70	6.50	54.90	0.90	24.90	0.54	42.40
14	IC 311074	23.00	80.00	130.10	4.30	4.80	55.20	0.80	26.60	0.94	28.50
15	IC 329456	62.00	125.00	152.00	4.10	5.70	56.00	0.75	24.70	0.74	88.60
16	IC 329593	33.00	92.00	154.30	4.20	6.55	38.60	0.65	23.50	1.03	36.50
17	IC 341581	43.00	100.00	123.90	4.50	5.10	52.20	0.80	23.30	0.81	26.60
18	IC 341591	35.00	95.00	84.95	4.30	4.90	41.80	0.55	14.40	0.32	20.00
19	IC 341592	54.00	105.00	132.00	3.90	6.60	50.30	0.95	21.90	1.15	103.90

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of primary branches	No. of secondary branches	No. of leaves/ plant	Plant girth at base (cm)	No. of tiller	100 seed weight (g)	Seed yield/ plant (g)
20	IC 341593	59.00	120.00	125.50	4.50	6.20	41.10	0.85	23.90	0.84	60.80
21	IC 341594	38.00	95.00	95.60	4.10	4.90	30.90	0.50	18.40	0.56	25.00
22	IC 341674	59.00	125.00	135.20	4.20	5.60	54.00	0.65	27.10	0.36	53.00
23	IC 341675	59.00	118.00	130.20	4.50	6.65	46.70	0.90	28.50	0.54	109.70
24	IC 341679	64.00	142.00	96.75	3.90	5.50	25.00	0.50	21.10	1.27	117.40
25	IC 341682	64.00	144.00	90.80	3.00	3.50	37.10	0.50	21.19	1.25	130.50
26	IC 341690	48.00	108.00	122.20	4.30	5.80	40.10	0.85	16.95	0.60	30.45
27	IC 361035	43.00	90.00	61.20	3.20	3.60	20.00	0.50	12.80	0.45	20.16
28	IC 361874	60.00	121.00	75.10	2.70	3.40	21.30	0.50	12.30	0.86	28.50
29	IC 381050	58.00	112.00	71.00	3.80	5.20	26.30	0.60	19.70	0.75	20.00
30	IC 381077	26.00	80.00	100.00	4.00	5.40	33.00	0.70	21.30	0.58	15.50
31	IC 381098	26.00	80.00	91.50	4.10	4.30	32.10	0.55	19.75	0.12	18.45
32	IC 381177	38.00	100.00	68.45	3.50	3.10	32.70	0.50	16.30	0.12	28.90
33	IC 381463	43.00	110.00	70.00	3.40	4.10	38.90	0.50	18.70	0.95	20.20
34	IC 382243	53.00	115.00	106.00	4.60	6.40	46.20	0.60	21.40	0.65	31.30
35	IC 382270	54.00	117.00	96.70	3.60	4.80	30.40	0.50	22.20	1.39	21.50
36	IC 382287	64.00	142.00	90.40	4.50	4.20	42.00	0.50	19.90	0.95	102.30
37	IC 382728	33.00	90.00	127.90	6.00	5.10	53.80	0.80	20.90	1.90	53.80
38	IC 382733	23.00	77.00	67.30	3.60	3.00	20.00	0.50	15.60	0.43	20.13
39	IC 382734	23.00	80.00	55.70	3.40	3.50	26.40	0.50	12.40	0.29	18.10
40	EC 58322	43.00	95.00	126.10	4.90	4.80	32.50	0.60	18.40	0.35	21.25

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of primary branches	No. of secondary branches	No. of leaves/ plant	Plant girth at base (cm)	No. of tiller	100 seed weight (g)	Seed yield/ plant (g)
41	EC 125357	43.00	100.00	100.05	4.00	5.40	40.00	0.65	22.30	0.18	25.00
42	EC 159500	28.00	82.00	132.80	4.80	5.60	42.50	1.00	22.80	1.55	28.30
43	EC 213685	33.00	88.00	120.40	3.80	4.60	34.60	1.00	15.90	0.84	16.70
44	EC 272442	40.00	90.00	122.85	3.75	3.20	26.70	0.85	16.75	0.15	15.18
45	EC 323724	43.00	85.00	94.10	3.80	3.40	25.65	0.50	17.70	0.20	17.50
46	EC 323739	40.00	80.00	90.50	4.20	3.20	28.00	0.50	16.70	0.18	20.00
47	Himpriya ©	70.00	145.00	135.50	5.40	4.55	48.50	0.70	25.70	1.80	120.45
48	PRB 1 ©	48.00	115.00	140.40	4.80	5.40	50.00	0.65	20.90	1.52	140.45

Table 87. Buckwheat germplasm evaluation (AICRP)-2004, Sangla

S. No.	Genotype	Plant population (0.5 square meters)	Days to flowering	Days to maturity	Plant height (cm)	Yield/ plant (g)	Grain yield (q/ha)	Straw yield (q/ha)	100 seed wt (g)
1	IC- 258232	64.00	57.00	106.00	86.20	0.20	0.52	10.42	3.00
2	IC- 274424	108.00	65.00	109.00	106.80	3.20	45.08	72.92	2.50
3	IC- 274429	113.00	59.00	126.00	103.00	0.40	1.83	37.50	3.00
4	IC- 274431	109.00	64.00	113.00	108.20	2.80	22.00	38.08	3.00
5	IC- 244436	109.00	65.00	109.00	97.20	3.60	24.50	38.08	4.10
6	IC- 274438	123.00	65.00	107.00	98.20	2.80	28.67	49.08	3.50
7	IC- 274439	120.00	78.00	126.00	105.80	7.60	34.42	125.00	1.50
8	IC- 278957	35.00	60.00	104.00	59.00	0.20	0.62	4.17	2.50
9	IC- 280349	32.00	57.00	104.00	62.20	0.80	1.00	4.17	2.50
10	IC- 280394	30.00	49.00	102.00	46.00	1.20	1.33	4.17	3.00
11	IC- 310045	93.00	64.00	107.00	89.40	2.80	30.33	50.00	3.50
12	Himpriya	56.00	79.00	126.00	128.60	5.20	33.42	83.33	3.75
13	IC- 310095	111.00	65.00	109.00	105.00	6.80	27.83	38.08	3.00
14	IC- 310104	92.00	64.00	114.00	107.40	0.20	0.83	37.50	1.75
15	IC- 311074	90.00	62.00	108.00	99.60	0.80	1.17	22.92	4.50
16	IC- 329456	171.00	69.00	126.00	117.00	2.00	21.67	64.58	1.50
17	IC- 329593	60.00	59.00	112.00	111.20	1.60	5.67	22.92	3.75
18	IC- 341587	38.00	59.00	111.00	92.60	0.80	1.17	12.50	3.00
19	IC- 341591	39.00	53.00	106.00	75.80	0.10	1.33	12.50	2.50

S. No.	Genotype	Plant population (0.5 square meters)	Days to flowering	Days to maturity	Plant height (cm)	Yield/ plant (g)	Grain yield (q/ha)	Straw yield (q/ha)	100 seed wt (g)
20	IC- 341592	64.00	62.00	109.00	105.60	2.80	22.83	50.00	3.50
21	IC- 341596	59.00	71.00	124.00	121.00	2.40	19.33	87.50	3.00
22	IC- 341594	48.00	58.00	111.00	109.20	2.00	3.33	16.67	3.00
23	IC- 341674	128.00	67.00	126.00	156.80	2.00	7.08	91.67	4.00
24	IC- 341675	87.00	72.00	128.00	136.20	2.40	15.58	104.17	4.50
25	IC- 341679	101.00	79.00	129.00	153.00	0.80	2.42	54.17	1.50
26	IC- 341682	98.00	71.00	126.00	154.20	2.00	21.67	125.00	2.10
27	IC- 341690	44.00	61.00	112.00	114.20	1.60	3.17	10.42	4.50
28	IC- 361035	85.00	57.00	108.00	115.60	3.20	13.83	22.92	3.00
29	IC- 361874	104.00	68.00	111.00	104.80	2.00	38.33	72.92	1.25
30	IC- 381047	99.00	53.00	104.00	59.00	0.20	3.67	10.42	4.50
31	IC- 381050	55.00	57.00	111.00	102.40	1.20	37.17	62.50	3.75
32	PRB-1	176.00	63.00	124.00	93.00	0.20	8.42	66.00	4.00
33	IC- 381077	43.00	50.00	85.00	63.00	0.10	0.67	10.42	2.10
34	IC- 381098	50.00	53.00	85.00	71.60	0.10	0.33	8.33	2.00
35	IC- 381120	63.00	57.00	85.00	89.20	1.20	8.17	20.83	3.75
36	IC- 381129	54.00	59.00	85.00	89.40	1.20	9.50	14.58	3.00
37	IC- 381130	58.00	60.00	85.00	69.00	0.80	8.83	14.58	3.00
38	IC- 381177	95.00	60.00	85.00	78.20	0.80	15.33	18.75	3.75
39	IC- 381463	67.00	60.00	85.00	65.40	1.60	14.00	14.58	4.10

S. No.	Genotype	Plant population (0.5 square meters)	Days to flowering	Days to maturity	Plant height (cm)	Yield/ plant (g)	Grain yield (q/ha)	Straw yield (q/ha)	100 seed wt (g)
40	IC- 382243	138.00	68.00	81.00	109.20	2.00	32.50	22.92	3.00
41	IC- 382270	119.00	62.00	81.00	96.00	2.00	17.50	33.33	4.00
42	Himpriya	137.00	79.00	126.00	115.80	1.60	6.92	125.00	3.00
43	IC- 382287	154.00	78.00	126.00	109.80	1.60	11.00	122.92	1.00
44	IC- 382728	107.00	62.00	124.00	77.20	0.20	0.42	45.83	1.50
45	IC- 382733	85.00	62.00	85.00	78.40	1.60	1.33	10.42	2.50
46	IC- 382734	65.00	55.00	85.00	70.40	0.10	0.08	10.42	2.50
47	EC- 58322	106.00	61.00	122.00	80.80	0.40	2.83	41.67	2.50
48	EC- 125357	118.00	59.00	124.00	109.60	1.60	2.33	41.67	2.00
49	EC- 159500	84.00	59.00	124.00	111.20	0.40	1.17	37.50	1.90
50	EC- 213685	111.00	58.00	124.00	93.40	0.40	3.83	33.33	3.00
51	EC- 272442	71.00	62.00	124.00	86.60	1.20	3.00	79.17	2.50
52	EC- 353724	60.00	63.00	124.00	80.20	1.92		54.17	2.00
53	EC- 323729	51.00	59.00	83.00	91.00	5.00		39.58	2.00
	Average	**86.36**	**62.60**	**108.98**	**97.35**	**1.73**	**12.16**	**43.44**	**2.90**
	Max	**176.00**	**79.00**	**129.00**	**156.80**	**7.60**	**45.08**	**125.00**	**4.50**
	Min	**30.00**	**49.00**	**81.00**	**46.00**	**0.10**	**0.08**	**4.17**	**1.00**
	St Dev	**35.65**	**7.15**	**15.63**	**23.92**	**1.61**	**12.62**	**34.32**	**0.92**

Table 88. Buckwheat germplasm evaluation (Station Trial)- 2004, Sangla

S. No.	Genotype	Plant population (0.5 square meters)	Days to flowering	Days to maturity	Plant height (cm)
1	Sangla B-129	130.00	60.00	109.00	102.00
2	Sangla B-211	147.00	57.00	114.00	105.60
3	Sangla B-120	112.00	60.00	110.00	124.40
4	Sangla B-201	186.00	57.00	105.00	109.00
5	Sangla B-128	199.00	64.00	109.00	109.00
6	Sangla B-217	133.00	57.00	109.00	102.40
7	Sangla B-108	171.00	65.00	108.00	117.20
8	Sangla B-208	140.00	63.00	103.00	85.00
9	Sangla B-105	172.00	64.00	101.00	72.60
10	Sangla B-216	201.00	57.00	110.00	95.60
11	Sangla B-106	224.00	63.00	112.00	105.20
12	Sangla B-212	193.00	60.00	109.00	105.60
13	Sangla B-110	133.00	64.00	103.00	98.80
14	Sangla B-207	116.00	60.00	109.00	108.60
15	Sangla B-1	196.00	64.00	106.00	110.20
16	Himpriya	230.00	78.00	124.00	139.00
17	Sangla B-203	127.00	60.00	111.00	112.00
18	Sangla B-124	213.00	64.00	108.00	113.60
19	Sangla B-215	70.00	57.00	106.00	107.00

S. No.	Genotype	Plant population (0.5 square meters)	Days to flowering	Days to maturity	Plant height (cm)
20	Sangla B-119	96.00	64.00	110.00	112.80
21	Sangla B-213	161.00	56.00	110.00	116.20
22	Sangla B-117	196.00	76.00	112.00	126.80
23	Sangla B-202	151.00	57.00	113.00	128.40
24	Sangla B-101	161.00	72.00	113.00	106.20
25	Sangla B-125	110.00	64.00	114.00	111.40
26	Sangla B-210	113.00	58.00	111.00	106.00
27	Sangla B-114	160.00	75.00	116.00	145.60
28	Sangla B-209	179.00	59.00	114.00	112.60
29	Sangla B-118	138.00	79.00	111.00	105.40
30	Sangla B-214	155.00	64.00	116.00	96.80
31	Sangla B-121	130.00	75.00	114.00	93.00
32	Sangla B-135	98.00	70.00	124.00	120.60
33	Sangla B-206	94.00	58.00	124.00	146.80
34	Sangla B-104	169.00	73.00	124.00	109.00
35	Sangla B-205	125.00	57.00	124.00	103.80
36	Sangla B-111	152.00	71.00	124.00	97.20
37	Sangla B-204	93.00	62.00	124.00	119.80
38	KBB-3	179.00	74.00	124.00	142.80
	Average	**151.39**	**64.16**	**112.84**	**111.16**
	Max	**230.00**	**79.00**	**124.00**	**146.80**
	Min	**70.00**	**56.00**	**101.00**	**72.60**
	St Dev	**39.68**	**6.83**	**6.73**	**15.53**

Table 89A. Germplasm Screening Nursery – Buckwheat, Shimla

S. No.	Acc.	Qualitative									
		Early plant vigour	Growth habit	Flower colour	Leaf colour	Leaf margin colour	Leaf shape	Stem colour	Seed shattering	Seed shape	Seed colour
		1	2	3	4	5	6	7	8	9	10
1	IC274424	3	3	1	3	5	2	5	3	2	5
2	IC274431	3	3	1	3	5	2	5	3	2	5
3	IC274436	3	3	1	3	5	2	7	3	2	5
4	IC274438	3	3	1	3	5	2	5	3	2	5
5	IC274439	3	3	1	3	5	2	5	3	2	5
6	IC280394	3	3	1	3	5	2	3	3	3	7
7	IC310045	3	3	1	3	5	2	7	3	2	7
8	IC310095	3	3	1	3	5	2	7	3	2	5
9	IC329456	3	3	1	3	5	2	7	3	3	7
10	IC341581	3	3	1	3	5	2	5	3	2	5
11	IC341591	3	3	1	3	5	2	5	3	2	5
12	HIMPRIYA	3	3	1	3	5	2	7	3	2	5
13	PRB-1	3	3	5	3	5	2	7	3	1	5
14	IC341592	3	3	1	3	5	2	7	3	2	5
15	IC341593	3	3	1	3	5	2	5	3	2	5
16	IC341594	3	3	1	3	5	2	5	3	2	5
17	IC341674	3	3	1	3	5	2	5	3	2	5
18	IC341675	3	3	1	3	5	2	7	3	2	5
19	IC341679	3	3	1	3	5	2	7	3	3	5

		1	2	3	4	5	6	7	8	9	10
20	IC341682	3	3	1	3	5	2	7	3	3	5
21	IC341635	3	3	1	3	5	2	7	3	2	5
22	IC361874	3	3	1	3	5	2	7	3	2	5
23	IC381047	3	3	1	3	5	2	5	3	2	5
24	IC381050	3	3	1	3	5	2	7	3	2	5
25	IC381120	3	3	1	3	5	2	7	3	2	5
26	IC381129	3	3	1	3	5	2	5	3	3	5
27	IC381130	3	3	1	3	5	2	5	3	2	7
28	IC381177	3	3	1	3	5	2	7	3	2	5
29	IC381463	3	3	1	3	5	2	7	3	2	7
30	IC381243	3	3	1	3	5	2	7	3	2	5
31	IC382270	3	3	1	3	5	2	7	3	2	5
32	IC382287	3	3	1	3	5	2	7	3	3	7
33	IC258232	3	3	1	3	5	2	5	3	1	5
34	IC274429	3	3	1	3	5	2	5	3	1	5
35	IC278957	3	3	1	3	3	2	5	3	1	5
36	IC280349	3	3	5	3	5	2	5	3	1	5
37	IC310104	3	3	5	3	5	2	5	3	1	5
38	IC311074	3	3	5	3	5	2	5	3	1	5
39	IC329593	3	3	5	3	5	2	5	3	1	5
40	IC391690	3	3	5	3	3	2	5	3	1	5
41	IC381077	3	3	5	3	5	2	5	3	1	5

		1	2	3	4	5	6	7	8	9	10
42	HIMPRIYA	3	3	1	3	5	2	7	3	1	5
43	PRB-1	3	3	5	3	5	2	7	3	1	5
44	IC381098	3	3	5	3	5	2	7	3	2	5
45	IC382728	3	3	5	3	5	2	7	3	1	5
46	IC382733	3	3	5	3	5	2	7	3	1	5
47	IC382734	3	3	5	3	5	2	7	3	1	5
48	EC058322	3	3	5	3	5	2	3	3	1	5
49	EC125357	3	3	5	3	5	2	5	3	1	5
50	EC159500	3	3	1	3	5	2	7	5	1	5
51	EC213685	3	3	5	3	5	2	5	3	1	5
52	EC272442	3	3	5	3	5	2	7	3	1	5
53	EC323724	3	3	5	3	5	2	5	3	1	5
54	EC323729	3	3	5	3	5	2	7	3	1	5

Table 89B. Germplasm Screening Nursery – Buckwheat, Shimla

S. No.	Acc.	Quantitative												
		Days to 50% flowering	Leaf length (cm)	Leaf width (cm)	No. of leaves	No. of internode	Petiole length (cm)	No. of primary branches	No. of infl./ plant	Cyme length (cm)	Plant height (cm)	Days to 80% maturity	No. of seed/ infl.	1000 seed wt. (g)
		11	12	13	14	15	16	17	18	19	20	21	22	23
1	IC274424	58.00	6.25	6.90	17.50	17.50	4.55	5.50	24.50	3.50	95.70	105.00	5.50	18.00
2	IC274431	60.00	5.60	6.60	17.00	16.00	6.35	4.50	29.50	2.65	92.90	107.00	7.00	18.20
3	IC274436	61.00	8.55	10.05	19.00	18.00	7.80	5.50	21.00	2.55	102.50	107.00	8.00	18.10
4	IC274438	60.00	7.65	8.20	21.00	20.00	5.30	6.50	41.50	3.35	119.20	107.00	6.00	16.40
5	IC274439	59.00	7.55	9.20	21.50	20.50	7.60	7.00	31.50	2.80	103.40	136.00	8.50	16.20
6	IC280394	51.00	5.10	6.20	21.00	20.50	3.35	4.50	36.00	3.45	80.10	86.00	5.50	14.20
7	IC310045	61.00	5.35	7.00	20.00	19.00	6.75	7.50	23.00	4.20	116.20	107.00	5.50	19.40
8	IC310095	63.00	8.75	9.85	20.50	19.50	6.55	6.00	30.00	3.80	135.30	107.00	4.50	19.00
9	IC329456	62.00	8.65	10.80	18.50	17.50	8.00	7.00	13.00	2.50	97.45	116.00	9.00	14.60
10	IC341581	60.00	5.15	6.05	19.50	18.50	3.00	3.50	50.00	3.35	105.60	111.00	8.50	17.20
11	IC341591	51.00	4.25	5.25	22.50	21.50	2.35	4.00	57.00	3.65	97.45	87.00	6.50	15.60
12	HIMPRIYA	67.00	9.20	11.60	25.00	15.60	15.45	7.50	37.00	3.25	132.30	143.00	4.50	16.40
13	PRB-1	51.00	6.25	8.15	23.00	22.50	5.50	8.50	65.00	5.80	167.25	138.00	4.50	19.45
14	IC341592	58.00	10.95	11.75	22.50	21.50	9.75	8.50	58.00	6.50	157.40	116.00	8.00	19.40
15	IC341593	59.00	8.10	10.15	20.50	19.50	6.15	7.50	37.00	3.70	111.50	102.00	4.50	17.80
16	IC341594	52.00	5.40	6.95	22.00	20.50	3.60	4.00	58.00	2.65	114.50	58.00	4.50	14.50

		11	12	13	14	15	16	17	18	19	20	21	22	23
17	IC341674	60.00	11.60	12.55	16.50	26.00	12.30	7.50	32.00	2.75	113.50	65.00	6.50	18.40
18	IC341675	65.00	11.55	13.00	19.00	18.00	10.75	7.50	41.00	3.55	135.35	115.00	8.50	18.60
19	IC341679	64.00	9.20	11.30	19.50	18.50	8.30	9.00	32.00	3.05	119.65	119.00	9.50	15.00
20	IC341682	62.00	10.75	11.00	21.50	20.50	9.80	7.00	34.00	4.75	137.25	115.00	8.50	14.20
21	IC341635	56.00	9.00	10.50	24.00	23.00	6.65	6.00	39.00	5.70	144.50	95.00	9.50	20.00
22	IC361874	64.00	8.15	9.20	19.50	18.50	7.30	7.50	22.00	4.30	122.00	107.00	8.50	16.80
23	IC381047	52.00	7.25	9.00	18.00	17.00	5.65	4.00	39.00	3.60	102.60	95.00	5.50	18.40
24	IC381050	62.00	10.80	11.60	21.00	20.00	9.45	7.00	25.00	5.25	138.00	95.00	5.50	20.80
25	IC381120	51.00	7.65	9.10	22.00	21.00	4.85	4.00	48.50	5.00	132.15	104.00	11.50	16.80
26	IC381129	62.00	7.10	8.00	21.00	19.00	6.40	3.50	26.50	4.45	116.00	105.00	5.50	16.80
27	IC381130	53.00	8.50	8.85	25.00	23.50	5.10	3.50	38.30	5.50	144.40	102.00	5.50	17.60
28	IC381177	54.00	8.50	9.30	23.50	22.00	6.00	4.00	38.00	4.25	163.40	101.00	8.00	16.40
29	IC381463	56.00	8.70	10.45	20.00	19.00	6.45	4.50	40.00	5.10	144.00	103.00	11.00	16.80
30	IC381243	62.00	19.75	12.75	22.50	21.50	9.00	5.00	47.00	6.75	160.40	104.00	12.00	19.20
31	IC382270	62.00	8.25	9.90	18.00	17.00	6.35	7.00	33.00	4.85	129.50	104.00	7.50	18.40
32	IC382287	68.00	10.85	12.35	22.00	21.00	13.20	5.50	33.50	4.30	138.50	125.00	8.50	12.80
33	IC258232	47.00	7.60	5.45	16.00	15.00	2.85	2.50	27.00	5.60	172.50	96.00	9.00	16.80
34	IC274429	47.00	9.50	8.40	22.00	21.00	5.50	4.50	29.00	9.50	165.00	107.00	8.50	20.00
35	IC278957	39.00	13.55	13.35	22.50	21.00	2.90	3.00	35.00	5.95	190.65	106.00	4.50	22.80
36	IC280349	39.00	7.50	6.70	19.50	18.50	4.60	4.50	35.00	4.80	140.35	125.00	4.50	20.60
37	IC310104	49.00	7.40	8.40	24.50	23.50	6.50	5.00	28.50	3.85	186.20	129.00	5.00	20.80
38	IC311074	46.00	6.60	7.65	21.00	20.00	4.40	3.00	37.50	3.00	129.25	131.00	4.50	21.80

		11	12	13	14	15	16	17	18	19	20	21	22	23
39	IC329593	46.00	9.60	10.25	23.00	22.00	6.45	5.00	68.00	8.65	102.15	122.00	3.50	21.40
40	IC391690	51.00	8.25	8.50	20.00	19.00	7.80	5.50	32.50	5.50	161.00	136.00	4.50	24.20
41	IC381077	40.00	8.25	7.70	17.00	16.00	4.25	3.50	30.00	5.70	157.00	131.00	4.50	20.40
42	HIMPRIYA	69.00	15.10	12.00	15.00	14.00	6.90	7.50	28.00	4.30	114.25	117.00	3.50	16.40
43	PRB-1	51.00	6.25	7.25	22.50	22.00	7.15	9.00	101.00	9.80	188.50	137.00	4.50	18.90
44	IC381098	66.00	8.50	10.30	16.50	17.50	7.90	6.50	27.00	3.15	108.05	139.00	3.50	14.80
45	IC382728	58.00	7.00	5.65	16.50	15.00	6.60	7.00	34.00	5.70	107.50	129.00	3.50	17.00
46	IC382733	46.00	6.00	6.30	15.50	14.50	5.00	5.00	41.00	6.35	98.40	131.00	4.00	16.17
47	IC382734	49.00	8.75	8.50	15.50	14.50	7.85	5.50	45.50	12.50	126.50	131.00	3.50	18.40
48	EC058322	36.00	5.60	4.05	15.00	14.00	2.10	3.50	15.00	7.85	144.50	105.00	4.00	15.84
49	EC125357	40.00	6.30	5.60	11.00	10.50	2.40	3.00	17.00	7.60	121.00	136.00	6.50	16.17
50	EC159500	46.00	10.50	8.75	16.00	15.00	9.15	5.50	25.00	7.35	167.65	139.00	6.50	15.00
51	EC213685	50.00	8.10	7.55	16.00	15.00	5.50	3.50	29.00	12.15	169.50	136.00	3.50	21.00
52	EC272442	46.00	6.20	5.80	14.50	13.00	2.50	5.00	25.00	6.35	138.75	129.00	3.50	21.11
53	EC323724	50.00	6.45	5.90	18.50	17.00	4.20	4.50	27.50	9375.00	158.55	122.00	4.50	24.60
54	EC323729	50.00	6.15	7.10	16.50	15.50	3.55	6.50	50.00	8.35	158.00	121.00	4.50	18.20

Table 90. Promising lines in buckwheat germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	23.00-64.00	IC 278957, IC 280349, IC 311074, IC 382733, IC 382734, IC 381077, IC 381098, IC 258232, EC 159500, IC 280394 (<33 days)
2	Days to maturity (days)	64.00-142.00	IC 258232, IC 278957, IC 280349, IC 382733, IC 311074, IC 381077, IC 381098, IC 382734, EC 323739, EC 159500 (<82 days)
3	No. of primary branches	3.20-6.00	IC 382728, IC 274429, IC 274431, IC 310045, IC 278957, EC 58322, IC 274439, EC 159500, IC 310104, IC 258232 (>4.60)
4	Seed yield/plant (g)	15.18-125.10	IC 341682, IC 274436, IC 341679, IC 341675, IC 274438, IC 341592, IC 382287, IC 274439, IC 274429, IC 329456 (>88.60 g)
Sangla			
1	Days to 50% flowering (days)	49.00-79.00	IC 280394, IC 381077, IC 382734, IC 381047, IC 381098 (<53 days)
2	Days to maturity (days)	81.00-128.00	IC 382243, IC 382270, EC 323729, IC 382733, IC 382734 (<85 days)
3	Plant height (cm)	59.00-156.80	IC 341674, IC 341679, IC 341675, IC 274439, IC 329456 (>117 cm)
4	Seed yield/plant (g)	0.10-7.60	IC 274439, IC 310095 (>6.80 g)
Shimla			
1	Days to 50% flowering (days)	36.00-68.00	EC 58322, IC 278957, IC 280349, IC 381077, EC 125357 (<40 days)
2	Days to maturity (days)	58.00-143.00	IC 341594, IC 341674, IC 280394, IC 341591 (<87 days)
3	Plant height (cm)	80.10-190.65	IC 278957, IC 310104, IC 258232, EC, 213685 (>169.50 cm)
4	Cyme length (cm)	2.50-12.50	IC 382734, EC 213685, EC 323724, IC 274429 (>9.50 cm)
5	100 seed wt. (g)	12.80-24.60	EC 323724, IC 391690, IC 278957, IC 311074, IC 329593 (>21.40 g)

Table 91. Evaluation of germplasm lines in chenopodium, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	No. of primary branches	Finger length (cm)	No. of finger/plant	No. of leaves/plant	Seed yield/plant (g)
1	IC 107185	65.00	112.00	125.60	48.30	7.00	7.26	18.00	21.00	66.60
2	IC 107295	74.00	122.00	145.50	46.60	9.00	11.13	24.60	20.00	100.00
3	IC 107299	79.00	128.00	143.65	50.30	9.60	13.60	21.00	14.00	54.50
4	IC 108086	64.00	112.00	118.66	41.00	8.60	11.86	24.00	10.60	81.30
5	IC 108088	69.00	115.00	93.66	40.00	8.60	8.26	21.00	17.00	28.70
6	IC 108816	80.00	131.00	111.66	45.60	8.00	9.06	23.30	19.00	67.40
7	IC 109480	95.00	145.00	111.35	43.00	9.00	7.60	24.00	24.00	41.80
8	IC 109734	90.00	140.00	105.60	44.50	10.00	7.86	24.30	22.60	33.50
9	IC 243192	95.00	146.00	95.45	37.30	12.30	6.26	22.60	21.60	20.80
10	IC 328854	70.00	118.00	72.66	36.60	10.60	5.55	12.60	11.30	11.40
11	IC 328878	64.00	112.00	68.00	33.30	8.00	6.30	21.60	15.30	14.50
12	IC 329185	64.00	112.00	87.30	41.00	8.30	5.00	22.60	17.30	28.20
13	IC 329470	69.00	120.00	85.60	35.00	8.60	7.26	23.00	18.60	56.30
14	IC 329494	69.00	118.00	95.75	37.60	10.60	5.00	28.00	22.60	31.00
15	IC 341698	70.00	120.00	91.00	42.30	12.30	8.20	20.30	16.00	19.96
16	IC 341701	90.00	140.00	96.70	38.75	12.00	8.00	23.30	19.30	22.60
17	IC 341708	88.00	137.00	124.50	48.00	13.30	6.60	31.00	27.60	24.20
18	IC 341710	90.00	142.00	96.60	42.30	9.30	7.66	26.00	21.00	50.00
19	IC 341715	84.00	136.00	80.65	34.35	9.00	7.06	22.30	17.00	31.60
20	IC 359447	90.00	142.00	123.00	37.40	11.30	7.90	28.60	23.00	21.40

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	No. of primary branches	Finger length (cm)	No. of finger/plant	No. of leaves/plant	Seed yield/plant (g)
21	IC 359451	92.00	144.00	88.33	34.60	13.00	7.30	18.60	14.00	60.34
22	NIC 15022	88.00	135.00	106.00	39.00	10.00	8.12	12.30	20.33	15.10
23	NIC 22499	90.00	140.00	62.75	24.35	7.30	5.50	15.30	10.66	23.30
24	NIC 22530	86.00	138.00	89.70	35.00	7.60	6.00	18.30	12.00	16.20
25	NIC 58233	90.00	140.00	64.18	29.50	6.30	5.00	16.30	10.50	27.00
26	Local ©	94.00	145.00	124.65	41.10	11.20		20.12	22.60	40.20
	Mean	**80.73**	**130.38**	**100.33**	**39.49**	**9.65**	**7.57**	**21.65**	**18.03**	**38.00**

Table 92A. Germplasm Screening Nursery – Chenopod, Shimla

S. No.	Acc.	Qualitative									
		Early Plant Vigour	Plant Growth Habit	Infl. Colour	Infl. Shape	Stem brnaching	Stem colour	leaf colour	Leaf tip	Leaf shape	Seed colour
		1	2	5	6	8	9	10	13	14	19
1	IC107185	3	1	1	1	2	2	1	2	2	4
2	IC107295	3	1	2	1	2	1	1	2	2	4
3	IC107299	3	1	2	1	2	1	1	1	6	4
4	IC108086	3	1	2	1	2	1	1	2	2	4
5	IC108088	3	1	3	1	2	1	1	2	6	4
6	IC108816	3	1	2	1	2	1	1	2	2	4
7	IC109480	3	1	2	1	2	1	1	2	2	4
8	IC109734	3	1	2	1	2	1	1	2	2	4
9	PRC9805	3	1	2	1	2	1	1	2	2	4
10	IC343192	3	1	1	1	2	1	1	1	6	4
11	IC328854	3	1	2	1	2	1	1	2	2	4
12	IC328878	3	1	2	1	2	1	1	2	2	4
13	IC329185	3	1	1	1	2	1	1	1	6	4
14	IC329470	3	1	1	1	2	1	1	2	6	3
15	IC329494	3	1	3	1	2	1	1	2	2	4
16	IC341698	3	1	1	1	2	1	1	1	6	3
17	IC341701	3	1	2	1	2	1	1	2	2	4
18	PRC9805	3	1	2	1	2	1	1	2	2	4
19	IC341708	3	1	2	1	2	1	1	2	2	4

		1	2	5	6	8	9	10	13	14	19
20	IC341710	3	1	1	1	2	1	1	1	6	4
21	IC341715	3	1	2	1	2	1	1	2	2	4
22	EC359447	3	1	3	1	2	1	1	2	2	4
23	EC359451	3	1	1	1	2	1	1	2	2	4
24	NIC15022	3	1	2	1	2	1	1	2	2	4
25	NIC22499	3	1	2	1	2	1	1	2	2	4
26	NIC22530	3	1	2	1	2	1	1	2	2	4
27	NC58232	3	1	2	1	2	1	1	2	2	4
28	PRC9805	3	1	2	1	2	1	1	2	2	4

Table 92B. Germplasm Screening Nursery – Chenopod, Shimla

S. No.	Acc.	Quantitative							
		Days to flowering	Infl. Lemgth (cm)	Leaf length (cm)	Leaf width (cm)	Plant height (cm)	Days to 80% maturity	Seed yield/plant (g)	1000 Seed wt. (g)
		3	4	11	12	15	16	17	18
1	IC107185	102.00	22.30	8.25	8.35	131.50	159.00	5.99	0.30
2	IC107295	105.00	16.95	12.55	12.85	172.55	172.00	5.94	0.40
3	IC107299	102.00	24.80	11.80	7.20	189.90	159.00	7.34	0.40
4	IC108086	104.00	23.20	12.50	12.65	164.80	158.00	7.80	0.50
5	IC108088	103.00	32.75	11.30	9.20	192.15	158.00	9.71	0.40
6	IC108816	102.00	24.25	13.30	13.55	199.20	172.00	10.69	0.40
7	IC109480	108.00	22.70	14.85	14.40	204.85	172.00	9.44	0.40
8	IC109734	101.00	28.00	13.25	12.90	214.85	172.00	8.68	0.40
9	PRC9805	104.00	23.50	13.30	11.90	174.40	172.00	6.03	0.30
10	IC343192	99.00	26.00	9.30	6.45	220.75	159.00	6.39	0.40
11	IC328854	105.00	18.75	12.50	12.15	197.95	171.00	9.05	0.30
12	IC328878	107.00	25.25	11.40	12.30	209.25	171.00	6.67	0.30
13	IC329185	101.00	23.20	11.15	8.25	174.60	159.00	11.81	0.60
14	IC329470	100.00	30.15	11.20	5.35	265.70	159.00	14.92	0.60
15	IC329494	103.00	25.65	13.65	11.80	247.75	171.00	7.98	0.30
16	IC341698	102.00	27.85	13.75	8.15	294.30	159.00	21.41	0.40
17	IC341701	105.00	22.55	13.40	13.55	219.10	172.00	6.78	0.30

		3	4	11	12	15	16	17	18
18	PRC9805	105.00	25.45	10.50	9.95	199.15	171.00	8.67	0.30
19	IC341708	107.00	27.85	12.15	12.60	233.25	171.00	6.76	0.30
20	IC341710	101.00	28.00	12.40	8.90	263.75	159.00	5.98	0.40
21	IC341715	102.00	40.00	16.00	12.00	266.50	159.00	10.95	0.40
22	EC359447	104.00	26.50	12.30	12.15	192.50	172.00	6.03	0.30
23	EC359451	105.00	25.95	12.10	11.60	202.55	172.00	7.50	0.40
24	NIC15022	103.00	28.25	14.75	13.30	211.25	172.00	8.75	0.30
25	NIC22499	105.00	27.80	13.75	12.80	186.75	171.00	9.41	0.40
26	NIC22530	104.00	26.95	11.75	11.15	156.15	172.00	7.26	0.30
27	NC58232	105.00	21.65	10.75	9.80	165.50	172.00	6.01	0.30
28	PRC9805	105.00	24.20	9.90	9.30	212.90	172.00	8.21	0.30

Table 93. Promising lines in chenopodium germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	64.00-90.00	IC 108086, IC 328878, IC 329185, IC 107185, IC 108088, IC 329470, IC 329494, IC 328854, IC 341698, IC 107295 (<74 days)
2	Days to maturity (days)	112.00-146.00	IC 107185, IC 108086, IC 328878, IC 329185, IC 108088, IC 329494, IC 329470, IC 341698, IC 107295, IC 107299 (<128 days)
3	No. of primary branches	6.30-13.30	IC 341708, IC 359451, IC 243192, IC 341698, IC 341701, IC 359447, IC 328854, IC 329494, IC 109734, NIC 15022 (10.00)
4	Seed yield/plant (g)	11.40-100.00	IC 107285, IC 108086, IC 108816, EC 359451, EC 359491, IC 329470, IC 107299, IC 341710, IC 109480 (>41.80 g)
Shimla			
1	Plant height (cm)	131.50-294.30	IC 341698, IC 329470, IC 329185, IC 341710, IC 109734 (>214.85 cm)
2	Inflor. length (cm)	16.95-40.00	IC 341715, IC 108088, IC 329470, NIC 15022 (>28.25 cm)
3	Seed yield/plant (g)	5.94-21.41	IC 341698, IC 329470, IC 329185, IC 341715, IC 108816 (>10.69 g)
4	Days to maturity (days)	158.00-172.00	IC 108086, IC 108088, IC 343192. IC 341698, IC 329470 (<159 days)
5	1000 Seed wt. (g)	0.30-0.60	IC 329470, IC 329185, IC 108086 (>0.50 g)

Table 94. Evaluation of germplasm lines in Rice bean, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield (g/plant)
1	LRB 1	102.00	168.00	139.66	10.66	11.16	6.30	25.30	29.16
2	LRB 2	107.00	171.00	133.50	10.00	11.50	7.10	28.50	18.25
3	LRB 5	112.00	176.00	136.83	7.00	12.80	5.50	32.00	14.24
4	LRB 6	112.00	176.00	147.85	9.66	13.50	6.80	41.33	16.31
5	LRB 7	107.00	170.00	147.00	10.00	13.33	7.80	39.00	18.05
6	LRB 8	107.00	171.00	142.33	9.33	9.55	4.30	36.50	15.36
7	LRB 9	102.00	166.00	130.16	9.50	9.45	5.10	35.00	16.01
8	LRB 10	106.00	169.00	121.33	7.00	7.50	4.16	25.16	11.50
9	LRB 11	112.00	175.00	124.15	10.33	8.00	4.00	20.50	15.34
10	LRB 12	102.00	168.00	127.60	9.85	8.65	4.25	30.00	14.05
11	LRB 13	97.00	134.00	117.50	10.00	5.00	3.16	20.16	18.08
12	LRB 15	96.00	134.00	105.33	9.16	5.33	3.50	16.15	18.19
13	LRB 17	112.00	177.00	126.16	8.66	9.33	5.35	27.50	19.14
14	LRB 18	112.00	175.00	100.00	13.33	11.80	5.50	22.20	20.46
15	LRB 20	114.00	177.00	131.66	9.00	11.50	4.00	26.60	19.70
16	LRB 22	102.00	166.00	123.50	8.16	9.66	5.60	16.60	17.07
17	LRB 22-2	107.00	172.00	162.16	8.00	13.00	5.80	30.60	20.00
18	LRB 23	91.00	128.00	135.84	10.66	12.16	5.10	37.60	24.41
19	LRB 26	107.00	172.00	140.50	9.66	14.80	5.60	26.50	14.09
20	LRB 30	96.00	142.00	146.50	10.00	10.80	6.30	36.00	15.26

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield (g/plant)
21	LRB 34	96.00	144.00	157.16	11.33	17.10	6.45	36.50	18.21
22	LRB 35	107.00	170.00	125.00	7.33	12.50	5.00	33.60	19.32
23	LRB 36	102.00	168.00	138.00	9.66	17.60	5.50	32.30	20.40
24	LRB 37	96.00	144.00	130.50	10.66	11.30	6.10	34.60	14.49
25	LRB 38	96.00	142.00	136.00	10.83	11.60	6.30	26.50	22.90
26	LRB 42	107.00	170.00	162.86	9.60	6.30	3.80	20.60	15.94
27	LRB 48	102.00	168.00	177.60	8.50	8.80	4.30	34.80	18.78
28	LRB 50	96.00	145.00	129.40	10.50	14.60	6.10	30.30	28.88
29	LRB 53	102.00	168.00	168.20	8.60	16.50	4.60	36.00	18.96
30	LRB 63	102.00	166.00	170.20	8.50	13.00	5.50	20.10	17.45
31	LRB 66	107.00	172.00	148.80	8.50	9.30	5.80	25.60	19.42
32	LRB 74-2	102.00	166.00	184.00	9.50	10.60	5.60	38.50	19.40
33	LRB 74-3	91.00	130.00	160.60	8.80	10.00	6.30	33.60	19.77
34	LRB 75-1	102.00	168.00	126.60	10.60	13.10	5.80	24.60	16.44
35	LRB 75-2	96.00	145.00	142.80	9.60	10.00	4.80	30.30	25.20
36	LRB 76	102.00	166.00	156.00	9.50	8.30	5.10	26.00	21.05
37	LRB 78	102.00	166.00	175.00	9.10	11.00	5.50	28.00	18.31
38	LRB 79	91.00	130.00	134.80	9.40	11.60	4.00	26.50	15.60
39	LRB 84	112.00	177.00	165.00	8.80	8.00	5.40	24.50	22.06
40	BRS 2	112.00	175.00	112.60	8.30	7.00	4.00	30.00	20.50
41	LRB 141	107.00	172.00	102.60	9.10	10.00	4.60	23.40	15.23

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield (g/plant)
42	LRB 159	112.00	176.00	84.10	7.10	7.50	4.10	28.60	15.70
43	LRB 161	114.00	178.00	100.00	8.35	5.00	3.10	25.00	16.80
44	LRB 162	96.00	148.00	78.50	7.50	7.30	4.00	20.50	14.45
45	LRB 170	91.00	131.00	110.66	7.00	8.80	4.60	25.60	17.62
46	LRB 199	97.00	146.00	104.84	7.50	8.00	4.00	24.40	21.43
47	RB 5 (IC 342379)	112.00	175.00	161.50	8.50	9.50	4.50	36.20	15.60
48	RS 76/99 (IC 335412)	96.00	146.00	170.83	9.55	9.60	6.10	38.00	16.33
49	USK 384 (IC 330410)	112.00	178.00	158.50	9.55	9.00	4.30	34.50	13.88
50	RD 107 (IC 374483)	112.00	178.00	156.55	9.30	8.00	4.00	28.70	16.70
51	PRR 1	81.00	140.00	150.65	9.83	10.88	6.55	32.80	30.60
52	PRR 2	86.00	162.00	133.75	9.50	8.45	5.50	26.70	40.15

Table 95. Evaluation of germplasm lines in Rice bean, Palampur

S. No.	Line	Days to 50% Flowering	Days to maturity	Plant height (cm)	Yield (g)
1	LRB 1	100	111	104.2	420
2	LRB2	91	101	113.8	300
3	LRB5	91	101	114.0	190
4	LRB6	99	105	115.8	100
5	LRB7	100	105	95.8	150
6	LRB8	101	108	94.8	310
7	LRB9	100	110	101.8	20
8	LRB 10	99	109	103.8	310
9	LRB 11	95	114	96.0	20
10	LRB 12	86	100	98.0	90
10A	PRA-1 ©	87	98	101.6	110
10B	PRR-2 ©	87	98	94.2	314
11	LRB 13	85	129	96.8	150
12	LRB 15	102	115	101.2	190
13	LRB 17	93	110	84.4	140
14	LRB 18	102	108	97.0	100
15	LRB 20	92	101	100.6	100
16	LRB 22	89	99	96.0	125
17	LRB 2-22-2	99	108	100.4	190
18	LRB 23	93	102	91.2	110
19	LRB 26	89	102	85.8	145
20	LRB30	93	102	93.4	145
21	LRB 34	100	111	93.4	245
22	LRB 35-1	93	102	95.8	110
23	LRB 36	92	101	96.4	215
24	LRB 37	85	97	105.6	150
25	LRB 38	80	101	95.6	250
25A	PRR-1	80	97	92.4	275
25B	PRR-2	83	99	85.6	150
26	LRB 42	92	99	92.2	15
27	LRB 48	91	101	93.2	15
28	LRB 50	95	103	93.4	15
29	LRB 53	89	101	89.8	10
30	LRB 63	91	101	100.8	50

S. No.	Line	Days to 50% Flowering	Days to maturity	Plant height (cm)	Yield (g)
31	LRB 66	89	99	92.6	50
32	LRB 74-2	92	100	102.2	60
33	LRB 74-3	91	99	90.0	55
34	LRB 75-1	83	95	95.8	30
35	LRB 75-2	85	99	89.6	65
36	LRB 76	95	109	99.0	125
37	LRB 78	95	111	96.2	130
38	LRB 79	91	108	115.8	80
39	LRB 84	85	95	89.0	90
40	BRS 2	88	99	92.8	100
41	LRB 141	91	101	84.0	45
42	LRB 159	91	109	107.0	95
43	LRB 161	91	101	91.0	75
43A	PRR-1	87	99	88.8	35
44	LRB 162	89	101	92.4	145
45	LRB 170	91	101	89.2	95
46	LRB 199	97	109	97.4	110
47	RBS (IC 342379)	92	108	85.2	115
48	RS 76/99 (IC 335412)	92	101	105.8	110
49	LUS 384 (IC 330410)	91	113	95.6	95
50	RP 1O7IC 374438	91	101	99.6	50
51	PRR2	97	111	103.6	195

Table 96A. Germplasm Screening Nursery – Rice bean, Shimla

S. No.	Acc.	Qualitative								
		Early plant vigour	Plant growth habit	Plant habit	Flower colour	Flowering behaviour	Leaflet shape	Pod shattering	Pod colour	Seed shape
		1	2	3	4	5	6	7	8	9
1	LRB-1	2	1	1	3	1	1	0	3	1
2	LRB-2	2	1	1	3	1	1	0	2	1
3	LRB-5	2	1	1	3	1	1	1	2	1
4	LRB-6	2	1	1	3	1	2	0	2	1
5	LRB-7	2	1	1	3	1	2	1	2	1
6	LRB-8	3	1	1	3	1	2	1	2	1
7	LRB-9	2	1	1	3	1	2	1	2	1
8	LRB-10	2	1	1	3	1	2	1	2	1
9	LRB-11	2	1	1	3	1	2	0	2	1
10	LRB-12	2	1	1	3	1	2	0	2	1
11	PRA-1	2	1	1	3	1	2	0	2	1
12	PRA2	2	2	1	3	1	1	0	2	1
13	LRB-13	2	1	1	3	1	1	1	2	1
14	LRB-15	2	1	1	3	1	2	0	2	1
15	LRB-17	2	1	1	3	1	1	0	2	1
16	LRB-18	1	1	1	3	1	1	1	2	1
17	LRB-20	3	1	1	3	1	1	0	2	1
18	LRB-22	2	1	1	3	1	1	0	2	1
19	LRB22-2	3	1	1	3	1	1	1	2	1

		1	2	3	4	5	6	7	8	9
20	LRB23	1	1	1	3	1	1	1	2	1
21	LRB26	2	1	1	3	1	1	0	2	1
22	LRB-1	2	1	1	3	1	1	0	3	1
23	LRB-2	2	1	1	3	1	1	0	2	1
24	LRB-5	2	1	1	3	1	1	1	2	1
25	LRB-30	1	1	1	3	1	1	1	2	1
26	LRB-34	2	1	1	3	1	1	0	2	1
27	LRB35-1	2	1	1	3	1	1	1	2	1
28	LRB36	2	2	1	3	1	1	1	2	1
29	LRB37	2	1	1	3	1	1	0	2	1
30	LRB38	2	1	1	3	1	1	1	2	1
31	PRR-1	1	1	1	3	1	2	1	2	1
32	PRR-2	2	1	1	3	1	1	1	2	1
33	LRB42	2	1	1	3	1	1	1	2	1
34	LRB48	2	1	1	3	1	1	0	2	1
35	LRB50	2	1	1	3	1	1	1	2	1
36	LRB53	2	1	1	3	1	1	1	2	1
37	LRB63	2	1	1	3	1	1	1	2	1
38	LRB66	2	1	1	3	1	1	1	2	1
39	LRB74-2	2	1	1	3	1	1	0	2	1
40	LRB74-3	2	1	1	3	1	1	1	2	1
41	LRB75-1	2	1	1	3	1	1	0	2	1

		1	2	3	4	5	6	7	8	9
42	LRB75-2	2	1	1	3	1	1	0	2	1
43	LRB76	2	1	1	3	1	1	0	2	1
44	LRB78	2	1	1	3	1	1	0	2	1
45	LRB79	2	1	1	3	1	1	0	2	1
46	LRB84	2	1	1	3	1	1	0	2	1
47	BRS-2	2	1	1	3	1	1	1	2	1
48	LRB141	2	1	1	3	1	2	0	2	1
49	LRB159	2	1	1	3	1	2	0	2	1
50	LRB161	3	1	1	3	1	1	0	2	1
51	PRR-1	2	1	1	3	1	2	1	2	1
52	LRB-162	2	2	1	3	1	2	1	3	1
53	LRB-170	2	1	1	3	1	1	1	3	1
54	LRB199	3	1	1	3	1	1	0	2	1
55	IC342379	3	2	1	3	1	2	0	2	1
56	IC335412	2	1	1	3	1	2	0	2	1
57	IC330410	2	1	1	3	1	1	0	3	1
58	IC374483	2	1	1	3	1	2	1	3	1
59	PRR-2	2	2	1	3	1	1	1	2	1

Table 96A. Germplasm Screening Nursery – Rice bean, Shimla

S. No.	Acc.	Quantative								
		Days to flowering	Leaflet size	No. of branches/ plant	Plant height (cm)	Stem thickness (mm)	Pod length (cm)	Days to 80% maturity	No of seed/pod	100 seed wt. (g)
		10	11	12	13	14	15	16	17	18
1	LRB-1	90.00	5.00	8.50	158.90	6.07	13.65	120.00	8.50	7.40
2	LRB-2	88.00	5.00	11.50	135.20	6.38	11.45	122.00	8.50	8.00
3	LRB-5	87.00	5.00	9.00	172.00	5.48	11.55	124.00	7.50	7.60
4	LRB-6	89.00	5.00	10.00	158.70	7.36	11.55	126.00	7.50	8.16
5	LRB-7	86.00	5.00	7.50	154.20	4.93	10.15	121.00	8.50	9.14
6	LRB-8	85.00	5.00	10.50	126.30	5.37	9.55	123.00	7.50	8.50
7	LRB-9	88.00	5.00	7.50	240.00	2.09	9.60	126.00	7.50	7.70
8	LRB-10	85.00	5.00	8.50	129.00	2.83	11.50	125.00	7.50	6.40
9	LRB-11	89.00	5.00	7.00	130.70	6.26	11.10	126.00	7.50	7.70
10	LRB-12	86.00	5.00	10.00	111.50	7.08	11.25	123.00	6.50	7.20
11	PRA-1	87.00	3.00	6.50	106.50	4.84	12.30	122.00	7.50	5.00
12	PRA2	85.00	5.00	9.50	161.00	5.41	11.80	130.00	7.50	7.60
13	LRB-13	90.00	3.00	12.50	133.80	4.31	11.30	126.00	8.50	6.90
14	LRB-15	88.00	5.00	11.00	135.60	6.66	10.80	127.00	7.50	7.70
15	LRB-17	90.00	5.00	10.50	118.60	7.16	10.20	128.00	7.50	7.40
16	LRB-18	67.00	3.00	10.50	129.30	6.15	11.70	122.00	8.00	7.00
17	LRB-20	87.00	5.00	11.00	149.50	5.85	10.60	123.00	6.50	6.10

		10	11	12	13	14	15	16	17	18
18	LRB-22	88.00	3.00	10.50	130.10	6.28	10.80	125.00	7.50	5.50
19	LRB22-2	86.00	3.00	9.00	124.50	6.18	13.60	126.00	8.00	6.90
20	LRB23	85.00	3.00	11.00	136.50	6.33	12.60	123.00	6.50	6.90
21	LRB26	89.00	3.00	11.00	107.10	3.96	11.35	122.00	7.50	7.40
22	LRB-1	90.00	5.00	8.50	158.90	6.07	13.65	120.00	8.50	7.40
23	LRB-2	88.00	5.00	11.50	135.20	6.38	11.45	122.00	8.50	8.00
24	LRB-5	87.00	5.00	9.00	172.00	5.48	11.55	124.00	7.50	7.60
25	LRB-30	87.00	5.00	8.50	145.60	7.29	10.20	124.00	6.50	8.00
26	LRB-34	85.00	5.00	12.00	156.50	6.62	10.30	126.00	7.50	5.80
27	LRB35-1	84.00	5.00	11.50	135.60	6.79	12.40	126.00	8.50	8.60
28	LRB36	85.00	3.00	11.00	154.00	6.19	9.30	123.00	6.50	7.60
29	LRB37	87.00	3.00	9.50	106.50	5.24	12.60	122.00	5.50	8.10
30	LRB38	84.00	3.00	12.00	162.60	6.19	13.30	127.00	7.50	9.50
31	PRR-1	85.00	3.00	8.50	109.00	4.91	12.60	125.00	6.50	7.60
32	PRR-2	84.00	5.00	11.00	120.00	8.81	11.90	127.00	5.50	8.00
33	LRB42	87.00	5.00	10.50	136.50	6.19	12.60	123.00	8.50	7.50
34	LRB48	88.00	3.00	9.00	111.20	6.22	10.80	123.00	7.50	6.30
35	LRB50	89.00	5.00	10.00	134.20	5.75	13.10	120.00	8.50	5.90
36	LRB53	85.00	3.00	9.00	114.60	4.62	11.90	121.00	7.50	9.20
37	LRB63	84.00	5.00	9.00	162.10	5.32	12.30	124.00	7.50	7.90
38	LRB66	87.00	5.00	7.50	131.50	4.17	10.40	126.00	6.50	6.20
39	LRB74-2	88.00	5.00	8.00	112.60	5.27	12.60	123.00	7.50	5.70

		10	11	12	13	14	15	16	17	18
40	LRB74-3	88.00	5.00	7.50	115.00	5.87	9.50	123.00	7.50	9.20
41	LRB75-1	87.00	5.00	8.50	151.10	5.85	13.30	121.00	6.50	7.00
42	LRB75-2	89.00	3.00	10.50	116.50	6.55	13.75	122.00	7.50	8.20
43	LRB76	84.00	5.00	10.00	146.50	4.27	11.30	120.00	7.50	6.10
44	LRB78	86.00	3.00	10.50	134.00	5.62	11.65	125.00	6.50	6.30
45	LRB79	85.00	5.00	10.50	119.00	4.67	12.60	124.00	7.50	8.20
46	LRB84	87.00	3.00	12.50	129.50	5.57	8.40	127.00	5.50	6.90
47	BRS-2	87.00	3.00	12.50	132.50	4.67	11.80	123.00	6.50	8.50
48	LRB141	86.00	3.00	12.50	135.00	4.23	11.25	128.00	7.50	7.50
49	LRB159	84.00	5.00	12.50	127.00	6.26	12.60	126.00	6.50	10.10
50	LRB161	86.00	5.00	9.00	99.50	6.67	11.60	120.00	6.50	8.40
51	PRR-1	87.00	5.00	9.50	122.50	6.67	10.60	123.00	8.50	5.90
52	LRB-162	87.00	5.00	10.50	116.00	7.66	11.80	126.00	5.50	7.50
53	LRB-170	85.00	3.00	8.50	117.00	5.09	10.80	123.00	6.50	7.40
54	LRB199	86.00	5.00	8.50	116.50	6.89	9.65	123.00	7.50	7.70
55	IC342379	89.00	3.00	11.00	116.00	5.99	8.70	122.00	6.50	9.60
56	IC335412	87.00	5.00	8.50	122.50	6.81	11.70	128.00	7.50	6.00
57	IC330410	86.00	5.00	7.50	116.50	6.75	9.60	123.00	7.50	7.80
58	IC374483	88.00	3.00	10.50	109.00	5.97	12.10	126.00	7.50	6.50
59	PRR-2	86.00	1.00	11.50	143.00	7.17	11.70	126.00	8.50	5.20

Table 97. Rice bean Germplasm screening Nursery at NBPGR RS, Bhowali

S. No.	Collector No.	IC No.	Days to 50% flowering	Days to 80% maturity	Plant height (cm)	No. of pods/peduncle	No. of primary branches	Pods length (cm)	No. of seeds/pod (g)	Plot yield (g)	100 grain weight (g)	Remarks
1	LRB 1		96	142	150	4	6	10.0	8	50	6.19	
2	LRB 2		91	135	180	4	5	10.0	9	170	7.58	
3	LRB 5		96	139	167	4	5	9.7	8	90	6.78	
4	LRB 6		89	126	176	3	4	8.5	8	25	7.12	
5	LRB 7		96	141	143	3	5	9.3	7	50	7.63	
6	LRB 8		96	139	89	2	3	8.2	8	35	7.60	
7	LRB 9		87	140	191	4	5	11.2	8	140	8.10	
8	LRB 10		91	140	123	3	4	9.9	8	50	7.36	
9	LRB 11		96	140	162	3	3	10.0	8	40	7.26	
10	LRB 12		NR	NR	174	NR	7	NR	NR	NR	NR	Late, no pod formation
1	PRR 1		87	138	117	2	4	6.0	5	20	5.23	
2	PRR 2		86	127	105	2	4	6.8	4	5	6.68	
11	LRB 13		90	142	143	3	3	9.2	9	30	6.67	
12	LRB 15		91	140	128	2	4	9.0	10	75	7.10	
13	LRB 17		91	140	164	2	4	10.0	8	100	7.49	
14	LRB 18		96	140	178	3	6	11.1	10	90	7.14	
15	LRB 20		94	135	174	2	5	9.0	8	25	6.45	
16	LRB 22		96	135	150	3	6	9.8	8	25	6.15	

S. No.	Collector No.	IC No.	Days to 50% flowering	Days to 80% maturity	Plant height (cm)	No. of pods/peduncle	No. of primary branches	Pods length (cm)	No. of seeds/pod (g)	Plot yield (g)	100 grain weight (g)	Remarks
17	LRB 22-2		86	138	179	3	5	11.2	10	45	7.69	
18	LRB 23		96	140	200	4	5	11.8	10	130	6.97	
19	LRB 26		96	135	138	3	5	11.6	10	25	7.28	
20	LRB 30		96	140	189	3	4	10.9	6	30	8.79	
21	LRB 34		96	145	108	5	5	8.6	7	15	8.10	
22	LRB 35-1		91	140	150	3	4	10.0	8	20	6.96	
23	LRB 36		91	135	150	4	5	7.8	6	50	6.62	
24	LRB 37		93	135	107	3	4	10.4	8	30	6.02	
25	LRB 38		NR	NR	85	NR	NR	NR	NR	NR	NR	Late, no pod formation
1	PRR 1		87	135	117	2	4	6.0	5	5	6.26	
2	PRR 2		91	135	105	2	4	6.8	4	5	5.30	
26	LRB 42		93	135	166	3	5	10.0	9	85	5.79	
27	LRB 48		91	135	132	2	4	9.9	7	40	7.20	
28	LRB 50		91	135	190	4	5	11.2	10	100	6.75	
29	LRB 53		89	135	100	3	3	10.5	9	160	7.04	
30	LRB 63		96	135	201	3	4	9.0	7	105	7.03	
31	LRB 66		91	139	109	2	3	9.4	8	50	8.14	
32	LRB 74-2		96	140	105	2	2	7.6	6	5	8.57	
33	LRB 74-3		96	142	91	2	3	7.1	5	25	7.52	

S. No.	Collector No.	IC No.	Days to 50% flowering	Days to 80% maturity	Plant height (cm)	No. of pods/peduncle	No. of primary branches	Pods length (cm)	No. of seeds/pod (g)	Plot yield (g)	100 grain weight (g)	Remarks
34	LRB 75-1		91	139	67	3	2	7.0	5	25	6.82	
35	LRB 75-2		91	141	73	1	2	9.7	6	5	8.02	
36	LRB 76		91	140	107	3	4	8.6	7	65	8.49	
37	LRB 78		96	141	74	2	3	6.2	4	15	6.44	
38	LRB 79		96	141	62	1	1	9.0	7	5	10.47	
39	LRB 84		91	139	84	3	5	8.6	6	20	9.25	
40	BRS 2		93	135	110	1	4	8.0	6	30	6.91	
41	LRB 141		96	139	97	2	5	8.8	7	50	6.71	
42	LRB 159		94	139	135	3	4	8.9	8	80	6.84	
43	LRB 161		96	139	108	3	4	8.0	7	15	6.45	
1	PRR 1		96	135	93	2	5	8.9	6	40	7.28	
44	LRB 162		91	135	145	4	5	9.8	9	90	7.87	
45	LRB 170		96	139	150	4	4	10.0	8	70	9.04	
46	LRB 199		94	135	123	2	3	6.0	6	10	6.93	
47	RB 5	IC 342379	96	142	163	2	3	8.5	6	5	12.70	
48	RS 76199	IC 335412	87	140	170	4	8	8.8	8	25	7.82	
49	USK 384	IC 330410	94	139	166	4	9	9.6	8	5	10.90	

S. No.	Collector No.	IC No.	Days to 50% flowering	Days to 80% maturity	Plant height (cm)	No. of pods/peduncle	No. of primary branches	Pods length (cm)	No. of seeds/pod (g)	Plot yield (g)	100 grain weight (g)	Remarks
50	RD 107	IC 374483	NR	NR	211	NR	4	NR	NR	NR	NR	Late, no pod formation
2	PRR 2	IC 374483	83	140	146	1	5	5.8	5	5	8.37	
51	DPRR 158	IC 361200	NR	NR	NR	NR	NR	NR	NR	NR	NR	Late, no pod formation
52	VASHM/PC 3246		66	127	189	3	6	9.40	10	150	3.80	
	CV (%)		**2.30**	**1.60**	**5.32**			**3.74**			**4.30**	

Table 98. Promising lines in rice bean germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	91.00-114.00	LRB 23, LRB 74-3, LRB 79, LRB 170, LRB 15, LRB 30, LRB 34, LRB 37, LRB 38, LRB 50, LRB 75-2, LRB 16-2, RS 76/99 (IC 335412) (<112 days)
2	Days to maturity (days)	128.00-178.00	LRB 23, LRB 74-3, LRB 79, LRB 170, LRB 13, LRB 15, LRB 30, LRB 38, LRB 34, LRB 37, LRB 50 (145 days)
3	Pod length (cm)	7.00-13.33	LRB 18, LRB 34, LRB 38, LRB 1, LRB 23, LRB 37, LRB 75-1, LRB 50, LRB 18, LRB 2, LRB 7, LRB 13 (10.00 cm)
4	Seed/pod	3.16-7.80	LRB 7, LRB 2, LRB 6, LRB 34, LRB 1, LRB 30, LRB 38, LRB 74-3, LRB 37, LRB 50, RS 76/99 (IC 335412) (6.10)
5	Seed yield/plant (g)	13.88-30.69	LRB 1, LRB 50, LRB 75-2, LRB 23, LRB 38, LRB 84, LRB 199, LRB 76, RBS 2, LRB 18, LRB 36, LRB 22-2 (>20.00 g)
Palampur			
1	Days to 50% flowering (days)	80.00-102.00	LRB 38, LRB 75-1, LRB 37, LRB 72-2, LRB 84 (<85 days)
2	Days to maturity (days)	95.00-115.00	LRB 75-1, LRB 84, LRB 22, LRB 42, LRB 66 (<99 days)
3	Plant height (cm)	85.20-115.80	LRB 79, LRB 6, LRB 5, LRB 2 (>113.80 cm)
4	Seed yield (g/plot)	10.00-420.00	LRB 1, LRB 2, LRB 8, LRB 10, LRB 34 (>245.00 g)

S. No.	Characters	Range	Promising lines
Shimla			
1	Plant height (cm)	99.50-172.00	LRB 5, LRB 38, LRB 63, LRB 1 (>158.90 cm)
2	Days to 50% flowering (days)	67.00-90.00	LRB 18, LRB 35-1, LRB 38, LRB 63, LRB 76, LRB 159 (<84 days)
3	Days to 80% maturity (days)	120.00-130.00	LRB 1, LRB 76, LRB 161 (<120 days)
4	Pod length (cm)	8.40-13.75	LRB 75-2, LRB 1, LRB 22-2, LRB 38, LRB 75-1 (>13.30 cm)
5	100 Seed weight (g)	5.00-10.10	LRB 159, IC 342379, LRB 38, LRB 53, LRB 74-3 (>9.20 g)
Bhowali			
1	Days to 50% flowering (days)	66.00-96.00	VASHM/PC-3246, IC 3354, LRB 22-2 (<86 days)
2	Plant height (cm)	62.00-211.00	LRB 79, LRB 75-1, LRB 75-2 (>121.40 cm)
3	Pod length (cm)	6.00-11.80	LRB 23, LRB 26, LRB 22-2 (>6.40 cm)
4	Days to 80% maturity (days)	126.00-145.00	LRB 6, VASHM/PC 3246, LRB 2 (<133.80 days)
5	100 grains weight (g)	3.80-12.70	IC 3423, IC 3304, LRB 79 (>6.80 g)

Table 99. Evaluation of germplasm lines in Adzuki bean, Palampur

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (gm)
1	EC 000251	56	73	67	128
2	EC 000254	54	73	72	70
3	EC 008707	56	73	69	160
4	EC 015256	55	73	78	130
5	EC 015257	71	84	102	25
6	EC 018151	66	81	89	240
7	EC 024523	56	75	64	140
8	EC 030256	57	73	62	165
9	EC 108080	55	73	65	155
10	EC 120460	55	83	92	135
11	EC 120460	63	77	49	135
12	HPAU 27-9	56	77	75	425
13	EC 187896	57	78	62	200
14	EC 290251	65	81	55	85
15	EC 340247	57	78	110	125
16	EC 340255	65	78	62	280
17	EC 340263	56	83	89	10
18	EC 340264	65	84	101	120
19	EC 340271	57	79	82	85
20	EC 340284	63	84	99	25
21	HPAU 27-9	56	87	88	310
22	EC 341940	56	77	43	2
23	EC 341952	56	87	76	5
24	EC 341954	61	85	79	5
25	EC 348955	61	85	82	130
26	EC 341958	54	77	42	100
27	EC 341960	57	78	115	308
28	EC 344625	63	81	125	186

Table 100A. Germplasm Screening Nursery - Adzuki bean, Shimla

S. No.	Acc.	Qualitative											
		Early plant vigour	Plant habit	Plant growth habit	Leaf colour	Leaf surface	Leaflet shape	Flower colour	Stem colour	Stem surface	Pod angle	Pod surface	Seed Coat colour
		1	2	3	4	5	6	8	9	10	13	16	20
1	EC00251	2	1	1	2	1	1	2	3	1	1	1	4
2	EC00254	2	1	2	2	1	1	2	3	1	1	1	4
3	EC008707	2	1	2	2	1	1	2	3	1	1	1	4
4	EC015256	2	1	2	2	1	1	2	3	1	1	1	4
5	EC015257	2	1	2	2	1	1	2	3	1	1	1	4
6	EC018151	2	1	2	2	1	1	2	3	1	1	1	4
7	EC024523	2	1	2	2	1	1	2	3	1	1	1	2
8	EC030256	2	1	2	2	1	1	2	3	1	1	1	4
9	EC108080	2	1	2	2	1	1	2	3	1	1	1	4
10	EC120460	2	1	1	1	1	1	1	2	1	1	1	4
11	HPU51	2	1	2	2	1	1	2	3	1	1	1	4
12	EC187896	2	1	1	1	1	1	1	2	1	1	1	4
13	EC290251	2	1	1	1	1	1	1	2	1	1	1	4
14	EC340247	2	1	2	1	1	1	2	3	1	1	1	2
15	EC340255	2	1	2	2	1	1	2	3	1	1	1	4
16	EC340263	3	1	2	2	1	1	2	3	1	1	1	4
17	EC340264	2	1	1	1	1	1	1	2	1	1	1	4
18	EC340271	3	1	2	2	1	1	2	3	1	1	1	2

		1	2	3	4	5	6	8	9	10	13	16	20
19	EC340284	2	1	2	2	1	1	2	3	1	1	1	4
20	HPU51	2	1	2	2	1	1	2	3	1	1	1	4
21	EC341940	2	1	2	1	1	1	1	2	1	1	1	99
22	EC341952	3	1	2	2	1	1	2	3	1	1	1	4
23	EC341954	3	1	2	2	1	1	2	3	1	1	1	4
24	EC341955	2	1	1	1	1	1	2	1	1	1	1	4
25	EC341958	2	1	2	1	1	1	1	2	1	1	1	4
26	EC 341960	2	1	1	1	1	1	2	1	1	1	1	4
27	EC0344625	2	1	2	1	1	1	2	2	1	1	1	4

Table 100B. Germplasm Screening Nursery - Adzuki bean, Shimla

S. No.	Acc.	Quantitative										Availability in gene bank
		Days to 50% flowering	No. of primary branches	No. of cluster / plant	No. of pod/ cluster	No. of pod/plant	Plant height (cm)	Days to 80% maturity	Seed yield/plant (g)	100 seed wt. (g)	No. of seed/Pod	
		7	11	12	14	15	17	18	19	21	22	23
1	EC00251	68.00	5.50	11.00	3.50	32.00	87.50	116.00	3.82	12.80	8.50	1
2	EC00254	69.00	5.50	8.50	4.50	34.00	10.70	117.00	31.30	9.80	7.00	0
3	EC008707	68.00	6.00	13.50	3.50	56.00	121.50	121.00	17.90	12.70	6.50	0
4	EC015256	67.00	4.50	14.50	3.00	46.50	118.50	123.00	41.20	10.90	9.50	0
5	EC015257	83.00	5.50	10.00	3.50	37.50	87.50	118.00	35.60	8.60	7.50	1
6	EC018151	68.00	5.00	10.00	3.50	37.50	125.50	117.00	38.10	11.30	8.50	0
7	EC024523	70.00	3.50	11.50	3.50	48.00	67.50	122.00	40.60	9.90	7.50	1
8	EC030256	69.00	4.00	12.50	4.00	50.50	114.00	123.00	52.00	10.50	8.00	1
9	EC108080	70.00	5.50	14.00	3.50	62.50	118.50	124.00	12.50	11.30	8.50	1
10	EC120460	66.00	11.00	7.50	5.50	58.50	76.10	118.00	19.60	11.80	8.50	0
11	HPU51	71.00	4.50	7.50	9.50	17.50	87.50	123.00	41.20	9.90	8.80	0
12	EC187896	69.00	6.50	11.50	4.00	41.00	117.50	122.00	14.70	13.20	8.00	1
13	EC290251	69.00	5.50	11.50	4.50	60.20	58.20	108.00	52.60	10.10	9.50	1
14	EC340247	79.00	4.50	7.50	5.50	46.50	120.50	115.00	27.50	11.10	7.00	1
15	EC340255	68.00	5.00	12.50	4.50	61.50	115.50	123.00	27.00	16.20	9.00	1
16	EC340263	69.00	5.50	14.50	4.50	7.30	115.00	121.00	41.70	11.80	8.50	1
17	EC340264	77.00	9.50	8.00	4.50	37.50	48.10	115.00	48.90	12.80	9.50	0

		7	11	12	14	15	17	18	19	21	22	23
18	EC340271	67.00	6.00	6.50	13.00	17.50	118.50	125.00	13.50	12.10	11.20	0
19	EC340284	68.00	4.50	7.50	9.50	17.50	87.50	122.00	21.10	13.40	15.50	0
20	HPU51	71.00	4.50	7.50	9.50	17.50	87.50	123.00	41.20	9.90	8.80	0
21	EC341940	80.00	11.50	6.50	4.50	32.50	87.50	114.00	30.20	11.00	9.50	1
22	EC341952	71.00	5.50	8.50	5.50	51.00	126.50	122.00	33.39	9.70	9.50	0
23	EC341954	72.00	5.50	7.00	3.50	27.50	92.00	122.00	36.10	11.30	9.50	0
24	EC341955	74.00	10.50	9.50	3.50	62.50	72.50	120.00	52.30	10.20	9.50	1
25	EC341958	73.00	9.50	11.00	4.50	46.50	72.12	115.00	7.10	12.20	8.00	0
26	EC 341960	74.00	10.50	9.50	3.50	62.50	72.50	120.00	52.30	10.20	9.50	1
27	EC0344625	77.00	9.00	7.50	4.00	34.50	63.15	118.00	44.40	11.40	9.50	1

Table 101. Promising lines in adzuki bean germplasm for various characters

S. No.	Characters	Range	Promising lines
Palampur			
1	Days to 50% flowering (days)	54.00-66.00	EC 254, EC 341958, EC 108080, EC 120460 (<63 days)
2	Days to maturity (days)	73.00-87.00	EC 30256, EC 108080, EC 15256, EC 8707, EC 254, EC 251 (<73 days)
3	Plant height (cm)	42.00-125.00	EC 344625, EC 341960, EC 340247, EC 15257, EC 340264 (101 cm)
4	Seed yield (g/plot)	200.00-425.00	HPAU 27, EC 341960, EC 340255, EC 18151 (>240.00 g)
Shimla			
1	Plant height (cm)	48.10-126.50	EC 341952, EC 18151, EC 8707, EC 346247 (>120.50 cm)
2	Days to 50% flowering (days)	66.00-83.00	EC 120460, EC 15256, EC 340271, EC 251, EC 8707, EC 18155, EC 340255 (<68 days)
3	Days to 80% maturity (days)	108.00-125.00	EC 290251, EC 341940, EC 340247, EC 340264, EC 341958 (<115 days)
4	Seed yield/plant (g)	3.82-52.60	EC 290251, EC 341955, EC 341960, EC 30256 (>52.00 g)
5	No of pods/plant	7.30-62.50	EC 108080, EC 341958, EC 341960, EC 340255, EC 290251 (>60.20)

Table 102. Evaluation of germplasm lines in Coix, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of tiller/plant	Green forage yield (q/ha)	Dry forage yield (q/ha)	Seed yield (q/ha)
1	RVN 90	170.00	230.00	190.66	9.66	488.00	68.00	1.28
2	H 3638	165.00	226.00	201.66	8.00	428.00	56.00	1.01
3	H 306	160.00	221.00	216.33	5.33	372.00	16.80	1.04
4	H 305	165.00	225.00	163.66	5.00	424.00	52.00	1.09
5	BD 03	160.00	220.00	204.00	4.66	284.00	13.40	0.95
6	RSFDI 342	155.00	216.00	168.66	5.33	244.00	12.00	1.16
7	HM 3026	170.00	230.00	195.66	4.66	309.60	15.20	3.57
8	DKH 07	170.00	230.00	205.00	4.00	348.00	16.00	3.42
9	BDS 1868	160.00	219.00	216.66	5.00	55.00	9.60	4.16
10	BDS 1870	165.00	225.00	190.00	5.00	296.00	14.80	0.85
11	H 557	160.00	220.00	186.00	4.33	292.00	14.40	5.07
12	H 626	170.00	231.00	201.66	3.33	92.00	10.00	4.14
13	H 3767	155.00	214.00	203.33	4.00	360.00	16.00	1.93
14	H 547	150.00	210.00	233.33	4.66	252.00	13.28	3.31
15	H 2279	150.00	212.00	211.66	4.33	404.00	56.80	3.04
16	BDS 1872	152.00	212.00	225.00	5.33	280.00	13.20	4.95
17	H 2333	155.00	215.00	236.60	5.00	348.00	16.10	2.14
18	NH 6/22	160.00	220.00	233.33	5.33	368.00	16.45	4.56
19	H 3768	155.00	215.00	240.00	4.00	332.00	15.80	1.75
20	H 696	145.00	206.00	176.00	3.66	308.00	15.00	3.58
	Mean	**159.60**	**219.85**	**204.96**	**5.03**	**314.23**	**23.04**	**2.65**

Table 103. Evaluation of germplasm lines in coix, Palampur

S. No.	Line	Days to 50% flowering	Plan height (cm)	Yield (gm)
1	BD3	101	207.8	60
2	BDS 1868	101	217.8	45
3	BDS 1870	101	219.4	10
4	BDS 1872	103	200.0	20
5	DKH7	104	201.2	20
6	H-0305	128	222.8	20
7	H-306	128	208.2	30
8	H-0547	128	205.2	20
9	H-0557	129	195.6	20
10	H-0626	130	214.6	45
11	H-0696	131	212.0	60
12	H-2779	131	260.2	80
13	H-2333	130	272.6	75
14	H-3638	130	272.4	125
15	H-3767	131	264.8	155
16	H-3768	113	281.2	210
17	H-3026	113	276.8	230
18	NH –6/22	115	256.8	210
19	RSFD/I	129	248.6	155

Table 104. Promising lines in coix germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	145.00-170.00	H 696, H 547, H 2279, BDS 1872, RSFDI 342, H 3767, H 2333, H 3768, H 306, BD 03 (<160 days)
2	Days to maturity (days)	206.00-231.00	H 696, H 547, H 2279, BDS 1872, H 3767, H 2333, H 3768, RSFDI 342, BDS 1868, BD 03 (<220 days)
3	No. of tiller/plant	3.33-9.66	RVN 90, H 3638, H 306, RSFDI 342, BDS 1872, NH 6/22, H 305, BDS 1868, BDS 1870, H 2333 (5.00)
Palampur			
1	Days to 50% flowering (days)	101.00-130.00	BD 3, BD 1868, BD 1870, BD 1872 (<103 days)
2	Plant height (cm)	207.80-281.20	H 3768, H 3026, NH 622, RSFDI-1 (>248.60 cm)
3	Yield (g)	10.00-230.00	H 3026, H 3768, NH 622, RSFDI-1 (>155 g)

Table 105. Evaluation of germplasm lines in perilla, Ranichauri

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of primary branches	No. of finger/ plant	Finger length (cm)	Length of leaf (cm)	Width of leaf (cm)	No. of leaves/ plant	Plant girth at base (cm)	Seed yield/ plant (g)
1	BDS 1647	120.00	171.00	92.00	17.50	18.00	4.25	5.25	4.50	24.00	0.65	40.50
2	BDS 1649	125.00	178.00	137.75	24.75	60.00	6.25	6.00	5.50	31.00	0.87	44.75
3	BDS 1650	120.00	182.00	116.75	19.50	41.50	5.25	7.00	6.00	26.00	0.75	37.20
4	GP 178	130.00	189.00	153.00	24.00	50.00	7.00	8.25	7.50	29.50	1.00	20.00
5	HO 556	135.00	195.00	107.25	18.25	33.25	4.75	5.25	4.75	19.50	0.50	16.50
6	HO 621	135.00	196.00	131.25	22.00	70.50	5.23	5.00	4.50	32.00	1.00	60.30
7	HO 664	140.00	200.00	133.50	21.00	54.50	5.00	6.75	6.00	28.50	0.75	18.60
8	H 1099	140.00	201.00	130.50	23.00	61.75	6.50	9.50	9.00	27.50	1.00	47.30
9	H 1143	125.00	180.00	120.50	22.25	64.00	4.75	5.00	5.00	26.50	0.75	45.90
10	H 1644	122.00	175.00	117.50	20.00	58.50	5.70	8.00	7.25	26.00	0.75	60.80
11	H 1756	130.00	188.00	110.50	21.25	61.00	5.25	6.50	6.25	22.00	0.75	56.00
12	H 1796	132.00	190.00	137.75	25.50	75.50	7.50	9.50	9.00	24.50	1.00	35.80
13	H 1812	135.00	194.00	84.75	18.50	37.50	5.00	4.50	4.50	20.00	0.50	38.20
14	H 2216	150.00	206.00	122.25	21.00	58.50	5.50	9.00	8.75	35.75	0.87	18.50
15	H 3944	150.00	206.00	105.00	24.00	69.45	7.50	8.25	8.00	28.00	0.75	20.00
16	NH 6/10	140.00	200.00	130.25	28.50	88.50	7.50	9.00	8.50	34.50	1.10	35.80
17	RD 029	120.00	170.00	97.25	26.75	85.00	4.50	8.25	8.00	25.00	1.00	26.50
18	RD 071	135.00	194.00	72.00	18.50	44.00	4.70	7.50	7.25	25.75	0.50	15.50
19	RD 074	120.00	171.00	94.25	19.50	64.50	4.00	6.00	6.00	21.00	0.50	44.50
20	RD 117	140.00	198.00	123.00	20.25	37.50	5.00	6.50	6.50	17.00	0.60	50.90

Table 106. Promising lines in perilla germplasm for various characters

S. No.	Characters	Range	Promising lines
Ranichauri			
1	Days to 50% flowering (days)	120.00-150.00	BDS 1647, BDS 1650, RD 029, RD 074, H 1644, BDS 1649, H 1143, GP 178, H 1756, H 1796 (<132 days)
2	Days to maturity (days)	171.00-206.00	RD 029, BDS 1647, RD 074, H 1644, BDS 1649, H 1143, BDS 1650, H 1756, GP 178, H 1796 (<190 days)
3	No. of primary branches	18.25-28.50	NH 6/10, RD 029, H 1796, BDS 1649, GP 178, H 3944, H 1099, H 1143, HO 621, H 1756 (>21.25)
4	Seed yield/plant (g)	15.50-60.80	H 1644, HO 621, H 1756, RD 117, H 1099, H 1143, BDS 1649, RD 074, BDS 1647, H 1812 (>38.20 g)

3.2 PLAINS

3.2.1 GRAIN AMARANTH (*Amaranthus* spp.)

Grain amaranth germplasm consisting of 100 genotypes was planned for evaluation at nine locations but due to shortage of seed, evaluation was done only at three locations viz. UAS, Bangalore; OUA&T, Bhubaneswar and MPKV, Rahuri. A set of one hundred fifty six genotypes and three checks Annapurna, GA 1 and Suvarna were evaluated at UAS, Bangalore for five major yield related characters. Maximum plant height (197.40 cm) and panicle length (91.20 cm) were recorded in the genotype, IC 3624. Early maturity (81.00 days) and flowering (36.00 and 37.00 days) were observed in the genotypes IC 95428, IC 95431 and IC 95304. Genotype IC 35536 was found to be the top yielder (37.20 g/plant) followed by IC 35544 yield (36.40 g/plant) (Table 107).

A total of 98 genotypes including two checks GA 1 and GA 2 were evaluated for seven characters at OUA&T, Bhubaneswar. Genotypes IC 35791 and IC 35732 were observed as early types. Highest seed yield per plant and plot yield were recorded in the genotype, IC 95321 (14.32 g, 716.00 g) and IC 120703 (13.71 g, 630.80 g) (Table 108).

Germplasm lines comprising 100 accessions were screened at MPKV, Rahuri for nine yield related characters along with three checks in an Augmented Design. Genotype IC 95566 was observed as early flowering (44 days) as well as early maturing (82 days). Longest inflorescence length (68.00 cm) was observed in the genotype IC 120633 followed by IC 133445 (65.00 cm). Highest seed yield (800 g/plant) was recorded in the local check IC 120588 while seed yield was very low (2.87 q/ha). Genotype IC 120657 was observed as the top seed yielder recording 550.00 g/plant and 19.71 q/ha seed yield (Table 109). The promising genotypes and range of characters have been presented in table 110.

3.2.2 RICE BEAN (*Vigna umbellata*)

In rice bean 100 genotypes supplied by UAS, Bangalore were planned to be evaluated at six locations viz. PAU, Ludhiana; OUA&T, Bhubaneswar; UAS, Bangalore, MPKV, Rahuri, NBPGR, Delhi and BAU, Ranchi. However, results have been received from UAS, Bangalore; OUA&T, Bhubaneswar; PAU, Ludhiana and

BAU, Ranchi. At UAS, Bangalore a total of 65 genotypes were evaluated without any check variety for six characters. The genotype LRB 314 was found better for number of pods per plant (55.00) and seed yield per plant (15.00 g). The range and mean for all six characters have been presented in table 111.

A total of 97 genotypes and two checks RBL 6 and RBL 1 were screened for eleven characters in Augmented Design at OUA&T, Bhubaneswar. All the genotypes flowered in 40.00 – 46.00 days and matured in 80.00 – 89.00 days. Maximum 100 seed weight was recorded (6.66 g) in the genotype LRB 447 followed by LRB 222 (6.45 g). The highest seed yield per plant and seed yield (kg/ha) were recorded as 18.97 g and 2870.80 in the genotype, BRB 18 (Table 112).

Eighty genotypes of rice bean including four checks with 16 genotype block were evaluated in Augmented Design at PAU, Ludhiana for eight characters. None of the entries was found early maturing and early flowering than the check variety. Maximum 100 seed weight (7.90 g) was observed in the genotype, LRB 222 followed by genotype LRB 358 (7.50 g). Highest seed yield per plot (485.00 g) was recorded in the genotype, LRB 324 followed by check variety LRB 299 (430.08 g) (Table 113).

A set of 65 accessions and two checks RBL 1 and RBL 6 were evaluated in Augmented Design for nine yield related attributes at BAU, Ranchi. Early flowering was observed (54.00 days) in the genotypes LRB 176 and LRB 324 whereas early maturity was observed (115.00 days) in the genotype LRB 145. Highest pods per plant (28.20) was observed in the genotype LRB 70 and maximum 100 seed weight (7.08 g) was recorded in the LRB 30 (Table 114). The promising genotypes and range of characters have been presented in table 115.

Table 107. Evaluation of germplasm lines in grain amaranth, Bangalore

S. No.	Entries	Plant height (cm)	Panicle Length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
1	IC 35534	149.80	62.40	42.00	87.00	16.20
2	IC 3414	159.40	90.60	42.00	85.00	27.20
3	IC 35391	143.40	64.40	43.00	86.00	17.40
4	IC 35735	150.20	84.20	45.00	89.00	14.80
5	IC 35439	178.40	87.40	46.00	90.00	8.80
6	IC 35598	173.60	86.00	42.00	86.00	14.00
7	IC 41997	64.60	25.60	42.00	85.00	4.20
8	IC 35553	179.00	83.60	42.00	86.00	8.40
9	IC 95332	77.80	33.20	42.00	86.00	16.00
10	IC 35626	194.40	84.20	43.00	84.00	26.60
11	IC 93962	120.40	51.60	48.00	93.00	8.60
12	IC 35370	153.80	67.80	41.00	85.00	15.40
13	IC 35661	131.20	58.40	47.00	90.00	9.40
14	IC 35777	140.80	74.00	44.00	89.00	27.00
15	IC *35n7*	136.00	61.60	45.00	89.00	16.00
16	IC 35593	111.40	42.20	46.00	90.00	8.00
17	IC 35780	117.40	43.00	42.00	85.00	6.80
18	IC 35544	171.20	69.40	47.00	92.00	36.40
19	IC 35586	140.40	48.80	44.00	89.00	8.50
20	IC 35675	150.60	61.40	46.00	90.00	15.20
21	IC 41989	155.20	66.00	40.00	83.00	30.20
22	IC 21810	158.60	57.60	42.00	85.00	*20.20*
23	IC 3624	197.40	91.20	42.00	85.00	27.40
24	IC 35781	121.80	48.80	42.00	86.00	9.00
25	IC 35589	64.20	27.80	46.00	90.00	4.00
26	IC 21790-A	154.00	56.20	44.00	87.00	14.20
27	IC 35757	163.20	61.40	43.00	86.00	18.00
28	IC 21940	169.80	69.40	43.00	87.00	9.20
29	IC 35538	89.80	36.80	45.00	88.00	6.00
30	IC 35536	173.20	74.20	46.00	90.00	37.20
31	IC 35441	173.20	62.60	46.00	90.00	16.40
32	IC 35612	127.40	47.00	48.00	91.00	23.80
33	IC 35590	132.40	44.40	47.00	90.00	25.00

S. No.	Entries	Plant height (cm)	Panicle Length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
34	IC 94649	177.60	74.40	43.00	86.00	15.20
35	IC 35494	169.40	67.40	42.00	85.00	20.40
36	IC 41991	157.80	60.40	44.00	88.00	24.20
37	IC 42250	146.00	51.80	44.00	87.00	10.00
38	IC 35409	141.80	57.00	46.00	90.00	10.00
39	IC 35546	130.60	54.40	46.00	90.00	26.60
40	IC 42015	156.60	67.40	47.00	92.00	15.40
41	IC 21938	143.40	57.40	47.00	90.00	17.20
42	IC 35627	131.60	42.40	43.00	86.00	9.40
43	IC 35438	118.20	56.00	44.00	88.00	6.20
44	IC 21923	111.00	40.20	46.00	90.00	15.20
45	IC 95287	137.60	63.40	45.00	89.00	12.00
46	IC 41983	160.40	67.00	47.00	91.00	15.20
47	IC 35399	110.00	53.60	46.00	91.00	5.80
48	IC 35507	103.40	41.60	47.00	90.00	5.00
49	IC 35673	168.00	68.80	47.00	90.00	19.00
50	IC 35452	140.40	66.80	45.00	89.00	8.00
51	IC 35505	159.40	66.40	46.00	91.00	33.80
52	IC 38243	120.20	58.80	38.00	84.00	8.80
53	IC 35608	109.60	45.20	44.00	88.00	8.00
54	IC 35602	121.00	51.80	46.00	91.00	7.00
55	IC 35754	138.80	61.20	44.00	88.00	9.00
56	IC 35445	156.40	54.80	46.00	90.00	13.40
57	IC 35440	145.80	61.40	42.00	82.00	17.60
58	IC 21925	161.20	68.60	43.00	84.00	10.80
59	IC 35709	167.40	66.20	45.00	88.00	31.80
60	IC 35616	133.20	47.40	45.00	89.00	20.40
61	IC 95431	131.00	64.40	37.00	82.00	21.80
62	IC 95304	60.80	34.20	37.00	81.00	3.80
63	IC 95419	137.40	69.00	42.00	86.00	16.40
64	IC 21796	118.80	50.20	42.00	85.00	13.20
65	IC 41994	137.80	64.60	46.00	90.00	12.40
66	IC 32189	129.40	61.00	46.00	89.00	13.40
67	IC 35385	131.60	59.20	47.00	91.00	11.60
68	IC 32195	78.00	35.80	48.00	92.00	18.40

S. No.	Entries	Plant height (cm)	Panicle Length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
69	IC 35373	145.00	58.40	46.00	89.00	10.00
70	IC 95269	131.20	56.60	46.00	88.00	17.20
71	IC 35691	146.80	55.80	46.00	89.00	21.40
72	IC 35774	184.00	81.20	49.00	92.00	15.00
73	IC 35723	148.80	59.60	47.00	90.00	10.80
74	IC 2546	137.60	47.60	47.00	90.00	20.80
75	IC 35411	159.80	69.40	49.00	93.00	9.80
76	IC 21927	144.60	65.20	49.00	94.00	12.80
77	IC 65548	122.20	55.60	52.00	97.00	13.00
78	IC 35408	109.40	48.60	49.00	92.00	7.00
79	IC 35394	85.00	30.40	49.00	93.00	14.20
80	IC 35474	137.20	52.80	49.00	93.00	8.80
81	IC 1491	147.00	62.60	51.00	96.00	20.40
82	SKNA 7	157.20	56.80	48.00	91.00	32.60
83	IC 81706	131.80	40.80	48.00	92.00	7.00
84	IC 95348	130.20	59.60	40.00	83.00	14.80
85	RAM 2	147.00	48.40	49.00	92.00	11.20
86	IC 35479	131.20	43.00	46.00	90.00	16.20
87	IC 35758	137.60	60.40	46.00	90.00	16.40
88	IC 35683	162.80	79.60	46.00	89.00	24.20
89	IC 35732	115.40	42.80	46.00	90.00	12.80
90	IC 81698-B	160.80	69.80	46.00	91.00	13.80
91	IC 35697	117.80	41.60	51.00	96.00	8.20
92	IC 35381	129.40	49.80	50.00	95.00	9.60
93	IC 21966	95.80	36.00	51.00	96.00	6.80
94	IC 35679	78.00	33.40	54.00	99.00	7.80
95	IC 120588	151.00	67.60	51.00	97.00	18.20
96	IC 35422	107.60	58.40	50.00	95.00	15.60
97	IC 95429	106.00	51.00	38.00	83.00	7.40
98	RASANA 2 ©	145.20	70.00	50.00	94.00	12.00
99	IC 35488	112.40	56.40	51.00	96.00	15.20
100	IC 35978	98.00	48.20	51.00	95.00	9.20
101	IC 95432	133.00	52.40	44.00	87.00	15.20
102	IC 95773	139.80	66.80	50.00	95.00	16.20
103	MGA 2	172.80	78.80	37.00	82.00	11.00

S. No.	Entries	Plant height (cm)	Panicle Length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
104	IC 95933	152.00	59.60	46.00	91.00	11.40
105	IC 35376	97.20	38.20	46.00	90.00	8.40
106	IC 95290	83.00	34.00	46.00	90.00	14.00
107	IC 35699	168.60	62.80	53.00	98.00	15.40
108	IC 35477	129.00	43.80	51.00	95.00	14.80
109	IC 35377	163.40	90.60	51.00	96.00	17.60
110	IC 35384	54.60	24.40	51.00	96.00	18.00
111	IC 35389	90.80	46.40	51.00	97.00	9.20
112	IC 35470	112.20	53.20	51.00	95.00	11.20
113	IC 35378	97.60	49.60	53.00	98.00	12.60
114	MGA 1	123.60	52.20	53.00	97.00	9.60
115	IC 21941	95.80	46.60	46.00	89.00	5.60
116	IC 95302	157.60	62.60	51.00	96.00	11.90
117	IC 95656	114.40	41.80	48.00	92.00	8.60
118	BGA 2	91.60	40.40	40.00	83.00	14.60
119	IC 32186	120.80	49.80	53.00	98.00	9.40
120	IC 41998	115.20	44.40	53.00	98.00	7.20
121	IC 95245	86.60	38.00	53.00	99.00	6.00
122	IC 35395	119.80	48.80	52.00	97.00	13.00
123	IC 25435	92.40	35.40	53.00	94.00	4.20
124	IC 95271	84.20	35.60	53.00	98.00	8.00
125	IC 95275	81.80	37.20	46.00	90.00	5.00
126	IC 95428	101.00	38.60	36.00	82.00	6.20
127	IC 35696	142.40	55.20	42.00	86.00	10.60
128	IC 35502	71.40	29.80	46.00	91.00	8.60
129	IC 35476	75.40	36.80	58.00	103.00	10.20
130	RGAS 99-2-7	82.60	42.20	56.00	101.00	7.60
131	IC 95346	89.00	46.40	60.00	107.00	7.80
132	IC 35776	92.40	50.20	54.00	100.00	11.80
133	IC 35485	115.00	57.80	46.00	90.00	10.80
134	IC 42258-A	77.20	46.60	54.00	99.00	5.80
135	BGA 3	95.80	46.20	46.00	90.00	7.80
136	IC 35392	93.40	35.20	54.00	100.00	5.60
137	RAM 1	79.20	34.60	54.00	99.00	4.00
138	IC 35386	76.00	40.40	58.00	105.00	5.20

S. No.	Entries	Plant height (cm)	Panicle Length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
139	SKNA 20	88.00	42.00	58.00	106.00	6.00
140	AG 114	90.00	30.60	54.00	100.00	5.60
141	IC 35375	67.00	41.00	46.00	90.00	5.60
142	RGAS 92-10-1	101.40	34.60	54.00	83.00	5.80
143	IC 95700	78.00	44.60	46.00	89.00	6.20
144	IC 55142	94.20	38.20	61.00	110.00	3.60
145	IC 35390	98.60	46.80	61.00	112.00	7.20
146	SUVARNA ©	111.00	41.40	49.00	92.00	11.20
147	GA 1 ©	101.40	63.80	53.00	99.00	6.00
148	IC 35489	159.40	41.40	42.00	86.00	24.00
149	IC 35393	114.20	59.40	40.00	83.00	8.80
150	IC 39471	143.60	42.60	46.00	91.00	7.80
151	IC 35782	120.40	24.00	46.00	90.00	6.00
152	K 432	68.20	30.00	44.00	88.00	4.80
153	IC 55151	82.20	40.20	49.00	93.00	6.00
154	ANNAPURNA ©	117.40	62.20	39.00	84.00	9.40
155	IC 35374	155.40	25.20	41.00	86.00	10.00
156	IC 35693	80.40	53.37	41.00	85.00	5.80
	Mean	**132.65**			**90.94**	**12.82**
	Range	**54.60-197.40**	**24.00-91.20**		**81.00-112.00**	**3.60-37.20**

Table 108. Evaluation of germplasm lines in grain amaranth, Bhubaneswar

S. No.	Accessions	Seed colour	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume weight (g/10ml)	Yield per plant (g)	Plot yield (g)
1	IC 35627	Creamy	51	112	84.4	8.51	7.458	380.36
2	IC 35632	Creamy	49	112	77.4	8.13	3.746	202.28
3	IC 35644	Creamy	49	112	98.8	7.98	4.494	233.69
4	IC 35648	Creamy	50	112	113	8.26	8.748	481.14
5	IC 35650	Creamy	51	112	102.6	7.9	11.618	615.75
6	IC 35665	Creamy	61	120	93	8	2.608	151.26
7	IC 35666	Creamy	51	112	77.4	7.97	3.2	179.2
8	IC 35673	Creamy	49	112	105.2	8.3	7.936	436.48
9	IC 35732	Creamy	48	112	90.4	8.38	8.898	480.49
10	IC 35735	Creamy	52	112	51	8.5	4.174	250.44
11	IC 35749	Creamy	51	112	85.8	8.5	5.074	274.15
12	IC 35777	Creamy	50	112	83.8	8.22	7.674	422.07
13	IC 35781	Creamy	52	112	75	8.37	6.77	365.58
14	IC 35791	Creamy	48	111	78.2	8.22	4.27	226.31
15	IC 38243	Creamy	49	111	71.2	8.28	10.26	533.52
16	IC 41983	Creamy	50	111	74.4	8.27	3.63	199.65
17	IC 41984	Creamy	54	111	83.8	8.37	4.284	239.9
18	IC 41989	Creamy	54	111	78.6	8.35	5.864	316.65

S. No.	Accessions	Seed colour	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume weight (g/10ml)	Yield per plant (g)	Plot yield (g)
19	IC 41991	Creamy	54	111	81.2	8.16	4.722	269.15
20	IC 41992	Black	54	111	63	8.38	3.716	211.81
21	IC 41993	Creamy	59	116	90.6	8.16	11.614	638.77
22	IC 41995	Creamy	53	111	75.6	8.37	5.526	309.93
23	IC 41999	Creamy	55	111	81.8	8.14	6.266	338.36
24	IC 42003	Creamy	54	112	94.4	8.46	5.802	301.7
25	IC 42015	Creamy	55	112	95.4	8.18	10.764	591
26	IC 42076	Creamy	54	112	81.6	8.24	9.246	499.6
27	IC 42256	Creamy	54	112	94.4	8.26	6.218	317.1
28	IC 42258	Creamy	56	112	92.2	8.29	8.814	458.3
29	IC 42258-1	Creamy	54	112	94.4	8.36	5.944	303.1
30	IC 55142	Creamy	60	116	106.2	8.2	7.084	382.5
31	IC 55147	Black	61	116	112.8	8.24	8.88	461.8
32	IC 65596	Black	59	116	63.8	8.07	2.16	120.9
33	IC 81695-A	Black	63	120	66.4	8.23	2.586	137.1
34	IC 81698	Creamy	64	120	79.2	8.1	10.606	572.7
35	IC 81700	Creamy	57	116	101.4	8.01	2.04	118.3
36	IC 81702	Creamy	58	116	125.6	8.32	7.622	434.5
37	IC 81708	Creamy	58	116	89.8	8.14	3.936	216.5
38	IC 81710	Creamy	59	116	61	7.76	3.352	201.1

S. No.	Accessions	Seed colour	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume weight (g/10ml)	Yield per plant (g)	Plot yield (g)
39	IC 85265	Creamy	54	112	59.4	8.33	3.71	226.3
40	IC 93941	Creamy	55	112	89.6	8.28	5.952	333.3
41	IC 93962	Creamy	54	112	90.2	8.18	3.422	205.3
42	IC 94650	Creamy	54	112	91	8.58	6.384	376.7
43	IC 94656	Creamy	54	112	95.2	8.28	6.384	389.4
44	IC 95244	Creamy	55	112	71.8	8.38	5.82	360.8
45	IC 95248	Black	59	116	65.2	8.47	6.016	354.9
46	IC 95255	Creamy	54	112	64.4	8.26	5.016	311
47	IC 95259	Creamy	56	112	105.4	8.35	6.936	402.3
48	IC 95270	Creamy	60	116	55	8.12	1.574	107
49	IC95283	Black	53	111	85.8	8.55	8.508	442.4
50	IC 95291	Mixblack & creamy	54	111	92.4	8.24	5.166	315.1
51	IC 95292	Mixblack & creamy	53	111	68.6	8.26	3.724	230.9
52	IC 95301	Mixblack & creamy	53	111	81.4	8.2	5.232	324.4
53	IC 95310	Black	50	111	82	8.34	4.582	274.9
54	IC 95321	Creamy	63	120	104.4	8.39	14.32	716
55	IC 95350	Black	54	112	95.4	8.16	7.138	435.4
56	IC 95395	Creamy	52	112	76.4	7.92	7.304	430.9
57	IC 95521	Creamy	50	111	79.2	8.09	4.428	256.8
58	IC 95523	Creamy	50	111	81.4	8.07	3.625	232

S. No.	Accessions	Seed colour	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume weight (g/10ml)	Yield per plant (g)	Plot yield (g)
59	IC 95531	Black	51	111	89.4	8.46	10.696	556.2
60	IC 95534	Creamy	49	111	89.4	8.32	5.848	374.3
61	IC 95548	Creamy	49	111	60.2	8.34	2.582	167.8
62	IC 95556	Creamy	53	111	106	8.25	8.645	492.8
63	IC 95559	Creamy	54	111	106	8.19	7.694	423.2
64	IC 95566	Creamy	53	111	112.8	8.09	9.804	588.2
65	IC 95571	Black	52	112	80.4	8.36	6.744	411.4
66	IC 95588	Creamy	53	112	109	8.45	9.08	508.5
67	IC 95594	Creamy	49	111	123.6	8.26	9.184	523.5
68	IC 95598	Mixblack & creamy	49	111	98.2	8.17	10.474	502.8
69	IC 95603	Mixblack & creamy	53	111	100.2	8.14	11.012	539.6
70	IC 95624	Creamy	53	111	108.4	8.13	11.898	559.2
71	IC 95628	Mixblack & creamy	52	111	112.2	8.28	10.304	494.6
72	IC 95638	Black	58	116	95.2	8.52	5.8	348
73	IC 95639	Creamy	58	116	80.4	8.17	3.522	214.8
74	IC 95642	Creamy	64	120	79	8.45	9.76	507.5
75	IC 110277	Creamy	62	120	93.2	8.21	10.174	508.7
76	IC 120580	Black	51	111	85.4	8.14	7.74	402.5
77	IC 120583	Creamy	50	111	92	8.36	6.888	378.8
78	IC 120585	Creamy	51	111	99.8	8.43	5.943	320.9

S. No.	Accessions	Seed colour	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume weight (g/10ml)	Yield per plant (g)	Plot yield (g)
79	IC 120602	Creamy	49	111	96.2	8.31	6.67	380.2
80	IC 120612	Creamy	49	111	90.6	8.14	6.52	358.6
81	IC 120629	Black	49	111	74.6	8.26	4.364	253.1
82	IC 120633	Creamy	49	111	91.6	8.28	5.96	363.6
83	IC 120635	Creamy	51	111	99	8.23	10.466	575.6
84	IC 120649	Creamy	51	111	75.2	8.4	6.02	385.3
85	IC 120657	Black	51	111	93	4.31	10.032	511.6
86	IC 120670	Creamy	52	111	105.4	8.41	8.5	459
87	IC 120673	Creamy	51	111	60.6	8.15	7.664	390.9
88	IC 120684	Black	54	112	60.8	8.48	6.878	378.3
89	IC 120690	Black	53	112	88.4	8.24	5.274	305.9
90	IC 120696	Creamy	53	112	85.2	8.22	8.16	448.8
91	IC 120699	Creamy	53	112	87.6	8.13	6.934	395.2
92	IC 120701	Black	51	112	84.2	8.62	7.916	419.5
93	IC 120703	Black	52	112	86.2	8.59	13.714	630.8
94	NIC 21584	Black	62	120	90	8.42	5.286	296
95	NIC 21586	Creamy	62	120	75.8	8.26	4.884	283.3
96	EC 133445	Creamy	53	112	107.6	8.24	4.184	251
97	GA 1 (C)	Creamy	62	135	141.5	7.54	6.725	250.5
98	GA 2 (C)	Creamy	63	137	140.2	7.85	7.75	285.8

Table 109. Grain amaranth Germplasm screening Nursery at M.P.K.V., Rahuri *rabi* 2003-2004

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
1.	IC-35627	53.00	92.00	21.00	112.00	57.00	22.00	0.24	8.30	8.60
2.	IC-35632	52.00	91.00	14.00	64.00	31.40	10.80	0.18	8.20	6.45
3.	IC-35644	57.00	94.00	21.00	101.00	52.00	16.60	0.16	8.00	5.73
4.	IC-35648	46.00	91.00	24.00	112.00	57.00	14.60	0.25	8.10	8.96
5.	IC-35650	52.00	90.00	26.00	91.60	39.00	18.00	0.26	8.00	9.32
6.	IC-35657	53.00	91.00	21.00	100.00	50.00	17.80	0.27	8.10	9.67
7.	IC35661	55.00	94.00	26.00	86.20	36.40	16.00	0.21	8.00	7.53
8.	IC-35665	52.00	90.00	16.00	90.00	37.00	10.00	0.26	5.80	9.31
9.	IC-35666	53.00	91.00	17.00	90.60	32.60	11.00	0.14	7.80	5.01
10.	IC-35673	54.00	91.00	21.00	101.00	49.00	13.60	0.27	8.00	9.68
1.	Suyama (Ch)	55.00	92.00	24.00	117.00	40.00	19.60	0.30	8.20	10.75
2.	GA I (Ch)	58.00	95.00	25.00	105.40	38.60	15.80	0.27	7.00	9.68
3.	IC-120588	58.00	90.00	20.00	96.40	47.00	14.40	0.17	5.00	6.09
11.	(Ch)	54.00	84.00	15.00	69.80	29.40	12.60	0.31	7.90	11.11
12.	IC-35732	45.00	85.00	12.00	44.60	22.00	9.20	0.14	8.30	5.02
13.	IC-35735	47.00	87.00	17.00	83.60	30.60	12.00	0.18	8.00	6.45
14.	IC-35749	44.00	87.00	15.00	59.60	33.80	15.40	0.26	8.00	4.32
15.	1C-35777	49.00	89.00	16.00	55.00	30.60	13.00	0.21	8.00	7.35
16.	IC-35781	47.00	88.00	20.00	56.40	31.40	12.40	0.20	8.20	7.17
17.	1C-35791	45.00	85.00	17.00	88.20	31.40	13.80	0.13	8.00	4.66

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
18.	IC-38243	46.00	87.00	18.00	78.60	31.40	12.80	0.18	8.00	6.45
19.	IC41983	49.00	89.00	12.00	82.00	28.00	19.00	0.24	3.50	8.60
20.	IC-41984	46.00	87.00	13.00	93.00	35.80	14.00	0.21	8.20	7.53
1.	Suyama (Ch)	54.00	92.00	28.00	98.8	38.00	18.80	0.21	8.00	7.53
2.	GA 1 (Ch)	58.00	95.00	16.00	99.6	34.00	10.80	0.20	8.00	7.17
3.	IC-120588 (Ch)	58.00	94.00	17.00	47.00	29.00	16.00	0.18	8.10	6.45
21.	IC-41991	47.00	88.00	22.00	76.00	39.00	16.00	0.24	8.00	8.60
22.	IC-41 992	45.00	85.00	18.00	55.00	26.00	17.00	0.11	8.50	3.94
23.	IC-41993	50.00	89.00	18.00	87.00	51.00	15.00	0.14	4.00	5.02
24.	IC-41995	53.00	83.00	13.00	85.60	36.60	16.00	0.17	7.00	6.09
25.	IC-41999	54.00	84.00	16.00	103.00	28.60	15.00	0.26	5.80	9.31
26.	IC-42003	53.00	83.00	12.00	99.00	39.00	19.00	0.19	8.00	6.81
27.	IC-42015	51.00	90.00	13.00	104.00	40.00	14.00	0.24	8.00	8.60
28.	IC-42076	53.00	92.00	19.00	93.00	36.00	16.00	0.20	8.20	7.17
29.	IC-42256	54.00	93.00	15.00	104.00	33.00	13.00	0.20	8.00	7.17
30.	IC-42258	50.00	90.00	17.00	88.00	29.00	14.00	0.18	8.00	6.45
1.	Suyama (Ch)	54.00	93.00	26.00	99.00	53.00	14.00	0.24	7.90	8.60
2.	GA-I (Ch)	57.00	95.00	21.00	103.00	44.00	16.00	0.14	3.50	5.02
3.	IC-120588 (Ch)	57.00	95.00	24.00	68.00	31.00	10.00	0.18	7.20	6.45
31.	I C-4225 8-1	52.00	92.00	16.00	92.00	36.00	13.00	0.13	8.00	4.66

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
32.	IC-55142	49.00	88.00	18.00	90.00	29.00	13.00	0.13	8.00	4.66
33.	IC-55147	53.00	91.00	15.00	65.00	31.00	11.00	0.36	7.80	12.90
34.	IC-65596	No Germination								
35.	IC-81695-A	52.00	92.00	13.00	86.00	48.00	10.00	0.21	5.00	7.53
36.	IC-81698	51.00	90.00	13.00	99.00	54.00	16.00	0.21	8.10	7.53
37.	IC-81700	53.00	92.00	21.00	94.00	38.00	13.00	0.38	8.00	13.62
38.	IC-81702	46.00	91.00	14.00	99.00	39.00	15.00	0.22	7.80	7.88
39.	IC-81708	No Germination								
40.	IC-81710	49.00	88.00	11.00	98.00	34.00	18.00	0.19	5.00	6.81
1.	Suvarna (Ch)	54.00	93.00	26.00	105.00	57.00	19.00	0.28	8.20	10.04
2.	GA-2 (Ch)	57.00	95.00	24.00	103.00	56.00	19.00	0.15	8.00	5.38
3.	IC-120588 (Ch)	57.00	95.00	18.00	87.00	53.00	16.00	0.80	7.00	2.87
41.	IC-85265	49.00	88.00	15.00	94.00	42.00	17.00	0.20	8.10	7.17
42.	IC-93941	46.00	85.00	18.00	86.00	38.00	13.00	0.27	8.00	9.68
43.	IC-93962	45.00	84.00	16.00	92.00	41.00	16.00	0.20	8.20	7.17
44.	IC-94650	49.00	88.00	15.00	77.00	31.00	9.00	0.24	3.80	8.60
45.	IC-94656	52.00	90.00	12.00	91.00	48.00	13.00	0.11	8.00	3.94
46.	IC-95244	No Germination								
47.	IC-95248	44.00	84.00	16.00	75.00	43.00	16.00	0.13	7.90	4.66
48.	IC-95255	47.00	87.00	13.00	65.00	39.00	9.00	0.10	8.20	3.58

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
49.	IC-95259	46.00	86.00	14.00	63.00	28.00	8.00	0.10	8.00	3.58
50.	IC-95270	49.00	88.00	11.00	65.00	34.00	12.00	0.24	7.30	8.42
1.	Suyama (Ch)	54.00	92.00	20.00	100.00	51.00	15.00	0.32	7.80	11.46
2.	GA I (Ch)	57.00	95.00	17.00	107.00	54.00	18.00	0.26	8.00	9.32
3.	IC-120588 (Ch)	57.00	95.00	15.00	97.00	37.00	13.00	0.21	5.00	7.53
51.	IC-95283	49.00	88.00	17.00	96.00	37.00	12.00	0.22	8.40	7.89
52.	IC-95291	50.00	89.00	18.00	92.00	36.00	13.00	0.17	8.20	6.09
53.	IC-95292	52.00	90.00	14.00	85.00	48.00	17.00	0.21	8.00	7.53
54.	IC-95301	54.00	92.00	15.00	92.00	47.00	15.00	0.18	8.20	6.45
55.	IC-95310	50.00	87.00	16.00	93.00	45.00	12.00	0.18	7.90	6.45
56.	IC-95321	47.00	86.00	7.00	92.00	42.00	12.00	0.17	8.00	6.09
57.	IC-95350	44.00	83.00	18.00	83.00	44.00	10.00	0.30	8.10	10.75
58.	IC-95395	46.00	85.00	17.00	99.00	48.00	17.00	0.29	8.20	10.39
59.	IC-95521	49.00	87.00	19.00	95.00	43.00	12.00	0.31	8.00	11.11
60.	IC-95523	45.00	84.00	20.00	86.00	44.00	13.00	0.33	8.10	11.83
1.	Suyama	54.00	92.00	15.00	100.00	55.00	19.00	0.35	8.20	12.54
2.	GA-I	57.00	95.00	18.00	102.00	54.00	18.00	0.28	7.80	10.03
3.	IC-120588	57.00	95.00	12.00	99.00	51.00	16.00	0.15	8.10	5.38
61.	IC-95531	47.00	85.00	19.00	92.00	48.00	11.00	0.13	8.00	4.66
62.	IC-95534	45.00	83.00	17.00	96.00	46.00	12.00	0.20	8.20	7.17
63.	IC-95548	47.00	85.00	21.00	95.00	52.00	16.00	0.20	8.40	7.17

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
64.	IC-95556	50.00	88.00	17.00	100.00	52.00	14.00	0.21	8.20	7.35
65.	IC-95559	46.00	84.00	18.00	92.00	49.00	12.00	0.40	8.00	14.34
66.	IC-95566	44.00	82.00	15.00	97.00	49.00	12.00	0.23	7.90	8.24
67.	IC-95571	47.00	85.00	7.00	91.00	49.00	10.00	0.19	7.80	6.81
68.	IC-95588	50.00	88.00	18.00	94.00	50.00	14.00	0.29	8.20	10.39
69.	IC-95598	46.00	84.00	19.00	96.00	53.00	15.00	0.29	8.10	10.39
70.	IC-95594	44.00	83.00	14.00	92.00	49.00	12.00	0.17	6.80	6.09
1.	Suyama (Ch)	54.00	92.00	22.00	92.00	53.00	16.00	0.38	8.20	13.62
2.	GA 2 (Ch)	57.00	96.00	15.00	101.00	56.00	19.00	0.16	8.10	5.7.3
3.	IC-120588 (Ch)	57.00	97.00	12.00	90.00	44.00	17.00	0.33	8.00	11.83
71.	IC-95603	50.00	88.00	9.00	122.00	52.00	14.00	0.24	8.10	8.60
72.	IC-95624	50.00	88.00	15.00	135.00	57.00	18.00	0.24	8.00	8.60
73.	IC-95628	49.00	87.00	13.00	86.00	45.00	20.00	0.19	8.40	6.81
74.	IC-95633	No Germination								
75.	IC-95634	No Germination								
76.	IC-95638	49.00	87.00	15.00	79.00	38.00	13.00	0.33	8.00	11.83
77.	IC-95639	47.00	85.00	16.00	130.00	34.00	14.00	0.25	8.10	8.96
78.	IC-95642	52.00	88.00	16.00	95.00	43.00	16.00	0.17	8.00	6.09
79.	IC-II0277	54.00	90.00	21.00	113.00	45.00	17.00	0.19	8.00	6.81
80.	IC-120580	50.00	88.00	16.00	91.00	43.00	16.00	0.37	8.20	13.26

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
1.	Suyarna (Ch)	54.00	92.00	18.00	122.00	59.00	21.00	0.23	8.00	8.24
2.	GA-l (Ch)	57.00	94.00	17.00	135.00	54.00	23.00	0.50	4.80	17.92
3.	IC-120588(CI1)	57.00	94.00	21.00	136.00	52.00	17.00	0.16	8.00	5.73
81.	IC- I 20583	49.00	87.00	20.00	119.00	54.00	15.00	0.18	8.40	6.50
82.	IC- I 20585	47.00	86.00	18.00	139.00	51.00	17.00	0.38	8.20	13.62
83.	1 C-120602	46.00	85.00	14.00	106.00	47.00	16.00	0.14	8.00	5.08
84.	1 C-120612	No Germination								
85.	lC-120629	50.00	88.00	16.00	88.00	33.00	13.00	0.25	8.00	8.96
86.	1 C-120633	53.00	90.00	18.00	156.00	68.00	20.00	0.40	8.20	14.34
87.	lC-120635	53.00	90.00	21.00	117.00	44.00	14.00	0.33	8.00	11.83
88.	lC-120649	54.00	91.00	22.00	130.00	51.00	14.00	0.38	8.00	13.62
89.	lC-120657	47.00	85.00	30.00	136.00	61.00	15.00	0.55	8.10	19.71
90.	IC- I 20670	50.00	88.00	32.00	129.00	42.00	11.00	0.32	8.00	11.47
1.	Suyarna (Ch)	54.00	92.00	28.00	135.00	44.00	18.00	0.43	8.00	15.41
2.	GA 1 (Ch)	57.00	93.00	24.00	116.00	43.00	15.00	0.12	7.90	4.30
3.	IC-120588 (Ch)	57.00	93.00	17.00	108.00	55.00	12.00	0.25	7.80	8.96
91.	lC-120701	50.00	88.00	16.00	70.00	19.00	9.00	0.10	8.00	3.58
92.	IC- 120703	47.00	85.00	15.00	92.00	45.00	24.00	0.23	8.00	8.24
93.	IC- I 20673	50.00	88.00	36.00	92.00	27.00	17.00	0.34	8.10	12.19

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant stand at maturity	Plant height (cm)	Inflorescence length (cm)	Inflorescence diameter (cm)	Grain yield/plot (kg)	Grain Weight/10 ml volume	Grain yield (q/ha)
94.	IC- I 20684	54.00	91.00	28.00	90.00	32.00	18.00	0.40	8.00	14.34
95.	IC- 120690	52.00	90.00	26.00	86.00	24.00	14.00	0.31	8.20	11.11
96.	IC- 120696	50.00	88.00	38.00	90.00	26.00	17.00	0.22	8.40	7.89
97.	IC-120699	47.00	85.00	21.00	84.00	27.00	15.00	0.31	8.00	11.11
98.	IC-2 I 584	51.00	88.00	24.00	60.00	29.00	19.00	0.11	8.00	3.94
99.	NIC-21586	49.00	87.00	26.00	87.00	34.00	8.00	0.22	8.20	7.88
100.	EC-133445	50.00	88.00	15.00	115.00	65.00	16.00	0.18	8.00	6.45
1.	Suyarna (Ch)	54.00	92.00	42.00	112.00	40.00	18.00	0.31	8.10	11.11
2.	G.A.-l (CI1)	57.00	94.00	22.00	128.00	41.00	17.00	0.07	6.50	2.51
3.	IC- I 20588(Ch)	57.00	95.00	15.00	87.00	43.00	19.00	0.19	8.20	6.81

Table 110. Promising lines in grain amaranth germplasm for various characters

S. No.	Character	Range	Promising
Bangalore			
1.	Days to 50% flowering (days)	36.00-61.00	IC 95428, MGA 2, IC 95431, IC 95304, IC 38243 (<38 days)
2.	Days to maturity (days)	81.00-112.00	IC 95304, IC 95431, MGA 2, IC 95428, RGAS 92-10-1 (<83 days)
3.	Inflorescence length (cm)	24.00-91.20	IC 3624, IC 3414, IC 35377, IC 35774, IC 35735, IC 35439, IC 35598 (>86.00 cm)
4.	Grain yield/plant (g)	3.60-37.20	IC 35536, IC 35544, IC 35505, SKNA 7, IC 41989 (>30.20 g)
5.	Plant height (cm)	54.60-197.40	IC 3624, IC 35626, IC 35439, IC 94649 (>177.60 cm)
Bhubaneswar			
1.	Days to 50% flowering (days)	48.00-64.00	IC 35732, IC 35791, IC 35673, IC 38243, IC 95598 (<49 days)
2.	Days to maturity (days)	111.00-120.00	IC 120635, IC 120657, IC 95566, IC 58243, IC 35650 (<112 days)
3.	Plant height (cm)	60.00-141.50	IC 81702, IC 95594, IC 95628, EC 55147 (>112.80 cm)
4.	Grain yield/plant (g)	2.16-14.32	IC 95321, IC 120703, IC 95624, IC 95603, IC 41993 (>11.10)
Rahuri			
1.	Days to maturity (days)	82 to 97	IC-35732, IC-41995, IC-42003, IC-41999, IC-93962, IC-95350, IC-95534, IC-95566, IC-95594 (<83 days)
2.	Plant height (cm)	47-156	IC-35627, IC-95603, IC-95624, IC-95639, GA-l, IC-120585, IC-120633, IC-120657 (>136.00 cm)
3.	Inflorescence length (cm)	19 to 65	IC-35627, Suvarna, IC-95624, IC-120633, EC-133445 (>65.00 cm)
4.	Grain yield per ha and per plot (2.79 sq. meter in gram)	80 to 500 g/plot	IC-12.657, IC-95559, IC-120633, IC-120684 (>14.30 q/ha)

Table 111. Evaluation of germplasm lines in rice bean, Bangalore

S. No.	Entries	Plant height (cm)	No. of branches / plant	Days to flowering	Days to maturity	No. of pods/ plant	Yield/plant (g)
1	LRB-103	33.60	2.40	52.00	78.00	52.40	15.00
2	LRB-221	44.40	2.40	52.00	74.00	40.00	10.00
3	LRB-134	39.80	2.20	48.00	74.00	43.80	11.60
4	LRB-327	39.60	2.40	47.00	72.00	22.00	10.00
5	LRB-181	35.40	2.00	47.00	72.00	22.00	7.60
6	LRB-225	29.60	2.00	47.00	70.00	52.20	9.00
7	LRB-197	36.40	2.20	48.00	71.00	20.00	11.40
8	LRB-113	32.40	2.20	48.00	71.00	34.20	9.60
9	LRB-105	27.60	2.00	48.00	70.00	34.00	8.00
10	LRB-361	27.60	2.00	47.00	70.00	22.80	7.00
11	LRB-84	27.80	2.00	47.00	71.00	21.400	5.60
12	LRB-324	20.80	1.60	47.00	70.00	12.00	3.60
13	LRB-353	25.80	2.00	48.00	71.00	40.00	7.00
14	LRB-308	28.00	1.60	50.00	76.00	34.00	11.20
15	LRB-179	31.00	2.00	50.00	74.00	22.00	8.00
16	LRB-334	35.40	2.00	49.00	72.00	30.00	7.00
17	LRB-314	43.40	2.00	49.00	70.00	55.00	12.00
18	LRB-71	24.80	2.00	47.00	70.00	32.00	8.60
19	LRB-76	27.00	1.80	47.00	74.00	24.00	5.00
20	LRB-293	29.40	2.00	49.00	73.00	24.00	6.40
21	LRB-381	39.20	2.00	47.00	72.00	20.00	8.00
22	LRB-204	41.40	2.00	48.00	71.00	49.60	10.60
23	LRB-70	36.90	2.00	47.00	71.00	33.60	9.20
24	LRB-178	24.60	2.00	48.00	71.00	22.00	6.40
25	LRB-331	21.20	1.60	48.00	71.00	19.00	4.00
26	LRB-222	29.00	1.40	49.00	74.00	32.00	7.40
27	LRB-201	36.40	2.00	50.00	74.00	34.00	7.00
28	LRB-59	19.40	1.20	47.00	70.00	22.00	6.00
29	LRB-97	23.20	2.00	47.00	70.00	40.00	10.00
30	LRB-61	32.80	2.00	47.00	70.00	33.20	7.20
31	LRB-69-2	31.00	1.80	47.00	72.00	30.00	5.60
32	LRB-145	22.80	1.60	47.00	71.00	26.00	6.00
33	LRB-216	26.00	1.40	47.00	70.00	16.00	4.00

S. No.	Entries	Plant height (cm)	No. of branches / plant	Days to flowering	Days to maturity	No. of pods/ plant	Yield/plant (g)
34	LRB-30	31.40	1.80	48.00	71.00	34.00	6.40
35	LRB-69	26.20	1.60	47.00	70.00	30.00	6.00
36	LRB-3	23.00	1.40	47.00	70.00	40.00	7.40
37	LRB-323	16.20	1.40	47.00	71.00	10.00	4.40
38	LRB-299	20.60	1.80	47.00	71.00	40.00	6.00
39	LRB-231	24.60	1.60	50.00	74.00	14.00	4.40
40	LRB-176	26.20	1.60	50.00	71.00	26.00	7.20
41	LRB-713	21.00	1.40	52.00	70.00	20.00	4.60
42	LRB-132	35.60	1.80	47.00	72.00	40.00	7.60
43	LRB-86	32.40	1.80	48.00	71.00	29.00	9.00
44	LRB-75-2	32.80	2.00	47.00	70.00	23.80	5.00
45	LRB-365	29.60	1.40	48.00	70.00	50.00	9.00
46	LRB-239	33.20	2.00	47.00	72.00	13.00	3.00
47	LRB-269	34.40	2.00	48.00	74.00	20.00	4.00
48	LRB-240	30.00	1.40	47.00	74.00	40.00	6.00
49	LRB-376	30.60	1.80	48.00	74.00	20.00	2.00
50	LRB-129	22.00	1.60	47.00	74.00	14.00	3.00
51	LRB-367	29.60	1.80	47.00	72.00	40.00	6.60
52	LRB-371	23.40	1.60	47.00	72.00	10.00	3.00
53	LRB-358	19.80	1.20	48.00	71.00	32.00	7.60
54	LRB-108	24.00	1.20	47.00	71.00	18.00	5.40
55	LRB-362	26.80	1.80	48.00	71.00	36.00	8.40
56	LRB-364	36.20	2.00	48.00	74.00	40.60	14.00
57	LRB-127	25.00	1.80	48.00	72.00	16.00	4.00
58	LRB-309	27.80	1.60	47.00	71.00	30.00	6.40
59	LRB-90	18.00	1.20	47.00	71.00	14.00	4.00
60	LRB-106	22.40	1.20	47.00	71.00	19.60	4.80
61	LRB-235	19.60	1.40	47.00	71.00	24.00	6.40
62	LRB-267	25.80	1.60	48.00	72.00	22.00	6.00
63	LRB-112	21.80	1.80	47.00	71.00	16.80	4.00
64	LRB-121	22.40	1.20	47.00	71.00	10.00	3.00
65	LRB-368	22:00	1.40	48.00	74.00	21.20	4.60
	GRAND MEAN	**28.58**	**1.76**	**47.87**	**71.75**	**28.14**	**6.89**
	Range	**16.20-44.40**	**1.20-2.40**	**47.00-52.00**	**70.00-78.00**	**10.00-55.00**	**2.00-15.00**

Table 112. Evaluation of germplasm lines in rice bean, Bhubaneswar

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
1	LRB 003	43	85	90.6	2.8	19.8	38.6	8.9	8	5.27	12.29	1636.6
2	LRB 030	44	88	85.2	3	14.6	28.4	8.85	7.1	6.01	8.67	1209.8
3	LRB 059	46	89	71.6	2.4	10.8	18.4	8.5	7.4	4.73	6.02	639.9
4	LRB 061	43	86	76	3	13.6	29.8	8.25	7.6	6.84	10.73	1540.1
5	LRB 069	43	86	72.8	2.6	9.8	27.2	8.1	7.2	4.89	7.14	959.6
6	LRB 069-2	44	88	86	4	19.4	30.4	9.3	8.4	4.58	10.95	1169.5
7	LRB 070	44	88	86.6	3.4	20.2	32.4	9.1	7.4	4.1	10.75	983
8	LRB 071	43	88	91	2.2	13.2	30.4	7.75	7.4	4.36	6.76	967.3
9	LRB 071-3	45	89	87	2.8	12.4	28.8	7.65	6.8	5.37	8.26	1038
10	LRB 075-2	42	86	81.2	3	12.2	29.2	8.65	8.1	4.83	9.76	1135.3
11	LRB 076	43	86	74.6	2.6	16.6	28.6	8.3	6.6	4.9	6.03	924.9
12	LRB 084	43	86	77.2	3	15.8	27.2	8.5	6.7	5.65	6.17	1020.5
13	LRB 086	42	86	87.4	3	18	31.6	8.3	7.8	4.89	8.83	1207.8
14	LRB 090	43	85	71.6	3.4	16.4	27.6	8.5	7.4	4.4	7.15	898.7
15	LRB 097	42	85	70.2	2.6	14.4	25.2	8.65	7.2	4.78	5.65	852.8
16	LRB 103	42	85	68	3	17.8	26.6	8.1	7	4.33	6.89	800.7
17	LRB 105	42	84	86.8	3.2	14.2	28.8	8.45	8.1	5.26	8.18	1204.4
18	RBL 1 (C)	41	82	88.4	2.2	14.8	23.4	8.4	6.9	4.44	6.52	710.4

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
19	LRB 106	43	85	93.4	3.4	18.4	33.8	8.7	7.9	4.64	8.96	1228.2
20	LRB 108	44	87	73.8	3.4	18.2	26.6	9.05	7.6	5.57	7.83	1132.1
21	LRB 112	43	85	71.6	2.2	11.2	19.2	8.8	7.6	4.03	3.39	583.7
22	LRB 113	42	84	70.6	2	12.6	24.2	9	8.2	4.5	4.48	893
23	LRB 121	42	83	67	3.4	19.4	30.4	9.2	8.2	4.79	8.53	1196.5
24	LRB 127	41	83	83.4	2.8	19.4	29	8.4	7.6	4.92	8.39	1080
25	LRB 129	43	85	81.6	3.2	16.2	28.8	8.95	7.1	4.14	6.18	838.4
26	LRB 132	40	82	79	2.6	13.2	22	8.8	7.7	4.93	6.84	830.1
27	LRB 134	43	85	69.8	1.8	14.2	22.2	8.6	8	5.66	9.35	1012.3
28	LRB 145	43	84	85.8	2.2	17	27.4	9	7.5	5.53	8.04	1130.3
29	LRB 176	41	83	76	2.6	13.8	24	8.5	6.9	5.05	5.92	844.6
30	LRB 178	42	84	86.6	2.2	13.8	25.4	9.05	7.1	4.62	5.31	829.6
31	LRB 179	41	84	90	4	18.6	42.2	9.9	7	5.02	11.32	1477
32	LRB 181	42	84	88.2	3	17	30.2	9.4	7	5.22	7.55	1099.3
33	LRB 191	43	85	79.4	3	18.2	33	9.75	7.7	5.14	10.14	1295.9
34	LRB 201	43	85	97.8	2.2	15.2	29.4	8.85	6.5	6.12	11.1	1387.4
35	RBL 6 (C)	42	84	76.6	3.2	12	24.6	8.6	7.9	5.18	7.56	1010.6
36	LRB 204	44	88	85.4	4.8	19.2	39.2	8.5	7.2	4.21	10.5	1356.3
37	LRB 216	45	89	101.2	6.2	25.6	50.4	8.35	7.4	5.06	17.6	2433.1

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
38	LRB 221	46	89	90	2.2	13.2	31.6	8.95	7.8	4.6	9.56	1133.8
39	LRB 222	44	88	83.6	4.2	16.2	35.6	9.25	7.5	6.45	11.42	1735.5
40	LRB 225	44	87	79.6	3.2	15.8	26	8.95	7.9	5.7	4.84	706.3
41	LRB 231	45	87	86.8	3.2	17.6	21.4	8.95	7.1	5.96	7.93	850.7
42	LRB 235	43	86	80.8	2.8	12.8	28.8	9.35	8.7	4.74	9.14	1127.5
43	LRB 240	43	87	101	3.2	19.7	33.4	8.95	7.4	5.03	8.23	1235.8
44	LRB267	44	87	99.8	3.2	15	33.4	8.8	7.5	4.7	9.03	1177.4
45	LRB 293	46	89	76.8	3.6	13	42.4	9.2	7.8	5.7	8.72	1272.3
46	LRB 299	45	88	96.2	4	16.6	33.8	8.5	6.8	6.14	10.9	1402
47	LRB 308	46	89	82.6	3	18.8	36	9.35	8	5.24	10.17	1497.6
48	LRB 314	44	88	77.8	3	15.2	40	8.6	7.9	4.34	8.53	1358.8
49	LRB 323	43	86	75.2	3.4	21.2	45.6	9.3	8.4	5.29	13.58	1754.6
50	LRB 324	42	84	78.6	3.4	22	35.8	8.25	8.2	5.47	7.2	1614.6
51	LRB 327	40	82	96	2.8	12.2	27	9.5	7.4	4.25	4.55	859.1
52	LRB 331	40	81	87.2	3.2	16.4	33.2	8.35	7.3	5.32	6.58	1284.5
53	LRB 334	40	82	83.4	3	13.4	29.4	9.4	7.4	4.77	6.43	1044.3
54	RBL 1 (C)	42	83	83.4	3.2	20	43.8	8.85	8.1	4.68	11.52	1667.5
55	LRB 339	41	82	71.8	2.6	12.4	19.6	8.2	7.2	5.65	5.85	970
56	LRB 353	42	83	84.4	3	22	32.8	9.75	7.6	6.36	10.42	1570.5

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
57	LRB 358	41	82	99.4	3	18.8	34.4	8.25	7.8	4.86	8.79	1464.5
58	LRB 361	40	82	92.8	3.2	14.6	34	10.5	7.2	4.72	7.45	1150.7
59	LRB 362	41	82	90.6	2.8	17.2	34.4	9.25	6.7	4.83	9.87	1106.3
60	LRB 364	42	83	74.2	3.2	15.6	31.5	9	7.5	4.83	7.53	1134
61	LRB 365	42	84	99.6	3.2	19.6	36.8	8.95	6.7	5.44	10.43	1356.1
62	LRB 367	42	83	98.6	3.4	19.6	37.2	8.4	6.3	4.98	10.08	1171.8
63	LRB 368	42	84	100.6	3.2	23	39.8	9.35	7.7	4.89	10.84	1379.1
64	LRB 369	44	87	81.4	2.8	15.2	34.8	9.15	6.8	5.31	9.55	1254.2
65	LRB 371	43	87	106	4	18.6	45.6	9.1	7.9	4.73	12.78	1693.1
66	LRB 376	44	88	90.6	3.2	18	38	9.55	8.2	4.3	12.08	1339.9
67	LRB 378	43	88	84	3	16	33.8	9.15	7.7	5.42	10.75	1405.4
68	LRB 381	44	88	94.2	3.4	26.6	43.4	9	7.9	5.74	12.69	1954.3
69	RBL 6 (C)	43	85	88.6	4.2	18	29.6	8.8	7.9	5.18	8.74	1216
70	LRB 434	40	80	61.4	1.6	13.6	30	8.2	6.9	5.25	7.23	1097.1
71	LRB 442	40	80	77.8	1.6	12.4	21.6	9.05	7.6	5.79	8.03	952.1
72	LRB 444	40	80	72.4	2	12.2	19.2	8.2	6.9	5.63	6.54	755.1
73	LRB 445	42	84	75.4	3	15.5	26.4	8.1	6.6	4.97	6.78	871.2
74	LRB 446	40	81	72	3.2	10.3	14.2	8.15	7	4.49	2.72	447.3
75	LRB 447	40	81	84.6	2.8	9.8	28.8	8.95	7.2	6.66	9.2	1389.3

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
76	LRB 450	41	81	60.4	2.4	15.8	32.2	9.05	8.2	5.84	10.69	1531.4
77	LRB 451	42	84	65.6	2.8	15.4	30	8.7	7.5	5.25	7.7	1192.5
78	LRB 457	40	80	86.2	2.8	12.6	21.2	7.65	7.6	5.38	7.27	870
79	LRB 460	41	80	64	2.6	16.8	31.2	9.55	7.7	5.48	7.93	1321.3
80	LRB 496	42	84	63.4	1.4	10.2	17.6	9	7.4	4.8	4.4	725.2
81	LRB 499	43	85	84	2.4	18.2	31.4	9	7.8	4.27	8.91	1053.2
82	LRB 512	45	88	67.2	2.2	13.2	28.8	10.1	7.5	4.51	7.5	972
83	BRB 1	40	91	83.3	3	11.4	33.5	8.35	7.2	5.23	10.22	1423.5
84	BRB 2	42	83	82.4	2.9	10.5	36.3	8.7	7.8	5.54	11.3	1530
85	RBL 1 (C)	40	84	87.5	3.1	18.5	38.2	8.65	7.8	4.61	10.25	1452.3
86	BRB 3	42	86	87.7	3.1	12.2	31	8.15	8.3	4.81	9.22	1325.1
87	BRB 4	41	85	80.3	3.5	13.1	29.7	8.05	8.1	4.73	10.21	1471.2
88	BRB 5	43	87	78.4	2.9	9.7	26.8	8.25	7.7	4.8	7.25	931.7
89	BRB 6	41	82	60	3.3	14.8	26.4	8.35	6.8	4.57	6.7	750.7
90	BRB 7	40	80	64.8	3.8	16.6	29.6	8.75	7.4	4.47	9.37	985.7
91	BRB 8	40	80	70.6	1.4	4.6	33.6	8.4	7.3	4.21	8.41	1030.2
92	BRB 9	40	80	81.8	3.8	12.8	43	8.5	6.9	4.34	9.6	1275.8
93	BRB 10	40	81	82.6	3.8	17.4	41.8	9.25	8.2	3.18	11.26	1096.8
94	BRB 11	41	80	83	3.8	16.8	45.4	8.75	6.7	5	14.1	1868.8

S. No	Variety/ Culture	Days to 50% flowering	Days to maturity	Plant height (cm)	Branches/plant	Clusters/plant	Pods/plant	Pod length (cm)	Seeds/pod	100 seed wt (g)	Seed Yield/plant (g)	Seed yield (kg/ha)
95	BRB 12	40	81	73.2	2.8	9.4	30.6	7.9	6.3	5.05	9.11	963.9
96	BRB 13	41	81	69.4	2	12.2	34.8	8.25	8.8	5.14	9.5	1592.4
97	BRB 14	40	81	78.4	3.2	12.2	32.2	8.1	8.1	4.61	10.74	1199.8
98	BRB 15	40	80	89.8	4.2	17.2	40.4	8.75	7.5	4.85	12.12	1484.7
99	BRB 16	41	81	81	1	9	35	7.3	6.2	5.27	8.79	1135.7
100	BRB 17	40	81	91	3.2	9.4	16.6	7.75	7.9	5.64	7.43	1021.4
101	BRB 18	40	80	45	5	19	89	7.45	7.7	5.64	18.97	2870.8
102	BRB 19	41	81	100	4.5	16	51.5	7.65	7.2	5.79	13.79	1723.1
103	RBL 6 (C)	40	52	81.3	3.7	14.8	28.4	8.15	8.2	5.22	8.15	1326.5

Table 113. Rice bean Germplasm Evaluation at Ludhiana during *Kharif 2004*

S. No.	Variety	Days to 50% flowering	Days to maturity	Plant height (cm)	BLB score	100 seed weight (g)	Stand count (%)	Seed colour	Yield/ plot (g)
1	LRB3	62.00	98.00	91.00	1.00	5.80	75.00	Brown	325.00
2	LRB 30	66.00	98.00	110.00	1.00	7.30	60.00	Brown	195.00
3	LRB 59	62.00	100.00	95.00	2.00	6.40	65.00	Brown	275.00
4	LRB 61	62.00	98.00	103.00	2.00	6.50	75.00	Green brown	350.00
5	LRB 69	61.00	98.00	76.00	3.00	5.20	75.00	Brown green	330.00
6	LRB 69-2	62.00	100.00	113.00	2.00	6.40	75.00	Green brown	360.00
7	LRB 70	65.00	104.00	120.00	1.00	6.20	80.00	Brown	360.00
8	LRB 71	64.00	107.00	75.00	3.00	7.00	75.00	Light brown	345.00
9	LRB 71-3	63.00	108.00	125.00	2.00	6.70	70.00	Light brown	305.00
10	LRB 75-2	62.00	104.00	62.00	2.00	5.90	65.00	Brown green	265.00
11	LRB 76	63.00	98.00	83.00	3.00	6.50	70.00	Brown	360.00
12	LRB 84	63.00	98.00	83.00	2.00	6.70	65.00	Light brown	210.00
13	LRB 86	61.00	98.00	75.00	2.00	6.00	66.00	Brown	170.00
14	LRB 90	60.00	98.00	80.00	2.00	6.20	65.00	Dark brown	235.00
15	LRB 97	61.00	99.00	97.00	2.00	6.10	75.00	Brown	215.00
16	LRB 103	61.00	98.00	80.00	2.00	6.10	75.00	Light brown	235.00
17	RBL 1 (ch)	62.00	100.00	80.00	2.00	5.70	65.00	Dark brown	175.00
18	RBL6 (ch)	61.00	99.00	64.00	2.00	6.70	65.00	Brown green	260.00
19	RBL35 (ch)	62.00	98.00	95.00	2.00	6.00	75.00	Brown green	275.00
20	RBL50 (ch)	61.00	99.00	91.00	3.00	5.70	87.00	Dark brown	385.00
21	LRB 105	63.00	101.00	102.00	2.00	6.10	75.00	Dark brown	300.00
22	LRB 106	64.00	102.00	100.00	3.00	5.90	75.00	Light green	310.00
23	LRB 108	64.00	113.00	145.00	3.00	6.00	60.00	Light green	170.00
24	LRB 112	64.00	113.00	98.00	3.00	6.30	75.00	Brown green	260.00
25	LRB 113	65.00	112.00	102.00	2.00	5.80	70.00	Light brown	240.00
26	LRB 121	60.00	108.00	72.00	2.00	6.10	75.00	Light green	300.00
27	LRB 127	61.00	98.00	102.00	3.00	6.20	80.00	Light green	395.00
28	LRB 129	60.00	98.00	88.00	3.00	6.50	80.00	Light green	370.00
29	LRB 132	61.00	103.00	75.00	2.0'0	6.20	75.00	Dark green	330.00
30	LRB 134	63.00	98.00	97.00	2.00	6.40	70.00	Light green	315.00
31	LRB 145	63.00	113.00	95.00	2.00	6.40	70.00	Light green	220.00
32	LRB 176	63.00	105.00	100.00	2.00	6.30	70.00	Brown green	290.00

S. No.	Variety	Days to 50% flowering	Days to maturity	Plant height (cm)	BLB score	100 seed weight (g)	Stand count (%)	Seed colour	Yield/ plot (g)
33	LRB 178	60.00	98.00	103.00	3.00	6.00	80.00	Light green	325.00
34	LRB 179	60.00	98.00	85.00	3.00	6.50	60.00	Light brown	170.00
35	LRB 181	61.00	98.00	88.00	2.00	5.90	75.00	Light green	300.00
36	LRB 191	60.00	98.00	85.00	2.00	6.00	85.00	Light green	360.00
37	RBL 1 (ch)	60.00	110.00	103.00	2.00	6.50	70.00		300.00
38	RBL6 (ch)	60.00	105.00	92.00	3.00	6.00	75.00		365.00
39	RBL35 (ch)	60.00	100.00	102.00	3.00	6.40	60.00		145.00
40	RBL50 (ch)	63.00	110.00	88.00	2.00	6.30	70.00		260.00
41	LRB 201	60.00	98.00	53.00	3.00	6.10	65.00	Green	200.00
42	LRB 204	60.00	98.00	50.00	2.00	6.30	80.00	Green brown	345.00
43	LRB 216	63.00	101.00	112.00	3.00	5.70	70.00	Brown green	290.00
44	LRB 221	61.00	105.00	90.00	3.00	6.40	60.00	Green	155.00
45	LRB 222	63.00	113.00	92.00	3.00	7.90	70.00	Brown green	250.00
46	LRB 225	63.00	113.00	92.00	3.00	6.40	60.00	Brown green	160.00
47	LRB 23 1	60.00	98.00	122.00	3.00	6.10	85.00	Dark brown	425.00
48	LRB 235	59.00	97.00	122.00	3.00	6.30	85.00	Light green	420.00
49	LRB 240	63.00	113.00	120.00	3.00	6.30	75.00	Light green	330.00
50	LRB 267	60.00	98.00	125.00	3.00	7.00	65.00	Light green	200.00
51	LRB 293	60.00	98.00	85.00	3.00	5.90	65.00	Brown green	265.00
52	LRB 299	60.00	98.00	103.00	3.00	7.00	85.00	Light brown	430.00
53	LRB 308	60.00	98.00	107.00	2.00	5.90	80.00	Green	415.00
54	LRB 314	60.00	98.00	82.00	2.00	6.70	70.00	Green	310.00
55	LRB 323	60.00	98.00	123.00	2.00	5.90	65.00	Green brown	255.00
56	LRB 324	60.00	98.00	88.00	2.00	6.10	85.00	Brown	485.00
57	RBL 1 (ch)	59.00	97.00	110.00	3.00	6.30	75.00		305.00
58	RBL6 (ch)	58.00	96.00	100.00	3.00	6.70	65.00		200.00
59	RBL35 (ch)	61.00	99.00	87.00	2.00	6.10	85.00		475.00
60	RBL50 (ch)	60.00	107.00	103.00	2.00	5.70	60.00		135.00
61	LRB 327	61.00	98.00	90.00	2.00	6.80	65.00	Brown	180.00
62	LRB 331	64.00	108.00	120.00	2.00	6.20	60.00	Brown green	110.00
63	LRB 334	60.00	100.00	85.00	3.00	6.90	70.00	Light brown	270.00
64	LRB 339	60.00	98.00	117.00	3.00	6.10	65.00	Brown green	210.00
65	LRB 353	60.00	98.00	128.00	3.00	6.00	70.00	Light green	305.00
66	LRB 358	61.00	105.00	93.00	3.00	7.50	75.00	Light brown	330.00

S. No.	Variety	Days to 50% flowering	Days to maturity	Plant height (cm)	BLB score	100 seed weight (g)	Stand count (%)	Seed colour	Yield/ plot (g)
67	LRB 361	59.00	110.00	115.00	2.00	6.80	75.00	Brown green	385.00
68	LRB 362	60.00	105.00	103.00	3.00	6.30	65.00	Light brown	250.00
69	LRB 364	60.00	105.00	120.00	3.00	5.10	80.00	Light green	365.00
70	LRB 365	65.00	109.00	140.00	3.00	6.80	60.00	Brown green	170.00
71	LRB 367	60.00	107.00	107.00	3.00	5.90	70.00	Green	310.00
72	LRB 368	60.00	107.00	98.00	3.00	6.20	70.00	Brown	355.00
73	LRB 369	60.00	108.00	111.00	3.00	7.00	65.00	Light brown	295.00
74	LRB 371	65.00	108.00	127.00	3.00	6.30	65.00	Brown	220.00
75	LRB 376	60.00	98.00	117.00	3.00	6.90	80.00	Brown	425.00
76	LRB 378	61.00	98.00	145.00	3.00	6.80	65.00	Brown green	160.00
77	RBL 1 (ch)	60.00	105.00	110.00	3.00	7.00	70.00		295.00
78	RBL6 (ch)	60.00	98.00	95.00	2.00	6.80	75.00		385.00
79	RBL35 (ch)	60.00	98.00	100.00	2.00	6.10	70.00		310.00
80	RBL50 (ch)	58.00	106.00	88.00	3.00	6.80	80.00		180.00

Table 114. Rice bean Germplasm Evaluation- 2004 (Ranchi)

S. No.	Entries	Days to flowering	Days to maturing	Plant height (cm)	Primary branches/plant	Pods/Plant	Seed/Pod	Pod length (cm)	Stand at maturity	100 seed weight
1	LRB-3	63.00	123.00	128.20	3.80	22.60	7.40	8.80	18.00	6.08
2	LRB-30	59.00	125.00	121.60	2.80	17.20	7.60	9.00	24.00	7.08
3	LRB-59	58.00	119.00	138.00	3.00	15.20	7.40	9.20	23.00	5.75
4	LRB-61	72.00	122.00	131.00	2.60	15.40	8.20	9.80	22.00	6.16
5	LRB-69	59.00	123.00	124.00	2.20	14.40	6.60	8.40	16.00	5.93
6	LRB-69-2	58.00	122.00	115.60	3.00	19.00	7.60	8.80	14.00	6.82
7	LRB-70	70.00	121.00	132.60	3.40	28.20	7.00	8.80	20.00	5.23
8	LRB-71	73.00	119.00	127.80	2.40	19.80	7.00	8.60	19.00	5.39
9	LRB-71-3	74.00	120.00	112.80	2.60	12.80	6.60	8.20	27.00	6.71
10	LRB-75-2	58.00	121.00	108.00	2.20	15.40	7.20	8.20	19.00	6.17
11	LRB-76	77.00	126.00	89.10	2.00	17.00	6.40	8.00	21.00	6.10
12	LRB-84	66.00	119.00	121.60	2.20	13.40	7.40	7.40	86.00	6.62
13	LRB-86	67.00	118.00	115.60	2.80	18.40	7.00	9.00	20.00	6.13
14	LRB-90	55.00	125.00	110.00	2.00	18.20	6.60	8.40	23.00	5.97
15	LRB-97	56.00	124.00	107.40	2.40	16.40	6.40	8.00	22.00	6.12
16	LRB-103	76.00	122.00	132.00	2.80	19.60	8.00	9.40	20.00	4.99
17	LRB-105	75.00	128.00	134.20	2.00	12.40	7.40	9.20	25.00	5.50
18	RBL-6©	61.00	127.00	115.00	2.80	11.60	7.60	9.00	15.00	5.85
19	LRB-106	67.00	126.00	116.00	1.80	11.80	7.40	8.60	23.00	6.09
20	LRB-108	73.00	121.00	76.80	2.00	13.60	6.80	8.20	29.00	6.84

S. No.	Entries	Days to flowering	Days to maturing	Plant height (cm)	Primary branches/plant	Pods/Plant	Seed/Pod	Pod length (cm)	Stand at maturity	100 seed weight
21	LRB-112	67.00	127.00	79.60	2.20	16.60	7.00	8.40	22.00	5.83
22	LRB-113	76.00	124.00	113.60	2.80	13.60	7.80	9.20	29.00	5.42
23	LRB-121	62.00	124.00	120.20	2.60	16.00	7.40	9.20	20.00	6.62
24	LRB-127	59.00	126.00	116.00	2.80	15.00	8.00	8.20	25.00	5.21
25	LRB-129	80.00	125.00	186.00	2.80	24.00	6.80	8.20	24.00	6.64
26	LRB-132	62.00	122.00	124.00	2.20	22.20	7.60	8.40	21.00	6.10
27	LRB-134	76.00	121.00	106.20	2.60	21.00	7.80	9.00	16.00	6.25
28	LRB-145	77.00	115.00	109.40	2.60	21.80	8.20	8.80	27.00	5.79
29	LRB-176	54.00	127.00	118.40	2.40	26.20	7.80	8.80	22.00	5.27
30	LRB-178	75.00	124.00	109.80	2.40	21.00	6.80	8.40	19.00	5.91
31	LRB-179	77.00	122.00	93.40	2.40	22.20	8.00	9.60	25.00	6.21
32	LRB-181	74.00	125.00	90.00	1.80	13.60	7.00	8.40	20.00	5.41
33	LRB-191	62.00	121.00	97.20	1.80	17.40	6.80	7.60	23.00	6.39
34	LRB-201	63.00	125.00	102.20	2.60	16.20	5.80	8.00	27.00	5.55
35	RBL-6©	66.00	120.00	119.00	2.20	22.00	6.20	8.20	22.00	7.51
36	LRB-204	55.00	119.00	100.20	2.40	13.40	6.60	7.60	20.00	5.58
37	LRB-216	67.00	118.00	86.00	2.80	21.80	6.60	8.40	21.00	5.30
38	LRB-212	62.00	123.00	103.00	3.20	23.00	8.20	8.80	16.00	5.32
39	LRB-222	76.00	120.00	112.60	2.60	20.40	8.00	8.60	25.00	5.56
40	LRB-225	75.00	121.00	97.20	1.80	11.80	6.20	7.60	30.00	5.08
41	LRB-231	80.00	119.00	105.80	2.20	21.80	8.00	9.20	18.00	5.83
42	LRB-235	77.00	126.00	103.20	2.60	18.40	7.60	8.80	28.00	5.18

S. No.	Entries	Days to flowering	Days to maturing	Plant height (cm)	Primary branches/plant	Pods/Plant	Seed/Pod	Pod length (cm)	Stand at maturity	100 seed weight
43	LRB-240	78.00	119.00	93.80	2.60	22.00	8.20	7.20	24.00	5.16
44	LRB-267	79.00	126.00	106.00	2.40	26.80	7.80	9.20	20.00	5.38
45	LRB-293	55.00	117.00	113.80	2.90	21.20	6.80	8.00	23.00	4.98
46	LRB-299	76.00	122.00	109.80	2.40	19.00	7.80	8.60	19.00	5.56
47	LRB-308	78.00	123.00	109.40	2.40	196.00	7.80	8.20	16.00	5.83
48	LRB-314	60.00	124.00	97.20	2.00	18.20	8.40	8.60	21.00	5.74
49	LRB-323	71.00	119.00	116.80	2.20	18.00	7.40	9.20	20.00	5.43
50	LRB-324	54.00	123.00	111.60	2.20	21.60	8.20	9.00	26.00	5.63
51	LRB-327	64.00	126.00	109.00	2.40	18.40	7.00	8.00	22.00	5.40
52	LRB-331	59.00	123.00	116.60	2.60	22.40	7.20	8.30	25.00	5.41
53	LRB-334	58.00	122.00	117.60	2.60	17.80	7.80	8.80	20.00	5.97
54	RBL-1©	62.00	124.00	128.40	2.40	23.20	7.60	8.40	24.00	5.58
55	LRB-339	61.00	126.00	108.00	2.40	17.80	7.00	8.00	18.00	5.81
56	LRB-353	59.00	124.00	109.80	2.60	17.60	6.80	8.20	19.00	6.19
57	LRB-358	66.00	120.00	113.80	2.00	20.60	6.60	7.60	30.00	5.39
58	LRB-361	68.00	124.00	115.00	2.20	15.80	7.00	8.40	14.00	5.19
59	LRB-362	69.00	126.00	115.20	2.00	18.00	7.20	8.60	22.00	5.43
60	LRB-364	68.00	122.00	121.60	2.60	14.20	8.60	9.40	14.00	5.50
61	LRB-365	68.00	123.00	119.60	2.00	13.60	6.80	8.00	28.00	6.16
62	LRB-367	72.00	126.00	126.60	2.60	17.60	6.60	7.20	21.00	5.77
63	LRB-368	68.00	124.00	110.80	2.80	20.60	6.60	8.20	15.00	5.28
64	LRB-369	66.00	122.00	111.20	3.00	15.60	6.80	7.60	18.00	5.75

S. No.	Entries	Days to flowering	Days to maturing	Plant height (cm)	Primary branches/plant	Pods/Plant	Seed/Pod	Pod length (cm)	Stand at maturity	100 seed weight
65	LRB-371	64.00	121.00	106.40	2.20	16.00	6.60	8.00	21.00	5.45
66	LRB-376	68.00	123.00	109.40	2.20	16.00	6.20	8.00	19.00	5.21
67	LRB-378	69.00	122.00	112.00	1.80	11.00	8.00	9.00	27.00	5.15
68	LRB-381	68.00	124.00	96.60	2.20	12.80	7.80	8.40	17.00	5.54
69	RBL-1©	69.00	125.00	109.80	2.40	21.00	6.80	8.40	23.00	5.86

Table 115. Promising lines in rice bean germplasm for various characters

S. No.	Character	Range	Promising
Bangalore			
1.	Days to 50% flowering (days)	47.00-52.00	LRB 327, LRB 225, LRB 197, LRB 97, LRB 364 (<48 days)
2.	Days to maturity (days)	70.00-78.00	LRB 314, LRB 97, LRB 327, LRB 365, LRB 225 (70 days)
3.	Plant height (cm)	16.20-44.40	LRB 221, LRB 314, LRB 414, LRB 134, LRB 327 (39.60 cm)
4.	No. of pods/plant	10.00-55.00	LRB 314, LRB 103, LRB 134, LRB 225, LRB 365 (>50.00)
5.	Grain yield/plant (g)	2.00-15.00	LRB 103, LRB 364, LRB 314, LRB 134, LRB 197 (11.40 g)
Bhubaneswar			
1.	Days to 50% flowering (days)	40.00-46.00	LRB 132, LRB 361, LRB 434, LRB 442, LRB 444, BRB 8, BRB 1, BRB 18 (40 days)
2.	Days to maturity (days)	80.00-89.00	LRB 434, LRB 442, LRB 444, LRB 457, LRB 460, BRB 11, BRB 18 (80 days)
3.	Plant height (cm)	45.00-106.00	LRB 371, LRB 368, LRB 240, LRB 216 (>101.20 cm)
4.	No. of pods/plant	14.20-45.60	LRB 323, LRB 293, LRB 371, LRB 381, BRB 11 (45.40)
5.	Grain yield/plant (g)	4.40-18.97	BRB 18, LRB 216, LRB 371, LRB 376, LRB 381, BRB 19 (>13.79 g)
Ludhiana			
1.	Days to 50% flowering (days)	58.00-66.00	LRB 324, LRB 231, LRB 361, LRB 235, LRB 324 (<60 days)
2.	Days to maturity (days)	97.00-113.00	LRB 235, LRB 324, LRB 231, LRB 299, LRB 376 (<98 days)
3.	Plant height (cm)	72.00-145.00	LRB 108, LRB 365, LRB 376, LRB 371, LRB 353 (>128.00 cm)
4.	100 seed weight (g)	5.70-7.90	LRB 30, LRB 122, LRB 358 (>7.50 g)
5.	Grain yield/plant (g)	110.00-485.00	LRB 324, LRB 399, LRB 376, LRB 231, LRB 235 (>420.00 g)

S. No.	Character	Range	Promising
Ranchi			
1.	Days to 50% flowering (days)	54.00-79.00	LRB 176, LRB 324, LRB 204, LRB 293, LRB 59, LRB 69-2, LRB 75-2 (<58 days)
2.	Days to maturity (days)	115.00-127.00	LRB 145, LRB 293, LRB 59, LRB 71, LRB 84, LRB 86 (<118 days)
3.	Plant height (cm)	76.80-138.00	LRB 59, LRB 105, LRB 103, LRB 61 (>124.00 cm)
4.	No. of pods/plant	11.00-28.20	LRB 70, LRB 267, LRB 176, LRB 129, LRB 212
5.	100 seed weight (g)	4.98-7.51	LRB 30, LRB 108, LRB 69-2, LRB 71-3 (>6.71 g)

AGRONOMY

IV. AGRONOMY

Twelve agronomic experiments; four on grain amaranth, five on rice bean and one trial each on buckwheat, Jatropha and karingada, were conducted at seven centres of the network during rabi 2003-04 and Kharif 2004. Centre-wise details of experiments are given in table 116.

4.1 GRAIN AMARANTH (*Amaranthus hypochondriacus*)

Four experiments on grain amaranth related to response of promising genotypes to fertilizer doses, fertilizer management in amaranth based intercrops, integrated nutrient management studies and effect of N, P and on grain amaranth were conducted. Experiment-wise details are as follows:

Experiment 1: Response of promising amaranth genotypes to different doses of fertilizer

This experiment was conducted at S.K. Nagar during rabi 2003-04 and at Sangla and Ranichauri during Kharif 2004 and at Bhubaneswar and Bangalore during late Kharif 2004 in order to work out the nitrogen/fertilizer requirement of grain amaranth varieties in the pipe line. The experiment was laid out in split plot design with four replications. The treatments comprised of three genotypes (PRA 2, Sangla A-1 and Sangla A-2) and four fertilizer doses (Recommended fertilizer – F_1, 75% of RF-F_2, 125% RF-F_3 and FYM @ 5 tons/ha RF-F_4) at Sangla and Ranichauri; four genotypes (IC 120588, AG 114, SKNA 7 and GA 2) and four N-doses (N_{40}, N_{60}, N_{80}, N_{100}) at S.K. Nagar; six genotypes (BGA 2, BGA 3, RMA 2, SKNA 7, IC 32195 and GA 2) and four N-doses (N_{20}, N_{40}, N_{60}, N_{80}) at Bhubaneswar; and four amaranth genotypes (BGA 2, RMA 2, SKNA 7 and IC 32195) and four fertilizer treatments (same as those at Sangla and Ranichauri) at Bangalore.

A perusal of data in grain yield obtained at various centres (Table 117) revealed that both the varieties Sangla A-1 and Sangla A-2 gave higher grain yield than the check (PRA 2) at Sangla. The difference in grain yields of the two varieties in the pipe line was not significant. Among the fertilizer doses, grain yield of amaranth obtained under all the three chemical fertilizer doses (F_1, F_2 and F_3) was at par but higher than that obtained by application of FYM (F_4). At

Ranichauri, neither of the varieties in the pipe line gave higher grain yield than the check. Also, amaranth grain yields obtained by application of recommended dose of fertilizer or 125% RF was higher than those obtained by application of 75% RF or FYM @ 5 tons/ha. At S.K. Nagar, the grain yields of all the genotypes tested was at par while application of 80 or 100 kg N/ha resulted in more grain yield than the other N-doses. At Bhubaneswar, genotype BGA 3 yielded higher amaranth grain than the check and grain yields of all the varieties were observed to increase with increase in the dose of applied N upto 80 kg N/ha. At Bangalore, yield of grain amaranth was too low to manifest any visible differences in yield due to genotypes or fertilizer doses.

Experiment 2: Fertilizer management in amaranth based intercrops

This experiment was conducted at Ranichauri during Kharif 2004 with the objective of finding out the fertilizer requirement of the most suitable amaranth based intercrops identified earlier. In this experiment, two amaranth based intercrops (Amaranth + rice bean and amaranth + French bean grown in 1: 2 ratio) were subjected to three fertilizer doses, namely, 1/3 RDF for amaranth + 2/3 RDF for pulse; No fertilizer for amaranth + full RDF for pulse; and Fall RDF for amaranth + Full RDF for pulse. The experiment was laid out in randomized block design with four replications.

Observations on grain yield, B: C ratio and net profit (Table 118) indicated that application of full recommended dose of fertilizer to the pulse intercrop and no fertilizer to amaranth resulted in maximum amaranth equivalent yield, B: C ratio and net profit (S. No. 2 and 5) in both the pulse intercrops.

Experiment 3: Integrated nutrient management studies in grain amaranth

Integrated nutrient management studies were conducted in grain amaranth at S.K. Nagar, Bhubaneswar and Mettupalayam with a view to work out a combination of organic and inorganic fertilizer requirement for grain amaranth. The design applied was randomized block design and the nine treatments were replicated four times.

Most of the fertilizer treatments resulted in increase in amaranth grain yield over control. However, treatment effects varied from location to location. Highest grain yield of amaranth was obtained at S.K. Nagar by application of recommended fertilizer dose or by application of 25% N through chemical fertilizer and 75% N through FYM. On the other hand, highest amaranth yield was obtained by application of 75% N through chemical fertilizer and 25% N through FYM at Bhubaneswar and Mettupalayam (Table 119).

Experiment 4: Effect of NPK on yield of grain amaranth

This experiment was conducted at Bhubaneswar during 2003-04 to study the individual and combined effect of N, P and K on yield of grain amaranth. The experiment comprised of nine treatments (Table 120) conducted in RBD with four replications.

Nitrogen dominated its effect on grain yield over P, K or even combined application of PK. K has negligible effect or no effect on grain yield of amaranth. Combined application of NPK recorded a grain yield of 1070 kg/ha and when supplemented with FYM 5 t/ha, the grain yield increased to 1272 kg/ha. The control plot recorded the lowest grain yield of 295 kg/ha which was at par with the grain yield of K_{20} (318 kg/ha).

4.2 BUCKWHEAT (*Fagopyrum* spp.)

One trial was conduced at Sangla and Ranichauri centres to study the response of promising buckwheat genotypes to varying fertilizer doses.

Experiment 5: Response of promising genotypes of buckwheat to varying fertilizer doses

Four promising genotypes of buckwheat were administered with three fertilizer doses at Sangla and Ranichauri during Kharif 2004. Details of genotypes and fertilizer doses are given in Table 121. The experiment was laid out in split plot design with four replications.

At Sangla, all the three genotypes in the pipe line gave higher grain yield than the check. However, grain yield differences among the promising genotypes and those due to different fertilizer doses were not significant. On the other

hand, the check gave the highest straw yield while entry Shimla B-1 was observed to be the lowest straw yielder. At Ranichauri, grain yield production of all the genotypes was at par and followed the pattern at Sangla for straw yield.

4.3 RICE BEAN (*Vigna umbellata*)

Five agronomic investigations were conducted on rice bean during Kharif 2004. These included studies on response to N-doses, crop rotations, intercropping, sowing time and weed management. Experiment-wise details are discussed below:

Experiment 6: Response of promising rice bean genotypes to varying N-doses

Five promising genotypes of rice bean were given three doses of Nitrogen at Ranichauri in hills and at Bangalore in plains. The experiment was laid out in split plot design with four replications (Table 122).

At Ranichauri, entry PRR 9402 recorded more seed yield than the check, which was at par with rest of the genotypes. Application of nitrogen @ 40 kg N/ha resulted in highest seed yield of rice bean followed by N_{20} and N_{60}, respectively.

At Bangalore, RBL 35 gave the highest seed yield but the difference was not significant. Seed yield of rice bean increased with increase in the dose of N upto 60 kg N/ha.

Experiment 7: Performance of rice bean based crop rotations under varying fertility conditions

The crop of rice bean was grown in rotation with six crops at Hisar and with five crops at Ranichauri in split plot design with four replications. Recommended fertilizer doses were applied to the rabi crops while three fertilizer doses was applied to rice bean (N_0P_0, $N_{20}P_{20}$ and $N_{20}P_{40}$).

At Hisar, crop rotation treatments did not affect the yield and yield attributes of rice bean. On the other hand, increase in fertilizer dose resulted in increase in all the yield attributes and yield of rice bean (Table 123).

At Ranichauri, the rice bean-pea rotation at $N_{20}P_{20}$ fertilizer dose gave highest net return of Rs.24611.00 per hectare (Table 124) followed by rice bean-pea at $N_{20}P_{40}$ fertilizer level gaving Rs.23912.00 per hectare and rice bean-pea at N_0P_0 level gave Rs.20055.00 per hectare, respectively. This trend was also followed by rice bean-mustard and rice bean-wheat crop rotations in descending order. However, the highest B: C ratio was recorded in rice bean-peas at $N_{20}P_{20}$ fertilizer level (2.27) followed by rice bean-peas at $N_{20}P_{40}$ fertilizer level (2.22) and rice bean-peas at N_0P_0 fertility level (2.06), respectively. This was also followed by rice bean-mustard at $N_{20}P_{20}$ level (2.09), rice bean-mustard at $N_{20}P_{40}$ fertility level (1.95), rice bean-mustard at N_0P_0 level (1.50) and rice bean-wheat in the descending order in the same trend in other crop rotations. Pooled analysis of two years data also indicated similar trends (Table 125) wherein, highest gross income was obtained in rice bean-peas (Veg) crop rotation and gave highest value of B: C ratio in the similar trend as mentioned earlier. Yield details of rice bean pure crop of Kharif 2004 is given in Table 126, while yields of rice bean obtained at Hisar is given in Table 127.

Experiment 8: Intercropping studies in rice bean

In order to identify a suitable row arrangement for intercropping rice bean with major crops, the rice bean crop was given nine intercrop treatments (Table 1278 at Bhubaneswar. The trial was laid out in randomized block design with four replications.

Growing pigeon pea and rice bean in 1: 2 row ratio was observed to have highest rice bean equivalent yield (18.10 q/ha), land equivalent ratio 1.34 and benefit-cost ratio (2.10).

Experiment 9: Optimization of sowing time in rice bean

To find out the optimal sowing time for introduction of rice bean in the existing cropping systems in Karnataka and in rice fallows in Orissa, two genotypes of rice bean were sown on six sowing dates at 15 days internal from end June to beginning of September at Bhubaneswar and on five dates from beginning of August to first half of October at Bangalore (Table 129) in split plot design with four replications.

Highest seed yield of rice bean was obtained when the crop was sown in the first week of August, both at Bhubaneswar as well as Bangalore. The seed yield of RBL 1 was observed to be more stable at Bangalore as compare to LRB 355, which showed reduction in yield when sown later than first week of August.

Experiment 10: Weed management in rice bean

The crop of rice bean was subjected to eleven weed control treatments at Bhubaneswar in order to standardize chemical weed control for rice bean in Orissa. The experiment was laid out in randomized block design with four replications.

Among the herbicides applied singly as pre-emergence or pre plant incorporation pendimethalin was better than metolachlor and fluchloralin. But pendimethalin followed by (fb) fluaziflop recorded seed yield (999 kg/ha) which was statistically at par with weed free condition (1018 kg/ha). Weedy check (unweeded control) recorded the lowest seed yield of 296 kg/ha (Table 130).

4.4 JATROPHA (*Jatropha curcas*)

Experiment 11: Effect of spacing and nutrients on Jatropha

In order to work out spatial and nutrient requirement of *Jatropha curcas*, the experiment was initiated at Hisar, S.K. Nagar, Bhubaneswar and Mettupalayam. However, data were received only from S.K. Nagar centre. In this experiment, *Jatropha curcas* was grown in four spacings and was given four fertilizer doses. The experiment was conducted in split plot design with three replications.

Growth as well as seed yield of Jatropha was observed to increase with increase in both spacing as well as fertilizer dose (Table 131).

4.5 KARINGADA (*Citrullus lanatus*)

Experiment 12: Response of promising genotypes of karingada to varying doses of nitrogen

Response of four promising genotypes of karingada to three doses of nitrogen was studied at S.K. Nagar to find out the nitrogen requirement of karingada genotypes.

Neither the genotype nor the nitrogen dose were reported to have any significant effect on days to flower, maturity, number of fruits, green fruit yield and seed yield of karingada (Table 132).

Table 116. Centre-wise details of agronomic experiments on underutilized crops conducted during 2003-04.

S. No.	Experiment	Sangla	Ranichauri	Hisar	S.K. Nagar	Bhubaneswar	Bangalore	Mettupalayam	Total
1	Response of promising amaranth genotypes to different doses of fertilizer	Y	Y	N	Y	Y	Y	-	5 (6)
2	Fertilizer management in amaranth based intercrops	-	Y	-	-	-	-	-	1 (1)
3	Integrated nutrient management studies in grain amaranth	-	-	N	Y	Y	-	Y	3 (4)
4	Effect of NPK on yield of grain amaranth	-	-	-	-	Y	-	-	1 (0)
5	Response of promising genotypes of buckwheat to varying fertilizer doses	Y	Y	-	-	-	-	-	2 (2)
6	Response of promising rice bean genotypes to varying N-doses	-	Y	-	-	-	-	-	1 (1)
7	Performance of rice bean based crop rotations under varying fertility conditions	-	Y	Y	-	-	Y	-	3 (3)
8	Intercropping studies in rice bean	-	-	-	-	Y	-	-	1 (1)
9	Optimization of sowing time in rice bean	-	-	-	-	Y	-	-	1 (1)
10	Weed management in rice bean	-	-	-	-	Y	Y	-	2 (2)
11	Effect of spacing and nutrients on Jatropha	-	-	N	Y	N	-	N	1 (4)
12	Response of promising genotypes of karingada to varying doses of nitrogen	-	-	-	Y	-	-	-	1 (1)
	Total	**2 (2)**	**5 (5)**	**1 (4)**	**4 (4)**	**6 (5)**	**3 (3)**	**1 (2)**	**22 (25)**

Note: Figures in parenthesis indicate the number of trials allotted

Table 117. Effect of fertilizer doses on grain yield (q/ha) of promising amaranth genotypes

S. No.	Location	Genotypes	F_1	F_2	F_3	F_4	Mean
1	Sangla	Sangla A-1	9.18	9.36	9.61	8.73	9.22
		Sangla A-2	9.11	8.24	9.90	8.02	8.81
		PRA 2 ©	6.28	6.64	7.14	3.16	5.81
		Mean	**8.19**	**8.08**	**8.88**	**6.64**	**7.95**
	CD @ 5%	**G**	**1.31**				
		F	**0.94**				
		G x F	**NS**				
2	Ranichauri	Sangla A-1	19.76	12.38	20.23	15.01	16.84
		Sangla A-2	17.45	10.74	18.96	13.66	15.20
		PRA 2 ©	18.87	13.79	21.73	14.27	17.17
		Mean	**18.69**	**12.30**	**20.31**	**14.31**	**16.40**
	CD @ 5%	**G**	**1.50**				
		F	**1.50**				
		G x F	**NS**				
			N_{40}	**N_{60}**	**N_{80}**	**N_{100}**	**Mean**
3	S.K. Nagar	IC 120588	14.51	14.81	16.51	19.91	16.43
		AG 114	13.58	14.35	14.78	15.43	14.53
		GA 2 ©	14.97	16.05	17.13	19.75	16.97
		SKNA 7	14.66	14.81	16.67	17.75	15.97
		Mean	**14.43**	**15.00**	**16.27**	**18.23**	**15.98**
	CD @ 5%	**G**	**NS**				
		N	**1.53**				
		G x N	**NS**				

S. No.	Location	Genotypes	N_{20}	N_{40}	N_{60}	N_{80}	Mean
4	Bhubaneswar						
		BGA 2	6.18	10.44	11.76	12.71	10.27
		IC 32195	3.80	8.17	11.38	10.91	8.56
		RMA 2	4.77	9.29	11.73	12.17	9.49
		SKNA 7	4.79	9.69	11.26	11.57	9.33
		BGA 3	6.84	10.40	11.86	12.87	10.49
		GA 2 ©	5.13	9.48	11.60	12.27	9.62
		Mean	**5.25**	**9.58**	**11.60**	**12.08**	**9.63**
	CD @ 5%	**G**	**0.67**				
		N	**0.36**				
		G x N	**0.87**				
5	Bangalore		**F_1**	**F_2**	**F_3**	**F_4**	**Mean**
		BGA 2	1.80	1.98	2.09	1.40	1.82
		RMA 2	1.71	1.84	1.99	1.15	1.77
		IC 32195	1.99	2.19	2.31	1.56	2.01
		SKNA 7	1.87	2.22	2.32	1.59	2.00
		Mean	**1.84**	**2.06**	**2.18**	**1.53**	**1.90**
	CD @ 5%	**G**	**0.24**				
		F	**0.14**				
		G x F	**0.27**				

Table 118. Grain and straw yield (q/ha) and economics of different treatments of intercropping systems based on grain amaranth

S. No.	Treatment	1st crop yield (q/ha)	Grain amaranth yield (q/ha)	Grain amaranth equivalent yield (q/ha)	Straw yield (q/ha)	B: C ratio	Net profit
1	Rice bean + grain amaranth 2: 1 ratio N 26.70 P33.30 (kg/ha)	6.06	6.56	16.66	28.61	1.47	8056.00
2	Rice bean + grain amaranth 2: 1 ratio N20P40 (kg/ha)	9.87	7.39	23.84	31.64	2.00	17877.00
3	Rice bean + grain amaranth 2: 1 ratio N60P60 (kg/ha)	7.56	7.34	19.94	28.26	1.75	12883.00
4	French bean + grain amaranth 2: 1 ratio N 26.70 P33.30 (kg/ha)	9.99	6.11	29.42	32.65	2.49	26384.50
5	French bean + grain amaranth 2: 1 ratio N20P40 (kg/ha)	14.22	9.08	42.26	36.48	3.57	45646.50
6	French bean + grain amaranth 2: 1 ratio N60P60 (kg/ha)	10.86	8.74	34.08	35.19	2.75	32535.50
	CD (5%)	**3.60**	**NS**	**4.90**	**4.34**		
	CV (%)	**24.91**	**26.30**	**11.75**	**8.97**		

Table 119. Effect of different nutrient management treatments on grain yield of amaranth (q/ha)

S. No.	Treatments		S.K. Nagar	Bhubaneswar	Mettupalayam
1	Recommended fertilizer ($N_{60}P_{40}$)	T_1	19.95	10.18	9.95
2	75% N through chemical fertilizer (C.F.) + 25% N through FYM	T_2	16.11	11.76	18.53
3	75% N through C.F. + 25% N through caster/neem cake (CC)	T_3	12.37	10.81	8.12
4	50% N through C.F. + 50% N through FYM	T_5	19.90	8.90	7.09
5	50% N through C.F. + 50% N through CC	T_6	17.00	8.38	8.02
6	25% N through C.F. + 75% N through FYM	T_7	19.72	7.80	15.23
7	25% N through C.F. + 75% N through CC	T_8	14.66	7.36	9.37
8	Control	T_{12}	13.30	3.57	7.83
9	100% N through FYM	T_{13}	19.89	8.92	9.17
10	100% N through CC	T_{14}	16.88	-	-
	CD (0.05)		**0.32**	**0.32**	**2.18**
	CV (%)		**13.55**	**-**	**17.85**

Table 120. Effect of N, P and K on grain yield of amaranth (Rabi 2003-04)

S. No.	Treatment	Grain yield (kg/ha)
1	Control (No fertilizer)	295.00
2	N (60 kg/ha)	838.00
3	P (40 kg/ha)	382.00
4	K (20 kg/ha)	318.00
5	N_{60} + P_{40} kg/ha	996.00
6	N_{60} + K_{20} kg/ha	967.00
7	P_{40} 9+ K_{20} kg/ha	453.00
8	N_{60} + P_{40} + K_{20} kg/ha	1070.00
9	N_{60} + P_{40} + K_{20} + FYM (5 t/ha)	1272.00
	CD (5%)	**70.85**

Table 121. Effect of different fertilizer doses on yield of promising buckwheat genotypes

S. No.	Genotypes	Grain yield (q/ha)		Straw yield (q/ha)	
		Sangla	Ranichauri	Sangla	Ranichauri
A.	**Genotypes**				
1	Sangla B-1	24.33	7.33	21.75	15.37
2	Sangla B-5	22.66	7.38	23.99	15.18
3	Shimla B-1	22.53	6.16	11.47	16.11
4	Himpriya ©	13.51	7.24	74.56	24.26
B.	**Fertilizer doses**				
1	$N_{15}P_{15}K_{15}$	19.32	5.96	31.85	18.47
2	$N_{40}P_{40}K_{0}$	21.26	6.51	33.80	19.03
3	$N_{40}P_{40}K_{20}$	21.69	5.95	33.17	15.69
	CD (5%) G	**2.60**	**NS**	**5.64**	**3.26**
	F	**NS**	**1.31**	**NS**	**2.83**
	G x G	**NS**	**6.14**	**NS**	**5.66**

Table 122. Effect of nitrogen levels on grain yield of different rice bean genotypes

S. No.	Location	Genotypes	Grain yield (q/ha)			
			N_{20}	N_{40}	N_{60}	Mean
1	Ranichauri	PRR 9302	14.10	17.23	10.88	14.07
		PRR 9402	17.89	23.58	10.00	17.15
		BRS 1	11.78	13.16	11.28	12.07
		LRB 122	15.92	16.32	10.42	14.22
		PRR 1 ©	14.50	15.09	12.24	13.94
		Mean	**14.84**	**17.08**	**10.96**	**14.29**
		CD (5%) G	**1.49**			
		N	**1.38**			
		G x N	**3.10**			
		CV (%)	**12.75**			
2.	Bangalore	RBL 35	6.84	9.05	12.01	9.30
		LRB 355	7.77	7.88	10.37	8.67
		LRB 349	7.08	10.28	12.24	8.67
		LRB 359	5.46	8.25	10.49	8.06
		RBL 6 ©	4.76	7.02	9.90	7.23
		Mean	**6.38**	**8.50**	**11.00**	**8.39**
		CD (5%) G	**3.47**			
		N	**2.11**			
		G x N	**4.73**			
		CV (%)	**22.10**			

Table 123. Performance of the rice bean based crop rotations during 2003-04

S. No.	Treatments	Plant height (cm) at 60 DAS	Plant population (Lakh/ha) at 60 DAS	Rice bean yield (q/ha)	2nd crop yield (q/ha)	Rice bean equivalent yield of system (q/ha)	Total cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	Benefit cost ratio	Yield of rotation (q/ha)	Net income (Rs./ha)
1	Rice bean – wheat N_0P_0	13.90	37.73	6.83	13.00	11.00	19513.00	27490.00	7962.00	1.41	12.35	12391.00
2	Rice bean – wheat $N_{20}P_{20}$	11.20	28.53	9.05	10.16	12.30	16680.00	30752.50	14072.50	1.84		
3	Rice bean – wheat $N_{20}P_{40}$	14.20	29.73	8.89	15.15	13.74	19206.50	34345.00	15138.50	1.79		
4	Rice bean – mustard N_0P_0	9.10	11.80	6.44	6.63	10.42	17320.00	26057.50	8737.00	1.50	13.17	15142.66
5	Rice bean – mustard $N_{20}P_{20}$	10.10	14.80	8.11	11.34	14.92	17846.50	37290.00	19443.00	2.09		
6	Rice bean – mustard $N_{20}P_{40}$	10.10	15.87	9.06	8.50	14.16	18153.00	35400.00	17247.00	1.95		
7	Rice bean – pea N_0P_0	7.00	4.80	8.11	15.50	15.55	18820.00	38875.00	20055.00	2.07	16.77	22859.33
8	Rice bean – pea $N_{20}P_{20}$	6.80	4.53	7.67	20.67	17.58	19346.50	43957.50	24611.00	2.27		
9	Rice bean – pea $N_{20}P_{40}$	6.70	3.20	8.39	18.83	17.43	19653.00	43565.00	23912.00	2.22		

S. No.	Treatments	Plant height (cm) at 60 DAS	Plant population (Lakh/ha) at 60 DAS	Rice bean yield (q/ha)	2nd crop yield (q/ha)	Rice bean equivalent yield of system (q/ha)	Total cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	Benefit cost ratio	Yield of rotation (q/ha)	Net income (Rs./ha)
10	Rice bean – barley N_0P_0	11.60	1.40	7.55	5.33	9.05	18680.00	22615.00	3935.00	1.21	8.69	2581.88
11	Rice bean – barley $N_{20}P_{20}$	14.10	11.33	7.22	6.83	9.14	19206.50	22840.00	3633.50	1.19		
12	Rice bean – barley $N_{20}P_{40}$	17.40	10.53	6.05	6.50	7.88	19513.00	19690.00	177.00	1.01		
13	Rice bean – lentil N_0P_0	5.20	14.67	5.67	4.00	8.87	17420.00	22165.00	4745.00	1.28	9.90	7014.16
14	Rice bean – lentil $N_{20}P_{20}$	5.10	24.13	7.05	5.00	11.05	17496.50	27632.00	10135.50	1.58		
15	Rice bean – lentil $N_{20}P_{40}$	5.10	1.60	6.17	4.50	9.77	18253.00	24415.00	6162.00	1.34		
	CD (5%)					**1.15**						
	Fertilizers					**0.95**						
	Interaction					**2.01**						

Table 124. Performance of rice bean crop rotations under varying fertility conditions for Kharif 2004 rice bean, grain and straw yield (q/ha) and economics

S. No.	Treatment	Grain yield (q/ha)	Straw yield (q/ha)	Cost of cultivation	Income	Profit (+) or loss (-) Rs./ha
A.	**Crop Rotation**					
1	Rice bean – wheat	14.84	68.67	12573.16	37250.00	24676.83
2	Rice bean – mustard	24.03	58.20	12573.16	60100.00	47526.83
3	Rice bean – pea (Veg.)	13.86	68.68	12573.16	34000.00	21426.83
4	Rice bean – barley	17.03	74.03	12573.16	42566.70	29993.70
5	Rice bean – lentil	15.66	62.92	12573.16	39166.70	26593.70
	CD (5%)	**2.34**	**9.99**			
	CV (%)	**12.61**	**13.83**			
B.	**Fertilizer Dose (kg/ha)**					
1	N_0P_0	14.60	66.63	12120.00	36210.00	24090.00
2	$N_{20}P_{20}$	19.47	66.01	12646.50	42960.00	30313.70
3	$N_{20}P_{40}$	17.18	66.87	12953.00	48680.00	35727.00
	CD (5%)	**1.87**	**NS**			
	CV (%)	**14.39**	**6.55**			
	R x F	17.08	66.50	12573.16	42616.70	30043.56
	CD (5%)	**NS**	**7.42**			
	CV (%)	**14.39**	**6.55**			

Table 125. Pooled data of gross return (Rs./ha) and cost benefit ratio of both 1st season and 2nd season crop (Kharif and Rabi) during 2002-03 and 2003-04

S. No.	Treatments	1st season crops (Rice bean)			2nd season crops			Pooled data			Total cost of cultivation	B: C ratio	
		2002-03	2003-04	Mean	2002-03	2003-04	Mean	2002-03	2003-04	Mean			
1	Rice bean – wheat N_0P_0	3475.00	17075.00	10275.00	13670.00	13000.00	13335.00	17145.00	30075.00	23610.00	19513.00	1.20	1.33
2	Rice bean – wheat $N_{20}P_{20}$	3475.00	22225.00	12850.00	15330.00	15150.00	15240.00	18805.00	37375.00	28090.00	19206.50	1.46	
3	Rice bean – wheat $N_{20}P_{40}$	2350.00	22625.00	12487.50	9670.00	10166.00	9915.00	12020.00	32785.00	2402.50	16680.00	1.34	
4	Rice bean – mustard N_0P_0	1410.00	16100.00	8755.00	13755.00	9945.00	11850.00	15165.00	26045.00	20605.00	17320.00	1.18	1.46
5	Rice bean – mustard $N_{20}P_{20}$	1920.00	20275.00	11097.50	21000.00	17010.00	19005.00	22920.00	37285.00	30102.50	17846.00	1.68	
6	Rice bean – mustard $N_{20}P_{40}$	1920.00	22650.00	12285.00	18000.00	12750.00	15375.00	19920.00	35400.00	27660.00	18153.00	1.52	
7	Rice bean – pea N_0P_0	1638.00	20975.00	11306.50	9800.00	26362.00	18081.00	11438.00	47337.00	29387.50	19653.00	1.49	1.80
8	Rice bean – pea $N_{20}P_{20}$	1638.00	19175.00	10406.50	35000.00	28938.00	31969.00	36638.00	48113.00	42375.50	19346.00	2.19	

S. No.	Treatments	1st season crops (Rice bean)			2nd season crops			Pooled data			Total cost of cultivation	B: C ratio	
		2002-03	2003-04	Mean	2002-03	2003-04	Mean	2002-03	2003-04	Mean			
9	Rice bean – pea $N_{20}P_{40}$	1246.00	20275.00	10760.50	21938.00	21700.00	21819.00	23184.00	41975.00	32579.50	18820.00	1.73	
10	Rice bean – barley N_0P_0	1197.00	15125.00	8161.00	6003.00	5850.00	5926.50	7200.00	20975.00	14087.50	19513.00	0.72	0.79
11	Rice bean – barley $N_{20}P_{20}$	1251.00	18050.00	9650.50	397.00	6147.00	7272.00	9648.00	24197.00	16922.50	19206.50	0.88	
12	Rice bean – barley $N_{20}P_{40}$	900.00	18875.00	9807.50	4203.00	4797.00	4500.00	5103.00	23672.00	14387.50	18680.00	0.77	
13	Rice bean – lentil N_0P_0	1580.00	14175.00	7877.50	8660.00	8000.00	8330.00	10240.00	22175.00	16207.50	17420.00	0.93	1.07
14	Rice bean – lentil $N_{20}P_{20}$	2440.00	17625.00	10032.50	14000.00	10000.00	12000.00	16440.00	27625.00	22032.50	17946.50	1.22	
15	Rice bean – lentil $N_{20}P_{40}$	2480.00	15425.00	8952.50	12000.00	9000.00	10500.00	14480.00	24425.00	19452.50	18253.00	1.06	

Table 126. Performance of rice bean crop rotations under varying fertility conditions for kharif, 2004 rice bean, grain and straw yield (q/ha) and economics

S. No.	Treatments	Grain yield (q/ha)	Straw yield (q/ha)	Cost of cultivation	Income	Profit (+) or loss (-) Rs./ha
A.	**Crop Rotation**					
1.	Rice bean – wheat	14.84	68.67	12573.16	37250.00	24676.83
2.	Rice bean – mustard	24.03	58.20	12573.16	60100.00	47526.83
3.	Rice bean – pea (veg.)	13.86	68.68	12573.16	34000.00	21426.83
4.	Rice bean – barley	17.03	74.03	12573.16	42566.70	29993.70
5.	Rice bean – lentil	15.66	62.92	12573.16	39166.70	26593.70
	CD (5%)	**2.34**	**9.99**			
	CV (%)	**12.61**	**13.83**			
B.	**Fertilizer dose (kg/ha)**					
	N_0P_0	14.60	66.63	12120.00	36210.00	24090.00
	$N_{20}P_{20}$	19.47	66.01	12646.50	42960.00	30313.70
	$N_{40}P_{40}$	17.18	66.87	12953.00	48680.00	35727.00
	CD (5%)	**1.87**	**NS**			
	CV (%)	**14.39**	**6.55**			
	R x F	**17.08**	**66.50**	**12573.16**	**42616.70**	**30043.56**
	CD (5%)	**NS**	**7.42**			
	CV (%)	**14.39**	**6.55**			

Table 127. Growth and yield attributes of rice bean crop as affected by different crop rotations and fertilizer treatments

Treatment	Plant height (cm)	Pod length (cm)	No. of seeds/pod	No. of pods/plant	Seed yield/plant (g)	Seed yield (kg/ha)
A. Crop Rotations						
Rice bean – wheat	99.00	7.40	7.64	56.70	18.20	6.63
Rice bean – barley	98.10	7.60	7.81	57.60	17.50	6.49
Rice bean – oats	97.70	7.50	7.84	59.00	17.00	6.19
Rice bean – berseem	95.60	7.63	7.58	56.90	17.10	6.37
Rice bean – gram	98.60	7.38	7.82	58.70	16.20	6.07
Rice bean – raya	95.80	7.51	8.05	57.10	16.60	6.12
CD (5%)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
B. Fertilizer Levels (kg/ha)						
N_0P_0	91.90	6.54	7.19	50.60	11.90	5.18
$N_{20}P_{20}$	97.90	7.62	7.93	59.30	18.30	6.69
$N_{20}P_{40}$	99.80	8.11	8.25	63.10	21.10	7.06
CD (5%)	**1.40**	**0.19**	**0.27**	**2.50**	**0.50**	**0.48**

Table 128. Grain yield, land equivalent ratio (LER) and economics of intercropping systems on rice bean (Kharif 2004)

S. No.	Treatment	1st crop yield (q/ha)	Rice bean yield (q/ha)	Rice bean equivalent yield (q/ha)	LER	B: C ratio
1	Maize (Sole crop)	32.20	-	14.60	1.00	1.69
2	Sorghum (Sole crop)	21.40	-	9.70	1.00	1.33
3	Pearl millet (Sole crop)	20.00	-	9.10	1.00	1.33
4	Pigeonpea (Sole crop)	12.40	-	15.30	1.00	1.87
5	Rice bean (Sole crop)	11.80	-	11.80	1.00	1.73
6	Maize + Rice bean (1: 2)	24.60	7.90	19.10	1.43	2.10
7	Sorghum + Rice bean (1: 2)	16.90	6.20	13.90	1.31	1.79
8	Pearl millet + Rice bean (1: 2)	15.00	6.00	12.80	1.26	1.76
9	Pigeonpea + Rice bean (1: 2)	8.20	8.00	18.10	1.34	2.10
	CD (5%)			**1.34**		

Table 129. Effect of sowing dates on grain yield of rice bean genotypes

S. No.	Location	Genotype	January 20	July 5	July 20	August 5	August 20	September 5	Mean
1	Bhubaneswar	LRB 355	9.82	9.90	11.05	11.53	10.40	7.69	10.06
		BRB 1	10.39	10.90	11.72	12.41	11.03	6.76	10.53
		Mean	**10.10**	**10.40**	**11.38**	**11.97**	**10.71**	**7.22**	**10.30**
		CD (5%) D	**0.77**						
		G	**0.38**						
		D x G	**0.93**						
2.	Bangalore		**August 4**	**August 17**	**September 8**	**September 27**	**October 12**		**Mean**
		RBL 1	5.28	6.87	5.53	8.48	4.80		6.19
		LRB 355	9.04	2.90	4.85	2.18	4.07		4.55
		Mean	**7.16**	**4.88**	**5.24**	**5.33**	**4.43**		**5.37**
		CD (5%) D	**2.42**						
		G	**Ns**						
		D x G	**3.42**						

Table 130. Effect of weed control treatments on seed yield of rice bean (Kharif 2005)

S. No.	Treatment	Dose (kg/ha)	Time of application	Seed yield (kg/ha)
1	Metolachlor	1.00	Pre emergence	702.00
2	Metolachlor fb + Fluazfop	0.75 fb 0.25	Pre fb post	991.00
3	Metolachlor fb + 1 hand weeding	0.75	Pre	904.00
4	Pendimethalin	1.00	Pre	735.00
5	Pendimethalin fb Fluazifop	0.75 fb 0.25	Pre fb post	999.00
6	Pendimethalin fb 1 hand weeding	0.75	Pre-emergent	927.00
7	Fluchloralin	1.00	Pre plant	658.00
8	Fluchloralin fb Fluazifop	0.75 fb 0.25	Pre plant fb post	976.00
9	Fluchloralin fb 1 hand weeding	0.75	Pre plant	982.00
10	Weed free	-	-	1018.00
11	Weedy check	-	-	296.00
	CD (5%)	**-**	**-**	**42.48**

Table 131. Effect of spacing and fertilizer on Jatropha

S. No.	Treatment	Plant height (cm)	No. of capsules/ plant	Stem girth (cm)	No. of branches/ plant	Seed yield (kg/ha)
1	S_1F_1	98.00	0.00	14.84	1.87	4.77
2	S_1F_2	152.00	1.83	20.61	4.40	19.05
3	S_1F_3	163.00	6.46	19.00	4.00	17.48
4	S_1F_4	166.00	5.61	19.03	4.40	36.44
5	S_2F_1	131.00	4.83	17.95	3.00	25.00
6	S_2F_2	159.00	5.33	19.43	3.93	13.54
7	S_2F_3	184.00	15.18	23.51	4.60	57.70
8	S_2F_4	184.00	26.60	23.00	4.60	75.47
9	S_3F_1	142.00	3.33	19.41	2.93	0.00
10	S_3F_2	171.00	16.16	22.71	4.67	32.09
11	S_3F_3	171.00	24.45	20.92	3.87	55.47
12	S_3F_4	182.00	25.08	25.17	3.73	65.08
13	S_4F_1	150.00	15.41	21.23	3.73	15.84
14	S_4F_2	182.00	28.50	25.11	4.93	28.12
15	S_4F_3	198.00	50.40	26.56	5.20	71.04
16	S_4F_4	197.00	60.66	25.80	4.80	138.57
	Spacing (A)					
	S. Em. (±)	**3.34**	**0.79**	**1.97**	**0.17**	**9.78**
	CD (5%)	**11.56**	**2.73**	**6.83**	**NS**	**NS**
	CV (%)	**7.26**	**12.90**	**43.33**	**14.72**	**82.41**
	Fertilizer (B)					
	S. Em. (±)	**3.10**	**0.54**	**3.20**	**0.16**	**6.35**
	CD (5%)	**9.04**	**1.58**	**9.35**	**0.46**	**18.54**
	CV (%)	**6.73**	**8.84**	**70.31**	**13.80**	**52.53**
	S x F			**NS**		**NS**
	S. Em. (±)	**6.20**	**1.08**		**0.32**	
	CD (5%)	**18.09**	**3.16**		**0.92**	

Table 132. Response of promising genotypes of karingda to varying doses of nitrogen

S. No.	Entry	N-dose	Days to flowering	Days to maturity	No. of fruit/plot	Green fruit weight (kg/ha)	Seed yield (kg/ha)
1	SKNK 4	00	42.00	88.00	18241.00	9213.00	255.00
2	SKNK 4	20	44.00	86.00	18241.00	8333.00	319.00
3	SKNK 4	40	42.00	85.00	19352.00	8333.00	294.00
4	SKNK 7	00	44.00	83.00	18796.00	9514.00	285.00
5	SKNK 7	20	39.00	85.00	19352.00	10648.00	404.00
6	SKNK 7	40	42.00	87.00	33241.00	13819.00	438.00
7	SKNK 13	00	39.00	88.00	20463.00	10301.00	239.00
8	SKNK 13	20	39.00	85.00	22315.00	11898.00	290.00
9	SKNK 13	40	45.00	85.00	31296.00	14375.00	435.00
10	Local	00	40.00	89.00	19352.00	6805.00	166.00
11	Local	20	42.00	88.00	16481.00	6620.00	210.00
12	Local	40	45.00	89.00	18796.00	6528.00	325.00
A.	**Genotype**						
	S. Em. (±)		**0.69**	**0.52**	**5244.83**	**2051.19**	**24.64**
	CD (5%)		**NS**	**NS**	**NS**	**NS**	**NS**
	CV (%)		**4.93**	**1.81**	**73.78**	**63.61**	**24.19**
B.	**Fertilizer**						
	S. Em. (±)		**0.66**	**0.73**	**1521.21**	**475.34**	**15.41**
	CD (5%)		**NS**	**NS**	**NS**	**NS**	**NS**
	CV (%)		**5.47**	**17.02**	**24.71**	**17.02**	**17.47**
	G x N		**NS**	**NS**	**NS**	**NS**	**NS**

QUALITY ANALYSIS

V. QUALITY ANALYSIS

1. AVT on Ricebean Hisar Centre (Table 133):

Twenty one genotypes from Hisar centre were analysed for its protein, total phenols, tryptophan, methionine content and protein digestibility. Protein content varied from 17.5 to 22.6%, Phenol content from 0.16 to 0.23%, Tryptophan and Methionine content from 4.5 to 6.8% and 0.82 to 0.96%, respectively with an average value of 19.5, 0.20, 5.6 and 0.88%, respectively. Protein digestibility was in the range 85.2 to 91.2% with the mean value of 88.2%.

The promising genotypes having high protein content and high tryptophan content were:

Genotypes	**Protein (%)**	**Genotypes**	**Tryptophan in protein (%)**
KHRB-2	22.6	LRB-122	6.8
PRR-9401	21.9	LRB-197	6.4
LRB-224	21.4	LRB-36	6.4
LRB-197	20.3	RBL-6 (Check)	6.7
RBL-6 (Check)	19.6		

The genotypes having low phenol content and high methionine content were:

Genotypes	**Phenols (%)**	**Genotypes**	**Methionine (%)**
LRB-188	0.16	LRB-188	0.96
LRB-122	0.18	PRR-2	0.93
LRB-188	0.18	RBL-36	0.93
LRB-224	0.18	RBL-6 (Check)	0.92
RBL-6 (Check)	0.19		

Protein digestibility

Genotypes	**Protein digestibility (%)**
LRB-33-1	91.2
LRB-224	91.2
LRB-330	90.2
RBL-50	89.7
RBL-6 (Check)	87.8

2. CVT on Grain Amaranth (Hill) Ranichauri, Centre (Table 134):

Thirteen genotypes of Grain Amaranth were analysed for protein and lysine content. Protein content varied from 12.3 to 14.7 percent, with an average value of 13.7%. Available lysine content was very high with an average value 5.8% and ranged from 5.2 to 6.4 percent.

The promising genotypes having high protein and high lysine content were:

Genotypes	Protein (%)	Genotypes	Lysine (g/16gN)
IC-35407	14.7	IC-35407	6.4
SHIMLA-A4	14.4	SHIMLA-A1	6.2
SHIMLA-A3	14.3	SHIMLA-A3	6.1
SHIMLA-A2	14.3	PRA-2000	6.1
Annapurna (Check)	13.1	Annapurna (Check)	5.8

3. CVT on Grain Amaranth (Plain) S.K. Nagar centre (Gujarat) (Table 135):

Sixteen genotypes of grain amaranth were analysed for protein and lysine content. Protein content varied from 11.8 to 13.2% with an average value of 12.3%. Available lysine content was very high with an average value of 5.1% and ranged from 5.2 to 6.4%.

The promising genotypes having high protein and high lysine content were:

Genotypes	Protein (%)	Genotypes	Lysine (g/16gN)
BGA-2	13.2	IC-32195	5.5
MGA-1	12.9	SKNA-7	5.4
RMA-2	12.9	IC-120558	5.4
IC-32195	12.6	RGAS-92-10-1	5.3
GA-1	12.6	Suvarna (Check)	5.2
Suvarna (Check)	12.2		

4. CVT on Fababean Hisar Centre (Table 136):

Seventeen genotypes from Hisar centre were analysed for its protein and vicine-convicine contents. Protein content varied from 23.2 to 26.2% and vicine-convicine content varied from 0.87 to 1.12% with an average value of 24.4 and 0.97%, respectively.

The promising genotypes having high protein content and low vicine-convicine content were:

Genotypes	Protein (%)	Genotypes	Vicine-convicine (%)
HB-180	26.2	HB-131	0.87
PRT-7	25.9	HB-43	0.88
BSH-193	25.2	HB-428	0.89
Vikrant	25.6	Vikrant	0.89

5. CVT on Adzukibean, Palampur centre (Table 137):

Twenty genotypes of Adzukibean were analysed for its protein and phenol content. Protein content varied from 20.2 to 23.4% and phenol content was in the range of 0.20 to 0.31 percent with an average value of 22.03 and 0.24%, respectively.

The genotypes having high protein and low phenols contents were:

Genotypes	Protein (%)	Genotypes	Phenols (%)
SMLAB-1	23.4	HPAB-27	0.20
SMLAB-3	23.2	HPAB-21	0.21
SMLAB-4	23.1	HPAB-25	0.21
SMLAB-8	23.1	A-1	0.21

6. Winged bean, Rahuri centre (Table 138):

Ten genotypes of Winged bean were analysed for oil content, protein in the defatted seed cake and fatty acid composition of the oil. Oil content ranged from 20.8 to 31.9% with an average value of 27.3%. Protein content in the defatted seed cake ranged from 34.5 to 39.4% having the average value of 37.3%. Among fatty acids, palmitic and stearic acid ranged from 8.8 to 11.4% and 4.7 to 7.1%, respectively. Oleic and Linoleic acids are desirable fatty acids which were in the high amount and ranged from 29.8 to 38.8 and 27.4 to 39.0%

with a mean value of 33.8 and 29.3%, respectively. The undesirable fatty acids i.e. linolenic acids was in very small amount ranging from 0 to 1.9% while behanic acid ranged from 2.7 to 15.5% with an average value of 9.6%. The other fatty acids were in very small amount.

The promising genotypes having high oil content and protein in the defatted seed cake were

Genotypes	Oil (%)	Genotypes	Protein in defatted seed cake (%)
AKWB-1	31.9	Mysore Local	39.4
NBRI-Selection	31.8	AKWB-1	39.0
Mysore Local	31.4	EC-178271	39.0
EC-178331	31.2	EC-29945	39.0

The genotypes having high oleic and linoleic acid content in the oil were

Genotypes	Oleic acid (%)	Genotypes	Linoleic acid (%)
NBRI-Selection	38.8	NBRI-Selection	39.0
EC-38955	36.3	Dwarf Mutant	29.8
EC-178331	35.0	EC-178271	29.1
EC-178271	34.1	EC-178331	29.0
Dwarf Mutant	34.1		

7. Perilla, Meghalaya centre (Table 139):

Forty five accessions from NBPGR Regional Station, Umiam, Meghalaya were analysed for Protein content in the defatted seed cake, oil content and its fatty acid composition. Protein content varied from 23.8 to 31.1% with the mean value of 27.4% and oil content were in the range 38.5 to 51.3% having average value of 46.8%.

Among fatty acids, palmitic acid and stearic acids ranged from 4.1 to 10.7% and 0.9 to 3.8%, respectively. Oleic and linoleic acids were in the range 5.5 to 11.8% and 9.5 to 23.8% having the average value of 9.5 and 18.5%, respectively. Linolenic acid content was very high which ranged from 27.1 to 60.8% with the mean value of 49.5%.

The accessions having high value of protein in the defatted seed cake and high oil content.

Accessions	Protein in the defatted seed cake	Accessions	Oil (%)
RS/SB/BP-61	31.1	IC-330445	51.3
H-529	29.9	H-2216	51.0
IC-330445	29.2	VRB-MA-2029	49.9
H-1099	29.1	RS-12	49.2

The accessions having high oleic and linoleic acid content in the oil were:

Accessions	Oleic acid (%)	Accessions	Linoleic acid (%)
H-556	11.8	IC-334314	23.8
H-2216	11.8	H-529	22.5
IC-330441	11.3	B/OC	22.3
IC-6440	11.1	IC-3942	21.8

The accessions having high linolenic acid content in the oil were:

Accessions	Linolenic acids (%)
RD-89	60.8
RS/SB/BP-61	59.0
IC-204185	57.8
IC-330441	57.3

8. Coix lacryma, Meghalaya centre (Table 140):

Forty five accessions from NBPGR Regional Station, Umiam, Meghalaya were analysed for protein and carbohydrate content. Protein content ranged from 12.8 to 17.7% with the mean value of 14.9% and carbohydrate content ranged from 71.0 to 78.9% with the mean value of 74.6%.

The accessions having high content of protein and carbohydrate were:

Accessions	Protein (%)	Accessions	Carbohydrate (%)
IC-89383	17.7	IC-203985	78.9
NIC-12637	16.7	NH-6/22	78.5
H-2287	16.6	IC-340015	78.2
IC-330448	16.6	BDS-1872	77.4
		IC-330448	77.4

9. Buckwheat, Ranichari centre (Table 141)

Ten genotypes were analysed for protein, total phenols and available lysine. Protein content varied from 9.5 to 11.9%, total phenols from 1.4 to 1.9% and available lysine content from 3.6 to 4.8%, having the average value of 10.4, 1.5 and 4.1%, respectively.

The genotypes having high protein and available lysine contents were:

Genotypes	**Protein (%)**	**Genotypes**	**Available lysine (%)**
Himpriya	11.9	Sangla B-2	4.8
PRB-9001-1 (KBB-3)	11.8	Sangla B-1	4.7
Sangla B-5	11.4	PRB-9001-1	4.6
VL-7	10.4	VL-7	4.2

The genotypes having low phenol contents were:

Genotypes	**Total Phenols (%)**
Sangla B-3	1.4
Sangla B-7	1.4
PRB-1	1.4

10. Chenopodium, Ranichauri centre (Table 142):

Ten genotypes were analysed for protein content, which ranged from 12.4 to 15.0% with an average value of 13.7%. High protein content were in the genotypes PRC-9801 (15.0%) and PRC-9802 (14.4%).

Table 133. Rice bean CVT, Hisar Centre

S. No.	Genotypes	Protein (%)	Trytophan in protein (%)	Methionine (%)	Total phenols (%)	Protein digestibility (%)
1	LRB-234 (AVT-2)	18.5	4.9	0.91	0.19	89.2
2	KHRB-1 (AVT-2)	20.9	4.5	0.88	0.22	86.8
3	PRR-9402 (AVT-2)	19.5	4.8	0.84	0.21	87.3
4	PRR-2 (AVT-2)	20.0	4.6	0.93	0.23	86.2
5	RBL-35 (AVT-2)	19.4	5.4	0.86	0.19	88.4
6	LRB-224 (AVT-2)	18.6	5.3	0.93	0.19	91.2
7	RBL-99 (AVT-2)	18.8	5.7	0.85	0.19	89.1
8	LRB-122 (AVT-2)	19.3	6.8	0.88	0.18	88.2
9	RBL-6 (AVT-2) Check	19.6	6.4	0.92	0.19	87.8
10	PRR-9401 (AVT-2)	21.9	4.9	0.82	0.23	86.3
11	LRB-351 (AVT-2)	20.0	5.1	0.86	0.21	86.5
12	KHRB-2 (AVT-2)	22.6	5.2	0.82	0.23	85.2
13	LRB-33-1 (AVT-2)	19.6	5.9	0.88	0.21	91.2
14	LRB-199 (AVT-1)	18.3	6.2	0.86	0.18	88.4
15	RBL-36 (AVT-1)	17.8	6.4	0.93	0.21	89.8
16	LRB-188 (AVT-1)	17.5	6.2	0.96	0.16	87.4
17	RBL-1 (AVT-1)	17.7	5.8	0.88	0.21	88.2
18	LRB-224 (AVT-1)	21.4	5.8	0.87	0.21	86.6
19	LRB-197 (AVT-1)	20.3	6.4	0.86	0.21	88.2
20	RBL-50 (AVT-1)	18.9	5.8	0.88	0.19	89.7
21	LRB-330 (AVT-1)	18.8	4.9	0.91	0.18	90.2
Mean		**19.5**	**5.6**	**0.88**	**0.20**	**88.2**
Range		**17.5-22.6**	**4.5-6.8**	**0.82-0.96**	**0.16-0.23**	**85.2-91.2**

Table 134. Amaranth (Hill) CVT, Ranichauri centre

S. No.	Genotypes	Protein (%)	Lysine (%)
1	PRA-2000	12.9	6.1
2	SHIMLA-A4	14.4	5.8
3	SANGLA-A1	13.1	5.4
4	SANGL-A2	14.0	5.2
5	SHIMLA-A1	12.3	6.2
6	ANNAPURNA	13.1	5.8
7	SHIMLA-A3	14.3	6.1
8	PRA-2	14.1	5.8
9	IC-35407	14.7	6.4
10	SHIMLA-A2	14.3	5.2
11	PRA-9801	13.3	5.6
12	PLP-1	13.6	5.6
13	PRA-3	13.7	5.8
	MEAN	**13.7**	**5.8**
	RANGE	**11.3 – 14.7**	**2.8 – 6.4**
14	WHEAT	11.3	2.8

Table 135. Amaranth (Plain) CVT, S.K. Nagar centre (Gujarat)

S. No.	Genotypes	Protein (%)	Lysine (%)
1	RAMA-2	12.9	5.1
2	RAME-3	12.0	4.9
3	RAMA-4	12.1	5.2
4	SKNA-7	11.8	5.4
5	SKNA-21	11.8	5.2
6	RGAS-92-10-1	11.8	5.3
7	IC-41998	12.5	5.0
8	IC-120558	12.3	5.4
9	MGA-1	12.9	4.8
10	IC-32195	12.6	5.5
11	MGA-2	12.3	4.6
12	BGA-3	11.9	4.8
13	IC-35696	12.4	5.1
14	BGA-2	13.2	5.2
15	GA-1	12.6	4.6
16	SUVARNA	12.2	5.2
	MEAN	**12.3**	**5.1**
	RANGE	**11.3 – 13.2**	**4.6– 5.5**
17	WHEAT	11.3	2.8

Table 136. Faba bean AVT, Hisar centre

S. No.	Genotypes	Protein (%)	Vicine-Convicine (%)
1	HB-43	23.8	0.88
2	HB-115	24.1	1.03
3	HB-123	24.2	1.12
4	HB-131	23.2	0.87
5	HB-180	26.2	1.10
6	HB-193	25.2	0.96
7	HB-405	24.8	1.02
8	HB-428	23.8	0.89
9	HB-430	25.2	1.02
10	HB-504	24.7	0.88
11	HB-509	24.2	1.06
12	HB-521	24.7	0.97
13	BSH-9	23.8	0.98
14	PRT-7	25.9	0.98
15	PRT-12	24.8	0.92
16	NDF-1	24.2	0.94
17	Vikrant	25.6	0.89
	Mean	**24.6**	**0.97**
	Range	**23.2 – 26.2**	**0.87 – 1.12**

Table 137. Adzuki bean, Palampur centre

S. No.	Genotypes	Protein (%)	Total Phenols (%)
1	SHIMLA 3A-1	21.2	0.27
2	SHIMLA-3	20.7	0.25
3	HPAB-25	22.4	0.21
4	SMLAB-8	23.1	0.31
5	SMLAB-6	22.8	0.29
6	SMLAB-9	21.6	0.24
7	SMLAB-10	22.7	0.25
8	SHIMLA-1	21.9	0.22
9	IC-241041	22.2	0.28
10	SMLAB-2	21.5	0.23
11	HPAB-31	20.2	0.23
12	SMLAB-1	23.4	0.27
13	A-1	22.9	0.21
14	SHIMLA-2	20.8	0.26
15	SMLAB-7	22.7	0.25
16	SMLAB-4	23.1	0.22
17	SMLAB-5	21.8	0.24
18	HPAB-27	22.1	0.20
19	HPAB-21	20.2	0.21
20	SMLAB-3	23.2	0.24
	Mean	**22.03**	**0.24**
	Range	**20.2 – 23.4**	**0.20 – 0.31**

Table 138. Winged bean, Rahuri Centre

S. No.	Genotypes	Protein (%) in the defatted seed cake	Oil (%)	Palmitic 16:0	Margatic 17:0	Stearic acid 18:0	Oleic acid 18:1	Linoleic acid 18:2	Linolenic acid 18:3	Arachidic 20:0	Ecosenoic 20:1	Behanic 22:0	Erucic 22:1	Lignocenic 24:0
1	EC-178331	36.0	31.2	11.1	0.00	5.0	35.0	29.0	1.9	2.0	0.4	06.8	1.05	1.5
2	EC-142665	34.5	25.6	10.0	0.00	5.7	33.8	28.7	1.4	1.5	2.6	09.1	0.00	1.7
3	EC-38955	34.8	26.9	11.4	0.00	7.1	36.3	27.4	1.1	1.6	1.8	07.2	0.00	1.5
4	EC-178313	34.7	26.1	06.2	0.18	6.1	33.0	26.8	1.1	2.2	3.2	15.5	0.17	3.6
5	EC-178271	39.0	26.0	11.3	0.00	5.9	34.1	29.1	1.4	1.3	1.8	10.4	0.78	3.4
6	EC-26945	39.0	20.9	07.9	0.00	5.6	29.8	28.1	1.3	1.7	2.7	11.3	0.21	2.7
7	Dwarf Mutant	38.0	20.8	10.0	0.00	4.7	34.1	29.8	1.4	1.5	3.0	09.0	0.35	1.6
8	AKWB-1	39.0	31.9	08.8	0.00	5.7	32.6	27.8	1.2	1.6	2.8	09.4	0.58	2.0
9	Mysore Local	39.4	31.4	10.8	0.31	5.1	30.3	27.6	0.0	1.2	2.1	14.6	0.72	6.0
10	NBRI-Selection	38.1	31.8	09.7	0.00	5.7	38.8	39.0	1.7	0.0	0.0	02.7	0.00	3.0
Mean		**37.3**	**27.3**	**9.7**		**5.7**	**33.8**	**29.3**	**1.3**	**1.5**	**2.0**	**9.6**	**0.39**	**2.7**
Range		**34.5 – 39.4**	**20.8 – 31.9**	**8.8 – 11.4**		**4.7 – 7.1**	**29.8 – 38.8**	**27.4 – 39.0**	**0.0– 1.9**	**0.0 – 2.2**	**0.0 – 3.2**	**2.7 – 15.5**	**0.0 – 1.05**	**1.5 – 6.0**

Table 139. Perilla, Meghalaya Centre

S. No.	Genotypes	Protein (%) in defatted seed cake	Oil (%)	Fatty acid composition				
				Palmitic acid 16:0	Stearic acid 18:0	Oleic acid 18:1	Linoleic acid 18:2	Linolenic acid 18:3
1	BDS-1812	25.5	47.7	8.7	1.8	10.7	20.7	53.4
2	IC-6440	27.0	46.5	9.6	2.9	11.1	20.2	51.2
3	H-2216	27.3	51.0	8.4	2.0	11.8	21.8	51.5
4	BDS-1649	25.9	43.4	6.8	1.6	10.1	20.6	44.8
5	IC-3865	25.3	47.7	5.1	1.1	5.8	10.2	27.1
6	IC-6444	26.5	47.1	9.0	1.5	9.4	19.6	54.6
7	IC-6441	28.4	44.3	6.3	1.2	7.4	15.1	36.5
8	RD-74	28.9	43.6	10.5	2.4	9.3	17.4	46.1
9	RS/SB/BP-59	27.1	44.0	----	----	----	----	----
10	H-529	29.9	49.9	8.8	1.7	10.2	22.5	56.8
11	H-1143	25.7	48.4	10.3	1.7	10.8	20.8	53.1
12	IC-6442	27.7	47.1	9.1	1.5	10.1	20.7	50.2
13	H-746	27.8	48.5	8.2	2.0	10.6	20.3	55.1
14	H-621	28.2	46.8	9.4	2.0	8.9	19.1	51.9
15	RS-72199	30.5	48.7	5.3	0.9	5.5	11.8	30.9
16	H-556	28.8	43.5	9.7	3.1	11.8	18.1	57.3
17	IC-330445	29.2	51.3	7.6	1.5	9.8	21.0	50.1
18	H-1099	29.1	48.6	7.8	2.0	10.8	20.4	56.3
19	RD-29	26.3	44.5	8.9	1.3	9.9	19.0	45.5

S. No.	Genotypes	Protein (%) in defatted seed cake	Oil (%)	Fatty acid composition				
				Palmitic acid 16:0	Stearic acid 18:0	Oleic acid 18:1	Linoleic acid 18:2	Linolenic acid 18:3
20	IC-3913	24.7	47.9	9.4	1.9	10.0	21.6	53.3
21	VRB-MA-2029	26.6	49.9	6.3	2.6	10.4	16.4	52.6
22	B/0C	23.8	46.5	7.5	1.9	10.6	22.3	55.7
23	IC-6446	28.8	47.4	8.3	1.8	10.3	17.1	48.0
24	GP-178	28.4	48.3	9.4	2.7	10.1	18.3	47.9
25	IC-211611	28.4	46.7	5.0	3.8	4.9	9.5	34.8
26	IC-3942	27.9	44.6	7.2	1.8	10.8	21.8	52.9
27	RD-29	27.7	38.5	6.6	2.6	10.3	19.1	47.8
28	IC-211608	28.3	46.5	8.4	0.44	10.7	22.3	56.9
29	IC-6443	27.8	48.3	----	----	----	----	----
30	NH-6-10	28.8	47.0	6.5	1.8	9.4	18.0	44.8
31	IC-334314	26.1	44.1	8.1	1.8	9.0	23.8	54.9
32	RD-117	26.3	48.5	5.0	3.3	10.7	16.9	45.0
33	H-1664	28.4	43.1	7.1	2.5	7.8	13.1	56.1
34	H-794	26.1	47.5	8.0	1.8	8.6	17.2	42.0
35	RD-134	27.7	48.5	10.3	1.6	10.2	20.2	49.5
36	IC-204185	28.8	46.6	6.6	1.8	10.2	21.6	57.8
37	IC-6442	26.4	46.3	----	----	----	----	----
38	IC-330441	26.1	48.6	10.7	2.6	11.3	17.4	57.3
39	IC-3708	27.6	45.6	7.0	1.1	8.0	18.6	45.1
40	EC-216288	26.7	46.2	8.3	2.1	11.1	21.2	54.9

S. No.	Genotypes	Protein (%) in defatted seed cake	Oil (%)	Fatty acid composition				
				Palmitic acid 16:0	Stearic acid 18:0	Oleic acid 18:1	Linoleic acid 18:2	Linolenic acid 18:3
41	IC-335402	27.9	47.4	4.1	1.2	6.5	12.4	31.6
42	RS/SB/BP-61	31.1	47.0	7.1	7.0	8.1	16.2	59.0
43	BDS-832	26.3	48.4	7.1	1.5	8.8	18.7	43.8
44	RD-89	25.8	43.3	8.5	3.2	9.1	14.6	60.8
45	RS-12	24.9	49.2	11.4	1.7	10.1	19.6	52.7
Mean		**27.4**	**46.8**	**7.9**	**2.1**	**9.5**	**18.5**	**49.5**
Range		**23.8 – 31.1**	**38.5 – 51.3**	**4.1 – 10.7**	**0.9 – 3.8**	**5.5 – 11.8**	**9.5 – 23.8**	**27.1 – 60.8**

Table 140. Coix lacryma, Meghalaya Centre

S. No.	Genotypes	Protein (%)	Carbohydrate (%)
1	IC-332644	14.3	74.2
2	FDI-Ap1/01	14.0	73.1
3	IC-334345	15.2	71.5
4	IC-334317	14.0	72.6
5	IC-39383	15.9	73.8
6	IC-89391	15.1	71.0
7	IC89384	14.8	74.4
8	IC-326203	14.6	75.2
9	IC-12703	15.4	72.5
10	IC-89383	17.7	71.8
11	IC-204184	15.2	73.9
12	IC-89394	14.8	74.2
13	IC-6465	14.6	73.6
14	IC-66692	15.2	72.7
15	IC-6647	15.6	73.9
16	IC-89393	14.8	72.1
17	IC-39387	14.6	75.5
18	NIC-12758	14.6	74.4
19	HM-3026	14.8	76.3
20	RD-128	13.8	75.8
21	POLLIN	15.2	73.7
22	IC-332682	14.2	74.6
23	BD-3	14.4	72.7
24	NIC-12639	14.2	74.2
25	BDS-865	13.8	76.3
26	IC-33262	14.6	76.8
27	NH-6/22	13.9	78.5
28	BDS-1872	13.6	77.4
29	IC-203984	14.6	74.6
30	IC-89385	15.2	72.1
31	IC-89392	15.0	74.2
32	IC-89387	15.0	75.4
33	H-1871	16.0	74.7
34	NIC-12637	16.7	76.4
35	IC-89390	16.0	73.6
36	IC-89381	16.2	74.3
37	IC-89382	15.9	75.2
38	IC-330396	15.8	74.1
39	IC-330440	13.9	76.7
40	H-2287	16.6	74.5
41	IC-203985	12.8	78.9
42	IC-330448	16.6	77.4
43	MAYUN	14.2	76.3
44	IC-340015	14.1	78.2
45	RD-128	13.8	74.4
Mean		**14.9**	**74.6**
Range		**12.8 – 17.7**	**71.0 – 78.9**

Table 141. Buckwheat, Ranichauri centre

S. No.	Genotypes	Protein (%)	Total Phenols (%)	Available lysine (%)
1	Sangla B-1	9.6	1.7	4.7
2	Sangla B-2	9.5	1.7	4.8
3	Sangla B-3	9.8	1.4	3.9
4	Himpriya	11.9	1.5	3.7
5	Sangla B-5	11.4	1.9	3.6
6	PRB-9001-1 (KBB-3)	11.8	1.5	3.8
7	Sangla B-7	9.7	1.4	3.9
8	VL-7	10.4	1.4	4.2
9	PRB-9001-1	9.8	1.5	4.6
10	PRB-1	9.8	1.4	3.8
Mean		**10.4**	**1.5**	**4.1**
Range		**9.5 – 11.9**	**1.4 – 1.9**	**3.6 – 4.8**

Table 142. Chenopodium (Grain), Ranichauri centre

S. No.	Genotypes	Protein (%)
1	PRC-9801	15.0
2	PRC-9802	14.4
3	PRC-9805	13.7
4	PRC-9807	13.7
5	CHLKW-4	12.4
6	CHLKW-5	13.6
7	CHLKW-6	13.4
8	CHLKW-8	13.6
9	CHLKW-9	13.4
Mean		**13.7**
Range		**12.4 – 15.0**

CENTRE REPORT

VI. CENTRE REPORT

6.1 HILLS

6.1.1 GBPUA&T, Ranichauri

Grain Amaranth

F_{1s} cross evaluation: In grain amaranth 22 inter varietal F_1 generations were evaluated along with their parents in a replicated trials. Extent of heterosis was also calculated for various crosses over better parents.

F_2 generation: F_2 generations of 24 crosses along with their parents were evaluated in unreplicated design. Data on 5 plants per cross showed many plants to be superior to their parents.

F_3 generation: Progeny rows of 17 crosses were evaluated along with their parents. Superior progeny rows were identified for seed yield and other characters.

F_4 and F_5 bulk testing: Bulk of 18 crosses and 11 crosses of F_4 and F_5 generation respectively were evaluated. Seed yield in these experiments were low.

F_6 yield testing: Selected lines of 6 crosses were tested for yield in a replicated trial. Many lines were found superior with respect to grain yield.

Station trial: 10 advanced lines were evaluated in a replicated trial. The yield level of some of the lines were superior to the check varieties.

Vegetable amaranth: Ten lines of vegetable type amaranth received from AVRDC, Taiwan were evaluated in paired observation rows. Although vegetative growth of the lines was satisfactory, all the lines were late maturing.

Hybridization and demonstration: New hybridization programme was initiated to generate 12 crosses and demonstration on elite lines was also undertaken.

Rice bean

F_1 crosses: Thirty three F_1 crosses of rice bean were evaluated in a replicated trial along with their parents. Heterotic crosses were identified. Mean values of some of the crosses were higher as compared to their better parents.

F_2 generation: Twenty four crosses were evaluated along with their respective parents and data on individual F_2 plants were recorded.

F_3 generation: Forty eight progeny rows of 16 crosses were evaluated in single row plots. Seed yield of many lines was superior to their parents but lower than the best check variety, PRR 21. However, many early maturing lines have been identified.

F_4 generation: Eighty one selected lines were evaluated in single row plots along with parents. Superior lines were identified.

F_5 generation: 110 lines of 22 crosses were evaluated along with check varieties. Seed yield of many lines was high.

Narrow leaf and early maturing lines: Sixty selected lines based on narrow leaf and early maturity were evaluated in their F_5 generation. Many lines with early maturity and high yield have been identified.

New hybridization and demonstration: Twelve new crosses were initiated during the season and demonstration on improved varieties were conducted.

6.1.2 CSK HPKVV, Palampur

F_1 generation of two crosses of rice bean (BRS 1 x Naini, BRS 2 x Naini) and two crosses of adzuki bean (HPAU 21 x SMLAB 1) and SMLAB 1 x HPAU 21) were advanced to F_2 generation. Inter varietal hybridization of rice bean involving five parents (BRS 1, BRS 2, Naini, MNPL 2 and RCRB 1-6) were also attempted. Work on inter-specific hybridization is also in progress for transferring disease resistance gene(s) from rice bean and adzuki bean to urd bean.

6.2 PLAINS

6.2.1 RAU, Mandor

Grain amaranth

Preliminary evaluation trial: Six preliminary evaluation trial consisting of 59 entries, two each in early, medium and late groups were conducted. Data on yield and related characters were recorded. Another station trial with RMA lines was also conducted. Multilocational adaptive trials were conducted at various districts of Rajasthan.

Kalingada

F_2 generation and germplasm evaluation nursery comprising 38 genotypes were evaluated.

Tumba

A germplasm evaluation nursery comprising 28 genotypes were undertaken.

Paradise tree

Data on five plants, planted in 1995 revealed that the maximum girth was upto 50 cm.

SUMMARY

VII. A SUMMARY OF RESEARCH ACHIEVEMENTS DURING 2004

A total of 198 trials were allotted during 2004 on aspects of germplasm evaluation, breeding, agronomic and quality of underutilized crops at twenty one locations in different agro-climatic zones of the country. Out of these, 116 trials were carried out. A summary of research achievements is given below:

7.1 PLANT BREEDING

Seventy two varietal trials, twenty four in hills and forty eight in plains, were conducted on fourteen 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:

Table 1: Best genotypes in different trials conducted at multilocations during 2004

Crop		**Entries**	**Locations**	**Top yielder**	**Yield (q/ha)**
HILLS					
Amaranth	AVT-I	4	5	IC 35407 ©	24.66
	IVT	14	5	IC 35407 ©	24.66
Buckwheat	IVT	6	4	Himpriya ©	18.41
Chenopodium	IVT	8	3	SMLCP 5	2.74
Rice bean	IVT	8	6	RBL 1 ©	24.75
Crop		**Entries**	**Locations**	**Top yielder**	**Yield (q/ha)**
Adzuki bean	IVT	15	3	HPAB 51	28.18
	AVT-II	4	3	Shimla-1	27.07
PLAINS					
Amaranth	IVT+AVT	25	10	SMLAM 7 (2 loc) BGA 2, RMA 2, Suvarna (8 loc)	11.45 >10.00
Rice bean	AVT	10	9	BRB 1	11.21
Faba bean	AVT	17	6	HB 430	9.02
Winged bean	ORT	9	3	EC 142665	19.70
Kalingada	ORT	13	2	SKNK 1	1.94
Kankoda	AVT	6	4	RMF 1	11.89
Tumba	AVT	10	1	Yield data not available	
Jatropha	ORT	8	3	Phule J-1	3.57

Based on the three years data, the best genotype in each crop with respect to yield has been identified and indicated in Table 2. The proposal of these genotypes and others ranking either second or third, whose performances have been given in Annual Report, can be submitted to Variety Identification Committee for consideration of their identification as varieties.

Table 2: List of the promising genotypes based on three years data

Crop	Genotype	Average seed yield (q/ha)	Increase/decrease over check (%)	
			First check	Second check
PLAINS				
Amaranth	RMA 2 BGA 2	10.77 10.41	-1.48 -4.76 (Suvarna)	50.16 45.15 (GA 1)
Faba bean	HB 131	14.23	7.98 (Vikrant)	
Jatropha	Chhatrapati	3.60	27.21 (Trial Mean)	
Kankoda	RMF 37	20.62	12.42 (Trial Mean)	

7.2 GERMPLASM EVALUATION

Over thirteen hundred accessions, some of them tested at more than one location, were evaluated at twenty four locations during 2004. Crop-wise number of accessions, locations and promising accessions have been given in table 3.

Table 3. Performance of germplasm accessions in different crops

Crops	No. of accessions	Location	Check	Best accession (Yield g/plant)	Best accession (Days to maturity)
HILLS					
Amaranth	50	Ranichauri	PRA 2, Annapurna	IC 95301 (68.95), IC 95249 (66.85)	IC 95353 (116), IC 37150 (116)
	50	Palampur	PRA 2, Annapurna	IC 37154 (690.00/plot), IC 95288 (575.00/plot)	-
	50	Shimla	PRA 2, Annapurna, IC 35407	-	IC 35470 (122), IC 38316 (134)

Buckwheat	46	Ranichauri	Himpriya, PRB 1	IC 341682 (125.10), IC 274436 (125.10)	IC 278957 (58), IC 258232 (64)
	37	Sangla	Himpriya	IC 274439 (7.60), IC 310095 (6.80)	IC 382243 (81), IC 382270 (81)
	50	Shimla	Himpriya, PRB 1	-	IC 341594 (58), IC 341674 (65)
Chenopodium	25	Ranichauri	Local	IC 107295 (100.00), IC 108086 (81.30)	IC 107185 (112), IC 108086 (112)
	28	Shimla	No check	IC 341698 (21.40), IC 329470 (14.00)	IC 108086 (158), IC 108088 (158)
Rice bean	50	Ranichauri	PRR 1, PRR 2	LRB 1 (29.16), LRB 50 (28.88)	LRB 23 (128), LRB 74-3 (130)
	50	Palampur	PRR 1, PRR 2	LRB 1 (420), LRB 2 (300)	LRB 75-1 (95), LRB 84 (95)
	53	Shimla	PRR 1, PRR 2	-	LRB 1 (120), LRB 30 (120), LRB 161 (120)
	50	Bhowali	PRR 1, PRR 2	-	LRB 6 (126), VASHM/PC 3426 (127)
Adzuki bean	26	Palampur	HPAU 27-9	HPAU 27-9 (425.00/plot), EC 341960 (308.00/plot)	EC 30256 (73), EC 108080 (73)
	25	Shimla	HPU 51	EC 290251 (52.60), EC 341955 (52.30)	EC 290251 (108), EC 340254 (115)
Coix	20	Ranichauri	No check	H 557 (5.07 q/ha), BDS 1872 (4.95 q/ha)	H 696 (206), H 547 (210)
Crops	**No. of accessions**	**Location**	**Check**	**Best accession (Yield g/plant)**	**Best accession (Days to maturity)**
Coix	19	Palampur	No check	H 3026 (230.00), H	-

				3768 (210.00)	
Perilla	20	Ranichauri	No check	H 1644 (60.80). H 621 (60.30)	RD 029 (170), BDS 1647 (171)
PLAINS					
Amaranth	152	Bangalore	Suvarna, GA 1, Annapurna	IC 5536 (37.20), IC 35544 (36.54)	IC 95304 (81), IC 95431 (82)
	96	Bhubaneswar	GA 1, GA 2	IC 95321 (14.32), IC 120703 (13.70)	IC 120635 (111), IC 120657 (111)
	63	Rahuri	Suvarna, GA 1	IC 120633 (19.71), IC 120684 (14.34)	IC 35732 (82), IC 95566 (82)
Crops	**No. of accessions**	**Location**	**Check**	**Best accession (Yield g/plant)**	**Best accession (Days to maturity)**
Rice bean	65	Bangalore	No check	LRB 103 (15.00 g), LRB 364 (14.00 g)	LRB 314 (70), LRB 97 (70)
	98	Bhubaneswar	RBL 1, RBL 6, LRB 1	BRB 18 (18.97), LRB 216 (17.60)	LRB 434 (80), LRB 442 (80)
	54	Ludhiana	RBL 1, RBL 6, RBL 35, RBL 50	LRB 324 (485.00/plot), LRB 299 (430.00/plot)	LRB 235 (97), LRB 324 (98)
	65	Ranchi	RBL 1, RBL 2	LRB 30 (7.08), LRB 108 (6.84)	LRB 145 (115), LRB 293 (117)

7.3 QUALITY

Seeds of promising genotypes evaluated in AVT of seven underutilized crops were analyzed for quality traits at CCS HAU Hisar. Crop-wise details of traits and best genotypes are given below in table:

Crops	Best genotypes
Faba bean	Protein (HB-180: 26.20%) Vicine – convicine (HB-131: 0.87%)
Rice bean	Protein (KHRB-2: 22.60%) Tryptophan (LRB 122: 6.80%) Methionine (RBL 188: 0.93%) Phenol (LRB 188: 0.16%)
Amaranth	Protein (IC 35407: 14.70%) Lysine (IC 35407: 6.40%)
Buckwheat	Protein (Himpriya: 19.90%) Lysine (Sangla B-2: 4.80%)
Perilla	Oil (H-2216: 51.00%) Oleic acid (H-2218: 11.80%)
Adzuki bean	Protein (SMLAB-1: 23.40%) Phenol (HPAB-27: 0.20%)
Winged bean	Protein (Mysore local: 39.40%) Oil (AKWB-1: 31.90%)

7.4 AGRONOMY

Twelve agronomic experiments were conducted on five underutilized crops at different centres of the project during 2004. These consisted of four investigations on grain amaranth, one on buckwheat, five on rice bean and one each on kalingada and Jatropha. Some of the salient findings are given below:

S. No.	Experiment	Finding
1.	Fertilizer management in amaranth based intercropping	Full recommended dose of fertilizers to pulse intercrop and no fertilizer to amaranth resulted in maximum amaranth equivalent yield, its B: C ratio and net profit
2.	Effect of NPK on yield of grain amaranth	Application of recommended doses of NPK gave an average seed yield of 1070 kg/ha. Supplementation with FYM @ 5 t/ha increased seed yield to 1272 kg/ha
3.	Intercropping studies in rice bean	Growing pigeonpea and rice bean in 1: 2 row ratios resulted in highest rice bean equivalent yield (18.10 q/ha), land equivalent ratio (1.34)

		and benefit cost ratio (2.10)
4.	Optimization of sowing time in rice bean	Sowing of rice bean in first week of August gave higher seed yield at Bhubaneswar and Bangalore
5.	Weed management in rice bean	Pre-emergence application of pendimethaline gave almost similar results as that of weed free treatment
6.	Effect of spacing and nutrients in Jatropha	Growth as well as seed yield of Jatropha increased with increase in spacing and fertilizer doses
7.	Response of nitrogen levels in different genotypes of karingada	Neither the genotypes nor the fertilizer doses had any significant effect on its yield and other traits

ANNEXURES

Annexure-I

Weighted mean for seed yield (q/ha) of grain amaranth varieties tested for the last three years: Hills

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Annapurna	PRA 2	PRA 3	IC 35407
1	PLP 1	18.12	5	17.29	5	16.18	5	17.20	15		-11.96	-12.60	-15.04	-13.96
2	PRA 9801	17.60	5	19.07	5	18.62	5	18.43	15		-5.65	-6.33	-8.94	-7.79
3	Annapurna ©	17.82	5	22.31	5	18.47	5	19.53	15		0.00	-0.73	-3.49	-2.27
4	PRA 2 ©	17.21	5	20.70	5	21.48	4	19.68	14	III	0.73	0.00	-2.78	-1.55
5	PRA 3 ©	19.99	5	19.26	5	21.47	5	20.24	15	I	3.62	2.86	0.00	1.27
6	IC 35407 ©	21.45	5	21.28	5	17.23	5	19.99	15	II	2.32	1.58	-1.25	0.00
	Mean	**18.70**		**19.99**		**18.91**		**19.18**						

Annexure-II

Weighted mean for maturity (Days) of grain amaranth varieties tested for the last three years: Hills

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Annapurna	PRA 2	PRA 3	IC 35407
1	PLP 1	123.93	4	120.50	4	128.67	5	124.70	13	II	-8.00	-6.57	-9.01	1.13
2	PRA 9801	135.19	4	138.42	4	140.33	5	138.16	13		1.93	3.51	0.82	12.05
3	Annapurna ©	128.53	4	137.33	4	139.73	5	135.55	13		0.00	1.55	-1.09	9.93
4	PRA 2 ©	131.35	4	135.09	4	133.87	5	133.47	13	III	-1.53	0.00	-2.60	8.25
5	PRA 3 ©	132.12	4	140.67	4	138.07	5	137.04	13		1.10	2.67	0.00	11.14
6	IC 35407 ©	125.39	4	119.92	4	124.34	5	123.30	13	I	-9.03	-7.62	-10.02	0.00
	Mean	**129.42**		**131.99**		**134.17**		**132.04**						

Annexure-III

Weighted mean for seed yield (q/ha) of adzuki bean varieties tested for the last three years: Hills

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	HPU 51
1	SMLAB 1	26.07	3	9.22	3	27.13	3	20.81	9		-40.13
2	SMLAB 2	25.09	3	12.06	3	20.46	3	19.20	9		-44.74
3	SMLAB 3	25.51	3	11.15	3	20.41	3	19.02	9		-45.26
4	SMLAB 4	25.50	3	11.68	3	23.41	3	20.20	9		-41.89
5	Shimla-1	37.30	2	10.17	1	27.07	3	27.66	6	II	-20.40
6	Shimla-2	37.37	2	9.30	1	22.87	3	25.44	6	III	-26.79
7	Shimla-3	36.95	2	12.83	1	19.58	3	24.25	6		-30.24
8	HPU 51 ©	63.33	2	16.79	1	21.69	3	34.75	6	I	0.00
	Mean	**34.64**		**11.65**		**22.83**		**23.92**			

Entries to be tested again because of data of checks available from less number of locations

Annexure-IV

Weighted mean for maturity (Days) of adzuki bean varieties tested for the last three years: Hills

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	HPU 51
1	SMLAB 1	118.67	3	112.17	3	105.78	3	112.21	9		-1.72
2	SMLAB 2	116.72	3	113.55	3	99.56	3	109.94	9		-3.70
3	SMLAB 3	120.78	3	112.78	3	105.44	3	113.00	9		-1.02
4	SMLAB 4	115.56	3	106.50	3	101.56	3	107.87	9		-5.51
5	Shimla-1	101.33	2	87.67	1	99.44	3	98.11	6	I	-14.06
6	Shimla-2	100.17	2	88.67	1	101.78	3	99.06	6	II	-13.23
7	Shimla-3	102.00	2	88.67	1	103.67	3	100.61	6	III	-11.87
8	HPU 51 ©	118.33	2	121.00	1	109.11	3	114.17	6		0.00
	Mean	**111.70**		**103.88**		**103.29**		**106.87**			

Annexure-V

Weighted mean for seed yield (q/ha) of grain amaranth varieties tested for the last three years: Plains

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Suvarna	GA 1
1	RMA 3	6.99	9	10.38	7	8.53	10	8.50	26		-22.28	18.45
2	RMA 4	7.06	7	12.77	7	9.06	10	9.56	24		-12.55	33.28
3	IC 41998	7.98	9	11.18	4	9.45	9	9.16	22		-16.16	27.77
4	BGA 2	10.14	7	11.23	6	10.03	8	10.41	21	III	-4.76	45.15
5	BGA 3	9.18	6	12.03	4	9.04	8	9.75	18		-10.79	35.97
6	RMA 2	9.98	11	12.53	7	10.16	6	10.77	24	II	-1.48	50.16
7	SKNA 7	7.66	6	12.54	7	9.61	7	10.05	20		-8.05	40.14
8	RAGS 92-10-1	9.49	11	12.65	7	8.73	7	10.16	25		-7.03	41.70
9	IC 120588	8.66	11	13.84	5	8.24	6	9.72	22		-11.05	35.57
10	IC 35696	6.99	5	11.21	4	7.51	6	8.32	15		-23.85	16.06
11	IC 32195	10.07	6	9.68	4	7.41	6	8.98	16		-17.89	25.15
12	MGA 1	6.79	5	6.75	3	7.18	7	6.96	15		-36.29	-2.90
13	Suvarna ©	10.94	11	11.64	5	10.32	6	10.93	22	I	0.00	52.41
14	GA 1 ©	7.24	10	7.90	6	6.54	8	7.17	24		-34.39	0.00
	Mean	**8.51**		**11.17**		**8.70**		**9.32**				

Annexure-VI

Weighted mean for maturity (Days) of grain amaranth varieties tested for the last three years: Plains

S. No.	Genotype	2004		2003		2002		Weighted			Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Suvarna	GA 1
1	RMA 3	123.71	10	136.67	10	133.03	9	131.07	29		-1.08	-4.78
2	RMA 4	121.35	10	140.44	10	118.75	7	127.75	27	I	-3.59	-7.19
3	SKNA 21	118.94	10	142.69	10	130.88	10	130.84	30		-1.26	-4.95
4	IC 41998	122.50	9	173.35	5	131.94	10	137.03	24		3.41	-0.45
5	BGA 2	125.41	8	151.15	8	109.40	7	129.49	23	III	-2.28	-5.92
6	BGA 3	126.75	8	154.96	6	114.21	6	131.45	20		-0.80	-4.50
7	MGA 2	124.26	9	164.32	8	134.08	6	140.76	23		6.23	2.26
8	RMA 2	127.39	6	140.19	10	131.75	11	133.91	27		1.06	-2.72
9	SKNA 7	127.89	7	139.63	10	130.57	11	133.14	28		0.48	-3.28
10	RAGS 92-10-1	129.87	7	138.15	10	118.52	10	128.73	27	II	-2.85	-6.47
11	IC 120588	135.29	6	155.05	8	128.64	9	139.56	23		5.32	1.39
12	IC 35696	135.63	6	175.05	5	86.95	5	132.74	16		0.17	-3.57
13	IC 32195	135.79	6	183.30	5	118.08	6	143.51	17		8.31	4.26
14	MGA 1	136.54	7	153.78	6	121.35	5	138.07	18		4.20	0.31
15	Suvarna ©	107.54	6	155.94	7	131.21	11	132.51	24		0.00	-3.73
16	GA 1 ©	131.69	7	150.46	9	130.28	10	137.65	26		3.88	0.00
	Trial Mean	**126.91**		**153.45**		**123.10**		**134.26**				

Annexure-VII

Weighted mean for seed yield (q/ha) of rice bean varieties tested for the last three years: Plains

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	RBL 1	RBL 6	RBL 35	RBL 50
1	LRB 330	10.13	8	5.65	7	10.44	9	8.94	24		4.08	-5.42	-6.83	-4.99
2	LRB 354	11.09	4	6.25	6	10.30	9	9.19	19		6.96	-2.80	-4.24	-2.36
3	LRB 355	12.17	4	5.78	6	10.41	9	9.32	19		8.49	-1.41	-2.88	-0.97
4	BRB 1	6.21	3	6.57	2	11.21	7	9.19	12		6.96	-2.81	-4.25	-2.37
5	RBL 1 ©	9.57	8	5.95	7	9.77	9	8.59	24		0.00	-9.13	-10.48	-8.72
6	RBL 6 ©	10.39	7	6.47	6	10.71	9	9.45	22	II	10.04	0.00	-1.49	0.45
7	RBL 35 ©	10.90	8	7.35	7	10.18	9	9.59	24	I	11.71	1.51	0.00	1.97
8	RBL 50 ©	10.23	8	6.53	7	10.92	9	9.41	24	III	9.55	-0.45	-1.93	0.00
	Mean	**10.09**		**6.32**		**10.49**		**9.21**						

Annexure-VIII

Weighted mean for maturity (Days) of rice bean varieties tested for the last three years: Plains

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	RBL 1	RBL 6	RBL 35	RBL 50
1	LRB 330	97.36	7	96.50	7	105.59	9	100.32	23		0.24	-1.53	1.93	-0.78
2	LRB 354	98.00	3	88.33	7	105.16	9	97.83	19	I	-2.25	-3.98	-0.60	-3.24
3	LRB 355	97.50	3	89.50	7	105.19	9	98.20	19	II	-1.88	-3.62	-0.23	-2.88
4	BRB 1	93.38	2	87.63	2	110.31	7	103.11	11		3.03	1.20	4.77	1.98
5	RBL 1 ©	97.07	7	96.57	7	105.14	9	100.08	23		0.00	-1.77	1.68	-1.02
6	RBL 6 ©	98.61	7	100.75	6	105.18	9	101.88	22		1.80	0.00	3.52	0.77
7	RBL 35 ©	96.46	7	97.71	7	100.49	9	98.42	23	III	-1.66	-3.40	0.00	-2.66
8	RBL 50 ©	96.68	7	98.32	7	106.72	9	101.11	23		1.03	-0.76	2.73	0.00
	Mean	**96.88**		**94.41**		**105.47**		**100.12**						

Annexure-IX

Weighted mean for seed yield (q/ha) of faba bean varieties tested for the last three years: Plains

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/ decrease over check
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Vikrant
1	HB 43	15.77	4	23.40	4	6.70	6	14.06	14	III	6.74
2	HB 115	13.92	4	22.81	4	6.39	6	13.23	14		0.44
3	HB 123	13.61	4	25.51	4	7.41	6	14.35	14	I	8.95
4	HB 131	14.61	4	24.02	4	7.44	6	14.23	14	II	7.98
5	HB 180	16.80	4	21.19	4	6.73	6	13.74	14		4.28
6	HB 193	13.92	4	21.34	4	6.69	6	12.94	14		-1.77
7	BSH 9	15.22	4	20.92	4	6.96	6	13.31	14		1.02
8	PRT 7	15.90	4	22.78	4	6.73	6	13.94	14		5.78
9	PRT 12	10.99	3	19.85	4	6.03	6	11.43	13		-13.26
10	Vikrant ©	15.57	4	20.82	4	6.48	6	13.17	14		0.00
	Mean	**14.63**		**22.26**		**6.76**		**13.44**			

Annexure-X

Weighted mean for maturity (days) of faba bean varieties tested for the last three years: Plains

S. No.	Genotype	2002		2003		2004		Weighted			Per cent increase/decrease over check
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Vikrant
1	HB 43	136.83	4	141.54	4	139.42	6	139.29	14	II	-0.75
2	HB 115	139.18	4	142.84	4	137.06	6	139.32	14	III	-0.73
3	HB 123	136.93	4	143.64	3	138.65	6	139.27	13	I	-0.76
4	HB 131	138.93	4	143.92	4	140.67	6	141.10	14		0.54
5	HB 180	138.43	4	144.46	4	141.31	6	141.39	14		0.75
6	HB 193	138.33	4	143.79	4	141.42	6	141.21	14		0.62
7	BSH 9	141.43	4	142.04	4	139.83	6	140.92	14		0.41
8	PRT 7	136.77	4	143.65	4	141.54	6	140.78	14		0.31
9	PRT 12	137.77	4	144.65	4	140.96	6	141.10	14		0.54
10	Vikrant ©	144.94	4	135.83	4	140.27	5	140.34	13		0.00
	Mean	**138.95**		**142.64**		**140.11**		**140.47**			

Annexure-XI

Weighted mean seed yield (q/ha) of Jatropha varieties tested for the last four years: Plains

S. No.	Genotype	2001		2002		2003		2004		Weighted			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Per cent increase/ decrease over mean
1	Hansaraj	0.38	1	3.94	2	2.13	2	2.52	3	2.51	8		-11.31
2	S.K. Nagar (Big)	0.41	1	4.32	2	2.60	2	3.24	3	3.00	8	II	5.87
3	Urlikanchan	0.40	1	3.62	2	2.57	2	3.38	3	2.87	8	III	1.24
4	Chhatrapti	0.50	1	5.74	2	3.40	2	3.34	3	3.60	8	I	27.21
5	Local	0.24	1	1.17	2	2.22	2	3.47	3	2.18	8		-23.01
	Mean	**0.39**		**3.76**		**2.58**		**3.19**		**2.83**			

Annexure-XII

Weighted mean seed yield (q/ha) of kankoda varieties tested for the last four years: Plains

S. No.	Genotype	2001		2002		2003		2004		Weighted			
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations	Rank	Per cent increase/ decrease over mean
1	RMF 7-P-1	35.78	1	27.98	1	20.40	1	6.92	3	17.49	6		-4.67
2	RMF 5-P-4	32.19	1	19.34	1	19.40	1	10.87	3	17.26	6		-5.92
3	RMF 1	40.78	1	13.65	1	14.60	1	11.89	3	17.45	6		-4.87
4	RMF 17	43.13	1	18.69	1	17.50	1	11.88	3	19.16	6	II	4.46
5	RMF 27	33.13	1	26.93	1	22.30	1	8.71	3	18.08	6	III	-1.42
6	RMF 37	37.97	1	27.65	1	25.50	1	10.87	3	20.62	6	I	12.42
	Mean	**37.16**		**22.37**		**19.95**		**10.19**		**18.34**			

Annexure-XIII

Number of trials/activities allotted and conducted at various centres AICRP on Underutilized Crops

Name of centre	Allotted					Conducted					
	Breeding/ Germplasm	Agronomy	Adaptive	Quality	Total	Breeding/ Germplasm	Adaptive	Agronomy	Quality	Total	Per cent
Bangalore	7	3	3	3	**13**	5	-	3	-	**8**	61.53
S.K. Nagar	7	4	-	-	**11**	3	-	4	-	**7**	63.63
Rahuri	8	-	-	-	**8**	6	-	-	-	**6**	75.00
Mettupalayam	7	2	-	-	**9**	2	-	1	-	**3**	33.33
Bhubaneswar	6	5	-	-	**11**	7	-	6	-	**13**	118.18
Ranichauri	15	5	3	3	**26**	12	-	5	-	**17**	65.38
Hisar	12	4	7	7	**30**	2	-	1	7	**10**	33.33
Ranchi	9	-	-	-	**9**	4	-	-	-	**4**	44.44
Ludhiana	7	-	-	-	**7**	3	-	-	-	**3**	42.85
Faizabad	10	-	-	-	**10**	4	-	-	-	**4**	40.00
Ambikapur	9	-	-	-	**9**	3	-	-	-	**3**	33.33
Mandor	7	-	-	-	**7**	3	-	-	-	**3**	42.85
Palampur	12	-	3	3	**18**	9	-	-	-	**9**	50.00
Sangla	4	-	2	2	**8**	3	-	2	-	**5**	62.50
Shimla	13	-	-	-	**13**	11	-	-	-	**11**	84.61
Shillong	6	-	-	-	**6**	1	-	-	-	**1**	16.66
Almora	5	1	-	-	**6**	4	-	-	-	**4**	66.66
Delhi	6	-	-	-	**6**	3	-	-	-	**3**	50.00
Akola	2	-	-	-	**2**	-	-	-	-	**-**	-
Bhowali	3	-	-	-	**3**	2	-	-	-	**2**	100.00
NBPGR, Jodhpur	1	-	-	-	**1**	-	-	-	-	**-**	-
Total	**156**	**24**	**18**	**18**	**198**	**87**	**-**	**22**	**7**	**116**	**58.58**

Annexure-XIV

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*)
Salt bush (*Atriplex* spp.)

II. FODDER CROPS

Amaranths (*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*)

Annexure-XV

List of Centres and Names of Scientists working on AICRP Underutilized Crops

		Fax	Phone (O)	Phone (R)
A.	**COORDINATING UNIT**			
1	**National Bureau of Plant Genetic Resources, Pusa, New Delhi – 110 012**			
	Dr. R.P. Dua Nodal Officer	011-25841835	011-25841835	0124-2461666 M.-9810432428
	Dr. B.S. Phogat Sr. Scientist (Agronomy)	011-25841835	011-25841835	011-25088241
	Dr. Hanuman Lal Scientist (Statistics)	011-25841835	011-25841835	011-25278556 M.-9312839336
	Dr. R.S. Rathi Technical Officer	011-25841835	011-25841835	011-25841362 M.-9868737635
B.	**SAU BASED MAIN CENTRES**			
1	**University of Agricultural Sciences, Bangalore – 560 024**			
	Dr. Chikkadevaiah Sr. Scientist (Breeding)	080-23414848	080-23411483 Ext. 39	
	Dr. G.N. Dhanpal Jr. Agronomist	080-23414848	080-23411483	
2	**Orissa University of Agriculture & Technology, Bhubaneswar – 751 003**			
	Dr. P.K. Sahu Plant Breeder	0674-2407780	0674-240169, 2402818-13	0674-2569101
	Dr. Jena Jr. Agronomist	0674-2407780	0674-240169, 2402818-13	
3	**CCS Haryana Agricultural University, Hisar – 125 004**			
	Dr. C.S. Tyagi Sr. Scientist & Head (MAP & UC)	01662-234952, 234613	01662-237726 Ext. 4283	01662-228308
	Dr. J.S. Hooda Plant Breeder			
	Dr. Anil Kumar Agronomist			

		Fax	Phone (O)	Phone (R)
	Dr. M. Khabiruddin Jr. Phytochemist			
4.	**Forest College & Research Institute (TNAU), Mettupalayam – 641 301**			
	Dr. K. Kumaran	04254-225064	04254-222010	M.- 09443377970
	Dr. K. Bhawani Shankar Asstt. Prof. (Plant Breeding)			
5	**Mahatma Phule Agricultural University, Rahuri – 413 722**			
	Dr. S.D. Sarode Plant Breeder	02426-243223	02426-243249	
6	**Birsa Agricultural University, Ranchi – 834 006**			
	Dr. K.D. Prasad Sr. Scientist	0651-2455850	0651-2455621, 2450625	0651-2555716
7	**College of Forestry & Hill Agriculture (GBPUAT), Ranichauri – 249 199**			
	Dr. M. Dutta Plant Breeder & TPL (PL. Br.)	01376-252138	01376-252121, 252119	
	Dr. T.P. Singh Agronomist			
8	**Regional Research Station (GAU), Sardar Krishinagar, Distt. Banaskantha – 385 506**			
	Dr. Y. Ravinder Babu Assoc. Res. Sci. (Pl.Br.)	02748-278433		02748-279003
	Dr. B.N. Patel Asstt. Res. Sci. (Agronomy)			
9	**Punjab Agricultural University, Ludhiana – 141 004**			
	Dr. Gurtej Singh Brar Ext. Specialist (FC)	0161-2400945	0161-2401960 Ext. 435	
10	**Agricultural Research Station (RAU), Mandor, Jodhpur – 342 304**			
	Dr. M.M.C. Bhandari Assoc. Director Research	0291-2571909	0291-2571813	0291-2571847, 2613869 M.-09414135861

		Fax	Phone (O)	Phone (R)
11	**CSK Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur – 176 062**			
	Dr. S.R. Thakur Asstt. Prof. Plant Breeding	01894-230511	0184-230391	
12	**Zonal Agricultural Research Station (IGKV), Ambikapur – 497 001**			
	Dr. M.K. Singh Scientist incharge (Underutilized Crops)	07774-230986, 220099	07774-230815, 230986	07774-220069 M.-9425256250
13	**Narendra Dev University of Agriculture & Technology, Faizabad – 224 229**			
	Dr. C.B. Yadav Scientist incharge Underutilized Crops		05270-262051	05270-220977
C.	**COOPERATING CENTRES**			
	Dr. V.D. Verma Officer incharge NBPGR Regional Station Shimla	0177-2235453	0177-2235453, 22355459	0177-2235453
	Dr. N.K. Dwivedi Officer incharge NBPGR Regional Station Jodhpur	0291-2740490	0291-2740490	0291-2744162
	Dr. I.P. Singh Officer incharge NBPGR Regional Station Akola	0724-2258067	0724-2258067	0724-2421849
	Dr. D.K. Hore Officer incharge NBPGR Regional Station Shillong	0364-2570651	0364-2570193	0364-2570194
	Dr. K.S. Negi Officer incharge NBPGR Regional Station Bhowali	05942-220027	05942-220027	05942-220038
D.	**VOLUNTARY CENTRES**			
1	**National Botanical Research Institute, Lucknow**			
	Dr. R.M. Pandey Head, Cytogenetic Lab	0522-205839, 205836	0522-205831-35, 205848, 205839	

		Fax	Phone (O)	Phone (R)
	Dr. Sudhir Shukla Scientist Deptt. Pl. Br. & Gen.			
2	**Vivekananda Parvatiya Krishi Anusandhan Shala, Almora**			
	Dr. Arun Gupta Scientist	05962-231539	05962-230060	
3	**Himachal Pradesh Krishi Vishwavidyalay, Palampur**			
	Dr. K.C. Dhimman Incharge Regional Research Station HPKVV, Sangla			

TECHNOLOGIES IDENTIFIED

Varieties

CROP	VARIETY	FEATURE	AREA	DEVELOPED BY
Grain Amaranth	IC 35407 (Durga)	High grain yield and Early maturing	Notrh West hill Zone	Dr. J.C. Rana Dr. S.K. Yadav Dr. V.D. Verma Dr. B.D. Sharma Dr. Prakash Chand
Tumba	RMT 59 (Mansha Marudhara)	High fruit and seed yield	Rajasthan and Gujarat	Dr. M.M.C. Bhandari Dr. Z.S. Solanki Dr. A.K. Bhansali Dr. B.R. Beniwal Dr. S.R. Kumar

Cultivation Practices

- Spacing *Jatropha* at 2m x 1m with application of fertilizer dose of N_{45}: K_{30} resulted in higher seed yield in Orissa state.
- Intercropping grain amaranth with french bean or rice bean in 2 : 1 row ratio (Pulse: Grain amaranth) resulted in highest land use efficiency and benefit-cost ratio in Uttaranchal state.