ALL INDIA COORDINATED RESEARCH NETWORK ON POTENTIAL CROPS

PROGRESS REPORT

Rabi 2014-15

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PREAMBLE

PREAMBLE

It is a well known fact that food and nutritional security on sustainable basis are the major challenges of the 21st Century. Crops of minor economic importance have been used, in reality, by the local populations over generations and are being maintained by the indigenous farming communities in the most vulnerable areas. Occurrence of genetic resources of these species is extremely important as they contribute significantly towards the well being and livelihoods of the rural households because they have comparative advantages in providing better food, are affordable by the poor and more available both in time and space. They also contribute to the diversity and stability of agro-ecosystems. These species often play a strategic role in fragile ecosystems such as those of arid and semi-arid lands, mountains, tropical regions and coastal regions. Most of these species can be successfully grown in vulnerable, marginal, degraded and wastelands with minimal inputs.

Recognizing the need for organized research effort on less common, under exploited crops, the All India Coordinated Research Project on Utilized and Under Exploited Plants was initiated during 1982 by ICAR. The Project was later redesignated as AICRP on Underutilized Crops and recently rechristened as AICRN on Potential Crops. Potential 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 future needs of human kind.

At present, the network is conducting research on 14 crops of food, fodder and industrial value through 14 main, 9 cooperating and 15 voluntary centres located in diverse agro-climate zones of the country. So far, 37 varieties in different crops have been released/identified in this project, besides identifying desirable genetic donors and accumulating indigenous and exotic germplasm collections. Planned multilocational evaluation of the germplasm and breeding lines is a continuous process for developing

high yielding superior genotypes and their improved production technologies suitable for various agro-ecological situations representing high mountains to the desert plains. Quality analysis of selected germplasm and breeding lines are also undertaken to facilitate crop improvement programme.

The present report embodies results of research work undertaken on germplasm evaluation, breeding and agronomic aspects in two Potential Crops at different centres during rabi 2014-15. The compiled report is an outcome of the concerted efforts made by the scientists of AICRN, cooperating and voluntary centres. I express my sincere thanks to Drs. H.L. Raiger, S.K. Yadav, Sheelamary, M.C. Singh, and M. Khabriddin, the Principal Investigators for, Documentation and Database Management, PGR management, Crop Improvement, Crop Production and Quality Analysis respectively for compilation of results and preparation of the report.

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

I wish to record my appreciation to Miss Rimpy and Mr. Ranbir Singh for neatly typing the report.

B.S. Phogat
Network Coordinator

PLANT GENETIC RESOURCES MANAGEMENT

II. PLANT GENETIC RESOURCES MANAGEMENT

During *rabi* 2014-15, a total of 143 accessions of potential crops germplasm were collected, 328 accessions were introduced and 215 accessions were evaluated. Activity wise details are as follows:

2.1 EXPLORATION AND COLLECTION OF GERMPLASM

During the period October 2014 to March 2015, a total of 143 accessions of grain amaranth (8 species) were collected from Andhra Pradesh, Arunachal Pradesh, Nagaland, Assam, Meghalaya, Haryana is given details below:

Table 1: Germplasm Collection of Grain amaranth during 2014-15.

S. No.	Name of Species	Number
1	Amaranthus spinosus	56
2	Amaranthus viridis	11
3	Amaranthus graecizans	27
4	Amaranthus tricolor	27
5	Amaranthus caudatus	3
6	Amaranthus hybridis	10
7	Amaranthus blitum	6
8	Amaranthus tristis	3
	Total	**143**

2.2 GERMPLASM INTRODUCTION

During the period under report, the germplasm of potential crops introduced is given in table 2. A total 328 samples of faba bean and jatropha germplasm were imported from Lebanon and Honduras during 2014-15.

Table 2: Germplasm Introduction of Potential Crops during 2014-15.

Crop/DU	No. of accessions	Supplied to	Country
Faba bean 863/2014	65 (ET268261-325)	ICARDA South Asia Regional Program, NASC Complex, New Delhi	Lebanon
Faba bean 870/2014	183(ET269579-761)	ICARDA South Asia Regional Program, NASC Complex, New Delhi	Lebanon
Jatropha 879/2014	70 (EC831436-505)	Reliance Industries Ltd., Banjara Hills, Hyderabad	Honduras
Faba bean 949/2014	10 (EC834597-606)	ICARDA South Asia Regional Program, NASC Complex, New Delhi	Lebanon

2.3 GERMPLASM EVALUATION

2.3.1 Hills

Multilocational germplasm screening nurseries were planned to be conducted on faba bean. The germplasm accessions were evaluated in augmented design with standard check cultivars.

2.3.1.1 Faba bean (*Vicia faba*)

Germpalsm screening nursery consisting of 100 accessions supplied by NBPGR, Shimla (50 accessions) and CCS HAU, Hisar (50 accessions) was planned to be evaluated at two locations viz. Ranichauri and Palampur. The results were received from both centres (Rabi 2014-15). The list of promising genotypes has been presented in Table 3 and the mean and range in Table 4.

At Palampur, a set of 100 germplasm lines including three checks were evaluated in Rabi 2014-15 for eight quantitative characters. The genotype EC 329695 (72.00 days) was early in flowering while EC691863 (160.00 days) was earliest in maturity. Highest seed yield (2.22 q/ha) was found in genotype HB-021.

At Ranichauri, a set of 100 germplasm lines including one check were evaluated in Rabi 2014-15 for eight quantitative characters. The genotype HB-038 (71.00 days) was early in flowering while HB-001 (160.00 days) was earliest in maturity. The entry HB-03 (30.00 g) was most superior for 100 seed weight while highest seed yield per plant (38.70 g) was found in genotype EC 363691.

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

The mean flowering time was the earliest at Palampur (78.24 days) while late at Ranichauri (113.46 days). On the basis of average over two locations, the entry HB-038 (74.00 days) was superior to the check varieties in flowering.

Maturity period was the earliest at Palampur (171.10 days) and delayed at Ranichauri (175.53 days). Based on the average over two locations entry HB-001 (164.50 days) was the earliest in maturity.

Mean plant height was highest at Palampur (42.53 cm) and low at Ranichauri (24.89 cm). Based on the average over the locations the entry HB-018 (48.70 cm) was found superior to check variety.

Table 3: Promising lines in fababean germplasm (Rabi 2014-15) for various characters at Palampur and Ranichuari (Hills)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
CSKHPKV Palampur (Accessions 100)					
1	Days to 50% flowering	72.00	86.00	EC329695, EC243770, EC243845, EC329691, EC243860, EC267675, EC329631, EC329693, EC363691, EC591792, EC628923, EC628954, HB-080 (< 75.56)	HPFB-2 (76.10)
2	Plant height(cm)	32.00	67.00	HB-018, HB-017, EC691863, HB-024, HB-034, HB-026, HB-028 (> 50.00)	HPFB-2 (45.50)
3	Days to maturity	160.00	178.00	EC691863, HB-053, EC263820, EC598938, HB-045, HB-058, RFB-4 (< 168.00)	HPFB-1(170.70)
4	Number of seed per pod	1.80	3.80	HB-082, HB-048, HB-085, EC329728, HB-035 (> 3.20)	HPFB-1 (2.76)
5	Pod length(cm)	3.40	5.80	HB-045, HB-082, EC243845, HB-175, HB-083, HB-026, HB-028, HB-046 (> 4.90)	HPFB-1 (4.46)
6	Branches/plant	1.60	3.20	HB-068, HB-017, EC598938, HB-003, HB-012, HB-033, HB-034, HB-039, HB-051, HB-062 (> 2.60)	HPFB-2 (2.38)
7	pod width (mm)	0.41	0.70	HB-035, EC117749, HB-608, EC010719, HB-025 (> 0.62)	HPFB-1 (0.55)
8	Grain yield (q/ha)	0.89	2.22	HB-021, HB-005, HB-020, HB-027, HB-033, HB-019 (> 1.56)	HPFB-2 (1.31)
UUHF Ranichuari (Accessions 100)					
1	Days to 50% flowering	71.00	132.00	HB-038, HB-035, HB-039, HB-037, HB-012, HB-033, HB-040, HB-043, HB-022 (< 94.00)	Vikrant (107.56)
2	Plant height (cm)	8.00	38.20	HB-613, EC003293, EC329627, HB-030, HB-012, EC107842, HB-007, EC329696, HB-047, HB-176, HB-188, HB-608, EC032962, EC329691, EC598938, HB-018 (> 30.00)	Vikrant (24.02)
3	Days to maturity	160.00	190.00	HB-001, HB-019, HB-021, HB-027, HB-035, HB-005, HB-017, HB-023, HB-025, HB-030 (< 162.00)	Vikrant (170.89)
4	Number of seed per pod	1.20	4.33	HB-022, HB-019, HB-034, EC243845 (> 3.20)	Vikrant (2.84)
5	Pod length (cm)	2.20	6.00	EC628939, HB-033, HB-047, EC243845, EC329696, EC329728, EC598938, EC628948, HB-007, HB-028 (> 4.80)	Vikrant (3.87)
6	Number of pod per plant	1.33	9.60	HB-012, HB-007, EC329706, EC243608, HB-005, HB-021, HB-047, EC025085, EC107842 (> 5.80)	Vikrant (2.87)
7	Seed yield per plant (g)	14.90	38.70	EC363691, EC329691, EC598938, EC329695, EC329679, HB-176, EC334951, EC329612, RFB-4 (> 35.80)	Vikrant (25.91)
8	100 seed weight (g)	17.60	30.00	HB-043, HB-041, EC010719, EC361494, EC591792, HB-024, EC329679 (> 28.20)	Vikrant (21.64)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
Best entries over locations (Accessions 100)					
1	Days to 50% flowering	74.00	105.00	HB-038 (< 76.10)	HPFB-2 (76.10)
2	Plant height(cm)	24.00	48.70	HB-018 (= 48.70)	HPFB-2 (45.50)
3	Days to maturity	164.50	182.00	HB-001, HB-027, HB-035, HB-021 (< 166.70)	HPFB-1(170.70)
4	Number of seed per pod	1.60	3.77	HB-022, HB-082, EC029085, HB-058, HB-048, HB-085, HB-007, HB-019, HB-035, EC329728, EC329691 (> 3.00)	HPFB-1 (2.76)
5	Pod length(cm)	3.35	5.16	EC628939, EC243845, HB-028, HB-033, EC010719, HB-047, HB-030, HB-023, HB-007, EC010845, EC598938 (> 4.65)	HPFB-1(4.46)

Table 4: Multilocation evaluation of germplasm lines in faba bean at Palampur & Ranichauri - Hills : Rabi 2014-15

S.No.	Accession No.	Days to 50% flowering			Plant height(cm)			Days to maturity		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean
1	EC003293	77.00	119.00	**98.00**	40.00	37.60	**38.80**	174.00	180.00	**177.00**
2	EC010719	77.00	116.00	**96.50**	36.00	27.40	**31.70**	172.00	182.00	**177.00**
3	EC010845	80.00	125.00	**102.50**	35.00	21.00	**28.00**	176.00	175.00	**175.50**
4	EC025085	78.00	127.00	**102.50**	32.00	27.00	**29.50**	172.00	180.00	**176.00**
5	EC029085	84.00	124.00	**104.00**	40.00	30.00	**35.00**	173.00	180.00	**176.50**
6	EC032962	81.00	122.00	**101.50**	48.00	30.40	**39.20**	174.00	185.00	**179.50**
7	EC107842	78.00	127.00	**102.50**	49.00	33.60	**41.30**	174.00	190.00	**182.00**
8	EC108908	81.00	124.00	**102.50**	48.00	19.25	**33.63**	169.00	184.00	**176.50**
9	EC117749	80.00	129.00	**104.50**	42.00	26.60	**34.30**	173.00	180.00	**176.50**
10	EC243608	78.00	131.00	**104.50**	41.00	30.00	**35.50**	176.00	175.00	**175.50**
11	EC243624	78.00	104.00	**91.00**	39.00	14.50	**26.75**	172.00	174.00	**173.00**
12	EC243709	81.00	118.00	**99.50**	46.00	23.67	**34.84**	176.00	178.00	**177.00**
13	EC243770	73.00	113.00	**93.00**	39.00	18.75	**28.88**	171.00	175.00	**173.00**
14	EC243784	75.00	129.00	**102.00**	40.00	26.00	**33.00**	172.00	177.00	**174.50**
15	EC243845	73.00	128.00	**100.50**	43.00	24.20	**33.60**	174.00	176.00	**175.00**
16	EC243860	74.00	132.00	**103.00**	46.00	27.00	**36.50**	171.00	178.00	**174.50**
17	EC263820	75.00	126.00	**100.50**	50.00	24.34	**37.17**	167.00	178.00	**172.50**
18	EC267675	74.00	126.00	**100.00**	36.00	23.40	**29.70**	170.00	176.00	**173.00**
19	EC328588	79.00	128.00	**103.50**	40.00	23.40	**31.70**	169.00	178.00	**173.50**
20	EC328923	78.00	131.00	**104.50**	44.00	24.00	**34.00**	173.00	180.00	**176.50**
21	EC329612	75.00	124.00	**99.50**	35.00	19.00	**27.00**	176.00	185.00	**180.50**
22	EC329627	78.00	127.00	**102.50**	41.00	37.60	**39.30**	174.00	177.00	**175.50**
23	EC329631	74.00	124.00	**99.00**	36.00	22.00	**29.00**	172.00	180.00	**176.00**
24	EC329679	75.00	127.00	**101.00**	42.00	22.40	**32.20**	169.00	182.00	**175.50**
25	EC329691	73.00	125.00	**99.00**	35.00	30.40	**32.70**	168.00	175.00	**171.50**

S.No.	Accession No.	Number of seed per pod			Pod length(cm)			Palampur			Ranichuari		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Branches/ plant	pod width(mm)	Grain yield (q/ha)	Number of pod per plant	Seed yield per plant (g)	100 seed weight (g)
1	EC003293	2.60	2.80	**2.70**	4.50	4.00	**4.25**	2.20	0.62	1.11	5.40	26.19	27.50
2	EC010719	2.60	2.80	**2.70**	4.90	4.80	**4.85**	2.40	0.66	1.33	4.00	29.17	28.70
3	EC010845	2.40	2.67	**2.54**	4.70	4.67	**4.69**	2.20	0.52	1.33	3.00	31.32	17.60
4	EC025085	2.00	2.40	**2.20**	4.10	4.00	**4.05**	2.00	0.60	1.33	6.00	26.60	22.30
5	EC029085	3.20	3.20	**3.20**	4.50	4.20	**4.35**	2.20	0.56	1.11	5.80	25.50	22.40
6	EC032962	2.20	2.60	**2.40**	4.40	4.40	**4.40**	2.20	0.52	1.11	5.20	22.10	27.50
7	EC107842	1.80	3.20	**2.50**	4.60	4.60	**4.60**	2.00	0.62	1.11	6.00	30.55	26.30
8	EC108908	3.10	2.67	**2.89**	3.90	4.33	**4.12**	2.00	0.54	1.33	3.67	31.60	26.60
9	EC117749	3.00	2.40	**2.70**	4.50	4.80	**4.65**	2.00	0.68	1.44	5.80	28.50	27.30
10	EC243608	2.60	3.20	**2.90**	4.40	4.80	**4.60**	2.00	0.58	1.11	7.00	32.10	26.40
11	EC243624	1.80	2.40	**2.10**	4.60	3.25	**3.93**	2.20	0.62	1.11	2.25	23.12	24.64
12	EC243709	2.20	2.60	**2.40**	4.39	3.60	**4.00**	2.00	0.50	1.11	3.80	25.15	23.71
13	EC243770	2.80	2.33	**2.57**	4.54	3.33	**3.94**	2.20	0.46	1.11	3.00	26.18	23.61
14	EC243784	2.60	2.67	**2.64**	4.36	4.00	**4.18**	1.80	0.58	1.11	3.20	23.19	25.08
15	EC243845	2.40	3.33	**2.87**	5.04	5.00	**5.02**	2.00	0.62	1.11	3.50	32.10	24.41
16	EC243860	2.40	3.00	**2.70**	4.29	4.00	**4.15**	2.00	0.58	1.11	3.00	35.15	23.90
17	EC263820	2.60	2.33	**2.47**	4.79	3.33	**4.06**	2.00	0.56	1.11	3.67	27.42	25.34
18	EC267675	2.00	2.20	**2.10**	4.64	3.40	**4.02**	1.80	0.50	1.11	2.98	28.40	23.96
19	EC328588	2.20	2.40	**2.30**	4.67	3.80	**4.24**	2.00	0.48	1.11	3.20	34.15	23.10
20	EC328923	2.50	2.67	**2.59**	4.37	3.33	**3.85**	2.20	0.56	1.11	3.33	33.80	27.30
21	EC329612	2.40	1.67	**2.04**	4.34	2.67	**3.51**	2.00	0.56	1.11	2.00	36.08	22.70
22	EC329627	2.60	2.60	**2.60**	4.31	4.60	**4.46**	2.00	0.54	1.11	5.20	26.90	24.30
23	EC329631	2.80	2.80	**2.80**	4.31	4.40	**4.36**	2.00	0.52	1.11	3.80	33.35	21.10
24	EC329679	3.00	2.20	**2.60**	4.45	2.60	**3.53**	2.20	0.48	1.11	3.80	36.80	28.40
25	EC329691	3.00	3.00	**3.00**	4.34	4.00	**4.17**	2.00	0.52	0.89	3.40	38.10	23.40

S.No.	Accession No.	Days to 50% flowering			Plant height(cm)			Days to maturity		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean
26	EC329693	74.00	131.00	**102.50**	41.00	20.60	**30.80**	170.00	180.00	**175.00**
27	EC329695	72.00	129.00	**100.50**	45.00	24.25	**34.63**	172.00	180.00	**176.00**
28	EC329696	75.00	131.00	**103.00**	40.00	32.40	**36.20**	174.00	185.00	**179.50**
29	EC329706	79.00	119.00	**99.00**	42.00	29.00	**35.50**	172.00	184.00	**178.00**
30	EC329728	78.00	122.00	**100.00**	35.00	27.00	**31.00**	170.00	180.00	**175.00**
31	EC329812	75.00	126.00	**100.50**	39.00	28.33	**33.67**	169.00	185.00	**177.00**
32	EC331564	79.00	131.00	**105.00**	44.00	18.00	**31.00**	168.00	180.00	**174.00**
33	EC334951	78.00	129.00	**103.50**	35.00	21.34	**28.17**	172.00	185.00	**178.50**
34	EC361494	75.00	124.00	**99.50**	40.00	8.00	**24.00**	172.00	190.00	**181.00**
35	EC363691	74.00	119.00	**96.50**	36.00	28.60	**32.30**	170.00	184.00	**177.00**
36	EC591792	74.00	122.00	**98.00**	35.00	28.50	**31.75**	169.00	180.00	**174.50**
37	EC598938	78.00	125.00	**101.50**	39.00	30.40	**34.70**	167.00	175.00	**171.00**
38	EC628923	74.00	129.00	**101.50**	44.00	22.40	**33.20**	174.00	177.00	**175.50**
39	EC628925	75.00	127.00	**101.00**	42.00	27.60	**34.80**	170.00	180.00	**175.00**
40	EC628937	78.00	131.00	**104.50**	35.00	25.40	**30.20**	174.00	182.00	**178.00**
41	EC628939	79.00	127.00	**103.00**	43.00	23.20	**33.10**	172.00	175.00	**173.50**
42	EC628948	78.00	131.00	**104.50**	40.00	28.00	**34.00**	175.00	180.00	**177.50**
43	EC628954	74.00	122.00	**98.00**	45.00	23.34	**34.17**	172.00	180.00	**176.00**
44	EC691863	79.00	124.00	**101.50**	53.00	23.20	**38.10**	160.00	185.00	**172.50**
45	HB-001	80.00	94.00	**87.00**	43.00	17.40	**30.20**	169.00	160.00	**164.50**
46	HB-003	81.00	98.00	**89.50**	35.00	20.67	**27.84**	170.00	165.00	**167.50**
47	HB-005	77.00	96.00	**86.50**	36.00	28.00	**32.00**	172.00	161.00	**166.50**
48	HB-007	80.00	97.00	**88.50**	41.00	32.80	**36.90**	170.00	162.00	**166.00**
49	HB-012	79.00	91.00	**85.00**	45.00	33.80	**39.40**	174.00	168.00	**171.00**
50	HB-017	79.00	96.00	**87.50**	55.00	23.00	**39.00**	172.00	161.00	**166.50**
51	HB-018	80.00	99.00	**89.50**	67.00	30.40	**48.70**	173.00	167.00	**170.00**
52	HB-019	81.00	94.00	**87.50**	46.00	27.80	**36.90**	178.00	160.00	**169.00**
53	HB-020	78.00	97.00	**87.50**	50.00	26.20	**38.10**	170.00	162.00	**166.00**

S.No.	Accession No.	Number of seed per pod			Pod length(cm)			Palampur			Ranichuari		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Branches/ plant	pod width(mm)	Grain yield (q/ha)	Number of pod per plant	Seed yield per plant (g)	100 seed weight (g)
26	EC329693	2.80	2.20	**2.50**	4.35	4.67	**4.51**	2.00	0.50	0.89	4.00	32.10	22.70
27	EC329695	2.20	1.75	**1.98**	4.48	3.20	**3.84**	2.20	0.52	1.11	2.75	36.90	24.60
28	EC329696	2.40	2.80	**2.60**	4.29	5.00	**4.65**	2.20	0.50	1.11	3.60	32.40	27.70
29	EC329706	1.80	2.60	**2.20**	4.37	4.20	**4.29**	2.00	0.54	1.11	7.20	32.00	24.10
30	EC329728	3.40	2.67	**3.04**	4.21	5.00	**4.61**	2.00	0.50	1.11	3.75	33.00	24.50
31	EC329812	2.40	3.00	**2.70**	4.21	4.33	**4.27**	2.60	0.52	1.11	3.67	32.15	26.33
32	EC331564	2.20	2.00	**2.10**	4.32	3.00	**3.66**	2.00	0.50	1.11	3.00	35.80	25.69
33	EC334951	2.50	1.33	**1.92**	4.40	3.00	**3.70**	2.20	0.52	1.11	3.67	36.35	26.50
34	EC361494	2.40	2.00	**2.20**	4.32	3.00	**3.66**	2.20	0.48	1.11	2.00	32.35	28.70
35	EC363691	2.80	2.40	**2.60**	4.46	4.00	**4.23**	1.80	0.50	1.11	4.36	38.70	22.40
36	EC591792	2.50	2.00	**2.25**	4.35	4.00	**4.18**	2.20	0.48	1.11	5.67	29.10	28.70
37	EC598938	2.40	2.80	**2.60**	4.32	5.00	**4.66**	2.80	0.50	1.11	5.20	37.12	27.70
38	EC628923	2.50	2.00	**2.25**	4.54	4.60	**4.57**	2.00	0.48	1.11	2.60	31.10	24.70
39	EC628925	2.40	2.00	**2.20**	4.62	4.00	**4.31**	2.00	0.50	1.11	4.00	28.70	21.22
40	EC628937	2.20	2.40	**2.30**	4.19	4.80	**4.50**	2.20	0.52	0.89	5.00	30.10	24.67
41	EC628939	2.80	3.00	**2.90**	4.31	6.00	**5.16**	2.00	0.54	0.89	4.50	32.10	25.41
42	EC628948	2.70	2.00	**2.35**	4.23	5.00	**4.62**	1.80	0.52	0.89	2.00	35.15	24.90
43	EC628954	2.60	2.33	**2.47**	4.27	4.33	**4.30**	2.04	0.50	0.89	4.67	27.42	25.34
44	EC691863	2.90	2.20	**2.55**	4.19	3.40	**3.80**	2.20	0.51	0.89	3.40	28.40	24.96
45	HB-001	2.40	2.00	**2.20**	4.00	3.20	**3.60**	2.40	0.61	1.11	3.20	16.80	27.60
46	HB-003	2.60	2.33	**2.47**	4.60	3.33	**3.97**	2.80	0.52	1.11	2.67	20.67	27.20
47	HB-005	2.60	2.60	**2.60**	4.60	4.60	**4.60**	2.60	0.54	1.67	7.00	21.10	26.55
48	HB-007	3.00	3.20	**3.10**	4.40	5.00	**4.70**	2.60	0.52	0.89	7.60	16.67	24.40
49	HB-012	2.80	2.60	**2.70**	3.90	4.20	**4.05**	2.80	0.51	0.89	9.60	25.10	26.50
50	HB-017	3.20	2.00	**2.60**	4.60	3.80	**4.20**	3.00	0.52	1.11	4.20	26.92	22.60
51	HB-018	2.50	2.40	**2.45**	4.20	3.00	**3.60**	2.60	0.51	0.89	5.00	18.90	24.63
52	HB-019	2.20	4.00	**3.10**	4.50	4.60	**4.55**	1.80	0.46	1.56	5.80	15.10	25.67
53	HB-020	2.40	2.60	**2.50**	4.80	3.60	**4.20**	1.80	0.48	1.67	4.60	20.00	24.35

S.No.	Accession No.	Days to 50% flowering			Plant height(cm)			Days to maturity		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean
54	HB-021	80.00	94.00	**87.00**	43.00	25.00	**34.00**	171.00	160.00	**165.50**
55	HB-022	77.00	93.00	**85.00**	46.00	28.80	**37.40**	170.00	162.00	**166.00**
56	HB-023	82.00	97.00	**89.50**	47.00	22.40	**34.70**	172.00	161.00	**166.50**
57	HB-024	84.00	99.00	**91.50**	53.00	21.60	**37.30**	173.00	165.00	**169.00**
58	HB-025	78.00	96.00	**87.00**	34.00	25.60	**29.80**	174.00	161.00	**167.50**
59	HB-026	84.00	99.00	**91.50**	52.00	24.20	**38.10**	174.00	164.00	**169.00**
60	HB-027	79.00	94.00	**86.50**	46.00	27.80	**36.90**	170.00	160.00	**165.00**
61	HB-028	86.00	99.00	**92.50**	52.00	24.80	**38.40**	169.00	165.00	**167.00**
62	HB-030	80.00	97.00	**88.50**	38.00	34.60	**36.30**	172.00	161.00	**166.50**
63	HB-031	81.00	97.00	**89.00**	46.00	30.00	**38.00**	170.00	162.00	**166.00**
64	HB-032	77.00	99.00	**88.00**	39.00	20.60	**29.80**	172.00	164.00	**168.00**
65	HB-033	82.00	91.00	**86.50**	40.00	24.20	**32.10**	174.00	167.00	**170.50**
66	HB-034	79.00	97.00	**88.00**	53.00	26.80	**39.90**	172.00	169.00	**170.50**
67	HB-035	81.00	74.00	**77.50**	40.00	16.60	**28.30**	170.00	160.00	**165.00**
68	HB-037	78.00	79.00	**78.50**	45.00	16.80	**30.90**	169.00	165.00	**167.00**
69	HB-038	77.00	71.00	**74.00**	45.00	19.00	**32.00**	168.00	168.00	**168.00**
70	HB-039	84.00	77.00	**80.50**	44.00	17.00	**30.50**	172.00	164.00	**168.00**
71	HB-040	81.00	91.00	**86.00**	39.00	18.00	**28.50**	172.00	180.00	**176.00**
72	HB-041	82.00	94.00	**88.00**	35.00	21.60	**28.30**	170.00	175.00	**172.50**
73	HB-043	78.00	91.00	**84.50**	39.00	16.00	**27.50**	169.00	177.00	**173.00**
74	HB-045	77.00	95.00	**86.00**	40.00	17.60	**28.80**	167.00	180.00	**173.50**
75	HB-046	79.00	97.00	**88.00**	48.00	25.33	**36.67**	174.00	180.00	**177.00**
76	HB-047	80.00	94.00	**87.00**	49.00	32.00	**40.50**	170.00	185.00	**177.50**
77	HB-048	78.00	96.00	**87.00**	50.00	29.33	**39.67**	174.00	178.00	**176.00**
78	HB-049	77.00	114.00	**95.50**	44.00	15.50	**29.75**	172.00	184.00	**178.00**
79	HB-050	75.00	119.00	**97.00**	42.00	24.40	**33.20**	170.00	180.00	**175.00**
80	HB-051	78.00	113.00	**95.50**	41.00	16.75	**28.88**	172.00	175.00	**173.50**
81	HB-053	79.00	129.00	**104.00**	40.00	26.00	**33.00**	160.00	177.00	**168.50**

S.No.	Accession No.	Number of seed per pod			Pod length(cm)			Palampur			Ranichuari		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Branches/ plant	pod width(mm)	Grain yield (q/ha)	Number of pod per plant	Seed yield per plant (g)	100 seed weight (g)
54	HB-021	2.40	2.40	**2.40**	4.20	3.80	**4.00**	2.20	0.52	2.22	6.60	22.10	24.15
55	HB-022	3.20	4.33	**3.77**	4.60	4.60	**4.60**	2.60	0.46	1.33	5.80	14.90	24.67
56	HB-023	2.80	2.00	**2.40**	4.70	4.80	**4.75**	2.20	0.58	1.11	3.60	20.15	26.60
57	HB-024	3.20	2.40	**2.80**	4.60	4.00	**4.30**	1.80	0.56	1.11	3.00	21.10	28.70
58	HB-025	2.60	2.00	**2.30**	4.80	3.40	**4.10**	1.60	0.64	1.33	3.80	25.12	24.40
59	HB-026	3.00	2.40	**2.70**	4.96	4.20	**4.58**	1.80	0.52	1.56	3.20	22.05	25.11
60	HB-027	2.50	2.00	**2.25**	4.70	3.60	**4.15**	2.00	0.62	1.67	5.20	19.18	26.70
61	HB-028	2.20	2.40	**2.30**	4.93	5.00	**4.97**	1.80	0.54	1.11	3.40	23.60	24.40
62	HB-030	2.40	2.60	**2.50**	4.80	4.80	**4.80**	1.80	0.52	0.89	5.60	26.12	25.30
63	HB-031	3.00	2.40	**2.70**	4.60	3.40	**4.00**	1.80	0.50	1.33	4.20	22.18	22.30
64	HB-032	2.00	2.60	**2.30**	4.70	4.20	**4.45**	1.60	0.58	1.33	2.00	33.10	24.60
65	HB-033	2.00	2.40	**2.20**	4.50	5.40	**4.95**	2.80	0.58	1.67	4.20	24.12	22.68
66	HB-034	2.20	3.35	**2.78**	4.60	4.65	**4.63**	2.80	0.58	0.89	3.60	19.13	24.12
67	HB-035	3.40	2.80	**3.10**	3.90	3.60	**3.75**	2.20	0.70	0.89	3.20	24.18	24.40
68	HB-037	2.20	2.00	**2.10**	4.80	3.40	**4.10**	2.20	0.56	1.11	3.20	26.12	22.20
69	HB-038	2.80	1.80	**2.30**	4.50	2.20	**3.35**	1.60	0.60	1.33	3.20	28.70	28.20
70	HB-039	2.60	2.00	**2.30**	4.50	2.33	**3.42**	2.80	0.50	1.11	1.33	33.40	19.40
71	HB-040	2.80	1.60	**2.20**	4.40	3.80	**4.10**	2.40	0.62	1.11	2.00	27.12	25.40
72	HB-041	2.00	1.20	**1.60**	4.60	2.80	**3.70**	2.60	0.48	1.33	4.20	23.10	29.20
73	HB-043	3.20	2.00	**2.60**	4.40	2.67	**3.54**	2.40	0.62	1.33	1.67	26.20	30.00
74	HB-045	2.40	1.80	**2.10**	5.80	3.04	**4.42**	1.80	0.52	1.33	1.66	28.00	26.00
75	HB-046	2.80	2.67	**2.74**	4.93	3.67	**4.30**	2.40	0.52	1.11	5.00	30.12	22.67
76	HB-047	3.20	2.80	**3.00**	4.50	5.20	**4.85**	2.00	0.52	1.11	6.33	31.80	24.68
77	HB-048	3.60	2.67	**3.14**	4.60	4.33	**4.47**	2.40	0.52	1.11	2.33	28.56	22.33
78	HB-049	3.00	2.40	**2.70**	4.40	3.25	**3.83**	1.80	0.62	1.11	2.25	22.12	23.64
79	HB-050	2.40	2.60	**2.50**	4.64	4.20	**4.42**	2.00	0.50	1.11	4.20	26.15	24.71
80	HB-051	2.60	2.33	**2.47**	4.71	3.33	**4.02**	2.80	0.48	0.89	3.00	27.18	24.61
81	HB-053	3.20	2.67	**2.94**	3.40	4.00	**3.70**	2.00	0.58	1.11	4.20	22.19	25.08

S.No.	Accession No.	Days to 50% flowering			Plant height(cm)			Days to maturity		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean
82	HB-056	80.00	124.00	**102.00**	42.00	20.60	**31.30**	168.00	180.00	**174.00**
83	HB-058	84.00		**84.00**	40.00		**40.00**	167.00		**167.00**
84	HB-059	81.00	119.00	**100.00**	39.00	28.67	**33.84**	169.00	182.00	**175.50**
85	HB-062	76.00	121.00	**98.50**	44.00	28.33	**36.17**	168.00	175.00	**171.50**
86	HB-068	75.00	119.00	**97.00**	42.00	19.67	**30.84**	172.00	180.00	**176.00**
87	HB-080	74.00	111.00	**92.50**	40.00	24.67	**32.34**	172.00	180.00	**176.00**
88	HB-082	80.00	126.00	**103.00**	42.00	23.12	**32.56**	170.00	175.00	**172.50**
89	HB-083	81.00	114.00	**97.50**	40.00	24.33	**32.17**	169.00	174.00	**171.50**
90	HB-085	84.00	121.00	**102.50**	42.00	24.67	**33.34**	169.00	183.00	**176.00**
91	HB-174	82.00	117.00	**99.50**	40.00	17.20	**28.60**	170.00	180.00	**175.00**
92	HB-175	81.00	124.00	**102.50**	47.00	22.00	**34.50**	172.00	185.00	**178.50**
93	HB-176	80.00	119.00	**99.50**	48.00	31.40	**39.70**	170.00	190.00	**180.00**
94	HB-188	79.00	124.00	**101.50**	46.00	31.00	**38.50**	174.00	184.00	**179.00**
95	HB-604	78.00	127.00	**102.50**	47.00	30.00	**38.50**	170.00	180.00	**175.00**
96	HB-608	80.00	124.00	**102.00**	36.00	30.80	**33.40**	171.00	175.00	**173.00**
97	HB-613	78.00	127.00	**102.50**	40.00	38.20	**39.10**	172.00	177.00	**174.50**
98	IC331449	78.00	131.00	**104.50**	44.00	25.00	**34.50**	168.00	180.00	**174.00**
99	RFB-4	75.00	124.00	**99.50**	45.00	19.00	**32.00**	167.00	185.00	**176.00**
Mean for check variety										
1	HPFB-1	76.50	-	76.50	41.90	-	41.90	170.70	-	170.70
2	HPFB-2	76.10	-	76.10	45.50	-	45.50	172.00	-	172.00
3	Vikrant	77.10	107.56	92.33	42.90	24.02	33.46	172.30	170.89	171.59
Minimum		**72.00**	**71.00**	**74.00**	**32.00**	**8.00**	**24.00**	**160.00**	**160.00**	**164.50**
Maximum		**86.00**	**132.00**	**105.00**	**67.00**	**38.20**	**48.70**	**178.00**	**190.00**	**182.00**
Mean		**78.24**	**113.46**	**95.34**	**42.53**	**24.89**	**33.97**	**171.10**	**175.53**	**173.23**
CD (0.05)		**4.80**	**-**	**-**	**12.95**	**-**	**-**	**4.92**	**-**	**-**
CV (%) Error		**2.44**	**-**	**-**	**11.62**	**-**	**-**	**1.12**	**-**	**-**
CV (%) Pheno.		**3.75**	**13.94**	**8.29**	**12.87**	**21.94**	**12.58**	**1.63**	**4.71**	**2.46**

S.No.	Accession No.	Number of seed per pod			Pod length(cm)			Palampur			Ranichuari		
		Palampur	Ranichuari	Mean	Palampur	Ranichuari	Mean	Branches/ plant	pod width(mm)	Grain yield (q/ha)	Number of pod per plant	Seed yield per plant (g)	100 seed weight (g)
82	HB-056	3.00	1.80	**2.40**	3.90	3.40	**3.65**	2.40	0.54	0.89	2.60	21.50	24.18
83	HB-058	3.20		**3.20**	4.00		**4.00**	1.60	0.60	0.89			
84	HB-059	2.80	3.00	**2.90**	4.50	3.67	**4.09**	2.40	0.58	1.11	3.67	22.12	23.54
85	HB-062	2.40	2.67	**2.54**	4.10	3.33	**3.72**	2.80	0.48	1.11	3.67	33.10	24.65
86	HB-068	2.60	2.00	**2.30**	3.90	4.00	**3.95**	3.20	0.52	0.89	2.67	32.15	23.67
87	HB-080	3.00	2.67	**2.84**	4.00	4.00	**4.00**	2.00	0.48	0.89	3.00	31.10	24.54
88	HB-082	3.80	2.67	**3.24**	5.20	3.66	**4.43**	2.60	0.60	1.11	3.00	32.33	23.67
89	HB-083	3.20	2.60	**2.90**	4.99	4.00	**4.50**	2.20	0.41	1.11	1.75	34.12	18.33
90	HB-085	3.60	2.67	**3.14**	4.41	3.33	**3.87**	2.00	0.58	1.11	2.33	25.18	23.97
91	HB-174	3.00	1.60	**2.30**	4.36	3.20	**3.78**	2.00	0.62	1.11	2.60	28.10	24.30
92	HB-175	2.80	2.00	**2.40**	5.04	4.20	**4.62**	2.20	0.51	1.11	4.20	30.60	22.70
93	HB-176	3.20	2.20	**2.70**	4.29	3.80	**4.05**	2.20	0.54	0.89	4.20	36.80	19.20
94	HB-188	3.00	2.00	**2.50**	4.79	4.00	**4.40**	2.00	0.62	1.11	5.50	34.12	19.30
95	HB-604	3.00	2.00	**2.50**	4.64	3.80	**4.22**	2.20	0.60	1.33	5.40	35.60	24.70
96	HB-608	2.60	2.60	**2.60**	4.50	4.40	**4.45**	2.00	0.68	1.11	5.60	28.75	26.30
97	HB-613	3.20	2.60	**2.90**	4.40	4.60	**4.50**	2.40	0.60	1.11	5.40	31.15	26.30
98	IC331449	2.80	2.67	**2.74**	4.35	3.00	**3.68**	1.80	0.48	0.89	3.33	32.80	26.30
99	RFB-4	3.10	1.67	**2.39**	4.29	2.67	**3.48**	1.80	0.46	0.89	2.00	36.08	22.70
Mean for check variety													
1	HPFB-1	2.76	-	2.76	4.46	-	4.46	2.26	0.55	1.11	-	-	-
2	HPFB-2	2.68	-	2.68	4.15	-	4.15	2.38	0.55	1.31	-	-	-
3	Vikrant	2.54	2.84	2.69	4.28	3.87	4.08	2.18	0.54	1.09	2.87	25.91	21.64
Minimum		**1.80**	**1.20**	**1.60**	**3.40**	**2.20**	**3.35**	**1.60**	**0.41**	**0.89**	**1.33**	**14.90**	**17.60**
Maximum		**3.80**	**4.33**	**3.77**	**5.80**	**6.00**	**5.16**	**3.20**	**0.70**	**2.22**	**9.60**	**38.70**	**30.00**
Mean		**2.67**	**2.45**	**2.56**	**4.46**	**3.94**	**4.21**	**2.17**	**0.54**	**1.14**	**3.96**	**28.23**	**24.69**
CD (0.05)		**0.82**	**-**	**-**	**0.90**	**-**	**-**	**0.68**	**0.12**	**0.56**	**-**	**-**	**-**
CV (%) Error		**11.97**	**-**	**-**	**8.19**	**-**	**-**	**11.66**	**8.63**	**18.78**	**-**	**-**	**-**
CV (%) Pheno.		**15.49**	**20.44**	**13.15**	**7.10**	**18.68**	**9.44**	**15.22**	**10.24**	**18.74**	**37.80**	**19.93**	**9.45**

2.3.2 Plains

Germplasm evaluation was planned to be conducted on grain amaranth, and faba bean. The germplasm accessions were evaluated in augmented design with standard check cultivars.

2.3.2.1 Grain Amaranth (Rabi 2014-15)

Germplasm screening nursery consisting of 65 accessions along with five checks was planned to be evaluated at eight locations. The results were received from all locations. The checks used were GA-2, BGA-2, RMA-7 and Suvarna at seven locations and GA-1, GA-2, BGA-2, RMA-7 and Suvarna at Ambikapur location. The list of promising accessions for all characters has been presented in Table 5, the qualitative characters for three locations in table 6 and statistical parameters for all the characters of different locations have been presented in Table 7.

A set of 65 accessions and four checks were evaluated for twelve quantitative and twelve qualitative characters (Table 6) at S.K. Nagar. Accession SKGPA-112 (51.20 g/plant) was observed highest yielder. The maximum plant height (182.54 cm) was observed in check variety GA-2. The maximum seed weight was recorded in accession IC095509 (8.90 g) followed by IC095654 (8.84 g). The longest inflorescence (92.80 cm) was recorded in the genotype SKGPA-112. Accession SKGPA-111 (31.00 days) was earliest in flowering while IC095369 was early in maturing (99.00 days).

A total of 65 accessions and four checks were also evaluated at OUA&T, Bhubaneswar for eleven quantitative characters. Accessions IC095348 (41.00 days) were earliest in flowering while IC095348 was early in maturity (91.00 days). The entry SKGPA-120 (28.86 g) had the highest grain yield per plant. The highest plant height was observed in IC094660 (135.00 cm). The highest seed volume weight was observed in accession IC095542 (8.18 g).

A set of 65 genotypes and four checks were screened for seven yield related attributes at JAU, Mandor. Accessions IC095348 (47.00 days) was found earlier to the check variety in flowering and IC095435 (117.00 days) was earliest for maturity. The maximum height (136.00 cm) was found in the

accession IC095481 followed by IC095540 (132.00 cm) and SKGPA-118 (15.00 g) was found superior to the check in yield per plant. The highest test weight (7.81 g) was observed in the genotype IC095301.

A set of 65 genotypes and four check varieties were screened for seven yield related attributes at IGKV, Ambikapur. Accessions IC095385 (77.00 days) were found earlier to the check variety in flowering while IC095369 was early in maturing (141.00 days). The maximum height (120.80 cm) was found in the accessions IC042016. The IC095301 was superior to the check for seed yield (12.50 q/ha). The highest inflorescence length (24.80 cm) was found in the genotype IC095604.

A total of 65 genotypes were also evaluated at Ranchi for twelve yield attributes. IC095258 (70.00 days) was earliest in flowering and IC095377 was found superior to check variety in maturity (148.00 days). Maximum plant height (71.00 cm) was observed in genotype SKGPA-115 while highest seed yield (11.40 g/plant) was observed in genotype IC042016. The highest inflorescence length (31.00 cm) was noted in the accession SKGPA-112.

At Rahuri, a set of 65 genotypes and four checks were evaluated for nine quantitative characters. The entry SKGPA-123 (100.30 cm) was superior as compared to check variety for plant height. SKGPA-111 (65.60 days) was earliest in flowering and SKGPA-123 was found superior to check variety in maturity (108.90 days). Highest seed yield (12.40 g/plant) was observed in genotype SKGPA-121. The highest inflorescence length (56.50 cm) was noted in the accession SKGPA-21.

At Akola, a set of 65 genotypes and four checks were evaluated for ten quantitative characters. The entry IC042016 (135.64 cm) was superior as compared to check variety for plant height. IC042011 (53.00 days) was earliest in flowering and IC042006 (115.00 days) was found superior to the check variety in maturity.

A total of 65 accessions and four checks were also evaluated at NBPGR, New Delhi for seven quantitative characters and nine qualitative characters (Table 6). Accessions SKGPA-124 (57.00 days) was earliest in flowering while SKGPA-113 was earliest in maturity (150.00 days). The longest inflorescence

length was found in IC042011 (57.92 cm). Highest seed yield (24.33 g/plant) was observed in genotype IC095302.

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

Significant differences were observed among the accessions for seed yield per plant at seven centres. Seed yield per plant (g) was low at Mandor (4.54 g) and high at S.K. Nagar (18.76 g). The accession IC095591 (17.22 g) was the highest seed yielder.

Plant height was the highest at S.K. Nagar (130.05 cm) and lowest at Ranchi (42.79 cm) on the basis of average over the eight locations. The genotype IC042016 had the highest plant height (114.69 cm).

Flowering time showed considerable variation among the locations as well as among the accessions within a location. The mean flowering time was the lowest (41.88 days) at S.K. Nagar while it was the longest (86.19 days) at Ranchi. The variety IC095258 showed consistency for early flowering over the locations and ranked first (57.43 days) based on the overall performance.

Maturity period was the earliest at S.K. Nagar (108.20 days) followed by Ranchi (118.70 days). The entry SKGPA-111 (127.00 days) was the earliest maturing line based on seven locations.

The length of inflorescence of the accessions was the highest at S.K. Nagar (64.54 cm) and lowest at Ranchi (14.62 cm). Based on the average over eight locations, the variety IC095508 had the longest inflorescence (45.32 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at seven centres showed that it was the highest at Ranchi (8.81 g/10ml) and low at Akola (6.21 g/10ml). Based on the average over seven locations, the check variety GA-1 showed the highest test weight (9.26 g/10ml).

2.3.2.2 Fababean (*Vicia faba*)

Germplasm screening nursery was evaluated at four locations viz. Hisar, New Delhi, Ranchi and Faizabad. The results were received from all locations. The check used was Vikrant and the list of promising genotypes of the all centres

has been presented in Table 8 and statistical parameters for all the characters of different locations have been presented in Table 9.

At CCS HAU, Hisar, a set of 50 including check was evaluated for ten quantitative. The genotype HB-032 (41.00 days) were earlier in flowering while HB-034 (139.00 days) for maturity. Maximum plant height (161.50 cm) was observed in the genotype HB-039 followed by HB-188 (137.50 cm). The entry EC628937 (55.30 g) had the highest 100 seed weight while the genotype EC628937 (87.30 g) had the highest seed yield per plant.

A total of 50 genotypes including one check was evaluated in Augmented Design at NBPGR, New Delhi for four quantitative and ten qualitative characters (Table-10). Early flowering was observed (68.00 days) in the genotype EC108908 whereas early maturity was observed (139.00 days) in the genotype EC108908. Highest seed yield per plant (38.86) were observed in the genotype HB-023. Maximum plant height (97.60 cm) was recorded in the genotype HB-001.

At NDUAT, Faizabad a set of 50 including check was evaluated for seven quantitative. The genotype HB-085 (54.00 days) were earlier in flowering while EC029085 (141.00 days) for maturity. Maximum plant height (109.20 cm) was observed in the genotype HB-012 followed by EC329627 (102.00 cm). The entry HB-188 (29.04 g) had the highest 100 seed weight while the genotype EC329627 (35.00 g) had the highest seed yield per plant.

A total of 50 genotypes including one check was evaluated in Augmented Design at BAU, Ranchi for five quantitative and eight qualitative characters (Table-10). Early flowering was observed (50.00 days) in the genotype EC329627 whereas early maturity was observed (149.00 days) in the genotype EC243860. Highest seed yield per plant (9.90) were observed in the genotype EC628923.

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

The mean flowering time was the earliest at Ranchi (55.16 days), while it was late at Delhi (76.52 days). On the basis of average over four locations, the entry RFB-4 (55.00 days) was superior to the check varieties in flowering.

Maturity period was the earliest at Delhi (143.48 days) and delayed at Hisar (159.50 days). Based on the average over four locations entry EC029085 (142.33 days) was the earliest in maturity.

Mean plant height was highest at Hisar (96.14 cm) and low at Delhi (75.73 cm). Based on the average over the locations the entry EC591792 (107.93 cm) was found superior to check variety.

The grain yield per plant recorded at four locations showed that Hisar centre had the very highest seed yield per plant (33.38 g) followed by Faizabad (26.23 g). Based on average over the four locations, the entry EC628937 (35.27 g) had the highest grain yield per plant.

100 seed weight was observed at four locations. It showed that highest seed weight was at Ranchi (33.53 g) followed by Hisar (29.27 g). Based on average over four locations, the entry EC628948 (34.52 g) was superior to check variety.

Table 5: Promising lines in grain amaranth germplasm (Rabi 2014-15) for various characters at different locations (Plains)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	NBPGR RS Akola (65 accessions)				
1	Days to 50% flowering	53.00	78.50	IC042011, SKGPA-111, SKGPA-118, SKGPA-122, IC042006, IC095254, SKGPA-125 (< 57.00)	GA-2 (70.50)
2	Days to 80% maturity	115.00	135.50	IC042006, SKGPA-124, IC095481, SKGPA-125, SKGPA-111, SKGPA-115, SKGPA-122 (< 122.00)	GA-2 (133.00)
3	Plant height (cm)	57.22	135.64	IC042016 (> 124.48)	GA-2 (124.48)
4	Stem thickness (mm)	6.83	16.07	IC095481, IC095604 (> 14.52)	Suvarna (14.52)
5	Leaf length (cm)	7.10	15.90	IC095512 (> 15.26)	Suvarna (15.26)
6	Leaf width (cm)	3.88	8.69		Suvarna (8.69)
7	Inflorescence length (cm)	14.82	34.16	IC095475, IC095481, IC095474, SKGPA-123, IC042015, SKGPA-122, IC042016 (> 32.00)	RMA-7 (29.03)
8	Lateral spikelet length (cm)	7.76	31.36	IC095604, SKGPA-113, IC095603, IC042015, SKGPA-123, IC055147, SKGPA-111 (> 24.72)	Suvarna (20.91)
9	Petiole length (cm)	3.20	8.93		BGA-2 (8.93)
10	Number of branches per plant	0.00	6.20	IC042011, IC095508, IC095435, IC081697, IC081698, IC095481, IC065548 (> 4.00)	RMA-7 (2.90)
11	Seed yield per plant (g)	0.62	15.61	IC095512, SKGPA-124, IC095504, IC095523, IC095529, IC042011, IC095474, IC095555 (> 8.80)	Suvarna (8.79)
12	Seed volume (g/10 ml)	5.20	7.60	IC095523, SKGPA-111, IC093950, IC095254 (> 7.40)	Suvarna (6.30)
	IGKV Ambikapur (65 accessions)				
1	Days to 50% flowering	77.00	88.00	IC095385, IC095386, IC081697 (< 83.00)	GA-2 (83.00)
2	Days to 80% maturity	141.00	151.00	IC095369, IC095377, IC095385 (< 147.00)	Suvarna (147.00)
3	Plant height (cm)	60.00	120.80	IC042016, IC042015, IC095475 (> 110.80)	Suvarna (110.80)
4	Inflorescence length (cm)	12.00	24.80	IC095604, IC095603, IC095385, IC093950, IC095345, IC095258 (> 22.20)	GA-2 (13.80)
5	Number of branches per plant	1.20	5.40	IC095603, IC095508, IC095523, IC095509, IC095301, IC095542, IC042006, SKGPA-113 (> 4.00)GA-1 (2.20)	RMA-7 (2.20)
6	Grain yield (q/ha)	1.53	12.50	IC095301, IC042015, IC081698, IC095254, IC095302, IC095541, IC095435 (> 9.33)	GA-2 (9.31)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	OUAT, Bhubaneswar (65 accessions)				
1	Days to 50% flowering	41.00	59.00	IC095348, IC095385, SKGPA-111, SKGPA-121, SKGPA-122, SKGPA-124, SKGPA-125, SKGPA-126, IC094652 (< 45.00)	GA-2 (56.50)
2	Days to 80% maturity	91.00	109.00	IC095348, IC095385, SKGPA-111, SKGPA-121, SKGPA-122, SKGPA-124, SKGPA-125, SKGPA-126 (< 93.00)	GA-2 (106.50)
3	Plant height (cm)	52.20	135.00	IC094660 (> 134.90)	BGA-2 (134.90)
4	Inflorescence length (cm)	30.00	69.80	IC093950, IC095365, IC095385, IC094660, IC095508, IC095302, IC095509 (> 58.60)	BGA-2 (56.35)
5	Grain yield (q/ha)	2.91	17.22	SKGPA-120 (> 14.30)	Suvarna(14.30)
6	Seed yield per plant (g)	2.01	28.86	SKGPA-120 (> 20.53)	BGA 2 (20.53)
7	Seed volume (g/10 ml)	7.19	8.18	IC095542, SKGPA-120, IC095541, IC095563 (> 8.13)	BGA-2 (7.91)
	NBPGR, New Delhi (65 accessions)				
1	Days to 50% flowering	57.00	94.33	SKGPA-124, IC095385, SKGPA-125, IC095529, IC095386, IC094652, IC095530, IC095541, IC093950, IC095387, IC095533 (< 73.85)	GA-2 (86.00)
2	Days to 80% maturity	150.00	176.00	SKGPA-113, SKGPA-121, IC055147, IC095435, SKGPA-115, SKGPA-120 (< 152.00)	RMA-7 (163.17)
3	Plant height (cm)	66.40	128.00	IC095346, IC095508 (> 124.83)	Suvarna (124.83)
4	Stem thickness (mm)	11.26	30.36	IC095542, SKGPA-123 (> 23.26)	Suvarna (17.38)
5	Leaf length (cm)	8.84	16.60	IC095512, IC095529, IC095385, IC042015, IC095386, IC095530 (> 14.70)	GA-2 (14.08)
6	Inflorescence length (cm)	30.08	57.92	IC042011, IC081697, IC095591, IC095508, SKGPA-117, IC095512 (> 54.50)	Suvarna (52.12)
7	Lateral spikelet length (cm)	6.00	18.20	SKGPA-113, IC094658, SKGPA-119, SKGPA-123, IC095345, IC095348, IC095592, IC095301, IC095360, IC095346 (> 14.51)	RMA-7 (9.78)
8	Petiole length (cm)	3.72	8.70	IC095512, IC095529, SKGPA-113 (> 7.61)	GA-2 (7.61)
9	Number of branches per plant	2.50	8.80	SKGPA-127, IC095591, IC095302, IC095592, IC095603, SKGPA-122 (> 7.00)	BGA-2 (7.00)
10	Seed yield per plant (g)	2.11	24.33	IC095302, IC095530, IC095504, IC055147, IC095387, SKGPA-121, IC095523, IC095508, IC095591 (> 18.68)	RMA-7 (9.24)
11	Seed volume (g/10 ml)	5.51	10.70	IC095301, IC081698, IC095365, IC095530, IC095360, IC095348 (> 9.70)	Suvarna (9.08)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	JAU, Mandor (65 accessions)				
1	Days to 50% flowering	47.00	74.57	IC095348, IC095508, IC095512, SKGPA-117 (< 48.00)	GA-2 (53.57)
2	Days to 80% maturity	117.00	137.00	IC095435 (< 117.14)	BGA-2 (117.14)
3	Plant height (cm)	86.00	136.00	IC095481, IC095504, IC095592, IC095475, IC095523, IC095603, IC095524, IC095563, IC095591 (> 124.00)	GA-2 (122.29)
4	Inflorescence length (cm)	36.71	63.00	IC095504, IC095529, IC095592, IC055147, IC095435, IC095508, IC095542 (> 60.00)	GA-2 (50.86)
5	Seed yield per plant (g)	1.00	15.00	SKGPA-118, IC095302, IC081698 (> 9.76)	RMA-7 (9.76)
6	Straw yield per plant (g)	3.00	45.00	SKGPA-118, IC095302, IC081698 (> 29.28)	RMA-7 (29.28)
7	Seed volume (g/10 ml)	6.11	7.81	IC095301, IC095348, IC095533, IC095345, IC081698 (>7.12)	RMA-7 (7.07)
	MPKV, Rahuri (15 accessions)				
1	Days to 50% flowering	65.60	83.10	SKGPA-111, SKGPA-120, SKGPA-115, SKGPA-123, SKGPA-127, SKGPA-113, SKGPA-122 (< 71.40)	GA-2 (71.80)
2	Days to 80% maturity	108.90	134.00	SKGPA-123, SKGPA-115, SKGPA-122, SKGPA-127, SKGPA-120, SKGPA-111, SKGPA-126, SKGPA-121 (< 116.00)	GA-2 (116.00)
3	Plant height (cm)	40.70	100.30	SKGPA-123 (> 99.20)	GA-2 (99.20)
4	Stem thickness (mm)	7.00	20.00	SKGPA-121, SKGPA-111 (> 18.00)	GA-2 (18.00)
5	Leaf length (cm)	5.60	12.60	SKGPA-121, SKGPA-119, SKGPA-118 (> 11.40)	RMA-7 (11.40)
6	Leaf width (cm)	1.50	4.00	SKGPA-119, SKGPA-121, SKGPA-115, SKGPA-118, SKGPA-117 (> 3.30)	Suvarna(3.30)
7	Inflorescence length (cm)	33.10	56.50	SKGPA-121, SKGPA-118, SKGPA-117 (> 49.90)	RMA-7 (49.90)
8	Lateral spikelet length (cm)	9.50	16.40	SKGPA-121, SKGPA-117, SKGPA-118 (> 14.70)	GA-2 (14.70)
9	Petiole length (cm)	3.20	5.90	SKGPA-119, SKGPA-121, SKGPA-118, SKGPA-120, SKGPA-117, SKGPA-111 (> 4.80)	GA-2 (4.80)
10	Seed yield per plant (g)	3.93	12.40	SKGPA-121, SKGPA-119 (> 9.33)	GA-2 (9.33)
11	Seed volume (g/10 ml)	6.60	8.60	SKGPA-111, SKGPA-119, SKGPA-117, SKGPA-115, SKGPA-121 (> 7.90)	GA-2 (7.90)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	BAU, Ranchi (65 accessions)				
1	Days to 50% flowering	70.00	98.00	IC095258, IC095254, IC042015, IC055147, IC093950, IC095377, IC095591 (< 75.15)	Suvarna (80.80)
2	Days to 80% maturity	148.00	169.00	IC095377, IC095542, IC055147, IC095435 (< 150.00)	BGA-2 (153.40)
3	Plant height (cm)	11.00	71.00	SKGPA-115, IC095529, IC094660, IC095523, SKGPA-112, IC095365, SKGPA-111 (> 57.00)	GA-1 (56.00)
4	Stem thickness (mm)	10.00	35.00	IC095603, IC094660, IC095302, IC095360, IC095523, IC095563, SKGPA-118 (> 25.00)GA-1 (25.00)	GA-1 (25.00)
5	Leaf length (cm)	2.00	8.00	SKGPA-112, IC095301, SKGPA-111, SKGPA-113, SKGPA-120, SKGPA-124 (> 5.70)	RMA-7 (5.70)
6	Leaf width (cm)	0.50	3.00	IC042015, IC095301, IC095365, SKGPA-111, SKGPA-112 (>3.00)	Suvarna(3.00)
7	Inflorescence length (cm)	5.00	31.00	SKGPA-112, IC042016, IC095387, SKGPA-122, IC055147, IC095258 (> 23.00)	GA-2 (22.60)
8	Lateral spikelet length (cm)	2.00	20.00	IC055147, IC095258, IC094660, IC095377 (> 15.00)	GA-2 (9.20)
9	Petiole length (cm)	1.00	5.00	SKGPA-124, IC095301, IC042015, SKGPA-111, SKGPA-112 (> 3.10)	Suvarna(3.10)
10	Number of branches per plant	1.00	52.00	IC095258, SKGPA-115, IC095523, IC095591, SKGPA-118 (>17.20)	GA-1 (17.20)
11	Seed yield per plant (g)	5.20	11.40	IC042016, SKGPA-115, IC042015, IC095563, IC095555 (>8.98)	BGA-2 (8.98)
12	Seed volume (g/10 ml)	6.60	11.60	SKGPA-124, IC095474, IC095377, IC042015, SKGPA-126 (>9.90)	GA-2 (9.68)
	SKDU, SK Nagar (65 accessions)				
1	Days to 50% flowering	31.00	50.29	SKGPA-111, SKGPA-118, SKGPA-125, SKGPA-122, SKGPA-113, SKGPA-121, IC094652, IC095345, IC095385, SKGPA-124, SKGPA-126 (< 35.00)	GA-2 (45.29)
2	Days to 80% maturity	99.00	116.00	IC095369, SKGPA-111, IC094652 (< 103.00)	GA-2 (110.71)
3	Plant height (cm)	73.40	182.54		GA-2 (182.54)
4	Stem thickness (mm)	31.00	71.00	IC095592, IC095591, IC095301 (> 62.37)	Suvarna (62.37)
5	Leaf length (cm)	2.80	37.10	SKGPA-112, IC095654, SKGPA-123, IC095592, IC095591, IC095603, IC095604, SKGPA-117 (> 23.20)	BGA-2 (22.85)
6	Inflorescence length (cm)	46.03	92.80	SKGPA-112 (> 84.29)	GA-2 (84.29)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
7	Lateral spikelet length (cm)	13.20	31.80	SKGPA-112, SKGPA-125, SKGPA-119, IC095386, SKGPA-111 (> 24.60)	GA-2 (21.09)
8	Petiole length (cm)	0.80	14.40	SKGPA-112, IC095604, IC095654, IC055147 (> 9.90)	Suvarna(8.60)
9	Number of branches per plant	0.00	3.80	SKGPA-111, IC095385, SKGPA-118, SKGPA-113, IC095345, SKGPA-122 (> 2.80)	GA-2 (0.00)
10	Seed yield per plant (g)	4.80	51.20	SKGPA-112, IC095591, IC095592, SKGPA-119, SKGPA-118 (> 32.96)	GA-2 (23.89)
11	Straw yield per plant (g)	13.00	136.00	SKGPA-112, IC095591, IC095592, SKGPA-119, SKGPA-118 (> 96.74)	GA-2 (70.20)
12	Seed volume (g/10 ml)	7.50	8.90	SKGPA-118, IC095509, IC095654, SKGPA-122, IC093950, IC095301 (> 8.67)	RMA-7 (8.31)
	Based on all locations (65 accessions)				
1	Days to 50% flowering	57.43	83.60	IC095258, SKGPA-111, SKGPA-125, IC095604, IC094652, IC095348, IC095541, SKGPA-118 (< 68.96)	GA-2 (68.96)
2	Days to 80% maturity	127.00	152.00	SKGPA-111, SKGPA-121, SKGPA-124, SKGPA-113, SKGPA-115, SKGPA-123 (< 128.33)	BGA-2 (133.35)
3	Plant height (cm)	63.70	114.69	IC042016 (> 113.93)	GA-2 (113.93)
4	Stem thickness (mm)	9.80	29.98	IC095591, IC095603, IC095592, IC095301 (> 26.27)	Suvarna (26.25)
5	Leaf length (cm)	5.40	16.40	SKGPA-112, IC095512, IC095509, IC055147, IC095523, IC042015, IC095654, IC095604 (> 13.41)	RMA-7 (12.95)
6	Leaf width (cm)	2.20	5.16	IC042015, IC095509 (> 5.00)	Suvarna (5.00)
7	Inflorescence length (cm)	14.60	45.32	IC095508, IC095591, IC042016, IC093950, IC095509, IC095385, SKGPA-112, IC081697, IC095512 (> 41.82)	GA-2 (41.66)
8	Lateral spikelet length (cm)	5.60	19.09	IC095603, SKGPA-121, SKGPA-112, IC055147, IC095604, SKGPA-119, SKGPA-123, SKGPA-113 (> 16.60)	GA-2 (14.71)
9	Petiole length (cm)	2.40	7.25	IC055147, SKGPA-112, IC042015, IC095509, IC095512 (>6.31)	Suvarna (6.31)
10	Number of branches per plant	2.06	12.60	IC095258, SKGPA-115, IC095523, IC095591, SKGPA-118 (>6.00)	BGA-2 (4.16)
11	Grain yield (q/ha)	3.09	10.41	SKGPA-120, IC095302, IC095301, IC081698 (> 9.80)	GA-2 (9.80)
12	Seed yield per plant (g)	5.80	17.22	IC095591, IC095302, IC095592, SKGPA-112, SKGPA-118 (>12.83)	GA-2 (11.54)
13	Straw yield per plant (g)	12.95	76.80	SKGPA-118, IC095591, SKGPA-112, IC095592, SKGPA-119, IC095302, IC081698, IC095301, IC095289 (> 47.20)	RMA-7 (46.00)
14	Seed volume (g/10 ml)	7.23	9.26		RMA-7 (10.08)

Table 6: Characterization of germplasm lines in grain amaranth at different locations : Rabi 2014-15 (Plains)

S.No.	Accession No.	Early plant vigour			Inflorescence colour			Inflorescence compactness			Inflorescence shape		Inflorescence spininess		Leaf colour		
		Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar
1	IC042006	2	1	3	11	11	5	5	5	3	1	4	3	2	3	5	3
2	IC042011	3	1	2	11	11	3	5	5	3	4	4	1	2	5	5	3
3	IC042015	3	2	2	8	6	9	5	7	3	1	4	1	2	8	7	10
4	IC042016	3	2	3	8	11	9	5	5	2	1	4	3	1	8	1	10
5	IC055147	2	2	3	8	6	9	5	7	3	4	4	1	2	8	5	10
6	IC065548	2	2	3	11	11	4	5	5	2	1	4	3	4	5	8	1
7	IC081697	2	1	2	8	6	9	5	7	2	4	4	4	3	8	8	8
8	IC081698	2	1	2	8	4	9	5	3	3	1	4	3	2	8	7	8
9	IC093950	2	1	3	8	4	9	5	7	3	4	4	3	3	8	5	10
10	IC094652	2	1	3	8	6	4	5	3	1	1	2	3	3	8	7	3
11	IC094658	2	2	3	8	6	9	5	5	3	4	4	3	2	8	8	8
12	IC094660	2	2	2	8	4	6	5	5	2	4	4	4	2	8	5	8
13	IC095254	1	2	2	11	4	4	5	7	3	4	4	4	3	5	5	3
14	IC095258	1	2	2	8	4	4	5	5	2	4	4	4	2	8	5	3
15	IC095289	1	2	3	11	4	2	5	7	2	4	4	3	2	5	5	3
16	IC095301	2	1	3	8	6	9	5	5	3	4	4	3	2	8	8	2
17	IC095302	1	1	2	11	4	2	5	5	2	1	4	3	3	5	5	3
18	IC095345	1	1	2	11	6	5	5	5	1	4	2	3	2	3	8	2
19	IC095346	2	2	2	8	6	9	5	5	3	4	4	3	2	10	8	10
20	IC095348	2	1	2	8	6	9	5	7	1	4	2	1	2	10	8	10
21	IC095353	2	2	3	8	6	9	5	7	3	2	4	1	3	10	7	10
22	IC095360	3	2	3	8	6	9	5	5	1	2	4	3	3	10	5	8
23	IC095365	3	2	2	8	11	6	5	7	2	1	4	3	2	10	5	9
24	IC095369	2	2	3	11	11	1	5	5	3	2	4	3	4	5	7	1
25	IC095377	2	2	3	11	6	4	5	5	2	1	4	3	2	5	5	3
26	IC095385	2	1	3	8	6	9	5	5	2	4	4	3	2	8	7	6

S.No.	Accession No.	Plant Growth habit			Seed colour		Seed shatering		Stem colour			Stem surface			Biotic Notes
		Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	SK Nagar
1	IC042006	1	3	1	1	2	3	1	2	2	2	2	2	2	1
2	IC042011	2	1	1	1	9	3	1	2	2	1	2	1	2	1
3	IC042015	1	2	1	1	9	3	1	6	4	4	2	2	2	1
4	IC042016	1	2	1	1	1	3	1	6	4	4	2	1	2	1
5	IC055147	1	2	1	1	9	3	1	6	4	4	2	2	2	1
6	IC065548	2	2	1	7	9	5	1	2	2	1	2	2	2	1
7	IC081697	1	2	1	7		3	2	5	2	4	2	2	2	1
8	IC081698	1	2	1	1	7	3	2	6	2	4	2	1	2	1
9	IC093950	1	2	1	1	1	3	1	6	2	7	2	1	2	1
10	IC094652	1	2	2	1	2	3	1	6	4	2	2	2	2	1
11	IC094658	1	1	1	1	9	3	1	6	4	7	2	2	2	1
12	IC094660	1	1	1	1	9	3	1	6	2	7	2	2	2	1
13	IC095254	1	1	1	1	9	7	1	2	2	2	2	1	2	1
14	IC095258	1	1	1	7	9	5	1	6	2	2	2	2	2	1
15	IC095289	1	2	1	1	9	7	1	2	2	2	2	2	2	1
16	IC095301	1	2	1	7	7	3	1	6	4	4	2	2	2	1
17	IC095302	1	2	1	1	9	3	1	2	4	2	2	1	2	1
18	IC095345	1	2	2	1	9	3	2	2	1	4	2	2	2	1
19	IC095346	1	2	1	1	9	3	1	5	4	6	2	2	2	1
20	IC095348	1	2	2	1	9	3	2	6	1	4	2	2	2	1
21	IC095353	1	2	1	7	7	3	2	6	6	4	2	1	2	1
22	IC095360	1	2	2	7	7	3	1	6	6	7	2	1	2	1
23	IC095365	1	2	1	7	7	3	2	5	6	1	2	2	2	1
24	IC095369	1	2	1	1	9	3	1	2	6	1	2	2	2	1
25	IC095377	1	2	1	1	1	3	1	2	4	4	2	2	2	1
26	IC095385	1	1	1	1	2	3	2	2	4	4	2	1	2	1

S.No.	Accession No.	Early plant vigour			Inflorescence colour			Inflorescence compactness			Inflorescence shape		Inflorescence spininess		Leaf colour		
		Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar
27	IC095386	2	1	2	8	6	9	5	5	3	4	4	3	2	8	7	7
28	IC095387	2	1	2	8	7	9	5	5	2	4	4	4	2	8	8	9
29	IC095435	1	1	3	11	6	2	5	5	2	4	4	4	2	5	5	3
30	IC095474	2	1	2	8	4	9	5	5	2	4	4	3	3	8	7	2
31	IC095475	3	1	3	8	6	9	5	7	1	4	4	3	3	8	7	7
32	IC095481	3	1	2	11	4	3	5	5	3	4	4	3	2	5	5	1
33	IC095504	1	1	3	11	4	1	5	5	3	4	4	3	2	5	5	1
34	IC095508	1	1	2	11	6	1	5	5	3	4	4	3	2	5	7	1
35	IC095509	2		2	11		2	5		2		4		2	5		3
36	IC095512	2	1	3	11	6	4	5	7	3	4	4	4	2	5	5	3
37	IC095523	2	2	2	8	6	6	5	5	2	4	4	3	2	8	5	2
38	IC095524	2	1	2	8	6	6	5	7	2	4	4	3	3	8	8	2
39	IC095529	2	1	2	8	6	9	5	5	2	4	4	3	2	8	8	8
40	IC095530	3	1	2	8	6	9	5	5	2	4	4	3	1	8	5	8
41	IC095533	2	1	3	8	6	9	5	5	2	4	4	3	2	8	8	8
42	IC095541	3	1	3	8	6	9	5	7	3	4	4	1	2	8	8	11
43	IC095542	3	2	3	8	6	9	5	7	3	4	4	3	3	8	8	2
44	IC095555	2	2	3	8	6	9	5	7	2	4	4	3	2	8	8	2
45	IC095563	1	2	3	8	4	9	5	5	2	4	4	3	2	8	7	9
46	IC095591	1	1	2	11	4	4	5	5	3	5	4	3	4	5	5	3
47	IC095592	1	1	3	8	6	8	5	7	3	1	4	3	3	8	3	10
48	IC095603	2	2	3	8	6	9	5	7	2	4	4	4	2	8	7	9
49	IC095604	3	1	3	8	4	9	5	7	2	4	4	3	3	8	7	9
50	IC095654	2	1	3	8	6	9	5	7	2	1	4	3	2	8	3	10
51	SKGPA-111	2	2	3	11	4	4	5	5	1	4	2	3	2	5	5	3
52	SKGPA-112	2	2	3	8	6	6	5	5	3	4	4	1	2	8	8	10
53	SKGPA-113	1	1	3	11	4	2	5	5	2	4	4	3	2	5	5	2
54	SKGPA-115	2	2	3	11	4	3	5	7	2	4	4	3	3	5	5	1

S.No.	Accession No.	Plant Growth habit			Seed colour		Seed shatering		Stem colour			Stem surface			Biotic Notes
		Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	SK Nagar
27	IC095386	1	1	1	7	7	3	1	2	4	7	2	1	2	1
28	IC095387	1	1	1	7	7	3	3	2	4	4	2	2	2	1
29	IC095435	2	1	1	1	9	3	2	2	4	2	2	2	2	1
30	IC095474	1	1	1	7	2	3	1	6	2	7	2	1	2	1
31	IC095475	1	1	1	1	3	5	2	6	2	4	2	2	2	1
32	IC095481	1	1	1	7	9	5	1	2	2	1	2	1	2	1
33	IC095504	2	1	1	1	9	3	1	2	2	1	2	1	2	1
34	IC095508	2	1	1	1	2	3	1	2	1	1	2	2	2	1
35	IC095509	2		1		9		2	2		1	2		2	1
36	IC095512	1	2	1	1	9	5	1	2	4	2	2	2	2	1
37	IC095523	1	2	1	7	7	5	1	5	4	2	2	2	2	1
38	IC095524	1	2	1	7	9	5	1	6	4	2	2	2	2	1
39	IC095529	1	2	1	1	1	3	1	6	4	7	2	2	2	1
40	IC095530	1	2	1	7	7	3	2	5	4	4	2	2	2	1
41	IC095533	1	2	1	7	7	3	2	5	1	7	2	2	2	1
42	IC095541	1	2	1	1	3	3	1	5	4	7	2	2	2	1
43	IC095542	1	2	1	1	9	3	3	5	4	7	2	2	2	1
44	IC095555	1	2	1	1	2	3	3	6	1	4	2	2	2	1
45	IC095563	1	2	1	7	7	3	1	6	1	7	2	2	2	1
46	IC095591	1	2	1	1	9	3	1	2	2	1	2	2	2	1
47	IC095592	1	2	1	1	3	3	1	5	4	4	2	1	2	1
48	IC095603	1	2	1	1	2	3	1	6	4	4	2	1	2	1
49	IC095604	1	2	1	7	9	3	1	5	1	4	2	2	2	1
50	IC095654	1	2	1	1	7	3	2	5	4	7	2	1	2	1
51	SKGPA-111	2	1	2	1	9	3	1	2	7	2	2	2	2	1
52	SKGPA-112	2	2	1	1	9	3	1	6	4	4	2	1	2	1
53	SKGPA-113	2	1	1	1	2	3	1	2	2	2	2	2	2	1
54	SKGPA-115	1	1	1	1	3	3	1	2	2	1	2	2	2	1

S.No.	Accession No.	Early plant vigour			Inflorescence colour			Inflorescence compactness			Inflorescence shape		Inflorescence spininess		Leaf colour		
		Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar
55	SKGPA-117	2	1	3	11	4	4	5	7	3	4	4	3	3	5	5	3
56	SKGPA-118	2	1	3	8	4	6	5	5	2	4	4	1	2	10	5	8
57	SKGPA-119	1	2	2	8	4	6	5	5	3	4	4	4	2	8	5	8
58	SKGPA-120	1	2	3	11	4	3	5	7	3	4	4	3	3	5	5	3
59	SKGPA-121	1	1	3	11	4	1	5	5	1	4	2	3	2	5	5	1
60	SKGPA-122	2	2	3	11	4	4	5	5	1	4	2	3	1	5	5	2
61	SKGPA-123	2	2	3	8	4	9	5	7	3	4	4	3	2	8	5	8
62	SKGPA-124	2	1	3	8	4	6	5	5	2	4	2	3	3	8	5	9
63	SKGPA-125	1	2	3	11	4	4	5	5	1	4	4	3	2	5	5	3
64	SKGPA-126	1	1	2	4	4	1	5	5	2	4	4	3	2	5	5	3
65	SKGPA-127	1		2	7		7	5		1		3		1	5		3
	Mean for check variety																
1	**BGA-2**	2	2	3	4	4	1	5	5	2	2	1	1	1	3	5	3
2	**GA-1**		2			4			5		4		3			5	
3	**GA-2**	2	2	3	6	6	9	5	5	3	4	4	3	2	10	8	10
4	**RMA-7**	2	2	3	11	4	4	5	7	3	4	4	3	3	5	5	3
5	**Suvarna**	2	2	3	11	4	1	5	7	2	4	1	1	1	3	5	3
	Minimum	**1**	**1**	**2**	**4**	**4**	**1**	**5**	**3**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**
	Maximum	**3**	**2**	**3**	**11**	**11**	**9**	**5**	**7**	**3**	**5**	**4**	**4**	**4**	**10**	**8**	**11**
	Mode	**2**	**1**	**3**	**8**	**6**	**9**	**5**	**5**	**2**	**4**	**4**	**3**	**2**	**8**	**5**	**3**

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

S.No.	Accession No.	Plant Growth habit			Seed colour		Seed shatering		Stem colour			Stem surface			Biotic Notes
		Akola	Ranchi	SK Nagar	Ranchi	SK Nagar	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	Akola	Ranchi	SK Nagar	SK Nagar
55	SKGPA-117	1	2	1	3	6	3	2	2	2	1	2	2	2	1
56	SKGPA-118	2	1	2	1	2	3	1	6	2	4	2	2	2	1
57	SKGPA-119	1	1	1	1	9	5	1	6	2	4	2	2	2	1
58	SKGPA-120	2	1	1	1	2	3	1	6	2	1	2	2	2	1
59	SKGPA-121	1	1	2	1	9	3	1	2	2	2	2	2	2	1
60	SKGPA-122	2	2	2	1	2	3	2	2	2	1	2	1	2	1
61	SKGPA-123	1	2	1	1	2	3	2	6	2	4	2	1	2	1
62	SKGPA-124	1	2	2	3	9	3	2	6	2	2	2	2	2	1
63	SKGPA-125	2	1	2	1	1	3	1	2	2	2	2	1	2	1
64	SKGPA-126	1	1	1	1	9	3	1	2	2	1	2	2	2	1
65	SKGPA-127	1		3		4		1	6		99	2		2	1
	Mean for check variety														
1	**BGA-2**	1	1	1	1	9	3	1	2	2	1	2	2	2	1
2	**GA-1**		1		1		3			2			2		
3	**GA-2**	1	2	1	1	9	3	1	6	4	6	2	2	2	1
4	**RMA-7**	1	2	1	1	9	3	1	2	2	1	2	2	2	1
5	**Suvarna**	1	2	1	1	9	3	1	2	1	1	2	2	2	1
	Minimum	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**2**	**1**	**1**	**2**	**1**	**2**	**1**
	Maximum	**2**	**3**	**3**	**7**	**9**	**7**	**3**	**6**	**7**	**99**	**2**	**2**	**2**	**1**
	Mode	**1**	**2**	**1**	**1**	**9**	**3**	**1**	**2**	**2**	**4**	**2**	**2**	**2**	**1**

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

Table 7: Multilocation evaluation of germplasm lines in grain amaranth at different locations : Rabi 2014-15 (Plains)

S.No.	Accession No.	Days to 50% flowering									Stem thickness (mm)					
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	56.00	82.00	49.00	79.00	53.00		97.00	37.00	**64.71**	7.57	15.60		20.00	43.00	**21.54**
2	IC042011	53.00	82.00	45.00	83.00	59.00		91.00	44.00	**65.29**	11.64	14.55		18.00	51.00	**23.80**
3	IC042015	60.00	80.00	55.00	77.00	72.00		73.00	46.00	**66.14**	11.95	14.64		15.00	46.60	**22.05**
4	IC042016	64.00	80.00	55.00	77.00	49.00		81.00	37.00	**63.29**	14.52	12.87		25.00	48.00	**25.10**
5	IC055147	60.00	81.00	55.00	77.00	66.00		75.00	35.00	**64.14**	13.34	13.08		25.00	46.00	**24.36**
6	IC065548	63.00	80.00	59.00	84.00	71.00		94.00	45.00	**70.86**	11.79	16.20		20.00	50.60	**24.65**
7	IC081697	57.00	79.00	55.00	77.00	56.00		90.00	46.00	**65.71**	11.04	12.57		15.00	38.60	**19.30**
8	IC081698	68.00	82.00	49.00	84.00	52.00		84.00	48.00	**66.71**	9.69	16.30		20.00	54.00	**25.00**
9	IC093950	69.00	82.00	52.00	70.00	63.00		75.00	46.00	**65.29**	9.67	12.40		20.00	46.20	**22.07**
10	IC094652	58.00	79.00	43.00	69.00	69.00		76.00	34.00	**61.14**	9.41	13.72		25.00	43.60	**22.93**
11	IC094658	59.00	82.00	52.00	78.00	48.00		93.00	35.00	**63.86**	10.60	15.22		15.00	45.60	**21.60**
12	IC094660	63.00	82.00	52.00	77.00	58.00		86.00	47.00	**66.43**	7.48	13.28		30.00	51.00	**25.44**
13	IC095254	56.00	83.00	59.00	93.00	64.00		70.00	48.00	**67.57**	7.98	14.11		20.00	51.00	**23.27**
14	IC095258	58.00	79.00	50.00	78.00	69.00		70.00	48.00	**64.57**	7.41	15.92		12.00	46.60	**20.48**
15	IC095289	60.00	79.00	50.00	84.00	51.00		88.00	37.00	**64.14**	9.88	13.32		20.00	48.00	**22.80**
16	IC095301	64.00	80.00	46.00	82.00	51.00		78.00	47.00	**64.00**	9.08	16.41		20.00	66.00	**27.87**
17	IC095302	66.00	83.00	52.00	79.00	66.00		81.00	44.00	**67.29**	8.33	15.91		30.00	43.00	**24.31**
18	IC095345	62.00	79.00	48.00	76.00	54.00		93.00	34.00	**63.71**	7.73	16.24		15.00	35.00	**18.49**
19	IC095346	60.00	82.00	47.00	83.00	58.00		93.00	47.00	**67.14**	10.15	16.52		20.00	41.60	**22.07**
20	IC095348	63.00	82.00	41.00	77.00	47.00		86.00	35.00	**61.57**	9.42	16.37		10.00	31.00	**16.70**
21	IC095353	66.00	80.00	49.00	84.00	72.00		88.00	46.00	**69.29**	6.83	13.58		25.00	41.00	**21.60**
22	IC095360	61.00	80.00	49.00	83.00	63.00		92.00	37.00	**66.43**	8.80	13.59		30.00	47.00	**24.85**
23	IC095365	58.00	82.00	46.00	84.00	68.00		94.00	46.00	**68.29**	10.14	19.35		20.00	35.00	**21.12**
24	IC095369	60.00	82.00	46.00	91.00	57.00		89.00	45.00	**67.14**	9.58	13.50		15.00	48.00	**21.52**
25	IC095377	68.00	79.00	49.00	92.00	65.00		75.00	45.00	**67.57**	9.13	12.50		20.00	48.00	**22.41**

S.No.	Accession No.	Plant height (cm)									Leaf width (cm)			
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Rahuri	Ranchi	Mean
1	IC042006	81.46	73.80	93.80	99.20	105.00		28.00	119.60	**85.84**	5.84		0.50	**3.17**
2	IC042011	91.28	73.60	96.40	115.60	118.00		23.00	126.80	**92.10**	6.48		1.60	**4.04**
3	IC042015	112.04	112.40	105.60	115.60	107.00		48.00	156.20	**108.12**	7.32		3.00	**5.16**
4	IC042016	135.64	120.80	123.80	112.60	111.00		47.00	152.00	**114.69**	7.06		2.00	**4.53**
5	IC055147	120.62	109.40	114.60	120.00	112.00		39.00	142.00	**108.23**	7.10		2.50	**4.80**
6	IC065548	105.34	84.40	105.20	118.20	104.00		44.00	123.40	**97.79**	5.50		2.00	**3.75**
7	IC081697	91.54	94.20	107.00	120.20	110.00		38.00	148.60	**101.36**	5.14		2.00	**3.57**
8	IC081698	87.56	95.60	111.60	108.20	111.00		53.00	143.60	**101.51**	6.16		1.50	**3.83**
9	IC093950	103.24	106.80	122.00	105.80	108.00		55.00	131.20	**104.58**	6.52		2.00	**4.26**
10	IC094652	87.54	97.20	72.00	86.60	115.00		44.00	73.40	**82.25**	4.80		2.00	**3.40**
11	IC094658	91.38	88.00	94.80	93.00	109.00		52.00	117.00	**92.17**	5.72		1.00	**3.36**
12	IC094660	94.80	87.00	135.00	91.80	103.00		61.00	120.40	**99.00**	5.48		2.00	**3.74**
13	IC095254	87.28	74.80	115.20	106.80	107.00		47.00	145.00	**97.58**	5.56		2.00	**3.78**
14	IC095258	92.44	73.60	91.00	112.80	97.00		11.00	108.40	**83.75**	5.32		1.00	**3.16**
15	IC095289	87.44	82.20	89.60	104.00	94.00		37.00	136.40	**90.09**	4.90		1.50	**3.20**
16	IC095301	99.62	87.80	106.40	110.00	96.00		37.00	165.40	**100.32**	5.84		3.00	**4.42**
17	IC095302	94.26	99.60	102.80	102.00	101.00		38.00	147.60	**97.89**	4.76		2.00	**3.38**
18	IC095345	94.22	60.00	78.60	87.20	97.00		31.00	74.20	**74.60**	3.90		1.00	**2.45**
19	IC095346	99.18	90.20	131.40	128.00	90.00		34.00	122.80	**99.37**	5.06		2.50	**3.78**
20	IC095348	102.92	83.80	76.60	97.00	114.00		24.00	78.00	**82.33**	5.34		2.00	**3.67**
21	IC095353	95.12	85.80	102.40	99.00	101.00		47.00	124.00	**93.47**	6.10		1.00	**3.55**
22	IC095360	104.48	86.40	101.60	86.60	108.00		41.00	109.20	**91.04**	5.68		2.00	**3.84**
23	IC095365	103.70	94.80	112.40	105.20	88.00		58.00	112.40	**96.36**	5.50		3.00	**4.25**
24	IC095369	94.96	78.00	91.80	95.60	97.00		52.00	122.40	**90.25**	5.18		2.00	**3.59**
25	IC095377	96.78	74.80	96.40	101.60	112.00		50.00	112.80	**92.05**	5.18		2.00	**3.59**

S.No.	Accession No.	Leaf length (cm)						Inflorescence length (cm)								
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	12.26	13.20		2.00	18.32	**11.45**	24.38	20.00	51.20	51.14	47.00		13.00	58.80	**37.93**
2	IC042011	11.68	13.26		3.50	15.27	**10.93**	28.72	21.40	51.20	57.92	50.00		12.00	65.20	**40.92**
3	IC042015	13.94	15.28		5.00	20.19	**13.60**	33.34	20.40	49.00	49.88	49.00		16.00	63.20	**40.12**
4	IC042016	13.38	14.32		3.00	21.24	**12.99**	32.24	18.40	58.60	49.48	60.00		27.00	66.80	**44.65**
5	IC055147	13.60	14.54		4.00	23.20	**13.84**	30.96	16.20	44.80	54.04	61.00		25.00	56.50	**41.21**
6	IC065548	11.44	14.00		4.00	18.95	**12.10**	31.40	17.20	42.00	54.50	51.00		15.00	64.00	**39.30**
7	IC081697	10.26	13.40		3.00	18.87	**11.38**	30.32	21.00	57.40	57.68	43.00		16.00	68.40	**41.97**
8	IC081698	10.70	12.20		3.00	19.75	**11.41**	31.00	18.60	57.60	52.36	47.00		15.00	60.80	**40.34**
9	IC093950	12.56	12.50		4.00	18.06	**11.78**	32.00	23.40	69.80	51.26	57.00		13.00	64.20	**44.38**
10	IC094652	9.38	12.42		3.00	15.01	**9.95**	16.78	17.60	50.20	43.40	56.00		13.00	50.80	**35.40**
11	IC094658	10.48	10.68		2.50	15.68	**9.84**	21.32	17.80	48.00	50.80	44.00		17.00	60.80	**37.10**
12	IC094660	10.58	10.42		5.00	15.80	**10.45**	27.80	17.00	62.00	38.60	49.00		22.00	60.20	**39.51**
13	IC095254	10.88	13.56		3.00	18.30	**11.44**	18.28	19.60	49.80	38.26	52.00		12.00	60.20	**35.73**
14	IC095258	10.20	13.36		2.00	19.10	**11.17**	22.52	22.80	46.20	48.60	40.00		23.00	55.60	**36.96**
15	IC095289	8.76	12.80		3.00	2.80	**6.84**	20.40	17.00	50.20	52.80	59.00		13.00	65.60	**39.71**
16	IC095301	10.26	11.96		6.00	20.30	**12.13**	26.12	21.60	53.60	51.40	50.00		12.00	78.00	**41.82**
17	IC095302	7.22	12.44		4.00	17.90	**10.39**	16.66	17.60	61.60	40.40	56.00		14.00	62.60	**38.41**
18	IC095345	7.10	14.20		2.00	14.00	**9.33**	14.82	23.20	50.60	43.44	39.00		9.00	56.20	**33.75**
19	IC095346	8.44	13.84		3.00	18.60	**10.97**	24.82	19.80	57.00	50.64	41.00		8.00	60.20	**37.35**
20	IC095348	8.88	13.20		2.50	13.00	**9.40**	21.40	18.00	48.80	51.80	40.00		8.00	56.80	**34.97**
21	IC095353	11.36	11.70		2.00	16.65	**10.43**	16.96	21.20	48.80	53.80	51.00		15.00	67.40	**39.17**
22	IC095360	10.90	10.94		5.00	18.20	**11.26**	17.48	18.00	52.60	48.24	49.00		14.00	67.00	**38.05**
23	IC095365	11.14	10.18		4.00	14.85	**10.04**	29.46	19.00	63.00	36.00	53.00		20.00	57.60	**39.72**
24	IC095369	10.36	11.54		5.00	19.32	**11.56**	24.32	20.60	49.60	39.02	46.00		12.00	67.20	**36.96**
25	IC095377	10.88	8.84		4.00	18.30	**10.51**	25.70	16.00	45.80	43.60	48.00		15.00	61.80	**36.56**

S.No.	Accession No.	Lateral spikelet length (cm)						Petiole length (cm)					
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	18.88	11.82		8.00	15.80	**13.63**	6.28	6.76		1.50	7.61	**5.54**
2	IC042011	22.76	12.28		5.00	20.20	**15.06**	6.36	7.28		1.50	6.89	**5.51**
3	IC042015	27.68	8.80		7.00	14.80	**14.57**	7.88	7.08		4.00	8.19	**6.79**
4	IC042016	22.52	8.48		5.00	19.60	**13.90**	8.24	6.54		2.00	8.44	**6.31**
5	IC055147	25.40	9.32		20.00	18.20	**18.23**	8.56	7.36		3.00	10.09	**7.25**
6	IC065548	24.72	12.38		6.00	16.80	**14.98**	6.68	7.24		2.00	7.55	**5.87**
7	IC081697	22.54	11.78		3.00	20.00	**14.33**	5.46	6.38		2.00	8.05	**5.47**
8	IC081698	20.56	9.64		6.00	18.40	**13.65**	5.81	7.48		3.00	8.68	**6.24**
9	IC093950	22.74	8.52		5.00	20.00	**14.07**	5.64	7.50		2.50	6.79	**5.61**
10	IC094652	9.44	11.78		9.00	20.40	**12.66**	4.52	6.18		1.00	6.05	**4.44**
11	IC094658	14.90	18.12		7.00	20.00	**15.01**	4.20	5.22		2.00	5.74	**4.29**
12	IC094660	15.96	12.98		18.00	16.40	**15.84**	5.06	5.60		2.00	6.81	**4.87**
13	IC095254	12.06	10.84		10.00	17.20	**12.53**	5.38	7.36		1.50	6.72	**5.24**
14	IC095258	16.54	10.90		19.00	14.40	**15.21**	5.08	6.98		1.00	7.30	**5.09**
15	IC095289	12.60	11.90		3.00	18.40	**11.48**	4.06	5.60		1.00	7.10	**4.44**
16	IC095301	15.82	15.50		4.00	20.80	**14.03**	5.20	5.92		4.50	7.50	**5.78**
17	IC095302	8.98	12.30		7.00	18.80	**11.77**	3.20	5.24		1.00	6.70	**4.04**
18	IC095345	10.12	16.76		12.00	23.40	**15.57**	3.45	6.34		1.00	4.99	**3.95**
19	IC095346	13.94	15.20		5.00	17.80	**12.99**	4.58	6.06		2.00	7.30	**4.99**
20	IC095348	12.24	16.02		4.00	22.60	**13.72**	4.16	5.50		1.50	4.47	**3.91**
21	IC095353	9.30	14.46		11.00	22.40	**14.29**	5.48	6.54		1.00	7.30	**5.08**
22	IC095360	14.76	15.22		6.00	18.00	**13.50**	5.82	5.00		2.00	8.04	**5.22**
23	IC095365	21.88	9.34		10.00	21.20	**15.61**	5.80	5.54		2.00	6.32	**4.92**
24	IC095369	13.88	13.26		4.00	16.80	**11.99**	5.64	5.98		1.50	8.25	**5.34**
25	IC095377	15.62	13.48		17.00	13.20	**14.83**	5.76	3.72		1.00	8.10	**4.65**

S.No.	Accession No.	Number of branches per plant						Days to 80% maturity								
		Akola	Ambikapur	Delhi	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	3.00	4.20	6.40	2.00	0.00	**3.12**	115.0	151.0	99.0	170.0	129.0		162.0	106.0	**133.14**
2	IC042011	6.20	3.40	6.75	2.00	0.00	**3.67**	122.0	151.0	95.0	167.0	136.0		165.0	107.0	**134.71**
3	IC042015	1.40	2.40	5.50	1.00	0.00	**2.06**	132.0	149.0	105.0	169.0	135.0		150.0	112.0	**136.00**
4	IC042016	3.80	2.60	4.67	1.00	0.00	**2.41**	133.0	149.0	105.0	160.0	131.0		163.0	111.0	**136.00**
5	IC055147	2.80	3.00	5.40	4.00	0.00	**3.04**	132.0	149.0	105.0	151.0	124.0		149.0	112.0	**131.71**
6	IC065548	4.20	3.00	5.40	12.00	0.00	**4.92**	131.0	151.0	109.0	176.0	130.0		161.0	108.0	**138.00**
7	IC081697	4.80	2.80	4.75	6.00	0.00	**3.67**	132.0	151.0	105.0	170.0	137.0		159.0	109.0	**137.57**
8	IC081698	4.60	1.40	5.67	13.00	0.00	**4.93**	131.0	150.0	99.0	166.0	136.0		167.0	107.0	**136.57**
9	IC093950	2.20	2.60	6.00	12.00	0.00	**4.56**	134.0	150.0	102.0	164.0	132.0		153.0	104.0	**134.14**
10	IC094652	1.80	2.80	5.40	7.00	2.80	**3.96**	132.0	150.0	93.0	163.0	122.0		151.0	102.0	**130.43**
11	IC094658	2.00	2.40	4.75	9.00	0.00	**3.63**	131.0	149.0	102.0	159.0	129.0		159.0	109.0	**134.00**
12	IC094660	2.20	2.60	6.60	15.00	0.00	**5.28**	128.0	148.0	102.0	160.0	121.0		154.0	110.0	**131.86**
13	IC095254	3.80	4.00	6.80	15.00	0.00	**5.92**	133.0	148.0	109.0	169.0	119.0		160.0	110.0	**135.43**
14	IC095258	2.40	2.80	5.80	52.00	0.00	**12.60**	132.0	148.0	100.0	162.0	134.0		151.0	111.0	**134.00**
15	IC095289	2.00	2.00	5.80	11.00	0.00	**4.16**	131.0	147.0	100.0	169.0	127.0		152.0	112.0	**134.00**
16	IC095301	2.80	4.40	4.25	10.00	0.00	**4.29**	131.0	147.0	96.0	166.0	131.0		166.0	111.0	**135.43**
17	IC095302	3.00	2.60	7.40	7.00	0.00	**4.00**	133.0	147.0	102.0	157.0	134.0		154.0	112.0	**134.14**
18	IC095345	1.80	2.60	6.40	9.00	3.00	**4.56**	133.0	149.0	98.0	165.0	137.0		151.0	106.0	**134.14**
19	IC095346	2.60	3.80	5.00	9.00	0.00	**4.08**	134.0	149.0	97.0	170.0	132.0		159.0	109.0	**135.71**
20	IC095348	1.80	3.00	6.60	8.00	0.00	**3.88**	133.0	149.0	91.0	166.0	123.0		154.0	104.0	**131.43**
21	IC095353	1.80	3.80	6.50	8.00	0.00	**4.02**	133.0	147.0	99.0	167.0	130.0		168.0	108.0	**136.00**
22	IC095360	2.00	2.60	5.50	4.00	0.00	**2.82**	131.0	146.0	99.0	165.0	122.0		158.0	104.0	**132.14**
23	IC095365	2.00	2.60	6.33	7.00	0.00	**3.59**	133.0	146.0	96.0	166.0	120.0		163.0	104.0	**132.57**
24	IC095369	2.20	3.20	5.60	3.00	0.00	**2.80**	134.0	141.0	96.0	168.0	131.0		163.0	99.0	**133.14**
25	IC095377	2.60	3.60	5.60	7.00	0.00	**3.76**	130.0	141.0	99.0	169.0	127.0		148.0	105.0	**131.29**

S.No.	Accession No.	Grain yield (q/ha)			Seed yield per plant (g)							
		Ambikapur	Bhubaneswar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	5.17	10.80	**7.99**	5.34	16.94	9.47	5.40		6.80	15.40	**9.89**
2	IC042011	5.44	8.04	**6.74**	10.56	15.48	10.32	5.50		8.50	22.80	**12.19**
3	IC042015	11.39	6.34	**8.86**	8.57	7.66	12.36	4.00		10.60	21.80	**10.83**
4	IC042016	6.39	7.79	**7.09**	5.43	12.64	9.00	5.30		11.40	15.60	**9.90**
5	IC055147	8.78	4.18	**6.48**	8.57	4.27	22.26	6.00		8.60	21.60	**11.88**
6	IC065548	8.33	5.76	**7.05**	7.52	7.70	14.00	5.30		7.10	16.80	**9.74**
7	IC081697	8.19	7.72	**7.96**	5.16	12.38	12.04	5.30		8.90	10.40	**9.03**
8	IC081698	11.39	8.54	**9.96**	5.57	9.18	15.93	9.80		8.90	27.60	**12.83**
9	IC093950	6.89	7.22	**7.05**	3.92	8.65	14.00	6.00		7.10	20.00	**9.94**
10	IC094652	5.42	6.71	**6.06**	3.29	6.95	11.30	2.50		9.00	13.60	**7.77**
11	IC094658	6.78	4.01	**5.39**	3.35	3.71	8.81	5.00		6.60	16.40	**7.31**
12	IC094660	7.61	6.87	**7.24**	3.48	5.47	17.07	2.50		6.80	22.20	**9.59**
13	IC095254	11.11	7.89	**9.50**	5.85	14.98	14.64	6.20		6.90	22.20	**11.79**
14	IC095258	6.11	6.12	**6.11**	2.69	10.91	11.66	1.30		8.60	20.80	**9.33**
15	IC095289	6.31	7.48	**6.89**	2.07	5.59	16.62	5.30		7.60	26.20	**10.56**
16	IC095301	12.50	7.80	**10.15**	0.62	8.68	17.95	5.10		6.40	30.20	**11.49**
17	IC095302	10.50	10.01	**10.26**	1.02	18.24	24.33	11.00		7.40	27.00	**14.83**
18	IC095345	1.53	7.78	**4.66**	1.02	8.61	9.85	4.00		8.30	10.00	**6.96**
19	IC095346	6.39	10.14	**8.26**	3.06	14.67	17.19	5.10		7.20	17.20	**10.74**
20	IC095348	3.72	5.63	**4.68**	3.18	3.25	11.21	2.50		9.60	10.60	**6.72**
21	IC095353	6.50	8.54	**7.52**	3.90	7.21	10.07	3.00		6.50	19.60	**8.38**
22	IC095360	3.50	10.04	**6.77**	6.12	14.32	9.26	2.50		6.20	14.80	**8.87**
23	IC095365	6.97	9.87	**8.42**	4.56	3.76	14.95	4.00		5.20	10.80	**7.21**
24	IC095369	3.67	11.31	**7.49**	2.90	12.68	11.71	3.50		9.20	13.60	**8.93**
25	IC095377	2.56	9.15	**5.85**	3.82	11.29	13.33	1.20		9.00	19.00	**9.61**

S.No.	Accession No.	Straw yield per plant (g)			Seed volume (g/10 ml)							
		Mandor	SK Nagar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC042006	16.20	42.00	**29.10**	6.80	7.98	8.06	6.72		9.50	8.41	**7.91**
2	IC042011	16.50	63.00	**39.75**	7.00	7.69	9.58	6.51		8.20	8.40	**7.90**
3	IC042015	12.00	59.80	**35.90**	5.80	7.84	8.00	6.42		10.00	8.52	**7.76**
4	IC042016	15.90	45.00	**30.45**	5.60	7.48	9.70	6.11		9.20	8.36	**7.74**
5	IC055147	18.00	62.40	**40.20**	6.40	7.79	9.70	6.37		9.30	8.14	**7.95**
6	IC065548	15.90	42.60	**29.25**	6.20	7.92	9.20	7.11		8.70	8.13	**7.88**
7	IC081697	15.90	30.00	**22.95**	5.40	7.88	7.48	7.12		8.80	8.00	**7.45**
8	IC081698	29.40	82.80	**56.10**	5.20	7.86	10.32	7.19		9.00	8.54	**8.02**
9	IC093950	18.00	52.00	**35.00**	7.40	7.26	8.48	6.97		9.40	8.76	**8.05**
10	IC094652	7.50	29.20	**18.35**	6.20	7.92	9.32	7.12		9.80	8.18	**8.09**
11	IC094658	15.00	55.60	**35.30**	5.80	7.44	8.40	7.10		9.70	8.41	**7.81**
12	IC094660	7.50	47.20	**27.35**	7.20	7.63	9.34	7.01		9.60	8.51	**8.22**
13	IC095254	18.60	69.00	**43.80**	7.40	8.02	8.08	7.02		7.20	8.50	**7.70**
14	IC095258	3.90	72.00	**37.95**	6.60	8.05	9.36	7.12		7.50	8.20	**7.81**
15	IC095289	15.90	80.00	**47.95**	6.80	7.19	9.56	7.11		7.30	8.37	**7.72**
16	IC095301	15.30	90.00	**52.65**	5.40	8.06	10.70	7.81		8.00	8.74	**8.12**
17	IC095302	33.00	80.00	**56.50**	5.80	7.70	8.40	6.89		8.60	8.42	**7.64**
18	IC095345	12.00	32.00	**22.00**	6.80	7.68	9.26	7.21		8.50	8.12	**7.93**
19	IC095346	15.30	50.00	**32.65**	6.00	8.04	9.22	7.12		9.70	7.90	**8.00**
20	IC095348	7.50	32.00	**19.75**	6.00	7.98	9.83	7.41		9.60	8.60	**8.24**
21	IC095353	9.00	69.00	**39.00**	6.20	8.06	9.37	6.96		7.10	8.47	**7.69**
22	IC095360	7.50	48.00	**27.75**	5.40	7.93	9.84	6.91		8.20	8.31	**7.77**
23	IC095365	12.00	36.00	**24.00**	5.80	8.04	9.87	6.99		8.50	8.51	**7.95**
24	IC095369	10.50	46.00	**28.25**	6.60	8.00	9.42	6.99		6.60	7.50	**7.52**
25	IC095377	3.60	56.00	**29.80**	5.80	7.96	9.00	6.41		10.10	8.42	**7.95**

S.No.	Accession No.	Days to 50% flowering									Stem thickness (mm)					
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	57.00	77.00	41.00	59.00	49.00		80.00	34.00	**56.71**	9.58	13.72		10.00	33.00	**16.57**
27	IC095386	62.00	77.00	46.00	68.00	62.00		95.00	48.00	**65.43**	9.76	14.57		10.00	47.00	**20.33**
28	IC095387	69.00	87.00	50.00	70.00	51.00		93.00	46.00	**66.57**	10.90	16.07		25.00	37.00	**22.24**
29	IC095435	64.00	83.00	50.00	91.00	57.00		96.00	47.00	**69.71**	9.60	15.64		20.00	50.00	**23.81**
30	IC095474	59.00	79.00	45.00	83.00	59.00		85.00	35.00	**63.57**	9.87	13.65		15.00	33.00	**17.88**
31	IC095475	58.00	82.00	46.00	84.00	64.00		81.00	44.00	**65.57**	8.99	13.65		15.00	38.00	**18.91**
32	IC095481	61.00	79.00	46.00	85.00	57.00		78.00	46.00	**64.57**	16.07	15.48		15.00	51.00	**24.39**
33	IC095504	70.00	83.00	50.00	92.00	51.00		88.00	47.00	**68.71**	14.06	15.73		15.00	42.00	**21.70**
34	IC095508	69.00	83.00	55.00	94.00	47.00		96.00	46.00	**70.00**	11.54	16.29		10.00	49.00	**21.71**
35	IC095509	71.00	83.00	55.00	94.00	69.00			48.00	**70.00**	11.49	17.10			46.00	**24.86**
36	IC095512	74.00	83.00	57.00	94.00	47.00		89.00	43.00	**69.57**	11.14	15.45		15.00	50.00	**22.90**
37	IC095523	71.00	83.00	55.00	77.00	56.00		93.00	46.00	**68.71**	10.38	13.78		30.00	44.00	**24.54**
38	IC095524	69.00	83.00	50.00	77.00	72.00		98.00	46.00	**70.71**	10.07	12.73		10.00	43.00	**18.95**
39	IC095529	61.00	79.00	46.00	61.00	70.00		76.00	45.00	**62.57**	8.22	13.63		25.00	39.00	**21.46**
40	IC095530	63.00	82.00	57.00	69.00	64.00		96.00	46.00	**68.14**	11.83	14.48		20.00	47.00	**23.33**
41	IC095533	64.00	79.00	50.00	70.00	60.00		76.00	44.00	**63.29**	7.87	11.57		20.00	45.00	**21.11**
42	IC095541	61.00	79.00	50.00	69.00	49.00		86.00	37.00	**61.57**	7.65	12.88		20.00	38.00	**19.63**
43	IC095542	58.00	83.00	50.00	77.00	56.00		88.00	37.00	**64.14**	7.70	30.36		20.00	47.00	**26.27**
44	IC095555	59.00	83.00	56.00	85.00	66.00		95.00	45.00	**69.86**	10.35	17.39		15.00	50.00	**23.18**
45	IC095563	60.00	82.00	50.00	77.00	71.00		96.00	46.00	**68.86**	7.38	13.36		30.00	44.00	**23.68**
46	IC095591	69.00		57.00	85.00	63.00		75.00	48.00	**66.17**	13.31	14.61		25.00	67.00	**29.98**
47	IC095592	67.00	80.00	57.00	77.00	56.00		96.00	42.00	**67.86**	12.67	13.76		20.00	71.00	**29.36**
48	IC095603	60.00	80.00	56.00	77.00	71.00		86.00	42.00	**67.43**	9.76	14.36		35.00	60.60	**29.93**
49	IC095604	58.00	82.00	49.00	76.00	49.00		77.00	36.00	**61.00**	15.32	12.07		20.00	47.60	**23.75**
50	IC095654	61.00	82.00	57.00	84.00	54.00		84.00	43.00	**66.43**	10.28	16.62		20.00	55.00	**25.48**
51	SKGPA-111	54.00	79.00	41.00	83.00	48.00	65.60	78.00	31.00	**59.95**	13.65	12.43	18.00	20.00	54.00	**23.62**

S.No.	Accession No.	Plant height (cm)									Leaf width (cm)			
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Rahuri	Ranchi	Mean
26	IC095385	95.18	80.00	98.20	99.60	88.00		28.00	82.80	**81.68**	5.10		1.00	**3.05**
27	IC095386	101.40	87.60	90.80	104.00	101.00		31.00	120.40	**90.89**	5.82		2.00	**3.91**
28	IC095387	81.72	77.20	97.00	112.60	112.00		54.00	132.00	**95.22**	5.38		2.00	**3.69**
29	IC095435	70.72	82.00	99.20	105.20	107.00		47.00	119.00	**90.02**	6.56		1.50	**4.03**
30	IC095474	93.46	70.60	91.00	94.80	111.00		37.00	118.80	**88.09**	7.36		2.00	**4.68**
31	IC095475	96.00	111.00	102.40	114.40	131.00		37.00	118.40	**101.46**	6.58		2.00	**4.29**
32	IC095481	100.68	76.20	104.20	114.60	136.00		34.00	132.20	**99.70**	6.26		1.50	**3.88**
33	IC095504	90.20	81.80	110.00	98.20	132.00		28.00	123.60	**94.83**	5.78		2.00	**3.89**
34	IC095508	107.64	95.40	120.00	127.20	102.00		40.00	136.40	**104.09**	5.84		2.00	**3.92**
35	IC095509	93.40	73.00	110.00	87.60	113.00			142.20	**103.20**	5.02			**5.02**
36	IC095512	121.68	77.20	105.40	104.40	112.00		43.00	138.60	**100.33**	6.58		1.50	**4.04**
37	IC095523	99.38	75.00	74.80	102.20	131.00		61.00	146.00	**98.48**	6.52		2.50	**4.51**
38	IC095524	97.40	89.20	71.40	93.60	129.00		36.00	126.40	**91.86**	6.00		2.00	**4.00**
39	IC095529	104.34	93.40	102.00	92.60	118.00		63.00	135.20	**101.22**	5.42		1.00	**3.21**
40	IC095530	88.62	76.80	73.00	104.80	90.00		33.00	151.20	**88.20**	5.80		2.00	**3.90**
41	IC095533	86.78	76.40	98.00	101.00	97.00		37.00	145.40	**91.65**	5.32		2.00	**3.66**
42	IC095541	90.78	82.40	105.80	92.40	121.00		35.00	149.40	**96.68**	5.96		1.50	**3.73**
43	IC095542	79.64	88.60	111.40	93.20	94.00		35.00	136.80	**91.23**	6.56		2.00	**4.28**
44	IC095555	107.34	87.40	95.80	113.40	117.00		48.00	132.00	**100.13**	6.70		2.00	**4.35**
45	IC095563	85.66	98.60	103.00	117.80	129.00		47.00	170.20	**107.32**	5.50		1.50	**3.50**
46	IC095591	95.50		102.20	104.40	127.00		36.00	151.20	**102.72**	5.82		2.00	**3.91**
47	IC095592	78.18	85.00	109.60	98.40	132.00		45.00	178.80	**103.85**	5.52		1.00	**3.26**
48	IC095603	91.36	93.00	86.80	80.20	130.00		53.00	164.80	**99.88**	5.46		2.00	**3.73**
49	IC095604	85.06	80.00	83.40	94.40	118.00		57.00	160.60	**96.92**	5.72		2.50	**4.11**
50	IC095654	94.22	86.00	82.40	103.20	124.00		45.00	177.20	**101.72**	6.12		1.00	**3.56**
51	SKGPA-111	81.72	66.00	60.80	87.80	94.00	51.20	58.00	74.20	**71.72**	5.34	3.20	3.00	**3.85**

S.No.	Accession No.	Leaf length (cm)						Inflorescence length (cm)								
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	9.46	15.30		3.00	16.60	**11.09**	27.60	23.80	63.00	53.00	54.00		18.00	58.20	**42.51**
27	IC095386	11.22	14.80		3.00	20.90	**12.48**	30.74	22.20	48.60	50.44	56.00		9.00	62.00	**39.85**
28	IC095387	11.30	14.50		4.00	17.30	**11.78**	30.00	18.20	47.00	51.46	49.00		27.00	65.40	**41.15**
29	IC095435	11.40	11.90		3.00	16.90	**10.80**	29.98	17.00	47.00	52.54	61.00		16.00	52.20	**39.39**
30	IC095474	12.74	11.50		4.00	20.00	**12.06**	33.78	18.20	49.00	48.46	45.00		11.00	60.20	**37.95**
31	IC095475	12.00	11.68		3.00	17.50	**11.05**	34.16	17.40	51.00	49.80	47.00		12.00	64.20	**39.37**
32	IC095481	12.50	12.96		3.00	19.20	**11.92**	33.94	15.40	47.00	51.32	50.00		10.00	58.40	**38.01**
33	IC095504	14.16	13.08		4.00	17.50	**12.19**	26.70	18.20	54.80	51.40	63.00		11.00	61.00	**40.87**
34	IC095508	13.76	14.00		3.00	20.20	**12.74**	31.42	20.00	61.80	55.00	61.00		20.00	68.00	**45.32**
35	IC095509	11.76	12.90			18.10	**14.25**	17.48	17.60	59.80	47.46	56.00			63.40	**43.62**
36	IC095512	15.90	16.60		4.00	22.60	**14.78**	31.16	20.60	58.40	54.60	50.00		13.00	65.20	**41.85**
37	IC095523	13.80	14.36		5.50	21.10	**13.69**	29.92	14.80	39.60	53.20	56.00		22.00	66.80	**40.33**
38	IC095524	12.55	11.90		4.00	21.10	**12.39**	31.52	14.20	41.60	46.00	59.00		14.00	68.00	**39.19**
39	IC095529	13.54	16.10		2.00	18.30	**12.49**	30.98	14.40	41.00	51.86	63.00		10.00	69.20	**40.06**
40	IC095530	13.38	14.78		4.00	21.30	**13.37**	31.72	12.80	35.80	47.00	49.00		12.00	73.80	**37.45**
41	IC095533	10.12	13.00		3.00	21.80	**11.98**	28.80	14.00	40.00	50.08	54.00		14.00	62.80	**37.67**
42	IC095541	13.20	14.50		2.50	19.70	**12.48**	25.55	15.40	47.00	49.80	56.00		7.00	69.60	**38.62**
43	IC095542	13.14	13.20		3.00	21.00	**12.59**	25.78	15.80	43.60	47.68	61.00		7.00	64.40	**37.89**
44	IC095555	13.52	13.68		4.00	19.30	**12.63**	29.38	13.20	43.80	51.94	59.00		17.00	62.20	**39.50**
45	IC095563	10.48	13.78		3.00	22.60	**12.47**	26.56	12.20	41.80	46.80	52.00		11.00	80.40	**38.68**
46	IC095591	13.10	12.36		3.00	24.30	**13.19**	27.38		50.20	56.80	51.00		9.00	76.60	**45.16**
47	IC095592	11.56	14.18		2.00	25.40	**13.29**	15.54	19.20	43.80	45.70	62.00		21.00	77.60	**40.69**
48	IC095603	11.54	11.88		4.00	24.30	**12.93**	23.04	24.40	48.80	37.64	59.00		23.00	71.20	**41.01**
49	IC095604	13.26	12.80		4.00	23.90	**13.49**	31.36	24.80	39.40	38.74	52.00		13.00	61.80	**37.30**
50	IC095654	13.08	13.08		2.00	26.20	**13.59**	17.33	19.00	39.20	49.20	49.00		21.00	78.20	**38.99**
51	SKGPA-111	11.30	12.70	9.80	6.00	16.98	**11.36**	25.30	13.00	30.40	48.86	43.00	36.50	14.00	57.80	**33.61**

S.No.	Accession No.	Lateral spikelet length (cm)						Petiole length (cm)					
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	18.66	8.82		8.00	20.60	**14.02**	5.36	6.06		1.00	0.80	**3.31**
27	IC095386	19.08	9.70		3.00	25.00	**14.20**	5.44	7.04		2.00	7.70	**5.55**
28	IC095387	20.54	7.82		12.00	21.40	**15.44**	4.92	7.18		2.00	6.40	**5.13**
29	IC095435	18.06	7.42		7.00	17.80	**12.57**	6.24	6.08		2.00	6.49	**5.20**
30	IC095474	20.60	9.14		5.00	21.20	**13.99**	7.28	6.08		1.50	8.35	**5.80**
31	IC095475	16.68	10.94		3.00	23.20	**13.46**	5.56	6.36		2.00	7.59	**5.38**
32	IC095481	22.98	12.66		4.00	18.80	**14.61**	5.70	6.96		1.00	7.80	**5.37**
33	IC095504	15.44	9.46		3.00	18.20	**11.53**	6.62	6.40		2.00	6.60	**5.41**
34	IC095508	20.78	6.00		5.00	19.00	**12.70**	6.10	7.26		2.00	8.15	**5.88**
35	IC095509	15.74	11.40			19.00	**15.38**	5.56	7.34			6.70	**6.53**
36	IC095512	17.12	9.88		5.00	17.40	**12.35**	7.90	8.70		1.00	8.20	**6.45**
37	IC095523	23.76	9.84		8.00	14.60	**14.05**	7.50	5.40		2.00	8.97	**5.97**
38	IC095524	23.00	6.84		5.00	15.40	**12.56**	7.22	5.76		2.00	9.00	**6.00**
39	IC095529	21.78	8.56		7.00	20.60	**14.49**	6.30	8.36		1.50	8.04	**6.05**
40	IC095530	20.60	10.48		3.00	23.00	**14.27**	5.48	7.12		1.00	8.50	**5.53**
41	IC095533	17.90	9.86		7.00	21.80	**14.14**	4.86	6.24		2.00	9.20	**5.58**
42	IC095541	16.48	9.50		3.00	20.60	**12.40**	6.58	6.06		1.50	8.19	**5.58**
43	IC095542	14.28	7.88		3.00	22.20	**11.84**	5.76	6.00		1.50	8.80	**5.52**
44	IC095555	23.04	6.80		9.00	18.40	**14.31**	7.50	5.54		2.00	7.78	**5.71**
45	IC095563	18.62	9.20		9.00	23.40	**15.06**	5.66	6.10		1.00	9.20	**5.49**
46	IC095591	18.36	12.10		4.00	23.60	**14.52**	6.80	6.26		1.50	9.50	**6.02**
47	IC095592	15.54	15.84		10.00	21.40	**15.70**	4.94	6.90		1.50	9.90	**5.81**
48	IC095603	28.04	12.32		13.00	23.00	**19.09**	5.56	5.44		2.00	9.50	**5.63**
49	IC095604	31.36	13.42		7.00	19.20	**17.75**	5.74	6.22		1.00	11.20	**6.04**
50	IC095654	17.38	13.20		10.00	20.40	**15.25**	6.52	5.82		1.50	11.20	**6.26**
51	SKGPA-111	25.30	14.12	10.80	8.00	24.80	**16.60**	5.14	6.24	4.80	4.00	7.33	**5.50**

S.No.	Accession No.	Number of branches per plant						Days to 80% maturity								
		Akola	Ambikapur	Delhi	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	2.40	3.00	5.20	5.00	3.60	**3.84**	125.0	144.0	91.0	163.0	134.0		159.0	111.0	**132.43**
27	IC095386	2.80	3.00	4.75	16.00	0.00	**5.31**	127.0	144.0	96.0	163.0	133.0		154.0	105.0	**131.71**
28	IC095387	3.00	2.60	5.00	14.00	0.00	**4.92**	130.0	144.0	100.0	167.0	122.0		157.0	113.0	**133.29**
29	IC095435	5.20	3.80	6.40	10.00	0.00	**5.08**	133.0	144.0	100.0	151.0	117.0		149.0	113.0	**129.57**
30	IC095474	3.00	3.00	5.80	11.00	0.00	**4.56**	125.0	147.0	95.0	171.0	130.0		158.0	109.0	**133.57**
31	IC095475	2.40	4.00	3.50	16.00	0.00	**5.18**	126.0	149.0	96.0	175.0	127.0		154.0	110.0	**133.86**
32	IC095481	4.40	2.60	3.50	9.00	0.00	**3.90**	120.0	149.0	96.0	174.0	120.0		166.0	108.0	**133.29**
33	IC095504	2.00	2.40	4.20	3.00	0.00	**2.32**	126.0	149.0	100.0	170.0	136.0		157.0	110.0	**135.43**
34	IC095508	5.40	5.20	7.00	4.00	0.00	**4.32**	132.0	150.0	105.0	176.0	134.0		156.0	106.0	**137.00**
35	IC095509	3.40	4.80	6.25		0.00	**3.61**	128.0	150.0	105.0	174.0	129.0			109.0	**132.50**
36	IC095512	3.40	2.00	5.33	14.00	0.00	**4.95**	129.0	149.0	107.0	170.0	123.0		152.0	113.0	**134.71**
37	IC095523	3.40	5.00	4.75	26.00	0.00	**7.83**	132.0	149.0	105.0	165.0	119.0		162.0	107.0	**134.14**
38	IC095524	2.80	2.40	6.60	8.00	0.00	**3.96**	129.0	150.0	100.0	161.0	120.0		156.0	106.0	**131.71**
39	IC095529	2.80	3.20	6.00	16.00	0.00	**5.60**	132.0	150.0	96.0	163.0	127.0		155.0	107.0	**132.86**
40	IC095530	3.20	2.60	5.50	7.00	0.00	**3.66**	126.0	150.0	107.0	166.0	131.0		156.0	107.0	**134.71**
41	IC095533	2.00	2.80	6.25	6.00	0.00	**3.41**	131.0	149.0	100.0	170.0	133.0		162.0	110.0	**136.43**
42	IC095541	2.40	3.00	6.20	10.00	0.00	**4.32**	133.0	149.0	100.0	168.0	129.0		152.0	107.0	**134.00**
43	IC095542	2.00	4.40	5.00	10.00	0.00	**4.28**	131.0	144.0	100.0	170.0	130.0		148.0	108.0	**133.00**
44	IC095555	2.00	2.60	4.00	6.00	0.00	**2.92**	133.0	144.0	106.0	160.0	129.0		160.0	109.0	**134.43**
45	IC095563	2.00	3.00	2.50	13.00	0.00	**4.10**	131.0	145.0	100.0	174.0	118.0		152.0	113.0	**133.29**
46	IC095591	2.80		7.60	18.00	0.00	**7.10**	135.0		107.0	163.0	127.0		152.0	107.0	**131.83**
47	IC095592	2.40	4.00	7.40	7.00	0.00	**4.16**	131.0	147.0	107.0	168.0	122.0		152.0	106.0	**133.29**
48	IC095603	2.20	5.40	7.40	10.00	0.00	**5.00**	130.0	147.0	106.0	164.0	131.0		152.0	110.0	**134.29**
49	IC095604	1.60	3.40	6.80	13.00	0.00	**4.96**	131.0	146.0	99.0	162.0	126.0		159.0	110.0	**133.29**
50	IC095654	3.80	3.40	6.00	7.00	0.00	**4.04**	126.0	146.0	107.0	152.0	130.0		169.0	111.0	**134.43**
51	SKGPA-111	4.00	1.40	6.00	9.00	3.80	**4.84**	121.0	145.0	91.0	170.0	126.0	114.0	150.0	99.0	**127.00**

S.No.	Accession No.	Grain yield (q/ha)			Seed yield per plant (g)							
		Ambikapur	Bhubaneswar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	3.61	8.95	**6.28**	3.97	10.60	16.08	8.00		9.60	11.40	**9.94**
27	IC095386	6.75	8.10	**7.42**	5.31	13.68	16.30	3.50		8.50	15.60	**10.48**
28	IC095387	9.25	9.88	**9.57**	5.73	9.78	22.09	5.20		7.90	13.80	**10.75**
29	IC095435	9.75	6.44	**8.09**	6.29	2.01	17.02	4.90		7.80	12.80	**8.47**
30	IC095474	5.56	6.24	**5.90**	10.06	3.30	7.77	1.00		9.40	15.00	**7.76**
31	IC095475	8.33	9.67	**9.00**	3.54	9.06	11.64	5.10		7.60	15.00	**8.66**
32	IC095481	5.28	12.20	**8.74**	7.04	15.69	10.48	5.20		7.20	16.20	**10.30**
33	IC095504	4.89	9.35	**7.12**	11.80	11.96	22.27	2.50		7.60	17.80	**12.32**
34	IC095508	2.11	7.83	**4.97**	3.61	16.78	19.83	4.80		8.50	18.20	**11.95**
35	IC095509	2.78	8.31	**5.54**	7.82	16.41	14.40	4.00			21.40	**12.81**
36	IC095512	2.11	5.59	**3.85**	15.61	7.12	8.77	4.20		7.80	23.00	**11.08**
37	IC095523	1.67	5.48	**3.57**	11.14	4.74	20.29	1.00		9.20	15.00	**10.23**
38	IC095524	3.67	4.89	**4.28**	3.55	4.72	13.53	1.20		9.80	10.60	**7.23**
39	IC095529	3.72	7.74	**5.73**	10.57	8.46	12.90	1.20		8.90	9.60	**8.60**
40	IC095530	7.89	4.70	**6.29**	2.90	6.06	23.68	5.20		7.10	12.00	**9.49**
41	IC095533	6.00	6.48	**6.24**	3.15	12.14	10.00	5.10		8.30	12.20	**8.48**
42	IC095541	9.83	8.67	**9.25**	7.31	9.63	14.60	3.10		9.40	10.60	**9.11**
43	IC095542	4.44	9.09	**6.77**	4.12	19.06	12.82	4.30		8.10	4.80	**8.87**
44	IC095555	5.17	6.37	**5.77**	9.28	11.79	14.54	2.50		10.10	9.00	**9.53**
45	IC095563	4.94	8.81	**6.88**	3.30	10.12	13.79	3.50		10.50	19.00	**10.04**
46	IC095591		6.72	**6.72**	8.77	14.96	19.08	4.10		9.40	47.00	**17.22**
47	IC095592	4.44	6.29	**5.37**	5.08	13.50	11.82	5.20		6.70	42.20	**14.08**
48	IC095603	5.33	2.91	**4.12**	8.80	6.96	16.63	4.80		7.70	27.60	**12.08**
49	IC095604	6.14	7.01	**6.58**	5.50	5.97	2.11	4.00		6.40	10.80	**5.80**
50	IC095654	8.89	3.95	**6.42**	8.00	5.52	5.50	5.10		6.20	18.00	**8.05**
51	SKGPA-111	2.64	5.31	**3.97**	2.15	10.16	9.24	5.00	8.61	7.40	21.40	**9.14**

S.No.	Accession No.	Straw yield per plant (g)			Seed volume (g/10 ml)							
		Mandor	SK Nagar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
26	IC095385	24.00	36.00	**30.00**	5.20	7.84	9.62	6.12		7.70	7.99	**7.41**
27	IC095386	10.50	49.00	**29.75**	5.40	8.09	9.56	6.72		9.40	8.35	**7.92**
28	IC095387	15.60	43.00	**29.30**	6.00	8.01	9.14	6.71		9.80	8.67	**8.06**
29	IC095435	14.70	40.00	**27.35**	6.00	7.89	8.46	6.35		9.20	7.99	**7.65**
30	IC095474	3.00	47.00	**25.00**	6.00	8.03	8.22	6.71		10.20	7.90	**7.84**
31	IC095475	15.30	53.00	**34.15**	5.40	7.91	7.42	6.68		8.60	8.16	**7.36**
32	IC095481	15.60	57.00	**36.30**	6.00	7.82	8.92	6.81		8.00	8.28	**7.64**
33	IC095504	7.50	56.00	**31.75**	6.00	7.99	8.90	6.67		9.20	8.00	**7.79**
34	IC095508	14.40	54.00	**34.20**	5.40	8.06	8.00	6.66		9.20	8.15	**7.58**
35	IC095509	12.00	69.00	**40.50**	5.80	8.10	8.40	6.75			8.90	**7.59**
36	IC095512	12.60	77.00	**44.80**	5.80	8.08	9.04	6.66		8.60	8.50	**7.78**
37	IC095523	3.00	54.00	**28.50**	7.60	8.12	9.54	6.87		7.70	8.48	**8.05**
38	IC095524	3.60	33.00	**18.30**	6.00	8.06	8.62	6.81		7.40	8.15	**7.51**
39	IC095529	3.60	28.00	**15.80**	6.20	8.05	9.26	6.41		7.70	8.29	**7.65**
40	IC095530	15.60	39.60	**27.60**	6.80	8.02	9.87	6.71		9.70	8.49	**8.27**
41	IC095533	15.30	38.00	**26.65**	6.00	8.12	9.66	7.25		8.70	8.38	**8.02**
42	IC095541	9.30	35.00	**22.15**	7.20	8.16	8.10	6.72		7.40	8.40	**7.66**
43	IC095542	12.90	13.00	**12.95**	6.60	8.18	7.36	6.82		8.90	8.14	**7.67**
44	IC095555	7.50	35.00	**21.25**	6.80	8.11	7.36	6.76		9.20	7.98	**7.70**
45	IC095563	10.50	62.00	**36.25**	6.00	8.16	5.51	6.95		9.90	8.45	**7.50**
46	IC095591	12.30	133.00	**72.65**	6.60	7.98	8.24	6.56		9.20	8.38	**7.83**
47	IC095592	15.60	118.00	**66.80**	6.80	8.01	8.50	6.41		9.90	8.29	**7.98**
48	IC095603	14.40	80.00	**47.20**	7.00	8.06	7.20	6.71		9.70	8.19	**7.81**
49	IC095604	12.00	36.40	**24.20**	6.80	8.01	7.48	6.91		8.80	8.23	**7.71**
50	IC095654	15.30	56.00	**35.65**	6.00	8.02	9.26	6.82		9.50	8.84	**8.07**
51	SKGPA-111	15.00	74.40	**44.70**	7.60	8.03	8.92	6.87	8.60	6.80	8.28	**7.87**

S.No.	Accession No.	Days to 50% flowering									Stem thickness (mm)					
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	58.00	82.00	57.00	84.00	56.00	76.50	95.00	44.00	**69.06**	12.47	15.31	11.00	20.00	59.00	**23.56**
53	SKGPA-113	57.00	80.00	45.00	84.00	66.00	69.50	92.00	33.00	**65.81**	8.16	15.82	9.00	15.00	41.00	**17.80**
54	SKGPA-115	64.00	80.00	50.00	77.00	51.00	67.80	95.00	43.00	**65.98**	10.63	11.26	10.00	25.00	45.40	**20.46**
55	SKGPA-117	72.00	80.00	49.00	93.00	47.00	77.40	91.00	43.00	**69.05**	11.56	15.72	12.00	15.00	44.20	**19.70**
56	SKGPA-118	55.00	79.00	46.00	76.00	54.00	75.20	80.00	31.00	**62.03**	9.88	14.51	7.00	30.00	59.60	**24.20**
57	SKGPA-119	59.00	79.00	46.00	77.00	52.00	82.10	83.00	35.00	**64.14**	8.67	14.65	13.00	20.00	60.40	**23.34**
58	SKGPA-120	62.00	80.00	46.00	94.00	63.00	65.70	95.00	46.00	**68.96**	7.44	12.93	8.00	20.00	56.60	**20.99**
59	SKGPA-121	57.00	79.00	42.00	78.00	59.00	72.30	93.00	33.00	**64.16**	12.96	13.38	20.00	15.00	58.40	**23.95**
60	SKGPA-122	55.00	79.00	42.00	77.00	62.00	70.30	95.00	32.00	**64.04**	9.11	13.98	7.00	15.00	46.00	**18.22**
61	SKGPA-123	57.00	79.00	45.00	77.00	48.00	67.80	93.00	35.00	**62.73**	10.30	24.85	10.00	15.00	53.00	**22.63**
62	SKGPA-124	69.00	80.00	42.00	57.00	62.00	71.40	88.00	34.00	**62.93**	7.24	14.91	16.00	20.00	47.20	**21.07**
63	SKGPA-125	56.00	80.00	42.00	60.00	53.00	73.20	92.00	31.00	**60.90**	8.91	12.30	8.00	10.00		**9.80**
64	SKGPA-126	69.00	80.00	42.00	76.00	59.00	75.80	95.00	34.00	**66.35**	11.16	14.02	11.00	20.00	51.00	**21.44**
65	SKGPA-127	72.00	82.00	57.00	84.00	67.00	68.00		45.00	**67.86**	12.08	16.15	16.00		50.00	**23.56**
	Mean for check variety															
1	**BGA-2**	78.50	86.00	58.00	94.33	74.57	81.00	94.00	48.14	**76.82**	12.49	14.51	14.00	20.00	53.77	**22.95**
2	**GA-1**		83.00					84.20		**83.60**				25.00		**25.00**
3	**GA-2**	70.50	83.00	56.50	86.00	53.57	71.80	85.00	45.29	**68.96**	14.15	16.66	18.00	20.00	54.17	**24.60**
4	**RMA-7**	71.00	88.00	58.00	92.83	55.57	79.00	87.20	50.29	**72.74**	10.06	17.07	16.00	18.00	60.09	**24.24**
5	**Suvarna**	76.50	86.00	58.50	93.33	74.29	83.10	80.80	49.71	**75.28**	14.52	17.38	17.00	20.00	62.37	**26.25**
Minimum		**53.00**	**77.00**	**41.00**	**57.00**	**47.00**	**65.60**	**70.00**	**31.00**	**56.71**	**6.83**	**11.26**	**7.00**	**10.00**	**31.00**	**9.80**
Maximum		**78.50**	**88.00**	**59.00**	**94.33**	**74.57**	**83.10**	**98.00**	**50.29**	**83.60**	**16.07**	**30.36**	**20.00**	**35.00**	**71.00**	**29.98**
Mean		**62.89**	**81.13**	**50.10**	**80.24**	**59.07**	**73.34**	**86.93**	**41.88**	**66.44**	**10.35**	**14.99**	**12.68**	**19.53**	**48.17**	**22.55**
CD (0.05)				**3.25**	**12.15**			**5.65**	**7.13**			**5.88**		**7.63**	**2.13**	
CV (%) Error				**2.34**	**5.15**			**2.58**	**5.82**			**13.93**		**14.56**	**14.61**	
CV (%) Pheno.		**9.26**	**2.66**	**10.56**	**10.98**	**13.59**	**7.45**	**8.84**	**13.67**	**6.04**	**20.89**	**18.45**	**32.51**	**28.71**	**17.07**	**14.08**

S.No.	Accession No.	Plant height (cm)									Leaf width (cm)			
		Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Akola	Rahuri	Ranchi	Mean
52	SKGPA-112	97.62	92.20	107.40	120.40	98.00	62.90	60.00	164.20	**100.34**	6.30	2.50	3.00	**3.93**
53	SKGPA-113	66.02	91.00	87.00	90.80	89.00	64.80	33.00	92.20	**76.73**	4.52	3.20	2.00	**3.24**
54	SKGPA-115	69.48	65.40	104.00	81.60	90.00	56.80	71.00	140.40	**84.84**	4.88	3.60	2.50	**3.66**
55	SKGPA-117	74.90	85.00	99.40	103.20	99.00	85.50	50.00	114.40	**88.93**	6.18	3.40	2.50	**4.03**
56	SKGPA-118	79.96	69.20	70.20	98.40	100.00	77.50	54.00	86.20	**79.43**	5.18	3.60	2.00	**3.59**
57	SKGPA-119	65.08	76.00	75.60	107.00	91.00	76.60	29.00	126.40	**80.84**	5.26	4.00	2.00	**3.75**
58	SKGPA-120	59.94	75.60	101.60	82.40	88.00	73.10	45.00	148.20	**84.23**	5.74	3.10	2.50	**3.78**
59	SKGPA-121	65.56	84.00	52.20	73.00	92.00	72.10	33.00	81.40	**69.16**	4.34	3.90	1.00	**3.08**
60	SKGPA-122	78.00	72.00	63.00	95.60	101.00	40.70	54.00	88.40	**74.09**	5.40	2.80	1.50	**3.23**
61	SKGPA-123	94.92	110.80	96.40	123.80	102.00	100.30	35.00	142.60	**100.73**	5.80	2.90	2.00	**3.57**
62	SKGPA-124	81.18	74.60	75.40	78.40	88.00	56.90	43.00	126.60	**78.01**	5.44	3.20	2.00	**3.55**
63	SKGPA-125	63.84	66.80	93.40	73.40	96.00	60.30	32.00	85.80	**71.44**	4.70	2.60	1.00	**2.77**
64	SKGPA-126	57.22	80.40	66.40	70.80	94.00	69.10	35.00	83.40	**69.54**	3.88	2.80	2.50	**3.06**
65	SKGPA-127	70.75	66.80	88.60	66.40	86.00	61.80		136.20	**82.36**	5.28	1.50		**3.39**
	Mean for check variety													
1	**BGA-2**	111.87	107.00	134.90	118.97	117.14	93.70	29.00	161.29	**109.23**	8.65	2.90	2.50	**4.68**
2	**GA-1**		71.40					56.00		**63.70**			2.20	**2.20**
3	**GA-2**	124.48	108.20	103.15	116.57	122.29	99.20	55.00	182.54	**113.93**	6.23	3.00	2.20	**3.81**
4	**RMA-7**	109.25	97.60	121.40	114.40	121.52	93.50	39.20	181.54	**109.80**	6.67	3.20	2.70	**4.19**
5	**Suvarna**	104.32	110.80	114.60	124.83	119.29	79.80	49.80	155.03	**107.31**	8.69	3.30	3.00	**5.00**
Minimum		**57.22**	**60.00**	**52.20**	**66.40**	**86.00**	**40.70**	**11.00**	**73.40**	**63.70**	**3.88**	**1.50**	**0.50**	**2.20**
Maximum		**135.64**	**120.80**	**135.00**	**128.00**	**136.00**	**100.30**	**71.00**	**182.54**	**114.69**	**8.69**	**4.00**	**3.00**	**5.16**
Mean		**91.99**	**85.65**	**97.41**	**101.52**	**107.32**	**72.41**	**42.79**	**130.05**	**93.06**	**5.78**	**3.09**	**1.94**	**3.78**
CD (0.05)				**23.33**	**37.71**			**18.98**	**34.90**				**0.87**	
CV (%) Error				**8.56**	**12.35**			**16.29**	**8.10**				**13.53**	
CV (%) Pheno.		**16.64**	**15.50**	**17.88**	**13.92**	**12.57**	**23.07**	**26.45**	**21.22**	**12.35**	**15.29**	**17.99**	**30.22**	**14.70**

S.No.	Accession No.	Leaf length (cm)						Inflorescence length (cm)								
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	13.82	14.40	8.70	8.00	37.10	**16.40**	21.26	14.60	45.00	53.70	41.00	37.40	31.00	92.80	**42.10**
53	SKGPA-113	8.80	14.70	9.00	6.00	18.05	**11.31**	18.46	16.60	38.80	49.40	47.00	41.50	5.00	71.40	**36.02**
54	SKGPA-115	10.92	11.90	10.00	3.50	21.85	**11.63**	23.78	16.20	49.20	44.20	51.00	36.80	12.00	56.40	**36.20**
55	SKGPA-117	12.74	12.52	11.20	5.00	23.60	**13.01**	29.68	20.20	41.60	54.80	54.00	50.80	16.00	49.40	**39.56**
56	SKGPA-118	13.10	14.12	11.40	4.00	19.82	**12.49**	30.08	21.20	36.80	46.06	43.00	54.80	5.00	56.40	**36.67**
57	SKGPA-119	11.50	13.68	12.30	3.00	17.26	**11.55**	26.02	20.40	41.80	52.60	37.00	44.50	15.00	60.60	**37.24**
58	SKGPA-120	11.94	10.96	10.50	6.00	20.90	**12.06**	24.42	20.00	46.00	42.06	41.00	44.80	10.00	67.40	**36.96**
59	SKGPA-121	9.86	13.08	12.60	3.00	10.41	**9.79**	29.68	20.00	30.00	34.26	47.00	56.50	9.00	59.20	**35.71**
60	SKGPA-122	11.24	12.80	7.00	4.00	11.80	**9.37**	32.26	20.40	36.60	46.20	45.00	33.10	26.00	69.60	**38.65**
61	SKGPA-123	12.86	14.58	8.90	5.00	25.72	**13.41**	33.66	19.20	39.20	49.70	48.00	45.70	14.00	69.00	**39.81**
62	SKGPA-124	10.86	12.28	9.00	6.00	17.13	**11.05**	30.22	19.00	44.80	41.60	39.00	33.10	19.00	60.40	**35.89**
63	SKGPA-125	10.22	11.80	8.40	2.00	10.86	**8.66**	27.22	22.20	55.20	42.64	42.00	40.50	15.00	66.80	**38.95**
64	SKGPA-126	8.54	12.76	7.00	3.50	18.94	**10.15**	22.33	15.80	38.20	41.00	51.00	43.90	6.00	64.20	**35.30**
65	SKGPA-127	10.02	11.76	5.60		16.94	**11.08**	29.90	12.00	32.80	30.08	42.00	34.60		72.00	**36.20**
	Mean for check variety															
1	**BGA-2**	14.92	11.46	9.00	4.00	22.85	**12.45**	24.82	13.60	56.35	51.01	38.43	46.70	5.00	53.34	**36.16**
2	**GA-1**				5.40		**5.40**		12.40					16.80		**14.60**
3	**GA-2**	14.85	14.08	9.40	4.20	21.79	**12.86**	26.93	13.80	41.90	45.67	50.86	47.20	22.60	84.29	**41.66**
4	**RMA-7**	13.05	13.66	11.40	5.70	20.94	**12.95**	29.03	13.00	52.80	45.71	41.43	49.90	10.40	79.49	**40.22**
5	**Suvarna**	15.26	11.23	9.50	5.60	22.05	**12.73**	24.38	12.80	42.20	52.12	36.71	42.50	15.40	46.03	**34.02**
Minimum		**7.10**	**8.84**	**5.60**	**2.00**	**2.80**	**5.40**	**14.82**	**12.00**	**30.00**	**30.08**	**36.71**	**33.10**	**5.00**	**46.03**	**14.60**
Maximum		**15.90**	**16.60**	**12.60**	**8.00**	**37.10**	**16.40**	**34.16**	**24.80**	**69.80**	**57.92**	**63.00**	**56.50**	**31.00**	**92.80**	**45.32**
Mean		**11.67**	**13.02**	**9.51**	**3.79**	**19.18**	**11.72**	**26.53**	**18.01**	**47.86**	**48.10**	**50.01**	**43.20**	**14.62**	**64.54**	**38.57**
CD (0.05)			**2.57**		**3.45**	**6.35**				**22.96**	**20.34**			**17.11**	**34.39**	
CV (%) Error			**7.93**		**27.20**	**11.43**				**17.77**	**16.26**			**47.89**	**20.63**	
CV (%) Pheno		**16.02**	**10.98**	**19.13**	**33.40**	**23.02**	**14.50**	**19.65**	**18.12**	**17.28**	**12.09**	**14.15**	**16.01**	**39.10**	**12.78**	**10.19**

S.No.	Accession No.	Lateral spikelet length (cm)						Petiole length (cm)					
		Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean	Akola	Delhi	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	21.26	12.38	13.40	15.00	31.80	**18.77**	6.76	7.30	3.80	4.00	14.40	**7.25**
53	SKGPA-113	28.46	18.20	12.50	2.00	23.20	**16.87**	4.88	8.08	3.90	2.00	7.65	**5.30**
54	SKGPA-115	15.44	12.94	13.40	8.00	21.80	**14.32**	5.10	6.10	4.60	2.00	9.75	**5.51**
55	SKGPA-117	15.72	11.80	15.90	9.00	17.80	**14.04**	6.64	5.40	5.20	2.00	8.97	**5.64**
56	SKGPA-118	19.80	12.66	14.80	4.00	24.60	**15.17**	6.16	5.46	5.80	3.00	8.34	**5.75**
57	SKGPA-119	16.82	17.32	14.60	12.00	25.60	**17.27**	5.42	6.88	5.90	2.00	8.12	**5.66**
58	SKGPA-120	14.64	8.40	13.80	5.00	18.80	**12.13**	6.14	5.36	5.40	2.00	7.52	**5.28**
59	SKGPA-121	18.56	12.32	16.40	5.00	23.80	**15.22**	4.50	5.46	5.90	1.50	3.75	**4.22**
60	SKGPA-122	23.60	14.24	9.50	6.00	18.60	**14.39**	5.46	5.56	3.50	2.00	4.13	**4.13**
61	SKGPA-123	25.84	16.96	12.80	12.00	17.60	**17.04**	7.40	7.36	4.20	1.50	9.57	**6.01**
62	SKGPA-124	19.88	12.94	10.90	12.00	16.60	**14.46**	4.66	5.96	4.80	5.00	7.08	**5.50**
63	SKGPA-125	14.26	11.56	12.80	7.00	29.80	**15.08**	3.98	6.02	4.30	1.00	5.35	**4.13**
64	SKGPA-126	14.40	11.86	12.60	4.00	19.00	**12.37**	3.44	5.40	3.60	1.50	7.78	**4.34**
65	SKGPA-127	7.76	8.96	10.60		19.80	**11.78**	3.68	4.20	3.20		5.28	**4.09**
	Mean for check variety												
1	**BGA-2**	14.09	8.19	14.60	4.00	16.34	**11.44**	8.93	6.35	4.70	2.00	8.51	**6.10**
2	**GA-1**				5.60		**5.60**				2.40		**2.40**
3	**GA-2**	19.32	9.27	14.70	9.20	21.09	**14.71**	6.62	7.61	4.80	2.40	8.52	**5.99**
4	**RMA-7**	15.80	9.78	12.70	5.80	18.46	**12.51**	6.48	7.29	4.60	2.20	7.77	**5.67**
5	**Suvarna**	20.91	8.11	12.70	7.80	15.40	**12.98**	8.07	7.20	4.60	3.10	8.60	**6.31**
Minimum		**7.76**	**6.00**	**9.50**	**2.00**	**13.20**	**5.60**	**3.20**	**3.72**	**3.20**	**1.00**	**0.80**	**2.40**
Maximum		**31.36**	**18.20**	**16.40**	**20.00**	**31.80**	**19.09**	**8.93**	**8.70**	**5.90**	**5.00**	**14.40**	**7.25**
Mean		**18.46**	**11.48**	**13.13**	**7.43**	**20.00**	**14.17**	**5.81**	**6.35**	**4.61**	**1.94**	**7.73**	**5.38**
CD (0.05)			**4.73**		**9.39**	**6.00**			**1.73**		**1.68**	**2.38**	
CV (%) Error			**20.81**		**56.93**	**13.28**			**9.45**		**27.25**	**11.27**	
CV (%) Pheno.		**26.90**	**25.09**	**13.88**	**54.45**	**16.90**	**14.17**	**21.33**	**14.46**	**17.33**	**44.43**	**24.13**	**15.93**

S.No.	Accession No.	Number of branches per plant						Days to 80% maturity								
		Akola	Ambikapur	Delhi	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	3.40	2.20	3.67	9.00	0.00	**3.65**	131.0	149.0	107.0	153.0	131.0	120.0	155.0	110.0	**132.00**
53	SKGPA-113	3.40	4.20	6.00	13.00	3.40	**6.00**	128.0	149.0	95.0	150.0	120.0	116.0	159.0	104.0	**127.63**
54	SKGPA-115	2.80	3.60	5.40	29.00	0.00	**8.16**	121.0	151.0	100.0	151.0	127.0	110.0	155.0	107.0	**127.75**
55	SKGPA-117	3.20	3.20	3.00	9.00	0.00	**3.68**	128.0	151.0	99.0	154.0	137.0	124.0	160.0	109.0	**132.75**
56	SKGPA-118	2.00	1.60	5.00	18.00	3.60	**6.04**	130.0	150.0	96.0	169.0	133.0	122.0	159.0	107.0	**133.25**
57	SKGPA-119	2.80	2.00	4.60	4.00	0.00	**2.68**	128.0	150.0	96.0	155.0	130.0	134.0	164.0	107.0	**133.00**
58	SKGPA-120	2.40	2.80	3.67	17.00	0.00	**5.17**	135.0	151.0	96.0	151.0	127.0	113.7	154.0	105.0	**129.09**
59	SKGPA-121	2.20	3.20	4.20	11.00	2.20	**4.56**	127.0	151.0	92.0	150.0	120.0	115.6	157.0	107.0	**127.45**
60	SKGPA-122	2.80	3.80	7.40	7.00	3.00	**4.80**	121.0	144.0	92.0	167.0	134.0	112.8	156.0	105.0	**128.98**
61	SKGPA-123	2.80	3.40	3.80	6.00	0.00	**3.20**	129.0	144.0	95.0	152.0	131.0	108.9	152.0	111.0	**127.86**
62	SKGPA-124	3.20	3.00	5.00	10.00	0.00	**4.24**	115.0	144.0	92.0	165.0	126.0	116.8	158.0	104.0	**127.60**
63	SKGPA-125	2.20	3.20	4.00	6.00	2.20	**3.52**	120.0	146.0	92.0	167.0	122.0	119.6	157.0	103.0	**128.33**
64	SKGPA-126	2.40	2.80	5.20	17.00	2.60	**6.00**	128.0	146.0	92.0	167.0	129.0	114.7	159.0	104.0	**129.96**
65	SKGPA-127	2.00	2.00	8.80		0.00	**3.20**	135.0	147.0	107.0	169.0	130.0	113.0		116.0	**131.00**
	Mean for check variety															
1	**BGA-2**	0.00	1.80	7.00	12.00	0.00	**4.16**	135.0	150.0	108.0	165.5	117.1	125.6	153.4	112.1	**133.35**
2	**GA-1**		2.20		17.20		**9.70**		149.0					155.0		**152.00**
3	**GA-2**	2.30	1.20	4.71	8.80	0.00	**3.40**	133.0	149.0	106.5	164.2	134.3	116.0	158.8	110.7	**134.06**
4	**RMA-7**	2.90	2.20	4.78	10.80	0.00	**4.14**	135.5	150.0	108.0	163.2	123.3	129.5	156.6	113.9	**134.99**
5	**Suvarna**	0.00	1.40	6.65	10.80	0.00	**3.77**	135.5	147.0	108.5	170.7	135.4	129.8	161.2	111.4	**137.44**
Minimum		**0.00**	**1.20**	**2.50**	**1.00**	**0.00**	**2.06**	**115.0**	**141.0**	**91.0**	**150.0**	**117.0**	**108.9**	**148.0**	**99.0**	**127.00**
Maximum		**6.20**	**5.40**	**8.80**	**52.00**	**3.80**	**12.60**	**135.5**	**151.0**	**109.0**	**176.0**	**137.0**	**134.0**	**169.0**	**116.0**	**152.00**
Mean		**2.74**	**3.00**	**5.55**	**10.55**	**0.44**	**4.49**	**129.6**	**147.8**	**100.1**	**164.5**	**128.1**	**118.7**	**156.9**	**108.2**	**133.26**
CD (0.05)				**3.58**	**14.30**	**0.00**				**3.3**	**18.8**			**9.8**	**4.3**	
CV (%) Error				**24.08**	**47.17**					**1.2**	**4.4**			**2.5**	**1.5**	
CV (%) Pheno.		**38.58**	**30.10**	**21.87**	**69.56**		**36.57**	**3.6**	**1.7**	**5.3**	**4.1**	**4.4**	**5.9**	**3.2**	**3.2**	**2.59**

S.No.	Accession No.	Grain yield (q/ha)			Seed yield per plant (g)							
		Ambikapur	Bhubaneswar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	8.08	9.41	**8.75**	6.21	12.17	11.50	1.30	7.14	7.50	51.20	**13.86**
53	SKGPA-113	4.44	7.09	**5.77**	1.51	14.24	9.78	1.10	5.41	8.70	18.40	**8.45**
54	SKGPA-115	3.72	6.27	**4.99**	7.96	11.42	7.64	5.00	8.08	10.90	18.60	**9.94**
55	SKGPA-117	3.89	7.01	**5.45**	8.66	11.97	6.72	6.80	9.12	10.10	17.60	**10.14**
56	SKGPA-118	3.44	6.26	**4.85**	6.65	7.41	10.83	15.00	6.11	9.50	36.00	**13.07**
57	SKGPA-119	5.19	10.15	**7.67**	4.27	14.70	10.71	1.10	9.70	8.30	40.00	**12.68**
58	SKGPA-120	3.61	17.22	**10.41**	7.78	28.86	5.54	2.50	4.21	9.40	24.40	**11.81**
59	SKGPA-121	9.33	8.60	**8.97**	4.93	5.41	21.20	5.10	12.40	9.40	24.60	**11.86**
60	SKGPA-122	4.72	8.10	**6.41**	6.63	9.70	7.38	5.30	4.12	6.90	12.40	**7.49**
61	SKGPA-123	7.11	6.91	**7.01**	5.88	13.62	12.06	6.00	6.15	6.80	15.20	**9.39**
62	SKGPA-124	2.22	5.18	**3.70**	12.59	3.70	10.87	2.40	4.53	8.60	10.20	**7.55**
63	SKGPA-125	2.28	7.11	**4.69**	2.50	14.30	10.26	3.70	3.93	8.50	13.00	**8.03**
64	SKGPA-126	2.33	11.81	**7.07**	4.51	12.18	12.74	4.50	5.38	9.90	7.40	**8.09**
65	SKGPA-127	2.22	3.97	**3.09**	1.56	7.56	12.30	9.00	6.20		13.60	**8.37**
	Mean for check variety											
1	**BGA-2**	5.33	12.00	**8.67**	6.34	20.53	7.83	3.00	7.80	8.98	13.94	**9.78**
2	**GA-1**	4.97		**4.97**						8.36		**8.36**
3	**GA-2**	9.31	10.29	**9.80**	8.49	14.19	8.98	7.06	9.33	8.86	23.89	**11.54**
4	**RMA-7**	6.47	9.44	**7.96**	4.99	12.97	9.24	9.76	8.10	7.34	19.74	**10.31**
5	**Suvarna**	5.22	14.30	**9.76**	8.79	19.39	8.11	3.70	8.45	8.92	17.91	**10.75**
Minimum		**1.53**	**2.91**	**3.09**	**0.62**	**2.01**	**2.11**	**1.00**	**3.93**	**5.20**	**4.80**	**5.80**
Maximum		**12.50**	**17.22**	**10.41**	**15.61**	**28.86**	**24.33**	**15.00**	**12.40**	**11.40**	**51.20**	**17.22**
Mean		**5.83**	**7.88**	**6.84**	**5.74**	**10.72**	**12.90**	**4.54**	**7.09**	**8.27**	**18.76**	**10.00**
CD (0.05)			**7.99**				**9.44**			**3.78**	**9.08**	
CV (%) Error			**34.66**				**42.95**			**17.50**	**18.99**	
CV (%) Pheno.		**45.77**	**31.48**	**26.62**	**52.83**	**46.25**	**36.02**	**54.59**	**32.02**	**15.60**	**47.07**	**20.88**

S.No.	Accession No.	Straw yield per plant (g)			Seed volume (g/10 ml)							
		Mandor	SK Nagar	Mean	Akola	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean
52	SKGPA-112	3.90	136.00	**69.95**	6.00	8.01	7.38	6.75	7.90	9.50	8.55	**7.73**
53	SKGPA-113	3.30	46.00	**24.65**	7.40	8.06	6.86	6.16	7.60	9.60	8.27	**7.71**
54	SKGPA-115	15.00	46.40	**30.70**	6.00	8.01	6.20	6.25	8.20	9.50	8.18	**7.48**
55	SKGPA-117	20.40	53.00	**36.70**	5.80	7.99	8.26	6.72	8.30	7.70	7.94	**7.53**
56	SKGPA-118	45.00	108.60	**76.80**	7.20	8.09	8.88	6.91	7.20	7.70	8.53	**7.79**
57	SKGPA-119	3.30	109.80	**56.55**	6.80	8.11	7.48	6.82	8.50	8.40	8.20	**7.76**
58	SKGPA-120	7.50	70.40	**38.95**	5.40	8.18	7.42	6.61	7.50	9.40	8.17	**7.53**
59	SKGPA-121	15.30	64.00	**39.65**	5.60	7.91	6.74	6.62	8.00	9.80	7.91	**7.51**
60	SKGPA-122	15.90	36.00	**25.95**	5.60	7.82	8.24	6.62	7.30	7.10	8.80	**7.35**
61	SKGPA-123	18.00	44.20	**31.10**	6.60	8.01	7.70	6.70	7.30	8.30	8.37	**7.57**
62	SKGPA-124	7.20	24.60	**15.90**	7.20	7.76	8.98	6.63	7.20	11.60	8.28	**8.24**
63	SKGPA-125	11.10	36.60	**23.85**	6.00	7.98	8.50	6.71	6.60	9.90	7.96	**7.66**
64	SKGPA-126	13.50	19.00	**16.25**	6.40	7.91	8.44	6.92	7.20	10.00	7.82	**7.81**
65	SKGPA-127	27.00	40.00	**33.50**	5.20	7.67	9.15	6.61	6.90		8.65	**7.36**
	Mean for check variety											
1	**BGA-2**	9.00	44.37	**26.69**	5.90	7.91	8.94	6.82	7.10	8.60	8.21	**7.64**
2	**GA-1**									9.26		**9.26**
3	**GA-2**	21.18	70.20	**45.69**	5.30	7.85	7.60	6.72	7.90	9.68	8.25	**7.61**
4	**RMA-7**	29.28	62.71	**46.00**	5.28	7.79	6.67	7.07	7.80	7.66	8.31	**7.23**
5	**Suvarna**	11.10	58.34	**34.72**	6.30	7.88	9.08	6.77	7.70	7.20	8.10	**7.58**
Minimum		**3.00**	**13.00**	**12.95**	**5.20**	**7.19**	**5.51**	**6.11**	**6.60**	**6.60**	**7.50**	**7.23**
Maximum		**45.00**	**136.00**	**76.80**	**7.60**	**8.18**	**10.70**	**7.81**	**8.60**	**11.60**	**8.90**	**9.26**
Mean		**13.62**	**55.92**	**34.77**	**6.21**	**7.93**	**8.59**	**6.79**	**7.62**	**8.81**	**8.30**	**7.79**
CD (0.05)			**26.54**			**0.22**	**2.41**			**1.47**	**0.73**	
CV (%) Error			**17.78**			**1.01**	**11.59**			**6.82**	**3.48**	
CV (%) Pheno.		**54.59**	**44.04**	**38.89**	**10.59**	**2.48**	**11.93**	**4.41**	**7.22**	**11.53**	**3.15**	**3.75**

Table 8: Promising lines in Fababean germplasm for various characters at different locations : Rabi 2014-15 (Plains)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	NBPGR Delhi (Accessions 50)				
1	Days to 50% flowering	68.00	83.00	EC108908, EC243608, HB-001, RFB-4(< 70.00)	Vikarant (79)
2	Days to 80% maturity	139.00	148.00	EC108908, HB-012, HB-041(< 141.00)	Vikarant (146)
3	plant height (cm)	55.20	97.60	HB-001, EC591792, HB-032, HB-056(> 93.20)	Vikarant (77.6)
4	No. of branches per plant	3.20	6.20	EC243709, HB-025, HB-012(> 5.80)	Vikarant (5.2)
5	Number of seed per pod	2.60	4.20	EC361494, EC243860, HB-059(>= 4.00)	Vikarant (3.8)
6	Number of pods per plant	15.40	48.00	HB-030, HB-020, EC329627(> 40.80)	Vikarant (34)
7	Pod length (cm)	3.94	6.46	EC243784, HB-059, EC003293, HB-608, EC243608(> 5.70)	Vikarant (5.7008)
8	Seed yield per plant (g)	6.27	38.86	HB-023, EC329627, HB-020, HB-049, HB-068, HB-027, HB-025, EC243608(> 25.88)	Vikarant (20.93)
9	100 Seed weight (g)	22.10	39.86	EC108908, RFB-4, EC029085, EC243784(> 29.90)	Vikarant (28)
10	Pod width (mm)	8.22	18.40	EC591792, EC243784, EC029085, HB-041(> 11.00)	Vikarant (9.728)
	NDUAT Faizabad (Accessions 50)				
1	Days to 50% flowering	54.00	78.00	HB-085, HB-007, HB-012, HB-023(< 59.00)	Vikarant (67.33)
2	Days to 80% maturity	141.00	163.00	EC029085, HB-037, HB-059, HB-085(<=141.00)	Vikarant (148.55)
3	plant height (cm)	72.60	109.20	HB-012, EC329627(> 101.44)	Vikarant (84.53)
4	No. of branches per plant	3.00	6.00	HB-068, EC329696, EC329679(> 5.00)	Vikarant (3.8)
5	Number of seed per pod	2.40	4.00	EC107842, EC591863, HB-037(> 3.80)	Vikarant (3.44)
6	Seed yield per plant (g)	19.40	35.00	EC329627, EC108908(> 31.00)	Vikarant (23.93)
7	100 seed weight (g)	19.05	29.04	, HB-188, EC329728(> 28.21)	Vikarant (25.64)
	CCSHAU Hisar (Accessions 50)				
1	Days to 50% flowering	41.00	78.00	HB-032, HB-025, RFB-4, HB-068, HB-083(< 44.00)	Vikarant (67)
2	Days to 80% maturity	139.00	181.00	HB-034, HB-007, HB-025, HB-049(< 142.00)	Vikarant (161)
3	plant height (cm)	58.50	161.50	HB-039, HB-188, EC628923, EC591792, EC628937, HB-023, EC628948(> 115.50)	Vikarant (95.7)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
4	No. of branches per plant	2.00	8.00	HB-188, HB-608, EC107842(> 6.00)	Vikarant (5)
5	Number of seed per pod	3.00	4.00	EC591863, EC628937(> 3.60)	Vikarant (3)
6	Number of pods per plant	19.00	83.00	HB-188, HB-017, HB-041, HB-085, HB-608(> 64.00)	Vikarant (38)
7	Pod length (cm)	4.70	8.10	EC591792, EC628937, EC628948(> 6.84)	Vikarant (5.7)
8	Seed yield per plant (g)	9.70	87.30	EC628937, HB-188, EC628923, HB-017, HB-085(> 53.20)	Vikarant (28.1)
9	100 Seed weight (g)	24.30	55.30	EC628937, EC628948, EC628923, EC591863, EC591792, HB-085, EC329696(> 30.12)	Vikarant (25.1)
10	Number of cluster per plant	3.00	22.00	HB-188, HB-017, HB-608, EC107842, EC329693(> 15.00)	Vikarant (10)
	BAU Ranchi (Accessions 50)				
1	Days to 50% flowering	50.00	59.00	EC329627, EC329696, HB-001(< 51.00)	Vikarant (57.8)
2	Days to 80% maturity	149.00	154.00	EC243860, EC591792, HB-012, HB-017, HB-025, HB-045, HB-068, HB-085(< =149.00)	Vikarant (150)
3	No. of branches per plant	2.00	6.00	HB-020, HB-023, HB-025, HB-039(> 5.00)	Vikarant (4.2)
4	Seed yield per plant (g)	3.90	9.90	EC628923, HB-034, HB-056, HB-608(> 9.20)	Vikarant (6.9)
5	100 seed weight (g)	30.20	37.50	EC591863, HB-020, HB-049, HB-047(> 36.20)	Vikarant (34.46)
	Best entries over locations (Accessions 50)				
1	Days to 50% flowering	55.00	73.00	RFB-4(< 61.01)	Vikarant (67.78)
2	Days to 80% maturity	142.33	157.00	EC029085, HB-059, HB-037, HB-068(< =144.75)	Vikarant (151.38)
3	plant height (cm)	69.40	107.93	EC591792, HB-188(> 101.53)	Vikarant (85.94)
4	No. of branches per plant	3.25	5.30	HB-188, HB-608, HB-025(> 5.00)	Vikarant (4.55)
5	Number of seed per pod	2.73	3.87	EC591863, EC107842, HB-037(> 3.41)	Vikarant (3.41)
6	Number of pods per plant	20.70	52.50	HB-188, HB-085, HB-017, HB-030, EC107842(> 47.00)	Vikarant (36)
7	Pod length (cm)	4.92	6.30	EC628937, EC591792, EC628948, EC243784, EC243608(> 5.70)	Vikarant (5.7004)
8	Seed yield per plant (g)	12.57	35.27	EC628937, EC628923, HB-188, HB-085, HB-017(> 25.88)	Vikarant (19.96)
9	100 seed weight (g)	26.44	34.52	EC628948, EC628937, EC591863, EC628923(> 31.13)	Vikarant (28.30)

Table 9: Multilocation Characterization & Evaluation of germplasm lines in faba bean at different locations (Plains)

S.No.	Accession No.	Days to 50% flowering					Days to 80% maturity					Plant height (cm)			
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Mean
1	EC003293	79.00	69.00	55.00	55.00	**64.50**	145.00	143.00	161.00	151.00	**150.00**	73.20	96.20	75.00	**81.47**
2	EC029085	76.00	67.00	49.00		**64.00**	141.00	141.00	145.00		**142.33**	73.60	72.60	69.80	**72.00**
3	EC107842	76.00	67.00	55.00	55.00	**63.25**	147.00	156.00	159.00	150.00	**153.00**	75.20	92.00	100.50	**89.23**
4	EC108908	68.00	67.00	62.00	58.00	**63.75**	139.00	147.00	169.00	153.00	**152.00**	63.80	90.00	88.50	**80.77**
5	EC243608	68.00	69.00	73.00	59.00	**67.25**	144.00	153.00	176.00	153.00	**156.50**	83.80	101.00	91.50	**92.10**
6	EC243709	75.00	62.00	61.00	52.00	**62.50**	141.00	150.00	168.00	151.00	**152.50**	69.40	95.00	90.50	**84.97**
7	EC243784	83.00	71.00	62.00	58.00	**68.50**	144.00	142.00	165.00	151.00	**150.50**	67.40	98.00	66.70	**77.37**
8	EC243860	78.00	63.00	71.00	52.00	**66.00**	143.00	143.00	172.00	149.00	**151.75**	73.60	94.00	105.30	**90.97**
9	EC267675	74.00	71.00	71.00	52.00	**67.00**	142.00	150.00	173.00	151.00	**154.00**	80.00	80.40	108.50	**89.63**
10	EC328923	76.00	68.00	60.00	54.00	**64.50**	144.00	153.00	160.00	151.00	**152.00**	73.80	93.00	99.75	**88.85**
11	EC329627	76.00	71.00	67.00	50.00	**66.00**	144.00	163.00	170.00	151.00	**157.00**	91.20	102.00	90.50	**94.57**
12	EC329679	79.00	71.00	56.00	56.00	**65.50**	142.00	146.00	157.00	151.00	**149.00**	61.40	100.00	94.50	**85.30**
13	EC329693	77.00	71.00	68.00	56.00	**68.00**	143.00	147.00	172.00	151.00	**153.25**	67.80	80.40	103.00	**83.73**
14	EC329696	76.00	72.00	69.00	50.00	**66.75**	142.00	146.00	170.00	153.00	**152.75**	55.20	80.40	113.40	**83.00**
15	EC329728	77.00	71.00	69.00	57.00	**68.50**	145.00	153.00	172.00	152.00	**155.50**	58.20	96.00	95.40	**83.20**
16	EC331564	81.00	69.00	68.00	52.00	**67.50**	146.00	150.00	172.00	153.00	**155.25**	80.60	95.00	99.40	**91.67**
17	EC361494	82.00	72.00	55.00	51.00	**65.00**	144.00	148.00	152.00	153.00	**149.25**	69.40	98.00	58.50	**75.30**
18	EC591792	75.00	63.00	72.00	54.00	**66.00**	143.00	142.00	175.00	149.00	**152.25**	97.40	94.00	132.40	**107.93**
19	EC591863	74.00	69.00	78.00	59.00	**70.00**	142.00	152.00	181.00	153.00	**157.00**	73.40	95.00	114.70	**94.37**
20	EC628923	82.00	78.00	75.00	57.00	**73.00**	145.00	150.00	179.00	150.00	**156.00**	65.80	80.00	132.90	**92.90**
21	EC628937	76.00	75.00	78.00	56.00	**71.25**	145.00	143.00	180.00	152.00	**155.00**	84.80	95.00	124.80	**101.53**
22	EC628948	80.00	76.00	70.00	54.00	**70.00**	145.00	147.00	175.00	153.00	**155.00**	84.80	96.00	116.40	**99.07**
23	HB-001	68.00	60.00	61.00	50.00	**59.75**	143.00	149.00	150.00	151.00	**148.25**	97.60	100.20	103.50	**100.43**
24	HB-005	74.00	64.00	56.00	52.00	**61.50**	144.00	147.00	145.00	151.00	**146.75**	67.40	86.20	88.30	**80.63**
25	HB-007	80.00	56.00	50.00	57.00	**60.75**	143.00	148.00	140.00	153.00	**146.00**	80.00	91.00	81.40	**84.13**
26	HB-012	79.00	58.00	54.00	57.00	**62.00**	140.00	150.00	150.00	149.00	**147.25**	67.40	109.20	109.50	**95.37**
27	HB-017	76.00	59.00	65.00	52.00	**63.00**	142.00	152.00	169.00	149.00	**153.00**	69.40	99.60	95.40	**88.13**

S.No.	Accession No.	No. of branches per plant					Number of seed per pod				Number of pods per			Pod length (cm)		
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Hisar	Mean	Delhi	Hisar	Mean
1	EC003293	4.20	3.80	3.00	3.00	**3.50**	3.80	3.00	3.00	**3.27**	29.00	38.00	**33.50**	5.87	5.10	**5.49**
2	EC029085	5.00	3.40	5.00		**4.47**	3.60	3.00	3.00	**3.20**	29.40	52.00	**40.70**	5.62	5.40	**5.51**
3	EC107842	4.60	4.60	6.00	3.00	**4.55**	3.60	4.00	3.00	**3.53**	37.60	59.00	**48.30**	5.43	5.10	**5.26**
4	EC108908	4.60	4.20	4.00	3.00	**3.95**	3.00	3.60	3.00	**3.20**	20.60	45.00	**32.80**	5.31	5.50	**5.41**
5	EC243608	4.00	3.60	2.00	4.00	**3.40**	3.60	3.40	3.00	**3.33**	39.00	33.00	**36.00**	5.74	5.80	**5.77**
6	EC243709	6.20	3.80	3.00	4.00	**4.25**	3.00	3.00	3.00	**3.00**	21.40	37.00	**29.20**	3.94	5.90	**4.92**
7	EC243784	4.20	3.80	3.00	4.00	**3.75**	2.80	3.20	3.00	**3.00**	26.20	30.00	**28.10**	6.46	5.50	**5.98**
8	EC243860	4.20	4.00	2.00	4.00	**3.55**	4.00	3.20	3.00	**3.40**	22.40	19.00	**20.70**	5.04	5.50	**5.27**
9	EC267675	4.80	4.40	4.00	3.00	**4.05**	2.80	3.20	3.00	**3.00**	29.00	45.00	**37.00**	5.47	5.40	**5.44**
10	EC328923	5.40	3.40	5.00	4.00	**4.45**	3.20	3.00	3.00	**3.07**	27.60	31.00	**29.30**	5.10	5.30	**5.20**
11	EC329627	4.60	3.40	3.00	2.00	**3.25**	3.40	2.80	3.00	**3.07**	41.00	31.00	**36.00**	5.57	5.00	**5.29**
12	EC329679	5.00	5.60	4.00	3.00	**4.40**	3.40	3.00	3.00	**3.13**	26.00	37.00	**31.50**	5.15	5.30	**5.23**
13	EC329693	5.80	4.40	5.00	4.00	**4.80**	3.40	3.20	3.00	**3.20**	22.00	64.00	**43.00**	5.14	5.30	**5.22**
14	EC329696	4.80	5.80	2.00	4.00	**4.15**	2.60	2.80	3.00	**2.80**	21.40	30.00	**25.70**	4.55	5.50	**5.02**
15	EC329728	5.40	4.00	4.00	4.00	**4.35**	3.20	3.00	3.00	**3.07**	21.40	42.00	**31.70**	4.61	5.50	**5.06**
16	EC331564	5.20	4.60	3.00	4.00	**4.20**	3.40	3.20	3.00	**3.20**	25.00	35.00	**30.00**	5.20	5.50	**5.35**
17	EC361494	4.40	4.80	4.00	5.00	**4.55**	4.20	2.80	3.00	**3.33**	21.00	35.00	**28.00**	5.46	5.10	**5.28**
18	EC591792	4.40	4.80	4.00	4.00	**4.30**	3.20	2.40	3.00	**2.87**	31.00	38.00	**34.50**	4.08	8.10	**6.09**
19	EC591863	5.00	3.00	5.00	4.00	**4.25**	3.60	4.00	4.00	**3.87**	15.40	32.00	**23.70**	4.91	5.70	**5.31**
20	EC628923	5.40	4.60	4.00	4.00	**4.50**	3.00	3.20	3.00	**3.07**	37.00	42.00	**39.50**	4.78	6.10	**5.44**
21	EC628937	5.80	3.00	5.00	4.00	**4.45**	3.60	2.60	4.00	**3.40**	34.00	56.00	**45.00**	5.10	7.50	**6.30**
22	EC628948	4.60	3.00	4.00	4.00	**3.90**	3.00	3.00	3.00	**3.00**	28.60	25.00	**26.80**	5.15	6.90	**6.02**
23	HB-001	3.80	4.00	3.00	5.00	**3.95**	3.60	3.00	3.00	**3.20**	28.00	39.00	**33.50**	5.30	5.60	**5.45**
24	HB-005	3.80	3.40	2.00	5.00	**3.55**	3.60	2.80	3.00	**3.13**	33.60	22.00	**27.80**	5.05	5.00	**5.02**
25	HB-007	4.00	5.00	4.00	5.00	**4.50**	3.80	3.00	3.00	**3.27**	39.00	40.00	**39.50**	4.93	5.20	**5.06**
26	HB-012	6.00	4.00	2.00	4.00	**4.00**	3.60	3.00	3.00	**3.20**	23.00	25.00	**24.00**	5.15	5.50	**5.33**
27	HB-017	5.80	4.40	6.00	3.00	**4.80**	3.40	3.20	3.00	**3.20**	17.40	81.00	**49.20**	5.20	4.80	**5.00**

S.No.	Accession No.	Seed yield per plant (g)					100 Seed weight (g)					Hisar	Delhi
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Ranchi	Mean	Number of cluster per plant	Pod width (mm)
1	EC003293	17.40	27.00	29.60	9.20	**20.80**	25.67	28.09	29.40	31.90	**28.77**	9.00	10.58
2	EC029085	14.80	19.41	39.00		**24.40**	30.82	23.77	28.40		**27.66**	15.00	11.25
3	EC107842	6.27	23.80	40.50	4.50	**18.77**	24.08	26.53	25.40	33.00	**27.25**	16.00	9.97
4	EC108908	7.30	32.51	34.80	6.90	**20.38**	39.86	21.25	28.50	32.50	**30.53**	11.00	10.73
5	EC243608	27.47	30.90	28.00	6.70	**23.27**	24.86	26.15	28.30	34.50	**28.45**	9.00	9.71
6	EC243709	12.78	27.70	28.60	7.80	**19.22**	26.30	24.50	28.50	33.80	**28.28**	9.00	10.17
7	EC243784	9.12	19.50	21.00	7.80	**14.36**	29.94	24.20	24.80	36.20	**28.79**	8.00	12.62
8	EC243860	14.80	19.40	12.50	7.60	**13.58**	25.66	23.40	24.70	32.00	**26.44**	6.00	10.00
9	EC267675	25.88	30.00	30.80	5.80	**23.12**	26.52	21.80	26.50	33.40	**27.06**	13.00	9.58
10	EC328923	19.63	29.50	9.70	7.80	**16.66**	26.96	25.50	24.50	31.90	**27.22**	9.00	11.00
11	EC329627	33.86	35.00	24.10	8.90	**25.46**	27.72	23.30	26.50	33.80	**27.83**	9.00	9.41
12	EC329679	14.00	25.50	26.40	5.80	**17.93**	27.74	27.73	25.60	30.20	**27.82**	10.00	10.53
13	EC329693	16.65	20.20	44.80	8.90	**22.64**	29.72	19.05	25.80	32.80	**26.84**	16.00	10.65
14	EC329696	11.45	24.00	25.80	8.90	**17.54**	24.42	26.55	30.50	34.40	**28.97**	7.00	10.16
15	EC329728	11.28	29.40	30.80	9.20	**20.17**	23.26	28.27	26.80	31.00	**27.33**	12.00	9.61
16	EC331564	19.29	27.30	28.10	5.80	**20.12**	26.46	23.33	27.30	34.50	**27.90**	9.00	10.30
17	EC361494	14.50	25.00	27.10	4.50	**17.78**	24.44	26.35	26.10	33.50	**27.60**	11.00	9.66
18	EC591792	21.60	28.00	40.70	7.60	**24.48**	28.34	23.60	37.80	33.30	**30.76**	6.00	18.40
19	EC591863	11.25	24.16	53.20	5.80	**23.60**	25.54	25.30	45.80	37.50	**33.54**	7.00	9.65
20	EC628923	24.00	28.80	59.90	9.90	**30.65**	22.10	25.10	51.50	33.00	**32.93**	7.00	8.71
21	EC628937	17.88	27.00	87.30	8.90	**35.27**	24.60	23.47	55.30	33.80	**34.29**	8.00	9.87
22	EC628948	20.75	25.00	36.70	7.60	**22.51**	25.16	24.80	54.80	33.30	**34.52**	3.00	9.97
23	HB-001	19.91	22.10	25.30	6.20	**18.38**	29.80	25.80	26.80	34.50	**29.23**	9.00	9.53
24	HB-005	13.51	24.00	11.50	5.80	**13.70**	27.82	26.00	24.90	33.80	**28.13**	6.00	10.48
25	HB-007	24.42	23.25	30.50	7.60	**21.44**	25.54	25.30	28.80	31.90	**27.89**	11.00	8.80
26	HB-012	13.54	24.00	18.50	9.20	**16.31**	26.62	25.00	29.90	33.30	**28.71**	5.00	9.92
27	HB-017	14.00	25.50	59.60	9.20	**27.08**	26.42	23.80	26.10	33.70	**27.51**	20.00	10.51

S.No.	Accession No.	Days to 50% flowering					Days to 80% maturity					Plant height (cm)			
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Mean
28	HB-020	76.00	63.00	51.00	56.00	**61.50**	143.00	148.00	143.00	152.00	**146.50**	93.20	101.20	93.40	**95.93**
29	HB-023	70.00	58.00	68.00	58.00	**63.50**	144.00	144.00	172.00	153.00	**153.25**	81.40	96.40	119.60	**99.13**
30	HB-025	75.00	60.00	42.00	54.00	**57.75**	144.00	148.00	140.00	149.00	**145.25**	80.00	98.40	62.70	**80.37**
31	HB-027	76.00	67.00	45.00	59.00	**61.75**	146.00	149.00	146.00	152.00	**148.25**	73.40	96.00	81.40	**83.60**
32	HB-030	76.00	69.00	49.00	54.00	**62.00**	147.00	147.00	145.00	153.00	**148.00**	88.60	96.40	85.80	**90.27**
33	HB-032	78.00	67.00	41.00	52.00	**59.50**	145.00	142.00	143.00	151.00	**145.25**	95.20	82.00	85.60	**87.60**
34	HB-034	75.00	66.00	47.00	58.00	**61.50**	141.00	147.00	139.00	153.00	**145.00**	56.40	80.00	71.80	**69.40**
35	HB-037	74.00	67.00	44.00	56.00	**60.25**	144.00	141.00	143.00	151.00	**144.75**	68.40	81.00	98.40	**82.60**
36	HB-039	77.00	68.00	49.00	52.00	**61.50**	141.00	145.00	145.00	151.00	**145.50**	61.00	76.60	161.50	**99.70**
37	HB-041	76.00	72.00	63.00	57.00	**67.00**	140.00	146.00	165.00	154.00	**151.25**	56.00	90.80	94.20	**80.33**
38	HB-045	77.00	63.00	54.00	59.00	**63.25**	143.00	145.00	159.00	149.00	**149.00**	58.80	87.20	69.80	**71.93**
39	HB-047	74.00	66.00	50.00	54.00	**61.00**	145.00	146.00	155.00	153.00	**149.75**	88.40	80.00	81.80	**83.40**
40	HB-049	78.00	65.00	44.00	58.00	**61.25**	148.00	147.00	140.00	152.00	**146.75**	86.60	89.00	70.50	**82.03**
41	HB-051	79.00	67.00	67.00	52.00	**66.25**	144.00	148.00	169.00	153.00	**153.50**	86.60	100.00	96.80	**94.47**
42	HB-056	77.00	68.00	68.00	56.00	**67.25**	144.00	146.00	170.00	153.00	**153.25**	94.80	78.00	107.40	**93.40**
43	HB-059	81.00	62.00	47.00	58.00	**62.00**	141.00	141.00	142.00	153.00	**144.25**	67.00	86.00	70.50	**74.50**
44	HB-068	83.00	78.00	43.00	55.00	**64.75**	143.00	142.00	145.00	149.00	**144.75**	71.80	95.40	79.30	**82.17**
45	HB-083	77.00	62.00	43.00	58.00	**60.00**	141.00	142.00	147.00	151.00	**145.25**	61.40	91.60	88.70	**80.57**
46	HB-085	80.00	54.00	65.00	55.00	**63.50**	144.00	141.00	170.00	149.00	**151.00**	87.60	99.40	115.50	**100.83**
47	HB-175	76.00	67.00	47.00	56.00	**61.50**	147.00	144.00	153.00	153.00	**149.25**	88.00	93.80	109.60	**97.13**
48	HB-188	76.00	68.00	70.00	58.00	**68.00**	145.00	150.00	175.00	151.00	**155.25**	86.80	95.00	137.50	**106.43**
49	HB-608	81.00	73.00	64.00	59.00	**69.25**	143.00	147.00	167.00	153.00	**152.50**	73.00	88.40	106.50	**89.30**
50	RFB-4	69.00		42.00	54.00	**55.00**	143.00		145.00	153.00	**147.00**	76.60		68.50	**72.55**
Mean for check variety															
1	**Vikrant**	79.00	67.33	67.00	57.80	**67.78**	146.00	148.56	161.00	150.00	**151.39**	77.60	84.53	95.70	**85.94**
Minimum		**68.00**	**54.00**	**41.00**	**50.00**	**55.00**	**139.00**	**141.00**	**139.00**	**149.00**	**142.33**	**55.20**	**72.60**	**58.50**	**69.40**
Maximum		**83.00**	**78.00**	**78.00**	**59.00**	**73.00**	**148.00**	**163.00**	**181.00**	**154.00**	**157.00**	**97.60**	**109.20**	**161.50**	**107.93**
Mean		**76.52**	**66.92**	**58.66**	**55.16**	**64.30**	**143.48**	**147.08**	**159.50**	**151.53**	**150.35**	**75.73**	**91.69**	**96.14**	**87.73**
CV (%) Pheno.		**4.70**	**8.03**	**18.54**	**4.94**	**5.67**	**1.36**	**2.96**	**8.36**	**0.98**	**2.62**	**15.53**	**8.82**	**21.92**	**10.51**

S.No.	Accession No.	No. of branches per plant					Number of seed per pod				Number of pods per			Pod length (cm)		
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Mean	Delhi	Hisar	Mean	Delhi	Hisar	Mean
28	HB-020	3.60	4.00	5.00	6.00	**4.65**	3.20	3.80	3.00	**3.33**	43.00	51.00	**47.00**	4.54	5.30	**4.92**
29	HB-023	5.80	3.80	4.00	6.00	**4.90**	3.40	3.00	3.00	**3.13**	39.00	40.00	**39.50**	5.61	5.50	**5.55**
30	HB-025	6.20	4.00	4.00	6.00	**5.05**	3.20	3.00	3.00	**3.07**	35.00	39.00	**37.00**	5.38	5.50	**5.44**
31	HB-027	5.80	5.00	4.00	4.00	**4.70**	3.20	3.20	3.00	**3.13**	26.40	29.00	**27.70**	4.55	5.30	**4.93**
32	HB-030	4.40	3.00	5.00	4.00	**4.10**	3.80	2.80	3.00	**3.20**	48.00	49.00	**48.50**	5.20	5.50	**5.35**
33	HB-032	5.60	3.40	6.00	4.00	**4.75**	2.80	3.20	3.00	**3.00**	39.00	49.00	**44.00**	4.60	5.40	**5.00**
34	HB-034	4.40	4.20	6.00	5.00	**4.90**	3.80	3.20	3.00	**3.33**	22.20	57.00	**39.60**	4.97	5.70	**5.34**
35	HB-037	3.20	3.20	6.00	5.00	**4.35**	3.40	4.00	3.00	**3.47**	31.00	49.00	**40.00**	5.56	5.70	**5.63**
36	HB-039	3.60	3.40	4.00	6.00	**4.25**	3.20	3.40	3.00	**3.20**	23.20	36.00	**29.60**	5.31	5.00	**5.15**
37	HB-041	4.00	4.00	5.00	4.00	**4.25**	3.60	3.60	3.00	**3.40**	16.40	66.00	**41.20**	4.94	5.90	**5.42**
38	HB-045	5.40	4.00	4.00	4.00	**4.35**	3.20	3.20	3.00	**3.13**	36.60	33.00	**34.80**	5.10	5.50	**5.30**
39	HB-047	4.40	4.00	5.00	4.00	**4.35**	3.00	3.00	3.00	**3.00**	22.60	47.00	**34.80**	5.16	5.50	**5.33**
40	HB-049	5.40	5.00	3.00	4.00	**4.35**	3.20	2.80	3.00	**3.00**	38.00	38.00	**38.00**	5.15	5.50	**5.33**
41	HB-051	4.00	4.00	3.00	5.00	**4.00**	3.40	3.20	3.00	**3.20**	26.40	34.00	**30.20**	5.39	5.00	**5.20**
42	HB-056	4.80	4.20	4.00	5.00	**4.50**	2.80	3.50	3.00	**3.10**	37.00	45.00	**41.00**	5.36	5.50	**5.43**
43	HB-059	5.00	3.80	2.00	3.00	**3.45**	4.00	3.20	3.00	**3.40**	26.00	29.00	**27.50**	5.97	4.90	**5.44**
44	HB-068	4.80	6.00	3.00	3.00	**4.20**	3.20	2.80	3.00	**3.00**	37.00	28.00	**32.50**	4.73	5.30	**5.02**
45	HB-083	5.00	4.50	3.00	4.00	**4.13**	2.80	2.40	3.00	**2.73**	24.20	32.00	**28.10**	4.90	5.70	**5.30**
46	HB-085	5.40	4.60	5.00	4.00	**4.75**	2.60	3.00	3.00	**2.87**	34.00	65.00	**49.50**	4.35	5.70	**5.03**
47	HB-175	4.80	3.60	4.00	4.00	**4.10**	3.20	3.20	3.00	**3.13**	27.20	45.00	**36.10**	4.99	5.40	**5.19**
48	HB-188	5.00	4.20	8.00	4.00	**5.30**	3.80	3.20	3.00	**3.33**	22.00	83.00	**52.50**	5.61	5.20	**5.40**
49	HB-608	5.40	3.40	8.00	4.00	**5.20**	3.80	3.00	3.00	**3.27**	18.40	65.00	**41.70**	5.75	5.20	**5.47**
50	RFB-4	4.80		3.00	4.00	**3.93**	3.00		3.00	**3.00**	25.00	30.00	**27.50**	5.20	4.70	**4.95**
Mean for check variety																
1	**Vikrant**	5.20	3.80	5.00	4.20	**4.55**	3.80	3.44	3.00	**3.41**	34.00	38.00	**36.00**	5.70	5.70	**5.70**
Minimum		**3.20**	**3.00**	**2.00**	**2.00**	**3.25**	**2.60**	**2.40**	**3.00**	**2.73**	**15.40**	**19.00**	**20.70**	**3.94**	**4.70**	**4.92**
Maximum		**6.20**	**6.00**	**8.00**	**6.00**	**5.30**	**4.20**	**4.00**	**4.00**	**3.87**	**48.00**	**83.00**	**52.50**	**6.46**	**8.10**	**6.30**
Mean		**4.84**	**4.08**	**4.10**	**4.12**	**4.29**	**3.34**	**3.13**	**3.04**	**3.17**	**28.89**	**42.04**	**35.47**	**5.15**	**5.52**	**5.34**
CV (%) Pheno.		**15.03**	**17.22**	**34.23**	**20.79**	**10.67**	**11.30**	**11.19**	**6.51**	**6.26**	**26.71**	**33.67**	**21.64**	**9.06**	**10.73**	**5.63**

S.No.	Accession No.	Seed yield per plant (g)					100 Seed weight (g)					Hisar	Delhi
		Delhi	Faizabad	Hisar	Ranchi	Mean	Delhi	Faizabad	Hisar	Ranchi	Mean	Number of cluster per plant	Pod width (mm)
28	HB-020	31.53	30.50	35.30	6.20	**25.88**	28.00	24.00	26.40	37.50	**28.98**	12.00	10.38
29	HB-023	38.86	24.25	27.80	6.90	**24.45**	26.26	25.90	26.50	33.00	**27.92**	9.00	9.44
30	HB-025	27.86	27.60	28.30	7.60	**22.84**	25.96	22.60	27.40	32.00	**26.99**	9.00	10.67
31	HB-027	27.87	28.50	19.10	6.70	**20.54**	29.66	23.39	26.60	33.80	**28.36**	7.00	9.40
32	HB-030	24.32	25.90	36.30	6.90	**23.36**	27.64	25.50	26.80	33.00	**28.24**	13.00	8.58
33	HB-032	25.00	24.60	34.70	8.90	**23.30**	25.60	23.73	27.10	34.50	**27.73**	13.00	9.62
34	HB-034	12.34	24.75	39.00	9.90	**21.50**	26.34	23.70	25.70	33.50	**27.31**	15.00	10.70
35	HB-037	12.36	25.00	33.80	8.90	**20.02**	26.68	24.70	27.00	34.40	**28.20**	12.00	10.08
36	HB-039	24.81	26.00	24.50	9.20	**21.13**	28.54	23.90	25.90	31.90	**27.56**	11.00	10.42
37	HB-041	13.09	31.00	49.60	7.80	**25.37**	27.98	20.40	27.20	32.00	**26.90**	15.00	11.24
38	HB-045	12.64	27.00	24.80	6.70	**17.78**	23.94	27.28	25.30	33.00	**27.38**	9.00	8.22
39	HB-047	14.41	29.70	31.60	7.60	**20.83**	25.30	24.35	25.40	37.30	**28.09**	14.00	9.74
40	HB-049	29.78	31.00	26.50	5.80	**23.27**	27.20	23.40	26.70	37.50	**28.70**	10.00	10.41
41	HB-051	16.36	30.00	23.80	6.70	**19.21**	24.42	27.60	26.50	34.40	**28.23**	10.00	10.01
42	HB-056	23.33	25.00	32.70	9.90	**22.73**	25.12	26.90	26.70	33.50	**28.06**	13.00	10.64
43	HB-059	23.93	25.00	18.50	7.80	**18.81**	24.52	28.00	27.40	33.30	**28.31**	9.00	10.53
44	HB-068	28.76	26.00	21.40	9.20	**21.34**	29.24	26.10	29.10	33.40	**29.46**	8.00	9.36
45	HB-083	8.85	28.00	27.80	9.20	**18.46**	26.24	27.60	29.30	31.00	**28.54**	9.00	10.01
46	HB-085	15.15	27.50	57.60	9.20	**27.36**	22.38	21.40	32.70	33.30	**27.45**	15.00	9.98
47	HB-175	20.39	26.00	35.50	5.80	**21.92**	23.50	23.13	28.20	34.50	**27.33**	10.00	9.81
48	HB-188	21.15	24.18	67.50	5.80	**29.66**	26.64	29.04	27.40	33.80	**29.22**	22.00	10.48
49	HB-608	10.47	19.83	53.20	9.90	**23.35**	25.24	20.77	28.40	33.00	**26.85**	17.00	9.98
50	RFB-4	18.71		15.10	3.90	**12.57**	30.92		24.30	31.90	**29.04**	8.00	10.11
Mean for check variety													
1	**Vikrant**	20.93	23.93	28.10	6.90	**19.97**	28.00	25.65	25.10	34.46	**28.30**	**10.00**	**9.73**
Minimum		**6.27**	**19.40**	**9.70**	**3.90**	**12.57**	**22.10**	**19.05**	**24.30**	**30.20**	**26.44**	**3.00**	**8.22**
Maximum		**38.86**	**35.00**	**87.30**	**9.90**	**35.27**	**39.86**	**29.04**	**55.30**	**37.50**	**34.52**	**22.00**	**18.40**
Mean		**18.79**	**26.23**	**33.38**	**7.56**	**21.51**	**26.67**	**24.72**	**29.27**	**33.53**	**28.54**	**10.62**	**10.23**
CV (%) Pheno.		**39.07**	**13.23**	**44.83**	**20.86**	**20.20**	**10.54**	**8.90**	**24.49**	**4.79**	**6.33**	**35.58**	**13.56**

Table 10: Multilocation Characterization & Evaluation of germplasm lines in faba bean at different locations (Plains) : Rabi 2014-15

S.No.	Accession No.	Early plant vigour	Early plant vigour	Leaflet shape	Leaflet shape	Leaflet size	Leaflet size	Plant growth habit	Plant habit	Plant habit	Plant Strength	Pod angle/attitude	Pod colour	Pod colour	Pod shape	Pod Shattering	Seed coat colour	Seed Shape	Seed shape	Stem colour	Branching habit	Stem pigmentation	Winged petal colour	Flower ground colour	Helium colour
		Hisar	Ranchi	Hisar	Ranchi	Hisar	Ranchi	Hisar	Hisar	Ranchi	Hisar	Ranchi	Delhi	Hisar	Delhi	Hisar	Delhi	Delhi	Hisar	Ranchi	Ranchi	Ranchi	Ranchi	Ranchi	Delhi
1	EC003293	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	2	2	2	2	0	2	1	1
2	EC029085	3		2		5		1	3		3		2	2	3	1	7	3	2						1
3	EC107842	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	3	2	2	2	0	2	1	1
4	EC108908	3	1	2	1	5	2	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
5	EC243608	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	5	3	3	2	2	0	2	1	1
6	EC243709	3	1	2	1	5	2	1	3	3	3	1	2	2	3	1	5	3	2	2	2	0	2	1	1
7	EC243784	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	3	2	2	2	0	2	1	1
8	EC243860	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
9	EC267675	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
10	EC328923	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
11	EC329627	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	3	2	2	0	2	1	1
12	EC329679	3	1	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	2	2	2	0	2	4	1
13	EC329693	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
14	EC329696	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	3	2	2	0	2	1	1
15	EC329728	3	1	2	1	5	2	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
16	EC331564	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	4	1
17	EC361494	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	7	3	3	1	2	1	2	1	1
18	EC591792	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
19	EC591863	3	2	2	1	5	5	1	3	3	3	1	2	2		1	5	3	3	2	2	0	2	1	1
20	EC628923	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
21	EC628937	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
22	EC628948	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
23	HB-001	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
24	HB-005	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	1	2	1	1
25	HB-007	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	8	2	3	2	2	0	2	1	1

S.No.	Accession No.	Early plant vigour	Early plant vigour	Leaflet shape	Leaflet shape	Leaflet size	Leaflet size	Plant growth habit	Plant habit	Plant habit	Plant Strength	Pod angle/attitude	Pod colour	Pod colour	Pod shape	Pod Shattering	Seed coat colour	Seed Shape	Seed shape	Stem colour	Branching habit	Stem pigmentation	Winged petal colour	Flower ground colour	Helium colour
		Hisar	Ranchi	Hisar	Ranchi	Hisar	Ranchi	Hisar	Hisar	Ranchi	Hisar	Ranchi	Delhi	Hisar	Delhi	Hisar	Delhi	Delhi	Hisar	Ranchi	Ranchi	Ranchi	Ranchi	Ranchi	Delhi
26	HB-012	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
27	HB-017	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
28	HB-020	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	5	2	3	2	3	0	2	1	1
29	HB-023	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	3	2	3	0	2	1	1
30	HB-025	3	1	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	2	2	3	0	2	1	1
31	HB-027	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	8	2	3	2	2	0	2	1	1
32	HB-030	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
33	HB-032	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
34	HB-034	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	3	2	2	0	2	1	1
35	HB-037	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	3	2	2	0	2	1	1
36	HB-039	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	2	3	2	3	0	2	1	1
37	HB-041	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	3	0	2	1	1
38	HB-045	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
39	HB-047	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
40	HB-049	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	2	2	2	0	2	1	1
41	HB-051	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	8	2	2	2	2	0	2	1	1
42	HB-056	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	3	2	2	2	0	2	1	1
43	HB-059	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	3	2	2	2	0	2	1	1
44	HB-068	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
45	HB-083	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	7	2	3	2	2	0	2	1	1
46	HB-085	3	3	2	1	5	3	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
47	HB-175	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
48	HB-188	3	2	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	4	1
49	HB-608	3	2	2	1	5	2	1	3	3	3	1	2	2	3	1	7	3	3	2	2	0	2	1	1
50	RFB-4	3	3	2	1	5	5	1	3	3	3	1	2	2	3	1	5	2	3	2	2	0	2	1	1
	Vikrant (C)	3	**3**	2	**1**	5	**5**	1	3	**3**	3	**1**	2	2	3	1	7	2	3	**2**	**2**	**0**	**2**	**1**	1
Minimum		**3**	**1**	**2**	**1**	**5**	**2**	**1**	**3**	**3**	**3**	**1**	**2**	**2**	**3**	**1**	**5**	**2**	**2**	**1**	**2**	**0**	**2**	**1**	**1**
Maximum		**3**	**3**	**2**	**1**	**5**	**5**	**1**	**3**	**3**	**3**	**1**	**2**	**2**	**3**	**1**	**8**	**3**	**3**	**2**	**3**	**1**	**2**	**4**	**1**

CROP IMPROVEMENT

III. CROP IMPROVEMENT

Based on the regional economic importance, area covered by the crop, specific adaptive advantage and future potential, the work on potential crops have been prioritized for hill as well as for the plain areas of the country. These include food and fodder crops, energy and industrial plants and crop species suitable for problematic areas. Among the economically important indigenous as well as introduced plant species, the promising lines are included in the coordinated testing programme. Apart from Initial Varietal Trial (IVT) and Advanced Varietal Trials (AVT-I & II) in two important crops like grain amaranth and faba bean, the results of the experiments conducted during *Rabi* 2014-15 in the plains and hills were presented here.

3.1 HILLS

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

3.1.1 FABA BEAN (*Vicia faba*)

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

3.1.1.1 Initial Varietal Trial (IVT)

The Initial Varietal Trial (IVT) comprising nine entries along with one check was conducted at two locations. The summary of performance of the entries has been presented in Table 11.

Significant differences were observed among the entries for seed yield at Palampur centre. Mean seed yield levels were quite low at both the centres Ranichauri (0.65 q/ha) and Palampur (1.23 q/ha) (Table 12). The seed yield was the highest in the entry EC024312 (1.65 q/ha).

Plant height (Table 13) was maximum at Palampur with an average height of 64.28 cm, while it was the lowest at Ranichauri (33.23 cm) centre. On the basis of average over two locations HB-69 showed the highest plant height (69.75 cm). The entries HB-20 was the shortest in terms of plant height (45.42 cm).

Flowering time was minimum at Palampur (79.39 days) and maximum at Ranichauri (102.67 days) showing about 23 days difference between the two centres (Table 14). On the basis of average over two locations, entry EC024312 (77.75 days) was recorded to be earliest in flowering.

Maturity period was shortest at Palampur (155.33 days) and longest (170.17 days) at Ranichauri (Table 15). There was a difference of more than 15 days in maturity between Ranichauri and Palampur centres. Based on the average over two locations, entry EC024312 was earliest in maturity (154.50 days).

Significant variations were observed among the entries with respect to pod yield at both the locations (Table 16). Pod yield at Palampur centre was the highest with an average yield of 10.83 q/ha while it was the very low at Ranichauri (3.38 q/ha) centre because of poor fertility and high rainfall at the centre. On the basis of average over two locations, the entry IC117726 (11.39 q/ha) was the highest yielder followed by entry EC024312 (9.17 q/ha).

The mean 100-seed weight was the highest at Palampur (27.06 g) centre and lowest at Ranichauri (23.15 g) centre (Table 17). On the basis of average over two locations, the entry HB-69 had the highest seed weight (28.85 g) followed by the entry IC117726 (27.35 g).

3.1.1.2 Advanced Varietal Trial (AVT-I&II)

The advanced Varietal Trial (AVT-I&II) comprising six entries along with one check was conducted at two locations. The summary of performance of the entries has been presented in Table 18.

Significant differences were observed among the entries for seed yield at Palampur centre. Mean seed yield levels were quite low at both the centres Ranichauri (0.65 q/ha) and Palampur (2.36 q/ha) (Table 19). The seed yield was the highest in the entry HB-186 (1.64 q/ha).

Plant height (Table 20) was maximum at Palampur with an average height of 64.47 cm, while it was the lowest at Ranichauri (26.50 cm) centre. On the basis of average over two locations HB-186 showed the highest plant height (48.14 cm). The entries HB-195 was the shortest in terms of plant height (42.78 cm).

Flowering time was minimum at Palampur (79.96 days) and maximum at Ranichauri (109.93 days) showing about 30 days difference between the two centres (Table 21). On the basis of average over two locations, entry HB-122 (89.79 days) was recorded to be earliest in flowering.

Maturity period was shortest at Palampur (155.50 days) and longest (178.38 days) at Ranichauri (Table 22). There was a difference of more than 23 days in maturity between Ranichauri and Palampur centres. Based on the average over two locations, entry HB-122 was earliest in maturity (162.42 days).

Significant variations were observed among the entries with respect to pod yield at both the locations (Table 23). Pod yield at Palampur centre was the highest with an average yield of 7.71 q/ha while it was the very low at Ranichauri (3.43 q/ha) centre because of poor fertility and high rainfall at the centre. On the basis of average over two locations, the entry HPFB-2 (7.03 q/ha) was the highest yielder followed by entry NDF-10 (6.36 q/ha).

The mean 100-seed weight was the highest at Palampur (27.33 g) centre and lowest at Ranichauri (24.18 g) centre (Table 24). On the basis of average over two locations, the entry HPFB-2 had the highest seed weight (26.85 g) followed by the entry HB-214 (26.08 g).

Table 11: Performance of Faba bean entries in Initial Varietal Trial (IVT) during rabi 2014-15 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 100 seed (g)	Mean seed yield over locations (q/ha)			Percent increase / decrease over check
				Mean	Location	Rank	Vikrant
1	EC024312	154.50	26.10	1.65	2	1	76.88
2	HB-19	161.92	24.73	0.84	2	8	-10.04
3	HB-20	162.34	24.23	0.94	2	5	1.08
4	HB-32	162.17	23.50	0.63	2	9	-32.79
5	HB-50	163.09	25.58	1.03	2	4	10.48
6	HB-60	163.17	26.15	0.94	2	6	0.54
7	HB-69	158.00	28.85	1.28	2	3	37.10
8	IC117726	156.00	27.35	1.44	2	2	54.84
9	Vikrant (c)	162.59	25.88	0.93	2	7	
	Mean	**160.42**	**25.82**	**1.07**			

Table 12: Grain yield (q/ha) in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
1	EC024312	1.65		1.65	1	2	0/2
2	HB-19	1.12	0.55	0.84	8	2	0/2
3	HB-20	1.15	0.73	0.94	5	2	0/2
4	HB-32	0.60	0.65	0.63	9	2	0/2
5	HB-50	1.50	0.56	1.03	4	2	0/2
6	HB-60	1.19	0.68	0.94	6	2	0/2
7	HB-69	1.28		1.28	3	2	0/2
8	IC117726	1.44		1.44	2	2	0/2
9	Vikrant (c)	1.14	0.73	0.93	7	2	
	Mean	**1.23**	**0.65**	**1.07**			
	CD (0.05)	**0.61**	**0.09**				
	CV (%) Error	**21.41**	**8.67**				

Table 13: Plant height (cm) in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
1	EC024312	67.25		67.25	2
2	HB-19	62.25	36.67	49.46	6
3	HB-20	62.50	28.33	45.42	9
4	HB-32	60.00	36.67	48.34	7
5	HB-50	72.25	30.73	51.49	4
6	HB-60	61.75	38.33	50.04	5
7	HB-69	69.75		69.75	1
8	IC117726	59.50		59.50	3
9	Vikrant (c)	63.25	28.67	45.96	8
	Mean	**64.28**	**33.23**	**54.13**	
	CD (0.05)	**2.17**			
	CV (%) Error	**2.32**			

Table 14: Days to 50% flowering in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
1	EC024312	77.75		77.75	1
2	HB-19	79.50	101.33	90.42	4
3	HB-20	81.00	100.67	90.84	6
4	HB-32	78.75	102.33	90.54	5
5	HB-50	79.25	104.33	91.79	8
6	HB-60	80.00	102.67	91.34	7
7	HB-69	79.25		79.25	2
8	IC117726	79.50		79.50	3
9	Vikrant (c)	79.50	104.67	92.09	9
	Mean	**79.39**	**102.67**	**87.06**	
	CD (0.05)	**1.40**			
	CV (%) Error	**1.21**			

Table 15: Days to maturity in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
1	EC024312	154.50		154.50	1	2	0/2
2	HB-19	154.50	169.33	161.92	4	2	0/2
3	HB-20	156.00	168.67	162.34	6	2	0/2
4	HB-32	154.00	170.33	162.17	5	2	0/2
5	HB-50	153.50	172.67	163.09	8	2	0/2
6	HB-60	156.00	170.33	163.17	9	2	0/2
7	HB-69	158.00		158.00	3	2	0/2
8	IC117726	156.00		156.00	2	2	0/2
9	Vikrant (c)	155.50	169.67	162.59	7	2	
	Mean	**155.33**	**170.17**	**160.42**			
	CD (0.05)	**4.36**					
	CV (%) Error	**1.21**					

Table 16: Pod yield (q/ha) in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
1	EC024312	9.17		9.17	2
2	HB-19	13.20	3.66	8.43	4
3	HB-20	11.39	2.97	7.18	8
4	HB-32	11.39	3.75	7.57	5
5	HB-50	9.03	3.37	6.20	9
6	HB-60	11.81	3.25	7.53	6
7	HB-69	9.03		9.03	3
8	IC117726	11.39		11.39	1
9	Vikrant (c)	11.11	3.26	7.19	7
	Mean	**10.83**	**3.38**	**8.18**	
	CD (0.05)	**1.75**	**0.24**		
	CV (%) Error	**7.01**	**4.25**		

Table 17: 100 seed weight (g) in Initial Varietal Trial (IVT) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
1	EC024312	26.10		26.10	4
2	HB-19	27.35	22.10	24.73	7
3	HB-20	25.25	23.20	24.23	8
4	HB-32	25.60	21.40	23.50	9
5	HB-50	27.85	23.30	25.58	6
6	HB-60	27.90	24.40	26.15	3
7	HB-69	28.85		28.85	1
8	IC117726	27.35		27.35	2
9	Vikrant (c)	27.25	24.50	25.88	5
	Mean	**27.06**	**23.15**	**25.82**	
	CD (0.05)	**1.70**			
	CV (%) Error	**2.71**			

Table 18: Performance of Faba bean entries in Advanced Varietal Trial (AVT-I & II) during rabi 2014-15 (Hills)

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 100 seed (g)	Mean seed yield over locations (q/ha)			Percent increase / decrease over
				Mean	Location	Rank	Vikrant
	AVT-I						
1	HB-195	167.17	25.40	1.49	2	5	-8.33
2	HB-214	170.09	26.08	1.60	2	3	-2.15
3	HPFB-2	167.42	26.85	1.57	2	4	-3.68
	AVT-II						
4	HB-122	162.42	25.50	1.41	2	6	-13.55
5	HB-186	162.84	24.65	1.64	2	1	0.31
6	NDF-10	169.59	26.05	1.22	2	7	-25.46
7	Vikrant (c)	169.09	25.75	1.63	2	2	-
	Mean	**166.94**	**25.75**	**1.51**			

Table 19: Grain yield (q/ha) in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
	AVT-I						
1	HB-195	2.27	0.72	1.49	5	2	0/2
2	HB-214	2.52	0.67	1.60	3	2	0/2
3	HPFB-2	2.45	0.69	1.57	4	2	0/2
	AVT-II						
4	HB-122	2.27	0.55	1.41	6	2	0/2
5	HB-186	2.54	0.73	1.64	1	2	0/2
6	NDF-10	1.94	0.49	1.22	7	2	0/2
7	Vikrant (c)	2.54	0.71	1.63	2	2	
	Mean	**2.36**	**0.65**	**1.51**			
	CD (0.05)	**2.70**	**0.12**				
	CV (%) Error	**46.69**	**11.01**				

Table 20: Plant height (cm) in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
	AVT-I				
1	HB-195	60.35	25.20	42.78	7
2	HB-214	62.20	29.33	45.77	4
3	HPFB-2	62.60	26.33	44.47	6
	AVT-II				
4	HB-122	62.05	28.07	45.06	5
5	HB-186	69.95	26.33	48.14	1
6	NDF-10	66.60	25.73	46.17	2
7	Vikrant (c)	67.55	24.50	46.03	3
	Mean	**64.47**	**26.50**	**45.49**	
	CD (0.05)	**2.26**			
	CV (%) Error	**2.36**			

Table 21: Days to 50% flowering in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
	AVT-I				
1	HB-195	81.00	112.67	96.84	5
2	HB-214	77.75	114.33	96.04	4
3	HPFB-2	81.50	113.33	97.42	6
	AVT-II				
4	HB-122	80.25	99.33	89.79	1
5	HB-186	81.50	100.33	90.92	2
6	NDF-10	80.25	116.33	98.29	7
7	Vikrant (c)	77.50	113.17	95.34	3
	Mean	**79.96**	**109.93**	**94.95**	
	CD (0.05)	**1.31**			
	CV (%) Error	**1.10**			

Table 22: Days to maturity in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank	Location	Frequency
	AVT-I						
1	HB-195	154.00	180.33	167.17	3	2	0/2
2	HB-214	157.50	182.67	170.09	7	2	0/2
3	HPFB-2	153.50	181.33	167.42	4	2	0/2
	AVT-II						
4	HB-122	157.50	167.33	162.42	1	2	0/2
5	HB-186	157.00	168.67	162.84	2	2	0/2
6	NDF-10	154.50	184.67	169.59	6	2	0/2
7	Vikrant (c)	154.50	183.67	169.09	5	2	
	Mean	**155.50**	**178.38**	**166.94**			
	CD (0.05)	**2.10**					
	CV (%) Error	**0.55**					

Table 23: Pod yield (q/ha) in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
	AVT-I				
1	HB-195	7.59	**3.42**	5.50	4
2	HB-214	6.48	**3.49**	4.98	5
3	HPFB-2	10.59	**3.47**	7.03	1
	AVT-II				
4	HB-122	7.87	**3.55**	5.71	3
5	HB-186	6.94	**2.65**	4.80	6
6	NDF-10	8.51	**4.20**	6.36	2
7	Vikrant (c)	6.02	**3.23**	4.62	7
	Mean	**7.71**	**3.43**	**5.57**	
	CD (0.05)	**1.73**	**0.24**		
	CV (%) Error	**9.15**	**4.26**		

Table 24: 100 seed weight (g) in Advanced Varietal Trial (AVT-I & II) on Faba bean: Rabi 2014-15 (Hills)

S. No.	Genotypes	Palampur	Ranichauri	Mean	Rank
	AVT-I				
1	HB-195	26.40	24.40	25.40	6
2	HB-214	27.75	24.40	26.08	2
3	HPFB-2	29.50	24.20	26.85	1
	AVT-II				
4	HB-122	28.30	22.70	25.50	5
5	HB-186	25.90	23.40	24.65	7
6	NDF-10	27.90	24.20	26.05	3
7	Vikrant (c)	25.55	25.95	25.75	4
	Mean	**27.33**	**24.18**	**25.75**	
	CD (0.05)	**2.70**			
	CV (%) Error	**4.03**			

3.2 PLAINS

The Varietal Trials Programmes constituted in grain amaranth at eight centres and faba bean at seven locations were conducted during *Rabi* 2014-15 season in plain reason. The details of trial IVT, AVT-I and AVT-II were given below:

3.2.1 Grain Amaranth (*Amaranthus* spp.)

3.2.1.1 Initial Varietal Trial (IVT): Rabi 2014-15

The trial comprising 20 entries including four checks was conducted at eight locations. Results have been received from eight centres. The summary of performance of the entries *vis-a-vis* the checks has been presented in table 25.

Significant differences were observed among the entries for grain yield at eight centres (Table 26). Grain yield levels were high at S.K. Nagar (20.07 q/ha) followed by at Ambikapur (13.27 q/ha) and Bhubaneswar (10.67 q/ha) centres. The yield at Faizabad centre was very low so that the results had been included in overall mean. The overall average performance at seven locations showed that the best entry BGA-4-9 (12.71 q/ha).

Plant height (Table 27) was the highest at S.K. Nagar (168.69 cm) and the lowest at Rahuri (88.57 cm). On the basis of average performance over the locations, the check variety RMA-7 (125.58 cm) had the highest plant height, whereas entry SKGPA 68 had the lowest (87.90 cm).

Flowering time was earliest at S.K. Nagar (44.50 days) followed by Bhubaneshwar (53.40 days) and Mandor (54.42 days); while it was late at Delhi (80.47 days) and Ambikapur (83.25 days) centres (Table 28). On the basis of average over locations RMA-57 flowered earliest in 58.54 days.

Maturity period (Table 29) was earliest at Bhubaneswar (102.15 days) and followed by S.K. Nagar (108.97 days). The entry RGA-12 (126.13 days) was the earliest maturing line.

Inflorescence length (Table 30) of the entries was the highest at S.K. Nagar (79.13 cm). Based on the average over the locations the entry RGA-11 (50.70 cm) had the longest inflorescence.

Test weight (Table 31) as measured by the weight of 10 ml seed showed maximum mean value at Ranchi (8.66 g) and minimum at Mandor (6.43 g). Based on the average over the locations the entry KBGA-5 had the highest seed weight (8.20 g).

3.2.1.2 Advanced Varietal Trial (AVT-I): Rabi 2014-15

The summary of performance of Rabi (2014-15) has been presented in Table 32. In this trial, eleven entries in AVT-I along with four checks were tested at eight locations. The results have been received from eight centres. The performance of the entries as compared to the checks has been given in Table 32. Result of Faizabad centre had not been included in overall mean due to poor yield. Based on the overall mean performance in respect of grain yield over seven locations, check variety BGA-2 showed grain yield (11.65 q/ha) and two locations the entry KBGA-4 superiority over the best check variety, BGA-2 (14.81 q/ha).

Significant differences were observed among the entries for grain yield at Ranchi (Table 33). Grain yield level was high at S.K. Nagar (20.00 q/ha), and moderate at Bhubaneswar (10.93 q/ha) Ambikapur (10.93 q/ha). Based on the average performance over six locations the entry KBGA-4 was the highest yielder (14.81 q/ha) followed by entry BGA-2 (11.65 q/ha).

Average plant height of the entries (Table 34) was the highest at S.K. Nagar (148.38 cm) followed by Mandor (123.31 cm). It was the lowest at Ranchi (84.14 cm) centre. Based on average performance over eight locations the check variety GA-2 had the highest plant height (123.27 cm), while based on two locations KBGA-4 (124.70 cm) had the highest plant height.

Flowering time showed considerable variation among the locations as well as among the entries within a location. The mean flowering time was the earliest (45.24 days) at S.K. Nagar and Bhubaneshwar (51.92 days) while it was the longest at Delhi (84.69 days) centre (Table 35). The entry, KBGA-4 showed

consistence for early flowering over two locations and ranked first (48.67 days) based on the overall performance.

The average maturity period of the entries over all the locations was 132.39 days (Table 36). The entry, KBGA-4 was earliest in maturity (112.67 days). The average maturity period was the minimum at Bhubaneswar (101.33 days), while it was the longest at Delhi (169.93 days).

The length of inflorescence (Table 37) of the entries was the highest at Mandor (64.12 cm) followed by at S.K. Nagar (62.32 cm). Based on the average over eight locations, the check variety KBGA-4 had the longest inflorescence (60.13 cm).

Test weight (Table 38) expressed in terms of weight of 10 ml seed recorded at six centres showed that it was the highest at Ranchi (9.54 g) and low at Mandor (6.47 g). The variation among the entries was relatively low. Based on the average over six locations, the RGA-9 (8.88 g) showed the highest test weight.

3.2.1.3 Advanced Varietal Trial (AVT-II): Rabi 2014-15

The summary of performance of Rabi (2014-15) has been presented in Table 39. In this trial, nine AVT-II entries along with four checks were tested at eight locations. The results have been received from eight centres. The result of Faizabad centre was not included over all mean due to poor yield. The performance of the entries as compared to the checks has been given in Table 39. Based on the overall mean performance in respect of grain yield over six locations, KBGA-1 entry showed grain yield (13.27 q/ha) superiority over the best check variety, GA-2 (12.18 q/ha).

Significant differences were observed among the entries for grain yield at Ranchi (Table 40). Grain yield level was high at S.K. Nagar (20.98 q/ha), Bhubaneshwar (11.51 q/ha) and moderate at Ambikapur (10.82 q/ha). Based on the average performance over locations the entry KBGA-1 was the highest yielder (13.27 q/ha) followed by check variety GA-2 (12.18 q/ha).

Average plant height of the entries (Table 41) was the highest at S.K. Nagar (161.91 cm) followed by Mandor (126.13 cm). It was the lowest at Ranchi (88.33 cm) centre. Based on average performance over six locations the entry IC035615 had the highest plant height (123.06 cm).

Flowering time showed considerable variation among the locations as well as among the entries within a location. The mean flowering time was the earliest (44.54 days) at S.K. Nagar and Bhubaneshwar (53.90 days) while it was the longest at Ranchi (88.25 days) centre (Table 42). The entry, KBGA-1 showed consistence for early flowering over the locations and ranked first (62.78 days) based on the overall performance.

The average maturity period of the entries over all the locations was 131.78 days (Table 43). The entry, KBGA-1 was earliest in maturity (124.11 days). The average maturity period was the minimum at Bhubaneswar (103.90 days), while it was the longest at Delhi (161.35 days).

The length of inflorescence (Table 44) of the entries was the highest at S.K. Nagar (73.31 cm) followed by at Mandor (59.05 cm). Based on the average over eight locations, the entry IC035615 had the longest inflorescence (50.64 cm).

Test weight (Table 45) expressed in terms of weight of 10 ml seed recorded at six centres showed that it was the highest at Ranchi (9.84 g) and low at Mandor (6.87 g). The variation among the entries was relatively low. Based on the average over six locations, the check variety Suvarna (8.48 g) showed the highest test weight.

3.2.2 Faba bean (*Vicia faba*)

The Varietal Trials Programmes constituted in faba bean at seven centres were conducted during *rabi* 2014-15 season.

3.2.2.1 Initial Varietal Trial (IVT): Rabi 2014-15

The Initial Varietal Trial comprising nineteen entries including one check was conducted at seven locations. Results have been received from all locations. The summary of performance of the entries has been presented in Table 46.

Significant differences were observed among the entries for seed yield at all the locations but difference from the best check was significant at six centres (Table 47). The average over the locations showed that seed yield was the highest in the entry, NDFB-13 (24.80 q/ha) followed by HB-27 (24.46 q/ha).

Plant height was the highest at Faizabad (99.03 cm) followed by at Hisar (95.97 cm) centre (Table 48). Moderate plant height was observed at Ludhiana (76.25 cm) and Delhi (77.04 cm) centre. Based on the average over the locations the entry, HB-9-15 (88.73 cm) showed the highest plant height.

Flowering time ranged from 53.54 days at Ranchi to 81.87 days at Ludhiana centre (Table 49). Based on the average over the locations RMDFB -2 (64.47 days) was the earliest flowering line.

Maturity period varied among the locations with mean maturity period ranging from 124.26 days at Ambikapur to 163.71 days at Hisar centre (Table 50). On the basis of overall mean, RMDFB-1 (138.32 days) had the earliest maturity.

Mean seed weight was the highest at Ranchi (33.82 g) and the lowest at Faridkot (21.77 g) centre (Table 51). Based on the average over locations the check variety Vikrant (28.37 g) had the boldest seed.

3.2.2.2 Advanced Varietal Trial (AVT-I): Rabi 2014-15

The advanced Varietal Trial comprising thirteen entries including one check was conducted at seven locations. Results have been received from all locations. The summary of performance of the entries has been presented in Table 52.

Significant differences were observed among the entries for seed yield at all the locations but difference from the best check was significant at three centres (Table 53). The average over the locations showed that seed yield was the highest in the entry, HB-8-12 (22.63 q/ha) followed by check variety (22.48 q/ha).

Plant height was the highest at Hisar (107.62 cm) followed by at Ranchi (85.28 cm) centre (Table 54). Moderate plant height was observed at Delhi (79.35 cm) centre. Based on the average over the locations the entry, HB-194 (85.98 cm) showed the highest plant height.

Flowering time ranged from 54.13 days at Ranchi to 80.58 days at Ludhiana centre (Table 55). Based on the average over the locations HB-193 (66.12 days) was the earliest flowering line.

Maturity period varied among the locations with mean maturity period ranging from 126.44 days at Ambikapur to 166.19 days at Hisar centre (Table 56). On the basis of overall mean, DFB-13-2 (137.81 days) had the earliest maturity.

Mean seed weight was the highest at Ranchi (32.86 g) and the lowest at Faridkot (22.36 g) centre (Table 57). Based on the average over locations the entry, HB-8-13 (28.18 g) had the boldest seed.

3.2.2.3 Advanced Varietal Trial (AVT-II): Rabi 2014-15

The advanced Varietal Trial-II comprising ten entries including one check was conducted at seven locations. Results have been received from all locations. The summary of performance of the entries has been presented in Table 58.

Significant differences were observed among the entries for seed yield at all the locations but difference from the best check was significant at three centres (Table 59). The average over the locations showed that seed yield was the highest in the check, vikrant (22.73 q/ha) followed by entry DFB-10-1 (22.25 q/ha).

Plant height was the highest at Hisar (103.39 cm) followed by at Ranchi (90.20 cm) centre (Table 60). Moderate plant height was observed at Delhi (81.29 cm) centre. Based on the average over the locations the entry, HB-182 (85.58 cm) showed the highest plant height.

Flowering time ranged from 55.60 days at Ranchi to 81.60 days at Ludhiana centre (Table 61). Based on the average over the locations HB-185 (66.01 days) was the earliest flowering line.

Maturity period varied among the locations with mean maturity period ranging from 127.96 days at Faizabad to 164.92 days at Hisar centre (Table 62). On the basis of overall mean, HB-082 (138.10 days) had the earliest maturity.

Mean seed weight was the highest at Ranchi (32.85 g) and the lowest at Faridkot (22.98 g) centre (Table 63). Based on the average over locations the entry, DFB-10-3 (29.29 g) had the boldest seed.

Table 25: Performance of grain amaranth entries in Initial Varietal Trial (IVT) during Rabi (2014-15) - Plains

S. No.	Genotypes	Mean maturity duration (days)	Overall mean seed weight (g/10ml)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check			
				Mean	Location	Rank	BGA-2	GA-2	RMA-7	Suvarna
1	BGA-4-9	132.58	7.83	12.71	7	1	20.98	5.07	11.20	14.06
2	BGA-8-5	132.67	7.92	12.62	7	2	20.06	4.27	10.35	13.20
3	KBGA-5	131.29	8.20	12.23	7	4	16.40	1.09	6.98	9.74
4	RGA-10	130.33	7.64	12.12	7	5	15.36	0.18	6.03	8.76
5	RGA-11	130.29	7.53	11.05	7	13	5.18	-8.66	-3.33	-0.84
6	RGA-12	126.13	7.83	12.50	7	3	18.93	3.28	9.31	12.12
7	RMA-57	131.63	7.58	10.59	7	14	0.76	-12.49	-7.39	-5.00
8	RMA-58	131.88	7.28	11.89	7	7	13.09	-1.79	3.94	6.62
9	RMA-59	131.58	8.01	11.58	7	9	10.21	-4.28	1.30	3.91
10	SKGPA-68	130.92	8.08	11.64	7	8	10.72	-3.85	1.76	4.39
11	SKGPA-72	132.13	7.85	9.68	7	19	-7.93	-20.05	-15.38	-13.20
12	SKGPA-74	134.33	7.46	8.72	7	20	-17.07	-27.98	-23.78	-21.81
13	SKGPA-86	131.17	7.89	9.94	7	18	-5.46	-17.90	-13.11	-10.87
14	SKGPA-91	132.29	7.91	10.38	7	16	-1.26	-14.25	-9.25	-6.91
15	SKNA-1003	127.08	7.55	10.09	7	17	-4.00	-16.63	-11.77	-9.49
16	SKNA-1008	134.14	7.68	11.49	7	10	9.33	-5.06	0.48	3.07
17	BGA-2 (C)	134.08	7.46	10.51	7	15	-	-13.16	-8.09	-5.72
18	GA-2 (C)	133.37	7.57	12.10	7	6	15.15	-	5.83	8.56
19	RMA-7 (C)	133.71	8.01	11.43	7	11	8.80	-5.51	-	2.58
20	Suvarna (C)	135.46	7.88	11.15	7	12	6.07	-7.89	-2.51	-
	Mean	**131.85**	**7.76**	**11.22**						

Table 26: Grain yield (q/ha) in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad *	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	BGA-4-9	14.54	10.96	11.11	3.93	11.39	9.73	8.52	22.75	12.71	1	7	0/7
2	BGA-8-5	15.05	14.00	11.11	3.93	10.56	9.78	7.28	20.56	12.62	2	7	0/7
3	KBGA-5	17.55	12.69	8.64	4.00	9.17	7.85	7.64	22.09	12.23	4	7	0/7
4	RGA-10	14.03	11.18	7.68	3.95	8.06	8.84	***12.67***	22.42	12.12	5	7	1/7
5	RGA-11	16.39	9.61	9.14	4.27	6.67	5.09	10.54	19.94	11.05	13	7	0/7
6	RGA-12	14.31	10.63	10.37	3.27	7.78	8.61	***11.80***	23.99	12.50	3	7	1/7
7	RMA-57	10.74	7.75	5.27	3.83	12.50	8.10	10.82	18.95	10.59	14	7	0/7
8	RMA-58	14.26	12.04	7.06	3.10	14.44	8.91	6.88	19.61	11.89	7	7	0/7
9	RMA-59	11.20	9.91	8.12	3.03	13.61	***11.57***	7.48	19.18	11.58	9	7	1/7
10	SKGPA-68	9.07	12.56	13.70	3.23	8.89	8.67	6.54	22.01	11.64	8	7	0/7
11	SKGPA-72	7.13	9.48	7.48	3.10	7.78	9.68	7.90	18.28	9.68	19	7	0/7
12	SKGPA-74	7.50	10.40	10.12	3.83	6.67	5.81	7.55	12.96	8.72	20	7	0/7
13	SKGPA-86	10.46	9.38	6.79	4.00	8.06	7.20	6.82	20.83	9.94	18	7	0/7
14	SKGPA-91	10.88	8.08	4.00	3.13	8.61	9.06	7.53	24.48	10.38	16	7	0/7
15	SKNA-1003	9.86	11.56	5.36	3.03	6.67	7.25	7.67	22.26	10.09	17	7	0/7
16	SKNA-1008	13.01	9.45	11.73		8.06	6.09	8.16	23.94	11.49	10	7	0/7
17	BGA-2 (C)	16.20	**12.00**	8.12	2.45	7.78	5.28	8.77	15.42	10.51	15	7	
18	GA-2 (C)	18.06	9.36	6.05	2.43	11.94	**8.76**	**10.12**	**20.42**	12.10	6	7	
19	RMA-7 (C)	16.67	10.48	9.51		**13.89**	5.07	6.50	17.93	11.43	11	7	
20	Suvarna (C)	**18.52**	11.96	**12.64**	**4.03**	7.50	5.19	8.93	13.29	11.15	12	7	
	Mean	**13.27**	**10.67**	**8.70**	**3.48**	**9.50**	**7.83**	**8.51**	**20.07**	**11.22**			
	CD (0.05)	**2.31**	**2.47**	**1.88**	**0.70**	**2.05**	**1.46**	**1.10**	**5.80**				
	CV (%) Error	**10.87**	**14.00**	**13.48**	**12.65**	**13.51**	**11.67**	**8.06**	**18.07**				

* *Data of Faizabad was not included in overall mean*

Table 27: Plant height (cm) in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-4-9	124.27	108.73	98.67	106.17	97.67	88.67	98.90	184.33	113.42	6
2	BGA-8-5	105.20	102.13	86.73	101.83	101.33	83.00	57.57	166.83	100.58	17
3	KBGA-5	118.73	106.60	106.67	98.67	105.67	88.50	87.47	130.53	105.35	13
4	RGA-10	117.07	106.53	90.47	101.67	108.00	105.50	91.17	196.50	114.61	5
5	RGA-11	131.73	118.00	121.33	102.33	104.00	108.00	100.97	194.77	122.64	3
6	RGA-12	100.67	106.87	97.40	101.00	107.33	103.67	82.13	183.87	110.37	11
7	RMA-57	110.60	105.10	77.27	110.17	105.67	104.00	79.47	202.00	111.78	9
8	RMA-58	91.27	107.53	77.07	111.33	102.67	102.33	78.03	163.00	104.15	15
9	RMA-59	114.20	84.13	81.33	108.33	99.67	107.33	141.47	146.33	110.35	12
10	SKGPA-68	85.47	81.20	58.93	108.00	89.67	73.17	75.77	131.00	87.90	20
11	SKGPA-72	83.40	96.13	95.87	113.33	87.33	87.63	102.43	133.13	99.91	18
12	SKGPA-74	105.67	107.20	94.40	106.67	120.33	83.50	80.97	137.73	104.56	14
13	SKGPA-86	99.73	91.73	102.13	113.33	118.33	105.17	75.30	194.80	112.57	8
14	SKGPA-91	112.73	99.27	65.20	106.67	133.00	114.17	94.53	178.53	113.01	7
15	SKNA-1003	82.40	92.47	83.07	110.00	93.00	68.30	75.77	145.33	93.79	19
16	SKNA-1008	97.40	95.27	89.53		104.33	92.67	78.03	148.20	100.78	16
17	BGA-2 (C)	125.00	110.67	107.07	106.00	123.67	106.17	100.97	179.47	119.88	4
18	GA-2 (C)	117.47	110.53	117.40	107.67	141.00	111.67	98.90	193.73	124.80	2
19	RMA-7 (C)	117.07	129.80	100.13		142.00	103.00	95.73	191.33	125.58	1
20	Suvarna (C)	108.47	108.00	89.33	111.00	125.33	101.67	75.77	172.33	111.49	10
	Mean	**107.43**	**103.39**	**92.00**	**106.90**	**110.50**	**96.91**	**88.57**	**168.69**	**109.38**	
	CD (0.05)	**17.96**	**12.58**	**23.23**	**4.33**	**15.02**	**17.11**	**19.32**	**11.20**		
	CV (%) Error	**10.45**	**7.36**	**15.78**	**2.53**	**8.49**	**11.04**	**13.70**	**4.15**		

Table 28: Days to flowering in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-4-9	82.33	53.67	79.33	56.00	51.00	60.67	88.00	43.00	64.25	16
2	BGA-8-5	82.33	51.00	84.00	60.33	54.00	59.00	78.00	43.00	63.96	15
3	KBGA-5	82.67	52.33	84.67	61.67	45.33	60.67	87.00	37.00	63.92	14
4	RGA-10	86.00	51.00	76.67	58.00	56.67	61.67	63.33	43.00	62.04	7
5	RGA-11	84.67	55.67	78.33	56.33	53.33	67.33	64.67	47.00	63.42	12
6	RGA-12	82.67	51.00	75.00	54.33	58.00	59.33	70.00	43.33	61.71	3
7	RMA-57	81.33	52.33	76.00	57.00	44.33	59.67	60.33	37.33	58.54	1
8	RMA-58	82.67	51.67	83.00	56.67	45.00	63.33	78.00	44.00	63.04	9
9	RMA-59	82.67	51.67	80.00	57.00	44.00	62.00	87.00	43.67	63.50	13
10	SKGPA-68	82.33	53.00	79.00	54.00	50.33	58.67	86.00	42.67	63.25	11
11	SKGPA-72	82.67	51.67	78.00	57.00	49.00	63.00	70.33	42.67	61.79	4
12	SKGPA-74	82.00	61.67	74.33	55.67	72.00	63.67	65.67	51.00	65.75	17
13	SKGPA-86	81.33	47.00	80.67	52.67	46.00	62.00	86.00	39.00	61.83	5
14	SKGPA-91	81.33	49.67	80.00	56.67	51.33	66.67	62.67	42.67	61.38	2
15	SKNA-1003	81.33	50.33	79.33	57.67	53.00	62.00	74.33	42.67	62.58	8
16	SKNA-1008	82.67	51.00	76.00		56.67	65.67	57.33	43.67	61.86	6
17	BGA-2 (C)	87.00	59.33	88.67	57.33	74.33	63.67	86.00	55.00	71.42	20
18	GA-2 (C)	83.00	53.67	83.33	56.33	52.67	63.00	70.00	43.33	63.17	10
19	RMA-7 (C)	87.00	58.67	85.67		56.33	66.00	67.00	50.33	67.29	18
20	Suvarna (C)	87.00	61.67	87.33	58.33	75.00	67.67	69.00	55.67	70.21	19
	Mean	**83.25**	**53.40**	**80.47**	**56.83**	**54.42**	**62.78**	**73.53**	**44.50**	**63.74**	
	CD (0.05)	**3.65**	**2.99**	**12.51**	**3.54**	**8.70**	**3.65**	**4.12**	**1.07**		
	CV (%) Error	**2.74**	**3.39**	**9.71**	**3.89**	**9.99**	**3.63**	**3.52**	**1.50**		

Table 29: Days to maturity in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	BGA-4-9	147.33	102.67	170.33	127.33	***127.67***	110.33	165.67	109.33	132.58	13	8	3/8
2	BGA-8-5	148.00	101.00	174.67	127.67	***124.00***	***103.67***	173.33	109.00	132.67	14	8	1/8
3	KBGA-5	148.33	101.33	170.67	121.67	***128.67***	111.00	159.33	109.33	131.29	7	8	2/8
4	RGA-10	148.00	101.33	168.67	122.67	135.67	114.00	137.67	114.67	130.33	4	8	3/8
5	RGA-11	148.00	103.33	170.67	125.67	***125.00***	114.33	144.33	111.00	130.29	3	8	3/8
6	RGA-12	147.00	101.00	***142.33***	125.33	131.00	***106.33***	148.67	***107.33***	126.13	1	8	3/8
7	RMA-57	147.00	102.00	173.33	124.33	***122.00***	***104.33***	168.67	111.33	131.63	9	8	3/8
8	RMA-58	146.33	101.67	167.00	125.00	***124.33***	113.33	168.00	109.33	131.88	10	8	3/8
9	RMA-59	146.67	101.33	173.33	127.33	***124.67***	110.00	161.33	***108.00***	131.58	8	8	3/8
10	SKGPA-68	149.00	102.67	167.33	129.67	***121.00***	111.67	159.33	***106.67***	130.92	5	8	3/8
11	SKGPA-72	147.00	101.00	170.67	125.33	***122.67***	113.33	168.00	109.00	132.13	11	8	3/8
12	SKGPA-74	148.00	104.67	170.33	124.00	134.00	113.00	173.33	***107.33***	134.33	19	8	3/8
13	SKGPA-86	147.67	***97.00***	169.33	127.67	130.33	110.33	157.00	110.00	131.17	6	8	3/8
14	SKGPA-91	148.00	***99.67***	174.67	125.00	***127.33***	116.33	159.00	***108.33***	132.29	12	8	3/8
15	SKNA-1003	148.67	100.67	168.00	118.33	***128.00***	114.00	140.00	**99.00**	127.08	2	8	3/8
16	SKNA-1008	147.33	100.67	173.00		***128.00***	116.00	169.00	105.00	134.14	18	7	3/7
17	BGA-2 (C)	148.33	105.00	168.33	122.33	137.00	113.00	168.67	110.00	134.08	17	8	-
18	GA-2 (C)	148.00	103.33	166.33	117.00	136.00	113.33	173.33	109.67	133.37	15	8	-
19	RMA-7 (C)	149.00	105.33	170.67		135.33	118.67	142.00	115.00	133.71	16	7	-
20	Suvarna (C)	148.00	107.33	168.33	126.33	138.33	117.33	168.00	110.00	135.46	20	8	-
	Mean	**147.78**	**102.15**	**168.90**	**124.59**	**129.05**	**112.22**	**160.23**	**108.97**	**131.85**			
	CD (0.05)	**2.33**	**2.19**	**22.54**	**3.05**	**6.35**	**4.67**	**5.61**	**1.27**				
	CV (%) Error	**0.98**	**1.30**	**8.34**	**1.53**	**3.07**	**2.60**	**2.20**	**0.73**				

Table 30: Inflorescence length (cm) in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-4-9	22.00	47.00	48.99	35.53	54.67	61.83	20.67	87.13	47.23	9
2	BGA-8-5	25.60	45.67	48.09	36.47	55.33	50.50	22.47	81.07	45.65	13
3	KBGA-5	25.20	51.27	49.79	40.33	62.33	58.50	21.93	70.00	47.42	7
4	RGA-10	21.33	44.00	45.33	41.17	62.67	58.83	25.73	97.20	49.53	6
5	RGA-11	20.07	51.67	57.23	44.67	60.33	52.00	28.73	90.93	50.70	3
6	RGA-12	20.07	45.93	50.74	40.67	59.00	50.67	22.47	84.80	46.79	10
7	RMA-57	25.93	46.47	42.77	36.67	63.00	65.33	28.93	92.47	50.20	5
8	RMA-58	22.20	45.20	39.31	32.67	61.00	62.67	23.80	79.87	45.84	12
9	RMA-59	21.13	36.73	46.51	36.50	60.00	70.33	20.60	68.33	45.02	15
10	SKGPA-68	22.53	38.60	35.07	41.33	57.33	47.83	22.47	71.33	42.06	18
11	SKGPA-72	24.53	43.53	47.97	46.00	56.67	55.33	25.97	71.47	46.43	11
12	SKGPA-74	16.87	41.47	41.75	36.00	53.00	45.67	22.47	52.80	38.75	20
13	SKGPA-86	24.13	40.67	46.69	38.80	63.33	71.83	20.93	97.73	50.52	4
14	SKGPA-91	26.80	40.67	39.43	37.33	62.33	66.00	20.17	86.40	47.39	8
15	SKNA-1003	25.40	47.80	44.73	38.00	57.67	45.17	23.57	74.13	44.56	16
16	SKNA-1008	22.60	42.40	48.44		59.67	55.33	22.57	66.67	45.38	14
17	BGA-2 (C)	19.20	42.27	51.67	46.67	50.67	53.83	24.47	66.93	44.46	17
18	GA-2 (C)	22.73	46.67	47.45	41.67	74.67	58.50	28.40	87.87	50.99	2
19	RMA-7 (C)	24.60	56.73	48.73		73.67	59.83	21.73	94.40	54.24	1
20	Suvarna (C)	18.93	39.93	40.35	45.67	49.33	45.67	21.43	61.00	40.29	19
	Mean	**22.59**	**44.73**	**46.05**	**39.79**	**59.83**	**56.78**	**23.48**	**79.13**	**46.67**	
	CD (0.05)	**4.88**	**6.21**	**11.37**	**3.49**	**9.50**	**9.26**	**5.45**	**7.47**		
	CV (%) Error	**13.49**	**8.40**	**15.43**	**5.48**	**9.92**	**10.19**	**14.59**	**5.90**		

Table 31: Seed weight (g/10ml) in Initial Varietal Trial (IVT) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-4-9	7.97	8.59	6.35	8.37	7.53	8.15	7.83	10
2	BGA-8-5	8.00	7.87	6.65	8.53	8.43	8.05	7.92	5
3	KBGA-5	7.74	8.54	6.79	7.67	10.67	7.79	8.20	1
4	RGA-10	7.97	7.58	6.36	8.47	7.57	7.92	7.64	13
5	RGA-11	7.59	7.34	6.69	7.73	7.60	8.22	7.53	17
6	RGA-12	7.71	7.39	6.12	7.80	9.83	8.10	7.83	10
7	RMA-57	7.90	8.19	6.47	7.40	7.40	8.13	7.58	14
8	RMA-58	7.88	6.70	6.38	7.40	7.33	7.96	7.28	20
9	RMA-59	7.86	8.67	6.52	8.53	8.50	8.00	8.01	3
10	SKGPA-68	7.56	8.29	6.30	8.50	9.70	8.11	8.08	2
11	SKGPA-72	7.76	7.00	5.93	8.07	10.23	8.10	7.85	9
12	SKGPA-74	7.58	7.19	6.03	8.43	7.57	7.97	7.46	18
13	SKGPA-86	7.75	7.36	6.72	7.50	9.70	8.32	7.89	7
14	SKGPA-91	7.89	7.65	6.60	8.40	8.90	7.99	7.91	6
15	SKNA-1003	7.74	7.35	6.00	8.43	7.90	7.88	7.55	16
16	SKNA-1008	7.76	7.62	6.06	8.17	8.30	8.18	7.68	12
17	BGA-2 (C)	7.74	7.11	6.43	7.80	7.53	8.14	7.46	19
18	GA-2 (C)	8.01	7.31	6.70	7.70	7.60	8.11	7.57	15
19	RMA-7 (C)	7.67	6.92	6.86	8.00	10.57	8.07	8.01	4
20	Suvarna (C)	7.70	6.48	6.60	8.10	10.23	8.13	7.88	8
	Mean	**7.79**	**7.56**	**6.43**	**8.05**	**8.66**	**8.07**	**7.76**	
	CD (0.05)	**0.19**	**1.16**	**0.43**	**0.49**	**0.99**	**0.22**		
	CV (%) Error	**1.46**	**9.56**	**4.21**	**3.78**	**7.08**	**1.71**		

Table 32: Performance of grain amaranth entries in Advanced Varietal Trial (AVT-I) during Rabi (2014-15) - Plains

S. No.	Genotypes	Mean maturity duration (days)	Overall mean seed weight (g/10ml)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check			
				Mean	Location	Rank	BGA-2	GA-2	RMA-7	Suvarna
1	Ambika GA 12-1	128.71	7.98	8.47	6	15	-27.25	-25.56	-11.08	-22.30
2	Ambika GA 12-2	132.79	8.15	10.89	7	8	-6.53	-4.36	14.26	-0.16
3	BGA-07	131.92	7.65	11.02	7	6	-5.40	-3.20	15.63	1.04
4	BGA-10-2	130.58	7.67	10.48	7	10	-10.03	-7.94	9.98	-3.90
5	KBGA-3	132.79	7.55	10.83	7	9	-7.03	-4.87	13.64	-0.70
6	KBGA-4	112.67	8.11	14.81	2	1	27.18	30.13	55.46	35.84
7	MGM-15	136.52	7.36	8.71	6	14	-25.22	-23.49	-8.60	-20.13
8	RGA-9	130.76	8.88	10.37	7	12	-10.98	-8.91	8.81	-4.92
9	SKNA-401	136.17	8.03	11.04	7	5	-5.24	-3.04	15.83	1.21
10	SKNA-403	134.75	7.55	11.24	7	4	-3.49	-1.25	17.97	3.08
11	SKNA-908	134.05	7.96	10.40	7	11	-10.73	-8.65	9.12	-4.65
12	BGA-2 (C)	137.00	7.81	11.65	7	2	-	2.32	22.24	6.81
13	GA-2 (C)	135.96	7.97	11.38	7	3	-2.27	-	19.46	4.39
14	RMA-7 (C)	134.63	8.23	9.53	7	13			-	
15	Suvarna (C)	136.50	8.01	10.91	7	7	-6.38	-4.20	14.44	-
	Mean	**132.39**	**7.93**	**10.78**						

Table 33: Grain yield (q/ha) in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad *	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	Ambika GA 12-1		9.63	6.91	3.70	4.17	6.03	8.74	15.36	8.47	15	6	0/6
2	Ambika GA 12-2	13.27	11.95	8.84	3.43	6.33	7.19	9.45	19.18	10.89	8	7	0/7
3	BGA-07	9.26	11.88	13.63	2.80	5.09	4.71	8.69	23.87	11.02	6	7	0/7
4	BGA-10-2	9.44	11.93	10.12	4.50	7.72	6.07	7.31	20.77	10.48	10	7	0/7
5	KBGA-3	10.80	9.88	10.72	3.58	5.56	11.92	7.76	19.17	10.83	9	7	0/7
6	KBGA-4						5.91		23.71	14.81	1	2	0/2
7	MGM-15	10.09		11.09	3.35	4.63	5.34	7.69	13.41	8.71	14	6	0/6
8	RGA-9	9.54	9.82	6.37		6.02	10.20	**9.86**	20.77	10.37	12	7	1/7
9	SKNA-401	9.63	9.61	6.78	4.33	11.11	8.81	7.54	23.79	11.04	5	7	0/7
10	SKNA-403	9.81	9.83	10.62	4.50	5.56	9.32	8.94	24.61	11.24	4	7	0/7
11	SKNA-908	9.57	9.27	11.14		9.57	4.11	6.75	22.39	10.40	11	7	0/7
12	BGA-2 (C)	14.51	13.85	**9.75**	3.33	8.02	6.48	8.51	20.42	11.65	2	7	
13	GA-2 (C)	14.51	10.06	7.26	3.27	8.95	**9.02**	8.84	**21.05**	11.38	3	7	
14	RMA-7 (C)	14.20	9.45	5.54	**4.17**	**10.03**	5.83	6.35	15.30	9.53	13	7	
15	Suvarna (C)	**16.23**	**14.90**	8.29	3.38	6.02	5.75	**8.90**	16.25	10.91	7	7	
	Mean	**11.60**	**10.93**	**9.08**	**3.70**	**7.06**	**7.11**	**8.24**	**20.00**	**10.78**			
	CD (0.05)	**1.55**	**1.89**	**2.04**	**0.93**	**1.15**	**1.42**	**0.79**	**5.50**				
	CV (%) Error	**7.93**	**10.24**	**13.37**	**15.27**	**9.72**	**11.95**	**5.71**	**16.43**				

* *Data of Faizabad was not included in overall mean*

Table 34: Plant height (cm) in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	Ambika GA 12-1		97.80	90.07	109.33	140.00	94.67	79.47	136.13	106.78	10
2	Ambika GA 12-2	94.20	98.47	93.73	104.00	140.00	76.17	78.03	144.13	103.59	13
3	BGA-07	90.00	102.97	101.80	107.00	102.33	113.83	91.17	135.80	105.61	12
4	BGA-10-2	77.47	90.47	100.80	112.67	107.33	77.67	84.23	115.40	95.75	15
5	KBGA-3	117.47	105.40	121.07	107.67	105.33	109.67	94.53	130.87	111.50	6
6	KBGA-4						74.00		175.40	124.70	1
7	MGM-15	83.20		116.20	108.67	114.33	105.67	87.47	128.80	106.33	11
8	RGA-9	95.60	93.80	99.40		104.00	84.33	57.90	136.53	95.94	14
9	SKNA-401	87.53	98.33	103.80	106.67	128.33	98.50	102.43	148.20	109.22	7
10	SKNA-403	101.53	91.27	109.67	106.67	126.33	108.00	80.97	143.93	108.55	9
11	SKNA-908	100.80	100.07	114.73		127.00	114.50	70.10	169.87	113.87	4
12	BGA-2 (C)	92.00	114.47	107.07	108.33	120.67	94.67	100.97	159.73	112.24	5
13	GA-2 (C)	106.33	109.33	117.40	105.67	142.67	125.17	99.50	180.13	123.27	2
14	RMA-7 (C)	112.60	122.67	121.60	106.67	143.00	128.50	75.47	162.20	121.59	3
15	Suvarna (C)	96.40	109.90	105.53	110.67	125.00	88.00	75.77	158.60	108.73	8
	Mean	**96.55**	**102.69**	**107.35**	**107.83**	**123.31**	**99.56**	**84.14**	**148.38**	**109.85**	
	CD (0.05)	**23.78**	**14.28**	**18.56**	**4.22**	**14.66**	**17.20**	**16.50**	**2.95**		
	CV (%) Error	**14.65**	**8.25**	**10.28**	**2.46**	**7.07**	**10.32**	**11.66**	**1.19**		

Table 35: Days to flowering in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	Ambika GA 12-1		45.00	76.67	54.67	53.33	59.00	75.00	36.33	57.14	2
2	Ambika GA 12-2	81.33	47.67	76.00	52.00	51.00	61.67	88.67	38.00	62.04	6
3	BGA-07	84.67	49.67	89.00	53.00	51.33	63.00	65.67	49.00	63.17	7
4	BGA-10-2	81.00	47.00	80.00	54.33	50.33	63.00	64.00	42.67	60.29	4
5	KBGA-3	81.00	52.00	82.33	53.67	46.67	60.33	75.00	37.00	61.00	5
6	KBGA-4						61.67		35.67	48.67	1
7	MGM-15	86.67		95.67	59.67	47.00	65.33	78.00	56.00	69.76	13
8	RGA-9	80.33	46.00	71.33		47.33	59.33	74.00	37.33	59.38	3
9	SKNA-401	82.00	54.33	85.67	56.33	53.33	63.33	86.00	44.67	65.71	10
10	SKNA-403	81.00	51.33	82.33	61.33	54.33	63.67	70.33	49.00	64.17	8
11	SKNA-908	86.00	54.67	93.33		52.67	65.67	88.67	49.00	70.00	14
12	BGA-2 (C)	85.33	59.67	88.67	56.00	75.00	66.00	92.00	53.00	71.96	15
13	GA-2 (C)	82.33	52.00	83.33	55.33	53.67	63.00	86.00	46.00	65.21	9
14	RMA-7 (C)	86.67	59.00	92.00	60.33	57.00	62.33	87.33	49.00	69.21	11
15	Suvarna (C)	85.00	56.67	89.33	58.67	77.00	64.33	69.00	56.00	69.50	12
	Mean	**83.33**	**51.92**	**84.69**	**56.28**	**55.00**	**62.78**	**78.55**	**45.24**	**63.81**	
	CD (0.05)	**3.52**	**5.36**	**9.15**	**2.57**	**6.69**	**3.16**	**4.79**	**2.80**		
	CV (%) Error	**2.51**	**6.12**	**6.42**	**2.89**	**7.23**	**3.01**	**3.62**	**3.70**		

Table 36: Days to maturity in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	Ambika GA 12-1		***95.67***	171.33	127.00	131.33	***107.67***	161.33	***106.67***	128.71	2	7	3/7
2	Ambika GA 12-2	158.67	***98.33***	172.33	127.00	131.33	***110.00***	159.33	***105.33***	132.79	6	8	3/8
3	BGA-07	159.00	100.00	169.00	***117.00***	***127.00***	116.67	157.67	109.00	131.92	5	8	2/8
4	BGA-10-2	159.00	***98.00***	165.33	124.67	***126.00***	112.33	152.67	***106.67***	130.58	3	8	3/8
5	KBGA-3	158.00	101.00	171.67	123.33	***128.00***	111.67	159.00	109.67	132.79	7	8	1/8
6	KBGA-4						115.67		109.67	112.67	1	2	0/2
7	MGM-15	158.67		166.00	123.67	***123.67***	115.33	159.33	109.00	136.52	14	7	1/7
8	RGA-9	159.67	***95.67***	168.33		***125.00***	***109.67***	148.00	109.00	130.76	4	7	3/7
9	SKNA-401	158.67	104.67	171.00	126.33	131.33	114.67	173.33	109.33	136.17	12	8	0/8
10	SKNA-403	159.67	101.33	175.67	130.00	131.33	115.33	157.00	107.67	134.75	10	8	0/8
11	SKNA-908	159.00	103.67	170.67		136.67	115.67	143.33	109.33	134.05	8	7	0/7
12	BGA-2 (C)	158.67	106.33	168.33	126.33	137.67	119.00	168.67	111.00	137.00	15	8	-
13	GA-2 (C)	158.67	101.67	166.33	125.00	135.67	118.00	173.33	109.00	135.96	11	8	-
14	RMA-7 (C)	158.67	106.67	175.33	129.00	136.00	117.00	142.00	112.33	134.63	9	8	-
15	Suvarna (C)	159.67	104.33	167.67	127.67	137.33	116.67	168.00	110.67	136.50	13	8	-
	Mean	**158.92**	**101.33**	**169.93**	**125.58**	**131.31**	**114.36**	**158.79**	**108.96**	**132.39**			
	CD (0.05)	**2.62**	**3.58**	**10.92**	**2.53**	**5.08**	**4.42**	**6.14**	**2.29**				
	CV (%) Error	**0.98**	**2.10**	**3.82**	**1.28**	**2.30**	**2.31**	**2.30**	**1.26**				

Table 37: Inflorescence length (cm) in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	Ambika GA 12-1		46.13	48.95	41.00	73.33	53.67	24.47	62.47	50.00	2
2	Ambika GA 12-2	23.80	44.93	48.67	44.00	73.67	38.50	20.93	61.40	44.49	10
3	BGA-07	20.20	45.87	47.93	42.33	53.67	61.17	21.93	66.20	44.91	7
4	BGA-10-2	21.60	44.13	50.99	49.00	59.67	44.00	25.97	59.07	44.30	11
5	KBGA-3	20.67	45.73	50.61	36.17	64.33	55.17	20.67	64.00	44.67	9
6	KBGA-4						45.00		75.27	60.13	1
7	MGM-15	11.27		51.28	46.00	64.33	45.00	20.60	46.00	40.64	13
8	RGA-9	20.80	45.20	48.76		60.67	49.67	19.17	63.13	43.91	12
9	SKNA-401	21.60	43.20	52.64	46.33	66.67	53.50	22.57	62.53	46.13	5
10	SKNA-403	24.93	38.40	56.14	47.33	67.33	48.50	23.57	56.40	45.33	6
11	SKNA-908	21.13	42.87	52.77		67.00	47.83	13.80	68.53	44.85	8
12	BGA-2 (C)	15.07	44.93	51.67	38.33	48.00	46.17	17.73	51.73	39.20	15
13	GA-2 (C)	19.00	48.20	47.45	42.17	74.00	55.00	23.20	79.13	48.52	4
14	RMA-7 (C)	24.60	53.87	56.59	42.33	74.33	60.83	19.23	66.20	49.75	3
15	Suvarna (C)	12.27	42.33	44.90	46.33	50.67	48.67	20.17	52.73	39.76	14
	Mean	**19.76**	**45.06**	**50.67**	**43.44**	**64.12**	**50.18**	**21.00**	**62.32**	**45.77**	
	CD (0.05)	**4.91**	**7.48**	**7.32**	**2.79**	**8.29**	**8.96**	**5.42**	**2.77**		
	CV (%) Error	**14.77**	**9.85**	**8.59**	**4.07**	**7.69**	**10.67**	**15.35**	**2.65**		

Table 38: Seed weight (g/10ml) in Advanced Varietal Trial (AVT-I) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	Ambika GA 12-1	7.57	8.52	6.42	7.02	10.13	8.20	7.98	7
2	Ambika GA 12-2	7.72	8.04	6.46	8.19	10.23	8.24	8.15	3
3	BGA-07	7.75	7.50	6.69	7.94	7.53	8.47	7.65	12
4	BGA-10-2	8.02	7.53	6.40	8.23	7.37	8.45	7.67	11
5	KBGA-3	7.93	6.18	6.39	7.94	8.30	8.57	7.55	14
6	KBGA-4				8.09		8.14	8.11	4
7	MGM-15		7.63	6.55	6.96	7.40	8.26	7.36	15
8	RGA-9	7.66	7.38	6.31	6.86	16.77	8.29	8.88	1
9	SKNA-401	7.35	8.19	6.66	7.96	9.70	8.31	8.03	5
10	SKNA-403	7.67	7.17	6.14	7.17	8.90	8.26	7.55	13
11	SKNA-908	7.69	8.35	6.71	7.16	9.65	8.22	7.96	9
12	BGA-2 (C)	7.85	7.11	6.18	8.05	9.42	8.24	7.81	10
13	GA-2 (C)	8.01	7.31	6.31	7.94	10.05	8.21	7.97	8
14	RMA-7 (C)	7.80	7.77	7.00	8.11	10.57	8.11	8.23	2
15	Suvarna (C)	7.94	10.17	6.32	7.79	7.57	8.25	8.01	6
	Mean	**7.77**	**7.77**	**6.47**	**7.70**	**9.54**	**8.28**	**7.93**	
	CD (0.05)	**0.11**	**1.34**	**0.71**	**0.38**	**2.80**	**0.26**		
	CV (%) Error	**0.83**	**10.27**	**6.56**	**2.95**	**17.45**	**1.90**		

Table 39: Performance of grain amaranth entries in Advanced Varietal Trial (AVT-II) during Rabi (2014-15) - Plains

S. No.	Genotypes	Mean maturity duration (days)	Overall mean seed weight (g/10ml)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check			
				Mean	Location	Rank	BGA-2	GA-2	RMA-7	Suvarna
1	BGA-04	134.29	8.19	11.37	7	5	0.68	-6.59	14.23	-3.92
2	BGA-11	133.17	7.66	10.49	7	9	-7.11	-13.81	5.40	-11.35
3	BGA-12	133.83	8.26	12.03	7	3	6.52	-1.17	20.86	1.66
4	BGA-21	134.46	7.99	10.88	7	8	-3.65	-10.60	9.32	-8.05
5	BGA-38	127.31	7.89	10.20	7	10	-9.70	-16.21	2.46	-13.82
6	BGA-43	126.52	7.99	10.92	7	7	-3.31	-10.29	9.71	-7.73
7	IC035615	127.83	8.31	10.01	6	12	-11.43	-17.82	0.50	-15.47
8	KBGA-1	124.11	7.29	13.27	6	1	17.49	9.02	33.32	12.13
9	RMA-45	135.67	8.10	10.06	7	11	-10.92	-17.34	1.08	-14.98
10	BGA-2 (C)	135.25	8.03	11.30	7	6	-	-7.21	13.47	-4.56
11	GA-2 (C)	132.63	8.22	12.18	7	2	7.78	-	22.29	2.86
12	RMA-7 (C)	133.29	8.28	9.96	7	13	-11.87	-18.23	-	-15.89
13	Suvarna (C)	134.75	8.48	11.84	7	4	4.78	-2.78	18.89	-
	Mean	**131.78**	**8.05**	**11.12**						

Table 40: Grain yield (q/ha) in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad *	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	BGA-04	9.10	14.26	10.26	3.69	8.18	9.63	9.34	18.83	11.37	5	7	0/7
2	BGA-11	9.23	12.07	8.77	3.67	5.09	4.80	10.53	22.97	10.49	9	7	0/7
3	BGA-12	8.80	14.44	12.25	4.08	7.10	7.21	***11.74***	22.70	12.03	3	7	1/7
4	BGA-21	9.35	10.56	7.60	4.07	8.95	4.83	9.87	25.02	10.88	8	7	0/7
5	BGA-38	8.89	12.22	1.48	4.83	8.33	4.55	10.70	25.23	10.20	10	7	0/7
6	BGA-43	9.48	9.40	8.30		10.19	5.70	**11.27**	22.14	10.92	7	7	1/7
7	IC035615	9.48	9.91			5.43	8.01	8.47	18.73	10.01	12	6	0/6
8	KBGA-1	8.58	12.65	11.11		12.04	8.79		26.47	13.27	1	6	0/6
9	RMA-45	9.51	9.80	6.85	3.90	13.27	8.89	9.30	12.82	10.06	11	7	0/7
10	BGA-2 (C)	14.20	10.96	9.75	3.33	8.95	7.89	8.31	19.02	11.30	6	7	
11	GA-2 (C)	14.20	8.99	7.26	3.27	**12.65**	**8.86**	**10.23**	**23.03**	12.18	2	7	
12	RMA-7 (C)	13.89	11.41	5.54	**4.17**	7.72	6.36	6.96	17.81	9.96	13	7	
13	Suvarna (C)	**15.93**	**13.00**	**11.60**	3.38	7.87	6.85	9.60	18.00	11.84	4	7	
	Mean	**10.82**	**11.51**	**8.40**	**3.84**	**8.91**	**7.11**	**9.69**	**20.98**	**11.12**			
	CD (0.05)	**1.11**	**1.58**	**2.29**	**0.93**	**2.39**	**1.51**	**0.61**	**5.02**				
	CV (%) Error	**6.11**	**8.14**	**16.11**	**15.27**	**15.96**	**12.64**	**3.74**	**14.23**				

* *Data of Faizabad was not included in overall mean*

Table 41: Plant height (cm) in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-04	109.13	97.40	110.67	107.33	123.00	94.00	102.53	172.13	114.53	5
2	BGA-11	88.07	82.00	91.40	104.33	122.33	81.83	90.07	131.60	98.95	12
3	BGA-12	79.87	84.33	96.93	97.33	114.33	74.33	80.87	132.33	95.04	13
4	BGA-21	108.67	96.00	103.40	102.33	121.67	92.00	98.43	154.60	109.64	8
5	BGA-38	93.67	92.60	71.45	112.33	131.33	98.67	69.73	165.47	104.41	11
6	BGA-43	101.53	98.33	75.00		115.67	116.00	77.80	179.47	109.11	9
7	IC035615	112.87	109.93			125.67	108.33	87.27	194.27	123.06	1
8	KBGA-1	116.00	101.20	84.50		134.33	88.83		155.87	113.46	7
9	RMA-45	110.93	103.47	101.33	108.33	155.00	102.50	92.67	140.80	114.38	6
10	BGA-2 (C)	99.87	109.80	107.07	108.33	124.33	107.50	107.97	170.00	116.86	3
11	GA-2 (C)	115.47	97.27	117.40	105.67	130.33	123.50	111.53	173.87	121.88	2
12	RMA-7 (C)	108.73	108.20	121.60	106.67	121.33	97.33	78.37	177.47	114.96	4
13	Suvarna (C)	94.47	98.27	105.53	110.67	120.33	88.83	62.73	156.93	104.72	10
	Mean	**103.02**	**98.37**	**98.86**	**106.33**	**126.13**	**97.97**	**88.33**	**161.91**	**110.85**	
	CD (0.05)	**26.84**	**11.53**	**21.92**	**4.22**	**13.47**	**20.17**	**17.69**	**15.01**		
	CV (%) Error	**15.49**	**6.96**	**13.12**	**2.46**	**6.35**	**12.24**	**11.85**	**5.51**		

Table 42: Days to flowering in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-04	85.00	57.67	89.67	56.67	76.67	74.67	93.67	45.00	72.38	11
2	BGA-11	84.67	47.67	76.67	52.00	72.67	74.00	75.33	40.00	65.38	3
3	BGA-12	84.67	52.00	74.67	54.00	72.33	73.67	92.33	42.00	68.21	5
4	BGA-21	85.00	54.00	89.00	55.67	71.33	75.33	83.00	44.33	69.71	9
5	BGA-38	84.33	49.67	80.00	54.00	56.00	74.33	84.00	38.00	65.04	2
6	BGA-43	84.67	48.33	89.00		54.67	77.67	93.00	37.33	69.24	8
7	IC035615	85.00	56.67			54.67	74.67	91.33	48.00	68.39	6
8	KBGA-1	85.00	48.67	82.00		49.00	71.00		41.00	62.78	1
9	RMA-45	85.00	56.67	82.67	53.33	52.00	75.67	76.33	44.67	65.79	4
10	BGA-2 (C)	85.00	58.00	88.67	56.00	76.33	74.00	93.00	53.00	73.00	12
11	GA-2 (C)	84.67	55.33	83.33	55.33	63.33	77.00	86.67	44.33	68.75	7
12	RMA-7 (C)	85.00	58.00	92.00	60.33	56.00	67.33	96.00	47.33	70.25	10
13	Suvarna (C)	85.00	58.00	89.33	58.67	74.00	77.67	94.33	54.00	73.88	13
	Mean	**84.85**	**53.90**	**84.75**	**55.60**	**63.77**	**74.38**	**88.25**	**44.54**	**68.68**	
	CD (0.05)	**2.14**	**2.60**	**12.92**	**2.57**	**5.37**	**1.69**	**4.48**	**1.79**		
	CV (%) Error	**1.50**	**2.87**	**9.02**	**2.89**	**5.01**	**1.35**	**3.00**	**2.40**		

Table 43: Days to maturity in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	BGA-04	155.00	108.00	167.33	***119.00***	149.33	119.00	153.00	***103.67***	134.29	9	8	2/8
2	BGA-11	154.00	***97.67***	176.33	***117.67***	143.00	119.67	152.00	***105.00***	133.17	6	8	3/8
3	BGA-12	154.00	103.00	173.00	***116.33***	146.33	118.00	156.33	***103.67***	133.83	8	8	2/8
4	BGA-21	155.33	104.00	166.33	***118.00***	144.67	119.67	159.00	108.67	134.46	10	8	1/8
5	BGA-38	153.67	**100.33**	***133.50***	128.00	134.67	121.33	141.33	105.67	127.31	3	8	2/8
6	BGA-43	153.67	***97.33***	***132.00***		132.00	125.00	140.00	105.67	126.52	2	7	2/7
7	IC035615	154.00	106.67			138.00	121.00	138.67	108.67	127.83	4	6	3/6
8	KBGA-1	153.67	***99.00***	***134.00***		133.67	119.33		***105.00***	124.11	1	6	3/6
9	RMA-45	155.00	106.33	176.00	124.67	131.67	121.00	162.33	108.33	135.67	13	8	0/8
10	BGA-2 (C)	155.67	107.67	168.33	126.33	135.00	123.00	158.33	107.67	135.25	12	8	-
11	GA-2 (C)	**153.67**	**105.00**	**166.33**	**125.00**	135.33	123.67	145.33	**106.67**	132.63	5	8	-
12	RMA-7 (C)	154.00	107.67	175.33	129.00	**134.67**	**117.00**	**140.00**	108.67	133.29	7	8	-
13	Suvarna (C)	154.67	108.00	167.67	127.67	139.67	125.00	148.67	106.67	134.75	11	8	-
	Mean	**154.33**	**103.90**	**161.35**	**123.17**	**138.31**	**120.97**	**149.58**	**106.46**	**131.78**			
	CD (0.05)	**1.70**	**1.78**	**9.42**	**2.53**	**4.26**	**2.23**	**2.60**	**1.47**				
	CV (%) Error	**0.65**	**1.02**	**3.46**	**1.28**	**1.83**	**1.10**	**1.03**	**0.82**				

Table 44: Inflorescence length (cm) in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Ambikapur	Bhubaneswar	Delhi	Faizabad	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-04	19.33	48.00	54.13	44.33	50.33	52.33	22.53	84.93	46.99	6
2	BGA-11	19.53	51.00	45.01	42.67	53.67	46.50	26.60	63.60	43.57	10
3	BGA-12	21.27	42.27	48.09	37.33	50.33	59.33	32.40	60.20	43.90	9
4	BGA-21	20.47	42.07	43.68	35.50	50.00	43.17	26.53	77.20	42.33	11
5	BGA-38	19.53	44.67	36.08	51.50	70.67	52.00	25.20	75.93	46.95	7
6	BGA-43	21.33	42.73	35.58		60.33	52.67	23.07	80.60	45.19	8
7	IC035615	20.13	49.47			58.67	58.67	23.37	93.53	50.64	1
8	KBGA-1	24.53	52.53	37.31		71.67	47.00		61.73	49.13	3
9	RMA-45	23.93	50.67	54.34	36.83	70.33	55.83	29.67	72.13	49.22	2
10	BGA-2 (C)	17.20	39.47	51.67	38.33	52.67	47.33	24.80	57.60	41.13	12
11	GA-2 (C)	23.27	42.60	47.45	42.17	57.67	56.67	25.43	94.60	48.73	4
12	RMA-7 (C)	21.93	51.67	56.59	42.33	66.00	52.83	20.07	76.13	48.45	5
13	Suvarna (C)	15.87	38.67	44.90	46.33	55.33	46.00	18.87	54.80	40.10	13
	Mean	**20.64**	**45.83**	**46.24**	**41.73**	**59.05**	**51.56**	**24.88**	**73.31**	**45.87**	
	CD (0.05)	**4.12**	**6.96**	**7.25**	**2.79**	**5.96**	**10.29**	**9.03**	**2.87**		
	CV (%) Error	**11.86**	**9.02**	**9.28**	**4.07**	**6.00**	**11.87**	**21.48**	**2.33**		

Table 45: Seed weight (g/10ml) in Advanced Varietal Trial (AVT-II) on grain amaranth :Rabi (2014-15)-Plains

S. No.	Genotypes	Bhubaneswar	Delhi	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	BGA-04	7.90	8.24	6.58	8.16	9.77	8.51	8.19	6
2	BGA-11	7.98	7.43	6.61	7.85	7.73	8.39	7.66	12
3	BGA-12	7.90	8.01	7.11	7.72	10.33	8.47	8.26	4
4	BGA-21	7.96	7.67	7.23	7.85	8.90	8.34	7.99	9
5	BGA-38	7.88	5.69	6.77	8.11	10.53	8.33	7.89	11
6	BGA-43	7.83	5.87	6.86	8.20	10.75	8.44	7.99	10
7	IC035615	7.82		6.79	7.62	10.90	8.44	8.31	2
8	KBGA-1	8.01	5.47	6.76	7.74		8.46	7.29	13
9	RMA-45	7.85	8.67	6.95	8.19	8.53	8.41	8.10	7
10	BGA-2 (C)	7.91	7.11	6.81	8.18	9.87	8.30	8.03	8
11	GA-2 (C)	7.78	7.31	7.08	7.93	10.80	8.44	8.22	5
12	RMA-7 (C)	8.02	7.77	6.86	8.12	10.46	8.44	8.28	3
13	Suvarna (C)	7.92	10.17	6.90	8.12	9.45	8.33	8.48	1
	Mean	**7.90**	**7.45**	**6.87**	**7.98**	**9.84**	**8.41**	**8.05**	
	CD (0.05)	**0.32**	**0.83**	**0.84**	**0.35**	**1.31**	**0.16**		
	CV (%) Error	**2.43**	**6.61**	**7.25**	**2.62**	**7.87**	**1.13**		

Table 46: Performance of Fababean entries in Initial Varietal Trial (IVT) during Rabi (2014-15) - Plain

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check
				Mean	Location	Rank	Vikrant
1	DFB-14-1	143.76	26.88	24.29	7	3	13.34
2	HB-27	141.18	26.71	24.46	7	2	14.11
3	HB-34	140.83	27.21	23.34	7	9	8.88
4	HB-37	141.33	27.28	22.17	7	15	3.44
5	HB-41	142.58	27.60	22.76	7	13	6.17
6	HB-45	140.04	27.51	23.09	7	12	7.72
7	HB-9-01	141.26	26.04	23.42	7	8	9.25
8	HB-9-06	142.64	27.95	23.26	7	10	8.53
9	HB-9-08	142.48	26.32	22.50	7	14	4.95
10	HB-9-15	141.68	28.17	23.67	7	7	10.41
11	HB-9-16	140.60	27.21	22.15	7	16	3.35
12	NDFB-13	141.25	26.74	24.80	6	1	15.68
13	NDFB-14	142.32	26.47	23.93	6	5	11.66
14	RFB-11	139.22	26.76	24.28	6	4	13.29
15	RFB-12	140.38	26.75	23.90	6	6	11.50
16	RFB-13	140.25	27.44	23.26	6	11	8.51
17	RMDFB-1	138.32	25.12	20.96	6	18	-2.23
18	RMDFB-2	140.35	28.01	19.98	6	19	-6.78
19	Vikrant (C)	140.39	28.37	21.43	7	17	-
	Mean	**141.10**	**27.08**	**23.03**			

Table 47: Seed yield (q/ha) in Initial Varietal Trial (IVT) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-14-1	***34.26***	***35.97***	21.73	14.10	34.55	16.89	***12.57***	24.29	3	7	3/7
2	HB-27	24.26	33.85	***32.33***	13.58	***39.06***	17.16	***10.96***	24.46	2	7	3/7
3	HB-34	27.41	28.47	23.83	11.89	***39.41***	***22.00***	10.36	23.34	9	7	2/7
4	HB-37	26.20	20.44	26.00	11.01	***42.53***	16.25	***12.77***	22.17	15	7	2/7
5	HB-41	29.63	20.10	27.00	12.67	***36.81***	18.52	***14.58***	22.76	13	7	2/7
6	HB-45	24.54	26.37	***33.20***	12.99	34.27	19.67	***10.59***	23.09	12	7	2/7
7	HB-9-01	24.81	21.29	***31.33***	13.13	***40.28***	21.31	**11.78**	23.42	8	7	3/7
8	HB-9-06	22.22	29.60	***27.50***	14.83	***43.68***	14.03	**10.98**	23.26	10	7	3/7
9	HB-9-08	24.07	28.35	21.33	10.93	***42.19***	19.68	**10.92**	22.50	14	7	2/7
10	HB-9-15	21.94	***35.75***	27.33	9.76	***45.10***	16.21	9.56	23.67	7	7	2/7
11	HB-9-16	23.15	30.86	25.17	10.38	***41.84***	14.84	8.83	22.15	16	7	1/7
12	NDFB-13	22.69	32.13	***32.67***	-	34.03	18.51	8.76	24.80	1	6	1/6
13	NDFB-14	22.22	33.01	***31.33***	-	31.08	16.22	9.74	23.93	5	6	1/6
14	RFB-11	24.81	32.14	24.00	-	29.62	23.30	***11.83***	24.28	4	6	1/6
15	RFB-12	21.94	34.75	***27.67***	-	29.93	16.22	***12.89***	23.90	6	6	2/6
16	RFB-13	24.07	28.38	22.67	-	30.38	20.15	***13.91***	23.26	11	6	1/6
17	RMDFB-1	9.95	27.79	***28.47***		31.77	15.05	***12.72***	20.96	18	6	1/6
18	RMDFB-2	9.31	27.54	24.30	-	28.65	17.62	***12.49***	19.98	19	6	1/6
19	Vikrant (C)	27.78	23.08	21.00	14.03	34.03	19.69	10.44	21.43	17	7	
	Mean	**23.44**	**31.53**	**26.78**	**12.44**	**36.27**	**18.07**	**11.40**	**23.03**			
	CD (0.05)	**4.24**	**12.47**	**6.42**	**2.38**	**2.52**	**2.28**	**0.48**				
	CV (%) Error	**11.31**	**26.92**	**14.98**	**13.29**	**5.05**	**9.11**	**3.01**				

Table 48: Plant height (cm) in Initial Varietal Trial (IVT) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-14-1	46.07	78.60	99.67	106.40	69.03	88.60	81.39	11
2	HB-27	46.33	77.00	99.33	93.78	71.55	97.55	80.92	12
3	HB-34	43.33	73.80	100.00	85.88	85.60	107.80	82.73	9
4	HB-37	44.73	86.33	98.67	100.10	84.83	107.05	86.95	3
5	HB-41	43.07	79.80	99.00	106.25	92.43	90.63	85.19	5
6	HB-45	44.53	77.73	101.00	87.15	91.95	90.85	82.20	10
7	HB-9-01	44.87	64.53	98.00	126.45	76.88	93.33	84.01	6
8	HB-9-06	47.67	76.07	100.00	117.30	77.48	93.08	85.26	4
9	HB-9-08	45.13	78.20	102.67	125.80	82.88	62.03	82.78	8
10	HB-9-15	45.93	81.13	99.00	121.63	87.15	97.53	88.73	1
11	HB-9-16	49.47	77.27	101.33	124.28	78.58	96.05	87.83	2
12	NDFB-13	48.67	74.87	103.50	85.95	74.93	94.83	80.46	13
13	NDFB-14	41.33	79.27	100.67	88.48	67.50	91.78	78.17	14
14	RFB-11	38.53	78.73	95.00	74.33	73.28	93.28	75.52	15
15	RFB-12	38.07	73.93	94.00	68.05	69.40	94.05	72.92	18
16	RFB-13	45.73	74.20	93.00	66.60	66.00	92.50	73.01	17
17	RMDFB-1	33.00	77.60	96.67	66.38	52.40	89.63	69.28	19
18	RMDFB-2	34.20	83.27	95.67	69.68	66.90	92.38	73.68	16
19	Vikrant (C)	47.60	71.47	104.33	109.00	80.10	85.08	82.93	7
	Mean	**43.59**	**77.04**	**99.03**	**95.97**	**76.25**	**92.53**	**80.74**	
	CD (0.05)	**11.34**	**11.62**	**4.35**	**6.50**	**4.69**	**13.23**		
	CV (%) Error	**16.25**	**9.42**	**2.74**	**4.88**	**4.43**	**10.31**		

Table 49: Days to 50% flowering in Initial Varietal Trial (IVT) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-14-1	65.67	72.67	56.33	76.00	70.00	80.75	51.00	67.49	12
2	HB-27	66.33	72.67	56.67	76.00	58.00	80.25	52.00	65.99	3
3	HB-34	65.00	79.67	56.00	77.00	57.50	79.75	53.75	66.95	11
4	HB-37	65.67	70.00	60.00	77.00	59.75	81.50	51.25	66.45	8
5	HB-41	65.33	75.67	56.33	77.00	64.00	82.50	54.25	67.87	14
6	HB-45	65.33	75.33	60.00	78.00	53.25	83.50	57.75	67.60	13
7	HB-9-01	65.67	78.00	56.33	77.00	71.00	82.75	53.25	69.14	19
8	HB-9-06	66.00	74.67	56.67	77.00	69.25	82.75	55.25	68.80	16
9	HB-9-08	65.33	75.00	57.33	78.00	72.50	83.75	50.25	68.88	18
10	HB-9-15	65.67	76.33	55.33	78.00	67.75	84.75	53.75	68.80	16
11	HB-9-16	65.67	73.33	59.67	77.00	63.50	81.75	57.75	68.38	15
12	NDFB-13	66.33	70.67	57.67	-	70.00	84.75	51.00	66.74	9
13	NDFB-14	66.00	71.00	56.00	-	70.75	84.50	50.00	66.38	6
14	RFB-11	67.00	75.33	60.33	-	63.25	79.50	55.00	66.74	9
15	RFB-12	66.00	75.00	57.00	-	64.50	78.50	56.00	66.17	4
16	RFB-13	66.33	73.67	60.00	-	62.50	78.75	55.75	66.17	4
17	RMDFB-1	67.00	74.33	57.67	-	54.50	85.50	53.00	65.33	2
18	RMDFB-2	67.00	73.33	56.00	-	55.75	78.50	56.25	64.47	1
19	Vikrant (C)	66.33	73.67	57.00	77.00	59.25	81.50	50.00	66.39	7
	Mean	**65.98**	**74.23**	**57.49**	**77.08**	**63.53**	**81.87**	**53.54**	**67.09**	
	CD (0.05)	**2.14**	**4.44**	**2.31**	**-**	**4.18**	**0.72**	**3.57**		
	CV (%) Error	**2.03**	**3.74**	**2.52**	**-**	**4.70**	**0.63**	**4.80**		

Table 50: Days to maturity in Initial Varietal Trial (IVT) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-14-1	124.67	144.00	126.67	143.00	173.25	***142.75***	152.00	143.76	19	7	1/7
2	HB-27	124.00	144.00	128.00	145.00	***153.75***	146.00	147.50	141.18	10	7	1/7
3	HB-34	123.00	143.33	126.00	144.00	***154.75***	***143.50***	151.25	140.83	9	7	2/7
4	HB-37	126.00	143.33	125.00	146.00	***155.00***	146.00	148.00	141.33	13	7	1/7
5	HB-41	124.33	142.67	127.33	146.00	166.25	147.00	144.50	142.58	17	7	0/7
6	HB-45	124.00	144.00	***123.00***	147.00	***143.00***	148.50	150.75	140.04	3	7	2/7
7	HB-9-01	123.00	***139.33***	126.00	145.00	170.50	145.00	***140.00***	141.26	12	7	2/7
8	HB-9-06	124.67	145.33	127.00	144.00	172.50	***143.50***	141.50	142.64	18	7	1/7
9	HB-9-08	125.00	143.33	***122.00***	146.00	174.75	146.00	140.25	142.48	16	7	1/7
10	HB-9-15	124.33	145.67	***122.00***	145.00	169.25	145.50	140.00	141.68	14	7	1/7
11	HB-9-16	125.00	142.33	125.33	145.00	162.00	145.75	***138.75***	140.60	8	7	1/7
12	NDFB-13	123.33	143.67	125.00	-	173.50	144.50	***137.50***	141.25	11	6	1/6
13	NDFB-14	124.67	144.67	125.33	-	174.00	***142.50***	142.75	142.32	15	6	1/6
14	RFB-11	124.67	143.33	126.33	-	163.00	144.00	***134.00***	139.22	2	6	1/6
15	RFB-12	123.00	145.00	130.00	-	169.25	***142.50***	***132.50***	140.38	6	6	2/6
16	RFB-13	124.67	142.67	127.67	-	167.50	145.25	***133.75***	140.25	4	6	1/6
17	RMDFB-1	124.33	143.67	127.67	-	***154.00***	***141.00***	***139.25***	138.32	1	6	3/6
18	RMDFB-2	124.33	145.67	126.33	-	***158.25***	***141.50***	146.00	140.35	5	6	2/6
19	Vikrant (C)	124.00	143.33	125.67	146.00	156.00	147.00	140.75	140.39	7	7	
	Mean	**124.26**	**143.65**	**125.91**	**145.17**	**163.71**	**144.62**	**142.16**	**141.10**			
	CD (0.05)	**2.09**	**3.91**	**2.89**	**-**	**5.03**	**0.79**	**2.09**				
	CV (%) Error	**1.05**	**1.70**	**1.43**	**-**	**2.20**	**0.40**	**1.06**				

Table 51: 100 seed weight (g) in Initial Varietal Trial (IVT) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-14-1	27.30	28.65	25.00	21.10	25.93	27.30	32.85	26.88	11
2	HB-27	27.57	25.91	23.83	20.10	26.73	28.20	34.63	26.71	15
3	HB-34	28.73	23.45	24.83	22.70	26.40	29.50	34.83	27.21	10
4	HB-37	25.77	28.33	24.67	21.70	28.53	26.90	35.08	27.28	8
5	HB-41	28.03	28.13	25.50	21.30	27.20	28.60	34.43	27.60	5
6	HB-45	25.53	27.87	25.17	23.10	28.13	28.60	34.20	27.51	6
7	HB-9-01	21.33	19.26	25.17	23.30	28.05	29.70	35.50	26.04	18
8	HB-9-06	28.03	28.42	24.83	20.60	28.68	30.10	35.00	27.95	4
9	HB-9-08	22.47	28.32	25.50	20.00	28.43	24.90	34.60	26.32	17
10	HB-9-15	30.10	26.73	24.67	21.20	28.68	27.90	37.93	28.17	2
11	HB-9-16	30.03	27.16	25.00	22.50	28.28	28.70	28.83	27.21	9
12	NDFB-13	24.60	27.29	24.83	-	25.13	26.20	32.40	26.74	14
13	NDFB-14	23.53	28.69	25.00	-	24.25	29.80	27.55	26.47	16
14	RFB-11	23.70	28.51	24.33	-	23.95	26.90	33.18	26.76	12
15	RFB-12	26.67	26.93	24.50	-	23.90	23.90	34.58	26.75	13
16	RFB-13	28.74	26.83	24.17	-	23.88	27.20	33.80	27.44	7
17	RMDFB-1	23.40	27.63	24.83	-	24.13	17.10	33.65	25.12	19
18	RMDFB-2	28.63	26.84	24.00	-	24.03	29.80	34.75	28.01	3
19	Vikrant (C)	31.47	27.72	25.17	23.60	26.40	29.50	34.75	28.37	1
	Mean	**26.61**	**26.98**	**24.79**	**21.77**	**26.35**	**27.41**	**33.82**	**27.08**	
	CD (0.05)	**2.97**	**4.48**	**1.15**	**-**	**0.49**	**0.84**	**2.87**		
	CV (%) Error	**6.96**	**10.37**	**2.91**	**-**	**1.35**	**2.21**	**6.12**		

Table 52: Performance of Fababean entries in Initial Varietal Trial (AVT-I) during Rabi (2014-15) - Plain

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check
				Mean	Location	Rank	Vikrant
1	DFB-13-2	137.81	26.65	19.84	6	12	-11.77
2	HB-193	143.51	28.12	21.47	7	6	-4.50
3	HB-194	146.83	27.37	22.19	7	3	-1.30
4	HB-212	144.06	27.61	20.94	7	9	-6.85
5	HB-214	143.62	27.41	20.63	7	10	-8.23
6	HB-8-11	143.51	27.42	21.15	7	7	-5.92
7	HB-8-12	144.99	26.71	22.63	7	1	0.63
8	HB-8-13	141.56	28.18	22.09	7	4	-1.74
9	HB-8-15	142.32	27.38	22.02	7	5	-2.04
10	NDFB-12	144.01	26.45	21.00	7	8	-6.60
11	RFB-6	143.08	27.17	19.43	7	13	-13.59
12	RFB-7	142.69	24.58	20.33	7	11	-9.60
13	Vikrant (C)	144.23	27.34	22.48	7	2	-
	Mean	**143.25**	**27.11**	**21.25**			

Table 53: Seed yield (q/ha) in Initial Varietal Trial (AVT-I) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-13-2	14.03	35.03	***34.07***	12.24		15.11	8.54	19.84	12	6	1/6
2	HB-193	21.18	23.15	26.73	17.19	***39.61***	13.11	9.33	21.47	6	7	1/7
3	HB-194	20.83	31.87	25.83	13.13	***41.77***	13.78	8.14	22.19	3	7	1/7
4	HB-212	18.61	31.40	21.83	11.85	***40.23***	13.92	8.76	20.94	9	7	1/7
5	HB-214	19.58	26.48	16.00	15.13	***39.97***	17.71	9.56	20.63	10	7	1/7
6	HB-8-11	18.96	23.11	27.53	13.75	***45.70***	11.68	7.33	21.15	7	7	1/7
7	HB-8-12	20.49	31.74	24.50	13.65	***43.13***	15.10	9.79	22.63	1	7	1/7
8	HB-8-13	18.06	28.85	26.83	12.34	***43.83***	12.29	***12.46***	22.09	4	7	2/7
9	HB-8-15	19.69	27.36	28.92	13.44	***44.53***	11.71	8.53	22.02	5	7	1/7
10	NDFB-12	13.96	33.04	***34.17***	11.56	33.98	11.51	8.79	21.00	8	7	1/7
11	RFB-6	18.19	27.92	20.83	13.76	33.20	10.83	11.26	19.43	13	7	0/7
12	RFB-7	20.83	22.57	27.33	13.28	32.50	13.89	11.88	20.33	11	7	0/7
13	Vikrant (C)	21.53	32.96	26.33	14.90	34.53	15.68	11.46	22.48	2	7	
	Mean	**18.92**	**31.53**	**26.22**	**13.56**	**39.42**	**13.56**	**9.68**	**21.25**			
	CD (0.05)	**2.09**	**11.55**	**6.59**	**2.80**	**2.39**	**2.12**	**0.80**				
	CV (%) Error	**6.62**	**23.77**	**14.95**	**14.43**	**4.37**	**11.28**	**5.93**				

Table 54: Plant height (cm) in Initial Varietal Trial (AVT-I) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-13-2	48.00	79.67	82.50		66.78	74.85	70.36	12
2	HB-193	48.87	76.67	77.67	127.43	79.83	90.85	83.55	3
3	HB-194	51.53	78.87	78.00	122.63	77.08	107.80	85.98	1
4	HB-212	47.07	80.93	82.33	135.60	72.10	97.55	85.93	2
5	HB-214	48.27	86.13	80.67	93.05	83.50	90.63	80.37	5
6	HB-8-11	43.07	80.47	81.67	114.30	65.50	74.98	76.66	10
7	HB-8-12	46.07	89.93	78.00	123.63	66.83	69.55	79.00	6
8	HB-8-13	53.60	75.13	74.83	114.88	66.78	78.18	77.23	8
9	HB-8-15	46.40	75.60	76.50	124.63	71.43	76.83	78.56	7
10	NDFB-12	47.33	78.87	80.67	88.83	66.03	91.78	75.58	11
11	RFB-6	50.33	81.07	79.67	76.30	77.15	97.53	77.01	9
12	RFB-7	38.40	70.80	77.00	68.80	74.18	62.03	65.20	13
13	Vikrant (C)	46.67	77.47	78.33	101.38	86.78	96.05	81.11	4
	Mean	**47.35**	**79.35**	**79.06**	**107.62**	**73.38**	**85.28**	**78.20**	
	CD (0.05)	**9.35**	**10.69**	**3.24**	**5.12**	**0.97**	**15.72**		
	CV (%) Error	**11.74**	**8.01**	**2.44**	**3.43**	**0.95**	**13.30**		

Table 55: Days to 50% flowering in Initial Varietal Trial (AVT-I) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-13-2	68.67	71.00	59.67	77.00		78.25	55.75	68.39	9
2	HB-193	66.33	70.67	60.33	77.00	56.75	80.50	51.25	66.12	1
3	HB-194	66.67	73.00	60.33	76.00	74.00	79.75	54.25	69.14	11
4	HB-212	68.00	73.67	57.67	78.00	55.00	80.75	53.00	66.58	3
5	HB-214	66.00	74.33	56.33	79.00	55.75	83.50	56.25	67.31	5
6	HB-8-11	66.33	71.00	56.67	78.00	62.50	81.25	54.00	67.11	4
7	HB-8-12	67.00	73.67	59.33	79.00	63.75	83.50	55.25	68.79	10
8	HB-8-13	66.67	70.33	58.00	78.00	58.75	82.25	57.25	67.32	6
9	HB-8-15	66.00	73.33	59.67	76.00	53.75	80.00	55.00	66.25	2
10	NDFB-12	68.67	73.67	57.67	77.00	75.25	82.25	55.75	70.04	13
11	RFB-6	67.67	69.33	59.00	76.00	73.75	77.25	50.00	67.57	8
12	RFB-7	66.00	75.33	54.67	77.00	69.75	77.50	51.00	67.32	6
13	Vikrant (C)	67.33	74.67	58.00	78.00	71.75	80.75	55.00	69.36	12
	Mean	**67.03**	**72.62**	**58.26**	**77.38**	**64.23**	**80.58**	**54.13**	**67.79**	
	CD (0.05)	**2.66**	**5.06**	**4.06**		**5.68**	**0.69**	**4.01**		
	CV (%) Error	**2.36**	**4.15**	**4.14**		**6.38**	**0.62**	**5.35**		

Table 56: Days to maturity in Initial Varietal Trial (AVT-I) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-13-2	125.00	144.33	130.00	***144.00***		***143.00***	***140.50***	137.81	1	6	3/6
2	HB-193	127.33	145.00	136.00	145.00	***158.75***	***143.75***	148.75	143.51	6	7	2/7
3	HB-194	126.67	146.67	134.00	145.00	176.75	147.00	151.75	146.83	13	7	0/7
4	HB-212	128.00	145.00	135.67	146.00	***156.75***	145.75	151.25	144.06	10	7	1/7
5	HB-214	125.33	146.67	126.33	146.00	163.00	147.25	150.75	143.62	8	7	0/7
6	HB-8-11	125.67	141.33	126.33	145.00	167.50	147.50	151.25	143.51	6	7	0/7
7	HB-8-12	125.67	147.67	131.33	146.00	168.25	145.75	150.25	144.99	12	7	0/7
8	HB-8-13	125.33	145.00	123.33	145.00	***154.50***	146.75	151.00	141.56	2	7	1/7
9	HB-8-15	128.00	141.67	133.33	***144.00***	***153.25***	147.00	149.00	142.32	3	7	2/7
10	NDFB-12	125.67	144.67	127.00	145.00	172.25	145.50	148.00	144.01	9	7	2/7
11	RFB-6	127.33	144.00	***125.00***	***143.00***	173.50	***142.75***	146.00	143.08	5	7	3/7
12	RFB-7	127.33	146.00	***123.00***	***143.00***	177.00	***143.25***	***139.25***	142.69	4	7	4/7
13	Vikrant (C)	126.33	144.67	131.33	144.00	172.75	143.00	147.50	144.23	11	7	
	Mean	**126.44**	**144.82**	**129.44**	**144.69**	**166.19**	**145.25**	**148.10**	**143.25**			
	CD (0.05)	**2.56**	**5.31**	**2.93**		**7.42**	**0.97**	**4.62**				
	CV (%) Error	**1.20**	**2.18**	**1.35**		**3.22**	**0.48**	**2.25**				

Table 57: 100 seed weight (g) in Initial Varietal Trial (AVT-I) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-13-2	28.23	27.09	24.83	20.20		27.53	32.01	26.65	11
2	HB-193	29.77	28.21	25.67	25.10	27.05	26.40	34.65	28.12	2
3	HB-194	29.90	29.09	24.83	22.40	26.13	24.20	35.08	27.37	7
4	HB-212	29.87	29.87	25.33	20.00	26.98	26.50	34.75	27.61	3
5	HB-214	28.60	29.63	25.00	23.90	26.18	23.93	34.63	27.41	5
6	HB-8-11	28.30	29.44	24.50	22.40	28.63	26.80	31.89	27.42	4
7	HB-8-12	29.30	28.03	25.00	22.80	27.93	22.20	31.75	26.71	10
8	HB-8-13	31.07	31.59	25.50	22.90	28.25	25.80	32.14	28.18	1
9	HB-8-15	29.50	28.14	24.67	23.70	28.48	25.70	31.50	27.38	6
10	NDFB-12	28.83	28.78	24.33	21.20	24.88	23.50	33.65	26.45	12
11	RFB-6	27.38	30.08	25.17	23.30	24.38	26.70	33.15	27.17	9
12	RFB-7	26.30	26.85	25.00	19.40	24.58	22.40	27.55	24.58	13
13	Vikrant (C)	30.90	27.21	22.10	23.40	25.08	28.30	34.43	27.34	8
	Mean	**29.07**	**28.77**	**24.76**	**22.36**	**26.54**	**25.38**	**32.86**	**27.11**	
	CD (0.05)	**3.62**	**3.26**	**2.80**		**0.62**	**0.93**	**2.65**		
	CV (%) Error	**7.40**	**6.74**	**6.72**		**1.68**	**2.64**	**5.81**		

Table 58: Performance of Fababean entries in Initial Varietal Trial (AVT-II) during Rabi (2014-15) - Plain

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean seed yield over locations (q/ha)			Percent increase/decrease over check
				Mean	Location	Rank	Vikrant
1	DFB-10-1	143.08	29.21	22.25	7	2	-2.15
2	DFB-10-2	143.61	28.92	21.94	7	4	-3.51
3	DFB-10-3	143.38	29.29	22.18	7	3	-2.42
4	HB-082	138.10	28.00	19.07	6	10	-16.12
5	HB-182	143.81	27.21	20.40	7	8	-10.27
6	HB-184	141.64	28.19	21.27	7	5	-6.42
7	HB-185	142.65	27.30	21.11	7	6	-7.16
8	HB-186	141.51	27.73	20.58	7	7	-9.47
9	HB-188	146.67	27.59	19.86	6	9	-12.62
10	Vikrant (C)	144.39	25.98	22.73	7	1	-
	Mean	**142.88**	**27.94**	**21.14**			

Table 59: Seed yield (q/ha) in Initial Varietal Trial (AVT-II) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-10-1	16.93	34.10	28.50	13.54	34.11	15.11	***13.43***	22.25	2	7	1/7
2	DFB-10-2	17.97	35.57	20.83	11.17	34.45	***18.21***	***15.35***	21.94	4	7	2/7
3	DFB-10-3	17.71	31.85	26.50	13.03	34.77	16.68	***14.76***	22.18	3	7	1/7
4	HB-082	16.67	30.79	27.57	9.38		**17.45**	12.56	19.07	10	6	1/6
5	HB-182	12.58	25.82	26.00	11.72	***40.96***	13.70	12.02	20.40	8	7	1/7
6	HB-184	4.84	29.58	29.17	11.54	***43.36***	***18.23***	12.20	21.27	5	7	2/7
7	HB-185	11.07	23.85	22.67	14.17	***44.14***	***18.87***	***12.98***	21.11	6	7	3/7
8	HB-186	11.07	27.26	21.67	10.03	***39.61***	***21.35***	***13.09***	20.58	7	7	3/7
9	HB-188	9.27	29.15		9.57	***44.71***	14.32	12.17	19.86	9	6	1/6
10	Vikrant (C)	21.88	32.96	26.33	14.39	**36.46**	14.97	12.15	22.73	1	7	
	Mean	**14.00**	**31.53**	**25.47**	**11.85**	**39.18**	**16.89**	**13.07**	**21.14**			
	CD (0.05)	**1.64**	**10.50**	**7.79**	**2.17**	**2.21**	**2.20**	**0.72**				
	CV (%) Error	**8.24**	**20.34**	**17.33**	**12.62**	**4.18**	**8.99**	**3.80**				

Table 60: Plant height (cm) in Initial Varietal Trial (AVT-II) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-10-1	65.20	78.67	77.67	93.50	77.23	92.98	80.87	7
2	DFB-10-2	59.30	87.67	73.00	65.38	89.93	94.18	78.24	9
3	DFB-10-3	63.35	78.87	76.33	86.88	72.85	93.15	78.57	8
4	HB-082	47.67	76.93	80.00		71.18	93.13	73.78	10
5	HB-182	63.35	80.33	77.67	119.50	78.58	94.03	85.58	2
6	HB-184	60.05	89.33	76.67	124.73	75.15	91.03	86.16	1
7	HB-185	61.13	81.93	72.33	107.20	76.53	86.75	80.98	6
8	HB-186	65.15	76.20	80.67	108.70	78.68	83.73	82.19	5
9	HB-188	64.95	85.53		112.85	73.75	79.45	83.31	3
10	Vikrant (C)	59.75	77.47	78.33	**111.78**	78.25	93.55	83.19	4
	Mean	**60.99**	**81.29**	**76.96**	**103.39**	**77.21**	**90.20**	**81.29**	
	CD (0.05)	**9.80**	**14.52**	**3.75**	**18.05**	**5.08**	**9.60**		
	CV (%) Error	**10.77**	**10.42**	**2.76**	**12.85**	**4.54**	**7.34**		

Table 61: Days to 50% flowering in Initial Varietal Trial (AVT-II) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-10-1	65.50	74.00	59.00	78.00	71.50	80.50	50.75	68.46	6
2	DFB-10-2	64.75	73.00	60.00	77.00	71.00	79.75	54.75	68.61	7
3	DFB-10-3	63.75	75.33	55.33	78.00	68.00	80.50	54.50	67.92	4
4	HB-082	67.67	74.67	53.67	79.00		78.75	60.25	69.00	8
5	HB-182	65.50	72.00	61.33	78.00	63.00	82.50	56.00	68.33	5
6	HB-184	65.50	72.00	58.67	75.00	55.75	79.50	58.50	66.42	2
7	HB-185	65.50	71.67	57.67	75.00	56.75	83.50	52.00	66.01	1
8	HB-186	64.00	73.00	60.67	77.00	57.00	84.25	55.75	67.38	3
9	HB-188	65.50	74.00		78.00	64.50	84.75	56.25	70.50	10
10	Vikrant (C)	67.50	74.67	58.00	78.00	**73.25**	82.00	57.25	70.10	9
	Mean	**65.52**	**73.43**	**58.26**	**77.30**	**64.53**	**81.60**	**55.60**	**68.27**	
	CD (0.05)	**3.99**	**3.90**	**3.18**		**3.86**	**0.82**	**3.18**		
	CV (%) Error	**4.19**	**3.10**	**3.10**		**4.19**	**0.69**	**3.95**		

Table 62: Days to maturity in Initial Varietal Trial (AVT-II) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFB-10-1	129.50	145.00	129.33	145.00	***169.75***	***143.00***	140.00	143.08	5	7	2/7
2	DFB-10-2	130.00	143.33	***127.67***	145.00	172.50	145.50	141.25	143.61	7	7	1/7
3	DFB-10-3	129.25	144.67	***127.00***	146.00	***169.00***	147.50	140.25	143.38	6	7	2/7
4	HB-082	**127.67**	145.00	***126.67***	147.00		***144.25***	138.00	138.10	1	6	3/6
5	HB-182	131.25	142.00	***125.67***	146.00	***163.50***	147.50	150.75	143.81	8	7	2/7
6	HB-184	129.25	146.67	128.33	143.00	***155.50***	***145.25***	143.50	141.64	3	7	2/7
7	HB-185	132.00	145.00	***127.33***	143.00	***155.50***	146.75	149.00	142.65	4	7	2/7
8	HB-186	130.00	147.00	128.33	145.00	***156.25***	***143.25***	140.75	141.51	2	7	2/7
9	HB-188	130.00	145.00		145.00	***167.75***	***142.50***	149.75	146.67	10	6	2/6
10	Vikrant (C)	130.00	144.67	131.33	145.00	**174.50**	146.25	139.00	144.39	9	7	
	Mean	**129.89**	**144.83**	**127.96**	**145.00**	**164.92**	**145.18**	**143.23**	**142.88**			
	CD (0.05)	**1.48**	**4.83**	**3.18**		**4.72**	**0.85**	**2.76**				
	CV (%) Error	**0.78**	**1.94**	**1.41**		**2.04**	**0.40**	**1.33**				

Table 63: 100 seed weight (g) in Initial Varietal Trial (AVT-II) on Fababean : Rabi (2014-15) - Plain

S. No.	Genotypes	Ambikapur	Delhi	Faizabad	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFB-10-1	36.01	29.23	25.17	26.70	28.10	25.00	34.24	29.21	2
2	DFB-10-2	31.88	30.20	25.33	22.80	28.48	28.40	35.38	28.92	3
3	DFB-10-3	34.18	29.39	25.67	25.20	26.48	28.30	35.85	29.29	1
4	HB-082	28.83	28.45	25.17	24.00		28.93	32.64	28.00	5
5	HB-182	29.64	27.28	25.67	22.70	28.35	24.80	32.04	27.21	9
6	HB-184	31.50	31.48	24.93	21.90	28.53	24.30	34.70	28.19	4
7	HB-185	29.87	28.57	24.83	22.00	28.70	24.90	32.25	27.30	8
8	HB-186	32.20	30.01	25.67	20.60	26.53	26.30	32.78	27.73	6
9	HB-188	31.92	28.31		21.20	29.33	24.60	30.20	27.59	7
10	Vikrant (C)	31.05	27.21	22.10	22.70	**24.73**	25.58	28.46	25.98	10
	Mean	**31.71**	**29.01**	**24.95**	**22.98**	**27.69**	**26.11**	**32.85**	**27.94**	
	CD (0.05)	**4.87**	**2.99**	**3.44**		**0.63**	**0.86**	**2.25**		
	CV (%) Error	**10.43**	**6.02**	**7.81**		**1.68**	**2.28**	**4.73**		

CROP PRODUCTION AND PROTECTION

IV. CROP PRODUCTION AND PROTECTION

4.1 CROP PRODUCTION

A total of six agronomic experiments were formulated to be conducted at seven locations in 11 trials during 2014-15. These comprised of three studies on amaranth, two on faba bean and one on potential crops in general. Out of these, results of six experiments were received from five locations in nine trials. Centre-wise details of experiments are presented in Table 64 and the findings are as follows:

Experiment 1: Organic Farming in Grain Amaranth

In order to develop cultivation practices for organic farming of grain amaranth, the crop of grain amaranth was subjected to eleven manurial treatments Cooch Behar and S.K. Nagar during Rabi 2014-15. The experiment was laid out in RBD with three replications.

Results:

The amaranth crop fertilized with FYM 10t/ha gave the highest grain yield (T_3) at S.K. Nagar (15.97 q/ha) and RDF 100% at Cooch Behar (10.78 q/ha). (Table 65)

Experiment 2: Performance of Amaranth Varieties at Different Locations

To identify amaranth varieties suitable for changing climate, this experiment was started at two centres in plains during Rabi 2014-15. Data have been received from both the centres.

In this trial, thirteen varieties were tested. The performance of the entries as compared with the mean have been given in (Table 66). Based on the overall mean performance in respect of grain yield over two locations, the variety RMA-4 showed highest seed yield.

Significant differences were observed among the varieties for seed yield at all two locations (Table 66). Seed yield level was high at S.K. Nagar (17.58 q/ha) and low at Ranchi (7.15 q/ha). Based on the overall mean performance in

respect of grain yield over seven locations, the variety RMA-4 showed highest seed yield.

Average plant height of the varieties (Table 66) was the highest at S.K. Nagar (100.01 cm) followed by at Ranchi (78.12 cm). Based on average performance over seven locations the variety RMA-4 had highest plant height (115.33 cm).

The mean flowering time was shorter (43.85 days) at S.K. Nagar while it was longer (91.90 days) at Ranchi. The variety Annpurna showed consistency for early flowering over the locations and ranked first (30.67 days) based on the overall performance (Table 66).

The average maturity period of the varieties over the locations was 110.28 days. The variety, PRA-2 was the earliest in maturity (85.33 days). The average maturity period was the shorter at S.K. Nagar (99.90 days) while, it was the longer at Ranchi (144.90 days) (Table 66).

Test weight expressed in terms of weight of 10 ml seed recorded at two centres. The variation among the varieties was relatively low. Based on the average over two locations the variety, GA-2 (9.62 g) showed the highest test weight (Table 66).

Experiment 3: Response of Grain Amaranth Genotypes to Different Fertilizer Doses

Year of start	:	2014
Objective	:	To work out fertilizer requirements of promising amaranth genotypes
Locations	:	Bhubaneswar
Treatments	:	a) Varieties: BGA-2, BGA-38, RGA-08-17, BGA-19, BGA-19 and GA-1 c) Fertilizer doses: RDF and 75% RDF, 100% RDF, 125% RDF
Design	:	Split plot
Replications	:	3

Results: Application of 100% recommended Fertilizer Dose (RFD) @ 60-40-20-Kg NPK/ha recorded significantly maximum grain yield among all genotypes

(Table 67). Maximum grain yield of 1469 kg/ha was recorded with BGA-2 variety with application of 100% RFD (F2) followed by genotype BGA-19 (1464 kg/ha) with the same treatment. Similarly highest B: C ratio was recorded from the treatment F2 i.e. 100% RFD application (Table 68).

Experiment 4: Studies on Rice bean based Cropping System

In order to work out suitable rice bean based cropping system in Orissa and Eastern Region. This experiment was conducted at Bhubaneswar and Cooch Behar in West Bengal in RBD with three replications.

Bhubaneswar

Treatments : Kharif-2014 Rice bean (Sole)

Rabi-2014-15 T1-Ricebean-Toria

T2-Ricebean-Grain amaranth

T3-Ricebean-Greengram

Cooch Behar

Treatment: Kharif-2014 Rice bean

Rabi-2014-15 T1: Rice bean - Buckwheat

T2: Rice bean - Niger

T3: Rice bean - Linseed

T4: Rice bean - Wheat

T5: Rice bean - Rai

T6: Rice bean - Toria

T7: Rice bean - Grain amaranth

Results: At Bhubaneswar, among all the treatments evaluated, it was revealed that during the year 2014-15, Rice bean-Green gram cropping system recorded maximum Rice bean Equivalent Yield (REY) of 3992 kg/ha with the highest B:C ratio of 2.49 followed by Rice bean-Toria cropping system (2956kg/ha) with a B:C ratio of 1.58 (Table 69). At Cooch Behar, Wheat recorded significantly the highest grain yield (27.28 q/ha) followed by buckwheat and Rai. Lowest seed yield was recorded under Niger (6.72 q/ha) (Table 70).

Experiment 5: Effect of Fertilizer Doses on Faba bean Genotypes

This experiment was taken up at Hisar with the objective to find out optional dose of fertilizer for faba bean genotypes in the pipe line. The experiment was laid out in Randomized Block Design with three replications.

Results: Perusal of the mean data of three years in the Table 71 showed that seed yield significantly increased up to highest level of $N_{40}P_{40}K_{20}$. The yield increase was to the tune of 20.7 and 31.8 per cent with the $N_{20}P_{20}K_{20}$ and $N_{40}P_{40}K_{20}$ treatments our control, respectively. All the genotypes showed variable response to different doses of fertilizers, however, the genotype HB 40 with seed yield of 29.64 q/ha was the highest producer and it was followed by HB 516 and HB 39. All the genotypes produced significantly higher seed yield than the national check Vikrant except during 2013-14 season in the HB 504 genotype.

On the basis of three years data it may be concluded that, seed yield of Bakla was significantly increased up to 20.7 and 31.8 per cent with the $N_{20}P_{20}K_{20}$ and $N_{40}P_{40}K_{20}$ treatments than control, respectively.

Experiment 6: Performance of Faba bean Genotypes under Different Agronomic Practices

This experiment was taken up at Hisar with the objective to evaluate promising genotype (AVT-II) entries (HB-082, HB-182, HB-185, HB-188 of Faba bean to different levels of Management (row spacing, date of sowing, seed rate, irrigation management, phosphorous level, nitrogen level. The experiment was laid out in factorial design with three replication with treatment

Results achieved : Perusal of the data in Table 4 showed that among all the genotypes the grain yield increased significantly up to 20 kg N/ha and it remained at par with 40 kg N/ha. The yield was increased to the tune of 20.7 per cent with the N_{20} than control. All the genotypes showed variable response to different doses of fertilizers, however, the genotype HB 82 with grain yield of 44.33 q/ha was the highest producer and it was followed by HB 188 and HB 185. All the genotypes produced significantly higher grain yield than the national check Vikrant except HB-182 (Table 70).

Table 64: Centre-wise details of agronomic experiments allotted/ conducted on different underutilized crops.

S. No.	Experiment	Palampur	Ranichauri	Cooch Behar	S.K. Nagar	Ranchi	Hisar	Bhubaneswar	Total
1	Organic farming in grain amaranth			1(1)	1(1)				**2(2)**
2	Performance of amaranth varieties at different locations				1(1)	1(1)			**2(2)**
3	Response of Grain Amaranth genotypes to different fertilizer doses.							1(1)	**1(1)**
4	Studies on rice bean based cropping system			1(1)				1(1)	**2(2)**
5	Effect of fertilizer doses on fababean genotypes						1(1)		**1(1)**
6	Performance of fababean genotypes under different agronomic Practices	1(0)	1(0)				1(1)		**3(1)**
Total		**1(0)**	**1(0)**	2(2)	**2(2)**	**1(1)**	**2(2)**	**2(2)**	**11(9)**

() = conducted; Without () = allotte

Table 65: Organic farming in grain amaranth at SK Nagar Rabi 2014-15.

S. No.	Treatment	Grain Yield (q/ha)			Days to 50% flowering	Days to Maturity	Plant height (cm)	Inflorescence Length (cm)	Fodder yield (q/ha)		
		SK Nagar	Cooch behar	Mean	SK Nagar	SK Nagar	SK Nagar	SK Nagar	SK Nagar	Cooch behar	Mean
1	FYM 5 t /ha	10.95	8.00	**9.48**	55.00	100.00	180.97	91.07	43.21	38.41	**40.81**
2	FYM 7.5 t /ha	14.18	8.89	**11.53**	56.00	105.00	190.80	90.67	48.15	44.10	**46.12**
3	FYM 10 t /ha	15.97	9.21	**12.59**	54.00	104.00	196.47	101.80	49.01	46.40	**47.71**
4	Ver. Com 5 t/ha	9.05	8.67	**8.86**	53.33	104.00	181.20	93.47	35.80	41.37	**38.59**
5	Ver. Com 7.5 t/ha	9.30	9.38	**9.34**	53.67	103.00	182.20	93.87	43.00	43.38	**43.19**
6	Ver. Com 10 t/ha	9.75	9.65	**9.70**	56.00	100.00	184.47	93.20	45.47	48.41	**46.94**
7	RDF 50 %+ Ver. Com 5 t/ha	14.16	10.19	**12.17**	53.00	101.00	185.40	96.47	50.43	50.60	**50.52**
8	RDF 100 %	14.44	10.78	**12.61**	55.00	104.00	183.13	90.33	59.26	52.70	**55.98**
9	Control	8.51	5.35	**6.93**	55.67	105.00	170.73	93.47	39.09	25.50	**32.30**
	Mean	**11.81**	**8.90**	**10.36**	**54.63**	**102.89**	**183.93**	**93.81**	**45.94**	**43.43**	**44.68**
	CD (0.05)	**1.95**	**3.60**		**4.43**	**2.00**	**14.31**	**5.33**	**2.93**	**1.55**	
	CV (%) Error	**9.52**	**8.19**		**4.68**	**1.12**	**4.50**	**3.28**	**3.68**	**9.24**	

Table 66: Performance of amaranth varieties at different locations during Rabi 2014-15 - Plain.

S. No	Genotype	Days to 50% Flowering			Days to maturity			Inflorescence length (cm)			Plant height cm			Grain yield q/ha			Seed volume (g/10ml)		
		SK Nagar	Ranchi	Mean	SK Nagar	Ranchi	Mean	SK Nagar	Ranchi	Mean	SK Nagar	Ranchi	Mean	SK Nagar	Ranchi	Mean	SK Nagar	Ranchi	Mean
1	Annpurna	30.67		**30.67**	85.67		**85.67**	62.67		**62.67**	72.07		**72.07**	12.12		**12.12**	8.29		**8.29**
2	Durga	53.00		**53.00**	105.33		**105.33**	36.00		**36.00**	105.20		**105.20**	21.49		**21.49**	8.24		**8.24**
3	BGA-2	52.00	94.67	**73.33**	105.33	147.33	**126.33**	33.87	17.53	**25.70**	100.73	79.80	**90.27**	20.73	7.86	**14.29**	8.30	9.87	**9.08**
4	GA-1	48.00	90.67	**69.33**	106.67	146.67	**126.67**	62.80	16.33	**39.57**	128.67	90.17	**109.42**	17.37	7.60	**12.49**	8.38	9.40	**8.89**
5	GA-2	43.33	84.33	**63.83**	106.67	147.00	**126.83**	61.80	17.17	**39.48**	128.67	76.80	**102.73**	22.48	9.60	**16.04**	8.37	10.87	**9.62**
6	GA-3	43.00	82.00	**62.50**	108.00	144.67	**126.33**	58.00	21.40	**39.70**	118.73	67.47	**93.10**	20.00	6.28	**13.14**	8.32	10.00	**9.16**
7	PRA-1	30.67		**30.67**	85.67		**85.67**	52.60		**52.60**	56.40		**56.40**	13.90		**13.90**	8.38		**8.38**
8	PRA -2	30.67		**30.67**	85.33		**85.33**	56.93		**56.93**	60.40		**60.40**	14.78		**14.78**	8.43		**8.43**
9	PRA-3	30.67		**30.67**	85.67		**85.67**	52.40		**52.40**	58.20		**58.20**	15.08		**15.08**	8.35		**8.35**
10	RMA-4	49.00		**49.00**	106.67		**106.67**	49.20		**49.20**	115.33		**115.33**	15.50		**15.50**	8.42		**8.42**
11	RMA-7	53.00	98.67	**75.83**	106.67	140.33	**123.50**	57.33	21.10	**39.22**	125.40	78.60	**102.00**	19.19	5.82	**12.50**	8.42	10.53	**9.48**
12	Suvrna	53.00	95.33	**74.17**	105.33	149.33	**127.33**	32.13	19.97	**26.05**	117.53	62.73	**90.13**	17.59	8.30	**12.95**	8.33	9.63	**8.98**
13	VL-44	53.00	97.67	**75.33**	105.67	139.00	**122.33**	37.93	25.10	**31.52**	112.80	91.30	**102.05**	18.36	4.59	**11.47**	8.33	9.40	**8.86**
Mean		**43.85**	**91.90**	**55.31**	**99.90**	**144.90**	**110.28**	**50.28**	**19.80**	**42.39**	**100.01**	**78.12**	**89.02**	**17.58**	**7.15**	**14.29**	**8.35**	**9.96**	**8.78**
CD (0.05)		**0.97**	**6.69**		**1.22**	**1.87**		**6.52**	**7.17**		**14.00**	**20.22**		**5.24**	**0.41**		0.15	**1.11**	
CV (%) Error		**1.31**	**4.09**		**0.73**	**0.72**		**7.71**	**20.34**		**8.33**	**14.54**		**17.71**	**3.21**		1.04	**6.24**	

Table 67: Grain amaranth genotypes yield (q/ha) during Rabi-2014-15 at Bhubaneswar location.

Sl.	Genotypes	F1	F2	F3	Grain yield (q/ha)
V1	BGA-27	12.57	14.13	11.68	12.79
V2	BGA-19	14.33	15.77	13.82	14.64
V3	BGA-38	11.80	12.93	11.98	12.24
V4	VRGA-08-17	11.09	13.03	11.48	11.87
V5	BGA-2	14.50	15.78	13.79	14.69
	Mean	**12.86**	**14.33**	**12.55**	**13.25**
	CD (0.05%) genotypes(main plot)				**0.44**
	CD (0.05) for fertilizer (sub-plot)				**0.25**
	CD (0.05) for genotypes x fertilizer				**0.80**
	C.V (%)Genotypes				**3.05**
	C.V (%) Fertilizers				

Table 68: Effect of different fertilizer doses on different genotypes during Rabi-2014-15 at Bhubaneswar location.

S. No.	Treatments	Grain yield (q/ha)	Gross return (Rs/ha)	B:C Ratio
1	V1F1	12.56	18840	1.37
2	V1F2	14.13	21195	1.41
3	V1F3	11.68	17520	1.14
4	V2F1	14.33	21495	1.56
5	V2F2	15.77	23655	1.57
6	V2F3	13.82	20730	1.34
7	V3F1	11.8	17700	1.29
8	V3F2	12.93	19395	1.30
9	V3F3	11.97	17955	1.16
10	V4F1	11.08	16620	1.21
11	V4F2	13.02	19545	1.30
12	V4-F3	11.47	17205	1.11
13	V5F1	14.41	21735	1.58
14	V5F2	15.78	23670	1.60
15	V5F3	13.79	15433	1.39

Cost of seed -Rs15/-/kg & Cost of cultivation-F1-13702/-/ha,F2-15000/- /ha & F3-15433/-/ha.

Table 69: Rice bean Equivalent Yield (REY) and economics of the Cropping System during the year 2014-15 at Bhubaneswar location.

Treatments	Crops	Rice bean yield (REY) (q/ha)	REY of Toria (q/ha)	REY of Grain amaranth (q/ha)	REY of Green gram (q/ha)	REY of the System (q/ha)	Net Return (Rs/ha)	B:C ratio
T1	Toria	9.82	19.74	-	-	29.56	44340.00	1.58
T2	Grain amaranth	10.02	-	14.03	-	24.05	36075.00	1.33
T3	Green gram	9.89	-	-	30.03	39.92	59880.00	2.49
	CD(0.05)					**1.16**		
	CV (%)(Error)					**5.10**		

Price-Ricebean/Grain amaranth,-Rs15/-/kg, Toria-Rs31/-/kg, & Green gram-. Rs46/-/kg

Table 70: Seed/grain yield of crops during Rabi 2014-15 under Rice bean based cropping system at Cooch Behar.

Treatments	Name of crops	Variety	Spacing (cm)	Yield (q/ha)
T1	Buckwheat	Shimla B-1	30 x 10	15.35
T2	Niger	Local	25 x 10	6.72
T3	Linseed	Neela (B-67)	30 x 10	9.35
T4	Wheat	Sonalika	22.5 x continuous	27.28
T5	Rai	Sanjucta	30 x 10	12.46
T6	Toria	Panchali	25 x 7	7.98
T7	Grain amaranth	Subarna	30 x 10	8.54
CD (0.05)				**1.05**
CV				**11.02**

Table 71: Influence of level of NPK on Seed yield in advance genotypes of Bakla (Rabi 2014-15).

Treatment	Seed Yield (q/ha)			
	2012-13	2013-14	2014-15	Mean
Fertilizer levels				
$N_0P_0K_0$	17.46	21.70	28.84	22.67
$N_{20}P_{20}K_{20}$	22.02	27.43	32.64	27.36
$N_{40}P_{40}K_{20}$	25.08	29.85	34.67	29.87
CD at 5 %	1.91	1.18	1.54	-
Genotypes				
Vikrant	18.46	23.65	29.06	23.72
HB-39	21.42	26.32	33.11	26.95
HB 40	24.13	28.99	35.80	29.64
HB 504	20.89	25.91	30.75	25.85
HB 516	22.71	26.77	31.52	27.00
CD at 5 %	**1.68**	**2.36**	**2.00**	**-**

Table 72: Performance of faba bean genotypes under different agronomic Practices.

	Treatments	Days to maturity	Pods/plant	100 seed weight	Seed yield (q/ha)
I. Effect of different row spacing					
A	**Genotypes**				
	HB-082	154.80	87.00	28.90	45.73
	HB-182	164.40	69.70	28.60	42.94
	HB-185	164.90	70.30	28.60	42.27
	HB-188	167.30	67.10	29.00	41.40
	Vikrant	172.20	60.10	25.10	36.46
	CD (0.05)	**3.80**	**4.40**	**0.50**	**1.15**
B	**Spacing**				
	20 x 10	163.30	64.50	27.60	40.88
	30 x 10	164.90	72.00	28.20	42.79
	40 x 10	166.10	76.00	28.40	41.61
	CD (0.05)	**N.S.**	**2.60**	**0.50**	**0.74**
II Effect of different dates of sowing					
A	**Time of sowing**				
	1-Oct	162.80	68.60	28.00	41.37
	15-Oct	166.90	74.00	28.30	43.45
	1-Nov.	157.60	62.80	27.40	38.58
	15-Nov.	145.80	51.20	26.00	21.52
	CD (0.05)	**2.70**	**2.30**	**0.40**	**1.48**
B	**Genotypes**				
	HB-082	149.90	77.30	28.80	40.05
	HB-182	157.30	65.00	28.30	37.62

	Treatments	Days to maturity	Pods/plant	100 seed weight	Seed yield (q/ha)
	HB-185	157.20	67.60	27.70	37.37
	HB-188	164.00	62.80	27.90	34.21
	Vikrant	163.00	48.10	24.40	31.90
	CD (0.05)	**5.00**	**3.90**	**0.50**	**1.83**
III Influence of seed rate					
A	**Seed rate (kg/ha)**				
	75	162.90	72.30	28.00	37.99
	100	165.50	71.40	27.70	43.49
	125	162.80	67.20	26.30	40.10
	CD (0.05)	**2.30**	**1.90**	**0.80**	**1.13**
B	**Genotypes**				
	HB-082	152.70	80.00	28.30	44.11
	HB-182	163.00	73.70	28.10	41.37
	HB-185	167.90	71.80	27.60	41.90
	HB-188	164.20	73.00	27.40	40.27
	Vikrant	170.90	53.10	25.20	34.99
	CD (0.05)	**3.70**	**5.20**	**1.00**	**1.83**
IV Influence of Irrigation management					
A	**Irrigation No.**				
	I_0	143.67	26.07	25.54	18.09
	I_1	154.20	48.07	26.53	30.90
	I_2	160.93	63.20	27.62	38.79
	I_3	166.73	72.40	28.17	42.40
	CD (0.05)	**1.54**	**2.16**	**0.15**	**1.12**
B	**Genotypes**				
	CD (0.05)	**3.88**	**3.08**	**0.20**	**1.60**
	HB-082	149.75	63.58	27.89	35.85
	HB-182	155.92	50.08	26.90	31.73
	HB-185	158.33	54.67	27.08	34.07
	HB-188	158.33	50.50	28.48	33.68
	Vikrant	159.58	43.33	24.48	27.39
V Effect of Phosphorous levels					
A	**Phosphorous levels (kg/ha)**				
	P_0	156.30	52.20	27.10	33.41
	P_{20}	162.00	63.90	27.90	39.30
	P_{40}	167.20	70.90	28.40	42.71
	P_{60}	168.10	69.70	27.90	41.31
	CD (0.05)	**2.80**	**2.70**	**0.50**	**1.78**
B	**Genotypes**				
	HB-082	157.50	78.90	28.90	43.18

	Treatments	Days to maturity	Pods/plant	100 seed weight	Seed yield (q/ha)
	HB-182	160.40	62.80	28.10	37.66
	HB-185	164.90	66.30	28.00	39.80
	HB-188	165.10	65.20	29.10	39.46
	Vikrant	169.00	47.80	25.00	35.82
	CD (0.05)	**3.90**	**3.40**	**0.70**	**2.65**
	VI Influence of N levels				
A	**Fertilizer levels(kg/ha)**				
	N_0	153.00	46.10	26.60	33.60
	N_{20}	165.00	62.90	28.00	40.55
	N_{40}	168.00	65.20	28.40	42.49
	CD at 5 %	**2.40**	**3.10**	**0.67**	**2.15**
B	**Genotypes**				
	HB-082	157.00	64.10	29.10	44.33
	HB-182	156.00	54.80	27.70	36.00
	HB-185	162.00	61.20	28.30	39.53
	HB-188	164.00	60.00	28.20	39.58
	Vikrant	171.00	50.20	25.20	34.94
	CD at 5 %	**3.40**	**6.10**	**0.63**	**1.60**

4.2 CROP PROTECTION

In crop protection, two experiments, *viz*., screening of germplasm against major insect pests and diseases and Integrated pest management (IPM) in potential crops were formulated to be conducted at 4 locations in 7 trials during *Rabi* 2014-15 on two crops such as grain amaranth and faba bean. Out of these, results of two experiments were received from 3 locations for 6 trials. Centre wise details of crop protection experiments allotted/conducted on different potential crops during *Rabi* 2014-15 was given in table 73. The results are as follows:

4.2.1 Screening of Germplasm against Major Insect Pests and Diseases

This experiment was planned in order to identify the sources of resistance in IVT, AVT entries and germplasm against major insect pests and diseases on grain amaranth and faba bean at different locations. The results on two crops (grain amaranth and faba bean) of IVT, AVT entries and germplasm at Bhubaneshwar, Hissar and S.K. Nagar had been received. The details of results have been given below:

4.2.1.1 Grain amaranth

Insect pests

During *Rabi* 2014-15, at S.K. Nagar, there was no incidence of any insect pests on grain amaranth during crop growth period.

At Bubhaneswar, 16 entries of IVT along with 4 checks of grain amaranth were screened against defoliators. The % defoliation was less than 10% in all the entries and it ranged from 1.10 to 8.33%. Similarly, 9 entries of AVT-I along with 4 checks of grain amaranth were screened against defoliators. The % defoliation was less than 8% in all the entries and it ranged from 3 to 7%.

Diseases

During *Rabi* 2014-15, at S.K. Nagar, there was no incidence of any diseases on grain amaranth during crop growth period.

At Bhubaneswar, 16 entries of IVT along with 4 checks of grain amaranth were screened against diseases. The per cent disease incidence (PDI) ranged from 3.7 to 27.8. Only one entry, SKGPA 68 (PDI of 3.7%) was found promising as PDI was < 5%. Similarly, 9 entries of AVT-I along with 4 checks of grain amaranth were screened against diseases. None of the entries is free from disease, and the per cent disease incidence (PDI) ranged from 10 to 23.3%.

4.2.1.2 Faba bean

Insect pests

At Hisar, during *Rabi* 2014-15, a total of 22 entries of IVT, 12 entries of AVT-I and 12 entries of AVT-II of faba bean were screened against semilooper (*Thysanoplusia orichalcea*) and aphid (*Aphis craccivora*), and it was observed that the incidence of these insect pests was very low.

Diseases

At Hisar, during *Rabi* 2014-15, a total of 22 entries of IVT, 12 entries of AVT-I and 12 entries of AVT-II of faba bean were screened against diseases**,** (Chocolate disease and collar rot disease etc.). Not even a single plant was found infected by these diseases in the trials.

4.2.2 Integrated Pest Management (IPM) in Potential Crops

This experiment was planned on grain amaranth, at Bhubaneswar to manage insect pests and diseases causing economic damage. The details of results have been given below:

Insect pests

At Bhubaneswar there was low incidence of sucking pests (aphids and jassids) on grain amaranth during *Rabi* 2014-15. Results of Integrated pest management (IPM) for the management of sucking pests of grain amaranth, indicated that out of the 7 treatments, maximum yield of 1,588.74 kg/ha was obtained acetamiprid @ 0.5 ml/lit in followed by azardiractin 1500 ppm @ 1.0 ml/lit (1551.68 kg/ha), thiamethoxam @ 0.05 ml/lit (1536.24 kg/ha) and neem oil @ 2.0 ml/lit (1534.88 kg/ha) compared to control (1343.89 kg/ha).

In case of defoliators, all the treatments showed minimum incidence of damage by defoliators. The per cent damage of leaves was minimum in case of spinosad @ 0.5 ml/lit followed by emamectin benzoate @ 0.5 ml/lit and profenophos @ 0.5 ml/lit. Maximum yield of 1530.74 kg/ha was obtained in emamectin benzoate @ 0.5 ml/lit, followed by spinosad @ 0.5 ml/lit (1521.80 kg/ha) and profenophos @ 0.5 ml/lit (1449.64 Kg/ha) compared to the yield of control (1087.16 kg/ha).

Diseases

At Bhubaneswar, the results revealed that no wilting and disease was observed in plants on its 1st date of observation (27 days after sowing). Subsequently, very less incidence of disease/wilting of plants were observed in the field. Treatments such as propiconazole @ 1 ml/lit, carbendazim @ 2 g/lit and *Tricoderma harzianum* @ 4 kg/ha were found effective as compared to other treatments in control of wilting.

All the treatments produced significantly higher yields as compared to the control in grain amaranth except the propiconazole @ 1 ml/lit and carbendazim @ 2 g/lit and found statistically at par with each other. Among all the treatments *Tricoderma viridae* @ 5 kg/ha produced highest yield (1459.75 Kg/ha) followed by Tebuconazole @ 1 ml/lit (1428.22 kg/ha) which are highly significant over the control (1173.40 kg/ha).

Table 73: Crop Protection Trials allotted/conducted during *Rabi* 2014-15 at different centres.

S. No.	Experiments		Bhubaneswar	Hisar	S.K. Nagar	Ranichauri	Total
1	Screening of germplasm against major insect pests and diseases	Grain Amaranth	1		**1**		**2**
		Faba bean		**1**			**1**
2	Integrated pest management in potential crops	Grain Amaranth	**1**		**1**		**2**
		Faba bean		**1**		**1(0)**	**2**
	Total		**2**	**2**	**2**	**1**	**7(6)**

QUALITY ANALYSIS

V. QUALITY ANALYSIS

The seed of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the two potential crops, namely, grain amaranth and faba bean were planned for quality analysis at CCSHAU, Hisar. Seed was supplied by S.K. Nagar and Hisar centres for quality analysis. The crop-wise details of quality traits are given below:

5.1 GRAIN AMARANTH

5.1.1 IVT, AVT-I and AVT-II Rabi 2014-15: Plain

A combined quality trial of IVT (16 entries), AVT-I (11 entries) and AVT-II (9 entries) Rabi 2014-15 with four checks were analysed at Hisar centre. The summary performance of various entries in respect of different quality parameters as compared to check varieties has been given in Table 74.

The entry SKGPA-91 had highest protein content (13.20%) followed by entry RMA-7 (12.90%). The check genotype Suvarna had highest oil content (8.70%). The entry RGA-9 had highest Zn content (3.00 mg/100g). No entry was superior to check variety Suvarna (30.10 mg/100g) in Fe content based on the overall performance. The entry BGA-2 had the highest Cu content (0.39 mg/100g) and the highest Mn content (1.50 mg/100g) (Table 75).

5.2 FABA BEAN

5.2.1 IVT, AVT-I, AVT-II and Germplasm Rabi 2014-15: Plain

In this trial, IVT (18 entries), AVT-I (13 entries), AVT-II (8 entries) and germplasm rabi 2014-15 (50 entries) along with one check was analysed at Hisar centre. Seed was supplied by CCS HAU, Hisar centre. The summary performance of various entries in respect of different quality parameters as compared to check varieties has been given in Table 76.

The germplasm line EC243784 had highest protein content (27.17%) followed by entry EC328923 (27.00%). The entries HB-059 and HB-41 had lowest Vicine-convicine content (0.70%). The entry HB-059 (0.22%) was superior to check variety Vikrant (0.24%) in Phenol content (Table 77).

Table 74: Promising genotypes in Grain Amaranth Rabi 2014-15 (Plain).

S. No.	Characters	Promising line	Value of best check
A. Coordinated Trials of Grain Amaranth at S.K. Nagar Rabi 2014-15: Hill			
1	Protein (%) (Range 10.20-13.80)		
	IVT	SKGPA-91 (13.20)	RMA-7 (12.90)
	AVT-I	MGA-15 (13.50)	
	AVT-II		
2	Oil (%)(Range 5.50-8.70)		
	IVT		Suvarna (8.70)
	AVT-I		
	AVT-II		
3	Mn (mg/100g) (Range 0.70-1.70)		
	IVT	RMA-59 (1.50)	BGA-2 (1.40)
	AVT-I	KBGA-3 (1.70)	
	AVT-II		
4	Cu (mg/100g) (Range 0.15-0.39)		
	IVT		BGA-2 (0.39)
	AVT-I		
	AVT-II		
5	Fe (mg/100g) (Range 12.40-30.10)		
	IVT		Suvarna (30.10)
	AVT-I		
	AVT-II		
6	Zn (mg/100g) (Range 1.70-3.50)		
	IVT	SKGPA-91 (2.90)	GA-2 (2.90)
	AVT-I	RGA-9 (3.00), SKNA-908 (2.90)	
	AVT-II		

Table 75: IVT, AVT and AVT-II of Grain Amaranth Rabi 2014-150 (Plain).

S. No.	Genotypes	Protein (%)	Oil (%)	Fe (mg/100g)	Zn (mg/100g)	Cu (mg/100g)	Mn (mg/100g)
	IVT						
1	BGA-4-9	11.70	6.20	14.50	2.70	0.16	1.20
2	BGA-8-5	12.10	6.80	16.20	2.30	0.18	1.00
3	KBGA-5	12.70	5.50	21.30	2.80	0.21	1.10
4	RGA-10	13.80	8.40	18.40	1.90	0.18	0.80
5	RGA-11	12.10	6.10	17.80	1.70	0.16	0.70
6	RGA-12	11.60	5.80	16.50	1.80	0.18	0.90
7	RMA-57	12.10	8.70	22.40	2.30	0.22	1.20
8	RMA-58	12.80	8.20	25.50	2.50	0.23	1.30
9	RMA-59	12.30	7.80	19.40	2.60	0.25	1.50
10	SKGPA-68	12.70	7.80	18.70	2.50	0.21	1.20
11	SKGPA-72	12.30	6.90	16.20	2.10	0.18	0.80
12	SKGPA-74	12.10	8.20	21.40	2.60	0.16	0.90
13	SKGPA-86	12.80	6.80	20.20	2.70	0.21	1.10
14	SKGPA-91	13.20	7.10	19.10	2.90	0.22	1.10
15	SKNA-1003	12.80	6.80	13.30	2.70	0.19	1.70
16	SKNA-1008	12.40	7.70	16.50	3.50	0.25	1.40
	AVI-I						
1	Ambika GA-12-1	11.70	6.50	13.80	1.90	0.25	0.90
2	Ambika GA-12-2	11.80	5.70	14.30	2.80	0.31	1.10
3	BGA-10-2	11.80	6.70	14.60	1.80	0.21	1.20
4	BGA-7-1	10.20	6.80	12.40	2.40	0.19	1.20
5	KBGA-3	12.20	6.80	20.40	2.80	0.22	1.70
6	KBGA-4	12.80	7.20	22.30	2.70	0.26	1.10
7	MGA-15	13.50	6.40	15.60	2.70	0.34	1.00
8	RGA-9	12.60	7.60	21.70	3.00	0.25	0.90
9	SKNA-401	12.30	7.80	16.90	2.50	0.27	1.20
10	SKNA-403	12.50	8.20	16.70	2.10	0.18	0.80
11	SKNA-908	12.40	8.10	27.20	2.90	0.23	1.30
	AVI-II						
1	BGA-04	11.80	6.50	18.30	1.90	0.28	0.90
2	BGA-11	12.50	7.80	20.50	2.10	0.26	0.80
3	BGA-12	11.50	7.20	22.40	2.40	0.23	0.90
4	BGA-21	10.30	6.30	21.50	1.80	0.31	1.20
5	BGA-38	11.20	7.50	17.40	2.40	0.18	1.20
6	BGA-43	12.60	6.80	16.10	2.70	0.15	0.80
7	IC-35615	11.30	7.30	22.70	2.10	0.21	1.30
8	KBGA-1	11.60	5.80	23.40	2.80	0.22	1.10
9	RMA-45	11.00	8.40	18.40	2.40	0.27	1.30
	Checks						
1	BGA-2 (C)	12.70	8.40	21.40	2.40	**0.39**	**1.40**
2	GA-2 (C)	11.50	8.50	15.80	**2.90**	0.30	1.30
3	RMA-7 (C)	**12.90**	7.80	23.30	2.10	0.31	1.10
4	Suvarna (C)	12.20	**8.70**	**30.10**	2.50	0.26	1.10
	Minimum	**10.20**	**5.50**	**12.40**	**1.70**	**0.15**	**0.70**
	Maximum	**13.80**	**8.70**	**30.10**	**3.50**	**0.39**	**1.70**
	Mean	**12.16**	**7.24**	**19.12**	**2.44**	**0.23**	**1.12**

Table 76: Promising genotypes in Faba bean Rabi 2014-15.

S. No.	Characters	Promising lines	Value of best check
A. Coordinated Trials of Faba bean at Hisar Rabi 2014-15			
1	**Protein % (Range 23.80-27.17)**		**Vikrant (25.1)**
	IVT	HB-9-06 (26.7), HB-9-15 (26.47), HB-27 (26.43), NDFB-14 (26.4), HB-9-08 (26.2)	
	AVT-I	HB-193 (25.93), DFB 13-2 (25.6), HB-212 (25.3), N, DF-12 (25.27)	
	AVT-II	HB-185 (26.07), HB-184 (25.3), DFB-10-2 (25.27), DFB-10-1 (25.23)	
	Germplasm	EC243784 (27.17), EC328923 (27), HB-045 (27), EC243608 (26.77), EC329627 (26.77), HB-005 (26.73)	
2	**Vicine-Convicine (Range 0.73-0.99)**		**Vikrant (0.8)**
	IVT	HB-41 (0.73), NDFB-13 (0.73), RMD FB-1 (0.73), HB-37 (0.74), RFB-13 (0.74)	
	AVT-I	DFB 13-1 (0.75), DFB 13-2 (0.75), HB-8-15 (0.75), HB-8-03 (0.76)	
	AVT-II	HB-186 (0.77), HB-182 (0.78), DFB-10-3 (0.79)	
	Germplasm	HB-059 (0.73), EC628937 (0.75), EC628948 (0.76), HB-039 (0.76), HB-175 (0.76)	
3	**Phenol % (Range 0.22-0.27)**		**Vikrant (0.24)**
	IVT	HB-41 (0.23), RFB-13 (0.23)	
	AVT-I	DFB 13-1 (0.23), HB-8-03 (0.23)	
	AVT-II	HB-186 (0.23)	
	Germplasm	HB-059 (0.22), EC691863 (0.23), HB-017 (0.23), HB-020 (0.23), HB-056 (0.23)	

Table 77: IVT, AVT I, AVT II and germplasm of Faba bean Rabi 2014-15: Plain.

S. No.	Genotypes	Protein (%)	Vicine-Convicine (%)	Phenol (%)
	IVT			
1	DFB-14-1	26.00	0.92	0.26
2	HB-27	26.43	0.98	0.26
3	HB-34	24.57	0.77	0.24
4	HB-37	24.87	0.74	0.24
5	HB-41	23.97	0.73	0.23
6	HB-45	25.30	0.81	0.25
7	HB-9-01	25.70	0.84	0.25
8	HB-9-06	26.70	0.98	0.26
9	HB-9-08	26.20	0.94	0.26
10	HB-9-15	26.47	0.89	0.27
11	HB-9-16	26.10	0.81	0.25
12	NDFB-13	24.90	0.73	0.24
13	NDFB-14	26.40	0.92	0.26
14	RFB-11	25.53	0.80	0.24
15	RFB-12	24.90	0.78	0.24
16	RFB-13	25.27	0.74	0.23
17	RMD FB-1	24.67	0.73	0.24
18	RMD FB-2	25.40	0.85	0.26
	AVT-I			
1	DFB 13-1	23.87	0.75	0.23
2	DFB 13-2	25.60	0.75	0.24
3	HB-193	25.93	0.83	0.24
4	HB-194	24.57	0.86	0.24
5	HB-212	25.30	0.84	0.25
6	HB-214	25.10	0.88	0.24
7	HB-8-03	24.87	0.76	0.23
8	HB-8-11	23.87	0.78	0.24
9	HB-8-12	24.93	0.79	0.25
10	HB-8-15	24.47	0.75	0.24
11	NDF-12	25.27	0.90	0.26
12	RFB-6	24.10	0.78	0.24
13	RFB-7	24.50	0.84	0.25
	AVT-II			
1	DFB-10-1	25.23	0.86	0.27
2	DFB-10-2	25.27	0.83	0.24
3	DFB-10-3	24.77	0.79	0.26
4	HB-182	24.50	0.78	0.25
5	HB-184	25.30	0.81	0.25
6	HB-185	26.07	0.82	0.25
7	HB-186	24.60	0.77	0.23
8	HB-188	25.10	0.80	0.25
	Germplasm			
1	EC003293	26.43	0.96	0.27
2	EC029085	24.90	0.86	0.25
3	EC107842	26.40	0.91	0.27
4	EC108908	26.07	0.92	0.26
5	EC243608	26.77	0.92	0.27
6	EC243709	25.07	0.85	0.25
7	EC243784	27.17	0.98	0.27
8	EC243860	25.03	0.89	0.26

S. No.	Genotypes	Protein (%)	Vicine-Convicine (%)	Phenol (%)
9	EC267675	24.63	0.85	0.25
10	EC328923	27.00	0.99	0.27
11	EC329627	26.77	0.96	0.26
12	EC329679	25.63	0.85	0.25
13	EC329693	25.10	0.89	0.25
14	EC329696	26.23	0.88	0.26
15	EC329728	24.73	0.81	0.24
16	EC331564	24.93	0.83	0.25
17	EC361494	26.37	0.89	0.26
18	EC591792	25.67	0.84	0.25
19	EC628923	25.47	0.83	0.24
20	EC628937	25.27	0.75	0.24
21	EC628948	24.73	0.76	0.24
22	EC691863	26.20	0.78	0.23
23	HB-001	26.40	0.81	0.24
24	HB-005	26.73	0.89	0.25
25	HB-007	24.77	0.78	0.24
26	HB-012	25.70	0.80	0.24
27	HB-017	24.73	0.77	0.23
28	HB-020	24.17	0.77	0.23
29	HB-023	26.10	0.86	0.25
30	HB-025	26.10	0.82	0.24
31	HB-027	26.33	0.83	0.24
32	HB-030	26.70	0.91	0.26
33	HB-032	25.43	0.85	0.25
34	HB-034	25.73	0.83	0.25
35	HB-037	24.43	0.85	0.24
36	HB-039	24.67	0.76	0.25
37	HB-041	25.60	0.80	0.26
38	HB-045	27.00	0.90	0.27
39	HB-047	25.30	0.81	0.25
40	HB-049	26.13	0.82	0.26
41	HB-051	25.77	0.90	0.26
42	HB-056	24.67	0.78	0.23
43	HB-059	23.80	0.73	0.22
44	HB-068	25.47	0.80	0.24
45	HB-083	26.10	0.88	0.25
46	HB-085	26.13	0.82	0.25
47	HB-175	25.10	0.76	0.24
48	HB-188	24.37	0.79	0.25
49	HB-608	25.93	0.87	0.25
50	RFB-4	25.43	0.78	0.24
	Check			
	Vikrant(C)	**25.10**	**0.80**	**0.24**
	Minimum	**23.80**	**0.73**	**0.22**
	Maximum	**27.17**	**0.99**	**0.27**
	Mean	**25.43**	**0.83**	**0.25**

CENTRE REPORT

VI. CENTRE REPORT

6.1 HILLS

6.1.1 HPKV, Palampur

Local collections: Five local germplasm lines/landraces of faba bean were collected from district Kangra and Una of Himachal Pradesh and evaluated under field conditions during the Rabi 2014-15.

Seed Multiplication: Seed of different varieties of faba bean was produced on the experimental farm of Department of Organic Agriculture, CSKHPKV, Palampur during the reporting period.

S. No.	Crop	Varieties	Quantity (Kg)
1	Faba bean	HPFB-1	8
2	Faba bean	Vikrant	6
3	Faba bean	HPFB-2	5
	Total		**19**

Field Level Demonstrations: Ten farmers field level demonstrations were conducted on faba bean in different parts of Himachal Pradesh. 18.50 kg seed of the faba bean of different varieties of HPFB-1, HPFB-2 and Vikrant were distributed among the farmers.

6.2 PLAINS

6.2.1 NDUAT, Faizabad

Hybridization programme of Faba bean: Twenty eight crosses (line x tester) were made during Rabi season 2014-15. F_1 crosses will be grown in Rabi 2015-16. **Line –** HB-182, HB-184, DFB-10-2; **Tester –** EC5873, EC329706, EC248940, EC243529, EC321605, EC263820EC117705, EC267914, EC374731, EC243845, EC321605, EC263620, IC301470, EC25085, EC243845, EC327724, EC187908 and IC561414.

Front Line Demonstrations on Faba bean: Various field level demonstrations were conducted at 7 farmers field on Faba bean in different villages of Faizabad. 209 q/ha seed yield are produced during the FLD in 3100 m^2 area.

6.2.2 OUAT, Bhubaneswar

Front Line Demonstrations on Grain amaranth: Various field level demonstrations were conducted at 10 farmers field in three villages on grain amaranth in different villages of Orissa under 2.00 ha. Grain amaranth var. Kapilasa (BGA-2) was sown during Rabi, 2014-15 season and farmers were advised on improved package of practices of grain amaranth in Dhenkanal Sadar block of Dhenkanal district. Maximum grain amaranth yield of 1166 kg/ha was recorded from the plot of Sri Brajabandhu Raut of Dengabarei village with a B:C ratio of 1.55 closely followed by a yield of 1154 kg/ha recorded from the field of Sri Duryodhana Prustyof Badagila village with a B:C ratio of 1.53 of the same block (Table 78).

Table 78: Grain yield of amaranth grown in farmer's field during Rabi, 2014-15.

S. No.	Name and address of the farmer	Grain amaranth	
		Yield (kg/ha)	B:C ratio
1.	Sri Brajabandhu Raut, Vill-Dengabarei, Dist.Dhenkanal	1166.0	1.55
2	Sri Seshadev Raut, Vill-Dengabarei, Dist.Dhenkanal	1078.0	1,43
3	Sri Maheswar Raut, Vill-Dengabarei, Dist.Dhenkanal	982.0	1.30
4	Sri Bhimsen Prusty, Vill-Badagila, Dist.Dhenkanal	1089.0	1.45
5	Sri Duryodhan Prusty, Vill-Badagila, Dist.Dhenkanal	1154.0	1.53
6	Sri Rabi Narayan Pradhan, Vill-Tarabha, Dist.Dhenkanal	1021.0	1.36
7	Sri Bipin Swain, Vill-Tarabha, Dist.Dhenkanal	1055.0	1.40
8	Sri Dilip Kumar Raut, Vill-Dengabarei, Dist.Dhenkanal	1087.0	1.44
9	Sri Santosh Raut, Vill-Dengabarei, Dist.Dhenkanal	1106.0	1.47
10	Sri Rasmi Ranjan Raut, Vill-Dengabarei, Dist.Dhenkanal	921.0	1.22

Price of Grain amaranth @ Rs.20.00/kg

Station Breeding Trial: In station trial 23 genotypes including four checks of grain amaranth were evaluated (Table 79).

Table 79: Station varietal trial in grain amaranth at Bhubaneswar.

S. No.	Genotype	Grain Yield (q/ha)	Days to 50% flowering	Days to maturity	Plant height (cm)	Seed volume (g/10 ml)	Inflorescence length (cm)
1	BGA 3	12.91	51.67	101.33	84.73	7.89	43.53
2	BGA 4	12.22	54.33	104.33	87.20	7.80	39.87
3	BGA 5	13.97	51.67	101.67	91.60	7.73	44.27
4	BGA 7	19.25	51.33	99.67	87.47	7.78	48.73
5	BGA 7-1 (E)	15.36	52.67	102.67	99.27	7.88	48.80
6	BGA 7-2 (L)	8.41	55.00	104.33	103.33	7.84	42.07
7	BGA 9	14.40	47.00	97.67	89.40	7.85	45.73
8	BGA 10	18.28	47.67	97.67	80.13	7.78	46.67
9	BGA 10-1	20.36	47.33	98.00	81.67	7.88	46.47
10	BGA 10-2	16.06	49.33	99.00	77.20	7.76	42.73
11	BGA 11	17.30	46.00	96.00	81.60	7.79	46.00
12	BGA 12	8.96	53.67	103.67	75.67	7.73	45.40
13	BGA 14	11.61	51.33	102.33	93.73	7.81	47.27
14	BGA 15	13.12	48.67	98.33	90.80	7.80	46.73
15	BGA 16	10.15	48.67	98.33	85.93	7.83	44.07
16	BGA 20	12.21	53.33	103.33	93.53	7.85	41.73
17	BGA 21	15.10	52.33	104.33	94.00	7.81	42.27
18	BGA 26	13.58	54.00	104.00	101.20	7.75	42.47
19	BGA 29	13.81	54.67	104.33	99.47	7.84	41.27
20	BGA 46	10.49	50.67	103.00	89.27	7.78	47.67
22	**BGA 2(C)**	14.01	56.67	107.33	97.33	7.91	37.93
21	**GA 2 (C)**	16.71	57.00	105.67	109.40	7.91	43.07
23	**Suvarna (C)**	14.98	59.33	109.00	101.73	7.82	38.07
	Mean	**14.05**	**51.93**	**102.00**	**91.12**	**7.82**	**44.03**
	CD (5%)	**3.37**	**3.31**	**2.74**	**15.96**	**0.15**	**6.23**
	CV (%) Error	**14.57**	**3.87**	**1.63**	**10.64**	**1.14**	**8.60**

Station Germplasm Evaluation: A total of 50 accessions and four checks were also evaluated at OUA&T, Bhubaneswar for six quantitative characters (Table 80). Accessions BGA-12 (45.00 days) were earliest in flowering while BGA-12 was early in maturity (95.00 days). The entry BGA-4-1 (17.20 q/ha) had the highest grain yield. The highest plant height was observed in BGA-23 (127.20

cm). The highest seed volume weight was observed in accession BGA-4-1 (8.02 g) (Table 81).

Table 80: Promising lines in grain amaranth for various characters at Bhubaneswar.

S. No.	Characer	Range		Promising genotype	Best Check Value
		Min	Max		
1	Grain yield (q/ha)	6.07	17.20	BGA-4-1(E) (> 16.64)	Suvarna (16.64)
2	Days to 50% flowering	45.00	61.00	BGA-12 (< 47.00)	GA 2 (52.00)
3	Days to maturity	95.00	109.00	BGA-12 (< 97.00)	GA 2 (102.00)
4	Plant height (cm)	69.80	127.20	BGA-23BGA-26BGA-14 (> 118.60)	Suvarna (112.20)
5	Seed volume (g/10 ml)	7.68	8.02	BGA-4-1(E)BGA-8BGA-23 (> 8.01)	BGA 2 (7.95)
6	Inflorescence length (cm)	29.20	55.80	BGA-7BGA-42BGA-25BGA-3 (> 50.00)	BGA 2 (44.00)

Table 81: Evaluation of germplasm lines in grain amaranth at Bhubanswar during Rabi 2014-15.

S. No.	Genotype	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Seed volume (g/10 ml)
1	BGA-1	47.00	97.00	87.80	43.40	13.44	7.73
2	BGA-2	57.00	107.00	105.40	36.80	15.96	7.90
3	BGA-3	55.00	105.00	104.20	51.40	9.42	7.89
4	BGA-4	59.00	109.00	105.80	48.20	11.16	7.84
5	BGA-4-1(E)	57.00	107.00	94.80	48.60	17.20	8.02
6	BGA-4-2(L)	52.00	102.00	96.00	38.40	13.72	7.78
7	BGA-5	59.00	109.00	116.40	44.00	15.94	7.71
8	BGA-5-1(Bro)	55.00	105.00	106.60	38.60	10.52	7.72
9	BGA-6	47.00	97.00	93.80	38.00	14.84	7.71
10	BGA-7	49.00	99.00	111.00	55.80	10.02	7.68
11	BGA-7-1(E)	52.00	102.00	115.50	50.00	7.51	8.01
12	BGA-7-2(L)	52.00	102.00	98.60	49.20	8.92	7.73
13	BGA-8	55.00	105.00	85.60	36.80	12.86	8.02
14	BGA-9	49.00	99.00	97.20	36.40	12.02	7.76
15	BGA-10	52.00	102.00	91.80	39.40	8.71	7.68

S. No.	Genotype	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Seed volume (g/10 ml)
16	BGA-10-1(E)	49.00	99.00	82.40	46.20	8.42	7.84
17	BGA-10-2(L)	49.00	99.00	84.00	43.80	9.69	7.96
18	BGA-11	52.00	102.00	95.80	34.40	8.91	7.84
19	BGA-12	45.00	95.00	89.00	30.60	8.32	7.77
20	BGA-13	59.00	109.00	74.80	31.40	8.94	7.91
21	BGA-14	57.00	107.00	120.80	39.80	6.89	7.86
22	BGA-16	57.00	107.00	95.00	38.80	6.65	7.89
23	BGA-17	57.00	107.00	91.00	32.00	6.07	7.68
24	BGA-19	52.00	102.00	96.60	36.40	7.80	7.84
25	BGA-20	52.00	102.00	79.40	29.20	7.78	7.93
26	BGA-21	49.00	99.00	116.00	41.20	7.51	7.94
27	BGA-22	59.00	109.00	97.00	44.00	8.10	7.81
28	BGA-23	49.00	99.00	127.20	48.00	14.46	8.02
29	BGA-24	55.00	105.00	115.60	48.60	10.28	7.98
30	BGA-25	52.00	102.00	118.60	52.60	15.68	7.83
31	BGA-26	49.00	99.00	126.40	43.20	15.91	7.93
32	BGA-27	49.00	99.00	84.60	37.20	12.20	7.94
33	BGA-28	61.00	107.00	104.00	43.20	11.18	7.96
34	BGA-29	52.00	102.00	110.60	41.80	16.55	7.88
35	BGA-29-1(E)	61.00	107.00	81.00	33.80	14.52	7.81
36	BGA-29- 2(L)	59.00	109.00	74.80	36.00	14.65	7.84
37	BGA-30	61.00	109.00	89.20	40.00	12.08	7.93
38	BGA-31	59.00	109.00	99.40	39.00	10.17	7.78
39	BGA-32	59.00	109.00	85.20	41.80	10.99	7.95
40	BGA-33	59.00	109.00	83.20	36.60	11.58	7.98
41	BGA-34	57.00	107.00	82.40	43.60	9.23	7.78
42	BGA-35	55.00	105.00	88.20	41.80	9.43	7.83
43	BGA-38	61.00	108.00	101.40	48.80	7.97	7.94
44	BGA-39	59.00	109.00	82.00	43.60	8.49	7.79
45	BGA-40	59.00	109.00	88.60	44.80	9.70	7.93
46	BGA-41	61.00	109.00	96.00	39.00	7.78	7.75
47	BGA-42	61.00	108.00	111.60	54.00	6.27	7.87
48	BGA-43	61.00	109.00	69.80	37.20	11.59	7.84
49	BGA-44	52.00	102.00	86.40	41.80	12.61	8.01

S. No.	Genotype	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Seed volume (g/10 ml)
50	BGA-45	57.00	107.00	108.40	46.20	12.71	7.96
	Checks						
	BGA 2 (C)	57.00	107.00	108.07	44.00	11.19	7.95
	GA 2 (C)	52.00	102.00	104.00	41.53	10.65	7.75
	RMA 7 (C)	57.00	107.00	103.13	41.13	11.16	7.82
	Suvarna (C)	57.67	107.67	112.20	40.80	16.64	7.73
	Minimum	**45.00**	**95.00**	**69.80**	**29.20**	**6.07**	**7.68**
	Maximum	**61.00**	**109.00**	**127.20**	**55.80**	**17.20**	**8.02**
	Mean	**54.92**	**104.55**	**97.67**	**41.72**	**10.98**	**7.86**
	CD (0.05)	**9.11**	**9.11**	**39.80**	**21.17**	**8.43**	**0.21**
	CV (%) Error	**5.52**	**2.90**	**13.43**	**17.15**	**25.19**	**0.90**

6.2.3 CCS HAU, Hisar

Hybribridation programme of Faba bean: Eighty one (81) fresh crosses were attempted during Rabi 2014-15. The parents used were selected on the basis of higher seed yield, bold seededness, tolerant to insect-pests and diseases, seed and pod shattering at maturity etc.

Seed multiplication (2014-15)

The following seed multiplication of various genotypes were carried out to meet out the ongoing demands:

S. No.	Crop	Genotype	Seed quantities (Kg)
A	Bakla	Vikrant	200
		Various entries	100
	Total		**300**

Breeder Seed available (2014-15): 50 kg breeder seed of Vikrant variety of faba bean is available for breeding programme.

6.2.4 BAU, Ranchi

Hybribridation programme of Fababean: Nine fresh hybridizations have been attempted with an objective to get some more variability with respect to days to maturity and various yield attributing characters and tolerant to insect pest and

diseases, using the parents – RFB3, RFB4, RFB5, RFB 6, RFB 7, HB 20, EC 329674, EC 329728 and Vikrant. The parents used for hybridization program were selected on the basis of their earliness and high yield along with incidence of insect pest and diseases reaction. In F2 28 Plant were selected (12 Plants for yield, 8 plants for incidence of insect along with disease reaction and 8 plants for earliness). In F3 18 Plant were selected (8 Plants for yield, 4 plants for incidence of insect along with disease reaction and 6 plants for earliness).

Cross combinations	No. of crosses made	No. of pods obtained	Number of seeds
RFB3 x EC 329674	20	8	15
RFB4 x EC 329674	16	7	14
RFB5 x EC 329674	21	7	17
RFB6 x EC 329674	20	5	13
RFB7 x EC 329674	23	6	16
HB 20 x EC 329674	17	8	20
RFB7 x EC 329728	20	7	16
RFB4 x EC 329728	22	6	15
Vikrant x EC 329728	20	8	20

A. Seed Production Of Potential Crops:

Crops	Variety	Quantity produced (kg)	Remarks
Faba bean	Vikrant	30 kg	Seeds were used for demonstration, Tribal Sub Plan and multiplication
Grain Amaranth	GA 1 GA 2 GA 3 Suvarna RMA 7	1.0 kg 2.0 kg 2.0 Kg 2.5 kg 2.0 Kg	Seeds were used for demonstration, Tribal Sub Plan and multiplication

B. Tribal Sub Plan Training of Potential Crops:

Five training were conducted during financial year 2014-15 in Rabi. Two training was conducted in Ranchi and three at Zonal Research Stations of BAU (Darisai, Dumka and Medininagar) one at each all together 147 farmers of different districts Ranchi (68 farmers), Medininagar (62 farmers), Jamshedpur (20 farmers) and Dumka (29 farmers).

Adaptive trial on Chenopodium: A five accessions were also evaluated at BAU, Ranchi for four quantitative characters (Table 82). Accessions IC411824 (52.75 days) were earliest in flowering while IC411825 was early in maturity (99.75 days). The entry IC411825 (7.11 q/ha) had the highest grain yield. The highest seed volume weight was observed in accession IC411825 (7.45 g).

Table 82: Evaluation of germplasm lines in chenopodium at BAU Ranchi: Rabi 2014-15 (Plains).

S. No.	Accessions	Seed yield q/ha	Days to 50% flowering	Days to maturity	Seed volume (g/10 ml)
1	IC411825	7.11	54.50	99.75	7.45
2	IC411824	5.30	52.75	101.00	6.98
3	IC507741	6.23	62.75	104.00	7.23
4	IC507742	4.79	65.00	105.50	6.98
5	IC507738	6.80	60.50	105.00	7.43
	Minimum	**4.79**	**52.75**	**99.75**	**6.98**
	Maximum	**7.11**	**65.00**	**105.50**	**7.45**
	Mean	**6.05**	**59.10**	**103.05**	**7.21**
	CD (0.05)	**0.84**	**3.07**	**3.68**	**0.54**
	CV (%) Error	**9.04**	**3.37**	**2.32**	**4.87**

6.2.5 MPKV, Rahuri

Collection: Thirty accessions of grain amaranth were collected from the different part of Maharshtra and evaluated.

Breeder Seed available (2014-15): 25 kg breeder seed of grain amaranth variety Phule Kartiki is available for breeding programme.

Preliminary yield trial on grain amaranth: A 20 accessions including checks were also evaluated at MPKV, Rahuri for six quantitative characters (Table 83). The check variety RMA-7 (53.10 days) were earliest in flowering while RMA-7 was early in maturity (99.20 days). The entry IC035615 (8.52 q/ha) had the highest grain yield. The highest seed volume weight was observed in accession RGAG-12-1 (8.52 g).

Table 83: Preliminary yield trial of grain amaranth at Rahuri during *Rabi* 2014-15.

S. No	Genotypes	Grain yield (q/ha)	Days to 50 % Flowering	Days to Maturity	Plant height (cm)	Inflorescence length (cm)	Seed volume (g/10 ml)
1	RGAG-12-1	**5.42**	66.50	116.10	98.30	50.30	8.54
2	RGAG-12-12	3.45	61.80	111.80	84.90	42.30	7.67
3	RGAG-12-13	**5.38**	**67.60**	**118.40**	71.60	36.10	8.52
4	AGM-13-3	1.96	62.50	114.00	76.90	37.90	7.02
5	RGAG-12-17	4.34	65.30	116.70	82.30	39.80	7.40
6	RGAG-12-27	3.09	64.10	116.40	78.90	31.40	7.19
7	RGAG-12-28	**5.48**	65.90	118.40	**60.60**	**25.70**	8.28
8	RGAG-12-30	2.35	63.60	114.50	61.40	29.90	7.75
9	RGAG-12-33	2.42	59.50	110.00	62.30	29.30	7.18
10	RGAG-12-34	3.32	61.60	112.60	84.70	39.10	7.90
11	IC 035713	1.97	61.10	107.50	71.00	26.90	6.70
12	IC 095371	4.29	61.20	111.30	82.40	36.40	8.03
13	IC 032193	2.21	64.20	114.50	75.90	33.90	8.00
14	IC 035615	**8.52**	63.90	116.20	96.20	51.30	8.70
15	IC 095498	**5.41**	61.10	112.00	92.20	49.50	7.88
16	RGAG-12-25	2.42	58.80	109.20	90.60	48.10	7.38
17	RGAG-12-51	**5.21**	60.30	106.50	80.80	40.50	8.28
21	**BGA-2 (C)**	4.13	63.30	113.90	82.00	39.60	8.03
19	**GA-2 (C)**	**4.91**	63.40	112.80	**98.60**	**55.50**	7.96
22	**P. Kartiki (C)**	4.29	61.30	111.70	89.40	47.00	8.05
18	**RMA-7 (C)**	2.80	**53.10**	**99.20**	89.10	47.60	8.03
20	**Suvarna (C)**	4.88	59.10	109.00	72.20	34.70	8.22
	Minimum	**1.96**	**53.10**	**99.20**	**60.60**	**25.70**	**6.70**
	Maximum	**8.52**	**67.60**	**118.40**	**98.60**	**55.50**	**8.70**
	Mean	**4.01**	**62.24**	**112.40**	**81.01**	**39.67**	**7.85**
	CV (%) Pheno.	**40.02**	**5.03**	**3.94**	**13.97**	**21.34**	**6.63**

Station trial on grain amaranth: A 12 accessions including checks were also evaluated at MPKV, Rahuri for six quantitative characters (Table 84). The entry RGAG-12-26 (55.40 days) were earliest in flowering while RGAG-12-26 was early in maturity (101.60 days). The entry RGAG-12-22 (13.11 q/ha) had the highest grain yield. The highest seed volume weight was observed in accession RGAG-12-22 (8.40 g).

Table 84: Station Trial of grain amaranth at Rahuri (*Rabi* 2014-15).

S. No	Genotypes	Grain yield (q/ha)	Days to 50 % Flowering	Days to Maturity	Plant height (cm)	Inflorescence length (cm)	Seed volume (g/10 ml)
1	RGAG-12-8	8.23	62.20	108.60	103.00	54.40	8.26
2	RGAG-12-11	8.51	62.00	112.30	96.10	46.70	7.98
3	RGAG-12-14	8.52	60.00	106.70	99.40	54.60	8.18
4	RGAG-12-16	5.01	58.00	104.60	102.00	**43.80**	7.80
5	RGAG-12-22	**13.11**	60.30	108.60	115.80	53.30	8.40
6	RGAG-12-23	8.07	55.70	102.10	109.00	55.90	7.60
7	RGAG-12-24	7.58	58.30	106.80	**93.30**	49.40	7.72
8	RGAG-12-26	5.40	**55.40**	**101.60**	97.90	51.60	7.63
9	RGAS-08-14	10.64	**65.50**	**113.20**	99.80	47.40	8.28
10	RGAS-08-17	8.26	63.80	112.80	103.90	58.80	7.87
13	**GA-2 (C)**	**12.02**	62.60	110.40	119.90	58.00	7.93
11	**Phule Kartiki (c)**	9.86	61.80	112.50	**129.40**	**60.70**	8.10
12	**Suvarna (C)**	6.17	60.60	109.80	101.00	43.90	8.12

Paradise tree (*Simarouba glauca*) maintained: During the summer season 2014, 19 females and 17 males plants have been flowered on the basis of seed yield and the genotype PS-2003-7 (19.08 kg/tree) are recorded. Highest seed yield per plan and followed by PS-2003-8 (11.70 kg/tree). The details of promising genotypes were given in table 85. The morphological characters of males and females plants were mentioned in table 86a and 86b.

Table 85: Promising lines in paradise tree germplasm for various characters at Rahuri during summer 2014-15.

S. No.	Characters	Range		Promising lines
		Min.	Max.	
	Male Plants			
1	Flowering span (days)	36.00	46.00	PS-2003-9, PS-2003-40, PS-2003-6, PS-2003-18, PS-2003-22(<38.00)
2	Plant height (m)	5.40	7.90	PS-2003-6, PS-2003-10, PS-2003-24, PS-2003-37, PS-2003-58(> =7.50)
3	Primary Branches	2.00	4.00	PS-2003-10, PS-2003-12, PS-2003-22, PS-2003-37, PS-2003-2(> 3.00)
4	Trunk girth (cm)	54.50	110.20	PS-2003-32, PS-2003-36, PS-2003-10, PS-2003-24, PS-2003-37(> 89.40)

S. No.	Characters	Range		Promising lines
		Min.	Max.	
	Female Plant			
1	Plant height (m)	4.80	8.60	PS-2003-4, PS-2003-7, PS-2003-27, PS-2003-5(> 7.50)
2	Primary Branches	2.00	6.00	PS-2003-48, PS-2003-49, PS-2003-1(> 4.0)
3	Trunk girth (cm)	55.70	126.50	PS-2003-3, PS-2003-4, PS-2003-5, PS-2003-29(> 100.20)
4	Druplets/ tree	30.00	187.00	PS-2003-7, PS-2003-48, PS-2003-26, PS-2003-8(> 154.00)
5	Fruits/ drupelets	14.00	49.00	PS-2003-7, PS-2003-8(> 32.00)
6	100 Dry seed wt (g)	112.00	190.00	PS-2003-28, PS-2003-7, PS-2003-8, PS-2003-26(> 175.00)
7	Seed yield (kg/tree)	0.18	19.08	PS-2003-7, PS-2003-8, PS-2003-26, PS-2003-29(> 7.73)

Table 86a: Morphological characters of Male Paradise tree at Rahuri during Summer 2014-15.

S. No.	Genotype	Flowering initiation	Flowering span (days)	Plant height (m)	Primary Branches	Trunk girth (cm)
1	PS-2003-2	20-01-15	40.00	6.50	3.00	71.20
2	PS-2003-6	18-01-15	38.00	7.90	3.00	88.50
3	PS-2003-9	22-01-15	36.00	6.00	3.00	54.50
4	PS-2003-10	16-01-15	43.00	7.90	4.00	89.60
5	PS-2003-11	26-01-15	40.00	7.00	3.00	67.40
6	PS-2003-12	22-01-15	43.00	7.30	4.00	83.40
7	PS-2003-18	24-01-15	39.00	7.20	2.00	85.60
8	PS-2003-22	18-01-15	39.00	6.30	4.00	84.30
9	PS-2003-24	24-01-15	40.00	7.50	3.00	89.50
10	PS-2003-32	27-01-15	43.00	6.40	3.00	110.20
11	PS-2003-34	26-01-15	44.00	6.30	2.00	89.30
12	PS-2003-36	28-01-15	46.00	5.40	3.00	91.20
13	PS-2003-37	19-01-15	42.00	7.50	4.00	89.40
14	PS-2003-40	14-01-15	37.00	6.70	2.00	87.60
15	PS-2003-44	14-01-15	42.00	6.30	2.00	67.40
16	PS-2003-50	26-01-15	46.00	5.80	3.00	55.40
17	PS-2003-58	08-01-15	43.00	7.50	2.00	56.80
	Minimum		**36.00**	**5.40**	**2.00**	**54.50**
	Maximum		**46.00**	**7.90**	**4.00**	**110.20**
	Mean		**41.24**	**6.79**	**2.94**	**80.08**

Table 86b: Morphological characters of Female Paradise tree at Rahuri during Summer 2014-15.

S. No.	Genotype	Flowering initiation	Plant height (m)	Primary Branches	Trunk girth (cm)	Druplets/ tree	Fruits/ drupelets	100 Dry seed wt (g)	Date of maturity	Seed yield (kg/tree)
1	PS-2003-1	25-12-14	4.80	4.00	55.70	60.00	22.00	112.00	13-04-15	1.10
2	PS-2003-3	24-01-15	5.90	4.00	**126.50**	137.00	24.00	148.00	05-05-15	4.78
3	PS-2003-4	26-01-15	**8.60**	4.00	122.70	138.00	22.00	172.00	03-05-15	5.00
4	PS-2003-5	13-01-15	7.80	3.00	110.20	134.00	26.00	154.00	29-04-15	5.43
5	PS-2003-7	22-01-15	8.30	3.00	100.20	**187.00**	**49.00**	186.00	06-05-15	**19.08**
6	PS-2003-8	20-01-15	7.50	3.00	98.40	156.00	38.00	184.00	08-05-15	**11.70**
7	PS-2003-20	17-01-15	6.20	4.00	89.40	67.00	14.00	171.00	05-05-15	1.29
8	PS-2003-21	12-02-15	6.30	4.00	90.30	76.00	26.00	175.00	17-05-15	3.46
9	PS-2003-23	27-01-15	7.40	2.00	90.40	54.00	14.00	169.00	09-05-15	0.43
10	PS-2003-24	24-01-15	6.40	3.00	72.30	30.00	16.00	164.00	14-05-15	0.18
11	PS-2003-26	22-01-15	6.30	3.00	78.20	163.00	32.00	178.00	09-50-15	**10.29**
12	PS-2003-27	29-01-15	7.90	3.00	67.50	110.00	31.00	158.00	14-05-15	5.76
13	PS-2003-28	01-02-15	6.30	3.00	60.70	86.00	19.00	**190.00**	10-05-15	3.17
14	PS-2003-29	24-01-15	6.70	2.00	101.30	154.00	32.00	170.00	11-05-15	**9.36**
15	PS-2003-45	26-01-15	7.30	4.00	84.60	144.00	32.00	154.00	16-05-15	**7.73**
16	PS-2003-46	19-01-15	5.30	2.00	77.50	98.00	21.00	118.00	09-05-15	2.34
17	PS-2003-47	22-01-15	6.90	4.00	69.60	145.00	25.00	134.00	07-05-15	4.89
18	PS-2003-48	27-01-15	7.00	**6.00**	75.60	165.00	26.00	119.00	15-05-15	5.31
19	PS-2003-49	03-05-15	6.40	5.00	57.30	102.00	26.00	117.00	06/05/15	3.12
	Minimum		**4.80**	**2.00**	**55.70**	**30.00**	**14.00**	**112.00**		**0.18**
	Maximum		**8.60**	**6.00**	**126.50**	**187.00**	**49.00**	**190.00**		**19.08**
	Mean		**6.81**	**3.47**	**85.71**	**116.11**	**26.05**	**156.47**		**5.50**

6.2.6 SDUA, SK Nagar

Breeding Programme in Grain amaranth (Rabi 2014-15): New hybridization programme in grain amaranth is formulated with objectives: to develop high yielding, lodging resistance, dwarf varieties; to develop bold seeded varieties; to develop early maturing varieties; and to develop varieties suitable for North Gujarat condition. The parents are involved in hybridization programme GA-1, GA-3, RMA-7, SKNA-903, Annapurna, Durga and Suvarna and 28 crosses are made.

(I) List of F_3 Evaluation in G. Amaranth

S. No	Cross	No. of single plant selected	S. No	Name of Entry	No. of single plant selected
1	GA-1 X Annapurna	1	8	Suvarna X IC-42258-A	1
2	GA-1 X IC-381135	1	9	EC-519527 X GA-3	2
3	GA-1 X EC-519549	1	10	EC-519527 X IC-381195	2
4	GA-1 X BGA-09	1	11	EC-519527 X EC-519549	1
5	GA-2 X GA-3	1	12	EC-519527 X BGA-09	2
6	GA-2 X EC-519549	1	13	EC-519527 X IC-42258-A	2
7	Suvarna X GA-3	2			

(II) List of F_4 Evaluation in G. Amaranth

S. No.	Cross	No. of single plant selected	S. No.	Cross	No. of single plant selected
1	GA-1 X Annapurna	1	8	GA-1 X GA-3	1
2	GA-2 X Annapurna	2	9	GA-3 X IC-381135	1
3	GA-3 X IC-1733	1	10	EC-519527 X GA-1	1
4	GA-3 X IC-1733	2	11	GA-3 X EC-519527	1
5	GA-3 X IC-381135	1	12	GA-1 X GA-3	1
6	GA-1 X IC-329151	1	13	GA-2 X EC 519527	1
7	GA-3 X EC-519527	1			

(III) List of F_5 Evaluation in G. Amaranth

S. No.	Cross	No. of single plant selected
1	Durga X Annapurna,	2
2	GA-3 X IC-1733	2
3	GA-3 X IC-381135	1
4	GA-1 X EC-519527	1
5	GA-1 X GA-3	1
6	BGA-2 X IC 7220	2

(IV) Mutation in Grain Amaranth

List of M_4 Evaluation in G. Amaranth

S. No.	Mutant	No. of single plant selected	S. No.	Cross	No. of single plant selected
1	GA-1 (5 KR)	3	12	GA-1 Mutant-1	2
2	GA-1 (5 KR)	1	13	GA-1 Mutant-6	1
3	GA-1 (10 KR)	1	14	GA-1 Mutant-8	2
4	GA-1 (25 KR)	1	15	GA-1 Mutant-10	1
5	GA-1 (Ems 0.1)	1	16	GA-1 Mutant-13	1
6	GA-1 (Ems 0.2)	1	17	GA-2 Mutant-2	1
7	GA-1 (Ems 0.5)	2	18	GA-2 Mutant-3	2
8	GA-1 (Ems 0.5)	1	19	GA-2 Muatnt-9	1
9	GA-1 (SA 0.004)	1	20	GA-2 Muatnt-10	3
10	GA-2 (SA 0.001)	1	21	GA-2 Mutant-11	1
11	GA-2 (SA 0.004)	1	22	GA-2 Muatnt-14	1
			23	GA-2 Muatnt-15	2

(V) Germplasm maintenance/evaluation: The 45 paradise trees were maintained and evaluated and results are presented. The details of promising genotypes were given in table 87. The morphological characters of males and females plants were mentioned in table 88.

Table 87: Promising lines in paradise tree germplasm for various characters at S.K. Nagar during summer 2014-15.

S. No.	Characters	Range		Promising lines
		Min.	Max.	
	Male Plants			
1	Plant height (m)	3.75	5.80	L1P5, L2P8 (> 5.10)
2	Trunk girth (cm)	50.00	105.00	L2P8, L10P8 (> 86.00)
3	No. of primary branches/plant	2.00	5.00	L1P5, L10P8 (> 4.00)
	Female Plant			
1	No. of primary branches/plant	2.00	5.00	L1P6, L3P12, L7P4, L7P15, L9P7 (> 5.00)
2	Plant height (m)	4.00	6.10	L9P7, L14P15, L12P1, L4P8, L13P17 (> 5.60)
3	Trunk girth (cm)	50.00	143.00	L8P3, L11P4, L1P6, L7P4, L9P7 (> 105.00)
4	Average No. of fruits/bunch	10.00	63.00	L14P15, L7P4, L11P18, L12P9, L11P7 (> 52.00)
5	Seed yield/plant (kg)	1.00	21.00	L11P18, L7P4, L9P7, L14P15, L7P15 (> 15.00)
6	100 Dry seed wt (g)	103.92	160.63	L14P9, L1P6, L8P3, L7P4, L2P4 (> 143.30)

Table 88: Morphological characters of Male/Female genotypes of Paradise tree at S.K. Nagar during Summer 2014-15.

S. No.	Sel. Plus tree code	Date of Planting	Seed yield/ plant (kg)	Aver. No. of Fruits/ bunch	100 dry seed weight (g)	Plant Height (m)	Trunk Girth (cm)	No. of Primary Branches/ pl.
	Female							
1	L1P6	18.07.2015	1.00	10.00	157.30	5.25	110.00	5.00
2	L2P4	18.07.2015	7.90	23.00	143.30	5.35	60.00	3.00
3	L3P12	18.07.2015	6.00	20.00	111.70	5.35	70.00	5.00
4	L4P8	18.07.2015	7.00	24.00	118.21	5.75	72.00	4.00
5	L5P9	18.07.2015	3.00	25.00	130.96	4.00	65.00	2.00
6	L6P6	18.07.2015	9.30	33.00	129.95	5.00	68.00	3.00
7	L7P4	18.07.2015	19.00	62.00	144.38	5.40	110.00	5.00
8	L7P15	18.07.2015	15.00	49.00	121.00	5.20	76.00	5.00
9	L8P3	18.07.2015	6.70	20.00	146.24	5.55	143.00	3.00
10	L8P9	18.07.2015	2.00	15.00	135.31	4.50	50.00	3.00
11	L9P7	18.07.2015	16.60	47.00	143.25	6.10	105.00	5.00
12	L10P7	18.07.2015	9.00	30.00	132.80	4.40	70.00	5.00
13	L11P2	18.07.2015	5.20	40.00	138.60	5.00	66.00	3.00
14	L11P4	18.07.2015	4.10	25.00	124.80	5.10	115.00	2.00
15	L11P7	18.07.2015	9.30	52.00	108.05	5.45	75.00	4.00
16	L11P18	18.07.2015	21.00	57.00	119.50	5.10	95.00	4.00
17	L12P1	18.07.2015	5.00	33.00	136.33	5.80	86.00	3.00
18	L12P9	18.07.2015	7.80	55.00	138.54	5.25	75.00	4.00
19	L12P13	18.07.2015	14.30	48.00	134.50	4.90	71.00	3.00
20	L13P5	18.07.2015	1.90	50.00	130.90	5.30	95.00	4.00
21	L13P17	18.07.2015	10.60	39.00	119.30	5.60	74.00	4.00
22	L14P9	18.07.2015	6.20	25.00	160.63	5.10	66.00	2.00
23	L14P15	18.07.2015	16.50	63.00	121.00	6.10	86.00	4.00
24	L15P4	18.07.2015	4.50	16.00	116.17	5.30	56.00	3.00
25	L15P17	18.07.2015	4.80	29.00	103.92	5.30	65.00	2.00
	Minimum		**1.00**	**10.00**	**103.92**	**4.00**	**50.00**	**2.00**
	Maximum		**21.00**	**63.00**	**160.63**	**6.10**	**143.00**	**5.00**
	Mean		**8.55**	**35.60**	**130.67**	**5.25**	**80.96**	**3.60**
	Male							
1	L1P5	18.07.2015	-	-	-	5.80	86.00	5.00
2	L1P10	18.07.2015	-	-	-	3.75	57.00	2.00
3	L2P8	18.07.2015	-	-	-	5.40	105.00	3.00
4	L6P10	18.07.2015	-	-	-	5.10	69.00	3.00
5	L9P4	18.07.2015	-	-	-	3.80	50.00	4.00
6	L10P8	18.07.2015	-	-	-	4.50	91.00	5.00
7	L12P7	18.07.2015	-	-	-	4.00	65.00	3.00
8	L15P19	18.07.2015	-	-	-	5.10	64.00	3.00
	Minimum					**3.75**	**50.00**	**2.00**
	Maximum					**5.80**	**105.00**	**5.00**
	Mean					**4.68**	**73.38**	**3.50**

(C) Front Line Demonstrations

FLD conducted during Rabi-2014-15 of grain amaranth on following farmer's fields.

S.N.	Name of Farmers	Variety			% incre. over local
			GA-3	Local	
1	Thakor Rameshbhai Gemraji Village: Dhanera, Ta: Dhanera, Di.B.K	GA-3	1800	1150	57
2	Patel Ratubhai Chelabhai Village: Dhaneri, Ta: Dantiwada, Di.B.K	GA-3	2000	1400	43
3	Parmar Natvarlal Karsandas Village: Rajpuriya, Ta: Amirgadh, Dist.B.K	GA-3	1650	1100	50

(D) Seed Production

S. No.	Crop/Variety	Seed production (Kg)
1.	Gujarat Amaranthus-1 (GA-1)	147.00
2.	Gujarat Amaranthus-2 (GA-2)	269.00
3.	Gujarat Amaranthus-3 (GA-3)	119.00

SUMMARY

VII. SUMMARY

A total of 52 experiments were allotted during Rabi 2014-15 which included germplasm evaluation (13), breeding (17), crop production (11), crop protection (7) and quality (4). These were allotted at thirteen locations in different agro-climatic zones of the country. Out of these, 48 trials were carried out. A summary of research achievements is given below:

7.1 PLANT GENETIC RESOURCES MANAGEMENT

7.1.1 Exploration and Collection of Germplasm

During the period October 2014 to March 2015, a total of 143 accessions of grain amaranth (8 species) were collected from Andhra Pradesh, Arunachal Pradesh, Nagaland, Assam, Meghalaya and Haryana (Table 1)

7.1.2 Germplasm Introduction

During the period under report, the germplasm of potential crops introduced is given in table 2. A total 318 samples of faba bean and jatropha germplasm were imported from Lebanon and Honduras during 2014-15.

7.1.3 Germplasm Evaluation (Hills and Plains)

About 215 accessions in different crops, some of them tested at more than one location, were evaluated at twenty locations during Rabi 2014-15. Crop-wise number of accessions, locations and promising accessions have been given in Table 89.

Table 89: Performance of germplasm accessions in different crops.

Location	Top 5 Accessions (Yield)	Top 5 Accessions (Days to maturity)
HILLS: Faba bean (100 Accessions)		
CSKHPKV, Palampur	HB-021, HB-005, HB-020, HB-027, HB-033, HB-019 (> 1.56) **HPFB-2 (1.31 q/ha)**	EC691863, HB-053, EC263820, EC598938, HB-045, HB-058RFB-4 (< 168.00) **HPFB-1(170.70)**
UUHF, Ranichuari	EC363691, EC329691, EC598938, EC329695, EC329679 (> 36.80) **Vikrant (25.91 g)**	HB-001, HB-019, HB-021, HB-027, HB-035 (< 161.00) **Vikrant (170.89)**
Based on average over locations		HB-001, HB-027, HB-035, HB-021 (< 166.70) **Vikrant (171.59)**

Location	Top 5 Accessions (Yield)	Top 5 Accessions (Days to maturity)
PLAINS: Amaranth (65 Accessions)		
NBPGR, Akola	IC095512, SKGPA-124, IC095504, IC095523, IC095529, IC042011, IC095474, IC095555 (> 8.80) **Suvarna(8.79)**	IC042006, SKGPA-124, IC095481, SKGPA-125, SKGPA-111, SKGPA-115, SKGPA-122 (< 122.00) **GA-2 (133.00)**
IGKV, Ambikapur	IC095301, IC042015, IC081698, IC095254, IC095302, IC095541, IC095435 (> 9.33) **GA-2 (9.31)**	IC095369, IC095377, IC095385 (< 147.00) **Suvarna (147.00)**
OUAT, Bhubaneswar	SKGPA-120 (> 20.53) **BGA 2 (20.53)**	IC095348, IC095385, SKGPA-111, SKGPA-121, SKGPA-122, SKGPA-124, SKGPA-125, SKGPA-126 (< 93.00) **GA-2 (106.50)**
NBPGR, Delhi	IC095302, IC095530, IC095504, IC055147, IC095387, SKGPA-121, IC095523, IC095508, IC095591 (> 18.68) **RMA-7 (9.24)**	SKGPA-113, SKGPA-121, IC055147, IC095435, SKGPA-115, SKGPA-120 (< 152.00) **RMA-7 (167.17)**
JAU, Mandor	SKGPA-118, IC095302, IC081698 (> 9.76) **RMA-7 (9.76)**	IC095435 (< 117.14)BGA-2 (117.14)
MPKV, Rahuri	SKGPA-121, SKGPA-119 (> 9.33) **GA-2 (9.33)**	SKGPA-123, SKGPA-115, SKGPA-122, SKGPA-127, SKGPA-120, SKGPA-111, SKGPA-126, SKGPA-121 (< 116.00) **GA-2 (116.00)**
BAU, Ranchi	IC042016, SKGPA-115, IC042015, IC095563, IC095555 (> 8.98) **BGA-2 (8.98)**	IC095377, IC095542, IC055147, IC095435 (< 150.00) **BGA-2 (153.40)**
SDAU, SK Nagar	SKGPA-112, IC095591, IC095592, SKGPA-119, SKGPA-118 (> 32.96) **GA-2 (23.89)**	IC095369, SKGPA-111, IC094652 (< 103.00) **GA-2 (110.71)**
Based on average over locations	IC095591, IC095302, IC095592, SKGPA-112, SKGPA-118 (>12.83) **GA-2 (11.54)**	SKGPA-111, SKGPA-121, SKGPA-124, SKGPA-113, SKGPA-115, SKGPA-123 (< 128.33) **BGA-2 (133.35)**
Faba bean (50 Accessions)		
NBPGR, Delhi	HB-023, EC329627, HB-020, HB-049 (>28.76) **Vikrant (20.93)**	EC108908, HB-012, HB-041 (< 141.00) **Vikrant (146.00)**
NDUAT, Faizabad	EC329627, EC108908, HB-041, HB-049, EC243608 (> 30.50) **Vikrant (23.93)**	EC029085, HB-037, HB-059, HB-085 (< 142.00) **Vikrant (148.55)**
CCS HAU, Hisar	EC628937, HB-188, EC628923, HB-017, HB-085 (> 53.20) **Vikrant (28.10)**	HB-034, HB-007, HB-025, HB-049 (< 141.00) **Vikrant (161.00)**
BAU, Ranchi	EC628923, HB-034, HB-056, HB-608, EC003293(>8.28) **Vikrant (6.90)**	EC243860, EC591792, HB-012, HB-017, HB-025, HB-045, HB-068, HB-085 (< 150.00) **Vikrant (150.00)**
Based on average over locations	EC628937, EC628923, HB-188, HB-085, HB-017 (>25.88) **Vikrant (19.86)**	EC029085, HB-059, HB-037 (> 144.75) **Vikrant (151.38)**

7.2 Crop Improvement

Seventeen varietal trials, 2 in hills and 15 in plains, were conducted on two potential crops (Grain amaranth and faba bean) in order to identify improved varieties. Details of trials, entries, number of locations and highest yielding entries are given below in Table 90.

Table 90: Best genotypes in different trials conducted at multilocation during 2014-15.

Crop		Entries	Locations	Top yielder	Yield (q/ha)	Best check yield (q/ha)
HILLS						
Faba bean	IVT	8	2	EC024312	1.65	Vikrant (0.93)
	AVT-I	3	2	HB-214	1.60	Vikrant (1.63)
	AVT-II	3	2	HB-186	1.64	
PLAINS						
Amaranth	IVT	16	7	BGA-4-9	12.71	GA-2 (12.10)
	AVT-I	11	7	KBGA-4	14.81	GA-2 (11.38)
	AVT-II	9	7	kBGA-1	13.27	GA-2 (12.18)
Faba bean	IVT	18	7	NDFB-13	24.80	Vikrant (21.43)
	AVT-I	14	7	HB-8-12	22.63	Vikrant (22.48)
	AVT-II	9	7			Vikrant (22.73)

Based on the three years data, the best genotype in each crop with respect to yield has been identified and indicated in Table 91.

Table 91: List of promising genotypes based on three years data.

Crop	Variety	Seed yield (q/ha)	Maturity (days)	Increase/decrease in yield over check (%) - Best check
HILLS				
Faba bean	NDF-10	11.66	160.45	20.98
PLAIN				
Grain amaranth	BGA-04	15.45	130.11	-3.00
Faba bean	DFB-10-3	24.01	145.34	5.00

7.3 Crop Production And Protection

7.3.1 Crop Production

A total of six agronomic experiments were formulated to be conducted at seven locations in 11 trials on grain amaranth and faba bean during rabi 2014-

15. Out of these, results of six experiments were received from five locations in 9 trials. Salient findings are as follows:

S. No.	Experiment	Findings
1.	Organic farming in grain amaranth	Among the organic manual treatment, application of FYM@10t/ha resulted in highest yield of grain amaranth
2.	Performance of amaranth varieties at different locations	Based on the mean performance in respect of grain yield over two locations, the variety RMA-4 showed highest seed yield.
3.	Response of Grain Amaranth genotypes to different fertilizer doses.	Maximum grain yield of 1469 kg/ha was recorded with BGA-2 variety with application of 100% RFD (F2) followed by genotype BGA-19 (1464 kg/ha) with the same treatment. Similarly highest B: C ratio was recorded from the treatment F2 i.e. 100% RFD application
4	Studies on rice bean based cropping system	Rice bean-Green gram cropping system recorded maximum Rice bean Equivalent Yield (REY) of 3992 kg/ha with the highest B:C ratio of 2.49 followed by Rice bean-Toria cropping system (2956kg/ha) with a B:C ratio of 1.58 at Bhubaneswar.
5	Effect of fertilizer doses on fababean genotypes	On the basis of three years data it may be concluded that, seed yield of Bakla was significantly increased up to 20.7 and 31.8 per cent with the $N_{20}P_{20}K_{20}$ and $N_{40}P_{40}K_{20}$ treatments than control, respectively
6	Performance of fababean genotypes under different agronomic Practices	All the genotypes showed variable response to different doses of fertilizers. However, the genotype HB 82 with grain yield of 44.33 q/ha was the highest producer and it was followed by HB 188 and HB 185 with $N_{40.}$

7.3.2 Crop Protection

In crop protection, two experiments in potential crops were formulated to be conducted at 4 locations in 7 trials during *Rabi 2014-15* on two crops. Out of these, results of two experiments were received from three location for 6 trials. The results are as follows:

S. No.	Experiments	Crops	Results
1	Screening of germplasm against major insect pests and diseases	Grain Amaranth	All genotypes in IVT, AVT and germplasm recorded low incidence of insect pests and disease at SK Nagar and Bhubaneswar
		Faba bean	All genotypes in IVT, AVT and germplasm recorded low incidence of insect pests and disease at Hisar

S. No.	Experiments	Crops	Results
2	Integrated pest management in potential crops	Grain Amaranth	At Bhubaneswar, incidence of insect pest was low and maximum yield of 1530.74 kg/ha was obtained in emamectin benzoate @ 0.5 ml/lit, compared to the yield of control (1087.16 kg/ha). In case of diseases management, *Tricoderma viridae* @ 5 kg/ha produced highest yield (1459.75 Kg/ha) followed by Tebuconazole @ 1 ml/lit (1428.22 kg/ha) which are highly significant over the control (1173.40 kg/ha).
		Faba bean	Low incidence of insect pests and disease was observed at Hisar

7.4 QUALITY ANALYSIS

The seed of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the two potential crops, namely, grain amaranth and faba bean were planned for quality analysis at CCSHAU, Hisar, Quality analysis was done and seed was supplied by S.K. Nagar and Hisar centres. The crop-wise details of quality traits are given below:

A. Grain Amaranth seed supply by S.K. Nagar Rabi 2014-15: Plains

S. No.	Parameters	Range	Promising accessions
1	Protein (%)	10.20-13.80	SKGPA-91 (13.20), MGA-15 (13.50) **RMA-7 (12.90)**
2	Oil (%)	5.50-8.70	**Suvarna (8.70)**
3	Mn (mg/100g)	0.70-1.70	KBGA-3 (1.70), RMA-59 (1.50), **BGA-2 (1.40)**
4	Cu (mg/100g)	0.15-0.39	**BGA-2 (0.39)**
5	Fe (mg/100g)	12.40-30.10	**Suvarna (30.10)**
6	Zn (mg/100g)	1.70-3.50	RGA-9 (3.00), **GA-2 (2.90)**

B. Faba bean seed supply by Hisar Rabi 2014-15

S. No.	Parameters	Range	Promising
1	Protein %	23.80-27.17	EC243784 (27.17), EC328923 (27.00), HB-045 (27.00), **Vikrant (25.1)**
2	Vicine-convicine	0.73-0.99	HB-41 (0.73), NDFB-13 (0.73), RMD FB-1 (0.73), HB-059 (0.73), **Vikrant (0.80)**
3	Phenol %	0.22-0.27	HB-059 (0.22), **Vikrant (0.24)**

ANNEXURES

Annexure-I

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

S. No.	Genotypes	2010-11		2012-13		2014-15		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant (c)
1	HB-122	11.90	0/2	15.94	0/2	1.41	0/2	9.75	1/6	III	1.16
2	HB-186	12.45	0/2	15.40	0/2	1.64	0/2	9.83	0/6	II	1.96
3	NDF-10	11.97	0/2	21.81	0/2	1.22	0/2	11.66	0/6	**I**	20.98
4	Vikrant (c)	13.61	2	13.70	2	1.63	2	9.64	6		
Mean		**12.48**		**16.71**		**1.47**		**10.22**			

Annexure-II

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

S. No.	Genotypes	2010-11		2012-13		2014-15		Weighted			Percent increase / decrease over check
		Mean	Frequency	Mean	Frequency	Mean	Frequency	Mean	Frequency	Rank	Vikrant (c)
1	HB-122	141.00	0/2	169.50	0/2	162.42	0/2	157.64	0/6	II	-0.23
2	HB-186	143.08	0/2	159.50	1/2	162.84	0/2	155.14	1/6	**I**	-1.81
3	NDF-10	144.25	0/2	167.50	0/2	169.59	0/2	160.45	0/6		1.55
4	Vikrant (c)	139.42	2	165.50	2	169.09	2	158.00		III	
Mean		**141.94**		**165.50**		**165.98**		**157.81**			

Annexure-III

Mean seed yield (q/ha) of grain amaranth (Rabi 200-09, 2011-12 & 2013-14) varieties tested for the last three years

S. No.	Genotypes	*2010-11*			*2012-13*			*2014-15*			*Weighted*				Percent increase / decrease over check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	BGA-04	18.33	7	1/7	16.83	6	1/6	11.37	7	0/7	15.45	**I**	20	2/20	3.31
2	BGA-11	16.33	7	1/7	17.03	6	1/6	10.49	7	0/7	14.49		20	2/20	-3.04
3	BGA-12	17.96	7	1/7	16.57	6	1/6	12.03	7	1/7	15.47	**II**	20	3/20	3.47
4	BGA-21	18.00	7	1/7	16.97	6	1/6	10.88	7	0/7	15.20	**III**	20	2/20	1.67
5	RMA-45	17.69	7	0/7	16.58	6	0/6	10.06	7	0/7	14.69		20	0/20	-1.76
6	BGA-2 (C)	14.69	7		13.38	6		11.30	7		13.11		20	-	-12.32
7	GA-2 (C)	15.77	7		17.23	6		12.18	7		14.95		20	-	-
8	RMA-7 (C)		0			0		9.96	7		9.96		7	-	-33.40
9	Suvarna (C)	14.41	7		13.83	6		11.84	7		13.34		20	-	-10.80
Mean		**16.65**			**16.05**			**11.12**			**14.07**				
		Rabi 2011-12			*Rabi 2013-14*			*Rabi 2014-15*			*Weighted*				Percent increase / decrease over check
S. No.	Genotypes	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	BGA-38	14.42	5	1/5	16.26	2	0/2	10.20	7	0/7	12.57	**II**	14	1/14	10.87
2	BGA-43	14.77	5	1/5	13.87	2	0/2	10.92	7	1/7	12.72	**III**	14	2/14	12.15
3	IC035615	13.07	5	0/5	14.17	4	1/4	10.01	6	0/6	12.14		15	1/15	7.04
4	KBGA-1	13.30	5	0/5	14.22	4	2/4	13.27	6	0/6	13.54	**I**	15	2/15	19.37
5	BGA-2 (C)	12.15	5		10.40	4		11.30	7		11.34		16		0.00
6	GA-2 (C)	12.65	3		12.81	4		12.18	7		12.46		14		9.86
7	RMA-7		0			0		9.96	7		9.96		7		-12.20
8	Suvarna (C)	9.29	5		9.82	4		11.84	7		10.54		16		-7.07
Mean		**12.81**			**13.08**			**11.21**			**11.91**				

Annexure IV

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

S. No.	Genotypes	*Rabi 2010-11*			*Rabi 2012-13*			*Rabi 2014-15*			*Weighted*				Percent increase / decrease over check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	BGA-04	131.21	8	2/8	124.83	8	5/8	134.29	8	2/8	130.11	**II**	24	9/24	-1.74
2	BGA-11	130.92	8	3/8	123.96	8	4/8	133.17	8	3/8	129.35	**I**	24	10/24	-2.32
3	BGA-12	131.58	8	2/8	126.04	8	4/8	133.83	8	3/8	130.49	**III**	24	9/24	-1.46
4	BGA-21	130.96	8	2/8	126.80	8	2/8	134.46	8	1/8	130.74		24	5/24	-1.27
5	RMA-45	132.71	8	2/8	128.50	8	2/8	135.67	8	0/8	132.29		24	4/24	-0.10
6	BGA-2 (c)	134.00	8	-	131.45	7	-	135.25	8	-	133.66		23	-	0.94
7	GA-2 (c)	136.48	8	-	128.17	8	-	132.63	8	-	**132.42**		24	-	-
8	RMA-7 (C)		0	-		0	-	133.29	8	-	133.29		8	-	0.66
9	Suvarna (c)	137.25	8	-	132.83	7	-	134.75	8	-	135.04		23	-	1.98
Mean		**133.14**			**127.82**			**134.15**			131.93				
S. No.	Genotypes	*Rabi 2011-12*			*Rabi 2013-14*			*Rabi 2014-15*			*Weighted*				Percent increase / decrease over check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	BGA-38	128.95	7	2/7	122.67	3	0/3	127.31	8	2/8	127.18	**I**	18	4/18	-4.13
2	BGA-43	134.24	7	1/7	119.78	3	2/3	126.52	7	2/7	128.51	**II**	17	5/17	-3.12
3	IC035615	133.81	7	1/7	133.71	7	2/7	127.83	6	0/6	131.99		20	3/20	-0.50
4	KBGA-1	132.62	7	1/7	133.10	7	2/7	124.11	6	3/6	130.23	**III**	20	6/20	-1.82
5	BGA-2 (C)	134.09	7	-	135.50	7	-	135.25	8	-	134.96		22		1.74
6	GA-2 (C)	129.93	5	-	134.62	7	-	132.63	8	-	**132.65**		20		0.00
7	RMA-7		0	-		0	-	133.29	8		133.29		8		0.48
8	Suvarna (C)	136.23	7	-	136.29	7	-	134.75	8	-	135.71		22		2.31
Mean		**132.84**			**130.81**			**130.21**			**131.81**				

Annexure V

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

S. No.	Genotypes	*Rabi 2010-11*			*Rabi-2012-13*			*2014-15*			Weighted				Percent increase / decrease over check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	DFB-10-1	31.80	3	0/3	19.97	6	2/6	22.25	7	1/7	23.18	**III**	16	3/16	1.50
2	DFB-10-2	31.63	3	0/3	20.81	6	1/6	21.94	7	2/7	23.33	**II**	16	3/16	2.15
3	DFB-10-3	35.46	3	0/3	20.40	6	1/6	22.18	7	1/7	24.01	**I**	16	2/16	5.10
4	HB-082	26.20	6	2/6	22.45	6	2/6	19.07	6	1/6	22.57		18	5/18	-1.17
5	HB-184	26.03	6	1/6	21.04	6	2/6	21.27	7	2/7	22.70		19	5/19	-0.61
6	HB-186	26.34	6	2/6	21.30	6	1/6	20.58	7	3/7	22.63		19	6/19	-0.94
7	Vikrant (C)	25.24	6		20.57	6		22.73	7		22.84		19		-
Mean		**28.96**			**20.93**			**21.43**			**23.04**				
S. No.	**Genotypes**	***2011-12***			***2013-14***			***2014-15***			**Weighted**				**Vikrant (C)**
		Mean	**Location**	**Frequency**	**Mean**	**Location**	**Frequency**	**Mean**	**Location**	**Frequency**	**Mean**	**Rank**	**Location**	**Frequency**	
1	HB-182	23.72	5	2/5	21.81	7	2/7	20.40	7	1/7	21.79	**II**	19	5/19	-1.34
2	HB-185	23.99	5	1/5	23.59	7	3/7	21.11	7	3/7	22.78	**I**	19	7/19	3.12
3	HB-188	23.14	5	1/5	21.20	7	2/7	19.86	6	1/6	21.29	**III**	18	4/18	-3.61
4	Vikrant (C)	22.73	5		21.00	7		22.73	7		22.09		19		-
	Mean	**23.39**			**21.90**			**21.03**							

Annexure VI

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

S. No.	Genotypes	*Rabi 2010-11*			*Rabi 2012-13*			2014-15			Weighted				Percent increase / decrease over check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Rank	Location	Frequency	
1	DFB-101	150.39	3	0/3	144.13	6	2/6	143.08	7	2/7	144.84		16	4/16	-0.77
2	DFB-102	150.64	3	0/3	145.17	6	3/6	143.61	7	1/7	145.51		16	4/16	-0.31
3	DFB-103	150.39	3	1/3	145.11	6	2/6	143.38	7	2/7	145.34		16	5/16	-0.43
4	HB-082	145.11	6	3/6	142.49	6	3/6	138.10	6	3/6	141.90	I	18	9/18	-2.79
5	HB-184	148.07	6	1/6	146.17	6	1/6	141.64	7	2/7	145.10		19	4/19	-0.60
6	HB-186	147.78	6	2/6	143.18	6	3/6	141.51	7	2/7	144.02	II	19	7/19	-1.34
7	Vikrant (C)	149.08	**6**		144.71	**6**		144.39	**7**		145.97		**19**		-
	Mean	**148.78**			**144.42**										
S. No.	**Genotypes**	***Rabi 2011-12***			***Rabi 2013-14***			**2014-15**							**Percent increase / decrease over check**
		Mean	**Location**	**Frequency**	**Mean**	**Location**	**Frequency**	**Mean**	**Location**	**Frequency**	**Mean**	**Rank**	**Location**	**Frequency**	
1	HB-182	146.93	**5**	**0/5**	148.62	**7**	**0/7**	143.81	**7**	**2/7**	146.40		**19**	**2/19**	-0.39
2	HB-185	144.47	**5**	**1/5**	146.69	**7**	**1/7**	142.65	**7**	**2/7**	144.62	I	**19**	**4/19**	-1.60
3	HB-188	149.45	**5**	**0/5**	149.69	**7**	**0/7**	146.67	**6**	**2/6**	148.62		**18**	**2/18**	1.12
4	Vikrant (C)	148.07	**5**		148.76	**7**		144.39	**7**		146.97		**19**		0.00
	Mean	**147.23**			**148.44**			**144.38**			**146.65**				

Annexure VII

Number of trials/activities allotted and conducted Potential Crops :Rabi 2014-15

S. No	Name of Centre	Alloted						Conducted						
		Breeding	Germplasm	Agronomy	Quality	Crop Protection	Total	Breeding	Germplasm	Agronomy	Quality	Crop Protection	Total	Percentage
	(A) Hill													
1	CSK HPKV, Palampur	1	1	1			**3**	1	1	0			**2**	**66.67**
2	UUHF, Ranichauri	1	1	1		1	**4**	1	1	0		0	**2**	**50.00**
3	UBKV, Cooch Behar	0	0	2			**2**	0	0	2			**2**	**100.00**
	Total (A)	**2**	**2**	**4**		**1**	**9**	**2**	**2**	**2**	**0**	**0**	**6**	**66.67**
	(B) Plain													
1	IGKV, Ambikapur	2					**2**	2					**2**	**100.00**
2	OUAT, Bhubaneswar	1	1	2		2	**6**	1	1	2		2	**6**	**100.00**
3	NBPGR, Delhi	2	2				**4**	2	2				**4**	**100.00**
4	NDUAT, Faizabad	2	1				**3**	2	1				**3**	**100.00**
5	CCS HAU, Hisar	1	1	2	4	2	**10**	1	1	2	3	2	**9**	**90.00**
6	PAU, Ludhiana	2					**2**	2					**2**	**100.00**
7	JAU, Mandor	1	1				**2**	1	1				**2**	**100.00**
8	MPKV, Rahuri	1	1				**2**	1	1				**2**	**100.00**
9	BAU, Ranchi	2	2	1			**5**	2	2	1			**5**	**100.00**
10	SDAU, S.K. Nagar	1	1	2		2	**6**	1	1	2		2	**6**	**100.00**
11	NBPGR, Akola		1				**1**		1				**1**	**100.00**
	Total (B)	**15**	**11**	**7**	**4**	**6**	**43**	**15**	**11**	**7**	**3**	**6**	**42**	**97.67**
	Grand Total (A+B)	**17**	**13**	**11**	**4**	**7**	**52**	**17**	**13**	**9**	**3**	**6**	**48**	**92.31**
	Percentage of trials conducted							**100.00**	**100.00**	**81.82**	**75.00**	**85.71**	**92.31**	

Annexure VIII

List of Potential Crops Identified for Research Work at different centres during Rabi 2014-15

S.No.	Crops	Hill			Plain											Total
		Palampur	Ranichauri	Cooch Behar	Ambikapur	Bhubaneswar	Delhi	Faizabad	Hisar	Ludhiana	Mandor	Rahuri	Ranchi	S.K. Nagar	Akola	
1	Grain amaranth			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	**11**
2	Faba bean	✓	✓		✓		✓	✓	✓	✓			✓			**8**
	Total	**1**	**1**	**1**	**2**	**1**	**2**	**2**	**2**	**1**	**1**	**1**	**2**	**1**	**1**	**19**

Annexure-IX

List of Centres and Names of Scientists working on AICRN Potential Crops

S No	Name	Fax /E-mail	Phone (O)	Phone (R)
A.	**COORDINATING UNIT**			
1	**National Bureau of Plant Genetic Resources, Pusa, New Delhi 110 012**			
	Dr. B.S. Phogat, Network Coordinator & Principal Scientist	011-25841835, phogatbs@nbpgr.ernet.in	011-25841835	M-09868592706
	Dr. H.L.Raiger, Principal Scientist &PI (Documentation and Database Management)	011-25841835, drhanumanlal@yahoo.co.in	011-25841835	M-09968271997
B.	**SAU BASED MAIN CENTRES**			
1	**RMD College of Agri. & Research Centre (IGKV), Ambikapur 497 001**			
	Dr. Jitendra Kumar Tiwari, Scientist (Plant Breeding)	07774-230986, tiwarijk5@gmail.com	07774-230815, 230986, 230056	M-07828082334
2	**University of Agricultural Sciences, Hebbal, Bengaluru 560 024**			
	Dr. Niranjana Murthy, Professor (Plant Breeding)	080-23414848. drniranjanamurthy@hotmail.com, aicrnuucrops@gmail.com	080-23514353 Ext. 39, 246	M-09448680139
	Dr. B.S. Lingappa, Associate Professor (Agronomy)	080-23627265, bslingappa@gmail.com	080-23627265	M-09686939098
3	**Odisha University of Agriculture & Technology, Bhubaneswar 751 003**			
	Dr. Dayanidhi Mishra, Associate Prof. (Plant Breeding)	0674-2391692/2391780, bhubaneswar.uucrops@gmail.com	0674-2391692	M-09437208099
	Dr. Mohima Prasad Behera, Associate Prof. Agronomy	0674-2561585, beheramp@gmail.com	0674-2561585	M-09437756821
4	**Narendra Dev University of Agriculture & Technology, Faizabad 224 229**			
	Dr. C.B. Yadav, Associate Professor (Plant Breeding)	05270-262051, cbyadav57@yahoo.in, kamlesh_2007_2006@india.com	05270-262051	M-09616833372

5	**CCS Haryana Agricultural University, Hisar 125 004**			
	Dr. I.S. Yadav, Professor & Head, (MA & PC), Deptt. of Plant Breeding	01662-234952, 234613, mauup@hau.ernet.in, ishwar.yadav07@gmail.com	01662-289283	M-9416439265
	Dr. J.S. Hooda, Professor (Plant Breeding)	mauup@hau.ernet.in	01662-289283	M-09416590652
	Dr. M. Khabiruddin, Professor (Phytochemistry)	mauup@hau.ernet.in	01662-289283	M-09416325484
6	**Punjab Agricultural University, Ludhiana 141 004**			
	Dr. S.S. Kandhola, Associate Professor (Plant Breeding)	0161-2459065, sskandhola@pau.edu	0161-2401960-70	M-9876197955
7	**Agriculture University Jodhpur, Mandor 342 304**			
	Dr. Ishwar Singh, Assistant Professor (Plant Breeding)	iskjala@gmail.com	0291-2571813	M-09413388213
8	**Forest College & Research Institute (TNAU), Mettupalayam 641 301**			
	Dr. A. Balasubramanian, Associate Professor (Agronomy)	04254-225064, balayzz@yahoo.com	04254-222010	M-09443505845
9	**CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur 176 062**			
	Dr. (Mrs.) Neelam Bhardwaj, Assistant Professor (Plant Breeding) Deptt. of Organic Agriculture	01894-230402, neenabhardwaj@gmail.com	01894-230391	M-09816743729
	Dr. Y.S. Dhaliwal, Prof. & Head, Deptt. of Food Science & Nutrition	ysdhaliwal44@yahoo.co.in	01894-232444	M-09816082444
	Dr. Nageshwar Singh, Asst. Scientist & PI, Deptt. of Chem. & Biochem, COBS, CSKHPKV, Palampur	01894-230311, nageshwers@yahoo.com	01894-230311, 234079/233234	M-09418431713
10	**Mahatma Phule Krishi Vidyapeeth, Rahuri 413 722**			
	Dr. Suresh S. Dodake, Associate Professor (Plant Breeding)	02426-243223, prof_sureshdodake@rediffmail.com, banyogesh@gmail.com	02426-243249	M-09604261101

11	**Birsa Agricultural University, Ranchi 834 006**			
	Dr. Jay Lal Mehto, Assistant Professor, Deptt. of Plant Breeding & Genetics	0651-2451011, jaylalmahto@ymail.com	0651-2450561	M-09334365602
12	**College of Horticulture and Forestry (UUHF), Ranichauri 249 199**			
	Dr. Arun Bhatt, Associate Professor (Plant Breeding)	01376-252606, arunbhatt@rediffmail.com	01376-252121, 252119	9634794563, 6410557319
	Dr. Ajay Kumar, JRO Agromomy, (AICRN on PC)	01376- 252606, 252138,252138,		M-08476004147
13	**Sardar Krushinagar Dantiwada Agri. Univ. (SDAU), Sardar Krushinagar 385 506**			
	Dr. Nitesh N. Prajapati, Assoc. Res. Sci. (Plant Breeding)	02748-278471, 02748-278433, Niteshprajapati1978@gmail.com	02748-278471	M-09909900962
	Dr. B.M. Patel, Associate Professor Res. Sci. (Agronomy)		02748-278471	02742-251268, M-09879245373
C.	**COOPERATING CENTRES**			
1	**NBPGR, New Delhi**			
	Dr. H.L. Raiger, PI (Documentation and Database Management)	011-25841835, hlal@nbpgr.ernet.in	011-25841835	M-09968271997
	Dr. S.K. Yadav, PI (Crop Introduction)	011-25841835, skyadav@nbpgr.ernet.in	011-25841835	M-09868573218
	Dr. Sheela Mary, PI (Crop Improvement)	011-25841835	011-25841835	M-09654919593
	Dr. M.C. Singh, PI (Crop Production)	011-25841835, mcsingh@nbpgr.ernet.in	011-25841835	M-09958196700
	Dr. T.V. Prasad, PI (Crop Protection)	011-25841835, tvprasad@nbpgr.ernet.in	011-25841835	M-09716859790

2	**NBPGR, Regional Station**			
	Dr. N. Dikshit, Officer Incharge, NBPGR Regional Station Akola	0724-2258067, dikshitn@ yahoo.com	0724-2258067	M-09423445981
	Dr. S.K. Verma, Officer Incharge, NBPGR Regional Station Bhowali	05942-220027, officerinchargebhowali@yahoo.com	05942-220027	M-09411162212
	Dr. Om Vir Singh, Officer Incharge, NBPGR Regional Station Jodhpur	0291-2740490, omvir_singh_ujjlain@yahoo.com	0291-2740385	M-09414030319
	Dr. A.K. Mishra, Officer Incharge, NBPGR Regional Station Shillong	0364-2570651, nbpgrshl@rediffmail.com	0364-2570193	M 09436703247
	Dr. Mohar Singh, Sr. Scientist, NBPGR Regional Station Shimla	0177-2235453, headnbpgr@dataone.in singhmohar_2003@yahoo.com	0177-2835459,	M 08894009386
D.	**VOLUNTARY CENTRES**			
1	**Vivekananda Parvatiya Krishi Anusandhan Shala, Almora**			
	Dr. Salej Sood, Scientist	05962-231539, salej1plp@gmail.com	05962-241003, 241005 Ext. 105	M-09411706285
2	**Central Arid Zone Research Institute (CAZRI), Regional Station, Jaisalmer**			
	Dr. H.R. Mahla, Sr. Scientist, CAZRI, RRS, Jaisalmer	hrmahla@cazri.res.in		M-09413568747
3	**CSK, Himachal Pradesh Krishi Vishwavidyalaya, Sangla**			
	Dr. Surender Sharma, Scientist Incharge, MAREC,CSKHPKV,Sangla – 172106, Kinnaur Distt. (H.P.)	01786-242332,		M-09418043669
4	**Uttar Banga Krishi Vishwavidyalaya, Coochbehar, West Bengal 736165**			
	Prof. Ashim C. Sinha, Prof. in Agronomy & In-charge, AICRN of UUC, Deptt. of Agronomy	03582-2720246, ashim_sinha50@rediffmail.com, ashimcsinha@indiatimes.com	03582-2770249, 03582-2770756	M-09434685513