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ALL INDIA COORDINATED RESEARCH NETWORK ON POTENTIAL CROPS

PROGRESS REPORT

RABI

2019-20

ICAR-National Bureau of Plant Genetic Resources

Pusa Campus, New Delhi 110 012, India

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PREAMBLE

PREAMBLE

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

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

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

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

Recognizing the need for organized research effort on less common, under exploited crops, the All India Coordinated Research Project on Under Utilized and Under Exploited Plants was initiated during 1982 by ICAR. The Project was later redesignated as AICRP on Underutilized Crops and recently rechristened as AICRN on Potential Crops. At present, the network is conducting research on 16 crops of food, fodder and industrial value through 16 main, 9 cooperating and 10 voluntary centres located in diverse agro-climatic zones of the country. So far, 48 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 PGR Management, Crop Improvement, Crop Production and Protection and quality evaluation and other studies in various Potential Crops at different centres during Rabi 2019-20. 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. Mohar Singh, N Murthy, JM Sutaliya, SP Singh and Sandeep Kumar, Technical Programme Leaders for PGR Management, Crop Improvement, Plant Production and Protection and Quality Analysis, respectively for compilation of the reports.

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. T. Mohapatra, Secretary, DARE and Director General, ICAR; Prof. T R Sharma, DDG (Crop Science), ICAR; Dr. D.K. Yadava ADG (Seeds), ICAR and Dr. Kuldeep Singh, Director, NBPGR.

I wish to record my appreciation to Mr. Pankaj, Mr. NK Jajoria and Mr. Ranvir Singh for neatly typing the report.

H.L. Raiger
Network Coordinator

EXCUTIVE SUMMARY

I. EXECUTIVE SUMMARY

A total of 144 experiments were allotted at twenty four locations during Rabi 2019-20 which included PGR Management (50), Crop Improvement (71), Crop production (9), Crop protection (5) and Quality (9). Out of these, 130 trials were carried out. A summary of research achievements is given below:

1 PLANT GENETIC RESOURCES MANAGEMENT

Exploration and Collection of Germplasm: During the period of report from 1st April 2020 to 31st August 2020, due to national pandemic of Covid – 19 no exploration and germplasm tour was conducted

Germplasm Introduction: During the period under report, the germplasm of potential crops were not introduced.

Plant Quarantine: During this period, pests interception was nil in potential crops *i.e.* Grain amaranth, Adzuki bean, Buckwheat, Chenopodium, Faba bean, Winged bean, Perilla, Paradise tree, Kankoda, Kalingada, Job's tear, Jojoba, Gayule, Jatropha and Tumba**.**

Germplasm Evaluation: A total of 422 accessions of different crops, some of them tested at more than one location, were evaluated at sixteen locations during Rabi 2019-20. Crop-wise number of accessions, locations and promising accessions have been given in Table 1.

Table 1: Performance of germplasm accessions in different crops based over location/Year.

Location	Top 5 Accessions (Days to maturity)	Top 5 Accessions (Yield g/plant)
A: Hills (129 Accessions)		
Faba bean (24) I Year Evaluation	ET226443 (167.5), ET226440 (168), **HFB-1 (169.5)**	**-**
Fababean (34) II Year Evaluation	ET218736 (161.5), ET218756 (161.5), **HFB-1 (161.57)**	-
Buckwheat (71)	**Shimla-B-1 (90.0)**	IC412849 (3.44), IC046160 (3.32), IC016552 (3.18), IC013140 (3.12), EC125940 (3.1), **Shimla-B-13 (2.56)**
B Plains (293 Accessions)		
Grain amaranth (50) I Set	IC506520 (102.8), IC506528 (103.2), IC506521 (103.6), IC255428 (104.2), IC279807 (104.8), **GA-2 (125.2)**	**GA-2 (14.82)**
Grain amaranth (100) II Set	IC279807 (105.29), IC281749 (105.86), IC317549 (106.43), IC393022 (106.63), IC337341 (106.71), **GA-2 (122.93)**	**GA – 2 (14.10)**
Based on two year data	IC279807 (102), IC266937 (103.62), IC281749 (104), IC337341 (104.25), IC317549 (104.5), **GA-2 (119.61)**	**GA-2 (14.81)**
Faba bean (33) I Year Evaluation	ET218737 (141.0), ET218719 (140.0), **Basabaer (136.80)**	ET218779 (20.53), **Hudeiba - 93 (19.09)**
Faba bean (35) II Year Evaluation	ET218704 (133.6) **Rebya-40 (134.87)**	ET218776 (25.24), ET218773 (24.18), ET218741 (22.96), ET218725 (22.31), ET218768 (22.3), **HFB-1 (21.42)**
Based on two year data	ET218768 (134.19), ET218743 (134.43), ET218747 (134.52), ET218767 (134.71), ET218738 (134.81), **HFB-1 (136.06)**	ET218772 (33.81), ET218776 (30.78), ET218725 (28.69), ET218786 (28.29), **Vikrant (27.62)**

Location	Top 5 Accessions (Days to maturity)	Top 5 Accessions (Yield g/plant)
Chenopodium (74) I Year Evaluation	EC896244 (107), EC896230 (108), EC896240 (108), EC896258 (108), EC896274 (108), **EC507741 (112)**	EC896204 (73.18), EC896077 (55), EC896084 (55), EC896099 (55), EC896267 (55), **EC507742 (18.2)**
Chenopodium (50)	EC896229 (99), EC896271 (99), EC896264 (100), **SSQC-1 (107.5)**	EC896219 (53.52), EC896233 (50.15), EC896218 (34.99), EC896097 (27.75), EC896109 (27.48), **GKVK-1 (21.67)**
Based on two year data	**GKVK-1 (87.73)**	EC896098 (119.59), EC896097 (108.68), **SSQC-1 (104.9)**

Germplasm Conservation: In the National Gene Bank, NBPGR, a total of 81 accessions of *Amranthus* species (27), Buckwheat (1), *Coix lacryma*-jobi (4), *Chenopodium* species (6), *Perilla frutescens* (43), were received and conserved during the period under report.

Seed Supply: The seed and planting material of potential crops were supplied to ICAR institutes/coordinated projects, agricultural universities and other users in India, Based on specific requests received. A total of 318 accessions of potential crops were supplied to the indentors for research purposes within the country under the Material Transfer Agreement (MTA) and GEX 01 Forms (Table 38).

2. CROP IMPROVEMENT:

Seventy one varietal trials, 14 in hills and 57 in plains, were conducted on four potential crops (Grain amaranth, buckwheat, *chenopodium quinoa* 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 2.

Table 2: Best genotypes in different trials conducted at multilocation during 2019-20.

	Crop	Trial	Top yielder (q/ha)	Best check (q/ha)
A	**HILLS**			
1	Faba bean (4)	IVT (16)	DFS 18-22 (25.4)	HFB-1 (20.58
		AVT-I (2)	EC243626 (9.5)	Vikrant (12.00)
		AVT-II (4)	HPFB-2 (16.66)	
2	Buckwheat (3)	IVT (7)	IC026755 (10.56)	VL-7 (10.85)
		AVT-I (4)	IC318859 (8.03)	
3	*C. quinoa (2)*	AVT-II(13)	EC507747 (7.32)	-
B	**PLAINS**			
1	Grain amaranth (6)	IVT Normal (26)	RGA-03 (13.62)	RMA-7 (11.76)
		IVT Early (4)	IC95290 (11.85)	RMA-7 (11.99)
		AVT-I (3)	SKNA 1407 (12.36)	RMA-7 (12.35)
		AVT-II (5)	SKNA 1406 (14.36)	GA-2 (12.37)
2	Faba bean (7)	IVT (15)	DFS 18-22 (25.4)	HFB-1 (20.58)
		AVT-I (5)	HB 15-07 (22.91)	HFB-1 (23.63)
		AVT-II (4)	NDFB 13 2 (24.72)	
3	*C. quinoa (10)*	AVT-I (13)	EC507744 (16.42)	-

Based on the three years data, the best genotype in each crop with respect to yield has been identified and indicated in Table 3.

Table 3: List of promising genotypes based on three years data (Plains).

Crop	Variety	Seed yield (q/ha)	Maturity (days)	Gain (%) over best check
Faba bean	NDFB 13 2	24.25	134.40	4.28
Grain amaranth	BGA-7-1 (E)	13.53	129.72	3.20
C. quinoa	EC507747	17.21	114.68	16.07

3. CROP PRODUCTION AND PROTECTION

Crop Production: A total of seven agronomic experiments were formulated to be conducted at seven locations in eleven trials during Rabi 2019-20. These comprised of three studies on amaranth, one each on buckwheat and quinoa and two experiments on faba bean. Results of nine experiments were received from seven locations in seven trials (Table 4).

Table 4: Salient findings of the Crop Production experiment

S. No.	Experiment	Findings
1	Effect of different systems of irrigation and irrigation schedules on **grain amaranth**	At SK Nagar, significantly higher grain yield (15.6 q/ha) was recorded in Sprinkler irrigation at 0.8 IW/CPE followed by Sprinkler irrigation at 0.6 IW/CPE and 0.4 IW/CPE.
2	Performance of different **grain amaranth** varieties	At Hyderabad, the maximum, seed yield was observed in variety Suvadra (15.90 q/ha) and followed by Durga (14.27 q/ha).
3	Response of **grain amaranth** to sulphur	At Bhubaneswar, split application of 20 kg S/ha (10 kg/ha at sowing +10 kg/ha at 3 WAS) along with RFD @ 20-40-20 kg NPK /ha recorded highest seed yield (13.64 q/ha), net return (Rs 24666/ha) with a B:C ratio of 1.82
4	Response of promising genotypes (AVT-II entries) of **Buckwheat** to different levels of management.	At Cooch Behar, a combination of 100% recommended dose of fertilizer (RDF) + three irrigations with genotype Himpriya recorded highest seed yield (14.73 q/ha) followed by RDF 75% + two irrigations and Himpriya
5	Response of ***C. quinoa*** to different levels of spacing and fertilizer	At Bengaluru, a combination of spacing of 30 cm x 15 cm and application of 60:40:40 kg NPK/ha resulted in highest seed yield of quinoa (29.08 q/ha). At SK Nagar, a combination of spacing of 30 cm x 10 cm and application of 60:40:40 kg NPK/ha resulted in highest seed yield (20.94 q/ha), net income (Rs. 69374/ ha) & B: C ratio (2.96) At Hisar, a combination of spacing of 30 cm x 10 cm and application of 60:40:40 kg NPK/ha was resulted highest seed yield of quinoa (16.18 q/ha)
6	Response of promising genotypes (AVT-II entries) of **Faba bean** to different levels of management.	At Hisar, a combination of genotypes HB-12-42 and 75% RDF + two irrigations was resulted highest seed yield (57.00 q/ha)
7	Effect of different phosphorus doses and sources on **faba bean.**	At Pasighat, significantly higher grain yield q/ha (17.22) was recorded with P_2O_5 30 kg/ha + PSB as compared to other treatments

Crop Protection: In crop protection, experiments on screening of germplasm, IVT, AVT-I and AVT-II of grain amaranth, faba bean and quinoa against major insect pests and diseases were formulated to be conducted at 5 different locations *i.e.* Ludhiana, Hisar, Bengaluru, Bhubaneswar and S.K. Nagar during 2019-20. The reports were received from all locations *i.e.* Bengaluru, Hisar, Ludhiana, Bhubaneswar and S.K. Nagar. The experiment and crop wise detail of results are given in Table 5.

Table 5: Screening of germplasm accessions IVT and AVT entries against major insect pests and diseases

Crops	Moderately resistant/tolerant entries/accessions
Faba bean	**Ludhiana** **Moderately resistant entries/accessions against chocolate leaf spot disease:** 3 IVT entries(HB 15-04, HB 15-34 and HB 15-55) 25 germplasm accessions (ET218698, ET218704, ET218712, ET218713, ET218720, ET218725, ET218734, ET218736, ET218738, ET218741, ET218743, ET218747, ET218757, ET218759, ET218764, ET218765, ET218767, ET218768, ET218769, ET218772, ET218773, ET218776, ET218778, ET218781 and ET218786) **Hisar** **Moderately resistant entries against *Alternaria* leaf blight** 2 AVT (HB-14-21 and HFB-1) **Resistant entries against Root rot-** 1 AVT (HFB-1) **Moderately resistant entries against Root rot** 7 AVT (HB 15-07, HB 15-17, NDFB-17-1, HB-14-21, NDF-13-2, NDFB-16-3 and Vikrant)
Grain amaranth	**Bhubaneswar** **Tolerant entries against leaf weber insect:** 5 IVT entries (IC 93941, IC 35541, IC 35623, RMA 10 and BGA 7) and 1 AVT-I entry (SKNA 1407) **Tolerant entries against sucking insects (aphid and jassids):** 4 IVT entries (IC 95290, IC 35548, IC 35623 and RGA 19) 2 AVT-II entries (RGA 17 and SKNA 1406) **Tolerant entries to wilt disease:** 5 IVT entries (IC 95290, IC 35547, RMA 10, BGA 16 and SKNA 1508) 2 AVT-II entries (BGA 4 and BGA 9)
C. quinoa	**Bengaluru** 5 AVT-II entries (IC411825, EC507738, EC507740, EC507744 and EC507747) promising against insect pests 8 germplasm accessions (EC896062, EC896090, EC896100, EC896120, EC896206, EC896207, EC896059 and EC896237) promising against insect pests

4 QUALITY ANALYSIS

The seed of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the three potential crops, namely, grain amaranth, faba bean and *Chenopodium quinoa.* Seeds of grain amaranth and quinoa were supplied by S.K. Nagar centre and alaysed at New Delhi centre whereas Faba bean trials were conducted as well as analysed at Hisar centre. The crop-wise details of quality traits are given in Table 6.

Table 6: Promising genotypes for quality traits during Rabi 2019-20 (Plain).

S.No.	Trial	Promising line	Value of best check
I	**Grain amaranth**		
A	**Protein (%) (Range 8.93-16.44)**		
1	IVT-N	BGA-16 (13.83), RGA-23 (13.21)	GA-2 (11.73)
2	IVT-E	IC35621 (14.22), IC93941 (13.07)	BGA-2 (12.86)
3	AVT-I	SKGPA150 (13.81), SKGPA155 (13.69)	BGA-2 (12.95)
4	AVT-II	BGA 9 (13.48), RGA17 (13.39)	BGA-2 (12.93)
5	Germplasm	IC255482 (16.44), IC255481 (16.12),	GA-2 (13.41)
B	**Oil (%) (Range 7.30-9.83)**		
1	IVT-N	IC35546 (9.73), RGA-23 (8.8),	GA-2 (8.42)
2	IVT-E	IC93941 (9.83), IC35621 (9.6)	BGA-2 (8.95)
3	AVT-I	-	GA-2 (8.94)
4	AVT-II	RGA17 (9.14)	GA-2 (8.8)
5	Germplasm	IC506529 (9.53), IC255419 (9.45)	BGA-2 (7.91)

S.No.	Trial	Promising line	Value of best check
II	**Faba bean**		
A	**Protein (%) (Range 21.89 - 27.69)**		
1	IVT	HB 15-51 (27.69), HB 15-41 (26.87)	Vikrant (26.38)
2	AVT-I & II	NDFB 13-2 (27.5), NDFB 17-1 (27.03)	HFB-1 (25.34)
3	Germplasm	ET218768 (27.07)	Vikrant (26.89)
B	**Phenol (%) (Range 0.14 - 0.22)**		
1	IVT	DFS 18-14 (0.14), DFS 18-20 (0.14)	HFB-1 (0.15)
2	AVT-I & II	HB 14-18 (0.15)	HFB-1 (0.17)
C	**Vicine-convicine (%) (Range 0.30 - 0.97)**		
1	IVT	DFS 18-5 (0.61), DFS 18-9 (0.63)	Shambhat (0.65)
2	AVT-I & II	-	Vikrant (0.78)
3	Germplasm	ET218775 (0.3), ET218772 (0.39),	Giza (0.63)
III	***C. quinoa***		
1	Protein (%)	IC411825 (15.64), EC507744 (14.91)	
2	Oil (%)	EC507741 (9.23), EC507738 (9.21	

Based on the three years data, the best genotype in each crop with respect to quality trait has been identified and indicated in Table 7.

Table 7: List of promising genotypes based on three years data (Plains).

S. No	Crop	Protein (%)	Vicine-convicine (%)	Oil (%)
I	Faba bean	HB 14-21 (27.64), Vikrant (24.84)	NDFB 13 2 (0.82), Vikrant (0.82)	-
II	Grain amaranth	SKNA 1406 (14.32), BGA-2 (13.01)	-	RGA-17 (9.24), BGA-2 (8.68)
III	*C. quinoa*	IC411825 (15.630)	-	EC507741 (9.260), EC507742 (9.260)

5. Technology Transfer: The progress in generation of technology as regards improved varieties and production packages especially for grain amaranth and faba bean is quite satisfactory. The project using its own resources is making sincere efforts to demonstrate the improved production technologies on farmer fields and Front Line Demonstrations (FLDs) in amaranth and Faba bean were conducted. During Rabi 2019-20, a total of 104 demonstrations in an area of about 24.82 ha were conducted in the states of Chhattisgarh, Odisha, Jharkhand, Gujarat, Uttar Pradesh, Haryana and Himachal Pradesh as detailed in (*Annexure XI*)

6. Quality Seed Production

The seed related activities were carried out in the project in four crops as detailed in annexure xix and 1643.90.00 kg seeds were produced in grain amaranth (479.40), faba bean (1004.50), *C. quinoa* (130.0) and Chia (30.0) at different centres for distribution to farmers and other agencies (*Annexure XI*).

7. Breeding Programme

34 fresh crosses in grain amaranth at Ambikapur (22), Ranchi (5), SK Nagar (7) and 78 in faba bean at Ambikapur (15), Ayodhya (27), Hisar (30), Ludhiana (11), Palampur (5) and Ranchi (5) were made using diverse genotypes from different centre under the AICRN on Potential Crops and the selection were also made in the segregating generation of F_2-F_6 from crosses made in previous year (*Annexure – XII*).

PLANT GENETIC RESOURCES MANAGEMENT

II. PLANT GENETIC RESOURCES MANAGEMENT

During the period under report, exploration and germplasm collection missions could not be undertaken due to national pandemic of Covid – 19 and none of the germplasm was introduced. During Rabi 2019-20, a total of 422 accessions were evaluated at different AICRN PC centres. In the National Gene Bank, NBPGR, a total of 81 accessions of Potential Crops were received and conserved during the period under report. A total of 318 accessions of potential crops were supplied to the indentors for research purposes within the country. Activity wise details are as follows:

2.1 EXPLORATION AND COLLECTION OF GERMPLASM

During the period of report from 1st April 2020 to 31st August 2020, due to national pandemic of Covid – 19 no exploration and germplasm tour was conducted

2.2 GERMPLASM INTRODUCTION

During the period under report, the germplasm of potential crops were not introduced.

2.3 PLANT QUARANTINE

During this period, pests interception was nil in potential crops *i.e.* Grain amaranth, Adzuki bean, Buckwheat, Chenopodium, Faba bean, Winged bean, Perilla, Paradise tree, Kankoda, Kalingada, Job's tear, Jojoba, Gayule, Jatropha and Tumba**.**

2.4 GERMPLASM EVALUATION

2.4.1 Hills

Multilocational germplasm screening nurseries (130 accessions) were planned to be conducted on faba bean (24 accessions first year evaluation at four locations), Faba bean (35 accessions second year evaluation at four locations) and Buckwheat (71 accessions first year evaluation one location). The germplasm accessions were evaluated in augmented design with standard check cultivars.

2.4.1.1 Faba bean (*Vicia faba*): First year evaluation

Germplasm screening nursery consisting of 24 accessions supplied by NBPGR, New Delhi (24 accessions) was planned to be evaluated at four locations viz, Palampur, Ranichauri, Pasighat, Srinagar and Barapani. The results were received from two centres (Rabi 2019-20). The experimental details and list of promising genotypes have been presented in Table 8 and Table No. 9 respectively. The statistical parameters are given in Table 10 & 11.

At CSKHPKV Palampur, a set of 24 germplasm lines with three check were evaluated in Rabi 2019-20 for eleven quantitative characters. The genotype ET-226446 (155.67 days) was early in maturity as compared to check variety Hashbenge (159.67 days). Highest seed yield (6.91 q/ha) was found in genotype ET-226441.

At Ranichauri, a set of 27 germplasm lines including three checks were evaluated in Rabi 2019-20 for five quantitative characters. The genotype ET-226443, ET-226452 (99.67 days) was early in flowering and maturity. The entry ET-226433 (4.02 cm) had longest pod length.

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 (81.11 days) while late at Ranichauri (121.57 days). On the basis of average over two locations, the entry, ET-226443 (99.50 days) was superior to the HFB-1 check (101.17) in flowering.

Maturity period was the earliest at Palampur (159.96 days) and delayed at Ranichauri (179.56 days). Based on the average over two locations entry ET-226443 (167.5 days) was the earliest in maturity.

Mean plant height was highest at Palampur (61.73 cm) and low at Ranichauri (27.82 cm). Based on the average over the locations the entry ET-226449 (42.30 cm) was found dwarf superior to check variety.

2.4.1.2 Faba bean *(Vicia faba):* Second year evaluation

Germplasm screening nursery consisting of 35 accessions supplied by NBPGR, New Delhi was planned to be evaluated at four locations viz. Ranichauri, Palampur, Pasighat, Srinagar. The results were received from two centres (Rabi 2019-20). The experimental details and list of promising genotypes has been presented in Table 12 and 13 respectively. The mean and range were given in Table 14.

At Ranichauri, a set of 34 germplasm lines with two check was evaluated in Rabi 2019-20 for six quantitative characters. The genotype ET-218702 (112 days) was early in flowering. Highest pod length (6 cm) was found in genotype ET-218762.

At Umiam, a set of 33 germplasm lines with four check were evaluated in Rabi 2019-20 for ten quantitative characters. The genotype ET-218774 (136.00 days) was early in maturity. The entry ET-218719 (86.50 g) was most superior for 100 seed weight while highest seed yield per plant (16.67 g) was found in genotype ET-218724.

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

The mean maturity time was the earliest at Umiam (141.38 days) while late at Ranichauri (187.58 days). On the basis of average over two locations, the entry ET-218736 (161.50 days) was superior to the check varieties in maturity.

Pod length was the longest at Umiam (6.52 cm) and shortest at Ranichauri (4.06 cm). Based on the average over two locations entry ET-218776 (8.76 cm) had the longest pod length.

Mean plant height was highest at Umiam (64.45 cm) and low at Ranichauri (40.11 cm). Based on the average over the locations the entry ET-218760 (65.88 cm) was found superior to check variety.

2.4.1.3 Buckwheat (*Fagopyrum* spp.) First year evaluation

A set of 71 accessions was planned to be screened at one locations (ICAR National organic Farming Research Institute, Tadong, Sikkim along with four checks Himgiri, Himpriya, VL 7, PRB 1 and Shimla B-1. The experimental details and list of promising accessions for all the characters has been presented in Table 15 and 16 respectively. The mean and range were given in Table 17. At ICAR Research Complex for NEH Region, Tadong, Sikkim, a set of 71 accessions was evaluated for fourteen quantitative characters and 11 qualitative characters along with four checks Himgiri, Himpriya, PRB 1, Shimla B-1 and VL-7. The entry IC042458 was superior to the check variety in flowering (50.00 days). The seed yield per plant were highest recorded in genotype IC412849 (3.44 g).

Table 8: Experimental Details germlasm evaluation of Faba bean Rabi 2019-20: Hill (Ist Year)

S. No	Item	Ranichauri	Palampur
1	No of entry	24	24
2	No of Check	3	3
3	Design	RBD	RBD
4	Replications in RBD	3	3
5	Number of Rows/plot	3	3
6	Row length (m)	3.0 m	3
7	Row spacing (cm)	30 cm	30
8	Plant spacing (cm)	10 cm	10
9	NPKS (kg/ha)	40:20:20:20	-
10	Net plot size (m^2)	2.7	-
11	Sowing Date	26.11.2019	26.11.2019
12	Harvesting periods	18.5.2020 to 27.5.2020	25.05.2020

Table 9: Promising lines in fababean germplasm (Rabi 2019-20) at different locations (Hills) (Ist Year)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**CSKHPKV Palampur, Himachal Pradesh (Accessions 24)**				
1	Days to 50% flowering	77.33	84.67	ET226446 (77.33), ET226443 (77.67), ET226440 (78.67), ET226456 (78.67), ET226455 (79)	Hashbenge (81)
2	Days to 80% maturity	155.67	165.00	ET226446 (155.67), ET226443 (156)	Hashbenge (159.67)
3	Plant height (cm)	57.27	66.00		HFB-1 (66)
4	Plant Height (cm) dwarf	57.27	66.00	ET226434 (57.27), ET226440 (58.5), ET226443 (59.2), ET226445 (59.5), ET226450 (59.87), ET226451 (59.93), ET226436 (59.97), ET226437 (60.27)	Rebya-40 (60.4)
5	Pod length (cm)	4.53	5.83		Hashbenge (5.83)
6	Number of branches per plant	2.20	2.47	ET226436 (2.47), ET226441 (2.47), ET226437 (2.4), ET226447 (2.4), ET226448 (2.4), ET226435 (2.4), ET226445 (2.4), ET226439 (2.33), ET226440 (2.33), ET226446 (2.33), ET226451 (2.33), ET226452 (2.33), ET226453 (2.33), ET226456 (2.33)	Rebya-40 (2.33)
7	Number of pod per plant	26.60	28.53	ET226433 (28.53), ET226445 (28.53), ET226441 (28.3), ET226436 (28.23), ET226444 (28.2), ET226434 (28.13), ET226437 (28.1), ET226435 (28), ET226452 (27.93), ET226455 (27.87), ET226456 (27.83), ET226439 (27.77), ET226446 (27.73)	Hashbenge (27.73)
8	Pod width (cm)	0.98	1.14	ET226436 (1.14), ET226445 (1.14), ET226447 (1.13), ET226433 (1.12), ET226438 (1.11), ET226446 (1.11)	Hashbenge (1.11)
9	Number of seed per pod	3.07	3.33	ET226441 (3.33)	Hashbenge (3.13)
10	Seed yield (q/ha)	5.43	6.91	ET226441 (6.91), ET226439 (6.54), ET226442 (6.54), ET226445 (6.54)	Rebya-40 (6.17)
11	100 seed weight (g)	44.10	52.47		HFB-1 (52.47)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
II	**UUHF Ranichuari, Uttaranchal (Accessions 24)**				
1	Days to 50 % Flowering	117.00	125.67	ET226433 (117)	HFB-1 (121)
2	Days to 80% maturity	176.00	183.00	ET226433 (176), ET226435 (177)	Rebya-40 (179.33)
3	Plant Height (cm)	19.43	35.67		HFB-1 (35.67)
4	Plant Height (cm) dwarf	19.43	35.67	ET226444 (19.43), ET226449 (23.27), ET226455 (23.4), ET226446 (23.6), ET226453 (24.13)	Rebya-40 (24.53)
5	Pod Length (cm)	0.83	4.02	ET226433 (4.02), ET226440 (3.7), ET226435 (3.41)	HFB-1 (3.37)
Best entries over locations (Accessions 24)					
1	Days to 50% flowering	99.50	103.33	ET226443 (99.5), ET226452 (99.67)	HFB-1 (101.17)
2	Days to 80% maturity	167.50	172.67	ET226443 (167.5), ET226440 (168)	HFB-1 (169.5)
3	Plant height (cm)	42.30	50.83		HFB-1 (50.83)
4	Plant Height (cm) dwarf	42.30	50.83	ET226449 (42.3), ET226445 (42.42), ET226444 (42.47)	Rebya-40 (42.47)
5	Pod length (cm)	2.82	4.72	ET226440 (4.72), ET226433 (4.64)	HFB-1 (4.55)

Table 10: Multilocation evaluation of germplasm lines in faba bean at different locations - Hills : Rabi 2019-20 (Ist Year)

S.No.	Accession No.	Days to 50 % Flowering			Days to 80% maturity			Plant Height (cm)			Pod Length (cm)		
		Ranichauri	Palampur	Mean	Palampur	Ranichauri	Mean	Ranichauri	Palampur	Mean	Ranichauri	Palampur	Mean
1	ET226433	117.00	84.67	**100.83**	165.00	176.00	**170.50**	31.27	61.67	**46.47**	4.02	5.27	**4.64**
2	ET226434	121.00	81.33	**101.17**	159.67	179.00	**169.33**	31.27	57.27	**44.27**	2.33	5.07	**3.70**
3	ET226435	119.00	84.00	**101.50**	164.00	177.00	**170.50**	31.93	61.00	**46.47**	3.41	5.67	**4.54**
4	ET226436	121.33	79.33	**100.33**	158.00	179.00	**168.50**	25.20	59.97	**42.58**	2.13	4.93	**3.53**
5	ET226437	122.33	82.33	**102.33**	161.33	179.67	**170.50**	27.47	60.27	**43.87**	3.03	5.40	**4.22**
6	ET226438	120.67	82.67	**101.67**	161.33	178.00	**169.67**	26.13	62.43	**44.28**	1.20	5.00	**3.10**
7	ET226439	121.67	84.33	**103.00**	164.67	180.67	**172.67**	27.27	60.43	**43.85**	3.36	5.13	**4.25**
8	ET226440	122.00	78.67	**100.33**	157.00	179.00	**168.00**	28.47	58.50	**43.48**	3.70	5.73	**4.72**
9	ET226441	120.33	82.67	**101.50**	161.33	178.33	**169.83**	30.33	60.63	**45.48**	3.02	5.03	**4.03**
10	ET226442	122.33	80.00	**101.17**	160.00	180.67	**170.33**	33.00	62.47	**47.73**	2.04	5.20	**3.62**
11	ET226443	121.33	77.67	**99.50**	156.00	179.00	**167.50**	28.73	59.20	**43.97**	2.85	5.33	**4.09**
12	ET226444	120.33	81.33	**100.83**	159.67	179.33	**169.50**	19.43	65.50	**42.47**	1.13	5.17	**3.15**
13	ET226445	123.33	81.33	**102.33**	159.67	180.67	**170.17**	25.33	59.50	**42.42**	2.34	5.00	**3.67**
14	ET226446	124.33	77.33	**100.83**	155.67	181.33	**168.50**	23.60	62.63	**43.12**	2.67	5.63	**4.15**
15	ET226447	120.00	79.67	**99.83**	158.33	178.33	**168.33**	28.20	61.00	**44.60**	2.82	5.73	**4.28**
16	ET226448	122.00	83.00	**102.50**	162.00	179.67	**170.83**	27.40	62.80	**45.10**	2.95	5.20	**4.07**
17	ET226449	122.67	81.33	**102.00**	159.67	181.00	**170.33**	23.27	61.33	**42.30**	2.27	5.03	**3.65**
18	ET226450	121.00	79.33	**100.17**	158.00	179.67	**168.83**	31.00	59.87	**45.43**	3.10	5.63	**4.37**
19	ET226451	120.00	83.00	**101.50**	162.00	178.33	**170.17**	28.33	59.93	**44.13**	2.00	5.63	**3.82**
20	ET226452	120.00	79.33	**99.67**	158.00	178.33	**168.17**	33.40	63.40	**48.40**	2.90	5.40	**4.15**
21	ET226453	122.33	80.67	**101.50**	159.33	180.67	**170.00**	24.13	65.43	**44.78**	1.97	4.83	**3.40**
22	ET226454	122.67	82.67	**102.67**	161.33	180.67	**171.00**	29.17	63.97	**46.57**	3.14	4.77	**3.95**
23	ET226455	124.00	79.00	**101.50**	158.00	182.00	**170.00**	23.40	61.80	**42.60**	0.83	4.80	**2.82**
24	ET226456	122.33	78.67	**100.50**	157.00	180.00	**168.50**	26.47	63.60	**45.03**	1.64	4.53	**3.08**
Mean for check variety													
1	Hashbenge ©	125.67	81.00	**103.33**	159.67	183.00	**171.33**	26.80	65.80	**46.30**	2.80	5.83	**4.32**
2	Rebya-40 ©	121.67	83.33	**102.50**	162.67	179.33	**171.00**	24.53	60.40	**42.47**	2.84	5.07	**3.95**
3	HFB-1 ©	121.00	81.33	**101.17**	159.67	179.33	**169.50**	35.67	66.00	**50.83**	3.37	5.73	**4.55**
	Minimum	**117.00**	**77.33**	**99.50**	**155.67**	**176.00**	**167.50**	**19.43**	**57.27**	**42.30**	**0.83**	**4.53**	**2.82**
	Maximum	**125.67**	**84.67**	**103.33**	**165.00**	**183.00**	**172.67**	**35.67**	**66.00**	**50.83**	**4.02**	**5.83**	**4.72**
	Mean	**121.57**	**81.11**	**101.34**	**159.96**	**179.56**	**169.76**	**27.82**	**61.73**	**44.78**	**2.59**	**5.25**	**3.92**
	CD (0.05)	**4.71**	**1.71**	**-**	**2.42**	**3.68**	**-**	**4.34**	**3.58**	**-**	**0.32**	**0.59**	**-**
	CV (%) Error	**2.36**	**1.28**	**-**	**0.92**	**1.25**	**-**	**9.53**	**3.54**	**-**	**7.61**	**6.83**	**-**
	CV (%) Phen.	**1.43**	**2.51**	**1.01**	**1.54**	**0.83**	**0.70**	**13.23**	**3.71**	**4.60**	**30.42**	**6.73**	**12.93**

Table 11: Multilocation evaluation of germplasm lines in faba bean at Palampur Centre - Hills : Rabi 2019-20 (Ist Year)

S.No.	Accession No.	Palampur					
		Number of branches per plant	Number of pod per plant	Pod width (cm)	Number of seed per pod	Seed yield (q/ha)	100 seed weight (g)
1	ET226433	2.27	28.53	1.12	3.13	6.05	48.00
2	ET226434	2.27	28.13	1.01	3.07	5.62	44.87
3	ET226435	2.40	28.00	1.09	3.27	5.93	47.67
4	ET226436	2.47	28.23	1.14	3.27	5.99	51.73
5	ET226437	2.40	28.10	1.03	3.07	6.17	46.23
6	ET226438	2.20	27.60	1.11	3.13	6.36	48.43
7	ET226439	2.33	27.77	1.06	3.13	6.54	46.47
8	ET226440	2.33	27.40	1.07	3.27	5.99	47.27
9	ET226441	2.47	28.30	1.07	3.33	6.91	50.10
10	ET226442	2.27	27.23	1.08	3.13	6.54	51.37
11	ET226443	2.27	27.43	1.09	3.07	5.80	47.43
12	ET226444	2.20	28.20	1.06	3.27	5.56	49.47
13	ET226445	2.40	28.53	1.14	3.27	6.54	51.37
14	ET226446	2.33	27.73	1.11	3.13	6.48	46.43
15	ET226447	2.40	27.67	1.13	3.10	6.05	48.60
16	ET226448	2.40	27.20	1.03	3.27	6.17	49.17
17	ET226449	2.27	27.53	1.02	3.27	5.74	45.07
18	ET226450	2.27	27.20	1.03	3.20	5.93	47.67
19	ET226451	2.33	27.67	1.09	3.20	5.93	44.80
20	ET226452	2.33	27.93	1.06	3.20	5.99	44.57
21	ET226453	2.33	27.07	0.98	3.07	6.30	48.37
22	ET226454	2.27	26.93	1.01	3.27	6.05	46.10
23	ET226455	2.27	27.87	1.02	3.07	5.43	47.83
24	ET226456	2.33	27.83	0.99	3.07	5.86	44.10
Mean for check variety							
1	Hashbenge ©	2.27	27.73	1.11	3.13	6.05	48.60
2	Rebya-40 ©	2.33	27.07	0.99	3.07	6.17	46.07
3	HFB-1 ©	2.27	26.60	1.10	3.13	5.93	52.47
	Minimum	**2.20**	**26.60**	**0.98**	**3.07**	**5.43**	**44.10**
	Maximum	**2.47**	**28.53**	**1.14**	**3.33**	**6.91**	**52.47**
	Mean	**2.32**	**27.69**	**1.07**	**3.17**	**6.08**	**47.79**
	CD (0.05)	**0.23**	**0.91**	**0.15**	**0.23**	**0.45**	**2.61**
	CV (%) Error	**5.99**	**2.01**	**8.86**	**4.47**	**4.57**	**3.34**
	CV (%) Phen.	**3.09**	**1.78**	**4.49**	**2.72**	**5.52**	**4.79**

Table 12 : Experimental details germlasm evaluation of Faba bean (Vegetable types) Rabi 2019-20 Hill-II Year

S. No.	Items	:	Ranichauri	Umiam
1	No of entry	:	34	33
2	No of Check	:	2	3
3	Design	:	ABD	ABD
4	No. of Blocks	:	7	5
5	Number of Rows/plot	:	2	4
6	Row length (m)	:	2.5 m	3
7	Row spacing (cm)	:	45 cm	45 cm
8	Plant spacing (cm)	:	15 cm	15 cm
9	NPKS (kg/ha)	:	40:20:20:20	
10	Net plot size (m^2)	:	2.25	
11	Sowing Date	:	18.11.2019	22-11-2019
12	Harvesting Period	:	17.5.2020 to 27.5.2020	

Table 13: Promising lines in fababean germplasm vegetable type (Rabi 2019-20) at different locations (Hills)
II Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**UUHF Ranichuari (Accessions 34)**				
1	Days to 50% Flowering	112.00	124.29	ET218702 (112), PL (112.95)	Vikrant (117.29)
2	Days to 80% maturity	182.00	192.00	ET218702 (182), ET218736 (182), ET218727 (183), ET218699 (184), ET218703 (184), ET218756 (184)	HFB-1 (185.14)
3	Plant height (cm)	17.60	60.80	ET218716 (60.8), PL (57.86), ET218748 (51.8), ET218760 (50.8), ET218744 (48.6), ET218700 (48.2), ET218769 (47.4), ET218747 (47.2), ET218737 (46.8), ET218699 (46.4), ET218703 (46.2), ET218736 (46.2), ET218783 (45.8)	Basabeer (44.2)
4	Plant height (cm) dwarf	17.60	60.80	ET218784 (17.6), PL (24.26), ET218761 (24.4), ET218701 (30.2), ET218746 (32.5), ET218780 (32.6), ET218785 (32.8), ET218774 (33), ET218782 (33.4), ET218740 (35.6), ET218786 (35.6), ET218704 (36), ET218779 (36.4), ET218718 (36.6), ET218735 (37.8)	HFB-1 (37.91)
5	Pod Length (cm)	2.20	6.00	ET218762 (6), ET218782 (6), ET218769 (5.6), ET218783 (5.3), ET218742 (5), ET218760 (5), ET218702 (4.7)	Rebya-40 (4.54)
6	No of pod per plant	1.00	3.60	PL (4.16), ET218761 (3.6), ET218786 (3.4), ET218719 (3.3), ET218744 (3.3), ET218702 (3), ET218718 (3), ET218740 (3), ET218780 (3), ET218784 (3), ET218700 (2.8), ET218769 (2.8)	Vikrant (2.7)
II	**ICAR Research Complex for NEH Region Umiam(Accessions 34)**				
1	Days to 50% flowering	68.60	85.00		Vikrant (68.6)
2	Days to 80% maturity	136.00	146.00	ET218774 (136), ET218769 (138), ET218783 (138)	HFB-1 (138)
3	Plant height (cm)	32.20	80.97	ET218760 (80.97), ET218756 (80.26), ET218774 (79.94), ET218701 (79.1), ET218744 (76.06), ET218757 (75.1), ET218785 (75.08)	Rebya-40 (73.69)
4	Plant height (cm) dwarf	32.20	80.97	ET218762 (32.2), PL (42.8), ET218716 (49.35), ET218737 (50.36), ET218736 (53), ET218719 (53.75), ET218704 (54.5), ET218782 (57.24), ET218735 (57.3), ET218740 (57.84), ET218747 (58.36), ET218699 (59.15), ET218724 (60.35), ET218718 (61.2), ET218783 (61.32), ET218742 (62.1)	Vikrant (62.6)
5	Pod Length (cm)	4.64	8.92	ET218760 (8.92), ET218774 (8.76), ET218782 (8.64), PL (7.87)	Rebya-40 (6.74)
6	Pod width (mm)	1.00	1.60	ET218774 (1.6), ET218760 (1.52), ET218701 (1.5), ET218716 (1.5), ET218735 (1.5), ET218756 (1.5), ET218704 (1.48), ET218748 (1.46), ET218769 (1.46), ET218746 (1.46)	Rebya-40 (1.46)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
7	Seed yield yield (q/ha)	1.15	16.67	ET218724 (16.67), ET218716 (13.33), ET218760 (13.33), ET218699 (11.89), ET218702 (11.19), ET218736 (11.11)	Vikrant (7.73)
8	100 seed weight (g)	42.50	86.50	ET218719 (86.5), ET218747 (84.9), ET218724 (77.9), ET218704 (76.6)	Basabeer (72.26)
9	Number of pods per node	1.00	3.00	ET218718 (3), ET218736 (3), ET218740 (3), ET218757 (3), ET218782 (3)	Basabeer (2)
10	Number of seeds per pod	2.00	6.00	ET218780 (6), ET218783 (5)	Basabeer (4.8)
Best entries over locations (Accessions 36)					
1	Days to 50% flowering	92.94	123.00		HFB-1 (93.11)
2	Days to 80% maturity	161.50	190.00	ET218736 (161.5), ET218756 (161.5)	HFB-1 (161.57)
3	Plant height (cm)	24.40	65.88	ET218760 (65.88), ET218744 (62.33), ET218756 (59.13), ET218769 (58.84)	Basabeer (58.66)
4	Plant height (cm) dwarf	24.40	65.88	ET218761 (24.4), ET218786 (35.6), ET218762 (36.8), ET218727 (38.2), ET218784 (42.24), ET218704 (45.25), ET218782 (45.32), ET218703 (46.2), ET218719 (46.68), ET218740 (46.72), ET218735 (47.55), ET218700 (48.2), ET218737 (48.58), ET218718 (48.9), ET218736 (49.6), ET218780 (50.37), ET218742 (50.45)	Vikrant (50.96)
5	Pod Length (cm)	2.50	8.76	ET218774 (8.76), ET218782 (7.32), ET218747 (7.22), ET218746 (7.06), ET218760 (6.96), ET218737 (6.47), ET218769 (6.32), ET218762 (6.08), ET218716 (5.95), ET218701 (5.92), ET218783 (5.85), ET218702 (5.65)	Rebya-40 (5.64)

Table 14: Multilocation evaluation of vegetable types faba bean at different locations Hills : Rabi 2019-20 - II Year

S.No.	Accession No.	Days to 50% Flowering			Days to 80% maturity			Plant height (cm)		
		Ranichuari	Umiam	Mean	Ranichuari	Umiam	Mean	Ranichuari	Umiam	Mean
1	ET218699	114.00	83.00	**98.50**	184.00	146.00	**165.00**	46.40	59.15	**52.78**
2	ET218700	115.00	-	**115.00**	186.00	-	**186.00**	48.20	-	**48.20**
3	ET218701	117.00	85.00	**101.00**	188.00	146.00	**167.00**	30.20	79.10	**54.65**
4	ET218702	112.00	83.00	**97.50**	182.00	145.00	**163.50**	41.20	68.00	**54.60**
5	ET218703	114.00	-	**114.00**	184.00	-	**184.00**	46.20	-	**46.20**
6	ET218704	116.00	76.00	**96.00**	187.00	140.00	**163.50**	36.00	54.50	**45.25**
7	ET218716	123.00	81.00	**102.00**	192.00	146.00	**169.00**	60.80	49.35	**55.08**
8	ET218718	119.00	71.00	**95.00**	190.00	142.00	**166.00**	36.60	61.20	**48.90**
9	ET218719	119.00	71.00	**95.00**	190.00	141.00	**165.50**	39.60	53.75	**46.68**
10	ET218724	117.00	76.00	**96.50**	188.00	141.00	**164.50**	42.40	60.35	**51.38**
11	ET218727	116.00	-	**116.00**	183.00	-	**183.00**	38.20	-	**38.20**
12	ET218735	120.00	78.00	**99.00**	190.00	144.00	**167.00**	37.80	57.30	**47.55**
13	ET218736	115.00	72.00	**93.50**	182.00	141.00	**161.50**	46.20	53.00	**49.60**
14	ET218737	118.00	73.00	**95.50**	189.00	141.00	**165.00**	46.80	50.36	**48.58**
15	ET218740	120.00	76.00	**98.00**	191.00	141.00	**166.00**	35.60	57.84	**46.72**
16	ET218742	119.00	78.00	**98.50**	189.00	144.00	**166.50**	38.80	62.10	**50.45**
17	ET218744	118.00	76.00	**97.00**	189.00	140.00	**164.50**	48.60	76.06	**62.33**
18	ET218746	115.00	78.00	**96.50**	186.00	142.00	**164.00**	32.50	69.94	**51.22**
19	ET218747	120.00	76.00	**98.00**	190.00	142.00	**166.00**	47.20	58.36	**52.78**
20	ET218748	121.00	78.00	**99.50**	191.00	141.00	**166.00**	51.80	62.78	**57.29**
21	ET218756	117.00	76.00	**96.50**	184.00	139.00	**161.50**	38.00	80.26	**59.13**
22	ET218757	115.00	78.00	**96.50**	186.00	140.00	**163.00**	42.00	75.10	**58.55**
23	ET218760	119.00	78.00	**98.50**	189.00	141.00	**165.00**	50.80	80.97	**65.88**
24	ET218761	123.00	-	**123.00**	190.00	-	**190.00**	24.40	-	**24.40**
25	ET218762	121.00	76.00	**98.50**	188.00	139.00	**163.50**	41.40	32.20	**36.80**
26	ET218769	122.00	74.00	**98.00**	189.00	138.00	**163.50**	47.40	70.28	**58.84**
27	ET218774	122.00	72.00	**97.00**	189.00	136.00	**162.50**	33.00	79.94	**56.47**
28	ET218779	120.00	81.00	**100.50**	187.00	141.00	**164.00**	36.40	65.54	**50.97**
29	ET218780	122.00	81.00	**101.50**	189.00	144.00	**166.50**	32.60	68.13	**50.37**
30	ET218782	121.00	78.00	**99.50**	188.00	139.00	**163.50**	33.40	57.24	**45.32**
31	ET218783	121.00	73.00	**97.00**	188.00	138.00	**163.00**	45.80	61.32	**53.56**
32	ET218784	121.00	81.00	**101.00**	188.00	146.00	**167.00**	17.60	66.88	**42.24**
33	ET218785	119.00	81.00	**100.00**	186.00	144.00	**165.00**	32.80	75.08	**53.94**
34	ET218786	120.00	-	**120.00**	187.00	-	**187.00**	35.60	-	**35.60**
Mean for check variety										
1	Basabeer (c)	124.14	71.00	**97.57**	188.43	140.20	**164.31**	44.20	73.12	**58.66**
2	HFB-1 (c)	117.43	68.80	**93.11**	185.14	138.00	**161.57**	37.91	71.27	**54.59**
3	Rebya-40 ©	124.29	72.80	**98.54**	188.71	141.20	**164.96**	40.49	73.69	**57.09**
4	Vikrant (c)	117.29	68.60	**92.94**	186.57	138.00	**162.29**	39.31	62.60	**50.96**
	Minimum	**112.00**	**68.60**	**92.94**	**182.00**	**136.00**	**161.50**	**17.60**	**32.20**	**24.40**
	Maximum	**124.29**	**85.00**	**123.00**	**192.00**	**146.00**	**190.00**	**60.80**	**80.97**	**65.88**
	Mean	**118.79**	**76.40**	**100.31**	**187.58**	**141.38**	**167.41**	**40.11**	**64.45**	**50.57**
	CD (0.05)	**4.34**	**4.01**	**-**	**4.99**	**2.08**	**-**	**13.66**	**19.80**	**-**
	CV (%) Error	**1.43**	**2.14**	**-**	**1.06**	**0.56**	**-**	**13.43**	**10.57**	**-**
	CV (%) Phen.	**2.54**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

S.No.	Accession No.	Pod Length (cm)			Ranichuari	Umiam				
		Ranichuari	Umiam	Mean	No of pod per plant	Pod width (mm)	Seed yield yield (q/ha)	100 seed weight (g)	Number of pods per node	Number of seeds per pod
1	ET218699	4.00	5.90	**4.95**	1.00	1.36	11.89	45.90	2.00	4.00
2	ET218700	4.40	-	**4.40**	2.80	-	-	-	-	-
3	ET218701	-	5.92	**5.92**	-	1.50	1.56	57.90	1.00	4.00
4	ET218702	4.70	6.60	**5.65**	3.00	1.28	11.19	52.60	1.00	4.00
5	ET218703	2.50	-	**2.50**	1.00	-	-	-	-	-
6	ET218704	4.00	6.96	**5.48**	1.60	1.48	4.89	76.60	2.00	2.00
7	ET218716	4.30	7.60	**5.95**	1.30	1.50	13.33	59.80	1.00	4.00
8	ET218718	3.00	5.96	**4.48**	3.00	1.04	1.22	54.70	3.00	3.00
9	ET218719	3.20	5.06	**4.13**	3.30	1.40	3.56	86.50	2.00	3.00
10	ET218724	3.70	7.22	**5.46**	2.30	1.42	16.67	77.90	2.00	4.00
11	ET218727	4.00	-	**4.00**	1.00	-	-	-	-	-
12	ET218735	2.20	6.38	**4.29**	1.70	1.50	2.67	64.50	1.00	4.00
13	ET218736	3.60	5.96	**4.78**	1.60	1.00	11.11	64.50	3.00	4.00
14	ET218737	-	6.47	**6.47**	-	1.40	5.96	54.50	2.00	4.00
15	ET218740	4.00	6.48	**5.24**	3.00	1.36	3.78	44.50	3.00	3.00
16	ET218742	5.00	5.10	**5.05**	2.00	1.08	1.70	63.10	2.00	2.00
17	ET218744	4.30	6.88	**5.59**	3.30	1.16	4.59	42.50	1.00	3.00
18	ET218746	-	7.06	**7.06**	-	1.46	1.96	59.40	2.00	3.00
19	ET218747	-	7.22	**7.22**	-	1.16	1.70	84.90	2.00	2.00
20	ET218748	4.00	7.00	**5.50**	2.00	1.46	1.48	53.50	2.00	4.00
21	ET218756	3.00	7.12	**5.06**	2.30	1.50	1.89	49.60	2.00	3.00
22	ET218757	3.20	6.68	**4.94**	1.40	1.44	1.26	54.60	3.00	4.00
23	ET218760	5.00	8.92	**6.96**	2.00	1.52	13.33	58.70	2.00	3.00
24	ET218761	3.80	-	**3.80**	3.60	-	-	-	-	-
25	ET218762	6.00	6.15	**6.08**	1.80	1.16	1.56	52.80	2.00	3.00
26	ET218769	5.60	7.04	**6.32**	2.80	1.46	3.22	56.70	2.00	2.00
27	ET218774	-	8.76	**8.76**	-	1.60	5.81	65.80	2.00	3.00
28	ET218779	4.30	5.14	**4.72**	1.60	1.26	1.26	47.70	1.00	4.00
29	ET218780	4.00	4.64	**4.32**	3.00	1.10	1.26	42.80	1.00	6.00
30	ET218782	6.00	8.64	**7.32**	1.00	1.28	1.33	47.80	3.00	4.00
31	ET218783	5.30	6.40	**5.85**	2.00	1.36	2.48	57.50	2.00	5.00
32	ET218784	4.00	6.50	**5.25**	3.00	1.36	1.15	61.50	1.00	4.00
33	ET218785	3.20	6.60	**4.90**	1.80	1.40	5.70	64.50	1.00	4.00
34	ET218786	3.20	-	**3.20**	3.40	-	-	-	-	-
Mean for check variety										
1	Basabeer (c)	4.53	6.17	**5.35**	2.07	1.45	6.26	72.26	2.00	4.80
2	HFB-1 (c)	3.23	5.06	**4.14**	1.89	1.08	6.97	66.80	1.80	4.00
3	Rebya-40 ©	4.54	6.74	**5.64**	1.84	1.46	4.99	67.14	1.60	4.40
4	Vikrant (c)	4.31	4.90	**4.61**	2.70	1.09	7.73	58.66	1.60	4.60
	Minimum	**2.20**	**4.64**	**2.50**	**1.00**	**1.00**	**1.15**	**42.50**	**1.00**	**2.00**
	Maximum	**6.00**	**8.92**	**8.76**	**3.60**	**1.60**	**16.67**	**86.50**	**3.00**	**6.00**
	Mean	**4.06**	**6.52**	**5.30**	**2.18**	**1.34**	**5.01**	**59.64**	**1.85**	**3.63**
	CD (0.05)	**2.75**	**1.13**	**-**	**1.46**	**0.25**	**10.92**	**32.08**	**2.27**	**3.22**
	CV (%) Error	**26.38**	**7.41**	**-**	**27.42**	**7.26**	**63.09**	**18.15**	**48.66**	**27.14**
	CV (%) Phen.	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table 15: Experimental details germlasm evaluation of Buckwheat Rabi 2019-20:Hills - I Year

A	**Centre Name:**	**:**	ICAR- National organic Farming Research Institute, Sikkim
1	No of entry	**:**	71
2	No of Check	**:**	4
3	Design	**:**	
4	No. of Blocks in ABD/Replications in RBD	**:**	
5	Number of Rows/plot	**:**	3
6	Row length (m)	**:**	3
7	Row spacing (cm)	**:**	45
8	Plant spacing (cm)	**:**	20
9	NPKS (kg/ha)	**:**	
10	Net plot size *(m^2)*	**:**	6 m
11	Sowing Date*(DD/MM/YYYY)*	**:**	5/11/2019
12	Transplanting date	**:**	
13	Harvesting Period	**:**	

Table 16: Promising lines in buckwheat germplasm for various characters at Shikim: Rabi 2019-20(Hills)
I Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Days to 50% flowering	50.00	80.00	IC042458 (50), IC047929 (50), IC049160 (50), IC006755 (55), IC202266 (60), IC026583 (60), IC026600 (60), IC299059 (60), IC046160 (60), IC013411 (61), IC013191 (62), IC018049 (62), IC037284 (62), IC042427 (62), IC049661 (63)	VL-7 (65)
2	Leaf length (cm)	4.95	9.40	IC013412 (9.4), IC024300 (9.34), IC049661 (9.15), EC321800 (9.12), IC047458 (9.05), IC299059 (8.95), IC016580 (8.8), IC107966 (8.64), EC104035 (8.45), IC202266 (8.42), IC014253 (8.41), IC013144 (8.37), IC049571 (8.35), IC016556 (8.32), IC202465 (8.3), IC018751 (8.24)	VL-8 (6.84)
3	Leaf width (cm)	3.96	7.85	IC047458 (7.85), IC049661 (7.5), IC024300 (7.42), EC321800 (7.25), IC202266 (7.24), IC024301 (6.98), IC016580 (6.96), IC014253 (6.95), IC013140 (6.9), IC037284 (6.85), IC013412 (6.76), IC299059 (6.76), IC107966 (6.72), IC013144 (6.54), IC025999 (6.38), IC026597 (6.34)	VL-9 (5.32)
4	Number of leaves	19.80	33.48	EC104035 (33.48), EC323724 (33.34), IC049668 (33), IC013411 (32.85), IC014253 (32.85), IC037282 (32.85), EC216630 (32.75), IC047458 (32.75), IC042427 (32.34), IC037296 (32.14), IC037295 (32), IC037284 (31.92), IC037303 (31.82), IC521297 (31.76), IC049659 (31.75), IC079238 (31.72)	Shimla-B-4 (31.22)
5	Number of internodes	7.84	15.68	IC025999 (15.68), EC218739 (14.58), IC024301 (14.32), IC022426 (13.94), EC286382 (13.86), EC286380 (13.58), IC018757 (13.28), IC014253 (13.24), IC202465 (12.88), EC323724 (12.8), IC049659 (12.6), IC202293 (12.56), IC026583 (12.52), EC125940 (12.4), IC042427 (12.4), IC042458 (12.34)	Himpriya (9.8)
6	Petiole length (cm)	3.80	7.54	IC037296 (7.54), IC037295 (7.42), IC037303 (7.4), IC018751 (7.2), IC026590 (7.2), IC013412 (7), IC026589 (7), IC049661 (7), IC013144 (6.8), IC013410 (6.8), IC047458 (6.8), IC009879 (6.8)	Himpriya (4.8)
7	Number of primary branch	3.80	11.80	IC026600 (11.8), IC026583 (10.2), IC047929 (9.2), IC202266 (7.2), EC218739 (6.8), IC026552 (6.8), IC018757 (6.6), IC037304 (6.6), EC218739 (6.2), IC013140 (6.2), IC046160 (6.2)	Himpriya (6.2)
8	Number of inflorescence p	12.24	19.80	IC049661 (19.8), IC202465 (19.6), IC047458 (19.58), IC037304 (19.27), IC037303 (19.15), IC299059 (19.05), IC107285 (18.94), EC125940 (18.94), EC286380 (18.8), EC216630 (18.72), IC049659 (18.64), IC079238 (18.6), IC107966 (18.38), IC042427 (18.37), IC049668 (18.32), IC037284 (18.3)	Shimla-B-8 (16.24)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Length of cyme (cm)	3.24	5.80	IC026552 (5.8), IC018757 (5.6), IC340829 (5.6), IC202293 (5.4), IC202465 (5.4), EC286382 (5.2), IC216622 (5.2), IC024301 (5.2), IC006755 (5.2), IC042458 (5.2)	Himpriya (4.32)
10	Plant height (cm)	26.20	171.00	IC016556 (171), IC018751 (158), IC049571 (153), IC026589 (149.6), EC286382 (148.2), EC104035 (148), IC049668 (145), EC286380 (139.6), IC026594 (133.4), IC026590 (130.4), IC202293 (122.2), EC218739 (118), IC202465 (111.8)	Shimla-B-10 (105.36)
11	Days to 80% maturity	90.00	125.00		Shimla-B-11 (90)
12	Number of seed per inflor	4.08	6.82	IC079238 (6.82), IC299059 (6.72), IC107982 (6.64), IC049659 (6.52), EC323724 (6.34), IC107966 (6.34), IC107285 (6.32), IC037284 (6.32), IC018049 (6.22), IC037304 (6.22), EC104035 (6.12), EC125940 (6.12), EC216630 (6.1), IC049571 (6.1), IC049668 (6.05)	Himpriya (5.66)
13	Seed yield per plant (g)	1.77	3.44	IC412849 (3.44), IC046160 (3.32), IC016552 (3.18), IC013140 (3.12), EC125940 (3.1), IC188669 (3), IC258239 (3), IC049571 (2.73), EC104035 (2.7), IC022426 (2.64), IC016580 (2.56)	Shimla-B-13 (2.56)
14	1000 seed weight (g)	28.96	42.67		Himpriya (42.67)

Table 17:Evaluation of germplasm lines in buckwheat at Tadong: Rabi 2019-20 (Hills)
I Year

S.No.	Accession No.	Days to 50% flowering	Leaf length (cm)	Leaf width (cm)	Number of leaves	Number of internodes	Petiole length (cm)	Number of primary branches	Number of inflorescence per plant	Length of cyme (cm)	Plant height (cm)	Days to 80% maturity	Number of seed per inflorescence	Seed yield per plant (g)	1000 seed weight (g)
1	EC104035	76.00	8.45	6.17	33.48	11.60	5.20	5.80	17.66	4.80	148.00	110.00	6.12	2.70	41.55
2	EC125940	65.00	7.75	5.92	30.18	12.40	6.60	5.60	18.94	5.00	94.20	100.00	6.12	3.10	41.76
3	EC216630	70.00	7.65	5.50	32.75	11.80	5.00	4.60	18.72	4.80	94.00	100.00	6.10	2.40	37.60
4	EC218739	80.00	8.20	6.12	21.80	14.58	6.00	6.80	16.60	4.80	95.60	110.00	5.20	2.54	38.00
5	EC218739	76.00	7.26	4.68	20.24	11.78	5.40	6.20	15.80	4.40	118.00	120.00	5.00	2.32	33.86
6	EC286380	72.00	8.22	5.86	19.80	13.58	6.40	4.40	18.80	4.80	139.60	115.00	4.60	2.42	37.30
7	EC286382	66.00	8.22	5.82	21.60	13.86	5.20	5.00	14.80	5.20	148.20	115.00	5.80	2.40	33.39
8	EC321800	64.00	9.12	7.25	23.60	9.99	6.60	6.00	14.30	4.00	104.40	115.00	4.92	2.40	36.94
9	EC323724	-	7.55	6.08	33.34	12.80	6.00	-	17.88	4.40	-	-	6.34	2.20	30.96
10	IC107285	65.00	7.36	5.52	31.68	11.40	5.00	4.80	18.94	4.80	63.00	100.00	6.32	2.00	39.22
11	IC107966	65.00	8.64	6.72	31.00	10.40	6.40	4.60	18.38	4.80	56.60	100.00	6.34	1.80	34.70
12	IC107982	65.00	6.46	5.45	31.15	11.60	4.20	4.40	16.56	4.20	53.60	110.00	6.64	2.50	33.84
13	IC108501	65.00	6.56	5.24	26.29	9.40	4.60	4.40	15.65	4.60	44.20	110.00	5.48	2.00	28.96
14	IC013140	68.00	7.36	6.90	22.60	8.95	5.30	6.20	16.34	4.90	94.20	115.00	5.79	3.12	33.22
15	IC013144	64.00	8.37	6.54	22.14	9.02	6.80	5.60	16.53	4.80	86.60	100.00	5.93	2.00	36.92
16	IC013191	62.00	7.32	5.92	22.28	8.51	6.40	5.00	14.65	4.00	74.20	100.00	6.00	2.20	35.38
17	IC013410	67.00	7.38	5.84	21.42	8.21	6.80	5.20	14.98	4.00	86.80	100.00	5.33	2.00	32.68
18	IC013411	61.00	6.39	5.75	32.85	8.33	5.60	5.40	16.18	4.20	80.80	95.00	5.80	1.80	35.30
19	IC013412	76.00	9.40	6.76	22.16	9.44	7.00	5.00	16.40	4.70	48.80	95.00	5.33	2.20	37.18
20	IC014253	77.00	8.41	6.95	32.85	13.24	6.00	6.00	16.16	4.80	62.00	95.00	5.65	1.94	33.68
21	IC016552	65.00	5.60	5.22	22.80	10.20	4.40	6.00	14.40	4.00	41.00	95.00	5.56	3.18	35.40
22	IC016556	64.00	8.32	6.05	23.00	11.24	6.00	5.80	15.38	5.00	171.00	100.00	5.68	2.20	39.64
23	IC016580	74.00	8.80	6.96	23.40	10.00	5.20	5.00	15.50	4.00	79.80	115.00	5.80	2.56	35.20
24	IC018049	62.00	7.86	6.05	31.42	9.60	5.60	5.00	18.28	4.80	56.80	100.00	6.22	2.10	39.50
25	IC018751	77.00	8.24	6.24	22.14	10.64	7.20	5.00	16.50	4.70	158.00	105.00	5.70	1.90	34.70

S.No.	Accession No.	Days to 50% flowering	Leaf length (cm)	Leaf width (cm)	Number of leaves	Number of internodes	Petiole length (cm)	Number of primary branches	Number of inflorescence per plant	Length of cyme (cm)	Plant height (cm)	Days to 80% maturity	Number of seed per inflorescence	Seed yield per plant (g)	1000 seed weight (g)
26	IC018757	75.00	7.40	5.96	22.40	13.28	6.00	6.60	15.52	5.60	99.80	115.00	5.40	2.28	37.12
27	IC188669	65.00	6.67	4.81	22.54	10.00	4.20	4.20	15.84	4.20	50.40	110.00	5.24	3.00	35.98
28	IC202266	60.00	8.42	7.24	21.90	12.00	5.20	7.20	16.60	4.80	72.00	115.00	5.20	2.24	34.77
29	IC202293	75.00	7.94	5.12	20.12	12.56	6.60	6.00	16.80	5.40	122.20	120.00	5.62	2.32	36.33
30	IC202465	80.00	8.30	6.24	21.65	12.88	5.00	5.20	19.60	5.40	111.80	120.00	4.60	2.32	34.34
31	IC216622	65.00	6.69	4.26	26.00	9.40	5.32	4.20	16.52	5.20	56.00	110.00	4.98	2.20	36.16
32	IC022426	78.00	6.80	5.94	22.60	13.94	5.00	4.60	15.80	4.40	99.80	115.00	5.80	2.64	34.56
33	IC024300	64.00	9.34	7.42	22.28	12.32	6.20	6.00	16.62	4.20	93.20	95.00	5.73	2.20	35.36
34	IC024301	65.00	7.64	6.98	23.60	14.32	6.60	5.60	14.60	5.20	65.80	105.00	6.00	2.12	38.24
35	IC258239	65.00	7.66	5.02	22.42	9.80	4.80	4.00	16.24	5.00	47.60	110.00	5.00	3.00	36.36
36	IC025999	65.00	6.58	6.38	23.00	15.68	5.00	5.60	15.20	4.60	72.80	115.00	5.20	1.88	41.52
37	IC026552	72.00	6.12	4.98	23.30	9.84	6.60	6.80	14.40	5.80	97.80	120.00	5.60	2.00	40.12
38	IC026583	60.00	7.48	4.82	23.10	12.52	4.20	10.20	14.80	4.80	82.60	100.00	5.60	1.96	34.24
39	IC026589	77.00	7.44	5.25	22.42	11.20	7.00	5.00	16.84	4.50	149.60	125.00	5.76	2.20	37.62
40	IC026590	74.00	6.45	5.28	24.85	11.80	7.20	5.80	15.69	4.20	130.40	110.00	5.78	1.77	34.34
41	IC026594	80.00	6.54	5.12	26.12	11.60	6.40	4.20	15.91	4.30	133.40	110.00	5.81	2.47	35.98
42	IC026597	70.00	7.32	6.34	21.10	11.32	5.80	5.60	14.30	5.00	66.60	100.00	5.20	2.26	34.34
43	IC026600	60.00	8.12	6.12	20.40	9.00	5.60	11.80	16.80	4.80	69.20	120.00	5.80	2.24	39.32
44	IC266743	65.00	4.95	3.96	26.15	9.60	5.40	4.40	12.32	5.00	45.00	110.00	4.08	2.00	33.10
45	IC006755	55.00	7.92	6.12	21.90	12.32	5.60	5.60	15.00	5.20	81.00	100.00	5.60	2.34	35.80
46	IC299059	60.00	8.95	6.76	31.14	11.80	4.20	5.00	19.05	4.60	64.80	110.00	6.72	2.00	33.64
47	IC319581	65.00	6.34	4.32	28.16	10.20	4.80	4.20	12.24	4.52	44.20	110.00	4.34	1.90	32.67
48	IC319588	65.00	5.26	4.32	23.58	9.00	4.60	4.20	16.52	4.32	45.40	110.00	4.70	1.80	34.25
49	IC329950	65.00	6.72	4.45	31.23	9.00	4.20	3.80	13.24	4.80	49.60	110.00	4.20	2.20	33.70
50	IC340829	65.00	6.61	4.57	26.92	8.60	4.40	4.00	14.32	5.60	43.60	110.00	4.48	1.80	35.68
51	IC037282	78.00	7.64	5.32	32.85	11.60	5.80	4.60	16.13	4.60	93.40	105.00	5.84	2.10	34.32
52	IC037284	62.00	8.06	6.85	31.92	12.00	5.80	5.60	18.30	4.20	64.20	100.00	6.32	2.00	39.90
53	IC037295	71.00	7.74	5.92	32.00	10.00	7.42	5.40	16.34	5.00	89.00	100.00	5.87	2.37	35.90

S.No.	Accession No.	Days to 50% flowering	Leaf length (cm)	Leaf width (cm)	Number of leaves	Number of internodes	Petiole length (cm)	Number of primary branches	Number of inflorescence per plant	Length of cyme (cm)	Plant height (cm)	Days to 80% maturity	Number of seed per inflorescence	Seed yield per plant (g)	1000 seed weight (g)
54	IC037296	71.00	7.84	5.84	32.14	10.80	7.54	5.80	16.56	4.80	95.20	100.00	5.89	2.10	35.66
55	IC037303	65.00	6.94	5.26	31.82	11.40	7.40	4.40	19.15	4.37	65.60	95.00	5.92	2.07	35.50
56	IC037304	65.00	7.57	5.82	30.68	10.60	5.00	6.60	19.27	4.20	89.40	110.00	6.22	2.54	42.36
57	IC412849	65.00	6.82	4.82	22.72	9.80	4.60	5.00	17.42	4.36	57.00	110.00	5.74	3.44	40.78
58	IC421601	65.00	6.68	4.39	30.00	10.20	5.00	3.80	16.52	4.60	55.20	110.00	4.74	2.00	38.68
59	IC042427	62.00	6.82	4.76	32.34	12.40	6.60	5.20	18.37	4.33	50.20	95.00	5.95	2.17	36.28
60	IC042458	50.00	7.88	5.82	22.80	12.34	6.40	5.40	15.60	5.20	43.80	100.00	5.40	2.42	34.82
61	IC046160	60.00	6.78	5.66	22.80	10.64	6.00	6.20	14.80	4.40	42.00	100.00	5.80	3.32	38.60
62	IC047458	66.00	9.05	7.85	32.75	11.60	6.80	5.00	19.58	4.00	26.20	95.00	5.97	2.43	38.98
63	IC047929	50.00	6.96	5.42	22.00	11.26	6.40	9.20	15.40	4.40	60.00	100.00	5.80	1.98	36.60
64	IC049160	50.00	6.32	5.88	22.00	10.36	5.20	5.20	17.60	4.40	40.40	100.00	5.20	2.22	36.35
65	IC049571	79.00	8.35	5.32	31.22	11.20	5.40	5.80	17.45	4.56	153.00	115.00	6.10	2.73	35.16
66	IC049659	66.00	8.16	6.24	31.75	12.60	5.60	4.80	18.64	4.60	57.40	110.00	6.52	2.50	35.28
67	IC049661	63.00	9.15	7.50	24.32	10.60	7.00	5.60	19.80	4.08	31.00	95.00	6.00	2.13	39.40
68	IC049668	72.00	7.35	6.32	33.00	11.60	6.40	5.40	18.32	4.92	145.00	105.00	6.05	2.53	38.12
69	IC521297	65.00	6.73	4.92	31.76	9.20	4.80	4.60	12.52	4.54	45.60	110.00	4.68	2.20	33.68
70	IC079238	65.00	7.62	5.32	31.72	11.60	6.40	4.60	18.60	4.40	41.40	110.00	6.82	1.80	35.74
71	IC009879	65.00	8.18	6.17	22.40	8.92	6.80	5.80	13.10	4.90	78.60	100.00	5.60	1.86	35.88
Mean for check variety															
1	Himpriya	80.00	6.54	5.23	28.52	9.80	4.80	6.20	15.32	4.32	85.82	95.00	5.66	2.20	42.67
2	VL-7	65.00	6.84	5.32	29.54	7.84	4.40	5.50	14.52	3.24	86.34	95.00	4.48	2.20	39.67
3	Shimla-B-1	75.00	5.26	4.62	31.22	8.52	3.80	4.40	16.24	3.25	105.36	90.00	5.32	2.56	32.30
4	PRB-1	75.00	6.46	5.22	24.56	8.64	4.60	4.60	13.32	4.22	95.54	95.00	5.22	2.32	38.78
	Minimum	**50.00**	**4.95**	**3.96**	**19.80**	**7.84**	**3.80**	**3.80**	**12.24**	**3.24**	**26.20**	**90.00**	**4.08**	**1.77**	**28.96**
	Maximum	**80.00**	**9.40**	**7.85**	**33.48**	**15.68**	**7.54**	**11.80**	**19.80**	**5.80**	**171.00**	**125.00**	**6.82**	**3.44**	**42.67**
	Mean	**67.38**	**7.44**	**5.75**	**26.32**	**10.96**	**5.69**	**5.44**	**16.32**	**4.61**	**80.95**	**105.88**	**5.59**	**2.28**	**36.32**
	CV(%) Ph.	**10.45**	**13.04**	**14.90**	**17.31**	**15.41**	**16.67**	**23.90**	**11.18**	**10.22**	**42.57**	**7.75**	**10.64**	**16.18**	**7.50**

2.4.2 Plains

Multilocation germplasm evaluation (292 accessions) was planned to be conducted on grain amaranth (Set-1 50, Set-2, 100 accessions second year evaluation at eleven locations and data are received eight locations), faba bean (33 accessions first year evaluation at six locations), faba bean (35 accessions at second year evaluation at six locations), Chenopodium (74 accessions for first year evaluation at ten locations, data received five locations) and Chenopodium quinoa (50 accessions at ten locations, data are received from five locations). The germplasm accessions were evaluated in augmented design with standard check cultivars.

2.4.2.1 Grain Amaranth-Set-1: II Year Evaluation

Germplasm screening nursery consisting of 50 accessions along with four checks was planned to be evaluated at ten locations. The results were received from seven locations. The checks used were GA-2, BGA-2, RMA-7 and Suvarna. The experimental details and list of promising accessions for all characters has been presented in Table 18 and 19 respectively and statistical parameters for all the characters of different locations have been presented in Table 20.

A set of 50 genotypes and five check varieties were screened for five yield related attributes at NBPGR, RS, Akola. The entry IC279652 (41 days) was found earlier to the check variety in flowering. The maximum height (84.76 cm) was found in the check GA-2 (84.76 cm). The IC279363 was superior to the check variety for seed yield (34.00 g/plant). The highest inflorescence length (54.06 cm) was found in the check RMA-7.

A set of 50 genotypes and five check varieties were screened for eleven yield related attributes at IGKV, Ambikapur. The entry IC506575 (52 days) was found earlier to the check variety in flowering while IC255555 was early in maturing (126.00 days). The maximum height (55.60 cm) was found in the entry IC265980 (55.60 cm). The IC095346 was superior to the check variety for seed yield (9.63 q/ha). The highest inflorescence length (22.00 cm) was found in the genotype IC266937.

A total of 50 accessions and four checks were also evaluated at OUA&T, Bhubaneswar for six quantitative characters. The genotype IC255555 (27.00 days) were earliest in flowering while IC265980 was early in maturity (85.00 days). No entry had the highest grain yield per plant as compared check variety BGA-2 (8.48 g). The highest plant height was observed in BGA-2 (122.64 cm). The highest seed volume weight was observed in accession IC317427 (7.91 g).

A set of 50 genotypes and four checks were screened for eight yield related attributes at JAU, Mandor. The maximum height (135.50 cm) was found in the accession IC-317427 (135.50 cm) and RMA-7 (20.05 q/ha) was found superior in yield.

At Rahuri, a set of 65 genotypes and four checks were evaluated for eleven quantitative characters. No entry was superior as compared to check variety RMA-7 (187.06 cm) for plant height. SKGPA-122 (32.00 days) was earliest in flowering and IC095386 was found superior to check variety in maturity (80.00 days). Highest seed yield (23.13 g) was observed in genotype IC095542. The highest inflorescence length (89.30 cm) was noted in the accession IC042006.

A total of 50 genotypes were also evaluated at Ranchi for thirteen yield attributes. IC506534 (69.00 days) was earliest in flowering and IC341452 was found superior to check variety in maturity (128.00 days). Maximum plant height (83.40 cm) was observed in genotype Suvarna while highest seed yield (20.00 g/plant) was observed in genotype IC279760. The highest inflorescence length (25.00 cm) was noted in the accession IC279832.

A set of 50 accessions and four checks were evaluated for twelve quantitative and twelve qualitative characters (Table 14) at S.K. Nagar. Accession IC506529 (27.60 g/plant) was observed highest yielder. The maximum plant height (166.00 cm) was observed in genotype GA-2. The maximum seed weight was recorded in accession IC506535 (7.87 g) followed by IC266937 (7.76 g). The longest inflorescence (62.48 cm) was recorded in the genotype GA-2 Accession IC279612 (29.00 days) was earliest in flowering while IC2669337 was early in maturing (87.00 days).

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 six centres. Seed yield per plant (g) was low at Bhubaneswar (5.12 g) and high at Rahuri (13.56 g). No accession was the highest seed yielder as compared to check variety.

Plant height was the highest at Rahuri (68.76 cm) and lowest at Ranchi (36.79 cm) on the basis of average over the seven locations. The check variety GA-2 had the highest plant height (108.61 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 (31.70 days) at Bhubaneswar while it was the longest (77.57 days) at Ranchi. The variety IC279807 showed consistency for early flowering over the locations and ranked first (39.17 days) based on the overall performance.

Maturity period was the earliest at Bhubaneswar (89.82 days) followed by S.K. Nagar (94.97 days). The entry IC506520 (102.80 days) was the earliest maturing line based on six locations.

The length of inflorescence of the accessions was the highest at Rahuri (41.47 cm) and lowest at Ranchi (12.59 cm). Based on the average over seven locations, the variety GA-2 had the longest inflorescence (41.02 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at five centres showed that it was the highest at Ranchi (7.80 g/10ml) and low at Ambikapur (5.67 g/10ml). Based on the average over five locations, the genotype IC506519 showed the highest test weight (7.83 g/10ml).

2.4.2.2 Grain Amaranth-Set-2: II Year Evaluation

Germplasm screening nursery consisting of 100 accessions along with four checks was planned to be evaluated at eleven locations. The results were received from eight locations. The checks used were GA-2, BGA-2, RMA-7 and Suvarna. The experimental details and list of promising accessions for all characters has been presented in Table 21 and 22 respectively and statistical parameters for all the characters of different locations have been presented in Table 23.

A set of 100 genotypes and four check varieties were screened for six yield related attributes at NBPGR, RS, Akola. The entry IC317517 (40 days) was found earlier to the check variety in flowering. The maximum height (125.20 cm) was found in the entry IC444105. The check suvarna was superior to all genotype for seed yield (13.62 g/plant). The highest inflorescence length (51.64 cm) was found in the check GA-2.

A set of 100 genotypes and five check varieties were screened for eleven yield related attributes at IGKV, Ambikapur. The entry IC469777 (49 days) was found earlier to the check variety in flowering while IC279652 was early in maturing (126.00 days). The maximum height (59.00 cm) was found in the entry IC356027 (59.00 cm). The

IC362257 was superior to the check variety for seed yield (10.86 q/ha). The highest inflorescence length (22.60 cm) was found in the genotype IC383647.

A set of 100 genotypes and four check varieties were screened for eleven yield related attributes at NDUAT, Ayodhya. The entry IC266937 (48.00 days) was found earlier to the check variety in flowering while IC340825 was early in maturing (118.00 days). The maximum height (105.20 cm) was found in the entry IC279631. The IC469777 was superior to the check variety for seed yield (28.0 g). The highest inflorescence length (44.50 cm) was found in the genotype IC338640.

A total of 100 accessions and four checks were also evaluated at OUA&T, Bhubaneswar for six quantitative characters. The genotype IC255482 (28.00 days) were earliest in flowering while IC279807 was early in maturity (79.00 days). The entry IC506529 (9.19 g) had the highest grain yield per plant as compared check variety RMA-7 (6.43 g). The highest plant height was observed in IC317427 (135.40 cm). The highest seed volume weight was observed in accession IC506535 (8.07 g).

A set of 100 genotypes and four checks were screened for six yield related attributes at AU, Mandor. The maximum height (128.40 cm) was found in the accession BGA-2 and Suvarna (14.64 g) was found superior in seed yield per plant.

At Rahuri, a set of 100 genotypes and four checks were evaluated for nine quantitative characters. The entry was superior as compared to check variety BGA-2 (150.43 cm) for plant height. IC340971 (28.0 days) was earliest in flowering and IC340861 was found superior to check variety in maturity (85.00 days). Highest seed yield (21.09 g) was observed in variety Suvarna. The highest inflorescence length (88.70 cm) was noted in the accession IC469837.

A total of 100 genotypes were also evaluated at Ranchi for thirteen yield attributes. IC340823 (72.00 days) was earliest in flowering and IC362257 was found superior to check variety in maturity (128.00 days). Maximum plant height (87.00 cm) was observed in genotype IC361327 while highest seed yield (33.00 g/plant) was observed in genotype IC265980. The highest inflorescence length (33.00 cm) was noted in the accession IC255419.

A set of 100 accessions and four checks were evaluated for twelve quantitative at S.K. Nagar. Accession IC391433 (24.80 g/plant) was observed highest yielder. The maximum plant height (147.00 cm) was observed in genotype IC361327. The maximum seed weight was recorded in accession GA-2 (7.43 g). The longest inflorescence (69.60 cm) was recorded in the genotype IC356046 Accession NC59949 (23.00 days) was earliest in flowering while IC265008 was early in maturing (87.00 days).

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 six centres. Seed yield per plant (g) was low at Bhubaneswar (5.60 g) and high at Ayodhya (15.87 g). No accession was the highest seed yielder as compared to check variety GA-2 (14.10 g).

Plant height was the highest at Ayodhya (88.11 cm) and lowest at Akola (39.43 cm) on the basis of average over the eight locations. The check variety GA-2 had the highest plant height (105.72 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 (33.88 days) at Bhubaneswar while it was the longest (88.32 days) at Ranchi. The variety

IC382640 showed consistency for early flowering over the locations and ranked first (40.71 days) based on the overall performance.

Maturity period was the earliest at Bhubaneswar (87.13 days) followed by S.K. Nagar (94.16 days). The entry IC279807 (105.29 days) was the earliest maturing line based on eight locations.

The length of inflorescence of the accessions was the highest at Rahuri (43.14 cm) and lowest at Ranchi (16.69 cm). Based on the average over eight locations, the variety GA-2 had the longest inflorescence (40.80 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at seven centres showed that it was the highest at Ranchi (9.15 g/10ml) and low at Ambikapur (5.73 g/10ml). Based on the average over seven locations, the genotype IC444193 showed the highest test weight (7.57 g/10ml).

2.4.2.3 Fababean (*Vicia faba*) – I Year Evaluation

Germplasm screening nursery was evaluated at six locations viz. Ambikapur, New Delhi, Hisar, Ludhiana and Ayodhya. The results were received from two locations. The check used was Basabeer, Hama-2, HFB-1, Hudeiba-93, Rebaya-40, Vikrant and the experimental details and list of promising genotypes of the tol centres has been presented in Table 24 and 25 respectively. Statistical parameters for all the characters of different locations have been presented in Table 26 & 27.

A total of 33 genotypes with four checks were evaluated in Augmented Design at NBPGR, New Delhi for three quantitative. Early flowering was observed (93.00 days) in the genotype ET218719. Highest seed yield per plant (30.06) were observed in the genotype ET218779. Maximum test weight (85.50 g) was recorded in the genotype ET218779.

A total of 33 genotypes with four checks were evaluated in Augmented Design at BAU, Ranchi for sixteen quantitative characters. Early flowering (52.0 days) and maturity (132.0 days) was observed in the genotype ET218783. Highest seed yield (28.00 g) was observed in the genotype ET218700.

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 (58.98 days), while it was late at Delhi (96.11 days). On the basis of average over two locations, the entry Rebaya-40 (55.80 days) was superior in flowering.

The grain yield per plant recorded at two locations showed that New Delhi centre had the very highest seed yield per plant (14.91 g) followed by Ranchi (11.72 g). Based on average over the two locations, the entry ET218779 (20.53 g) had the highest grain yield per plant.

100 seed weight was observed at two locations. It showed that highest seed weight was at Ranchi (72.57 g) followed by New Delhi (67.57 g). Based on average over two locations, the entry ET218699 (89.50 g) was superior to check variety.

2.4.2.4 Fababean (*Vicia faba*): II Year Evaluation

Germplasm screening nursery was evaluated at six locations viz. Ambikapur, Ayodhya, New Delhi, Hisar, Ludhiana and Ranchi. The results were received from all locations. The check used were Giza-4, HFB-1, Rebaya-40, Vikrant, and the experimental details and list of promising genotypes of the all centres has been presented in Table 28 and 29 respectively. Statistical parameters for all the characters of different locations have been presented in Table 30.

At IGKV, Ambikapur a set of 35 genotypes and four checks were evaluated for thirteen quantitative characters. The genotype ET218741 (52.00 days) were earlier in flowering while ET218698 (123.00 days) for maturity. Maximum plant height (60.80 cm) was observed in the genotype ET218757 followed by ET218743 (60.20 cm). The entry ET218757 (23.85 g) had the highest 100 seed weight.

At NDUAT, Ayodhya a set of 35 genotypes with four checks were evaluated for nine quantitative characters. The genotype ET218770 (63.00 days) were earlier in flowering while ET218704 (124.00 days) for maturity. Maximum plant height (91.60 cm) was observed in the genotype ET218759 followed by ET218743 (90.30cm). The entry ET218781 (28.70 g) had the highest 100 seed weight while the genotype ET218743 (38.40 g) had the highest seed yield per plant.

At CCS HAU, Hisar, a set of 35 genotypes with four check were evaluated for nine quantitative characters. The genotype ET218702 (68.00 days) was earlier in flowering while ET218719 (135.00 days) for maturity. Maximum plant height (92.30 cm) was observed in the genotype ET218738 followed by ET218764 (91.42 cm). The entry ET218768 (80.40 g) had the highest 100 seed weight while the genotype ET218769 (22.82 g) had the highest seed yield per plant.

A total of 35 genotypes with four check were evaluated in Augmented Design at PAU, Ludhiana for eleven quantitative characters. Early flowering was observed (70.00 days) in the genotype ET218775 whereas early maturity was observed (141.33 days) in the genotype ET218786. Highest seed yield (34.34 q/ha) was observed in the genotype ET218720.

A total of 35 genotypes with four check were evaluated in Augmented Design at NBPGR, New Delhi for three quantitative. Early flowering was observed (92.00 days) in the genotype ET218713. Highest seed yield per plant (20.47) were observed in the genotype ET218739.

At BAU, Ranchi a set of 35 genotypes with four checks were evaluated for seventeen quantitative. The genotype ET218786 (56.00 days) were earlier in flowering while ET218772 (132.00 days) for maturity. Maximum plant height (120.00 cm) was observed in the genotype ET218725 followed by ET218757 (108.00 cm). The entry ET218778 (84.00 g) had the highest 100 seed weight while the genotype ET218776 (51.0 g) had the highest seed yield per plant.

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

The mean flowering time was the earliest at Ambikapur (60.92 days), while it was late at New Delhi (93.81 days). On the basis of average over six locations, the check Giza-4 (67.65 days) was superior to the check varieties in flowering.

Maturity period was the earliest at Ambikapur (126.05 days) and delayed at Ludhiana (144.04 days). Based on the average over six locations entry ET218704 (133.60 days) was the earliest in maturity.

Mean plant height was highest at Ranchi (94.64 cm) and low at Ambikapur (53.65cm). Based on the average over the locations the entry ET218764 (86.20 cm) was found superior to check variety.

The grain yield per plant recorded at five locations showed that Ayodhya centre had the very highest seed yield per plant (33.34 g) followed by Ludhiana (21.34 g). Based on average over the five locations, the entry ET218776 (25.24 g) had the highest grain yield per plant.

100 seed weight was observed at six locations. It showed that highest seed weight was at Ludhiana (70.70 g) followed by Hisar (63.34 g). Based on average over six locations, the entry ET218778 (58.92 g) was superior to check variety.

2.4.2.5 Chenopodium quinoa: I Year Evaluation

Germplasm screening nursery consisting of 74 accessions was planned to be evaluated at eleven locations. The results were received from four locations. The experimental details and list of promising accessions for all characters has been presented in Table 31 & 32 respectively. Statistical parameters for all the characters of different locations have been presented in Table 33.

A set of 74 genotypes were screened for thirteen yield related attributes at IGKV, Ambikapur and 33 accessions germinated. The entry EC896077 (55.00 days) was found earlier to the check variety in flowering while EC896061 was early in maturing (111.00 days). The maximum height (72.0 cm) was found in the accession EC896077. The EC896077 was superior to the check variety for seed yield (55.0 g/plant). The highest inflorescence length (6.20 cm) was found in the genotype EC896077.

At PAU, Ludhiana a set of 74 genotypes were evaluated for thirteen quantitative characters out of 74 accessions, 13 accessions are germinated. The entry EC896213 had highest plant height (84.47 cm). EC896224 (80.33 days) was earliest in flowering while EC896065 in maturity (126.00 days). Highest seed yield (73.18 g) was observed in genotype EC896204. The highest inflorescence length (13.33 cm) was noted in the accession EC896075.

A set of 74 genotypes were screened for eight yield related attributes at AU, Mandor and 15 accessions are germinated. The maximum plant height (102.50 cm) was found in the accession EC896076 (102.50 cm) followed by EC89204 (102.0 cm). The highest seed volume weight was observed in genotype EC896069 (6.36 g).

A total of 74 genotypes were also evaluated at BAU, Ranchi for sixteen yield attributes and 28 accessions are germinated. EC896225 (59.00 days) was earliest in flowering while EC896225 in maturity (100.00 days). Maximum plant height (97.00 cm) was observed in genotype EC896224 while highest seed yield (14.00 g/plant) was observed in check SSQC-1. The highest inflorescence length (14.00 cm) was noted in the accession EC896258.

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 grain yield per plant at three centres. Seed yield per plant (g) was low at Ranchi (6.36 g) and high at Ludhiana (31.78 g). The accession EC896204 (73.18 g) was the highest seed yielder.

Plant height was the highest at Mandor (96.77 cm) and lowest at Ludhiana (56.59 cm) on the basis of average over the three locations. The genotype EC896244 had the highest plant height (97.0 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 at Mandor (60.00 days), while it was the longest (85.77 days) at Ludhiana. The variety EC896077 showed consistency for early flowering over the locations and ranked first (55.0 days) based on the overall performance.

Maturity period was the earliest at Ranchi (109.10 days) followed by Ambikapur (118.60 days). The entry EC896244 (107.0 days) was the earliest maturing line based on four locations.

The length of inflorescence of the accessions was the highest at Mandor (10.96 cm) and lowest at Ambikapur (4.65 cm). Based on the average over four locations, the variety EC896258 had the longest inflorescence (14.00 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at four centres showed that it was the highest at Ranchi (7.33 g/10ml) and low at Ambikapur (6.67 g/10ml). Based on the average over four locations, the entry EC896230 showed the highest test weight (7.80 g/10ml).

2.4.2.5 Chenopodium quinoa: II Year Evaluation

Germplasm screening nursery consisting of 50 accessions was planned to be evaluated at nine locations. The results were received from five locations. The experimental details and list of promising accessions for all characters has been presented in Table 34 & 35 respectively. Statistical parameters for all the characters of different locations have been presented in Table 36.

A set of 50 genotypes were screened for six yield related attributes at UAS, Bengaluru. The entry EC896276 (34.67 days) was found earlier to the check variety in flowering while EC896105 was early in maturing (79.00 days). The maximum plant height (116.67 cm) was found in the check GKVK-2. The EC896059 was superior to the check variety for seed yield (23.67 g/plant). The highest inflorescence length (36.33 cm) was found in the genotype EC896088.

At PAU, Ludhiana a set of 50 genotypes were evaluated for thirteen quantitative characters. The entry EC896218 had highest plant height (82.45 cm). EC896212 (82.33 days) was earliest in flowering while EC896219 in maturity (116.00 days). Highest seed yield (117.45 g) was observed in genotype EC896089. The highest inflorescence length (20.00 cm) was noted in the accession EC896233.

A set of 50 genotypes were screened for eight yield related attributes at AU, Mandor. The maximum height (163.33 cm) was found in the accession ET896089 (163.33 cm) followed by EC896215 (128.67 cm). The highest seed volume weight was observed in genotype EC896089 (6.23 g).

A total of 50 accessions were also evaluated at MPKV, Rahuri for eight quantitative characters. The genotype EC896109 (42.00 days) were earliest in flowering while EC896205 was early in maturity (95.00 days). The entry EC896219 had the highest grain yield (35.00 g/plant). The highest plant height was observed in EC896212 (141.30 cm). The highest seed volume weight was observed in accession EC896219 (7.00 g).

A total of 50 genotypes were also evaluated at BAU, Ranchi for sixteen yield attributes. EC896116 (54.00 days) was earliest in flowering while EC896100 in maturity (99.00 days). Maximum plant height (103.00 cm) was observed in genotype EC896202 while highest seed yield (25.0 g/plant) was observed in genotype EC896062. The highest inflorescence length (26.25 cm) was noted in the check SSQC-1.

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 grain yield per plant at four centres. Seed yield per plant (g) was low at Ranchi (5.17 g) and high at Ludhiana (67.37 g). The accession EC896219 (53.52 g) was the highest seed yielder.

Plant height was the highest at Bengaluru (102.87 cm) and lowest at Ludhiana (64.90 cm) on the basis of average over the five locations. The Check GKVK-2 had the highest plant height (216.67 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 (37.80 days) at Bangalore while it was the longest (87.37 days) at Ludhiana. The variety EC896228 showed consistency for early flowering over the locations and ranked first (44.00 days) based on the overall performance.

Maturity period was the earliest at Bengaluru (85.84 days) followed by Rahuri (103.04 days). The entry EC896229 (99.00 days) was the earliest maturing line based on five locations.

The length of inflorescence of the accessions was the highest at Bengaluru (30.44 cm) and lowest at Ranchi (8.41 cm). Based on the average over five locations, the check GKVK-1 had the longest inflorescence (36.11 cm).

Test weight expressed in terms of weight of g/10ml seed recorded at five centres showed that it was the highest at Ludhiana (8.39 g/10ml) and low at Rahuri (5.28 g/10ml). Based on the average over five locations, the entry EC896063 showed the highest test weight (9.00 g/10ml).

Table 18: Experimental details of germplasm evaluation of grain amaranth Rabi 2019-20 Plain-SET-1 II Year

S.No.	Items	Ambikapur	Akola	Bhubaneswar	Mandor	Ranchi	Rahuri	SK Nagar
1	No of entry	50	50	50	50	50	50	50
2	No of Check	4	4	4	4	4	4	4
3	Design	ABD	ABD	ABD	ABD	ABD	ABD	ABD
4	No of Block	5	5	5	5	5	5	5
5	Number of Rows	3	2	3	2	3	2	3
6	Row length (m)	3	3	3	3	3	3	3
7	Row spacing (cm)	45	45	45	45	45	45	45
8	Plant spacing (cm)	15	15	15	15	15	15	15
9	NPKS (kg/ha)	-	60:40:20:20	60:40:20:20	-	60:40:20:20	-	60:40:20:20
10	plot size (m^2)	4.05	2.7	4.05	2.7	4.05	2.7	4.05
11	Sowing Date	12/4/2019	-	3/12/2019	22/11/2019	13/12/2019	1/12/2019	20/11/2019
12	Harvesting Period	As per maturity	-	2/3/2020	As per maturity	26/04/2020 to 06/05/2020	07/03/2020 to 13/03/2020	25/02/2020

Table 19: Promising lines in grain amaranth germplasm for various characters at different locations (Plains) (Rabi 2019-20) -Set 1 -II Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**NBPGR, RS, Akola (50 accession)**				
1	Days to 50% flowering	41.00	82.20	IC279652 (41), IC279832 (41), IC444100 (41), IC255555 (42), IC279511 (42), IC279670 (42), IC444099 (42), IC506514 (42), IC506521 (42), IC506524 (42), IC506534 (42), IC506535 (42), IC506575 (42), IC506611 (42),	GA-2 (74.8)
	Number of days to 50% flowering **(adjusted valaues)**	37.20	82.20	IC279511 (37.2), IC265980 (38.2), IC266778 (38.2), IC279413 (38.2), IC279462 (38.2), IC279512 (38.2), IC524215 (39.2), IC279807 (39.2), IC279363 (40.2), IC266812 (41.2), IC279652 (42.2), IC279832 (42.2), IC444100 (42.2)	GA 2 (74.8)
2	Inflorescence length (cm)	10.60	54.06		RMA-7 (54.06)
	Inflorescence length (cm) **(adjusted valaues)**	1.01	54.06		RMA 7 (54.06)
3	Plant height (cm)	21.00	84.76		GA-2 (84.76)
	Plant height (cm) dwarf	21.00	84.76	IC279832 (21), IC279511 (21.6), IC255428 (23.2), IC506555 (24.4), IC506524 (25.8), IC506528 (26), IC279631 (26.4), IC279612 (27.6), IC506520 (28), IC279760 (28.9), IC506514 (29), IC506529 (29), IC506535 (29.4), IC506573 (29.4), IC279567 (30.2)	RMA-7 (70.64)
4	Seed yield per plant (g)	1.90	34.00	IC279363 (34), IC444100 (25.6), IC444099 (21.2), IC266778 (19.3)	Suvarna (13.64)
5	Stem thickness (cm)	2.50	12.55		Suvarna (12.55)
II	**IGKV, Ambikapur (50 accessions)**				
1	Days to 50% flowering	52.00	63.00	IC506575 (52), IC255481 (53), IC266937 (53), IC279462 (53), IC279652 (53), IC506611 (53)	BGA-2 (54.4)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
2	Days to 80% maturity	126.00	132.00	IC255555 (126), IC268885 (126), IC279567 (126), IC279670 (126), IC506520 (126), IC506531 (126), IC506611 (126), IC524215 (126)	BGA-2 (129.76)
3	Inflorescence length (cm)	16.60	22.00	IC266937 (22), IC506521 (21.2), IC506612 (21.2), IC506534 (21), IC317427 (20.8), IC506605 (20.8)	Suvarna (20.64)
	Inflorescence length (cm) **(adjusted valaues)**	15.27	22.83	IC383647 (22.83), IC266778 (22.83), IC279760 (22.23), IC279807 (22.03), IC506604 (21.91), IC340823 (21.83), IC340825 (21.83), IC340861 (21.83), IC265980 (21.83), IC506531 (21.71), IC279567 (21.63), IC444105 (21.43)	SUVARNA (20.64)
4	Leaf length (cm)	5.88	8.08	IC506534 (8.08), IC444105 (7.9), IC506575 (7.8), IC279652 (7.7), IC506611 (7.7), IC255481 (7.68), IC266778 (7.62)	BGA-2 (7.6)
5	Leaf width (cm)	2.98	4.69		BGA-2 (4.69)
6	Number of branches per plant	4.20	7.80		BGA-2 (7.8)
	Number of branches per plant **(adjusted valaues)**	4.16	8.08	IC506521 (8.08)	BGA-2 (7.8)
7	Petiole length (cm)	2.00	3.56	IC255419 (3.56)	RMA-7 (3.37)
8	Plant height (cm)	43.20	55.60	IC265980 (55.6)	RMA-7 (53)
	Plant height (cm) dwarf	43.20	55.60	IC444105 (43.2), IC279413 (44), IC279631 (44), IC279512 (44.2), IC506573 (44.6), IC266937 (44.8), IC341452 (44.8), IC255481 (45), IC506534 (45), IC506545 (45), IC506575 (45.2), IC506611 (46.2), IC444099 (46.4), IC506524 (46.8), IC279567 (47)	BGA-2 (49.24)
9	Seed volume (g/10ml)	4.10	7.30	IC279652 (7.3),IC279760 (7.15), IC255555 (7.1), IC255482 (7.05), IC506605 (6.95)	Suvarna (6.92)
10	Stem thickness (cm)	3.88	4.86	IC444100 (4.86), IC506555 (4.76)	BGA-2 (4.47)
11	seed yield(q/ha)	4.57	9.63	IC279832 (9.63)	GA-2 (9.19)
	seed yield(q/ha) **(adjusted valaues)**	3.10	11.30	IC340823 (11.3), IC391433 (11.3), IC362257 (11.1), IC255481 (10.61), IC356046 (10.51), IC444099 (10.51), IC382640 (10.36), IC340825 (10.31), IC392525 (10.31), IC341452 (10.11), IC265980 (10.06)	GA-2 (9.19)
III	**OUA&T, Bhubaneswar (50 accessions)**				

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Days to 50% flowering	27.00	50.80	IC255555 (27), IC266778 (27), IC506612 (27), IC255482 (28), IC279413 (28), IC279670 (28), IC279832 (28), IC506529 (28)	RMA-7 (46.4)
2	Days to 80% maturity	85.00	102.20	IC265980 (85), IC255428 (86), IC266835 (86), IC279832 (86), IC506612 (86), IC255481 (87), IC255482 (87), IC266778 (87), IC268885 (87), IC341452 (87), IC506519 (87), IC506555 (87), IC506604 (87), IC506605 (87)	RMA-7 (100.6)
	Days to maturity **(adjusted valaues)**	83.60	102.20	IC279832 (83.6), IC506612 (85.1), IC444099 (85.6), IC506604 (86.1), IC506605 (86.1), IC506519 (86.1), IC265980 (86.35), IC279631 (86.6), IC279670 (86.6), IC279760 (86.6), IC444100 (86.6), IC506545 (87.1), IC506555 (87.35)	RMA 7 (100.6)
3	Inflorescence length (cm)	25.80	48.40	IC506521 (48.4)	RMA-7 (44.32)
4	Plant height (cm)	42.20	122.64		BGA-2 (122.64)
	Plant height (cm) dwarf	42.20	122.64	IC279832 (42.2), IC268885 (47.4), IC255482 (49.4), IC279612 (49.8), IC444100 (49.8), IC506520 (52.2), IC279652 (52.6), IC255481 (54.2), IC506555 (54.6), IC279462 (54.8), IC279631 (54.8), IC506514 (55), IC506575 (56)	GA-2 (112.88)
	Plant height (cm) **(adjusted valaues)**	40.38	122.64		BGA 2 (122.64)
5	Seed volume (g/10ml)	7.60	7.91	IC317427 (7.91), IC506519 (7.88), IC506604 (7.88), IC279462 (7.86), IC279511 (7.85)	BGA-2 (7.84)
6	Seed yield per plant (g)	2.62	8.48		BGA-2 (8.48)
IV	**AU, Mandor (50 accessions)**				
1	Days to 50% flowering	35.00	67.80	IC268885 (35), IC266937 (36), IC279462 (36), IC506605 (36), IC255555 (37), IC279760 (37), IC356027 (37), IC506521 (37)	GA-2 (63.2)
	Number of days to 50% flowering (adjusted valaues)	32.80	67.80	IC279462 (32.8), IC506605 (35.3), IC279807 (35.8), IC279363 (35.8), IC506521 (36.3), IC268885 (36.55), IC255482 (36.55), IC265980 (36.8), IC506612 (37.3), IC506520 (37.3), IC279760 (37.55), IC266937 (37.55), IC266778 (37.8), IC266812 (37.8)	GA 2 (63.2)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
2	Days to 80% maturity	112.00	145.80	IC266937 (112), IC268885 (114), IC279760 (114), IC506605 (114), IC255428 (115), IC279670 (115), IC506520 (115), IC506521 (115), IC506531 (115), IC255482 (116), IC255555 (116), IC279652 (116)	GA-2 (142)
3	Inflorescence length (cm)	19.00	41.50	IC317427 (41.5), IC444105 (38.5)	Suvarna (37.9)
4	Plant height (cm)	39.00	135.50	IC317427 (135.5)	Suvarna (127.2)
	Plant height (cm) dwarf	39.00	135.50	IC266812 (39), IC279807 (39.5), IC524215 (41), IC255482 (42.5), IC266778 (42.5), IC279462 (44), IC506529 (44), IC506531 (45), IC506519 (45.5), IC279631 (46.5), IC506605 (47), IC279612 (48), IC506520 (48.5), IC279511 (49), IC506521 (49)	GA-2 (121.4)
5	Seed volume (g/10ml)	6.23	7.62	IC266778 (7.62), IC356027 (7.55), IC266812 (7.53), IC279612 (7.53), IC506524 (7.45), IC255482 (7.28), IC444100 (7.25), IC279631 (7.2), IC506575 (7.15), IC317427 (7.13), IC279652 (7.11)	RMA-7 (7.1)
	Seed volume (g/10) **(adjusted valaues)**	6.09	7.70	IC266778 (7.7), IC266812 (7.61), IC255482 (7.61), IC279612 (7.45), IC362257 (7.35), IC268885 (7.33), IC506524 (7.25), IC266937 (7.24), IC506573 (7.2), IC266835 (7.18), IC444100 (7.17), IC255555 (7.16), IC279631 (7.12)	RMA 7 (7.1)
6	Seed yield per plant (g)	1.33	20.05		RMA-7 (20.05)
8	Stem thickness (cm)	3.56	9.30		Suvarna (9.3)
V	**MPKV, Rahuri (50 accessions)**				
1	Days to 50% flowering	29.00	65.00	IC255428 (29), IC255482 (30), IC266835 (31), IC506575 (31), IC255555 (33), IC279462 (33), IC356027 (33), IC506521 (33), IC506528 (33), IC506573 (33), IC506605 (33)	GA-2 (55.5)
2	Days to 80% maturity	90.00	120.00	IC255482 (90), IC266937 (91), IC279612 (91), IC506528 (91), IC506545 (91), IC506573 (91), IC279567 (92), IC506520 (92), IC506575 (92), IC506612 (92)	Suvarna (116)
3	Inflorescence length (cm)	22.70	61.00	IC279760 (61), IC279807 (58), IC265980 (56), IC266778 (55.3), IC279363 (51.3), IC524215 (50.7), IC279462 (49.3), IC266812 (48.6), IC279413 (48.3), IC279512 (48.3), IC506605 (48.3), IC279670 (48)	GA-2 (39.65)
4	Leaf length (cm)	7.60	19.10	IC255419 (19.1), IC279612 (16.1)	Suvarna (14.3)
5	Leaf width (cm)	4.00	9.20		Suvarna (9.2)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
6	Petiole length (cm)	3.20	10.90		Suvarna (10.9)
7	Plant height (cm)	47.60	114.50		GA-2 (114.5)
	Plant height (cm) dwarf	47.60	114.50	IC506528 (47.6), IC506521 (51), IC506529 (51.7), IC506535 (53), IC382640 (53.7), IC266937 (56), IC279567 (58), IC255482 (59.7), IC279631 (60), IC506604 (60), IC266812 (60.7), IC506514 (61), IC255555 (61.3), IC279612 (61.3), IC506524 (61.7)	Suvarna (93)
8	Seed volume (g/10ml)	7.00	8.50	IC266778 (8.5), IC279567 (8.5), IC279670 (8.5), IC279760 (8.5), IC506519 (8.5), IC506520 (8.5), IC506521 (8.3), IC506575 (8.3)	RMA-7 (8.25)
9	Seed yield per plant (g)	8.90	21.50		Suvarna (21.5)
VI	**BAU, Ranchi (50 accessions)**				
1	Days to 50% flowering	69.00	95.40	IC506534 (69), IC506573 (69), IC279363 (70), IC268885 (71), IC279567 (71), IC382640 (71), IC506531 (71), IC506535 (71), IC279512 (72), IC279612 (72), IC356027 (72), IC506575 (72)	BGA-2 (72.4)
2	Days to 80% maturity	128.00	162.00	IC341452 (128), IC266812 (129), IC444099 (129), IC506519 (129), IC506535 (130), IC255481 (132), IC279832 (133), IC317427 (133), IC506514 (133), IC506545 (133), IC506555 (133)	RMA-7 (141)
3	Inflorescence length (cm)	4.00	25.00	IC279832 (25), IC506514 (25), IC506555 (25), IC265980 (24), IC279413 (24), IC279652 (24), IC506611 (24), IC317427 (19), IC279760 (18)	Suvarna (16)
4	Lateral Inflorescence length (cm)	2.00	17.00	IC265980 (17), IC279413 (17), IC279652 (17), IC506611 (17), IC317427 (14), IC279832 (13), IC506514 (13), IC506555 (13)	RMA-7 (9)
5	Leaf length (cm)	2.00	9.00	IC279832 (9), IC506514 (9), IC506555 (9), IC265980 (8.5), IC279413 (8.5), IC279652 (8.5), IC506611 (8.5), IC255419 (7)	Suvarna (7)
6	Leaf width (cm)	1.50	6.00	IC265980 (6), IC279413 (6), IC279652 (6), IC506611 (6), IC255419 (4), IC279832 (4), IC382640 (4), IC506514 (4), IC506555 (4)	Suvarna (4)
7	Number of branches per plant	2.00	12.00	IC279832 (12), IC506514 (12), IC506555 (12)	Suvarna (10)
8	Petiole length (cm)	1.00	5.00		Suvarna (5)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Plant height (cm)	12.00	83.40		Suvarna (83.4)
	Plant height (cm) dwarf	12.00	83.40	IC279631 (12), IC279512 (15), IC279612 (15), IC506604 (15), IC279363 (16), IC506534 (16), IC506605 (16), IC279567 (18), IC506545 (19), IC266835 (20), IC268885 (21), IC356027 (21), IC506535 (23), IC444105 (24), IC382640 (25), IC255482 (26)	BGA-2 (30.4)
10	Seed volume (g/10ml)	1.00	9.80	IC266812 (9.8), IC279832 (9.8), IC444099 (9.8), IC506514 (9.8), IC506519 (9.8), IC506555 (9.8), IC356027 (9.7), IC255482 (9.4), IC506575 (9.3), IC255419 (9.2), IC265980 (9.2), IC279413 (9.2), IC279652 (9.2), IC382640 (9.2), IC506573 (9.2)	BGA-2 (8.26)
11	Seed yield per plant (g)	1.70	20.00	IC279760 (20), IC356027 (19), IC255419 (14), IC255482 (14), IC279832 (14), IC506514 (14), IC506555 (14), IC279462 (12), IC279670 (12), IC506612 (12), IC506573 (11), IC506575 (11)	RMA-7 (6.82)
12	Stem thickness (cm)	0.50	4.00	IC265980 (4), IC279413 (4), IC279652 (4), IC506611 (4)	Suvarna (4)
13	Number of Lateral Inflorescence	4.00	22.00	IC279832 (22), IC506514 (22), IC506555 (22), IC255419 (16), IC341452 (16), IC506534 (16)	Suvarna (15)
VII	**SDAU, SK Nagar (50 accessions)**				
1	Days to 50% flowering	29.00	70.40	IC279612 (29), IC279567 (30), IC279760 (30), IC279807 (30), IC341452 (30), IC506529 (30), IC279363 (31), IC265980 (32), IC279413 (32), IC279462 (32), IC444100 (32), IC506605 (32)	GA-2 (61.4)
2	Days to 80% maturity	87.00	139.40	IC266937 (87), IC255481 (88), IC255482 (88), IC265980 (88), IC268885 (88), IC356027 (88), IC506575 (88), IC279567 (89), IC506528 (89), IC506545 (89), IC506555 (89), IC506611 (89)	RMA-7 (129.2)
3	Inflorescence length (cm)	15.40	62.48		GA-2 (62.48)
4	Lateral spikelet length (cm)	5.20	21.48		GA-2 (21.48)
5	Leaf length (cm)	7.82	26.34	IC506524 (26.34)	BGA-2 (15.53)
6	Leaf width (cm)	2.98	8.40		Suvarna (8.4)
7	Number of branches per plant	1.00	4.00	IC506528 (4), IC265980 (3.8), IC279363 (3.8), IC279511 (3.8), IC279512 (3.8), IC506535 (3.8), IC255428 (3.6), IC255481 (3.6), IC255555 (3.6), IC524215 (3.6)	BGA-2 (1)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
8	Petiole length (cm)	2.78	7.57		BGA-2 (7.57)
9	Plant height (cm)	26.40	166.00		GA-2 (166)
	Plant height (cm) dwarf	26.40	166.00	IC506519 (26.4), IC266812 (37.2), IC506611 (38.2), IC279652 (39.4), IC279832 (39.6), IC506545 (40.2), IC266835 (40.8), IC279670 (41.2), IC255481 (43), IC506612 (45), IC506514 (45.8), IC506555 (46), IC279631 (46.8), IC266937 (47.2), IC506521 (48.4), IC255482 (48.6)	Suvarna (124.8)
10	Seed volume (g/10ml)	4.03	7.87	IC506535 (7.87), IC266937 (7.76), IC279612 (7.58), IC506555 (7.58), IC279567 (7.57), IC356027 (7.56), IC506534 (7.52), IC506514 (7.5), IC524215 (7.48), IC506612 (7.47)	GA-2 (7.46)
11	Seed yield per plant (g)	1.70	27.60	IC506529 (27.6), IC506531 (26.7)	GA-2 (25.26)
12	Stem thickness (cm)	3.71	16.25		Suvarna (16.25)
	Based on all locations (50 accessions)				
1	Days to 50% flowering	39.17	67.66	IC279807 (39.17), IC266778 (39.67), IC506521 (39.83), IC255428 (40.17), IC279511 (40.33), IC506528 (40.33), IC506520 (40.83), IC524215 (41.67), IC255555 (43.43), IC506575 (43.43), IC506573 (43.57), IC506605 (43.71), IC279760 (43.86), IC255482 (44)CG Rajgira- 1 (57.4)	GA-2 (60.38)
2	Days to 80% maturity	102.80	130.01	IC506520 (102.8), IC506528 (103.2), IC506521 (103.6), IC255428 (104.2), IC279807 (104.8), IC279511 (105.8), IC266778 (106), IC524215 (107.4), IC268885 (107.67), IC266937 (107.83), IC255482 (108.5), IC255481 (108.67), IC266835 (108.83), IC506545 (108.83)	GA-2 (125.2)
3	Inflorescence length (cm)	19.68	41.02		GA-2 (41.02)
4	Lateral spikelet length (cm)	6.60	21.48		GA-2 (21.48)
5	Leaf length (cm)	6.87	18.87	IC279462 (18.87), IC506612 (18.81), IC279670 (18.55), IC506524 (11.88), IC255419 (11.71), IC279612 (11.05)	Suvarna (10.96)
6	Leaf width (cm)	3.39	6.44		Suvarna (6.44)
7	Number of branches per plant	3.27	8.10	IC317427 (8.1), IC506611 (7.6)CG Rajgira- 1 (7.32), IC279832 (6.87), IC506555 (6.8), IC506514 (6.73), IC265980 (6.33)	Suvarna (6.04)
8	Petiole length (cm)	2.83	6.32		Suvarna (6.32)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Plant height (cm)	41.50	108.61		GA-2 (108.61)
	Plant height (cm) dwarf	41.50	108.61	IC279631 (41.5), IC279612 (44.87), IC279832 (45.29), IC266937 (45.37), IC255482 (45.6), IC266812 (46.1), IC279567 (46.4), IC266835 (46.46), IC506545 (46.56), IC279512 (46.66), IC506519 (46.69), IC382640 (47.08), IC506605 (47.57), IC279670 (47.6), IC255481 (47.69), IC444100 (47.87)	CG Rajgira- 1 (49.24)
10	Seed volume (g/10ml)	5.77	7.83	IC506519 (7.83), IC255482 (7.67), IC279652 (7.65), IC279413 (7.6), IC506573 (7.52), IC444099 (7.49), IC356027 (7.47), IC266812 (7.42), IC506514 (7.41), IC279760 (7.41), IC506575 (7.39), IC279670 (7.36), IC506555 (7.35), IC506524 (7.33), IC266937 (7.3)	RMA-7 (7.25)
11	Seed yield per plant (g)	5.58	14.82		GA-2 (14.82)

Table 20: Multilocation evaluation of germplasm in grain amaranth at different locations : Rabi 2019-20 (Plains)
SET-1: II Year

S. No	Accession No.	Days to 50% flowering								Leaf length (cm)				
		Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	46.00	58.00	29.00	44.00	40.00	78.00	33.00	**46.86**	7.50	19.10	7.00	13.24	**11.71**
2	IC255428	44.00	61.00	32.00	39.00	29.00	-	36.00	**40.17**	7.16	10.50	-	11.24	**9.63**
3	IC255481	46.00	53.00	31.00	39.00	36.00	78.00	36.00	**45.57**	7.68	7.80	5.50	9.46	**7.61**
4	IC255482	45.00	61.00	28.00	35.00	30.00	74.00	35.00	**44.00**	7.56	7.70	5.50	7.82	**7.15**
5	IC255555	42.00	57.00	27.00	37.00	33.00	73.00	35.00	**43.43**	6.64	10.50	5.00	11.10	**8.31**
6	IC265980	43.00	59.00	29.00	40.00	38.00	90.00	32.00	**47.29**	7.30	10.40	8.50	12.40	**9.65**
7	IC266778	43.00	56.00	27.00	41.00	37.00	-	34.00	**39.67**	7.62	11.20	-	11.88	**10.23**
8	IC266812	46.00	58.00	29.00	41.00	37.00	81.00	38.00	**47.14**	7.38	9.10	6.00	9.40	**7.97**
9	IC266835	45.00	56.00	29.00	38.00	31.00	74.00	39.00	**44.57**	6.02	8.00	4.50	10.10	**7.16**
10	IC266937	45.00	53.00	30.00	36.00	51.00	76.00	35.00	**46.57**	7.14	9.10	4.00	12.08	**8.08**
11	IC268885	44.00	59.00	29.00	35.00	62.00	71.00	35.00	**47.86**	7.34	9.80	4.00	15.32	**9.12**
12	IC279363	45.00	59.00	29.00	39.00	62.00	70.00	31.00	**47.86**	6.70	9.10	3.50	15.24	**8.64**
13	IC279413	43.00	62.00	28.00	43.00	35.00	90.00	32.00	**47.57**	6.62	9.10	8.50	13.54	**9.44**
14	IC279462	43.00	53.00	30.00	36.00	33.00	82.00	32.00	**44.14**	7.50	9.90	4.50	13.06	**8.74**
15	IC279511	42.00	60.00	31.00	42.00	34.00	-	33.00	**40.33**	6.74	9.80	-	13.48	**10.01**
16	IC279512	43.00	57.00	32.00	44.00	36.00	72.00	35.00	**45.57**	6.94	10.90	4.00	13.64	**8.87**
17	IC279567	44.00	57.00	30.00	40.00	38.00	71.00	30.00	**44.29**	6.90	7.90	4.00	14.58	**8.35**
18	IC279612	43.00	59.00	32.00	39.00	38.00	72.00	29.00	**44.57**	6.70	16.10	4.00	17.40	**11.05**
19	IC279631	43.00	62.00	30.00	39.00	35.00	75.00	34.00	**45.43**	7.48	10.80	3.50	14.50	**9.07**
20	IC279652	41.00	53.00	31.00	38.00	40.00	90.00	37.00	**47.14**	7.70	10.80	8.50	10.90	**9.48**
21	IC279670	42.00	63.00	28.00	38.00	41.00	82.00	39.00	**47.57**	7.20	9.80	4.50	12.20	**8.43**
22	IC279760	43.00	58.00	31.00	37.00	35.00	73.00	30.00	**43.86**	6.38	10.90	5.50	12.70	**8.87**
23	IC279807	44.00	56.00	30.00	39.00	36.00	-	30.00	**39.17**	6.62	10.00	-	13.06	**9.89**
24	IC279832	41.00	56.00	28.00	40.00	34.00	79.00	37.00	**45.00**	7.60	11.20	9.00	11.06	**9.72**
25	IC317427	80.00	63.00	39.00	44.00	60.00	84.00	-	**61.67**	6.90	8.70	5.00	-	**6.87**
26	IC341452	43.00	57.00	30.00	43.00	34.00	78.00	30.00	**45.00**	6.32	10.60	4.50	16.90	**9.58**
27	IC356027	43.00	62.00	30.00	37.00	33.00	72.00	34.00	**44.43**	7.10	11.30	4.50	16.02	**9.73**
28	IC382640	44.00	60.00	29.00	42.00	35.00	71.00	-	**46.83**	7.38	10.60	5.50	-	**7.83**
29	IC444099	42.00	62.00	30.00	41.00	35.00	81.00	36.00	**46.71**	7.00	8.10	6.00	10.38	**7.87**
30	IC444100	41.00	61.00	30.00	40.00	36.00	78.00	32.00	**45.43**	7.20	11.30	3.00	11.94	**8.36**
31	IC444105	80.00	60.00	39.00	45.00	38.00	74.00	61.00	**56.71**	7.90	7.60	4.00	17.32	**9.21**

S. No	Accession No.	Leaf width (cm)					Days to 80% maturity						
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	4.12	5.60	4.00	4.46	**4.55**	130.00	88.00	126.00	93.00	134.00	91.00	**110.33**
2	IC255428	3.62	5.90	-	3.78	**4.43**	129.00	86.00	115.00	99.00	-	92.00	**104.20**
3	IC255481	3.84	4.00	3.50	3.48	**3.71**	129.00	87.00	118.00	98.00	132.00	88.00	**108.67**
4	IC255482	3.76	4.10	3.00	3.24	**3.53**	130.00	87.00	116.00	90.00	140.00	88.00	**108.50**
5	IC255555	3.50	4.70	3.00	4.42	**3.91**	126.00	89.00	116.00	101.00	134.00	90.00	**109.33**
6	IC265980	4.26	5.70	6.00	4.32	**5.07**	130.00	85.00	122.00	96.00	142.00	88.00	**110.50**
7	IC266778	4.20	5.60	-	4.36	**4.72**	132.00	87.00	125.00	94.00	-	92.00	**106.00**
8	IC266812	3.94	4.70	3.50	2.98	**3.78**	129.00	90.00	123.00	99.00	129.00	90.00	**110.00**
9	IC266835	3.04	4.50	2.00	4.88	**3.61**	128.00	86.00	119.00	93.00	135.00	92.00	**108.83**
10	IC266937	3.38	4.70	2.00	3.46	**3.39**	130.00	89.00	112.00	91.00	138.00	87.00	**107.83**
11	IC268885	4.04	5.30	2.50	4.18	**4.01**	126.00	87.00	114.00	94.00	137.00	88.00	**107.67**
12	IC279363	3.50	4.90	2.00	4.64	**3.76**	127.00	91.00	120.00	96.00	142.00	92.00	**111.33**
13	IC279413	3.02	4.50	6.00	4.46	**4.50**	132.00	90.00	124.00	97.00	142.00	93.00	**113.00**
14	IC279462	3.94	5.20	3.00	4.28	**4.11**	130.00	91.00	125.00	96.00	138.00	93.00	**112.17**
15	IC279511	3.00	5.00	-	5.58	**4.53**	129.00	90.00	123.00	96.00	-	91.00	**105.80**
16	IC279512	3.06	5.70	3.00	4.28	**4.01**	131.00	91.00	122.00	94.00	139.00	93.00	**111.67**
17	IC279567	3.48	4.10	2.00	5.24	**3.71**	126.00	91.00	119.00	92.00	143.00	89.00	**110.00**
18	IC279612	3.54	5.20	3.00	6.00	**4.44**	131.00	90.00	119.00	91.00	139.00	91.00	**110.17**
19	IC279631	3.14	5.50	2.00	5.36	**4.00**	127.00	89.00	117.00	99.00	145.00	92.00	**111.50**
20	IC279652	3.10	5.50	6.00	3.96	**4.64**	129.00	90.00	116.00	102.00	142.00	90.00	**111.50**
21	IC279670	3.42	4.70	3.00	4.42	**3.89**	126.00	89.00	115.00	101.00	138.00	92.00	**110.17**
22	IC279760	3.10	5.10	3.00	3.88	**3.77**	129.00	89.00	114.00	99.00	137.00	94.00	**110.33**
23	IC279807	2.98	5.40	-	4.32	**4.23**	132.00	89.00	118.00	95.00	-	90.00	**104.80**
24	IC279832	3.76	5.70	4.00	3.82	**4.32**	130.00	86.00	120.00	97.00	133.00	92.00	**109.67**
25	IC317427	3.20	4.80	2.50	-	**3.50**	131.00	90.00	129.00	119.00	133.00	-	**120.40**
26	IC341452	3.10	5.90	2.50	6.58	**4.52**	131.00	87.00	129.00	97.00	128.00	90.00	**110.33**
27	IC356027	3.44	5.90	3.00	5.22	**4.39**	131.00	90.00	121.00	99.00	140.00	88.00	**111.50**
28	IC382640	3.16	5.80	4.00	-	**4.32**	132.00	89.00	125.00	102.00	136.00	-	**116.80**
29	IC444099	3.98	4.40	3.50	4.34	**4.06**	132.00	88.00	123.00	96.00	129.00	94.00	**110.33**
30	IC444100	3.90	5.90	2.00	4.36	**4.04**	130.00	89.00	120.00	96.00	137.00	92.00	**110.67**
31	IC444105	4.08	5.40	2.00	5.36	**4.21**	129.00	95.00	123.00	97.00	138.00	118.00	**116.67**

S. No	Accession No.	Petiole length (cm)					Inflorescence length (cm)							
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	3.56	6.70	4.00	3.92	**4.55**	22.40	17.60	36.60	30.00	46.00	14.00	31.00	**28.23**
2	IC255428	2.50	5.70	-	4.40	**4.20**	18.40	19.00	32.60	29.00	45.30	-	27.80	**28.68**
3	IC255481	2.90	4.00	3.20	3.34	**3.36**	17.40	19.40	32.80	23.00	36.00	10.00	25.00	**23.37**
4	IC255482	2.92	4.60	3.00	3.38	**3.48**	24.60	18.20	27.40	22.50	38.00	9.00	29.20	**24.13**
5	IC255555	2.96	4.90	3.50	3.48	**3.71**	22.20	19.60	39.00	22.50	38.70	7.00	28.00	**25.29**
6	IC265980	2.56	5.30	4.00	4.80	**4.17**	19.90	17.40	35.40	32.50	56.00	24.00	28.20	**30.49**
7	IC266778	2.00	3.80	-	4.76	**3.52**	14.60	18.20	39.60	24.50	55.30	-	27.40	**29.93**
8	IC266812	2.62	4.80	3.00	3.58	**3.50**	15.20	17.40	41.20	23.00	48.60	13.00	23.00	**25.91**
9	IC266835	2.56	6.10	3.50	3.72	**3.97**	15.20	17.80	39.60	25.50	38.70	6.00	25.20	**24.00**
10	IC266937	3.10	4.80	2.50	6.10	**4.13**	14.20	22.00	33.00	25.50	38.00	14.00	28.40	**25.01**
11	IC268885	2.56	7.30	3.00	4.12	**4.25**	18.00	19.60	25.80	24.50	39.00	8.00	27.00	**23.13**
12	IC279363	3.02	4.90	1.50	5.90	**3.83**	18.20	16.80	40.80	24.00	51.30	4.00	29.60	**26.39**
13	IC279413	3.12	3.20	4.00	5.34	**3.92**	21.20	18.40	34.60	23.00	48.30	24.00	30.20	**28.53**
14	IC279462	2.34	4.40	2.00	4.84	**3.40**	15.80	18.80	31.80	25.00	49.30	17.00	31.20	**26.99**
15	IC279511	2.26	4.90	-	4.16	**3.77**	12.80	17.80	41.00	26.50	44.00	-	26.20	**28.05**
16	IC279512	2.70	4.20	2.00	5.02	**3.48**	14.80	18.00	35.20	27.50	48.30	6.00	30.60	**25.77**
17	IC279567	2.60	3.20	2.00	6.04	**3.46**	10.60	18.40	35.40	24.00	39.00	6.00	27.20	**22.94**
18	IC279612	2.30	5.20	2.00	7.36	**4.22**	16.80	19.40	32.40	28.50	40.70	6.00	32.40	**25.17**
19	IC279631	2.74	7.10	2.00	5.58	**4.36**	13.20	20.20	32.40	21.00	43.30	7.00	29.60	**23.81**
20	IC279652	2.58	7.50	4.00	4.54	**4.66**	12.60	20.20	37.00	24.00	44.30	24.00	22.40	**26.36**
21	IC279670	2.64	6.30	2.00	5.50	**4.11**	14.80	18.00	39.20	21.50	48.00	17.00	25.20	**26.24**
22	IC279760	2.76	5.00	2.00	5.54	**3.83**	13.40	20.60	38.40	26.50	61.00	18.00	30.00	**29.70**
23	IC279807	2.46	5.90	-	4.26	**4.21**	13.40	19.20	37.40	20.00	58.00	-	32.80	**30.13**
24	IC279832	2.40	5.30	4.50	4.08	**4.07**	11.00	17.40	38.80	25.00	46.30	25.00	25.20	**26.96**
25	IC317427	2.84	5.30	3.50	-	**3.88**	-	20.80	38.60	41.50	43.00	19.00	-	**32.58**
26	IC341452	3.16	6.40	2.50	6.48	**4.64**	18.20	16.60	32.00	32.00	41.00	11.00	30.20	**25.86**
27	IC356027	2.94	8.90	2.00	5.98	**4.96**	17.40	17.00	41.80	20.50	41.70	8.00	30.60	**25.29**
28	IC382640	2.74	7.20	4.00	-	**4.65**	15.20	20.20	41.60	25.50	33.70	10.00	-	**24.37**
29	IC444099	2.84	5.30	3.00	3.44	**3.65**	18.80	16.80	38.70	25.00	43.00	13.00	26.60	**25.99**
30	IC444100	3.06	5.90	1.50	4.60	**3.77**	18.40	18.60	37.40	23.00	44.00	12.00	29.80	**26.17**
31	IC444105	2.00	5.60	3.00	6.64	**4.31**	-	17.60	42.00	38.50	41.00	8.00	36.80	**30.65**

S. No	Accession No.	Stem thickness (cm)					Plant height (cm)							
		Akola	Ranchi	SK Nagar	Ambikapur	Mean	Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	7.20	2.50	5.84	4.28	**4.96**	42.20	50.80	62.60	71.00	71.70	42.00	54.60	**56.41**
2	IC255428	2.50	-	6.51	4.56	**4.52**	23.20	51.00	57.80	52.00	77.70	-	53.00	**52.45**
3	IC255481	5.40	2.00	4.88	4.44	**4.18**	31.60	45.00	54.20	59.00	64.00	37.00	43.00	**47.69**
4	IC255482	6.70	1.50	5.67	4.46	**4.58**	42.20	50.80	49.40	42.50	59.70	26.00	48.60	**45.60**
5	IC255555	4.30	2.00	5.72	4.18	**4.05**	33.60	49.60	63.80	52.00	61.30	28.00	51.00	**48.47**
6	IC265980	4.86	4.00	10.60	3.96	**5.86**	40.40	55.60	63.40	49.50	68.30	80.00	55.80	**59.00**
7	IC266778	5.70	-	7.74	4.16	**5.87**	42.60	50.00	65.00	42.50	65.60	-	51.00	**52.78**
8	IC266812	6.55	3.00	4.37	3.90	**4.46**	32.20	50.40	61.20	39.00	60.70	42.00	37.20	**46.10**
9	IC266835	7.31	0.50	7.02	4.30	**4.78**	32.20	49.60	56.60	58.50	67.50	20.00	40.80	**46.46**
10	IC266937	5.00	3.00	4.42	4.06	**4.12**	31.00	44.80	57.60	54.00	56.00	27.00	47.20	**45.37**
11	IC268885	5.20	1.50	6.89	4.06	**4.41**	32.20	51.40	47.40	50.50	101.30	21.00	50.00	**50.54**
12	IC279363	7.80	1.20	6.52	4.00	**4.88**	40.00	48.40	63.00	50.50	69.70	16.00	54.20	**48.83**
13	IC279413	7.40	4.00	5.53	4.12	**5.26**	42.80	44.00	56.20	51.50	64.70	80.00	52.20	**55.91**
14	IC279462	6.00	2.00	6.37	4.20	**4.64**	32.40	51.00	54.80	44.00	68.70	34.00	56.20	**48.73**
15	IC279511	3.28	-	5.59	4.12	**4.33**	21.60	47.20	64.00	49.00	64.30	-	52.00	**49.68**
16	IC279512	6.70	1.50	5.94	4.58	**4.68**	38.80	44.20	58.80	49.50	68.30	15.00	52.00	**46.66**
17	IC279567	7.76	2.00	6.23	3.94	**4.98**	30.20	47.00	57.20	53.00	58.00	18.00	61.40	**46.40**
18	IC279612	4.90	1.50	10.63	3.98	**5.25**	27.60	51.40	49.80	48.00	61.30	15.00	61.00	**44.87**
19	IC279631	2.90	1.00	6.10	4.22	**3.56**	26.40	44.00	54.80	46.50	60.00	12.00	46.80	**41.50**
20	IC279652	6.20	4.00	4.58	4.02	**4.70**	33.40	49.20	52.60	51.50	65.60	80.00	39.40	**53.10**
21	IC279670	4.70	2.00	6.31	4.56	**4.39**	30.80	48.20	56.20	58.50	64.30	34.00	41.20	**47.60**
22	IC279760	6.50	2.50	6.66	4.12	**4.95**	28.90	47.20	61.40	58.50	73.30	39.00	52.80	**51.59**
23	IC279807	5.50	-	7.05	4.20	**5.58**	30.80	50.20	58.20	39.50	71.70	-	60.40	**51.80**
24	IC279832	3.40	3.00	5.79	4.48	**4.17**	21.00	47.20	42.20	50.00	66.00	51.00	39.60	**45.29**
25	IC317427	9.70	3.00	-	4.50	**5.73**	-	49.00	112.80	135.50	67.00	53.00	-	**83.46**
26	IC341452	4.20	3.00	6.99	4.00	**4.55**	33.40	44.80	59.00	59.00	72.30	36.00	57.40	**51.70**
27	IC356027	5.70	2.00	6.96	4.22	**4.72**	42.80	49.00	75.40	59.50	69.30	21.00	60.40	**53.91**
28	IC382640	6.70	2.00	-	4.12	**4.27**	32.00	52.40	62.40	57.00	53.70	25.00	-	**47.08**
29	IC444099	4.02	3.00	6.75	4.36	**4.53**	39.20	46.40	58.00	54.00	65.00	42.00	50.80	**50.77**
30	IC444100	4.30	1.00	4.91	4.86	**3.77**	43.20	50.00	49.80	50.50	62.00	27.00	52.60	**47.87**
31	IC444105	9.50	2.00	13.55	4.74	**7.45**	-	43.20	108.20	112.50	-	24.00	104.00	**78.38**

S. No	Accession No.	Seed volume (g/10ml)							Lateral Inflorescence length (cm)			seed yield(q/ha)
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ranchi	SK Nagar	Mean	Ambikapur
1	IC255419	4.25	7.71	6.47	7.00	9.20	7.43	**7.01**	10.00	14.80	**12.40**	7.65
2	IC255428	6.45	7.66	6.47	7.00	-	7.39	**6.99**	-	13.60	**13.60**	6.62
3	IC255481	4.70	7.77	6.35	7.00	8.10	6.95	**6.81**	7.00	13.20	**10.10**	6.17
4	IC255482	7.05	7.74	7.28	7.20	9.40	7.37	**7.67**	6.00	13.20	**9.60**	7.41
5	IC255555	7.10	7.73	6.83	7.50	6.50	4.03	**6.62**	5.00	15.00	**10.00**	5.93
6	IC265980	4.80	7.65	6.45	8.00	9.20	7.32	**7.24**	17.00	14.60	**15.80**	8.40
7	IC266778	4.75	7.76	7.62	8.50	-	7.05	**7.14**	-	15.80	**15.80**	8.64
8	IC266812	4.10	7.64	7.53	8.00	9.80	7.46	**7.42**	8.00	11.20	**9.60**	6.42
9	IC266835	6.10	7.68	6.85	8.00	7.50	7.41	**7.26**	4.00	15.80	**9.90**	7.90
10	IC266937	5.50	7.62	6.91	7.40	8.60	7.76	**7.30**	9.00	15.20	**12.10**	7.78
11	IC268885	4.20	7.60	7.00	7.60	6.80	7.41	**6.77**	6.00	15.80	**10.90**	5.93
12	IC279363	5.25	7.71	6.92	7.50	7.20	7.30	**6.98**	2.00	13.20	**7.60**	9.14
13	IC279413	6.40	7.83	6.73	8.00	9.20	7.43	**7.60**	17.00	17.20	**17.10**	7.65
14	IC279462	5.20	7.86	6.48	8.00	7.60	7.16	**7.05**	11.00	16.60	**13.80**	8.40
15	IC279511	4.30	7.85	6.63	8.00	-	7.43	**6.84**	-	12.40	**12.40**	7.90
16	IC279512	5.55	7.74	6.67	8.00	6.90	7.33	**7.03**	4.00	16.80	**10.40**	8.40
17	IC279567	4.86	7.72	6.95	8.50	6.40	7.57	**7.00**	3.50	16.60	**10.05**	6.42
18	IC279612	5.05	7.75	7.53	8.00	6.90	7.58	**7.14**	4.00	19.20	**11.60**	6.91
19	IC279631	6.60	7.79	7.20	7.50	6.50	7.42	**7.17**	3.00	15.00	**9.00**	6.05
20	IC279652	7.30	7.73	7.11	7.50	9.20	7.06	**7.65**	17.00	11.40	**14.20**	7.90
21	IC279670	6.80	7.71	6.45	8.50	7.60	7.12	**7.36**	11.00	11.80	**11.40**	7.90
22	IC279760	7.15	7.82	6.77	8.50	6.90	7.31	**7.41**	10.00	18.00	**14.00**	9.14
23	IC279807	4.90	7.75	6.54	7.00	-	7.28	**6.69**	-	14.60	**14.60**	6.91
24	IC279832	5.10	7.64	6.37	7.50	9.80	7.33	**7.29**	13.00	13.80	**13.40**	9.63
25	IC317427	5.75	7.91	7.13	7.60	7.10	-	**7.10**	14.00	-	**14.00**	6.17
26	IC341452	4.25	7.61	6.61	8.00	1.00	7.13	**5.77**	7.00	15.60	**11.30**	8.40
27	IC356027	4.85	7.64	7.55	7.50	9.70	7.56	**7.47**	5.00	18.80	**11.90**	6.79
28	IC382640	4.65	7.76	6.67	7.50	9.20	-	**7.16**	7.00	-	**7.00**	7.16
29	IC444099	6.30	7.72	6.53	7.50	9.80	7.08	**7.49**	8.00	18.80	**13.40**	5.19
30	IC444100	5.40	7.76	7.25	7.50	6.40	7.44	**6.96**	7.00	16.40	**11.70**	6.42
31	IC444105	5.90	7.73	6.95	7.00	5.90	4.33	**6.30**	3.00	11.40	**7.20**	6.91

S. No	Accession No.	Seed yield per plant (g)							Number of branches per plant				Number of Lateral Inflorescence
		Bhubaneswar	Mandor	Rahuri	Akola	SK Nagar	Ranchi	Mean	Ambikapur	Ranchi	SK Nagar	Mean	Ranchi
1	IC255419	4.01	10.27	13.10	4.10	11.80	14.00	**9.55**	5.60	9.00	3.20	**5.93**	16.00
2	IC255428	2.69	4.93	13.00	4.50	9.30	-	**6.89**	6.20	-	3.60	**4.90**	-
3	IC255481	5.12	7.47	11.00	4.40	7.00	6.20	**6.86**	6.80	5.00	3.60	**5.13**	7.00
4	IC255482	5.53	3.20	11.50	14.30	4.20	14.00	**8.79**	6.80	6.00	2.60	**5.13**	8.00
5	IC255555	4.16	6.27	11.50	4.20	7.00	6.40	**6.59**	6.00	5.00	3.60	**4.87**	7.00
6	IC265980	2.75	2.80	11.20	8.50	16.10	8.70	**8.34**	6.20	9.00	3.80	**6.33**	14.00
7	IC266778	4.83	4.67	9.70	19.30	7.60	-	**9.22**	5.20	-	3.40	**4.30**	-
8	IC266812	2.62	2.67	10.20	14.90	4.90	2.80	**6.35**	5.40	7.00	2.80	**5.07**	11.00
9	IC266835	3.97	11.47	14.00	7.60	11.30	9.30	**9.61**	4.20	6.00	3.40	**4.53**	10.00
10	IC266937	2.97	4.53	13.00	1.90	8.60	2.50	**5.58**	5.80	5.00	3.20	**4.67**	10.00
11	IC268885	3.69	1.33	10.50	4.10	13.80	6.90	**6.72**	6.80	4.00	3.20	**4.67**	8.00
12	IC279363	4.39	9.60	11.00	34.00	24.30	1.70	**14.17**	6.20	3.00	3.80	**4.33**	4.00
13	IC279413	6.81	7.20	13.50	12.80	16.90	8.70	**10.98**	5.60	9.00	3.00	**5.87**	14.00
14	IC279462	5.12	10.00	19.00	3.90	12.80	12.00	**10.47**	6.20	5.00	3.00	**4.73**	14.00
15	IC279511	6.35	8.67	19.00	2.80	18.20	-	**11.00**	6.00	-	3.80	**4.90**	-
16	IC279512	4.63	5.73	15.00	9.90	14.80	8.40	**9.74**	6.60	5.00	3.80	**5.13**	7.00
17	IC279567	4.74	5.33	9.50	9.20	21.40	2.70	**8.81**	7.20	4.00	3.00	**4.73**	9.00
18	IC279612	4.93	8.00	8.90	10.40	24.50	4.40	**10.19**	6.60	5.00	3.00	**4.87**	7.00
19	IC279631	5.68	2.93	9.20	4.60	10.00	1.90	**5.72**	6.80	2.00	3.40	**4.07**	5.00
20	IC279652	5.11	5.07	18.00	17.60	8.70	8.70	**10.53**	5.80	9.00	2.20	**5.67**	14.00
21	IC279670	5.27	11.33	11.70	4.50	6.00	12.00	**8.47**	5.80	5.00	2.20	**4.33**	14.00
22	IC279760	7.58	9.47	13.00	7.00	16.80	20.00	**12.31**	6.60	6.00	2.60	**5.07**	13.00
23	IC279807	4.99	4.53	12.00	5.00	20.70	-	**9.44**	5.40	-	3.40	**4.40**	-
24	IC279832	3.54	8.53	14.00	2.60	6.10	14.00	**8.13**	5.80	12.00	2.80	**6.87**	22.00
25	IC317427	8.08	13.28	13.80	-	-	6.90	**10.52**	7.20	9.00	-	**8.10**	14.00
26	IC341452	3.70	7.33	16.80	6.60	18.40	6.50	**9.89**	6.00	8.00	3.00	**5.67**	16.00
27	IC356027	3.53	8.27	11.60	7.60	14.10	19.00	**10.68**	5.80	4.00	2.60	**4.13**	7.00
28	IC382640	5.57	10.00	15.40	8.80	-	6.20	**9.19**	5.20	6.00	-	**5.60**	10.00
29	IC444099	4.28	9.33	15.50	21.20	11.30	2.80	**10.73**	5.00	7.00	3.40	**5.13**	11.00
30	IC444100	6.42	12.30	14.00	25.60	9.70	5.30	**12.22**	6.40	5.00	2.40	**4.60**	9.00
31	IC444105	3.86	4.27	13.00	-	4.20	4.40	**5.94**	6.40	4.00	-	**5.20**	5.00

S. No	Accession No.	Days to 50% flowering								Leaf length (cm)				
		Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
32	IC506514	42.00	56.00	29.00	39.00	38.00	79.00	35.00	**45.43**	6.94	9.90	9.00	11.08	**9.23**
33	IC506519	47.00	57.00	31.00	40.00	39.00	81.00	39.00	**47.71**	7.12	12.10	6.00	7.90	**8.28**
34	IC506520	43.00	60.00	31.00	38.00	38.00	-	35.00	**40.83**	7.16	9.10	-	12.72	**9.66**
35	IC506521	42.00	63.00	29.00	37.00	33.00	-	35.00	**39.83**	7.02	9.70	-	10.68	**9.13**
36	IC506524	42.00	58.00	33.00	41.00	35.00	77.00	34.00	**45.71**	6.98	10.20	4.00	26.34	**11.88**
37	IC506528	43.00	58.00	33.00	42.00	33.00	-	33.00	**40.33**	5.88	7.60	-	14.04	**9.17**
38	IC506529	46.00	55.00	28.00	38.00	34.00	78.00	30.00	**44.14**	6.78	8.90	5.00	13.44	**8.53**
39	IC506531	46.00	62.00	31.00	38.00	40.00	71.00	33.00	**45.86**	6.54	11.90	3.00	16.56	**9.50**
40	IC506534	42.00	56.00	30.00	43.00	40.00	69.00	34.00	**44.86**	8.08	11.20	4.00	16.76	**10.01**
41	IC506535	42.00	56.00	34.00	45.00	34.00	71.00	35.00	**45.29**	6.76	8.70	3.00	14.04	**8.13**
42	IC506545	45.00	62.00	29.00	41.00	38.00	76.00	36.00	**46.71**	7.34	11.50	4.00	9.56	**8.10**
43	IC506555	43.00	58.00	31.00	41.00	34.00	79.00	34.00	**45.71**	6.68	12.30	9.00	10.90	**9.72**
44	IC506573	46.00	54.00	29.00	40.00	33.00	69.00	34.00	**43.57**	7.52	9.80	6.00	12.46	**8.95**
45	IC506575	42.00	52.00	30.00	42.00	31.00	72.00	35.00	**43.43**	7.80	11.20	5.00	13.64	**9.41**
46	IC506604	49.00	56.00	33.00	39.00	41.00	74.00	34.00	**46.57**	7.26	9.50	3.50	10.74	**7.75**
47	IC506605	43.00	58.00	29.00	36.00	33.00	75.00	32.00	**43.71**	7.56	9.00	2.00	11.52	**7.52**
48	IC506611	42.00	53.00	29.00	39.00	34.00	90.00	34.00	**45.86**	7.70	8.30	8.50	10.68	**8.80**
49	IC506612	43.00	60.00	27.00	38.00	34.00	82.00	37.00	**45.86**	6.86	12.30	4.50	11.08	**8.69**
50	IC524215	44.00	61.00	31.00	46.00	35.00	-	33.00	**41.67**	6.58	9.30	-	9.54	**8.47**
Mean for check variety														
1	BGA-2	82.20	54.40	49.80	64.20	65.00	72.40	69.80	**65.40**	7.60	13.80	5.10	15.53	**10.51**
2	CG Rajgira- 1	-	57.40	-	-	-	-	-	**57.40**	7.20	-	-	-	**7.20**
3	GA-2	74.80	56.60	50.80	63.20	55.50	-	61.40	**60.38**	6.82	11.40	-	13.36	**10.53**
4	RMA-7	75.40	58.40	46.40	67.80	63.00	95.40	67.20	**67.66**	7.55	13.10	5.00	12.76	**9.60**
5	Suvarna	79.40	54.40	50.60	65.00	61.50	91.00	70.40	**67.47**	7.56	14.30	7.00	14.96	**10.96**
Minimum		**41.00**	**52.00**	**27.00**	**35.00**	**29.00**	**69.00**	**29.00**	**39.17**	**5.88**	**7.60**	**2.00**	**7.82**	**6.87**
Maximum		**82.20**	**63.00**	**50.80**	**67.80**	**65.00**	**95.40**	**70.40**	**67.66**	**8.08**	**19.10**	**9.00**	**26.34**	**11.88**
Mean		**47.46**	**57.95**	**31.70**	**41.74**	**39.15**	**77.57**	**37.13**	**46.98**	**7.12**	**10.42**	**5.24**	**12.93**	**9.02**
CD (0.05)		**5.60**	**1.37**	**4.47**	**3.75**	-	-	**3.72**	**-**	**0.79**	-	-	**4.85**	**-**
CV (%) Error		**2.69**	**0.96**	**3.39**	**2.16**	-	-	**2.07**	**-**	**4.20**	-	-	**12.85**	**-**
CV (%) Phen.		**23.76**	**5.16**	**17.60**	**17.13**	**23.82**	**8.56**	**26.56**	**13.88**	**6.60**	**20.26**	**34.76**	**23.31**	**12.31**

S. No	Accession No.	Leaf width (cm)					Days to 80% maturity						
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
32	IC506514	3.18	5.20	4.00	3.44	**3.96**	129.00	89.00	120.00	98.00	133.00	94.00	**110.50**
33	IC506519	4.24	5.60	3.50	3.48	**4.21**	128.00	87.00	123.00	101.00	129.00	96.00	**110.67**
34	IC506520	4.06	4.50	-	4.18	**4.25**	126.00	89.00	115.00	92.00	-	92.00	**102.80**
35	IC506521	3.48	5.30	-	4.08	**4.29**	128.00	89.00	115.00	93.00	-	93.00	**103.60**
36	IC506524	3.10	5.60	3.50	3.94	**4.04**	132.00	89.00	119.00	94.00	162.00	92.00	**114.67**
37	IC506528	3.10	4.70	-	3.88	**3.89**	127.00	91.00	118.00	91.00	-	89.00	**103.20**
38	IC506529	3.00	4.90	3.00	5.14	**4.01**	132.00	91.00	117.00	93.00	142.00	92.00	**111.17**
39	IC506531	3.18	6.20	1.50	6.18	**4.27**	126.00	89.00	115.00	95.00	143.00	94.00	**110.33**
40	IC506534	3.50	5.60	2.00	5.12	**4.06**	128.00	90.00	128.00	100.00	136.00	94.00	**112.67**
41	IC506535	3.58	4.20	1.50	4.56	**3.46**	130.00	94.00	129.00	101.00	130.00	95.00	**113.17**
42	IC506545	3.92	6.00	2.00	3.28	**3.80**	130.00	88.00	122.00	91.00	133.00	89.00	**108.83**
43	IC506555	3.08	6.30	4.00	3.64	**4.26**	130.00	87.00	128.00	97.00	133.00	89.00	**110.67**
44	IC506573	3.40	5.30	3.00	5.34	**4.26**	127.00	88.00	121.00	91.00	141.00	90.00	**109.67**
45	IC506575	3.62	5.76	3.00	3.84	**4.06**	129.00	89.00	130.00	92.00	140.00	88.00	**111.33**
46	IC506604	3.30	5.10	2.00	3.96	**3.59**	128.00	87.00	122.00	101.00	141.00	91.00	**111.67**
47	IC506605	3.64	4.90	2.00	3.36	**3.48**	130.00	87.00	114.00	97.00	140.00	92.00	**110.00**
48	IC506611	3.48	4.90	6.00	3.86	**4.56**	126.00	89.00	119.00	93.00	142.00	89.00	**109.67**
49	IC506612	3.78	6.60	3.00	3.88	**4.32**	130.00	86.00	117.00	92.00	138.00	91.00	**109.00**
50	IC524215	3.56	4.80	-	3.16	**3.84**	126.00	90.00	129.00	100.00	-	92.00	**107.40**
Mean for check variety													
1	BGA-2	4.69	8.40	3.00	6.94	**5.76**	129.76	101.40	145.00	118.50	148.60	136.80	**130.01**
2	CG Rajgira- 1	3.82	-	-	-	**3.82**	129.00	-	-	-	-	-	**129.00**
3	GA-2	3.87	7.15	-	6.26	**5.76**	130.60	102.20	142.00	120.00	-	131.20	**125.20**
4	RMA-7	4.51	7.55	3.00	5.13	**5.05**	131.80	100.60	145.80	118.00	141.00	129.20	**127.73**
5	Suvarna	4.17	9.20	4.00	8.40	**6.44**	130.00	102.20	143.00	116.00	142.80	139.40	**128.90**
Minimum		**2.98**	**4.00**	**1.50**	**2.98**	**3.39**	**126.00**	**85.00**	**112.00**	**90.00**	**128.00**	**87.00**	**102.80**
Maximum		**4.69**	**9.20**	**6.00**	**8.40**	**6.44**	**132.00**	**102.20**	**145.80**	**120.00**	**162.00**	**139.40**	**130.01**
Mean		**3.58**	**5.43**	**3.11**	**4.51**	**4.20**	**129.22**	**89.82**	**122.31**	**98.03**	**138.12**	**94.97**	**111.68**
CD (0.05)		**0.34**	-	-	**2.40**	**-**	**2.33**	**2.40**	**4.01**	-	-	**9.22**	**-**
CV (%) Error		**3.21**	-	-	**13.47**	**-**	**0.70**	**0.88**	**1.04**	-	-	**2.58**	**-**
CV (%) Phen.		**12.06**	**18.07**	**37.20**	**23.51**	**13.78**	**1.48**	**4.29**	**6.30**	**7.48**	**4.33**	**12.88**	**5.50**

S. No	Accession No.	Petiole length (cm)					Inflorescence length (cm)							
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
32	IC506514	2.56	6.00	4.50	4.44	**4.38**	14.40	19.20	37.20	24.00	37.30	25.00	30.60	**26.81**
33	IC506519	2.32	5.90	3.00	3.20	**3.61**	16.40	20.40	37.80	19.00	39.70	13.00	15.40	**23.10**
34	IC506520	2.66	5.70	-	4.32	**4.23**	13.60	18.60	31.20	24.50	39.00	-	31.80	**26.45**
35	IC506521	2.66	5.10	-	3.78	**3.85**	16.20	21.20	48.40	25.50	36.40	-	31.20	**29.82**
36	IC506524	2.36	5.40	4.00	3.50	**3.82**	14.20	18.40	41.60	25.50	39.70	17.00	28.20	**26.37**
37	IC506528	2.88	5.10	-	5.74	**4.57**	12.40	17.20	39.00	25.00	28.70	-	29.80	**25.35**
38	IC506529	3.26	4.10	3.50	3.88	**3.69**	12.80	19.00	38.00	23.50	29.30	7.00	31.20	**22.97**
39	IC506531	3.10	5.40	1.00	7.14	**4.16**	21.00	20.40	43.40	20.50	39.30	10.00	31.00	**26.51**
40	IC506534	3.36	6.70	2.00	6.72	**4.70**	25.60	21.00	38.80	36.00	38.30	5.00	30.20	**27.84**
41	IC506535	2.96	4.80	1.50	5.16	**3.61**	18.40	18.80	34.20	35.00	34.00	6.00	33.00	**25.63**
42	IC506545	2.24	6.00	3.00	3.46	**3.68**	19.20	19.00	41.80	19.00	35.70	6.00	24.20	**23.56**
43	IC506555	2.88	5.70	4.50	4.00	**4.27**	16.40	17.80	35.00	25.00	37.00	25.00	29.20	**26.49**
44	IC506573	2.86	4.70	3.00	4.38	**3.74**	17.20	19.20	35.40	23.50	36.30	16.00	31.00	**25.51**
45	IC506575	2.92	6.00	3.50	5.68	**4.53**	26.00	18.80	41.60	25.50	43.30	6.00	30.40	**27.37**
46	IC506604	2.32	6.20	2.00	4.02	**3.64**	25.20	19.00	35.40	32.50	44.00	4.00	29.40	**27.07**
47	IC506605	2.64	6.00	1.50	4.12	**3.57**	18.60	20.80	42.60	23.50	48.30	5.00	31.60	**27.20**
48	IC506611	2.42	5.40	4.00	3.18	**3.75**	16.00	20.40	36.80	20.00	45.00	24.00	25.40	**26.80**
49	IC506612	2.64	7.90	2.00	4.10	**4.16**	19.00	21.20	41.60	23.50	22.70	17.00	29.80	**24.97**
50	IC524215	2.58	3.70	-	2.78	**3.02**	15.80	18.00	43.40	23.50	50.70	-	31.00	**30.40**
Mean for check variety														
1	BGA-2	3.31	9.85	4.40	7.57	**6.28**	46.72	20.36	39.28	31.80	27.00	9.40	30.84	**29.34**
2	CG Rajgira- 1	2.83	-	-	-	**2.83**	-	19.68	-	-	-	-	-	**19.68**
3	GA-2	3.15	8.35	-	6.06	**5.85**	50.36	20.12	41.52	32.00	39.65	-	62.48	**41.02**
4	RMA-7	3.37	8.55	3.00	5.33	**5.06**	54.06	20.36	44.32	34.00	35.80	15.00	39.32	**34.69**
5	Suvarna	3.16	10.90	5.00	6.22	**6.32**	43.68	20.64	38.20	37.90	23.30	16.00	30.44	**30.02**
Minimum		**2.00**	**3.20**	**1.00**	**2.78**	**2.83**	**10.60**	**16.60**	**25.80**	**19.00**	**22.70**	**4.00**	**15.40**	**19.68**
Maximum		**3.56**	**10.90**	**5.00**	**7.57**	**6.32**	**54.06**	**22.00**	**48.40**	**41.50**	**61.00**	**25.00**	**62.48**	**41.02**
Mean		**2.75**	**5.80**	**2.95**	**4.80**	**4.09**	**19.46**	**19.03**	**37.70**	**26.21**	**41.47**	**12.59**	**29.70**	**26.93**
CD (0.05)		**0.33**	-	-	**2.11**	**-**	**8.65**	**2.28**	**10.97**	**12.69**	-	-	**10.16**	**-**
CV (%) Error		**4.13**	-	-	**12.57**	**-**	**6.66**	**4.44**	**10.07**	**14.02**	-	-	**9.34**	**-**
CV (%) Phen.		**12.62**	**26.60**	**34.46**	**25.01**	**16.57**	**47.88**	**6.99**	**11.36**	**19.62**	**18.83**	**52.68**	**19.78**	**12.26**

S. No	Accession No.	Stem thickness (cm)					Plant height (cm)							
		Akola	Ranchi	SK Nagar	Ambikapur	Mean	Akola	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
32	IC506514	4.60	3.00	3.85	4.60	**4.01**	29.00	49.00	55.00	59.50	61.00	51.00	45.80	**50.04**
33	IC506519	6.40	3.00	4.52	4.62	**4.64**	37.60	50.40	61.20	45.50	63.70	42.00	26.40	**46.69**
34	IC506520	6.10	-	3.97	4.68	**4.92**	28.00	52.80	52.20	48.50	62.00	-	50.20	**48.95**
35	IC506521	7.30	-	4.47	4.26	**5.34**	34.60	48.00	64.20	49.00	51.00	-	48.40	**49.20**
36	IC506524	3.40	2.50	6.66	4.26	**4.21**	25.80	46.80	59.80	61.00	61.70	44.00	50.40	**49.93**
37	IC506528	5.30	-	6.03	4.28	**5.20**	26.00	48.60	60.00	59.50	47.60	-	53.80	**49.25**
38	IC506529	4.70	2.00	7.96	4.42	**4.77**	29.00	50.80	58.20	44.00	51.70	50.00	55.60	**48.47**
39	IC506531	3.60	1.00	10.70	4.58	**4.97**	38.80	49.20	86.00	45.00	80.70	32.00	62.40	**56.30**
40	IC506534	6.60	1.50	8.35	4.44	**5.22**	51.80	45.00	64.60	87.50	77.30	16.00	73.00	**59.31**
41	IC506535	4.31	1.00	6.94	4.44	**4.17**	29.40	49.40	58.00	66.50	53.00	23.00	62.60	**48.84**
42	IC506545	5.10	1.50	6.88	4.56	**4.51**	32.40	45.00	65.00	55.00	69.30	19.00	40.20	**46.56**
43	IC506555	4.90	3.00	4.95	4.76	**4.40**	24.40	51.60	54.60	59.50	64.00	51.00	46.00	**50.16**
44	IC506573	7.40	2.00	5.78	4.40	**4.90**	29.40	44.60	58.40	55.50	67.30	38.00	52.20	**49.34**
45	IC506575	5.04	3.00	3.71	4.14	**3.97**	36.80	45.20	56.00	64.50	66.00	33.00	58.60	**51.44**
46	IC506604	8.90	1.50	5.77	4.02	**5.05**	46.20	49.80	74.00	71.50	60.00	15.00	65.20	**54.53**
47	IC506605	5.20	1.00	5.57	4.06	**3.96**	32.80	49.40	71.80	47.00	63.00	16.00	53.00	**47.57**
48	IC506611	3.50	4.00	3.74	4.08	**3.83**	33.00	46.20	56.20	51.50	69.30	80.00	38.20	**53.49**
49	IC506612	4.90	2.00	3.94	4.16	**3.75**	30.80	50.00	65.60	51.50	85.00	34.00	45.00	**51.70**
50	IC524215	6.20	-	6.55	3.88	**5.54**	34.00	48.60	62.20	41.00	70.00	-	51.60	**51.23**
Mean for check variety														
1	BGA-2	8.36	2.20	14.77	4.47	**7.45**	77.35	49.24	122.64	126.20	102.45	30.40	126.80	**90.73**
2	CG Rajgira- 1	-	-	-	4.37	**4.37**	-	49.24	-	-	-	-	-	**49.24**
3	GA-2	8.54	-	14.47	4.05	**9.02**	84.76	52.12	112.88	121.40	114.50	-	166.00	**108.61**
4	RMA-7	8.65	3.50	13.36	4.07	**7.40**	70.64	53.00	114.12	124.20	111.80	52.60	150.24	**96.66**
5	Suvarna	12.55	4.00	16.25	4.40	**9.30**	78.40	50.40	115.68	127.20	93.00	83.40	124.80	**96.13**
Minimum		**2.50**	**0.50**	**3.71**	**3.88**	**3.56**	**21.00**	**43.20**	**42.20**	**39.00**	**47.60**	**12.00**	**26.40**	**41.50**
Maximum		**12.55**	**4.00**	**16.25**	**4.86**	**9.30**	**84.76**	**55.60**	**122.64**	**135.50**	**114.50**	**83.40**	**166.00**	**108.61**
Mean		**5.92**	**2.28**	**6.95**	**4.29**	**4.97**	**36.92**	**48.68**	**65.59**	**61.31**	**68.76**	**36.79**	**59.10**	**54.55**
CD (0.05)		**5.33**	-	**4.16**	**0.29**	**-**	**57.46**	**6.20**	**26.94**	**18.68**	-	-	**29.55**	**-**
CV (%) Error		**20.96**	-	**10.61**	**2.65**	**-**	**27.68**	**4.80**	**8.68**	**5.61**	-	-	**7.80**	**-**
CV (%) Phen.		**32.82**	**41.51**	**42.45**	**5.71**	**23.55**	**36.80**	**5.57**	**28.69**	**39.50**	**20.14**	**53.22**	**45.55**	**25.96**

S. No	Accession No.	Seed volume (g/10ml)							Lateral Inflorescence length (cm)			seed yield(q/ha)
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ranchi	SK Nagar	Mean	Ambikapur
32	IC506514	4.70	7.84	6.42	8.20	9.80	7.50	**7.41**	13.00	16.20	**14.60**	5.19
33	IC506519	6.45	7.88	6.98	8.50	9.80	7.36	**7.83**	8.00	5.20	**6.60**	5.43
34	IC506520	5.75	7.73	7.00	8.50	-	7.06	**7.21**	-	16.40	**16.40**	7.41
35	IC506521	4.90	7.75	6.96	8.30	-	7.25	**7.03**	-	11.20	**11.20**	8.40
36	IC506524	6.15	7.73	7.45	8.20	7.20	7.27	**7.33**	9.00	15.20	**12.10**	6.42
37	IC506528	6.80	7.67	6.93	7.50	-	7.01	**7.18**	-	17.20	**17.20**	6.67
38	IC506529	6.35	7.75	6.84	7.00	6.90	7.13	**7.00**	4.00	17.20	**10.60**	7.90
39	IC506531	5.40	7.71	6.60	8.00	6.80	7.24	**6.96**	6.00	18.80	**12.40**	8.89
40	IC506534	6.24	7.68	6.64	8.00	6.80	7.52	**7.15**	3.00	16.40	**9.70**	8.40
41	IC506535	4.55	7.69	6.67	7.20	7.10	7.87	**6.85**	3.00	17.00	**10.00**	8.64
42	IC506545	5.20	7.66	6.23	8.00	7.10	7.07	**6.88**	4.00	17.40	**10.70**	6.17
43	IC506555	5.20	7.72	6.58	7.20	9.80	7.58	**7.35**	13.00	12.60	**12.80**	6.17
44	IC506573	6.70	7.70	6.87	7.30	9.20	7.34	**7.52**	10.00	12.80	**11.40**	4.94
45	IC506575	4.70	7.66	7.15	8.30	9.30	7.25	**7.39**	4.00	11.40	**7.70**	6.57
46	IC506604	6.30	7.88	6.75	7.50	6.90	6.97	**7.05**	3.00	20.60	**11.80**	5.68
47	IC506605	6.95	7.75	6.91	7.50	7.20	6.79	**7.18**	3.00	17.40	**10.20**	4.57
48	IC506611	4.60	7.67	6.70	8.00	9.20	7.19	**7.23**	17.00	16.20	**16.60**	5.93
49	IC506612	6.00	7.69	6.43	7.50	7.60	7.47	**7.12**	11.00	15.60	**13.30**	4.81
50	IC524215	5.60	7.72	6.40	7.50	-	7.48	**6.94**	-	14.60	**14.60**	7.28
Mean for check variety												
1	BGA-2	6.42	7.84	6.70	7.75	8.26	5.31	**7.05**	6.00	11.24	**8.62**	7.46
2	CG Rajgira- 1	6.29	-	-	-	-	-	**6.29**	-	-	**-**	8.44
3	GA-2	6.55	7.79	6.86	7.50	-	7.46	**7.23**	-	21.48	**21.48**	9.19
4	RMA-7	6.56	7.81	7.10	8.25	6.70	7.10	**7.25**	9.00	17.44	**13.22**	7.56
5	Suvarna	6.92	7.82	6.98	7.90	7.10	5.30	**7.00**	9.00	12.58	**10.79**	7.80
Minimum		**4.10**	**7.60**	**6.23**	**7.00**	**1.00**	**4.03**	**5.77**	**2.00**	**5.20**	**6.60**	**4.57**
Maximum		**7.30**	**7.91**	**7.62**	**8.50**	**9.80**	**7.87**	**7.83**	**17.00**	**21.48**	**21.48**	**9.63**
Mean		**5.67**	**7.74**	**6.83**	**7.74**	**7.80**	**7.11**	**7.11**	**7.86**	**15.15**	**12.03**	**7.17**
CD (0.05)		**0.37**	**0.13**	**0.61**	-	-	**1.21**	-	-	**5.75**	**-**	**3.26**
CV (%) Error		**2.25**	**0.62**	**3.31**	-	-	**7.21**	-	-	**13.74**	**-**	**15.82**
CV (%) Phen.		**16.20**	**0.95**	**4.96**	**5.90**	**20.78**	**10.39**	**4.93**	**54.86**	**19.01**	**24.10**	**17.39**

S. No	Accession No.	Seed yield per plant (g)							Number of branches per plant				Number of Lateral Inflorescence
		Bhubaneswar	Mandor	Rahuri	Akola	SK Nagar	Ranchi	Mean	Ambikapur	Ranchi	SK Nagar	Mean	Ranchi
32	IC506514	6.51	8.93	13.10	12.50	8.00	14.00	**10.51**	5.20	12.00	3.00	**6.73**	22.00
33	IC506519	7.82	17.73	13.40	11.50	1.70	2.80	**9.16**	4.40	7.00	-	**5.70**	11.00
34	IC506520	4.76	11.60	9.80	9.90	11.00	-	**9.41**	5.80	-	3.20	**4.50**	-
35	IC506521	4.46	8.13	19.00	9.40	9.80	-	**10.16**	6.40	-	3.00	**4.70**	-
36	IC506524	4.89	8.00	12.40	8.10	12.30	5.70	**8.57**	7.00	7.00	3.20	**5.73**	11.00
37	IC506528	3.72	8.27	10.30	7.60	13.20	-	**8.62**	6.00	-	4.00	**5.00**	-
38	IC506529	6.38	8.67	11.90	5.00	27.60	2.10	**10.27**	5.60	4.00	3.00	**4.20**	6.00
39	IC506531	5.60	9.60	13.80	14.80	26.70	5.80	**12.72**	6.60	5.00	3.40	**5.00**	7.00
40	IC506534	5.37	8.53	16.00	17.40	25.00	3.90	**12.70**	6.40	4.00	3.00	**4.47**	16.00
41	IC506535	5.27	14.93	13.90	9.60	16.10	3.10	**10.48**	5.60	3.00	3.80	**4.13**	6.00
42	IC506545	3.39	7.47	11.60	6.10	6.00	4.30	**6.48**	5.40	6.00	2.60	**4.67**	10.00
43	IC506555	5.96	5.47	11.00	7.60	5.90	14.00	**8.32**	6.00	12.00	2.40	**6.80**	22.00
44	IC506573	3.58	5.73	9.80	9.40	10.40	11.00	**8.32**	6.20	5.00	2.40	**4.53**	11.00
45	IC506575	3.85	11.07	19.00	10.20	6.50	11.00	**10.27**	5.60	5.00	2.20	**4.27**	8.00
46	IC506604	7.67	8.80	10.00	7.40	14.40	1.70	**8.33**	5.60	4.00	2.20	**3.93**	7.00
47	IC506605	5.53	4.00	16.00	9.30	13.70	4.20	**8.79**	5.00	2.00	2.80	**3.27**	5.00
48	IC506611	3.72	7.47	19.00	8.70	6.70	8.70	**9.05**	6.20	9.00	-	**7.60**	14.00
49	IC506612	3.92	6.27	10.00	13.50	6.50	12.00	**8.70**	6.20	5.00	3.00	**4.73**	14.00
50	IC524215	4.52	3.33	13.50	13.90	15.20	-	**10.09**	5.40	-	3.60	**4.50**	-
Mean for check variety													
1	BGA-2	8.48	13.66	17.95	8.00	16.72	6.66	**11.91**	7.80	4.40	1.00	**4.40**	9.20
2	CG Rajgira- 1	-	-	-	-	-	-	**-**	7.32	-	-	**7.32**	-
3	GA-2	7.89	11.26	19.85	9.86	25.26	-	**14.82**	7.28	-	1.00	**4.14**	-
4	RMA-7	8.20	20.05	16.80	9.38	17.36	6.82	**13.10**	7.08	7.00	1.00	**5.03**	9.00
5	Suvarna	8.03	13.31	21.50	13.64	18.77	5.80	**13.51**	7.12	10.00	1.00	**6.04**	15.00
Minimum		**2.62**	**1.33**	**8.90**	**1.90**	**1.70**	**1.70**	**5.58**	**4.20**	**2.00**	**1.00**	**3.27**	**4.00**
Maximum		**8.48**	**20.05**	**21.50**	**34.00**	**27.60**	**20.00**	**14.82**	**7.80**	**12.00**	**4.00**	**8.10**	**22.00**
Mean		**5.12**	**8.20**	**13.56**	**9.90**	**12.99**	**7.56**	**9.59**	**6.09**	**6.12**	**2.91**	**5.10**	**10.87**
CD (0.05)		**2.81**	**9.26**	-	**4.19**	**4.10**	-	-	**0.92**	-	**0.00**	**-**	-
CV (%) Error		**12.90**	**23.81**	-	**15.38**	**7.87**	-	-	**4.96**	-	**0.00**	**-**	-
CV (%) Phen.		**30.44**	**46.12**	**23.60**	**60.53**	**50.15**	**60.88**	**22.17**	**12.20**	**41.14**	**25.68**	**18.96**	**41.48**

Table 21: Experimental details of germplasm evaluation of grain amaranth Rabi 2019-20 Plain SET-2 - II Year

S. No	Item	Ambikapur	Akola	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar
1	No of entry	100	100	100	100	100	100	100	100
2	No of Check	4	4	4	4	4	4	4	4
3	Design	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD
4	No of Block	5	5	-	5	5	5	5	7
7	Number of Rows	3	2	3	3	3	2	3	3
8	Row length (m)	3	3	3	3	3	3	3	3
5	Row spacing (cm)	45	45	45	45	45	45	45	45
6	Plant spacing (cm)	15	15	15	15	15	15	15	15
9	NPKS (kg/ha)	-	60:40:20:20	-	60:40:20:20	60:40:20:20	60:40:20:20	60:40:20:20	60:40:20:20
12	plot size (m^2)	4.05	2.7	4.05	4.05	4.05	2.7	4.05	4.05
10	Sowing Date	12/4/2019	-	2/12/2019	5/12/2019	15/11/2019	1/12/2019	5/12/02019	20/12/2019
11	Harvesting Period	As per maturity	-	17/04/2020	2/3/2020	As per maturity	08/03/2020 to 15/03/2020	1/04/2020 to 06/04/2020	25/02/2020
13	Conversion Factor	24.69	37.04	24.69	24.69	24.69	37.04	24.69	24.69

Table 22: Promising lines in grain amaranth germplasm for various characters at different locations (Plains)
(Rabi 2019-20) SET-2 - II Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**NBPGR, RS, Akola (100 accession)**				
1	Days to 50% flowering	40.00	93.00	IC317517 (40), IC279670 (41), IC279760 (41), IC279832 (41), IC340823 (41), IC383578 (41), IC436974 (41), IC444193 (41), IC255419 (42), IC255428 (42), IC255482 (42), IC279631 (42), IC279807 (42), IC338640 (42), IC340803 (42), IC340861 (42), IC341452 (42), IC356085 (42), IC362257 (42), IC383647 (42), IC391468 (42), IC391517 (42), IC444099 (42), IC506535 (42), IC506575 (42), IC524215 (42),	RMA-7 (72.4)
	Number of days to 50% flowering **(adjusted valaues)**	29.8	90.8	IC317517 (29.8), IC444193 (30.8), IC383578 (30.8), IC436974 (30.8), IC340823 (30.8), IC356085 (31.8), IC383647 (31.8), IC340861 (31.8), IC340803 (31.8)	RMA-7 (72.4)
2	Days to 80% maturity	90.00	118.00	IC340825 (90), IC506514 (90), IC506528 (90), IC506612 (90)NC59949 (90), IC255555 (91), IC255481 (92), IC255482 (92), IC266754 (92), IC266937 (92), IC268885 (92), IC282786 (92), IC340861 (92), IC341452 (92), IC391561 (92), IC393022 (92), IC506611 (92)	RMA-7 (111.4)
	Days to 80% maturity (adjusted valaues)	86.2	122.7	IC340825 (86.2), IC255555 (86.2), IC341452 (87.2), IC255481 (87.2), IC268885 (87.2), IC266937 (87.2), IC255482 (87.2), IC393022 (87.2), IC266754 (87.2), IC340861 (88.2), IC252428 (88.2), IC362257 (89.2), IC264854 (89.2), IC338640 (89.2)	RMA-7 (111.4)
3	Inflorescence length (cm)	10.00	51.64		GA-2 (51.64)
	Inflorescence length (cm) (adjusted valaues)	9.085	51.64		GA-2 (51.64)
4	Plant height (cm)	19.50	125.20	IC444105 (125.2), IC317427 (107.8)	BGA-2 (89.52)
	Plant height (cm) dwarf	19.50	125.20	IC506514 (19.5), IC436948 (22), IC340803 (22.4), IC265980 (23), IC340971 (23), IC506605 (23.4), IC356085 (23.8), IC356023 (24.2), IC264805 (24.6), IC265008 (24.8), IC266812 (25.4), IC506520 (25.6), NC59949 (26.2), IC444159 (27.2), IC444156 (27.6)	RMA-7 (62.28)
5	Seed yield per plant (g)	0.10	13.62		Suvarna (13.62)
6	Stem thickness (mm)	1.70	13.93		Suvarna (13.93)
II	**IGKV, Ambikapur (100 accessions)**				

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Days to 50% flowering	49.00	61.00	IC469777 (49), IC392525 (50), IC506575 (50)	Suvarna (54.4)
2	Days to 80% maturity	126.00	132.00	IC279652 (126), IC338640 (126), IC356041 (126), IC362257 (126), IC392498 (126), IC429977 (126), IC436953 (126), IC469858 (126), IC506529 (126)	BGA-2 (129.76)
3	Inflorescence length (cm)	16.60	22.60	IC383647 (22.6), IC266778 (22.4), IC279760 (21.8), IC506604 (21.8), IC279807 (21.6), IC340823 (21.6), IC340825 (21.6), IC340861 (21.6), IC506531 (21.6), IC265980 (21.4), IC279567 (21.2), IC266835 (21), IC382640 (21), IC436948 (21), IC436953 (21), IC444105 (21), IC506520 (21), IC255428 (20.8), IC355992 (20.8), IC356012 (20.8), IC391433 (20.8), IC391517 (20.8), IC469777 (20.8), IC469803 (20.8), IC506534 (20.8)	Suvarna (20.64)
4	Leaf length (cm)	5.92	8.54	IC279512 (8.54)	BGA-2 (7.6)
5	Leaf width (cm)	2.92	4.88	IC279511 (4.88), IC279832 (4.82), IC266812 (4.7)	BGA-2 (4.69)
6	Number of branches per plant	4.00	8.60	IC506521 (8.6)	BGA-2 (7.8)
7	Petiole length (cm)	1.94	4.08	IC356046 (4.08), IC340803 (3.98), IC444105 (3.98), IC279511 (3.76)	RMA-7 (3.37)
8	Plant height (cm)	38.40	59.00	IC356027 (59), IC355992 (58.8), IC255555 (57.6), IC266937 (56), IC338640 (56), IC356012 (55.8), IC268885 (55.6), IC266754 (55.4), IC279363 (55.2), IC356041 (55.2)	RMA-7 (53)
	Plant height (cm) dwarf	38.40	59.00	IC506524 (38.4), IC506528 (40.6), IC264805 (42.8), IC255428 (44.6), IC279832 (44.6), IC444099 (44.8), IC506612 (44.8), IC356070 (45), IC361327 (45.2), IC436953 (45.2), IC469820 (45.2), IC265980 (45.6), IC506521 (45.6), IC524215 (45.6), IC356023 (46), IC362257 (46.2)	BGA-2 (49.24)
9	Seed volume (g/10ml)	4.10	7.58	IC444100 (7.58), IC279670 (7.35), IC356012 (7.33)	Suvarna (6.92)
10	Stem thickness (mm)	3.64	5.16	IC255428 (5.16), IC265008 (4.94), IC265980 (4.92), IC279832 (4.9), IC279363 (4.86), IC391433 (4.84), IC362257 (4.84), IC279612 (4.82), IC341452 (4.8), IC506604 (4.8), IC506612 (4.78)	BGA-2 (4.47)
11	seed yield(q/ha)	3.95	10.86	IC362257 (10.86), IC340823 (10.62), IC391433 (10.62), IC255481 (10.37), IC356046 (10.12), IC382640 (10.12), IC444099 (10.12), IC341452 (9.88), IC265980 (9.68), IC279670 (9.63), IC337341 (9.63), IC340825 (9.63), IC360827 (9.63), IC392525 (9.63), IC444105 (9.63), IC265008 (9.38)	GA-2 (9.19)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
III	**NDUAT, Ayodhya (100 accessions0**				
1	Days to 50% flowering	48.00	61.00	IC266937 (48), IC279612 (48), IC341452 (48), IC506612 (48), IC255555 (49), IC266778 (49), IC279462 (49), IC282786 (49), IC356070 (49), IC391433 (49), IC444156 (49)	Suvarna (54)
2	Days to 80% maturity	118.00	131.00	IC340825 (118), IC469820 (118)	GA-2 (122)
3	Inflorescence length (cm)	29.10	44.50	IC338640 (44.5), IC362257 (43.2), IC361327 (43.1)	RMA-7 (43)
4	Plant height (cm)	72.30	105.20	IC279631 (105.2), IC356012 (102.2), IC360834 (102), IC279832 (101.8), IC340825 (101.7), IC279612 (101.5), IC356046 (101.4), IC356023 (101.3), IC506575 (101.2), IC268885 (100.9), IC266835 (100.5), IC393022 (100.1), IC255419 (99.8), IC340823 (99.6), IC265980 (99)	GA-2 (98.8)
	Plant height (cm) dwarf	72.30	105.20	IC506531 (72.3), IC469858 (75), IC264805 (75.1), IC429977 (75.1), IC506529 (75.4), IC444100 (75.5), IC506535 (75.9), IC506520 (76.2), IC337341 (76.6), IC506611 (76.9), IC506534 (77.2), IC436957 (77.4), IC506514 (78.4), IC444167 (78.7), IC356070 (78.9), IC282786 (79.4)	BGA-2 (90.6)
5	Seed volume (g/10ml)	5.40	7.80	IC340971 (7.8), IC391468 (7.8), IC506604 (7.8), IC391561 (7.7), IC436974 (7.7)	Suvarna (7.65)
6	Seed yield per plant (g)	8.60	28.00	IC469777 (28), IC429977 (27.5), IC469803 (27), IC436974 (22.5), IC391468 (20.6), IC383578 (20.5), IC436953 (20.5), IC392525 (20), IC506535 (20), IC383647 (19.5), IC266937 (19), IC469837 (19), IC506605 (19)BGA-2 (19)	RMA-7 (19)
IV	**OUA&T, Bhubaneswar (100 accessions)**				
1	Days to 50% flowering	28.00	58.00	IC255482 (28), IC265008 (28), IC266778 (28), IC279760 (28), IC337341 (28), IC360858 (28), IC391468 (28), IC391517 (28), IC444099 (28), IC444100 (28), IC506611 (28), IC264805 (29), IC265980 (29), IC266812 (29), IC338640 (29), IC391561 (29), IC393022 (29), IC469805 (29), IC469820 (29), IC506612 (29), IC524215 (29)	RMA-7 (53.4)
	Days to 50% flowering (adjusted valaues)	25.25	58.00	IC391468 (25.25), IC391517 (25.25), IC391561 (26.25), IC469805 (26.25), IC469820 (26.25), IC469777 (27.25), IC469803 (27.25), IC469837 (27.25), IC469858 (27.25), IC333741 (27.5), IC360858 (27.5), IC265008 (27.5), IC266778 (27.5), IC392498 (28.25)	RMA 7 (C) (53.4)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
2	Days to 80% maturity	79.00	98.60	IC279807 (79), IC524215 (79), IC436948 (83), IC266754 (84), IC266937 (84), IC279462 (84), IC279760 (84), IC356085 (84), IC391561 (84), IC444167 (84), IC506521 (84)NC59949 (84), IC255481 (85), IC265980 (85), IC266812 (85), IC268885 (85), IC279832 (85), IC281749 (85), IC282786 (85), IC317517 (85), IC338640 (85), IC340971 (85), IC341452 (85), IC362257 (85), IC391468 (85), IC444193 (85), IC469805 (85), IC506514 (85), IC506520 (85)	RMA-7 (97)
3	Inflorescence length (cm)	20.80	42.96		GA-2 (42.96)
	Inflorence Length (cm) **(adjusted valaues)**	20.60	45.95	IC279807 (45.95), IC333741 (45.35), IC279462 (44.95), IC360858 (43.95), IC524215 (43.75), IC279511 (43.75), IC279512 (43.75), IC356070 (43.35), IC279413 (43.35)	GA 2 (C) (42.96)
4	Plant height (cm)	41.80	135.40	IC317427 (135.4)	GA-2 (111.48)
	Plant height (cm) dwarf	41.80	135.40	IC506575 (41.8), IC391433 (42.8), IC266937 (43.4), IC317549 (45.4), IC317517 (45.6), IC340803 (46), IC436948 (46), IC340971 (46.4), IC356085 (46.6), IC282786 (47.2), IC469803 (47.6), IC266835 (47.8), IC264854 (49), IC340861 (49.2), IC382640 (49.6)	RMA-7 (91.76)
5	Seed volume (g/10ml)	7.34	8.07	IC506535 (8.07), IC279512 (7.98), IC506519 (7.98), IC506529 (7.97), IC279670 (7.95), IC279567 (7.94), IC506528 (7.94), IC506605 (7.94), IC265980 (7.93), IC279413 (7.93)NC59949 (7.93), IC317427 (7.92), IC255481 (7.91), IC279462 (7.9)	Suvarna (7.79)
	Seed volume (g/10ml) (adjusted valaues)	7.33	8.06	IC506535 (8.06), IC506519 (7.95), IC279512 (7.95), IC506529 (7.94), IC279670 (7.92), IC506605 (7.91), IC506528 (7.91), IC279567 (7.91), IC391517 (7.91), NC59949 (7.9), IC265980 (7.9), IC279413 (7.9), IC444156 (7.9), IC392498 (7.9), IC255481 (7.9)	BGA 2 (C) (7.75)
6	Seed yield per plant (g)	2.09	9.19	IC506529 (9.19), IC506528 (8.97), IC506605 (8.68), IC506519 (8.39), IC391517 (8.16), IC279567 (8.08), IC265980 (8.03), IC279512 (8.02)NC59949 (7.93), IC506534 (7.77), IC506531 (7.66), IC392498 (7.54), IC506521 (7.54), IC279670 (7.48), IC362257 (7.4), IC279413 (7.37), IC255481 (7.37), IC506604 (7.33), IC279612 (7.26), IC337341 (7.2)	RMA-7 (6.43)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
	Seed yield (g/plant) **(adjusted valaues)**	1.11	8.85	IC279567 (8.85), IC265980 (8.8), IC279512 (8.8), IC391517 (8.61), IC279670 (8.25), IC506529 (8.2), IC279413 (8.15), IC362257 (8.15), IC255481 (8.12), IC279612 (8.03), IC506528 (7.98), IC392498 (7.98), IC333741 (7.98), IC382640 (7.86)	RMA 7 (C) (6.43)
V	**AU, Mandor (100 accessions)**				
1	Days to 50% flowering	36.00	68.20	IC392498 (36), IC255428 (37), IC393022 (37), IC506524 (37), IC264854 (38), IC356012 (38), IC391468 (38), IC436953 (38), IC444167 (38), IC506521 (38), IC524215 (38), IC341452 (39), IC356023 (39), IC356041 (39), IC382640 (39), IC436948 (39), IC444100 (39), IC444193 (39), IC506514 (39), IC506520 (39), IC265980 (40), IC268885 (40), IC279631 (40), IC355992 (40), IC356027 (40), IC356085 (40), IC362257 (40), IC444156 (40), IC469805 (40), IC469858 (40), IC506605 (40)	BGA-2 (64.8)
1	Number of days to 50% flowering **(adjusted valaues)**	36.05	68.20	IC392498 (36.05), IC506524 (36.3), IC444167 (36.8), IC436953 (36.8), IC506521 (37.3), IC524215 (37.55), IC444193 (37.8), IC436948 (37.8), IC391468 (38.05), IC356012 (38.05), IC444100 (38.3), IC506514 (38.3), IC506520 (38.3), IC444156 (38.8), IC356085 (38.8)	BGA 2 (C) (64.8)
2	Days to 80% maturity	114.00	146.00	IC506524 (114), IC255428 (115), IC264854 (115), IC506521 (115), IC524215 (115), IC268885 (116), IC392498 (116), IC444167 (116), IC506514 (116), IC356012 (117), IC391468 (117), IC444100 (118)NC59949 (118), IC279511 (119), IC340803 (119), IC341452 (119), IC391517 (119), IC392525 (119), IC393022 (119), IC444156 (119), IC506612 (119), IC255555 (120), IC279462 (120), IC340971 (120), IC355992 (120), IC356023 (120), IC444193 (120), IC469820 (120), IC506605 (120)	BGA-2 (143.2)
3	Inflorescence length (cm)	21.00	43.67	IC444105 (43.67), IC255419 (43.33)	Suvarna (41.8)
4	Plant height (cm)	37.33	128.40		BGA-2 (128.4)
	Plant height (cm) dwarf	37.33	128.40	IC279462 (37.33), IC360834 (37.5), IC444099 (40.67), IC392525 (41.33), IC506611 (41.33), IC279670 (43), IC356070 (43), IC266754 (43.5), IC506519 (43.67), IC444159 (44), IC383647 (45), IC436957 (45), IC524215 (45.5), IC506520 (45.67), IC383578 (46), IC255482 (46.5)	RMA-7 (96.33)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
5	Seed volume (g/10ml)	6.13	8.39	IC392525 (8.39), IC279832 (7.87), IC444156 (7.75), IC436948 (7.65), IC393022 (7.63), IC279612 (7.6), IC356085 (7.58), IC391433 (7.58), IC469837 (7.57), IC506528 (7.57), IC469803 (7.56), IC266835 (7.55)	RMA-7 (7.17)
	Seed volume (g/10) (adjusted valaues)	6.01	8.31	IC392525 (8.31), IC444156 (8.09), IC436948 (7.99), IC356085 (7.92), IC391433 (7.92), IC340823 (7.85), IC444167 (7.83), IC340861 (7.79), IC383647 (7.77), IC444193 (7.75), IC279832 (7.75), IC340971 (7.73), IC317631 (7.72), IC340803 (7.71)	RMA 7 (C) (7.17)
6	Seed yield per plant (g)	1.20	14.64		Suvarna (14.64)
VI	**MPKV, Rahuri (100 accessions)**				
1	Days to 50% flowering	28.00	63.00	IC340971 (28), IC469858 (28), IC265008 (29), IC265980 (29), IC266778 (29), IC317517 (29), IC356012 (29), IC469837 (29), IC255555 (30), IC317549 (30), IC255428 (31), IC279413 (31), IC279462 (31), IC338640 (31), IC355992 (31), IC356070 (31), IC436953 (31), IC444099 (31), IC524215 (31), IC255419 (32), IC255481 (32), IC255482 (32), IC264805 (32), IC264854 (32), IC279760 (32), IC362257 (32), IC469805 (32), IC506612 (32)	Suvarna (59.5)
2	Days to 80% maturity	85.00	120.75	IC340861 (85), IC340803 (88), IC340823 (88), IC340825 (88), IC338640 (89), IC383578 (89), IC255482 (90), IC266754 (90), IC340971 (90), IC356041 (90), IC392525 (90), IC393022 (90), IC436957 (90), IC356027 (91), IC392498 (91), IC444167 (91), IC469837 (91), IC266937 (92), IC279807 (92), IC356023 (92), IC356085 (92), IC360827 (92), IC383647 (92), IC391468 (92), IC391561 (92), IC436948 (92), IC469803 (92), IC469820 (92)	Suvarna (116.5)
3	Inflorescence length (cm)	29.30	88.70	IC469837 (88.7)	GA-2 (49.85)
4	Leaf length (cm)	5.80	18.93		BGA-2 (18.93)
5	Leaf width (cm)	3.30	12.23		Suvarna (12.23)
6	Petiole length (cm)	3.80	14.68		BGA-2 (14.68)
7	Plant height (cm)	47.70	150.43		BGA-2 (150.43)
	Plant height (cm) dwarf	47.70	150.43	IC279807 (47.7), IC264805 (50.7), IC360834 (52.7), IC279363 (53.3), IC279413 (54.6), IC356085 (56.3), IC382640 (57), IC436957 (57.3), IC469803 (57.3), IC279832 (57.7), IC279462 (58), IC266812 (59.3), IC279670 (59.3), IC279760 (59.3)	RMA-7 (138)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
8	Seed volume (g/10ml)	6.60	8.60	IC279612 (8.6), IC268885 (8.5), IC391433 (8.5), IC429977 (8.5), IC506605 (8.5), IC282786 (8.4), IC382640 (8.4), IC444099 (8.4)	RMA-7 (8.4)
9	Seed yield per plant (g)	7.80	21.90		Suvarna (21.9)
VII	**BAU, Ranchi (100 accessions)**				
1	Days to 50% flowering	72.00	97.00	IC340823 (72), IC356046 (72), IC436948 (72), IC469858 (72), IC506521 (72), IC255428 (73), IC279511 (73), IC340861 (73), IC391468 (73), IC436957 (73), IC506524 (73), IC282786 (74), IC341452 (74)	BGA-2 (83.2)
2	Days to 80% maturity	128.00	152.00	IC362257 (128), IC393022 (128), IC444099 (128), IC506535 (128), IC266937 (129), IC279512 (129), IC340803 (129), IC383647 (129), IC506528 (129), IC506575 (129), IC338640 (130), IC506604 (130), IC266754 (131), IC266812 (131), IC268885 (131), IC279652 (131), IC279670 (131), IC279832 (131), IC356012 (131), IC356023 (131), IC356041 (131), IC356085 (131), IC436974 (131), IC444159 (131), IC444167 (131), IC469777 (131), IC506514 (131), IC506520 (131), IC506611 (131), IC524215 (131)NC59949 (131)	RMA-7 (143)
3	Inflorescence length (cm)	6.00	30.00	IC255419 (30), IC391561 (30), IC469858 (26), IC469837 (25), IC506605 (25), IC255482 (23)	BGA-2 (23)
4	Lateral Inflorescence length (cm)	5.00	18.00	IC255419 (18), IC266754 (18), IC268885 (18), IC279670 (18), IC356023 (18), IC391561 (18), IC444167 (18), IC506514 (18), IC524215 (18), IC255555 (14), IC265008 (14), IC340823 (14), IC356027 (14), IC356046 (14), IC383578 (14), IC391517 (14), IC436948 (14), IC444105 (14), IC444193 (14), IC469820 (14), IC506519 (14), IC506521 (14), IC506531 (14)	BGA-2 (13.6)
5	Leaf length (cm)	4.00	9.00	IC265980 (9), IC279612 (9), IC360834 (9), IC392525 (9), IC469837 (9), IC506605 (9)	BGA-2 (8.7)
6	Leaf width (cm)	2.00	8.00	IC265980 (8), IC279612 (8), IC360834 (8), IC392525 (8)	BGA-2 (6.2)
7	Number of branches per plant	4.00	13.00	IC340971 (13), IC506529 (13), IC255419 (12), IC265008 (12), IC356027 (12), IC383578 (12), IC391561 (12), IC444193 (12), IC469837 (12), IC506519 (12), IC506605 (12), IC506604 (11), IC279462 (10), IC340825 (10), IC436953 (10)	Suvarna (10)
8	Petiole length (cm)	1.50	6.60		BGA-2 (6.6)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Plant height (cm)	24.00	87.00	IC361327 (87), IC279462 (80), IC340825 (80), IC436953 (80)	Suvarna (78.4)
	Plant height (cm) dwarf	24.00	87.00	IC279832 (24), IC360858 (26), IC506575 (29), IC338640 (30), IC362257 (30), IC506535 (30), IC266778 (32), IC279631 (32), IC355992 (32), IC356070 (32), IC429977 (32), IC444156 (32), IC506612 (32), IC282786 (35), IC341452 (35)	RMA-7 (50.4)
10	Seed volume (g/10ml)	6.70	10.00	IC255428 (10), IC265008 (10), IC266937 (10), IC268885 (10), IC282786 (10), IC356041 (10), IC356085 (10), IC391468 (10), IC436974 (10), IC506520 (10), IC506604 (10), IC506605 (10), IC506611 (10)	BGA-2 (8.54)
11	Seed yield per plant (g)	2.00	33.00	IC265980 (33), IC279612 (33), IC360834 (33), IC392525 (33), IC265008 (28), IC469858 (20), IC255419 (17), IC391561 (17)	BGA-2 (16.42)
12	Stem thickness (mm)	2.00	4.60		BGA-2 (4.6)
13	Number of Lateral Inflorescence	7.00	32.00	IC255419 (32), IC391561 (32), IC506604 (27), IC506531 (23), IC265008 (22), IC340971 (22), IC356027 (22), IC383578 (22), IC444193 (22), IC469837 (22), IC506519 (22), IC506529 (22), IC506605 (22), IC362257 (20), IC506535 (20)	Suvarna (15)
VIII	**SDAU, SK Nagar (100 accessions)**				
1	Days to 50% flowering	23.00	69.29	NC59949 (23), IC266835 (28), IC382640 (29), IC444193 (29), IC341452 (30), IC362257 (30), IC436974 (30), IC356027 (31), IC391433 (31), IC506521 (31), IC279511 (32), IC355992 (32), IC360834 (32), IC360858 (32), IC429977 (32), IC444100 (32), IC444156 (32), IC469858 (32), IC506524 (32)	GA-2 (61.43)
	Days to 50% flowering **(adjusted valaues)**	23.14	69.29	NC 59949 (23.14), IC 382640 (25.89), IC 266835 (26.39), IC 362257 (26.89), IC 341452 (26.89), IC 506524 (28.89), IC 506528 (29.89), IC 255428 (29.89), IC 444193 (30.14), IC 391433 (30.14), IC 255481 (30.89), IC 436974 (31.14), IC 429977 (31.14), IC 506521 (31.14)	GA-2(C1)(61.43)
2	Days to 80% maturity	87.00	137.24	IC265008 (87), IC265980 (87), IC279567 (87), IC356027 (87), IC255481 (88), IC266812 (88), IC279511 (88), IC338640 (88), IC362257 (88), IC393022 (88), IC266778 (89), IC337341 (89), IC341452 (89), IC356012 (89), IC356023 (89), IC360858 (89), IC383647 (89), IC391517 (89), IC391561 (89), IC469858 (89), IC506535 (89)	RMA-7 (128.07)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
3	Inflorescence length (cm)	12.00	69.60	IC356046 (69.6), IC361327 (66.8)	GA-2 (47.14)
	Inflorescence length (cm) **(adjusted valaues)**	11.57	72.37	IC 361327 (72.37), IC 356046 (65.17)	GA-2(C1)(47.14)
4	Lateral Inflorescence length (cm)	5.40	34.20	IC361327 (34.2), IC356046 (33.2)	GA-2 (17.03)
5	Leaf length (cm)	6.42	22.78	IC317427 (22.78)	RMA-7 (15.2)
6	Leaf width (cm)	2.16	7.08	IC317427 (7.08)	Suvarna (6.17)
7	Number of branches per plant	1.00	5.00	IC393022 (5), IC391468 (3.6), IC444159 (3.6), IC340825 (3.4), IC340861 (3.4), IC356085 (3.4), IC383647 (3.4), IC444156 (3.4), IC469820 (3.4), IC340971 (3.2), IC436948 (3.2), IC436953 (3.2), IC444193 (3.2)	Suvarna (1)
8	Petiole length (cm)	2.16	10.70	IC317427 (10.7)	Suvarna (8.07)
9	Plant height (cm)	22.40	147.00	IC361327 (147), IC356046 (141.6)	GA-2 (139.83)
	Plant height (cm) dwarf	22.40	147.00	IC282786 (22.4), IC266835 (23.2), IC436948 (24.6), IC383647 (26), IC356085 (26.4), IC444156 (26.4), IC444159 (27.6), IC383578 (28.6), IC356023 (30.4), IC356012 (30.6), IC469777 (31.4), IC506612 (31.6), IC266937 (32), IC279832 (33), IC264854 (33.4), IC444167 (33.6)	BGA-2 (101.57)
	Plant height (cm) **(adjusted valaues)**	22.06	150.06	IC 361327 (150.06)	GA-2(C1)(139.83)
10	Seed volume (g/10ml)	4.01	7.43		GA-2 (7.43)
11	Seed yield per plant (g)	1.10	24.80	IC391433 (24.8), IC382640 (22), IC506535 (21.8), IC506524 (21)	GA-2 (20.64)
12	Stem thickness (mm)	2.70	12.46		Suvarna (12.46)
IX	**Based on all locations (100 accessions)**				
1	Days to 50% flowering	40.71	66.41	IC382640 (40.71), IC444100 (40.86), IC469805 (41), IC279413 (41.29), IC317549 (42), IC469803 (42.14), IC279807 (42.43), IC337341 (42.43), IC391433 (42.57), IC264805 (43), IC317517 (43.14)	GA-2 (62.8)
2	Days to 80% maturity	105.29	129.00	IC279807 (105.29), IC281749 (105.86), IC317549 (106.43), IC393022 (106.63), IC337341 (106.71), IC279567 (106.86), IC317631 (106.86), IC264805 (107.29), IC469805 (107.29), IC469803 (107.43), IC268885 (107.63)	GA-2 (122.93)
3	Inflorescence length (cm)	19.68	40.80		GA-2 (40.8)
4	Lateral Inflorescence length (cm)	6.55	23.60	IC356046 (23.6), IC361327 (22.6), IC524215 (18), IC391433 (17.2), IC444167 (17.1)	GA-2 (17.03)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
5	Leaf length (cm)	6.86	15.09	IC317427 (15.09)	BGA-2 (12.5)
6	Leaf width (cm)	3.50	7.06		BGA-2 (7.06)
7	Number of branches per plant	3.40	7.32	CGRajgira-1 (7.32), IC356046 (7.3), IC265008 (7.27), IC506519 (7.2), IC506529 (7.2), IC391561 (7.13), IC444193 (7.13), IC361327 (7.1)	Suvarna (6.04)
8	Petiole length (cm)	2.83	7.72		BGA-2 (7.72)
9	Plant height (cm)	48.67	105.72		GA-2 (105.72)
	Plant height (cm) dwarf	48.67	105.72	IC264805 (48.67), IC356085 (48.93), IC282786 (49.13), IC436948 (49.13)	CGRajgira-1 (49.24)
10	Seed volume (g/10ml)	6.15	7.57	IC444193 (7.57), IC506604 (7.57), IC506611 (7.53), IC436957 (7.52), IC255428 (7.51), IC383578 (7.5), IC356085 (7.5), IC444156 (7.49), IC506531 (7.48), IC266835 (7.46), IC279670 (7.46), IC340971 (7.44)	GA-2 (7.37)
11	Seed yield per plant (g)	6.04	14.10		GA-2 (14.1)
12	Stem thickness (mm)	3.34	8.70		Suvarna (8.7)

Table 23: Multilocation evaluation of germplasm lines in grain amaranth at different locations : Rabi 2019-20 (Plains)
SET-2 - II Year

S. No	Accession No.	Days to 50% flowering									Leaf length (cm)				
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	42.00	61.00	56.00	33.00	44.00	32.00	75.00	36.00	**47.38**	7.24	11.90	7.50	12.48	**9.78**
2	IC255428	42.00	59.00	50.00	33.00	37.00	31.00	73.00	33.00	**44.75**	8.04	11.00	5.50	13.18	**9.43**
3	IC255481	43.00	53.00	50.00	32.00	43.00	32.00	78.00	34.00	**45.63**	7.14	12.30	6.00	13.14	**9.65**
4	IC255482	42.00	57.00	54.00	28.00	42.00	32.00	83.00	37.00	**46.88**	6.90	8.80	5.00	10.64	**7.84**
5	IC255555	43.00	59.00	49.00	35.00	41.00	30.00	77.00	35.00	**46.13**	6.84	14.40	6.50	11.80	**9.89**
6	IC264805	45.00	61.00	58.00	29.00	41.00	32.00	-	35.00	**43.00**	6.34	5.80	-	12.58	**8.24**
7	IC264854	43.00	58.00	58.00	31.00	38.00	32.00	77.00	38.00	**46.88**	6.86	13.00	7.00	9.40	**9.07**
8	IC265008	47.00	56.00	54.00	28.00	41.00	29.00	82.00	36.00	**46.63**	6.82	11.20	7.00	10.16	**8.80**
9	IC265980	46.00	54.00	60.00	29.00	40.00	29.00	75.00	34.00	**45.88**	7.44	9.90	9.00	10.86	**9.30**
10	IC266754	44.00	58.00	53.00	30.00	41.00	33.00	82.00	35.00	**47.00**	7.24	10.10	6.00	8.28	**7.91**
11	IC266778	44.00	58.00	49.00	28.00	50.00	29.00	80.00	33.00	**46.38**	6.66	8.50	5.50	12.20	**8.22**
12	IC266812	47.00	57.00	52.00	29.00	46.00	33.00	78.00	36.00	**47.25**	7.60	8.40	5.50	9.10	**7.65**
13	IC266835	44.00	57.00	56.00	33.00	43.00	36.00	86.00	28.00	**47.88**	7.52	11.60	4.50	9.20	**8.21**
14	IC266937	43.00	55.00	48.00	30.00	41.00	35.00	81.00	39.00	**46.50**	5.92	9.10	6.00	9.88	**7.73**
15	IC268885	44.00	60.00	50.00	31.00	40.00	34.00	82.00	38.00	**47.38**	7.48	11.30	6.00	10.54	**8.83**
16	IC279363	44.00	61.00	59.00	30.00	43.00	33.00	-	38.00	**44.00**	7.88	9.20	-	10.30	**9.13**
17	IC279413	44.00	53.00	51.00	32.00	45.00	31.00	-	33.00	**41.29**	7.34	9.50	-	13.20	**10.01**
18	IC279462	44.00	59.00	49.00	31.00	41.00	31.00	90.00	33.00	**47.25**	7.18	10.50	7.00	13.18	**9.47**
19	IC279511	43.00	56.00	52.00	32.00	44.00	34.00	73.00	32.00	**45.75**	8.20	10.10	5.50	15.36	**9.79**
20	IC279512	44.00	54.00	55.00	32.00	43.00	33.00	81.00	33.00	**46.88**	8.54	10.80	6.00	17.70	**10.76**
21	IC279567	43.00	58.00	60.00	33.00	41.00	35.00	-	34.00	**43.43**	8.02	10.50	-	10.50	**9.67**
22	IC279612	43.00	59.00	48.00	31.00	41.00	34.00	75.00	36.00	**45.88**	6.56	11.10	9.00	11.22	**9.47**
23	IC279631	42.00	52.00	55.00	37.00	40.00	35.00	80.00	33.00	**46.75**	7.50	11.00	5.50	10.96	**8.74**
24	IC279652	43.00	58.00	58.00	39.00	42.00	37.00	78.00	39.00	**49.25**	7.04	10.50	5.50	9.42	**8.12**
25	IC279670	41.00	53.00	57.00	37.00	46.00	34.00	82.00	39.00	**48.63**	7.26	10.80	6.00	10.42	**8.62**
26	IC279760	41.00	51.00	50.00	28.00	41.00	32.00	78.00	36.00	**44.63**	7.82	10.20	5.50	8.20	**7.93**
27	IC279807	42.00	53.00	54.00	30.00	44.00	37.00	-	37.00	**42.43**	7.52	12.10	-	8.92	**9.51**
28	IC279832	41.00	60.00	51.00	30.00	42.00	39.00	82.00	39.00	**48.00**	7.90	11.30	4.00	7.22	**7.61**
29	IC281749	74.00	53.00	50.00	31.00	43.00	36.00	-	37.00	**46.29**	7.50	9.60	-	8.68	**8.59**
30	IC282786	47.00	59.00	49.00	31.00	43.00	35.00	74.00	39.00	**47.13**	7.12	9.90	4.00	6.42	**6.86**
31	IC317427	78.00	51.00	54.00	50.00	49.00	-	-	66.00	**58.00**	7.40	-	-	22.78	**15.09**
32	IC317517	40.00	58.00	57.00	38.00	44.00	29.00	-	36.00	**43.14**	6.44	7.30	-	10.30	**8.01**
33	IC317549	43.00	51.00	54.00	39.00	42.00	30.00	-	35.00	**42.00**	7.00	13.70	-	11.14	**10.61**
34	IC317631	43.00	57.00	50.00	39.00	42.00	36.00	-	36.00	**43.29**	7.36	11.70	-	11.81	**10.29**
35	IC337341	46.00	55.00	56.00	28.00	43.00	33.00	-	36.00	**42.43**	6.44	8.50	-	7.88	**7.61**
36	IC338640	42.00	54.00	56.00	29.00	41.00	31.00	82.00	33.00	**46.00**	6.84	9.40	4.00	10.54	**7.70**

S. No	Accession No.	Leaf width (cm)					Number of branches per plant				Petiole length (cm)				
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	3.94	7.20	4.00	4.10	**4.81**	5.60	12.00	2.60	**6.73**	3.36	7.30	4.00	5.02	**4.92**
2	IC255428	3.44	6.20	3.00	4.54	**4.30**	6.00	6.00	2.60	**4.87**	3.10	6.10	2.00	5.90	**4.28**
3	IC255481	3.26	6.50	3.00	4.18	**4.24**	6.20	5.00	2.80	**4.67**	3.26	7.00	2.00	4.72	**4.25**
4	IC255482	4.16	5.00	2.50	2.50	**3.54**	5.80	9.00	2.60	**5.80**	2.98	6.50	2.00	3.92	**3.85**
5	IC255555	3.48	7.60	3.00	3.60	**4.42**	5.00	8.00	2.60	**5.20**	2.80	9.90	3.00	4.52	**5.06**
6	IC264805	3.28	4.80	-	3.94	**4.01**	5.60	-	2.40	**4.00**	2.24	3.80	-	5.24	**3.76**
7	IC264854	3.32	7.00	4.00	3.16	**4.37**	6.20	8.00	2.60	**5.60**	2.42	6.40	3.50	3.98	**4.08**
8	IC265008	3.96	6.10	3.50	3.38	**4.24**	7.40	12.00	2.40	**7.27**	2.52	6.90	4.00	3.24	**4.17**
9	IC265980	4.12	5.10	8.00	3.08	**5.08**	4.40	7.00	2.60	**4.67**	2.62	6.00	4.50	3.86	**4.25**
10	IC266754	3.22	5.90	3.50	2.74	**3.84**	5.60	8.00	2.80	**5.47**	3.06	6.20	2.50	3.30	**3.77**
11	IC266778	3.94	4.60	4.00	4.12	**4.17**	6.20	6.00	2.60	**4.93**	2.58	5.10	3.00	5.22	**3.98**
12	IC266812	4.70	4.80	3.00	2.70	**3.80**	5.00	6.00	2.60	**4.53**	3.40	5.60	6.00	3.24	**4.56**
13	IC266835	3.64	6.40	2.50	2.80	**3.84**	6.60	8.00	2.60	**5.73**	2.56	5.50	2.50	3.88	**3.61**
14	IC266937	3.36	4.70	3.00	2.92	**3.50**	7.40	8.00	2.80	**6.07**	3.42	3.90	3.00	3.16	**3.37**
15	IC268885	4.10	6.20	3.50	3.80	**4.40**	7.20	8.00	2.40	**5.87**	2.92	6.70	2.50	3.18	**3.83**
16	IC279363	4.10	5.20	-	3.86	**4.39**	4.60	-	2.60	**3.60**	2.70	5.10	-	3.86	**3.89**
17	IC279413	3.90	4.80	-	3.68	**4.13**	6.20	-	2.40	**4.30**	2.46	4.00	-	4.58	**3.68**
18	IC279462	3.48	6.20	4.00	4.56	**4.56**	5.20	10.00	2.80	**6.00**	2.44	5.00	5.00	4.74	**4.30**
19	IC279511	4.88	5.40	3.00	4.78	**4.52**	4.00	6.00	2.60	**4.20**	3.76	6.40	2.00	5.92	**4.52**
20	IC279512	3.92	5.50	3.50	5.98	**4.73**	5.40	7.00	2.80	**5.07**	3.10	6.60	3.00	7.18	**4.97**
21	IC279567	4.28	5.90	-	3.74	**4.64**	5.20	-	2.80	**4.00**	2.72	6.10	-	3.82	**4.21**
22	IC279612	3.26	5.80	8.00	3.34	**5.10**	5.80	7.00	2.40	**5.07**	1.94	5.80	4.50	4.78	**4.26**
23	IC279631	3.86	6.20	4.00	3.60	**4.42**	5.60	6.00	3.00	**4.87**	2.98	6.50	3.00	3.50	**4.00**
24	IC279652	3.30	6.00	3.00	3.30	**3.90**	4.60	6.00	2.40	**4.33**	2.54	5.70	6.00	3.24	**4.37**
25	IC279670	3.94	5.80	3.50	3.18	**4.11**	6.00	8.00	2.80	**5.60**	2.78	6.10	2.50	3.74	**3.78**
26	IC279760	3.90	5.40	3.00	3.34	**3.91**	6.40	5.00	3.00	**4.80**	3.16	7.40	1.50	2.82	**3.72**
27	IC279807	3.46	6.20	-	3.52	**4.39**	5.80	-	2.60	**4.20**	2.94	6.80	-	2.44	**4.06**
28	IC279832	4.82	5.80	2.00	2.42	**3.76**	5.60	4.00	3.00	**4.20**	2.94	6.10	2.00	2.50	**3.39**
29	IC281749	3.32	5.10	-	2.46	**3.63**	6.20	-	2.60	**4.40**	2.50	4.90	-	3.28	**3.56**
30	IC282786	4.06	5.50	3.00	2.30	**3.72**	6.20	6.00	-	**6.10**	2.46	5.70	2.00	2.38	**3.14**
31	IC317427	3.54	-	-	7.08	**5.31**	6.80	-	-	**6.80**	2.70	-	-	10.70	**6.70**
32	IC317517	3.66	6.00	-	3.32	**4.33**	5.80	-	2.80	**4.30**	2.64	6.80	-	3.78	**4.41**
33	IC317549	3.48	6.90	-	4.14	**4.84**	6.00	-	3.00	**4.50**	2.28	7.10	-	3.38	**4.25**
34	IC317631	3.66	6.10	-	3.82	**4.53**	5.60	-	2.60	**4.10**	2.98	5.90	-	4.50	**4.46**
35	IC337341	3.64	4.80	-	2.90	**3.78**	6.20	-	2.60	**4.40**	2.76	5.60	-	2.44	**3.60**
36	IC338640	3.12	5.20	2.50	3.58	**3.60**	6.20	6.00	2.40	**4.87**	3.06	7.30	2.00	4.54	**4.23**

S. No	Accession No.	Lateral Inflorescence length (cm)			Inflorescence length (cm)								
		Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	18.00	11.20	**14.60**	28.40	18.80	37.10	40.60	43.33	47.00	30.00	24.00	**33.65**
2	IC255428	10.00	14.60	**12.30**	21.20	20.80	39.10	30.40	27.67	39.30	18.00	33.80	**28.78**
3	IC255481	12.00	13.00	**12.50**	21.60	19.00	37.00	31.40	22.67	49.00	18.00	26.60	**28.16**
4	IC255482	12.00	11.20	**11.60**	21.00	18.20	40.00	39.20	24.67	45.00	23.00	25.40	**29.56**
5	IC255555	14.00	11.60	**12.80**	19.20	19.80	34.20	35.00	28.67	49.00	22.00	28.20	**29.51**
6	IC264805	-	11.20	**11.20**	13.00	20.20	33.50	35.20	25.67	34.70	-	23.40	**26.52**
7	IC264854	10.00	5.40	**7.70**	24.20	19.60	35.10	30.80	36.00	53.30	16.00	21.60	**29.58**
8	IC265008	14.00	10.80	**12.40**	12.20	19.80	34.20	37.00	32.00	43.00	22.00	21.40	**27.70**
9	IC265980	13.00	11.80	**12.40**	16.00	21.40	42.20	35.80	24.50	48.00	22.00	25.60	**29.44**
10	IC266754	18.00	12.00	**15.00**	22.60	18.00	39.60	39.40	21.50	42.30	16.00	20.80	**27.53**
11	IC266778	7.00	12.40	**9.70**	16.40	22.40	41.30	35.40	41.67	39.00	11.00	28.20	**29.42**
12	IC266812	10.00	12.20	**11.10**	15.60	20.20	40.00	34.00	26.33	35.60	15.00	23.60	**26.29**
13	IC266835	7.00	11.20	**9.10**	22.60	21.00	36.00	32.00	30.33	39.00	11.00	14.00	**25.74**
14	IC266937	7.00	9.60	**8.30**	20.20	19.60	35.20	29.40	25.67	39.30	14.00	21.40	**25.60**
15	IC268885	18.00	11.80	**14.90**	19.60	19.00	38.30	29.00	31.33	47.70	16.00	24.80	**28.22**
16	IC279363	-	11.60	**11.60**	22.00	18.40	35.00	34.80	26.67	37.30	-	21.00	**27.88**
17	IC279413	-	14.80	**14.80**	18.60	18.80	32.50	39.00	26.00	35.30	-	31.40	**28.80**
18	IC279462	9.00	15.40	**12.20**	19.40	19.80	40.80	40.60	27.33	36.30	16.00	29.40	**28.70**
19	IC279511	10.00	14.40	**12.20**	17.80	19.60	33.80	39.40	22.33	37.00	18.00	29.60	**27.19**
20	IC279512	8.00	13.60	**10.80**	20.60	19.80	32.40	39.40	25.67	44.30	13.00	29.80	**28.12**
21	IC279567	-	13.00	**13.00**	15.80	21.20	40.10	35.40	26.00	36.00	-	26.80	**28.76**
22	IC279612	13.00	12.60	**12.80**	17.40	20.00	36.70	37.40	22.33	38.00	22.00	26.80	**27.58**
23	IC279631	7.00	12.20	**9.60**	21.20	19.80	34.20	36.60	25.33	50.30	11.00	21.20	**27.45**
24	IC279652	10.00	11.00	**10.50**	21.80	18.00	34.20	35.00	26.67	43.00	15.00	27.00	**27.58**
25	IC279670	18.00	11.40	**14.70**	18.40	19.80	40.00	32.40	24.67	38.70	16.00	23.00	**26.62**
26	IC279760	10.00	8.40	**9.20**	18.00	21.80	36.10	35.20	25.33	40.00	18.00	19.20	**26.70**
27	IC279807	-	12.60	**12.60**	20.40	21.60	34.50	41.60	28.67	41.70	-	24.00	**30.35**
28	IC279832	5.50	7.60	**6.55**	22.40	20.40	38.00	34.40	24.33	35.30	6.00	17.20	**24.75**
29	IC281749	-	10.40	**10.40**	14.40	17.20	42.00	36.40	26.67	43.30	-	17.20	**28.17**
30	IC282786	10.00	7.50	**8.75**	17.00	18.60	38.00	25.00	23.50	40.30	14.00	12.00	**23.55**
31	IC317427	-	11.20	**11.20**	39.80	20.20	36.10	33.60	40.33	-	-	34.80	**34.14**
32	IC317517	-	12.00	**12.00**	12.70	20.60	35.30	29.80	25.33	29.30	-	26.60	**25.66**
33	IC317549	-	12.00	**12.00**	10.20	20.20	36.20	22.20	29.67	45.00	-	21.80	**26.47**
34	IC317631	-	13.40	**13.40**	23.00	20.20	39.50	27.80	25.33	47.00	-	35.60	**31.20**
35	IC337341	-	11.20	**11.20**	23.80	18.60	35.20	41.00	22.50	39.70	-	26.20	**29.57**
36	IC338640	7.00	12.60	**9.80**	18.80	19.20	44.50	30.00	26.67	42.00	11.00	32.80	**28.12**

S. No	Accession No.	Stem thickness (mm)					Plant height (cm)								
		Akola	Ambikapur	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	5.0	4.6	3.0	6.7	**4.8**	51.80	54.00	99.80	63.40	114.67	84.70	62.00	44.60	**71.87**
2	IC255428	6.0	5.2	2.5	6.9	**5.2**	32.40	44.60	81.90	51.60	79.00	66.30	39.00	44.80	**54.95**
3	IC255481	5.2	4.3	3.0	6.1	**4.7**	39.20	54.20	94.20	55.80	59.50	85.00	44.00	51.00	**60.36**
4	IC255482	1.7	4.6	3.0	5.0	**3.6**	35.40	53.80	94.20	61.40	46.50	73.00	47.00	44.00	**56.91**
5	IC255555	3.8	4.3	3.5	5.7	**4.3**	34.20	57.60	80.00	53.60	55.00	97.70	50.00	43.60	**58.96**
6	IC264805	5.1	4.0	-	7.2	**5.5**	24.60	42.80	75.10	55.60	48.50	50.70	-	43.40	**48.67**
7	IC264854	6.1	4.2	3.0	4.7	**4.5**	46.40	54.00	88.60	49.00	72.00	90.00	45.00	33.40	**59.80**
8	IC265008	4.7	4.9	4.0	4.8	**4.6**	24.80	53.00	83.10	65.80	67.50	63.70	77.00	48.80	**60.46**
9	IC265980	4.4	4.9	4.0	5.4	**4.7**	23.00	45.60	99.00	59.20	48.50	71.00	70.00	45.80	**57.76**
10	IC266754	5.8	4.2	2.0	5.0	**4.3**	39.20	55.40	98.70	57.80	43.50	66.00	40.00	34.00	**54.33**
11	IC266778	5.1	4.5	2.0	4.9	**4.1**	37.60	53.00	96.70	54.40	123.33	63.00	32.00	48.00	**63.50**
12	IC266812	3.0	4.1	3.0	6.2	**4.1**	25.40	49.00	90.50	54.60	56.33	59.30	48.00	39.00	**52.77**
13	IC266835	7.9	4.5	3.0	6.1	**5.4**	40.60	50.20	100.50	47.80	58.33	65.00	36.00	23.20	**52.70**
14	IC266937	4.5	4.2	2.5	4.9	**4.0**	31.80	56.00	96.90	43.40	51.33	69.00	41.00	32.00	**52.68**
15	IC268885	6.6	4.2	2.0	5.7	**4.6**	33.20	55.60	100.90	51.40	66.00	78.30	40.00	36.40	**57.73**
16	IC279363	5.4	4.9	-	6.1	**5.5**	38.60	55.20	85.50	63.40	48.00	53.30	-	35.20	**54.17**
17	IC279413	5.8	4.3	-	5.5	**5.2**	41.80	53.00	82.70	65.60	59.00	54.60	-	59.20	**59.41**
18	IC279462	5.6	4.0	4.0	4.7	**4.6**	39.60	48.60	93.40	62.20	37.33	58.00	80.00	56.40	**59.44**
19	IC279511	3.2	4.3	2.5	6.6	**4.1**	40.00	47.40	98.50	70.40	51.33	60.00	39.00	58.60	**58.15**
20	IC279512	4.8	4.7	3.0	5.2	**4.4**	41.00	46.80	96.00	69.40	49.33	68.70	42.00	50.20	**57.93**
21	IC279567	4.7	4.6	-	5.8	**5.0**	34.00	49.20	97.30	63.40	55.33	70.70	-	44.20	**59.16**
22	IC279612	3.9	4.8	4.0	5.0	**4.4**	33.80	48.20	101.50	68.20	50.33	70.00	70.00	50.40	**61.55**
23	IC279631	7.2	4.4	2.0	4.7	**4.6**	38.40	53.40	105.20	55.20	54.67	87.30	32.00	41.40	**58.45**
24	IC279652	4.2	4.3	3.0	4.1	**3.9**	36.00	51.80	93.00	56.40	54.00	61.30	48.00	36.80	**54.66**
25	IC279670	6.7	4.6	2.0	4.4	**4.4**	41.60	47.00	90.00	54.40	43.00	59.30	40.00	35.80	**51.39**
26	IC279760	8.5	4.4	2.0	4.5	**4.8**	45.40	52.80	92.20	54.20	61.67	59.30	47.00	35.80	**56.05**
27	IC279807	4.4	4.6	-	7.0	**5.3**	37.00	50.20	92.10	67.20	61.00	47.70	-	41.80	**56.71**
28	IC279832	5.7	4.9	2.0	3.2	**3.9**	43.80	44.60	101.80	56.60	55.50	57.70	24.00	33.00	**52.13**
29	IC281749	7.6	4.5	-	5.2	**5.8**	38.00	54.00	92.60	57.00	60.50	68.00	-	37.20	**58.19**
30	IC282786	6.5	4.3	2.0	3.2	**4.0**	34.80	53.20	79.40	47.20	50.00	71.00	35.00	22.40	**49.13**
31	IC317427	12.9	4.5	-	4.7	**7.4**	107.80	49.20	83.20	135.40	108.67	-	-	89.80	**95.68**
32	IC317517	5.6	4.5	-	3.9	**4.7**	32.40	48.40	81.60	45.60	48.00	72.70	-	40.40	**52.73**
33	IC317549	3.5	4.6	-	3.7	**3.9**	32.00	46.40	82.20	45.40	54.67	87.00	-	38.60	**55.18**
34	IC317631	7.9	4.5	-	8.1	**6.8**	59.80	47.00	81.50	51.80	47.33	73.60	-	46.80	**58.26**
35	IC337341	4.8	4.1	-	5.7	**4.9**	43.30	46.80	76.60	60.60	49.50	60.70	-	35.60	**53.30**
36	IC338640	4.4	4.7	2.0	4.2	**3.8**	31.00	56.00	95.20	56.40	56.67	71.00	30.00	45.60	**55.23**

S. No	Accession No.	Days to 80% maturity									seed yield(g/ha)	Number of Lateral Inflorescence
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi
1	IC255419	95.00	129.00	126.00	86.00	125.00	98.00	137	92.00	**111.00**	7.90	32.00
2	IC255428	93.00	130.00	124.00	87.00	115.00	99.00	137	91.00	**109.50**	8.64	13.00
3	IC255481	92.00	130.00	129.00	85.00	126.00	96.00	135	88.00	**110.13**	10.37	16.00
4	IC255482	92.00	129.00	126.00	86.00	128.00	90.00	132	91.00	**109.25**	4.94	16.00
5	IC255555	91.00	132.00	125.00	88.00	120.00	97.00	139	90.00	**110.25**	8.89	19.00
6	IC264805	105.00	127.00	123.00	87.00	124.00	94.00	-	91.00	**107.29**	7.04	-
7	IC264854	94.00	128.00	127.00	87.00	115.00	97.00	135	94.00	**109.63**	6.67	17.00
8	IC265008	102.00	130.00	128.00	87.00	124.00	95.00	144	87.00	**112.13**	9.38	22.00
9	IC265980	99.00	129.00	124.00	85.00	123.00	95.00	151	87.00	**111.63**	9.68	12.00
10	IC266754	92.00	132.00	126.00	84.00	122.00	90.00	131	91.00	**108.50**	5.93	8.00
11	IC266778	99.00	130.00	128.00	87.00	128.00	99.00	134	89.00	**111.75**	6.67	12.00
12	IC266812	100.00	131.00	126.00	85.00	129.00	97.00	131	88.00	**110.88**	8.40	18.00
13	IC266835	105.00	131.00	125.00	87.00	121.00	94.00	132	92.00	**110.88**	8.89	16.00
14	IC266937	92.00	131.00	122.00	84.00	125.00	92.00	129	90.00	**108.13**	4.44	14.00
15	IC268885	92.00	127.00	127.00	85.00	116.00	93.00	131	90.00	**107.63**	6.91	8.00
16	IC279363	97.00	131.00	125.00	88.00	122.00	99.00	-	94.00	**108.00**	9.14	-
17	IC279413	97.00	127.00	129.00	88.00	121.00	102.00	-	92.00	**108.00**	8.40	-
18	IC279462	100.00	128.00	126.00	84.00	120.00	102.00	142	96.00	**112.25**	6.54	15.00
19	IC279511	106.00	130.00	129.00	87.00	119.00	97.00	137	88.00	**111.63**	4.69	13.00
20	IC279512	97.00	132.00	127.00	88.00	126.00	98.00	129	90.00	**110.88**	7.90	11.00
21	IC279567	99.00	129.00	124.00	88.00	124.00	97.00	-	87.00	**106.86**	5.31	-
22	IC279612	99.00	130.00	121.00	86.00	125.00	98.00	151	92.00	**112.75**	7.90	12.00
23	IC279631	97.00	129.00	122.00	87.00	124.00	102.00	134	94.00	**111.13**	4.94	12.00
24	IC279652	97.00	126.00	127.00	88.00	126.00	97.00	131	92.00	**110.50**	6.17	18.00
25	IC279670	99.00	127.60	129.00	87.00	129.00	99.00	131	93.00	**111.83**	9.63	8.00
26	IC279760	99.00	129.00	120.00	84.00	128.00	103.00	133	96.00	**111.50**	5.38	13.00
27	IC279807	101.00	129.00	120.00	79.00	124.00	92.00	-	92.00	**105.29**	7.11	-
28	IC279832	99.00	132.00	122.00	85.00	128.00	102.00	131	92.00	**111.38**	8.15	7.00
29	IC281749	95.00	129.00	125.00	85.00	123.00	93.00	-	91.00	**105.86**	6.67	-
30	IC282786	92.00	132.00	128.00	85.00	123.00	94.00	138	92.00	**110.50**	8.64	9.00
31	IC317427	114.00	128.00	125.00	98.00	124.00	-	-	125.00	**119.00**	4.69	-
32	IC317517	103.00	129.00	119.00	85.00	126.00	100.00	-	96.00	**108.29**	7.41	-
33	IC317549	97.00	130.00	121.00	86.00	122.00	95.00	-	94.00	**106.43**	6.62	-
34	IC317631	97.00	128.00	125.00	86.00	123.00	93.00	-	96.00	**106.86**	8.15	-
35	IC337341	97.00	129.00	122.00	88.00	127.00	95.00	-	89.00	**106.71**	9.63	-
36	IC338640	94.00	126.00	123.00	85.00	127.00	89.00	130	88.00	**107.75**	5.19	10.00

S. No	Accession No.	Seed yield per plant (g)							Seed volume (g/10ml)							
		Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
1	IC255419	14.00	5.31	8.67	19.20	17.00	6.40	**11.76**	4.85	7.60	7.82	6.99	8.00	9.90	6.60	**7.39**
2	IC255428	12.00	5.71	5.07	10.00	7.40	14.10	**9.05**	6.75	6.61	7.79	6.70	8.00	10.00	6.72	**7.51**
3	IC255481	15.00	7.37	8.73	9.00	8.00	9.60	**9.62**	4.60	6.50	7.91	6.71	8.00	9.20	6.12	**7.01**
4	IC255482	15.00	3.40	4.67	8.10	4.00	5.80	**6.83**	6.55	6.80	7.68	7.39	7.40	9.60	6.32	**7.39**
5	IC255555	13.00	3.74	7.07	16.80	8.20	4.20	**8.83**	5.65	7.20	7.64	6.83	7.50	7.80	6.27	**6.98**
6	IC264805	12.30	6.79	5.33	13.20	-	3.50	**8.23**	5.75	7.20	7.85	7.45	8.10	-	6.28	**7.11**
7	IC264854	16.00	6.33	7.87	10.30	12.00	5.10	**9.60**	5.40	5.90	7.88	6.98	7.50	9.40	6.35	**7.06**
8	IC265008	16.40	6.72	12.13	14.80	28.00	10.90	**14.83**	4.45	7.00	7.82	7.46	8.30	10.00	6.25	**7.33**
9	IC265980	10.40	8.03	3.13	12.20	33.00	7.70	**12.41**	4.10	6.70	7.93	7.26	8.20	7.20	6.19	**6.80**
10	IC266754	16.00	4.41	5.67	9.80	5.00	3.20	**7.35**	4.50	7.20	7.69	6.91	8.00	9.90	6.21	**7.20**
11	IC266778	11.30	6.64	8.80	11.60	5.40	7.00	**8.46**	6.25	5.80	7.78	7.48	8.30	9.50	6.62	**7.39**
12	IC266812	15.00	6.32	3.13	10.20	5.50	9.10	**8.21**	5.54	5.70	7.80	7.13	7.90	9.70	6.27	**7.15**
13	IC266835	17.00	6.01	9.00	7.80	7.40	3.10	**8.39**	6.45	6.62	7.84	7.55	8.00	9.60	6.19	**7.46**
14	IC266937	19.00	6.01	4.33	12.00	7.30	5.90	**9.09**	5.25	7.60	7.82	6.87	8.00	10.00	6.54	**7.44**
15	IC268885	18.00	5.27	6.93	12.90	5.40	7.30	**9.30**	5.80	6.52	7.76	6.96	8.50	10.00	6.09	**7.38**
16	IC279363	11.20	5.48	7.00	10.80	-	9.40	**8.78**	6.15	6.30	7.68	7.15	7.80	-	6.10	**6.86**
17	IC279413	15.00	7.37	4.67	13.20	-	17.40	**11.53**	5.60	6.10	7.93	6.67	8.00	-	6.08	**6.73**
18	IC279462	16.00	7.07	1.40	11.90	2.20	16.90	**9.24**	4.40	7.10	7.90	7.35	8.30	6.90	6.19	**6.88**
19	IC279511	18.00	6.26	1.20	11.50	6.00	20.40	**10.56**	5.30	7.00	7.74	6.92	7.30	9.60	6.46	**7.19**
20	IC279512	10.00	8.02	2.80	11.60	9.00	17.90	**9.89**	6.40	7.10	7.98	6.88	7.20	9.80	6.32	**7.38**
21	IC279567	15.60	8.08	2.47	14.50	-	11.40	**10.41**	4.80	7.00	7.94	6.51	8.00	-	6.45	**6.78**
22	IC279612	13.60	7.26	6.00	13.40	33.00	8.70	**13.66**	6.70	6.40	7.78	7.60	8.60	7.20	5.96	**7.18**
23	IC279631	11.00	6.99	4.13	14.10	5.40	7.50	**8.19**	6.48	6.20	7.76	7.39	8.00	9.50	6.57	**7.41**
24	IC279652	15.00	5.89	4.47	11.60	5.50	4.70	**7.86**	6.30	6.50	7.69	7.08	8.00	9.70	6.43	**7.39**
25	IC279670	16.00	7.48	4.73	11.20	2.70	7.50	**8.27**	7.35	6.10	7.95	7.38	7.60	9.50	6.36	**7.46**
26	IC279760	12.50	4.65	2.67	10.00	9.80	7.70	**7.89**	5.55	6.20	7.85	6.63	7.80	9.90	6.20	**7.16**
27	IC279807	18.00	6.48	6.67	11.60	-	15.00	**11.55**	6.80	5.90	7.83	7.27	7.60	-	6.60	**7.00**
28	IC279832	13.60	2.72	4.53	11.60	7.00	2.70	**7.03**	6.60	7.20	7.72	7.87	7.30	7.10	6.22	**7.14**
29	IC281749	18.00	3.22	5.47	12.70	-	11.40	**10.16**	6.00	6.72	7.68	6.77	8.10	-	6.30	**6.93**
30	IC282786	17.00	2.97	6.20	11.40	15.00	1.10	**8.95**	4.80	6.80	7.71	6.62	8.40	10.00	6.40	**7.25**
31	IC317427	14.00	7.12	5.33	-	-	3.90	**7.59**	5.75	6.70	7.92	6.13	-	-	4.32	**6.16**
32	IC317517	16.60	2.26	8.13	12.90	-	8.60	**9.70**	4.80	6.60	7.64	6.78	8.00	-	6.52	**6.72**
33	IC317549	14.60	2.95	6.67	13.20	-	10.70	**9.62**	6.15	6.20	7.69	6.88	8.20	-	6.75	**6.98**
34	IC317631	15.60	2.09	7.07	11.40	-	19.80	**11.19**	5.48	6.80	7.63	7.38	8.30	-	6.43	**7.00**
35	IC337341	18.00	7.20	3.20	13.50	-	8.10	**10.00**	4.65	6.30	7.86	7.48	8.00	-	6.48	**6.80**
36	IC338640	16.00	4.97	3.67	8.00	2.30	12.80	**7.96**	6.10	6.71	7.73	6.96	8.00	9.80	6.33	**7.38**

S. No	Accession No.	Days to 50% flowering									Leaf length (cm)				
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
37	IC340803	42.00	55.00	55.00	37.00	41.00	35.00	81.00	33.00	**47.38**	7.08	9.10	6.00	10.88	**8.27**
38	IC340823	41.00	59.00	58.00	35.00	44.00	37.00	72.00	35.00	**47.63**	5.92	13.70	5.00	10.86	**8.87**
39	IC340825	43.00	53.00	53.00	35.00	43.00	36.00	90.00	33.00	**48.25**	6.28	11.40	7.00	9.96	**8.66**
40	IC340861	42.00	57.00	53.00	37.00	43.00	35.00	73.00	34.00	**46.75**	6.78	11.60	5.50	9.38	**8.32**
41	IC340971	44.00	60.00	56.00	38.00	42.00	28.00	78.00	35.00	**47.63**	6.70	11.30	7.00	10.48	**8.87**
42	IC341452	42.00	53.00	48.00	34.00	39.00	33.00	74.00	30.00	**44.13**	6.50	10.30	4.00	13.62	**8.61**
43	IC355992	45.00	55.00	60.00	32.00	40.00	31.00	80.00	32.00	**46.88**	7.58	12.20	5.50	11.48	**9.19**
44	IC356012	43.00	53.00	58.00	34.00	38.00	29.00	78.00	36.00	**46.13**	8.16	12.10	5.50	10.50	**9.07**
45	IC356023	45.00	56.00	55.00	35.00	39.00	33.00	82.00	39.00	**48.00**	6.10	11.20	6.00	7.92	**7.81**
46	IC356027	43.00	58.00	53.00	35.00	40.00	34.00	97.00	31.00	**48.88**	7.54	11.70	7.00	12.48	**9.68**
47	IC356041	43.00	61.00	60.00	37.00	39.00	35.00	78.00	33.00	**48.25**	7.06	12.10	5.50	12.36	**9.26**
48	IC356046	47.00	51.00	61.00	39.00	41.00	-	72.00	66.00	**53.86**	6.74	-	5.00	14.62	**8.79**
49	IC356070	45.00	51.00	49.00	32.00	42.00	31.00	80.00	34.00	**45.50**	7.64	11.80	5.50	10.82	**8.94**
50	IC356085	42.00	54.00	50.00	33.00	40.00	35.00	78.00	33.00	**45.63**	6.98	9.60	5.50	9.70	**7.95**
51	IC360827	44.00	57.00	55.00	37.00	43.00	33.00	-	35.00	**43.43**	7.04	11.00	-	10.56	**9.53**
52	IC360834	47.00	57.00	59.00	39.00	45.00	36.00	75.00	32.00	**48.75**	7.12	12.60	9.00	12.50	**10.31**
53	IC360858	46.00	57.00	53.00	28.00	41.00	34.00	78.00	32.00	**46.13**	7.10	12.40	5.00	9.84	**8.59**
54	IC361327	93.00	58.00	54.00	52.00	55.00	35.00	81.00	63.00	**61.38**	7.48	12.60	5.00	12.90	**9.50**
55	IC362257	42.00	53.00	56.00	31.00	40.00	32.00	82.00	30.00	**45.75**	6.84	12.00	5.00	13.76	**9.40**
56	IC382640	44.00	51.00	50.00	33.00	39.00	39.00	-	29.00	**40.71**	6.80	10.60	-	12.00	**9.80**
57	IC383578	41.00	61.00	50.00	35.00	42.00	40.00	97.00	35.00	**50.13**	6.32	12.00	7.00	8.24	**8.39**
58	IC383647	42.00	59.00	57.00	34.00	42.00	35.00	81.00	34.00	**48.00**	7.18	10.60	6.00	7.30	**7.77**
59	IC391433	43.00	60.00	49.00	38.00	43.00	34.00	-	31.00	**42.57**	7.18	12.80	-	12.40	**10.79**
60	IC391468	42.00	58.00	52.00	28.00	38.00	35.00	73.00	34.00	**45.00**	6.94	10.30	5.50	12.60	**8.84**
61	IC391517	42.00	56.00	53.00	28.00	43.00	34.00	77.00	34.00	**45.88**	7.02	12.50	6.50	12.20	**9.56**
62	IC391561	44.00	58.00	54.00	29.00	42.00	37.00	75.00	34.00	**46.63**	7.50	12.60	7.50	10.24	**9.46**
63	IC392498	43.00	51.00	58.00	31.00	36.00	36.00	78.00	35.00	**46.00**	6.36	14.00	6.00	10.54	**9.23**
64	IC392525	45.00	50.00	60.00	32.00	43.00	33.00	75.00	36.00	**46.75**	6.90	12.60	9.00	10.32	**9.71**
65	IC393022	44.00	51.00	52.00	29.00	37.00	34.00	78.00	33.00	**44.75**	6.34	10.80	4.50	9.76	**7.85**
66	IC429977	47.00	51.00	54.00	32.00	44.00	38.00	80.00	32.00	**47.25**	6.76	12.00	5.50	12.42	**9.17**
67	IC436948	43.00	55.00	51.00	32.00	39.00	34.00	72.00	34.00	**45.00**	6.66	11.30	5.00	10.84	**8.45**
68	IC436953	43.00	59.00	53.00	32.00	38.00	31.00	90.00	33.00	**47.38**	6.14	11.20	7.00	9.28	**8.41**
69	IC436957	43.00	57.00	52.00	33.00	43.00	34.00	73.00	36.00	**46.38**	6.72	9.20	5.50	9.28	**7.68**
70	IC436974	41.00	55.00	53.00	35.00	41.00	38.00	78.00	30.00	**46.38**	7.46	11.70	5.50	12.74	**9.35**
71	IC444099	42.00	57.00	53.00	28.00	43.00	31.00	78.00	38.00	**46.25**	6.92	8.60	4.50	9.72	**7.44**
72	IC444100	43.00	56.00	54.00	28.00	39.00	34.00	-	32.00	**40.86**	6.98	10.20	-	10.74	**9.31**
73	IC444105	47.00	58.00	50.00	49.00	50.00	-	86.00	54.00	**56.29**	8.10	-	8.00	16.28	**10.79**
74	IC444156	46.00	54.00	49.00	34.00	40.00	38.00	80.00	32.00	**46.63**	6.60	10.00	5.50	9.00	**7.78**
75	IC444159	46.00	51.00	54.00	32.00	42.00	39.00	78.00	34.00	**47.00**	6.70	10.30	5.50	7.92	**7.61**

S. No	Accession No.	Leaf width (cm)					Number of branches per plant				Petiole length (cm)				
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
37	IC340803	3.80	7.30	3.50	3.12	**4.43**	5.80	7.00	3.00	**5.27**	3.98	6.60	3.00	3.66	**4.31**
38	IC340823	3.38	5.90	2.50	3.70	**3.87**	5.60	9.00	2.80	**5.80**	2.86	7.30	3.50	4.24	**4.48**
39	IC340825	3.20	5.30	4.00	3.14	**3.91**	5.80	10.00	3.40	**6.40**	3.12	5.50	5.00	4.40	**4.51**
40	IC340861	3.60	6.10	3.00	3.44	**4.04**	5.20	6.00	3.40	**4.87**	3.48	7.30	2.00	2.30	**3.77**
41	IC340971	3.58	6.00	4.00	3.54	**4.28**	5.00	13.00	3.20	**7.07**	2.64	6.70	2.00	3.26	**3.65**
42	IC341452	3.50	6.10	3.00	4.88	**4.37**	6.00	6.00	2.60	**4.87**	3.46	6.70	2.00	6.04	**4.55**
43	IC355992	3.80	6.70	4.00	4.12	**4.66**	6.00	6.00	2.80	**4.93**	2.52	6.10	3.00	3.90	**3.88**
44	IC356012	4.40	6.50	3.00	3.52	**4.36**	5.40	6.00	2.20	**4.53**	3.66	4.30	6.00	4.42	**4.60**
45	IC356023	3.08	5.80	3.50	3.26	**3.91**	5.40	8.00	2.80	**5.40**	2.98	6.40	2.50	2.32	**3.55**
46	IC356027	4.10	5.90	3.50	4.40	**4.48**	5.60	12.00	2.60	**6.73**	3.68	5.80	4.00	5.04	**4.63**
47	IC356041	4.16	6.40	3.00	3.70	**4.32**	5.60	6.00	2.80	**4.80**	3.04	5.00	6.00	4.38	**4.61**
48	IC356046	3.86	-	2.50	4.90	**3.75**	5.60	9.00	-	**7.30**	4.08	-	3.50	5.60	**4.39**
49	IC356070	3.74	6.00	4.00	3.82	**4.39**	5.60	6.00	2.80	**4.80**	2.44	7.70	3.00	4.96	**4.53**
50	IC356085	4.10	4.80	3.00	3.40	**3.83**	5.00	6.00	3.40	**4.80**	3.16	5.40	6.00	3.70	**4.57**
51	IC360827	3.84	5.90	-	3.14	**4.29**	6.20	-	2.40	**4.30**	2.48	7.70	-	3.88	**4.69**
52	IC360834	3.74	6.60	8.00	4.22	**5.64**	4.80	7.00	2.40	**4.73**	2.64	6.30	4.50	4.10	**4.39**
53	IC360858	3.42	6.00	2.00	3.12	**3.64**	5.80	6.00	2.80	**4.87**	2.64	6.70	2.00	3.30	**3.66**
54	IC361327	3.96	6.50	3.50	4.18	**4.54**	5.20	9.00	-	**7.10**	2.92	7.40	2.50	4.04	**4.22**
55	IC362257	3.48	6.60	3.00	4.98	**4.52**	6.00	9.00	2.60	**5.87**	3.10	7.60	2.00	5.24	**4.49**
56	IC382640	3.44	7.40	-	4.16	**5.00**	6.20	-	2.60	**4.40**	2.90	6.20	-	4.44	**4.51**
57	IC383578	3.04	6.10	3.50	2.98	**3.91**	4.60	12.00	3.00	**6.53**	3.00	6.30	4.00	2.84	**4.04**
58	IC383647	4.12	7.00	3.50	3.14	**4.44**	4.60	7.00	3.40	**5.00**	3.30	6.60	3.00	2.16	**3.77**
59	IC391433	3.98	5.80	-	4.44	**4.74**	4.20	-	2.60	**3.40**	2.62	7.20	-	3.78	**4.53**
60	IC391468	3.48	8.00	3.00	4.00	**4.62**	6.00	6.00	3.60	**5.20**	2.98	6.70	2.00	4.98	**4.17**
61	IC391517	3.54	6.00	3.00	4.60	**4.29**	7.20	8.00	2.80	**6.00**	2.54	4.90	3.00	4.14	**3.65**
62	IC391561	3.90	6.40	4.00	3.54	**4.46**	6.40	12.00	3.00	**7.13**	2.70	6.50	4.00	4.32	**4.38**
63	IC392498	3.40	6.00	3.00	3.80	**4.05**	7.00	5.00	2.40	**4.80**	3.16	6.90	2.00	3.98	**4.01**
64	IC392525	3.68	6.10	8.00	2.22	**5.00**	5.20	7.00	2.80	**5.00**	2.54	5.70	4.50	4.86	**4.40**
65	IC393022	3.04	5.40	2.50	3.16	**3.53**	5.40	8.00	5.00	**6.13**	3.12	8.10	2.50	3.28	**4.25**
66	IC429977	3.18	6.60	4.00	4.60	**4.60**	5.80	6.00	3.00	**4.93**	2.38	8.90	3.00	4.36	**4.66**
67	IC436948	2.92	5.60	2.50	4.12	**3.79**	4.80	9.00	3.20	**5.67**	2.88	7.40	3.50	3.76	**4.39**
68	IC436953	3.24	6.20	4.00	3.26	**4.18**	5.60	10.00	3.20	**6.27**	2.82	5.30	5.00	3.42	**4.14**
69	IC436957	3.42	4.50	3.00	3.46	**3.60**	5.80	6.00	3.00	**4.93**	3.28	4.60	2.00	3.20	**3.27**
70	IC436974	3.14	5.00	3.00	4.20	**3.84**	5.80	6.00	2.60	**4.80**	3.16	5.80	6.00	3.60	**4.64**
71	IC444099	3.86	4.90	2.50	3.40	**3.67**	4.80	8.00	2.60	**5.13**	2.38	4.90	2.50	4.04	**3.46**
72	IC444100	3.20	5.90	-	4.02	**4.37**	7.00	-	2.40	**4.70**	2.36	6.10	-	3.36	**3.94**
73	IC444105	4.02	-	6.00	6.14	**5.39**	5.80	6.00	-	**5.90**	3.98	-	4.50	5.92	**4.80**
74	IC444156	3.70	5.60	4.00	3.00	**4.08**	5.60	6.00	3.40	**5.00**	2.96	5.83	3.00	2.80	**3.65**
75	IC444159	3.94	5.80	3.00	2.56	**3.83**	5.80	6.00	3.60	**5.13**	2.78	4.90	6.00	3.36	**4.26**

S. No	Accession No.	Lateral Inflorescence length (cm)			Inflorescence length (cm)								
		Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
37	IC340803	8.00	12.00	**10.00**	11.80	18.60	34.60	29.40	30.33	42.30	13.00	23.20	**25.40**
38	IC340823	14.00	13.60	**13.80**	18.20	21.60	34.60	36.20	25.00	53.70	19.00	22.40	**28.84**
39	IC340825	9.00	14.20	**11.60**	18.40	21.60	40.50	32.80	25.67	44.70	16.00	26.20	**28.23**
40	IC340861	10.00	11.40	**10.70**	17.70	21.60	35.30	34.20	29.67	42.30	18.00	23.20	**27.75**
41	IC340971	13.00	14.80	**13.90**	12.30	18.00	35.00	29.60	28.67	50.30	18.00	27.00	**27.36**
42	IC341452	10.00	15.00	**12.50**	20.40	19.60	38.00	33.60	27.67	40.00	14.00	33.60	**28.36**
43	IC355992	7.00	11.80	**9.40**	21.40	20.80	36.00	31.00	29.33	47.70	11.00	30.40	**28.45**
44	IC356012	10.00	9.00	**9.50**	14.80	20.80	34.20	32.40	26.33	47.00	15.00	16.00	**25.82**
45	IC356023	18.00	12.00	**15.00**	15.80	17.80	35.20	31.40	33.33	45.00	16.00	19.80	**26.79**
46	IC356027	14.00	12.00	**13.00**	17.00	20.60	36.70	35.80	38.00	42.30	22.00	35.00	**30.93**
47	IC356041	10.00	11.00	**10.50**	10.00	19.00	37.60	32.40	29.00	57.30	15.00	24.60	**28.11**
48	IC356046	14.00	33.20	**23.60**	27.40	18.60	38.40	23.40	27.50	-	19.00	69.60	**31.99**
49	IC356070	7.00	9.80	**8.40**	17.40	19.20	35.60	39.00	22.00	42.70	11.00	26.60	**26.69**
50	IC356085	10.00	15.20	**12.60**	10.20	18.20	37.80	26.80	27.00	33.70	15.00	20.60	**23.66**
51	IC360827	-	8.20	**8.20**	13.80	20.40	39.50	30.00	30.33	54.00	-	23.80	**30.26**
52	IC360834	13.00	10.60	**11.80**	18.80	20.20	40.70	31.80	21.00	56.00	22.00	27.00	**29.69**
53	IC360858	5.00	12.60	**8.80**	21.80	20.60	36.10	39.60	29.67	45.70	7.50	25.80	**28.35**
54	IC361327	11.00	34.20	**22.60**	16.00	18.40	43.10	20.80	41.33	-	19.00	66.80	**32.20**
55	IC362257	5.00	17.20	**11.10**	18.60	17.80	43.20	38.00	31.33	40.70	8.00	34.60	**29.03**
56	IC382640	-	14.80	**14.80**	13.60	21.00	42.00	27.80	33.67	33.70	-	33.60	**29.34**
57	IC383578	14.00	13.00	**13.50**	15.80	19.80	35.50	39.00	23.00	37.00	22.00	21.00	**26.64**
58	IC383647	8.00	15.80	**11.90**	11.80	22.60	35.30	33.20	22.33	43.00	13.00	17.00	**24.78**
59	IC391433	-	17.20	**17.20**	21.30	20.80	41.60	27.00	25.33	46.00	-	32.00	**30.58**
60	IC391468	10.00	15.00	**12.50**	14.10	19.40	36.10	37.40	28.33	43.30	18.00	22.60	**27.40**
61	IC391517	14.00	10.60	**12.30**	15.50	20.80	40.20	31.00	29.00	45.00	22.00	23.80	**28.41**
62	IC391561	18.00	14.80	**16.40**	21.50	17.80	37.50	37.40	27.67	45.00	30.00	26.20	**30.38**
63	IC392498	12.00	8.80	**10.40**	20.60	17.60	39.50	34.40	30.67	49.00	18.00	24.20	**29.25**
64	IC392525	13.00	10.40	**11.70**	20.20	18.60	35.10	34.80	25.33	44.00	22.00	25.20	**28.15**
65	IC393022	7.00	11.40	**9.20**	23.40	19.00	40.30	32.60	28.00	33.30	11.00	25.40	**26.63**
66	IC429977	7.00	13.00	**10.00**	18.00	19.80	31.20	39.60	27.67	40.00	11.00	33.20	**27.56**
67	IC436948	14.00	12.00	**13.00**	12.60	21.00	35.10	31.00	30.33	40.00	19.00	16.40	**25.68**
68	IC436953	9.00	15.20	**12.10**	14.80	21.00	38.10	32.20	26.33	42.00	16.00	24.80	**26.90**
69	IC436957	10.00	15.40	**12.70**	14.70	19.60	34.20	33.60	22.33	34.00	18.00	23.60	**25.00**
70	IC436974	10.00	16.40	**13.20**	15.50	18.60	35.10	32.00	30.00	44.30	15.00	40.60	**28.89**
71	IC444099	7.00	7.80	**7.40**	25.20	20.60	37.10	38.00	22.33	43.00	11.00	23.40	**27.58**
72	IC444100	-	13.60	**13.60**	19.60	20.20	40.10	38.20	31.67	40.30	-	28.60	**31.24**
73	IC444105	14.00	10.20	**12.10**	39.90	21.00	38.00	35.80	43.67	-	18.00	40.20	**33.80**
74	IC444156	7.00	10.00	**8.50**	14.00	18.00	34.20	27.40	28.00	43.00	11.00	18.40	**24.25**
75	IC444159	10.00	6.00	**8.00**	16.50	16.60	35.00	29.00	25.50	50.30	15.00	16.80	**25.59**

S. No	Accession No.	Stem thickness (mm)					Plant height (cm)								
		Akola	Ambikapur	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
37	IC340803	2.2	4.2	3.0	4.0	**3.3**	22.40	48.20	97.50	46.00	81.00	62.30	42.00	40.20	**54.95**
38	IC340823	8.2	4.1	3.0	4.3	**4.9**	46.40	54.00	99.60	64.00	50.00	89.30	47.00	41.40	**61.46**
39	IC340825	4.7	4.3	4.0	4.9	**4.5**	39.20	53.80	101.70	52.00	55.50	63.00	80.00	41.80	**60.88**
40	IC340861	6.4	4.4	2.5	4.9	**4.6**	44.40	53.60	98.00	49.20	59.50	70.70	39.00	44.00	**57.30**
41	IC340971	3.4	4.2	3.5	5.6	**4.2**	23.00	50.20	93.70	46.40	57.50	84.00	59.00	45.20	**57.38**
42	IC341452	5.4	4.8	2.0	8.7	**5.2**	39.40	52.40	88.00	54.40	60.67	66.30	35.00	53.80	**56.25**
43	IC355992	6.3	4.5	2.0	6.1	**4.7**	46.20	58.80	82.20	54.00	61.67	86.30	32.00	41.40	**57.82**
44	IC356012	5.0	4.0	3.0	4.8	**4.2**	39.00	55.80	102.20	50.20	61.33	80.00	48.00	30.60	**58.39**
45	IC356023	3.4	4.0	2.0	4.5	**3.5**	24.20	46.00	101.30	53.20	64.00	72.70	40.00	30.40	**53.98**
46	IC356027	3.9	3.8	4.0	7.1	**4.7**	37.20	59.00	98.00	53.00	54.67	59.70	72.00	51.60	**60.65**
47	IC356041	4.6	4.7	3.0	4.6	**4.2**	29.60	55.20	96.10	52.20	56.00	93.70	48.00	39.20	**58.75**
48	IC356046	7.5	4.4	3.0	4.3	**4.8**	61.40	49.40	101.40	71.20	62.67	-	47.00	141.60	**76.38**
49	IC356070	4.7	4.3	2.0	4.3	**3.8**	32.20	45.00	78.90	64.20	43.00	69.70	32.00	44.40	**51.18**
50	IC356085	4.6	3.8	3.0	5.4	**4.2**	23.80	52.00	82.30	46.60	56.00	56.30	48.00	26.40	**48.93**
51	IC360827	4.7	4.7	-	5.0	**4.8**	29.60	54.20	91.60	51.20	61.33	85.00	-	41.60	**59.22**
52	IC360834	5.9	4.4	4.0	7.6	**5.5**	31.60	51.00	102.00	53.60	37.50	52.70	70.00	45.20	**55.45**
53	IC360858	5.2	4.6	2.0	5.9	**4.4**	43.40	53.20	80.20	71.20	60.50	80.30	26.00	50.80	**58.20**
54	IC361327	10.4	4.1	3.0	5.3	**5.7**	30.00	45.20	96.50	74.60	125.00	-	87.00	147.00	**86.47**
55	IC362257	5.9	4.8	2.5	8.3	**5.4**	43.20	46.20	88.20	59.80	64.67	73.00	30.00	61.00	**58.26**
56	IC382640	5.3	4.5	-	7.8	**5.9**	30.00	53.60	92.00	49.60	62.50	57.00	-	62.20	**58.13**
57	IC383578	6.6	4.4	4.0	5.1	**5.0**	41.00	52.60	85.00	63.20	46.00	63.70	72.00	28.60	**56.51**
58	IC383647	6.8	4.2	3.0	3.9	**4.5**	32.80	51.60	83.80	54.20	45.00	76.00	42.00	26.00	**51.43**
59	IC391433	7.8	4.8	-	7.7	**6.8**	54.20	52.40	82.70	42.80	56.67	76.00	-	49.20	**59.14**
60	IC391468	4.5	4.3	2.5	5.4	**4.2**	32.20	47.80	91.50	68.20	61.67	71.30	39.00	38.80	**56.31**
61	IC391517	5.7	4.7	3.5	5.5	**4.8**	41.60	51.80	81.60	64.00	52.67	77.70	50.00	42.00	**57.67**
62	IC391561	7.7	4.7	3.0	5.6	**5.2**	50.60	53.00	82.20	60.60	52.00	73.70	62.00	43.60	**59.71**
63	IC392498	9.7	4.6	3.0	4.1	**5.3**	53.80	50.20	89.10	58.40	63.33	84.00	44.00	36.60	**59.93**
64	IC392525	7.7	4.5	4.0	5.0	**5.3**	43.20	53.00	90.20	59.40	41.33	73.30	70.00	40.20	**58.83**
65	IC393022	3.6	4.5	3.0	5.2	**4.1**	40.20	54.00	100.10	54.20	53.50	60.30	36.00	43.60	**55.24**
66	IC429977	7.7	4.1	2.0	6.3	**5.0**	38.00	51.00	75.10	67.40	49.67	69.30	32.00	49.00	**53.93**
67	IC436948	3.8	4.1	3.0	3.9	**3.7**	22.00	46.60	83.00	46.00	55.50	68.30	47.00	24.60	**49.13**
68	IC436953	6.1	3.6	4.0	4.4	**4.5**	29.40	45.20	82.00	50.20	49.00	68.30	80.00	35.00	**54.89**
69	IC436957	4.9	4.3	2.5	4.5	**4.1**	30.80	53.60	77.40	54.80	45.00	57.30	39.00	37.40	**49.41**
70	IC436974	8.1	4.0	3.0	7.4	**5.6**	49.40	52.40	84.50	52.20	58.00	67.30	48.00	56.60	**58.55**
71	IC444099	6.8	4.6	3.0	2.7	**4.3**	38.00	44.80	85.30	66.00	40.67	70.30	36.00	34.80	**51.98**
72	IC444100	4.6	4.1	-	5.8	**4.8**	32.40	49.00	75.50	66.60	57.50	62.70	-	55.00	**56.96**
73	IC444105	13.9	4.6	4.0	4.8	**6.8**	125.20	54.80	80.70	124.80	122.67	-	71.00	117.00	**99.45**
74	IC444156	3.9	4.2	2.0	9.3	**4.8**	27.60	51.80	90.00	53.00	58.50	60.30	32.00	26.40	**49.95**
75	IC444159	7.8	4.1	3.0	4.6	**4.9**	27.20	50.00	80.50	54.40	44.00	68.60	48.00	27.60	**50.04**

S. No	Accession No.	Days to 80% maturity									seed yield(g/ha)	Number of Lateral Inflorescence
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi
37	IC340803	97.00	129.00	124.00	89.00	119.00	88.00	129	91.00	**108.25**	6.91	11.00
38	IC340823	97.00	129.00	121.00	87.00	126.00	88.00	134	96.00	**109.75**	10.62	14.00
39	IC340825	90.00	131.00	118.00	88.00	128.00	88.00	142	92.00	**109.63**	9.63	15.00
40	IC340861	92.00	130.00	121.00	88.00	121.00	85.00	137	90.00	**108.00**	8.15	13.00
41	IC340971	97.00	127.00	122.00	85.00	120.00	90.00	134	93.00	**108.50**	6.42	22.00
42	IC341452	92.00	129.00	128.00	85.00	119.00	98.00	138	89.00	**109.75**	9.88	9.00
43	IC355992	107.00	129.00	124.00	89.00	120.00	102.00	134	90.00	**111.88**	6.91	12.00
44	IC356012	107.00	127.00	122.00	90.00	117.00	93.00	131	89.00	**109.50**	8.15	18.00
45	IC356023	105.00	132.00	121.00	86.00	120.00	92.00	131	89.00	**109.50**	6.42	8.00
46	IC356027	105.00	128.00	122.00	86.00	127.00	91.00	152	87.00	**112.25**	5.19	22.00
47	IC356041	97.00	126.00	119.00	88.00	126.00	90.00	131	92.00	**108.63**	5.93	18.00
48	IC356046	102.00	130.00	124.00	88.00	125.00	-	134	120.00	**117.57**	10.12	14.00
49	IC356070	97.00	127.00	127.00	88.00	128.00	94.00	134	90.00	**110.63**	8.64	12.00
50	IC356085	97.00	127.00	120.00	84.00	124.00	92.00	131	90.00	**108.13**	6.15	18.00
51	IC360827	105.00	129.00	122.00	89.00	122.00	92.00	-	96.00	**107.86**	9.63	-
52	IC360834	97.00	128.00	126.00	87.00	129.00	100.00	151	93.00	**113.88**	5.19	12.00
53	IC360858	104.00	132.00	120.00	89.00	125.00	93.00	134	89.00	**110.75**	7.09	10.00
54	IC361327	118.00	129.00	120.00	94.00	139.00	104.00	136	118.00	**119.75**	7.65	12.00
55	IC362257	94.00	126.00	127.00	85.00	129.00	105.00	128	88.00	**110.25**	10.86	20.00
56	IC382640	96.00	132.00	125.00	88.00	128.00	103.00	-	90.00	**108.86**	10.12	-
57	IC383578	97.00	129.00	124.00	88.00	126.00	89.00	152	92.00	**112.13**	8.89	22.00
58	IC383647	96.00	131.00	131.00	87.00	128.00	92.00	129	89.00	**110.38**	5.43	11.00
59	IC391433	103.00	132.00	128.00	87.00	126.00	94.00	-	94.00	**109.14**	10.62	-
60	IC391468	97.00	131.00	127.00	85.00	117.00	92.00	137	90.00	**109.50**	8.89	13.00
61	IC391517	97.00	130.00	125.00	86.00	119.00	94.00	139	89.00	**109.88**	5.19	19.00
62	IC391561	92.00	132.00	123.00	84.00	122.00	92.00	137	89.00	**108.88**	9.06	32.00
63	IC392498	97.00	126.00	126.00	88.00	116.00	91.00	135	92.00	**108.88**	6.91	16.00
64	IC392525	97.00	128.00	127.00	87.00	119.00	90.00	151	90.00	**111.13**	9.63	12.00
65	IC393022	92.00	129.00	121.00	86.00	119.00	90.00	128	88.00	**106.63**	4.20	16.00
66	IC429977	97.00	126.00	121.00	88.00	126.00	95.00	134	90.00	**109.63**	4.44	12.00
67	IC436948	104.00	132.00	123.00	83.00	123.00	92.00	134	90.00	**110.13**	8.40	14.00
68	IC436953	97.00	126.00	128.00	86.00	121.00	93.00	142	93.00	**110.75**	6.67	15.00
69	IC436957	97.00	130.00	129.00	88.00	129.00	90.00	137	90.00	**111.25**	7.21	13.00
70	IC436974	105.00	132.00	120.00	89.00	124.00	94.00	131	95.00	**111.25**	8.02	18.00
71	IC444099	99.00	130.00	126.00	87.00	128.00	103.00	128	93.00	**111.75**	10.12	16.00
72	IC444100	101.00	130.00	129.00	87.00	118.00	99.00	-	90.00	**107.71**	7.41	-
73	IC444105	99.00	132.00	127.00	98.00	129.00	-	147	122.00	**122.00**	9.63	14.00
74	IC444156	108.00	131.00	125.00	86.00	119.00	93.00	134	93.00	**111.13**	7.78	12.00
75	IC444159	97.00	132.00	123.00	86.00	123.00	98.00	131	92.00	**110.25**	7.41	18.00

S. No	Accession No.	Seed yield per plant (g)							Seed volume (g/10ml)							
		Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
37	IC340803	14.50	4.02	11.40	16.50	9.00	10.30	**10.95**	5.25	6.20	7.63	7.37	8.00	9.80	6.40	**7.24**
38	IC340823	15.10	3.26	9.67	11.50	3.50	9.70	**8.79**	6.80	6.70	7.65	7.51	7.50	8.90	6.48	**7.36**
39	IC340825	15.00	4.15	6.53	14.10	2.20	5.20	**7.86**	6.45	6.60	7.68	6.88	7.60	6.90	6.30	**6.92**
40	IC340861	13.60	4.04	5.87	17.20	6.00	9.30	**9.33**	5.70	7.10	7.65	7.45	8.00	9.60	6.11	**7.37**
41	IC340971	15.60	3.61	8.07	12.90	13.00	6.70	**9.98**	6.30	7.80	7.66	7.39	7.20	9.60	6.14	**7.44**
42	IC341452	11.00	5.40	7.20	9.20	14.00	16.20	**10.50**	4.66	6.90	7.78	6.41	8.20	9.90	6.01	**7.12**
43	IC355992	15.00	2.94	8.20	16.20	5.40	8.10	**9.31**	5.26	7.40	7.65	7.06	8.30	9.50	6.34	**7.36**
44	IC356012	10.60	3.65	10.27	15.60	5.50	7.30	**8.82**	7.33	6.10	7.69	6.97	7.00	9.70	6.59	**7.34**
45	IC356023	11.60	4.41	8.00	15.60	2.70	6.90	**8.20**	6.42	5.61	7.72	7.41	8.00	9.50	6.34	**7.29**
46	IC356027	15.60	3.90	6.00	18.40	16.00	14.30	**12.37**	5.70	7.40	7.66	7.48	7.50	9.20	5.94	**7.27**
47	IC356041	8.60	3.92	6.87	13.00	2.90	8.20	**7.25**	4.90	7.10	7.78	6.87	7.60	10.00	6.45	**7.24**
48	IC356046	9.60	2.31	8.73	-	3.50	13.10	**7.45**	5.70	7.00	7.62	6.96	-	8.90	6.28	**7.08**
49	IC356070	12.40	6.32	2.33	17.90	5.40	11.40	**9.29**	5.30	6.10	7.83	6.61	7.90	9.50	6.10	**7.05**
50	IC356085	16.50	3.01	13.33	19.90	2.90	7.40	**10.51**	7.15	5.87	7.66	7.58	8.10	10.00	6.12	**7.50**
51	IC360827	15.00	2.63	6.07	13.90	-	7.90	**9.10**	6.95	6.75	7.64	7.40	8.30	-	6.24	**7.21**
52	IC360834	12.00	5.17	6.27	13.00	33.00	12.30	**13.62**	4.10	6.20	7.75	7.15	6.90	7.20	6.02	**6.47**
53	IC360858	15.00	5.88	5.53	12.00	9.20	18.00	**10.94**	6.70	6.90	7.76	6.55	7.00	9.80	6.33	**7.29**
54	IC361327	18.00	7.09	14.33	8.70	12.00	13.10	**12.20**	4.66	6.80	7.65	7.03	8.10	8.60	5.00	**6.83**
55	IC362257	15.00	7.40	9.93	11.60	2.00	17.60	**10.59**	4.70	7.50	7.74	6.91	8.00	9.60	6.32	**7.25**
56	IC382640	11.00	7.11	9.67	14.10	-	22.00	**12.78**	6.05	6.50	7.73	6.69	8.40	-	6.38	**6.96**
57	IC383578	20.50	5.22	9.47	11.40	16.00	7.10	**11.62**	6.70	7.00	7.73	7.35	8.30	9.20	6.25	**7.50**
58	IC383647	19.50	6.21	6.60	10.90	9.00	2.30	**9.08**	4.60	7.50	7.84	7.43	6.80	9.80	6.40	**7.20**
59	IC391433	15.60	3.76	6.87	13.00	-	24.80	**12.81**	6.30	6.70	7.69	7.58	8.50	-	6.10	**7.15**
60	IC391468	20.60	4.29	8.87	18.00	7.40	11.90	**11.84**	4.35	7.80	7.69	6.74	8.20	10.00	6.36	**7.31**
61	IC391517	18.60	8.16	8.33	11.50	8.20	11.60	**11.07**	6.50	7.50	7.88	7.41	7.90	7.80	6.48	**7.35**
62	IC391561	18.60	6.97	12.13	14.00	17.00	13.80	**13.75**	4.15	7.70	7.84	7.17	7.80	9.90	6.44	**7.29**
63	IC392498	17.50	7.54	13.20	18.70	8.00	12.10	**12.84**	5.35	7.20	7.87	7.28	8.00	9.20	6.47	**7.34**
64	IC392525	20.00	5.55	8.80	16.00	33.00	13.10	**16.07**	5.67	5.40	7.73	8.39	7.50	7.20	6.30	**6.88**
65	IC393022	17.00	5.55	4.33	8.50	4.40	9.80	**8.26**	5.90	5.90	7.78	7.63	7.60	9.90	6.20	**7.27**
66	IC429977	27.50	5.95	4.00	13.50	5.40	15.30	**11.94**	4.75	6.10	7.77	6.84	8.50	9.50	6.81	**7.18**
67	IC436948	18.00	4.90	8.00	11.90	3.50	3.80	**8.35**	5.20	7.17	7.73	7.65	7.50	8.90	6.20	**7.19**
68	IC436953	20.50	5.49	7.80	14.50	2.20	18.10	**11.43**	4.90	6.91	7.76	7.35	7.00	6.90	6.42	**6.75**
69	IC436957	15.00	5.11	9.73	17.90	6.00	16.00	**11.62**	6.35	6.70	7.74	7.33	8.30	9.60	6.60	**7.52**
70	IC436974	22.50	5.64	8.53	16.20	2.90	15.00	**11.80**	5.50	7.70	7.77	6.87	6.60	10.00	6.54	**7.28**
71	IC444099	17.00	6.69	3.53	11.20	2.60	9.80	**8.47**	5.26	6.70	7.86	7.00	8.40	9.90	6.45	**7.37**
72	IC444100	18.00	5.37	3.00	10.40	-	7.40	**8.83**	7.58	6.50	7.81	7.07	8.00	-	6.07	**7.17**
73	IC444105	16.00	3.54	7.13	-	4.60	15.40	**9.33**	5.10	6.80	7.74	6.44	-	6.80	4.01	**6.15**
74	IC444156	15.60	6.37	9.47	13.70	5.40	5.50	**9.34**	6.90	6.20	7.85	7.75	7.80	9.50	6.43	**7.49**
75	IC444159	12.40	4.00	7.07	18.50	5.50	3.60	**8.51**	5.50	7.61	7.73	6.86	7.00	9.70	6.55	**7.28**

S. No	Accession No.	Days to 50% flowering									Leaf length (cm)				
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
76	IC444167	43.00	57.00	52.00	33.00	38.00	40.00	82.00	34.00	**47.38**	6.84	10.00	6.00	8.30	**7.79**
77	IC444193	41.00	58.00	56.00	33.00	39.00	33.00	97.00	29.00	**48.25**	5.98	12.40	7.00	14.40	**9.95**
78	IC469777	46.00	49.00	56.00	30.00	42.00	35.00	78.00	40.00	**47.00**	6.94	13.00	5.50	6.78	**8.06**
79	IC469803	46.00	53.00	50.00	30.00	41.00	36.00	-	39.00	**42.14**	7.76	11.50	-	10.40	**9.89**
80	IC469805	49.00	51.00	51.00	29.00	40.00	32.00	-	35.00	**41.00**	6.78	11.70	-	10.70	**9.73**
81	IC469820	43.00	58.00	57.00	29.00	41.00	33.00	84.00	34.00	**47.38**	7.36	12.20	5.00	9.00	**8.39**
82	IC469837	47.00	57.00	59.00	30.00	44.00	29.00	79.00	34.00	**47.38**	7.70	7.70	9.00	10.66	**8.77**
83	IC469858	45.00	55.00	52.00	30.00	40.00	28.00	72.00	32.00	**44.25**	7.02	10.40	6.00	12.30	**8.93**
84	IC506514	46.00	54.00	51.00	30.00	39.00	34.00	82.00	34.00	**46.25**	7.10	9.30	6.00	10.70	**8.28**
85	IC506519	46.00	60.00	57.00	35.00	43.00	40.00	97.00	39.00	**52.13**	7.76	9.80	7.00	11.20	**8.94**
86	IC506520	44.00	59.00	53.00	34.00	39.00	33.00	78.00	39.00	**47.38**	7.36	11.40	5.50	10.76	**8.76**
87	IC506521	45.00	52.00	53.00	31.00	38.00	33.00	72.00	31.00	**44.38**	7.70	11.10	5.00	10.12	**8.48**
88	IC506524	46.00	59.00	50.00	33.00	37.00	40.00	73.00	32.00	**46.25**	7.72	12.60	5.50	12.72	**9.64**
89	IC506528	44.00	61.00	51.00	33.00	48.00	39.00	81.00	33.00	**48.75**	6.62	11.30	6.00	12.84	**9.19**
90	IC506529	45.00	54.00	54.00	35.00	42.00	40.00	78.00	35.00	**47.88**	7.96	11.60	7.00	10.12	**9.17**
91	IC506531	46.00	56.00	61.00	40.00	47.00	39.00	86.00	41.00	**52.00**	7.28	13.10	8.00	10.72	**9.78**
92	IC506534	46.00	59.00	50.00	38.00	48.00	40.00	-	39.00	**45.71**	7.56	11.70	-	10.14	**9.80**
93	IC506535	42.00	57.00	61.00	35.00	55.00	41.00	82.00	36.00	**51.13**	7.36	10.50	5.00	10.92	**8.45**
94	IC506575	42.00	50.00	56.00	33.00	44.00	38.00	95.00	35.00	**49.13**	7.66	11.30	5.00	11.74	**8.93**
95	IC506604	45.00	61.00	51.00	35.00	43.00	-	76.00	38.00	**49.86**	7.02	-	6.50	11.10	**8.21**
96	IC506605	45.00	57.00	57.00	31.00	40.00	33.00	84.00	37.00	**48.00**	6.66	10.20	9.00	10.30	**9.04**
97	IC506611	48.00	58.00	51.00	28.00	44.00	33.00	78.00	38.00	**47.25**	7.30	11.90	5.50	10.26	**8.74**
98	IC506612	43.00	51.00	48.00	29.00	41.00	32.00	80.00	36.00	**45.00**	7.48	11.70	5.50	11.16	**8.96**
99	IC524215	42.00	55.00	57.00	29.00	38.00	31.00	82.00	36.00	**46.25**	7.50	10.20	6.00	13.20	**9.23**
100	NC59949	45.00	56.00	50.00	31.00	41.00	33.00	78.00	23.00	**44.63**	6.60	10.60	5.50	10.28	**8.25**
Mean for check variety															
1	BGA-2	76.80	54.40	57.00	54.40	64.80	61.50	83.20	65.00	**64.64**	7.60	18.93	8.70	14.77	**12.50**
2	CGRajgira-1	-	57.40	-	-	-	-	-	-	**57.40**	7.20	-	-	-	**7.20**
3	GA-2	78.80	56.60	60.00	58.00	64.80	60.00	-	61.43	**62.80**	6.82	16.45	-	13.74	**12.34**
4	RMA-7	72.40	58.40	55.00	53.40	68.20	63.00	97.00	63.86	**66.41**	7.55	16.75	5.00	15.20	**11.12**
5	Suvarna	74.20	54.40	54.00	56.20	66.40	59.50	91.40	69.29	**65.67**	7.56	18.00	7.00	14.92	**11.87**
Minimum		**40.00**	**49.00**	**48.00**	**28.00**	**36.00**	**28.00**	**72.00**	**23.00**	**40.71**	**5.92**	**5.80**	**4.00**	**6.42**	**6.86**
Maximum		**93.00**	**61.00**	**61.00**	**58.00**	**68.20**	**63.00**	**97.00**	**69.29**	**66.41**	**8.54**	**18.93**	**9.00**	**22.78**	**15.09**
Mean		**46.15**	**55.93**	**53.81**	**33.88**	**42.92**	**35.19**	**80.32**	**36.84**	**47.50**	**7.13**	**11.24**	**6.05**	**11.13**	**9.04**
CD (0.05)		**11.12**	**1.37**	-	**4.05**	**3.77**	**2.50**	-	**4.25**	**-**	**0.79**	**4.21**	-	**3.23**	**-**
CV (%) Error		**5.52**	**0.96**	-	**2.74**	**2.14**	**1.53**	-	**2.61**	**-**	**4.20**	**8.99**	-	**8.76**	**-**
CV (%) Phen.		**19.49**	**5.59**	**6.60**	**18.20**	**13.22**	**17.37**	**7.76**	**22.64**	**10.04**	**7.46**	**17.37**	**20.35**	**21.07**	**13.11**

S. No	Accession No.	Leaf width (cm)					Number of branches per plant				Petiole length (cm)				
		Ambikapur	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi	SK Nagar	Mean	Ambikapur	Rahuri	Ranchi	SK Nagar	Mean
76	IC444167	3.60	4.90	3.50	3.00	**3.75**	4.80	8.00	2.80	**5.20**	3.60	5.50	2.50	2.40	**3.50**
77	IC444193	3.48	6.30	3.50	5.38	**4.67**	6.20	12.00	3.20	**7.13**	2.80	8.00	4.00	5.62	**5.11**
78	IC469777	3.62	7.40	3.00	2.16	**4.05**	5.80	6.00	2.60	**4.80**	2.54	7.60	6.00	2.54	**4.67**
79	IC469803	3.78	5.70	-	3.38	**4.29**	5.40	-	3.00	**4.20**	3.22	5.50	-	3.20	**3.97**
80	IC469805	3.50	6.20	-	3.86	**4.52**	5.80	-	3.00	**4.40**	2.94	7.20	-	2.98	**4.37**
81	IC469820	3.36	6.20	2.50	3.00	**3.77**	5.60	9.00	3.40	**6.00**	2.38	6.80	3.50	3.32	**4.00**
82	IC469837	3.68	3.30	4.00	3.36	**3.59**	5.60	12.00	2.80	**6.80**	2.52	7.10	4.50	4.24	**4.59**
83	IC469858	3.58	5.90	4.00	3.40	**4.22**	5.00	8.00	2.80	**5.27**	2.94	6.90	3.50	5.06	**4.60**
84	IC506514	3.50	5.30	3.50	3.98	**4.07**	5.80	8.00	2.60	**5.47**	3.30	6.90	2.50	3.96	**4.17**
85	IC506519	4.64	6.00	3.50	4.76	**4.73**	7.00	12.00	2.60	**7.20**	2.76	7.30	4.00	3.12	**4.30**
86	IC506520	3.80	5.70	3.00	3.94	**4.11**	6.20	6.00	2.60	**4.93**	2.30	5.80	6.00	3.42	**4.38**
87	IC506521	3.88	6.10	2.50	3.12	**3.90**	8.60	9.00	2.60	**6.73**	2.36	5.70	3.50	3.42	**3.75**
88	IC506524	4.10	6.60	3.00	4.24	**4.49**	5.60	6.00	2.60	**4.73**	2.18	7.50	2.00	5.68	**4.34**
89	IC506528	3.56	5.90	3.50	4.24	**4.30**	6.40	7.00	2.60	**5.33**	2.48	6.50	3.00	4.44	**4.11**
90	IC506529	3.50	7.00	4.00	3.56	**4.52**	6.20	13.00	2.40	**7.20**	2.08	6.70	2.00	2.98	**3.44**
91	IC506531	3.62	6.90	4.00	3.68	**4.55**	5.40	9.00	2.60	**5.67**	3.04	7.50	5.50	3.44	**4.87**
92	IC506534	3.98	6.50	-	3.58	**4.69**	6.20	-	2.60	**4.40**	2.40	5.10	-	3.02	**3.51**
93	IC506535	3.54	6.30	3.00	4.16	**4.25**	6.40	9.00	2.80	**6.07**	2.10	6.10	2.00	3.88	**3.52**
94	IC506575	3.98	6.40	2.50	4.28	**4.29**	5.80	4.00	2.60	**4.13**	2.26	6.40	3.50	4.82	**4.25**
95	IC506604	3.66	-	4.00	3.94	**3.87**	6.00	11.00	2.80	**6.60**	2.94	-	3.00	4.80	**3.58**
96	IC506605	3.34	6.10	4.00	3.00	**4.11**	6.00	12.00	2.60	**6.87**	2.14	5.50	4.50	3.54	**3.92**
97	IC506611	3.40	6.60	3.00	3.40	**4.10**	6.00	6.00	2.40	**4.80**	3.04	7.10	6.00	3.64	**4.95**
98	IC506612	3.72	6.80	4.00	3.76	**4.57**	5.20	6.00	2.80	**4.67**	2.00	7.10	3.00	5.01	**4.28**
99	IC524215	3.90	6.00	3.50	3.60	**4.25**	4.40	8.00	2.60	**5.00**	2.74	5.70	2.50	5.24	**4.05**
100	NC59949	3.16	6.20	3.00	4.22	**4.15**	5.80	6.00	2.40	**4.73**	2.96	8.30	6.00	3.08	**5.09**
Mean for check variety															
1	BGA-2	4.69	12.18	6.20	5.16	**7.06**	7.80	8.00	1.00	**5.60**	3.31	14.68	6.60	6.30	**7.72**
2	CGRajgira-1	3.82	-	-	-	**3.82**	7.32	-	-	**7.32**	2.83	-	-	-	**2.83**
3	GA-2	3.87	8.50	-	5.28	**5.88**	7.28	-	1.00	**4.14**	3.15	11.18	-	6.64	**6.99**
4	RMA-7	4.51	9.05	3.00	4.69	**5.31**	7.08	7.00	1.00	**5.03**	3.37	12.68	3.00	5.13	**6.04**
5	Suvarna	4.17	12.23	4.00	6.17	**6.64**	7.12	10.00	1.00	**6.04**	3.16	7.63	5.00	8.07	**5.96**
Minimum		**2.92**	**3.30**	**2.00**	**2.16**	**3.50**	**4.00**	**4.00**	**1.00**	**3.40**	**1.94**	**3.80**	**1.50**	**2.16**	**2.83**
Maximum		**4.88**	**12.23**	**8.00**	**7.08**	**7.06**	**8.60**	**13.00**	**5.00**	**7.32**	**4.08**	**14.68**	**6.60**	**10.70**	**7.72**
Mean		**3.71**	**6.15**	**3.57**	**3.77**	**4.32**	**5.83**	**7.80**	**2.71**	**5.31**	**2.85**	**6.55**	**3.51**	**4.12**	**4.27**
CD (0.05)		**0.34**	**3.80**	-	**1.50**	**-**	**0.92**	-	**0.00**	**-**	**0.33**	**6.68**	-	**1.31**	-
CV (%) Error		**3.21**	**13.58**	-	**11.25**	**-**	**4.96**	-	**0.00**	**-**	**4.13**	**17.84**	-	**7.95**	-
CV (%) Phen.		**10.80**	**19.67**	**33.77**	**22.70**	**13.52**	**13.56**	**28.31**	**18.82**	**17.81**	**15.36**	**23.58**	**39.24**	**31.03**	**16.87**

S. No	Accession No.	Lateral Inflorescence length (cm)			Inflorescence length (cm)								
		Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
76	IC444167	18.00	16.20	**17.10**	17.30	20.40	35.30	34.60	28.50	47.00	16.00	23.00	**27.76**
77	IC444193	14.00	16.40	**15.20**	14.20	20.40	41.30	30.00	27.50	44.70	22.00	36.00	**29.51**
78	IC469777	10.00	8.80	**9.40**	14.80	20.80	33.40	34.60	29.67	41.30	15.00	20.40	**26.25**
79	IC469803	-	8.80	**8.80**	19.20	20.80	30.50	29.80	30.00	34.30	-	21.40	**26.57**
80	IC469805	-	11.60	**11.60**	11.20	20.60	34.70	32.00	29.50	49.60	-	26.60	**29.17**
81	IC469820	14.00	9.80	**11.90**	17.60	18.80	31.20	34.20	29.33	46.30	19.00	24.20	**27.58**
82	IC469837	13.00	12.00	**12.50**	20.20	20.00	29.10	30.80	31.67	88.70	25.00	25.20	**33.83**
83	IC469858	13.00	12.80	**12.90**	23.00	19.80	36.20	34.00	32.50	40.00	26.00	36.40	**30.99**
84	IC506514	18.00	11.40	**14.70**	13.20	20.00	35.00	32.60	25.67	40.70	16.00	23.60	**25.85**
85	IC506519	14.00	9.00	**11.50**	23.00	18.80	37.20	33.00	21.00	42.00	22.00	16.20	**26.65**
86	IC506520	10.00	12.60	**11.30**	14.60	21.00	37.00	35.80	25.00	41.00	15.00	17.80	**25.90**
87	IC506521	14.00	12.00	**13.00**	17.80	18.40	36.80	36.80	28.67	42.00	19.00	30.60	**28.76**
88	IC506524	10.00	16.00	**13.00**	18.20	20.40	31.30	40.60	24.67	48.00	18.00	34.20	**29.42**
89	IC506528	8.00	12.00	**10.00**	19.60	20.20	35.20	29.60	28.67	41.70	13.00	25.60	**26.70**
90	IC506529	13.00	11.40	**12.20**	23.40	20.00	36.00	36.60	28.33	39.00	18.00	26.20	**28.44**
91	IC506531	14.00	9.40	**11.70**	26.00	21.60	37.50	36.20	22.33	45.00	21.00	26.60	**29.53**
92	IC506534	-	13.00	**13.00**	18.80	20.80	34.60	32.60	22.33	43.30	-	26.40	**28.40**
93	IC506535	5.00	14.20	**9.60**	23.60	20.00	34.00	33.60	37.00	30.30	8.00	35.60	**27.76**
94	IC506575	5.00	11.80	**8.40**	19.00	20.20	35.20	20.80	25.33	34.70	11.00	25.40	**23.95**
95	IC506604	13.00	9.60	**11.30**	22.60	21.80	35.00	33.20	26.33	-	17.00	16.20	**24.59**
96	IC506605	13.00	12.60	**12.80**	17.00	19.80	38.00	36.40	24.67	42.00	25.00	23.80	**28.33**
97	IC506611	10.00	11.60	**10.80**	23.60	18.60	36.80	35.60	21.33	55.00	15.00	16.20	**27.77**
98	IC506612	7.00	12.80	**9.90**	21.00	18.20	35.20	34.40	28.33	40.30	11.00	19.40	**25.98**
99	IC524215	18.00	18.00	**18.00**	20.00	17.80	37.60	39.40	24.33	39.30	16.00	33.60	**28.50**
100	NC59949	10.00	12.20	**11.10**	15.00	19.60	40.10	33.20	25.67	48.30	15.00	25.40	**27.78**
Mean for check variety													
1	BGA-2	13.60	10.63	**12.11**	39.44	20.36	42.50	35.52	39.61	41.75	23.00	29.40	**33.95**
2	CGRajgira-1	-	-	**-**	-	19.68	-	-	-	-	-	-	**19.68**
3	GA-2	-	17.03	**17.03**	51.64	20.12	41.20	42.96	32.67	49.85	-	47.14	**40.80**
4	RMA-7	9.00	13.77	**11.39**	39.76	20.36	43.00	34.96	33.53	43.50	14.20	34.31	**32.95**
5	Suvarna	9.00	11.34	**10.17**	45.30	20.64	40.50	36.56	41.80	38.90	16.00	30.43	**33.77**
Minimum		**5.00**	**5.40**	**6.55**	**10.00**	**16.60**	**29.10**	**20.80**	**21.00**	**29.30**	**6.00**	**12.00**	**19.68**
Maximum		**18.00**	**34.20**	**23.60**	**51.64**	**22.60**	**44.50**	**42.96**	**43.67**	**88.70**	**30.00**	**69.60**	**40.80**
Mean		**11.12**	**12.57**	**11.97**	**19.69**	**19.80**	**36.95**	**33.77**	**28.21**	**43.14**	**16.69**	**26.60**	**28.25**
CD (0.05)		-	**6.56**	**-**	**8.86**	**2.28**	-	**7.38**	**15.47**	**13.29**	-	**6.51**	**-**
CV (%) Error		-	**19.82**	**-**	**7.54**	**4.44**	-	**7.37**	**15.71**	**11.45**	-	**7.33**	**-**
CV (%) Phen.		**31.93**	**30.54**	**22.84**	**35.42**	**6.07**	**8.32**	**13.03**	**17.77**	**16.71**	**28.48**	**32.00**	**9.70**

S. No	Accession No.	Stem thickness (mm)					Plant height (cm)								
		Akola	Ambikapur	Ranchi	SK Nagar	Mean	Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
76	IC444167	7.1	4.2	2.0	5.6	**4.7**	29.60	53.00	78.70	56.00	56.50	61.60	40.00	33.60	**51.13**
77	IC444193	6.4	3.8	4.0	7.9	**5.5**	28.00	47.60	81.50	53.60	53.00	80.00	72.00	50.20	**58.24**
78	IC469777	3.8	4.4	3.0	4.0	**3.8**	32.20	51.60	83.70	53.40	51.00	61.30	48.00	31.40	**51.58**
79	IC469803	5.7	4.1	-	6.8	**5.5**	36.40	47.60	83.50	47.60	53.33	57.30	-	39.60	**52.19**
80	IC469805	5.9	4.6	-	5.9	**5.5**	28.00	54.20	84.40	52.00	61.67	91.70	-	42.80	**59.25**
81	IC469820	5.8	4.4	3.0	5.8	**4.7**	30.80	45.20	85.10	51.40	56.67	72.70	53.00	37.80	**54.08**
82	IC469837	7.3	4.2	3.0	5.2	**4.9**	54.60	54.00	81.10	51.80	58.67	89.00	51.00	40.40	**60.07**
83	IC469858	7.6	4.1	3.0	5.0	**4.9**	50.80	53.40	75.00	57.00	59.33	67.30	47.00	53.00	**57.85**
84	IC506514	2.8	4.4	2.0	4.4	**3.4**	19.50	49.60	78.40	59.60	51.67	66.70	40.00	40.20	**50.71**
85	IC506519	6.4	4.6	4.0	5.6	**5.1**	37.40	48.60	82.20	51.60	43.67	70.70	72.00	41.00	**55.90**
86	IC506520	4.7	4.2	3.0	3.3	**3.8**	25.60	46.40	76.20	60.60	45.67	66.30	48.00	36.20	**50.62**
87	IC506521	4.9	4.0	3.0	4.1	**4.0**	29.60	45.60	84.10	58.20	49.00	68.30	47.00	48.20	**53.75**
88	IC506524	5.5	4.6	2.5	5.0	**4.4**	28.00	38.40	81.50	68.00	50.67	86.60	39.00	64.20	**57.05**
89	IC506528	5.9	3.9	3.0	5.0	**4.4**	33.80	40.60	80.00	62.60	58.67	69.00	42.00	44.20	**53.86**
90	IC506529	4.9	4.1	3.5	5.8	**4.6**	42.60	46.40	75.40	64.60	55.00	65.70	59.00	45.00	**56.71**
91	IC506531	6.5	4.4	3.5	4.8	**4.8**	41.60	50.20	72.30	76.20	56.67	84.30	52.00	44.20	**59.68**
92	IC506534	5.5	4.4	-	6.9	**5.6**	37.80	50.40	77.20	68.40	60.00	75.30	-	45.00	**59.16**
93	IC506535	6.1	4.3	2.5	7.9	**5.2**	36.00	48.20	75.90	50.80	109.33	60.70	30.00	47.20	**57.27**
94	IC506575	4.7	4.5	2.0	7.2	**4.6**	32.20	50.40	101.20	41.80	50.33	59.70	29.00	46.80	**51.43**
95	IC506604	7.9	4.8	3.0	4.9	**5.2**	41.80	50.60	81.90	76.60	59.33	-	51.00	34.60	**56.55**
96	IC506605	5.7	4.5	3.0	4.9	**4.5**	23.40	47.60	88.10	69.00	52.00	71.30	51.00	36.00	**54.80**
97	IC506611	7.1	4.4	3.0	3.4	**4.5**	37.40	53.60	76.90	62.60	41.33	87.30	48.00	35.80	**55.37**
98	IC506612	7.1	4.8	2.0	3.4	**4.3**	30.20	44.80	80.20	60.40	46.67	70.60	32.00	31.60	**49.56**
99	IC524215	3.1	4.4	2.0	9.2	**4.7**	39.40	45.60	89.80	56.80	45.50	65.30	40.00	50.60	**54.13**
100	NC59949	5.6	4.5	3.0	4.4	**4.4**	26.20	47.00	80.90	56.00	53.50	80.30	48.00	41.00	**54.11**
Mean for check variety															
1	BGA-2	11.2	4.5	4.6	11.9	**8.0**	89.52	49.24	90.60	98.92	128.40	150.43	73.60	101.57	**97.78**
2	CGRajgira-1	-	4.4	-	-	**4.4**	-	49.24	-	-	-	-	-	-	**49.24**
3	GA-2	8.1	4.1	-	11.8	**8.0**	79.40	52.12	98.80	111.48	119.53	138.90	-	139.83	**105.72**
4	RMA-7	7.4	4.1	3.5	11.0	**6.5**	62.28	53.00	91.50	91.76	96.33	138.00	50.40	125.24	**88.56**
5	Suvarna	13.9	4.4	4.0	12.5	**8.7**	80.82	50.40	94.50	101.84	124.20	147.65	78.40	102.90	**97.59**
Minimum		**1.7**	**3.6**	**2.0**	**2.7**	**3.3**	**19.50**	**38.40**	**72.30**	**41.80**	**37.33**	**47.70**	**24.00**	**22.40**	**48.67**
Maximum		**13.9**	**5.2**	**4.6**	**12.5**	**8.7**	**125.20**	**59.00**	**105.20**	**135.40**	**128.40**	**150.43**	**87.00**	**147.00**	**105.72**
Mean		**5.9**	**4.4**	**2.9**	**5.7**	**4.8**	**39.43**	**50.43**	**88.11**	**60.37**	**60.40**	**73.22**	**48.58**	**47.78**	**58.79**
CD (0.05)		**5.8**	**0.3**	-	**2.0**	**-**	**11.35**	**6.20**	-	**21.47**	**32.85**	**23.06**	-	**12.14**	-
CV (%) Error		**21.3**	**2.6**	-	**6.7**	**-**	**5.45**	**4.80**	-	**7.97**	**10.51**	**6.01**	-	**4.12**	-
CV (%) Phen.		**35.8**	**6.5**	**23.9**	**32.1**	**19.3**	**40.69**	**7.66**	**9.67**	**24.99**	**33.60**	**24.50**	**30.63**	**49.00**	**18.59**

S. No	Accession No.	Days to 80% maturity									seed yield(g/ha)	Number of Lateral Inflorescence
		Akola	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ranchi
76	IC444167	97.00	129.00	122.00	84.00	116.00	91.00	131	96.00	**108.25**	6.91	8.00
77	IC444193	103.00	129.00	127.00	85.00	120.00	93.00	152	90.00	**112.38**	7.28	22.00
78	IC469777	98.00	129.00	122.00	86.00	127.00	97.00	131	93.00	**110.38**	7.65	18.00
79	IC469803	105.00	130.00	119.00	87.00	125.00	92.00	-	94.00	**107.43**	7.16	-
80	IC469805	102.00	132.00	120.00	85.00	122.00	97.00	-	93.00	**107.29**	6.42	-
81	IC469820	98.00	129.00	118.00	87.00	120.00	92.00	133	91.00	**108.50**	7.90	14.00
82	IC469837	105.00	129.00	122.00	87.00	121.00	91.00	133	96.00	**110.50**	5.43	22.00
83	IC469858	104.00	126.00	123.00	88.00	126.00	96.00	134	89.00	**110.75**	6.67	18.00
84	IC506514	90.00	132.00	125.00	85.00	116.00	97.00	131	92.00	**108.50**	4.94	8.00
85	IC506519	99.00	131.00	127.00	88.00	125.00	96.00	152	97.00	**114.38**	7.65	22.00
86	IC506520	99.00	129.00	120.00	85.00	121.00	98.00	131	91.00	**109.25**	6.42	18.00
87	IC506521	99.00	132.00	122.00	84.00	115.00	95.00	134	91.00	**109.00**	7.65	14.00
88	IC506524	99.00	132.00	126.00	87.00	114.00	101.00	137	92.00	**111.00**	6.17	13.00
89	IC506528	90.00	129.00	121.00	87.00	128.00	103.00	129	90.00	**109.63**	7.90	11.00
90	IC506529	110.00	126.00	119.00	86.00	125.00	95.00	134	92.00	**110.88**	5.19	22.00
91	IC506531	104.00	128.00	122.00	90.00	126.00	94.00	132	92.00	**111.00**	7.65	23.00
92	IC506534	105.00	129.00	120.00	87.00	129.00	102.00	-	94.00	**109.43**	5.43	-
93	IC506535	99.00	132.00	124.00	89.00	136.00	104.00	128	89.00	**112.63**	8.02	20.00
94	IC506575	99.00	129.00	119.00	86.00	130.00	102.00	129	92.00	**110.75**	7.16	7.00
95	IC506604	107.00	131.00	124.00	89.00	126.00	-	130	96.00	**114.71**	7.41	27.00
96	IC506605	96.00	132.00	121.00	86.00	120.00	103.00	133	90.00	**110.13**	7.90	22.00
97	IC506611	92.00	128.00	125.00	86.00	122.00	96.00	131	91.00	**108.88**	5.43	18.00
98	IC506612	90.00	130.00	119.00	87.00	119.00	103.00	134	92.00	**109.25**	3.95	12.00
99	IC524215	101.00	132.00	121.00	79.00	115.00	98.00	131	96.00	**109.13**	8.89	8.00
100	NC59949	90.00	129.00	121.00	84.00	118.00	99.00	131	94.00	**108.25**	5.68	18.00
Mean for check variety												
1	BGA-2	113.40	129.76	123.00	97.40	143.20	120.50	148	133.23	**126.11**	7.46	14.00
2	CGRajgira-1	-	129.00	-	-	-	-	-	-	**129.00**	8.44	-
3	GA-2	117.00	130.60	122.00	98.20	143.60	120.50	-	128.61	**122.93**	9.19	-
4	RMA-7	111.40	131.80	124.00	97.00	146.00	120.75	143	128.07	**125.25**	7.56	9.00
5	Suvarna	115.00	130.00	124.00	98.60	144.00	116.50	145	137.24	**126.32**	7.80	15.00
Minimum		**90.00**	**126.00**	**118.00**	**79.00**	**114.00**	**85.00**	**128**	**87.00**	**105.29**	**3.95**	**7.00**
Maximum		**118.00**	**132.00**	**131.00**	**98.60**	**146.00**	**120.75**	**152**	**137.24**	**129.00**	**10.86**	**32.00**
Mean		**99.28**	**129.50**	**123.78**	**87.13**	**124.18**	**96.55**	**136**	**94.16**	**110.95**	**7.41**	**15.14**
CD (0.05)		**12.03**	**2.33**	-	**1.22**	**4.83**	**2.94**	-	**6.49**	**-**	**3.26**	-
CV (%) Error		**3.95**	**0.70**	-	**0.47**	**1.25**	**0.92**	-	**1.96**	**-**	**15.82**	-
CV (%) Phen.		**6.08**	**1.42**	**2.47**	**3.81**	**4.85**	**6.71**	**5**	**10.44**	**3.85**	**22.35**	**34.27**

S. No	Accession No.	Seed yield per plant (g)							Seed volume (g/10ml)							
		Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean
76	IC444167	12.80	4.73	7.33	11.50	2.70	4.10	**7.19**	5.70	6.50	7.76	7.49	8.00	9.50	6.49	**7.35**
77	IC444193	15.00	6.55	9.33	13.80	16.00	12.30	**12.16**	6.80	7.60	7.81	7.41	8.20	9.20	5.94	**7.57**
78	IC469777	28.00	6.12	6.33	12.90	5.50	4.00	**10.48**	4.96	6.50	7.79	7.18	8.20	9.70	6.46	**7.26**
79	IC469803	27.00	3.29	6.20	13.80	-	4.80	**11.02**	6.30	5.80	7.68	7.56	7.70	-	6.24	**6.88**
80	IC469805	15.00	3.60	5.20	15.00	-	6.10	**8.98**	5.40	7.50	7.66	6.38	8.00	-	6.71	**6.94**
81	IC469820	18.00	5.78	8.20	12.90	6.90	17.50	**11.55**	6.38	5.80	7.71	6.39	7.90	7.10	6.64	**6.85**
82	IC469837	19.00	3.84	8.07	21.10	14.00	5.90	**11.98**	6.15	6.20	7.65	7.57	8.20	9.80	6.18	**7.39**
83	IC469858	13.50	5.03	5.53	15.80	20.00	12.20	**12.01**	6.05	6.60	7.72	6.50	7.30	7.40	6.38	**6.85**
84	IC506514	16.00	5.36	2.53	9.60	2.70	8.20	**7.40**	6.30	5.70	7.74	6.51	7.00	9.50	7.10	**7.12**
85	IC506519	17.00	8.39	8.53	11.60	16.00	6.90	**11.40**	5.20	6.50	7.98	7.03	7.60	9.20	6.03	**7.08**
86	IC506520	18.00	4.56	4.20	11.00	2.90	5.00	**7.61**	5.70	6.00	7.75	7.15	7.50	10.00	6.30	**7.20**
87	IC506521	12.01	7.54	4.60	9.50	3.50	7.50	**7.44**	5.45	6.35	7.86	6.91	7.60	8.90	4.59	**6.81**
88	IC506524	15.00	4.50	3.93	15.20	6.00	21.00	**10.94**	5.76	6.60	7.73	6.91	7.30	9.60	5.20	**7.01**
89	IC506528	16.00	8.97	8.67	10.50	9.00	18.90	**12.01**	4.10	6.10	7.94	7.57	7.30	9.80	6.37	**7.03**
90	IC506529	12.00	9.19	8.13	12.90	13.00	11.70	**11.15**	6.15	6.75	7.97	6.99	7.30	9.60	6.18	**7.28**
91	IC506531	13.00	7.66	6.47	15.30	15.00	8.70	**11.02**	5.34	7.10	7.85	7.53	8.20	9.60	6.76	**7.48**
92	IC506534	18.00	7.77	5.27	12.00	-	9.00	**10.41**	6.72	7.22	7.81	7.50	7.60	-	6.50	**7.23**
93	IC506535	20.00	4.71	11.07	14.60	4.40	21.80	**12.76**	4.90	7.15	8.07	7.43	8.20	7.30	6.40	**7.06**
94	IC506575	15.80	6.54	4.20	8.80	4.50	20.10	**9.99**	5.80	6.10	7.34	7.13	8.30	9.80	6.29	**7.25**
95	IC506604	16.00	7.33	3.40	-	7.50	4.20	**7.69**	5.90	7.80	7.88	7.24	-	10.00	6.57	**7.57**
96	IC506605	19.00	8.68	2.47	13.80	15.00	4.40	**10.56**	4.50	6.60	7.94	6.51	8.50	10.00	6.13	**7.17**
97	IC506611	18.60	5.40	2.80	9.20	6.50	6.40	**8.15**	6.35	7.30	7.77	6.65	8.10	10.00	6.52	**7.53**
98	IC506612	16.00	6.20	2.00	9.80	5.40	7.80	**7.87**	5.95	7.50	7.79	6.79	7.50	9.50	6.56	**7.37**
99	IC524215	16.00	5.97	4.93	10.90	2.70	14.00	**9.08**	4.65	7.10	7.71	7.09	7.50	9.50	6.37	**7.13**
100	NC59949	15.00	7.93	1.88	10.80	5.50	12.70	**8.97**	6.10	7.60	7.93	6.13	7.60	9.70	6.37	**7.35**
Mean for check variety																
1	BGA-2	19.00	6.29	11.03	18.75	16.42	14.84	**14.39**	6.42	6.90	7.75	6.69	7.90	8.54	5.47	**7.10**
2	CGRajgira-1	-	-	-	-	-	-	**-**	6.29	-	-	-	-	-	-	**6.29**
3	GA-2	16.00	6.19	13.98	18.18	-	20.64	**15.00**	6.55	7.50	7.78	6.97	8.00	-	7.43	**7.37**
4	RMA-7	19.00	6.43	12.64	18.15	6.10	15.77	**13.01**	6.56	7.10	7.73	7.17	8.40	6.70	6.79	**7.21**
5	Suvarna	18.00	6.42	14.64	21.90	6.76	15.49	**13.87**	6.92	7.65	7.79	6.96	8.05	7.30	5.20	**7.12**
Minimum		**8.60**	**2.09**	**1.20**	**7.80**	**2.00**	**1.10**	**6.83**	**4.10**	**5.40**	**7.34**	**6.13**	**6.60**	**6.70**	**4.01**	**6.15**
Maximum		**28.00**	**9.19**	**14.64**	**21.90**	**33.00**	**24.80**	**16.07**	**7.58**	**7.80**	**8.07**	**8.39**	**8.60**	**10.00**	**7.43**	**7.57**
Mean		**15.87**	**5.60**	**6.77**	**13.18**	**8.88**	**10.48**	**10.14**	**5.73**	**6.75**	**7.77**	**7.09**	**7.84**	**9.15**	**6.27**	**7.16**
CD (0.05)		-	**0.72**	**8.23**	**4.54**	-	**4.73**	-	**0.37**	-	**0.09**	**0.38**	**0.46**	-	**0.99**	-
CV (%) Error		-	**4.25**	**23.59**	**8.83**	-	**11.29**	-	**2.25**	-	**0.45**	**2.03**	**2.15**	-	**6.32**	-
CV (%) Phen.		**21.45**	**29.94**	**44.84**	**23.38**	**82.38**	**50.73**	**20.03**	**14.46**	**8.63**	**1.35**	**5.61**	**5.58**	**11.11**	**7.48**	**3.88**

Table 24: Experimental Details of Faba bean germplasm evaluation :Rabi 2019-20 Plain: I Year

S.No.	Items	New Delhi	Ranchi
1	No of entry	33	33
2	No of Check	4	4
3	Design	ABD	ABD
4	No of Block	4	4
7	Number of Rows	3	3
8	Row length (m)	3	3
5	Row spacing (cm)	30	45
6	Plant spacing (cm)	10	15
9	NPKS (kg/ha)	40:40:20:20	40:40:20:20
12	Plot size (m^2)	2.7	4.05
10	Sowing Date	26/11/2019	29/11/2019
11	Harvesting Period	24/04/2020	10/04/2020 - 20/20/2020
13	Conversion Factor	37.04	24.69

Table 25: Promising lines in Fababean germplasm for various characters at different locations : Rabi 2019-20 (Plains) I Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**NBPGR, New Delhi (33 accessions)**				
1	Days to 50% flowering	93.00	99.00	ET218719 (93), ET218724 (93), ET218748 (93), ET218782 (93), ET218716 (94), ET218742 (94), ET218744 (94)	HFB-1 (96)
2	100 seed weight (g)	29.13	85.50	ET218779 (85.5)	Hama - 2 (83.25)
3	Seed yield per plant (g)	6.82	30.06	ET218779 (30.06), ET218761 (25.6), ET218762 (23.33), ET218780 (23.11), ET218748 (22.19), ET218769 (20.87), ET218760 (20.68), ET218756 (20.44)	Hudeiba - 93 (19.09)
II	**BAU, Ranchi (33 accessions)**				
1	Days to 50% flowering	52.00	65.00	ET218783 (52), ET218762 (53)	HFB-1 (55)
2	100 seed weight (g)	31.00	104.00	ET218716 (104), PL (103.24), ET218699 (97), ET218746 (93), ET218748 (93), ET218786 (89), ET218736 (87), ET218724 (86), ET218774 (86), ET218780 (85)	Rebaya-40 (82.2)
3	Seed yield per plant (g)	4.10	28.00	ET218700 (28), ET218735 (25), ET218703 (21), ET218744 (18)	Vikrant (18)
	Seed yield/plant (g) **(Adj.Values)**	2.47	24.72	ET218735 (24.72), ET218744 (23.39), ET218747 (20.39), ET218786 (19.29), ET218783 (18.29)	Vikrant (18)
4	Plant height (cm)	77.00	119.00	ET218699 (119), ET218701 (113), ET218703 (109), ET218736 (106), ET218719 (105), ET218735 (104), ET218724 (103), ET218748 (103)	HFB-1 (95.8)
5	Number of branches/plant	1.00	5.00	ET218701 (5), ET218783 (5), ET218785 (5), ET218702 (4), ET218737 (4), ET218746 (4), ET218747 (4)	Vikrant (3.8)
6	Number of pods/plant	3.00	30.00	ET218703 (30), ET218702 (29), ET218786 (26), ET218783 (24), ET218760 (21)	Vikrant (19.2)
7	Number of seeds/pod	2.00	4.00	ET218700 (4), ET218703 (4), ET218718 (4), ET218719 (4), ET218724 (4), ET218756 (4), ET218762 (4), ET218779 (4), ET218784 (4), ET218786 (4)	Rebaya-40 (3.6)
8	Pod length (cm)	1.50	11.00	ET218784 (11), ET218718 (10), ET218703 (9.5), ET218748 (9.5), ET218769 (9.5), ET218699 (9), ET218719 (9), ET218724 (9), ET218756 (9)	Rebaya-40 (7.8)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Pod width (cm)	1.00	2.00	ET218699 (2), ET218716 (2), ET218718 (2), ET218724 (2), ET218747 (2), ET218748 (2), ET218756 (2), ET218769 (2), ET218774 (2), ET218780 (2), ET218784 (2)	Rebaya-40 (1.7)
10	Leaf length (cm)	3.50	7.00	ET218699 (7), ET218700 (7), ET218701 (7), ET218703 (7), ET218716 (7), ET218719 (7), ET218735 (7), ET218747 (7), ET218748 (7), ET218762 (7)	HFB-1 (6.4)
11	Leaf width (cm)	2.00	4.00	ET218700 (4), ET218703 (4), ET218769 (4), ET218780 (4), ET218699 (3.5), ET218701 (3.5), ET218719 (3.5), ET218724 (3.5), ET218746 (3.5), ET218748 (3.5), ET218779 (3.5)	HFB-1 (3.2)
12	Number of flowers/cluster	3.00	7.00	ET218704 (7), ET218735 (7), ET218699 (6), ET218716 (6), ET218724 (6), ET218737 (6), ET218746 (6), ET218774 (6), ET218779 (6)	Basabaer (5.6)
13	Number of flowers cluster	6.00	19.00	ET218704 (19), ET218724 (16), ET218756 (16), ET218716 (15), ET218736 (15), ET218701 (14), ET218783 (14), ET218737 (13), ET218748 (13), ET218760 (13), ET218762 (13), ET218786 (13), ET218699 (12), ET218718 (12), ET218735 (12), ET218779 (12)	Rebaya-40 (11.6)
14	Number of flowers/plant	40.00	170.00	ET218716 (170), ET218724 (162), ET218701 (145), ET218699 (140), ET218704 (140), ET218746 (140), ET218737 (122), ET218783 (116), ET218756 (115), ET218736 (110), ET218748 (110), ET218762 (110)	Basabaer (106.2)
15	Stem thickness (cm)	2.50	4.00	ET218699 (4), ET218701 (4), ET218703 (4), ET218718 (4), ET218719 (4), ET218735 (4), ET218737 (4), ET218769 (4)	Rebaya-40 (3.4)
16	Days to maturity	132.00	141.00	ET218737 (141), ET218719 (140), ET218747 (140), ET218704 (139), ET218746 (139)	Basabaer (136.8)
17	Plant height (cm) dwarf	77.00	119.00	ET218769 (77)	Rebaya-40 (83)
III	**Based on all locations (33 accessions)**				
18	Days to 50% flowering	55.80	98.25		Rebaya-40 (55.8)
1	100 seed weight (g)	30.26	89.50	ET218699 (89.5), ET218716 (85.75), ET218746 (85.5)	Hama - 2 (83.25)
9	Seed yield per plant (g)	6.23	20.53	ET218779 (20.53)	Hudeiba - 93 (19.09)

Table 26: Multilocation evaluation of germplasm lines in faba bean at different locations Rabi 2019-20 (Plains)

S. No	Accessions No	Days to 50% flowering			100 seed weight (g)			Seed yield per plant (g)		
		New Delhi	Ranchi	Mean	New Delhi	Ranchi	Mean	New Delhi	Ranchi	Mean
1	ET218699	95.00	63.00	**79.00**	82.00	97.00	**89.50**	10.02	14.00	**12.01**
2	ET218700	95.00	63.00	**79.00**	79.00	33.00	**56.00**	8.98	28.00	**18.49**
3	ET218701	95.00	59.00	**77.00**	78.50	50.00	**64.25**	7.94	8.00	**7.97**
4	ET218702	98.00	55.00	**76.50**	70.50	78.00	**74.25**	9.64	13.00	**11.32**
5	ET218703	95.00	60.00	**77.50**	69.50	79.00	**74.25**	7.73	21.00	**14.36**
6	ET218704	95.00	64.00	**79.50**	75.50	79.00	**77.25**	10.78	5.60	**8.19**
7	ET218716	94.00	62.00	**78.00**	67.50	104.00	**85.75**	13.76	10.00	**11.88**
8	ET218718	95.00	61.00	**78.00**	72.00	80.00	**76.00**	17.00	13.00	**15.00**
9	ET218719	93.00	57.00	**75.00**	39.50	71.00	**55.25**	7.57	4.90	**6.23**
10	ET218724	93.00	55.00	**74.00**	60.50	86.00	**73.25**	8.83	10.00	**9.41**
11	ET218735	98.00	57.00	**77.50**	64.50	77.00	**70.75**	6.82	25.00	**15.91**
12	ET218736	98.00	54.00	**76.00**	62.50	87.00	**74.75**	14.77	7.30	**11.04**
13	ET218737	98.00	61.00	**79.50**	50.50	75.00	**62.75**	9.69	9.40	**9.55**
14	ET218740	98.00	-	**98.00**	58.00	-	**58.00**	11.67	-	**11.67**
15	ET218742	94.00	60.00	**77.00**	76.50	31.00	**53.75**	15.53	12.00	**13.76**
16	ET218744	94.00	57.00	**75.50**	64.00	81.00	**72.50**	11.98	18.00	**14.99**
17	ET218746	95.00	54.00	**74.50**	78.00	93.00	**85.50**	18.62	12.00	**15.31**
18	ET218747	98.00	62.00	**80.00**	73.50	79.00	**76.25**	14.55	15.00	**14.78**
19	ET218748	93.00	64.00	**78.50**	72.50	93.00	**82.75**	22.19	7.10	**14.64**
20	ET218756	96.00	63.00	**79.50**	69.50	79.00	**74.25**	20.44	12.00	**16.22**
21	ET218757	99.00	63.00	**81.00**	68.00	53.00	**60.50**	15.96	14.00	**14.98**
22	ET218760	96.00	54.00	**75.00**	78.00	31.00	**54.50**	20.68	12.00	**16.34**
23	ET218761	98.00	54.00	**76.00**	67.00	81.00	**74.00**	25.60	4.10	**14.85**
24	ET218762	98.00	53.00	**75.50**	77.00	78.00	**77.50**	23.33	9.20	**16.27**
25	ET218769	95.00	64.00	**79.50**	72.50	78.00	**75.25**	20.87	5.30	**13.09**
26	ET218774	98.00	65.00	**81.50**	74.00	86.00	**80.00**	17.09	6.70	**11.89**
27	ET218779	96.00	56.00	**76.00**	85.50	69.00	**77.25**	30.06	11.00	**20.53**
28	ET218780	96.00	62.00	**79.00**	81.00	85.00	**83.00**	23.11	5.90	**14.50**
29	ET218782	93.00	60.00	**76.50**	72.50	72.00	**72.25**	15.33	10.00	**12.66**
30	ET218783	96.00	52.00	**74.00**	65.50	69.00	**67.25**	14.90	16.00	**15.45**
31	ET218784	98.00	60.00	**79.00**	59.50	74.00	**66.75**	15.63	4.20	**9.92**
32	ET218785	96.00	62.00	**79.00**	56.50	75.00	**65.75**	14.02	6.90	**10.46**
33	ET218786	99.00	56.00	**77.50**	58.00	89.00	**73.50**	8.48	17.00	**12.74**
Mean for check variety										
1	Basabaer	-	59.60	**59.60**	-	73.60	**73.60**	-	8.98	8.98
2	Hama - 2	96.75	-	**96.75**	83.25	-	**83.25**	17.49	-	17.49
3	HFB-1	96.00	55.00	**75.50**	30.50	33.20	**31.85**	11.40	15.72	13.56
4	Hudeiba - 93	98.25	-	**98.25**	78.38	-	**78.38**	19.09	-	19.09
5	Rebaya-40	-	55.80	**55.80**	-	82.20	**82.20**	-	11.76	11.76
6	Vikrant	97.25	60.80	**79.03**	29.13	31.40	**30.26**	10.21	18.00	14.11
Minimum		**93.00**	**52.00**	**55.80**	**29.13**	**31.00**	**30.26**	**6.82**	**4.10**	**6.23**
Maximum		**99.00**	**65.00**	**98.25**	**85.50**	**104.00**	**89.50**	**30.06**	**28.00**	**20.53**
Mean		**96.11**	**58.98**	**78.05**	**67.57**	**72.57**	**70.36**	**14.91**	**11.72**	**13.37**
CD (0.05)		-	**8.26**	**-**	-	**21.04**	**-**	-	**18.24**	**-**
CV (%) Error		-	**5.36**	**-**	-	**14.31**	**-**	-	**50.20**	**-**
CV (%) Phen.		**1.91**	**6.41**	**9.60**	**19.67**	**26.74**	**18.45**	**38.20**	**47.79**	**23.75**

Table 27: Multilocation evaluation of germplasm lines in faba bean at Ranchi Centre Rabi 2019-20 (Plains)

S. No	Accessions No	Plant height (cm)	Number of branches/plant	Number of pods/plant	Number of seeds/pod	Pod length (cm)	Pod width (cm)	Leaf length (cm)
1	ET218699	119.00	3.00	10.00	3.00	9.00	2.00	7.00
2	ET218700	81.00	3.00	15.00	4.00	8.50	1.50	7.00
3	ET218701	113.00	5.00	16.00	3.00	7.00	1.50	7.00
4	ET218702	96.00	4.00	29.00	3.00	4.50	1.00	5.50
5	ET218703	109.00	3.00	30.00	4.00	9.50	1.50	7.00
6	ET218704	100.00	2.00	7.00	3.00	8.00	1.50	6.50
7	ET218716	88.00	2.00	6.00	3.00	7.00	2.00	7.00
8	ET218718	100.00	2.00	5.00	4.00	10.00	2.00	6.00
9	ET218719	105.00	2.00	5.00	4.00	9.00	1.50	7.00
10	ET218724	103.00	3.00	11.00	4.00	9.00	2.00	6.50
11	ET218735	104.00	2.00	19.00	3.00	8.50	1.50	7.00
12	ET218736	106.00	3.00	15.00	3.00	7.50	1.50	6.50
13	ET218737	99.00	4.00	15.00	3.00	6.00	1.50	6.00
14	ET218740	-	-	-	-	-	-	-
15	ET218742	100.00	2.00	18.00	3.00	5.00	1.00	5.00
16	ET218744	96.00	2.00	6.00	3.00	7.50	1.50	6.50
17	ET218746	100.00	4.00	10.00	3.00	7.50	1.50	6.50
18	ET218747	88.00	4.00	4.00	3.00	8.00	2.00	7.00
19	ET218748	103.00	2.00	6.00	3.00	9.50	2.00	7.00
20	ET218756	92.00	3.00	9.00	4.00	9.00	2.00	6.00
21	ET218757	88.00	2.00	16.00	3.00	7.50	1.50	5.50
22	ET218760	89.00	3.00	21.00	3.00	5.00	1.00	5.00
23	ET218761	81.00	3.00	18.00	3.00	5.00	1.00	5.00
24	ET218762	100.00	2.00	10.00	4.00	7.00	1.50	7.00
25	ET218769	77.00	1.00	3.00	3.00	9.50	2.00	3.50
26	ET218774	100.00	3.00	12.00	3.00	7.00	2.00	6.00
27	ET218779	99.00	3.00	12.00	4.00	8.00	1.50	6.00
28	ET218780	100.00	2.00	9.00	2.00	9.00	2.00	6.50
29	ET218782	91.00	2.00	4.00	3.00	1.50	1.50	5.50
30	ET218783	98.00	5.00	24.00	3.00	4.50	1.00	5.00
31	ET218784	77.00	2.00	3.00	4.00	11.00	2.00	6.50
32	ET218785	83.00	5.00	5.00	3.00	6.00	1.50	6.00
33	ET218786	95.00	2.00	26.00	4.00	5.50	1.00	4.50
Mean for check variety								
1	Basabaer	88.80	3.20	16.00	3.20	6.80	1.40	6.10
2	Hama - 2	-	-	-	-	-	-	-
3	HFB-1	95.80	2.40	11.80	3.40	7.60	1.40	6.40
4	Hudeiba - 93	-	-	-	-	-	-	-
5	Rebaya-40	83.00	3.20	15.20	3.60	7.80	1.70	6.00
6	Vikrant	90.80	3.80	19.20	3.00	5.90	1.20	5.10
Minimum		**77.00**	**1.00**	**3.00**	**2.00**	**1.50**	**1.00**	**3.50**
Maximum		**119.00**	**5.00**	**30.00**	**4.00**	**11.00**	**2.00**	**7.00**
Mean		**95.51**	**2.85**	**12.81**	**3.28**	**7.35**	**1.56**	**6.10**
CD (0.05)		**23.78**	**1.93**	**22.20**	**1.33**	**3.25**	**0.84**	**1.26**
CV (%) Error		**9.95**	**23.00**	**53.51**	**15.15**	**17.35**	**21.96**	**8.00**
CV (%) Phen.		**10.21**	**34.72**	**57.05**	**15.16**	**26.13**	**22.36**	**14.03**

S. No	Accessions No	Leaf width (cm)	Number of flowers/cluster	Number of flowers cluster	Number of flowers/plant	Stem thickness (cm)	Days to maturity
1	ET218699	3.50	6.00	12.00	140.00	4.00	135.00
2	ET218700	4.00	4.00	9.00	65.00	3.50	132.00
3	ET218701	3.50	4.00	14.00	145.00	4.00	133.00
4	ET218702	2.50	5.00	8.00	62.00	3.00	134.00
5	ET218703	4.00	5.00	8.00	48.00	4.00	137.00
6	ET218704	3.00	7.00	19.00	140.00	3.50	139.00
7	ET218716	3.00	6.00	15.00	170.00	3.50	134.00
8	ET218718	3.00	5.00	12.00	98.00	4.00	136.00
9	ET218719	3.50	5.00	6.00	81.00	4.00	140.00
10	ET218724	3.50	6.00	16.00	162.00	3.00	137.00
11	ET218735	3.00	7.00	12.00	98.00	4.00	136.00
12	ET218736	3.00	5.00	15.00	110.00	3.00	135.00
13	ET218737	3.00	6.00	13.00	122.00	4.00	141.00
14	ET218740	-	-	-	-	-	-
15	ET218742	2.00	4.00	7.00	45.00	3.00	137.00
16	ET218744	3.00	5.00	9.00	65.00	3.00	135.00
17	ET218746	3.50	6.00	11.00	140.00	3.50	139.00
18	ET218747	3.00	5.00	9.00	60.00	3.50	140.00
19	ET218748	3.50	5.00	13.00	110.00	3.00	137.00
20	ET218756	3.00	5.00	16.00	115.00	3.00	133.00
21	ET218757	2.00	5.00	11.00	95.00	2.50	132.00
22	ET218760	2.00	4.00	13.00	73.00	3.00	136.00
23	ET218761	2.00	5.00	10.00	84.00	3.00	136.00
24	ET218762	3.00	4.00	13.00	110.00	3.50	132.00
25	ET218769	4.00	5.00	8.00	55.00	4.00	134.00
26	ET218774	3.00	6.00	7.00	84.00	3.00	136.00
27	ET218779	3.50	6.00	12.00	70.00	3.00	138.00
28	ET218780	4.00	4.00	6.00	61.00	3.50	135.00
29	ET218782	3.00	5.00	9.00	51.00	3.00	133.00
30	ET218783	2.00	3.00	14.00	116.00	3.00	132.00
31	ET218784	2.50	5.00	6.00	40.00	3.00	137.00
32	ET218785	2.50	5.00	8.00	52.00	3.00	136.00
33	ET218786	2.00	4.00	13.00	57.00	3.00	134.00
Mean for check variety							
1	Basabaer	2.90	5.60	9.40	106.20	3.10	136.80
2	Hama - 2	-	-	-	-	-	-
3	HFB-1	3.20	5.60	9.00	68.20	3.30	136.60
4	Hudeiba - 93	-	-	-	-	-	-
5	Rebaya-40	3.00	5.60	11.60	102.60	3.40	135.20
6	Vikrant	2.50	5.20	10.80	83.00	3.20	135.00
Minimum		**2.00**	**3.00**	**6.00**	**40.00**	**2.50**	**132.00**
Maximum		**4.00**	**7.00**	**19.00**	**170.00**	**4.00**	**141.00**
Mean		**2.99**	**5.11**	**10.97**	**91.22**	**3.33**	**135.68**
CD (0.05)		**1.11**	**3.56**	**7.14**	**62.80**	**0.98**	**7.16**
CV (%) Error		**14.34**	**24.28**	**26.25**	**26.15**	**11.32**	**1.98**
CV (%) Phen.		**20.23**	**17.08**	**29.04**	**38.36**	**12.73**	**1.74**

Table 28 : Experimental Details of Faba bean germplasm evaluation :Rabi 2019-20 Plain: II Year

S.No.	Items	Ayodhya	Ambikapur	Hisar	Ludhiana	New Delhi	Ranchi
1	No of entry	35	35	35	35	35	35
2	No of Check	4	4	4	4	4	4
3	Design	ABD	ABD	ABD	ABD	ABD	ABD
4	No of Block	5	5	4	5	5	-
5	Number of Rows	3	3	3	3	3	3
6	Row length (m)	3	3	3	3	3	3
7	Row spacing (cm)	45	45	30	45	30	45
8	Plant spacing (cm)	15	15	10	15	10	15
9	NPKS (kg/ha)	-	60:40:20:20	-	-	-	40:40:20:20
10	Plot size (m^2)	4.05	4.05	2.7	4.05	2.7	4.05
11	Sowing Date	30/11/2019	12/7/2019	-	25.11.2019	26/11/2019	-
12	Harvesting Period	14/04/2020	As per maturity	-	28.4.2020	22/04/2020	-
13	Conversion Factor	24.69	24.69	37.04	24.69	37.04	24.69

Table 29: Promising lines in Fababean germplasm for various characters at different locations :
Rabi 2019-20 (Plains) II Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**IGKV, Ambikapur (35 accessions)**				
1	Days to 50% flowering	52.00	70.00	ET218741 (52), ET218738 (53), ET218743 (53), ET218775 (53), ET218725 (54), ET218786 (54)	Vikrant (61.4)
	Days to 50% flowering (Adjusted Values) **(adjusted values)**	50.95	68.70	ET-218775 (50.95), ET-218786 (51.95), ET-218741 (53.7), ET-218776 (53.95)	Vikrant (CK) (61.4)
2	Days to 80% maturity	123.00	128.00	ET218698 (123), ET218759 (123)	HFB-1 (124.8)
3	Number of branches per plant	1.20	2.80	ET218775 (2.8), ET218713 (2.6), ET218741 (2.6), ET218765 (2.6), ET218766 (2.6), ET218768 (2.6), ET218719 (2.4), ET218725 (2.4), ET218734 (2.4), ET218738 (2.4), ET218770 (2.4), ET218772 (2.4), ET218773 (2.4), ET218778 (2.4)	Rebya-40 (2.28)
4	Number of flowers per cluster	4.00	5.80	ET218713 (5.8), ET218719 (5.6), ET218734 (5.6), ET218757 (5.6), ET218770 (5.6), ET218773 (5.6), ET218778 (5.6), ET218772 (5.4), ET218702 (5.2), ET218725 (5.2), ET218736 (5.2), ET218768 (5.2), ET218776 (5.2)	Vikrant (5.16)
5	Number of pods per plant	2.20	4.40	ET218704 (4.4), ET218764 (4.2), ET218769 (4.2), ET218778 (4.2), ET218768 (4), ET218739 (3.8), ET218775 (3.8), ET218698 (3.6), ET218719 (3.6), ET218720 (3.6), ET218734 (3.6), ET218783 (3.6)	Giza-4 (3.48)
	No of Pod per Plant **(Adjusted Values)**	1.58	4.63	ET-218704 (4.63), ET-218778 (4.38), ET-218739 (4.38), ET-218734 (4.18), ET-218764 (4.03), ET-218775 (3.98), ET-218741 (3.98), ET-218698 (3.83), ET-218719 (3.83), ET-218720 (3.83), ET-218783 (3.78), ET-218725 (3.58), ET-218733 (3.58)	Giza-4 (CK) (3.48)
6	Number of seeds per pod	1.80	3.00	ET218783 (3), ET218720 (2.6), ET218733 (2.6), ET218736 (2.6), ET218739 (2.6), ET218741 (2.6), ET218747 (2.6), ET218764 (2.6), ET218767 (2.6), ET218769 (2.6), ET218773 (2.6)	Vikrant (2.4)
7	Plant height (cm)	47.00	60.80	ET218757 (60.8), ET218743 (60.2), ET218739 (60), ET218765 (58.6), ET218736 (58.4), ET218759 (57), ET218766 (57), ET218773 (56.8), ET218764 (56), ET218738 (55.4), ET218775 (55.4)	Rebya-40 (55.32)
	Plant Height (cm) Dwarf	47.00	60.80	ET218767 (47), ET218713 (48.2), ET218768 (48.2), ET218778 (48.8), ET218786 (48.8), ET218725 (49.2), ET218704 (50), ET218734 (50), ET218712 (50.4), ET218747 (51), ET218763 (51.4), ET218720 (51.6), ET218733 (51.8), ET218783 (52.2)	HFB-1 (52.6)
8	Pod width (cm)	1.36	1.64	ET218747 (1.64), ET218768 (1.6), ET218773 (1.6)	HFB-1 (1.58)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
9	Pod length (cm)	4.20	6.40	ET218720 (6.4), ET218712 (6), ET218719 (6), ET218734 (6), ET218786 (6), ET218747 (5.8), ET218702 (5.6), ET218713 (5.6), ET218736 (5.6), ET218757 (5.6), ET218772 (5.6), ET218733 (5.4), ET218743 (5.4), ET218768 (5.4), ET218781 (5.4)	Vikrant (5.32)
10	Seed yield per Plot (kg)	1.30	2.33	ET218738 (2.33), ET218764 (2.32), ET218739 (2.25), ET218759 (2.19), ET218725 (2.17), ET218763 (2.16), ET218741 (2.1), ET218786 (2.03), ET218736 (1.96), ET218778 (1.92), ET218720 (1.87)	Rebya-40 (1.85)
11	Stem thickness	2.46	3.64	ET218733 (3.64), ET218786 (3.62), ET218764 (3.56), ET218769 (3.54), ET218741 (3.5), ET218768 (3.5), ET218763 (3.38), ET218736 (3.36)	Vikrant (3.35)
12	100 seed weight (g)	21.45	23.85	ET218757 (23.85), ET218776 (23.68), ET218759 (23.6), ET218741 (23.53), ET218766 (23.4), ET218733 (23.2), ET218743 (23.19), ET218725 (23.1), ET218704 (23.08), ET218736 (23.04), ET218783 (22.94), ET218769 (22.87), ET218719 (22.85), ET218765 (22.84), ET218786 (22.84)	Rebya-40 (22.84)
II	**NDUAT, Ayodhya (35 accessions)**				
1	Days to 50% flowering	63.00	73.00	ET218770 (63), ET218783 (63), ET218713 (64), ET218733 (64), ET218764 (64), ET218773 (64), ET218786 (64)	Rebya-40 (68)
2	Days to 80% maturity	124.00	132.00	ET218704 (124), ET218720 (124)	Rebya-40 (126)
3	Number of pods per plant	27.90	38.70	ET218738 (38.7), ET218745 (37.1), ET218759 (36.2), ET218734 (35.4), ET218702 (35.2), ET218769 (35.2), ET218698 (35.1), ET218766 (35)	Vikrant (34.7)
4	Number of seeds per pod	2.90	4.40	ET218743 (4.4), ET218759 (4.4), ET218767 (4.4), ET218736 (4.3), ET218764 (4.3)	Vikrant (4.3)
5	Plant height (cm)	69.40	91.60	ET218759 (91.6), ET218743 (90.3)	Vikrant (90.1)
6	Plant height (cm) dwarf	69.40	91.60	ET218768 (69.40), ET218767 (72.00), ET218702 (72.40), ET218786 (73.20)	Giza-4 (81.70)
7	Pod length (cm)	3.30	5.10	ET218778 (5.1), ET218757 (5), ET218765 (5), ET218736 (4.9), ET218764 (4.9)	Vikrant (4.9)
8	Seed yield per plant (g)	28.00	38.40	ET218743 (38.4), ET218783 (38)	Vikrant (37.6)
9	100 seed weight (g)	23.00	28.70	ET218781 (28.7), ET218759 (28.5)	Vikrant (28.4)
III	**CCS, HAU, Hisar (35 accessions)**				
1	Days to 50% flowering	68.00	75.00	ET218702 (68), ET218704 (68), ET218719 (68), ET218738 (68), ET218759 (68), ET218763 (68), ET218764 (68), ET218767 (68), ET218768 (68), ET218770 (68), ET218773 (68), ET218776 (68)	Giza-4 (68)
2	Days to 80% maturity	135.00	146.00	ET218719 (135)	Giza-4 (135.2)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
3	Plant height (cm)	58.72	92.30	ET218738 (92.3), ET218764 (91.42), ET218783 (90.97), ET218778 (89.89), ET218786 (88.83), ET218733 (86.22), ET218741 (85.4), ET218765 (85.31), ET218769 (84.14), ET218759 (83.94)	HFB-1 (83.76)
4	Plant Hieght (cm) Dwarf	58.72	92.30	ET218713 (58.72), ET218698 (58.8), ET218712 (60.35)	Giza-4 (80.18)
5	Seed yield per plant (g)	8.60	22.82	ET218769 (22.82)	HFB-1 (22.55)
6	Seed Yield (q/ha)	8.10	22.82	ET218741 (22.82)	HFB-1 (21.8)
7	Green Pod Yield (q/ha)	15.92	76.41	ET218772 (76.41), ET218776 (75.4), ET218736 (70.46), ET218745 (70.33), ET218775 (67.95), ET218786 (65.24), ET218778 (63.21), ET218769 (60.41), ET218783 (59.99), ET218773 (59.34)	Giza-4 (58.93)
8	Green pod yield per plant (g)	28.44	115.20	ET218773 (115.2), ET218776 (113.4), ET218775 (112.8), ET218736 (112.32), ET218786 (110.64), ET218772 (108.84), ET218733 (108.72), ET218745 (107.88), ET218769 (107.04)Giza-4 (103.32)	Giza-4 (103.32)
9	100 seed weight (g)	39.74	80.40	ET218768 (80.4), ET218783 (76.4), ET218747 (75.6), ET218767 (74.5), ET218757 (74.2)	Giza-4 (73.34)
IV	**PAU, Ludhiana (35 accessions)**				
1	Days to 50% flowering	70.00	81.00	ET218775 (70)	Rebya-40 (73)
2	Days to 80% maturity	141.33	148.00	ET218786 (141.33), ET218783 (141.67)	HFB-1 (143.8)
	Days to 80% maturity (adjusted valaues)	141.02	149.35	ET218734 (141.02), ET218736 (141.02)	HFB-1 (CH) (143.8)
3	Number of branches per plant	2.33	5.67	ET218743 (5.67), ET218734 (5.33), ET218736 (5), ET218725 (4.67), ET218745 (4.67), ET218757 (4.67), ET218786 (4.67), ET218738 (4.33), ET218720 (4), ET218763 (4)	Rebya-40 (3.8)
4	Number of pods per plant	12.33	34.67	ET218768 (34.67), ET218736 (34.33), ET218720 (33.67), ET218743 (33)HFB-1 (32.67), ET218769 (32.33)	Vikrant (30.87)
5	Number of seeds per pod	2.33	4.33	ET218776 (4.33), ET218704 (4), ET218719 (4), ET218720 (4), ET218702 (3.67), ET218712 (3.67), ET218713 (3.67), ET218733 (3.67), ET218745 (3.67), ET218768 (3.67), ET218781 (3.67), ET218783 (3.67)	Giza-4 (3.6)
	Plant height (cm)	63.82	109.20	ET218733 (109.2), ET218712 (101.82), ET218736 (98.7), ET218704 (97.43), ET218764 (95.57), ET218720 (95.17), ET218745 (94.82), ET218719 (93.87), ET218702 (93.8), ET218725 (93.07), ET218768 (91.43)	Giza-4 (91.25)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
6	Plant height (cm) (adjusted valaues)	57.29	102.80	ET218768 (102.8), ET218769 (102.26), ET218733 (102.18), ET218772 (101.96), ET218770 (101.46), ET218764 (94.34), ET218765 (93.78), ET218745 (93.59), ET218767 (93.2), ET218712 (92.71), ET218736 (91.68)	GIZA-4 (CH) (91.25)
	Plant height (cm) Dwarf	63.82	109.20	ET218781 (63.82), ET218778 (66.38), ET218698 (66.4), ET218766 (69.72), ET218783 (73.77), ET218773 (74.12), ET218775 (74.73), ET218747 (74.78), ET218757 (74.83), ET218759 (75.87), ET218786 (77.87), ET218767 (81.83), ET218765 (82.42)	Vikrant (82.64)
7	Pod width (cm)	0.63	1.77	ET218769 (1.77), ET218739 (1.57), ET218764 (1.53), ET218775 (1.53), ET218719 (1.47), ET218736 (1.43), ET218770 (1.4), ET218702 (1.37), ET218747 (1.37), ET218773 (1.37), ET218745 (1.33)	Giza-4 (1.29)
8	Pod length (cm)	4.20	10.00	ET218719 (10), ET218769 (9.97), ET218739 (9.67)	Giza-4 (8.45)
9	Seed yield per plant (g)	12.77	34.34	ET218720 (34.34), ET218725 (30.36), ET218712 (27.78), ET218739 (27.75)	Vikrant (27.53)
	Seed yield per plant (g) (adjusted valaues)	9.09	31.14	ET218725 (31.14), ET218768 (29.97), ET218772 (29.71), ET218739 (28.53), ET218743 (28.07)	Vikrant (27.53)
10	100 seed weight (g)	33.66	98.80	ET218713 (98.8), ET218786 (97.1), ET218704 (88.92), ET218719 (87.79), ET218702 (86.6), ET218778 (84.11), ET218775 (83.57), ET218763 (81.04), ET218766 (80.92), ET218757 (79.71)	Giza-4 (79.61)

VI	**NBPGR, New Delhi (35 accessions)**				
1	100 seed weight (g)	30.20	106.50	ET218763 (106.5), ET218704 (75.5), ET218766 (73), ET218747 (72), ET218702 (70.5), ET218772 (67.5), ET218719 (67), ET218765 (67), ET218778 (67), ET218768 (66.5)	Rebya-40 (66.2)
2	Days to 50% flowering	92.00	95.00	ET218713 (92), ET218741 (92), ET218745 (92), ET218765 (92)	Rebya-40 (93.6)
3	Seed yield per plant (g)	5.79	20.47	ET218739 (20.47)	Aguadulce (16.71)
	Seed yield per plant **(adjusted valaues)**	6.41	19.38	ET 218739 (19.38),ET 218741 (17.49),ET 218725 (16.99)	Aguadulce (16.71)
VII	**BAU, Ranchi (35 accessions)**				
1	Days to 50% flowering	56.00	71.00	ET218786 (56), ET218783 (58)	HFB-1 (61.4)
	Days to 50% flowering (adjusted valaues)	57.20	73.45	ET218725 (57.2), ET218734 (58.2), ET218704 (59.7), ET218719 (59.7), ET218736 (60.2), ET218720 (60.7)	HFB-1 (61.4)
2	Days to 80% maturity	132.00	147.00	ET218772 (132), ET218743 (134), ET218786 (134)	Vikrant (138.8)
3	Number of branches per plant	1.00	6.00	ET218739 (6), ET218736 (5), ET218734 (4), ET218765 (4), ET218766 (4)	HFB-1 (3.2)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
5	Number of flowers per cluster	3.00	16.00	ET218763 (16), ET218764 (15), ET218702 (14), ET218739 (13), ET218768 (13), ET218773 (13), ET218733 (12)	Vikrant (11.4)
5	Number of flowers per cluster	3.00	7.00	ET218773 (7), ET218719 (6), ET218768 (6), ET218775 (6)	Rebya-40 (5)
6	Number of pods per plant	4.00	32.00	ET218786 (32), ET218712 (29), ET218734 (29), ET218720 (27), ET218747 (26), ET218769 (24), ET218736 (22), ET218768 (22), ET218766 (20)	Vikrant (17.6)
7	Number of seeds per pod	2.00	4.00	ET218702 (4), ET218712 (4), ET218713 (4), ET218720 (4), ET218734 (4), ET218757 (4), ET218767 (4), ET218769 (4), ET218776 (4), ET218778 (4), ET218783 (4), ET218786 (4)	Vikrant (3.8)
8	Plant height (cm)	58.00	120.00	ET218725 (120), ET218757 (108), ET218764 (108), ET218734 (106), ET218747 (104)	Vikrant (102.6)
	Plant height (cm) dwarf	58.00	120.00	ET218778 (58), ET218773 (64)	Giza-4 (97.6)
9	Pod width (cm)	1.00	2.00	ET218698 (2), ET218702 (2), ET218725 (2), ET218733 (2), ET218739 (2), ET218743 (2), ET218757 (2), ET218764 (2), ET218767 (2), ET218776 (2)	HFB-1 (1.7)
10	Pod length (cm)	5.00	9.50	ET218698 (9.5), ET218743 (9), ET218776 (9), ET218783 (9), ET218757 (8.5), ET218769 (8.5), ET218725 (8), ET218764 (8), ET218766 (8), ET218767 (8), ET218772 (8), ET218773 (8), ET218781 (8), ET218759 (7.5)	Rebya-40 (7)
11	Seed yield per plant (g)	2.90	51.00	ET218776 (51), ET218773 (34), ET218768 (23), ET218741 (21), ET218767 (19),	Vikrant (10.82)
12	Stem thickness (cm)	2.00	4.00	ET218698 (4), ET218719 (4), ET218743 (4), ET218757 (4), ET218764 (4), ET218765 (4), ET218766 (4), ET218767 (4), ET218768 (4), ET218776 (4), ET218786 (4)	HFB-1 (3.8)
13	Leaf length (cm)	4.50	60.00	ET218733 (60), ET218767 (8)	HFB-1 (7.1)
14	Leaf width (cm)	2.00	4.00	ET218713 (4), ET218764 (4), ET218766 (4)	Rebya-40 (3.5)
15	Number of flowers/plant	54.00	162.00	ET218702 (162), ET218739 (147), ET218725 (143), ET218757 (136), ET218759 (122), ET218773 (120), ET218768 (118), ET218734 (114)	Rebya-40 (91.6)
16	100 seed weight (g)	31.00	84.00	ET218778 (84), ET218725 (82), ET218757 (82), ET218772 (80), ET218775 (80), ET218739 (77), ET218783 (77), ET218781 (72), ET218698 (71), ET218741 (71), ET218766 (71)	Giza-4 (68.2)
V	**Based on all locations (35 accessions)**				
1	Days to 50% flowering	67.65	74.17		Giza-4 (67.65)
2	Days to 80% maturity	133.60	138.00	ET218704 (133.6)	Rebya-40 (134.87)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
3	Number of branches per plant	1.91	4.07	ET218736 (4.07), ET218734 (3.91), ET218739 (3.78), ET218738 (3.24), ET218757 (3.22), ET218743 (3.16), ET218765 (3.09), ET218766 (3.09), ET218763 (3.07), ET218725 (3.02), ET218720 (3)	Rebya-40 (2.96)
4	Number of flowers per cluster	3.60	8.53	ET218773 (8.53), ET218702 (8.07), ET218768 (8.07), ET218763 (7.93), ET218764 (7.73), ET218739 (7.53), ET218719 (7.2), ET218757 (7.2), ET218736 (7.07)	Vikrant (6.99)
5	Number of pods per plant	13.19	24.67	ET218734 (24.67), ET218769 (23.93), ET218768 (23.47), ET218720 (23.19), ET218736 (22.88)	HFB-1 (21.69)
6	Number of seeds per pod	2.58	3.72	ET218783 (3.72), ET218720 (3.63), ET218767 (3.58), ET218776 (3.46), ET218713 (3.42)	Vikrant (3.39)
7	Plant height (cm)	69.45	86.20	ET218764 (86.2), ET218733 (85.2)	Rebya-40 (82.79)
8	Plant Hieght (cm) Dwarf	69.45	86.20	ET218778 (69.45), ET218773 (71.02), ET218781 (72.29), ET218698 (72.48), ET218775 (72.91), ET218772 (74.04), ET218786 (74.74), ET218713 (74.88), ET218767 (74.96), ET218766 (75.23), ET218783 (75.25), ET218712 (75.29)	Giza-4 (81)
9	Pod width (cm)	1.12	1.69	ET218739 (1.69), ET218764 (1.63), ET218702 (1.6), ET218698 (1.6), ET218767 (1.58), ET218757 (1.56), ET218776 (1.51), ET218736 (1.5)	Rebya-40 (1.49)
10	Pod length (cm)	5.27	6.86	ET218783 (6.86), ET218769 (6.64), ET218772 (6.64), ET218739 (6.57), ET218719 (6.4), ET218764 (6.4), ET218712 (6.36), ET218757 (6.26), ET218767 (6.21), ET218698 (6.19)	Rebya-40 (6.17)
11	Seed yield per plant (g)	14.98	25.24	ET218776 (25.24), ET218773 (24.18), ET218741 (22.96), ET218725 (22.31), ET218768 (22.3), ET218739 (22.27)	HFB-1 (21.42)
12	100 seed weight (g)	30.95	58.92	ET218778 (58.92), ET218775 (57.73), ET218757 (57.54), ET218766 (56.72), ET218702 (55.71), ET218763 (55.51), ET218783 (55.5), ET218765 (55.05), ET218747 (54.49)	Giza-4 (54.16)

Table 30: Multilocation evaluation of germplasm lines in faba bean at different locations Rabi 2019-20 (Plains)

II Year

S.No.	Accessions No.	Days to 50% flowering							Number of branches per plant			
		Ambikapur	Ayodhya	Hisar	Ludhiana	Ranchi	New Delhi	Mean	Ambikapur	Ludhiana	Ranchi	Mean
1	ET218698	70.00	68.00	71.00	76.00	67.00	93.00	**74.17**	1.80	2.67	3.00	**2.49**
2	ET218702	69.00	69.00	68.00	73.67	65.00	94.00	**73.11**	2.00	3.00	2.00	**2.33**
3	ET218704	67.00	67.00	68.00	73.00	61.00	94.00	**71.67**	2.00	3.33	2.00	**2.44**
4	ET218712	63.00	70.00	71.00	77.67	66.00	94.00	**73.61**	2.00	2.67	3.00	**2.56**
5	ET218713	65.00	64.00	71.00	78.00	63.00	92.00	**72.17**	2.60	3.67	2.00	**2.76**
6	ET218719	60.00	72.00	68.00	78.67	61.00	94.00	**72.28**	2.40	3.33	3.00	**2.91**
7	ET218720	57.00	67.00	71.00	80.00	62.00	93.00	**71.67**	2.00	4.00	3.00	**3.00**
8	ET218725	54.00	71.00	73.00	75.00	64.00	93.00	**71.67**	2.40	4.67	2.00	**3.02**
9	ET218733	65.00	64.00	75.00	75.67	70.00	94.00	**73.94**	2.00	3.00	1.00	**2.00**
10	ET218734	58.00	65.00	75.00	81.00	65.00	93.00	**72.83**	2.40	5.33	4.00	**3.91**
11	ET218736	59.00	71.00	71.00	78.00	67.00	94.00	**73.33**	2.20	5.00	5.00	**4.07**
12	ET218738	53.00	70.00	68.00	72.00	69.00	93.00	**70.83**	2.40	4.33	3.00	**3.24**
13	ET218739	57.00	68.00	70.00	76.00	70.00	94.00	**72.50**	2.00	3.33	6.00	**3.78**
14	ET218741	52.00	71.00	70.00	76.00	71.00	92.00	**72.00**	2.60	2.33	3.00	**2.64**
15	ET218743	53.00	68.00	71.00	74.00	66.00	94.00	**71.00**	1.80	5.67	2.00	**3.16**
16	ET218745	59.00	65.00	71.00	73.00	65.00	92.00	**70.83**	2.20	4.67	2.00	**2.96**
17	ET218747	65.00	67.00	71.00	74.00	62.00	95.00	**72.33**	2.00	3.67	3.00	**2.89**
18	ET218757	62.00	65.00	69.00	77.00	67.00	93.00	**72.17**	2.00	4.67	3.00	**3.22**
19	ET218759	62.00	73.00	68.00	78.00	68.00	95.00	**74.00**	1.80	3.67	2.00	**2.49**
20	ET218763	61.00	65.00	68.00	72.00	63.00	93.00	**70.33**	2.20	4.00	3.00	**3.07**
21	ET218764	63.00	64.00	68.00	75.00	66.00	94.00	**71.67**	1.60	3.67	2.00	**2.42**
22	ET218765	65.00	70.00	73.00	76.00	61.00	92.00	**72.83**	2.60	2.67	4.00	**3.09**
23	ET218766	67.00	67.00	71.00	73.00	65.00	95.00	**73.00**	2.60	2.67	4.00	**3.09**
24	ET218767	58.00	67.00	68.00	72.00	66.00	93.00	**70.67**	1.80	3.00	2.00	**2.27**
25	ET218768	62.00	68.00	68.00	71.00	67.00	95.00	**71.83**	2.60	3.67	2.00	**2.76**
26	ET218769	63.00	70.00	70.00	72.00	62.00	95.00	**72.00**	2.20	2.67	3.00	**2.62**
27	ET218770	64.00	63.00	68.00	71.00	63.00	94.00	**70.50**	2.40	2.67	2.00	**2.36**
28	ET218772	65.00	71.00	70.00	78.00	62.00	93.00	**73.17**	2.40	3.67	2.00	**2.69**
29	ET218773	57.00	64.00	68.00	76.00	66.00	94.00	**70.83**	2.40	2.33	1.00	**1.91**
30	ET218775	53.00	67.00	70.00	70.00	62.00	95.00	**69.50**	2.80	2.67	2.00	**2.49**
31	ET218776	56.00	66.00	68.00	71.00	66.00	94.00	**70.17**	2.00	3.00	3.00	**2.67**
32	ET218778	58.00	72.00	69.00	74.00	67.00	95.00	**72.50**	2.40	2.67	2.00	**2.36**
33	ET218781	65.00	65.00	70.00	77.00	67.00	95.00	**73.17**	2.20	2.67	2.00	**2.29**
34	ET218783	62.00	63.00	70.00	78.00	58.00	95.00	**71.00**	1.20	3.67	3.00	**2.62**
35	ET218786	54.00	64.00	70.00	78.33	56.00	94.00	**69.39**	2.00	4.67	2.00	**2.89**
Mean for check variety												
1	Giza-4	64.20	69.00	68.00	73.27	63.80	-	**67.65**	2.24	3.07	2.00	**2.44**
2	HFB-1	64.20	70.00	70.00	73.87	61.40	95.00	**72.41**	2.04	3.60	3.20	**2.95**
3	Rebya-40	63.00	68.00	68.00	73.00	62.20	93.60	**71.30**	2.28	3.80	2.80	**2.96**
4	Vikrant	61.40	69.00	68.00	74.20	61.40	94.20	**71.37**	2.00	3.47	3.00	**2.82**
Minimum		**52.00**	**63.00**	**68.00**	**70.00**	**56.00**	**92.00**	**67.65**	**1.20**	**2.33**	**1.00**	**1.91**
Maximum		**70.00**	**73.00**	**75.00**	**81.00**	**71.00**	**95.00**	**74.17**	**2.80**	**5.67**	**6.00**	**4.07**
Mean		**60.92**	**67.62**	**69.82**	**75.01**	**64.48**	**93.81**	**71.83**	**2.17**	**3.52**	**2.67**	**2.78**
CD (0.05)		**7.39**	**-**	**0.00**	**3.99**	**8.24**	**3.73**	**-**	**1.26**	**2.06**	**2.32**	**-**
CV (%) Error		**4.38**	**-**	**0.00**	**2.03**	**4.96**	**1.49**	**-**	**22.10**	**22.15**	**31.67**	**-**
CV (%) Phen.		**7.73**	**4.12**	**2.73**	**3.66**	**5.04**	**1.02**	**1.92**	**14.80**	**24.16**	**36.88**	**16.66**

S.No.	Accessions No.	Number of flowers per cluster				Number of pods per plant				
		Ambikapur	Ranchi	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Ayodhya	Mean
1	ET218698	4.80	11.00	5.00	**6.93**	3.60	25.00	14.00	35.10	**19.43**
2	ET218702	5.20	14.00	5.00	**8.07**	3.00	22.00	17.00	35.20	**19.30**
3	ET218704	4.60	8.00	4.00	**5.53**	4.40	13.33	10.00	31.30	**14.76**
4	ET218712	4.80	7.00	5.00	**5.60**	3.00	15.33	29.00	30.00	**19.33**
5	ET218713	5.80	8.00	3.00	**5.60**	3.00	15.67	9.00	31.50	**14.79**
6	ET218719	5.60	10.00	6.00	**7.20**	3.60	12.67	13.00	34.00	**15.82**
7	ET218720	5.00	5.00	4.00	**4.67**	3.60	33.67	27.00	28.50	**23.19**
8	ET218725	5.20	7.00	4.00	**5.40**	3.00	24.33	9.00	32.10	**17.11**
9	ET218733	4.20	12.00	4.00	**6.73**	3.00	24.33	5.00	33.10	**16.36**
10	ET218734	5.60	9.00	5.00	**6.53**	3.60	30.67	29.00	35.40	**24.67**
11	ET218736	5.20	11.00	5.00	**7.07**	2.20	34.33	22.00	33.00	**22.88**
12	ET218738	4.00	8.00	5.00	**5.67**	2.40	23.00	16.00	38.70	**20.03**
13	ET218739	4.60	13.00	5.00	**7.53**	3.80	29.00	10.00	31.80	**18.65**
14	ET218741	4.20	9.00	4.00	**5.73**	3.40	29.67	12.00	28.90	**18.49**
15	ET218743	4.20	9.00	5.00	**6.07**	2.60	33.00	11.00	34.10	**20.18**
16	ET218745	4.80	5.00	4.00	**4.60**	2.60	25.00	13.00	37.10	**19.43**
17	ET218747	4.00	11.00	4.00	**6.33**	3.40	24.00	26.00	29.10	**20.63**
18	ET218757	5.60	11.00	5.00	**7.20**	3.00	22.00	8.00	34.60	**16.90**
19	ET218759	4.80	10.00	4.00	**6.27**	3.00	17.33	9.00	36.20	**16.38**
20	ET218763	4.80	16.00	3.00	**7.93**	3.40	28.67	10.00	33.10	**18.79**
21	ET218764	4.20	15.00	4.00	**7.73**	4.20	25.67	6.00	33.70	**17.39**
22	ET218765	4.20	9.00	4.00	**5.73**	3.00	21.33	15.00	29.30	**17.16**
23	ET218766	4.40	7.00	4.00	**5.13**	3.20	16.67	20.00	35.00	**18.72**
24	ET218767	5.00	7.00	4.00	**5.33**	2.80	22.00	14.00	34.20	**18.25**
25	ET218768	5.20	13.00	6.00	**8.07**	4.00	34.67	22.00	33.20	**23.47**
26	ET218769	4.60	6.00	5.00	**5.20**	4.20	32.33	24.00	35.20	**23.93**
27	ET218770	5.60	6.00	4.00	**5.20**	3.40	24.33	7.00	30.60	**16.33**
28	ET218772	5.40	5.00	5.00	**5.13**	2.40	16.00	11.00	34.50	**15.98**
29	ET218773	5.60	13.00	7.00	**8.53**	2.60	22.00	5.00	32.10	**15.43**
30	ET218775	4.80	9.00	6.00	**6.60**	3.80	21.33	4.00	29.20	**14.58**
31	ET218776	5.20	8.00	5.00	**6.07**	3.00	16.33	7.00	34.00	**15.08**
32	ET218778	5.60	6.00	5.00	**5.53**	4.20	16.67	4.00	27.90	**13.19**
33	ET218781	5.00	4.00	5.00	**4.67**	2.80	13.33	7.00	32.30	**13.86**
34	ET218783	4.80	9.00	4.00	**5.93**	3.60	13.67	9.00	33.50	**14.94**
35	ET218786	4.80	3.00	3.00	**3.60**	2.60	12.33	32.00	31.20	**19.53**
Mean for check variety										
1	Giza-4	4.52	9.60	4.20	**6.11**	3.48	20.53	11.00	32.50	**16.88**
2	HFB-1	4.72	8.60	4.80	**6.04**	3.40	32.67	16.60	34.10	**21.69**
3	Rebya-40	5.00	9.60	5.00	**6.53**	3.32	16.53	14.00	33.20	**16.76**
4	Vikrant	5.16	11.40	4.40	**6.99**	2.92	30.87	17.60	34.70	**21.52**
Minimum		**4.00**	**3.00**	**3.00**	**3.60**	**2.20**	**12.33**	**4.00**	**27.90**	**13.19**
Maximum		**5.80**	**16.00**	**7.00**	**8.53**	**4.40**	**34.67**	**32.00**	**38.70**	**24.67**
Mean		**4.89**	**9.06**	**4.57**	**6.17**	**3.24**	**22.88**	**13.98**	**32.90**	**18.25**
CD (0.05)		**1.54**	**8.95**	**2.78**	**-**	**1.32**	**14.94**	**18.77**	**-**	**-**
CV (%) Error		**11.92**	**34.24**	**22.63**	**-**	**15.07**	**22.26**	**47.53**	**-**	**-**
CV (%) Phen.		**10.17**	**33.39**	**18.42**	**17.87**	**16.81**	**29.94**	**54.11**	**7.49**	**16.18**

S.No.	Accessions No.	Number of seeds per pod					Pod width (cm)			
		Ambikapur	Ludhiana	Ranchi	Ayodhya	Mean	Ambikapur	Ludhiana	Ranchi	Mean
1	ET218698	2.40	3.33	3.00	3.20	**2.98**	1.56	1.23	2.00	**1.60**
2	ET218702	2.20	3.67	4.00	3.40	**3.32**	1.44	1.37	2.00	**1.60**
3	ET218704	2.20	4.00	3.00	2.90	**3.03**	1.38	1.20	1.00	**1.19**
4	ET218712	2.20	3.67	4.00	3.40	**3.32**	1.36	1.27	1.00	**1.21**
5	ET218713	2.40	3.67	4.00	3.60	**3.42**	1.36	1.03	1.50	**1.30**
6	ET218719	2.40	4.00	3.00	3.00	**3.10**	1.50	1.47	1.50	**1.49**
7	ET218720	2.60	4.00	4.00	3.90	**3.63**	1.58	1.13	1.00	**1.24**
8	ET218725	2.00	3.33	3.00	3.70	**3.01**	1.46	0.93	2.00	**1.46**
9	ET218733	2.60	3.67	3.00	4.10	**3.34**	1.36	0.90	2.00	**1.42**
10	ET218734	2.20	3.00	4.00	3.60	**3.20**	1.40	0.97	1.00	**1.12**
11	ET218736	2.60	3.33	2.00	4.30	**3.06**	1.56	1.43	1.50	**1.50**
12	ET218738	2.20	2.67	2.00	4.10	**2.74**	1.58	1.20	1.50	**1.43**
13	ET218739	2.60	3.33	3.00	3.80	**3.18**	1.50	1.57	2.00	**1.69**
14	ET218741	2.60	2.33	3.00	4.00	**2.98**	1.54	1.27	1.50	**1.44**
15	ET218743	2.20	3.33	3.00	4.40	**3.23**	1.54	0.73	2.00	**1.42**
16	ET218745	2.20	3.67	3.00	3.00	**2.97**	1.45	1.33	1.50	**1.43**
17	ET218747	2.60	2.67	3.00	3.20	**2.87**	1.64	1.37	1.00	**1.34**
18	ET218757	2.20	3.00	4.00	3.40	**3.15**	1.52	1.17	2.00	**1.56**
19	ET218759	2.20	3.33	3.00	4.40	**3.23**	1.40	0.93	1.50	**1.28**
20	ET218763	2.40	3.00	3.00	3.20	**2.90**	1.40	0.97	1.00	**1.12**
21	ET218764	2.60	3.33	3.00	4.30	**3.31**	1.36	1.53	2.00	**1.63**
22	ET218765	2.20	3.00	3.00	3.60	**2.95**	1.48	1.10	1.50	**1.36**
23	ET218766	2.00	3.33	3.00	4.10	**3.11**	1.46	1.27	1.50	**1.41**
24	ET218767	2.60	3.33	4.00	4.40	**3.58**	1.50	1.23	2.00	**1.58**
25	ET218768	2.40	3.67	3.00	3.70	**3.19**	1.60	1.23	1.50	**1.44**
26	ET218769	2.60	2.67	4.00	3.30	**3.14**	1.38	1.77	1.00	**1.38**
27	ET218770	2.40	3.33	3.00	3.40	**3.03**	1.44	1.40	1.00	**1.28**
28	ET218772	2.40	3.00	3.00	4.00	**3.10**	1.52	1.27	1.50	**1.43**
29	ET218773	2.60	2.67	3.00	4.10	**3.09**	1.60	1.37	1.50	**1.49**
30	ET218775	1.80	3.33	2.00	3.20	**2.58**	1.38	1.53	1.50	**1.47**
31	ET218776	2.20	4.33	4.00	3.30	**3.46**	1.56	0.97	2.00	**1.51**
32	ET218778	2.20	3.33	4.00	3.80	**3.33**	1.48	0.83	1.50	**1.27**
33	ET218781	2.40	3.67	3.00	4.10	**3.29**	1.45	0.63	1.50	**1.19**
34	ET218783	3.00	3.67	4.00	4.20	**3.72**	1.56	1.17	1.50	**1.41**
35	ET218786	1.80	3.33	4.00	3.10	**3.06**	1.56	1.20	1.50	**1.42**
Mean for check variety										
1	Giza-4	2.36	3.60	3.20	3.80	**3.24**	1.54	1.29	1.50	**1.44**
2	HFB-1	2.28	3.53	3.40	4.00	**3.30**	1.58	0.86	1.70	**1.38**
3	Rebya-40	2.28	3.27	3.00	4.10	**3.16**	1.51	1.27	1.70	**1.49**
4	Vikrant	2.40	3.07	3.80	4.30	**3.39**	1.48	0.99	1.20	**1.22**
Minimum		**1.80**	**2.33**	**2.00**	**2.90**	**2.58**	**1.36**	**0.63**	**1.00**	**1.12**
Maximum		**3.00**	**4.33**	**4.00**	**4.40**	**3.72**	**1.64**	**1.77**	**2.00**	**1.69**
Mean		**2.35**	**3.35**	**3.27**	**3.73**	**3.17**	**1.49**	**1.19**	**1.53**	**1.40**
CD (0.05)		**0.65**	**1.77**	**1.63**	**-**	**-**	**0.23**	**0.64**	**0.97**	**-**
CV (%) Error		**10.48**	**19.66**	**18.28**	**-**	**-**	**5.59**	**21.76**	**23.94**	**-**
CV (%) Phen.		**10.25**	**12.59**	**17.95**	**12.12**	**7.23**	**5.40**	**20.44**	**22.86**	**9.93**

S.No.	Accessions No.	Pod length (cm)					Plant height (cm)					
		Ambikapur	Ayodhya	Ludhiana	Ranchi	Mean	Ambikapur	Ayodhya	Hisar	Ludhiana	Ranchi	Mean
1	ET218698	5.20	4.30	5.77	9.50	**6.19**	55.00	83.20	58.80	66.40	99.00	**72.48**
2	ET218702	5.60	4.20	8.20	6.00	**6.00**	53.60	72.40	76.47	93.80	90.00	**77.25**
3	ET218704	5.00	4.50	9.33	5.50	**6.08**	50.00	78.50	75.08	97.43	81.00	**76.40**
4	ET218712	6.00	4.30	9.63	5.50	**6.36**	50.40	76.90	60.35	101.82	87.00	**75.29**
5	ET218713	5.60	4.00	6.67	6.00	**5.57**	48.20	84.00	58.72	84.48	99.00	**74.88**
6	ET218719	6.00	3.60	10.00	6.00	**6.40**	53.20	90.10	69.62	93.87	86.00	**78.56**
7	ET218720	6.40	3.40	6.07	6.50	**5.59**	51.60	86.70	77.27	95.17	74.00	**76.95**
8	ET218725	5.20	3.40	7.43	8.00	**6.01**	49.20	75.00	68.31	93.07	120.00	**81.12**
9	ET218733	5.40	4.20	6.10	6.00	**5.43**	51.80	78.80	86.22	109.20	100.00	**85.20**
10	ET218734	6.00	4.30	6.37	5.00	**5.42**	50.00	77.00	77.87	85.93	106.00	**79.36**
11	ET218736	5.60	4.90	8.30	5.00	**5.95**	58.40	78.60	68.81	98.70	84.00	**77.70**
12	ET218738	5.00	4.30	8.83	5.50	**5.91**	55.40	87.80	92.30	90.08	80.00	**81.12**
13	ET218739	4.80	4.80	9.67	7.00	**6.57**	60.00	78.90	76.38	86.08	100.00	**80.27**
14	ET218741	5.00	4.60	7.10	6.00	**5.68**	54.40	84.00	85.40	84.12	88.00	**79.18**
15	ET218743	5.40	4.70	4.20	9.00	**5.83**	60.20	90.30	78.33	82.93	100.00	**82.35**
16	ET218745	5.20	4.30	8.13	7.00	**6.16**	53.40	83.00	78.55	94.82	97.00	**81.35**
17	ET218747	5.80	4.20	7.23	5.00	**5.56**	51.00	82.50	73.93	74.78	104.00	**77.24**
18	ET218757	5.60	5.00	5.93	8.50	**6.26**	60.80	75.90	76.65	74.83	108.00	**79.24**
19	ET218759	5.00	3.30	5.47	7.50	**5.32**	57.00	91.60	83.94	75.87	88.00	**79.28**
20	ET218763	4.20	4.70	7.17	5.00	**5.27**	51.40	78.60	81.49	86.18	96.00	**78.73**
21	ET218764	5.00	4.90	7.70	8.00	**6.40**	56.00	80.00	91.42	95.57	108.00	**86.20**
22	ET218765	4.80	5.00	6.57	7.00	**5.84**	58.60	84.20	85.31	82.42	101.00	**82.30**
23	ET218766	5.00	4.20	6.23	8.00	**5.86**	57.00	74.70	74.72	69.72	100.00	**75.23**
24	ET218767	5.20	3.80	7.83	8.00	**6.21**	47.00	72.00	74.95	81.83	99.00	**74.96**
25	ET218768	5.40	4.20	6.50	6.00	**5.53**	48.20	69.40	77.83	91.43	95.00	**76.37**
26	ET218769	4.80	3.30	9.97	8.50	**6.64**	53.80	75.00	84.14	90.90	80.00	**76.77**
27	ET218770	4.80	4.30	7.93	5.50	**5.63**	53.80	76.80	80.02	90.10	96.00	**79.34**
28	ET218772	5.60	3.80	9.17	8.00	**6.64**	54.60	74.00	70.00	90.60	81.00	**74.04**
29	ET218773	4.60	4.10	7.10	8.00	**5.95**	56.80	81.20	79.01	74.12	64.00	**71.02**
30	ET218775	5.00	4.30	8.60	6.00	**5.98**	55.40	79.40	78.00	74.73	77.00	**72.91**
31	ET218776	4.60	4.60	5.90	9.00	**6.03**	54.80	82.00	82.33	84.92	81.00	**77.01**
32	ET218778	4.60	5.10	5.30	7.00	**5.50**	48.80	84.20	89.89	66.38	58.00	**69.45**
33	ET218781	5.40	4.60	4.60	8.00	**5.65**	54.80	80.00	80.81	63.82	82.00	**72.29**
34	ET218783	5.20	4.30	8.93	9.00	**6.86**	52.20	78.30	90.97	73.77	81.00	**75.25**
35	ET218786	6.00	3.80	7.67	7.00	**6.12**	48.80	73.20	88.83	77.87	85.00	**74.74**
Mean for check variety												
1	Giza-4	5.24	3.90	8.45	6.40	**6.00**	54.28	81.70	80.18	91.25	97.60	**81.00**
2	HFB-1	5.24	4.70	6.05	6.90	**5.72**	52.60	87.20	83.76	86.16	98.20	**81.59**
3	Rebya-40	5.24	4.50	7.94	7.00	**6.17**	55.32	85.60	82.86	89.76	100.40	**82.79**
4	Vikrant	5.32	4.90	5.79	6.50	**5.63**	54.64	90.10	83.08	82.64	102.60	**82.61**
Minimum		**4.20**	**3.30**	**4.20**	**5.00**	**5.27**	**47.00**	**69.40**	**58.72**	**63.82**	**58.00**	**69.45**
Maximum		**6.40**	**5.10**	**10.00**	**9.50**	**6.86**	**60.80**	**91.60**	**92.30**	**109.20**	**120.00**	**86.20**
Mean		**5.26**	**4.29**	**7.33**	**6.91**	**5.95**	**53.65**	**80.58**	**78.53**	**85.32**	**91.64**	**77.94**
CD (0.05)		**1.16**	**-**	**1.21**	**3.94**	**-**	**8.44**	**-**	**19.52**	**23.50**	**27.89**	**-**
CV (%) Error		**8.28**	**-**	**6.43**	**22.05**	**-**	**5.84**	**-**	**8.87**	**10.07**	**10.48**	**-**
CV (%) Phen.		**8.84**	**11.33**	**20.52**	**18.58**	**6.57**	**6.53**	**6.90**	**10.53**	**12.11**	**13.72**	**4.91**

S.No.	Accessions No.	Stem thickness			Days to 80% maturity					
		Ambikapur	Ranchi	Mean	Ayodhya	Ranchi	Ambikapur	Ludhiana	Hisar	Mean
1	ET218698	3.04	4.00	**3.52**	126.00	144.00	123.00	143.00	142.00	**135.60**
2	ET218702	3.12	3.50	**3.31**	131.00	145.00	125.00	144.00	137.00	**136.40**
3	ET218704	3.10	3.00	**3.05**	124.00	138.00	124.00	145.00	137.00	**133.60**
4	ET218712	3.08	3.00	**3.04**	126.00	140.00	127.00	143.00	144.00	**136.00**
5	ET218713	3.18	3.50	**3.34**	130.00	141.00	127.00	144.00	140.00	**136.40**
6	ET218719	3.00	4.00	**3.50**	127.00	139.00	124.00	145.00	135.00	**134.00**
7	ET218720	3.02	3.50	**3.26**	124.00	137.00	126.00	143.00	145.00	**135.00**
8	ET218725	3.22	3.00	**3.11**	127.00	141.00	128.00	145.00	145.00	**137.20**
9	ET218733	3.64	3.50	**3.57**	128.00	145.00	127.00	145.00	145.00	**138.00**
10	ET218734	3.08	3.50	**3.29**	125.00	139.00	128.00	142.00	145.00	**135.80**
11	ET218736	3.36	3.00	**3.18**	127.00	142.00	127.00	142.00	140.00	**135.60**
12	ET218738	2.96	3.00	**2.98**	128.00	140.00	128.00	143.00	135.00	**134.80**
13	ET218739	2.98	3.50	**3.24**	131.00	141.00	126.00	143.00	140.00	**136.20**
14	ET218741	3.50	3.50	**3.50**	132.00	139.00	128.00	145.00	140.00	**136.80**
15	ET218743	3.06	4.00	**3.53**	128.00	134.00	125.00	142.00	142.00	**134.20**
16	ET218745	3.12	3.50	**3.31**	127.00	147.00	126.00	144.00	142.00	**137.20**
17	ET218747	2.46	2.50	**2.48**	128.00	138.00	124.00	143.00	142.00	**135.00**
18	ET218757	2.86	4.00	**3.43**	127.00	147.00	126.00	144.00	136.00	**136.00**
19	ET218759	3.14	3.50	**3.32**	127.00	144.00	123.00	145.00	135.00	**134.80**
20	ET218763	3.38	2.50	**2.94**	131.00	143.00	126.00	148.00	135.00	**136.60**
21	ET218764	3.56	4.00	**3.78**	128.00	145.00	128.00	148.00	135.00	**136.80**
22	ET218765	3.26	4.00	**3.63**	126.00	144.00	125.00	145.00	146.00	**137.20**
23	ET218766	2.98	4.00	**3.49**	128.00	146.00	128.00	143.00	140.00	**137.00**
24	ET218767	3.24	4.00	**3.62**	128.00	143.00	127.00	143.00	135.00	**135.20**
25	ET218768	3.50	4.00	**3.75**	129.00	140.00	124.00	144.00	135.00	**134.40**
26	ET218769	3.54	3.50	**3.52**	130.00	138.00	125.00	143.00	140.00	**135.20**
27	ET218770	2.92	3.00	**2.96**	132.00	141.00	124.00	148.00	135.00	**136.00**
28	ET218772	3.22	3.00	**3.11**	129.00	132.00	125.00	147.00	140.00	**134.60**
29	ET218773	3.18	3.50	**3.34**	128.00	144.00	127.00	143.00	135.00	**135.40**
30	ET218775	3.02	3.00	**3.01**	127.00	135.00	128.00	144.00	141.00	**135.00**
31	ET218776	3.22	4.00	**3.61**	128.00	137.00	128.00	144.00	135.00	**134.40**
32	ET218778	2.80	2.00	**2.40**	129.00	136.00	128.00	144.33	140.00	**135.47**
33	ET218781	2.92	3.00	**2.96**	128.00	137.00	125.00	143.00	140.00	**134.60**
34	ET218783	3.04	3.50	**3.27**	130.00	137.00	128.00	141.67	140.00	**135.33**
35	ET218786	3.62	4.00	**3.81**	129.00	134.00	125.00	141.33	140.00	**133.87**
Mean for check variety										
1	Giza-4	3.26	3.50	**3.38**	128.00	142.60	125.40	144.73	135.20	**135.19**
2	HFB-1	3.29	3.80	**3.55**	129.00	141.00	124.80	143.80	140.40	**135.80**
3	Rebya-40	3.10	3.60	**3.35**	126.00	142.60	126.40	144.13	135.20	**134.87**
4	Vikrant	3.35	3.40	**3.37**	130.00	138.80	126.20	144.40	135.20	**134.92**
Minimum		**2.46**	**2.00**	**2.40**	**124.00**	**132.00**	**123.00**	**141.33**	**135.00**	**133.60**
Maximum		**3.64**	**4.00**	**3.81**	**132.00**	**147.00**	**128.00**	**148.00**	**146.00**	**138.00**
Mean		**3.16**	**3.44**		**128.10**	**140.46**	**126.05**	**144.04**	**139.10**	**135.55**
CD (0.05)		**0.62**	**1.56**		**-**	**10.23**	**5.46**	**2.76**	**1.46**	**-**
CV (%) Error		**7.17**	**16.40**		**-**	**2.71**	**1.63**	**0.72**	**0.40**	**-**
CV (%) Phen.		**7.63**	**14.32**		**1.52**	**2.67**	**1.24**	**1.13**	**2.58**	**0.77**

S.No.	Accessions No.	Seed yield per plant (g)						Hisar		
		Ayodhya	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Seed Yield (q/ha)	Green Pod Yield (q/ha)	Green pod yield per plant (g)
1	ET218698	31.50	8.60	23.27	7.33	4.20	**14.98**	8.10	15.92	28.44
2	ET218702	33.00	15.90	19.54	9.61	4.40	**16.49**	15.49	23.65	38.88
3	ET218704	28.00	17.15	24.04	12.55	17.00	**19.75**	14.32	22.16	42.36
4	ET218712	29.30	15.18	27.78	5.79	15.00	**18.61**	12.83	35.04	64.32
5	ET218713	31.00	12.19	27.07	7.34	4.40	**16.40**	11.30	22.41	37.68
6	ET218719	28.50	14.29	20.64	11.65	10.00	**17.02**	15.28	54.30	79.20
7	ET218720	33.50	14.55	34.34	12.57	4.30	**19.85**	13.45	38.84	65.28
8	ET218725	32.90	12.21	30.36	18.08	18.00	**22.31**	12.08	39.80	61.80
9	ET218733	36.20	12.71	19.22	10.76	6.30	**17.04**	9.19	53.22	108.72
10	ET218734	33.00	12.55	20.02	8.99	6.90	**16.29**	11.15	34.93	60.12
11	ET218736	35.60	12.48	21.39	11.59	7.90	**17.79**	11.86	70.46	112.32
12	ET218738	35.00	17.64	20.11	15.68	11.00	**19.89**	15.87	48.21	84.00
13	ET218739	34.10	20.32	27.75	20.47	8.70	**22.27**	19.77	46.71	76.56
14	ET218741	34.00	22.36	18.86	18.59	21.00	**22.96**	22.82	57.83	90.72
15	ET218743	38.40	18.33	26.12	10.16	11.00	**20.80**	17.32	55.97	93.24
16	ET218745	28.30	20.07	24.79	10.00	11.00	**18.83**	20.76	70.33	107.88
17	ET218747	29.60	18.53	20.76	12.26	6.70	**17.57**	15.98	41.05	75.00
18	ET218757	29.50	19.57	15.29	9.67	13.00	**17.41**	18.17	40.48	69.36
19	ET218759	37.20	18.98	19.26	7.26	7.30	**18.00**	18.37	38.98	64.20
20	ET218763	28.00	17.09	15.30	13.75	18.00	**18.43**	14.98	51.30	91.20
21	ET218764	37.00	19.65	21.17	8.79	6.10	**18.54**	21.11	34.42	51.72
22	ET218765	30.20	17.86	12.77	13.09	2.90	**15.37**	16.09	43.70	76.32
23	ET218766	36.10	17.53	17.98	16.12	10.00	**19.55**	17.96	53.56	82.56
24	ET218767	36.50	15.47	22.05	12.16	19.00	**21.04**	16.32	45.88	68.40
25	ET218768	31.80	20.83	25.26	10.61	23.00	**22.30**	19.87	34.73	58.56
26	ET218769	29.90	22.82	21.36	10.72	12.00	**19.36**	20.47	60.41	107.04
27	ET218770	31.00	21.41	13.46	9.65	11.00	**17.30**	18.22	45.52	84.84
28	ET218772	33.60	19.20	25.00	10.94	13.00	**20.35**	21.40	76.41	108.84
29	ET218773	35.00	16.47	23.39	12.03	34.00	**24.18**	13.01	59.34	115.20
30	ET218775	31.80	13.53	16.04	7.80	10.00	**15.83**	12.42	67.95	112.80
31	ET218776	31.70	17.57	20.06	5.89	51.00	**25.24**	18.36	75.40	113.40
32	ET218778	34.50	20.68	17.39	11.43	12.00	**19.20**	20.15	63.21	102.96
33	ET218781	37.10	19.14	14.87	8.90	17.00	**19.40**	16.55	42.60	77.76
34	ET218783	38.00	20.47	15.08	12.24	8.00	**18.76**	21.20	59.99	92.28
35	ET218786	32.10	16.34	15.45	9.70	3.50	**15.42**	14.94	65.24	110.64
Mean for check variety										
1	Giza-4	35.50	20.47	20.40	-	8.92	**21.32**	18.39	58.93	103.32
2	HFB-1	37.50	22.55	26.60	12.05	8.38	**21.42**	21.80	43.67	72.62
3	Rebya-40	36.60	20.46	20.45	15.58	8.74	**20.37**	19.27	47.66	80.57
4	Vikrant	37.60	19.23	27.53	11.90	10.82	**21.41**	18.29	38.63	64.49
Minimum		**28.00**	**8.60**	**12.77**	**5.79**	**2.90**	**14.98**	**8.10**	**15.92**	**28.44**
Maximum		**38.40**	**22.82**	**34.34**	**20.47**	**51.00**	**25.24**	**22.82**	**76.41**	**115.20**
Mean		**33.34**	**17.50**	**21.34**	**11.41**	**12.19**	**19.21**	**16.54**	**48.18**	**80.40**
CD (0.05)		**-**	**3.10**	**14.81**	**3.28**	**7.42**	**-**	**5.12**	**24.37**	**33.72**
CV (%) Error		**-**	**5.63**	**23.37**	**8.74**	**30.18**	**-**	**9.87**	**19.34**	**15.74**
CV (%) Phen.		**9.43**	**19.32**	**23.01**	**29.25**	**73.08**	**12.93**	**22.37**	**30.95**	**29.32**

S.No.	Accessions No.	100 seed weight (g)							Ranchi		
		Ambikapur	Ayodhya	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Leaf length (cm)	Leaf width (cm)	Number of flowers/plant
1	ET218698	22.35	23.00	50.60	49.52	43.00	71.00	**43.24**	5.50	3.50	94.00
2	ET218702	22.19	24.70	72.30	86.60	70.50	58.00	**55.71**	6.00	3.00	162.00
3	ET218704	23.08	23.60	72.30	88.92	75.50	31.00	**52.40**	6.00	3.00	63.00
4	ET218712	22.05	24.50	64.50	71.24	49.00	31.00	**43.72**	5.00	3.00	78.00
5	ET218713	22.50	24.00	68.90	98.80	59.50	48.00	**53.62**	7.00	4.00	104.00
6	ET218719	22.85	27.80	53.30	87.79	67.00	64.00	**53.79**	6.00	3.00	79.00
7	ET218720	22.20	25.20	66.50	67.00	44.50	50.00	**45.90**	5.50	3.00	94.00
8	ET218725	23.10	24.00	40.30	56.01	62.50	82.00	**47.99**	7.00	3.50	143.00
9	ET218733	23.20	25.40	52.30	66.67	51.50	67.00	**47.68**	60.00	3.00	80.00
10	ET218734	21.75	24.80	52.20	63.19	56.50	63.00	**46.91**	6.00	2.00	114.00
11	ET218736	23.04	26.20	50.60	74.91	54.50	66.00	**49.21**	5.00	2.00	94.00
12	ET218738	22.45	26.20	72.20	64.91	57.50	60.00	**50.54**	5.00	3.00	58.00
13	ET218739	22.39	24.10	58.50	79.01	56.00	77.00	**52.83**	7.00	2.50	147.00
14	ET218741	23.53	24.00	68.40	63.35	57.50	71.00	**51.30**	6.00	2.50	84.00
15	ET218743	23.19	25.40	50.40	63.98	55.00	62.00	**46.66**	6.50	3.50	73.00
16	ET218745	21.69	26.80	50.60	70.66	53.00	66.00	**48.12**	6.00	3.50	76.00
17	ET218747	22.75	24.10	75.60	67.50	72.00	65.00	**54.49**	5.00	2.50	97.00
18	ET218757	23.85	27.00	74.20	79.71	58.50	82.00	**57.54**	7.00	3.50	136.00
19	ET218759	23.60	28.50	64.10	70.09	59.00	68.00	**52.21**	5.50	3.00	122.00
20	ET218763	22.20	24.80	67.50	81.04	106.50	31.00	**55.51**	5.00	3.00	113.00
21	ET218764	22.53	24.60	68.20	75.87	56.50	66.00	**52.28**	7.00	4.00	105.00
22	ET218765	22.84	23.80	70.50	78.15	67.00	68.00	**55.05**	6.00	2.00	94.00
23	ET218766	23.40	26.50	65.50	80.92	73.00	71.00	**56.72**	7.00	4.00	71.00
24	ET218767	22.16	27.50	74.50	76.29	63.00	34.00	**49.58**	8.00	3.00	77.00
25	ET218768	22.12	26.70	80.40	67.41	66.50	35.00	**49.69**	6.00	3.50	118.00
26	ET218769	22.87	27.20	70.50	58.16	64.00	55.00	**49.62**	6.00	3.00	71.00
27	ET218770	21.45	26.40	52.20	64.52	55.50	63.00	**47.18**	5.50	2.50	82.00
28	ET218772	21.54	24.30	62.60	55.80	67.50	80.00	**51.96**	6.00	2.50	78.00
29	ET218773	21.90	23.70	72.40	68.93	63.00	33.00	**47.16**	6.00	3.00	120.00
30	ET218775	22.19	24.50	70.60	83.57	65.50	80.00	**57.73**	5.00	3.00	104.00
31	ET218776	23.68	23.60	65.20	62.92	58.00	35.00	**44.73**	5.50	2.50	83.00
32	ET218778	21.80	24.20	72.40	84.11	67.00	84.00	**58.92**	4.50	2.00	100.00
33	ET218781	21.60	28.70	58.20	59.10	48.00	72.00	**47.93**	6.00	2.50	54.00
34	ET218783	22.94	24.20	76.40	72.95	59.50	77.00	**55.50**	5.00	2.00	85.00
35	ET218786	22.84	23.80	56.10	97.10	66.00	59.00	**54.14**	6.00	2.50	71.00
Mean for check variety											
1	Giza-4	22.57	27.10	73.34	79.61	-	68.20	**54.16**	6.00	3.30	89.00
2	HFB-1	22.27	26.60	39.74	34.06	30.20	32.80	**30.95**	7.10	3.00	89.40
3	Rebya-40	22.84	27.00	72.54	73.27	66.20	57.00	**53.14**	6.30	3.50	91.60
4	Vikrant	22.31	28.40	43.72	33.66	30.50	31.60	**31.70**	6.40	3.00	88.40
Minimum		**21.45**	**23.00**	**39.74**	**33.66**	**30.20**	**31.00**	**30.95**	**4.50**	**2.00**	**54.00**
Maximum		**23.85**	**28.70**	**80.40**	**98.80**	**106.50**	**84.00**	**58.92**	**60.00**	**4.00**	**162.00**
Mean		**22.56**	**25.46**	**63.34**	**70.70**	**59.89**	**59.35**	**50.19**	**7.37**	**2.94**	**94.42**
CD (0.05)		**2.07**	**-**	**34.08**	**5.74**	**10.53**	**18.60**	**-**	**2.16**	**1.78**	**78.35**
CV (%) Error		**3.44**	**-**	**22.27**	**3.90**	**7.90**	**14.71**	**-**	**12.56**	**20.87**	**32.77**
CV (%) Phen.		**2.77**	**6.26**	**17.02**	**19.91**	**21.31**	**28.45**	**11.93**	**117.88**	**18.86**	**25.89**

Table 31: Experimental details of germplasm evaluation of chenopodium quinoa Rabi 2019-20 Plain

S. No	Item	Ambikapur	Bengaluru	Ludhiana	Mandor	Ranchi
1	No of entry	74	50	74	74	74
2	No of Check	4	5	4	-	4
4	Design	-	4	6	5	6
3	No of Block	ABD	ABD	ABD	ABD	ABD
7	Number of Rows	3	3	3	-	3
8	Row length (m)	3	3	3	-	3
5	Row spacing (cm)	45	45	45	45	45
6	Plant spacing (cm)	15	15	15	15	15
13	NPKS (kg/ha)	24.69	24.69	24.69	37.04	24.69
11	plot size *(m^2)*	As per maturity	10/2/2020	4/9/2020	As per maturity	26/03/2020 to 30/03/2020
9	Sowing Date	60:40:20:20	60:40:20:20	-	N60:P40:K20	20:40:20:20
10	Harvesting Period	11/17/2019	28-10-2019	19/11/2019	15/11/2019	6/12/2019
12	Conversion Factor	4.05	4.05	4.05	2.7	4.05

Table 32: Promising lines in chenopodium quinoa germplasm at various locations: Rabi 2019-20 (Plains)-I Year

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**IGKV, Ambikapur (57 accessions)**				
1	Days to 50% flowering	55.00	69.00	EC896077 (55), EC896081 (55), EC896084 (55), EC896099 (55), EC896224 (55), EC896267 (55)	EC507742 (63)
2	Days to 80% maturity	111.00	127.00	EC896061 (111)	EC507742 (113)
3	Inflorescence length (cm)	3.56	6.20	EC896077 (6.2), EC896081 (6.2), EC896084 (6.2), EC896099 (6.2), EC896224 (6.2), EC896267 (6.2), EC896082 (6.18), EC896225 (6.18), EC896268 (6.18), EC896070 (4.82)	EC507738 (4.6)
4	Leaf length (cm)	3.44	5.46	EC896077 (5.46), EC896081 (5.46), EC896084 (5.46), EC896099 (5.46), EC896224 (5.46), EC896267 (5.46), EC896082 (5.24), EC896225 (5.24), EC896268 (5.24), EC896060 (4.98), EC896070 (4.88), EC896074 (4.88), EC896101 (4.88), EC896167 (4.88)	EC507742 (3.98)
5	Leaf width (cm)	2.14	3.86	EC896077 (3.86), EC896081 (3.86), EC896084 (3.86), EC896099 (3.86), EC896224 (3.86), EC896267 (3.86), EC896082 (3.62), EC896225 (3.62), EC896268 (3.62), EC896060 (3.5), EC896074 (3.5), EC896101 (3.5), EC896167 (3.5)	EC507738 (2.86)
6	Number of primary branches	1.20	6.20	EC896082 (6.2), EC896225 (6.2), EC896268 (6.2), EC896077 (4), EC896081 (4), EC896084 (4), EC896099 (4), EC896224 (4), EC896267 (4), EC896069 (3.4), EC896076 (3.4), EC896103 (3.4), EC896183 (3.4)	EC507738 (3.2)
7	Number of inflorescence per plant	16.40	32.80	EC896082 (32.8), EC896225 (32.8), EC896268 (32.8), EC896077 (25.8), EC896081 (25.8), EC896084 (25.8), EC896099 (25.8), EC896224 (25.8), EC896267 (25.8)	EC507738 (21.8)
8	Number of internodes	11.40	13.00		EC507738 (13)
9	Number of leaves/plant	31.00	91.00	EC896082 (91), EC896225 (91), EC896268 (91), EC896077 (77.6), EC896081 (77.6), EC896084 (77.6), EC896099 (77.6), EC896224 (77.6), EC896267 (77.6)	EC507738 (69)
10	Petiole length (cm)	2.38	3.86	EC896060 (3.86), EC896074 (3.86), EC896101 (3.86), EC896167 (3.86), EC896082 (3.7), EC896225 (3.7), EC896268 (3.7), EC896077 (3.62), EC896081 (3.62), EC896084 (3.62), EC896099 (3.62), EC896224 (3.62), EC896267 (3.62), EC896070 (2.98)	EC507738 (2.5)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
11	Plant height (cm)	35.60	72.00	EC896077 (72), EC896081 (72), EC896084 (72), EC896099 (72), EC896224 (72), EC896267 (72)	EC507738 (70.2)
	Plant height (cm) dwarf	35.60	72.00	EC896073 (35.6), EC896075 (35.6), EC896080 (35.6), EC896102 (35.6), EC896171 (35.6), EC896223 (35.6), EC896266 (35.6)	EC507742 (35.6)
12	Seed yield per plant (g)	13.00	55.00	EC896077 (55), EC896081 (55), EC896084 (55), EC896099 (55), EC896224 (55), EC896267 (55), EC896060 (19)	EC507742 (18.2)
13	Seed volume (g/10ml)	6.14	7.34	EC896077 (7.34), EC896081 (7.34), EC896084 (7.34), EC896099 (7.34), EC896224 (7.34), EC896267 (7.34), EC896060 (7.04), EC896061 (6.88), EC896074 (6.8), EC896101 (6.8), EC896167 (6.8), EC896069 (6.76), EC896076 (6.76), EC896103 (6.76), EC896183 (6.76)	EC507738 (6.34)
II	**PAU, Ludhiana (57 accessions)**				
1	Days to 50% flowering	80.33	92.00	EC896224 (80.33), EC896081 (81), EC896231 (81.33), EC896102 (82), EC896076 (84.67), EC896071 (86), EC896213 (86), EC896065 (87), EC896075 (87), EC896070 (87.33), EC896074 (88.33), EC896204 (92), EC896301 (92)	
2	Days to 80% maturity	126.00	132.67	EC896065 (126), EC896071 (126), EC896231 (126), EC896213 (127), EC896070 (127.33), EC896074 (128.33), EC896102 (128.33), EC896076 (130), EC896204 (130), EC896224 (130.33), EC896075 (131), EC896081 (131), EC896301 (132.67)	
3	Inflorescence length (cm)	7.00	13.33	EC896075 (13.33), EC896301 (13.33), EC896065 (13), EC896204 (12.67), EC896074 (12.33), EC896102 (11.33), EC896224 (9.67), EC896076 (8.33), EC896231 (8.33), EC896071 (8), EC896081 (8), EC896213 (8), EC896070 (7)	
4	Leaf length (cm)	4.17	6.37	EC896070 (6.37), EC896076 (6.17), EC896102 (5.97), EC896075 (5.73), EC896204 (5.53), EC896065 (5.5), EC896074 (5.43), EC896071 (5.43), EC896081 (5.27), EC896224 (4.87), EC896213 (4.47), EC896231 (4.37), EC896301 (4.17)	
5	Leaf width (cm)	2.50	5.07	EC896070 (5.07), EC896071 (4.67), EC896065 (4.4), EC896204 (4.33), EC896213 (4.07), EC896102 (4.03), EC896081 (4), EC896074 (3.8), EC896301 (3.63), EC896224 (3.5), EC896075 (3.17), EC896231 (2.53), EC896076 (2.5)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
6	Number of primary branches	6.33	21.33	EC896213 (21.33), EC896081 (20), EC896224 (19.67), EC896301 (19.67), EC896204 (19.33), EC896102 (18.67), EC896075 (18.33), EC896074 (16), EC896231 (15.33), EC896076 (13.67), EC896071 (9), EC896070 (8), EC896065 (6.33)	
7	Number of inflorescence per plant	16.00	34.33	EC896213 (34.33), EC896204 (33), EC896301 (32.67), EC896070 (31.33), EC896074 (26.33), EC896076 (24.67), EC896081 (24), EC896102 (23), EC896075 (22.33), EC896071 (21), EC896065 (18.67), EC896231 (17.67), EC896224 (16)	
8	Number of internodes	7.00	25.00	EC896213 (25), EC896224 (23.67), EC896204 (23), EC896301 (22.33), EC896075 (22), EC896081 (21.67), EC896102 (19.33), EC896074 (17), EC896231 (16.67), EC896076 (16.33), EC896070 (11.67), EC896071 (11.67), EC896065 (7)	
9	Number of leaves/plant	46.00	138.67	EC896301 (138.67), EC896213 (117.67), EC896204 (104), EC896070 (98.67), EC896074 (90), EC896076 (85.67), EC896075 (75.33), EC896231 (74.67), EC896081 (74), EC896224 (69.67), EC896102 (60.33), EC896065 (56), EC896071 (46)	
10	Petiole length (cm)	2.17	4.83	EC896081 (4.83), EC896213 (4.63), EC896070 (4.07), EC896204 (3.97), EC896074 (3.67), EC896301 (3.43), EC896075 (3.17), EC896102 (3.07), EC896065 (2.6), EC896224 (2.57), EC896076 (2.53), EC896231 (2.33), EC896071 (2.17)	
11	Plant height (cm)	33.37	84.47	EC896213 (84.47), EC896301 (70.83), EC896075 (63.18), EC896074 (63.17), EC896081 (62.77), EC896070 (57.12), EC896204 (56.15), EC896076 (55.27), EC896224 (52.08), EC896231 (50.42), EC896102 (49.08), EC896065 (37.73), EC896071 (33.37)	
	Plant height (cm) dwarf	33.37	84.47	EC896071 (33.37), EC896065 (37.73), EC896102 (49.08), EC896231 (50.42), EC896224 (52.08), EC896076 (55.27), EC896204 (56.15), EC896081 (62.77), EC896074 (63.17), EC896075 (63.18), EC896301 (70.83), EC896213 (84.47)	
12	Seed yield per plant (g)	11.31	73.18	EC896204 (73.18), EC896074 (60.89), EC896213 (47.2), EC896075 (39.34), EC896070 (38.73), EC896065 (34.88), EC896301 (32.45), EC896076 (17.24), EC896231 (15.38), EC896081 (14.65), EC896224 (14.28), EC896102 (13.59), EC896071 (11.31)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
13	Seed volume (g/10ml)	7.06	9.04	EC896074 (9.04), EC896301 (8.74), EC896071 (8.67), EC896076 (8.65), EC896070 (8.43), EC896075 (8.27), EC896081 (8.13), EC896102 (8.12), EC896204 (7.95), EC896213 (7.66), EC896231 (7.15), EC896224 (7.07), EC896065 (7.06)	
III	**AU, Mandor (57 accessions)**				
1	Days to 50% flowering	53.00	65.00	EC896229 (53), EC896069 (56), EC896071 (57), EC896081 (57), EC896213 (57), EC896070 (59), EC896102 (59), EC896075 (60), EC896231 (61), EC896074 (62), EC896301 (62), EC896084 (63), EC896076 (64), EC896204 (65), EC896224 (65)	
2	Days to 80% maturity	126.00	141.00	EC896229 (126), EC896213 (130), EC896081 (131), EC896069 (132), EC896102 (132), EC896224 (132), EC896071 (133), EC896070 (135), EC896231 (135), EC896074 (138), EC896301 (138), EC896084 (139), EC896204 (139), EC896075 (140), EC896076 (141)	
3	Inflorescence length (cm)	10.17	11.53	EC896076 (11.53), EC896204 (11.43), EC896084 (11.37), EC896075 (11.33), EC896074 (11.27), EC896231 (11.03), EC896070 (10.97), EC896224 (10.97), EC896301 (10.87), EC896071 (10.77), EC896102 (10.77), EC896069 (10.67), EC896081 (10.63), EC896213 (10.57), EC896229 (10.17)	
4	Leaf length (cm)	3.21	5.41	EC896081 (5.41), EC896084 (5.11), EC896069 (5.01), EC896301 (4.95), EC896070 (4.94), EC896076 (4.42), EC896224 (4.42), EC896204 (4.41), EC896229 (4.38), EC896213 (3.98), EC896074 (3.92), EC896075 (3.66), EC896071 (3.55), EC896231 (3.46), EC896102 (3.21)	
5	Leaf width (cm)	1.42	2.48	EC896069 (2.48), EC896076 (2.36), EC896081 (2.33), EC896229 (2.31), EC896301 (2.31), EC896224 (2.06), EC896075 (2.02), EC896204 (2.01), EC896070 (1.98), EC896084 (1.96), EC896231 (1.95), EC896074 (1.84), EC896102 (1.65), EC896213 (1.44)	
6	Number of primary branches	89.50	102.50	EC896076 (102.5), EC896204 (102), EC896084 (101), EC896074 (100), EC896075 (100), EC896224 (98.5), EC896231 (98), EC896070 (97), EC896301 (97), EC896102 (95.5), EC896071 (95), EC896069 (94), EC896081 (94), EC896213 (93.5), EC896229 (89.5)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
7	Plant height (cm)	89.50	102.50	EC896076 (102.5), EC896204 (102), EC896084 (101), EC896074 (100), EC896075 (100), EC896224 (98.5), EC896231 (98), EC896070 (97), EC896102 (95.5), EC896071 (95), EC896069 (94), EC896081 (94), EC896213 (93.5), EC896301 (91), EC896229 (89.5)	
	Plant height (cm) dwarf	89.50	102.50	EC896229 (89.5), EC896301 (91), EC896213 (93.5), EC896069 (94), EC896081 (94), EC896071 (95), EC896102 (95.5), EC896231 (98), EC896224 (98.5), EC896074 (100), EC896075 (100), EC896084 (101), EC896204 (102), EC896076 (102.5)	
8	Seed volume (g/10ml)	5.35	6.36	EC896069 (6.36), EC896074 (6.12), EC896102 (6.02), EC896076 (6.01), EC896301 (5.95), EC896224 (5.85), EC896075 (5.78), EC896071 (5.77), EC896229 (5.72), EC896231 (5.71), EC896070 (5.55), EC896213 (5.55), EC896204 (5.49), EC896081 (5.45)	
IV	**BAU, Ranchi (57 accessions)**				
1	Days to 50% flowering	59.00	67.00	EC896225 (59), EC896228 (59), EC896242 (59), EC896272 (59), EC896301 (59), EC896258 (62)	SSQC-1 (63)
2	Days to 80% maturity	100.00	114.00	EC896225 (100), EC896224 (103)	EC507738 (109.33)
3	Inflorescence length (cm)	7.00	14.00	EC896258 (14), EC896240 (13), EC896279 (13), EC896223 (10), EC896224 (10), EC896227 (10), EC896244 (10), EC896268 (10), EC896299 (10)	EC507738 (9)
4	Leaf length (cm)	4.00	7.30		EC507741 (7.3)
5	Leaf width (cm)	2.00	4.00	EC896230 (4), EC896258 (4), EC896259 (4), EC896274 (4), EC896320 (4)	EC507738 (3.67)
6	Number of primary branches	12.00	24.00	EC896224 (24), EC896227 (24), EC896244 (24), EC896268 (24), EC896299 (24), EC896258 (20)	EC507738 (18.33)
7	Number of inflorescence per plant	17.00	44.00	EC896258 (44), EC896223 (30)	EC507738 (29.33)
8	Number of internodes	17.00	30.00	EC896230 (30), EC896274 (30), EC896320 (30)	EC507738 (27.33)
9	Number of leaves/plant	40.00	140.00		SSQC-1 (140)
10	Petiole length (cm)	2.00	4.50		EC507741 (4.5)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
11	Plant height (cm)	48.00	97.00	EC896224 (97), EC896227 (97), EC896244 (97), EC896268 (97), EC896299 (97), EC896240 (91), EC896279 (91), EC896258 (77), EC896230 (73), EC896274 (73), EC896320 (73)	EC507738 (70.67)
	Plant height (cm) dwarf	48.00	97.00	EC896223 (48), EC896229 (49), EC896265 (49), EC896273 (49), EC896305 (49)	SSQC-1 (49)
12	Seed yield per plant (g)	1.90	14.00		SSQC-1 (14)
13	Stem thickness (cm)	3.00	4.00	EC896224 (4), EC896227 (4), EC896244 (4), EC896258 (4), EC896259 (4), EC896268 (4), EC896299 (4), EC896223 (3.5)	EC507738 (3)
14	Lateral Inflorescence length (cm)	4.00	9.00	EC896240 (9), EC896279 (9), EC896258 (8)	EC507741 (6)
15	No. of Lateral Inflorescence	10.00	29.00	EC896258 (29)	SSQC-1 (26)
16	Seed volume (g/10ml)	6.10	8.00		EC507738 (8)
V	**Based on all locations (57 accessions)**				
1	Days to 50% flowering	55.00	78.50	EC896077 (55), EC896099 (55), EC896267 (55), EC896229 (58)	EC507742 (63)
2	Days to 80% maturity	107.00	134.50	EC896244 (107), EC896230 (108), EC896240 (108), EC896258 (108), EC896274 (108), EC896279 (108), EC896320 (108)	EC507741 (112)
3	Inflorescence length (cm)	3.56	14.00	EC896258 (14), EC896240 (13), EC896279 (13), EC896204 (12.05), EC896301 (10.4), EC896244 (10), EC896299 (10), EC896231 (9.46), EC896075 (9.41), EC896071 (9.38), EC896213 (9.28), EC896224 (9.21), EC896074 (9.09)	EC507741 (9)
4	Leaf length (cm)	3.44	7.30		EC507741 (7.3)
5	Leaf width (cm)	2.07	4.00	EC896230 (4), EC896258 (4), EC896259 (4), EC896274 (4), EC896320 (4), EC896077 (3.86), EC896099 (3.86), EC896267 (3.86), EC896065 (3.63), EC896082 (3.62), EC896060 (3.5), EC896101 (3.5), EC896167 (3.5), EC896240 (3.5), EC896279 (3.5)	EC507738 (3.26)
6	Number of primary branches	1.20	60.67	EC896204 (60.67), EC896213 (57.42), EC896084 (52.5), EC896071 (52), EC896229 (51.75), EC896069 (48.7), EC896301 (42.89), EC896231 (42.44), EC896076 (39.86), EC896075 (39.84), EC896074 (39.47), EC896081 (39.33), EC896102 (38.46), EC896224 (36.54), EC896070 (35.8)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
7	Number of inflorescence per plant	16.40	44.00	EC896258 (44), EC896213 (34.33), EC896204 (33), EC896082 (32.8), EC896268 (30.9), EC896244 (29), EC896299 (29), EC896230 (28), EC896274 (28), EC896320 (28), EC896077 (25.8), EC896084 (25.8), EC896099 (25.8), EC896267 (25.8)	EC507738 (25.57)
8	Number of internodes	10.00	30.00	EC896230 (30), EC896274 (30), EC896320 (30), EC896244 (27), EC896299 (27), EC896258 (26), EC896213 (25), EC896259 (24), EC896204 (23), EC896240 (22), EC896279 (22), EC896224 (20.69), EC896301 (20.67)	EC507738 (20.17)
9	Number of leaves/plant	31.00	140.00		SSQC-1 (140)
10	Petiole length (cm)	2.00	4.63	EC896213 (4.63)	EC507741 (4.5)
11	Plant height (cm)	35.60	97.00	EC896244 (97), EC896299 (97), EC896240 (91), EC896279 (91), EC896213 (88.98), EC896084 (86.5), EC896227 (83.6), EC896268 (83.5), EC896069 (80.4), EC896224 (79.9), EC896204 (79.08), EC896258 (77), EC896081 (76.26), EC896076 (74.86), EC896070 (74.31)	EC507738 (70.43)
	Plant height (cm) dwarf	35.60	97.00	EC896073 (35.6), EC896080 (35.6), EC896171 (35.6), EC896266 (35.6)	EC507742 (35.6)
12	Seed yield per plant (g)	1.90	73.18	EC896204 (73.18), EC896077 (55), EC896084 (55), EC896099 (55), EC896267 (55), EC896213 (47.2), EC896074 (38.44), EC896081 (34.82), EC896075 (28.77), EC896070 (25.87), EC896065 (25.44), EC896224 (25.33), EC896060 (19), EC896301 (18.43)	EC507742 (18.2)
13	Seed volume (g/10ml)	6.10	7.80	EC896230 (7.8), EC896274 (7.8), EC896320 (7.8)	EC507741 (7.7)

Table 33: Multilocation evaluation of germplasm lines in chenopodium quinoa : Rabi 2019-20 (Plains)-I Year

S. No	Accessions No.	Leaf length (cm)					Leaf width (cm)					Number of leaves/plant			
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Mandor	Ambikapur	Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Ambikapur	Mean
1	EC896060	4.98	-	-	-	**4.98**	-	3.50	-	-	**3.50**	-	-	58.80	**58.80**
2	EC896061	3.94	-	-	-	**3.94**	-	2.14	-	-	**2.14**	-	-	40.80	**40.80**
3	EC896065	3.60	5.50	-	-	**4.55**	-	2.86	4.40	-	**3.63**	56.00	-	69.00	**62.50**
4	EC896069	3.44	-	5.01	-	**4.23**	2.48	2.86	-	-	**2.67**	-	-	68.80	**68.80**
5	EC896070	4.88	6.37	4.94	-	**5.40**	1.98	2.76	5.07	-	**3.27**	98.67	-	37.00	**67.83**
6	EC896071	-	5.43	3.55	-	**4.49**	1.42	-	4.67	-	**3.04**	46.00	-	-	**46.00**
7	EC896073	3.98	-	-	-	**3.98**	-	2.14	-	-	**2.14**	-	-	31.00	**31.00**
8	EC896074	4.88	5.43	3.92	-	**4.74**	1.84	3.50	3.80	-	**3.05**	90.00	-	58.00	**74.00**
9	EC896075	3.98	5.73	3.66	-	**4.46**	2.02	2.14	3.17	-	**2.44**	75.33	-	31.00	**53.17**
10	EC896076	3.44	6.17	4.42	-	**4.68**	2.36	2.86	2.50	-	**2.57**	85.67	-	68.80	**77.23**
11	EC896077	5.46	-	-	-	**5.46**	-	3.86	-	-	**3.86**	-	-	77.60	**77.60**
12	EC896079	3.60	-	-	-	**3.60**	-	2.86	-	-	**2.86**	-	-	69.00	**69.00**
13	EC896080	3.98	-	-	-	**3.98**	-	2.14	-	-	**2.14**	-	-	31.00	**31.00**
14	EC896081	5.46	5.27	5.41	-	**5.38**	2.33	3.86	4.00	-	**3.40**	74.00	-	77.60	**75.80**
15	EC896082	5.24	-	-	-	**5.24**	-	3.62	-	-	**3.62**	-	-	91.00	**91.00**
16	EC896084	5.46	-	5.11	-	**5.29**	1.96	3.86	-	-	**2.91**	-	-	77.60	**77.60**
17	EC896099	5.46	-	-	-	**5.46**	-	3.86	-	-	**3.86**	-	-	77.60	**77.60**
18	EC896101	4.88	-	-	-	**4.88**	-	3.50	-	-	**3.50**	-	-	58.00	**58.00**
19	EC896102	3.98	5.97	3.21	-	**4.39**	1.65	2.14	4.03	-	**2.61**	60.33	-	31.00	**45.67**
20	EC896103	3.44	-	-	-	**3.44**	-	2.86	-	-	**2.86**	-	-	68.80	**68.80**
21	EC896104	3.60	-	-	-	**3.60**	-	2.86	-	-	**2.86**	-	-	69.00	**69.00**
22	EC896167	4.88	-	-	-	**4.88**	-	3.50	-	-	**3.50**	-	-	58.00	**58.00**
23	EC896171	3.98	-	-	-	**3.98**	-	2.14	-	-	**2.14**	-	-	31.00	**31.00**
24	EC896183	3.44	-	-	-	**3.44**	-	2.86	-	-	**2.86**	-	-	68.80	**68.80**
25	EC896204	-	5.53	4.41	-	**4.97**	2.01	-	4.33	-	**3.17**	104.00	-	-	**104.00**
26	EC896213	-	4.47	3.98	-	**4.22**	1.44	-	4.07	-	**2.75**	117.67	-	-	**117.67**
27	EC896223	3.98	-	-	4.00	**3.99**	-	2.14	-	2.00	**2.07**	-	40.00	31.00	**35.50**
28	EC896224	5.46	4.87	4.42	4.00	**4.69**	2.06	3.86	3.50	3.00	**3.11**	69.67	75.00	77.60	**74.09**
29	EC896225	5.24	-	-	4.00	**4.62**	-	3.62	-	3.00	**3.31**	-	41.00	91.00	**66.00**
30	EC896227	3.60	-	-	4.00	**3.80**	-	2.86	-	3.00	**2.93**	-	75.00	69.00	**72.00**
31	EC896228	-	-	-	4.00	**4.00**	-	-	-	3.00	**3.00**	-	41.00	-	**41.00**
32	EC896229	-	-	4.38	4.50	**4.44**	2.31	-	-	3.00	**2.66**	-	140.00	-	**140.00**
33	EC896230	-	-	-	6.00	**6.00**	-	-	-	4.00	**4.00**	-	85.00	-	**85.00**

S. No	Accessions No.	Number of internodes				Petiole length (cm)				Days to 50% flowering					No.of inflorescence			
		Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean
1	EC896060	12.20	-	-	**12.20**	3.86	-	-	**3.86**	69.00	-	-	-	**69.00**	17	-	-	**17**
2	EC896061	11.80	-	-	**11.80**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
3	EC896065	13.00	7.00	-	**10.00**	2.50	2.60	-	**2.55**	64.00	87.00	-	-	**75.50**	22	19	-	**20**
4	EC896069	11.60	-	-	**11.60**	2.50	-	-	**2.50**	65.00	-	56.00	-	**60.50**	22	-	-	**22**
5	EC896070	12.20	11.67	-	**11.93**	2.98	4.07	-	**3.52**	60.00	87.33	59.00	-	**68.78**	19	31	-	**25**
6	EC896071	-	11.67	-	**11.67**	-	2.17	-	**2.17**	-	86.00	57.00	-	**71.50**	-	21	-	**21**
7	EC896073	12.60	-	-	**12.60**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
8	EC896074	11.60	17.00	-	**14.30**	3.86	3.67	-	**3.76**	66.00	88.33	62.00	-	**72.11**	17	26	-	**22**
9	EC896075	12.60	22.00	-	**17.30**	2.38	3.17	-	**2.77**	63.00	87.00	60.00	-	**70.00**	16	22	-	**19**
10	EC896076	11.60	16.33	-	**13.97**	2.50	2.53	-	**2.52**	65.00	84.67	64.00	-	**71.22**	22	25	-	**23**
11	EC896077	11.40	-	-	**11.40**	3.62	-	-	**3.62**	55.00	-	-	-	**55.00**	26	-	-	**26**
12	EC896079	13.00	-	-	**13.00**	2.50	-	-	**2.50**	64.00	-	-	-	**64.00**	22	-	-	**22**
13	EC896080	12.60	-	-	**12.60**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
14	EC896081	11.40	21.67	-	**16.53**	3.62	4.83	-	**4.23**	55.00	81.00	57.00	-	**64.33**	26	24	-	**25**
15	EC896082	11.60	-	-	**11.60**	3.70	-	-	**3.70**	60.00	-	-	-	**60.00**	33	-	-	**33**
16	EC896084	11.40	-	-	**11.40**	3.62	-	-	**3.62**	55.00	-	63.00	-	**59.00**	26	-	-	**26**
17	EC896099	11.40	-	-	**11.40**	3.62	-	-	**3.62**	55.00	-	-	-	**55.00**	26	-	-	**26**
18	EC896101	11.60	-	-	**11.60**	3.86	-	-	**3.86**	66.00	-	-	-	**66.00**	17	-	-	**17**
19	EC896102	12.60	19.33	-	**15.97**	2.38	3.07	-	**2.72**	63.00	82.00	59.00	-	**68.00**	16	23	-	**20**
20	EC896103	11.60	-	-	**11.60**	2.50	-	-	**2.50**	65.00	-	-	-	**65.00**	22	-	-	**22**
21	EC896104	13.00	-	-	**13.00**	2.50	-	-	**2.50**	64.00	-	-	-	**64.00**	22	-	-	**22**
22	EC896167	11.60	-	-	**11.60**	3.86	-	-	**3.86**	66.00	-	-	-	**66.00**	17	-	-	**17**
23	EC896171	12.60	-	-	**12.60**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
24	EC896183	11.60	-	-	**11.60**	2.50	-	-	**2.50**	65.00	-	-	-	**65.00**	22	-	-	**22**
25	EC896204	-	23.00	-	**23.00**	-	3.97	-	**3.97**	-	92.00	65.00	-	**78.50**	-	33	-	**33**
26	EC896213	-	25.00	-	**25.00**	-	4.63	-	**4.63**	-	86.00	57.00	-	**71.50**	-	34	-	**34**
27	EC896223	12.60	-	22.00	**17.30**	2.38	-	2.00	**2.19**	63.00	-	-	65.00	**64.00**	16	-	30	**23**
28	EC896224	11.40	23.67	27.00	**20.69**	3.62	2.57	2.00	**2.73**	55.00	80.33	65.00	67.00	**66.83**	26	16	29	**24**
29	EC896225	11.60	-	19.00	**15.30**	3.70	-	2.00	**2.85**	60.00	-	-	59.00	**59.50**	33	-	17	**25**
30	EC896227	13.00	-	27.00	**20.00**	2.50	-	2.00	**2.25**	64.00	-	-	67.00	**65.50**	22	-	29	**25**
31	EC896228	-	-	19.00	**19.00**	-	-	2.00	**2.00**	-	-	-	59.00	**59.00**	-	-	17	**17**
32	EC896229	-	-	19.00	**19.00**	-	-	2.50	**2.50**	-	-	53.00	63.00	**58.00**	-	-	22	**22**
33	EC896230	-	-	30.00	**30.00**	-	-	3.50	**3.50**	-	-	-	67.00	**67.00**	-	-	28	**28**

S. No	Accessions No.	Number of primary branches					Inflorescence length (cm)					Plant height (cm)				
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Mandor	Ranchi	Ludhiana	Ambikapur	Mean	Mandor	Ambikapur	Ludhiana	Ranchi	Mean
1	EC896060	2.40	-	-	-	**2.40**	-	-	-	3.68	**3.68**	-	53.80	-	-	**53.80**
2	EC896061	1.80	-	-	-	**1.80**	-	-	-	3.56	**3.56**	-	39.40	-	-	**39.40**
3	EC896065	3.20	6.33	-	-	**4.77**	-	-	13.00	4.60	**8.80**	-	70.20	37.73	-	**53.97**
4	EC896069	3.40	-	94.00	-	**48.70**	10.67	-	-	4.60	**7.63**	94.00	66.80	-	-	**80.40**
5	EC896070	2.40	8.00	97.00	-	**35.80**	10.97	-	7.00	4.82	**7.60**	97.00	68.80	57.12	-	**74.31**
6	EC896071	-	9.00	95.00	-	**52.00**	10.77	-	8.00	-	**9.38**	95.00	-	33.37	-	**64.18**
7	EC896073	1.20	-	-	-	**1.20**	-	-	-	3.56	**3.56**	-	35.60	-	-	**35.60**
8	EC896074	2.40	16.00	100.00	-	**39.47**	11.27	-	12.33	3.68	**9.09**	100.00	51.80	63.17	-	**71.66**
9	EC896075	1.20	18.33	100.00	-	**39.84**	11.33	-	13.33	3.56	**9.41**	100.00	35.60	63.18	-	**66.26**
10	EC896076	3.40	13.67	102.50	-	**39.86**	11.53	-	8.33	4.60	**8.16**	102.50	66.80	55.27	-	**74.86**
11	EC896077	4.00	-	-	-	**4.00**	-	-	-	6.20	**6.20**	-	72.00	-	-	**72.00**
12	EC896079	3.20	-	-	-	**3.20**	-	-	-	4.60	**4.60**	-	70.20	-	-	**70.20**
13	EC896080	1.20	-	-	-	**1.20**	-	-	-	3.56	**3.56**	-	35.60	-	-	**35.60**
14	EC896081	4.00	20.00	94.00	-	**39.33**	10.63	-	8.00	6.20	**8.28**	94.00	72.00	62.77	-	**76.26**
15	EC896082	6.20	-	-	-	**6.20**	-	-	-	6.18	**6.18**	-	70.00	-	-	**70.00**
16	EC896084	4.00	-	101.00	-	**52.50**	11.37	-	-	6.20	**8.78**	101.00	72.00	-	-	**86.50**
17	EC896099	4.00	-	-	-	**4.00**	-	-	-	6.20	**6.20**	-	72.00	-	-	**72.00**
18	EC896101	2.40	-	-	-	**2.40**	-	-	-	3.68	**3.68**	-	51.80	-	-	**51.80**
19	EC896102	1.20	18.67	95.50	-	**38.46**	10.77	-	11.33	3.56	**8.55**	95.50	35.60	49.08	-	**60.06**
20	EC896103	3.40	-	-	-	**3.40**	-	-	-	4.60	**4.60**	-	66.80	-	-	**66.80**
21	EC896104	3.20	-	-	-	**3.20**	-	-	-	4.60	**4.60**	-	70.20	-	-	**70.20**
22	EC896167	2.40	-	-	-	**2.40**	-	-	-	3.68	**3.68**	-	51.80	-	-	**51.80**
23	EC896171	1.20	-	-	-	**1.20**	-	-	-	3.56	**3.56**	-	35.60	-	-	**35.60**
24	EC896183	3.40	-	-	-	**3.40**	-	-	-	4.60	**4.60**	-	66.80	-	-	**66.80**
25	EC896204	-	19.33	102.00	-	**60.67**	11.43	-	12.67	-	**12.05**	102.00	-	56.15	-	**79.08**
26	EC896213	-	21.33	93.50	-	**57.42**	10.57	-	8.00	-	**9.28**	93.50	-	84.47	-	**88.98**
27	EC896223	1.20	-	-	18.00	**9.60**	-	10.00	-	3.56	**6.78**	-	35.60	-	48.00	**41.80**
28	EC896224	4.00	19.67	98.50	24.00	**36.54**	10.97	10.00	9.67	6.20	**9.21**	98.50	72.00	52.08	97.00	**79.90**
29	EC896225	6.20	-	-	12.00	**9.10**	-	7.00	-	6.18	**6.59**	-	70.00	-	53.00	**61.50**
30	EC896227	3.20	-	-	24.00	**13.60**	-	10.00	-	4.60	**7.30**	-	70.20	-	97.00	**83.60**
31	EC896228	-	-	-	12.00	**12.00**	-	7.00	-	-	**7.00**	-	-	-	53.00	**53.00**
32	EC896229	-	-	89.50	14.00	**51.75**	10.17	7.00	-	-	**8.58**	89.50	-	-	49.00	**69.25**
33	EC896230	-	-	-	18.00	**18.00**	-	8.00	-	-	**8.00**	-	-	-	73.00	**73.00**

S. No	Accessions No.	Days to 80% maturity					Seed yield per plant (g)				Seed volume (g/10ml)					Ranchi		
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Stem thickness (cm)	Lateral Inflorescence length (cm)	No. of Lateral Inflorescence
1	EC896060	120.0	-	-	-	**120.0**	19.00	-	-	**19.00**	7.04	-	-	-	**7.04**	-	-	-
2	EC896061	111.0	-	-	-	**111.0**	18.20	-	-	**18.20**	6.88	-	-	-	**6.88**	-	-	-
3	EC896065	116.0	126.0	-	-	**121.0**	16.00	34.88	-	**25.44**	6.34	7.06	-	-	**6.70**	-	-	-
4	EC896069	116.0	-	132.0	-	**124.0**	15.00	-	-	**15.00**	6.76	-	6.36	-	**6.56**	-	-	-
5	EC896070	120.0	127.3	135.0	-	**127.4**	13.00	38.73	-	**25.87**	6.24	8.43	5.55	-	**6.74**	-	-	-
6	EC896071	-	126.0	133.0	-	**129.5**	-	11.31	-	**11.31**	-	8.67	5.77	-	**7.22**	-	-	-
7	EC896073	113.0	-	-	-	**113.0**	18.20	-	-	**18.20**	6.24	-	-	-	**6.24**	-	-	-
8	EC896074	123.0	128.3	138.0	-	**129.8**	16.00	60.89	-	**38.44**	6.80	9.04	6.12	-	**7.32**	-	-	-
9	EC896075	113.0	131.0	140.0	-	**128.0**	18.20	39.34	-	**28.77**	6.24	8.27	5.78	-	**6.76**	-	-	-
10	EC896076	116.0	130.0	141.0	-	**129.0**	15.00	17.24	-	**16.12**	6.76	8.65	6.01	-	**7.14**	-	-	-
11	EC896077	125.0	-	-	-	**125.0**	55.00	-	-	**55.00**	7.34	-	-	-	**7.34**	-	-	-
12	EC896079	116.0	-	-	-	**116.0**	16.00	-	-	**16.00**	6.34	-	-	-	**6.34**	-	-	-
13	EC896080	113.0	-	-	-	**113.0**	18.20	-	-	**18.20**	6.24	-	-	-	**6.24**	-	-	-
14	EC896081	125.0	131.0	131.0	-	**129.0**	55.00	14.65	-	**34.82**	7.34	8.13	5.45	-	**6.97**	-	-	-
15	EC896082	127.0	-	-	-	**127.0**	13.00	-	-	**13.00**	6.14	-	-	-	**6.14**	-	-	-
16	EC896084	125.0	-	139.0	-	**132.0**	55.00	-	-	**55.00**	7.34	-	5.35	-	**6.35**	-	-	-
17	EC896099	125.0	-	-	-	**125.0**	55.00	-	-	**55.00**	7.34	-	-	-	**7.34**	-	-	-
18	EC896101	123.0	-	-	-	**123.0**	16.00	-	-	**16.00**	6.80	-	-	-	**6.80**	-	-	-
19	EC896102	113.0	128.3	132.0	-	**124.4**	18.20	13.59	-	**15.89**	6.24	8.12	6.02	-	**6.79**	-	-	-
20	EC896103	116.0	-	-	-	**116.0**	15.00	-	-	**15.00**	6.76	-	-	-	**6.76**	-	-	-
21	EC896104	116.0	-	-	-	**116.0**	16.00	-	-	**16.00**	6.34	-	-	-	**6.34**	-	-	-
22	EC896167	123.0	-	-	-	**123.0**	16.00	-	-	**16.00**	6.80	-	-	-	**6.80**	-	-	-
23	EC896171	113.0	-	-	-	**113.0**	18.20	-	-	**18.20**	6.24	-	-	-	**6.24**	-	-	-
24	EC896183	116.0	-	-	-	**116.0**	15.00	-	-	**15.00**	6.76	-	-	-	**6.76**	-	-	-
25	EC896204	-	130.0	139.0	-	**134.5**	-	73.18	-	**73.18**	-	7.95	5.49	-	**6.72**	-	-	-
26	EC896213	-	127.0	130.0	-	**128.5**	-	47.20	-	**47.20**	-	7.66	5.55	-	**6.61**	-	-	-
27	EC896223	113.0	-	-	106.0	**109.5**	18.20	-	5.00	**11.60**	6.24	-	-	7.50	**6.87**	3.50	5.00	10
28	EC896224	125.0	130.3	132.0	103.0	**122.6**	55.00	14.28	6.70	**25.33**	7.34	7.07	5.85	7.60	**6.97**	4.00	6.00	20
29	EC896225	127.0	-	-	100.0	**113.5**	13.00	-	4.40	**8.70**	6.14	-	-	7.10	**6.62**	3.00	4.00	12
30	EC896227	116.0	-	-	109.0	**112.5**	16.00	-	4.20	**10.10**	6.34	-	-	7.60	**6.97**	4.00	6.00	20
31	EC896228	-	-	-	110.0	**110.0**	-	-	4.40	**4.40**	-	-	-	7.10	**7.10**	3.00	4.00	12
32	EC896229	-	-	126.0	111.0	**118.5**	-	-	14.00	**14.00**	-	-	5.72	6.80	**6.26**	3.00	6.00	26
33	EC896230	-	-	-	108.0	**108.0**	-	-	5.00	**5.00**	-	-	-	7.80	**7.80**	3.00	4.00	12

S. No	Accessions No.	Leaf length (cm)					Leaf width (cm)					Number of leaves/plant			
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Mandor	Ambikapur	Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Ambikapur	Mean
34	EC896231	-	4.37	3.46	7.30	**5.04**	1.95	-	2.53	3.00	**2.49**	74.67	125.00	-	**99.83**
35	EC896240	-	-	-	5.00	**5.00**	-	-	-	3.50	**3.50**	-	84.00	-	**84.00**
36	EC896242	-	-	-	4.00	**4.00**	-	-	-	3.00	**3.00**	-	41.00	-	**41.00**
37	EC896244	-	-	-	4.00	**4.00**	-	-	-	3.00	**3.00**	-	75.00	-	**75.00**
38	EC896258	-	-	-	5.00	**5.00**	-	-	-	4.00	**4.00**	-	114.00	-	**114.00**
39	EC896259	-	-	-	5.50	**5.50**	-	-	-	4.00	**4.00**	-	124.00	-	**124.00**
40	EC896261	-	-	-	7.30	**7.30**	-	-	-	3.00	**3.00**	-	125.00	-	**125.00**
41	EC896265	-	-	-	4.50	**4.50**	-	-	-	3.00	**3.00**	-	140.00	-	**140.00**
42	EC896266	3.98	-	-	-	**3.98**	-	2.14	-	-	**2.14**	-	-	31.00	**31.00**
43	EC896267	5.46	-	-	-	**5.46**	-	3.86	-	-	**3.86**	-	-	77.60	**77.60**
44	EC896268	5.24	-	-	4.00	**4.62**	-	3.62	-	3.00	**3.31**	-	75.00	91.00	**83.00**
45	EC896272	3.60	-	-	4.00	**3.80**	-	2.86	-	3.00	**2.93**	-	41.00	69.00	**55.00**
46	EC896273	-	-	-	4.50	**4.50**	-	-	-	3.00	**3.00**	-	140.00	-	**140.00**
47	EC896274	-	-	-	6.00	**6.00**	-	-	-	4.00	**4.00**	-	85.00	-	**85.00**
48	EC896277	-	-	-	7.30	**7.30**	-	-	-	3.00	**3.00**	-	125.00	-	**125.00**
49	EC896279	-	-	-	5.00	**5.00**	-	-	-	3.50	**3.50**	-	84.00	-	**84.00**
50	EC896299	-	-	-	4.00	**4.00**	-	-	-	3.00	**3.00**	-	75.00	-	**75.00**
51	EC896301	-	4.17	4.95	4.00	**4.37**	2.31	-	3.63	3.00	**2.98**	138.67	41.00	-	**89.83**
52	EC896305	-	-	-	4.50	**4.50**	-	-	-	3.00	**3.00**	-	140.00	-	**140.00**
53	EC896320	-	-	-	6.00	**6.00**	-	-	-	4.00	**4.00**	-	85.00	-	**85.00**
Mean for check variety															
54	EC507738	3.60	-	-	5.50	**4.55**	-	2.86	-	3.67	**3.26**	-	60.00	69.00	**64.50**
55	EC507741	-	-	-	7.30	**7.30**	-	-	-	3.00	**3.00**	-	125.00	-	**125.00**
56	EC507742	3.98	-	-	-	**3.98**	-	2.14	-	-	**2.14**	-	-	31.00	**31.00**
57	SSQC-1	-	-	-	4.50	**4.50**	-	-	-	3.00	**3.00**	-	140.00	-	**140.00**
Minimum		**3.44**	**4.17**	**3.21**	**4.00**	**3.44**	**1.42**	**2.14**	**2.50**	**2.00**	**2.07**	**46.00**	**40.00**	**31.00**	**31.00**
Maximum		**5.46**	**6.37**	**5.41**	**7.30**	**7.30**	**2.48**	**3.86**	**5.07**	**4.00**	**4.00**	**138.67**	**140.00**	**91.00**	**140.00**
Mean		**4.37**	**5.33**	**4.32**	**4.99**	**4.73**	**2.01**	**2.99**	**3.82**	**3.20**	**3.06**	**83.90**	**90.75**	**60.19**	**78.04**
CV (%) Phen.		**17.75**	**12.91**	**15.62**	**23.43**	**18.71**	**16.12**	**21.73**	**19.94**	**14.47**	**17.54**	**30.84**	**40.12**	**33.71**	**40.19**

S. No	Accessions No.	Number of internodes				Petiole length (cm)				Days to 50% flowering					No.of inflorescence			
		Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean
34	EC896231	-	16.67	17.00	**16.83**	-	2.33	4.50	**3.42**	-	81.33	61.00	65.00	**69.11**	-	18	22	**20**
35	EC896240	-	-	22.00	**22.00**	-	-	2.00	**2.00**	-	-	-	64.00	**64.00**	-	-	20	**20**
36	EC896242	-	-	19.00	**19.00**	-	-	2.00	**2.00**	-	-	-	59.00	**59.00**	-	-	17	**17**
37	EC896244	-	-	27.00	**27.00**	-	-	2.00	**2.00**	-	-	-	67.00	**67.00**	-	-	29	**29**
38	EC896258	-	-	26.00	**26.00**	-	-	4.00	**4.00**	-	-	-	62.00	**62.00**	-	-	44	**44**
39	EC896259	-	-	24.00	**24.00**	-	-	3.50	**3.50**	-	-	-	66.00	**66.00**	-	-	25	**25**
40	EC896261	-	-	17.00	**17.00**	-	-	4.50	**4.50**	-	-	-	65.00	**65.00**	-	-	22	**22**
41	EC896265	-	-	19.00	**19.00**	-	-	2.50	**2.50**	-	-	-	63.00	**63.00**	-	-	22	**22**
42	EC896266	12.60	-	-	**12.60**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
43	EC896267	11.40	-	-	**11.40**	3.62	-	-	**3.62**	55.00	-	-	-	**55.00**	26	-	-	**26**
44	EC896268	11.60	-	27.00	**19.30**	3.70	-	2.00	**2.85**	60.00	-	-	67.00	**63.50**	33	-	29	**31**
45	EC896272	13.00	-	19.00	**16.00**	2.50	-	2.00	**2.25**	64.00	-	-	59.00	**61.50**	22	-	17	**19**
46	EC896273	-	-	19.00	**19.00**	-	-	2.50	**2.50**	-	-	-	63.00	**63.00**	-	-	22	**22**
47	EC896274	-	-	30.00	**30.00**	-	-	3.50	**3.50**	-	-	-	67.00	**67.00**	-	-	28	**28**
48	EC896277	-	-	17.00	**17.00**	-	-	4.50	**4.50**	-	-	-	65.00	**65.00**	-	-	22	**22**
49	EC896279	-	-	22.00	**22.00**	-	-	2.00	**2.00**	-	-	-	64.00	**64.00**	-	-	20	**20**
50	EC896299	-	-	27.00	**27.00**	-	-	2.00	**2.00**	-	-	-	67.00	**67.00**	-	-	29	**29**
51	EC896301	-	22.33	19.00	**20.67**	-	3.43	2.00	**2.72**	-	92.00	62.00	59.00	**71.00**	-	33	17	**25**
52	EC896305	-	-	19.00	**19.00**	-	-	2.50	**2.50**	-	-	-	63.00	**63.00**	-	-	22	**22**
53	EC896320	-	-	30.00	**30.00**	-	-	3.50	**3.50**	-	-	-	67.00	**67.00**	-	-	28	**28**
Mean for check variety																		
54	EC507738	13.00	-	27.33	**20.17**	2.50	-	3.33	**2.92**	64.00	-	-	65.67	**64.83**	22	-	29	**26**
55	EC507741	-	-	17.00	**17.00**	-	-	4.50	**4.50**	-	-	-	65.00	**65.00**	-	-	22	**22**
56	EC507742	12.60	-	-	**12.60**	2.38	-	-	**2.38**	63.00	-	-	-	**63.00**	16	-	-	**16**
57	SSQC-1	-	-	19.00	**19.00**	-	-	2.50	**2.50**	-	-	-	63.00	**63.00**	-	-	22	**22**
Minimum		**11.40**	**7.00**	**17.00**	**10.00**	**2.38**	**2.17**	**2.00**	**2.00**	**55.00**	**80.33**	**53.00**	**59.00**	**55.00**	**16**	**16**	**17**	**16**
Maximum		**13.00**	**25.00**	**30.00**	**30.00**	**3.86**	**4.83**	**4.50**	**4.63**	**69.00**	**92.00**	**65.00**	**67.00**	**78.50**	**33**	**34**	**44**	**44**
Mean		**12.10**	**18.26**	**22.37**	**17.12**	**2.96**	**3.31**	**2.78**	**2.97**	**62.06**	**85.77**	**60.00**	**64.02**	**64.78**	**21**	**25**	**24**	**23**
CV (%) Phen.		**5.15**	**30.09**	**20.21**	**31.89**	**21.24**	**26.48**	**33.92**	**25.86**	**6.21**	**4.48**	**5.94**	**4.44**	**7.17**	**23**	**25**	**24**	**23**

S. No	Accessions No.	Number of primary branches					Inflorescence length (cm)					Plant height (cm)				
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Mandor	Ranchi	Ludhiana	Ambikapur	Mean	Mandor	Ambikapur	Ludhiana	Ranchi	Mean
34	EC896231	-	15.33	98.00	14.00	**42.44**	11.03	9.00	8.33	-	**9.46**	98.00	-	50.42	63.00	**70.47**
35	EC896240	-	-	-	18.00	**18.00**	-	13.00	-	-	**13.00**	-	-	-	91.00	**91.00**
36	EC896242	-	-	-	12.00	**12.00**	-	7.00	-	-	**7.00**	-	-	-	53.00	**53.00**
37	EC896244	-	-	-	24.00	**24.00**	-	10.00	-	-	**10.00**	-	-	-	97.00	**97.00**
38	EC896258	-	-	-	20.00	**20.00**	-	14.00	-	-	**14.00**	-	-	-	77.00	**77.00**
39	EC896259	-	-	-	15.00	**15.00**	-	8.50	-	-	**8.50**	-	-	-	56.00	**56.00**
40	EC896261	-	-	-	14.00	**14.00**	-	9.00	-	-	**9.00**	-	-	-	63.00	**63.00**
41	EC896265	-	-	-	14.00	**14.00**	-	7.00	-	-	**7.00**	-	-	-	49.00	**49.00**
42	EC896266	1.20	-	-	-	**1.20**	-	-	-	3.56	**3.56**	-	35.60	-	-	**35.60**
43	EC896267	4.00	-	-	-	**4.00**	-	-	-	6.20	**6.20**	-	72.00	-	-	**72.00**
44	EC896268	6.20	-	-	24.00	**15.10**	-	10.00	-	6.18	**8.09**	-	70.00	-	97.00	**83.50**
45	EC896272	3.20	-	-	12.00	**7.60**	-	7.00	-	4.60	**5.80**	-	70.20	-	53.00	**61.60**
46	EC896273	-	-	-	14.00	**14.00**	-	7.00	-	-	**7.00**	-	-	-	49.00	**49.00**
47	EC896274	-	-	-	18.00	**18.00**	-	8.00	-	-	**8.00**	-	-	-	73.00	**73.00**
48	EC896277	-	-	-	14.00	**14.00**	-	9.00	-	-	**9.00**	-	-	-	63.00	**63.00**
49	EC896279	-	-	-	18.00	**18.00**	-	13.00	-	-	**13.00**	-	-	-	91.00	**91.00**
50	EC896299	-	-	-	24.00	**24.00**	-	10.00	-	-	**10.00**	-	-	-	97.00	**97.00**
51	EC896301	-	19.67	97.00	12.00	**42.89**	10.87	7.00	13.33	-	**10.40**	91.00	-	70.83	53.00	**71.61**
52	EC896305	-	-	-	14.00	**14.00**	-	7.00	-	-	**7.00**	-	-	-	49.00	**49.00**
53	EC896320	-	-	-	18.00	**18.00**	-	8.00	-	-	**8.00**	-	-	-	73.00	**73.00**
Mean for check variety																
54	EC507738	3.20	-	-	18.33	**10.77**	-	9.00	-	4.60	**6.80**	-	70.20	-	70.67	**70.43**
55	EC507741	-	-	-	14.00	**14.00**	-	9.00	-	-	**9.00**	-	-	-	63.00	**63.00**
56	EC507742	1.20	-	-	-	**1.20**	-	-	-	3.56	**3.56**	-	35.60	-	-	**35.60**
57	SSQC-1	-	-	-	14.00	**14.00**	-	7.00	-	-	**7.00**	-	-	-	49.00	**49.00**
Minimum		**1.20**	**6.33**	**89.50**	**12.00**	**1.20**	**10.17**	**7.00**	**7.00**	**3.56**	**3.56**	**89.50**	**35.60**	**33.37**	**48.00**	**35.60**
Maximum		**6.20**	**21.33**	**102.50**	**24.00**	**60.67**	**11.53**	**14.00**	**13.33**	**6.20**	**14.00**	**102.50**	**72.00**	**84.47**	**97.00**	**97.00**
Mean		**2.99**	**15.79**	**97.17**	**16.69**	**19.12**	**10.96**	**8.84**	**10.26**	**4.65**	**7.42**	**96.77**	**58.56**	**56.59**	**67.85**	**65.33**
CV (%) Phen.		**48.24**	**32.01**	**3.74**	**24.97**	**90.27**	**3.46**	**22.37**	**23.78**	**22.81**	**34.29**	**4.10**	**25.98**	**23.47**	**26.91**	**24.53**

S. No	Accessions No.	Days to 80% maturity					Seed yield per plant (g)				Seed volume (g/10ml)					Ranchi		
		Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Ambikapur	Ludhiana	Ranchi	Mean	Ambikapur	Ludhiana	Mandor	Ranchi	Mean	Stem thickness (cm)	Lateral Inflorescence length (cm)	No. of Lateral Inflorescence
34	EC896231	-	126.0	135.0	112.0	**124.3**	-	15.38	1.90	**8.64**	-	7.15	5.71	7.70	**6.85**	3.00	6.00	23
35	EC896240	-	-	-	108.0	**108.0**	-	-	4.70	**4.70**	-	-	-	7.30	**7.30**	3.00	9.00	26
36	EC896242	-	-	-	110.0	**110.0**	-	-	4.40	**4.40**	-	-	-	7.10	**7.10**	3.00	4.00	12
37	EC896244	-	-	-	107.0	**107.0**	-	-	4.20	**4.20**	-	-	-	7.60	**7.60**	4.00	6.00	20
38	EC896258	-	-	-	108.0	**108.0**	-	-	6.60	**6.60**	-	-	-	6.10	**6.10**	4.00	8.00	29
39	EC896259	-	-	-	109.0	**109.0**	-	-	12.00	**12.00**	-	-	-	7.30	**7.30**	4.00	5.00	21
40	EC896261	-	-	-	112.0	**112.0**	-	-	1.90	**1.90**	-	-	-	7.70	**7.70**	3.00	6.00	23
41	EC896265	-	-	-	111.0	**111.0**	-	-	14.00	**14.00**	-	-	-	6.80	**6.80**	3.00	6.00	26
42	EC896266	113.0	-	-	-	**113.0**	18.20	-	-	**18.20**	6.24	-	-	-	**6.24**	-	-	-
43	EC896267	125.0	-	-	-	**125.0**	55.00	-	-	**55.00**	7.34	-	-	-	**7.34**	-	-	-
44	EC896268	127.0	-	-	109.0	**118.0**	13.00	-	4.20	**8.60**	6.14	-	-	7.60	**6.87**	4.00	6.00	20
45	EC896272	116.0	-	-	110.0	**113.0**	16.00	-	4.40	**10.20**	6.34	-	-	7.10	**6.72**	3.00	4.00	12
46	EC896273	-	-	-	111.0	**111.0**	-	-	14.00	**14.00**	-	-	-	6.80	**6.80**	3.00	6.00	26
47	EC896274	-	-	-	108.0	**108.0**	-	-	5.00	**5.00**	-	-	-	7.80	**7.80**	3.00	4.00	12
48	EC896277	-	-	-	112.0	**112.0**	-	-	1.90	**1.90**	-	-	-	7.70	**7.70**	3.00	6.00	23
49	EC896279	-	-	-	108.0	**108.0**	-	-	4.70	**4.70**	-	-	-	7.30	**7.30**	3.00	9.00	26
50	EC896299	-	-	-	109.0	**109.0**	-	-	4.20	**4.20**	-	-	-	7.60	**7.60**	4.00	6.00	20
51	EC896301	-	132.7	138.0	110.0	**126.9**	-	32.45	4.40	**18.43**	-	8.74	5.95	7.10	**7.26**	3.00	4.00	12
52	EC896305	-	-	-	111.0	**111.0**	-	-	14.00	**14.00**	-	-	-	6.80	**6.80**	3.00	6.00	26
53	EC896320	-	-	-	108.0	**108.0**	-	-	5.00	**5.00**	-	-	-	7.80	**7.80**	3.00	4.00	12
Mean for check variety																		
54	EC507738	116.0	-	-	109.3	**112.7**	16.00	-	4.07	**10.03**	6.34	-	-	8.00	**7.17**	3.00	4.83	20
55	EC507741	-	-	-	112.0	**112.0**	-	-	4.90	**4.90**	-	-	-	7.70	**7.70**	3.00	6.00	23
56	EC507742	113.0	-	-	-	**113.0**	18.20	-	-	**18.20**	6.24	-	-	-	**6.24**	-	-	-
57	SSQC-1	-	-	-	114.0	**114.0**	-	-	14.00	**14.00**	-	-	-	6.80	**6.80**	3.00	6.00	26
Minimum		**111.0**	**126.0**	**126.0**	**100.0**	**107.0**	**13.00**	**11.31**	**1.90**	**1.90**	**6.14**	**7.06**	**5.35**	**6.10**	**6.10**	**3.00**	**4.00**	**10**
Maximum		**127.0**	**132.7**	**141.0**	**114.0**	**134.5**	**55.00**	**73.18**	**14.00**	**73.18**	**7.34**	**9.04**	**6.36**	**8.00**	**7.80**	**4.00**	**9.00**	**29**
Mean		**118.6**	**128.8**	**134.7**	**109.1**	**117.4**	**23.30**	**31.78**	**6.36**	**18.21**	**6.61**	**8.07**	**5.78**	**7.33**	**6.92**	**3.27**	**5.60**	**20**
CV (%) Phen.		**4.5**	**1.7**	**3.2**	**2.6**	**6.7**	**65.54**	**62.57**	**63.56**	**85.34**	**6.55**	**8.25**	**4.83**	**6.01**	**6.77**	**13.48**	**24.99**	**31**

Table 34: Experimental details of germplasm evaluation of chenopodium quinoa Rabi 2019-20 Plain: II Year

S. No	Item	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi
1	No of entry	50	46	46	46	46
2	No of Check	5	4	4	4	3
4	Design	4	5	5	-	5
3	No of Block	ABD	ABD	ABD	ABD	ABD
7	Number of Rows	3	3	-	2	2
8	Row length (m)	3	3	-	3	3
5	Row spacing (cm)	45	45	45	45	45
6	Plant spacing (cm)	15	15	15	15	15
13	NPKS (kg/ha)	24.69	-	37.04	37.04	37.04
11	plot size *(m^2)*	10/2/2020	4/9/2020	As per maturity	09/03/2020 to 17/03/2020	09/03/2020 to 17/03/2020
9	Sowing Date	60:40:20:20	-	60:40:20	-	20:40:20:20
10	Harvesting Period	28-10-2019	11/19/2019	15/11/2019	3/12/2019	3/12/2019
12	Conversion Factor	4.05	4.05	2.7	2.7	2.7

Table 35: Promising lines in chenopodium quinoa germplasm at various locations: Rabi 2019-20 (Plains)-IIYear

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
I	**UAS, Bengaluru (50 accessions)**				
1	Days to 50% flowering	34.67	41.67	EC896276 (34.67)	EC507738 (35.33)
2	Days to 80% maturity	79.00	92.33	EC896105 (79), EC896089 (79.67)	EC507741 (85.33)
3	Inflorescence length (cm)	19.00	36.33	EC896088 (36.33), EC896215 (36.33)	GKVK-1 (36.11)
4	Plant height (cm)	79.33	116.67	-	GKVK-2 (116.67)
	Plant height (cm) dwarf	79.33	116.67	EC896205 (79.33), EC896206 (84.33), EC896091 (89.67), EC896061 (92.67)	SSQC-1 (92.67)
5	Seed yield per plant (g)	12.33	23.67	EC896059 (23.67), EC896219 (23.67), EC896098 (22.67), EC896062 (22.33), EC896097 (22)	GKVK-1 (21.67)
6	Seed volume (g/10ml)	4.75	5.81	EC896276 (5.81), EC896206 (5.8), EC896062 (5.79)	GKVK-1 (5`.75)
II	**PAU, Ludhiana (50 accessions)**				
1	Days to 50% flowering	82.33	93.00	EC896212 (82.33), EC896205 (82.67), EC896111 (83.67), EC896089 (85), EC896115 (86), EC896086 (87), EC896109 (91), EC896218 (91), EC896219 (92), EC896233 (93)	
2	Days to 80% maturity	116.00	133.00	EC896219 (116), EC896233 (118), EC896218 (118.33), EC896205 (126), EC896111 (126.67), EC896212 (127), EC896086 (130), EC896115 (130.67), EC896089 (131), EC896109 (133)	
3	Inflorescence length (cm)	7.17	20.00	EC896233 (20), EC896109 (19.33), EC896219 (19.33), EC896089 (18.33), EC896218 (18.33), EC896115 (18), EC896205 (14.67), EC896212 (14.67), EC896086 (12.33), EC896111 (7.17)	
4	Leaf length (cm)	2.47	7.43	EC896089 (7.43), EC896218 (6.77), EC896233 (6.73), EC896109 (6.5), EC896115 (5.87), EC896205 (5.83), EC896086 (5.8), EC896219 (5.7), EC896212 (3.93), EC896111 (2.47)	
5	Leaf width (cm)	1.37	5.50	EC896233 (5.5), EC896109 (5.1), EC896115 (4.27), EC896218 (4.23), EC896089 (4.2), EC896219 (3.97), EC896086 (3.6), EC896205 (3.33), EC896212 (1.83), EC896111 (1.37)	
6	Number of inflorescence per plant	19.67	41.67	EC896233 (41.67), EC896219 (33.67), EC896218 (32.33), EC896089 (29.67), EC896086 (26.67), EC896109 (24.33), EC896212 (24), EC896115 (23.33), EC896205 (23), EC896111 (19.67)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
7	Number of internodes per plant	7.00	22.33	EC896089 (22.33), EC896233 (22), EC896109 (18.33), EC896115 (16.67), EC896086 (14.33), EC896218 (12.33), EC896205 (12), EC896212 (9.67), EC896219 (9.67), EC896111 (7)	
8	Number of leaves/plant	41.33	114.33	EC896233 (114.33), EC896109 (110.67), EC896219 (95), EC896218 (82.67), EC896212 (71), EC896115 (70.67), EC896089 (68), EC896205 (64.67), EC896086 (57.33), EC896111 (41.33)	
9	Petiole length (cm)	1.17	4.53	EC896233 (4.53), EC896109 (4.17), EC896219 (4.17), EC896115 (4.03), EC896218 (4.03), EC896212 (3.6), EC896086 (3.53), EC896089 (3.4), EC896205 (2.97), EC896111 (1.17)	
10	Plant height (cm)	24.83	82.45	EC896218 (82.45), EC896233 (82.37), EC896089 (82.13), EC896219 (77.43), EC896115 (74.5), EC896109 (67.42), EC896086 (67.1), EC896205 (48.58), EC896212 (42.13), EC896111 (24.83)	
	Plant height (cm) dwarf	24.83	82.45	EC896111 (24.83), EC896212 (42.13), EC896205 (48.58), EC896086 (67.1), EC896109 (67.42), EC896115 (74.5), EC896219 (77.43), EC896089 (82.13), EC896233 (82.37), EC896218 (82.45)	
11	Number of branches/plant	2.67	20.67	EC896233 (20.67), EC896089 (19.67), EC896109 (15.67), EC896205 (12.33), EC896218 (11.33), EC896086 (11), EC896115 (11), EC896219 (9), EC896212 (8), EC896111 (2.67)	
12	Seed yield per plant (g)	24.33	117.45	EC896233 (117.45), EC896218 (102.08), EC896219 (101.91), EC896109 (70.8), EC896115 (63.49), EC896089 (49.98), EC896086 (39.1), EC896205 (37.16), EC896212 (24.33)	
13	Seed volume (g/10ml)	7.63	9.48	EC896115 (9.48), EC896219 (8.9), EC896089 (8.47), EC896086 (8.32), EC896233 (8.27), EC896218 (8.19), EC896212 (8.14), EC896109 (8.13), EC896205 (7.63)	
III	**AU, Mandor (50 accessions)**				
1	Days to 50% flowering	54.00	70.00	EC896089 (54), EC896203 (55), EC896211 (57), EC896114 (59), EC896086 (62), EC896110 (62), EC896108 (65), EC896215 (67), EC896218 (68), EC896219 (70)	
2	Days to 80% maturity	129.00	139.00	EC896089 (129), EC896215 (129), EC896114 (130), EC896203 (131), EC896110 (133), EC896211 (134), EC896218 (135), EC896086 (138), EC896219 (138), EC896108 (139)	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
3	Inflorescence length (cm)	18.00	31.50	EC896089 (31.5), EC896215 (29), EC896086 (26.33), EC896108 (26.33), EC896219 (25.33), EC896211 (24), EC896218 (23.5), EC896114 (22.5), EC896203 (21), EC896110 (18)	
4	Leaf length (cm)	3.56	4.98	EC896215 (4.98), EC896089 (4.78), EC896218 (4.56), EC896211 (4.16), EC896219 (4.15), EC896114 (4.12), EC896108 (3.98), EC896110 (3.86), EC896086 (3.56), EC896203 (3.56)	
5	Leaf Width (cm)	1.45	2.45	EC896215 (2.45), EC896089 (2.13), EC896218 (2.12), EC896114 (2.01), EC896219 (1.94), EC896108 (1.89), EC896203 (1.77), EC896086 (1.75), EC896211 (1.75), EC896110 (1.45)	
6	Plant height (cm)	59.67	163.33	EC896089 (163.33), EC896215 (128.67), EC896219 (127.33), EC896108 (108.5), EC896203 (107), EC896218 (102.5), EC896086 (101.5), EC896211 (91), EC896114 (81.5), EC896110 (59.67)	
	Plant height (cm) dwarf	59.67	163.33	EC896110 (59.67), EC896114 (81.5), EC896211 (91), EC896086 (101.5), EC896218 (102.5), EC896203 (107), EC896108 (108.5), EC896219 (127.33), EC896215 (128.67), EC896089 (163.33)	
7	Number of branches/plant	4.50	14.00	EC896215 (14), EC896086 (10), EC896089 (9.5), EC896219 (9), EC896114 (8), EC896108 (7.5), EC896218 (7.5), EC896110 (5), EC896203 (4.5), EC896211 (4.5)	
8	Seed volume (g/10ml)	5.12	6.23	EC896089 (6.23), EC896215 (6.14), EC896203 (5.95), EC896219 (5.85), EC896218 (5.79), EC896211 (5.75), EC896108 (5.56), EC896114 (5.56), EC896086 (5.12), EC896110 (5.12)	
IV	**MPKV, Rahuri (50 accessions)**				
1	Days to 50% flowering	42.00	51.00	EC896109 (42), EC896089 (43), EC896111 (43), EC896215 (43), EC896275 (43), EC896100 (44), EC896114 (44), EC896205 (44), EC896212 (44), EC896228 (44)	
2	Days to 80% maturity	95.00	111.00	EC896205 (95), EC896210 (96), EC896275 (96), EC896276 (96), EC896209 (97), EC896089 (98), EC896086 (99), EC896208 (99), EC896229 (99), EC896271 (99), EC896233 (100), EC896264 (100)	
3	Inflorescence length (cm)	17.70	38.70	EC896100 (38.7), EC896089 (33.7), EC896208 (33.7), EC896090 (33.3), EC896112 (32.3), EC896088 (31.3), EC896097 (31), EC896212 (31), EC896110 (30.7), EC896111 (30.7), EC896219 (30.3), EC896207	

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
4	Leaf length (cm)	2.60	9.80	EC896090 (9.8), EC896083 (8.9), EC896276 (8), EC896088 (7.8), EC896219 (7.5), EC896202 (7.4), EC896206 (7.4), EC896264 (7.4), EC896275 (7.4)	
5	Leaf width (cm)	1.90	7.80	EC896086 (7.8), EC896083 (7.6), EC896061 (6.6), EC896206 (6.5), EC896090 (6.2), EC896088 (6.1), EC896246 (6.1), EC896059 (5.9), EC896089 (5.9), EC896239 (5.9)	
6	Plant height (cm)	59.70	141.30	EC896212 (141.3), EC896090 (140), EC896088 (136), EC896114 (135), EC896059 (134.3), EC896061 (133), EC896086 (130), EC896111 (129), EC896097 (127.3), EC896208 (121.7)	
	Plant height (cm) dwarf	59.70	141.30	EC896229 (59.7), EC896264 (65.6), EC896205 (66.3), EC896228 (75.3), EC896237 (84), EC896100 (90.7), EC896112 (90.7), EC896215 (91.3), EC896238 (91.3), EC896233 (93.7), EC896209 (94), EC896239	
7	Seed yield per plant (g)	9.00	35.00	EC896219 (35), EC896097 (33.5), EC896088 (32), EC896086 (29.6), EC896083 (26.6), EC896061 (25), EC896111 (24), EC896112 (23), EC896059 (22)	
8	Seed volume (g/10ml)	3.00	7.00	EC896219 (7), EC896100 (6.5), EC896246 (6.2), EC896088 (6), EC896105 (6), EC896215 (6), EC896233 (6), EC896238 (6), EC896276 (6), EC896206 (5.9), EC896205 (5.6)	
V	**BAU, Ranchi (50 accessions)**				
1	Days to 50% flowering	54.00	68.00	EC896116 (54), EC896205 (54), EC896206 (55), EC896207 (56)	SSQC-1 (59.75)
2	Days to 80% maturity	99.00	114.00	EC896100 (99), EC896114 (99), EC896089 (100), EC896109 (100), EC896090 (101), EC896110 (101), EC896116 (103), EC896111 (104), EC896115 (104), EC896207 (104), EC896211 (104)	SSQC-1 (107.5)
3	Inflorescence length (cm)	5.00	26.25		SSQC-1 (26.25)
4	Leaf length (cm)	3.00	6.00	EC896202 (6), EC896205 (6), EC896218 (5.5)	EC507741 (5.2)
5	Leaf width (cm)	1.50	4.50	EC896207 (4.5), EC896218 (4.5), EC896105 (4), EC896202 (4), EC896209 (4)	EC507741 (3.25)
6	Number of inflorescence per plant	7.00	29.00	EC896109 (29), EC896114 (21), EC896062 (19), EC896120 (19), EC896105 (18), EC896115 (18), EC896087 (17), EC896059 (16), EC896064 (16), EC896110 (16), EC896202 (16), EC896218 (15)	EC507742 (12.8)
7	Number of inflorescence per plant	17.00	40.00	EC896115 (40), EC896202 (37), EC896110 (33), EC896120 (33), EC896100 (32), EC896062 (31), EC896207 (31), EC896064 (30), EC896089 (30), EC896105 (30)	EC507742 (25.2)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
8	Number of internodes per plant	17.00	57.00	EC896207 (57), EC896202 (48), EC896111 (38), EC896205 (37), EC896120 (36), EC896208 (36), EC896218 (36), EC896276 (36), EC896115 (35)	EC507738 (30.33)
9	Number of leaves/plant	25.00	175.00	EC896202 (175), EC896105 (136), EC896218 (130), EC896110 (113), EC896064 (90), EC896115 (83), EC896100 (82)	EC507742 (77)
10	Petiole length (cm)	1.13	4.00	EC896111 (4), EC896207 (4), EC896218 (4), EC896205 (3.5), EC896209 (3.5), EC896064 (3), EC896086 (3), EC896110 (3), EC896206 (3)	SSQC-1 (2.75)
11	Plant height (cm)	51.00	103.00	EC896202 (103), EC896218 (95), EC896115 (92), EC896064 (90), EC896105 (90), EC896059 (89), EC896089 (82)	EC507742 (75.6)
	Plant height (cm) dwarf	51.00	103.00	EC896100 (51)	EC507741 (51.75)
12	Number of branches/plant	10.00	31.00	EC896202 (31), EC896089 (28), EC896105 (28), EC896218 (28), EC896064 (26), EC896112 (26), EC896110 (25)	EC507742 (21.6)
13	Seed yield per plant (g)	1.20	25.00	EC896062 (25), EC896276 (24), EC896110 (10)	EC507741 (9.73)
14	Stem thickness (cm)	2.50	6.40	EC896207 (6.4), EC896202 (5), EC896218 (4.5), EC896088 (4), EC896089 (4), EC896110 (4), EC896115 (4), EC896120 (4), EC896206 (4), EC896210 (4)	EC507742 (3.4)
15	Lateral Inflorescence length (cm)	3.00	10.00	EC896115 (10), EC896120 (9), EC896212 (7.5), EC896208 (7), EC896276 (7), EC896218 (6.5), EC896059 (6), EC896064 (6), EC896087 (6), EC896105 (6), EC896202 (6)	EC507738 (4.67)
16	Seed volume (g/10ml)	7.10	9.00	EC896063 (9), EC896105 (8.9), EC896202 (8.9), EC896090 (8.8), EC896086 (8.7), EC896089 (8.7), EC896112 (8.7), EC896206 (8.7), EC896276 (8.7), EC896062 (8.6)	EC507738 (8.57)
VI	**Based on all locations (50 accessions)**				
1	Days to 50% flowering	44.00	74.00	EC896228 (44), EC896083 (45), EC896097 (46), EC896061 (47), EC896229 (47), EC896264 (48), EC896271 (48), EC896237 (49), EC896246 (49), EC896239 (50), EC896116 (50.5), EC896207 (50.5), EC896238 (51), EC896275 (51), EC896090 (51.5)	SSQC-1 (59.75)
2	Days to 80% maturity	99.00	122.11	EC896229 (99), EC896271 (99), EC896264 (100)	SSQC-1 (107.5)
3	Inflorescence length (cm)	5.00	36.11		GKVK-1 (36.11)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
4	Leaf length (cm)	3.50	8.90	EC896083 (8.9), EC896264 (7.4), EC896202 (6.7), EC896061 (6.6), EC896271 (6.6), EC896097 (6.5), EC896090 (6.4), EC896276 (6.25), EC896206 (6.2)	EC507741 (5.2)
5	Leaf width (cm)	1.88	7.60	EC896083 (7.6), EC896061 (6.6), EC896246 (6.1), EC896239 (5.9), EC896238 (5.5), EC896264 (5.5), EC896097 (5.1), EC896207 (4.95), EC896202 (4.75), EC896206 (4.75)	EC507741 (3.25)
6	Number of inflorescence per plant	14.50	41.67	EC896233 (41.67), EC896219 (33.67), EC896115 (27.11), EC896202 (26.5), EC896120 (26), EC896109 (25.44), EC896218 (25.11), EC896062 (25), EC896110 (24.5), EC896105 (24)	EC507742 (19)
7	Number of internodes per plant	9.67	57.00	EC896207 (57), EC896202 (48), EC896120 (36), EC896208 (36), EC896276 (36)	EC507738 (30.33)
8	Number of leaves/plant	34.00	175.00	EC896202 (175), EC896105 (136), EC896233 (114.33), EC896110 (113), EC896218 (106.33), EC896219 (95), EC896064 (90), EC896109 (86.33), EC896100 (82)	EC507742 (77)
9	Petiole length (cm)	1.13	4.53	EC896233 (4.53), EC896219 (4.17), EC896218 (4.02), EC896207 (4), EC896209 (3.5), EC896086 (3.27), EC896115 (3.27), EC896205 (3.23), EC896109 (3.08), EC896064 (3), EC896110 (3), EC896206 (3), EC896212 (2.8)	SSQC-1 (2.75)
10	Plant height (cm)	57.00	116.67		GKVK-2 (116.67)
	Plant height (cm) dwarf	57.00	116.67	EC896063 (57), EC896205 (67.8), EC896211 (73.5), EC896112 (75.35)	EC507742 (75.6)
11	Number of branches/plant	4.50	31.00	EC896202 (31), EC896105 (28), EC896064 (26), EC896112 (26), EC896062 (24)	EC507742 (21.6)
12	Seed yield per plant (g)	2.90	53.52	EC896219 (53.52), EC896233 (50.15), EC896218 (34.99), EC896097 (27.75), EC896109 (27.48), EC896115 (25.71), EC896062 (23.67), EC896098 (22.67), EC896089 (22.17)	GKVK-1 (21.67)
13	Seed volume (g/10ml)	4.17	9.00	EC896063 (9)	EC507742 (8.22)

Table 36: Multilocation evaluation of germplasm lines in chenopodium quinoa : Rabi 2019-20 (Plains)-II Year

S. No	Accessions No.	Leaf length (cm)					Leaf width (cm)					Number of inflorescence			
		Ludhiana	Mandor	Rahuri	Ranchi	Mean	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Ludhiana	Ranchi	Ranchi	Mean
1	EC896059	-	-	6.50	5.00	**5.75**	-	-	5.90	3.00	**4.45**	-	16.00	20.00	**18.00**
2	EC896061	-	-	6.60	-	**6.60**	-	-	6.60	-	**6.60**	-	-	-	**-**
3	EC896062	-	-	-	3.50	**3.50**	-	-	-	2.00	**2.00**	-	19.00	31.00	**25.00**
4	EC896063	-	-	-	3.50	**3.50**	-	-	-	2.50	**2.50**	-	10.00	20.00	**15.00**
5	EC896064	-	-	-	5.00	**5.00**	-	-	-	3.00	**3.00**	-	16.00	30.00	**23.00**
6	EC896067	-	-	-	4.50	**4.50**	-	-	-	2.00	**2.00**	-	11.00	18.00	**14.50**
7	EC896083	-	-	8.90	-	**8.90**	-	-	7.60	-	**7.60**	-	-	-	**-**
9	EC896086	5.80	3.56	3.10	4.50	**4.24**	3.60	1.75	7.80	2.50	**3.91**	26.67	13.00	17.00	**18.89**
10	EC896087	-	-	7.30	5.00	**6.15**	-	-	5.50	3.00	**4.25**	-	17.00	24.00	**20.50**
11	EC896088	-	-	7.80	4.50	**6.15**	-	-	6.10	2.50	**4.30**	-	11.00	22.00	**16.50**
12	EC896089	7.43	4.78	7.30	4.50	**6.00**	4.20	2.13	5.90	2.00	**3.56**	29.67	10.00	30.00	**23.22**
13	EC896090	-	-	9.80	3.00	**6.40**	-	-	6.20	2.00	**4.10**	-	9.00	20.00	**14.50**
14	EC896091	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-	**-**
15	EC896097	-	-	6.50	-	**6.50**	-	-	5.10	-	**5.10**	-	-	-	**-**
16	EC896098	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-	**-**
17	EC896100	-	-	5.30	4.00	**4.65**	-	-	4.20	3.00	**3.60**	-	8.00	32.00	**20.00**
18	EC896105	-	-	5.40	5.00	**5.20**	-	-	4.90	4.00	**4.45**	-	18.00	30.00	**24.00**
19	EC896108	-	3.98	7.30	-	**5.64**	-	1.89	5.80	-	**3.85**	-	-	-	**-**
20	EC896109	6.50	-	7.00	4.50	**6.00**	5.10	-	5.00	3.00	**4.37**	24.33	29.00	23.00	**25.44**
21	EC896110	-	3.86	6.10	4.00	**4.65**	-	1.45	4.50	3.00	**2.98**	-	16.00	33.00	**24.50**
22	EC896111	2.47	-	7.00	5.00	**4.82**	1.37	-	5.40	3.00	**3.26**	19.67	12.00	29.00	**20.22**
23	EC896112	-	-	6.10	3.50	**4.80**	-	-	4.10	1.50	**2.80**	-	13.00	28.00	**20.50**
24	EC896114	-	4.12	6.50	3.00	**4.54**	-	2.01	4.90	2.00	**2.97**	-	21.00	20.00	**20.50**
25	EC896115	5.87	-	6.90	4.00	**5.59**	4.27	-	5.60	3.00	**4.29**	23.33	18.00	40.00	**27.11**
26	EC896116	-	-	6.50	4.00	**5.25**	-	-	5.30	3.00	**4.15**	-	13.00	28.00	**20.50**
27	EC896120	-	-	5.50	4.00	**4.75**	-	-	4.50	3.00	**3.75**	-	19.00	33.00	**26.00**
28	EC896202	-	-	7.40	6.00	**6.70**	-	-	5.50	4.00	**4.75**	-	16.00	37.00	**26.50**
29	EC896203	-	3.56	5.80	-	**4.68**	-	1.77	4.60	-	**3.19**	-	-	-	**-**
30	EC896205	5.83	-	2.60	6.00	**4.81**	3.33	-	1.90	3.00	**2.74**	23.00	9.00	27.00	**19.67**
31	EC896206	-	-	7.40	5.00	**6.20**	-	-	6.50	3.00	**4.75**	-	9.00	27.00	**18.00**

S. No	Accessions No.	No. of internodes per plant			Number of leaves/plant			Petiole length (cm)			Number of branches/plant			
		Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Mean	Ludhiana	Mandor	Ranchi	Mean
1	EC896059	-	23.00	**23.00**	-	72.00	**72.00**	-	2.50	**2.50**	-	-	23.00	**23.00**
2	EC896061	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
3	EC896062	-	27.00	**27.00**	-	71.00	**71.00**	-	1.50	**1.50**	-	-	24.00	**24.00**
4	EC896063	-	17.00	**17.00**	-	34.00	**34.00**	-	2.00	**2.00**	-	-	10.00	**10.00**
5	EC896064	-	30.00	**30.00**	-	90.00	**90.00**	-	3.00	**3.00**	-	-	26.00	**26.00**
6	EC896067	-	20.00	**20.00**	-	37.00	**37.00**	-	2.50	**2.50**	-	-	13.00	**13.00**
7	EC896083	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
9	EC896086	14.33	22.00	**18.17**	57.33	25.00	**41.17**	3.53	3.00	**3.27**	11.00	10.00	14.00	**11.67**
10	EC896087	-	28.00	**28.00**	-	62.00	**62.00**	-	2.50	**2.50**	-	-	20.00	**20.00**
11	EC896088	-	23.00	**23.00**	-	52.00	**52.00**	-	2.00	**2.00**	-	-	13.00	**13.00**
12	EC896089	22.33	34.00	**28.17**	68.00	76.00	**72.00**	3.40	2.00	**2.70**	19.67	9.50	28.00	**19.06**
13	EC896090	-	32.00	**32.00**	-	64.00	**64.00**	-	1.50	**1.50**	-	-	22.00	**22.00**
14	EC896091	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
15	EC896097	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
16	EC896098	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
17	EC896100	-	22.00	**22.00**	-	82.00	**82.00**	-	2.50	**2.50**	-	-	18.00	**18.00**
18	EC896105	-	29.00	**29.00**	-	136.00	**136.00**	-	2.50	**2.50**	-	-	28.00	**28.00**
19	EC896108	-	-	**-**	-	-	**-**	-	-	**-**	-	7.50	-	**7.50**
20	EC896109	18.33	33.00	**25.67**	110.67	62.00	**86.33**	4.17	2.00	**3.08**	15.67	-	22.00	**18.83**
21	EC896110	-	34.00	**34.00**	-	113.00	**113.00**	-	3.00	**3.00**	-	5.00	25.00	**15.00**
22	EC896111	7.00	38.00	**22.50**	41.33	46.00	**43.67**	1.17	4.00	**2.58**	2.67	-	19.00	**10.83**
23	EC896112	-	34.00	**34.00**	-	42.00	**42.00**	-	2.00	**2.00**	-	-	26.00	**26.00**
24	EC896114	-	24.00	**24.00**	-	41.00	**41.00**	-	1.50	**1.50**	-	8.00	16.00	**12.00**
25	EC896115	16.67	35.00	**25.83**	70.67	83.00	**76.83**	4.03	2.50	**3.27**	11.00	-	24.00	**17.50**
26	EC896116	-	31.00	**31.00**	-	58.00	**58.00**	-	2.00	**2.00**	-	-	22.00	**22.00**
27	EC896120	-	36.00	**36.00**	-	74.00	**74.00**	-	1.50	**1.50**	-	-	23.00	**23.00**
28	EC896202	-	48.00	**48.00**	-	175.00	**175.00**	-	2.50	**2.50**	-	-	31.00	**31.00**
29	EC896203	-	-	**-**	-	-	**-**	-	-	**-**	-	4.50	-	**4.50**
30	EC896205	12.00	37.00	**24.50**	64.67	58.00	**61.33**	2.97	3.50	**3.23**	12.33	-	24.00	**18.17**
31	EC896206	-	30.00	**30.00**	-	35.00	**35.00**	-	3.00	**3.00**	-	-	18.00	**18.00**

S. No	Accessions No.	Plant height (cm)						Inflorescence length (cm)					
		Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean
1	EC896059	96.50	-	-	134.30	89.00	**106.60**	31.00	-	-	27.30	10.00	**22.77**
2	EC896061	92.67	-	-	133.00	-	**112.83**	19.00	-	-	28.70	-	**23.85**
3	EC896062	106.00	-	-	-	78.00	**92.00**	31.00	-	-	-	9.00	**20.00**
4	EC896063	-	-	-	-	57.00	**57.00**	-	-	-	-	5.00	**5.00**
5	EC896064	102.67	-	-	-	90.00	**96.33**	25.33	-	-	-	9.00	**17.17**
6	EC896067	107.67	-	-	-	62.00	**84.83**	34.33	-	-	-	6.00	**20.17**
7	EC896083	105.00	-	-	108.70	-	**106.85**	31.67	-	-	27.30	-	**29.48**
9	EC896086	105.00	67.10	101.50	130.00	60.00	**92.72**	25.33	12.33	26.33	-	7.00	**17.75**
10	EC896087	101.00	-	-	119.30	77.00	**99.10**	34.33	-	-	29.70	9.00	**24.34**
11	EC896088	110.00	-	-	136.00	80.00	**108.67**	36.33	-	-	31.30	7.00	**24.88**
12	EC896089	106.67	82.13	163.33	118.00	82.00	**110.43**	31.00	18.33	31.50	33.70	9.00	**24.71**
13	EC896090	110.00	-	-	140.00	70.00	**106.67**	31.67	-	-	33.30	8.00	**24.32**
14	EC896091	89.67	-	-	-	-	**89.67**	29.00	-	-	-	-	**29.00**
15	EC896097	97.67	-	-	127.30	-	**112.48**	33.67	-	-	31.00	-	**32.33**
16	EC896098	94.33	-	-	-	-	**94.33**	33.67	-	-	-	-	**33.67**
17	EC896100	102.00	-	-	90.70	51.00	**81.23**	26.00	-	-	38.70	8.00	**24.23**
18	EC896105	110.00	-	-	111.00	90.00	**103.67**	33.67	-	-	27.30	10.00	**23.66**
19	EC896108	-	-	108.50	113.00	-	**110.75**	-	-	26.33	27.30	-	**26.82**
20	EC896109	107.33	67.42	-	107.60	61.00	**85.84**	28.33	19.33	-	24.00	7.00	**19.67**
21	EC896110	101.00	-	59.67	100.00	70.00	**82.67**	32.33	-	18.00	30.70	9.00	**22.51**
22	EC896111	105.00	24.83	-	129.00	59.00	**79.46**	30.00	7.17	-	30.70	5.00	**18.22**
23	EC896112	-	-	-	90.70	60.00	**75.35**	-	-	-	32.30	5.00	**18.65**
24	EC896114	-	-	81.50	135.00	73.00	**96.50**	-	-	22.50	28.70	5.00	**18.73**
25	EC896115	105.00	74.50	-	105.30	92.00	**94.20**	32.00	18.00	-	23.70	12.00	**21.43**
26	EC896116	-	-	-	117.30	72.00	**94.65**	-	-	-	27.00	6.00	**16.50**
27	EC896120	96.67	-	-	94.70	80.00	**90.46**	23.33	-	-	29.00	12.00	**21.44**
28	EC896202	-	-	-	103.30	103.00	**103.15**	-	-	-	26.00	10.00	**18.00**
29	EC896203	-	-	107.00	104.00	-	**105.50**	-	-	21.00	28.70	-	**24.85**
30	EC896205	79.33	48.58	-	66.30	77.00	**67.80**	28.33	14.67	-	25.60	7.00	**18.90**
31	EC896206	84.33	-	-	110.30	64.00	**86.21**	22.33	-	-	-	7.00	**14.67**

S. No	Accessions No.	Days to 50% flowering						Days to 80% maturity					
		Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean
1	EC896059	38.33	-	-	49.00	67.00	**58.00**	85.67	-	-	109.00	110.00	**109.50**
2	EC896061	38.33	-	-	47.00	-	**47.00**	87.67	-	-	106.00	-	**106.00**
3	EC896062	35.67	-	-	-	66.00	**66.00**	82.33	-	-	-	109.00	**109.00**
4	EC896063	-	-	-	-	61.00	**61.00**	-	-	-	-	107.00	**107.00**
5	EC896064	38.33	-	-	-	66.00	**66.00**	83.67	-	-	-	109.00	**109.00**
6	EC896067	40.33	-	-	-	67.00	**67.00**	86.67	-	-	-	108.00	**108.00**
7	EC896083	38.33	-	-	45.00	-	**45.00**	86.33	-	-	101.00	-	**101.00**
9	EC896086	35.33	87.00	62.00	46.00	65.00	**65.00**	83.00	130.00	138.00	99.00	105.00	**118.00**
10	EC896087	36.33	-	-	48.00	63.00	**55.50**	85.33	-	-	111.00	107.00	**109.00**
11	EC896088	35.67	-	-	45.00	65.00	**55.00**	82.33	-	-	101.00	110.00	**105.50**
12	EC896089	40.33	85.00	54.00	43.00	62.00	**61.00**	79.67	131.00	129.00	98.00	100.00	**114.50**
13	EC896090	38.33	-	-	45.00	58.00	**51.50**	82.00	-	-	103.00	101.00	**102.00**
14	EC896091	35.33	-	-	-	-	**-**	90.67	-	-	-	-	**-**
15	EC896097	36.33	-	-	46.00	-	**46.00**	85.67	-	-	101.00	-	**101.00**
16	EC896098	38.33	-	-	-	-	**-**	85.00	-	-	-	-	**-**
17	EC896100	40.33	-	-	44.00	61.00	**52.50**	86.00	-	-	108.00	99.00	**103.50**
18	EC896105	38.33	-	-	47.00	64.00	**55.50**	79.00	-	-	106.00	112.00	**109.00**
19	EC896108	-	-	65.00	45.00	-	**55.00**	-	-	139.00	105.00	-	**122.00**
20	EC896109	35.67	91.00	-	42.00	60.00	**64.33**	90.67	133.00	-	103.00	100.00	**112.00**
21	EC896110	36.33	-	62.00	47.00	58.00	**55.67**	89.00	-	133.00	111.00	101.00	**115.00**
22	EC896111	38.33	83.67	-	43.00	57.00	**61.22**	86.33	126.67	-	104.00	104.00	**111.56**
23	EC896112	-	-	-	48.00	60.00	**54.00**	-	-	-	108.00	105.00	**106.50**
24	EC896114	-	-	59.00	44.00	68.00	**57.00**	-	-	130.00	106.00	99.00	**111.67**
25	EC896115	40.67	86.00	-	48.00	65.00	**66.33**	83.00	130.67	-	108.00	104.00	**114.22**
26	EC896116	-	-	-	47.00	54.00	**50.50**	-	-	-	107.00	103.00	**105.00**
27	EC896120	35.67	-	-	48.00	59.00	**53.50**	89.00	-	-	109.00	111.00	**110.00**
28	EC896202	36.33	-	-	49.00	65.00	**57.00**	-	-	-	106.00	113.00	**109.50**
29	EC896203	38.33	-	55.00	49.00	-	**52.00**	-	-	131.00	105.00	-	**118.00**
30	EC896205	36.33	82.67	-	44.00	54.00	**60.22**	82.00	126.00	-	95.00	107.00	**109.33**
31	EC896206	38.33	-	-	50.00	55.00	**52.50**	89.00	-	-	108.00	105.00	**106.50**

S. No	Accessions No.	Seed yield per plant (g)					Seed volume (g/10ml)						Ranchi	
		Bengaluru	Ludhiana	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Stem thickness (cm)	Lateral Inflorescence length (cm)
1	EC896059	23.67	-	22.00	4.90	**16.86**	5.64	-	-	5.50	8.10	**6.41**	3.50	6.00
2	EC896061	18.00	-	25.00	-	**21.50**	5.50	-	-	5.50	-	**5.50**	-	-
3	EC896062	22.33	-	-	25.00	**23.67**	5.79	-	-	-	8.60	**7.20**	2.50	5.00
4	EC896063	-	-	-	4.80	**4.80**	-	-	-	-	9.00	**9.00**	3.00	3.00
5	EC896064	12.33	-	-	2.40	**7.37**	5.20	-	-	-	8.10	**6.65**	3.00	6.00
6	EC896067	17.67	-	-	2.30	**9.98**	5.25	-	-	-	8.50	**6.88**	3.50	4.00
7	EC896083	15.67	-	26.60	-	**21.13**	5.41	-	-	5.00	-	**5.21**	-	-
9	EC896086	14.00	39.10	29.60	2.10	**21.20**	5.55	8.32	5.12	5.00	8.70	**6.54**	2.50	4.00
10	EC896087	20.00	-	21.40	2.70	**14.70**	4.75	-	-	5.00	8.30	**6.02**	3.50	6.00
11	EC896088	14.00	-	32.00	8.70	**18.23**	5.69	-	-	6.00	8.40	**6.70**	4.00	5.00
12	EC896089	18.00	49.98	18.20	2.50	**22.17**	5.55	8.47	6.23	4.50	8.70	**6.69**	4.00	5.00
13	EC896090	20.00	-	20.20	2.50	**14.23**	5.59	-	-	5.00	8.80	**6.46**	2.50	4.50
14	EC896091	17.67	-	-	-	**17.67**	5.44	-	-	-	-	**5.44**	-	-
15	EC896097	22.00	-	33.50	-	**27.75**	5.57	-	-	5.00	-	**5.29**	-	-
16	EC896098	22.67	-	-	-	**22.67**	5.48	-	-	-	-	**5.48**	-	-
17	EC896100	19.00	-	18.50	3.30	**13.60**	5.58	-	-	6.50	8.10	**6.73**	3.00	4.00
18	EC896105	18.00	-	16.50	2.60	**12.37**	5.66	-	-	6.00	8.90	**6.85**	3.50	6.00
19	EC896108	-	-	14.00	-	**14.00**	-	-	5.56	5.50	-	**5.53**	-	-
20	EC896109	15.00	70.80	18.00	6.10	**27.48**	5.54	8.13	-	5.00	8.30	**6.74**	3.50	4.00
21	EC896110	16.33	-	12.00	10.00	**12.78**	5.43	-	5.12	4.50	8.50	**5.89**	4.00	3.00
22	EC896111	19.00	-	24.00	3.50	**15.50**	5.51	-	-	5.50	8.20	**6.40**	3.50	3.00
23	EC896112	-	-	23.00	1.70	**12.35**	-	-	-	5.00	8.70	**6.85**	3.00	3.00
24	EC896114	-	-	20.00	6.30	**13.15**	5.20	-	5.56	5.00	7.90	**5.91**	3.00	4.00
25	EC896115	18.67	63.49	17.00	3.70	**25.71**	4.86	9.48	-	5.00	8.00	**6.84**	4.00	10.00
26	EC896116	-	-	20.00	3.80	**11.90**	4.75	-	-	5.50	8.10	**6.12**	3.00	4.00
27	EC896120	13.67	-	11.00	2.60	**9.09**	4.88	-	-	4.50	8.40	**5.93**	4.00	9.00
28	EC896202	-	-	10.00	1.40	**5.70**	-	-	-	5.00	8.90	**6.95**	5.00	6.00
29	EC896203	-	-	14.00	-	**14.00**	-	-	5.95	5.00	-	**5.48**	-	-
30	EC896205	16.67	37.16	16.00	6.40	**19.06**	5.66	7.63	-	5.60	7.80	**6.67**	3.00	5.00
31	EC896206	16.67	-	17.00	2.50	**12.06**	5.80	-	-	5.90	8.70	**6.80**	4.00	5.00

S. No	Accessions No.	Leaf length (cm)					Leaf width (cm)					Number of inflorescence			
		Ludhiana	Mandor	Rahuri	Ranchi	Mean	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Ludhiana	Ranchi	Ranchi	Mean
32	EC896207	-	-	6.70	5.00	**5.85**	-	-	5.40	4.50	**4.95**	-	10.00	31.00	**20.50**
33	EC896208	-	-	6.20	3.00	**4.60**	-	-	4.90	2.00	**3.45**	-	11.00	22.00	**16.50**
34	EC896209	-	-	5.20	5.00	**5.10**	-	-	3.80	4.00	**3.90**	-	8.00	21.00	**14.50**
35	EC896210	-	-	6.20	3.00	**4.60**	-	-	4.30	2.00	**3.15**	-	7.00	22.00	**14.50**
36	EC896211	-	4.16	-	3.50	**3.83**	-	1.75	-	2.00	**1.88**	-	8.00	22.00	**15.00**
37	EC896212	3.93	-	6.20	4.00	**4.71**	1.83	-	4.90	2.00	**2.91**	24.00	7.00	20.00	**17.00**
38	EC896215	-	4.98	6.40	-	**5.69**	-	2.45	4.60	-	**3.53**	-	-	-	**-**
39	EC896218	6.77	4.56	-	5.50	**5.61**	4.23	2.12	-	4.50	**3.62**	32.33	15.00	28.00	**25.11**
40	EC896219	5.70	4.15	7.50	-	**5.78**	3.97	1.94	4.90	-	**3.60**	33.67	-	-	**33.67**
41	EC896228	-	-	5.20	-	**5.20**	-	-	3.80	-	**3.80**	-	-	-	**-**
42	EC896229	-	-	4.70	-	**4.70**	-	-	3.90	-	**3.90**	-	-	-	**-**
43	EC896233	6.73	-	4.80	-	**5.77**	5.50	-	3.80	-	**4.65**	41.67	-	-	**41.67**
44	EC896237	-	-	5.20	-	**5.20**	-	-	4.20	-	**4.20**	-	-	-	**-**
45	EC896238	-	-	6.00	-	**6.00**	-	-	5.50	-	**5.50**	-	-	-	**-**
46	EC896239	-	-	6.10	-	**6.10**	-	-	5.90	-	**5.90**	-	-	-	**-**
47	EC896246	-	-	4.30	-	**4.30**	-	-	6.10	-	**6.10**	-	-	-	**-**
48	EC896264	-	-	7.40	-	**7.40**	-	-	5.50	-	**5.50**	-	-	-	**-**
49	EC896271	-	-	6.60	-	**6.60**	-	-	3.70	-	**3.70**	-	-	-	**-**
50	EC896275	-	-	7.40	4.00	**5.70**	-	-	4.20	3.00	**3.60**	-	7.00	24.00	**15.50**
51	EC896276	-	-	8.00	4.50	**6.25**	-	-	5.70	3.00	**4.35**	-	13.00	26.00	**19.50**
Mean for check variety															
1	EC507738	-	-	-	4.00	**4.00**	-	-	-	2.67	**2.67**	-	10.00	22.33	**16.17**
2	EC507741	-	-	-	5.20	**5.20**	-	-	-	3.25	**3.25**	-	10.00	21.50	**15.75**
3	EC507742	-	-	-	4.30	**4.30**	-	-	-	2.80	**2.80**	-	12.80	25.20	**19.00**
4	SSQC-1	-	-	-	4.25	**4.25**	-	-	-	2.75	**2.75**	-	11.00	25.00	**18.00**
5	GKVK-1	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-	**-**
6	GKVK-2	-	-	-	-	**-**	-	-	-	-	**-**	-	-	-	**-**
Minimum		**2.47**	**3.56**	**2.60**	**3.00**	**3.50**	**1.37**	**1.45**	**1.90**	**1.50**	**1.88**	**19.67**	**7.00**	**17.00**	**14.50**
Maximum		**7.43**	**4.98**	**9.80**	**6.00**	**8.90**	**5.50**	**2.45**	**7.80**	**4.50**	**7.60**	**41.67**	**29.00**	**40.00**	**41.67**
Mean		**5.70**	**4.17**	**6.35**	**4.34**	**5.35**	**3.74**	**1.93**	**5.11**	**2.82**	**3.90**	**27.83**	**12.86**	**25.81**	**20.64**
CV (%) Phen.		**25.80**	**11.47**	**21.23**	**18.34**	**18.86**	**34.73**	**14.22**	**21.42**	**25.86**	**29.44**	**23.58**	**36.96**	**21.09**	**27.35**

S. No	Accessions No.	No. of internodes per plant			Number of leaves/plant			Petiole length (cm)			Number of branches/plant			
		Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Mean	Ludhiana	Ranchi	Mean	Ludhiana	Mandor	Ranchi	Mean
32	EC896207	-	57.00	**57.00**	-	34.00	**34.00**	-	4.00	**4.00**	-	-	23.00	**23.00**
33	EC896208	-	36.00	**36.00**	-	73.00	**73.00**	-	2.00	**2.00**	-	-	22.00	**22.00**
34	EC896209	-	27.00	**27.00**	-	63.00	**63.00**	-	3.50	**3.50**	-	-	17.00	**17.00**
35	EC896210	-	31.00	**31.00**	-	65.00	**65.00**	-	1.50	**1.50**	-	-	16.00	**16.00**
36	EC896211	-	28.00	**28.00**	-	51.00	**51.00**	-	2.00	**2.00**	-	4.50	18.00	**11.25**
37	EC896212	9.67	26.00	**17.83**	71.00	38.00	**54.50**	3.60	2.00	**2.80**	8.00	-	22.00	**15.00**
38	EC896215	-	-	**-**	-	-	**-**	-	-	**-**	-	14.00	-	**14.00**
39	EC896218	12.33	36.00	**24.17**	82.67	130.00	**106.33**	4.03	4.00	**4.02**	11.33	7.50	28.00	**15.61**
40	EC896219	9.67	-	**9.67**	95.00	-	**95.00**	4.17	-	**4.17**	9.00	9.00	-	**9.00**
41	EC896228	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
42	EC896229	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
43	EC896233	22.00	-	**22.00**	114.33	-	**114.33**	4.53	-	**4.53**	20.67	-	-	**20.67**
44	EC896237	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
45	EC896238	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
46	EC896239	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
47	EC896246	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
48	EC896264	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
49	EC896271	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
50	EC896275	-	31.00	**31.00**	-	68.00	**68.00**	-	2.50	**2.50**	-	-	20.00	**20.00**
51	EC896276	-	36.00	**36.00**	-	77.00	**77.00**	-	2.50	**2.50**	-	-	23.00	**23.00**
Mean for check variety														
1	EC507738	-	30.33	**30.33**	-	62.00	**62.00**	-	2.33	**2.33**	-	-	21.33	**21.33**
2	EC507741	-	23.25	**23.25**	-	43.75	**43.75**	-	1.13	**1.13**	-	-	15.25	**15.25**
3	EC507742	-	30.20	**30.20**	-	77.00	**77.00**	-	2.10	**2.10**	-	-	21.60	**21.60**
4	SSQC-1	-	30.25	**30.25**	-	71.00	**71.00**	-	2.75	**2.75**	-	-	19.00	**19.00**
5	GKVK-1	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
6	GKVK-2	-	-	**-**	-	-	**-**	-	-	**-**	-	-	-	**-**
Minimum		**7.00**	**17.00**	**9.67**	**41.33**	**25.00**	**34.00**	**1.17**	**1.13**	**1.13**	**2.67**	**4.50**	**10.00**	**4.50**
Maximum		**22.33**	**57.00**	**57.00**	**114.33**	**175.00**	**175.00**	**4.53**	**4.00**	**4.53**	**20.67**	**14.00**	**31.00**	**31.00**
Mean		**14.43**	**30.81**	**28.07**	**77.57**	**67.80**	**70.38**	**3.56**	**2.43**	**2.58**	**12.13**	**7.95**	**20.98**	**17.95**
CV (%) Phen.		**36.58**	**24.51**	**29.42**	**29.92**	**45.74**	**41.96**	**26.88**	**30.33**	**31.11**	**44.45**	**36.85**	**22.73**	**32.20**

S. No	Accessions No.	Plant height (cm)						Inflorescence length (cm)					
		Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean
32	EC896207	-	-	-	107.00	72.00	**89.50**	-	-	-	30.00	6.00	**18.00**
33	EC896208	-	-	-	121.70	76.00	**98.85**	-	-	-	33.70	10.00	**21.85**
34	EC896209	-	-	-	94.00	77.00	**85.50**	-	-	-	22.70	6.00	**14.35**
35	EC896210	-	-	-	98.30	74.00	**86.15**	-	-	-	24.30	8.00	**16.15**
36	EC896211	-	-	91.00	-	56.00	**73.50**	-	-	24.00	-	8.50	**16.25**
37	EC896212	113.33	42.13	-	141.30	71.00	**91.94**	31.00	14.67	-	31.00	8.00	**21.17**
38	EC896215	106.67	-	128.67	91.30	-	**108.88**	36.33	-	29.00	26.70	-	**30.68**
39	EC896218	96.33	82.45	102.50	-	95.00	**94.07**	32.67	18.33	23.50	-	10.00	**21.13**
40	EC896219	110.00	77.43	127.33	110.30	-	**106.27**	33.67	19.33	25.33	30.30	-	**27.16**
41	EC896228	100.00	-	-	75.30	-	**87.65**	24.33	-	-	22.00	-	**23.17**
42	EC896229	100.00	-	-	59.70	-	**79.85**	24.33	-	-	21.00	-	**22.67**
43	EC896233	96.33	82.37	-	93.70	-	**90.80**	26.33	20.00	-	25.00	-	**23.78**
44	EC896237	107.67	-	-	84.00	-	**95.83**	34.33	-	-	24.00	-	**29.17**
45	EC896238	99.33	-	-	91.30	-	**95.32**	32.33	-	-	19.70	-	**26.02**
46	EC896239	111.67	-	-	94.30	-	**102.98**	32.67	-	-	18.30	-	**25.48**
47	EC896246	-	-	-	94.30	-	**94.30**	-	-	-	24.30	-	**24.30**
48	EC896264	107.67	-	-	65.60	-	**86.63**	22.33	-	-	17.70	-	**20.02**
49	EC896271	105.00	-	-	100.30	-	**102.65**	32.33	-	-	26.70	-	**29.52**
50	EC896275	111.67	-	-	96.30	66.00	**91.32**	35.33	-	-	22.30	7.50	**21.71**
51	EC896276	108.33	-	-	107.30	77.00	**97.54**	31.67	-	-	23.00	9.00	**21.22**
Mean for check variety													
1	EC507738	101.11	-	-	-	70.33	**85.72**	27.00	-	-	-	7.00	**17.00**
2	EC507741	106.89	-	-	-	51.75	**79.32**	33.33	-	-	-	6.88	**20.10**
3	EC507742	-	-	-	-	75.60	**75.60**	-	-	-	-	7.50	**7.50**
4	SSQC-1	92.67	-	-	-	64.75	**78.71**	33.00	-	-	-	26.25	**29.63**
5	GKVK-1	113.56	-	-	-	-	**113.56**	36.11	-	-	-	-	**36.11**
6	GKVK-2	116.67	-	-	-	-	**116.67**	35.56	-	-	-	-	**35.56**
Minimum		**79.33**	**24.83**	**59.67**	**59.70**	**51.00**	**57.00**	**19.00**	**7.17**	**18.00**	**17.70**	**5.00**	**5.00**
Maximum		**116.67**	**82.45**	**163.33**	**141.30**	**103.00**	**116.67**	**36.33**	**20.00**	**31.50**	**38.70**	**26.25**	**36.11**
Mean		**102.87**	**64.90**	**107.10**	**105.97**	**72.87**	**93.52**	**30.44**	**16.22**	**24.75**	**27.12**	**8.41**	**22.45**
CV (%) Phen.		**7.67**	**30.65**	**26.51**	**19.02**	**17.00**	**13.41**	**14.35**	**24.98**	**15.69**	**16.66**	**42.42**	**26.67**

S. No	Accessions No.	Days to 50% flowering						Days to 80% maturity					
		Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean
32	EC896207	-	-	-	45.00	56.00	**50.50**	-	-	-	106.00	104.00	**105.00**
33	EC896208	-	-	-	47.00	58.00	**52.50**	-	-	-	99.00	106.00	**102.50**
34	EC896209	-	-	-	48.00	59.00	**53.50**	-	-	-	97.00	105.00	**101.00**
35	EC896210	-	-	-	47.00	60.00	**53.50**	-	-	-	96.00	110.00	**103.00**
36	EC896211	-	-	57.00	-	62.00	**59.50**	-	-	134.00	-	104.00	**119.00**
37	EC896212	38.33	82.33	-	44.00	63.00	**63.11**	85.00	127.00	-	109.00	112.00	**116.00**
38	EC896215	40.33	-	67.00	43.00	-	**55.00**	85.33	-	129.00	103.00	-	**116.00**
39	EC896218	38.33	91.00	68.00	-	63.00	**74.00**	84.67	118.33	135.00	-	113.00	**122.11**
40	EC896219	41.67	92.00	70.00	45.00	-	**69.00**	87.33	116.00	138.00	106.00	-	**120.00**
41	EC896228	40.33	-	-	44.00	-	**44.00**	85.67	-	-	101.00	-	**101.00**
42	EC896229	38.33	-	-	47.00	-	**47.00**	88.33	-	-	99.00	-	**99.00**
43	EC896233	36.33	93.00	-	45.00	-	**69.00**	92.33	118.00	-	100.00	-	**109.00**
44	EC896237	38.33	-	-	49.00	-	**49.00**	87.00	-	-	101.00	-	**101.00**
45	EC896238	40.33	-	-	51.00	-	**51.00**	84.67	-	-	106.00	-	**106.00**
46	EC896239	40.33	-	-	50.00	-	**50.00**	89.00	-	-	107.00	-	**107.00**
47	EC896246	-	-	-	49.00	-	**49.00**	-	-	-	104.00	-	**104.00**
48	EC896264	40.33	-	-	48.00	-	**48.00**	85.67	-	-	100.00	-	**100.00**
49	EC896271	38.67	-	-	48.00	-	**48.00**	87.00	-	-	99.00	-	**99.00**
50	EC896275	36.33	-	-	43.00	59.00	**51.00**	83.00	-	-	96.00	114.00	**105.00**
51	EC896276	34.67	-	-	45.00	60.00	**52.50**	88.33	-	-	96.00	110.00	**103.00**
Mean for check variety													
1	EC507738	35.33	-	-	-	66.33	**66.33**	86.33	-	-	-	110.67	**110.67**
2	EC507741	35.67	-	-	-	63.50	**63.50**	85.33	-	-	-	110.00	**110.00**
3	EC507742	-	-	-	-	64.00	**64.00**	-	-	-	-	110.60	**110.60**
4	SSQC-1	35.33	-	-	-	59.75	**59.75**	88.33	-	-	-	107.50	**107.50**
5	GKVK-1	36.33	-	-	-	-	**-**	87.67	-	-	-	-	**-**
6	GKVK-2	37.67	-	-	-	-	**-**	88.67	-	-	-	-	**-**
Minimum		**34.67**	**82.33**	**54.00**	**42.00**	**54.00**	**44.00**	**79.00**	**116.00**	**129.00**	**95.00**	**99.00**	**99.00**
Maximum		**41.67**	**93.00**	**70.00**	**51.00**	**68.00**	**74.00**	**92.33**	**133.00**	**139.00**	**111.00**	**114.00**	**122.11**
Mean		**37.80**	**87.37**	**61.90**	**46.36**	**61.49**	**56.42**	**85.94**	**125.67**	**133.60**	**103.40**	**106.83**	**108.47**
CV (%) Phen.		**5.00**	**4.65**	**9.03**	**4.90**	**6.22**	**12.77**	**3.35**	**4.85**	**2.87**	**4.29**	**3.98**	**5.56**

S. No	Accessions No.	Seed yield per plant (g)					Seed volume (g/10ml)						Ranchi	
		Bengaluru	Ludhiana	Rahuri	Ranchi	Mean	Bengaluru	Ludhiana	Mandor	Rahuri	Ranchi	Mean	Stem thickness (cm)	Lateral Inflorescence length (cm)
32	EC896207	-	-	18.00	2.50	**10.25**	-	-	-	5.00	7.10	**6.05**	6.40	4.00
33	EC896208	-	-	10.00	2.60	**6.30**	-	-	-	4.50	8.40	**6.45**	3.00	7.00
34	EC896209	-	-	13.00	3.30	**8.15**	-	-	-	5.00	8.40	**6.70**	3.00	4.00
35	EC896210	-	-	15.00	4.10	**9.55**	-	-	-	5.50	8.10	**6.80**	4.00	5.00
36	EC896211	-	-	-	2.90	**2.90**	-	-	5.75	-	8.10	**6.93**	3.50	4.00
37	EC896212	17.67	24.33	12.00	1.20	**13.80**	5.17	8.14	-	5.50	8.40	**6.80**	3.00	7.50
38	EC896215	16.33	-	13.00	-	**14.67**	5.66	-	6.14	6.00	-	**5.93**	-	-
39	EC896218	15.67	102.08	19.00	3.20	**34.99**	4.96	8.19	5.79	-	8.50	**6.86**	4.50	6.50
40	EC896219	23.67	101.91	35.00	-	**53.52**	5.54	8.90	5.85	7.00	-	**6.82**	-	-
41	EC896228	14.00	-	9.00	-	**11.50**	5.29	-	-	4.50	-	**4.90**	-	-
42	EC896229	15.00	-	12.00	-	**13.50**	5.33	-	-	3.00	-	**4.17**	-	-
43	EC896233	19.00	117.45	14.00	-	**50.15**	5.51	8.27	-	6.00	-	**6.59**	-	-
44	EC896237	16.33	-	10.00	-	**13.17**	4.77	-	-	5.00	-	**4.88**	-	-
45	EC896238	18.33	-	12.00	-	**15.17**	5.27	-	-	6.00	-	**5.63**	-	-
46	EC896239	15.33	-	19.00	-	**17.17**	5.42	-	-	4.50	-	**4.96**	-	-
47	EC896246	-	-	15.00	-	**15.00**	-	-	-	6.20	-	**6.20**	-	-
48	EC896264	17.67	-	19.00	-	**18.33**	5.40	-	-	5.50	-	**5.45**	-	-
49	EC896271	14.67	-	12.00	-	**13.33**	5.33	-	-	5.00	-	**5.17**	-	-
50	EC896275	18.33	-	9.00	3.30	**10.21**	5.68	-	-	5.50	8.00	**6.39**	3.50	4.00
51	EC896276	17.33	-	19.00	24.00	**20.11**	5.81	-	-	6.00	8.70	**6.84**	3.00	7.00
Mean for check variety														
1	EC507738	20.33	-	-	8.10	**14.22**	5.58	-	-	-	8.57	**7.07**	3.17	4.67
2	EC507741	18.33	-	-	9.73	**14.03**	5.71	-	-	-	8.08	**6.89**	3.38	4.13
3	EC507742	-	-	-	3.42	**3.42**	-	-	-	-	8.22	**8.22**	3.40	4.50
4	SSQC-1	21.00	-	-	5.88	**13.44**	5.06	-	-	-	8.08	**6.57**	3.38	3.75
5	GKVK-1	21.67	-	-	-	**21.67**	5.75	-	-	-	-	**5.75**	-	-
6	GKVK-2	20.00	-	-	-	**20.00**	5.65	-	-	-	-	**5.65**	-	-
Minimum		**12.33**	**24.33**	**9.00**	**1.20**	**2.90**	**4.75**	**7.63**	**5.12**	**3.00**	**7.10**	**4.17**	**2.50**	**3.00**
Maximum		**23.67**	**117.45**	**35.00**	**25.00**	**53.52**	**5.81**	**9.48**	**6.23**	**7.00**	**9.00**	**9.00**	**6.40**	**10.00**
Mean		**17.90**	**67.37**	**17.78**	**5.17**	**16.45**	**5.41**	**8.39**	**5.71**	**5.28**	**8.34**	**6.28**	**3.49**	**5.02**
CV (%) Phen.		**15.68**	**49.23**	**36.76**	**101.86**	**56.47**	**5.45**	**6.27**	**6.61**	**13.01**	**4.49**	**13.17**	**21.27**	**32.23**

2.4 GERMPLASM CONSERVATION

In the National Gene Bank, NBPGR the following crops were received and conserved during the period under report.

Table 37: Germplasm Conservation of Potential Crop in the National Gene Bank during Rabi 2019-20.(1st April 2020 to 31st August 2020)

Crop/Species Name	No. of Accession stored
Amaranth	**27**
Amaranthus hypocondriacus	26
Amaranthus sp.	1
Buckwheat	**1**
Fagopyrum tataricum	1
Job`s Tears	**4**
Coix lacryma-jobi	4
Lamb`s Quarters	**6**
Chenopodium album	6
Perilla	**43**
Perilla frutescens	43

Table 38: Germplasm holding in National Gene Bank (31st August 2020)

S. No	Crop/Species Name	No. of Accession stored
1	**Adzuki Bean**	**186**
	Vigna angularis	186
2	**Amaranth**	**5237**
	Amaranthus albus	4
	Amaranthus amora	6
	Amaranthus blitum	29
	Amaranthus caudatum	10
	Amaranthus caudatus	207
	Amaranthus caudatus var. albiflorus	1
	Amaranthus caudatus var. atropurpurea	1
	Amaranthus cordatus	3
	Amaranthus crispus	1
	Amaranthus cruentus	157
	Amaranthus dubius	66
	Amaranthus edulis	1
	Amaranthus fimbriatus	2
	Amaranthus flavus	1
	Amaranthus graecizans	30
	Amaranthus hybridus	86
	Amaranthus hypocondriacus	3172
	Amaranthus leucocorpus	2
	Amaranthus mangostanus	7
	Amaranthus oleraceus	23
	Amaranthus palmeri	3
	Amaranthus paniculatus	17
	Amaranthus polygonoides	4
3	**Crop/Species Name**	**No. of Accession stored**
	Amaranthus powellii	3

S. No	Crop/Species Name	No. of Accession stored
	Amaranthus retroflexus	9
	Amaranthus sp.	1351
	Amaranthus spinosus	34
	Amaranthus tristis	7
4	**Amaranth(Vegetable)**	**504**
	Amaranthus gangeticus	26
	Amaranthus tricolor	422
	Amaranthus viridis	56
5	**Buckwheat**	**1049**
	Fagopyrum emarginatum	1
	Fagopyrum esculentum	558
	Fagopyrum gracilipes	1
	Fagopyrum himalianum	8
	Fagopyrum sp.	39
	Fagopyrum tataricum	442
6	**Chenopodium**	**91**
	Chenopodium botrys	8
	Chenopodium giganteum	2
	Chenopodium hybridum	4
	Chenopodium karoi	1
	Chenopodium quinoa	19
	Chenopodium sp.	57
7	**Colocynth**	**138**
	Citrullus colocynthis	138
8	**Faba bean**	**855**
	Viciafaba	855
9	**Jatropha**	**2167**
	Jatropha curcas	2160
	Jatropha gossypifolia	7
10	**Job`s Tears**	**136**
	Coixaquatica	1
	Coixlacryma-jobi	134
	Trilobachnecookei	1
11	**Lamb`s Quarters**	**168**
	Chenopodium album	168
12	**Mountain Spinach**	**5**
	Atriplex hortensis	5
13	**Perilla**	**295**
	Perilla frutescens	295
14	**Rice Bean**	**2041**
	Vigna umbellata	2041
15	**Simarouba**	**1**
	Simarouba glauca	1
16	**Teasel Gourd**	**66**
	Momordica dioica	55
	Momordica subangulata ssp. renigera	11
17	**Watermelon**	**306**
	Citrullus lanatus	250
	Citrullus lanatus var. citroides	13
	Citrullus lanatus var. lanatus	39
	Citrullus sp.	1
	Citrullus vulgaris	1
	Cucumis vulgaris	2
18	**Wild Chenopod**	**3**

S. No	Crop/Species Name	No. of Accession stored
	Chenopodium murale	3
19	**Winged Bean**	**213**
	Psophocarpustetragonolobus	213

Table 39: Status of Potential Crops conserved at TCCU up to 31.8.2020

S. No.	Crop name	Total accessions (Cryostored)
1	Grain amaranth	57
2	Adzuki bean	4
3	Buckwheat	3
4	Faba bean	3
5	Perilla	46
6	Paradise tree	10
7	Kankoda	5
8	Kalingada	4
9	Job's tear	69
10	Jojoba	4 +12*
11	Jatropha	94
12	Tumba	11
12* as *in vitro* cultures		

2.5 SEED SUPPLY

The seed and planting material of different crops were supplied to ICAR institutes/coordinated projects, agricultural universities and other users in India. Based on specific requests received samples were supplied as per details given below under the Material Transfer Agreement (MTA) and GEX 01 Forms.

Table 40: Seed Supply of Potential Crops during 2019-20.

Crop	Accns.	Supplied To	Source
Potential Crops (318)			
Job's tear	81	NBPGR RS Shillong	NBPGR, New Delhi
Faba bean	206	CAU (Imphal), Umiam	CCS HAU Hisar
Faba bean	13	IGKV, Ambikapur	NBPGR, New Delhi
Faba bean	18	PAU, Ludhiana	NBPGR, New Delhi

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, faba bean, buckwheat and Chenopodium, quinoa the results of the experiments conducted during *Rabi* 2019-20 in the plains and hills were presented here.

3.1 HILLS

The crop included in the hill areas is grain legumes faba bean, buckwheat and Chenopodium quinoa. 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 Annexure.

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 and advance Varietal Trial (IVT & AVT-I & II) was proposed to be conducted at Barapani, Palampur, Pasighat, Ranichauri, Srinagar.

3.1.1.1 Initial Varietal Trial (IVT)

The Initial Varietal Trial (IVT) comprising fifteen entries along with five checks was conducted at four locations. The details of experiment and summary of performance of the entries has been presented in Table 41 & 42.

Significant differences were observed among the entries for seed yield at all the centre. Mean seed yield levels were quite low at the centres Palampur (7.61 q/ha) and Umiam (9.03 q/ha). The seed yield was the highest in the entry DFS 18-19 (25.40 q/ha).

Plant height was maximum at Pasighat with an average height of 102.93 cm, while it was the lowest at Palampur (61.46 cm) centre. On the basis of average over five locations DFS 18-04 showed the highest plant height (71.09 cm). The entries DFS 18-13 was the shortest in terms of plant height (62.25 cm).

Flowering time was minimum at Pasighat (62.89 days) and maximum at Ranichauri (117.15 days) showing about 54 days difference between the two centres. On the basis of average over five locations, check Vikrant (88.97 days) was recorded to be earliest in flowering.

Maturity period was shortest at Pasighat (129.72 days) and longest (162.17 days) at Palampur. There was a difference of more than 32 days in maturity between Pasighat and Ranichauri centres. Based on the average over five locations, the entry DFS 18-22 was earliest in maturity (152.57 days).

Pod length was maximum at Pasighat with an average pod length of 8.73 cm, while it was the shortest at Ranichauri (3.02 cm) centre. On the basis of average over five locations DFS 18-02 showed the longest pod (8.12 cm).

The mean 100-seed weight was the highest at Umiam (76.30 g) centre and lowest at Srinagar (62.44 g) centre. On the basis of average over four locations, the

check variety Aguduice had the highest seed weight (87.52 g) followed by the entry DFS 18-03 (86.51 g).

3.1.1.2 Advanced Varietal Trial (AVT-I&II)

The advanced Varietal Trial (AVT-I&II) comprising six entries along with two check was conducted at four locations. The experimental details and summary of performance of the entries has been presented in Table 43 & 44.

Significant differences were observed among the entries for seed yield at Umiam centre. Mean seed yield levels were quite low at Umiam (7.10 q/ha) and Palampur (7.36 q/ha). The seed yield was the highest in the entry HPFB-2 (16.66 q/ha).

Plant height was maximum at Pasighat with an average height of 95.69 cm, while it was the lowest at Ranichauri (41.92 cm) centre. On the basis of average over four locations EC010845 showed the highest plant height (66.43 cm). The entries EC243626 was the shortest in terms of plant height (62.80 cm).

Flowering time was minimum at Pasighat (64.79 days) and maximum at Ranichauri (121.14 days) showing about 56 days difference between the four centres. On the basis of average over four locations, entry HB-195 (83.65 days) was recorded to be earliest in flowering.

Maturity period was shortest at Pasighat (132.25 days) and longest (173.95 days) at Ranichauri. There was a difference of more than 41 days in maturity between Pasighat and Ranichauri centres. Based on the average over four locations, the check Vikrant was earliest in maturity (151.02 days).

Pod length was maximum at Pasighat with an average pod length of 5.54 cm, while it was the shortest at Ranichauri (4.95 cm) centre. On the basis of average over four locations check variety Vikrant showed the longest pod (5.42 cm).

The mean 100-seed weight was the highest at Umiam (32.34 g) centre and lowest at Palampur (25.90 g) centre. On the basis of average over three locations, the entry HB-19 had the highest seed weight (32.92 g) followed by the check variety Vikrant (30.33 g).

3.1.2 BUCKWHEAT (*Fagopyrum* spp.)

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

3.1.2.1 Advanced Varietal Trial (IVT & AVT-I)

A combined trial of Initial Varietal Trial (07 entries), Advanced Varietal Trial I (4 entries) with four checks was conducted at three locations viz. Basar, Tadong and Medziphema. The experimental details and summary performance of various entries in respect of grain yield and other important traits as compared to the checks has been given in table 45 & 46.

No Significant differences were observed among the entries with respect to grain yield at all the locations. Seed yield at Basar was comparatively low (4.25 q/ha). Highest seed yield was recorded at Tadong (11.51 q/ha).

Average plant height was recorded to be the highest at Medziphema (80.62 cm) followed by at Tadong (70.66 cm). The entry PRB-1 was the tallest (95.55 cm).

Flowering time was minimum at Basar (36.33 days) and maximum at Tadong (54.40 days) showing about 18 days difference between the three centres. On the basis

of average over three locations, entry IC108508 (40.56 days) was recorded to be earliest in flowering.

Maturity period also showed similar trend as that of flowering time. Average maturity period was the earliest at Medziphema (78.85 days) followed by at Tadong (114.07 days). On the basis of average over two locations the check variety Shimla B-1 was earliest in maturity (94.00 days).

The average test weight was recorded to be higher at Medziphema (5.21 g) than at other centres. On the basis of average over three locations EC125940 possessed the highest (4.87 g) and IC329199 the lowest (2.78 g) test weight.

3.1.3 CHENOPODIUM (*Chenopodium quinoa*)

In *Chenopodium quinoa* are economically important and hence have been included in the evaluation programme. An Initial Varietal Trial and Advanced Varietal Trial comprising both the species was proposed to be conducted at two locations.

3.1.3.1 Advanced Varietal Trial (AVT-II)

The Initial Varietal Trial and Advanced Varietal Trial comprising thirteen lines was conducted at two centres. The entries comprised of the lines received from two centres, Basar and Manipur. The experimental and performance of the entries has been summarized in table 47 & 48.

The average grain yield (3.09 q/ha) was low at Manipur, while it was the highest at Basar (4.26 q/ha). Based on average over two locations the entry EC507747 was the highest yielder (7.32 q/ha).

Average plant height was the highest at Manipur (50.42 cm) and the lowest at Basar (34.85 cm) centre.

Table 41: Experimental Details for IVT of Faba bean Rabi 2019-20 :Hill

S. No	Item	Palampur	Pasighat	Ranichauri	Srinagar	Umiam
1	No. of Entries	15	15	15	15	15
2	Check	5	5	5	5	5
3	No. of Reps.	3	3	4	1	3
4	Design	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	30	30	30	30	45
6	Plant x Plant (cms.)	10	10	10	25	15
7	No. of rows/ plot	6	4	4	3	3
8	Row length (m)	3	1.5	3	2	3
9	Date of sowing	13.11.2019	6/12/2019	6/12/2019	12/10/2019	25/11/2019
10	Date of harvesting	16.05.2020	09/04/2020 to 16/04/2020	18/5/2020 to 28/05/2020	6/14/2020	As per maturity
11	Plot Size	5.4	1.8	3.6	1.8	4.05
12	Conversion Factor	18.51851852	55.56	27.78	55.55555556	24.69135802
13	NPKS	-	40:20:20:20	-	-	-

Table 42: Performance of Faba bean entries in Initial Varietal Trial (IVT) during rabi 2019-20

S. No.	Genotypes	Grain yield (q/ha)									Plant height (cm)					
		Palampur	Pasighat	Srinagar	Umiam	Mean	Gain(%)over best check	Rank	Location	Frequency	Palampur	Pasighat	Ranichauri	Srinagar	Umiam	Mean	Rank
1	DFS 18-02	5.65	10.60	26.72	8.22	**12.80**	-37.80	14	4	0/4	59.67	101.70	38.90	58.20	74.45	**66.58**	10
2	DFS 18-03	**9.81**	16.85	41.06	10.02	**19.44**	-5.54	4	4	1/4	62.43	98.90	38.70	71.80	74.85	**69.34**	4
3	DFS 18-04	6.60	17.77	36.61	10.49	**17.87**	-13.15	7	4	0/4	67.17	104.40	39.05	64.20	80.62	**71.09**	1
4	DFS 18-06	7.07	22.22	42.89	8.57	**20.19**	-1.89	3	4	0/4	64.10	101.70	35.45	63.20	76.21	**68.13**	5
5	DFS 18-10	7.59	23.70	15.44	12.07	**14.70**	-28.54	10	4	0/4	60.27	106.10	33.30	56.20	66.34	**64.44**	17
6	DFS 18-12	7.44	17.59	31.39	8.79	**16.30**	-20.77	9	4	0/4	59.30	102.20	37.40	63.30	66.28	**65.70**	13
7	DFS 18-13	**11.67**	15.37	16.78	9.38	**13.30**	-35.36	13	4	1/4	60.47	107.80	29.05	45.70	68.25	**62.25**	20
8	DFS 18-15	8.73	11.85	20.28	7.75	**12.15**	-40.93	17	4	0/4	70.00	103.90	36.75	51.50	66.81	**65.79**	12
9	DFS 18-16	6.02	15.74	23.22	6.15	**12.78**	-37.88	15	4	0/4	56.80	109.50	31.40	58.30	76.49	**66.50**	11
10	DFS 18-19	8.43	21.03	31.44	10.25	**17.79**	-13.55	8	4	0/4	56.53	106.70	34.90	62.70	72.19	**66.61**	9
11	DFS 18-22	**9.26**	16.11	69.67	6.57	**25.40**	**23.45**	1	4	1/4	60.70	104.50	31.30	58.50	81.75	**67.35**	6
12	DFS 18-23	8.64	4.07	11.94	7.70	**8.09**	-60.68	20	4	0/4	57.30	106.60	32.65	58.00	72.30	**65.37**	15
13	HB -13-10	5.74	9.63	36.28	6.15	**14.45**	-29.77	11	4	0/4	56.90	101.10	28.80	64.80	68.84	**64.09**	18
14	HB -13-48	6.85	14.26	29.67	3.85	**13.66**	-33.62	12	4	0/4	59.73	103.30	36.25	78.80	74.05	**70.43**	2
15	HB -15-23	7.19	6.85	28.17	2.57	**11.19**	-45.60	19	4	0/4	64.63	93.90	24.10	65.40	70.00	**63.61**	19
16	Aguaduice (C)	8.24	7.59	28.56	5.62	**12.50**	-39.24	16	4	-	63.60	104.50	37.50	57.40	65.39	**65.68**	14
17	Hama -2 (C)	5.77	14.81	20.00	4.40	**11.24**	-45.35	18	4	-	68.73	100.60	38.35	64.80	78.69	**70.23**	3
18	HFB -1 (C)	5.65	17.03	30.83	28.79	**20.58**		2	4	-	60.83	97.80	30.40	71.80	75.15	**67.20**	7
19	Hudeiba-93 (C)	7.22	27.22	29.39	8.74	**18.14**	-11.82	6	4	-	57.67	105.00	34.20	62.80	64.99	**64.93**	16
20	Vikrant (C)	8.67	20.74	30.83	14.57	**18.70**	-9.10	5	4	-	62.27	98.30	33.10	66.20	74.45	**66.86**	8
	Mean	**7.61**	**15.55**	**30.06**	**9.03**	**15.56**		-	-	-	**61.46**	**102.93**	**34.08**	**62.18**	**72.41**	**66.61**	-
	CD (0.05)	**0.52**	**4.28**	-	**3.76**	-		-	-	-	**4.96**	**9.10**	**3.37**	-	**11.69**	-	-
	CV (%) Error	**4.10**	**16.67**	-	**15.18**	-		-	-	-	**4.89**	**5.35**	**6.98**	-	**9.77**	-	-

S. No.	Genotypes	Days to 50% flowering							Days to 80 % maturity							
		Palampur	Pasighat	Ranichauri	Srinagar	Umiam	Mean	Rank	Palampur	Pasighat	Ranichauri	Srinagar	Umiam	Mean	Rank	Frequency
1	DFS 18-02	89.67	61.70	116.75	123.00	73.33	**92.89**	16	164.00	128.70	158.75	177.00	140.67	**153.82**	8	0/5
2	DFS 18-03	89.67	62.70	116.75	120.00	67.00	**91.22**	8	161.67	130.00	159.00	176.00	144.33	**154.20**	11	0/5
3	DFS 18-04	83.00	60.70	117.25	122.00	66.67	**89.92**	5	161.67	130.00	159.75	176.00	142.33	**153.95**	9	0/5
4	DFS 18-06	84.33	63.70	116.75	122.00	68.00	**90.96**	7	159.00	130.30	159.00	176.00	144.67	**153.79**	7	0/5
5	DFS 18-10	82.33	61.30	114.75	122.00	65.00	**89.08**	2	161.33	129.00	158.25	177.00	143.33	**153.78**	6	0/5
6	DFS 18-12	81.67	62.00	119.25	122.00	74.67	**91.92**	11	169.00	127.30	162.00	177.00	143.67	**155.79**	18	0/5
7	DFS 18-13	81.33	63.00	116.00	123.00	74.67	**91.60**	9	162.67	131.30	158.75	177.00	144.33	**154.81**	14	0/5
8	DFS 18-15	86.67	60.70	119.00	120.00	73.00	**91.87**	10	158.33	127.70	162.25	177.00	143.00	**153.66**	5	0/5
9	DFS 18-16	81.67	61.30	117.00	121.00	68.67	**89.93**	6	156.67	132.30	159.50	178.00	140.00	**153.29**	3	0/5
10	DFS 18-19	81.67	63.30	117.25	122.00	75.67	**91.98**	13	156.67	130.70	159.75	178.00	145.33	**154.09**	10	0/5
11	DFS 18-22	83.00	61.70	117.75	122.00	65.00	**89.89**	4	157.00	127.70	159.50	177.00	141.67	**152.57**	1	0/5
12	DFS 18-23	90.33	63.30	117.75	120.00	73.67	**93.01**	17	164.67	128.00	160.50	177.00	143.67	**154.77**	12	0/5
13	HB -13-10	90.33	63.00	119.00	122.00	67.00	**92.27**	15	164.00	131.30	161.25	177.00	146.33	**155.98**	19	0/5
14	HB -13-48	89.67	61.70	119.25	122.00	68.67	**92.26**	14	160.67	127.70	163.00	177.00	145.67	**154.81**	13	0/5
15	HB -15-23	91.67	62.70	115.75	122.00	67.67	**91.96**	12	163.33	131.70	159.00	177.00	145.00	**155.21**	17	0/5
16	Aguaduice (C)	94.00	64.30	118.00	122.00	82.00	**96.06**	20	166.67	130.70	160.50	177.00	139.33	**154.84**	15	-
17	Hama -2 (C)	89.00	65.00	116.00	122.00	76.00	**93.60**	18	169.67	131.30	158.50	177.00	144.00	**156.09**	20	-
18	HFB -1 (C)	78.67	64.00	116.25	121.00	66.33	**89.25**	3	157.67	131.00	159.00	177.00	143.00	**153.53**	4	-
19	Hudeiba-93 (C)	88.67	66.70	116.00	122.00	74.67	**93.61**	19	162.00	127.00	158.00	177.00	142.33	**153.27**	2	-
20	Vikrant (C)	79.67	65.00	116.50	120.00	63.67	**88.97**	1	166.67	130.70	159.00	175.00	143.00	**154.87**	16	-
	Mean	**85.85**	**62.89**	**117.15**	**121.60**	**70.57**	**91.61**	-	**162.17**	**129.72**	**159.76**	**176.85**	**143.28**	**154.36**	-	-
	CD (0.05)	**2.57**	**3.13**	**3.19**	-	**4.54**	**-**	-	**2.43**	**2.32**	**3.73**	-	**2.23**	**-**	-	-
	CV (%) Error	**1.81**	**3.01**	**1.92**	-	**3.89**	**-**	-	**0.91**	**1.08**	**1.65**	-	**0.94**	**-**	-	-

S. No.	Genotypes	Pod lenght (cm)							100 seed weight (g)					
		Palampur	Pasighat	Ranichauri	Srinagar	Umiam	Mean	Rank	Palampur	Pasighat	Srinagar	Umiam	Mean	Rank
1	DFS 18-02	8.17	11.90	4.34	6.20	9.99	**8.12**	1	73.33	96.50	88.63	78.37	**84.21**	3
2	DFS 18-03	7.01	11.70	4.02	7.20	7.57	**7.50**	2	93.53	79.70	98.48	74.33	**86.51**	2
3	DFS 18-04	7.14	9.60	2.25	6.40	7.60	**6.60**	7	72.00	90.80	86.11	83.80	**83.18**	5
4	DFS 18-06	7.01	10.50	1.98	5.80	7.60	**6.58**	9	74.53	80.70	80.20	98.43	**83.47**	4
5	DFS 18-10	7.88	10.40	3.27	5.60	7.52	**6.93**	4	71.57	90.60	60.09	73.57	**73.96**	10
6	DFS 18-12	7.28	10.70	3.48	5.30	6.65	**6.68**	6	81.63	84.00	81.89	57.17	**76.17**	9
7	DFS 18-13	7.71	9.20	2.40	5.20	6.73	**6.25**	14	76.87	95.90	55.88	88.89	**79.39**	8
8	DFS 18-15	6.30	9.00	3.58	6.00	7.39	**6.45**	11	73.47	80.90	65.64	66.13	**71.53**	13
9	DFS 18-16	5.95	9.80	3.62	7.40	7.63	**6.88**	5	71.97	79.70	70.73	67.40	**72.45**	12
10	DFS 18-19	6.89	8.80	2.95	7.20	6.97	**6.56**	10	72.33	90.90	64.09	104.57	**82.97**	6
11	DFS 18-22	8.07	8.00	3.80	6.00	5.57	**6.29**	13	71.27	75.40	60.86	61.77	**67.32**	15
12	DFS 18-23	7.35	9.80	1.79	5.00	6.83	**6.15**	15	80.23	85.50	63.29	54.47	**70.87**	14
13	HB -13-10	7.28	6.80	1.38	4.00	5.79	**5.05**	17	34.17	30.90	34.68	70.43	**42.55**	17
14	HB -13-48	7.01	5.10	2.61	4.00	4.99	**4.74**	20	32.47	29.30	24.64	73.33	**39.94**	19
15	HB -15-23	6.20	5.30	3.32	4.60	6.11	**5.11**	16	30.93	36.00	31.30	59.50	**39.43**	20
16	Aguaduice (C)	6.91	9.90	4.00	7.20	7.54	**7.11**	3	81.87	114.90	83.76	69.57	**87.52**	1
17	Hama -2 (C)	5.80	8.30	3.25	6.20	7.93	**6.30**	12	79.57	107.50	59.72	83.33	**82.53**	7
18	HFB -1 (C)	7.34	4.90	2.13	5.20	5.68	**5.05**	18	30.40	32.40	26.02	101.10	**47.48**	16
19	Hudeiba-93 (C)	7.39	8.90	3.77	5.20	7.68	**6.59**	8	76.70	64.00	80.12	74.43	**73.81**	11
20	Vikrant (C)	6.89	6.00	2.48	4.50	5.27	**5.03**	19	24.23	27.20	32.74	85.37	**42.38**	18
	Mean	**7.08**	**8.73**	**3.02**	**5.71**	**6.95**	**6.30**	-	**65.15**	**73.64**	**62.44**	**76.30**	**69.38**	-
	CD (0.05)	**1.21**	**1.59**	**0.28**	-	**1.87**	**-**	-	**5.37**	**2.85**	-	**10.95**	**-**	-
	CV (%) Error	**10.32**	**11.00**	**6.65**	-	**16.31**	**-**	-	**4.98**	**2.34**	-	**8.68**	**-**	-

Table 43: Experimental Details for AVT-I and II of Faba bean Rabi 2019-20 :Hill

S. No	Item	Palampur	Pasighat	Ranichauri	Umiam
1	No. of Entries	5	6	6	5
2	Check	2	2	2	2
3	No. of Replication	3	3	4	3
4	Design	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	30	30	30	45
6	Plant x Plant (cms.)	10	10	10	15
7	No. of rows/ plot	6	4	3	3
8	Row length (m)	3	1.5	3	3
9	Date of sowing	18.11.2019	16/12/2019	2/12/2019	26/11/2019
10	Date of harvesting	17.05.2020	13/04/2020 to 18/04/2020	18/05/2020 to 27/05/2020	As per maturity
11	Plot Size	5.4	1.8	2.7	4.05
12	Conversion Factor	18.52	55.56	37.04	24.69

Table 44: Performance of Faba bean entries in Advanced Varietal Trial (AVT-I & II) during rabi 2019-20

S. No.	Genotypes	Grain yield (q/ha)								Plant height (cm)					
		Palampur	Pasighat	Umiam	Mean	Gain(%) over best check	Rank	Location	Frequency	Palampur	Pasighat	Ranichauri	Umiam	Mean	Rank
	AVT-I														
1	EC010845	7.10	10.92		9.01	-24.88	7	2	0/3	63.25	93.90	42.13		66.43	1
2	EC243626	7.28	14.63	6.59	9.50	-20.80	6	3	0/2	61.70	92.23	44.85	52.42	62.80	8
	AVT-II														
3	HB-19	6.67	9.26	***8.33***	8.09	-32.60	8	3	1/3	59.77	94.47	42.25	66.89	65.84	2
4	HB-32	7.41	15.74	***7.63***	10.26	-14.49	4	3	1/3	61.07	99.43	42.15	57.05	64.92	3
5	HB-195	8.18	17.59	6.48	10.75	-10.38	3	3	0/3	60.43	94.43	46.36	57.97	64.80	4
6	HPFB- 2		16.66		16.66	**38.91**	1	1	0/1		92.77	34.30		63.53	7
7	HFB-1 (C)	6.67	17.03	6.52	10.07	-16.03	5	3		62.10	99.03	45.35	48.40	63.72	6
8	VIKRANT (C)	8.21	20.74	7.04	12.00		2	3		59.21	99.23	37.95	60.05	64.11	5
	Mean	**7.36**	**15.32**	**7.10**	**10.79**		-	-	-	**61.07**	**95.69**	**41.92**	**57.13**	**64.52**	-
	CD (0.05)	**5.65**		**0.16**	-		-	-	-	**1.94**	**8.31**	**1.42**		-	-
	CV (%) Error	**12.86**		**11.75**	-		-	-	-	**1.79**	**4.96**	**2.30**		-	-

S. No.	Genotypes	Days to 50% flowering						Days to maturity							
		Palampur	Pasighat	Ranichauri	Umiam	Mean	Rank	Palampur	Pasighat	Ranichauri	Umiam	Mean	Rank	Location	Frequency
	AVT-I														
1	EC010845	89.00	64.00	121.18		91.39	7	***158.33***	130.67	173.32		154.11	7	3	0/3
2	EC243626	85.00	65.00	121.50	68.00	84.88	6	***155.33***	132.67	174.25	142.83	151.27	2	4	1/4
	AVT-II														
3	HB-19	83.67	65.67	121.42	64.33	83.77	2	**156.67**	132.00	176.01	141.33	151.50	3	4	0/4
4	HB-32	84.33	65.33	121.13	65.00	83.95	3	160.00	134.33	174.00	141.67	152.50	4	4	0/4
5	HB-195	84.67	64.33	122.25	63.33	83.65	1	161.33	132.00	175.25	142.00	152.65	6	4	0/4
6	HPFB- 2		65.00	123.25		94.13	8		134.33	176.51		155.42	8	2	0/2
7	HFB-1 (C)	87.00	64.00	120.17	66.00	84.29	4	163.00	131.33	173.50	142.17	152.50	4	4	
8	VIKRANT (C)	88.33	65.00	118.25	67.67	84.81	5	161.33	130.67	168.75	143.33	151.02	1	4	
	Mean	**86.00**	**64.79**	**121.14**	**65.72**	**86.36**	-	**159.43**	**132.25**	**173.95**	**142.22**	**152.62**	-	-	-
	CD (0.05)	**1.99**	**1.55**	**3.17**	**0.72**	**-**	-	**2.10**	**2.08**	**4.09**	**2.83**	**-**	-	-	-
	CV (%) Error	**1.30**	**1.36**	**1.78**	**0.60**	**-**	-	**0.74**	**0.90**	**1.60**	**1.09**	**-**	-	-	-

S. No.	Genotypes	Pod lenght (cm)						100 seed weight (g)				
		Palampur	Pasighat	Ranichauri	Umiam	Mean	Rank	Palampur	Pasighat	Umiam	Mean	Rank
	AVT-I											
1	EC010845	4.99	6.10	4.30		5.13	7	25.83	34.07		29.95	3
2	EC243626	5.59	5.67	4.86	4.83	5.24	4	25.53	29.07	31.33	28.64	5
	AVT-II											
3	HB-19	4.96	5.10	5.21	5.44	5.18	5	28.13	34.63	36.00	32.92	1
4	HB-32	5.72	5.33	5.27	5.04	5.34	2	26.00	27.30	28.80	27.37	8
5	HB-195	5.40	5.40	4.90	5.42	5.28	3	26.87	29.10	30.07	28.68	4
6	HPFB- 2		5.90	4.40		5.15	6		28.33		28.33	7
7	HFB-1 (C)	5.16	4.77	5.22	4.99	5.04	8	24.79	32.30	28.00	28.36	6
8	VIKRANT (C)	5.25	6.07	5.40	4.96	5.42	1	24.17	27.00	39.83	30.33	2
	Mean	**5.30**	**5.54**	**4.95**	**5.11**	**5.22**	-	**25.90**	**30.23**	**32.34**	**29.32**	-
	CD (0.05)	**0.66**	**0.56**	**0.43**	**1.11**	**-**	-	**2.34**	**2.59**	**9.40**	**-**	-
	CV (%) Error	**7.04**	**5.77**	**5.88**	**11.97**	**-**	-	**5.08**	**4.90**	**15.98**	**-**	-

Table 45: Experimental Details for IVT and AVT-I of Buckwheat Rabi 2019-20 :Hill

S. No	Item	Basar	Medziphema	Tadong
1	No. of Entries	11	11	11
2	Check	4	4	4
3	Design	RBD	RBD	RBD
4	No. of Reps.	-	3	-
5	No. of rows/ plot	-	4	3
6	Row length (m)	-	3	2
7	Row x Row (cms.)	-	30	45
8	Plant x Plant (cms.)	-	10	20
9	NPKS (Kg/ha)	-	-	-
10	Plot Size	2.1 m2	-	6
11	Date of sowing	2/12/2019	5/12/2019	2/12/2019
12	Date of harvesting	5/4/2020	28/02/2020	As per maturity

Table 46: Performance of Buckwheat entries in Initial and advanced Varietal Trial (IVT& AVT-I) during rabi 2019-20

S. No.	Genotypes	Grain yield (q/ha)							Plant height					Days to Flowering				
		Basar	Tadong	Mean	Gain (%) over best check	Rank	Location	Frequency	Basar	Medziphema	Tadong	Mean	Rank	Basar	Medziphema	Tadong	Mean	Rank
A	**IVT**																	
1	EC125940	2.95	11.73	7.34	-32.46	13	2	0/2	32.07	53.67	88.40	58.04	13	35.33	38.33	52.33	42.00	6
2	IC024300	5.16	11.20	8.18	-24.72	5	2	0/2	33.27	38.83	57.60	43.23	15	35.33	36.67	53.67	41.89	4
3	IC026755	7.95	13.17	10.56	-2.78	2	2	0/2	66.67	122.00	90.80	93.16	2	36.33	37.33	54.67	42.78	7
4	IC037296	5.52	12.84	9.18	-15.50	4	2	0/2	42.93	93.17	67.40	67.83	8	37.33	40.33	54.67	44.11	13
5	IC042412	3.76	10.07	6.91	-36.36	14	2	0/2	47.60	85.50	78.40	70.50	7	35.33	41.33	54.00	43.56	11
6	IC329195	6.43	9.38	7.91	-27.24	8	2	0/2	51.80	69.00	52.80	57.87	14	36.33	35.33	52.00	41.22	2
7	NIC8817	4.42	11.61	8.02	-26.20	7	2	0/2	61.87	99.67	51.20	70.91	6	37.33	34.33	53.00	41.56	3
B	**AVT-I**																	
8	IC037269	2.62	12.11	7.36	-32.24	12	2	0/2	55.13	81.00	43.80	59.98	10	36.33	39.33	54.67	43.44	9
9	IC108508	2.36	12.94	7.65	-29.61	11	2	0/2	48.80	69.67	57.20	58.56	11	35.33	33.67	52.67	40.56	1
10	IC318859	3.30	12.76	8.03	-26.11	6	2	0/2	55.20	86.17	51.00	64.12	9	36.33	34.33	55.00	41.89	5
11	IC329199	2.77	10.62	6.69	-38.39	15	2	0/2	45.40	81.67	48.20	58.42	12	36.33	39.67	55.67	43.89	12
12	Himpriya (C)	3.65	11.98	7.81	-28.10	9	2	0/2	50.33	93.17	85.82	76.44	5	37.33	36.67	56.67	43.56	10
13	PRB-1(C)		10.25	10.25	-5.68	3	1	0/2			95.55	95.55	1			55.33	55.33	14
14	Shimla B-1(C)	4.30	11.11	7.71	-29.07	10	2	0/2	59.47	74.50	105.35	79.77	4	37.33	36.33	56.33	43.33	8
15	VL-7 (C)		10.86	**10.86**		1	1	0/2			86.35	86.35	3			55.33	55.33	14
	Mean	**4.24**	**11.51**	**8.30**		-	-	-	**50.04**	**80.62**	**70.66**	**69.38**	-	**36.33**	**37.21**	**54.40**	**44.30**	-
	CD (0.05)	**0.79**	**0.87**	-		-	-	-	**2.48**	**21.39**	**3.00**	-	-	**2.57**		**4.54**	**-**	-
	CV (%) Error	**11.08**	**4.51**	-		-	-	-	**2.94**	**15.75**	**2.54**	-	-	**1.81**		**3.89**	**-**	-

S. No.	Genotypes	Day to maturity						100 Seed Weight (g)				
		Medziphema	Tadong	Mean	Rank	Location	Frequency	Basar	Medziphema	Tadong	Mean	Rank
A	**IVT**											
1	EC125940	79.67	111.33	95.50	5	2	0/2	2.32	8.67	3.61	4.87	1
2	IC024300	78.67	115.00	96.83	8	2	0/2	2.13	3.33	3.65	3.04	12
3	IC026755	79.00	116.33	97.67	10	2	0/2	2.37	3.00	3.25	2.87	13
4	IC037296	82.33	119.00	100.67	13	2	0/2	2.61	5.33	3.45	3.80	8
5	IC042412	82.67	115.00	98.83	12	2	0/2	2.66	6.33	3.65	4.22	4
6	IC329195	78.00	114.67	96.33	7	2	0/2	1.95	5.67	3.52	3.71	10
7	NIC8817	75.67	114.67	95.17	3	2	0/2	2.90	5.00	3.81	3.90	5
B	**AVT-I**											
8	IC037269	80.00	116.33	98.17	11	2	0/2	2.61	5.00	3.54	3.72	9
9	IC108508	75.67	115.33	95.50	5	2	0/2	2.52	7.67	3.45	4.55	3
10	IC318859	75.00	115.67	95.33	4	2	0/2	2.63	4.00	3.82	3.49	11
11	IC329199	80.67	114.33	97.50	9	2	0/2	2.21	2.67	3.45	2.78	15
12	Himpriya (C)	79.67	109.33	94.50	2	2		1.80	8.33	4.05	4.73	2
13	PRB-1(C)		111.33	111.33	14	1				3.86	3.86	7
14	Shimla B-1(C)	78.00	110.00	94.00	1	2		2.41	2.67	3.53	2.87	14
15	VL-7 (C)		112.67	112.67	15	1				3.88	3.88	6
	Mean	**78.85**	**114.07**	**98.67**	-	-	-	**2.39**	**5.21**	**3.64**	**3.75**	-
	CD (0.05)	**2.20**	**2.49**	**-**	-	-	-	**1.16**	**1.77**	**0.81**	**-**	-
	CV (%) Error	**1.66**	**1.31**	**-**	-	-	-	**2.87**	**20.21**	**1.33**	**-**	-

Table 47: Experimental Details for IVT and AVT-I of Chenopodium quinoa Rabi 2019-20 :Hill

S. No	Item	Basar	Manipur
1	No. of Entries	13	13
2	Check	-	-
3	Design	RBD	RBD
4	No. of Reps.	3	3
5	No. of rows/ plot	-	5
6	Row length (m)	-	1.95
7	Row x Row (cms.)	-	40
8	Plant x Plant (cms.)	-	15
9	NPKS (Kg/ha)	-	-
10	Plot Size	4	4
11	Date of sowing	12/12/2019	10/1/2020
12	Date of harvesting	5/4/2020	11/06/2020 to 29/06/2020

Table 48: Performance of C. quinoa entries in Advanced Varietal Trial (AVT-II) Rabi 2019-20(Hills)

S. No.	Genotypes	Grain yield (q/ha)							Plant height (cm)			
		Basar	Manipur	Mean	Gain (%) over Trial Mean	Rank	Location	Frequency	Basar	Manipur	Mean	Rank
1	EC507738	3.20	1.61	2.40	-34.62	11	2	0/2	21.60	49.83	35.72	10
2	EC507739	4.37	1.87	3.12	-15.10	6	2	0/2	33.13	47.83	40.48	5
3	EC507740	4.40	2.65	3.52	-4.22	4	2	0/2	34.27	46.17	40.22	6
4	EC507741	1.75	3.00	2.37	-35.46	13	2	0/2	25.60	42.93	34.27	11
5	EC507742	3.25	2.85	3.05	-17.17	7	2	0/2	30.80	42.43	36.62	9
6	EC507743	**5.46**	1.40	3.43	-6.70	5	2	1/2	34.87	43.17	39.02	8
7	EC507744	4.17	1.72	2.95	-19.87	9	2	0/2	20.80	43.50	32.15	12
8	EC507746	1.96	4.00	2.98	-18.90	8	2	0/2	28.00	50.50	39.25	7
9	EC507747	**9.87**	**4.76**	7.32	98.90	1	2	2/2	55.67	81.00	68.33	1
10	EC507748	4.16	7.87	6.01	63.50	2	2	0/2	32.13	61.97	47.05	4
11	EC507749	4.15	0.64	2.39	-34.90	12	2	0/2	55.87	61.33	58.60	2
12	IC411824	4.53	**6.32**	5.42	47.44	3	2	0/2	53.80	47.67	50.73	3
13	IC411825	4.16	1.52	2.84	-22.90	10	2	0/2	26.53	37.13	31.83	13
	Mean	**4.26**	**3.09**	**3.68**		-	-	-	**34.85**	**50.42**	**42.64**	-
	CD (0.05)	0.48	**0.96**	-		-	-	-	**0.75**	**14.37**	-	-
	CV (%) Error	**6.64**	**18.41**	-		-	-	-	**1.27**	**16.91**	-	-

3.2 PLAINS

The Varietal Trials Programmes constituted in grain amaranth at nine centres, faba bean at seven locations and *Chenopodium quinoa* at twelve centres were conducted during *Rabi* 2019-20 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) Normal Sowing: Rabi 2019-20

The trial comprising 26 entries including four checks was conducted at nine locations. Results have been received from six centres. The experimental details and summary of performance of the entries *vis-a-vis* the checks has been presented in table 49 & 50.

Significant differences were observed among the entries for grain yield at Ranchi centre. Grain yield levels were high at Rahuri (13.30 q/ha) followed by at SK Nagar (11.73 q/ha) and Ambikapur (11.68 q/ha) centres. The yield at Ranchi centres was very low so that the results had been not included in overall mean. The overall average performance at five locations showed that the best entry RMA-62 (12.36 q/ha).

Plant height was the highest at Mandor (118.25 cm) and the lowest at Ambikapur (60.94 cm). On the basis of average performance over the locations, the check variety GA-2 (109.58 cm) had the highest plant height, whereas entry IC35548 had the lowest (85.86 cm).

Flowering time was earliest at Bhubaneswar (47.90 days) followed by Rahuri (56.38 days) and SK Nagar (56.47 days); while it was late at Ranchi (86.98 days) and Ambikapur (85.68 days) centres. On the basis of average over locations SKN-1508 flowered earliest in 57.25 days.

Maturity period was earliest at Bhubaneswar (100.67 days) and followed by Rahuri (111.07 days). The entry SKNK-1508 (119-17 days) was the earliest maturing line.

Inflorescence length of the entries was the highest at SK Nagar (48.53 cm). Based on the average over the locations the entry SKNA-1508 (42.19 cm) had the longest inflorescence.

Test weight as measured by the weight of 10 ml seed showed maximum mean value at Bhubaneswar (7.85 g) and minimum at Ambikapur (5.17 g). Based on the average over the locations the entry SKN-1503 had the highest seed weight (7.21 g).

3.2.1.2 Initial Varietal Trial (IVT) Early Sowing: Rabi 2019-20

The trial comprising 4 entries including six checks was conducted at nine locations. Results have been received from six centres. The experimental details and summary of performance of the entries *vis-a-vis* the checks has been presented in table 51 & 52.

No Significant differences were observed among the entries for grain yield at six centre. Grain yield levels were high at Ambikapur (12.14 q/ha) followed by at Rahuri (11.73 q/ha) and SK Nagar (10.75 q/ha) centres. The yield at Ranchi centres was very low so that the results had not been included in overall mean. The overall average performance at five locations showed that the best entry RMA-7 (11.99 q/ha).

Plant height was the highest at Rahuri (131.64 cm) and the lowest at Ranchi (76.72 cm). On the basis of average performance over the locations, the check variety GA-2 (126.48 cm) had the highest plant height, whereas entry Annapurna had the lowest (87.29 cm).

Flowering time was earliest at Bhubaneswar (52.44 days) followed by SK Nagar (56.11 days) and Rahuri (56.70 days); while it was late at Ranchi (89.62 days) and Ambikapur (79.57 days) centres. On the basis of average over locations check Annapurna flowered earliest in 51.27 days.

Maturity period was earliest at Bhubaneswar (97.52 days) and followed by Rahuri (108.44 days). The entry IC93941 (106.33 days) was the earliest maturing line.

Inflorescence length of the entries was the highest at SK Nagar (55.20 cm). Based on the average over the locations the check GA-2 (55.25 cm) had the longest inflorescence.

Test weight as measured by the weight of 10 ml seed showed maximum mean value at Ranchi (9.87 g) and minimum at Ambikapur (5.49 g). Based on the average over the locations the check Annapurna had the highest seed weight (7.79 g).

3.2.1.2 Advanced Varietal Trial (AVT-I): Rabi 2019-20

The experimental details and summary of performance of Rabi (2019-20) has been presented in Table 53 & 54. In this trial, three entries in AVT-I along with four checks were tested at nine locations. The results have been received from six centres. Result of Mandor centre had not been included in overall mean due to poor yield.

Significant differences were observed among the entries for grain yield at Bhubaneswar. Grain yield level was high at Ambikapur (14.45 q/ha), and moderate at Bhubaneswar (11.74 q/ha). Based on the average performance over five locations the entry SKNA-1407 was the highest yielder (12.36 q/ha) followed by check variety RMA-7 (12.35 q/ha).

Average plant height of the entries was the highest at Rahuri (135.00 cm) followed by S.K. Nagar (120.52 cm). It was the lowest at Ambikapur (76.86 cm) centre. Based on average performance over six locations the check variety BGA-2 had the highest plant height (116.24 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 (52.52 days) at Bhubaneswar and Ayodhya (54.81 days) while it was the longest at Ambikapur (87.90 days) centre. The entry, SKGPA-155 showed consistence for early flowering over eight locations and ranked first (59.78 days) based on the overall performance.

The average maturity period of the entries over all the locations was 119.25 days. The entry, SKGPA-155 was earliest in maturity (126.61 days). The average maturity period was the minimum at Bhubaneswar (102.19 days), while it was the longest at Ambikapur (155.95 days).

The length of inflorescence of the entries was the highest at SK Nagar (53.12 cm) followed by at Rahuri (45.25 cm). Based on the average over six locations, the check variety GA-2 had the longest inflorescence (45.32 cm).

Test weight expressed in terms of weight of 10 ml seed recorded at six centres showed that it was the highest at Bhubaneswar (7.82 g) and low at Ambikapur (5.32 g). The variation among the entries was relatively low. Based on the average over six locations, the SKGPA-155 (7.07 g) showed the highest test weight.

3.2.1.3 Advanced Varietal Trial (AVT-II): Rabi 2019-20

The experimental details and summary of performance of Rabi (2019-20) has been presented in Table 55 & 56. In this trial, five entries in AVT-II along with four checks were tested at nine locations. The results have been received from six centres.

Significant differences were observed among the entries for grain yield at Bhubaneswar and Mandor. Grain yield level was high at Ambikapur (15.04 q/ha), and moderate at Bhubaneswar (11.28 q/ha). Based on the average performance over six locations the entry SKNA-1406 was the highest yielder (14.36 q/ha) followed by entry BGA-7-1 (E) (12.83 q/ha).

Average plant height of the entries was the highest at Rahuri (133.29 cm) followed by S.K. Nagar (128.10 cm). It was the lowest at Ambikapur (66.85 cm) centre. Based on average performance over six locations the check variety GA-2 had the highest plant height (116.61 cm).

The mean flowering time was the earliest (52.26 days) at Bhubaneswar and Ayodhya (54.26 days) while it was the longest at Ambikapur (81.59 days) centre. The entry, BGA-9 showed consistence for early flowering over six locations and ranked first (58.56 days) based on the overall performance.

The average maturity period of the entries over all the locations was 134.11 days. The entry, BGA-1 was earliest in maturity (128.67 days). The average maturity period was the minimum at Bhubaneswar (109.81 days), while it was the longest at Mandor (146.41 days).

The length of inflorescence of the entries was the highest at Ambikapur (62.59 cm) followed by at SK Nagar (56.45 cm). Based on the average over six locations, the check variety GA-2 had the longest inflorescence (52.74 cm).

Test weight expressed in terms of weight of 10 ml seed recorded at six centres showed that it was the highest at Bhubaneswar (7.78 g) and low at Ambikapur (5.16 g). The variation among the entries was relatively low. Based on the average over six locations, the BGA-9 (7.09 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* 2015-16 season.

3.2.2.1 Initial Varietal Trial (IVT): Rabi 2019-20

The Initial Varietal Trial comprising eighteen entries including one check was conducted at seven locations. Results have been received from all locations. The experimental details and summary of performance of the entries has been presented in Table 57 & 58.

No significant differences were observed among the entries for seed yield at all the locations. The average over the locations showed that seed yield was the highest in the entry, HB-15.21 (25.29 q/ha) followed by HB 15-51 (24.83 q/ha).

Plant height was the highest at Ludhiana (112.41 cm) followed by at Ayodhya (91.25 cm) centre. Moderate plant height was observed at Faridkot (89.25 cm), Hisar (89.59 cm) and Ranchi (83.78 cm) centre. Based on the average over the locations the entry, DFS 18-11 (93.41 cm) showed the highest plant height.

Flowering time ranged from 59.86 days at Ranchi to 99.24 days at New Delhi centre. Based on the average over the locations DFS 18-11 (72.12 days) was the earliest flowering line.

Maturity period varied among the locations with mean maturity period ranging from 127.11 days at Ambikapur to 149.71 days at Ludhiana centre. On the basis of overall mean, HB 15-04 (136.67 days) had the earliest maturity.

Pod length was the longest at Ludhiana (7.44 cm) followed by at Ranchi (7.03 cm) centre. Based on the average over the locations the entry, DFS 18.01 (7.48 cm) showed the highest pod length.

Mean seed weight was the highest at Ludhiana (57.31 g) and the lowest at Ayodhya (21.47 g) centre. Based on the average over locations the the entry DFS 18-01 (62.74 g) had the boldest seed.

3.2.2.2 Advanced Varietal Trial (AVT-I &II): Rabi 2019-20

The advanced Varietal Trial comprising nine entries (5 entry in AVT-I & 4 entry in AVT-II) including two check was conducted at seven locations. Results have been received from all locations. The experimental details and summary of performance of the entries has been presented in Table 59 & 60.

Significant differences were observed among the entries for seed yield at Ayodhya, Ludhiana, New Delhi. The average over the locations showed that seed yield was the highest in the entry, NDF 13-02 (24.72 q/ha) followed by check variety HFB-1 (23.63 q/ha).

Plant height was the highest at Ludhiana (113.58 cm) followed by at Ayodhya (96.57 cm) centre. Dwarf plant height was observed at Ambikapur (63.45 cm) centre. Based on the average over the locations the check variety Vikrant (95.36 cm) showed the highest plant height.

Flowering time ranged from 50.70 days at Ambikapur to 99.77 days at New Delhi centre. Based on the average over the locations NDF 17-1 (66.63 days) was the earliest flowering line.

Maturity period varied among the locations with mean maturity period ranging from 128.41 days at Ambikapur to 148.16 days at Hisar centre. On the basis of overall mean, NDFB 16-03 (135.47 days) had the earliest maturity.

Pod length was the longest at Ayodhya (5.84 cm) followed by at Ludhiana (5.83 cm) centre. Based on the average over the locations the entry, NDF-17-1 (5.46 cm) showed the highest pod length.

Mean seed weight was the highest at Ludhiana (31.42 g) and the lowest at Ambikapur (22.49 g) centre. Based on the average over locations the check variety, HFB-1 (29.45 g) had the boldest seed.

3.2.3 CHENOPODIUM (*Chenopodium quinoa*)

In *Chenopodium quinoa* are economically important and hence have been included in the evaluation programme. Advanced Varietal Trial comprising was proposed to be conducted at twelve locations and result of two centres Delhi and Raipur had not been received.

3.2.3.1 Advanced Varietal Trial (AVT-II)

The Initial Varietal Trial and Advanced Varietal Trial comprising thirteen lines was conducted at twelve centres. The entries comprised of the lines received from ten centres. The experimental and performance of the entries has been summarized in table 61 & 62.

The average grain yield was low at Ranchi (4.28 q/ha) and Mandor (6.84 q/ha), while it was the highest at SK Nagar (18.76 q/ha). The yield of Ranchi and Mandor centre had not been included in overall mean due to poor performance.

Based on average over eight locations the entry IC507744 was the highest yielder (16.42 q/ha).

Average plant height of the entries was the highest at Hisar (160.14 cm) followed by Ayodhya (143.57 cm). It was the lowest at Ambikapur (66.92 cm) centre. Based on average performance over eight locations the entry EC507747 had the highest plant height (114.68 cm).

The mean flowering time was the earliest (38.15 days) at Bhubaneswar and SK Nagar (41.90days) while it was the longest at Ludhiana (89.62 days) centre. The entry, EC507738 showed consistence for early flowering over nine locations and ranked first (56.58 days) based on the overall performance.

The average maturity period of the entries over all the locations was 111.03 days. The entry, IC411825 was earliest in maturity (108.67 days). The average maturity period was the minimum at Bhubaneswar (77.64 days), while it was the longest at Mandor (132.79 days).

The length of inflorescence of the entries was the highest at Bengaluru (32.82 cm) followed by at Hisar (31.67 cm). Based on the average over ten locations, the entry EC507747 had the longest inflorescence (24.80 cm).

Test weight expressed in terms of weight of 10 ml seed recorded at eight centres showed that it was the highest at Ranchi (8.91 g) and low at Bengaluru (5.30 g). The variation among the entries was relatively low. Based on the average over eight locations, the entry IC411824 (7.08 g) showed the highest test weight.

Table 49: Experimental Details of (IVT-Normal Sowing) of grain amaranth Rabi 2019-20 (Plain)

S. No	Item	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar
1	No. of Entries	16	16	14	17	20	22
2	No. of checks	4	4	4	4	4	4
3	No. of Replication	3	3	3	3	3	3
4	Design	RBD	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	45	45	45	45 cm	45 cm	45 cm
6	Plant x Plant (cms.)	15	15	15	15 cm	15 cm	15 cm
7	No. of rows/ plot	4	4	3	4	4	4
8	Row length (m)	3	3	3	3	3	3
9	Date of sowing	11/20/2019	02.12.2019	15/11/2019	1.12.2019	3/12/2019	28/11/2019
10	Date of harvesting	As per maturity	19.03.2020	As per maturity	20/3/2020 to 23/3/2020	04/04/2020 to 06/04/2020	19/03/2020
11	Plot Size	5.4	5.4	4.05	5.40	-	5.40
12	Conversion factor	18.52	18.52	24.69	18.52	-	18.52

Table 50: Performance of grain amaranth entries in Initial Varietal Trial (IVT-Early): Rabi (2019-20) - Plains

S. No.	Genotypes	Grain yield (q/ha)											Plant height (cm)						
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency	Gain (%) over best check	Ambikapur	Bhubaneswar	Mandor	Ranchi	SK Nagar	Mean	Rank
1	BGA 07	-	11.15	-	14.57	4.53	11.28	**12.34**	5	3	0/3	4.89	-	107.00	-	70.43	117.87	**98.43**	11
2	BGA 16	-	11.54	-	12.65	3.23	12.80	**12.33**	6	3	0/3	4.85	-	109.73	-	61.67	106.53	**92.64**	17
3	CGA-18-1	12.53	-	-	-	-	11.33	**11.93**	9	2	0/2	1.45	63.53	-	-	-	104.00	**83.77**	27
4	CGA-18-2	12.35	-	-	-	-	-	**12.35**	4	1	0/1	4.97	65.73	-	-	-	-	**65.73**	29
5	IC21923	14.81	11.46	8.66	14.91	**6.03**	11.70	**12.31**	7	5	1/5	4.66	56.97	119.60	145.78	114.23	91.60	**105.64**	5
6	IC35542	11.23	11.16	8.58	15.04	**6.17**	11.70	**11.54**	16	5	1/5	-1.85	60.63	91.67	107.00	77.20	121.00	**91.50**	18
7	IC35546	10.68	11.40	5.14	14.01	3.83	7.33	**9.71**	30	5	0/5	-17.42	59.87	103.20	108.22	75.27	143.07	**97.92**	12
8	IC35547	12.47	11.59	7.74	15.98	2.60	12.35	**12.02**	8	5	0/5	2.24	56.60	95.20	117.89	66.73	142.67	**95.82**	14
9	IC35548	11.36	12.04	6.58	15.36	3.63	14.04	**11.88**	11	5	0/5	0.97	60.13	93.27	106.89	63.07	105.93	**85.86**	26
10	IC35622	10.93	10.32	7.62	13.40	2.77	13.08	**11.07**	22	5	0/5	-5.88	56.53	86.47	117.78	70.00	103.33	**86.82**	25
11	IC35623	13.21	10.10	8.77	12.87	3.43	13.14	**11.62**	15	5	0/5	-1.23	58.81	92.33	133.89	77.83	112.67	**95.11**	15
12	IC35624	11.73	12.11	7.84	11.09	2.63	13.53	**11.26**	19	5	0/5	-4.27	63.40	96.13	117.67	71.23	103.47	**90.38**	21
13	RGA 03	13.33	-	-	13.91	-	-	**13.62**	1	2	0/2	**15.82**	67.83	-	-	-	-	**67.83**	28
14	RGA 04	11.17	-	-	14.23	-	-	**12.70**	2	2	0/2	7.99	63.10	-	-	-	-	**63.10**	30
15	RGA 15	11.36	-	10.02	-	-	-	**10.69**	27	2	0/2	-9.10	57.97	-	123.89	-	-	**90.93**	19
16	RGA 19	-	11.44	-	-	3.77	10.18	**10.81**	26	2	0/2	-8.11	-	106.27	-	73.73	134.67	**104.89**	6
17	RGA 20	-	-	-	-	-	11.48	**11.48**	17	1	0/1	-2.38	-	-	-	-	118.40	**118.40**	3
18	RGA 21	-	-	-	-	-	11.28	**11.28**	18	1	0/1	-4.11	-	-	-	-	90.53	**90.53**	20
19	RGA 22	-	-	-	-	**-**	11.12	**11.12**	20	1	0/1	-5.42	-	-	-	**-**	98.53	**98.53**	10
20	RGA 23	-	-	-	-	-	10.33	**10.33**	29	1	0/1	-12.14	-	-	-	-	120.87	**120.87**	1
21	RGA 24	-	-	-	-	-	11.89	**11.89**	10	1	0/1	1.08	-	-	-	-	96.80	**96.80**	13
22	RMA 09	12.35	12.91	9.55	12.33	2.70	12.22	**11.87**	12	5	0/5	0.92	56.87	100.07	102.11	67.90	121.33	**89.66**	22
23	RMA 10	10.37	12.13	9.02	10.09	3.67	13.03	**10.93**	24	5	0/5	-7.09	61.93	92.33	106.33	70.00	113.33	**88.79**	23
24	RMA 62	13.52	***13.38***	10.23	11.19	-	13.49	**12.36**	3	5	1/5	5.12	60.87	113.40	113.33	-	122.27	**102.47**	7
25	SKNA 1503	-	**13.16**	8.41	11.40	2.53	13.84	**11.70**	14	4	1/5	-0.49	-	101.73	113.33	76.67	109.47	**100.30**	8
26	SKNA 1508	-	12.02	7.28	11.81	-	12.23	**10.83**	25	4	0/4	-7.88	-	97.60	136.56	-	124.53	**119.56**	2
27	BGA-2 (C)	13.89	**10.86**	7.62	13.91	3.03	8.36	**10.93**	23	5	-		62.40	106.47	109.11	56.53	106.47	**88.20**	24
28	GA-2 (C)	12.16	**11.22**	7.65	11.79		12.62	**11.09**	21	5	-		63.53	111.93	126.00		136.87	**109.58**	4
29	RMA-7 (C)	12.96	**10.95**	8.63	14.23	2.97	12.04	**11.76**	13	5	-		60.90	100.93	107.78	61.83	140.13	**94.32**	16
30	Suvarna (C)	11.85	**11.23**	5.60	14.59	4.40	8.49	**10.35**	28	5	-		61.27	106.47	135.00	78.93	112.73	**98.88**	9
Mean		**12.21**	**11.61**	**8.05**	**13.30**	**3.64**	**11.73**	**11.54**	-	-	-		**60.94**	**101.59**	**118.25**	**72.55**	**115.35**	**94.44**	**-**
CD (0.05)		**1.18**	**1.12**	**1.64**	**2.97**	**0.48**	**2.15**	**-**	-	-	-		**5.24**	**9.37**	**15.96**	**22.12**	**9.28**	**-**	**-**
CV (%) Error		**5.86**	**5.82**	**12.31**	**13.49**	**7.90**	**11.16**	**-**	-	-	-		**5.20**	**5.58**	**8.13**	**18.34**	**4.91**	**-**	**-**

* *Data of Ranchi were not included in overall mean*

S. No.	Genotypes	Days to flowering								Days to maturity									
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	BGA 07	-	50.0	-	55.7	91.3	59.3	**64.08**	13	-	**99.7**	-	**109.3**	153.0	122.7	**121.17**	6	4	2/4
2	BGA 16	-	48.0	-	52.0	95.3	52.3	**61.92**	6	-	100.0	-	**111.0**	145.7	121.3	**119.50**	5	4	1/4
3	CGA-18-1	87.7	-	-	-	-	54.3	**71.00**	24	161.0	-	-	-	-	121.3	**141.17**	28	2	0/2
4	CGA-18-2	87.0	-	-	-	-	-	**87.00**	30	166.0	-	-	-	-	-	**166.00**	30	1	0/1
5	IC21923	84.0	46.0	65.0	53.0	83.0	45.7	**62.78**	9	163.3	100.7	156.0	113.0	150.7	**120.3**	**134.00**	21	6	1/6
6	IC35542	83.3	45.0	68.0	51.3	79.0	58.0	**64.11**	14	164.0	**98.7**	142.3	**106.7**	**142.0**	**116.3**	**128.33**	11	6	4/6
7	IC35546	84.3	47.7	64.3	52.0	78.7	64.0	**65.17**	18	164.0	**99.7**	150.0	**111.7**	**145.0**	134.0	**134.06**	22	6	3/6
8	IC35547	83.7	47.3	64.3	55.0	84.0	56.3	**65.11**	17	163.7	101.0	150.3	**112.3**	151.3	122.0	**133.44**	20	6	1/6
9	IC35548	85.0	48.0	64.3	55.3	84.0	54.7	**65.22**	19	164.0	**99.7**	150.0	**112.0**	149.7	**115.0**	**131.72**	15	6	3/6
10	IC35622	87.0	47.7	63.7	54.0	86.0	48.0	**64.39**	15	164.0	100.0	145.7	**110.3**	153.3	**115.7**	**131.50**	13	6	2/6
11	IC35623	84.0	47.3	65.3	53.7	83.0	46.3	**63.28**	11	164.0	100.7	149.7	113.0	148.7	**115.7**	**131.94**	16	6	1/6
12	IC35624	85.0	45.7	63.3	52.7	83.0	49.7	**63.22**	10	164.0	**99.3**	150.3	112.7	153.0	**116.7**	**132.67**	18	6	2/6
13	RGA 03	83.3	-	-	61.7	-	-	**72.50**	25	163.3	-	-	**109.7**	-	-	**136.50**	26	2	1/2
14	RGA 04	91.3	-	-	55.0	-	-	**73.17**	27	167.7	-	-	**108.0**	-	-	**137.83**	27	2	1/2
15	RGA 15	84.7	-	65.7	-	-	-	**75.17**	29	160.3	-	140.7	-	-	-	**150.50**	29	2	0/2
16	RGA 19	-	51.3	-	-	97.3	59.0	**69.22**	23	-	102.0	-	-	152.0	133.3	**129.11**	12	3	0/3
17	RGA 20	-	-	-	-	-	50.3	**50.33**	2	-	-	-	-	-	122.0	**122.00**	7	1	0/1
18	RGA 21	-	-	-	-	-	51.3	**51.33**	3	-	-	-	-	-	**118.3**	**118.33**	2	1	1/1
19	RGA 22	-	-	-	-	**-**	49.3	**49.33**	1	-	-	-	-	**-**	**117.3**	**117.33**	1	1	1/1
20	RGA 23	-	-	-	-	-	62.3	**62.33**	8	-	-	-	-	-	125.0	**125.00**	9	1	0/1
21	RGA 24	-	-	-	-	-	53.3	**53.33**	4	-	-	-	-	-	**119.3**	**119.33**	4	1	1/1
22	RMA 09	87.0	46.7	65.3	54.7	91.7	55.7	**66.83**	21	164.0	101.0	149.3	**108.7**	146.0	**120.0**	**131.50**	13	6	2/6
23	RMA 10	87.0	47.3	64.0	54.7	85.0	58.0	**66.00**	20	163.3	**98.7**	147.0	**110.0**	153.7	124.7	**132.89**	19	6	2/6
24	RMA 62	86.7	46.0	64.0	56.0	-	57.0	**61.93**	7	162.7	**99.0**	141.7	**110.0**	-	122.0	**127.07**	10	5	2/5
25	SKNA 1503	-	48.0	65.7	58.3	86.3	60.3	**63.73**	12	-	**99.7**	145.7	**107.0**	151.3	**120.7**	**124.87**	8	5	3/5
26	SKNA 1508	-	48.7	63.7	59.3	-	57.3	**57.25**	5	-	**99.3**	146.7	**110.0**	-	**120.7**	**119.17**	3	4	3/4
27	BGA-2 (C)	84.7	52.7	70.0	65.0	95.7	69.0	**72.83**	26	162.0	103.7	148.7	116.3	151.3	130.0	**135.33**	23	6	-
28	GA-2 (C)	87.3	45.0	67.3	61.7		62.7	**64.80**	16	168.3	103.3	150.7	116.0		123.0	**132.27**	17	5	-
29	RMA-7 (C)	84.3	50.3	68.7	60.3	76.3	64.3	**67.39**	22	167.0	102.7	148.3	117.3	150.0	127.7	**135.50**	24	6	-
30	Suvarna (C)	86.3	49.3	72.3	62.7	99.0	69.7	**73.22**	28	167.3	104.7	142.7	118.7	153.0	130.7	**136.17**	25	6	-
Mean		**85.7**	**47.9**	**65.8**	**56.4**	**87.0**	**56.5**	64.93	**-**	**164.2**	**100.7**	**147.5**	**111.6**	**150.0**	**122.1**	131.21	-	-	-
CD (0.05)		**4.1**	**2.7**	**2.5**	**2.6**	**4.3**	**2.5**	**-**	**-**	**4.8**	**2.3**	**2.7**	**2.7**	**4.9**	**1.9**	**-**	-	-	-
CV (%) Error		**2.9**	**3.4**	**2.3**	**2.8**	**2.9**	**2.7**	**-**	**-**	**1.8**	**1.4**	**1.1**	**1.5**	**2.0**	**1.0**	**-**	-	-	-

S. No.	Genotypes	Inflorescence length (cm)							Seed weight (g/10ml						
		Ambikapur	Bhubaneswar	Mandor	Ranchi	SK Nagar	Mean	Rank	Ambikapur	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank
1	BGA 07	-	43.27	-	20.13	47.33	**36.91**	13	-	7.87	-	7.50	6.22	**7.19**	3
2	BGA 16	-	43.40	-	17.20	45.07	**35.22**	19	-	7.86	-	7.93	6.97	**7.59**	1
3	CGA-18-1	31.40	-	-	-	53.60	**42.50**	4	6.10	-	-	-	6.63	**6.37**	25
4	CGA-18-2	31.33	-	-	-	-	**31.33**	26	5.80	-	-	-	-	**5.80**	29
5	IC21923	30.00	43.53	41.22	22.37	39.44	**35.31**	18	5.00	7.90	7.55	8.00	6.81	**7.05**	5
6	IC35542	30.60	40.07	30.78	24.00	47.93	**34.68**	22	5.20	8.00	7.23	7.13	6.98	**6.91**	12
7	IC35546	27.27	42.73	37.33	25.20	55.33	**37.57**	12	5.87	7.87	7.65	7.50	5.54	**6.89**	13
8	IC35547	28.33	43.60	31.78	18.43	55.53	**35.54**	14	5.40	7.85	7.40	7.07	5.83	**6.71**	18
9	IC35548	30.00	39.27	29.33	18.73	48.13	**33.09**	25	5.20	7.92	7.13	6.93	7.14	**6.87**	14
10	IC35622	30.27	40.60	30.33	21.00	44.73	**33.39**	23	5.20	7.82	7.20	7.93	6.91	**7.01**	7
11	IC35623	30.00	41.27	36.67	23.20	46.53	**35.53**	15	4.43	7.75	7.94	7.20	6.57	**6.78**	16
12	IC35624	33.00	37.67	31.89	19.67	51.53	**34.75**	21	4.70	7.82	7.75	7.93	6.94	**7.03**	6
13	RGA 03	31.20	-	-	-	-	**31.20**	27	5.17	-	-	8.00	-	**6.58**	20
14	RGA 04	30.13	-	-	-	-	**30.13**	30	5.47	-	-	7.30	-	**6.38**	24
15	RGA 15	30.30	-	36.11	-	-	**33.21**	24	5.87	-	6.73	-	-	**6.30**	27
16	RGA 19	-	43.47	-	18.03	52.67	**38.06**	10	-	7.83	-	-	6.17	**7.00**	8
17	RGA 20	-	-	-	-	49.47	**49.47**	1	-	-	-	-	6.56	**6.56**	21
18	RGA 21	-	-	-	-	42.47	**42.47**	5	-	-	-	-	6.72	**6.72**	17
19	RGA 22	-	-	-	**-**	41.73	**41.73**	7	-	-	-	-	5.45	**5.45**	30
20	RGA 23	-	-	-	-	48.47	**48.47**	2	-	-	-	-	6.31	**6.31**	26
21	RGA 24	-	-	-	-	44.67	**44.67**	3	-	-	-	-	6.48	**6.48**	23
22	RMA 09	29.47	43.20	33.11	16.67	52.73	**35.04**	20	5.07	7.83	7.14	7.87	6.72	**6.93**	10
23	RMA 10	30.00	41.73	31.33	23.67	50.47	**35.44**	17	4.27	7.86	6.79	7.83	6.68	**6.69**	19
24	RMA 62	31.30	47.93	32.56	-	54.40	**41.55**	8	4.47	7.81	7.86	7.33	6.73	**6.84**	15
25	SKNA 1503	-	45.67	32.56	22.50	50.73	**37.86**	11	-	7.83	7.26	6.80	6.96	**7.21**	2
26	SKNA 1508	-	43.87	31.78	-	50.93	**42.19**	6	-	7.88	7.25	7.07	6.48	**7.17**	4
27	BGA-2 (C)	33.16	**36.20**	31.00	13.27	40.47	**30.82**	29	4.40	**7.84**	6.44	7.40	5.22	**6.26**	28
28	GA-2 (C)	32.27	**37.47**	36.56		57.87	**41.04**	9	4.80	**7.82**	7.25	7.77	6.93	**6.91**	11
29	RMA-7 (C)	30.67	**39.40**	35.44	19.40	52.60	**35.50**	16	5.73	**7.87**	7.37	7.63	6.40	**7.00**	9
30	Suvarna (C)	33.27	**35.67**	31.44	18.13	36.93	**31.09**	28	5.30	**7.81**	7.09	7.27	5.23	**6.54**	22
Mean		**30.70**	**41.50**	**33.40**	**20.09**	**48.53**	**37.19**	-	**5.17**	**7.85**	**7.28**	**7.50**	**6.45**	**6.72**	-
CD (0.05)		**4.50**	**4.46**	**4.27**	**4.17**	**6.06**	**-**	-	**0.96**	**0.08**	**0.11**	**0.33**	**0.39**	**-**	-
CV (%) Error		**8.87**	**6.50**	**7.71**	**12.48**	**7.62**	**-**	-	**11.24**	**0.62**	**0.92**	**2.66**	**3.71**	**-**	-

Table 51: Experimental Details of IVT-Early of grain amaranth Rabi 2019-20 (Plain)

S. No	Item	Ambikapur	Bhubaneswar	Faizabad	Mandor	Rahuri	SK Nagar
1	No. of Entries	4	4	4	4	4	3
2	No. of checks	5	5	5	5	5	5
3	No. of Replication	3	3	3	3	3	3
4	Design	RBD	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	45	45	45	45 cm	45 cm	45 cm
6	Plant x Plant (cms.)	15	15	15	15 cm	15 cm	15 cm
7	No. of rows/ plot	4	4	3	4	4	4
8	Row length (m)	3	3	3	3	3	3
9	Date of sowing	11/19/2019	10.12.2019	15.11.2019	1/12/2019	28/11/2019	3/12/2019
10	Date of harvesting	As per maturity	28.03.2020	As per maturity	20/3/2020 to 23/3/2020	11/3/2020	01/04/2020 to 06/04/2020
11	Plot Size	5.4	5.4	4.05	5.40	5.40	-
12	Conversion factor	18.52	18.519	24.691	18.519	18.519	-

Table 52: Performance of grain amaranth entries in Initial Varietal Trial (IVT-Early): Rabi (2019-20) - Plains

S. No.	Genotypes	Grain yield (q/ha)											Plant height (cm)							
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Gain (%) over best check	Rank	Location	Frequency	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Rank
1	IC35541	12.47	12.72	8.30	10.04	2.17	7.36	10.18	-15.10	7	5	0/5	86.1	107.9	131.9	116.5	83.0	125.2	108.4	6
2	IC35621	11.36	9.32	6.55	10.13	3.57	9.44	9.36	-21.92	8	5	0/5	65.4	97.5	98.3	128.7	75.3	106.7	95.3	9
3	IC93941	-	8.87	-	11.13	-	13.80	11.26	-6.03	4	3	0/3	-	102.1	-	133.7	-	123.7	119.8	2
4	IC95290	12.28	13.68	9.15	11.06	2.60	13.09	11.85	-1.11	2	5	0/5	88.6	112.7	100.9	134.3	85.8	143.7	111.0	5
5	Annapurna (C)	-	6.07	6.83	6.08	2.73	12.42	7.85	-34.51	9	4	-	-	100.3	130.7	104.3	41.3	59.8	87.3	10
6	BGA 2 (C)	11.36	12.63	9.93	12.53	2.97	8.36	10.96	-8.57	6	5	-	91.7	124.2	111.7	144.4	97.1	103.9	112.2	4
7	GA 2 (C)	10.99	7.99	10.73	15.20	-	12.12	11.41	-4.86	3	5	-	85.5	119.3	139.7	150.3	-	137.7	126.5	1
8	RMA-7 (C)	13.64	11.33	8.63	14.82	2.17	11.52	**11.99**	-	1	5	-	72.4	117.3	104.1	138.5	76.2	134.2	107.1	7
9	Suvarna (C)	12.90	13.28	5.68	14.59	2.60	8.65	11.02	-8.07	5	5	-	86.8	123.8	134.3	134.1	78.3	124.8	113.7	3
10	VL Chua 44 (C)	-	-	5.63	-	-	-	5.63	-53.04	10	1	-	-	-	101.4	-	-	-	101.4	8
	Mean	**12.14**	**10.65**	**7.94**	**11.73**	**2.69**	**10.75**	**10.15**		-	-	-	**82.4**	**111.7**	**117.0**	**131.6**	**76.7**	**117.7**	**108.3**	**-**
	CD (0.05)	**3.77**	**1.48**	**1.49**	**4.18**	**0.77**	**4.36**	**-**		-	-	-	**15.9**	**13.9**	**17.3**	**14.9**	**23.5**	**8.3**	**-**	**-**
	CV (%) Error	**16.03**	**7.57**	**15.57**	**12.24**	**4.21**	**11.79**	**-**		-	-	-	**10.8**	**7.2**	**8.6**	**6.5**	**17.2**	**4.1**	**-**	**-**

* *Data o fRanchi were not included in overall mean*

S. No.	Genotypes	Days to flowering								Days to maturity									
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Rank	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Rank	Location	Frequency
1	IC35541	82.3	54.7	67.3	61.7	94.3	57.0	69.6	7.0	167.33	97.67	146.67	112.67	155.33	111.33	131.83	6	6	0/6
2	IC35621	83.0	49.7	65.0	49.7	82.7	46.7	62.8	4.0	168.33	95.33	143.67	108.67	150.00	107.67	128.94	4	6	0/6
3	IC93941	-	54.0	-	51.7	-	50.0	51.9	2.0	-	95.67	-	112.67	-	110.67	106.33	1	3	0/3
4	IC95290	84.0	54.7	65.7	62.3	87.7	63.3	69.6	8.0	169.33	98.00	148.33	111.33	152.33	117.00	132.72	7	6	0/6
5	Annapurna (C)	-	45.3	62.7	44.3	67.7	36.3	51.3	1.0	-	92.67	131.67	86.67	129.67	101.00	108.33	2	5	-
6	BGA 2 (C)	81.3	53.3	69.7	65.7	101.0	64.0	72.5	10.0	172.00	99.33	144.33	109.00	153.67	130.67	134.83	9	6	-
7	GA 2 (C)	83.0	55.3	67.3	57.7	-	61.7	65.0	5.0	169.00	100.67	142.67	118.67	-	124.00	131.00	5	5	-
8	RMA-7 (C)	60.3	51.7	67.7	56.7	95.3	61.3	65.5	6.0	169.00	98.67	141.67	106.33	153.33	127.33	132.72	7	6	-
9	Suvarna (C)	83.0	53.3	70.0	60.7	98.7	64.7	71.7	9.0	170.00	99.67	147.67	110.00	152.33	132.00	135.28	10	6	-
10	VL Chua 44 (C)	-	-	59.7	-	-	-	59.7	3.0	-	-	114.33	-	-	-	114.33	3	1	-
	Mean	**79.6**	**52.4**	**66.1**	**56.7**	**89.6**	**56.1**	**63.9**	**-**	**169.29**	**97.52**	**140.11**	**108.44**	**149.52**	**117.96**	**125.63**	-	-	-
	CD (0.05)	**30.4**	**3.1**	**2.4**	**2.3**	**6.1**	**7.1**	**-**	**-**	**2.38**	**2.79**	**2.50**	**4.28**	**3.53**	**3.66**	**-**	-	-	-
	CV (%) Error	**21.5**	**3.4**	**2.1**	**2.3**	**3.8**	**7.3**	**-**	**-**	**0.79**	**1.66**	**1.03**	**2.28**	**1.33**	**1.79**	**-**	-	-	-

S. No.	Genotypes	Inflorescence (cm)								Seed weight (g/10 ml)							
		Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Rank	Ambikapur	Bhubaneswar	Mandor	Rahuri	Ranchi	Sk Nagar	Mean	Rank
1	IC35541	60.77	49.47	43.78	52.07	23.60	61.00	48.45	3	5.67	7.66	6.27	7.00	10.11	6.72	7.24	6
2	IC35621	43.23	42.27	40.33	56.40	23.07	57.07	43.73	6	5.03	7.69	7.53	7.50	10.17	6.94	7.48	3
3	IC93941	-	40.60	-	49.40	-	58.70	49.57	2	-	7.75	-	7.17	-	6.87	7.26	5
4	IC95290	58.43	48.93	41.00	52.73	17.73	65.87	47.45	4	5.03	7.71	7.06	7.80	10.50	6.82	7.49	2
5	Annapurna (C)	-	37.47	46.56	39.00	15.13	36.73	34.98	10	-	7.65	7.11	7.50	9.69	6.69	7.73	1
6	BGA 2 (C)	46.03	42.73	35.33	44.33	18.73	47.00	39.03	7	5.07	7.73	7.36	7.00	9.35	6.28	7.13	8
7	GA 2 (C)	65.53	43.47	43.67	58.87	-	64.73	55.25	1	6.27	7.68	7.03	7.83	-	6.98	7.16	7
8	RMA-7 (C)	54.10	44.33	34.11	52.33	19.27	59.53	43.95	5	5.67	7.70	7.34	7.53	9.39	6.71	7.39	4
9	Suvarna (C)	40.77	44.47	37.89	44.00	14.67	46.17	37.99	8	5.70	7.72	6.38	6.63	9.86	5.77	7.01	9
10	VL Chua 44 (C)	-	-	35.00	-	-	-	35.00	9	-	-	6.37	-	-	-	6.37	10
	Mean	**52.70**	**43.75**	**39.74**	**49.90**	**18.89**	**55.20**	**43.54**	-	**5.49**	**7.70**	**6.94**	**7.33**	**9.87**	**6.64**	**7.23**	-
	CD (0.05)	**10.75**	**6.08**	**4.93**	**9.48**	**5.42**	**7.02**	**-**	-	**1.35**	**0.03**	**0.26**	**0.33**	**0.53**	**0.17**	**-**	-
	CV (%) Error	**11.47**	**8.03**	**7.17**	**10.98**	**16.14**	**7.34**	**-**	-	**13.84**	**0.23**	**2.17**	**2.57**	**3.01**	**1.44**	**-**	-

Table 53: Experimental Details of AVT-I of Grain amaranth Rabi 2019-20 (Plain)

S. No	Item	Ambikapur	Faizabad	Bhubaneswar	Mandor	Rahuri	SK Nagar
1	No. of Entries	3	3	3	3	3	3
2	No. of checks	4	4	4	4	4	4
3	No. of Replication	3	3	3	3	3	3
4	Design	RBD	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	45	45	45	45	45	45
6	Plant x Plant (cms.)	15	15	15	15	15	15
7	No. of rows/ plot	6	6	6	6	4	6
8	Row length (m)	3	3	3	3	3	3
9	Date of sowing	11/19/2019	25.11.2019	27.11.2019	15/11/2019	1.12.2019	18/11/2019
10	Date of harvesting	As per maturity	14.04.2020	16.03.2020	As per maturity	21/3/2020 to 25/3/2020	9/4/2020
11	Plot Size	8.1	8.1	8.1	2.7	8.10	8.1
12	Conversion factor	-	-	12.35	12.35	12.35	12.35

Table 54: Performance of grain amaranth entries in Advanced Varietal Trial (AVT-I) during Rabi (2019-20) - Plains

S. No.	Genotypes	Grain yield (q/ha)											Plant height (cm)							
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Gain (%) over best check	Rank	Location	Frequency	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank
1	SKNA 1407	13.54	7.90	**13.26**	5.84	14.98	12.09	12.36	0.07	1	5	1/5	79.0	83.7	103.3	91.0	118.2	128.3	100.6	6
2	SKGPA 150	14.49	8.60	12.21	4.49	16.24	10.02	12.31	-0.31	3	5	0/5	75.3	81.0	109.5	99.0	129.2	112.2	101.0	5
3	SKGPA 155	14.40	7.82	12.25	5.28	14.67	11.97	12.22	-1.01	4	5	0/5	77.7	81.7	104.7	89.3	127.1	109.8	98.4	7
4	BGA 2 (C)	15.43	8.23	11.12	5.14	12.07	9.28	11.23	-9.08	7	5	-	76.3	106.3	123.2	127.0	153.1	111.5	116.2	1
5	GA 2 (C)	13.70	9.38	10.42	5.46	13.57	11.38	11.69	-5.31	5	5	-	78.0	102.7	127.1	114.3	131.2	141.9	115.9	2
6	RMA 7 (C)	14.73	8.72	11.61	5.56	15.72	10.96	12.35		2	5	-	77.3	92.3	114.8	126.0	146.3	122.2	113.2	4
7	Suvarna (C)	14.86	9.17	11.29	4.58	12.73	9.19	11.45	-7.30	6	5	-	74.3	105.7	118.9	136.3	139.9	117.7	115.5	3
Mean		**14.45**	**8.54**	**11.74**	**5.19**	**14.28**	**10.70**	**11.94**		-	-	-	**76.9**	**93.3**	**114.5**	**111.9**	**135.0**	**120.5**	**108.7**	**-**
CD (0.05)		**1.40**	**1.78**	**1.40**	**0.71**	**2.60**	**2.04**	**-**		-	-	-	**3.3**	**7.5**	**9.5**	**10.0**	**20.4**	**17.7**	**-**	**-**
CV (%) Error		**5.43**	**11.72**	**6.73**	**7.72**	**10.13**	**10.70**	**-**		-	-	-	**2.4**	**4.5**	**4.7**	**5.0**	**8.5**	**8.3**	**-**	**-**

S. No.	Genotypes	Days to flowering								Days to maturity									
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Location	Frequency
1	SKNA 1407	84.0	53.3	52.3	63.7	56.0	56.0	60.89	2	156.7	132.7	99.7	149.0	112.0	**122.7**	128.78	2	6	1/6
2	SKGPA 150	84.0	52.3	53.0	66.3	60.7	57.3	62.28	3	156.7	127.0	100.3	145.3	110.7	136.0	129.33	4	6	0/6
3	SKGPA 155	83.3	50.3	50.0	66.3	56.7	52.0	59.78	1	156.7	126.0	100.0	150.7	**105.7**	120.7	126.61	1	6	1/6
4	BGA 2 (C)	91.7	57.7	54.7	71.0	63.3	69.7	68.00	6	152.7	125.3	104.0	145.7	119.3	133.0	130.00	5	6	-
5	GA 2 (C)	92.7	57.3	52.0	67.7	57.3	60.3	64.56	5	159.3	126.3	105.3	150.3	116.7	127.3	130.89	7	6	-
6	RMA 7 (C)	87.0	54.3	52.7	69.3	56.7	61.7	63.61	4	154.3	123.3	102.3	146.0	119.0	128.0	128.83	3	6	-
7	Suvarna (C)	92.7	58.3	53.0	74.7	63.7	71.7	69.00	7	155.3	127.3	103.7	145.3	112.3	138.0	130.33	6	6	-
Mean		**87.9**	**54.8**	**52.5**	**68.4**	**59.2**	**61.2**	**64.02**	**-**	**156.0**	**126.9**	**102.2**	**147.5**	**113.7**	**129.4**	**129.25**	-	-	-
CD (0.05)		**2.5**	**2.2**	**1.9**	**2.1**	**5.4**	**3.0**	**-**	**-**	**13.3**	**3.7**	**2.6**	**4.0**	**3.4**	**3.0**	**-**	-	-	-
CV (%) Error		**1.6**	**2.3**	**2.0**	**1.7**	**5.2**	**2.7**	**-**	**-**	**4.8**	**1.6**	**1.4**	**1.5**	**1.7**	**1.3**	**-**	-	-	-

S. No.	Genotypes	Inflorescence (cm)								Seed weight (g/10 ml)							
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank
1	SKNA 1407	30.73	41.83	50.00	35.00	39.87	56.40	42.31	3	5.20	6.57	7.82	6.69	7.50	6.76	6.76	5
2	SKGPA 150	30.10	41.40	47.27	37.67	40.60	53.80	41.81	5	5.53	7.33	7.93	7.07	7.13	6.44	6.91	4
3	SKGPA 155	30.00	43.00	46.47	31.00	46.07	55.87	42.07	4	5.50	7.58	7.86	7.32	7.33	6.83	7.07	1
4	BGA 2 (C)	30.27	36.50	40.80	30.00	44.73	41.00	37.22	7	5.40	6.22	7.85	6.95	7.23	6.02	6.61	6
5	GA 2 (C)	29.93	36.50	47.00	38.67	55.73	64.07	45.32	1	5.17	6.90	7.76	7.51	8.07	6.67	7.01	3
6	RMA 7 (C)	29.73	42.00	44.87	35.33	51.80	57.20	43.49	2	5.53	6.63	7.74	7.17	8.50	6.66	7.04	2
7	Suvarna (C)	30.73	39.00	39.33	36.67	37.93	43.53	37.87	6	4.93	6.57	7.78	6.26	8.07	5.47	6.51	7
Mean		**30.21**	**40.03**	**45.10**	**34.90**	**45.25**	**53.12**	**41.44**	-	**5.32**	**6.83**	**7.82**	**7.00**	**7.69**	**6.41**	**6.84**	-
CD (0.05)		**1.77**	**2.61**	**4.58**	**5.81**	**9.54**	**7.11**	**-**	-	**1.19**	**0.97**	**0.05**	**0.13**	**0.39**	**0.25**	**-**	-
CV (%) Error		**3.29**	**3.67**	**5.71**	**9.36**	**11.86**	**7.53**	**-**	-	**12.59**	**7.98**	**0.34**	**1.03**	**2.87**	**2.22**	**-**	-

Table 55: Experimental Details of AVT-II of Grain amaranth Rabi 2019-20 (Plain)

S. No	Item	Ambikapur	Bhubaneswar	Faizabad	Mandor	Rahuri	SK Nagar
1	No. of Entries	5	5	5	5	4	5
2	No. of checks	4	4	4	4	4	4
3	No. of Reps.	3	3	3	3	3	3
4	Design	RBD	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cms.)	45	45	45	45	45 cm	45
6	Plant x Plant (cms.)	15	15	15	15	15 cm	15
7	No. of rows/ plot	6	6	6	3	4	6
8	Row length (m)	3	3	3	3	3	3
9	Date of sowing	11/12/2019	21.11.2019	25.11.2019	11.11.2019	1.12.2019	18.11.2019
10	Date of harvesting	As per maturity	14.03.2020	14.04.2020	As per maturity	21/3/2020 to 25/3/2020	9/4/2020
11	Plot Size	8.1	8.1	8.10 m.sq.	2.7	8.10	8.1
12	Conversion factor	-	12.346	-	12.35	-	12.35

Table 56: Performance of grain amaranth entries in Advanced Varietal Trial (AVT-II) during Rabi (2019-20) - Plains

S. No.	Genotypes	Grain yield (q/ha)											Plant height (cm)							
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Gain (%) over best check	Rank	Location	Frequency	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank
1	BGA 4	14.98	7.40	11.90	**15.08**	15.51	10.42	12.55	1.41	3	6	1/6	66.3	86.0	112.7	108.7	131.2	118.7	103.9	7
2	BGA-7-1 (E)	14.90	8.31	11.87	**17.05**	13.91	10.96	12.83	3.71	2	6	1/6	70.0	81.3	111.0	103.8	118.7	112.6	99.6	9
3	BGA 9	16.42	7.36	**13.04**	**15.18**	10.66	12.58	12.54	1.34	4	6	2/6	64.7	85.7	117.1	123.6	122.8	122.7	106.1	5
4	RGA 17	15.68	7.53	10.11	**15.52**	-	9.26	11.62	-6.11	7	5	1/6	67.0	91.7	107.1	145.3	-	153.1	112.8	1
5	SKNA 1406	15.35	8.39	11.54	**22.21**	15.76	12.91	14.36	16.04	1	6	1/6	67.0	83.7	103.7	100.0	123.7	128.3	101.1	3
6	BGA 2 (C)	14.07	8.10	10.87	9.09	13.66	8.36	11.01	-11.01	8	6	-	66.3	101.7	112.6	136.6	138.3	118.3	112.3	8
7	GA 2 (C)	15.14	9.05	10.83	9.10	14.53	12.32	12.37		5	6	-	66.7	97.3	114.7	117.0	152.4	151.6	116.6	2
8	RMA 7 (C)	14.20	8.43	11.14	6.86	14.57	11.65	12.00	-3.05	6	6	-	67.0	91.0	106.6	118.2	132.7	126.8	107.0	4
9	Suvarna (C)	14.61	8.76	10.21	10.39	14.20	6.46	10.85	-12.35	9	6	-	66.7	99.7	114.1	137.6	147.4	120.8	114.4	6
Mean		**15.04**	**8.15**	**11.28**	**13.39**	**14.10**	**10.55**	**12.24**		-	-	-	**66.9**	**90.9**	**111.1**	**121.2**	**133.4**	**128.1**	**108.2**	**-**
CD (0.05)		**1.24**	**1.35**	**1.18**	**2.83**	2.81	**1.86**	**-**		-	-	-	**4.1**	**8.5**	**6.3**	**9.5**	**16.4**	**10.8**	**-**	**-**
CV (%) Error		**4.76**	**9.58**	**6.04**	**12.20**	**11.36**	**10.16**	**-**		-	-	-	**3.5**	**5.4**	**3.3**	**4.6**	**7.0**	**4.9**	**-**	**-**

S. No.	Genotypes	Days to flowering								Days to maturity									
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Location	Frequency
1	BGA 4	82.0	54.3	51.0	66.3	57.7	58.3	61.61	5	174.0	128.7	**107.7**	146.7	**108.3**	135.3	133.44	4	6	2/6
2	BGA-7-1 (E)	82.0	52.7	49.7	66.3	53.3	55.3	59.89	2	173.7	127.3	110.3	147.3	**103.7**	135.7	133.00	2	6	1/6
3	BGA 9	82.0	52.0	49.7	62.0	52.7	53.0	58.56	1	175.0	127.7	110.3	147.3	**103.7**	**128.7**	132.11	1	6	2/6
4	RGA 17	81.3	52.7	50.0	64.3	-	56.7	61.00	4	172.7	125.7	**107.7**	144.7	**-**	**127.3**	135.60	8	5	2/6
5	SKNA 1406	81.3	52.3	51.7	64.3	56.0	57.7	60.56	3	174.7	128.3	108.0	150.7	**105.0**	133.7	133.39	3	6	1/6
6	BGA 2 (C)	81.0	56.3	55.0	69.3	63.0	69.3	65.67	8	173.0	125.3	110.0	144.0	115.3	137.3	134.17	5	6	-
7	GA 2 (C)	81.0	55.7	57.3	66.7	56.7	58.3	62.61	7	174.3	126.3	111.7	143.3	118.3	133.3	134.56	7	6	-
8	RMA 7 (C)	81.7	55.0	49.0	68.3	58.0	62.0	62.33	6	174.3	123.3	111.7	145.7	116.7	135.0	134.44	6	6	-
9	Suvarna (C)	82.0	57.3	57.0	69.3	61.3	72.3	66.56	9	175.7	127.3	111.0	148.0	116.0	139.7	136.28	9	6	-
	Mean	**81.6**	**54.3**	**52.3**	**66.3**	**57.3**	**60.3**	**62.09**	**-**	**174.1**	**126.7**	**109.8**	**146.4**	**110.9**	**134.0**	**134.11**	-	-	-
	CD (0.05)	**2.6**	**2.7**	**2.7**	**2.8**	**3.4**	**1.6**	**-**	**-**	**4.8**	**4.1**	**2.1**	**2.8**	**3.6**	**2.5**	**-**	-	-	-
	CV (%) Error	**1.8**	**2.9**	**3.0**	**2.5**	**3.4**	**1.5**	**-**	**-**	**1.6**	**1.9**	**1.1**	**1.1**	**1.8**	**1.1**	**-**	-	-	-

S. No.	Genotypes	Inflorescence (cm)								Seed weight (g/10 ml)							
		Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank	Ambikapur	Ayodhya	Bhubaneswar	Mandor	Rahuri	SK Nagar	Mean	Rank
1	BGA 4	61.00	39.83	49.20	32.78	48.11	58.87	48.30	5	5.27	6.57	7.92	7.39	7.13	6.59	6.81	6
2	BGA-7-1 (E)	62.00	36.60	48.07	38.89	46.53	49.73	46.97	7	5.17	6.87	7.77	7.32	7.70	6.77	6.93	5
3	BGA 9	63.67	38.17	50.07	37.78	47.00	57.07	48.96	6	5.20	7.35	7.68	8.10	7.27	6.92	7.09	3
4	RGA 17	54.33	37.87	47.80	45.89	-	63.00	49.78	2	4.87	6.38	7.74	6.41	-	6.57	6.39	7
5	SKNA 1406	60.33	41.00	49.13	38.67	43.73	62.20	49.18	3	5.53	6.22	7.85	7.21	7.53	6.92	6.88	3
6	BGA 2 (C)	66.67	36.00	41.07	40.44	43.47	44.13	45.30	8	5.47	6.12	7.73	6.76	7.50	6.00	6.60	8
7	GA 2 (C)	65.67	36.33	39.67	44.78	58.97	71.00	52.74	1	5.40	6.97	7.85	6.63	7.40	6.96	6.87	1
8	RMA 7 (C)	67.67	40.67	47.80	38.78	51.80	60.33	51.17	4	4.87	6.63	7.75	7.59	8.03	6.93	6.97	2
9	Suvarna (C)	62.00	37.33	43.27	43.89	47.13	41.73	45.89	9	4.67	6.92	7.70	6.75	7.53	5.80	6.56	9
	Mean	**62.59**	**38.20**	**46.23**	**40.21**	**48.34**	**56.45**	**48.70**	-	**5.16**	**6.67**	**7.78**	**7.13**	**7.51**	**6.61**	**6.79**	-
	CD (0.05)	**8.23**	**1.60**	**5.63**	**6.06**	**9.46**	**9.22**	**-**	-	**1.51**	**0.74**	**0.05**	**0.11**	**0.35**	**0.20**	**-**	-
	CV (%) Error	**7.60**	**2.41**	**7.04**	**8.70**	**11.18**	**9.44**	**-**	-	**16.90**	**6.43**	**0.37**	**0.87**	**2.67**	**1.72**	**-**	-

Table 57: Experimental Details of IVT of Faba bean Rabi 2019-20 Plain

S. No	Item	Ambikapur	Faizabad	Faridkot	Ludhiana	New Delhi	Hisar	Ranchi
1	No. of Entries	18	18	18	18	18	18	18
2	Checks	4	4	4	4	4	4	4
3	No. of Reps.	4	4	3	3	3	3	3
4	Design	RBD	RBD	RBD	RBD	RBD	RBD	RBD
5	Row x Row (cm)	30	30	30	30	30	30	30
6	Plant x Plant(cm.)	10	10	10	10	10	10	15
7	No. of Rows	6	6	6	6	6	6	6
8	Row length (m)	3	4	3	3	3	3	3
9	Date of sowing	11/23/2019	18.11.2019	24.11.19	20.11.19	27/11/2019	-	26/11/2019
10	Date of harvesting		06.04.2020	17.4.20	23.4.20	24/04/2020	-	07/04/2020 to 17/04/2020
11	Plot Size	5.4	7.2	5.4	5.4	-	-	-

Table 58: Performance of Fababean entries in Initial Varietal Trial (IVT) during Rabi (2015-16) - Plain

S. No.	Genotypes	Seed yield (q/ha)												Plant height (cm)							
		Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Gain (%) over best check	Rank	Location	Frequency	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank
1	DFS 18 01	26.5	22.9	17.4	22.1	12.3	9.8	5.4	16.64	-31.13	20	7	0/7	72.5	99.5	86.2	88.9	101.7	83.8	88.7	17
2	DFS 18 05	25.8	21.2	20.3	31.7	18.5	16.2	6.4	20.01	-17.16	14	7	0/7	68.8	86.0	93.5	88.0	109.7	92.2	89.7	11
3	DFS 18 07	27.0	21.5	22.9	32.0	23.5	14.9	5.1	20.99	-13.11	11	7	0/7	72.0	94.0	87.1	87.5	111.0	81.2	88.8	16
4	DFS 18 08	25.5	21.2	14.6	36.0	17.3	8.2	5.1	18.26	-24.41	17	7	0/7	66.0	81.0	76.9	89.5	109.3	91.3	85.7	21
5	DFS 18 09	27.0	20.5	24.2	35.0	30.9	13.0	6.1	22.39	-7.33	10	7	0/7	72.5	97.3	93.6	83.8	113.0	85.6	91.0	6
6	DFS 18 11	29.1	20.8	19.5	24.7	27.8	12.1	8.2	20.32	-15.87	12	7	0/7	73.0	99.3	89.6	90.4	121.0	87.3	93.4	1
7	DFS 18 14	26.4	20.5	20.1	22.9	16.1	9.4	4.2	17.09	-29.26	19	7	0/7	70.5	94.0	92.2	92.2	110.7	85.5	90.8	8
8	DFS 18 17	24.7	21.5	13.2	16.9	10.5	8.3	3.8	14.13	-41.50	22	7	0/7	73.3	89.5	79.1	94.2	101.3	88.8	87.7	19
9	DFS 18 18	25.6	21.6	17.2	17.6	11.7	15.8	3.5	16.13	-33.22	21	7	0/7	71.8	93.3	85.2	92.7	112.7	83.2	89.8	10
10	DFS 18 20	24.4	21.2	15.9	18.1	17.9	18.7	5.3	17.35	-28.18	18	7	0/7	70.0	78.5	73.5	78.6	113.0	79.1	82.1	22
11	DFS 18 21	27.6	20.5	14.5	23.1	21.6	15.7	5.4	18.35	-24.04	16	7	0/7	72.0	92.3	82.6	86.9	115.0	78.8	87.9	18
12	HB 15 04	25.7	20.1	27.5	37.0	30.9	14.9	9.4	23.64	-2.14	8	7	0/7	71.3	101.5	103.9	90.6	112.3	77.7	92.9	2
13	HB 15 14	31.1	26.7	25.8	33.1	26.5	19.1	8.4	24.39	0.94	4	7	0/7	71.0	88.0	92.9	89.6	113.3	78.6	88.9	15
14	HB 15 21	25.4	20.7	**32.4**	42.4	27.8	17.8	10.6	25.29	4.67	1	7	1/7	71.0	94.5	97.7	87.7	113.0	81.8	90.9	7
15	HB 15 34	27.9	23.1	29.4	34.3	30.9	18.5	9.5	24.80	2.64	3	7	0/7	70.3	92.3	90.8	91.7	109.0	83.3	89.5	12
16	HB 15 41	24.9	24.2	**32.7**	39.4	24.7	17.5	10.4	24.83	2.76	2	7	1/7	68.3	87.5	97.5	95.7	107.0	80.4	89.4	14
17	HB 15 51	24.9	20.7	29.9	27.3	27.8	17.0	10.8	22.59	-6.47	9	7	0/7	70.5	84.3	100.8	91.3	119.0	81.1	91.2	5
18	HB 15 55	26.9	20.8	**32.2**	32.4	29.0	16.0	9.1	23.77	-1.60	7	7	1/7	70.3	80.5	93.7	88.6	105.3	83.2	86.9	20
19	HFB-1 (C)	26.0	20.8	28.4	38.8	27.8	17.2	9.3	24.05	-0.46	6	7	-	69.8	95.5	93.5	92.9	113.0	84.1	91.4	4
20	Rebya-40 (C)	26.3	20.5	15.3	31.3	22.8	9.7	8.8	19.25	-20.30	15	7	-	74.8	88.5	77.1	90.7	132.7	93.2	92.8	3
21	Shambat-75 (C)	25.3	21.4	18.1	33.3	19.8	16.3	6.3	20.06	-16.95	13	7	-	69.0	96.3	85.6	90.3	118.0	81.4	90.1	9
22	Vikrant (C)	24.7	22.2	26.0	36.5	30.9	17.9	10.9	24.16		5	7	-	68.8	94.3	90.7	89.2	112.0	82.2	89.5	13
Mean		**26.3**	**21.6**	**22.6**	**30.3**	**23.0**	**14.7**	**7.4**	**20.84**		-	-	-	**70.8**	**91.3**	**89.2**	**89.6**	**112.4**	**83.8**	**89.5**	-
CD (0.05)		**4.6**	**3.0**	**2.7**	**6.3**	**1.8**	**2.2**	**0.8**	**-**		-	-	-	**4.3**	**5.9**	**15.8**	**5.9**	**21.2**	**7.4**	**-**	-
CV (%) Error		**12.3**	**9.9**	**13.5**	**14.7**	**8.7**	**9.1**	**7.6**	**-**		-	-	-	**4.3**	**4.6**	**10.8**	**4.6**	**11.4**	**6.3**	**-**	-

S. No.	Genotypes	Days to 50% flowering									Days to maturity									
		Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Rank	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency
1	DFS 18 01	67.3	66.0	70.7	80.0	70.0	98.3	56.3	72.6	2.0	124.5	130.0	136.0	148.3	148.3	136.3	137.2	3	6	0/6
2	DFS 18 05	68.0	68.0	73.0	84.0	72.3	99.3	64.0	75.5	19.0	124.5	130.5	137.7	150.3	147.3	137.5	138.0	11	6	0/6
3	DFS 18 07	65.8	65.8	70.3	84.5	73.3	98.7	61.5	74.3	10.0	128.0	132.5	137.0	149.5	150.7	137.0	139.1	18	6	0/6
4	DFS 18 08	64.8	68.0	72.7	84.8	77.0	99.3	65.8	76.0	22.0	126.5	129.5	136.7	148.5	149.0	138.0	138.0	12	6	0/6
5	DFS 18 09	64.5	67.3	71.7	84.3	73.3	99.0	60.0	74.3	13.0	126.8	130.0	136.7	148.0	152.7	138.3	138.7	16	6	0/6
6	DFS 18 11	63.5	70.0	69.3	83.5	67.7	97.3	53.5	72.1	1.0	126.5	129.0	130.0	149.0	153.7	138.5	137.8	8	6	0/6
7	DFS 18 14	63.8	64.0	72.0	80.0	74.7	100.0	63.5	74.0	7.0	127.5	133.5	135.7	147.8	153.3	140.3	139.7	20	6	0/6
8	DFS 18 17	64.5	70.8	72.3	84.3	73.3	98.7	66.3	75.7	20.0	128.5	131.5	135.3	152.8	154.3	140.3	140.4	22	6	0/6
9	DFS 18 18	65.8	63.8	73.7	84.0	77.3	99.7	66.5	75.8	21.0	128.8	126.0	136.7	153.0	149.7	138.8	138.8	17	6	0/6
10	DFS 18 20	68.3	68.3	72.7	82.5	72.0	99.3	59.0	74.6	16.0	126.8	128.5	136.0	148.8	148.7	136.8	137.6	7	6	0/6
11	DFS 18 21	67.8	71.0	72.0	80.5	70.3	98.3	61.0	74.4	14.0	126.0	128.0	134.3	149.3	148.0	135.5	136.8	2	6	0/6
12	HB 15 04	66.5	70.3	71.3	80.0	72.3	100.7	58.8	74.3	10.0	126.5	129.8	135.3	146.0	145.7	136.8	136.7	1	6	0/6
13	HB 15 14	65.3	67.5	72.3	80.3	73.7	99.7	61.3	74.3	12.0	127.8	130.3	138.3	149.0	148.0	137.3	138.4	15	6	0/6
14	HB 15 21	64.5	70.0	72.7	80.3	74.0	99.0	59.0	74.2	9.0	127.0	129.0	134.3	145.0	148.3	139.8	137.2	4	6	0/6
15	HB 15 34	66.8	71.3	73.7	79.8	72.7	99.3	59.0	74.6	17.0	128.3	127.0	136.3	146.5	151.0	138.3	137.9	10	6	0/6
16	HB 15 41	64.8	65.5	72.3	81.0	71.0	100.0	56.5	73.0	4.0	127.3	129.0	138.3	147.8	149.7	136.5	138.1	13	6	0/6
17	HB 15 51	65.0	71.0	73.0	84.5	76.0	98.7	59.5	75.4	18.0	127.0	129.3	137.3	148.0	150.7	138.3	138.4	14	6	0/6
18	HB 15 55	64.8	65.5	72.7	81.8	72.7	99.7	58.0	73.6	6.0	126.8	127.3	136.7	146.8	149.7	138.3	137.6	6	6	0/6
19	HFB-1 (C)	69.0	70.3	71.7	80.5	72.0	99.7	58.3	74.5	15.0	126.5	132.5	137.7	146.8	147.7	134.0	137.5	5	6	
20	Rebya-40 (C)	69.5	69.8	71.3	79.8	69.3	98.3	55.3	73.3	5.0	128.5	135.0	136.0	148.8	149.0	139.3	139.4	19	6	
21	Shambat-75 (C)	68.5	65.5	70.7	78.5	69.7	100.0	57.8	72.9	3.0	129.0	134.8	135.7	153.0	148.7	140.0	140.2	21	6	
22	Vikrant (C)	67.0	72.8	71.7	78.8	71.0	100.3	56.5	74.0	8.0	127.8	129.0	136.7	147.8	149.7	136.3	137.8	9	6	-
Mean		**66.1**	**68.3**	**72.0**	**81.7**	**72.5**	**99.2**	**59.9**	**74.2**	**-**	**127.1**	**130.1**	**136.1**	**148.6**	**149.7**	**137.8**	**138.2**	-	-	-
CD (0.05)		**2.2**	**3.0**	**1.7**	**1.1**	**2.3**	**2.3**	**3.3**	**-**	**-**	**2.0**	**3.7**	**2.0**	**2.4**	**2.1**	**2.7**	**-**	-	-	-
CV (%) Error		**2.3**	**3.1**	**1.4**	**1.0**	**1.9**	**1.4**	**3.9**	**-**	**-**	**1.1**	**2.0**	**0.9**	**1.2**	**0.9**	**1.4**	**-**	-	-	-

S. No.	Genotypes	Pod length (cm)							100 seed weight (g)								
		Ambikapur	Ayodhya	Hisar	Ludhiana	Ranchi	Mean	Rank	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Rank
1	DFS 18 01	4.23	6.50	8.14	10.13	8.40	7.48	1	23.68	24.33	77.40	78.24	80.87	78.17	76.52	62.74	1
2	DFS 18 05	4.80	5.25	7.14	6.57	7.73	6.30	11	22.75	23.00	72.07	84.77	82.97	67.50	71.35	60.63	5
3	DFS 18 07	4.73	5.75	6.30	11.03	8.25	7.21	3	23.38	20.94	73.43	87.96	83.97	71.83	75.83	62.48	2
4	DFS 18 08	4.55	5.50	8.05	7.50	8.73	6.86	7	23.31	18.96	67.07	32.91	82.83	71.67	75.44	53.17	13
5	DFS 18 09	5.30	5.50	6.21	7.20	8.05	6.45	10	22.88	20.48	73.23	72.94	78.30	64.50	71.78	57.73	7
6	DFS 18 11	4.55	6.00	7.40	9.27	7.93	7.03	5	23.06	22.84	69.13	68.23	70.27	60.67	70.02	54.89	11
7	DFS 18 14	4.73	5.50	7.31	8.47	7.48	6.70	9	23.31	24.28	66.87	87.30	81.80	74.50	75.13	61.88	3
8	DFS 18 17	4.73	5.75	6.81	8.37	8.35	6.80	8	22.63	23.86	64.97	74.34	71.07	65.33	71.65	56.26	9
9	DFS 18 18	4.55	5.75	7.48	10.17	7.65	7.12	4	23.06	22.76	68.63	93.99	80.80	67.50	75.40	61.74	4
10	DFS 18 20	4.90	6.25	7.40	10.30	7.90	7.35	2	22.25	21.01	70.43	60.18	71.03	75.00	71.78	55.96	10
11	DFS 18 21	4.35	5.75	7.07	7.07	6.95	6.24	12	22.88	21.40	60.80	70.97	63.97	65.50	70.34	53.69	12
12	HB 15 04	4.73	4.00	5.59	6.30	5.73	5.27	18	24.13	17.83	25.13	31.91	28.43	28.17	31.54	26.73	20
13	HB 15 14	4.63	5.00	5.68	6.13	5.80	5.45	15	23.31	20.56	23.80	31.68	30.20	32.17	29.90	27.37	18
14	HB 15 21	4.58	5.00	5.49	5.73	5.43	5.24	19	23.00	20.09	25.00	32.02	26.10	27.83	30.86	26.41	21
15	HB 15 34	4.58	4.25	5.37	5.47	5.48	5.03	20	22.50	17.85	26.20	30.71	28.60	28.67	29.48	26.29	22
16	HB 15 41	4.50	4.50	5.60	3.27	5.75	4.72	22	22.88	20.53	26.40	78.12	27.00	26.00	28.78	32.81	14
17	HB 15 51	4.58	4.75	5.39	6.67	5.30	5.34	16	23.69	21.61	24.77	32.86	31.00	30.17	30.27	27.77	17
18	HB 15 55	4.65	4.00	5.40	5.23	5.78	5.01	21	23.56	20.18	28.10	29.98	30.50	27.00	29.42	26.96	19
19	HFB-1 (C)	4.63	4.75	5.57	7.80	6.23	5.79	14	23.88	21.06	23.87	34.46	31.23	31.33	30.14	28.00	15
20	Rebya-40 (C)	4.28	4.75	7.99	9.87	7.75	6.93	6	23.11	23.69	66.60	65.74	73.43	67.83	75.07	56.50	8
21	Shambat-75 (C)	4.68	4.50	7.43	5.83	8.10	6.11	13	23.19	22.95	67.83	70.88	77.07	69.50	82.85	59.18	6
22	Vikrant (C)	4.70	4.75	5.90	5.23	5.88	5.29	17	23.44	22.06	27.43	32.27	29.43	29.67	30.54	27.83	16
Mean		**4.63**	**5.17**	**6.58**	**7.44**	**7.03**	**6.17**	-	**23.18**	**21.47**	**51.33**	**58.29**	**57.31**	**52.75**	**56.09**	**45.77**	-
CD (0.05)		**0.55**	**1.22**	**0.77**	**0.37**	**1.09**	**-**	-	**1.46**	**3.48**	**1.30**	**0.50**	**1.11**	**5.27**	**6.59**	**-**	-
CV (%) Error		**8.46**	**16.63**	**8.29**	**3.02**	**11.01**	**-**	-	**4.46**	**9.85**	**1.53**	**0.60**	**1.18**	**6.06**	**8.31**	**-**	-

Table 59: Experimental Details of AVT -I & II of Faba bean Rabi 2019-20 Plain

S. No	Item	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi
1	No. of Entries AVT-I	5	5	5	5	5	4	5
2	No. of Entries AVT-II	4	4	4	4	4	4	4
3	Checks	2	2	2	2	2	2	2
4	Design	RBD	RBD	RBD	RBD	RBD	RBD	RBD
5	No. of Replication	4	4	3	3	3	3	4
6	No. of Rows	8	8	8	8	8	6	8
7	Row length (m)	3	3	3	3	3	3	3
8	Row x Row (cm)	30	30	30	30	30	30	30
9	Plant x Plant	10	10	10	10	10	10	15
10	Date of sowing	11/19/2019	18.11.2019	24.11.19	14.11.19	20.11.2019	27.11.2019	28/11/2019
11	Date of harvesting	-	06.04.2020	17.4.2020	20.4.2020	23.4.2020	25/04/2020	08/04/2020 to 16/11/2020
12	Plot Size	7.2	7.2	7.2	7.2	7.2	-	-

Table 60: Performance of Fababean entries in Advanced Varietal Trial (AVT-I & II) during Rabi (2019-20) - Plain

S. No.	Genotypes	Seed yield (q/ha)												Pod length (cm)						
		Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Gain (%) over best check	Rank	Location	Frequency	Ambikapur	Ayodhya	Hisar	Ludhiana	Ranchi	Mean	Rank
A	**AVT-I**																			
1	HB 13 11	19.38	23.26	20.58	32.93	26.39	14.68	15.33	**21.79**	-7.79	9	7	1/7	4.43	6.00	4.90	5.63	5.65	5.32	6
2	HB 13 38	22.43	25.17	20.69	35.87	22.68	**18.20**	15.25	22.90	-3.11	4	7	1/7	4.55	6.00	4.50	5.23	5.38	5.13	11
3	HB 15 07	21.49	21.87	25.49	33.21	**27.78**	**18.76**	11.75	**22.91**	-3.07	3	7	3/7	4.60	5.75	4.95	5.27	5.35	5.18	10
4	HB 15 17	20.21	23.09	28.54	26.18	**30.09**	**17.91**	12.13	22.59	-4.41	6	7	2/7	4.58	5.75	5.15	5.57	5.88	5.38	5
5	NDFB 17 1	19.51	21.87	23.77	32.85	23.15	-	11.50	22.11	-6.45	8	6	0/6	5.03	6.25	4.85	6.13	5.05	5.46	1
B	**AVT-II**																			
6	HB 14 18	22.74	23.94	21.37	30.68	**29.63**	14.34	16.35	22.72	-3.86	5	7	1/7	4.83	5.25	4.75	5.97	5.55	5.27	7
7	HB 14 21	22.64	24.13	22.96	35.93	**27.78**	9.16	12.25	22.12	-6.39	7	7	1/7	4.85	6.00	5.15	5.50	5.48	5.40	4
8	NDFB 13 2	22.81	25.86	29.75	32.26	**28.70**	**19.82**	13.85	24.72	4.61	1	7	2/7	4.93	5.75	4.80	6.30	5.40	5.44	3
9	NDFB 16 3	17.88	**26.21**	26.00	27.12	**30.56**	12.97	9.80	21.51	-9.00	11	7	1/7	4.43	5.75	4.90	6.40	4.60	5.22	8
10	HFB-1 (C)	23.96	23.26	31.71	32.35	25.93	13.12	15.10	23.63		2	7		5.00	6.00	4.85	6.33	5.10	5.46	2
11	Vikrant (C)	23.51	21.35	22.85	26.94	27.78	14.94	14.13	21.64	-8.42	10	7		4.58	5.75	4.40	5.77	5.43	5.18	9
Mean		**21.51**	**23.64**	**24.88**	**31.48**	**27.32**	**15.39**	**13.40**	**22.60**		-	-	-	**4.71**	**5.84**	**4.84**	**5.83**	**5.35**	**5.31**	-
CD (0.05)		**3.32**	**2.91**	**3.4**	**5.84**	**0.00**	**2.75**	**2.28**	**-**		-	-	-	**0.55**	**1.18**	**0.41**	**0.23**	**0.58**	**-**	-
CV (%) Error		**10.68**	**8.51**	**11.17**	**12.84**	**0.00**	**10.43**	**11.76**	**-**		-	-	-	**8.11**	**13.95**	**5.84**	**2.35**	**7.52**	**-**	-

S. No.	Genotypes	Plant height (cm)								Days to 50% flowering								
		Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Rank
A	**AVT-I**																	
1	HB 13 11	60.75	100.50	82.20	90.50	105.00	94.35	88.88	9	51.25	62.50	72.00	84.00	71.33	100.00	56.25	71.05	5
2	HB 13 38	58.00	101.75	79.45	80.40	125.67	90.80	89.34	8	49.25	65.25	72.33	79.75	70.00	100.33	58.25	70.74	4
3	HB 15 07	63.25	98.25	84.40	86.05	107.67	90.88	88.42	10	51.50	69.00	71.33	79.25	71.67	101.00	56.25	71.43	7
4	HB 15 17	59.50	98.25	86.37	103.50	111.67	91.95	91.87	4	51.25	61.50	74.33	80.00	70.00	99.67	56.50	70.46	3
5	NDFB 17 1	62.75	93.00	92.28	99.20	115.33	92.55	92.52	3	50.50	67.00	73.67	78.25	72.33	-	58.00	66.63	1
B	**AVT-II**																	
6	HB 14 18	61.75	95.75	85.88	92.20	113.67	95.00	90.71	5	51.25	63.75	73.33	78.75	70.67	99.67	60.25	71.10	6
7	HB 14 21	63.25	97.75	77.25	103.25	104.33	91.05	89.48	7	49.75	66.00	71.33	80.25	71.00	99.33	55.50	70.45	2
8	NDFB 13 2	66.00	97.25	86.47	89.50	113.00	85.30	89.59	6	49.75	69.50	72.33	83.00	71.67	100.33	55.50	71.73	10
9	NDFB 16 3	68.25	91.25	82.78	95.80	109.33	74.25	86.94	11	51.00	70.00	72.33	80.00	72.00	100.00	55.75	71.58	8
10	HFB-1 (C)	67.00	95.00	83.08	97.10	120.00	94.50	92.78	2	52.00	70.50	73.67	80.25	71.00	98.67	55.50	71.65	9
11	Vikrant (C)	67.50	93.50	95.93	100.90	123.67	90.60	95.35	1	50.25	71.25	72.00	79.00	73.33	98.67	58.25	71.82	11
Mean		**63.45**	**96.57**	**85.10**	**94.40**	**113.58**	**90.11**	**90.53**	-	**50.70**	**66.93**	**72.61**	**80.23**	**71.36**	**99.77**	**56.91**	**70.79**	**-**
CD (0.05)		**5.16**	**5.39**	**17.19**	**4.87**	**11.03**	**11.32**	**-**	-	**1.41**	**3.57**	**1.77**	**1.13**	**1.89**	**1.23**	**2.91**	**-**	**-**
CV (%) Error		**5.63**	**3.86**	**11.86**	**3.57**	**5.70**	**8.70**	**-**	-	**1.93**	**3.69**	**1.43**	**0.97**	**1.55**	**0.72**	**3.53**	**-**	**-**

S. No.	Genotypes	Days to maturity										100 seed weight (g)								
		Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	Ranchi	Mean	Rank	Location	Frequency	Ambikapur	Ayodhya	Faridkot	Hisar	Ludhiana	New Delhi	Ranchi	Mean	Rank
A	**AVT-I**																			
1	HB 13 11	127.8	130.5	136.0	150.3	147.0	134.0	137.6	9	6	0/6	24.0	24.6	22.3	31.3	32.2	25.3	32.6	27.47	9
2	HB 13 38	127.8	127.8	137.0	149.8	146.3	137.3	137.6	10	6	0/6	23.3	29.8	25.3	31.7	31.3	30.3	30.0	28.83	4
3	HB 15 07	134.8	129.8	136.3	148.3	147.3	135.8	138.7	11	6	0/6	23.8	29.6	23.6	34.2	30.3	28.8	30.0	28.61	5
4	HB 15 17	127.3	**126.5**	137.7	149.5	148.0	135.5	137.4	8	6	1/6	22.8	30.0	25.5	31.6	32.0	29.7	31.6	29.00	3
5	NDFB 17 1	127.3	**125.8**	138.3	145.8	147.7	132.5	136.2	2	6	1/6	22.3	26.4	25.6	30.5	29.0	-	26.9	26.78	11
B	**AVT-II**																			
6	HB 14 18	128.5	129.8	134.0	**143.8**	146.3	137.0	136.6	4	6	1/6	22.4	28.1	23.9	32.4	31.0	27.2	31.5	28.08	7
7	HB 14 21	129.0	128.5	135.7	146.0	147.0	136.0	137.0	6	6	0/6	22.4	27.1	26.8	32.5	32.7	27.7	29.2	28.33	6
8	NDFB 13 2	127.8	127.5	137.3	151.3	145.7	130.8	136.7	5	6	0/6	20.6	26.5	28.5	31.7	32.2	26.8	29.3	27.93	8
9	NDFB 16 3	127.5	126.8	**133.7**	150.3	146.7	**128.0**	135.5	1	6	2/6	21.3	27.3	28.8	32.5	32.0	27.7	21.7	27.31	10
10	HFB-1 (C)	127.8	130.8	136.7	147.8	145.3	134.3	137.1	7	6		22.5	27.8	30.8	32.8	32.1	30.0	30.1	29.45	1
11	Vikrant (C)	127.3	130.5	135.7	147.3	145.3	131.3	136.2	2	6		22.2	31.4	28.3	30.7	30.8	30.0	29.7	29.02	2
Mean		**128.4**	**128.5**	**136.2**	**148.2**	**146.6**	**133.8**	**137.0**	-	-	-	**22.5**	**28.0**	**26.3**	**32.0**	**31.4**	**28.4**	**29.3**	**28.25**	-
CD (0.05)		**6.5**	**3.7**	**2.0**	**2.2**	**1.5**	**2.9**	**-**	-	-	-	**3.0**	**0.5**	**0.8**	**0.3**	**1.1**	**2.3**	**3.5**	**-**	-
CV (%) Error		**3.5**	**2.0**	**0.9**	**1.0**	**0.6**	**1.5**	**-**	-	-	-	**9.2**	**1.2**	**1.8**	**0.6**	**2.1**	**4.7**	**8.3**	**-**	-

Table 61: Experimental Details of AVT-II of Chenopodium quinoa Rabi 2019-20 (Plain)

S. No	Item	Ambikapur	Ayodhya	Bengaluru	Bhubaneswar	Hisar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar
1	No of entry	13	13	13	13	13	13	13	13	13	13
2	No of Replication	3	3	3	3	3	3	3	3	3	3
3	Design	RBD	RBD	RBD	RBD	RBD	RBD	RBD	RBD	RBD	RBD
4	Row spacing (cm)	30	60	60	30	60	30	45	45 cm	45	30
5	Plant spacing (cm)	15	30	30	15	30	15	15	15 cm	15	15
6	Number of Rows	4	4	4	4	4	4	-	4	4	4
7	Row length (m)	3	3	3	3	3	3	-	3	3	3
8	Sowing Date	18/11/2019	26/12/2019	26/12/2019	07/12/2019		19/11/2019	21/11/2019	1/12/2019	6/12/2019	15/11/2019
9	Harvesting Period	At Maturity	04/04/2020	04/04/2020	17/02/2020 to 28/02/2020		20/04/2020	As per maturity	9/3/2020 to 16/3/2020	01/04/2020 to 06/04/2020	25/02/2020
10	plot size (m^2)	3.6	3.6	3.6	3.6	3.6	3.6	3.00	8.10	3.6	3.6
11	NPKS (kg/ha)	-	-	-	-	-	-	-	40:20:20:20	20:40:20:20	

Table 62: Performance of C. quinoa entries in Advanced Varietal Trial (AVT-II)during Rabi (2019-20) - Plains

S. No.	Genotypes	Grain yield (q/ha)													
		Ambikapur	Ayodhya	Bengaluru	Bhubaneswar	Hisar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	EC507738	16.53	16.10	10.19	9.27	14.50	2.78	4.96	15.09	-	16.41	12.61	13	8	0/8
2	EC507739	15.23	17.59	24.38	9.50	11.80	**10.18**	5.20	13.89	4.20	20.87	15.43	3	8	1/8
3	EC507740	14.35	16.06	20.37	8.63	12.93	7.41	4.06	13.61	3.82	16.61	13.75	10	8	0/8
4	EC507741	17.64	18.23	19.75	**13.72**	5.70	9.26	**9.05**	15.46	2.01	**22.18**	15.24	4	8	3/8
5	EC507742	16.30	21.11	17.28	**8.57**	12.83	8.33	**12.65**	11.76	-	16.45	14.08	8	8	2/8
6	EC507743	13.70	19.44	19.75	**11.84**	6.33	6.94	**9.90**	12.22	2.35	17.58	13.48	11	8	2/8
7	EC507744	**20.79**	17.59	21.60	**13.84**	**15.33**	**13.70**	**9.38**	13.52	4.10	14.94	16.42	1	8	5/8
8	EC507746	14.35	19.76	15.43	9.76	12.45	8.33	5.44	14.44	3.83	15.88	13.80	9	8	0/8
9	EC507747	14.21	18.51	**23.77**	9.11	10.73	**10.18**	6.11	15.74	4.29	**22.77**	15.63	2	8	3/8
10	EC507748	13.52	19.53	18.52	11.06	13.07	7.41	**9.85**	11.94	**5.03**	17.69	14.09	7	8	2/8
11	EC507749	18.12	18.00	11.73	7.71	9.97	7.41	4.65	13.98	**6.08**	18.92	13.23	12	8	1/8
12	IC411824	**19.49**	19.21	14.20	7.62	14.25	6.94	2.37	13.80	5.56	**22.37**	14.73	6	8	1/8
13	IC411825	17.87	20.97	15.74	**12.01**	10.57	7.41	5.30	15.65	5.84	**21.21**	15.18	5	8	1/8
Mean		**16.32**	**18.62**	**17.90**	**10.20**	**11.57**	**8.18**	**6.84**	**13.93**	**4.28**	**18.76**	**14.44**	-	-	-
CD (0.05)		**1.99**	**2.75**	**4.12**	**1.45**	**3.73**	**1.53**	**1.50**	**3.37**	**0.61**	**2.25**	**-**	-	-	-
CV (%) Error		**7.23**	**8.75**	**13.66**	**8.41**	**19.14**	**11.12**	**13.02**	**14.37**	**8.35**	**7.12**	**-**	-	-	-

* *Data of Ranchi and Mandor were not included in overall mean*

S. No.	Genotypes	Plant height (cm)											
		Ambikapur	Ayodhya	Bengaluru	Bhubaneswar	Hisar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	EC507738	67.28	151.00	119.11	87.47	156.78	82.52	101.33	117.60	-	112.13	110.58	6
2	EC507739	70.38	136.87	96.56	86.27	126.78	88.08	102.33	105.93	80.40	111.80	100.54	13
3	EC507740	68.22	172.77	130.33	87.73	140.78	81.12	112.67	107.67	83.53	119.73	110.45	7
4	EC507741	56.83	141.73	103.33	94.90	145.22	103.97	115.67	115.00	81.70	125.33	108.37	12
5	EC507742	68.47	138.97	112.56	80.53	191.89	98.55	75.67	116.87	-	115.27	110.97	4
6	EC507743	73.33	141.70	128.11	95.27	164.11	103.40	77.67	115.47	78.83	121.13	109.90	9
7	EC507744	66.95	139.37	130.22	93.93	161.22	100.12	122.67	117.87	77.07	126.40	113.58	3
8	EC507746	66.22	139.63	128.78	88.43	170.78	99.15	84.00	114.53	81.03	123.27	109.58	10
9	EC507747	68.68	139.07	136.44	88.47	172.11	102.25	137.00	120.00	64.07	118.73	114.68	1
10	EC507748	65.87	135.53	133.56	90.93	158.44	104.72	101.67	113.07	84.23	112.20	110.02	8
11	EC507749	72.08	136.67	107.78	98.00	147.78	106.80	113.67	124.33	86.97	114.13	110.82	5
12	IC411824	64.07	137.67	121.22	89.20	172.33	86.43	106.67	107.20	75.33	126.80	108.69	11
13	IC411825	61.55	160.67	120.33	94.53	173.56	89.90	119.67	113.93	82.80	120.53	113.75	2
Mean		**66.92**	**143.97**	**120.64**	**90.44**	**160.14**	**95.92**	**105.44**	**114.57**	**79.63**	**119.04**	**110.15**	**-**
CD (0.05)		**13.24**	**6.60**	**16.59**	**7.99**	**24.38**	**3.12**	**11.70**	**12.73**	**16.15**	**10.59**	**-**	**-**
CV (%) Error		**11.74**	**2.72**	**8.16**	**5.24**	**9.04**	**1.93**	**6.58**	**6.59**	**11.91**	**5.28**	**-**	**-**

S. No.	Genotypes	Days to flowering										
		Ambikapur	Ayodhya	Bengaluru	Bhubaneswar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	EC507738	75.33	60.67	39.67	39.33	90.00	57.33	47.00	-	43.33	56.58	###
2	EC507739	76.00	63.00	35.33	40.00	92.00	58.00	46.67	67.67	41.33	57.78	4
3	EC507740	74.67	68.67	40.33	38.00	89.00	56.00	46.00	71.00	43.33	58.56	11
4	EC507741	77.00	59.00	35.33	39.00	93.00	58.67	47.33	71.67	44.00	58.33	9
5	EC507742	74.00	62.67	37.67	41.67	91.00	59.67	47.33	-	42.00	57.00	3
6	EC507743	77.00	59.67	49.67	38.00	90.67	61.33	49.00	66.67	42.00	59.33	13
7	EC507744	75.00	61.00	50.67	36.67	89.00	62.67	47.67	67.67	39.00	58.81	12
8	EC507746	74.67	59.00	45.33	39.67	92.33	59.00	47.33	64.33	42.00	58.19	8
9	EC507747	75.00	57.00	51.33	36.00	86.00	60.67	46.67	66.67	44.00	58.15	7
10	EC507748	74.67	59.67	45.33	36.33	93.33	53.33	46.00	71.00	41.00	57.85	5
11	EC507749	75.33	57.33	46.00	35.67	85.33	58.33	45.00	67.00	42.00	56.89	2
12	IC411824	76.67	61.00	45.67	39.33	86.33	57.00	48.67	68.67	43.00	58.48	10
13	IC411825	76.00	61.67	40.00	36.33	87.00	61.67	45.33	66.00	37.67	56.85	1
Mean		**75.49**	**60.79**	**43.26**	**38.15**	**89.62**	**58.74**	**46.92**	**68.03**	**41.90**	**57.91**	**-**
CD (0.05)		**2.43**	**1.98**	**1.11**	**3.95**	**1.62**	**3.90**	**1.64**	**3.95**	**1.69**	**-**	**-**
CV (%) Error		**1.91**	**1.93**	**1.52**	**6.15**	**1.07**	**3.94**	**2.07**	**3.41**	**2.39**	**-**	**-**

S. No.	Genotypes	Days to maturity											
		Ambikapur	Bengaluru	Bhubaneswar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank	Location	Frequency
1	EC507738	128.00	91.67	82.00	140.67	133.33	107.00	-	95.67	111.19		7	0/7
2	EC507739	125.00	**85.33**	74.00	142.00	129.67	**102.00**	117.00	96.67	108.96	3	8	1/8
3	EC507740	126.00	92.00	**71.33**	**138.00**	**124.67**	105.00	117.33	96.00	108.79	2	8	3/8
4	EC507741	124.00	**85.67**	82.00	143.33	136.00	107.00	**113.00**	**92.00**	110.38	4	8	3/8
5	EC507742	124.67	**88.67**	81.33	144.00	134.33	106.67	-	95.67	110.76	5	7	1/7
6	EC507743	124.33	99.00	80.67	143.33	**124.67**	110.33	118.67	95.67	112.08	10	8	1/8
7	EC507744	125.33	101.33	79.33	142.00	136.67	108.33	118.67	96.33	113.50	13	8	0/8
8	EC507746	124.33	93.00	81.67	141.33	137.67	108.33	117.00	96.67	112.50	12	8	0/8
9	EC507747	123.00	103.33	**72.33**	138.00	142.33	111.00	114.67	95.00	112.46	11	8	1/8
10	EC507748	126.00	92.00	81.33	144.67	128.67	106.67	120.00	96.00	111.92	9	8	0/8
11	EC507749	125.00	92.33	**70.00**	**138.33**	136.33	108.67	119.67	96.00	110.79	6	8	2/8
12	IC411824	122.67	94.67	79.00	141.33	133.33	107.67	115.67	96.33	111.33	8	8	0/8
13	IC411825	123.33	**86.33**	74.33	**139.00**	128.67	105.67	117.00	95.00	108.67	1	8	2/8
Mean		**124.74**	**92.72**	**77.64**	**141.23**	**132.79**	**107.26**	**117.15**	**95.62**	**111.03**	-	-	-
CD (0.05)		**6.98**	**2.34**	**4.80**	**1.49**	**5.09**	**2.29**	**3.32**	**1.27**	**-**	-	-	-
CV (%) Error		**3.32**	**1.49**	**3.67**	**0.62**	**2.27**	**1.27**	**1.67**	**0.79**	**-**	-	-	-

S. No.	Genotypes	Inflorescence (cm)											
		Ambikapur	Ayodhya	Bengaluru	Bhubaneswar	Hisar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	EC507738	21.55	22.67	25.78	20.53	32	14.67	24.00	25.87	-	21.60	23.18	6
2	EC507739	22.80	23.33	37.67	17.37	30	16.33	24.00	27.00	9.87	21.00	22.94	7
3	EC507740	20.53	23.00	31.44	20.27	29	14.17	28.33	25.67	10.33	23.47	22.62	10
4	EC507741	21.35	21.67	34.78	23.00	29.22	13.67	29.67	23.33	-	24.93	24.62	2
5	EC507742	22.28	22.67	31.67	21.15	33.11	13.33	23.33	24.07	-	22.67	23.81	4
6	EC507743	22.33	24.67	34.89	21.73	30.22	18.67	20.67	22.80	9.53	22.13	22.76	9
7	EC507744	21.73	22.33	34.56	24.07	26.22	14.67	31.33	24.40	9.13	19.27	22.77	8
8	EC507746	23.20	23.67	30.33	19.53	31.33	18.00	21.33	25.00	8.63	20.27	22.13	12
9	EC507747	21.93	21.33	38.56	21.60	36.56	15.67	36.00	26.07	8.53	21.73	24.80	1
10	EC507748	19.55	21.00	34.78	22.47	29.33	12.67	27.33	23.13	9.57	21.80	22.16	11
11	EC507749	22.88	20.33	27.67	21.40	25.22	17.33	25.00	26.60	9.93	19.13	21.55	13
12	IC411824	21.87	24.33	34.22	19.47	38.56	14.83	23.67	23.47	8.40	23.53	23.23	5
13	IC411825	21.15	23.33	30.33	23.47	41	20.67	27.67	24.47	8.70	22.80	24.36	3
Mean		**21.78**	**22.64**	**32.82**	**21.23**	**31.67**	**15.74**	**26.33**	**24.76**	**9.26**	**21.87**	**23.15**	-
CD (0.05)		**2.85**	**2.44**	**4.76**	**2.67**	**12.1**	**1.70**	**3.60**	**3.03**	**3.17**	**4.10**	**-**	-
CV (%) Error		**7.76**	**6.39**	**8.61**	**7.46**	**22.66**	**6.42**	**8.12**	**7.26**	**19.93**	**11.13**	**-**	-

S. No.	Genotypes	Seed weight (g/10 ml)									
		Ambikapur	Bengaluru	Bhubaneswar	Ludhiana	Mandor	Rahuri	Ranchi	SK Nagar	Mean	Rank
1	EC507738	5.33	4.51	5.86	7.83	5.99	6.93	-	7.58	6.29	13
2	EC507739	5.33	5.66	5.66	8.98	5.84	6.97	8.79	7.58	6.85	6
3	EC507740	5.67	5.34	5.66	8.57	6.09	6.57	9.06	7.56	6.81	7
4	EC507741	6.00	4.24	5.85	8.57	5.93	6.90	8.79	7.51	6.72	10
5	EC507742	5.33	5.34	5.98	7.81	5.74	7.27	-	7.70	6.45	12
6	EC507743	7.00	5.46	5.91	7.94	6.17	7.07	8.93	7.62	7.01	3
7	EC507744	7.00	5.50	5.63	7.62	6.35	7.10	9.02	7.91	7.02	2
8	EC507746	5.67	5.35	5.84	7.88	5.83	7.17	8.82	7.77	6.79	8
9	EC507747	6.00	5.43	5.84	8.47	5.09	6.47	9.15	7.86	6.79	9
10	EC507748	6.33	5.56	5.74	7.73	5.98	7.40	8.87	7.57	6.90	4
11	EC507749	6.00	5.42	5.65	7.57	5.24	6.57	8.83	7.51	6.60	11
12	IC411824	6.67	5.64	5.78	8.63	6.01	7.20	8.89	7.82	7.08	1
13	IC411825	6.67	5.42	5.71	8.53	5.89	6.20	8.89	7.73	6.88	5
Mean		**6.08**	**5.30**	**5.78**	**8.16**	**5.86**	**6.91**	**8.91**	**7.67**	**6.78**	-
CD (0.05)		**2.73**	**1.03**	**0.06**	**0.42**	**0.38**	**0.89**	**0.39**	**0.31**	**-**	-
CV (%) Error		**26.67**	**11.53**	**0.65**	**3.06**	**3.83**	**7.64**	**2.54**	**2.40**	**-**	-

CROP PRODUCTION AND PROTECTION

IV. CROP PRODUCTION AND PROTECTION

4.1 CROP PRODUCTION

A total of seven agronomic experiments were formulated to be conducted at seven locations in eleven trials during *Rabi* 2019-20. These comprised of three studies on amaranth, one each on buckwheat & quinoa and two experiments on faba bean. Results of nine experiments were received from seven locations in seven trials. Centre-wise details of experiments are presented in Table 63 and the findings are as follows:

Experiment 1 : Effect of irrigation schedules on Grain Amaranth under sprinkler irrigation system

Objective : To work out irrigation requirement of grain amaranth under sprinkler irrigation

Year of start : Rabi 2018-19

Location : SDAU, S.K. Nagar

Treatments :
i. Surface Irrigation
ii. Control (only pre sowing irrigation)
iii. Sprinkler irrigation at 0.2 IW/CPE
iv. Sprinkler irrigation at 0.4 IW/CPE
v. Sprinkler irrigation at 0.6 IW/CPE
vi. Sprinkler irrigation at 0.8 IW/CPE

Design : RBD

Replications : 4

Plot size : Depending upon requirement for sprinkler irrigation

Observations :
i. Yield (both grain and DM)
ii. Yield attributes (Plant height, branches per plant, inflorescence length, days to flower, days to maturity, harvest index)
iii. Water use efficiency
iv. Economic water productivity

Results: Results indicated that significantly higher grain yield (15.6 q/ha) was recorded in Sprinkler irrigation at 0.8 IW/CPE followed by Sprinkler irrigation at 0.6 IW/CPE and 0.4 IW/CPE. Water use efficiency (WUE) was found significantly higher in control (only pre sowing irrigation) compared to other treatments. Highest net returns and B: C Ratio (Rs 46516/ha & 2.48) was observed with Sprinkler irrigation at 0.8 IW/CPE followed by Sprinkler irrigation at 0.6 IW/CPE (Rs34050/ha & 2.14) and 0.4 IW/CPE (Rs 27779/ha & 1.98) as in Table 64 & 65.

Experiment 2 : Response of grain amaranth to sulphur

Objective : To work out the Sulphur (S) requirement of grain amaranth

Year of start : 2015-16

Location : Bhubaneswar

Treatments :
T_1 RFD @ 60-40-20 kg NPK/ha
T_2 RFD + 20 kg S/ha
T_3 RFD + 40 kg S/ha
T_4 RFD + 10 kg S/ha at sowing & 10 kg S/ha at 3WAS
T_5 RFD + 20 kg S/ha at sowing & 20 kg S/ha at 3WAS

Design	:	RBD
Replications	:	4

Result: Split application of 20 kg S/ha (10 kg/ha at sowing +10 kg/ha at 3 WAS) along with RFD @ 20-40-20 kg NPK /ha recorded highest seed yield (13.64 q/ha), & net return of (Rs 24666/ha) with a B:C ratio of 1.82 followed by basal application of 20 kg S/ha with RFD (13.50 q/ha), net return (Rs 24104/ha) with a B:C of 1.81. Since both the treatments remained at par, therefore, basal application of 20 kg S/ha along with RFD have been found to be economical (Table 66).

Experiment 3	**:**	**Response of quinoa to different levels of spacing and fertilizer**
Objective	:	To standardize the spatial and fertilizer requirements for cultivation of *Chenopodium quinoa* in the plains.
Year of start	:	2017-18
Locations	:	Bangalore, Bhubaneswar, Cooch Behar, Hisar and S.K. Nagar.
Treatments	:	a) Spacing S_1-30x10 cm S_2-30x15 cm S_3-22.5x15 cm b) Fertilizer dose F_1- Control F_2- N30P20K20 F_3- N60P40K40
Design	:	Factorial RBD
Replications	:	3

Result. At Bengaluru, no significant difference of seed yield was observed among different spacing levels. However, spacing of 30 cm x 15 cm recorded highest seed yield (26.10 q/ha) followed by 22.5 cm x 15 cm (25.77 q/ha) & 30 cm x 10 cm (23.60 q/ha). Among fertility levels, application of 60:40:40 kg NPK/ha recorded significantly higher grain yield as compared to other treatments (Table 67). Interaction effect of treatment combinations was non-significant on seed yield. However, a combination of spacing of 30 cm x 15 cm and application of 60:40:40 kg NPK/ha resulted in highest seed yield of quinoa (29.08 q/ha).

At SK Nagar, significantly higher grain yield & (16.87 q/ha) was recorded in treatment S1 (30 cm X 10 cm) followed by S3 & S2 (15.90 &14.85 q/ha, respectively). In case of fertilizer levels, application of 60:40:40 kg NPK/ha recorded significantly higher grain yield (19.93 q/ha) as compared to other treatments. Interaction effect of treatment combinations was non-significant on seed yield. However, a combination of spacing of 30 cm x 10 cm and application of 60:40:40 kg NPK/ha resulted in highest seed yield (20.94 q/ha), net income (Rs. 69374/ ha) & B: C (2.96) (Table 68-69).

At Hisar, among different spacing levels, spacing of 30 cm x 10 cm recorded seed yield (15.01 q/ha) followed by 22.5 cm x 15 cm (14.41 q/ha) which remained at par with each other. Among fertility levels, application of 60:40:40 kg NPK/ha recorded significantly higher grain yield as compared to other treatments. Interaction effect of treatment combinations was non-significant on seed yield. However, a combination of spacing of 30 cm x 10 cm and application of 60:40:40 kg NPK/ha resulted highest seed yield of quinoa (16.18 q/ha) as shown in Table 70.

Experiment 4 : **Response of promising genotypes (AVT-II entries) of Faba bean to different levels of management**

Objective : To evaluate promising genotypes (AVT-II entries) of faba bean at different levels of management

Year of start : 2014

Locations : Hisar

Design : Split plot

Treatments :
a) Genotypes: Vikrant, HFB-1,
EC 010845 and EC 243626 (Hills) Seed supply from Hisar)
HB 12-8, HB 12-34, HB12-37, HB 12-42 (Seed from Hisar)
NDFB 16-2 (Seed from Faizabad) (Plains)
b) Managements levels: Control
50% RDF + one irrigation
75% RDF + two irrigations
100%RDF + three irrigations

Results:- At Hisar, among the genotypes HB-12-37 with seed yield of 53.34 q/ha was found statistically higher followed by HB 12-34, HB 12-42 and HB 11-12. The seed yield significantly increased with the improvement in the management levels. The seed yield was increased to the tune of 8.24, 12.41 and 19.03 percent with 50% RDF + one irrigation, 75% RDF + two irrigation and RDF + three irrigation, respectively than the control (40.29 q/ha). Interaction effect of treatment combinations was non-significant on seed yield. However, a combination of HB 12-37 genotype with RDF + 3 irrigation resulted highest seed yield of (57.00 q/ha) (Table 71).

Experiment 5 : **Effect of different phosphorus doses and sources on faba bean**

Objective : To assess the effect of different phosphorus doses and sources on faba bean

Year of start : 2018

Location : Pasighat

Design : RBD

Treatments :
1. Control
2. P_2O_5 10kg/ha
3. P_2O_5 20kg/ha
4. P_2O_5 30kg/ha
5. P_2O_5 10kg/ha + PSB
6. P_2O_5 20kg/ha + PSB
7. P_2O_5 30kg/ha + PSB
8. P_2O_5 10kg/ha + VAM
9. P_2O_5 20kg/ha + VAM
10. P_2O_5 30kg/ha + VAM

Results:- The results indicated that significantly higher grain yield q/ha (17.22) was recorded with P_2O_5 30 kg/ha + PSB as compared to other treatments but it was at par with P_2O_5 20 kg/ha+ PSB (16.85), P_2O_5 10 kg/ha + PSB (16.11) and P_2O_5 20 kg/ha (13.70). Economic studies revealed that P_2O_5 30 kg/ha + PSB recorded highest net return (Rs 57450/ha) and B:C ratio

(2.01) followed by P_2O_5 20 kg/ha + PSB with net return of Rs. 55790/ha and a B:C of 1.96 (Table 72-73).

Experiment 6 : Performance of different grain amaranth varieties

Objectives : i. To identify grain amaranth varieties for Telangana region
ii. To identify suitable varieties of grain amaranth for different culinary preparations.

Year of start : *Rabi* 2018-19

Location : NBPGR Regional Station, Hyderabad

Treatments : Annapurna, Durga PRA-1, PRA-2, VL Chua 44, RMA-4, RMA-7, GA-1, GA-2, GA-3, Kapilasa, Suvadra, KBGA-1, KBGA-4, Suvarna

Design : RBD

Replications : 3

Plot size : 3 x 3.6m

Spacing : R X R 45 cm
P X P 15 cm

Fertilizer dose : N_{60} P_{40} kg/ha

Irrigation : 0.6 IW/CPE

Results:- The highest, seed yield was observed in variety Suvadra (15.90 q/ha) followed by Durga (14.27 q/ha) both remained at par with each other. The highest plant height (212.44 cm) was found in RMA-7, while the longest inflorescence length was in GA-2 (85.77 cm). The variety KBGA-4 had early maturity (82.33 days) at NBPGR, RS, Hyderabad. (Table 74)

Experiment 7 : Response of promising genotypes (AVT-II) of Buckwheat to different levels of management.

Objective : To evaluate promising genotypes (AVT-II entries) of buckwheat at different levels of management

Year of start : 2014

Locations : Cooch Behar

Treatments : a) Genotypes: Himpriya, PRB-1, IC341589 (**Seed from Shimla**)
b) Managements levels: Control
50% RDF + one irrigation
75% RDF + two irrigations
100% RDF + three irrigations

Results: The results indicated that there was non- significant effect of genotypes on seed yield. However, genotype Himpriya recorded highest seed yield (13.16 q/ha) followed by PRB-1 (13.04 q/ha) and IC 341589 (12.48 q/ha).

Among different management levels, 75% RDF + two irrigations recorded highest seed yield (14.24 q/ha) followed by 50% RDF + one irrigation (14.01 q/ha) and 100% RDF + three irrigations (13.74 q/ha) which remained at par with each other and statistically superior to control.

Interaction effect of treatment combinations was non-significant on seed yield. However, a combination of 100% recommended dose of fertilizer (RDF) + three irrigations with genotype Himpriya recorded highest seed yield (14.73 q/ha) followed by 75% RDF + two irrigations with Himpriya (Table 75).

Table 63: Centre - wise details of agronomic experiments allotted/conducted on different potential crops

S. No	Experiments	Bangalore	Bhubaneswar	Cooch Behar	Hisar	Hyderabad	Pasighat	S.K. Nagar	Total
1	Effect of different systems of irrigation and irrigation schedules on **grain amaranth**							1(1)	**1(1)**
2	Performance of different **grain amaranth** varieties					1(1)			**1(1)**
3	Response of **grain amaranth** to sulphur		1(1)						**1(1)**
4	Response of promising genotypes (AVT-II entries) of **Buckwheat** to different levels of management.			1(1)					**1(1)**
5	Response of **quinoa** to different levels of spacing and fertilizer	1(1)			1(1)			1(1)	**3(3)**
6	Response of promising genotypes (AVT-II entries) of **Faba bean** to different levels of management.				1(1)				**1(1)**
7	Effect of different phosphorus doses and sources on **faba bean.**						1(1)		**1(1)**
	Total	**1(1)**	**1(1)**	**1(1)**	**2(2)**	**1(1)**	**1(1)**	**2(2)**	**9(9)**

Without () allotted; () conducted

Table 64: Effect of irrigation schedules on Grain Amaranth under sprinkler irrigation system at SK Nagar

S. No	Treatment	Plant height (cm)	Inflorescence length (cm)	Seed yield (q/ha)	Harvest Index	Days to flowering	Days to maturity	Test weight (g/10ml)	WUE (kg/ha-mm)
1	Surface Irrigation	156.30	65.58	11.35	17.87	60.75	136.71	6.76	2.84
2	Control (only pre sowing irrigation)	85.55	38.45	4.58	17.33	49.00	108.53	8.09	11.45
3	Sprinkler irrigation at 0.2 IW/CPE	111.55	49.70	7.12	14.90	52.00	113.21	7.77	6.80
4	Sprinkler irrigation at 0.4 IW/CPE	144.60	62.90	11.20	17.66	54.25	120.46	7.83	7.33
5	Sprinkler irrigation at 0.6 IW/CPE	174.90	71.60	12.77	18.66	58.00	127.46	7.66	5.32
6	Sprinkler irrigation at 0.8 IW/CPE	191.95	83.88	15.59	17.82	60.25	132.96	7.76	4.87
	Mean	**144.14**	**62.02**	**10.44**	**17.37**	**55.71**	**123.22**	**7.64**	**6.44**
	CD (0.05)	**19.26**	**9.01**	**1.40**	**2.20**	**1.90**	**8.91**	**0.28**	**1.92**
	CV(%) Error	**8.86**	**9.64**	**8.89**	**8.39**	**2.26**	**4.80**	**2.43**	**19.76**

Table 65: Economics of different irrigation schedules under drip irrigation on grain amaranth at SK Nagar

S. No	Treatment	Grain yield q/ha	Gross Income (Rs./ha)	Cost of cultivation (Rs./ha)	Net Income (Rs./ha)	B:C
1	Surface irrigation	11.35	56753.94	34858.50	21895.44	1.63
2	Control (only pre sowing irrigation)	4.58	22903.85	25018.50	-2114.65	0.92
3	Drip irrigation at 0.2 IW/CPE	7.12	35604.39	26618.50	8985.89	1.34
4	Drip irrigation at 0.4 IW/CPE	11.20	55997.77	28218.50	27779.27	1.98
5	Drip irrigation at 0.6 IW/CPE	12.77	63868.09	29818.50	34049.59	2.14
6	Drip irrigation at 0.8 IW/CPE	15.59	77934.36	31418.50	46515.86	2.48

Table 66: Yield and economics and sulphur on Grain Amaranth at Bhubaneswar

Treatments	Plant height (cm)	Length of inflorescence (cm)	Seed yield (qt/ha)	Net return (Rs/ha)	B:C ratio	Initial S-status (kg/ha)	Final S-status (kg/ha)
RFD @ 60-40-20 kg NPK/ha	119.6	36.9	10.01	10547	1.36	23.2	21.4
RFD + 20 kg S/ha	138.5	44.45	13.5	24104	1.81	5.4	22.5
RFD + 40 kg S/ha	131	40.85	12.12	18183	1.6	36.8	37.4
RFD + 10 kg S/ha at sowing & 10 kg S/ha at 3WAS	146.57	45.55	13.64	24666	1.82	26.6	24.8
RFD + 20 kg S/ha at sowing & 20 kg S/ha at 3WAS	135.45	42.4	12.41	19343	1.64	34.4	36.6
CD (0.05)	14.88	5.27	2.112	8448	0.28	-	-
CV (%)	7.22	8.15	11.11	28.31	11.01	-	-

Table 67: Response of quinoa to different levels of spacing and fertilizer at Bengaluru

S.No.	Treatments	Grain yield (q/ha)	Plant height (cm)	panicle length (cm)	No. of branches per plant	No. of panicles per plant	No. of leaves per plant
A	**Interaction**						
1	S1F1	19.48	110.33	27.44	11.00	9.00	236.67
2	S1F2	23.10	119.11	36.44	16.78	15.89	334.00
3	S1F3	28.23	125.00	37.89	18.89	17.67	342.33
4	S2F1	23.46	111.67	32.78	12.00	10.00	260.00
5	S2F2	25.76	115.00	37.00	20.00	15.11	345.22
6	S2F3	29.08	130.44	39.44	21.00	17.11	424.67
7	S3F1	23.81	93.33	22.33	9.00	8.00	191.67
8	S3F2	26.42	105.00	23.33	15.44	14.33	237.56
9	S3F3	27.08	118.33	30.00	18.00	15.33	311.67
	Mean	**25.16**	**114.25**	**31.85**	**15.79**	**13.60**	**298.20**
	CD (0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
B	**Spacings (S)**						
	S1: 30x10	23.60	118.15	33.93	15.56	14.19	304.33
	S2: 30x15	26.10	119.04	36.41	17.67	14.07	343.30
	S3: 22.5x15	25.77	105.56	25.22	14.15	12.56	246.96
	CD (0.05)	**NS**	**6.817**	**4.524**	**1.326**	**N/A**	**45.063**
C	**Fertilizer levels (F)**						
	F1: control	22.25	105.11	27.52	10.67	9.00	229.44
	F2: 30/20/20 NPK	25.09	113.04	32.26	17.41	15.11	305.59
	F3: 60-40-40 NPK	28.13	124.59	35.78	19.30	16.70	359.56
	CD (0.05)	**NS**	**6.817**	**4.524**	**1.326**	**1.824**	**45.063**
	CV(%) Error	**18.71**	**5.92**	**14.09**	**8.33**	**13.30**	**14.99**

Table 68: Response of quinoa to different levels of spacing and fertilizer at SK Nagar

S. No	Treatment	Plant height (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Days to 50% flowering	Days to 80% maturity	Dry fodder yield (Kg/ha)	Seed volume (g/10 ml)
A	**Interaction**							
1	S1F1	79.80	17.44	12.47	41.97	99.24	840.41	6.99
2	S1F2	84.56	23.64	17.20	44.64	102.33	1535.84	6.32
3	S1F3	92.13	29.61	20.94	46.31	104.14	2317.02	6.22
4	S2F1	70.18	16.20	10.35	45.31	101.14	601.53	6.16
5	S2F2	80.01	23.08	14.83	41.64	103.53	1604.35	6.02
6	S2F3	94.83	31.67	19.39	46.31	102.47	2185.82	6.09
7	S3F1	78.31	19.89	11.79	41.31	100.24	796.50	6.44
8	S3F2	89.86	26.09	16.46	41.64	104.64	1585.93	6.83
9	S3F3	101.06	28.30	19.45	45.31	102.31	1838.71	6.51
	Mean	**85.64**	**23.99**	**15.88**	**43.83**	**102.23**	**1478.46**	**6.40**
	CD (0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
B	**Spacing**							
	S1: 30x10	85.49	23.57	16.87	44.31	101.90	1564.42	6.51
	S2: 30x15	81.67	23.65	14.85	44.42	102.38	1463.90	6.09
	S3: 22.5x15	89.74	24.76	15.90	42.75	102.40	1407.05	6.60
	CD (0.05)	**NS**	**NS**	**1.39**	**NS**	**NS**	**NS**	**0.35**
C	**Fertilizer dose**							
	F1: control	76.09	17.85	11.54	45.00	100.21	746.15	6.53
	F2: 30/20/20 NPK	84.81	24.27	16.16	49.11	103.50	1575.37	6.39
	F3: 60-40-40 NPK	96.01	29.86	19.93	51.00	102.97	2113.85	6.27
	CD (0.05)	**7.26**	**2.34**	**1.39**	**NS**	**NS**	**173.20**	**NS**
D	**CV (%) Error**	**8.49**	**9.74**	**8.75**	**8.87**	**8.89**	**11.72**	**5.53**

Table 69: Response of quinoa to different levels of spacing and fertilizer at SK Nagar

S. No	Treatment		Grain yield q/ha	Gross Income (Rs.)	cost of cultivation (Rs.)	Net Income (Rs.)	B:C
Genotypes							
1	S1	30x10	16.9	84356	30339	54018	2.781
2	S2	30x15	14.9	74270	30339	43931	2.448
3	S3	22.5x15	15.9	79511	30339	49172	2.621
fertilizer levels							
1	F1	control	11.5	57678	30339	27340	1.901
2	F2	30-20-20 NPK	16.2	80819	32002	48817	2.525
3	F3	60-40-40 NPK	19.9	99640	35329	64311	2.820
GXF Interaction							
	1	S1F1	12.5	62360	30339	32021	2.06
	2	S1F2	17.2	86006	32002	54004	2.69
	3	S1F3	20.9	104703	35329	69374	2.96
	4	S2F1	10.3	51735	30339	21397	1.71
	5	S2F2	14.8	74131	32002	42129	2.32
	6	S2F3	19.4	96943	35329	61614	2.74
	7	S3F1	11.8	58940	30339	28601	1.94
	8	S3F2	16.5	82319	32002	50317	2.57
	9	S3F3	19.5	97273	35329	61944	2.75

Table 70: Response of quinoa to different levels of spacing and fertilizer at Hisar

S.No.	Treatments	Plant height (cm)	No. of branche/ plant	Days to 50% maturity	Inflorescence length (cm)	No of Inflorescence/ Plant	Seed volume (g/10ml)	Grain yield (q/ha)
1	S1F1	97.67	3.03	157.00	19.73	21.40	7.72	13.93
2	S1F2	103.13	3.73	158.00	22.00	22.53	7.74	14.92
3	S1F3	111.93	3.47	161.00	23.00	23.87	8.09	16.18
4	S2F1	101.47	3.50	158.00	22.13	21.87	8.08	10.35
5	S2F2	105.87	3.73	160.33	22.40	24.00	8.10	14.11
6	S2F3	117.20	3.57	161.33	24.40	25.00	8.11	15.98
7	S3F1	100.07	3.63	158.33	20.73	21.73	7.85	11.75
8	S3F2	104.40	3.77	158.33	22.30	23.40	7.91	15.45
9	S3F3	113.13	3.67	161.67	24.00	24.67	8.09	16.03
	Mean	**106.10**	**3.57**	**159.33**	**22.30**	**23.16**	**7.97**	**14.30**
	CD (0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
A	**Spacing (S)**							
	S1: 30x10	104.25	3.41	158.67	21.58	22.60	7.85	15.01
	S2: 30x15	108.18	3.60	159.89	22.98	23.62	8.10	13.48
	S3: 22.5x15	105.87	3.69	159.44	22.34	23.27	7.95	14.41
	CD (0.05)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
B	**Fertilizer levels (F)**							
	F1: control	99.73	3.39	157.78	20.87	21.67	7.88	12.01
	F2: 30/20/20 NPK	104.47	3.74	158.89	22.23	23.31	7.92	14.83
	F3: 60-40-40 NPK	114.09	3.57	161.33	23.80	24.51	8.10	16.06
	CD (0.05)	**8.38**	**0.26**	**2.16**	**1.23**	**1.61**	**NS**	**1.41**
	CV(%) Error	**8.07**	**1.34**	**1.69**	**2.59**	**3.31**	**1.46**	**3.70**

Table 71: Response of promising genotypes (AVT-II entries) of Faba bean to different levels of management at Hisar

S. No.	Treatments	Plant height (cm)	No. of branche/ plant	Pod length (cm)	No. of Seeds/ pod	No. of pods/ plant	Biological yield (q/ha)	Seed yield (q/ha)	100 seed weight (gm)
A	**Interaction**								
1	G1M0	104.53	3.50	4.13	3.20	25.80	85.19	37.02	35.00
2	G1M1	107.93	3.60	4.13	3.33	26.33	86.07	37.33	36.67
3	G1M2	111.93	3.67	4.23	3.40	26.80	94.96	38.66	36.67
4	G1M3	113.87	3.80	4.50	3.47	29.93	110.00	42.58	36.67
5	G2M0	102.20	3.80	4.07	3.33	27.00	76.67	32.16	38.00
6	G2M1	117.80	3.83	4.17	3.37	31.33	95.37	40.25	37.67
7	G2M2	123.33	4.00	4.27	3.47	31.87	100.74	43.56	38.33
8	G2M3	124.27	4.13	4.33	3.57	32.47	104.44	44.53	38.33
9	G3M0	96.20	4.03	4.13	3.30	28.60	86.30	41.55	36.67
10	G3M1	103.93	4.13	4.10	3.43	29.07	95.04	42.07	38.33
11	G3M2	116.27	4.17	4.23	3.50	31.80	107.85	42.41	35.67
12	G3M3	128.00	4.20	4.27	3.60	33.80	116.63	55.00	36.67
13	G4M0	89.60	3.33	4.33	3.07	29.33	103.28	45.85	34.67
14	G4M1	97.60	3.90	4.40	3.43	29.40	104.25	47.89	36.33
15	G4M2	101.27	4.07	4.43	3.47	31.00	107.64	50.00	35.67
16	G4M3	111.80	4.20	4.47	3.53	33.53	122.91	51.30	37.33
17	G5M0	100.53	3.67	4.20	3.20	30.13	103.71	47.82	38.00
18	G5M1	102.07	3.80	4.33	3.27	31.27	104.33	52.07	37.67
19	G5M2	113.73	4.30	4.30	3.37	35.93	125.37	56.47	38.33
20	G5M3	126.80	4.53	4.83	3.53	36.87	128.33	57.00	37.33
21	G6M0	100.53	3.80	4.60	3.07	34.27	100.10	40.37	35.33
22	G6M1	106.47	4.13	4.73	3.47	34.87	104.71	47.26	36.00
23	G6M2	111.93	4.10	4.80	3.77	37.20	105.56	47.78	35.33
24	G6M3	115.60	4.47	4.93	3.87	39.20	119.53	48.15	37.33
25	G7M0	89.60	3.33	4.33	3.07	29.33	103.28	45.85	34.67
26	G7M1	100.27	4.13	3.87	3.30	26.93	79.74	39.22	36.67
27	G7M2	104.93	4.23	4.23	3.67	30.87	91.37	39.56	34.67
28	G7M3	121.13	4.27	4.33	3.80	33.80	92.15	40.18	35.67
29	G8M0	105.93	3.83	4.00	3.13	26.60	83.34	39.75	36.00
30	G8M1	108.27	3.97	4.07	3.17	32.07	84.18	42.74	37.00
31	G8M2	118.13	4.07	4.43	3.50	33.80	102.04	43.87	36.33
32	G8M3	128.07	4.27	4.60	3.60	35.67	111.85	44.92	36.67
	Mean	**109.52**	**3.98**	**4.34**	**3.41**	**31.46**	**101.15**	**44.54**	**36.61**

S. No.	Treatments	Plant height (cm)	No. of branche/ plant	Pod length (cm)	No. of Seeds/ pod	No. of pods/ plant	Biological yield (q/ha)	Seed yield (q/ha)	100 seed weight (gm)
	Factor(B)at same level of A								
	CD	NS	NS	NS	NS	NS	NS	NS	NS
	Factor(A)at same level of B								
	CD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS
B	**Genotypes (G)**								
	Vikrant	109.57	3.64	4.25	3.35	27.22	94.06	38.90	36.25
	HFB-1	116.90	3.94	4.21	3.43	30.67	94.31	40.12	38.08
	HB 12-8	111.10	4.13	4.18	3.46	30.82	101.45	45.26	36.83
	HB 12-34	100.07	3.88	4.41	3.38	30.82	109.52	48.76	36.00
	HB 12-37	110.78	4.08	4.42	3.34	33.55	115.44	53.34	37.83
	HB-12-42	108.63	4.13	4.77	3.54	36.38	107.47	45.89	36.00
	NDFB 16-2	106.35	4.13	4.06	3.53	29.55	85.03	39.19	35.83
	HB-11-12	115.10	4.03	4.28	3.35	32.03	95.35	42.82	36.50
	CD (0.05)	3.26	0.17	0.08	0.06	1.26	6.33	1.62	0.63
C	**Fertilizer**								
	Control	99.83	3.73	4.16	3.20	28.54	89.43	40.29	36.25
	50% RDF + one irrigation	105.54	3.94	4.23	3.35	30.16	94.21	43.61	37.04
	75% RDF + two irrigations	112.69	4.08	4.37	3.52	32.41	104.44	45.29	36.38
	100%RDF + three irrigations	121.19	4.23	4.53	3.62	34.41	113.23	47.96	37.00
	CD (0.05)	1.59	0.07	0.05	0.04	0.97	2.57	1.11	0.49

Table 72: Effect of different phosphorus doses and sources on faba bean at Pasighat

S.No.	Treatments	Days to 50% flowering	Plant height (cm)	Number of Branches/plant	Number of pods per plant	Pod length (cm)	Number of seeds per pod	100 seed weight (g)	Pod yield (q/ha)	Seed yield (q/ha)
1	Control	65.33	88.23	4.60	9.30	8.77	3.33	81.67	11.11	5.93
2	P_2O_5 10kg/ha	65.00	86.50	5.13	10.30	10.50	3.67	102.50	17.78	9.26
3	P_2O_5 20kg/ha	64.33	90.50	5.13	9.90	12.03	3.00	85.63	19.45	13.70
4	P_2O_5 30kg/ha	64.00	92.90	5.00	11.50	11.67	4.00	94.80	18.52	12.59
5	P_2O_5 10kg/ha + PSB	63.33	93.33	5.67	11.73	11.77	4.67	108.90	23.15	16.11
6	P_2O_5 20kg/ha + PSB	63.00	94.43	4.53	12.07	11.37	4.67	81.33	24.73	16.85
7	P_2O_5 30kg/ha + PSB	64.33	99.47	5.50	11.30	11.63	4.00	92.63	27.32	17.22
8	P_2O_5 10kg/ha + VAM	63.33	99.43	5.67	10.93	12.33	4.67	120.40	18.52	11.30
9	P_2O_5 20kg/ha + VAM	62.67	99.60	6.50	12.47	11.43	4.33	110.17	16.30	11.11
10	P_2O_5 30kg/ha + VAM	62.00	101.67	6.00	12.80	12.13	4.67	97.33	17.04	10.93
	Mean	**63.73**	**94.61**	**5.37**	**11.23**	**11.36**	**4.10**	**97.54**	**19.39**	**12.50**
	CD (0.05)	**1.19**	**10.33**	**0.84**	**2.26**	**1.40**	**0.85**	**1.72**	**7.27**	**4.56**
	CV(%) Error	**1.09**	**6.37**	**9.15**	**11.72**	**7.18**	**12.15**	**1.03**	**21.86**	**21.25**

Table 73: Economics of effect of different phosphorus doses and sources on faba bean at Pasighat

S. No	Treatments	Seed yield (q/ha)	Cost of cultivation(Rs/ha)	Total income(Rs/ha)	Net profit (Rs/ha)	B:C
1.	Control	5.93	26460.00	29650.00	3190.00	0.12
2.	P_2O_5 10kg/ha	9.26	27085.00	46300.00	19215.00	0.71
3.	P_2O_5 20kg/ha	13.70	27710.00	68500.00	40790.00	1.47
4.	P_2O_5 30kg/ha	12.59	28335.00	62950.00	34615.00	1.22
5.	P_2O_5 10kg/ha + PSB	16.11	27835.00	80550.00	52715.00	1.89
6.	P_2O_5 20kg/ha + PSB	16.85	28460.00	84250.00	55790.00	1.96
7.	P_2O_5 30kg/ha + PSB	17.22	28650.00	86100.00	57450.00	2.01
8.	P_2O_5 10kg/ha + VAM	11.30	28135.00	56500.00	28365.00	1.01
9.	P_2O_5 20kg/ha + VAM	11.11	28760.00	55550.00	26790.00	0.93
10.	P_2O_5 30kg/ha + VAM	10.93	29385.00	54650.00	25265.00	0.86

Table 74: Performance of different grain amaranth varieties at Hyderabad

S. No.	Variety Name	Days to 50% flowering	Days 80% maturity	Plant height (cm)	Leaf Length (cm)	Leaf Width(cm)	Petiole length(cm)	Lateral spikelet length (cm)	Inflorescence length (cm)	Grain yield (q/ha)	Seed volume (g/10ml)
1	Annapurna	47.33	92.67	78.44	12.31	7.08	8.82	28.55	50.11	6.48	5.17
2	Durga	46.67	88.67	187.77	23.90	14.75	16.66	28.11	55.22	14.27	4.83
3	GA-1	52.00	96.33	176.88	20.94	9.57	14.38	26.88	79.11	4.65	4.33
4	GA-2	50.00	95.67	200.11	23.30	11.05	13.92	29.44	85.77	5.57	4.83
5	GA-3	49.67	96.00	184.33	19.77	9.97	12.86	34.89	83.22	13.23	4.67
6	Kapilasa	49.67	89.33	185.77	22.79	13.49	14.28	30.88	61.22	12.92	4.33
7	KBGA-1	46.33	92.00	179.77	18.60	9.40	10.50	41.67	72.55	12.21	4.67
8	KBGA-4	45.00	82.33	170.11	19.45	10.37	12.32	31.89	75.11	10.78	4.83
9	PRA-2	47.33	92.00	77.66	10.33	6.38	7.20	32.28	50.44	9.16	4.67
10	PRA-3	47.00	84.00	83.44	11.44	6.16	7.26	29.89	58.99	3.33	4.83
11	RMA-4	54.00	95.33	185.00	20.34	10.06	13.33	28.22	79.11	7.39	4.50
12	RMA-7	49.33	90.00	212.44	20.93	9.14	11.53	32.77	83.66	6.73	4.67
13	Suvadra	46.33	80.67	194.44	20.41	10.09	11.70	27.89	73.55	15.90	4.33
14	Suvarna	47.67	96.00	208.11	22.16	14.31	14.56	25.99	54.00	11.14	4.50
15	VL Chua 44	51.00	94.67	169.22	19.70	10.42	12.81	25.22	62.44	9.74	4.67
	Mean	**48.62**	**91.04**	**166.23**	**19.09**	**10.15**	**12.14**	**30.30**	**68.30**	**9.57**	**4.66**
	CD (0.05)	**4.35**	**4.84**	**25.87**	**3.86**	**2.54**	**3.23**	**8.34**	**16.93**	**2.01**	**0.67**
	CV(%) Error	**5.35**	**3.18**	**9.30**	**12.10**	**14.98**	**15.90**	**16.46**	**14.82**	**12.54**	**8.60**

Table 75. Response of promising genotypes (AVT- II entries) of buckwheat to different levels of management at Cooch Behar.

S.No.	Treatments	Plant height (cm)	No. of primary branches per plant	No. of secondary branches per plant	Seed yield (q/ha)	Test weight (g)
A	**Interaction**					
1	V1M1	73.00	2.44	4.00	9.58	36.07
2	V1M2	89.00	3.56	5.78	13.75	39.40
3	V1M3	96.67	3.22	5.11	14.56	39.03
4	V1M4	96.00	2.89	4.78	14.73	36.90
5	V2M1	78.00	2.56	4.22	9.74	36.67
6	V2M2	86.00	3.33	5.78	14.48	40.30
7	V2M3	101.67	3.11	5.44	14.42	39.80
8	V2M4	98.33	2.67	4.89	13.52	38.47
9	V3M1	72.33	2.22	3.56	9.42	34.70
10	V3M2	94.00	2.67	5.44	13.79	36.13
11	V3M3	96.33	2.78	5.11	13.74	36.60
12	V3M4	95.33	2.56	4.78	12.96	35.33
	Mean	**89.72**	**2.83**	**4.91**	**12.89**	**37.45**
	Factor(B)at same level of A					
	CD	NS	NS	NS	NS	NS
	Factor(A)at same level of B					
	CD (0.05)	NS	NS	NS	NS	NS
B	**Genotypes (G)**					
	Hinpriya	88.67	3.03	4.92	13.16	37.85
	PRB 1	91.00	2.92	5.08	13.04	38.81
	IC 341589	89.50	2.56	4.72	12.48	35.69
	CD (0.05)	NS	0.11	NS	NS	1.52
C	**Fertilizer**					
1	Control	74.44	2.41	3.93	9.58	35.81
2	50% RDF + one irrigation	89.67	3.19	5.67	14.01	38.61
3	75% RDF + two irrigations	98.22	3.04	5.22	14.24	38.48
4	100%RDF + three irrigations	96.56	2.70	4.81	13.74	36.90
	CD (0.05)	7.28	0.35	0.22	0.75	1.19

4.2 Crop Protection

Experiments on screening of germplasm, IVT, AVT-I and AVT-II of grain amaranth, faba bean and quinoa against major insect-pests and diseases were formulated at 5 different locations *i.e.* Ludhiana, Hisar, Bengaluru, Bhubaneswar and S.K. Nagar during 2019-20. The report was received from 4 locations *i.e.* Bengaluru, Ludhiana, Bhubaneswar and S.K. Nagar.

4.2.1 Screening of germplasm, IVT, AVT-I and AVT-II of grain amaranth, faba bean and quinoa against major insect pests and diseases

This experiment was planned in order to identify the source of resistance in IVT, AVT and germplasm entries against major insect pests and diseases of grain amaranth, faba bean and quinoa at different locations.

4.2.1.1 Faba bean

Diseases

At Ludhiana, a total 63 genotypes including germplasm accessions, initial and advanced varietal trial entries of faba bean along with 4 checks were evaluated against chocolate leaf spot (CLS) disease. In case of IVT, out of 18 entries, 3 entries namely HB 15-04, HB 15-34 and HB 15-55 showed moderate resistance reaction to chocolate leaf spot disease while remaining 15 entries were found susceptible to highly susceptible to chocolate leaf spot disease (Table 76). However, under AVT-I and AVT-II all 9 entries were found susceptible to highly susceptible to chocolate leaf spot disease (Table 77). Thirty five faba bean germplasm successions were evaluated against chocolate leaf spot disease. Out of 36 germplasm accessions, 25 accessions *viz*., ET218698, ET218704, ET218712, ET218713, ET218720, ET218725, ET218734, ET218736, ET218738, ET218741, ET218743, ET218747, ET218757, ET218759, ET218764, ET218765, ET218767, ET218768, ET218769, ET218772, ET218773, ET218776, ET218778, ET218781 and ET218786 showed moderate resistance reaction to chocolate leaf spot disease while remaining 10 accessions were found susceptible (Table 78).

At Hisar, 11 AVT-I and II genotypes including 2 checks were screened for their relative resistance to Alternaria leaf blight and root rot diseases under natural field conditions during Rabi 2019-20. None of the genotype was found resistance to Alternaria leaf blight, however only one genotype namely HFB-1 showed resistance reaction (0-5% disease incidence) against root rot disease. Two genotype i.e. HB-14-21, HFB-1 HB 13-38 showed moderately resistance reaction to Alternaria leaf blight. On the other side seven genotypes namely HB 15-07, HB 15-17, NDFB-17-1, HB-14-21, NDF-13-2, NDFB-16-3 and Vikrant showed moderate resistance reaction (6-15% disease incidence) against root rot disease (Table 79).

4.2.1.2 Grain amaranth

Insect pests

At S.K. Nagar, during Rabi 2019-20, no incidence of any insect pests was observed in grain amaranth during the entire crop period. At Bhubaneswar, 20 IVT entries, 3 AVT-I entries and 5 AVT-II entries were evaluated against defoliator (leaf weber) and sucking (aphid and

jassid) insect pests. The results showed that 5 IVT entries (IC 93941, IC 35541, IC 35623, RMA 10 and BGA 7) and 1 AVT-I entry *i.e.* SKNA 1407 were found tolerant to leaf weber (defoliator) insect (Table 80). The results of screening against sucking insect pests (aphid/jassids) indicate that 4 IVT entries *i.e.* (IC 95290, IC 35548, IC 35623 and RGA 19) and 2 AVT-II entries namely RGA 17 and SKNA 1406 were found tolerant (Table 81).

Diseases

At S.K. Nagar, during Rabi 2019-20, no incidence of any diseases was observed in grain amaranth during the entire crop period. At Bhubaneswar, 20 IVT entries, 3 AVT-I entries and 5 AVT-II entries were evaluated against wilt disease of grain amaranth. The screening result indicates that 5 IVT entries i.e. (IC 95290, IC 35547, RMA 10, BGA 16 and SKNA 1508), 1 AVT-I entry namely SKGPA155 and 2 AVT-II entries i.e. (BGA 4 and BGA 9) were found tolerant to wilt disease (Table 82).

4.2.1.3 *Chenopodium quinoa*

Insect pests

This experiment was conducted in order to identify the source of resistance in germplasm accessions, initial and advanced varietal trial entries of quinoa against major insect pests and diseases at Ludhiana, S.K. Nagar and Bengaluru. The data on insect pests received from Bengaluru centre. At Bengaluru, 13 AVT-II entries along with 2 checks were evaluated against sucking insect pests like leaf hoppers, thrips, aphids, whiteflies, and pentatomid bugs along with leaf eating caterpillars like *Spodoptera*. Out of these 13 AVT-II entries, 5 entries *i.e.*IC411825, EC507738, EC507740, EC507744 and EC507747 harbor less number of insect species *i.e.* leaf hoppers, thrips, aphids, whiteflies, pentatomid bug and leaf eating caterpillars with little population hence seems to be promising. Twenty nine germplasm accessions along with 5 checks were also evaluated at Bengaluru against major insect pests. Out of these 29 germplasm accessions,8 germplasm accessions namely EC896062, EC896090, EC896100, EC896120, EC896206, EC896207, EC896059 and EC896237harbor less number of insect speciesspecies *i.e.* leaf hoppers, thrips, aphids, whiteflies, pentatomid bug and leaf eating caterpillars with little population hence seems to be promising (Table 83).

Table 76: Screening of IVT entries of fababean against Chocolate leaf spot disease at PAU, Ludhiana during *Rabi* 2019-20 under natural conditions

S.No.	Accession No.	Chocolate leaf spot disease score (1-9)*			
		R1	R2	R3	Mean score and disease reaction
1.	DFS 18-01	9	8	9	8.67 (HS)
2.	DFS 18-05	9	7	8	8.00 (HS)
3.	DFS 18-07	6	6	5	5.67 (S)
4.	DFS 18-08	7	8	8	7.67 (HS)
5.	DFS 18-09	5	5	6	5.33 (S)
6.	DFS 18-11	7	7	7	7.00 (S)
7.	DFS 18-14	8	7	7	7.33 (HS)
8.	DFS 18-17	7	7	8	7.33 (HS)
9.	DFS 18-18	7	7	7	7.00 (S)
10.	DFS 18-20	6	6	7	6.33 (S)

S.No.	Accession No.	Chocolate leaf spot disease score (1-9)*			
		R1	R2	R3	Mean score and disease reaction
11.	DFS 18-21	7	6	6	6.33 (S)
12.	HB 15-04	5	5	4	4.67 (MR)
13.	HB 15-14	7	7	6	6.67 (S)
14.	HB 15-21	6	5	5	5.33 (S)
15.	HB 15-34	5	5	5	5.00 (MR)
16.	HB 15-41	7	6	7	6.67 (S)
17.	HB 15-51	6	6	5	5.67 (S)
18.	HB 15-55	4	5	5	4.67 (MR)
19.	VIKRANT (C)	5	5	6	5.33 (S)
20.	HFB 1 (C)	7	7	8	7.33 (HS)
21.	SHAMBAT-75 (C)	7	8	7	7.33 (HS)
22.	REBAYA-40 (C)	8	8	9	8.33 (S)

MR-Moderately resistant, S-Susceptible, HS-Highly susceptible
***Disease rating scale (1-9) developed by ICARDA (1986) for chocolate leaf spot disease of faba bean**

Grade	Disease intensity	Reaction
1.0	No disease visible on any plant	Highly resistant
1.1-3.0	Lesions visible on less than 10% of the plants, no stem girdling	Resistant
3.1-5.0	Lesions visible on up to 25% plants, stem girdling on less than 10% plants but little damage	Moderately resistant
5.1-7.0	Lesions present on most of the plants, stem girdling on 50% of plants	Susceptible
7.1-9.0	Lesions profuse on plants, stem girdling present in more than 50% plants	Highly susceptible

Table 77: Screening of AVT-Iand II entries of fababean against Chocolate leaf spot disease at PAU, Ludhiana during *Rabi* 2019-20 under natural conditions

S.No.	Accession No.	Chocolate leaf spot disease score (1-9)			
		R1	R2	R3	Mean score and disease reaction
1.	HB 13-11	7	8	6	7.00 (S)
2.	HB 13-38	7	8	7	7.33 (HS)
3.	HB 15-07	6	6	7	6.33 (S)
4.	HB 15-17	6	5	5	5.33 (S)
5.	NDFB 17-1	7	8	8	7.67 (HS)
6.	HB 14-18	6	6	5	5.67 (S)
7.	HB 14-21	7	8	7	7.33 (HS)
8.	NDFB 13-2	7	6	6	6.33 (S)
9.	NDFB 16-3	5	5	6	5.33 (S)
10.	VIKRANT (ch)	7	7	8	7.33 (HS)
11.	HFB 1 (Ch)	8	9	8	8.33 (HS)

S-Susceptible, HS-Highly susceptible

Table 78: Screening of faba bean germplasm accessions against Chocolate leaf spot disease at PAU, Ludhiana during *rabi* 2019-20 under natural conditions.

S.No.	Entries	Disease score (1-9) & disease reaction	S.No.	Entries	Disease score (1-9) & disease reaction
1.	ET218698	5.0 (MR)	22.	ET218765	5.0 (MR)
2.	ET218702	6.0 (S)	23.	ET218766	6.0 (S)
3.	ET218704	5.0 (MR)	24.	ET218767	5.0 (MR)
4.	ET218712	5.0 (MR)	25.	ET218768	5.0 (MR)
5.	ET218713	5.0 (MR)	26.	ET218769	5.0 (MR)
6.	ET218719	6.0 (S)	27.	ET218770	6.0 (S)
7.	ET218720	5.0 (MR)	28.	ET218772	5.0 (MR)
8.	ET218725	5.0 (MR)	29.	ET218773	5.0 (MR)
9.	ET218733	6.0 (S)	30.	ET218775	6.0 (S)
10.	ET218734	5.0 (MR)	31.	ET218776	5.0 (MR)
11.	ET218736	5.0 (MR)	32.	ET218778	5.0 (MR)
12.	ET218738	5.0 (MR)	33.	ET218781	5.0 (MR)
13.	ET218739	6.0 (S)	34.	ET218783	6.0 (S)
14.	ET218741	5.0 (MR)	35.	ET218786	5.0 (MR)
15.	ET218743	5.0 (MR)		HFB-1 (C)	6.2 (S)
16.	ET218745	6.0 (S)		GIZA-4 (C)	5.6 (S)
17.	ET218747	5.0 (MR)		VIKRANT (C)	6.4 (S)
18.	ET218757	5.0 (MR)		REBAYA 40 (C)	6.4 (S)
19.	ET218759	5.0 (MR)			
20.	ET218763	6.0 (S)			
21.	ET218764	5.0 (MR)			

MR-Moderately resistant, S-Susceptible

Table 79: Screening of faba bean AVT-I and AVT-II genotypes against Alternaria leaf blight and root rot disease at Hisar during Rabi 2019-20

Disease reaction (Alternaria leaf blight	Genotypes	Disease reaction (Root rot)	Genotypes
0-5% (HR)	Nil	0.5% (R) (1)	HFB-1
6-10% (R)	Nil	6-15% (MR) (7)	HB 15-07, HB 15-17, NDFB-17-1, HB-14-21, NDF-13-2, NDFB-16-3, Vikrant
11-20% (MR) (2)	HB-14-21, HFB-1	16-25% (S) (3)	HB-13-11, HB 13-38, HB-14-18
21-30% (MS) (2)	HB 13-38, HB 15-17	>25% (HS)	Nil
31-50% (S) (6)	HB-13-11, HB 15-07, HB-14-18, NDF-13-2, NDFB-16-3, Vikrant		
>50% (HS) (1)	NDFB-17-1		

R- Resistant, MR-Moderately resistant, S-Susceptible, HS-Highly susceptible

Disease scale adopted for *Alternaria* blight and Root rot incidence

Disease score	Disease severity (%) (*Alternaria* blight)	Disease Reaction	Disease incidence (%) (Root rot)	Disease Reaction
1	0-5	HR	0-5	R
2	6-10	R	6-15	MR
3	11-20	MR	16-25	S
4	21-30	MS	>25	HS
5	31-50	S		
6	>50	HS		

Table 80: Screening of IVT, AVT-1 and AVT-II entries of grain amaranth against defoliator (leaf weber) insect at Bhubaneswar during *Rabi* 2019-20 under natural conditions

S.No.	Accession No.	Number of leaf weber per plant			
		R1	R2	R3	Mean
IVT Early					
1.	IC 35621	12.4.	10.80	12.60	11.93
2.	IC 93941	10.20	9.00	9.40	9.54
3.	IC 95290	15.00	13.60	13.20	13.93
4.	IC 35541	11.20	10.00	11.60	10.93
IVT Normal					
5.	IC 21923	10.40	11.60	15.60	12.53
6.	IC 35542	12.20	13.80	13.80	13.27
7.	IC 35546	11.60	12.20	12.60	12.13
8.	IC 35547	12.40	11.60	12.60	12.20
9.	IC 35548	12.80	13.40	13.80	13.33
10	IC 35622	12.40	14.20	14.40	14.67
11.	IC 35623	10.80	11.00	10.80	10.87
12.	IC 35624	12.80	14.40	14.00	13.73
13.	RMA 9	14.00	13.20	13.60	13.60
14.	RMA 10	12.00	10.60	10.20	10.93
15.	RMA 62	12.40	15.40	10.80	14.20
16.	RGA 19	14.60	10.00	10.00	11.53
17.	BGA 7	10.00	12.40	12.80	11.73
18.	BGA 16	12.80	13.00	12.80	12.87
19.	SKNA 1503	13.20	13.80	13.80	13.27
20.	SKNA 1508	14.00	12.80	13.40	13.40
AVT-I					
21.	SKNA 1407	10.00	10.80	11.40	10.73
22.	SKGPA 150	11.60	11.20	11.00	11.27
23.	SKGPA 155	11.80	11.40	10.60	11.27
AVT-II					
24.	BGA 4	16.60	13.40	14.60	14.87
25.	BGA 7-1 (E)	13.80	12.60	12.20	12.87
26.	BGA 9	14.20	14.60	13.40	14.07
27.	RGA 17	12.60	13.60	12.40	12.87
28.	SKNA 1406	13.00	13.20	13.00	13.07
	GA 2 (C)	15.60	13.60	14.20	14.47
	Suvarna (C)	11.80	13.20	11.60	12.20
	BGA 2 (C)	10.20	10.60	10.60	10.47

	RMA 7 (C)	13.20	13.60	14.20	13.67
	Mean	**12.64**	**12.43**	**12.66**	**12.58**
	SEM(±)				**060**
	CD(0.05)				**1.69**
	CV(%) error				**8.24**

Table 81: Screening of IVT, AVT-1 and AVT-II entries of grain amaranth against sucking insects (jassids/aphids) at Bhubaneswar during *Rabi* 2019-20 under natural conditions

S.No.	Accession No.	Number of sucking insects (jassids/aphids) per plant			
		R1	R2	R3	Mean
IVT Early					
1.	IC 35621	22.47	17.33	17.80	19.20
2.	IC 93941	21.07	20.60	20.00	20.56
3.	IC 95290	14.93	11.00	11.00	12.31
4.	IC 35541	20.00	20.67	21.27	20.64
IVT Normal					
5.	IC 21923	17.93	18.73	17.80	18.16
6.	IC 35542	17.67	18.87	18.27	18.27
7.	IC 35546	21.20	17.40	17.00	18.53
8.	IC 35547	14.67	14.73	15.60	15.00
9.	IC 35548	13.27	13.07	13.53	13.29
10	IC 35622	15.20	16.27	17.27	16.24
11.	IC 35623	13.33	13.93	14.60	13.96
12.	IC 35624	16.87	16.07	16.47	16.47
13.	RMA 9	18.00	15.47	17.73	17.07
14.	RMA 10	14.67	16.53	17.73	16.31
15.	RMA 62	16.30	19.00	17.40	17.57
16.	RGA 19	12.47	12.60	13.53	12.87
17.	BGA 7	16.87	17.07	15.87	16.60
18.	BGA 16	16.47	15.87	14.40	15.58
19.	SKNA 1503	16.83	12.80	13.73	14.46
20.	SKNA 1508	17.60	14.73	13.67	15.33
AVT-I					
21.	SKNA 1407	17.20	14.60	14.27	15.36
22.	SKGPA 150	16.33	15.20	13.73	15.09
23.	SKGPA 155	17.87	17.60	16.27	17.24
AVT-II					
24.	BGA 4	17.87	17.27	15.73	16.96
25.	BGA 7-1 (E)	16.80	17.80	16.80	17.13
26.	BGA 9	17.27	18.23	18.40	17.97
27.	RGA 17	14.80	9.07	10.20	11.36
28.	SKNA 1406	12.67	10.87	9.93	11.16
	GA 2 (C)	17.27	17.33	18.00	17.53
	Suvarna (C)	15.00	10.93	11.93	12.62
	BGA 2 (C)	22.00	15.87	15.00	17.62
	RMA 7 (C)	14.80	13.67	14.27	14.24
	Mean	**16.80**	**15.66**	**15.60**	**16.02**
	SEM(±)				**0.81**
	CD(0.05)				**2.30**
	CV (%)				**8.79**

Table 82: Screening of IVT, AVT-1 and AVT-II entries of grain amaranth against wilt disease at Bhubaneswar during *Rabi* 2019-20 under natural conditions.

S.No.	Accession No.	Per cent disease index			
		R1	R2	R3	Mean
IVT Early					
1.	IC 35621	2.69	3.08	2.50	2.76
2.	IC 93941	2.92	1.92	2.80	2.55
3.	IC 95290	1.92	1.92	2.40	2.08
4.	IC 35541	3.18	3.20	2.50	2.96
IVT Normal					
5.	IC 21923	2.50	2.80	3.04	2.78
6.	IC 35542	3.27	2.69	2.92	2.96
7.	IC 35546	2.69	3.20	2.61	2.83
8.	IC 35547	2.08	1.92	2.17	2.06
9.	IC 35548	3.08	2.69	3.04	2.94
10	IC 35622	3.54	3.20	3.48	3.41
11.	IC 35623	3.33	2.69	2.80	2.94
12.	IC 35624	3.33	2.69	3.08	3.03
13.	RMA 9	2.50	3.33	2.31	2.71
14.	RMA 10	2.08	2.31	2.50	2.30
15.	RMA 62	1.92	2.31	3.04	2.42
16.	RGA 19	2.31	2.31	2.92	2.51
17.	BGA 7	2.69	2.69	3.33	2.91
18.	BGA 16	2.00	2.08	2.08	2.06
19.	SKNA 1503	2.40	2.50	2.92	2.61
20.	SKNA 1508	2.08	2.00	2.50	2.19
AVT-I					
21.	SKNA 1407	3.46	3.20	3.48	3.38
22.	SKGPA 150	2.69	3.48	2.50	2.89
23.	SKGPA 155	1.92	2.50	2.50	2.31
AVT-II					
24.	BGA 4	1.92	2.50	2.17	2.20
25.	BGA 7-1 (E)	3.20	2.31	3.04	2.85
26.	BGA 9	2.31	2.08	2.61	2.33
27.	RGA 17	2.69	2.00	2.92	2.54
28.	SKNA 1406	3.60	2.92	2.61	3.04
	GA 2 (C)	2.08	2.40	2.50	2.33
	Suvarna (C)	2.31	2.40	2.61	2.44
	BGA 2 (C)	2.00	2.61	2.61	2.41
	RMA 7 (C)	2.31	2.92	2.61	2.61
	Mean	**2.59**	**2.59**	**2.72**	**2.64**
	SEM(±)				**0.20**
	CD(0.05)				**0.56**
	CV(%)				**11.01**

Table 83: Evaluation of Quinoa germplasm against major insect pests during *Rabi* 2019-20

S. No	Name of the germplasm	Number of insect pests per plant					
		Leaf hoppers	Thrips	Aphids	White flies	Pentatomid bugs	Leaf eating caterpillars (Spodoptera)
1	EC896062	0	0	0	0	2	2
2	EC896063	2	0	0	2	0	2
3	EC896064	3	2	5	1	0	0
4	EC896087	3	0	5	0	0	0
5	EC896088	3	0	0	0	1	0
6	EC896089	0	3	3	0	0	1
7	EC896090	1	0	0	0	0	0
8	EC896097	0	1	5	3	0	0
9	EC896100	0	0	3	0	0	0
10	EC896105	4	0	0	1	0	2
11	EC896108	0	3	3	0	2	0
12	EC896115	3	0	4	1	0	1
13	EC896120	0	2	0	1	0	1
14	EC896206	1	0	0	0	0	1
15	EC896207	2	1	0	0	0	0
16	EC896212	1	0	4	0	0	0
17	EC896264	1	2	4	0	1	0
18	EC896275	3	0	3	0	0	1
20	EC896276	2	0	0	2	0	1
21	EC896218	2	2	5	0	0	0
22	EC896219	3	2	5	2	1	1
23	EC896238	2	0	0	3	0	0
24	EC896109	3	0	4	1	0	0
25	EC896059	0	2	0	0	1	1
26	EC896205	0	0	4	0	1	0
27	EC896215	3	1	0	0	0	0
28	EC896237	2	0	0	0	0	1
29	EC896233	1	0	2	1	1	0
	EC507738 (C)	**2**	**0**	**5**	**2**	**0**	**1**
	SSQ-1 (C)	**2**	**0**	**4**	**3**	**0**	**0**
	GKVK-1 (W) C	**0**	**0**	**4**	**3**	**1**	**0**
	GKVK-2 (R) C	**2**	**3**	**5**	**2**	**1**	**0**
	EC507741 (C)	**3**	**2**	**5**	**2**	**1**	**0**

QUALITY ANALYSIS

V. QUALITY ANALYSIS

The seed of promising genotypes evaluated in IVT, AVT and germplasm evaluation of the three potential crops, namely, grain amaranth, faba bean and *Chenopodium quinoa.* Seeds of grain amaranth and quinoa were supplied by S.K. Nagar centre and analyzed at New Delhi centre whereas faba bean trials were conducted as well as analyzed at Hisar centre. The crop-wise details of quality traits are given below:

5.1 GRAIN AMARANTH

5.1.1 IVT Normal Sowing, IVT Early Sowing, AVT-I, AVT-II and Germplasm Rabi 2019-20: Plain

Entries from different trials including IVT Normal Sowing (22 entries), IVT Early sowing (4 entries), AVT-I (3 entries) and AVT-II (5 entries) and germplasm (50 entries) along with four checks were analyzed for oil and protein content. The summary performance of various entries in respect of different quality parameters as compared to check varieties has been given in Table 83.

Among IVT Normal Sowing entries, the highest protein content was found in entry BGA-16 (13.83%) followed by RGA-23 (13.21%) in comparison to best check GA-2 (11.73%). Entry IC35546 had highest oil content among the entries with 9.73% followed by RGA-23 (8.8%) in comparison to check GA-2 (8.42%). Under IVT Early sowing trial, two entries, namely IC35621 (14.22 and 9.6%) and IC93941 (13.07 and 9.83%) had higher as well oil content in comparison to best check BGA-2 (12.86 and 8.95%). Among AVT-I entries, two entries SKGPA150 (13.81%) and SKGPA155 (13.69%) had higher protein content than check BGA-2 (12.95%). In case of germplasm trial, IC255482 had highest protein content with (16.44%, whereas, IC506529 had highest oil content with 9.53% as shown in Table 83.
Statistical parameters for all the characters of different trials have been presented in Table 84 - 88.

5.2 FABA BEAN

5.2.1 IVT, AVT-I & II and Germplasm Rabi 2019-20: Plain

In this trial, IVT (18 entries), AVT-I (5 entries), AVT-II (4 entries) and germplasm (35 entries) along with two check in varietal trials and four checks in germplasm trial were analysed for quality traits. The summary performance of various entries in respect of different quality parameters as compared to check varieties has been given in Table 89.

Three IVT entries HB 15-51 (27.69%), HB 15-41 (26.87%), DFS 18-11 (26.63%) had higher protein content than best check Vikrant (26.38%), AVT-II entry NDFB 13-02 had27.50% protein content. The germplasm line ET218775 had lowest Vicine-convicine content (0.30%). IVT entries DFS 18-14 (0.14%) and DFS 18-20 (0.14%) were found superior to check variety HFB-1 (0.15%) for phenol content. Statistical parameters for all the characters of different trials have been presented in Table 90 - 92.

5.3 CHENOPOD (*Chenopodium quinoa*)

5.3.1 AVT-II Rabi 2019-20: Plain

In this trial, AVT-II (13 entries) were analyzed for protein and oil content. The summary performance of various entries in respect of different quality parameters as compared to check varieties has been given in Table 93.

The entry IC411825 had highest protein content (15.64%) followed by entry EC507744 (14.91%) in comparison to overall mean value 14.15%. Entry EC507741 had highest oil content (9.23%) in comparison to overall mean value 8.92%. Statistical parameters for all the characters of different trials have been presented in Table 94.

Table 83: Promising genotypes in Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Trial	Range		Promising lines	Value of best check
		Min.	Max.		
A	**Protein (%) (Range 8.93-16.44)**				
1	IVT-N	8.93	13.83	BGA-16 (13.83), RGA-23 (13.21), CGA-18-1 (12.95), IC35623 (12.86), IC21923 (12.78), IC35542 (12.6), RGA-22 (12.16), SKNA1503 (11.99), SKNA1508 (11.81), RGA-21 (11.73)	GA-2 (11.73)
2	IVT-E	10.77	14.22	IC35621 (14.22), IC93941 (13.07)	BGA-2 (12.86)
3	AVT-I	12.36	13.81	SKGPA150 (13.81), SKGPA155 (13.69)	BGA-2 (12.95)
4	AVT-II	11.55	13.48	BGA 9 (13.48), RGA17 (13.39)	BGA-2 (12.93)
5	Germplasm	11.01	16.44	IC255482 (16.44), IC255481 (16.12), IC506528 (15.96), IC265980 (15.96), IC279652 (15.96), IC279413 (15.48), IC506545 (15.32), IC279631 (15.16), IC556604 (15.16), IC444099 (15), IC506612 (15), IC524215 (14.84), IC506575 (14.68), IC279512 (14.68)	GA-2 (13.41)
B	**Oil (%) (Range 7.30-9.83)**				
1	IVT-N	7.30	9.73	IC35546 (9.73), RGA-23 (8.8), CGA-18-1 (8.79), IC35542 (8.59), RGA-21 (8.56), BGA-16 (8.54), IC35622 (8.49)	GA-2 (8.42)
2	IVT-E	7.32	9.83	IC93941 (9.83), IC35621 (9.6)	BGA-2 (8.95)
3	AVT-I	8.18	8.94	-	GA-2 (8.94)
4	AVT-II	8.36	9.14	RGA17 (9.14)	GA-2 (8.8)
5	Germplasm	7.23	9.53	IC506529 (9.53), IC255419 (9.45), IC255481 (9.44), IC506605 (9.4), IC506514 (9.4), IC268885 (9.36), IC255428 (9.31), IC362257 (9.3), IC506611 (9.29), IC279567 (9.24), IC506535 (9.23), IC279807 (9.19), IC341452 (9.19), IC255555 (9.17), IC506531 (9.16)	BGA-2 (7.91)

Table 84: IVT Normal Sowing of Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Accession No.	Protein (%)	Oil (%)
1	IC21923	12.78	8.10
2	IC35542	12.60	8.59
3	IC35546	9.45	9.73
4	IC35547	10.94	7.70
5	IC35548	11.73	8.03
6	IC35622	10.94	8.49
7	IC35623	12.86	8.28
8	IC35624	11.20	7.69
9	RMA-9	11.73	7.45
10	RMA-10	9.98	7.85
11	RMA-62	11.38	7.89
12	CGA-18-1	12.95	8.79
13	SKNA1503	11.99	7.51
14	SKNA1508	11.81	7.85
15	BGA-7	10.85	7.58
16	BGA-16	13.83	8.54
17	RGA-19	11.46	7.47
18	RGA-20	8.93	7.45
19	RGA-21	11.73	8.56

S.No.	Accession No.	Protein (%)	Oil (%)
20	RGA-22	12.16	7.46
21	RGA-23	13.21	8.80
22	RGA-24	11.64	7.51
Mean for check variety			
1	BGA-2	10.50	7.95
2	GA-2 ©	11.73	8.42
3	RMA-7	10.33	7.30
4	Suvarna	10.50	8.15
	Minimum	**8.93**	**7.30**
	Maximum	**13.83**	**9.73**
	Mean	**11.51**	**8.04**
	CD (0.05)	**0.44**	**0.14**
	CV (%) Error	**1.85**	**0.83**
	CV (%) Phen.	**10.11**	**7.14**

Table 85: IVT Early Sowing of Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Accession No.	Protein %	Oil%
1	IC35621	14.22	9.60
2	IC93941	13.07	9.83
3	IC95290	10.77	7.73
4	IC35541	11.42	7.72
Mean for check variety			
1	Annapurna	12.64	8.31
2	BGA-2	12.86	8.95
3	GA-2	11.85	8.16
4	RMA-7	11.35	7.32
5	Suvarna	11.20	8.48
	Minimum	**10.77**	**7.32**
	Maximum	**14.22**	**9.83**
	Mean	**12.15**	**8.46**
	CD (0.05)	**0.33**	**0.39**
	CV (%) Error	**1.21**	**2.05**
	CV (%) Phen.	**9.17**	**10.17**

Table 86: AVT-I of Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Accession No.	Protein %	Oil%
1	SKNA1407	12.51	8.25
2	SKGPA150	13.81	8.48
3	SKGPA155	13.69	8.30
Mean for check variety			
1	BGA-2	12.95	8.48
2	GA-2	12.69	8.94
3	RMA-7	12.36	8.18
4	Suvarna	12.78	8.42
	Minimum	**12.36**	**8.18**
	Maximum	**13.81**	**8.94**
	Mean	**12.97**	**8.44**
	CD (0.05)	**0.37**	**0.10**
	CV (%) Error	**1.20**	**0.48**
	CV (%) Phen.	**4.35**	**2.99**

Table 87: AVT-II of Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Accession No.	Protein %	Oil%
1	BGA 4	11.55	8.61
2	BGA-7-1	12.86	8.55
3	BGA 9	13.48	8.68
4	RGA17	13.39	9.14
5	SKNA1406	11.64	8.67
Mean for check variety			
1	BGA-2	12.93	8.76
2	GA-2	12.45	8.80
3	RMA-7	12.68	8.36
4	Suvarna	12.08	8.55
	Minimum	**11.55**	**8.36**
	Maximum	**13.48**	**9.14**
	Mean	**12.56**	**8.68**
	CD (0.05)	**0.31**	**0.22**
	CV (%) Error	**1.10**	**1.13**
	CV (%) Phen.	**5.55**	**2.50**

Table 88: Germplasm lines of Grain Amaranth Rabi 2019-20 (Plain).

S.No.	Accession No.	Protein %	Oil%
1	IC265980	15.96	8.95
2	IC266778	12.77	8.71
3	IC266812	14.04	8.83
4	IC524215	14.84	8.80
5	IC279807	11.01	9.19
6	IC279363	14.20	8.56
7	IC279413	15.48	8.79
8	IC279462	14.52	8.70
9	IC279511	13.25	9.03
10	IC279512	14.68	8.93
11	IC279567	13.09	9.24
12	IC279612	13.57	9.05
13	IC279631	15.16	8.88
14	IC279652	15.96	8.66
15	IC279670	13.73	8.68
16	IC279760	13.09	8.56
17	IC279832	14.52	8.79
18	IC444099	15.00	8.67
19	IC444100	13.25	8.60
20	IC444105	12.93	7.23
22	IC556604	15.16	8.92
23	IC506605	14.20	9.40
24	IC506611	13.57	9.29
25	IC506612	15.00	8.90
26	IC506545	15.32	8.98
26	IC506545	15.32	8.98
27	IC506514	13.41	9.40
28	IC506519	11.97	8.02
29	IC506520	12.29	9.03
30	IC506521	13.73	9.09
31	IC506524	13.57	8.99
32	IC506528	15.96	9.12
33	IC506529	13.41	9.53
34	IC506531	12.45	9.16
35	IC506534	12.13	9.12
36	IC506535	12.93	9.23
37	IC506575	14.68	9.05

S.No.	Accession No.	Protein %	Oil%
38	IC506555	13.57	8.79
40	IC362257	14.52	9.30
41	IC341452	13.09	9.19
42	IC255428	13.57	9.31
43	IC255555	14.36	9.17
44	IC255419	13.09	9.45
45	IC255481	16.12	9.44
46	IC266835	14.20	8.01
47	IC268885	12.93	9.36
48	IC266937	12.77	8.97
49	IC255482	16.44	9.01
50	IC506573	13.25	9.07
Mean for check variety			
1	BGA-2	12.77	7.91
2	GA-2	13.41	7.71
3	RMA-7	13.41	7.80
4	Suvarna	12.77	7.80
	Minimum	**11.01**	**7.71**
	Maximum	**16.44**	**9.36**
	Mean	**13.87**	**8.41**
	CV (%) Phen.	**8.53**	**8.03**

Table 89: Promising genotypes in Faba bean Rabi 2019-20.

S. No.	Trial	Range		Promising lines	Value of best check
		Min.	Max.		
A	**Protein (%) (Range 21.89 - 27.69)**				
1	IVT	22.72	27.69	HB 15-51 (27.69), HB 15-41 (26.87), DFS 18-11 (26.63)	Vikrant (26.38)
2	AVT-I & II	23.67	27.50	NDFB 13-2 (27.5), NDFB 17-1 (27.03), HB 15-17 (26.86), HB 14-21 (26.69), HB 14-18 (26.31), NDFB 16-3 (25.98)	HFB-1 (25.34)
3	Germplasm	21.89	27.07	ET218768 (27.07)	Vikrant (26.89)
B	**Phenol (%) (Range 0.14 - 0.22)**				
1	IVT	0.14	0.20	DFS 18-14 (0.14), DFS 18-20 (0.14), DFS 18-8 (0.15)	HFB-1 (0.15)
2	AVT-I & II	0.15	0.22	HB 14-18 (0.15)	HFB-1 (0.17)
C	**Vicine-convicine (%) (Range 0.30 - 0.97)**				
1	IVT	0.61	0.88	DFS 18-5 (0.61), DFS 18-9 (0.63), DFS 18-14 (0.63), HB 15-14 (0.63)	Shambhat (0.65)
2	AVT-I & II	0.78	0.97	-	Vikrant (0.78)
3	Germplasm	0.30	0.95	ET218775 (0.3), ET218772 (0.39), ET218712 (0.44), ET218765 (0.45), ET218776 (0.46), ET218763 (0.5), ET218768 (0.52), ET218749 (0.52), ET218745 (0.53), ET218766 (0.55), ET218764 (0.57), ET218787 (0.6), ET218725 (0.6), ET218734 (0.63)	Giza (0.63)

Table 90: IVT of Faba bean Rabi 2019-20: Plain.

S.No	Accession No.	Protein (%)	Phenol (%)	Vicine-convicine (%)
1	DFS 18-1	22.72	0.17	0.86
2	DFS 18-5	25.16	0.15	0.61
3	DFS 18-7	25.99	0.19	0.66
4	DFS 18-8	25.60	0.15	0.76
5	DFS 18-9	23.74	0.18	0.63
6	DFS 18-11	26.63	0.19	0.68
7	DFS 18-14	24.93	0.14	0.63
8	DFS 18-17	25.38	0.18	0.76
9	DFS 18-18	24.36	0.19	0.76
10	DFS 18-20	24.33	0.14	0.66
11	DFS 18-21	24.14	0.16	0.77
12	HB 15-4	24.97	0.17	0.83
13	HB 15-14	23.66	0.16	0.63
14	HB 15-21	25.41	0.16	0.80
15	HB 15-34	25.63	0.20	0.79
16	HB 15-41	26.87	0.20	0.77
17	HB 15-51	27.69	0.16	0.76
18	HB 15-55	24.82	0.17	0.87
Mean for check variety				
1	HFB-1 (C)	25.74	0.15	0.69
2	Rebya (C)	24.98	0.19	0.68
3	Shambhat (C)	24.04	0.17	0.65
4	Vikrant (C)	26.38	0.16	0.88
	Minimum	**22.72**	**0.14**	**0.61**
	Maximum	**27.69**	**0.20**	**0.88**
	Mean	**25.14**	**0.17**	**0.73**
	CD (0.05)	**1.27**	**0.02**	**0.07**
	CV (%) Error	**3.07**	**7.01**	**5.47**
	CV (%) Phen.	**4.64**	**10.87**	**11.66**

Table 91: AVT-I & II of Faba bean Rabi 2019-20: Plain.

S.No.	Accession No.	% Protein	Phenol (%)	Vicine-convicine (%)
AVT-I				
1	HB 13-11	23.67	0.17	0.97
2	HB 13-38	26.06	0.19	0.96
3	HB 15-07	24.66	0.19	0.81
4	HB 15-17	26.86	0.19	0.90
5	NDFB 17-1	27.03	0.19	0.91
AVT-II				
6	HB 14-18	26.31	0.15	0.79
7	HB 14-21	26.69	0.22	0.87
8	NDFB 13-2	27.50	0.21	0.94
9	NDFB 16-3	25.98	0.22	0.88
Mean for check variety				
1	Vikrant (C)	24.64	0.18	0.78
2	HFB-1 (C)	25.34	0.17	0.87
	Minimum	**23.67**	**0.15**	**0.78**
	Maximum	**27.50**	**0.22**	**0.97**
	Mean	**25.89**	**0.19**	**0.88**
	CD (0.05)	**0.42**	**0.04**	**0.09**
	CV (%) Error	**0.95**	**13.15**	**6.30**
	CV (%) Phen.	**4.57**	**11.53**	**7.32**

Table 92: Germplasm lines of Faba bean Rabi 2019-20: Plain.

S.No.	Accession No.	% Protein	Vicine-convicine (%)
1	ET218702	25.59	0.71
2	ET218712	22.48	0.44
3	ET218713	23.76	0.67
4	ET218719	22.59	0.75
5	ET218720	23.99	0.74
6	ET218725	23.30	0.60
7	ET218733	24.96	0.64
8	ET218734	25.66	0.63
9	ET218736	24.54	0.63
10	ET218738	24.94	0.95
11	ET218739	24.26	0.64
12	ET218741	21.89	0.80
13	ET218743	22.87	0.73
14	ET218745	26.74	0.53
15	ET218747	23.43	0.74
16	ET218749	24.12	0.52
17	ET218751	23.43	0.74
18	ET218757	24.07	0.72
19	ET218763	23.79	0.50
20	ET218764	23.79	0.57
21	ET218765	23.95	0.45
22	ET218766	25.59	0.55
23	ET218767	23.57	0.82
24	ET218768	27.07	0.52
25	ET218770	24.18	0.78
26	ET218771	23.95	0.72
27	ET218772	24.94	0.39
28	ET218773	23.71	0.75
29	ET218775	26.25	0.30
30	ET218776	22.87	0.46
31	ET218778	25.38	0.71
32	ET218786	24.26	0.65
33	ET218787	24.26	0.60
34	ET218797	24.40	0.84
35	ET218798	23.13	0.82
Mean for check variety			
1	Gizza (C)	23.71	0.63
2	HFB-1 (C)	25.74	0.69
3	Rebya (C)	24.46	0.68
4	Vikrant (C)	26.89	0.79
	Minimum	**21.89**	**0.30**
	Maximum	**27.07**	**0.95**
	Mean	**24.32**	**0.65**
	CD (0.05)	**1.45**	**0.15**
	CV (%) Error	**2.94**	**11.08**
	CV (%) Phen.	**5.01**	**21.07**

Table 93: Promising genotypes in *Chenopodium quinoa* Rabi 2019-20.

S. No.	Characters	Range		Promising lines
		Min.	Max.	
1	Protein (%)	13.01	15.64	IC411825 (15.64), EC507744 (14.91), EC507740 (14.77), EC507741 (14.76)
2	Oil (%)	8.34	9.23	EC507741 (9.23), EC507738 (9.21), EC507742 (9.18), EC507749 (9.08)

Table 94: AVT II of *Chenopodium quinoa* Rabi 2019-20: Plain.

S.No.	Accession No.	Protein %	Oil%
1	EC507738	13.01	9.21
2	EC507739	13.89	8.93
3	EC507740	14.77	8.59
4	EC507741	14.76	9.23
5	EC507742	14.01	9.18
6	EC507743	13.01	8.83
7	EC507744	14.91	8.71
8	EC507746	13.81	9.06
9	EC507747	13.57	8.34
10	EC507748	13.65	9.06
11	EC507749	14.70	9.08
12	IC411824	14.26	8.85
13	IC411825	15.64	8.91
	Minimum	**13.01**	**8.34**
	Maximum	**15.64**	**9.23**
	Mean	**14.15**	**8.92**
	CD (0.05)	**0.23**	**0.07**
	CV (%) Error	**0.74**	**0.38**
	CV (%) Phen.	**5.50**	**2.91**

CENTRE REPORT

VI. Centre Report

6.1 AMBIKAPUR

Breeding Programme: 37crosses have been attempted in Faba bean and Grain amaranth crop during rabi 2019-20.

Faba bean: 22 crosses have been attempted in Faba bean crop during rabi 2019-20. List of Crosses attempt in faba bean are given below

1	Vikrant x HB 13-11	12	Rebya-40 x HB15-14
2	HFB-1 x HB 13-38	13	Rebya-40 x HB15-21
3	Rebya-40 x HB 15-07	14	Rebya-40 x HB 15-34
4	Shambat-75 x HB 15-17	15	Rebya-40 x HB 15-41
5	Vikrant x HB 14-18	16	Rebya-40 x HB 15-51
6	Vikrant x HB 14-21	17	Shambat-75 x BH 18-09
7	Vikrant x NDF 13-2	18	Shambat-75 x HB 18- 11
8	Vikrant x NDFD 16-3	19	Shambat-75 x HB 15-04
9	Vikrant x NDFD 17-1	20	Shambat-75 x BH 18-21
10	Vikrant x DFS 18-01	21	HFB-1 x DFS 18-18
11	Vikrant x DFS 18-05	22	HFB-1 x HB 15-55

Grain Amaranth: 15 fresh crosses were attempted at IGKV, Ambikapur during rabi 2019-20 using diverse genotypes from different centers. List of Crosses attempt in faba beanare are given below

1	SUVARNA x SKGPA 150	6	GA-2 x IC 35541	11	SUVARNA x RMA-67
2	GA-2 x SKGPA 155	7	BGA-2 x IC 35623	12	GA-2 x SKNA 1407
3	BGA-2 x SKNA 1406	8	SUVARNA x IC 35548	13	RMA-7 x IC 35547
4	RMA-7 x IC 356201	9	SUVARNA x IC 35547	14	BGA-2 x BGA-9
5	BGA-9 x IC 95290	10	GA-2 x IC 35546	15	SUVARNA x RGA -17

Seed Production: 53 kg seed of variety of Faba bean (Vikrant and HFB-1) and grain amaranth (Suvarnaand GA-2) were produced and distributed to farmers for popularization faba bean in ambikapur district.

S. No.	Crop	Variety	Seeds produced (kg)
1	Faba bean	Vikrant	20 kg
		HFB-1	15 kg
2	Grain Amaranth	SUVARNA	10 kg
		GA-2	8 kg

Front Line Demonstration: A total 8 FLD on Faba bean and Grain Amaranth were conducted at four village (Kalyanpur, Sonwahi Udaypur, Kanakpur) for popularization of crops and delivered 2 training programme on improved cultivation practices of Grain amaranth and Faba bean.

6.2 AYODHYA

Seed Production: Eleven kg seed of Vikrant variety of Faba bean were produced and distributed to farmers for popularization faba bean in Ayodhya district.

Crossing Programme: 270 crosses have been attempted in Faba bean crop during rabi 2019-20**.**

Selection Of Advance Line: 10 elite lines of Faba bean have been selected during rabi 2019-20 viz,. NDFB 19-1, NDFB 19-2, NDFB 19-3, NDFB 19-4, NDFB 19-5, NDFB 19-6, NDFB 19-1-1, NDFB 19-1-2, NDFB 19-9 and NDFB 19-1-7

Front Line Demonstration: Ten Front Line Demonstration of Faba bean crops with package of practices have been conducted on Farmers' field in nearby villages of Ayodhya District.

6.3 BENGALURU

Project Approved: One RKVY project entitled "Nutritional and health empowerment through nutria-rich potential crops in selected districts of southern Karnataka" have been approved in SLSC for the year 2020-21 with the project outlay of Rs. 42.50 lakhs.

Popularization Of Chia Crop: Linkage of farmers to the market was done during *Rabi* 2019-20. Taken major share in increasing area under Chia crop by providing TV and radio programmes.

Seed Production

S. No.	Crop	Variety	Quantity (kg)
1	Quinoa	GKVK-1	130
2	Chia	GKVK-1	30
		Total	**160**

Training Programme: Organized one DST sponsored National Training programme on "Policies and Issues related to GM Crops/GMOs) from 09th -13th December 2019.

6.4 BHUBANESWAR

TSP Activities: Under TSP-2019-20 Programme, a total of 30 FLDs on grain amaranth were conducted during the year Rabi-2019-20. Twenty numbers of whole package FLDs on grain amaranth crop were conducted in Keonjhar sadar and Banspal blocks of Keonjhar district covering two villages viz; Chhemundibil and Chakundapal. Another ten numbers of whole package FLDs on grain amaranth crop were conducted in Jasipur block of Mayurbhanj district covering one villages viz; Chhamudia. Each whole package FLD was conducted in an area of 0.5 acre. A total area of 15.0 acres was covered involving thirty beneficiaries. All the farmer beneficiaries were supplied with all the critical inputs required in conducting the FLDs. The productivity ranged between 8.30q/ha to 10.40 q/ha.

Seed Production Activities: Breeder Seed production programme was conducted during Rabi, 2019-20 on Grain amaranth variety-BGA 2 (Kapilasa) and 0.60q was seed was produced. The produce was distributed to different farmers for conducting FLDs, University establishments under different programmes.

Hybridization Programme/Generation Advancement Programme : For the first time, hybridization programme was undertaken in Grain amaranth crop. Fourteen numbers of

cross combinations were effected by involving 21 parents during Rabi 2018-19. The F_1 was raised during Rabi,2019-20. Presently, F2 seeds of 205 F_1 validated lines are available with the centre and the F2 will be grown during Rabi, 2020-21.

Mutation Breeding Programme: Mutagenesis programme on rice bean is going on under the scheme as station trials. Presently, 25 selected lines are in M5 generation.

Station Trial-I: the 60 germplasm line were tested. Five BGA germplasm viz; BGA 4-2(L), BGA 10, BGA 17, BGA 26 and BGA 28 (seed yield >10.3g/plant) were found high yielding with higher seed yield as compared to the best check BGA 2 (7.40 g/plant). Ten test BGA germplasm were found maturing less than 104 days as compared to the best check RMA 7 (108 days). The germplasm BGA 17 recorded both higher seed yield and less duration to mature. These cultures will be included in the preliminary yield trial in next season.

Station Trial-II: Fourteen the advanced breeding lines were screened at Bhubaneswar centre, three advanced cultures viz; BGA 21, BGA 10-1(E) and BGA 29 produced higher seed yield (14.6 to 15.2 q/ha) as compared to the best check BGA 2 (13.2 q/ha) and grand mean of 13.1 q/ha. These three cultures matured within 105 days with higher inflorescence length. The culture, BGA 10-1(E) was found to be earliest to mature among all the genotypes tested (99.7 days). Considering the seed yield, days to maturity and length of inflorescence, three cultures viz; BGA 21, BGA 10-1(E) and BGA 29 were found promising among all the cultures tested during Rabi 2019-20.

6.5 HISAR

Faba bean Breeding Program: Thirty fresh crosses were attempted. 10 F1, 22 F2, 35 F3, 30 F4, 36 F5, 40 F6 crosses were evaluated against check for seed yield and other associated character and were advanced to the next generations. The details of fresh crosses attempted are given below:

Various crosses of Faba bean attempted during 2019-20

S. No.	Crosses	S. No.	Crosses	S. No.	Crosses
1	HFB-1 x NDFB-17	11	HFB-1 x ET226533	21	Vikrant x ET218764
2	HFB-1 x HB-85	12	HFB-1 x ET226550	22	Vikrant x ET226426
3	HFB-1 x DFS18-20	13	HFB-1 x ET226562	23	Vikrant x ET226426
4	HFB-1 x EC591784	14	HFB-1 x ET218558	24	Vikrant x ET226432
5	HFB-1 x ET218704	15	HFB-1 x ET218764	25	Vikrant x ET226438
6	HFB-1 x ET226426	16	Vikrant x NDFB-17	26	Vikrant x ET226439
7	HFB-1 x ET226432	17	Vikrant x HB-85	27	Vikrant x ET226454
8	HFB-1 x ET226438	18	Vikrant x DFS18-20	28	Vikrant x ET226533
9	HFB-1 x ET226439	19	Vikrant x EC591784	29	Vikrant x ET226550
10	HFB-1 x ET226454	20	Vikrant x ET218704	30	Vikrant x ET226562

Programme of work for 2020-21: Fresh crosses will be attempted and different filial generations will be advanced and selections will be made.

Seed Production: 400 kg seed of Vikrant and 550 kg of HFB-1 varieties of Faba bean were produced and distributed to farmers for popularization faba bean in Hisar district.

Front Line Demonstration: Twenty Front Line Demonstration of Faba bean crops (Ten Vikrant, Ten HFB-1) with package of practices have been conducted on Farmers' field in nearby villages of Hisar district.

6.6 LUDHIANA

Faba Bean Crossing Programme: Eleven fresh crosses were attempted at PAU Ludhiana during rabi 2019-20 using diverse genotypes from different centers under All Indian Coordinated Research Network (AICRN) on Potential crops.

List of fresh crosses of Faba bean attempted at PAU, Ludhiana during *rabi* 2019-20:

S. No	Cross		
1	HB 182	x	DFS 18-11
2	HB 182	x	DFS 18-07
3	HB 185	x	DFS 18-09
4	HB 185	x	DFS 18-21
5	DFB 10-1	x	DFS 18-21
6	DFB 10-1	x	DFS 18-11
7	RMDFB-2	x	HB 14-21
8	RMDFB-2	x	DFS 18-07
9	EC 10719	x	HB 14-21
10	EC 331449	x	HB 14-18
11	RFB 15	x	DFS 18-21

Breeding Material: The details of breeding material generated during *rabi* 2019-20 is as follows:

List of F_1s evaluated:

S. No	Cross		
1	HB 45	x	ET 218764
2	HB 27	x	ET 218766
3	HB 185	x	ET 218776
4	DFB 10-1	x	ET 218776
5	DFB 10-1	x	ET 218766
6	HB 12-42	x	EC 243626
7	NDFB 16-2	x	EC 243782
8	HB 14-20	x	EC 243770
9	EC 10719	x	HB 82
10	RMDFB 1	x	HB 14-20

List of F_2 evaluated

S. No	Cross		
1	RFB 15	x	HFB 1
2	HB 14-14	x	HFB 1
3	HB 185	x	HFB 1
4	HB 11-15	x	PRT 12
5	HB 12-34	x	PRT 12
6	HB 14-20	x	Vikrant
7	EC 628938	x	Vikrant

S. No	Cross		
8	EC 598958	x	Vikrant
9	EC 628955	x	Vikrant
10	NDFB 12	x	PRT 12
11	NDFB 16-2	x	HB 185
12	RMDFB-1	x	PRT 12
13	RMDFB-2	x	HFB 1

*2-3 single plants were selected from each cross.

List of F_3 populations evaluated

S. No	Cross			S. No	Cross		
1	Vikrant	x	PRT 12	**11**	HB 27	x	PRT 12
2	Vikrant	x	HB 186	**12**	HFB 1	x	HB 188
3	Vikrant	x	EC 10719	**13**	HFB 1	x	HB 9-16
4	Vikrant	x	DFB 103	**14**	HB 11-32	x	HFB 1
5	Vikrant	x	HFB 9-16	**15**	NDFB 12	x	DFB 9-2
6	Vikrant	x	DFB 14-1	**16**	NDFB 12	x	RMDFB 2
7	HB 45	x	DFB 14-1	**17**	NDFB 13	x	DFB 9-2
8	HB 45	x	DFB 102	**18**	NDFB 14	x	EC 10719
9	HB 27	x	HB 186	**19**	NDFB 16	x	HB 12-8
10	HB 27	x	HB 9-16	**20**	NDFB 16	x	HFB 1

*2-3 single plants were selected from each cross.

List of F_4 populations evaluated

S. No	Cross			S. No	Cross		
1	Vikrant	x	PRT 12	**11**	HB 27	x	DFB 102
2	Vikrant	x	HB 45	**15**	DFB 14-1	x	HB 45
3	Vikrant	x	DFB 102	**16**	DFB 14-1	x	RFB 13
4	Vikrant	x	NDFB 13	**17**	DFB 14-1	x	NDFB 13
5	Vikrant	x	NDFB 14	**18**	DFB 14-1	x	NDFB 14
6	Vikrant	x	RFB 13	**19**	NDFB 12	x	DFB 102
7	Vikrant	x	ICARDA No. 34103	**20**	HB 186	x	ICARDA No. 34128
8	HB 188	x	HB 27	**21**	HB 186	x	ICARDA No. 34113
9	HB 188	x	HB 45	**22**	RMDFB 2	x	HB 27
10	HB 188	x	DFB 102	**23**	RMDFB 2	x	HB 45
11	HB 188	x	NDFB 13	**24**	RMDFB 2	x	DFB 102
12	HB 188	x	NDFB 14	**25**	RMDFB 2	x	NDFB 13
13	DFB 14-1	x	HB 27	**26**	RMDFB 2	x	NDFB 14

*2-3 single plants were selected from each cross.

STANDARDIZATION OF EMASCULATION TECHNIQUE IN CHENOPODIUM QUINOA: Hot water treatment was used to emasculate anthers in *Chenopodium quinoa* inflorescence. This treatment was given before pollen shedding stage. The two genotypes EC507738, EC507749 and four temperature 42°c, 43°c, 45°c and 48°c were used for study. The conclusion are given below:

- No effect was observed, when the spikes were treated with hot water at 42°c and 43°c. Normal seed setting was observed.
- When the spike was treated with hot water at 45°c for 5 minutes seed setting was normal.

- About 10-20% seed setting was obtained, when the spike was treated with hot water at 45°c for 10 min.
- The spike was dead after treatment at 45°c for 12 minutes.
- 30-40% and 10-20% seed set was observed, when the spike was treated at 48°c for 5 min. and 7.5 min respectively. The spikes were dead, when treated with hot water at 48°c for 10 min. and 12 min.
- No genotypic differences were observed.

6.7 PALAMPUR

Breeding Programme: Five fresh crosses were planed and attempted but due to complete lockdown situation at the time of flowering and pot formation stage the results were not upto mark.

Seed Production

S. No.	Crop	Variety	Quantity (Kg)
1	Fababean	Vikrant	4
		HFB-1	2
	Total		**6**

Extension activities: 5 FLDs were conduct on high yielding varieties and improved packages of practices in Kangra district.
Training Programme under the TSP: Four trainings were proposed to popularize the amaranth and buckwheat through value addition program in Kinnaur district of the State, but due to COVID19 could not be completed yet.

6.8 RAHURI

Station Trial (ST) on Grain amaranth: It can be observed from the data, the among the genotypes RGAG-12-22 (15.49 q/ha.) recorded significantly highest grain yield. The maximum plant height (158.3 cm) and highest inflorescence length (66.1 cm) was observed in RGAG-14-2 than the rest of the genotypes under study. Among the check, Phule Kartiki gave higher yield (15.80 q/ha).

6.9 RANCHI

HYBRIDIZATION: FABABEAN: Five fresh crosses have been made 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. **Grain Amaranth:** Five were made during rabi-2019-20 for with respect to days to maturity and various yield attributing characters.
DEMONSTRATION IN FARMERS' FIELD: 10 Demonstrations on fababean (20 farmers) and 5 demonstrations (15 farmers) on grain amaranth were conducted at village, Totambi, Kudlongnagar, Siladih, Nagra, Block: Mandar, District: Ranchi, and Ulihatu in Khuti district under Jharkhand States. The yield was observed 12.6 to 20.2q and 7.2 to 11.8q/ha in fababean and grain amaranth, respectively, during rabi 2019-20.
STATION TRIALS: Two trial are conducted on Faba bean and grain amaranth during Rabi 2019-20
Fababean: In station trials 22 genotypes of fababean were evaluated along with standard checks Vikrant and HFB-1. The entries were selected from other trials, which perform better and evaluated for their performance. HB-11-32, RFB-20, RFB 21, RFB-29, DFB-14-1, RFB-26, RFB-27, RFB-28, RFB-19, RFB-23, RFB-24, RFB-22, HB-8-12, HB 41, DFB-14-1, RMDFB-2 and RMDFB-1 were performed superior to the best check. The yield ranged from 20.9

q/ha for RFB-27 to 12.8 q/ha for Vikrant. The yield of green pod ranged from 60.1 q/ha (HB-12-8) to 56.6 q/ha (RFB 29). The earliest entry was RFB-28 (128 days).

Grain Amaranth: In station trials 23 genotypes of grain amaranth were evaluated along with standard 4 checks (GA-2, BGA-2, RMA-7, Suvarna). The entries were selected from IVT and AVT other trials, which performed better and evaluated for their performance in station/MLT. RGA-19, RGA-22, RGA-24, RGA-25, RGA-26 and RGA-27 were performed superior to the best check used in terms of yield. The yield ranged from 12.9 q/ha (RGA-27) to 10.8 q/ha (RGA-19). The earliest entry was SKGPA-1003 and RGA-26 (140 days).

Quality Seed Production of Potential Crops:

S. No	Crop Name	Variety	Quantity (Kg)
1	Faba bean	Vikrant	1.2
		HFB-1	1.3
2	Grain amaranth	GA-2	0.6
		BGA-2	0.5
		Survarna	0.4
		RMA-7	0.5
	Total		**4.5**

6.10 SK NAGAR

State Trials on grain amaranth: The PET + SSVT consists of 10 entries along with 2 checks. The experiment was conducted at Centre for Crop Improvement, S.K.Nagar, Di: Banaskantha of North Gujarat).

Large Scale Varietal Trial on Grain Amaranth: The Large Scale Varietal Trial consists of 8 entries along with 2 checks. The experiment was conducted at four locations (1. Seed Spices Research Station, SDAU, Jagudan,Di: Mahesana 2. Agricultural Research Station, Aaseda, Di: Banaskantha and 3.Centre for Crop Improvement, S.K.Nagar, Di: Banaskantha of North Gujarat).

Release Proposal Submitted: Proposal of grain amaranth varietyga 6 (Gujarat Amaranth 6) is submitted for notification by "central subcommittee on crop standards, notification and release of varieties of agri-horticultural crops". The variety GA-6, Recommended by15th AGRESCO Sub-committee of Crop Improvement, Plant Physiology and Biotechnology held on March 5-6, 2019 and 15th Joint AGRESCO meeting held on March 14-15, 2019 at SDAU, Sardar krushinagar, respectively. It is also recommended for release by 15th Combined AGRESCO meeting of SAUs of Gujarat held on April 29 to May 1, 2019 at AAU, Anand, Gujarat. 50th state seed sub-committee held at Gandhinagar on 24th Oct 2019. Amaranth growing farmers of Gujarat state are advised to grow Gujarat Amaranth-6 variety having green stature, early maturity and non-lodging, creamy white, bold seed contain high protein with higher grain yield (1884 kg/ha) than Gujarat Amaranth-3 and Gujarat Amaranth-2 with yield advancement of 10.37 and 10.82 percent, respectively.

Germplasm maintenance/evaluation/Breeding materials on Grain Amaranth

S. No	Activity	Number
1	Germplasm Maintained	150
2	Mutant F line	7
3	No of IPS	18
4	Bulk	3
5	Segregating materials F5	10

Seed Production

S.N.	Crop/Variety	Seed production (Kg)
1.	Gujarat Amaranthus-1 (GA-1)	160
2.	Gujarat Amaranthus-2 (GA-2)	110
3.	Gujarat Amaranthus-3 (GA-3)	123
	Total	**393**

Front Line Demonstration: Total 30 Front Line Demonstrations conducted during Rabi 2019-20 of Grain Amaranth released verities (GA 1, GA-2 and GA-3) on farmer's fields of villages of Banaskantha and Mehsana district of Gujarat.

Training Programme Under TSP: Two awareness training programme on Potential Crops (Grain amaranth, Kalingada, Kankoda and Simarouba)

S. No.	Location	Date
1	Awavillage Virampur, Ta; Danta, District: Banaskantha,	23/10/2019 (Farmers benefited :212 farmers of Trible areas)
2	at village Khatani Magari, Ta; Danta, District: Banaskantha, Gujarat	13/03/2020 (Farmers benefited :159 farmers of Trible areas)

ANNEXURES

Annexure-I

Promising lines in Grain amaranth germplasm for various characters based on multi-location over two year Rabi 2018-20 (Plains)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Days to 50% Flowering Mean	40.73	62.50	IC444100 (40.73), IC317517 (41), IC469805 (41), IC279807 (41.2), IC317549 (41.5), IC337341 (41.5), IC317631 (41.83), IC391433 (41.83), IC264805 (42.17), IC360827 (42.17), IC382640 (42.25), IC469803 (42.33), IC279567 (42.5)	CGRajgira-1 (57.4)
2	Days to 80% maturity Mean	102.00	129.00	IC279807 (102), IC266937 (103.62), IC281749 (104), IC337341 (104.25), IC317549 (104.5), IC264805 (104.92), IC340861 (104.92), IC393022 (104.92), IC317631 (105.17)	GA-2 (119.61)
3	10 ml Volume seed weight(g) Mean	6.24	7.57	IC436957 (7.57), IC444193 (7.56), IC355992 (7.55), IC506611 (7.5), IC266778 (7.49), IC469837 (7.45), IC506604 (7.45), IC444156 (7.44), IC356085 (7.43), IC266835 (7.42)	GA-2 (7.4)

Annexure-II

Promising lines in Chenopodium germplasm for various characters based on multi-location over two year Rabi 2018-20 (Plains)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Plant height (cm) Mean	77.87	121.55	EC896208 (121.55), EC896059 (121.37)	GKVK-2 (120.88)
2	Petiole length (cm) Mean	1.90	5.37	EC896239 (5.37), EC896097 (5.19), EC896271 (4.93), EC896209 (4.8), EC896108 (4.7), EC896087 (4.64), EC896203 (4.64), EC896110 (4.56), EC896105 (4.51), EC896083 (4.44), EC896116 (4.39), EC896086 (4.35), EC896246 (4.33), EC896088 (4.33), EC896238 (4.28), EC896208 (4.27)	EC507741 (3.79)
3	No of Inflorescence Mean Mean	7.75	27.83	EC896098 (27.83), EC896219 (26.33), EC896218 (25.11), EC896062 (24.1), EC896115 (23.84), EC896097 (23.06), EC896064 (23), EC896109 (22.27)	EC507741 (21.63)
4	Seed yield plant (g) Mean	11.50	119.59	EC896098 (119.59), EC896097 (108.68)	SSQC-1 (104.9)

Annexure-III

Promising lines in Faba bean germplasm for various characters based on multi-location over two year Rabi 2018-20 (Plains)

S. No.	Characters	Range		Promising lines	Value of best check
		Min.	Max.		
1	Days to 50% flowering Mean	68.26	73.70	ET218776 (68.26), ET218770 (68.37), ET218775 (68.78), ET218764 (69.07), ET218767 (69.67), ET218786 (69.7)	HFB-1 (70.59)
2	Days to 80% maturity Mean	134.19	137.81	ET218768 (134.19), ET218743 (134.43), ET218747 (134.52), ET218767 (134.71), ET218738 (134.81), ET218759 (134.81), ET218772 (134.95), ET218704 (135.14), ET218769 (135.19), ET218786 (135.43), ET218776 (135.48), ET218757 (135.71)	HFB-1 (136.06)
3	Number of seeds per pod Mean	2.66	3.47	ET218783 (3.47), ET218767 (3.39), ET218720 (3.38), ET218713 (3.37), ET218778 (3.3), ET218781 (3.28)	Vikrant (3.28)
4	Pod length(cm) Mean	5.59	7.00	ET218783 (7), ET218719 (6.99), ET218772 (6.8), ET218764 (6.73), ET218765 (6.64), ET218713 (6.59), ET218769 (6.58), ET218704 (6.54), ET218739 (6.53), ET218766 (6.53), ET218775 (6.52), ET218712 (6.52), ET218702 (6.49), ET218698 (6.48), ET218781 (6.47), ET218786 (6.44)	HFB-1 (5.69)
5	Pod width (cm) Mean	3.65	8.10	ET218772 (8.1), ET218783 (8.03), ET218776 (7.87), ET218778 (7.84), ET218766 (7.75), ET218719 (7.72), ET218764 (7.6), ET218786 (7.55), ET218702 (7.47), ET218757 (7.44), ET218712 (7.38), ET218739 (7.29), ET218713 (7.22), ET218775 (7.19), ET218768 (7.18), ET218769 (7.03)	HFB-1 (5.93)
6	100 seed weight (g) Mean	30.30	56.71	ET218778 (56.71), ET218702 (54.88), ET218757 (54.7), ET218775 (54.57), ET218766 (53.26), ET218783 (53.22), ET218704 (52.73), ET218765 (52.67), ET218713 (52.47), ET218763 (51.88), ET218719 (51.6), ET218786 (51.6), ET218747 (50.84), ET218772 (50.45), ET218764 (50.31), ET218739 (49.12)	Vikrant (31.34)
7	Seed yield per plant(g) Mean	19.32	33.81	ET218772 (33.81), ET218776 (30.78), ET218725 (28.69), ET218786 (28.29)	Vikrant (27.62)

Annexure-IV

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

S. No.	Genotypes	Rabi 2017-18			Rabi 2018-19			Rabi 2019-20			Weighted			Percent increase / decrease over best check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Frequency	Rank	Vikrant (c)
1	HB-19	15.62	3	0/2	7.91	3	0/3	8.09	3	1/3	10.54	1/9		-24.61
2	HB-32	17.78	1	0/1	3.17	2	0/2	10.26	3	1/3	9.15	1/6		-34.55
3	HB-195	19.26	1	1/1	3.77	2	0/2	10.75	3	0/3	9.84	1/6		-29.59
4	HPFB-2	17.64	2	0/2	3.23	2	0/2	16.66	1	0/1	11.68	0/5		-16.44
5	HFB-1 ©	15.62	3	-	8.58	3	-	10.07	3	-	11.42	-	-	-18.27
6	**Vikrant (c)**	18.45	3	-	11.49	3	-	12.00	3	-	**13.98**	-	I	-
	Mean	**17.40**	**-**	**-**	**6.36**	**-**	**-**	**11.30**	**-**	**-**	**11.10**	**-**	**-**	**-**

Annexure-V

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

S. No.	Genotypes	Rabi 2017-18			Rabi 2018-19			Rabi 2019-20			Weighted			Percent increase / decrease over best check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Frequency	Rank	Vikrant (c)
1	HB-19	143.00	3	0/3	150.00	3	1/3	151.50	4	0/4	148.50	1/10	I	-0.65
2	HB-32	152.50	2	0/2	172.50	2	1/2	152.50	4	0/4	157.50	1/8		5.37
3	HB-195	149.00	2	1/2	172.33	2	1/2	152.65	4	0/4	156.66	2/8		4.80
4	HPFB-2	144.00	3	1/3	173.00	2	1/2	155.42	2	0/2	155.55	2/7		4.06
5	HFB-1 ©	145.44	3	-	151.67	3	-	152.50	4	-	150.13	-	-	0.44
6	**Vikrant (c)**	144.89	3	-	152.00	3	-	151.02	4	-	**149.48**	-	-	-
	Mean	**146.47**	**-**	**-**	**161.92**	**-**	**-**	**-**	**-**	**-**	**152.97**	**-**	**-**	**-**

Annexure-VI

Performance of Grain amaranth varieties tested for the last three years :Plain

S. No.	Genotypes	Rabi 2017-18			Rabi 2018-19			Rabi 2019-20			Mean			Gain (%) over the best check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Frequency	Rank	
A	**Mean Seed Yield**													
1	BGA 4	10.86	8	0/8	14.45	6	2/6	12.55	6	1/6	12.44	3/20		-5.11
2	BGA-7-1 (E)	12.98	8	0/8	14.97	6	0/6	12.83	6	1/6	13.53	1/20	I	3.20
3	BGA 9	13.12	7	0/7	14.27	6	0/6	12.54	6	2/6	13.30	2/19		1.42
4	RGA 17	12.27	8	1/8	14.38	4	1/4	11.62	5	1/6	12.57	3/17		-4.11
5	SKNA 1406	11.17	8	0/8	14.07	6	0/6	14.36	6	1/6	13.00	1/20		-0.89
6	BGA 2 (C)	11.25	8	-	13.45	6	-	11.01	6	-	11.84	-	-	-9.72
7	**GA 2 (C)**	13.43	8	-	13.43	6	-	12.37	6	-	**13.11**	-	-	-
8	RMA 7 (C)	10.00	6	-	13.33	5	-	12.00	6	-	11.68	-	-	-10.90
9	Suvarna (C)	11.00	8	-	13.14	6	-	10.85	6	-	11.60	-	-	-11.57
	Mean	**11.79**	-	-	**13.94**	-	-	**12.24**	-	-	**12.56**	-	-	-
B	**Mean Maturity day**													
1	BGA 4	126.13	8	2/8	131.29	7	2/7	135.333	6	2/6	130.48	6/21		-1.20
2	BGA-7-1 (E)	124.42	8	3/8	130.67	7	2/7	135.667	6	1/6	129.72	6/21		-1.78
3	BGA 9	123.17	8	2/8	132.05	7	1/7	128.667	6	2/6	127.70	5/21		-3.30
4	RGA 17	123.63	8	4/8	132.47	5	3/5	127.333	5	2/6	127.11	9/18	I	-3.75
5	SKNA 1406	122.29	8	3/8	130.14	7	1/7	133.667	6	1/4	128.16	5/21		-2.96
6	BGA 2 (C)	129.42	8	-	132.38	7	-	137.333	6	-	132.67	-	-	0.46
7	**GA 2 (C)**	128.71	8	-	134.81	7	-	133.333	6	-	**132.06**	-	-	-
8	RMA 7 (C)	131.22	6	-	133.53	5	-	135.00	6	-	133.23	-	-	0.89
9	Suvarna (C)	129.92	8	-	132.86	7	-	139.667	6	-	133.68	-	-	1.23
	Mean	**126.55**	-	-	**132.24**	-	-	**134.00**	-	-	**130.54**	-	-	-

Performance of Faba bean varieties tested for the last three years :Plain ***Annexure-VII***

S. No.	Genotypes	Rabi 2017-18			Rabi 2018-19			Rabi 2019-20			Weighted			Gain (%) over the best check
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Frequency	Rank	
A	**Mean Seed Yield**													
1	HB 14 18	22.19	6	2/6	26.43	7	2/7	22.72	7	1/7	23.86	5/20		2.61
2	HB 14 21	22.63	6	3/6	26.04	7	1/7	22.12	7	1/7	23.65	5/20		1.69
3	NDFB 13 2	20.85	5	3/5	26.20	7	0/7	24.72	7	2/7	24.25	5/19	**I**	4.28
4	NDFB 16 3	21.42	6	3/6	27.48	7	1/7	21.51	7	1/7	23.57	5/20		1.37
5	**HFB-1 (C)**	18.79	6		26.70	7		23.63	7		**23.25**			-
6	Vikrant (C)	17.34	6		26.29	7		21.64	7		21.98			-5.48
		20.54			**26.52**			**22.72**			**23.43**			
B	**Mean Maturity day**													
1	HB 14 18	127.67	6	2/6	135.62	7	2/7	136.56	6	1/6	133.40	5/19		-0.95
2	HB 14 21	129.01	6	1/6	137.24	7	2/7	137.03	6	0/6	134.57	3/19		-0.08
3	NDFB 13 2	129.20	5	1/5	136.14	7	2/7	136.71	6	0/6	134.40	3/18	I	-0.21
4	NDFB 16 3	127.03	6	2/6	137.29	7	0/7	135.47	6	2/6	133.48	4/19		-0.89
5	HFB-1 (C)	129.28	6	-	137.52	7	-	137.08	6	-	134.78	-	-	0.08
6	**Vikrant (C)**	129.25	6	-	138.02	7	-	136.21	6	-	**134.68**	-	-	-
	Mean	**128.57**	-	-	**136.97**	-	-	**136.51**	-	-	**134.22**	-	-	-

Annexure-VIII

Performance of Chenopodium quinoa varieties tested for the last three years :Plain

S. No.	Genotypes	Rabi 2017-18			Rabi 2018-19			Rabi 2019-20			Weighted			Percent increase / decrease over trial mean
		Mean	Location	Frequency	Mean	Location	Frequency	Mean	Location	Frequency	Mean	Frequency	Rank	
A	**Mean Seed Yield**													
1	EC507738	12.42	4	1/4	13.10	10	1/10	16.41	8	0/8	14.18	2/22		-4.39
2	EC507739	7.89	4	0/4	13.20	10	1/10	20.87	8	1/8	15.02	2/22		1.31
3	EC507740	8.49	4	0/4	13.65	10	2/10	16.61	8	0/8	13.79	2/22		-7.02
4	EC507741	11.86	4	1/4	14.27	10	2/10	22.18	8	3/8	16.71	6/22	II	12.66
5	EC507742	11.42	4	1/4	13.62	10	2/10	16.45	8	2/8	14.25	5/22		-3.91
6	EC507743	9.99	4	0/4	15.21	10	3/10	17.58	8	2/8	15.12	5/22		1.99
7	EC507744	10.14	4	0/4	13.58	10	2/10	14.94	8	5/8	13.45	7/22		-9.30
8	EC507746	9.66	4	0/4	10.73	10	0/10	15.88	8	0/8	12.41	0/22		-16.33
9	EC507747	9.91	4	1/4	15.69	10	3/10	22.77	8	3/8	17.21	7/22	I	16.07
10	EC507748	9.54	4	0/4	13.91	10	5/10	17.69	8	2/8	14.49	7/22		-2.28
11	EC507749	9.4	4	1/4	13.60	10	2/10	18.92	8	1/8	14.77	4/22		-0.40
12	IC411824	10.19	4	1/4	13.79	10	1/10	22.37	8	1/8	16.26	3/22	III	9.62
13	IC411825	10.25	4	0/4	12.20	10	2/10	21.21	8	1/8	15.12	3/22		1.98
	Mean	**10.09**	-	-	**13.58**	-	-	**18.76**	-	-	**14.83**	-	-	-
B	**Mean Maturity day**													
1	EC507738	116.50	4	1/4	114.30	10	0/10	111.19	7	0/7	113.68	0/21		0.14
2	EC507739	115.75	4	1/4	111.47	10	4/10	108.96	8	1/8	111.33	6/22	II	-1.93
3	EC507740	117.33	4	1/4	110.77	10	5/10	108.79	8	3/8	111.24	9/22	I	-2.01
4	EC507741	114.00	4	2/4	114.33	10	1/10	110.38	8	3/8	112.83	6/22		-0.61
5	EC507742	117.92	4	1/4	115.63	10	1/10	110.76	7	1/7	114.44	3/21		0.81
6	EC507743	114.33	4	1/4	113.33	10	1/10	112.08	8	1/8	113.06	3/22		-0.41
7	EC507744	115.67	4	1/4	114.80	10	0/10	113.50	8	0/8	114.49	1/22		0.85
8	EC507746	118.00	4	0/4	115.23	10	0/10	112.50	8	0/8	114.74	0/22		1.07
9	EC507747	118.33	4	0/4	115.00	10	2/10	112.46	8	1/8	114.68	3/22		1.02
10	EC507748	119.58	4	0/4	114.13	10	0/10	111.92	8	0/8	114.32	0/22		0.70
11	EC507749	119.92	4	0/4	115.53	10	2/10	110.79	8	2/8	114.61	4/22		0.95
12	IC411824	118.67	4	0/4	114.47	10	0/10	111.33	8	0/8	114.09	0/22		0.50
13	IC411825	119.00	4	0/4	112.50	10	3/10	108.67	8	2/8	112.29	5/22	III	-1.09
	Mean	**117.31**	-	-	**113.96**	-	-	**111.03**	-	-	**113.52**	-	-	-

Annexure-IX

Quality parameter of Grain amaranth varieties tested for the last three years :Plain

S. No.	Genotypes	Rabi 2017-18	Rabi 2018-19	Rabi 2019-20	Mean	Rank	Percent increase / decrease over Best check (BGA-2)
A	**Mean protein (%)**						
1	BGA 4	14.70	10.33	11.55	12.19		-6.30
2	BGA-7-1 (E)	14.00	13.74	12.86	13.53	**III**	4.00
3	BGA 9	9.10	14.26	13.48	12.28		-5.64
4	RGA 17	12.60	15.5	13.39	13.83	**II**	6.28
5	SKNA 1406	16.80	14.53	11.64	14.32	**I**	10.07
6	**BGA 2 (C)**	11.62	14.49	12.93	**13.01**		-
7	GA 2 (C)	13.30	11.90	12.45	12.55		-3.56
8	RMA 7 (C)	11.85	14.18	12.68	12.90		-0.85
9	Suvarna (C)	12.25	13.65	12.08	12.66		-2.72
	Mean	**12.91**	**13.62**	**12.56**	**13.03**		
B	**Mean Oil (%)**						
1	BGA 4	8.02	9.02	8.61	8.55		-1.46
2	BGA-7-1 (E)	8.77	8.43	8.55	8.58		-1.08
3	BGA 9	9.16	8.61	8.68	8.82	**II**	1.61
4	RGA 17	9.57	9.00	9.14	9.24	**I**	6.45
5	SKNA 1406	8.12	8.29	8.67	8.36		-3.65
6	**BGA 2 (C)**	8.92	8.35	8.76	**8.68**		-
7	GA 2 (C)	8.78	8.14	8.8	8.57		-1.19
8	RMA 7 (C)	8.19	7.77	8.36	8.11		-6.57
9	Suvarna (C)	8.16	8.86	8.55	8.52		-1.77
	Mean	**8.63**	**8.50**	**8.68**	**8.60**		

Quality parameter of Faba bean varieties tested for the last three years :Plain ***Annexure-X***

S. No.	Genotypes	Rabi 2017-18	Rabi 2018-19	Rabi 2019-20	Weighted	Rank	Percent increase / decrease over best check Vikrant
A	**Mean protein (%)**						
1	HB 14 18	28.35	27.58	26.31	27.41	**III**	10.36
2	HB 14 21	29.40	26.84	26.69	27.64	**I**	11.29
3	NDFB 13 2	25.20	27.50	27.50	26.73		7.62
4	NDFB 16 3	28.00	28.46	25.98	27.48	**II**	10.63
5	HFB-1 (C)	23.80	25.20	25.34	24.78		-0.24
6	**Vikrant (C)**	24.23	25.65	24.64	**24.84**		-
	Mean	**26.50**	**26.87**	**26.08**	**26.48**		
B	**Mean Vicine-convicine (%)**						
1	HB 14 18	1.40	0.75	0.79	0.98		19.03
2	HB 14 21	1.01	0.74	0.87	0.87		6.07
3	NDFB 13 2	0.90	0.63	0.94	0.82	I	0.00
4	NDFB 16 3	0.99	0.66	0.88	0.84	II	2.43
5	HFB-1 (C)	0.82	0.90	0.87	0.86		4.86
6	**Vikrant (C)**	0.84	0.85	0.78	**0.82**	I	
	Mean	**0.99**	**0.76**	**0.86**	**0.87**		

Annexure-XI

Quality parameter of Chenopodium quinoa varieties tested for the last three years :Plain

S. No.	Genotypes	Rabi 2017-18	Rabi 2018-19	Rabi 2019-20	Mean	Rank	Percent increase / decrease over Trial Mean
A	**Mean protein (%)**						
1	EC507738	13.50	13.04	13.01	13.183		-6.77
2	EC507739	15.40	11.03	13.89	13.440		-4.95
3	EC507740	14.80	13.65	14.77	14.407		1.89
4	EC507741	14.20	**16.36**	14.76	15.107	**III**	6.84
5	EC507742	13.70	**14.00**	14.01	13.903		-1.67
6	EC507743	15.80	12.60	13.01	13.803		-2.38
7	EC507744	14.70	**14.96**	14.91	14.857		5.07
8	EC507746	13.70	12.43	13.81	13.313		-5.85
9	EC507747	13.00	12.43	13.57	13.000		-8.06
10	EC507748	14.60	11.81	13.65	13.353		-5.56
11	EC507749	16.00	**15.05**	14.7	15.250	**II**	7.85
12	IC411824	14.50	**14.96**	14.26	14.573		3.06
13	IC411825	14.80	**16.45**	15.64	15.630	**I**	10.54
	Mean	**14.52**	**13.75**	**14.15**	**14.140**		
B	**Mean Oil (%)**						
1	EC507738	-	**9.150**	9.210	9.180		1.96
2	EC507739	-	**9.570**	8.930	9.250	**II**	2.73
3	EC507740	-	**9.590**	8.590	9.090		0.96
4	EC507741	-	**9.290**	9.230	9.260	**I**	2.84
5	EC507742	-	**9.340**	9.180	9.260	**I**	2.84
6	EC507743	-	**9.170**	8.830	9.000		-0.04
7	EC507744	-	7.900	8.710	8.305		-7.76
8	EC507746	-	**9.100**	9.060	9.080		0.85
9	EC507747	-	8.370	8.340	8.355		-7.21
10	EC507748	-	**9.090**	9.060	9.075		0.79
11	EC507749	-	**9.410**	9.080	9.245	**III**	2.68
12	IC411824	-	8.870	8.850	8.860		-1.60
13	IC411825	-	**9.270**	8.910	9.090		0.96
	Mean		**9.086**	**8.922**	**9.004**		

Annexure XII

Rabi 2019-20 Hybridization Programme of AICRN on PC

S.No.	Name of Centre	Filial generations							Total
		Fresh Crosses	F1	F2	F3	F4	F5	F6	
A	**Grain amaranth**								
1	Ambikapur	22	-	-	-	-	-		**22**
2	Ranchi	5	-	-	-	-	-		**5**
3	S.K. Nagar	7	-	-	-	-	10		**17**
	Total (A)	**34**	**0**	**0**	**0**	**0**	**10**		**44**
B	**Faba bean**								
1	Ambikapur	15	-	-	-	-	-		**15**
2	Ayodhya	27	-	-	-	-	-		**27**
3	Hisar	30	10	22	35	30	36	10	**173**
4	Ludhiana	11	10	13	20	26	-		**80**
5	Palampur	5	-	-	-	-	-		**5**
6	Ranchi	5	-	-	-	-	-		**5**
	Total (B)	**78**	**20**	**35**	**55**	**56**	**36**	**10**	**280**
	Total A+B	**112**	**20**	**35**	**55**	**56**	**46**	**10**	**324**

Annexure XIII

Breeder/Certified and Foundation Seed Production during Rabi 2019-20

S.No.	Name of Centre	Variety	Seed Production
A	**Grain amaranth**		
1	Ambikapur	Suvarna	10.00
		GA-2	8.00
2	Bhubaneswar	BGA-2	60.00
3	Ranchi	BGA-2	0.50
		Suvarna	0.40
		RMA-7	0.50
4	S.K. Nagar	GA-1	160.00
		GA-2	110.00
		GA-3	130.00
	Total (A)		**479.40**
B	Faba bean		
1	Ambikapur	Vikrant	20.00
		HFB-1	15.00
2	Ayodhya	Vikrant	11.00
3	Hisar	Vikrant	400.00
		HFB-1	550.00
4	Palampur	Vikrant	4.00
		HFB-1	2.00
5	Ranchi	Vikrant	1.20
		HFB-1	1.30
	Total (B)		**1004.50**
C	*C. quinoa*		
3	Bengaluru	GKVK-1	130.00
	Total ©		**130.00**
D	**Chia**		
1	Bengaluru	GKVK-1	30.00
	Total (D)		***30.00***
	Total (A+B+C+D)		**1643.90**

Annexure XIV

No of front Line demonstration conducted on potential crops during Rabi 2019-20

S.No.	Name of Centre	Variety	No. of FLD	No. of Benficiaries	Covering Area (ha)	Productivity Range (q/ha)	Yield of variety	Yield of local check variety	Gain %
A	**Grain amaranth**								
1	Ambikapur	Suvarna	2	2	0.50	13.00 -16.00	16.00	14.00	14.29
		Chattisgarh	2	2	0.50	14.00 - 15.00	15.00	14.00	7.14
2	Bhubaneswar	BGA-2	30	30	6.07	8.30-10.40	9.02	7.50	20.27
3	Ranchi	GA-2	1	3	0.40	7.20-10.50	8.50	7.00	21.43
		BGA-2	3	7	1.21	8.20-10.50	10.50	8.20	28.05
		Suvarna	1	4	0.40	7.90-10.60	10.60	7.90	34.18
4	S.K. Nagar	GA-1	7	7	2.83	9.50 - 11.00	11.90	10.00	19.00
		GA-2	7	7	2.83	9.50 - 11.00	12.60	10.00	26.00
		GA-3	7	7	2.83	9.50 - 11.00	12.25	10.00	22.50
	Total (A)		**60**	**69**	**17.59**	**-**	**106.37**	**88.60**	**20.06**
B	**Faba bean**								
1	Ambikapur	Vikrant	2	2	1.00	14.00 - 18.00	16.00	12.00	33.33
		HFB-1	2	2	1.00	12.00 - 14.00	14.00	12.00	16.67
2	Ayodhya	Vikrant	10	10	1.21	18.00 - 27.00	27.00	22.00	22.73
3	Hisar	HFB-1	10	10	0.50	34.00 - 42.00	39.00	34.00	14.71
		Vikrant	10	10	0.50	30.00 - 38.00	34.00	30.00	13.33
4	Palampur	Vikrant	5	10	1.00	6.00 - 8.50	8.00	6.00	33.33
5	Ranchi	Vikrant	2	2	0.81	9.60 - 12.80	12.80	9.60	33.33
		HFB-1	3	3	1.21	10.60 - 16.20	16.20	10.60	52.83
	Total (B)		**44**	**49**	**7.23**	**-**	**167.00**	**136.20**	**22.61**
	Total (A+B)		**104**	**118**	**24.82**	**-**	**273.37**	**224.80**	**21.61**

Annexure XV

Number of trials/activities allotted and conducted Potential Crops :Rabi 2019-20

S. No	Name of Centre	Alloted						Conducted						
		Crop Improvement	PGR Management	Crop Production	Crop Protection	Quality	Total	Crop Improvement	PGR Management	Crop Production	Crop Protection	Quality	Total	Percentage
	(A) Hill													
1	CSK HPKV, Palampur	2	2				**4**	2	2				**4**	**100.00**
2	ICAR RC Umiam	2	2				**4**	2	2				**4**	**100.00**
3	ICAR, RC, Medziphema	1					**1**	1					**1**	**100.00**
4	ICAR, RC, Tadong	1					**1**	1					**1**	**100.00**
5	ICAR, RC, Basar	2					**2**	2					**2**	**100.00**
6	ICAR, RC Lamphelpat	1					**1**	1					**1**	**100.00**
7	NBPGR, RS, Srinagar	1	1				**2**	1	1				**2**	**100.00**
8	CAU, Pasighat	2		1			**3**	2		1			**3**	**100.00**
9	UUHF, Ranichauri	2	2				**4**	2	2				**4**	**100.00**
10	UBKV, Cooch Behar			1			**1**			1			**1**	**100.00**
	Total (A)	**14**	**7**	**2**			**23**	**14**	**7**	**2**			**23**	**100.00**
	(B) Plain													
1	NBPGR RS, Akola		2				**2**		2				**2**	**100.00**
2	IGKV, Ambikapur	7	6				**13**	7	6				**13**	**100.00**
3	UAS, Bangalore	1	2	1	1		**5**	1	2	1	1		**5**	**100.00**
4	OUAT, Bhubaneswar	5	2	1	1		**9**	5	2	1	1		**9**	**100.00**
5	NBPGR, New Delhi	7	6				**13**	2	2				**4**	**30.77**
	NBPGR, New Delhi Q)					6	**6**					6	**6**	**100.00**
6	NDUAT, Ayodhya	7	4				**11**	5	4				**9**	**81.82**
7	CCS HAU, Hisar	3	2	2	1		**8**	3	2	2	1		**8**	**100.00**
	CCS HAU, Hisar(Q)					3	**3**					3	**3**	**100.00**
8	PAU, Ludhiana	3	3		1		**7**	3	3		1		**7**	**100.00**
9	PAU, Faridkot	2					**2**	2					**2**	**100.00**
10	AU, Mandor	5	4				**9**	4	4				**8**	**88.89**
11	MPKV, Rahuri	5	2				**7**	5	2				**7**	**100.00**
12	BAU, Ranchi	7	6				**13**	5	6				**11**	**84.62**
13	SDAU, S.K. Nagar	5	4	2	1		**12**	5	4	2	1		**12**	**100.00**
14	NBPGR, RS, Hyderbad			1			**1**			1			**1**	**100.00**
	Total (B)	**57**	**43**	**7**	**5**	**9**	**121**	**47**	**39**	**7**	**5**	**9**	**107**	**88.43**
	Grand Total (A+B)	**71**	**50**	**9**	**5**	**9**	**144**	**61**	**46**	**9**	**5**	**9**	**130**	**90.28**
	% of trials conducted							**85.92**	**92.00**	**100.00**	**100.00**	**100.00**	**90.28**	

Q Quality analyzed centre

Annexure – XXII

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

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
A.	**Coordinating Unit, ICAR-National Bureau of Plant Genetic Resources, Pusa, New Delhi - 110012**			
	Dr. HL Raiger, Network Coordinator & Principal Scientist	hanuman.raiger@icar.gov.in; drhanumanlal@yahoo.co.in;	011-25802842	9968271997
	Dr. Vinay Mahajan, Principal Scientist	vinmaha9@gmail.com;	011-25802844	9999237696
	Dr. SP Singh, Principal Scientist	surendra.singh7@icar.gov.in	011-25802752	7838548439
	Dr. Sandeep Kumar, Principal Scientist	kumarsandeep_boichem@rediffmail.com	011-25802893	9873235356
B.	**SAU BASED MAIN CENTRES**			
1.	**RMD, College of Agriculture and Research Station, IGKV, Ambikapur – 497001, Chhattisgarh**			
	Dr. Jitendra Kumar Tiwari, Scientist (Plant Breeding),Department of Genetics and Plant Breeding	tiwarijk5@gmail.com	07774-230815, 230986, 230056	8839556957
2	**University of Agricultural Sciences, GKVK, Bengaluru – 560 065, Karnataka**			
	Dr. Niranjana Murthy, Professor (Plant Breeding, RIOF Building,	drniranjanamurthy@hotmail.com, aicrnuucrops@gmail.com;	080-23627265	9448680139
	Dr. AnandSR, Jr. Agronomist	anuagron80@gmail.com	080-23627265	9986735146
3	**Odisha University of Agriculture &Technology, Bhubaneswar – 751 003, Odisha**			
	Dr. Dayanidhi Mishra, Professor (Plant Breeding& Genetics),	bhubaneswar.uucrops@gmail.com	0674-2391692	9437208099
	Dr. Mohima Prasad Behera, Associate Prof.(Agronomy)	beheramp@gmail.com;	0674-2561585	9437756821
4	**Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya – 224229, Uttar Pradesh**			

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
	Dr. RM Tripathi, Assistant Professor (Plant Breeding), Department of Genetics and Plant Breeding	mani.tripathi77@gmail.com	05270-262051	9415918413
5	**CCS Haryana Agricultural University, Hisar – 125004, Haryana**			
	Dr. Jhabar Mal Sutalia, Assistant Agronomist, MAP Section, Department of Genetics and Plant Breeding	jsutaliya@gmail.com;	-	9050007739
	Dr. Ravi Kumar, Phytochemist, MAP Section, Department of Genetics and Plant Breeding	ravi_beniwal@hotmail.com; ravibeniwal@hau.ac.in;	-	9996501981
	Dr. Gajraj Dahiya, Principal Scientist, (Plant Breeding), MAP Section, Department of Genetics and Plant Breeding	gsdahiya69@gmail.com;	-	8708370937
6	**Punjab Agricultural University, Ludhiana – 141 004, Punjab**			
	Dr. Ranjit Kaur Gill, Assistant Breeder, Pulses Section	rkgillpbg@pau.edu	0161-2401960-70	8146800575
7	**Agriculture University Jodhpur, Mandor – 342 304, Rajasthan**			
	Dr Rahul Bhardwaj Assistant Professor (PB &G), Division of Genetics and Plant Breeding, Agricultural Research Station,	bhardwajrahul4u@gmail.com; arsmandor@gmail.com;	--	9610518283, 8502014040
8	**Forest College & Research Institute, TNAU, Mettupalayam – 641301, Coimbatore, Tamil Nadu**			
	Dr. PS Devanand, Assistant Professor (Plant Breeding and Genetics), Department of Tree Breeding	devps7@yahoo.com	04254-271502	9789448194

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
9	**CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur – 176062, Himachal Pradesh**			
	Dr. Gopal Katna, Senior Scientist (Plant Breeding), Department of Organic Agriculture& Natural Farming, College of Agriculture	gkatna@gmail.com	01894-230391	9418155748 7018060179
	Dr. YS Dhaliwal, Dean, College of Home Science	ysdhaliwal44@yahoo.co.in	-	9816082444
	Dr. Nageshwar Singh, Assistant Scientist, Department of Chemistry & Biochemistry, College of Basic Sciences	nageshwers@yahoo.com;	01894-230311, 234079/233234	9418431716
10	**Mahatma Phule Krishi Vidyapeeth, Rahuri – 413722, Maharashtra**			
	Dr. MTBhingarde, Plant Breeder, Department of Botany	mtbhingarde@gmail.com; ptcbot.mpkv@gmail.com;	02426-243249	9404112496
11	**Birsa Agricultural University, Ranchi – 834 006, Jharkhand**			
	Dr. Jay Lal Mahto, Assistant Professor, Department of Plant Breeding & Genetics	jaylalmahto@ymail.com	0651-2450561	8986845402
12	**VCSG Uttarakhand University of Horticulture and Forestry, Ranichauri – 249199, Uttarakhand**			
	Dr. Ajay Kumar, Assistant Professor (Agronomy),College of Horticulture and Forestry	ajay25912@rediffmail.com	01376-252121, 252119	9415278438
	Dr. ArunimaPaliwal, Assistant Professor (Agronomy),College of Horticulture and Forestry	arunima.28@rediffmail.com	-	9456777954

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
13	**Sardar krushinagar-Dantiwada Agricultural University, Sardarkrushinagar, Dantiwada – 385506, Gujarat**			
	Dr. Nitesh N. Prajapati, Associate Research Scientist (Plant Breeding)	niteshprajapati1978@gmail.com;	02748-278471	9909900962
	Dr. Ashok N. Chaudhary, Assistant Research Scientist (Agronomy)	ashokjegoda@gmail.com; drashok_agro@sdau.edu.in;	02748-278471	9624549722
14	**Uttar Banga Krishi Vishwavidyalaya, Pundibari, Coochbehar, West Bengal – 736165**			
	Dr. Tarun. Paul, Assistant Professor (Agronomy), Department of Agronomy	tarun.bckv@gmail.com	03582-2720246, 03582-2770756	8759580947
	Dr. Avijit Kundu, Assistant Professor (Agronomy),Department of Agronomy	avijit@ubkv.ac.in;	03582-2720246, 03582-2770756	9433678323
15	**Central Agricultural University, Pasighat – 791102, Arunachal Pradesh**			
	Dr. Prankanu Debnath, Professor & Head (NRM), Collage of Horticulture and Forestry	kanupran@yahoo.co.in;	-	9402477047
	Dr. Amit Kumar, Scientist (Plant Breeding),	amit4118@gmail.com	-	8974630789

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
16.	**ICAR-ICAR Research Complex for NEH Region, Umroi Road, Umiam – 793103, Meghalaya**			
C	**ICAR-NBPGR, Regional Station Based Cooperating Centres**			
1	Dr. Dinesh Chand, OIC, ICAR-NBPGR RS, Akola – 444104, Maharashtra	dinesh.chand@icar.gov.in dinesh.chamola@yahoo.co.in	0724-2558067	9637697222
2	Dr. Mamta Arya, OIC, ICAR-NBPGR RS, Bhowali, Niglat, Nainital– 263132, Uttarakhand	Mamta.Arya@icar.gov.in mamta32840@yahoo.com;	05942-220027	9685515598
3	Dr. Kartar Singh, OIC, ICAR-NBPGR RS,CAZRI Campus, Jodhpur – 342003,Rajasthan	kartar.singh1@icar.gov.in; kartar1532@gmail.com;	0291-2740385 0291-2740490	9911496280
4	Dr. Harish GD, OIC, ICAR-NBPGR RS, Umroi Road, Umiam, Shillong – 793103, Meghalaya	harish.gd@icar.gov.in; harishnbpgr@gmail.com	0364-2570193	9402149236
5	Dr. Mohar Singh, OIC, ICAR-NBPGR RS, Phagli, Shimla – 171004, Himachal Pradesh	singhmohar_2003@yhaoo.com mohar.singh2@icar.gov.in	0177-2835459	8894009386
6	Dr. M Latha , OIC, ICAR-NBPGR RS, Vellanikkara, KAU, Thrissur – 680656,Kerela	nbpgr.thrissur@icar.gov.in;	0487-2370499	9995546541
7	Dr. Kodaru Anitha , OIC, ICAR-NBPGR RS, ARI Campus, Rajendranagar, Hyderabad – 500030, Andhra Pradesh	nbpgr.hyderabad@icar.gov.in	040-24015478	9440116873

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
8	Dr. V. Kamala, Pr. Scientist, ICAR-NBPGR RS, ARI Campus, Rajendranagar, Hyderabad – 500030, Andhra Pradesh	040 2401 4072 Kamala.Venkateswaran@icar.gov.in;	040-24015478	9849211356
9	Dr. Shashi Bhushan Choudhary , OIC, ICAR-NBPGR RS, CHES Campus, Plandu, Tata Road, Namkum, Ranchi – 834010, Jharkhand	shashi.choudhary@icar.gov.in; shashigen@gmail.com;	0651-2260681	9297784187
10	Dr. Sheikh M. Sultan, OIC, ICAR-NBPGR RS, CITH Campus, Rangreth-Srinagar – 190005, Jammu & Kashmir.	mohmmad.sheikh@icar.gov.in;	0194-2305359	9419504232
D.	**Voluntary Centres**			
1	**ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora – 263601,Uttarakhand**			
	Dinesh Chandra Joshi, Scientist (Plant Breeding), Division of Crop Improvement	dinesh.pbl@gmail.com;	05962-241003, 241005	7880660820
2	**ICAR-Central Arid Zone Research Institute, Regional Station, Jaisalmer**			
	Dr. Archana Sanyal, Scientist	archana.sanyal@icar.gov.in;	-	9540638027
3	**CSK, Himachal Pradesh KrishiVishwavidyalaya, Sangla**			
	Dr. JD Sharma, SIC, MAREC, CSKHPKV, Sangla - 172106, Kinnaur Distt. (H.P.)	-	-	-
4	**IGKV, Raipur**			
	Dr. R.K. Yadav, Principal Scientist	yadavrk98@gmail.com;	-	9425527540
E	**ICAR. Res. Complex for NEH Region – Regional Stations,**			
1	Dr, Ampee Tasung, ICAR Research Complex for NEH Region, Basar – 791101, Arunachal Pradesh	ampeetasung@gmail.com;	-	-

S. No.	Name	E-mail	Phone (O)	Phone (Mob)
2	Dr. Meraj A Ansari, ICAR Research Complex for NEH Region, Manipur Centre, Lamphelpat, Imphal – 795004, Manipur	merajiari@gmail.com;	-	7005706398
3	Dr. Sunil Sunami, ICAR Research Complex for NEH Region, Mizoram Centre, Kolasib– 796081, Mizoram	subilsunami11@gmail.com;	-	7008002355
4	Dr. Harendra Verma, ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani, Medziphema – 797106, Nagaland	harendraicar@gmail.com;	-	8876739227
5	Dr. Amit Kumar, ICAR Research Complex for NEH Region, Tadong, Gangtok – 737 102, Sikkim	amitkumaricar13@gmail.com;	-	8750882646
6	Dr. Gulab Singh, ICAR Research Complex for NEH Region, Lembucherra, Tripura Centre – 799210, Tripura	gulab.iari@gmail.com;	-	8413971329