

For Official Use Only

ALL INDIA COORDINATED RESEARCH NETWORK ON UNDERUTILIZED CROPS

ANNUAL REPORT 2003



भा कृ अनुष
ICAR

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

ALL INDIA COORDINATED RESEARCH NETWORK ON UNDERUTILIZED CROPS

**PROGRESS REPORT
2003**

Compiled by

Dr. Hanuman Lal

Dr. R.S. Rathi

Dr. M. Dutta

Dr. B.S. Phogat

Dr. R.P. Dua



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

CONTENTS

	Pages
I PREAMBLE	1-2
II PLANT BREEDING	3-131
2.1 Hills	3-55
2.2 Plains	56-131
III GERMLASM EVALUATION	132-209
3.1 Hills	132-166
3.2 Plains	167-209
IV QUALITY ANALYSIS	210-223
V AGRONOMY	224-248
VI CENTRE REPORTS	249-262
6.1 Hills	249-252
6.2 Plains	253-262
VII SUMMARY	263-267
ANNEXURES	i-xxv
I Weighted mean seed yield (q/ha) based on 3 years data	i-xix
II List of trials allotted and conducted	xx
III List of crops	xxi
IV List of centres & scientist	xxii-xxv

PREAMBLE

I. PREAMBLE

Underutilized crops constitute those plant species that occur as life support species in extreme environmental conditions or threatened habitats, having appropriate genetic make up to survive under such adverse situations and also possess promising nutritional or industrial utility for a variety of purposes for the present as well as the future needs of human kind. Their cultivation is restricted to specialized geographical pockets in different agro-ecological regions mainly by the poor farming communities, who have little access to modern agro-inputs and well organized marketing and communication infrastructure. Having superior nutritional quality, these crops provide household food and nutritional security to the millions of impoverished people living in remote corners of the country often in inhospitable terrains, where public distribution system is yet to reach.

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

These plants do not require high input technology and can be raised with comparatively lower management cost on marginal, submarginal, degraded and various categories of wastelands on a sustainable basis. There are about 158 million hectares of wastelands of different kinds in India such as sand dunes, ravines, saline, alkali and acidic soils, marshy and marginal lands, which are unfit for supporting cultivation of high input

demanding elite crops. Such lands can easily be put to use for growing low-input requiring underutilized crops to diversify present day agriculture in order to support ever-increasing population and to cater to the fast changing human needs.

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

Recognizing the need for organised research effort on less common, under exploited crops, the All India Coordinated Research Project on Under Utilized and Under Exploited Plants was initiated during 1982 by ICAR. The Project was later redesignated as AICRP on Underutilized Crops and presently the project is conducting research on 17 crops of food, fodder and industrial value through 13 main, 6 cooperating and 2 voluntary centres located in diverse agro-climatic zones of the country. About 23 varieties in different crops have been released/identified in this project, besides identifying desirable genetic donors and accumulating indigenous and exotic germplasm collections. Planned multi-locational evaluation of the germplasm and breeding lines is a continuous process for developing high yielding superior genotypes and their improved production technologies suitable for various agro-ecological situations representing high mountains to the desert plains.

The present report embodies results of research work undertaken on germplasm evaluation, breeding and agronomic aspects, quality evaluation, and other studies in various underutilized crops at different centres. The compiled report is an outcome of the dedicated and sincere efforts made by the scientists of AICRP, Cooperating and Voluntary centres. I express my sincere thanks to Drs. M. Dutta and B.S. Phogat, PIs, Plant Breeding and Agronomy for compilation of the report on respective disciplines. I am extremely thankful to Dr. H. Lal, Scientist and Dr. R.S. Rathi, Technical Officer of the unit for helping in preparation of the report.

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

I wish to record my appreciation to Mrs. V. Vijayalakshmi and Mr. Saroj Kumar Jha for secretarial and typing work.

R.P. Dua
Nodal Officer

PLANT BREEDING

II. PLANT BREEDING

On the basis of indigenous economic importance, area covered by a crop, specific adaptive advantage and future potential, underutilized crops have been prioritized specifically over the years, for the mountain as well as the plain areas of the country. These crops include food crops, fodder crops, energy and industrial plants and crop species suitable for problematic areas. Both indigenous as well as introduced plant species are considered for their economic worth and included in the coordinated testing programme, if found promising. But, due to paucity of test entries and non-availability of sufficient quantity of seed required for multi-locational testing only one type of coordinated trial i.e. Advanced Varietal Trial (AVT) is being organized in most of the crops. However, in a few crops, Initial Varietal Trial (IVT) has also been constituted. In addition to this, Adaptive Trials, Multi-locational Observation Rows and Germplasm Screening Nurseries are also being conducted in crops requiring explorative investigation. An account of the experiments conducted in various crop species during *kharif* 2003, both in the hills as well as in the plains, and during rabi 2002-2003 in plains are enumerated under the following heads:

2.1 HILLS

The crops included for evaluation in the hill areas are the pseudocereals like grain amaranth, buckwheat and chenopods; grain legumes such as ricebean, faba bean and adzuki bean; oil-seed crop like *Perilla* and dual purpose food and fodder crop like *Coix*. These crops are taken up only in the kharif season in the hill areas of North-Western and North-Eastern Himalayas. Replicated yield data were received from most of the centres this year. Statistical analysis was carried out and CD at 5% level and CV (%) values of yield data for individual centres have been calculated. For overall comparison, mean over locations have been calculated. For the varieties qualifying for consideration of identification on the basis of three years performance, the weighted mean in respect of grain yield have been given in the Annexures.

2.1.1 GRAIN AMARANTH (*Amaranthus* spp.)

Grain amaranth is a major cash crop in the mid and high altitude regions of North-Western Himalaya. It is a multipurpose crop grown for its foliage and grain. Its seeds being rich in protein and essential amino acids are promoted for various confectionary items and other food products.

In grain amaranth one Advanced Varietal Trial, one Initial Varietal Trial and a Germplasm Evaluation Nursery were proposed to be conducted during kharif, 2003 in the hill locations. Although many species of grain amaranth are economically important, but three species, namely, *A. hypochondriacus*, *A. caudatus* and *A. edulis* being the important grain yielding types, have been included in the testing programmes.

2.1.1.1 *Advanced Varietal Trial (AVT)*

In the Advanced Varietal Trial 13 entries, including two check varieties were proposed to be tested at five locations. But at Palampur a few new entries have also been included. Data have been reported by all the centres. The performance of the entries as compared to the check varieties has been summarized in table 1. Annapurna was the higher yielding check (22.31 q/ha) than PRA 2 (20.70 q/ha) Sangla A-2 was the highest yielding variety (25.13 q/ha) followed by Shimla A-1 (22.04 q/ha).

Significant differences were observed among the entries for seed yield at all the locations (Table 2). Mean seed yield level was quite high at Shimla centre (46.03 q/ha) while, it was considerably low at Almora, Palampur and Sangla centres. At Ranichauri centre moderately high yield level was obtained (24.79 q/ha). Based on the average over locations Sangla A-2 was the highest seed yielding entry followed by Shimla A-1. The other highest yielding entries were IC 35407 and PRA 2000.

Based on individual centres, PRA 2000 was the highest yielder at Ranichaurhi (42.68 q/ha) and Palampur (13.43 q/ha); IC 35407 at Almora (15.00 q/ha); Annapurna at Shimla (57.53 q/ha) and Sangla A-5 at Sangla (15.62 q/ha).

Plant height was the highest at Shimla centre (298.19 cm) followed by Palampur (231.26 cm) and Almora (214.67 cm) centres (Table 3). It was the lowest at Ranichauri (157.78 cm) centre. The range of plant height at Shimla was from 259.41 to 370.40 cm, at Ranichauri was from 130.80 to 198.26 cm. Based on the average over four locations Shimla A-2 had the highest plant height (257.83 cm). Next in order were Shangla A-5 (248.66 cm) and Shangla A-6 (244.40 cm).

Flowering time showed wide variations among the locations as well as among the entries within a location. The mean flowering time was the lowest (73.08 days) at Almora centre while it was the longest (91.41 cm) at Shimla centre (Table 4). The over all mean flowering time over all the locations was 82.57 days. The variation in flowering time among the entries was also extremely wide at Palampur (67.00 – 94.33 days) and Almora (54.00 – 83.67 days) centre followed by Ranichauri (66.00 – 96.00 days) and Shimla (84.00 – 99.66

days) centres. The entry PLP 1 (70.25 days) showed early flowering consistently at all the locations except at Shimla. It ranked first based on the average over all the locations. The response of various entries differed at different locations.

Maturity period also showed similar trend as the flowering time. The average maturity period of the entries over all the locations was 133.50 days (Table 5). The earliest flowering entry, PLP 1 showed the earliest maturity at two locations, namely, Palampur and Almora centres. The average maturity period was the lowest at Almora centre (106.64 days) while, it was the longest at Shimla centre (155.61 days). The entry, Shimla A-1 was the longest maturing line requiring 143.67 days on an average over three locations.

The length of inflorescence of the entries was the highest at Shimla (68.94 cm) centre followed by Palampur (61.64 cm) and Ranichauri (56.12 cm) centres (Table 6). Inflorescence length was the lowest (55.36 cm) at Almora centre. The variation among the entries was extremely wide at Shimla (53.45 – 101.11 cm) followed by Palampur (48.67 – 73.33 cm) centre. Moderate to high variations were observed at Almora (47.33 – 66.67 cm) and Ranichauri (41.73 – 68.73 cm) centres. Based on the average over four locations Shimla A-2 (75.40 cm) had the longest inflorescence and IC 35407 (49.54 cm) the shortest.

Test weight expressed in terms of weight of 10 ml seed recorded at three centres showed that it was the highest at Ranichauri (13.13 g) centre and low to moderate at Palampur (7.69 g) and Shimla (8.62 g) centres (Table 7). The variation among the entries was relatively low at Shimla centre (7.76 – 9.07 g), Palampur (7.07 – 8.13 g) and Ranichauri (12.04 – 13.80 g) centres. Based on the average over two locations the entry, Sangla A-2 (11.23 g) showed the highest test weight followed by Sangla A-1 (11.21 g).

2.1.1.2 Initial Varietal Trial (IVT)

In this trial 21 entries were evaluated at three locations, namely, Ranichauri, Shimla and Palampur centres. The average performance of the entries have been presented in Table 8. The check variety PRA 1 was the highest yielding entry but it was tested at one location only. The another check variety Annapurna yielded 23.63 q/ha on the basis of two locations data. GA 1 was the best check based on three locations performance. Entries RGAS 92-10-1 was highest yielding (29.44 q/ha) followed by SKNA 7 (22.23 q/ha) and RMA 4 (21.43 q/ha) based on the performance over three locations.

The grain yield data of the entries showed significant variation at all the locations (Table 9). However, the grain yield level at Palampur centre was extremely low. It was high

at Shimla (27.09 q/ha) and moderate to high (20.54 q/ha) at Ranichauri centre. The range of variation was very high (8.33 – 58.27 q/ha) at Ranichauri centre.

Plant height was the highest at Shimla (198.79 cm) followed by Palampur (175.56 cm) and Ranichauri (145.60 cm) centre (Table 10). The range of variation was also very high at Shimla (130.33 – 295.80 cm) centre. The entry RGAS 92-10-1 (205.66 cm) was the tallest closely followed by RMA 2 (202.25 cm) and RMA 3 (201.05 cm).

Flowering time (Table 11) was lowest at Ranichauri centre (74.21 days) and highest at Shimla (84.84 days) centre. It varied from 57.00 to 93.00 days at Ranichauri and from 62.00 to 94.67 days at Palampur centre. Based on the average performance the entry IC 120588 was the earliest in flowering (60.33 days).

The maturity period of the entries was the earliest at Palampur (133.83 days) followed by Ranichauri (141.33 days) and Shimla (151.04 days) centres (Table 12). The entry, IC 120588 was earliest in maturity (128.11 days) and was followed by IC 41998 (129.56 days) and IC 32195 (131.22 days).

The length of inflorescence was the highest at Shimla (65.28 cm) and the lowest at Palampur (51.07 cm) centre (Table 13). Based on the average of two locations, the entry SKNA 21 (69.47 cm) had the longest inflorescence followed by RMA 4 (67.17 cm) and RMA 2 (65.09 cm).

The weight of 10 ml seed was the highest at Ranichauri (12.24 g) centre followed by Shimla (7.79 g) and Palampur (7.32 g) centres (Table 14). Based on the average over locations the entry RMA 3 (9.51 g) had the highest grain weight followed by RMA 2 (9.49 g) and RGAS 92-10-1 (9.47 g).

2.1.2 BUCKWHEAT (*Fagopyrum* spp.)

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

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

2.1.2.1 *Advanced Varietal Trial*

The Advanced Varietal Trial was conducted with 12 entries at four locations viz. Shimla, Ranichauri, Almora and Sangla. The summary of various entries in respect of grain yield and other important traits as compared to the checks have been given in table 15. Only one entry, Sangla B-5 (25.03 q/ha) was superior to the best check variety, Himpriya.

Statistically analysed results of grain yield data have been presented in Table 16. Significant differences were observed among the entries with respect to grain yield at all the locations. Seed yield level at all the locations was comparatively low but at Ranichauri centre it was very high. Among the four locations Ranichauri centre recorded the highest yield, the average being 31.16 q/ha followed by Sangla (21.58 q/ha) and Shimla (11.39 q/ha) centres. Seed yield varied from 18.69 to 53.41 q/ha at Ranichauri, from 3.08 to 30.63 q/ha at Sangla, from 8.96 to 14.95 q/ha at Shimla and from 2.22 to 6.66 q/ha at Almora. Sangla B-5 was the highest yielding entry (25.03 q/ha) at Ranichauri, Sangla B-7 at Sangla while, Himpriya at Shimla and PRB 1 were the highest yielding entries at Almora centre, respectively.

Average plant height (Table 17) was recorded to be highest at Ranichauri (153.72 cm) followed by at Shimla (133.24 cm) and Almora (92.75 cm). VL 79 check variety had the highest height (148.52 cm) followed by PRB 1.

Flowering time varied from 31.00 to 56.33 days at Shimla, from 44.33 to 78.00 days at Ranichauri and 28.00 to 57.33 days at Almora centre (Table 18). Mean flowering time was the earliest at Shimla (49.97 days) followed by Almora (51.31 days) and Ranichauri (60.78 days) centres. On the basis of average over three locations the check variety, VL 7 was the earliest in flowering (35.55 days) while Himpriya (62.67 days) was the late in flowering.

Maturity period (Table 19) also had a similar trend to that of the flowering time, but average maturity period was the earliest at Almora (97.14 days) followed by Ranichauri (111.58 days) and Shimla (117.83 days) centre. On the basis of average over the locations the entry VL 7 turned out to be the earliest in maturity (84.11 days) and Himpriya (120.78 days) to be late in maturity.

The average test weight was higher at Shimla (2.02 g) centre than that at Ranichauri (1.95 g) and Almora (1.92 g) centres (Table 20). The check variety, VL 7 had the highest test weight at Shimla and Almora centres. On the basis of average over the locations VL 7

turned out to be the highest (2.33 g) and Shimla B2 the lowest (1.53 g) seed weight producing entries, respectively.

2.1.3 CHENOPODIUM (*Chenopodium* spp.)

In chenopodium two species viz. *C. quinoa* and *C. album* are economically important and hence have been included in the evaluation programme. An Observation Row Trial comprising both the species was proposed to be conducted at two locations.

2.1.3.1 Observation Row Trial

The observation row trial on 15 lines was proposed to be conducted at two locations but data have been received only from Ranichauri centre only. The entries comprised of the lines received from NBRI, Lucknow; NBPGR Regional Station, Shimla and GBPUAT, Ranichauri. The data on seed yield and associated morphological characters are presented in table 21. Seed yield level of the entries was low. The grain yield level varied from 3.73 to 17.12 q/ha. CHLKW 6 (17.12 q/ha) was the highest yielding line followed by CHLKW 8 (15.83 q/ha) and IC 107297 (12.21 q/ha).

Considerable variation was observed for maturity period of the lines. Flowering time varied from 66.50 to 82.00 days and maturity period from 119.00 to 127.00 days. The entries CHLKW 1, 3 and 9 (119.00 days) were the earliest maturing lines. Plant height on the other hand showed extreme variation ranging from 52.40 to 146.20 cm. The entry CHLKW 6, that yielded the highest showed moderate plant height (97.60 cm). Earhead length also showed wide variation ranging from 19.25 to 44.40 cm. The entry, IC 107297 (44.40 cm) had the longest earhead followed by PRC 9801 (34.60 cm) and IC 107295 (33.30 cm).

2.1.4 RICE BEAN (*Vigna umbellata*)

Rice bean is an important grain legume of the low and mid altitude regions having multifarious utility. It is particularly suitable for mid hill regions where traditional pulses like black gram and green gram cannot be grown with success. In rice bean the Advanced Varietal Trials, one each for normal and early maturing types, were conducted. In addition, one germplasm screening nursery was also planned to be conducted.

2.1.4.1 Advanced Varietal Trial – Normal Duration.

The Advanced Varietal Trial comprising 12 entries, including two check varieties, was planned to be conducted at 6 locations. Data have been received from five centres.

However, at Palampur centre a few new entries were planted. The summary of performance of rice bean entries has been presented in table 22.

Significant variations were observed among the entries with respect to their grain yield at all the locations (Table 23). Yield level at Shillong centre was the highest with an average yield of 26.84 q/ha while it was the lowest (3.43 q/ha) at Almora centre because of extreme drought condition. The yield levels at other centres were moderate. Seed yield varied from 11.86 to 21.59 q/ha at Shimla, 10.21 to 18.58 q/ha at Ranichauri, 2.50 to 7.49 q/ha at Palampur and 2.97 to 6.23 q/ha at Almora. The entry RBL 35 yielded the highest at Shimla, while PRA 9301 was the highest yielder at Ranichauri.

On the basis of average over five locations RBL 35 (15.57 q/ha) was the highest yielder followed by PRR 9301 (14.82 q/ha) and RBL 35 (14.58 q/ha).

Plant height was the highest at Palampur showing an average plant height of 173.21 cm while it was the lowest at Almora (94.30 cm) centre (Table 24). At Shimla centre also plant height was considerably high (152.11 cm). Variation in plant height was also extremely wide at Palampur (121.67 – 230.00 cm). At other centres, the range of variation was moderate. On the basis of average over four locations LRB 188 showed the highest plant height (145.58 cm) followed closely by PRR 9302 (144.32 cm) and PRR 9301 (142.47 cm).

Flowering time was the earliest at Shillong (46.25 days) and extremely delayed at Ranichauri (92.61 days) and Palampur (85.89 days) centres showing more than 30 days difference between these centres (Table 25). At other centres moderately delayed flowering was observed. On the basis of average over the locations PRR 1 (70.47 days) showed the earliest flowering followed closely by PRR 9401 (71.60 days) and the check variety, VRB 1 (72.04 days).

Maturity period (Table 26), like flowering time, showed earliest maturity at Shillong (97.67 days) and most delayed maturity at Ranichauri (158.80 days). Moderate to late maturity was observed at Palampur (106.52 days) and Shimla (146.22 days) centres. There was a difference of about 50 days between Shillong and Ranichauri centres with respect to maturity period of the entries. However, much variation was not observed in maturity period of the entries. Based on the average over locations PRR 9301 (119.92 days) was the earliest while RBL 33-1 (134.63 days) had the longest maturity period.

Test weight (100 seed weight) was recorded at five locations. The mean 100 seed weight was the highest at Ranichauri (8.36 g) centre and the lowest at Almora (5.09 g)

centre (Table 27). On the basis of average over five locations RBL 33-1 had the largest seed (7.52 g) and PRR 1 (6.45 g) the smallest seed.

2.1.4.2 *Advanced Varietal Trial – Early Duration*

The Advanced Varietal Trial consisting of 14 early maturity duration entries was proposed to be conducted at hill as well as plain locations. The hill locations were Ranichauri and Palampur. Some new entries were planted at Palampur centre. The summary of performance of different entries has been presented in table 28.

Significant differences were observed among the entries for seed yield at both the locations. Seed yield level was higher at Ranichauri centre with mean seed yield of 16.78 q/ha (Table 29). Range of seed yield was also higher at Ranichauri (5.06 – 26.00 q/ha) centre as compared to that of Palampur (2.70 – 9.50 q/ha) centre. The entry PRR 9402 (26.00 q/ha) was the highest yielder at Ranichauri while LRB 224 (9.50 q/ha) yielded the highest at Palampur. On the basis of average over the two locations LRB 351 (15.88 q/ha) was the highest yielder followed by KHRB 1 (14.06 q/ha) against the check variety PRR 2 (12.68 q/ha).

Flowering time (Table 30) was earlier at Palampur (76.98 days) than at Ranichauri (102.66 days). It ranged from 94.00 to 111.33 days at Ranichauri while the variation at Palampur was from 71.00 to 84.67 days. The entries, PRR 9401 and LRB 351 (94.00 days) were earliest at Ranichauri, while local (Tortu) was earliest (71.00 days) at Palampur. The over all average showed that LRB 351 (84.17 days) was the earliest flowering line based on two locations data.

Maturity period (Table 31) of the entries differed between the locations. It was more than 40 days earlier at Palampur (120.48 days) than at Ranichauri (169.41 days). The range of variation was greater at Ranichauri (161.00 – 178.33 days) than that at Palampur (103.67 – 134.67 days) centre. On the basis of average performance over two locations LRB 234 (140.17 days) was the earliest maturing entry.

Plant height (Table 32) showed reverse trend, being higher at Palampur (150.36 cm) and lower at Ranichauri (136.38 cm) centre. It ranged from 119.00 to 152.33 cm at Ranichauri and from 81.67 to 187.67 cm at Palampur centre. Based on the average over two locations PRR 2 (164.33 cm) showed the highest plant height and KHRB 2 (131.67 cm) the lowest.

Test weight (Table 33) as measured by 100 seed weight was marginally higher at Ranichauri (7.88 g) centre. The range of 100 seed weight was from 6.33 to 8.97 g at Ranichauri and from 6.13 to 8.13 at Palampur. The entry, RBL 33-1 (8.51 g) had the boldest seed and RBL 35 (6.80 g) the smallest.

2.1.5 ADZUKIBEAN (*Vigna angularis*)

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

2.1.5.1 Observation Row Trial

The observation Row Trial comprising 20 lines was proposed to be conducted at four locations. Data have been received from three locations. However, the trial was conducted with 13 entries at Ranichauri centre. The summary of performance of various entries during the year has been presented in Table 34.

The average yield (Table 35) level at Shimla centre (13.95 q/ha) was higher than at Ranichauri (9.25 q/ha) and Palampur (9.70 q/ha). The range of variation in yield was also very high at Shimla as compared to those of the other centres. Significant differences were however, observed for seed yield of the entries at three locations. On the basis of single location data HPU 51 (16.79 q/ha) was the highest yielding entry followed by Shimla 2 (12.83 q/ha). On the basis of two locations data HPAB 31 was highest yielder (12.57 q/ha) followed by EC 241041 (12.48 q/ha).

Plant height (Table 36) was the highest at Palampur (70.15 cm) followed by Shimla (57.45 cm) and Ranichauri (25.52 cm). It was the lowest at Ranichauri centre (22.52 cm). The range of plant height was lower at Shimla (52.73 – 61.60 cm) as compared to that of Palampur (44.33 – 93.67 cm) centre. Based on the average over the locations the entry, SMLAB 5 (61.09 cm) had the maximum plant height followed by SMLAB 3 (57.91 cm) and SMLAB 4 (55.59 cm).

Flowering time (Table 37) was the earliest at Ranichauri (55.97 days) followed by Shimla (57.69 days) and Palampur (59.58 days) centre. Much variation was not observed in flowering time of the lines at all the centres that ranged from 55.00 to 60.67 days at Shimla, 43.50 to 68.50 days at Ranichauri and 54.33 to 63.33 days at Palampur. Based on the overall average, the entry SMLAB 5 was the earliest in flowering (53.17 days) closely followed by HPAB 4 (54.17 days).

Maturity period (Table 38) of the entries also showed similar trend as was observed for flowering time. Entries took minimum time (88.58 days) to mature at Palampur and maximum at Ranichauri (130.53 days). Variation in maturity period of the entries was also negligible at all the centres. Based on the average over the locations the entry, SMLAB 4 (106.50 days) was the earliest maturing entry while, the entry HPAB 9 took longest time (116.83 days) to mature.

Test weight (100 seed weight) showed reasonable variation from location to location. The average test weight was 13.35 g at Shimla while it was only 10.07 g at Ranichauri centre (Table 39). The range of variation in 100 seed weight was also higher at Shimla (11.70 – 16.73 g) as compared to those of other locations. The entry HPAB 27 (12.93 g) had the highest seed weight based on the average followed by SMLAB 1 (12.48 g).

Incidence of leaf blight disease was reported by Ranichauri centre.

2.1.6 FABA BEAN (*Vicia faba*)

Faba bean is grown in the hills mainly for its protein rich green pods which are used as vegetable. An Advanced Varietal Trial was proposed to be conducted at Palampur and Ranichauri. But results have not been received from Ranichauri centre because of non-receipt of seed.

2.1.6.1 Advanced Varietal Trial

The Advanced Varietal Trial consisting of 17 entries was conducted at Palampur during kharif 2003 season. The check variety included was Local. The entries showed significant variation with respect to their grain yield that ranged from 14.25 to 23.70 q/ha (Table 40). HB 115 gave highest pod yield (62.95 q/ha) whereas HB 186 gave higher seed yield (23.70 q/ha) followed by NDF 1 and HB 180 (22.75 q/ha). Many entries showed significantly superior yield over the Local check variety that yielded 14.25 q/ha. Plant height showed considerable variation (88.00 – 125.50 cm) however, much variation was not observed for flowering time (97.00 – 102.00 days) and maturity period (138.50 – 177.00 days) of the entries.

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

Job's tear, widely grown in the North-Eastern Himalayan region, is being exploited as a dual purpose crop both for its seed and forage purposes. An Advanced Varietal Trial was proposed to be conducted in this crop.

2.1.7.1 *Advanced Varietal Trial*

The Advanced Varietal Trial comprising 17 entries from North-Eastern hills was planned to be conducted at five locations. But data have been received from Ranichauri centre only while at Shillong centre germplasm evaluation was undertaken. At Ranichauri centre also the crop growth was not good and hence seed yield was quite poor. Dry forage yield ranged from 1.07 to 6.78 q/ha at Ranichauri (Table 41). The entry, H 2333 produced the highest dry forage yield. Significant difference was observed among the entries for dry forage yield.

Seed yield showed significant variation among the entries. It varied from 0.26 to 0.60 q/ha, the entry BDS 1871 being the highest yielder.

Plant height was quite low at Ranichauri and ranged from 78.33 to 183.40 cm.

2.1.8 PERILLA (*Perilla frutescens*)

Perilla is being exploited as an edible oil yielding underutilized crop which is grown in the hills largely as a spice crop. Its leaves also contain aromatic compounds. In Perilla an Observation Row Trial was proposed to be conducted at two hill locations. But results have been received from Shillong centre only.

2.1.8.1 *Observation Row Trial*

An Observation Row Trial comprising 17 entries was conducted at Shillong centre. Seed yield showed significant variation ranging from 2.81 to 8.44 q/ha (Table 42). The highest yielding entry was H 1099 (8.44 q/ha) followed by H 1650 (6.88 q/ha) and NH 6/10 (6.88 q/ha). Plant height (124.80 – 172.30 cm), number of inflorescence (77.35 – 136.15) and test weight (1.43 – 1.75 g) showed wide variation.

Table 1: Performance of Grain Amaranth entries in Advanced Varietal Trial during 2003 (Hills).

S. No.	Genotype	Mean maturity duration (days)	Mean weight of 10 ml seed (g)	Mean yield over locations (q/ha)	Percent increase/decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						PRA 2	Annapurna	
1	PRA 9401	140.67	9.55	19.26 (5)	1.19	-6.97	-13.69	0/5
2	PRA 9801	138.42	9.96	19.07 (5)	0.23	-7.86	-14.51	0/5
3	PRA 2000	133.08	9.98	21.19 (5)	11.33	2.35	-5.04	1/5
4	PLP 1	120.50	9.83	17.29 (5)	-9.13	-16.47	-22.49	1/5
5	Shimla A1	143.67	10.00	22.04 (4)	15.81	6.46	-1.22	0/4
6	Shimla A2	136.83	9.75	14.81 (5)	-22.19	-28.46	-33.63	0/5
7	IC 35407	119.92	9.41	21.28 (5)	11.83	2.81	-4.61	1/5
8	Sangla A1	129.44	11.21	18.54 (4)	-2.59	-10.44	-16.91	1/4
9	Sangla A2	135.44	11.23	25.13 (4)	32.07	21.42	12.66	2/4
10	Sangla A5	138.67	7.57	19.23 (4)	1.05	-7.10	-13.81	1/4
11	Sangla A6	134.11	7.54	14.47 (4)	-23.95	-30.08	-35.13	0/4
12	Shimla A3	126.33	10.79	16.65 (2)	-12.50	-19.56	-25.37	0/2
13	Shimla A4	133.00	10.85	13.47 (2)	-29.20	-34.92	-39.61	0/2
14	PRA 2 ©	135.09	9.98	20.70 (5)	8.78	0.00	-7.22	
15	Annapurna ©	137.33	9.64	22.31 (5)	17.24	7.78	0.00	
Trial Mean		133.50	9.82	19.03				

Table 2. Grain Yield (q/ha) in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotype	Ranichauri		Palampur		Almora		Shimla		Sangla		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	PRA 9401	28.76	3	9.07	4	6.00	7	44.14	8	8.31	8	19.26	7	0/5
2	PRA 9801	28.30	4	10.87	2	6.66	6	43.14	9	6.40	12	19.07	9	0/5
3	PRA 2000	42.68*	1	13.43	1	7.66	4	34.04	12	8.12	9	21.19	5	1/5
4	PLP 1	15.31	12	9.07	4	14.32*	2	40.73	10	7.03	10	17.29	11	1/5
5	Shimla A1	20.41	9	6.93	9			50.50	4	10.31	4	22.04	3	0/4
6	Shimla A2	16.70	11	4.00	12	2.32	9	46.33	7	4.69	13	14.81	13	0/5
7	IC 35407	24.31	8	7.47	7	15.00*	1	53.22	2	6.41	11	21.28	4	1/5
8	Sangla A1	14.75	13			6.66	6	38.05	11	14.69*	3	18.54	10	1/4
9	Sangla A2	33.59*	2			7.00	5	47.30	6	12.65*	2	25.13	1	2/4
10	Sangla A5			5.07	11	6.00	7	50.23	5	15.62*	1	19.23	8	1/4
11	Sangla A6			5.17	10	3.32	8	40.65	13	8.75	6	14.47	14	0/4
12	Shimla A3	24.77	7	8.53	5							16.65	12	0/2
13	Shimla A4	18.95	10	8.00	6							13.47	15	0/2
14	PRA 2 ©	27.37	5	7.33	8	7.66	4	52.54	3	8.59	7	20.70	6	0/5
15	Annapurna ©	26.44	6	10.67	3	8.00	3	57.53	1	8.90	5	22.31	2	0/5
	Mean	24.79		8.12		7.55		46.03		9.27		19.03		
	C.D. at 5%	3.54		3.93		2.06		11.73		2.60				
	CV (%)	14.18		29.53		16.11		15.27		19.80				

Table 3. Plant Height (cm) in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Almora		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRA 9401	173.06	3	193.33	12	202.67	9	303.40	6	218.12	10
2	PRA 9801	148.46	8	261.67	3	243.00	2	307.78	5	240.23	4
3	PRA 2000	173.13	2	195.33	11	225.67	3	281.85	9	219.00	9
4	PLP 1	165.53	4	225.00	6	201.00	10	259.41	3	212.74	12
5	Shimla A1	160.00	5	235.00	5			311.08	4	235.36	5
6	Shimla A2	198.26	1	214.67	9	248.00	1	370.40	1	257.83	1
7	IC 35407	150.00	7	209.33	10	194.00	12	275.38	11	207.18	14
8	Sangla A1	130.80	11			203.33	8	269.28	12	201.14	15
9	Sangla A2	152.96	6			223.33	4	282.63	8	219.64	7
10	Sangla A5			225.00	6	196.67	11	324.31	2	248.66	2
11	Sangla A6			224.33	7	213.33	6	295.53	7	244.40	3
12	Shimla A3	150.00	7	288.33	1					219.17	8
13	Shimla A4	142.46	10	274.67	2					208.57	13
14	PRA 2 ©	160.00	5	215.33	8	218.67	5	320.78	3	228.70	6
15	Annapurna ©	146.46	9	244.33	4	206.33	7	274.58	10	217.93	11
	Mean	157.78		231.26		214.67		298.19		225.24	
	C.D. at 5%			18.33		27.14		46.43			
	CV (%)			4.89		7.48		9.26			

Table 4. Days to Flowering in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Almora		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRA 9401	83.00	8	90.67	10	78.00	5	93.00	7	86.17	9
2	PRA 9801	86.33	9	84.67	5	82.00	10	95.00	10	87.00	11
3	PRA 2000	91.00	10	90.00	9	80.00	8	94.00	8	88.75	13
4	PLP 1	76.00	3	67.00	1	54.00	1	84.00	1	70.25	1
5	Shimla A1	91.00	10	84.33	4			92.66	6	89.33	14
6	Shimla A2	96.00	11	69.67	3	79.33	7	88.33	2	83.33	8
7	IC 35407	82.33	6	69.33	2	55.00	2	84.00	1	72.67	2
8	Sangla A1	66.00	1			79.00	6	94.00	9	79.67	4
9	Sangla A2	81.00	4			82.00	10	99.66	100	87.55	12
10	Sangla A5			93.33	11	61.00	3	89.00	3	81.11	6
11	Sangla A6			94.33	15	61.67	4	90.00	4	82.00	7
12	Shimla A3	69.33	2	85.33	6					77.33	3
13	Shimla A4	76.00	3	85.33	6					80.67	5
14	PRA 2 ©	82.66	7	88.67	8	81.33	9	93.33	8	86.50	10
15	Annapurna ©	82.00	5	87.67	7	83.67	11	91.33	5	86.17	9
	Mean	81.74		83.87		73.08		91.41		82.57	
	C.D. at 5%			2.05		2.28		0.97			
	CV (%)			1.51		1.85		0.64			

Table 5. Days to Maturity in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Almora		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRA 9401	135.00	9	149.33	12	114.67	6	163.66	12	140.67	14
2	PRA 9801	137.00	10	141.67	9	117.33	8	157.66	7	138.42	12
3	PRA 2000	142.00	11	146.00	11	84.67	2	159.66	10	133.08	6
4	PLP 1	125.33	3	127.00	1	82.00	1	147.66	2	120.50	2
5	Shimla A1	142.00	11	128.67	3			160.33	11	143.67	15
6	Shimla A2	147.00	12	131.67	4	119.00	11	149.65	3	136.83	10
7	IC 35407	128.66	5	127.67	2	82.00	1	141.33	1	119.92	1
8	Sangla A1	117.00	1			113.33	5	158.00	8	129.44	4
9	Sangla A2	132.00	6			118.00	10	156.33	6	135.44	9
10	Sangla A5			151.00	13	109.00	4	156.00	5	138.67	13
11	Sangla A6			142.00	10	106.00	3	154.32	4	134.11	7
12	Shimla A3	120.33	2	132.33	5					126.33	3
13	Shimla A4	127.00	4	139.00	8					133.00	5
14	PRA 2 ©	133.66	8	132.67	6	116.00	7	158.03	9	135.09	8
15	Annapurna ©	133.33	7	138.00	7	117.67	9	160.33	11	137.33	11
	Mean	132.33		137.46		106.64		155.61		133.50	
	C.D. at 5%			4.87		28.32		6.96			
	CV (%)			2.21		15.71		2.65			

Table 6. Inflorescence Length (cm) in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Almora		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRA 9401	62.66	3	64.67	7	51.00	9	68.41	7	61.69	7
2	PRA 9801	61.66	4	67.67	3	62.33	2	65.08	10	64.19	3
3	PRA 2000	68.73	1	55.33	9	53.67	6	66.90	8	61.16	9
4	PLP 1	50.60	9	48.67	13	53.67	6	53.45	13	51.60	14
5	Shimla A1	62.66	3	63.00	8			77.55	2	67.74	2
6	Shimla A2	67.80	2	66.00	5	66.67	1	101.11	1	75.40	1
7	IC 35407	41.73	12	54.67	10	47.33	11	54.43	12	49.54	15
8	Sangla A1	43.53	11			58.00	4	70.16	6	57.23	12
9	Sangla A2	50.53	10			51.67	7	58.28	11	53.49	13
10	Sangla A5			54.00	11	57.33	5	73.66	3	61.66	8
11	Sangla A6			50.33	12	61.67	3	70.41	5	60.80	10
12	Shimla A3	54.73	6	71.67	2					63.20	4
13	Shimla A4	51.20	8	73.33	1					62.27	5
14	PRA 2 ©	60.86	5	65.33	6	51.33	8	70.76	4	62.07	6
15	Annapurna ©	52.86	7	66.67	4	49.67	10	66.00	9	58.80	11
	Mean	56.12		61.64		55.36		68.94		60.72	
	C.D. at 5%			4.59		8.50		15.42			
	CV (%)			4.55		9.08		13.35			

Table 7. Weight of 10 ml Seed (g) in Advanced Varietal Trial (AVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRA 9401	12.94	10	7.67	7	8.04	10	9.55	11
2	PRA 9801	13.20	7	7.73	6	8.94	3	9.96	7
3	PRA 2000	13.09	8	7.97	2	8.88	4	9.98	6
4	PLP 1	13.23	6	7.57	8	8.70	7	9.83	8
5	Shimla A1	13.63	2	7.77	5	8.60	9	10.00	5
6	Shimla A2	12.56	11	7.93	3	8.75	6	9.75	9
7	IC 35407	12.04	13	7.40	9	8.80	5	9.41	12
8	Sangla A1	13.45	5			8.97	2	11.21	2
9	Sangla A2	13.58	3			8.88	4	11.23	1
10	Sangla A5			7.37	10	7.76	12	7.57	13
11	Sangla A6			7.07	11	8.00	11	7.54	14
12	Shimla A3	13.80	1	7.77	5			10.79	4
13	Shimla A4	13.57	4	8.13	1			10.85	3
14	PRA 2 ©	13.05	9	7.83	4	9.07	1	9.98	6
15	Annapurna ©	12.53	12	7.73	6	8.67	8	9.64	10
	Mean	13.13		7.69		8.62		9.82	
	C.D. at 5%			0.22		0.54			
	CV (%)			1.77		3.73			

Table 8: Performance of Grain Amaranth entries in Initial Varietal Trial during 2003 (Hills).

S. No.	Genotypes	Mean maturity duration (days)	Mean weight of 10 ml seed (g)	Mean yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						PRA 1	Annapurna	
1	GA 1 ©	147.78	8.97	20.60 (3)	13.12	-46.98	-12.82	1/3
2	GA 2 ©	151.11	8.95	17.52 (3)	-3.78	-54.90	-25.85	1/3
3	SKNA 7	145.22	9.31	22.23 (3)	22.06	-42.79	-5.94	1/3
4	RGAS 92-10-1	148.00	9.47	29.44 (3)	61.70	-24.21	24.61	1/3
5	SKNA 21	149.33	9.09	18.89 (3)	3.72	-51.39	-20.07	1/3
6	Shimla A-5	138.00	11.61	24.76 (1)	35.96	-36.27	4.78	1/1
7	Shimla A-6	142.33	13.36	17.19 (1)	-5.58	-55.74	-27.24	0/1
8	PRA 1 ©	145.66	12.33	38.85 (1)	113.34	0.00	64.41	1/1
9	RMA 2	150.33	9.49	17.69 (3)	-2.86	-54.47	-25.14	1/3
10	RMA 3	153.22	9.51	14.69 (3)	-19.35	-62.20	-37.85	0/3
11	RMA 4	151.22	9.19	21.43 (3)	17.69	-44.83	-9.30	1/3
12	MGA 1	135.44	8.74	16.96 (3)	-6.89	-56.36	-28.25	0/3
13	MGA 2	146.00	9.25	11.12 (3)	-38.93	-71.38	-52.94	0/3
14	BGA 2	139.78	8.71	12.95 (3)	-28.90	-66.67	-45.21	0/3
15	BGA 3	137.11	9.06	12.05 (3)	-33.83	-68.98	-49.01	0/3
16	IC 35696	133.11	8.71	15.13 (3)	-16.91	-61.06	-35.97	1/3
17	IC 32195	131.22	9.30	18.25 (3)	0.20	-53.03	-22.78	1/3
18	IC 120588	128.11	8.65	13.09 (3)	-28.12	-66.31	-44.60	1/3
19	IC 41998	129.56	9.21	14.10 (3)	-22.56	-63.70	-40.32	1/3
20	Suvarna ©	125.33	6.80	1.83 (1)	-89.95	-95.29	-92.26	
21	Annapurna ©	140.50	7.97	23.63 (2)	29.76	-39.18	0.00	
Trial mean		141.35	9.41	18.21				

Table 9. Grain Yield (q/ha) in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	GA 1 ©	38.85*	3	1.87	14	21.08	17	20.60	5	1/3
2	GA 2 ©	24.97*	7	2.37	8	25.22	9	17.52	9	1/3
3	SKNA 7	43.29*	2	2.23	9	21.16	16	22.23	3	1/3
4	RGAS 92-10-1	58.27*	1	1.97	13	28.09	6	29.44	1	1/3
5	SKNA 21	33.30*	4	2.07	12	21.29	15	18.89	6	1/3
6	Shimla A-5	24.76*	8					24.76		1/1
7	Shimla A-6	17.19	10					17.19		0/1
8	PRA 1 ©	38.85*	3					38.85		1/1
9	RMA 2	25.53*	6	3.30	5	24.24	10	17.69	8	1/3
10	RMA 3	19.98	9	2.20	10	21.88	14	14.69	12	0/3
11	RMA 4	31.64*	5	2.57	6	30.09	4	21.43	4	1/3
12	MGA 1	13.33	11	1.70	16	35.84	2	16.96	10	0/3
13	MGA 2	9.56	17	1.83	15	21.97	13	11.12	17	0/3
14	BGA 2	10.77	14	1.60	17	26.47	7	12.95	15	0/3
15	BGA 3	9.99	16	2.17	11	23.99	11	12.05	16	0/3
16	IC 35696	11.10	13	4.47*	4	29.82	5	15.13	11	1/3
17	IC 32195	12.76	12	7.07*	2	34.91	3	18.25	7	1/3
18	IC 120588	8.33	18	7.43*	1	23.51	12	13.09	14	1/3
19	IC 41998	10.54	15	5.57*	3	26.19	8	14.10	13	1/3
20	Suvarna ©			1.83	15			1.83		
21	Annapurna ©			2.40	7	44.86	1	23.63	2	
	Mean	20.54		3.04		27.09		18.21		
	C.D. at 5%	2.39		2.21		9.38				
	CV (%)	16.24		45.60		21.64				

Table 10. Plant Height (cm) in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GA 1	158.15	5	161.33	13	238.82	4	186.10	9
2	GA 2	155.60	6	192.33	7	216.73	8	188.22	8
3	SKNA 7	138.70	11	210.00	2	225.07	5	191.26	7
4	RGAS 92-10-1	164.10	4	203.67	3	249.80	2	205.86	1
5	SKNA 21	170.00	2	199.33	4	213.63	9	194.32	5
6	Shimla A-5	148.90	10					148.90	
7	Shimla A-6	150.30	8					150.30	
8	PRA 1	150.00	9					150.00	
9	RMA 2	168.30	3	217.33	1	221.12	7	202.25	2
10	RMA 3	190.00	1	169.00	11	244.15	3	201.05	3
11	RMA 4	153.90	7	198.33	5	222.50	6	191.58	6
12	MGA 1	130.60	14	152.67	15	156.30	13	146.52	14
13	MGA 2	128.90	15	159.33	14	295.80	1	194.68	4
14	BGA 2	127.90	17	112.33	18	130.33	17	123.52	17
15	BGA 3	128.80	16	119.00	17	147.90	15	131.90	16
16	IC 35696	119.00	18	185.33	9	134.92	16	146.42	15
17	IC 32195	133.40	13	168.67	12	160.42	11	154.16	13
18	IC 120588	136.80	12	176.67	10	156.53	12	156.67	11
19	IC 41998	113.00	19	195.67	6	155.35	14	154.67	12
20	Suvarna			186.67	8			186.67	
21	Annapurna			152.33	16	210.13	10	181.23	10
	Mean	145.60		175.56		198.79		170.77	
	C.D. at 5%			33.61		31.06			
	CV (%)			11.96		9.76			

Table 11. Days to Flowering in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GA 1	83.00	7	94.67	17	100.00	12	92.56	14
2	GA 2	93.00	10	87.00	13	100.67	13	93.56	15
3	SKNA 7	88.00	9	90.33	16	92.33	7	90.22	12
4	RGAS 92-10-1	83.00	7	79.00	10	99.00	10	87.00	8
5	SKNA 21	83.00	7	84.67	12	99.00	10	88.89	11
6	Shimla A-5	70.50	4					70.50	
7	Shimla A-6	75.50	5					75.50	
8	PRA 1	78.00	6					78.00	
9	RMA 2	84.00	8	79.33	11	99.33	11	87.55	10
10	RMA 3	93.00	10	89.67	15	102.00	15	94.89	15
11	RMA 4	88.00	9	88.00	14	101.33	14	92.44	13
12	MGA 1	57.00	1	78.00	9	64.67	4	66.56	6
13	MGA 2	67.00	3	72.33	6	98.33	9	79.22	8
14	BGA 2	67.00	3	77.67	8	65.33	5	70.00	7
15	BGA 3	62.00	2	70.00	5	64.67	4	65.56	5
16	IC 35696	62.00	2	62.67	2	62.67	2	62.45	2
17	IC 32195	57.00	1	66.67	3	69.33	6	64.33	4
18	IC 120588	57.00	1	62.00	1	62.00	1	60.33	1
19	IC 41998	62.00	2	62.67	2	64.00	3	62.89	3
20	Suvarna			68.67	4			68.67	
21	Annapurna			72.67	7	97.67	8	85.17	9
	Mean	74.21		77.00		84.84		77.92	
	C.D. at 5%			6.61		5.49			
	CV (%)			5.36		4.05			

Table 12. Days to Maturity in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GA 1	148.00	10	144.33	11	151.00	6	147.78	11
2	GA 2	155.00	11	147.33	13	151.00	6	151.11	15
3	SKNA 7	150.00	11	135.00	9	150.67	5	145.22	9
4	RGAS 92-10-1	147.33	9	146.00	12	150.67	5	148.00	12
5	SKNA 21	148.00	10	149.33	14	150.67	5	149.33	13
6	Shimla A-5	138.00	4					138.00	
7	Shimla A-6	142.33	7					142.33	
8	PRA 1	145.66	8					145.66	
9	RMA 2	148.00	10	152.67	15	150.33	4	150.33	14
10	RMA 3	153.00	12	154.67	16	152.00	7	153.22	17
11	RMA 4	150.00	11	152.67	15	151.00	6	151.22	16
12	MGA 1	128.00	1	128.00	7	150.33	4	135.44	5
13	MGA 2	139.00	5	141.33	10	157.67	9	146.00	10
14	BGA 2	140.00	6	127.00	6	152.33	8	139.78	7
15	BGA 3	134.00	3	127.00	6	150.33	4	137.11	6
16	IC 35696	134.00	3	114.67	3	150.67	5	133.11	4
17	IC 32195	128.00	1	116.33	4	149.33	2	131.22	3
18	IC 120588	128.00	1	106.33	1	150.00	3	128.11	1
19	IC 41998	129.00	2	111.00	2	148.67	1	129.56	2
20	Suvarna			125.33	5			125.33	
21	Annapurna			130.00	8	151.00	6	140.50	8
	Mean	141.33		133.83		151.04		141.35	
	C.D. at 5%			3.96		3.13			
	CV (%)			1.85		1.29			

Table 13. Inflorescence Length (cm) in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GA 1	34.33	15	72.90	1	53.62	
2	GA 2	57.67	6	67.40	7	62.54	5
3	SKNA 7	56.00	7	69.27	3	62.64	4
4	RGAS 92-10-1	54.67	9	64.60	12	59.64	8
5	SKNA 21	73.33	1	65.60	9	69.47	1
6	RMA 2	62.67	4	67.50	6	65.09	3
7	RMA 3	48.67	12	67.77	5	58.22	11
8	RMA 4	65.00	2	69.33	2	67.17	2
9	MGA 1	31.67	17	62.58	14	47.13	16
10	MGA 2	43.00	14	65.57	10	54.29	13
11	BGA 2	31.00	18	61.57	10	46.29	17
12	BGA 3	33.33	16	63.53	13	48.43	15
13	IC 35696	55.00	8	52.10	16	53.55	14
14	IC 32195	51.00	11	67.30	8	59.15	9
15	IC 120588	52.33	10	65.10	11	58.72	10
16	IC 41998	63.33	3	59.22	15	61.28	6
17	Suvarna	59.67	5			59.67	7
18	Annapurna	46.67	13	68.37	4	57.52	12
	Mean	51.07		65.28		58.02	
	C.D. at 5%	8.51		14.57			
	CV (%)	10.42		13.94			

Table 14. Weight of 10 ml Seed (g) in Initial Varietal Trial (IVT) in Grain Amaranth: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Shimla		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GA 1	11.88	13	6.83	13	8.19	1	8.97	11
2	GA 2	11.92	12	6.76	15	8.16	2	8.95	12
3	SKNA 7	12.58	7	7.23	10	8.11	3	9.31	4
4	RGAS 92-10-1	12.89	5	7.57	4	7.94	7	9.47	3
5	SKNA 21	12.10	11	7.10	11	8.07	5	9.09	9
6	Shimla A-5	11.61	15					11.61	
7	Shimla A-6	13.36	1					13.36	
8	PRA 1	12.33	10					12.33	
9	RMA 2	13.18	2	7.30	9	8.00	6	9.49	2
10	RMA 3	12.96	4	7.63	3	7.93	8	9.51	1
11	RMA 4	11.87	14	7.87	2	7.82	9	9.19	8
12	MGA 1	11.18	18	7.40	6	7.65	12	8.74	13
13	MGA 2	12.60	6	7.07	12	8.09	4	9.25	6
14	BGA 2	11.59	16	6.80	14	7.74	10	8.71	14
15	BGA 3	12.46	9	7.33	8	7.39	15	9.06	10
16	IC 35696	11.36	17	7.50	5	7.27	17	8.71	14
17	IC 32195	13.06	3	7.50	5	7.35	16	9.30	5
18	IC 120588	11.12	19	7.37	7	7.45	14	8.65	15
19	IC 41998	12.53	8	7.50	5	7.60	13	9.21	7
20	Suvarna			6.80	14			6.80	
21	Annapurna			8.20	1	7.73	11	7.97	16
	Mean	12.24		7.32		7.79		9.41	
	C.D. at 5%			0.38		0.31			
	CV (%)			3.28		2.51			

Table 15: Performance of Buckwheat entries in Advanced Varietal Trial (AVT) during 2003 (Hills).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/decrease over trial mean	Percent increase/ decrease over check variety			Frequency
						Himpriya	VL 7	PRB 1	
1	KBB 3	107.33	1.99	19.39 (4)	12.68	-8.36	114.75	78.40	¼
2	Sangla B1	105.66	1.87	16.05 (4)	-6.75	-24.15	77.73	47.64	¼
3	Sangla B2	110.67	2.04	18.98 (4)	10.28	-10.30	110.19	74.61	¼
4	Sangla B3	109.66	1.98	17.25 (4)	0.23	-18.48	91.03	58.69	¼
5	Sangla B5	118.00	2.00	25.03 (4)	45.45	18.30	177.20	130.28	¼
6	Sangla B6	113.33	2.07	16.85 (4)	-2.09	-20.37	86.60	55.01	¼
7	Sangla B7	115.67	1.96	16.99 (4)	-1.30	-19.73	88.10	56.26	¼
8	Shimla B1	89.78	1.88	17.50 (4)	1.69	-17.29	93.82	61.01	¼
9	Shimla B2	118.89	1.53	17.38 (4)	1.01	-17.85	92.51	59.92	¼
10	Himpriya (C)	120.78	2.12	21.16 (4)	22.95	0.00	134.33	94.66	0/4
11	VL 7 (C)	84.11	2.33	9.03 (4)	-47.53	-57.33	0.00	-16.93	0/4
12	PRB-1 (C)	112.33	1.78	10.87 (4)	-36.84	-48.63	20.38	0.00	0/4
Trial mean		108.85	1.96	17.21					

Table 16. Grain Yield (q/ha) in Advanced Varietal Trial (AVT) in Buckwheat: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Sangla		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	KBB 3	11.70	5	33.23	4	5.91	3	26.73	5	19.39	3	¼
2	Sangla B1	10.25	9	23.99	9	4.79	5	25.17	6	16.05	10	¼
3	Sangla B2	12.65	3	28.48	5	5.55	4	29.24	3	18.98	4	¼
4	Sangla B3	12.50	4	24.92	8	6.28	2	25.30	7	17.25	7	¼
5	Sangla B5	13.09	2	53.41	1	5.55	4	28.08	4	25.03	1	¼
6	Sangla B6	11.50	6	24.92	8	5.91	3	25.07	8	16.85	9	¼
7	Sangla B7	9.46	10	25.63	7	2.22	7	30.63	1	16.99	8	¼
8	Shimla B1	11.25	8	26.11	6	2.95	6	29.70	2	17.50	5	¼
9	Shimla B2	9.04	11	37.97	3	2.20	8	20.32	9	17.38	6	¼
10	Himpriya (C)	14.85	1	53.40	2	5.55	4	10.86	10	21.16	2	0/4
11	VL 7 (C)	11.41	7	18.69	11	2.95	6	3.08	12	9.03	12	0/4
12	PRB-1 (C)	8.96	12	23.14	10	6.66	1	4.72	11	10.87	11	0/4
Mean		11.39		31.16		4.71		21.58		17.21		
C.D. (5%)		3.00		2.76		1.31		6.68				
CV (%)		15.56		13.99		16.51		18.30				

Table 17. Plant Height (cm) in Advanced Varietal Trial (AVT) in Buckwheat: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KBB 3	117.03	10	150.00	9	92.00	4	119.68	7
2	Sangla B1	128.82	6	152.90	7	87.33	8	123.02	5
3	Sangla B2	141.67	3	155.13	5	96.67	3	131.16	4
4	Sangla B3	130.57	5	121.18	12	88.00	6	113.25	12
5	Sangla B5	112.77	11	160.00	4	84.67	10	119.15	9
6	Sangla B6	133.05	4	144.86	10	81.33	11	119.75	6
7	Sangla B7	124.33	7	137.93	11	85.00	9	115.75	11
8	Shimla B1	186.82	1	150.53	8	99.00	2	145.45	3
9	Shimla B2	112.03	12	167.13	3	72.00	12	117.05	10
10	Himpriya (C)	117.23	9	152.66	6	87.67	7	119.19	8
11	VL 7 (C)	176.95	2	178.60	1	90.00	5	148.52	1
12	PRB-1 (C)	117.62	8	173.66	2	149.33	1	146.87	2
Mean		133.24		153.72		92.75		126.57	
C.D. (5%)		21.83				25.43			
CV (%)		9.69				16.22			

Table 18. Days to Flowering in Advanced Varietal Trial (AVT) in Buckwheat: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KBB 3	54.00	5	60.33	6	52.67	5	55.67	6
2	Sangla B1	55.33	9	50.33	2	56.33	9	54.00	4
3	Sangla B2	54.33	6	58.66	5	52.00	4	55.00	5
4	Sangla B3	54.67	7	60.33	6	52.67	5	55.89	7
5	Sangla B5	55.00	8	74.33	10	54.00	6	61.11	11
6	Sangla B6	54.67	7	63.00	7	54.67	7	57.45	8
7	Sangla B7	53.67	4	68.00	9	57.33	11	59.67	10
8	Shimla B1	31.00	1	54.66	4	47.33	2	44.33	2
9	Shimla B2	56.33	10	63.33	8	57.00	10	58.89	9
10	Himpriya (C)	54.33	6	78.00	11	55.67	8	62.67	12
11	VL 7 (C)	34.33	2	44.33	1	28.00	1	35.55	1
12	PRB-1 (C)	42.00	3	54.00	3	48.00	3	48.00	3
	Mean	49.97		60.78		51.31		54.02	
	C.D. (5%)	1.68				3.20			
	CV (%)	1.99				3.69			

Table 19. Days to Maturity in Advanced Varietal Trial (AVT) in Buckwheat: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KBB 3	123.00	5	99.00	2	100.00	4	107.33	4
2	Sangla B1	122.33	3	97.33	1	97.33	3	105.66	3
3	Sangla B2	122.33	3	109.00	6	100.67	5	110.67	6
4	Sangla B3	122.33	3	105.66	5	101.00	6	109.66	5
5	Sangla B5	125.33	6	126.66	11	102.00	8	118.00	10
6	Sangla B6	122.67	4	115.33	8	102.00	8	113.33	8
7	Sangla B7	122.67	4	118.66	9	105.67	10	115.67	9
8	Shimla B1	84.00	1	102.66	4	82.67	2	89.78	2
9	Shimla B2	127.00	8	124.00	10	105.67	10	118.89	11
10	Himpriya (C)	128.67	9	129.66	12	104.00	9	120.78	12
11	VL 7 (C)	88.00	2	101.33	3	63.00	1	84.11	1
12	PRB-1 (C)	125.67	7	109.66	7	101.67	7	112.33	7
	Mean	117.83		111.58		97.14		108.85	
	C.D. (5%)	3.59				4.01			
	CV (%)	1.80				2.44			

Table 20. 100 Seed Weight (g) in Advanced Varietal Trial (AVT) in Buckwheat: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KBB 3	1.95	9	2.21	2	1.80	4	1.99	6
2	Sangla B1	1.99	7	1.61	10	2.00	2	1.87	10
3	Sangla B2	2.04	5	2.08	6	2.00	2	2.04	4
4	Sangla B3	2.05	4	2.00	7	1.90	3	1.98	7
5	Sangla B5	2.04	5	2.16	4	1.80	4	2.00	5
6	Sangla B6	2.03	6	2.17	3	2.00	2	2.07	3
7	Sangla B7	2.19	2	1.80	9	1.90	3	1.96	8
8	Shimla B1	1.78	11	2.15	5	1.70	5	1.88	9
9	Shimla B2	1.80	10	1.59	11	1.20	6	1.53	12
10	Himpriya (C)	2.13	3	2.22	1	2.00	2	2.12	2
11	VL 7 (C)	2.32	1	1.87	8	2.80	1	2.33	1
12	PRB-1 (C)	1.97	8	1.48	12	1.90	3	1.78	11
	Mean	2.02		1.95		1.92		1.96	
	C.D. (5%)	0.09							
	CV (%)	2.64							

Table 21. Observation Row Trial on Chenopodium: 2003 (Ranichauri)

S. No.	Genotypes	Days to flowering		Days to maturity		Plant height (cm)		Inflorescence length (cm)		Seed yield (q/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	PRC 9801	79.50	7	124.50	6	135.10	2	34.60	2	11.65	5
2	IC 107296	75.50	3	120.50	2	101.90	7	22.70	7	8.58	11
3	CHLKW 8	81.00	9	126.00	8	132.20	3	26.40	4	15.81	2
4	PRC 9807	82.00	10	127.00	9	100.80	8	20.40	12	5.43	14
5	IC 107295	74.00	2	119.00	1	115.60	5	30.30	3	10.07	8
6	PRC 9805	76.00	4	121.00	3	95.00	10	20.33	13	12.00	4
7	CHLKW 1	74.00	2	119.00	1	52.40	15	21.22	9	3.73	15
8	CHLKW 3	66.50	1	119.00	1	90.60	12	20.80	11	6.32	13
9	CHLKW 4	78.50	6	123.50	5	90.80	11	22.80	6	10.10	7
10	CHLKW 5	77.00	5	122.00	4	87.50	13	21.20	10	9.09	10
11	PRC 9802	77.00	5	122.00	4	81.60	14	19.25	14	9.12	9
12	IC 107297	80.50	8	125.50	7	146.20	1	44.40	1	12.21	3
13	IC 107299	79.50	7	124.50	6	120.30	4	25.80	5	10.37	6
14	CHLKW 6	77.00	5	122.00	4	97.60	9	21.20	10	17.12	1
15	CHLKW 9	74.00	2	119.00	1	114.10	6	21.80	8	8.04	12
Mean		76.80		122.30		104.11		24.88		9.98	
C.D. (5%)										0.49	
CV (%)										9.45	

Table 22: Performance of Rice bean (Normal duration) entries in Advanced Varietal Trial during 2003 (Hills).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						PRR 1	PRR 2	
1	RBL 33-1	134.63	7.52	14.58 (4)	8.62	3.82	13.97	0/4
2	RBL 35	125.97	6.92	15.57 (5)	16.04	10.91	21.75	1/5
3	LRB 188	129.96	7.37	12.91 (4)	-3.77	-8.02	0.97	0/4
4	PRR 9301	119.97	6.95	14.82 (5)	10.44	5.56	15.88	2/5
5	PRR 9302	122.63	7.15	13.89 (5)	3.53	-1.04	8.63	1/5
6	PRR 9401	121.23	7.37	10.67 (5)	-20.53	-24.04	-16.61	1/5
7	PRR 9402	123.03	7.03	13.68 (5)	1.95	-2.55	6.97	1/5
8	NAINI	122.63	7.36	11.54 (5)	-14.01	-17.80	-9.77	0/5
9	BRS 1	124.83	7.13	12.67 (5)	-5.57	-9.74	-0.92	0/5
10	VRB 1	127.21	6.88	13.83 (4)	3.06	-1.49	8.13	0/5
11	PRR 1 (C)	120.83	6.45	14.04 (5)	4.62	0.00	9.77	0/5
12	PRR 2 (C)	122.17	6.59	12.79 (5)	-4.69	-8.90	0.00	0/5
Trial mean		124.59	7.06	13.42				

Table 23. Seed Yield (q/ha) in Advanced Varietal Trial (Normal Duration) on Rice bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Shillong		Palampur		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	RBL 33-1	16.83	8	11.88	6			24.07	7	5.53	2	14.58	3	0/4
2	RBL 35	21.59	1	12.71	3	2.76	4	34.57	1	6.23*	1	15.57	1	1/5
3	LRB 188	11.86	12	10.21	10			25.32	6	4.27	4	12.91	8	0/4
4	PRR 9301	16.79	9	19.58*	1	7.49*	1	27.82	3	2.43	9	14.82	2	2/5
5	PRR 9302	20.89	2	16.70*	2	2.76	4	25.32	6	3.80	6	13.89	5	1/5
6	PRR 9401	13.45	11	10.21	10	3.59*	3	21.88	9	4.20	5	10.67	12	1/5
7	PRR 9402	20.31	3	11.60	7	4.71*	2	27.82	4	3.97	6	13.68	7	1/5
8	NAINI	13.83	10	12.06	5	2.76	4	25.32	6	3.73	8	11.54	11	0/5
9	BRS 1	16.90	7	11.13	9	2.76	4	27.50	5	5.07	3	12.67	10	0/5
10	VRB 1	18.57	6	12.06	5	2.50	5	22.19	8			13.83	6	0/5
11	PRR 1 (C)	18.97	4	12.52	4	2.50	5	32.50	2	3.73	8	14.04	4	0/5
12	PRR 2 (C)	18.63	5	11.23	8	2.50	5	27.82	4	3.76	7	12.79	9	0/5
	Mean	17.39		12.66		3.43		26.84		4.25		13.42		
	C.D. (5%)	8.59		2.39		0.90				2.92				
	CV (%)	29.25		18.67		15.23				41.89				

Table 24. Plant Height (cm) in Advanced Varietal Trial (Normal Duration) on Rice bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Shillong		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 33-1	145.67	8	115.33	10			111.45	6	168.00	7	135.11	6
2	RBL 35	139.33	10	121.66	8	81.67	8	109.10	8	144.33	10	119.22	11
3	LRB 188	131.67	12	133.00	3			113.65	5	204.00	1	145.58	1
4	PRR 9301	174.67	1	125.66	6	106.67	3	125.35	3	180.00	5	142.47	3
5	PRR 9302	174.33	2	129.00	5	94.67	4	131.95	1	191.67	4	144.32	2
6	PRR 9401	146.00	7	134.00	2	93.00	5	110.15	7	196.33	3	135.90	5
7	PRR 9402	136.33	11	130.00	4	111.33	2	104.95	10	203.67	2	137.26	4
8	NAINI	160.33	4	117.33	9	117.33	1	104.30	11	132.67	11	126.39	8
9	BRS 1	141.33	9	135.66	1	88.33	6	105.45	9	156.33	9	125.42	9
10	VRB 1	151.00	6	122.33	7	81.33	9	118.15	4			118.20	12
11	PRR 1 (C)	166.67	3	90.66	12	88.00	7	125.60	2	161.33	8	126.45	7
12	PRR 2 (C)	158.00	5	95.00	11	80.67	10	101.55	12	171.67	6	121.38	10
	Mean	152.11		120.80		94.30		113.47		173.64		131.48	
	C.D. (5%)	28.88				23.23				22.70			
	CV (%)	11.24				14.36				7.79			

Table 25. Days to Flowering in Advanced Varietal Trial (Normal Duration) on Rice bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Shillong		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 33-1	88.67	9	92.66	6			52.00	7	75.67	6	77.25	10
2	RBL 35	85.00	3	101.00	9	75.00	8	50.00	6	77.00	7	77.60	11
3	LRB 188	83.67	1	101.00	9			50.00	6	81.00	9	78.92	12
4	PRR 9301	87.00	6	87.33	3	71.67	3	44.00	4	77.00	7	73.40	4
5	PRR 9302	88.00	8	91.00	5	75.33	9	43.00	3	73.67	2	74.20	5
6	PRR 9401	86.33	4	82.66	2	72.67	5	42.00	2	74.33	4	71.60	2
7	PRR 9402	87.33	7	93.66	7	70.67	2	55.50	8	79.00	8	77.23	9
8	NAINI	85.00	3	100.00	8	72.00	4	46.00	5	71.67	1	74.93	8
9	BRS 1	84.67	2	100.00	8	73.00	7	42.00	2	74.67	5	74.87	7
10	VRB 1	84.67	2	92.66	6	69.33	1	41.50	1			72.04	3
11	PRR 1 (C)	83.67	1	78.66	1	73.00	7	43.00	3	74.00	3	70.47	1
12	PRR 2 (C)	86.67	5	90.66	4	72.70	6	46.00	5	75.67	6	74.34	6
	Mean	85.89		92.61		72.54		46.25		75.79		74.74	
	C.D. (5%)	3.74				4.60				4.61			
	CV (%)	2.57				3.69				3.51			

Table 26. Days to Maturity in Advanced Varietal Trial (Normal Duration) on Rice bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Almora		Shillong		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 33-1	148.67	8	160.00	6			95.50	1	134.33	9	134.63	11
2	RBL 35	146.67	5	167.00	8	111.33	8	99.50	5	105.33	6	125.97	8
3	LRB 188	147.67	7	167.00	8			99.50	5	105.67	7	129.96	10
4	PRR 9301	143.67	2	151.66	3	105.00	2	97.50	3	102.00	2	119.97	1
5	PRR 9302	147.00	6	158.00	5	107.00	4	97.50	3	103.67	4	122.63	5
6	PRR 9401	146.67	5	148.66	2	109.67	7	97.50	3	103.67	4	121.23	3
7	PRR 9402	144.00	3	160.00	6	108.33	5	98.50	4	104.33	5	123.03	6
8	NAINI	142.67	1	166.00	7	106.33	3	96.50	2	101.67	1	122.63	5
9	BRS 1	150.67	9	166.00	7	107.00	4	97.50	3	103.00	3	124.83	7
10	VRB 1	147.00	6	160.00	5	104.33	1	97.50	3			127.21	9
11	PRR 1 (C)	144.00	10	144.66	1	112.00	9	97.50	3	106.00	8	120.83	2
12	PRR 2 (C)	146.00	11	156.66	4	108.67	6	97.50	3	102.00	2	122.17	4
	Mean	146.22		158.80		107.97		97.67		106.52		124.59	
	C.D. (5%)	4.27				3.99				2.42			
	CV (%)	1.73				2.16				1.32			

Table 27. 100 Seed Weight (g) in Advanced Varietal Trial (Normal Duration) on Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Almora		Shimla		Shillong		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 33-1	7.58	10			8.07	6	6.53	2	7.90	1	7.52	1
2	RBL 35	7.63	9	4.90	5	8.24	3	6.45	4	7.37	2	6.92	8
3	LRB 188	7.54	11			7.36	9	7.29	1	7.30	4	7.37	2
4	PRR 9301	7.85	8	5.40	2	8.16	5	6.25	6	7.07	9	6.95	7
5	PRR 9302	9.39	2	5.20	3	7.96	7	6.07	9	7.13	7	7.15	4
6	PRR 9401	10.03	1	5.20	3	8.16	5	6.28	5	7.20	5	7.37	2
7	PRR 9402	8.72	5	5.40	2	7.96	7	6.06	10	7.03	10	7.03	6
8	NAINI	8.79	4	6.00	1	8.17	4	6.50	3	7.33	3	7.36	3
9	BRS 1	8.63	6	5.10	4	8.50	1	6.23	7	7.17	6	7.13	5
10	VRB 1	8.93	3	4.80	6	7.84	8	5.93	11			6.88	9
11	PRR 1 (C)	7.31	12	4.30	8	8.38	2	5.06	12	7.20	5	6.45	11
12	PRR 2 (C)	7.91	7	4.60	7	7.17	10	6.15	8	7.10	8	6.59	10
	Mean	8.36		5.09		8.00		6.23		7.25		7.06	
	C.D. (5%)					0.04				0.11			
	CV (%)					0.30				0.91			

Table 28: Performance of Rice bean (Early duration) entries in Advanced Varietal Trial during 2003 (Hills).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						RBL 6	PRR 2	
1	KHRB-1	150.50	7.11	14.06 (2)	19.55	20.37	10.88	½
2	KHRB-2	148.50	7.50	6.26 (2)	-46.75	-46.38	-50.61	0/2
3	RBL-33-1	150.50	8.51	9.42 (2)	-19.87	-19.32	-25.68	0/2
4	RBL-35	150.50	6.80	9.77 (2)	-16.96	-16.40	-22.99	0/2
5	RBL-99	170.66	8.97	13.87 (1)	17.94	18.75	9.38	0/1
6	LRB 122	146.17	7.34	10.52 (2)	-10.53	-9.91	-17.02	0/2
7	LRB 224	146.00	7.18	11.97 (2)	1.79	2.49	-5.60	0/2
8	LRB-234	140.17	7.22	11.65 (2)	-0.97	-0.29	-8.15	0/2
9	LRB 351	139.17	7.78	15.88 (2)	35.03	35.96	25.24	½
10	PRR-9401	161.00	7.70	24.56 (1)	108.80	110.23	93.65	1/1
11	PRR-9402	170.66	7.57	26.00 (1)	121.09	122.60	105.05	1/1
12	Naini	110.00	7.07	4.67 (1)	-60.29	-60.02	-63.17	0/1
13	BRS 1	116.67	7.10	6.33 (1)	-46.17	-45.80	-50.08	0/1
14	BRS 2	121.33	7.07	7.93 (1)	-32.57	-32.11	-37.46	0/1
15	Local (Totru)	103.67	5.23	2.70 (1)	-77.04	-76.88	-78.71	0/1
16	RBL 6 ©	151.83	6.94	11.68 (2)	-0.68	0.00	-7.89	0/2
17	PRR-2 (C)	144.17	7.99	12.68 (2)	7.82	8.56	0.00	0/2
Trial mean		142.44	7.36	11.76				

Table 29. Seed Yield (q/ha) in Advanced Varietal Trial (Early Duration) in Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	
1	KHRB-1	22.39*	3	5.73	12	14.06	4	½
2	KHRB-2	5.06	11	7.47	6	6.26	15	0/2
3	RBL-33-1	12.28	10	6.57	9	9.42	12	0/2
4	RBL-35	13.00	9	6.53	10	9.77	11	0/2
5	RBL-99	13.87	8			13.87	5	0/1
6	LRB 122	14.44	7	6.60	8	10.52	10	0/2
7	LRB 224	14.44	7	9.50	1	11.97	7	0/2
8	LRB-234	15.16	6	8.13	4	11.65	9	0/2
9	LRB 351	24.56*	2	7.20	7	15.88	3	½
10	PRR-9401	24.56*	2			24.56	2	1/1
11	PRR-9402	26.00*	1			26.00	1	1/1
12	Naini			4.67	13	4.67	16	0/1
13	BRS 1			6.33	11	6.33	14	0/1
14	BRS 2			7.93	5	7.93	13	0/1
15	Local (Totru)			2.70	14	2.70	17	0/1
16	RBL 6 ©	15.17	5	8.20	2	11.68	8	0/2
17	PRR-2 (C)	17.19	4	8.17	3	12.68	6	0/2
	Mean	16.78		6.84		11.76		
	C.D. (5%)	1.89		2.55				
	CV (%)	13.93		21.94				

Table 30. Days to Flowering in Advanced Varietal Trial (Early Duration) in Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB-1	110.66	8	79.67	10	95.17	14
2	KHRB-2	111.33	9	77.33	9	94.33	13
3	RBL-33-1	100.33	4	81.33	11	90.83	9
4	RBL-35	111.33	9	77.00	8	94.17	12
5	RBL-99	103.66	6			103.66	16
6	LRB 122	98.66	3	82.67	12	90.67	10
7	LRB 224	98.00	2	76.67	7	87.34	6
8	LRB-234	98.00	2	77.33	9	87.67	7
9	LRB 351	94.00	1	74.33	4	84.17	5
10	PRR-9401	94.00	1			94.00	11
11	PRR-9402	103.66	6			103.66	16
12	Naini			72.33	3	72.33	3
13	BRS 1			76.00	6	76.00	4
14	BRS 2			71.67	2	71.67	2
15	Local (Totru)			71.00	1	71.00	1
16	RBL 6 ©	108.33	7	84.67	13	96.50	15
17	PRR-2 (C)	102.66	5	75.67	5	89.17	8
	Mean	102.66		76.98		88.37	
	C.D. (5%)			4.81			
	CV (%)			3.68			

Table 31. Days to Maturity in Advanced Varietal Trial (Early Duration) in Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB-1	176.66	9	124.33	8	150.50	11
2	KHRB-2	178.33	10	118.67	5	148.50	10
3	RBL-33-1	166.33	5	134.67	12	150.50	11
4	RBL-35	178.33	10	122.67	7	150.50	11
5	RBL-99	170.66	7			170.66	14
6	LRB 122	165.66	4	126.67	9	146.17	9
7	LRB 224	165.00	3	127.00	10	146.00	8
8	LRB-234	163.66	2	116.67	3	140.17	6
9	LRB 351	161.00	1	117.33	4	139.17	5
10	PRR-9401	161.00	1			161.00	13
11	PRR-9402	170.66	7			170.66	14
12	Naini			110.00	2	110.00	2
13	BRS 1			116.67	3	116.67	3
14	BRS 2			121.33	6	121.33	4
15	Local (Totru)			103.67	1	103.67	1
16	RBL 6 ©	175.33	8	128.33	11	151.83	12
17	PRR-2 (C)	169.66	6	118.67	5	144.17	7
	Mean	169.41		120.48		142.44	
	C.D. (5%)			3.64			
	CV (%)			1.78			

Table 32. Plant Height (cm) in Advanced Varietal Trial (Early Duration) in Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB-1	146.66	2	131.00	12	138.83	10
2	KHRB-2	135.00	8	128.33	13	131.67	13
3	RBL-33-1	140.00	5	187.67	1	163.84	2
4	RBL-35	119.00	12	153.67	7	136.34	12
5	RBL-99	119.66	11			119.66	15
6	LRB 122	152.33	1	158.67	4	155.50	3
7	LRB 224	146.66	2	155.33	6	151.00	5
8	LRB-234	130.66	9	171.33	3	151.00	5
9	LRB 351	136.66	6	151.33	9	144.00	9
10	PRR-9401	145.00	3			145.00	8
11	PRR-9402	124.00	10			124.00	14
12	Naini			137.67	11	137.67	11
13	BRS 1			153.00	8	153.00	4
14	BRS 2			150.33	10	150.33	6
15	Local (Totru)			81.67	14	81.67	16
16	RBL 6 ©	136.00	7	157.67	5	146.84	7
17	PRR-2 (C)	141.33	4	187.33	2	164.33	1
	Mean	136.38		150.36		140.86	
	C.D. (5%)			15.55			
	CV (%)			6.09			

Table 33. 100 Seed Weight (g) in Advanced Varietal Trial (Early Duration) in Rice bean: 2003 (Hills)

S. No.	Genotypes	Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB-1	7.15	10	7.07	5	7.11	11
2	KHRB-2	7.93	7	7.07	5	7.50	7
3	RBL-33-1	8.88	2	8.13	1	8.51	2
4	RBL-35	6.33	13	7.27	3	6.80	15
5	RBL-99	8.97	1			8.97	1
6	LRB 122	8.41	5	6.27	6	7.34	8
7	LRB 224	7.05	11	7.30	2	7.18	10
8	LRB-234	8.31	6	6.13	7	7.22	9
9	LRB 351	8.45	4	7.10	4	7.78	4
10	PRR-9401	7.70	8			7.70	5
11	PRR-9402	7.57	9			7.57	6
12	Naini			7.07	5	7.07	13
13	BRS 1			7.10	4	7.10	12
14	BRS 2			7.07	5	7.07	13
15	Local (Totru)			5.23	8	5.23	16
16	RBL 6 ©	6.81	12	7.07	5	6.94	14
17	PRR-2 (C)	8.87	3	7.10	4	7.99	3
	Mean	7.88		6.93		7.36	
	C.D. (5%)			0.22			
	CV (%)			1.91			

Table 34: Performance of Adzuki bean entries in Observation Row Trial during 2003 (Hills).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/decrease over trial mean	Percent increase/decrease over check variety	Frequency
						HPU 51	
1	SMLAB-1	112.17	12.48	9.22 (3)	-14.76	-45.07	0/3
2	SMLAB-2	113.55	11.05	12.06 (3)	11.43	-28.19	0/3
3	SMLAB-3	112.78	11.22	11.15 (3)	3.05	-33.59	1/3
4	SMLAB-4	106.50	11.76	11.68 (3)	7.98	-30.41	1/3
5	EC 241041	111.83	11.71	12.48 (3)	15.37	-25.65	1/3
6	EC 108080	115.22	10.76	10.39 (3)	-3.94	-38.10	0/3
7	HPAB 4	110.94	10.74	10.41 (3)	-3.76	-37.98	0/3
8	HPAB 9	116.83	11.48	10.59 (3)	-2.09	-36.91	0/3
9	HPAB 31	107.83	11.25	12.57 (3)	16.14	-25.15	1/3
10	A-1	112.50	11.35	9.55 (3)	-11.71	-43.10	0/3
11	Shimla 1	87.67	11.17	10.17 (1)	-6.01	-39.43	0/1
12	Shimla 2	88.67	10.60	9.30 (1)	-14.05	-44.61	0/1
13	Shimla 3	88.67	10.80	12.83 (1)	18.58	-23.59	1/1
14	Shimla 4	88.00	10.97	9.73 (1)	-10.07	-42.05	0/1
15	HPAB 27	131.42	12.93	7.43 (2)	-31.33	-55.75	0/2
16	HPAB 21	127.75	11.23	11.91 (2)	10.07	-29.06	0/2
17	SMLAB-5	106.84	10.25	9.52 (2)	-12.01	-43.30	½
18	HPAB 25	139.50	10.40	6.42 (1)	-40.67	-61.76	0/1
19	HPAB 30	134.00	10.40	12.23 (1)	13.03	-27.16	0/1
20	HPU 51 ©	121.00	12.43	16.79 (1)	55.18	0.00	0/1
Trial mean		111.68	11.25	10.82			

Table 35. Seed Yield (q/ha) in Observation Row Trial in Adzuki bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Palampur		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	SMLAB-1	13.80	8	5.44	12	8.43	9	9.22	18	0/3
2	SMLAB-2	16.04	2	9.93	8	10.20	4	12.06	6	0/3
3	SMLAB-3	12.40	9	12.65*	2	8.40	10	11.15	9	1/3
4	SMLAB-4	11.61	12	12.04*	3	11.40	2	11.68	8	1/3
5	EC 241041	14.48	7	11.94*	4	11.03	3	12.48	4	1/3
6	EC 108080	14.62	6	6.83	10	9.73	6	10.39	12	0/3
7	HPAB 4	12.00	11	11.74	6	7.50	11	10.41	11	0/3
8	HPAB 9	15.63	3	6.42	11	9.73	6	10.59	10	0/3
9	HPAB 31	12.07	10	15.90*	1	9.73	6	12.57	3	1/3
10	A-1	15.23	5	4.56	13	8.87	8	9.55	15	0/3
11	Shimla 1					10.17	5	10.17	13	0/1
12	Shimla 2					9.30	7	9.30	17	0/1
13	Shimla 3					12.83*	1	12.83	2	1/1
14	Shimla 4					9.73	6	9.73	14	0/1
15	HPAB 27	11.23	13	3.63	14			7.43	19	0/2
16	HPAB 21	15.40	4	8.42	9			11.91	7	0/2
17	SMLAB-5			10.61*	7	8.43	9	9.52	16	½
18	HPAB 25			6.42	11			6.42	20	0/1
19	HPAB 30			12.23	5			12.23	5	0/1
20	HPU 51 ©	16.79	1					16.79	1	0/1
	Mean	13.95		9.25		9.70		10.82		
	C.D. (5%)	9.10		0.39		2.47				
	CV (%)	38.79		7.63		15.23				

Table 36. Plant Height (cm) in Observation Row Trial in Adzuki bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	SMLAB-1	57.33	7	22.50	10	73.00	8	50.94	11
2	SMLAB-2	59.50	5	25.25	7	79.33	4	54.69	7
3	SMLAB-3	60.40	4	29.00	2	84.33	3	57.91	4
4	SMLAB-4	54.70	10	24.75	8	87.33	2	55.59	5
5	EC 241041	61.17	2	27.75	6	75.33	6	54.75	6
6	EC 108080	59.17	6	27.25	6	74.67	7	53.70	8
7	HPAB 4	55.13	9	31.00	1	66.67	9	50.93	12
8	HPAB 9	52.73	13	21.50	11	73.00	8	49.08	14
9	HPAB 31	55.23	8	22.75	9	78.33	5	52.10	9
10	A-1	61.00	3	21.25	12	56.00	11	46.08	15
11	Shimla 1					50.67	13	50.67	13
12	Shimla 2					64.33	10	64.33	1
13	Shimla 3					51.33	12	51.33	10
14	Shimla 4					44.33	14	44.33	16
15	HPAB 27	54.33	12	28.25	4			41.29	17
16	HPAB 21	54.58	11	24.75	8			39.67	18
17	SMLAB-5			28.50	3	93.67	1	61.09	3
18	HPAB 25			27.50	5			27.50	19
19	HPAB 30			20.75	13			20.75	20
20	HPU 51 ©	61.60	1					61.60	2
	Mean	57.45		25.52		70.15		49.42	
	C.D. (5%)	10.75				9.14			
	CV (%)	11.12				7.78			

Table 37. Days to Flowering in Observation Row Trial in Adzuki bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	SMLAB-1	57.00	5	53.50	4	59.67	6	56.72	8
2	SMLAB-2	56.00	3	58.50	5	61.33	7	58.61	12
3	SMLAB-3	55.67	2	52.00	3	62.67	9	56.78	9
4	SMLAB-4	60.67	10	48.50	2	55.33	2	54.83	5
5	EC 241041	59.00	8	53.50	4	56.67	3	56.39	7
6	EC 108080	55.67	2	58.50	5	57.67	4	57.28	10
7	HPAB 4	59.67	9	48.50	2	54.33	1	54.17	3
8	HPAB 9	58.00	6	68.50	7	59.33	5	61.94	15
9	HPAB 31	58.33	7	43.50	1	61.33	7	54.39	4
10	A-1	56.33	4	53.50	4	62.67	9	57.50	11
11	Shimla 1					59.67	6	59.67	13
12	Shimla 2					63.33	10	63.33	17
13	Shimla 3					62.00	8	62.00	16
14	Shimla 4					63.33	10	63.33	17
15	HPAB 27	62.67	11	68.50	7			65.59	18
16	HPAB 21	56.00	3	63.50	6			59.75	14
17	SMLAB-5			52.00	3	54.33	1	53.17	2
18	HPAB 25			68.50	7			68.50	19
19	HPAB 30			48.50	2			48.50	1
20	HPU 51 ©	55.00	1					55.00	6
	Mean	57.69		55.97		59.58		58.37	
	C.D. (5%)	4.91				2.09			
	CV (%)	5.06				2.10			

Table 38. Days to Maturity in Observation Row Trial in Adzuki bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	SMLAB-1	118.67	3	128.50	4	89.33	9	112.17	9
2	SMLAB-2	120.33	6	134.00	5	86.33	1	113.55	12
3	SMLAB-3	119.00	4	127.00	3	92.33	11	112.78	11
4	SMLAB-4	114.33	1	118.50	1	86.67	2	106.50	4
5	EC 241041	120.00	5	128.50	4	87.00	3	111.83	8
6	EC 108080	120.67	7	134.00	5	91.00	10	115.22	13
7	HPAB 4	121.00	8	123.50	2	88.33	6	110.94	7
8	HPAB 9	118.67	3	139.50	7	92.33	11	116.83	14
9	HPAB 31	118.33	2	118.50	1	86.67	2	107.83	6
10	A-1	120.00	5	128.50	4	89.00	8	112.50	10
11	Shimla 1					87.67	4	87.67	1
12	Shimla 2					88.67	7	88.67	3
13	Shimla 3					88.67	7	88.67	3
14	Shimla 4					88.00	5	88.00	2
15	HPAB 27	122.33	9	140.50	8			131.42	17
16	HPAB 21	119.00	4	136.50	6			127.75	16
17	SMLAB-5			127.00	3	86.67	2	106.84	5
18	HPAB 25			139.50	7			139.50	19
19	HPAB 30			134.00	5			134.00	18
20	HPU 51 ©	121.00	8					121.00	15
	Mean	119.49		130.53		88.58		111.68	
	C.D. (5%)	2.87				2.43			
	CV (%)	1.43				1.64			

Table 39. 100 Seed Weight (g) in Observation Row Trial in Adzuki bean: 2003 (Hills)

S. No.	Genotypes	Shimla		Ranichauri		Palampur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	SMLAB-1	16.73	1	10.00	6	10.70	9	12.48	2
2	SMLAB-2	11.62	13	11.20	3	10.33	12	11.05	11
3	SMLAB-3	11.76	11	9.40	10	12.50	1	11.22	9
4	SMLAB-4	14.33	4	8.92	12	12.03	2	11.76	3
5	EC 241041	13.62	5	12.04	1	9.47	13	11.71	4
6	EC 108080	13.46	6	9.75	7	9.07	14	10.76	13
7	HPAB 4	12.44	9	9.10	11	10.67	10	10.74	15
8	HPAB 9	11.70	12	11.81	2	10.93	7	11.48	5
9	HPAB 31	12.54	7	10.08	5	11.13	4	11.25	8
10	A-1	14.35	3	8.78	13	10.93	7	11.35	6
11	Shimla 1					11.17	3	11.17	10
12	Shimla 2					10.60	11	10.60	16
13	Shimla 3					10.80	8	10.80	14
14	Shimla 4					10.97	6	10.97	12
15	HPAB 27	16.16	2	9.70	8			12.93	1
16	HPAB 21	12.45	8	10.00	6			11.23	7
17	SMLAB-5			9.47	9	11.03	5	10.25	18
18	HPAB 25			10.40	4			10.40	17
19	HPAB 30			10.40	4			10.40	17
20	HPU 51 ©	12.43	10					12.43	3
	Mean	13.35		10.07		10.82		11.25	
	C.D. (5%)	0.04				0.37			
	CV (%)	0.17				2.04			

Table 40. Advanced Varietal Trial in Faba bean: 2003 (Palampur)

S. No.	Genotypes	Days to 75% flowering		Days to maturity		Plant height (cm)		Green pod yield (kg/plot)		Pod yield (q/ha)		Seed yield (q/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	BSH 9	98.50	5	169.25	7	118.75	2	2.50	12	37.03	12	19.60	12
2	HB 1123	100.25	11	166.00	2	86.25	17	3.00	8	44.43	8	17.75	16
3	HB 207	93.00	1	167.50	3	102.50	8	2.43	5	35.92	13	19.40	14
4	HB 186	99.00	7	170.50	10	96.00	13	3.45	4	51.10	4	23.70	1
5	HB 188	98.25	4	176.00	15	78.50	18	3.43	5	50.73	5	19.50	13
6	HB 43	102.75	12	167.50	3	98.00	11	3.10	7	45.92	7	21.45	6
7	HB 180	99.25	8	169.75	8	88.00	16	2.50	12	37.03	12	22.75	3
8	HB 193	97.50	2	173.25	14	96.00	13	3.60	3	53.32	3	22.40	4
9	HB 131	97.75	3	138.50	1	103.00	7	2.25	13	33.33	14	21.25	7
10	VL 82-1	97.50	2	172.75	13	93.50	15	2.50	12	37.03	12	22.10	5
11	NDF 1	102.00	10	170.00	9	96.50	12	2.88	10	42.58	10	23.65	2
12	HB 303	99.50	9	168.75	5	99.00	10	3.00	8	44.43	8	21.00	9
13	HB 405	99.50	9	169.25	6	103.50	6	2.75	11	40.73	11	19.00	15
14	BSH 42	98.75	6	168.00	4	95.75	14	2.50	12	37.03	12	20.95	10
15	HB 115	97.50	2	171.25	11	105.50	4	4.25	1	62.95	1	16.10	18
16	HB 430	98.75	6	169.00	6	125.50	1	2.75	11	40.73	11	21.05	8
17	HB 428	97.75	3	172.50	12	100.50	9	2.90	9	42.95	9	20.55	11
18	HB 327	97.50	2	169.00	6	118.25	3	3.25	6	48.14	6	17.65	17
19	Local	99.00	7	169.00	6	96.00	13	3.75	2	55.54	2	14.25	19
	Mean	98.63		168.30		100.05		2.99		44.26		20.22	
	CD (5%)	4.08		4.53		5.85		1.26		18.61		12.07	
	CV (%)	2.98		1.94		4.22		21.45		21.46		30.46	

Table 41. Advanced Varietal Trial in Coix: 2003 (Ranichauri)

S. No.	Genotypes	Dry Forage yield (q/ha)		Plant height (cm)		Seed Yield (q/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank
1	BDS 1870	2.40	4	127.80	8	0.39	5
2	DKM 7	2.40	4	153.00	3	0.43	4
3	H 547	6.62	2	167.00	2	0.57	3
4	H 2333	6.78	1	183.40	1	0.57	3
5	BDS 1668	2.05	5	151.20	5	0.67	1
6	H 300	1.66	9	88.75	12	0.32	8
7	H 305	1.14	12	151.65	4	0.29	10
8	H 2279	1.81	8	80.33	13	0.35	7
9	BD 3	1.07	13	134.33	7	0.31	9
10	H 732	1.98	6	143.35	6	0.32	8
11	AAH 33	1.66	9	100.00	10	0.26	11
12	H 557	1.91	7	78.33	16	0.38	6
13	H 303	1.24	11	83.33	15	0.31	9
14	BDS 1871	2.48	3	90.00	12	0.60	2
15	H 2287	1.04	14	92.00	11	0.32	8
16	H 626	1.49	10	100.00	9	0.35	7
17	H 306	1.07	13	88.00	14	0.26	11
	Mean	2.28		118.38		0.39	
	C.D. (5%)	0.76				0.07	
	CV	26.33				14.93	

Table 42. Advanced Varietal Trial on Perilla: 2003 (Shillong)

S. No.	Genotypes	Plant height (cm)		No. of primary branches/plant		No. of inflorescence/plant		1000 Seed weight (g)		Grain yield (q/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	H-1647	147.50	10	16.65	12	82.35	9	1.59	6	5.00	7
2	H-1650	157.00	6	15.25	13	82.20	11	1.58	7	6.88	2
3	H-664	136.15	11	19.35	6	111.50	2	1.57	8	5.94	4
4	BDS-1812	129.00	14	12.50	17	82.30	10	1.53	10	5.63	5
5	H-1143	133.80	12	18.15	8	77.50	13	1.60	5	4.69	8
6	H-1644	124.80	15	14.80	15	75.35	15	1.75	2	3.75	10
7	H-1756	131.00	13	15.00	14	75.35	15	1.48	12	4.06	9
8	H-621	148.65	8	18.15	8	72.35	16	1.47	13	2.81	11
9	H-2216	162.00	3	17.80	9	97.35	6	1.50	11	3.75	10
10	H-1099	172.30	1	21.85	2	78.65	12	1.80	1	8.44	1
11	H-3944	157.50	5	22.50	1	93.35	7	1.71	3	5.00	7
12	H-1796	156.65	6	17.50	10	104.65	3	1.75	2	5.31	6
13	H-566	147.65	9	18.65	7	103.65	5	1.43	15	4.69	8
14	BDS-1649	156.30	7	20.85	4	104.00	4	1.44	14	2.81	11
15	GP-178	159.35	4	17.00	11	92.65	8	1.55	1	2.81	11
16	BIOC (Check)	166.30	2	20.65	5	77.35	14	1.48	12	6.56	3
17	NH6/10	159.30	4	21.00	3	136.15	1	1.65	4	6.88	2
Mean		149.72		18.10		90.98		1.58		5.00	

2.2 PLAINS

The Advanced Varietal Trials were constituted in grain amaranth, ricebean, faba bean, Kalingada, Kankoda and Tumba. In others, Initial Varietal Trial, Adaptive Trial, Observation Row Trial or Germplasm Screening Nursery were planned to be conducted. Most of the experiments were conducted during the kharif 2003 season. However, in some crops such as faba bean and grain amaranth, experiments were conducted during the rabi 2002-2003 season at most of the centres in the northern and western India, which have been compiled.

2.2.1 GRAIN AMARANTH (*Amaranthus spp.*)

In grain amaranth one Initial Varietal Trial and one Advanced Varietal Trial was constituted for multilocational testing in the plains in addition to germplasm evaluation of nursery. The IVT was not planted by any centre.

2.2.1.1 *Advanced Varietal Trial*

The Advanced Varietal Trial comprising 14 entries was proposed to be conducted at 14 locations. Barring the two Southern centres viz. Bangalore and Mettupalayam where the crop is grown in kharif season, the trial was conducted during rabi season in all other centres. Data have been received from 10 centres only. In some of the centres the trial was conducted without a few entries possibly because of nonavailability of seed material. The summary of performance of the entries has been presented in table 43.

Significant differences were observed among the entries for grain yield at all the centres. The data from Delhi, Akola and Bangalore were rejected because of CV being more than 30%. Seed yield levels were high at Mandor (20.24 q/ha), moderate at Ambikapur (16.67 q/ha) and S.K. Nagar (16.67 q/ha) centres. However, it was low at most of the other centres (Table 44). The range of variation was quite high at Mandor (9.44 – 28.33 q/ha) followed by at S.K. Nagar (12.32 – 20.10 q/ha). The overall average showed that the entry IC 120588 (13.84 q/ha) was the highest yielder. The entry RMA 4 ranked second based on seven locations and RGAS 92-10-1 ranked third based on seven locations data.

Flowering time was earliest at Mettupalayam (47.56 days) followed by at Mandor, S.K. Nagar, Mettupalayam, Bhubaneshwar, Bangalore and Rahuri centres; while it was moderately late at Ambikapur and Ranchi centres (Table 45). On the basis of average over five locations IC 35696 (50.15 days) was the earliest flowering line followed by IC 41998 (50.20 days).

Maturity period was the earliest at Bangalore, Mettupalayam and Bhubaneswar centres; early to moderate at Akola, Rahuri and Ambikapur centres, while extremely delayed flowering was observed at Ranchi (164.45 days) centre (Table 46). IC 35696 (96.30 days) and IC 41996 (96.60 days) were the earliest maturing lines based on five locations data. The average maturity period of the entries was 109.82 days.

Plant height was the highest at Bangalore (197.86 cm) and the lowest at Ranchi (93.98 cm) centre (Table 47). Akola, Ambikapur and Mandor centres showed low plant height while Mettupalayam and Rahuri centres showed high plant height. On the basis of average over the locations IC 32195 (183.30 cm) had the highest plant height based on five locations data and GA 2 (102.84 cm) the lowest.

Inflorescence length of the entries showed wide variation ranging from 15.31 cm at Akola to 86.80 cm at S.K. Nagar (Table 48). At other locations moderately high inflorescence length was observed. Variation among the entries was the highest at Mettupalayam (45.50 – 72.50 cm) centre followed by Akola (7.00 – 23.58 cm) and Bangalore (46.00 – 65.25 cm) centre. Based on the average over locations IC 32195 (62.45 cm) had the longest inflorescence and BGA 3 (41.01 cm) the shortest.

Test weight as measured by the weight of 10 ml seed showed maximum mean value at Ranchi (8.02 g) and minimum at Bangalore (5.27 g) centre (Table 49). Based on the average over locations IC 120588 had the highest seed weight and the lowest by BGA 3.

2.2.2 RICE BEAN (*Vigna umbellata*)

Two advanced varietal trials, one consisting of normal maturity duration entries (AVT – ND) and the other of early maturing entries (AVT-ED) were constituted in rice bean. The summary of performance of the entries has been presented in table 50.

2.2.2.1 Advanced Varietal Trial – Normal Duration

The Advanced Varietal Trial on 18 normal maturity duration entries was proposed to be conducted at 10 locations in the plains. Data have been received from seven locations except Ludhiana, Delhi and Faizabad. Summary performance of these entries has been indicated in Table 50.

Seed yield level low to moderate at most of the centres. The average seed weight ranged from 3.37 at Bangalore to 9.32 q/ha at Ambikapur (Table 51). Significant differences

were observed among the entries for seed yield at all the locations. The range of variation was higher at Ambikapur (5.97 – 14.17 q/ha) and Rahuri (6.55 – 11.40 q/ha) centres. On the basis of average over seven locations the entry RBL 35 (7.32 q/ha) was the highest yielder followed by LRB 188 (6.92 q/ha). Many entries from Ludhiana were not planted at Hisar centre.

Mean flowering time was the earliest at Mettupalayam (46.89 days) centre closely followed by Bangalore (46.92 days) and Bhubaneswar centres while it was the longest at Hisar (76.83 days) centre (Table 52). At other locations moderate to late (51.81 – 76.83 days) flowering period was observed. Based on the average over locations LRB 355 (46.58 days) had the earliest flowering followed by LRB 351 (47.42 days) and LRB 354 (48.00 days).

Maturity period showed considerable variation among the locations but very little among the entries. While earliest maturity was observed at Bangalore (76.16 days) centre, it was the most delayed at Hisar (120.00 days) centre (Table 53). The range of variation was relatively higher at Ranchi (86.75 – 107.50 days) centre. On the basis of average over the locations BRB 1 (87.63 days) and LRB 202 were the earliest flowering lines followed closely by LRB 351 (87.88 days).

Plant height showed extreme variation ranging from 45.32 to 164.58 cm at Bangalore and Hisar centres, respectively (Table 54). At other centres moderate to high (64.87 – 135.07 cm) plant height was observed. Based on the average over the locations the entry RBL 99 (117.83 cm) had the maximum plant height. Other entries in order of merit were RBL 6 (115.80 cm) and RBL 36 (105.90 cm).

Weight of 100 seeds was comparatively higher at Hisar (6.16 g) followed by Mettupalayam (6.10 g) and Ranchi (6.00 g) centres (Table 55). The range of variation was maximum at Mettupalayam (5.58 – 7.05 g) centre. Based on the average over two locations LRB 202 (5.97 g) had the boldest seed and RBL 50 (5.28 g) the smallest.

Number of primary branches was recorded at six centres. The average number of primary branches was highest at Mettupalayam (5.99) and lowest (1.64) at Bangalore (Table 56).

2.2.2.2 *Advanced Varietal Trial – Early Duration*

The Advanced Varietal Trial on 15 early maturing rice bean entries, taken both from the hills as well as the plains, was planned to be conducted at seven locations. Data have

been received from four locations. The summary of performance of the entries has been presented in table 57.

Significant differences were observed among the entries for seed yield at all the locations (Table 58). Yield level was high at Ambikapur (11.80 q/ha) centre but low at Bangalore (2.93 q/ha), Hisar (3.81 q/ha) and Bhubaneswar (6.81 q/ha) centres. The range of variation was also high at Ambikapur (3.05 – 20.38 q/ha) centre. On the basis of average over the locations the entry, KHRB 1 (8.11 q/ha) was the highest yielder followed by the PRR 2 (8.02 q/ha) and LRB 351 (7.08 q/ha).

Flowering time was the earliest at Bhubaneshwar (44.47 days) and longest at Hisar (76.15 days) centre (Table 59). Moderate to late (49.72 – 68.24 days) flowering was observed at other centres. Range of variation among the entries was comparatively low at most of the locations except at Ambikapur centre. Based on the average over locations LRB 355 (47.42 days) had the earliest flowering time followed by LRB 354 (47.61 days).

Maturity period recorded at four locations showed that it was the earliest at Bangalore (74.52 days) and longest at Hisar (120.00 days) centre (Table 60). Maturity period at Bhubaneshwar was moderate (94.83 days) while at Ambikapur centre it was late (111.33 days). On the basis of average over locations LRB 355 (87.42 days) showed earliest maturity followed closely by LRB 354 (87.92 days) and LRB 303 (89.56 days).

Plant height was the highest at Hisar (157.40 cm) and lowest at Bangalore (37.99 cm) centre, while it was moderate at Ambikapur (139.90 cm) and Bhubaneshwar (89.57 cm) centres (Table 61). Variation for plant height was the highest at Hisar (135.00 – 190.00 cm) followed by Ambikapur (79.80 – 168.53 cm) centre. The overall average showed that LRB 234 (120.05 cm) had the highest plant height and LRB 99 (116.60 cm) the lowest.

Weight of 100 seeds also showed much variation among the centres. The average test weight was 6.19 g at Hisar centre and 4.57 g at Bangalore centre (Table 62). Based on the average over locations RBL 33-1 (5.76 g) had the highest 100 seed weight followed by KHRB 2 (5.70 g) and RBL 35 (5.57 g). Much variation was not observed among the entries for average seed weight.

Number of primary branches recorded at three centres did not show much variation from location to location (Table 63). It ranged from 1.00 at Bangalore to 3.87 at Ambikapur centre. The entry, LRB 122 (3.00) had the highest average number of primary branches.

2.2.3 FABA BEAN (*Vicia faba*)

2.2.3.1 Advanced Varietal Trial

The Advanced Varietal Trial consisting of 14 entries was planned to be conducted at seven locations in the plains. Results have been received from four centres. The summary of performance of the entries has been presented in table 64.

Significant differences were observed among the entries for seed yield at all the centres. Mean seed yield levels were quite high at Hisar (38.50 q/ha) and Ambikapur (23.75 q/ha) centres but low at Ranchi (8.46 q/ha) (Table 65). The range of variation in seed yield among the entries was from 30.42 to 44.70 q/ha at Hisar, 18.75 to 31.86 q/ha at Ambikapur, 7.73 to 13.19 q/ha at Ranchi and 13.65 to 22.90 q/ha at New Delhi centre. The average over the locations showed that seed yield was the highest in the entry, HB 430 (28.09 q/ha) and lowest in PRT 12 (19.85 q/ha).

Flowering time ranged from 64.69 days at Ranchi to 81.43 days at New Delhi centre (Table 66). At Ranchi and Ambikapur (65.88 days) centres flowering was the earlier as compared to that at New Delhi (81.43 days) centre. Based on the average over the locations HB 43 (66.56 days) was the earliest flowering line followed by HRB 193 (66.73 days) and NDF 1 (67.33 days).

Maturity period varied among the locations with mean maturity period ranging from 132.00 days at Ambikapur to 165.86 days at Hisar centre (Table 67). Little variation was observed among New Delhi and Ranchi centres with respect to maturity. On the basis of over all mean, HB 43 (141.54 days) had the earliest maturity followed by BSH 9 (142.04 days) having a very low margin of difference.

Plant height was the highest at Hisar (79.08 cm) followed by Ambikapur (63.33 cm) centre (Table 68). Slightly lower plant height was observed at New Delhi (52.02 cm) and Ranchi (59.64 cm) centres. Variation in plant height was higher at Hisar (73.60 – 86.60 cm) as compared to other centres. Based on the average over the locations HB 430 (72.31 cm) showed the highest plant height and the HB 180 (59.11 cm) the lowest.

Pod yield recorded at three locations showed wide variation among the centres (Table 69). It was the highest at Hisar (145.86 q/ha) and the lowest at Ranchi (37.17 q/ha). Based on the average HB 405 (100.76 q/ha) had the highest pod yield.

Number of primary branches recorded at four centres revealed that it was the highest at Ambikapur (5.22) and lowest at Ranchi (2.48) centre (Table 70). Based on average HB 430 (5.00) had the highest number of primary branches.

Weight of 100 seeds recorded at 4 locations showed slight variation among the centres. Mean seed weight was the highest at Ambikapur (31.27 g) and the lowest at Hisar (24.40 g) centre (Table 71). Variation among the entries at individual centres was from 27.30 to 34.40 g at Ambikapur, 20.70 g to 30.00 g at Hisar, 23.73 to 28.18 g at New Delhi and 24.86 to 31.73 g at Ranchi centres. Based on the average over the locations HB 131 (30.48 g) had the boldest seed.

Number of pods per plant was high at Hisar (44.79) and low at Ambikapur (21.90) centre (Table 72). At New Delhi centre it was 26.70. Based on average the entry HB 428 (40.17) had the highest number of pods per plant.

2.2.4 WINGED BEAN (*Psophocarpus tetragonolobus*)

2.2.4.1 Observation Row

The Observation Row consisting of 10 entries mainly from Akola and Bangalore centres was planned to be conducted at six locations but, data have been received only from four locations. The summary of performance of the entries has been given in Table 73. Many entries showed superiority over the check variety, AKWB 1.

Pod yield recorded at two centres showed wide variation among the centres as well as entries (Table 74). It was the highest in the entry EC 178313 (1503.25 kg/plot) and the lowest in EC 142665 (822.00 kg/plot) based on the average. Pod yield was the highest at Ranchi (1895.45 kg/plot) and the lowest at Rahuri (251.10 kg/plot).

Seed yield per plot (Table 75) was the highest at Ambikapur (523.50 g/plot). The average seed yield at various locations ranged from 129.28 – 523.50 g/plot. The entry Mysore Local yielded the highest (314.83 g) and the check, AKWB 1 (260.25 g) the lowest. Average seed yield per plot was the lowest at Rahuri (129.28 g).

Flowering time of the entries recorded at four centres ranged from 68.50 to 93.15 days at different centres (Table 76). However, the variation for flowering at Ambikapur (85.50 – 100.25 days) was considerable. Based on average the entry EC 38955 (72.88 days) showed the earliest flowering and the entry, EC 178313 (79.81 days) longest flowering time, respectively.

Maturity period of the entries was recorded at three centres (Table 77). Variation in maturity period was negligible at most of the centres. Maturity was the earliest at Bangalore (152.80 days) and Rahuri (161.50 days), while it was late at Ranchi (184.50 days) centres. The entry IC 26945 was the earliest maturing entry (163.50 days).

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

Pods per plant showed wide variation among the locations. While it was 117.20 at Ranchi centre but only 24.59 at Bangalore centre (Table 79). IC 26945 had the highest pod per plant (79.23). 100 seed weight was higher at Ranchi (32.32 g) and Ambikapur (32.04 g) than at other centres (Table 80). Based on the average NBRI Sel. (31.22 g) had the highest seed weight.

2.2.5 KALINGADA (*Citrullus lanatus*)

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

2.2.5.1 Advanced Varietal Trial

The Advanced Varietal Trial consisting of 14 entries was planned to be conducted at three locations. Results have been received from two locations. The summary of performance of the entries has been given in table 81. Seed yield levels were higher at S.K. Nagar (1.39 q/ha) as compared to those of Mandor (0.86 q/ha) centre (Table 82). The range of variation was also highest at S.K. Nagar (0.60 – 2.45 q/ha) followed by Mandor (0.50 – 1.70 q/ha) centre. The overall yield of the entries ranged from 0.59 to 1.71 q/ha, the entry, SKNK 3 was the highest yielder and SKNK 17 the lowest.

Flowering time recorded at two centres showed that there was little variation (45.36 – 50.62 days) among the centres (Table 83). Based on the average over two locations SKNK 17 (46.00 days) was the earliest flowering line followed by SKNK 3 (47.33 days) and SKNK 16 (47.67 days) having a very little difference in flowering period.

Maturity period of the entries was lower at Mandor (68.24 days) centre than those of S.K. Nagar (88.81 days) centre (Table 84). Variation in maturity period was higher at S.K.

Nagar (65.00 – 72.00 days) centre while it was quite low at Rahuri (82.33 – 88.33 days) centre. The over all mean data over the location showed that SKNK 19 (76.17 days) had the earliest maturity.

Weight of 100 seed was higher at S.K. Nagar (6.15 g) centre and lower at Mandor (5.82 g) centre (Table 85). The range of variation was also higher at S.K. Nagar (5.90 – 6.30 g) followed by Mandor (5.60 – 6.03 g) centre. The average over the locations showed that SKNK 5 (6.12 g) had the highest seed weight followed by SKNK 21 (6.08 g) and SKNK 17 (6.06 g).

Fruit yield per plot and other characters were recorded at two centres viz. Mandor and S.K. Nagar (Table 86). There was wide difference in yield attributes among the centres.

2.2.6 KANKODA (*Momordica dioica*)

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

2.2.6.1 Advanced Varietal Trial

The Advanced Varietal Trial on six Kankoda entries was planned to be conducted at seven locations. Seed was to be supplied by Ambikapur centre. However, data have been received from Ambikapur centre only.

Wide variation was observed among the genotypes with respect to fruit yield that ranged from 14.60 to 25.50 q/ha (Table 87). Much Variation was not observed for days to fruiting, number of fruits, etc.

2.2.7 TUMBA (*Citrullus colocynthis*)

Tumba is an important crop of the desert region having wide medicinal value. Its seed is used for extracting oil which is used for industrial purposes. In Tumba one Advanced Varietal Trial and an Initial Varietal Trial were formulated.

2.2.7.1 Advanced Varietal Trial

In the Advanced Varietal Trial eight entries were proposed to be evaluated at three locations. Results have been received from two locations viz. Mandor and S.K. Nagar only. The summary of performance of the entries has been given in table 88.

Significant differences were observed among the entries at both the locations (Table 89), though seed yield was quite low. The mean seed yield was 1.94 q/ha at Mandor and 1.95 q/ha at S.K. Nagar. There was considerable variation in seed yield at Mandor (1.41 – 2.25 q/ha) centre. Overall mean of the entries showed that GP 183 (2.24 q/ha) yielded the highest and GP 181 (1.60 q/ha) the lowest.

Flowering time recorded at S.K. Nagar and Mandor centres ranged from 52.97 to 88.21 days (Table 90). Flowering was early at S.K. Nagar centre. The entry, GP 3 (67.88 days) showed the earliest flowering.

Maturity period of the entries also showed much variation between the centres. Entries matured in 81.38 days at S.K. Nagar while they took 180.63 days at Mandor centre (Table 91). Based on average the entry, GP 3 (133.00 days) was the earliest maturing entry. However, much difference was not found among the entries for maturity period.

Seed weight per fruit recorded at two centres showed that it was marginally higher at Mandor (13.81 g) followed by S.K. Nagar (11.23 g) centres (Table 92). Based on the average over locations the entry, GP 194 (15.77 g) yielded the highest and GP 3 (10.58 g) the lowest.

Number of fruits per plot was higher at S.K. Nagar (47.56 per plant) and low at Mandor (25.78 per plant) centre (Table 93). Variation in number of fruits was also high (19.20 – 34.00 per plant) at Mandor centre. Based on the average GP 59 (40.88 per plant) had the highest number of fruits per plant.

Test weight recorded at two centres showed that it was marginally higher at S.K. Nagar (2.71 g) followed by Mandor (2.68 g) centres (Table 94).

Circumference of fruit, fruit yield per hectare, etc. recorded at Mandor showed wide variation (Table 95).

2.2.7.2 Initial Varietal Trial

The Initial Varietal Trial was constituted with 12 entries and proposed to be conducted at two locations. Results have been received from both the locations. The summary of performance of the entries has been given in Table 96. Significant difference in yield was observed among the entries (Table 97). Seed yield was higher at Mandor centre (2.05 q/ha). Based on the average GP 233 and GP 255 (1.80 q/ha) had the highest seed yield.

Flowering time of the entries ranged from 65.00 to 66.67 days, the entry GP 27 having the earliest flowering time (Table 98).

Maturity period of the entries showed very little variation (131.67 – 141.00 days) (Table 99). GP 233 was the earliest maturing (131.67 days) entry based on the average.

Number of fruits per plant showed considerable variation ranging from 24.06 – 53.62 (Table 100). The entry GP 255 (46.50) had the highest fruit number plant.

Test weight of the entries ranged from 2.68 to 2.78 g (Table 101). The entry GP 31 (2.82 g) had the highest test weight.

Other yield attributes of tumba have been presented in Table 102.

2.2.8 JATROPHA (*Jatropha* spp.)

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

2.2.8.1 *Advanced Varietal Trial*

The Advanced Varietal Trial with five entries was proposed to be conducted at seven centres. Results have been received from two centres. The summary of performance of the entries has been given in Table 103. The seed yield recorded in five genotypes has been presented in Table 104. Seed yield was higher at Hisar centre as compared to that of Bhubaneswar centre. It ranged from 1.12 to 2.80 q/ha, at Bhubaneswar centre while it was from 2.66 to 4.00 q/ha at Hisar. The genotype Chhatrapati (3.40 q/ha) was the highest yielder based on the average over two locations followed by SKN Big (2.68 q/ha) and Urlikanchan (2.57 q/ha).

Ancillary characters have been recorded at Mandor, Bhubaneswar and Hisar centres. Plant height was very high at Bhubaneswar (286.65 cm), medium at Hisar (129.50 cm) and low (46.90 cm) at Mandor (Table 105).

Stem girth at Bhubaneswar was higher (11.55 cm) than that at Hisar (8.04 cm) or Mandor (8.51 cm) centre (Table 106). Based on the average performance S.K. Nagar Big (10.20 cm) had the highest stem girth.

Much variation was observed in test weight among the entries (Table 107). Based on single location data Urlikanchan (51.23 g) had the highest test weight.

2.2.9 PARADISE TREE (*Simarouba glauca*)

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

2.2.10 GUAYULE

Germplasm maintenance and evaluation work were to be carried out at Hisar and S.K. Nagar centres. 14 germplasm lines are being maintained at Hisar.

2.2.11 JOJOBA

Observation Row Trial comprising 8-10 accessions was to be conducted at S.K. Nagar and Mandor centres. Results have not been received from the centres.

2.2.12 ATRIPLEX

Faizabad, Hisar and Mandor centres were entrusted with the responsibility of initiating work. Results have not been received from these centres.

2.2.13 HENNA

Mandor centre was given the responsibility to initiate germplasm evaluation work. Progress has not been reported by the centre.

2.2.14 SALVALDORA

Mettupalayam, Faizabad, New Delhi, Hisar and Bachau were supposed to initiate the programme. No report has been received from these centres.

2.2.15 PONGANIA

Mettupalayam centre was given responsibility of growing kharif germplasm but not results have been received.

Table 43: Performance of Grain Amaranth entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 10 ml seed weight (g)	Mean yield over locations (q/ha)	Percent increase/decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						GA 1	Suvarna	
1	RMA 2	116.08	6.40	12.53 (7)	16.36	58.64	7.67	2/7
2	RMA 3	118.26	6.20	10.38 (7)	-3.61	31.41	-10.81	1/7
3	RMA 4	116.80	6.39	12.77 (7)	18.59	61.67	9.72	2/7
4	SKNA 7	113.23	6.41	12.54 (7)	16.46	58.76	7.75	3/7
5	SKNA 21	115.44	6.40	11.12 (7)	3.24	40.74	-4.48	1/7
6	RGAS 92-10-1	116.33	6.52	12.65 (7)	17.42	60.08	8.65	4/7
7	IC 41998	96.60	5.92	11.18 (4)	3.84	41.56	-3.92	1/7
8	IC 120588	104.11	6.07	13.84 (5)	28.51	75.20	18.91	4/7
9	IC 35696	96.30	5.96	11.21 (4)	4.09	41.91	-3.69	2/4
10	IC 32195	97.90	5.94	9.68 (4)	-10.13	22.52	-16.84	2/4
11	BGA 2	113.56	6.24	11.23 (6)	4.31	42.21	-3.48	3/6
12	BGA 3	104.96	6.14	12.03 (4)	11.72	52.31	3.37	2/4
13	MGA 1	104.38	6.07	6.75 (3)	-37.31	-14.54	-42.00	0/3
14	MGA 2	113.30	6.83	6.36 (4)	-40.99	-19.55	-45.40	1/4
15	GA 1 (C)	115.97	6.10	7.90 (6)	-26.65	0.00	-32.13	-
16	Suvarna (C)	102.68	6.04	11.64 (5)	8.08	47.34	0.00	-
17	Annapurna (c)	91.50	5.43	11.21 (2)	4.04	41.84	-3.74	-
18	GA 2 (C)	133.45	7.12	10.26 (3)	-4.70	29.92	-11.83	-
19	Local check	115.75	-	9.44 (1)	-12.35	19.49	-18.90	-
Trial mean		109.82	6.23	10.78				

Table 44. Grain Yield (q/ha) in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		New Delhi (Del.)		Ranchi		Ambikapur		Bhubaneswar		Akola (Del.)		Mandor		Bangalore (Del.)		Mettupalayam		Rahuri		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	RMA 2	16.49*	4	6.75	5	4.31	5	16.61	6	8.05	10	21.75	9	27.77*	2	4.63	11	2.70	11	11.80	7	12.53	5	2/7
2	RMA 3	13.43	10	9.63	6	2.91	8	12.64	9	7.92	11	19.00	11	23.61*	4	1.76	16	2.03	12	10.13	10	10.38	12	1/7
3	RMA 4	20.10*	1	4.36	8	4.00	6	16.25	7	7.57	12	27.75	4	28.33*	1	3.15	13	1.61	13	11.54	8	12.77	2	2/7
4	SKNA 7	14.17	9	8.56	3	6.29	2	19.59*	2	9.10	7	28.75	3	24.99*	3	1.85	15	0.80	15	12.85*	2	12.54	4	3/7
5	SKNA 21	14.91	8	7.47	4	6.64	1	18.19	4	9.07	8	18.00	14	15.83	8	4.19	12	0.90	14	12.29*	4	11.12	11	1/7
6	RGAS 92-10-1	17.23*	3	9.22	2	4.36	4	21.53*	1	10.73*	4	27.25	5	16.38	7	7.31	9	4.41	9	13.89*	1	12.65	3	4/7
7	IC 41998	14.91	8							8.86	9					11.11	3	8.61	5	12.35*	3	11.18	10	1/7
8	IC 120588	18.15*	2					17.11	5	11.22*	3	32.25	1			10.56	4	9.87	3	12.85*	2	13.84	1	4/7
9	IC 35696	15.75	6							7.45	14					7.41	8	9.52	4	12.13*	6	11.21	9	2/4
10	IC 32195	15.93*	5							7.37	15					12.31	1	3.18	10	12.24*	5	9.68	14	2/4
11	BGA 2	16.49*	4			2.22	9	10.06	10	14.01*	2	26.50	6			9.44	7	17.63	1	7.00	12	11.23	8	3/6
12	BGA 3							19.30*	3	14.26*	1	24.33	7			11.94	2	7.81	7	6.76	13	12.03	6	2/4
13	MGA 1			3.77	9					7.54	13	31.67	2			9.88	5	6.54	8	6.18	14	6.75	17	0/3
14	MGA 2			5.62	6	2.18	10			6.95	16	21.25	10			5.55	10	10.74	2	5.55	15	6.36	18	¼
15	GA 1 (C)	15.47	7	2.59	10	3.33	7			9.25	6	18.75	12	16.94	5	2.49	14	0.29	16	10.00	11	7.90	16	
16	Suvarna (C)	12.32	11							10.33	5	22.50	8	16.66	6	9.54	6	8.12	6	10.76	9	11.64	7	
17	Annapurna (c)	9.36	12											13.05	9							11.21	9	
18	GA 2 (C)			5.25	7	5.96	3	15.39	8			18.25	13	9.44	10							10.26	13	
19	Local check													9.44	10							9.44	15	
	Mean	15.34		6.32		4.22		16.67		9.36		24.14		20.24		7.07		5.92		10.52		10.77		
	CD (5%)	0.42		5.29		1.01		3.26		0.43		10.87		3.86		3.31		0.74		1.43				
	CV (%)	14.64		55.01		16.52		13.50		3.32		32.50		13.79		33.80		11.47		9.82				

Table 45. Days to Flowering in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		New Delhi		Ranchi		Akola		Mandor		Bangalore		Mettupalayam		Bhubaneswar		Ambikapur		Rahuri		Overall		
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	RMA 2	52.50	5	79.67	2	98.50	6	69.75	6	43.00	3	50.25	4	51.75	9	54.75	11	86.00	6	53.75	6	63.99	13	
2	RMA 3	51.00	2	82.33	5	93.50	4	76.50	12	46.25	6	55.75	12	55.00	14	54.00	9	93.50	8	56.00	9	66.38	18	
3	RMA 4	53.75	8	83.67	7	99.00	7	69.75	6	45.25	5	52.25	9	53.50	13	52.25	6	85.75	5	54.00	7	64.92	16	
4	SKNA 7	54.00	9	85.33	8	83.25	1	66.75	4	47.25	7	53.75	10	52.50	10	49.25	1	85.00	3	57.00	11	63.41	12	
5	SKNA 21	54.75	11	80.67	3	88.25	3	69.75	6	50.50	9	53.75	10	53.25	12	51.00	4	83.75	2	56.50	10	64.22	14	
6	RGAS 92-10-1	53.50	7	77.33	1	84.00	2	61.50	2	44.25	4	47.50	2	44.50	7	54.50	10	81.75	1	55.50	8	60.43	11	
7	IC 41998	54.00	9									52.25	9	42.75	4	52.00	5			50.00	2	50.20	4	
8	IC 120588	53.50	7					65.00	3			51.75	7	43.25	5	51.00	4	85.00	3	53.00	4	57.50	7	
9	IC 35696	52.25	4									52.00	8	45.00	8	49.50	2			52.00	3	50.15	3	
10	IC 32195	55.50	12									54.00	11	52.75	11	53.25	8			53.00	4	53.70	6	
11	BGA 2	54.50	10			96.00	5	71.00	7			50.25	4	44.25	6	52.00	5	94.75	9	56.00	9	64.84	15	
12	BGA 3							73.33	10			51.00	5	42.25	2	49.50	2	86.50	7	53.25	5	59.31	9	
13	MGA 1			82.67	6			74.25	11			51.50	6	42.50	3	52.50	7			56.00	9	59.90	10	
14	MGA 2			81.33	4	100.00	10	61.00	1			35.00	1	38.50	1	50.50	3			47.25	1	59.08	8	
15	GA 1 (C)	53.25	6	82.33	5	99.75	9	72.00	9	60.25	10	54.00	11	56.00	15	54.50	10			57.00	11	65.45	17	
16	Suvarna (C)	51.25	3					71.75	8	50.25	8	49.25	3	43.25	5	55.00	12			53.00	4	53.39	5	
17	Annapurna (c)	39.50	1							35.00	1												37.25	1
18	GA 2 (C)			79.67	2	99.50	8	68.25	5	40.00	2							85.50	4				74.58	19
19	Local check									40.00	2												40.00	2
	Mean	52.38		81.50		94.18		69.33		50.20		50.89		47.56		52.22		86.75		53.95		58.35		
	CD (5%)	2.25		2.07		4.00		6.71		3.25		1.54		3.70		0.79		1.62		3.57				
	CV (%)	3.10		3.04		2.93		6.99		4.85		2.18		5.61		1.09		1.29		4.77				

Table 46. Days to Maturity in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		New Delhi		Bhubaneswar		Ranchi		Akola		Mandor		Bangalore		Mettupalayam		Ambikapur		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RMA 2	104.75	6	137.33	2	97.00	5	166.25	5	107.25	7	116.75	3	85.50	10	90.25	2	138.75	3	117.00	8	116.08	15
2	RMA 3	106.50	9	139.33	7	95.75	1	172.00	8	113.75	12	120.75	6	88.50	14	89.50	1	141.50	7	115.00	6	118.26	18
3	RMA 4	105.00	7	139.00	6	96.50	4	169.00	6	110.25	10	118.25	5	86.00	11	91.00	3	139.00	4	114.00	5	116.80	17
4	SKNA 7	104.75	6	138.00	3	96.00	2	133.75	1	106.50	6	117.00	4	84.50	9	93.50	6	140.25	5	118.00	9	113.23	9
5	SKNA 21	102.50	2	138.67	5	97.00	5	161.50	2	107.25	7	122.00	9	85.50	10	94.25	8	136.75	1	109.00	1	115.44	12
6	RGAS 92-10-1	106.50	9	137.33	2	97.50	7	164.75	3	105.25	4	121.75	8	86.25	12	94.00	7	138.00	2	112.00	3	116.33	16
7	IC 41998	103.00	4			97.25	6							78.00	6	91.75	4			113.00	4	96.60	3
8	IC 120588	104.75	6			97.50	7			100.75	1			76.75	4	91.75	4	141.25	6	116.00	7	104.11	6
9	IC 35696	103.25	5			96.25	3							78.50	7	93.50	6			110.00	2	96.30	2
10	IC 32195	102.75	3			97.50	7							82.00	8	94.25	8			113.00	4	97.90	4
11	BGA 2	106.50	9			96.00	2	169.00	6	106.50	6			77.75	5	91.00	3	143.75	8	118.00	9	113.56	11
12	BGA 3					97.00	5			110.00	9			75.25	2	92.50	5	139.00	4	116.00	7	104.96	8
13	MGA 1			137.00	1	97.00	5			103.50	2			78.00	6	94.75	10			116.00	7	104.38	7
14	MGA 2			138.33	4	96.00	2	170.00	7	105.50	5			70.75	1	95.50	11			117.00	8	113.30	10
15	GA 1 (C)	104.75	6	138.00	3	98.50	8	173.25	9	110.75	11	121.25	7	86.75	13	95.50	11			115.00	6	115.97	14
16	Suvarna (C)	105.75	8			99.00	9			103.75	3	121.75	8	76.00	3	94.50	9			118.00	9	102.68	5
17	Annapurna (c)	72.00	1									111.00	1									91.50	1
18	GA 2 (C)			138.00	3			165.00	4	108.25	8	115.75	2					140.25	5			133.45	19
19	Local check											115.75	2									115.75	13
	Mean	102.34		138.10		96.98		164.45		107.09		130.20		81.00		92.97		139.85		114.81		109.82	
	CD (5%)	2.00		0.80		0.76		22.25		7.06		2.63		3.19		1.00		2.36		3.07			
	CV (%)	1.41		0.33		0.57		9.33		4.75		1.53		2.84		0.77		1.17		1.93			

Table 47. Plant Height (cm) in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		New Delhi		Bhubaneswar		Ranchi		Akola		Mandor		Bangalore		Mettupalayam		Ambikapur		Rahuri		Overall		
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	RMA 2	185.75	3	116.55	9	135.00	5	87.75	8	103.70	8	126.50	1	176.50	15	192.75	5	104.10	7	173.25	12	140.19	13	
2	RMA 3	192.25	2	125.61	7	138.75	2	96.25	3	90.00	14	94.50	8	178.50	14	156.25	14	121.55	3	173.00	13	136.67	16	
3	RMA 4	184.75	4	135.22	3	132.00	10	93.75	5	100.98	11	108.00	6	180.25	13	193.75	4	104.45	6	171.25	15	140.44	12	
4	SKNA 7	165.75	11	117.95	8	128.75	12	91.90	7	118.35	3	120.75	3	187.00	11	186.00	7	112.05	5	167.75	16	139.63	14	
5	SKNA 21	183.75	5	143.22	2	134.00	7	91.95	6	103.58	10	121.00	2	188.00	10	187.75	6	101.90	9	171.75	14	142.69	11	
6	RGAS 92-10-1	159.75	12	114.22	10	135.00	5	94.63	4	103.68	9	106.25	7	186.50	12	192.75	5	102.00	8	186.75	7	138.15	15	
7	IC 41998	155.50	13			123.75	13							217.75	3	178.75	9			191.00	4	173.35	3	
8	IC 120588	168.50	10			122.75	14			95.45	13			197.25	9	180.50	8	126.15	2	194.75	3	155.05	6	
9	IC 35696	173.25	8			136.25	4							202.50	7	158.75	13			199.50	1	174.05	2	
10	IC 32195	171.25	9			130.50	11							221.25	2	195.25	3			198.25	2	183.30	1	
11	BGA 2	175.00	7			135.00	5	107.23	1	110.55	4			205.50	5	155.25	15	135.65	1	185.00	8	151.15	9	
12	BGA 3					137.25	3			131.67	1			209.75	4	161.00	12	99.35	10	190.75	5	154.96	7	
13	MGA 1			132.17	4	132.75	8			108.73	5			201.75	8	171.00	10			176.25	11	153.78	8	
14	MGA 2			188.78	1	139.50	1	84.95	9	120.28	2			221.75	1	213.75	1			181.25	9	164.32	4	
15	GA 1 (C)	196.00	1	130.11	5	132.50	9	99.45	2	106.83	7	120.50	4	188.00	10	201.50	2			179.25	10	150.46	10	
16	Suvarna (C)	180.50	6			134.75	6			100.10	12	120.00	5	203.50	6	162.75	11			190.00	6	155.94	5	
17	Annapurna (c)	88.50	14										57.75	10									73.13	18
18	GA 2 (C)			129.45	6			91.90	7	107.75	6	68.00	9					117.10	4				102.84	17
19	Local check												68.00	9									68.00	19
	Mean	170.04		133.33		133.03		93.98		107.26		111.13		197.86		180.48		112.43		183.11		142.00		
	CD (5%)	15.31		34.17		3.30		12.04		27.85		10.19		28.99		31.38		12.93		5.15				
	CV (%)	6.50		20.20		1.79		8.84		18.73		6.74		10.57		12.55		7.94		2.03				

Table 48. Inflorescence Length (cm) in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		New Delhi		Bhubaneswar		Ranchi		Akola		Mandor		Bangalore		Mettupalayam		Ambikapur		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RMA 2	91.50	3	63.00	7	59.85	8	30.75	8	17.95	7	64.00	1	51.50	7	66.25	4	29.45	4	51.30	5	52.56	10
2	RMA 3	90.25	4	57.78	10	65.13	1	33.30	5	11.25	10	54.50	5	51.00	8	58.25	8	19.85	10	50.20	7	49.15	13
3	RMA 4	97.00	2	75.22	2	62.33	4	33.40	4	18.33	5	64.00	1	60.25	2	68.75	3	25.50	9	48.98	9	55.38	5
4	SKNA 7	83.50	11	74.95	3	55.88	13	32.20	7	21.34	3	62.50	3	56.75	5	58.50	7	28.35	7	53.63	2	52.76	9
5	SKNA 21	90.00	5	67.26	4	62.10	5	32.70	6	16.65	8	63.25	2	57.25	4	56.75	9	29.25	5	47.50	11	52.27	11
6	RGAS 92-10-1	85.75	9	64.00	6	63.43	3	27.70	10	22.55	2	60.50	4	65.25	1	69.75	2	29.50	3	50.60	6	53.90	7
7	IC 41998	80.50	12			54.75	14							51.00	8	54.75	10			46.30	13	57.46	3
8	IC 120588	87.00	8			62.05	6			23.58	1			47.25	12	49.50	12	30.80	1	52.80	3	50.43	12
9	IC 35696	89.50	7			61.93	7							45.25	14	49.50	12			46.70	12	58.58	2
10	IC 32195	89.75	6			56.28	11							51.00	8	63.50	5			51.70	4	62.45	1
11	BGA 2	84.25	10			64.50	2	30.55	9	7.00	13			46.00	13	47.75	14	30.55	2	55.80	1	45.80	14
12	BGA 3					62.33	4			7.33	12			50.00	9	48.75	13	27.75	8	49.90	8	41.01	17
13	MGA 1			58.78	9	59.35	9			11.84	9			44.75	10	52.50	11			43.78	16	45.17	15
14	MGA 2			91.44	1	56.73	10	39.23	1	20.15	4			58.25	3	72.50	1			44.30	15	54.66	6
15	GA 1 (C)	102.00	1	60.11	8	56.28	11	34.60	2	11.20	11	53.00	6	54.75	6	59.00	6			46.10	14	53.00	8
16	Suvarna (C)	68.25	14			55.95	12			6.90	14	42.00	7	47.50	11	45.50	15			48.60	10	44.96	16
17	Annapurna (c)	76.00	13									38.50	9									57.25	4
18	GA 2 (C)			64.11	5			34.45	3	18.30	6	41.00	8					28.90	6			37.35	19
19	Local check											41.00	8									41.00	18
	Mean	86.80		67.67		59.93		32.89		15.31		58.43		52.36		57.59		27.99		49.26		50.80	
	CD (5%)	9.28		18.86		2.70		4.18		8.85		4.13		11.78		10.50		6.97		4.82			
	CV (%)	7.71		20.21		3.25		8.78		41.74		5.26		16.24		13.15		17.18		7.06			

Table 49. 10 ml Seed Weight (g) in Advanced Varietal Trial in Grain Amaranth: 2003 (Plains)

S. No.	Genotypes	Mettupalayam		New Delhi		Bhubaneswar		Bangalore		Ranchi		S.K. Nagar		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RMA 2	7.60	8	6.37	3	5.68	1	5.25	8	8.16	6	5.49	5	6.25	8	6.40	5
2	RMA 3	7.46	12	5.80	10	5.68	1	4.98	12	7.16	10	5.47	6	6.87	1	6.20	8
3	RMA 4	7.66	6	6.72	1	5.60	6	5.25	8	7.74	7	5.54	3	6.20	9	6.39	6
4	SKNA 7	7.66	6	6.30	4	5.64	2	5.35	5	8.25	4	5.32	10	6.38	5	6.41	4
5	SKNA 21	7.90	1	6.00	8	5.60	6	5.53	2	8.53	2	5.33	9	5.92	14	6.40	5
6	RGAS 92-10-1	7.73	3	6.16	6	5.63	3	5.30	6	8.93	1	5.44	7	6.43	3	6.52	3
7	IC 41998	7.65	7			5.60	6	5.05	10			5.23	12	6.08	12	5.92	15
8	IC 120588	7.68	5			5.51	9	5.18	9			5.57	2	6.42	4	6.07	11
9	IC 35696	7.82	2			5.68	1	5.00	11			5.30	11	5.99	13	5.96	13
10	IC 32195	7.47	11			5.52	8	5.28	7			5.50	4	5.91	15	5.94	14
11	BGA 2	7.55	10			5.61	5	5.30	6	7.45	9	5.44	7	6.10	11	6.24	7
12	BGA 3	7.33	13			5.48	11	5.43	4					6.34	6	6.14	9
13	MGA 1	7.56	9	6.25	5	5.62	4	4.65	13					6.29	7	6.07	11
14	MGA 2	7.90	1	6.55	2	5.54	7	5.95	1	8.38	3			6.69	2	6.83	2
15	GA 1 (C)	7.32	14	5.94	9	5.45	12	5.28	7	7.46	8	5.58	1	5.65	16	6.10	10
16	Suvarna (C)	7.70	4			5.50	10	5.48	3			5.33	9	6.19	10	6.04	12
17	Annapurna (c)											5.43	8			5.43	16
18	GA 2 (C)			6.07	7					8.17	5					7.12	1
	Local check	7.62		6.22		5.58		5.27		8.02		5.43		6.23		6.23	
	CD (5%)	0.16		1.02		0.08		0.64		0.87		0.56		0.09			
	CV (%)	1.49		9.51		1.03		8.83		7.51		0.75		1.07			

Table 50: Performance of Rice bean (Normal duration) entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over location (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						RBL 1	RBL 6	
1	RBL 35	97.71	5.66	7.35 (7)	16.46	23.50	13.58	3/7
2	RBL 36	97.75	5.36	5.71 (7)	-9.47	-3.99	-11.70	1/7
3	RBL 50	98.32	5.28	6.53 (7)	3.44	9.70	0.88	1/7
4	RBL 99	100.71	5.75	6.27 (6)	-0.65	5.36	-3.10	0/6
5	LRB 188	96.96	5.56	6.92 (7)	9.60	16.23	6.89	2/7
6	LRB 197	98.71	5.42	6.48 (7)	2.67	8.88	0.13	1/7
7	LRB 199	96.82	5.43	6.02 (7)	-4.53	1.24	-6.89	1/7
8	LRB 202	87.63	5.97	5.52 (2)	-12.52	-7.23	-14.68	0/2
9	LRB 224	98.43	5.41	5.98 (7)	-5.27	0.46	-7.61	0/7
10	LRB 234	98.00	5.66	6.28 (7)	-0.51	5.51	-2.97	1/7
11	LRB 303	91.50	5.41	6.49 (6)	2.79	9.01	0.25	1/6
12	LRB 330	96.50	5.48	5.65 (7)	-10.47	-5.05	-12.68	0/7
13	LRB 349	92.29	5.62	5.58 (6)	-11.56	-6.20	-13.74	0/6
14	LRB 351	87.88	5.90	5.89 (6)	-6.67	-1.02	-8.97	0/6
15	LRB 354	88.33	5.63	6.25 (6)	-0.93	5.06	-3.38	0/6
16	LRB 355	89.50	5.43	5.78 (6)	-8.39	-2.85	-10.66	0/6
17	BRB 1	87.63	5.37	6.57 (2)	4.16	10.46	1.59	½
18	BRB 2	101.25	5.13	8.47 (2)	34.23	42.35	30.91	0/2
19	RBL 1 ©	96.57	5.41	5.95 (7)	-5.71	0.00	-8.04	
20	RBL 6 ©	100.75	5.47	6.47 (6)	2.54	8.74	0.00	
Trial mean		95.16	5.52	6.31				

Table 51. Seed Yield (q/ha) in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Mettupalayam		Ranchi		Bhubaneswar		Ambikapur		Bangalore		Rahuri		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	RBL 35	5.56*	2	6.97	1	6.02	8	6.91	7	11.04*	2	3.54	6	11.40*	1	7.35	2	3/7
2	RBL 36	3.39	6	2.49	19	6.59	2	4.67	16	12.50*	3	2.60	13	7.75	13	5.71	17	1/7
3	RBL 50	3.73	3	5.16	4	5.31	12	6.73	8	10.77	4	2.95	12	11.04*	3	6.53	5	1/7
4	RBL 99	3.01	10	3.91	14	5.42	10	7.24	6	10.42	5			7.62	14	6.27	10	0/6
5	LRB 188	3.54	5	4.79	7	5.41	11	6.91	7	14.17*	1	2.50	14	11.09*	2	6.92	3	2/7
6	LRB 197	3.35	7	4.38	11	5.98	8	8.18*	4	10.10	6	3.99	2	9.38	5	6.48	7	1/7
7	LRB 199	5.75	1	4.63	10	6.33	4	6.15	11	8.69	12	4.08	1	6.55	18	6.02	12	1/7
8	LRB 202			3.57	16									7.47	16	5.52	20	0/2
9	LRB 224	3.69	4	3.49	17	7.24	1	6.34	9	8.68	13	3.54	6	8.86	7	5.98	13	0/7
10	LRB 234	3.31	8	4.89	6	5.90	9	9.45*	2	9.46	9	3.40	8	7.53	15	6.28	9	1/7
11	LRB 303			4.64	9	6.25	6	9.17*	3	7.58	14	3.27	9	8.01	11	6.49	6	1/6
12	LRB 330	3.39	6	4.14	13	5.16	13	6.11	12	9.52	8	3.02	10	8.21	9	5.65	18	0/7
13	LRB 349			3.86	15	5.00	14	6.32	10	7.48	15	3.57	5	7.26	17	5.58	19	0/6
14	LRB 351			4.34	12	6.17	7	6.15	11	6.77	16	3.67	3	8.24	8	5.89	15	0/6
15	LRB 354			5.12	5	6.59	2	5.81	14	5.97	18	3.64	4	10.38	4	6.25	11	0/6
16	LRB 355			4.77	8	6.30	5	6.00	13	6.33	17	3.23	11	8.05	10	5.78	17	0/6
17	BRB 1			3.21	18			9.94*	1							6.57	4	½
18	BRB 2			6.90	2					10.04	7					8.47	1	0/2
19	RBL 1 ©	3.23	9	6.43	3	6.56	3	4.57	15	9.42	10	3.47	7	7.99	12	5.95	14	
20	RBL 6 ©	3.73	3			6.30	5	7.33	5	8.73	11	3.47	7	9.23	6	6.47	8	
	Mean	3.81		4.61		6.03		6.89		9.32		3.37		8.67		6.31		
	C.D. (5%)	0.33		0.74		1.35		0.24		1.65		0.83		1.53				
	CV (%)	5.12		11.47		16.19		2.47		12.80		17.75		12.72				

Table 52. Days to Flowering in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Ranchi		Bhubaneswar		Ambikapur		Bangalore		Mettupalayam		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 35	79.00	5	55.25	11	47.75	5	76.25	11	48.50	10	39.75	1	54.00	8	57.21	10
2	RBL 36	78.00	4	50.25	5	48.75	9	71.25	5	47.75	8	50.50	11	52.00	4	56.93	9
3	RBL 50	79.00	5	58.00	13	48.00	7	74.25	7	47.00	6	49.25	7	51.00	3	58.07	14
4	RBL 99	74.00	1	56.50	12	50.50	12	74.25	7			42.25	4	49.00	1	57.75	13
5	LRB 188	75.00	2	54.00	8	45.75	5	74.00	6	46.00	3	49.00	6	52.50	6	56.61	8
6	LRB 197	78.00	4	59.00	14	51.50	13	76.00	10	47.25	7	50.00	9	58.00	11	59.96	18
7	LRB 199	75.00	2	53.00	7	49.50	10	78.25	13	48.00	9	50.00	9	56.00	9	58.54	16
8	LRB 202											50.50	11	50.00	2	50.25	6
9	LRB 224	75.00	2	53.00	7	52.00	14	74.75	8	47.00	6	42.25	4	57.00	10	57.29	11
10	LRB 234	79.00	5	55.25	11	53.25	15	74.00	6	46.25	4	42.25	4	54.00	8	57.71	12
11	LRB 303			39.00	1	48.50	8	58.00	4	46.00	3	40.50	3	57.00	10	48.17	4
12	LRB 330	78.00	4	54.50	10	50.00	11	78.25	13	46.50	5	51.00	12	51.00	3	58.46	15
13	LRB 349			52.25	6	45.50	4	75.25	9	46.25	4	51.25	13	50.00	2	53.42	7
14	LRB 351			43.50	2	44.00	2	50.00	1	45.25	1	49.50	8	52.25	5	47.42	2
15	LRB 354			43.75	3	44.50	3	53.75	2	45.50	2	43.50	5	57.00	10	48.00	3
16	LRB 355			44.00	4	43.75	1	54.25	3	46.50	5	40.00	2	51.00	3	46.58	1
17	BRB 1					48.50	8					50.25	10			49.38	5
18	BRB 2							78.25	13			50.00	9			64.13	19
19	RBL 1 ©	76.00	3	55.25	11	50.00	11	77.75	12	48.50	10	49.25	7	53.00	7	58.54	16
20	RBL 6 ©	76.00	3	54.25	9	48.00	7	74.75	8	48.50	10			52.50	6	59.00	17
	Mean	76.83		51.81		48.32		70.74		46.92		46.89		53.18		55.17	
	CD (5%)			8.17		0.68		2.38		2.17		1.56		2.12			
	CV (%)			11.38		1.02		2.42		3.33		2.39		2.87			

Table 53. Days to Maturity in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Bhubaneswar		Hisar		Ranchi		Bangalore		Ambikapur		Mettupalayam		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 35	94.00	7	120.00	1	107.00	13	76.50	5	111.75	7	80.75	6	94.00	8	97.71	11
2	RBL 36	98.25	13	120.00	1	104.00	7	76.00	4	113.75	11	85.00	15	87.25	4	97.75	12
3	RBL 50	96.50	10	120.00	1	106.75	12	76.00	4	112.00	8	84.00	14	93.00	7	98.32	14
4	RBL 99	97.50	11	120.00	1	103.75	6			111.75	7	80.00	4	91.25	5	100.71	17
5	LRB 188	90.50	3	120.00	1	104.75	9	77.00	7	112.00	8	81.75	9	92.75	6	96.96	10
6	LRB 197	97.50	11	120.00	1	104.50	8	77.00	7	112.75	10	83.25	11	96.00	14	98.71	16
7	LRB 199	94.50	8	120.00	1	106.25	11	77.50	8	111.75	7	84.00	13	83.75	1	96.82	9
8	LRB 202											81.00	7	94.25	9	87.63	1
9	LRB 224	98.50	14	120.00	1	107.50	14	76.75	6	111.75	7	80.00	4	94.50	10	98.43	15
10	LRB 234	98.00	12	120.00	1	105.25	10	76.50	5	110.00	5	80.50	5	95.75	13	98.00	13
11	LRB 303	91.00	4			102.50	5	75.50	3	106.25	4	78.50	1	95.25	12	91.50	5
12	LRB 330	95.50	9	120.00	1	104.75	9	76.00	4	112.25	9	81.00	7	86.00	2	96.50	7
13	LRB 349	91.25	5			101.00	4	75.00	2	111.00	6	81.50	8	94.00	8	92.29	6
14	LRB 351	89.00	2			86.75	1	74.50	1	100.25	1	81.75	9	95.00	11	87.88	2
15	LRB 354	88.00	1			91.00	2	75.50	3	101.75	2	79.75	3	94.00	8	88.33	3
16	LRB 355	88.00	1			91.75	3	75.00	2	104.00	3	79.50	2	98.75	16	89.50	4
17	BRB 1	93.50	6									81.75	9			87.63	1
18	BRB 2									119.00	12	83.50	12			101.25	19
19	RBL 1 ©	95.50	9	120.00	1	103.75	6	76.75	6	111.75	7	82.00	10	86.25	3	96.57	8
20	RBL 6 ©	94.50	8	120.00	1	104.00	7	77.00	7	112.00	8			97.00	15	100.75	18
	Mean	93.97		120.00		102.07		76.16		110.32		81.55		92.71		95.16	
	CD (5%)	0.70				2.79		2.03		1.90		1.13		2.79			
	CV (%)	0.54				1.97		1.93		1.24		1.00		2.17			

Table 54. Plant Height (cm) in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Mettupalayam		Hisar		Ranchi		Bhubaneswar		Ambikapur		Bangalore		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 35	65.00	7	170.00	2	98.05	2	98.78	9	141.73	10	48.35	2	104.50	16	103.77	11
2	RBL 36	63.25	11	180.00	1	105.05	1	100.63	4	156.48	3	44.90	10	112.00	9	108.90	3
3	RBL 50	65.00	7	120.00	6	96.50	3	101.63	2	153.68	4	41.30	15	102.25	18	97.19	14
4	RBL 99	64.75	8	180.00	1	94.35	6	100.68	3	156.68	2			110.50	10	117.83	1
5	LRB 188	62.50	4	140.00	5	92.75	10	97.45	11	146.73	5	46.90	6	103.50	17	98.55	13
6	LRB 197	63.25	11	170.00	2	89.15	13	95.28	13	143.60	9	47.35	5	127.00	5	105.09	6
7	LRB 199	68.75	3	160.00	4	93.15	8	100.18	12	160.60	1	43.80	11	106.75	13	104.75	7
8	LRB 202	67.75	4											136.75	2	102.25	12
9	LRB 224	63.75	9	180.00	1	94.90	5	90.45	17	145.60	7	46.75	8	109.75	11	104.46	10
10	LRB 234	63.00	12	160.00	4	92.10	11	97.70	10	145.73	6	48.15	3	125.50	6	104.60	9
11	LRB 303	63.50	10			83.00	15	92.55	14	110.28	15	49.35	1	123.25	7	86.99	16
12	LRB 330	67.25	5	165.00	3	93.05	9	102.35	1	139.68	11	47.90	4	135.50	3	107.25	5
13	LRB 349	70.00	2			87.75	12	90.98	16	134.73	12	39.85	16	112.25	8	89.26	15
14	LRB 351	59.50	16			78.15	17	91.20	15	95.88	16	42.20	14	106.00	14	78.82	20
15	LRB 354	63.25	11			82.10	16	99.78	7	94.13	17	42.35	13	107.00	12	81.43	19
16	LRB 355	60.25	15			95.25	4	97.18	12	93.88	18	43.55	12	105.50	15	82.60	18
17	BRB 1	66.25	6					99.08	8							82.66	17
18	BRB 2	72.75	1							143.68	8					108.22	4
19	RBL 1 ©	62.75	13	170.00	2	85.85	14	100.43	5	133.93	14	46.85	7	133.25	4	104.72	8
20	RBL 6 ©			180.00	1	94.05	7	100.18	6	134.28	13	45.55	9	140.75	1	115.80	2
	Mean	64.87		164.58		91.48		97.58		135.07		45.32		116.78		99.26	
	CD (5%)	2.48				17.52		2.21		20.46		10.04		5.54			
	CV (%)	2.76				13.82		1.63		10.93		15.99		3.42			

Table 55. 100 Seed Weight (g) in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Bhubaneswar		Mettupalayam		Ranchi		Bangalore		Hisar		Ambikapur		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 35	5.77	2	6.40	5	5.35	2	4.53	14	6.20	3	5.05	9	6.35	4	5.66	4
2	RBL 36	4.99	16	6.05	10	4.98	8	4.70	11	6.10	4	5.00	10	5.70	12	5.36	14
3	RBL 50	5.41	8	5.30	16	4.84	13	4.70	11	5.80	6	5.15	7	5.78	10	5.28	15
4	RBL 99	5.19	12	6.10	8	5.02	7			6.35	2	5.30	5	6.53	2	5.75	3
5	LRB 188	4.79	17	6.28	6	4.95	9	4.95	7	6.40	1	5.00	10	6.58	1	5.56	7
6	LRB 197	5.45	7	5.58	15	5.13	5	4.80	9	6.40	1	5.20	6	5.35	15	5.42	11
7	LRB 199	5.06	14	6.13	9	5.16	4	4.80	9	6.35	2	5.10	8	5.38	14	5.43	10
8	LRB 202			5.60	14									6.33	6	5.97	1
9	LRB 224	5.28	11	5.88	12	4.79	14	5.13	4	5.95	5	5.10	8	5.75	11	5.41	12
10	LRB 234	5.82	1	6.65	3	5.32	3	5.08	5	6.10	4	4.90	11	5.78	10	5.66	4
11	LRB 303	5.09	13	6.50	4	4.71	16	4.55	13			6.00	2	5.63	13	5.41	12
12	LRB 330	5.61	3	6.05	10	4.67	17	4.83	8	6.10	4	4.75	12	6.35	4	5.48	8
13	LRB 349	5.03	15	7.05	1	5.49	1	5.28	2			5.05	9	5.80	9	5.62	6
14	LRB 351	5.59	4	6.70	2	5.08	6	5.33	1			6.30	1	6.38	3	5.90	2
15	LRB 354	5.47	6	6.40	5	4.90	11	5.03	6			5.75	2	6.25	7	5.63	5
16	LRB 355	5.31	10	5.83	13	4.88	12	5.23	3			5.45	3	5.90	8	5.43	10
17	BRB 1	4.54	18	6.20	7											5.37	13
18	BRB 2			5.20	17							5.05	9			5.13	16
19	RBL 1 ©	5.58	5	5.93	11	4.78	15	4.60	12	6.20	3	5.15	7	5.63	13	5.41	12
20	RBL 6 ©	5.34	9			4.91	10	4.73	10	5.95	5	5.35	4	6.53	2	5.47	9
	Mean	5.29		6.10		5.00		4.89		6.16		5.26		6.00		5.52	
	CD (5%)	0.17		0.16		0.60		0.76						0.37			
	CV (%)	2.27		1.86		8.70		11.20						4.48			

Table 56. Number of Primary Branches in Advanced Varietal Trial-I (Normal Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Bhubaneswar		Mettupalayam		Ranchi		Ambikapur		Bangalore		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RBL 35	2.70	13	5.25	8	1.95	10	4.00	3	2.00	1	3.23	14	3.19	16
2	RBL 36	2.45	16	7.00	1	2.40	6	3.80	5	1.60	7	3.40	11	3.44	9
3	RBL 50	2.83	12	6.75	2	1.95	10	3.88	4	1.15	11	3.48	9	3.34	12
4	RBL 99	2.90	10	6.50	3	2.15	9	3.78	6			3.60	8	3.79	4
5	LRB 188	3.15	7	5.75	6	2.30	8	3.33	12	2.00	1	3.30	13	3.31	14
6	LRB 197	3.35	6	5.25	8	2.40	6	4.28	2	1.95	2	4.15	3	3.56	6
7	LRB 199	3.15	7	5.00	9	2.35	7	3.68	7	2.00	1	3.83	7	3.34	12
8	LRB 202			6.00	5							4.03	5	5.02	2
9	LRB 224	3.45	5	6.00	5	2.70	1	3.68	7	1.85	3	4.25	1	3.66	5
10	LRB 234	3.93	2	6.00	5	2.30	8	3.53	9	1.55	8	3.38	12	3.45	8
11	LRB 303	3.48	4	6.00	5	2.30	8	3.40	11	1.40	9	3.40	11	3.33	13
12	LRB 330	2.60	14	6.25	4	2.65	2	3.40	11	1.80	4	3.45	10	3.36	11
13	LRB 349	2.85	11	6.50	3	2.35	7	3.60	8	1.35	10	4.08	4	3.46	7
14	LRB 351	2.98	8	6.25	4	2.30	8	3.05	13	1.35	10	3.00	16	3.15	17
15	LRB 354	2.55	15	6.00	5	2.45	5	3.05	13	1.35	10	2.98	17	3.06	18
16	LRB 355	2.95	9	6.00	5	2.60	3	3.45	10	1.65	6	3.15	15	3.30	15
17	BRB 1	4.00	1	5.50	7									4.75	3
18	BRB 2			6.50	3			3.60	8					5.05	1
19	RBL 1 ©	2.43	17	5.25	8	2.50	4	4.33	1	1.70	5	4.20	2	3.40	10
20	RBL 6 ©	3.50	3			2.30	8	3.60	8	1.60	7	3.98	6	3.00	19
	Mean	3.07		5.99		2.35		3.64		1.64		3.61		3.60	
	CD (5%)	0.23		1.19		0.46		0.45		0.83		0.56			
	CV (%)	5.38		14.33		14.26		8.88		36.51		11.14			

Table 57: Performance of Rice bean (Early duration) entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety		Frequency
						PRR 2	RBL 6	
1	KHRB 1	103.04	5.56	8.11 (4)	29.15	1.13	18.06	1/4
2	KHRB 2	101.75	5.70	6.70 (4)	6.71	-16.44	-2.45	0/4
3	RBL 33-1	100.96	5.76	6.07 (4)	-3.29	-24.27	-11.59	0/4
4	RBL 35	99.86	5.57	6.26 (4)	-0.38	-21.99	-8.94	¼
5	RBL 99	100.63	5.37	6.14 (4)	-2.17	-23.39	-10.57	0/4
6	LRB 122	101.38	5.24	6.62 (4)	5.41	-17.46	-3.64	0/4
7	LRB 224	100.71	5.36	6.43 (4)	2.32	-19.88	-6.47	0/4
8	LRB 234	103.50	5.43	6.80 (3)	8.33	-15.17	-0.97	0/3
9	LRB 303	89.56	5.08	3.80 (3)	-39.45	-52.59	-44.65	0/3
10	LRB 349	91.25	5.01	6.46 (1)	2.84	-19.47	-5.99	0/1
11	LRB 351	101.58	5.54	7.08 (4)	12.80	-11.68	3.11	¼
12	LRB 354	87.92	5.30	5.81 (3)	-7.44	-27.52	-15.39	1/3
13	LRB 355	87.42	5.34	4.62 (3)	-26.48	-42.43	-32.80	1/3
14	PRR 9401	97.00	5.09	4.47 (3)	-28.84	-44.28	-34.95	1/3
15	PRR 9402	100.15	5.40	6.48 (4)	3.26	-19.14	-5.61	2/4
16	RBL 6 (C)	102.19	5.47	6.87 (4)	9.39	-14.34	0.00	
17	PRR 2 (C)	100.79	5.27	8.02 (4)	27.71	0.00	16.74	
Trial mean		98.22	5.38	6.28				

Table 58. Seed Yield (q/ha) in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Bhubaneswar		Bangalore		Ambikapur		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	KHRB 1	2.82	12	5.87	12	3.37	3	20.38*	1	8.11	1	1/4
2	KHRB 2	3.08	10	4.56	15	2.33	11	16.84	3	6.70	6	0/4
3	RBL 33-1	2.97	11	6.52	9	2.82	8	11.98	9	6.07	13	0/4
4	RBL 35	5.48*	2	4.54	16	3.12	5	11.88	10	6.26	11	¼
5	RBL 99	2.82	12	7.31	7	2.43	10	12.02	8	6.14	12	0/4
6	LRB 122	3.81	4	6.98	8	2.64	9	13.05	5	6.62	7	0/4
7	LRB 224	3.73	5	7.81	5	2.18	13	11.98	9	6.43	10	0/4
8	LRB 234	3.50	8			3.99	2	12.92	6	6.80	5	0/3
9	LRB 303			5.64	14	2.33	11	3.44	13	3.80	17	0/3
10	LRB 349			6.46	10					6.46	9	0/1
11	LRB 351	5.67*	1	5.79	13	4.16	1	12.71	7	7.08	3	¼
12	LRB 354			9.13*	1	3.20	4	5.11	12	5.81	14	1/3
13	LRB 355			7.89*	4	2.91	7	3.05	14	4.62	15	1/3
14	PRR 9401	3.27	9	8.05*	3	2.09	14			4.47	16	1/3
15	PRR 9402	5.21*	3	8.79*	2	2.29	12	9.65	11	6.48	8	2/4
16	RBL 6 (C)	3.54	7	6.00	11	2.95	6	14.97	4	6.87	4	
17	PRR 2 (C)	3.58	6	7.54	6	3.99	2	16.98	2	8.02	2	
Mean		3.81		6.81		2.93		11.80		6.28		
C.D. (5%)		0.38		0.31		0.53		3.17				
CV (%)		5.89		3.24		13.05		16.05				

Table 59. Days to Flowering in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Bhubaneswar		Ambikapur		Bangalore		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB 1	79.00	4	53.25	14	76.67	13	45.00	7	63.48	16
2	KHRB 2	80.00	5	49.25	7	77.33	14	42.75	1	62.33	14
3	RBL 33-1	79.00	4	52.00	12	74.00	10	43.25	2	62.06	13
4	RBL 35	72.00	1	50.00	9	73.33	9	44.00	5	59.83	9
5	RBL 99	77.00	3	51.75	11	74.33	11	43.25	2	61.58	12
6	LRB 122	77.00	3	50.75	10	70.33	6	45.00	7	60.77	10
7	LRB 224	75.00	2	53.75	15	70.33	6	44.50	6	60.90	11
8	LRB 234	80.00	5			70.67	7	44.50	6	65.06	17
9	LRB 303			50.00	9	56.33	3	44.00	5	50.11	4
10	LRB 349			45.75	1					45.75	1
11	LRB 351	72.00	1	48.75	6	67.00	5	43.50	3	57.81	6
12	LRB 354			46.00	2	52.33	2	44.50	6	47.61	3
13	LRB 355			46.50	3	52.00	1	43.75	4	47.42	2
14	PRR 9401	75.00	2	48.50	5			46.00	9	56.50	5
15	PRR 9402	75.00	2	49.50	8	61.33	4	45.50	8	57.83	7
16	RBL 6 (C)	77.00	3	53.00	13	75.33	12	45.00	7	62.58	15
17	PRR 2 (C)	72.00	1	46.75	4	72.33	8	47.00	10	59.52	8
	Mean	76.15		49.72		68.24		44.47		57.71	
	C.D. (5%)			0.82		3.43		1.98			
	CV (%)			1.19		3.00		3.21			

Table 60. Days to Maturity in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Bhubaneswar		Bangalore		Ambikapur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB 1	120.00	1	98.00	12	74.50	5	119.67	11	103.04	16
2	KHRB 2	120.00	1	96.00	9	74.00	3	117.00	10	101.75	14
3	RBL 33-1	120.00	1	95.75	8	73.75	2	114.33	6	100.96	11
4	RBL 35	120.00	1	96.00	9	74.75	6	108.67	3	99.86	6
5	RBL 99	120.00	1	96.00	9	74.50	5	112.00	5	100.63	8
6	LRB 122	120.00	1	95.25	7	74.25	4	116.00	8	101.38	12
7	LRB 224	120.00	1	98.50	13	74.00	3	110.33	4	100.71	9
8	LRB 234	120.00	1			73.50	1	117.00	10	103.50	17
9	LRB 303			93.50	5	74.50	5	100.67	2	89.56	3
10	LRB 349			91.25	4					91.25	4
11	LRB 351	120.00	1	96.50	10	73.50	1	116.33	9	101.58	13
12	LRB 354			91.00	3	74.75	6	98.00	1	87.92	2
13	LRB 355			90.50	1	73.75	2	98.00	1	87.42	1
14	PRR 9401	120.00	1	94.75	6	76.25	8			97.00	5
15	PRR 9402	120.00	1	96.00	9	74.25	4	110.33	4	100.15	7
16	RBL 6 (C)	120.00	1	97.50	11	75.25	7	116.00	8	102.19	15
17	PRR 2 (C)	120.00	1	90.75	2	76.75	9	115.67	7	100.79	10
	Mean	120.00		94.83		74.52		111.33		98.22	
	C.D. (5%)			0.68		2.28		3.77			
	CV (%)			0.51		2.21		2.02			

Table 61. Plant Height (cm) in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Bhubaneswar		Bangalore		Ambikapur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB 1	135.00	8	84.18	12	40.40	7	156.27	5	103.96	12
2	KHRB 2	125.00	9	93.45	4	33.35	13	165.53	2	104.33	10
3	RBL 33-1	165.00	5	81.48	16	32.75	15	168.53	1	111.94	5
4	RBL 35	165.00	5	94.75	3	33.05	14	151.60	7	111.10	6
5	RBL 99	185.00	2	92.85	7	31.00	16	157.53	4	116.60	2
6	LRB 122	150.00	6	83.88	13	33.85	12	148.27	9	104.00	16
7	LRB 224	170.00	3	83.35	14	34.75	10	142.00	12	107.53	9
8	LRB 234	168.00	4			42.55	3	149.60	8	120.05	1
9	LRB 303			93.35	5	39.85	8	79.80	15	71.00	16
10	LRB 349			92.05	8					92.05	13
11	LRB 351	150.00	6	81.90	15	41.55	4	162.93	3	109.10	7
12	LRB 354			85.20	11	41.45	5	86.73	13	71.13	15
13	LRB 355			90.85	10	40.45	6	81.33	14	70.88	17
14	PRR 9401	135.00	8	93.10	6	38.75	9			88.95	14
15	PRR 9402	145.00	7	94.98	2	46.10	1	148.20	10	108.57	8
16	RBL 6 (C)	190.00	1	91.88	9	34.05	11	144.27	11	115.05	4
17	PRR 2 (C)	165.00	5	95.85	1	44.00	2	155.87	6	115.18	3
	Mean	157.54		89.57		37.99		139.90		101.26	
	C.D. (5%)			3.00		7.69		18.27			
	CV (%)			2.42		14.60		7.80			

Table 62. 100 Seed Weight (g) in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Bhubaneswar		Bangalore		Ambikapur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB 1	6.10	7	5.61	6	4.48	7	6.05	1	5.56	4
2	KHRB 2	6.35	4	6.22	1	4.30	11	5.95	2	5.70	2
3	RBL 33-1	6.80	1	6.07	2	4.33	10	5.85	3	5.76	1
4	RBL 35	6.70	2	5.35	8	4.85	2	5.40	8	5.57	3
5	RBL 99	6.45	3	5.33	9	4.35	9	5.35	9	5.37	9
6	LRB 122	6.20	6	4.85	15	4.50	6	5.40	8	5.24	14
7	LRB 224	6.10	7	5.63	5	4.38	8	5.35	9	5.36	10
8	LRB 234	5.65	9			4.85	2	5.80	4	5.43	7
9	LRB 303			5.18	10	4.75	4	5.30	10	5.08	16
10	LRB 349			5.01	14					5.01	17
11	LRB 351	6.70	2	5.01	14	4.98	1	5.45	7	5.54	5
12	LRB 354			5.86	3	4.58	5	5.45	7	5.30	12
13	LRB 355			5.66	4	4.76	3	5.60	6	5.34	11
14	PRR 9401	5.20	10	5.58	7	4.50	6			5.09	15
15	PRR 9402	6.20	6	5.17	11	4.38	8	5.85	3	5.40	8
16	RBL 6 (C)	6.30	5	5.05	12	4.58	5	5.95	2	5.47	6
17	PRR 2 (C)	5.70	8	5.03	13	4.58	5	5.75	5	5.27	13
	Mean	6.19		5.41		4.57		5.63		5.38	
	C.D. (5%)			0.24		0.57					
	CV (%)			3.15		8.96					

Table 63. Number of Primary Branches in Advanced Varietal Trial-II (Early Duration) in Rice bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		Bhubaneswar		Bangalore		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	KHRB 1	3.60	9	2.80	8	1.35	2	2.58	7
2	KHRB 2	3.87	7	2.63	10	0.75	11	2.42	15
3	RBL 33-1	4.47	2	2.48	13	0.65	13	2.53	10
4	RBL 35	4.20	3	2.43	15	0.75	11	2.46	13
5	RBL 99	3.73	8	2.98	7	0.70	12	2.47	12
6	LRB 122	4.53	1	3.38	4	1.10	6	3.00	1
7	LRB 224	4.07	5	3.38	4	1.05	7	2.83	4
8	LRB 234	4.53	1			1.45	1	2.99	2
9	LRB 303	3.07	10	2.45	14	0.90	9	2.14	16
10	LRB 349			2.68	9			2.68	6
11	LRB 351	4.13	4	2.50	12	0.85	10	2.49	11
12	LRB 354	3.00	11	3.55	2	1.15	5	2.57	8
13	LRB 355	3.07	10	3.45	3	1.10	6	2.54	9
14	PRR 9401			3.23	5	0.95	8	2.09	17
15	PRR 9402	3.87	7	3.70	1	1.20	4	2.92	3
16	RBL 6 (C)	3.87	7	2.60	11	0.85	10	2.44	14
17	PRR 2 (C)	4.00	6	3.18	6	1.25	3	2.81	5
	Mean	3.87		2.96		1.00		2.59	
	C.D. (5%)	0.73		0.27		0.45			
	CV (%)	11.25		6.49		32.11			

Table 64: Performance of Faba bean entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over location (q/ha)	Percent increase/decrease over trial mean	Percent increase/decrease over check variety	Frequency
						Vikrant	
1	HB 43	141.54	26.74	23.40 (4)	6.62	12.40	4/4
2	HB 115	142.84	26.07	22.81 (4)	3.93	9.57	¾
3	HB 123	143.64	27.22	25.55 (3)	16.40	22.72	2/3
4	HB 131	143.92	30.48	24.02 (4)	9.42	15.35	¾
5	HB 180	144.46	26.56	21.19 (4)	-3.45	1.79	2/4
6	HB 193	143.79	27.06	21.34 (4)	-2.76	2.52	2/4
7	HB 324	143.33	28.28	7.73 (1)	-64.78	-62.87	0/1
8	NDF 1	147.78	28.32	20.58 (3)	-6.24	-1.15	0/3
9	BSH 9	142.04	25.89	20.92 (4)	-4.68	0.49	¼
10	PRT 12	144.65	27.69	19.85 (4)	-9.59	-4.68	0/4
11	PRT 7	143.65	27.90	22.78 (4)	3.79	9.43	2/4
12	HB 405	149.45	30.47	27.79 (3)	26.59	33.46	2/3
13	HB 428	151.78	29.82	22.33 (3)	1.75	7.27	2/3
14	HB 430	148.00	30.10	28.09 (3)	27.99	34.93	2/3
15	Vikrant ©	144.94	27.30	20.82 (4)	-5.15	0.00	
Trial mean		145.05	27.99	21.95			

Table 65. Seed Yield (q/ha) in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Hisar		New Delhi		Ranchi		Ambikapur		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	
1	HB 43	40.00*	5	17.08*	4	13.19*	1	23.34*	7	23.40	5	4/4
2	HB 115	39.68*	6	17.43*	3	9.49	6	24.65*	5	22.81	6	¾
3	HB 123	36.77*	10	14.32	9			25.56*	4	25.55	3	2/3
4	HB 131	42.59*	3	17.92*	2	8.42	10	27.14*	3	24.02	4	¾
5	HB 180	41.00*	4	13.65	10	7.91	12	22.21*	8	21.19	10	2/4
6	HB 193	37.56*	8	14.83	8	8.52	9	24.47*	6	21.34	9	2/4
7	HB 324					7.73	13			7.73	15	0/1
8	NDF 1	30.42	14			9.68	5	21.64	9	20.58	13	0/3
9	BSH 9	37.03*	9	16.01	6	11.90	2	18.75	13	20.92	11	¼
10	PRT 12	35.44	13	16.08	5	8.66	8	19.20	12	19.85	14	0/4
11	PRT 7	38.49*	7	22.90*	1	8.52	9	21.22	11	22.78	7	2/4
12	HB 405	44.70*	1			10.00	4	28.66*	2	27.79	2	2/3
13	HB 428	36.50*	11			8.29	11	22.21*	8	22.33	8	2/3
14	HB 430	43.12*	2			9.30	7	31.86*	1	28.09	1	2/3
15	Vikrant ©	35.71	12	15.80	7	10.23	3	21.54	10	20.82	12	
	Mean	38.50		16.60		9.42		23.75		21.95		
	C.D. (5%)	0.44		1.59		2.49		0.43				
	CV (%)	8.66		19.55		15.71		14.83				

Table 66. Days to Flowering in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		Hisar		New Delhi		Ranchi		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	67.00	6	59.00	2	80.25	3	60.00	2	66.56	1
2	HB 115	66.67	5	72.00	8	79.75	2	62.33	4	70.19	8
3	HB 123	67.00	6	72.00	8	81.75	6			73.58	13
4	HB 131	63.67	1	75.00	10	81.50	5	66.33	9	71.63	12
5	HB 180	66.00	3	69.00	5	84.00	10	67.33	11	71.58	11
6	HB 193	65.67	2	57.00	1	83.25	9	61.00	3	66.73	2
7	HB 324							67.33	11	67.33	3
8	NDF 1	67.33	7	72.00	8			62.67	5	67.33	3
9	BSH 9	68.00	8	63.00	3	82.25	8	56.67	1	67.48	4
10	PRT 12	66.00	3	71.00	7	78.75	1	70.33	12	71.52	10
11	PRT 7	66.33	4	70.00	6	82.00	7	63.00	6	70.33	9
12	HB 405	67.33	7	71.00	7			71.33	13	69.89	6
13	HB 428	68.33	9	74.00	9			65.00	7	69.11	5
14	HB 430	69.67	10	74.00	9			66.67	10	70.11	7
15	Vikrant ©	67.67	7	67.00	4	80.75	4	65.33	8	70.19	8
	Mean	66.91		69.00		81.43		64.67		69.57	
	C.D. (5%)	4.30				2.10		4.18			
	CV (%)	3.82				2.49		3.84			

Table 67. Days to Maturity in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		Hisar		New Delhi		Ranchi		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	131.33	3	161.00	1	136.50	3	137.33	3	141.54	1
2	HB 115	133.67	8	164.00	4	137.00	4	136.67	2	142.84	3
3	HB 123	130.67	1	162.00	2	138.25	6			143.64	5
4	HB 131	131.00	2	165.00	5	138.00	5	141.67	6	143.92	8
5	HB 180	132.00	5	165.00	5	139.50	8	141.33	5	144.46	9
6	HB 193	133.33	7	164.00	4	138.50	7	139.33	4	143.79	7
7	HB 324							143.33	8	143.33	4
8	NDF 1	131.33	3	167.00	7			145.00	10	147.78	12
9	BSH 9	131.67	4	163.00	3	138.50	7	135.00	1	142.04	2
10	PRT 12	132.33	6	168.00	8	136.25	2	142.00	7	144.65	10
11	PRT 7	131.00	2	166.00	6	138.25	6	139.33	4	143.65	6
12	HB 405	131.67	4	168.00	8			148.67	13	149.45	14
13	HB 428	135.33	9	173.00	9			147.00	12	151.78	15
14	HB 430	132.00	5	168.00	8			144.00	9	148.00	13
15	Vikrant ©	130.67	1	168.00	8	135.75	1	145.33	11	144.94	11
	Mean	132.00		165.86		137.65		141.86		145.05	
	C.D. (5%)	5.09				1.31		2.75			
	CV (%)	2.29				1.04		1.15			

Table 68. Plant Height (cm) in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Hisar		New Delhi		Ambikapur		Ranchi		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	73.60	11	51.29	5	62.00	8	66.07	1	63.24	9
2	HB 115	77.60	7	53.00	4	64.47	5	59.93	7	63.75	7
3	HB 123	81.70	3	53.83	3	61.87	10			65.80	5
4	HB 131	75.60	10	48.52	10	61.87	10	55.33	13	60.33	13
5	HB 180	76.30	9	50.72	7	56.93	12	52.47	14	59.11	14
6	HB 193	73.30	12	49.14	9	62.33	7	61.83	5	61.65	12
7	HB 324							55.67	12	55.67	15
8	NDF 1	81.30	4			67.40	2	63.07	3	70.59	3
9	BSH 9	78.30	6	50.99	6	64.40	6	59.47	8	63.29	8
10	PRT 12	81.30	4	54.68	2	55.20	13	58.27	10	62.36	11
11	PRT 7	79.30	5	49.77	8	61.93	9	60.47	6	62.87	10
12	HB 405	81.30	4			65.93	4	62.60	4	69.94	4
13	HB 428	84.30	2			67.07	3	64.40	2	71.92	2
14	HB 430	86.60	1			73.47	1	56.87	11	72.31	1
15	Vikrant ©	76.60	8	58.27	1	61.80	11	58.53	9	63.80	6
	Mean	79.08		52.02		63.33		59.64		64.44	
	C.D. (5%)			8.17		12.98		8.18			
	CV (%)			10.98		12.19		8.16			

Table 69. Pod Yield (q/ha) in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Hisar		Ambikapur		Ranchi		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	161.00	2	56.25	12	42.13	2	86.46	6
2	HB 115	160.00	3	65.51	6	40.27	4	88.59	5
3	HB 123	140.00	7	46.06	13			93.03	4
4	HB 131	160.00	3	63.89	8	32.41	11	85.43	8
5	HB 180	139.00	8	59.95	11	38.43	6	79.13	10
6	HB 193	133.00	9	59.95	11	40.74	3	77.90	11
7	HB 324					42.59	1	42.59	15
8	NDF 1	113.00	12	103.01	3	36.57	7	84.19	9
9	BSH 9	149.00	6	51.62	9	30.56	12	77.06	12
10	PRT 12	130.00	10	61.34	10	33.33	10	74.89	14
11	PRT 7	158.00	4	64.82	7	35.19	9	86.00	7
12	HB 405	165.00	1	103.94	2	33.33	10	100.76	1
13	HB 428	154.00	5	112.04	1	36.11	8	100.72	2
14	HB 430	161.00	2	98.61	4	39.35	5	99.65	3
15	Vikrant ©	119.00	11	71.99	5	39.35	5	76.78	13
	Mean	145.86		72.78		37.17		83.55	
	C.D. (5%)			15.96		5.91			
	CV (%)			13.04		9.45			

Table 70. Number of Primary Branches in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		New Delhi		Ranchi		Hisar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	5.13	6	3.43	6	2.93	1	4.00	4	3.87	12
2	HB 115	5.47	3	3.05	10	2.80	2	5.00	3	4.08	9
3	HB 123	5.00	7	3.30	8			5.00	3	4.43	3
4	HB 131	4.93	8	4.30	1	2.67	3	4.00	4	3.98	10
5	HB 180	5.20	5	3.25	9	2.13	8	6.00	2	4.15	6
6	HB 193	5.20	5	3.65	4	2.60	4	5.00	3	4.11	7
7	HB 324					2.40	6			2.40	13
8	NDF 1	4.87	9			2.07	9	5.00	3	3.98	10
9	BSH 9	5.27	4	4.05	3	2.07	9	5.00	3	4.10	8
10	PRT 12	4.80	10	3.40	7	2.33	7	5.00	3	3.88	11
11	PRT 7	5.00	7	3.45	5	2.60	4	7.00	1	4.51	2
12	HB 405	5.67	2			2.60	4	5.00	3	4.42	4
13	HB 428	6.13	1			2.40	6	5.00	3	4.51	2
14	HB 430	5.47	3			2.53	5	7.00	1	5.00	1
15	Vikrant ©	4.87	9	4.20	2	2.60	4	5.00	3	4.17	5
	Mean	5.22		3.61		2.48		5.21		4.11	
	C.D. (5%)	0.89		1.25		0.73					
	CV (%)	10.15		23.61		17.38					

Table 71. 100 Seed Weight (g) in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		Hisar		New Delhi		Ranchi		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	28.60	13	23.60	8	25.21	6	29.54	8	26.74	12
2	HB 115	27.30	14	23.90	7	23.73	9	29.36	10	26.07	14
3	HB 123	31.40	8	25.20	5	25.05	7			27.22	10
4	HB 131	34.40	1	30.00	1	25.80	5	31.73	1	30.48	1
5	HB 180	28.93	12	20.70	13	27.81	2	28.81	12	26.56	13
6	HB 193	31.77	7	22.20	11	24.77	8	29.50	9	27.06	11
7	HB 324							28.28	13	28.28	6
8	NDF 1	33.10	4	21.10	12			30.76	2	28.32	5
9	BSH 9	29.83	10	22.30	10	26.57	3	24.86	14	25.89	15
10	PRT 12	31.30	9	23.90	7	26.01	4	29.55	7	27.69	8
11	PRT 7	32.10	6	24.20	6	24.77	8	30.54	3	27.90	7
12	HB 405	32.53	5	28.60	2			30.29	4	30.47	2
13	HB 428	34.17	2	25.70	4			29.60	5	29.82	4
14	HB 430	33.13	3	27.60	3			29.56	6	30.10	3
15	Vikrant ©	29.27	11	22.60	9	28.18	1	29.16	11	27.30	9
	Mean	31.27		24.40		25.79		29.40		27.99	
	C.D. (5%)	3.26				2.01		2.61			
	CV (%)	6.19				5.30		5.27			

Table 72. Number of Pods/plant in Advanced Varietal Trial in Faba bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		New Delhi		Hisar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	HB 43	17.53	12	28.25	3	47.00	3	30.93	7
2	HB 115	25.13	5	26.00	5	43.00	6	31.38	6
3	HB 123	18.67	8	22.63	10	47.00	3	29.43	10
4	HB 131	19.40	7	25.45	7	40.00	8	28.28	12
5	HB 180	17.67	11	24.25	8	42.00	7	27.97	13
6	HB 193	19.60	6	26.35	4	52.00	1	32.65	5
7	NDF 1	28.93	3			42.00	7	35.47	4
8	BSH 9	17.87	10	25.70	6	44.00	5	29.19	11
9	PRT 12	15.13	13	23.15	9	45.00	4	27.76	14
10	PRT 7	15.07	14	29.90	2	44.00	5	29.66	9
11	HB 405	26.73	4			52.00	1	39.37	2
12	HB 428	31.33	2			49.00	2	40.17	1
13	HB 430	35.00	1			42.00	7	38.50	3
14	Vikrant ©	18.47	9	35.30	1	38.00	9	30.59	8
Mean		21.90		26.70		44.79		32.24	
C.D. (5%)		10.97		8.38					
CV (%)		29.80		23.39					

Table 73: Performance of Winged bean entries in Observation Row Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean seed yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety
						AKWB 1
1	EC 178313	167.00	29.25	8.25 (3)	4.30	13.95
2	EC 178271	165.17	29.26	8.20 (3)	3.67	13.26
3	EC 178331	169.00	30.83	7.41 (3)	-6.32	2.35
4	EC 142665	167.17	30.08	8.15 (3)	3.03	12.57
5	EC 38955	165.83	29.32	7.43 (3)	-6.07	2.62
6	IC 26945	163.50	28.89	8.43 (3)	6.57	16.44
7	NBRI Sel.	165.50	31.22	8.29 (3)	4.80	14.50
8	Mysore Local-1	169.33	28.51	7.75 (3)	-2.02	7.04
9	Dwarf Mutant	164.17	28.69	7.98 (3)	0.88	10.22
10	AKWB-1 (C)	166.00	29.80	7.24 (3)	-8.47	0.00
Trial mean		166.27	29.58	7.91		

Table 74. Pod weight/plot (kg) in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Ranchi		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	2784.00	1	222.50	8	1503.25	1
2	EC 178271	1445.00	10	231.00	7	838.00	9
3	EC 178331	1965.50	4	241.50	6	1103.50	4
4	EC 142665	1456.50	9	187.50	9	822.00	10
5	EC 38955	1583.50	8	183.00	10	883.25	8
6	IC 26945	2072.50	3	266.50	5	1169.50	3
7	NBRI Sel.	2275.00	2	317.50	1	1296.25	2
8	Mysore Local-1	1797.50	6	281.00	3	1039.25	6
9	Dwarf Mutant	1825.00	5	308.50	2	1066.75	5
10	AKWB-1 (C)	1750.00	7	272.00	4	1011.00	7
	Mean	1895.45		251.10		1073.28	
	CD (5%)	1128.52		21.73			
	CV (%)	26.34		3.83			

Table 75. Seed weight/plot (g) in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Ambikapur		Rahuri		Ranchi		Overall		
		Mean	Rank	Mean	Rank	Mean	Rank	Mean (g)	Mean (kg/ha)	Rank
1	EC 178313	507.50	6	122.00	7	261.00	2	296.83	825.19	4
2	EC 178271	506.25	7	120.50	8	258.50	3	295.08	820.32	5
3	EC 178331	517.50	5	102.25	9	180.00	7	266.58	741.09	9
4	EC 142665	472.50	10	123.00	6	284.00	1	293.17	815.01	6
5	EC 38955	532.50	4	123.00	6	147.00	10	267.50	743.65	8
6	IC 26945	545.00	3	123.50	5	241.00	4	303.17	842.81	2
7	NBRI Sel.	570.00	2	151.50	1	173.00	8	298.17	828.91	3
8	Mysore Local-1	592.50	1	141.00	3	211.00	5	314.83	875.23	1
9	Dwarf Mutant	505.00	8	150.50	2	206.00	6	287.17	798.33	7
10	AKWB-1 (C)	486.25	9	135.50	4	159.00	9	260.25	723.50	10
	Mean	523.50		129.28		212.05		288.28	791.42	
	CD (5%)	183.85		9.55		192.98				
	CV (%)	24.23		3.27		40.27				

Table 76. Days to Flowering in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Ranchi		Bangalore		Rahuri		Ambikapur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	77.00	7	67.50	3	74.50	7	100.25	9	79.81	10
2	EC 178271	79.00	8	67.00	2	69.00	3	85.50	1	75.13	3
3	EC 178331	73.00	4	67.50	3	67.00	1	87.75	2	73.81	2
4	EC 142665	75.00	5	69.50	6	74.00	6	95.50	5	78.50	9
5	EC 38955	69.00	2	67.00	1	67.00	1	88.50	3	72.88	1
6	IC 26945	71.50	3	68.50	4	69.00	3	99.25	8	77.06	7
7	NBRI Sel.	73.00	4	69.00	5	73.00	5	90.00	4	76.25	5
8	Mysore Local-1	75.50	6	68.50	4	71.50	4	88.50	3	76.00	4
9	Dwarf Mutant	64.50	1	73.00	7	77.00	8	98.25	7	78.19	8
10	AKWB-1 (C)	73.00	4	67.50	3	68.00	2	98.00	6	76.63	6
	Mean	73.05		68.50		71.00		93.15		76.43	
	CD (5%)	7.28		2.48		4.87		3.97			
	CV (%)	4.41		1.60		3.04		2.94			

Table 77. Days to Maturity in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Bangalore		Ranchi		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	156.00	7	186.00	5	159.00	4	167.00	6
2	EC 178271	150.00	2	188.50	6	157.00	2	165.17	3
3	EC 178331	153.00	4	185.00	4	169.00	9	169.00	9
4	EC 142665	153.00	4	186.50	5	162.00	6	167.17	8
5	EC 38955	152.50	5	181.00	2	164.00	7	165.83	5
6	IC 26945	150.50	3	185.00	4	155.00	1	163.50	1
7	NBRI Sel.	149.00	1	185.50	4	162.00	6	165.50	4
8	Mysore Local-1	156.00	7	184.00	3	168.00	8	169.33	10
9	Dwarf Mutant	155.00	6	179.50	1	158.00	3	164.17	2
10	AKWB-1 (C)	153.00	4	184.00	3	161.00	5	166.00	7
	Mean	152.80		184.50		161.50		166.27	
	CD (5%)	11.62		3.47		6.21			
	CV (%)	3.36		0.83		1.70			

Table 78. Plant Height (cm) in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Bangalore		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	141.00	8	165.00	8	153.00	9
2	EC 178271	160.50	5	215.00	1	187.75	4
3	EC 178331	152.80	6	207.00	4	179.90	5
4	EC 142665	139.00	9	171.00	7	155.00	8
5	EC 38955	132.50	10	161.00	10	146.75	10
6	IC 26945	166.00	3	205.00	5	185.50	3
7	NBRI Sel.	148.50	7	189.00	6	168.75	6
8	Mysore Local-1	175.50	1	208.00	3	191.75	1
9	Dwarf Mutant	165.50	4	163.00	9	164.25	7
10	AKWB-1 (C)	171.00	2	210.00	2	190.50	2
Mean		155.23		189.40		172.32	
CD (5%)		62.66		19.26			
CV (%)		17.86		4.52			

Table 79. Pods per Plant in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Bangalore		Ranchi		Rahuri		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	22.80	7	143.50	1	60.00	6	75.43	3
2	EC 178271	26.70	4	110.00	7	68.00	3	68.23	4
3	EC 178331	17.10	10	113.50	5	64.00	5	64.87	8
4	EC 142665	20.80	8	134.50	3	67.00	4	74.10	2
5	EC 38955	23.10	6	84.50	10	53.00	10	53.53	10
6	IC 26945	28.20	3	140.50	2	69.00	2	79.23	1
7	NBRI Sel.	30.00	2	108.00	8	58.00	7	65.33	7
8	Mysore Local-1	33.20	1	111.50	6	57.00	8	67.23	6
9	Dwarf Mutant	23.30	5	124.50	4	55.00	9	67.60	5
10	AKWB-1 (C)	20.70	9	101.50	9	75.00	1	65.73	9
	Mean	24.59		117.20		62.60		68.13	
	CD (5%)	11.99		60.28		15.89			
	CV (%)	21.57		22.76		11.23			

Table 80. 100 Seed Weight (g) in Observation Row Trial in Winged bean: 2003 (Plains)

S. No.	Genotypes	Ranchi		Bangalore		Rahuri		Ambikapur		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	EC 178313	32.58	5	25.10	8	27.95	6	31.35	6	29.25	7
2	EC 178271	30.97	8	24.10	9	30.65	2	31.31	7	29.26	6
3	EC 178331	34.52	2	29.15	2	28.68	5	30.95	10	30.83	2
4	EC 142665	33.21	3	25.95	6	29.08	4	32.09	4	30.08	3
5	EC 38955	28.23	10	26.55	4	30.82	1	31.68	5	29.32	5
6	IC 26945	31.45	7	23.30	10	27.36	7	33.46	2	28.89	8
7	NBRI Sel.	37.30	1	27.15	3	29.26	3	31.18	8	31.22	1
8	Mysore Local-1	29.61	9	26.05	5	24.08	9	34.30	1	28.51	10
9	Dwarf Mutant	33.20	4	25.65	7	24.89	8	31.03	9	28.69	9
10	AKWB-1 (C)	32.10	6	30.00	1	24.01	10	33.09	3	29.80	4
	Mean	32.32		26.30		27.68		32.04		29.58	
	CD (5%)	4.68		6.76		0.82		4.89			
	CV (%)	6.41		11.37		1.31		10.54			

Table 81: Performance of Kalingada entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over locations (q/ha)	Percent increase/ decrease over trial mean	Percent increase/ decrease over check variety	Frequency
						GK 1	
1	SKNK 1	79.00	6.05	1.12 (2)	0.00	-4.27	0/2
2	SKNK 2	77.83	5.98	1.31 (2)	17.37	12.35	½
3	SKNK 3	79.17	5.92	1.71 (2)	52.84	46.31	½
4	SKNK 4	79.33	5.94	1.07 (2)	-4.87	-8.93	0/2
5	SKNK 5	77.33	6.12	0.60 (2)	-46.32	-48.62	0/2
6	SKNK 6	79.17	6.03	1.17 (2)	4.47	0.01	0/2
7	SKNK 11	77.67	5.95	0.82 (2)	-27.05	-30.17	0/2
8	SKNK 15	79.83	5.95	1.35 (2)	20.50	15.35	½
9	SKNK 16	80.17	5.95	1.01 (2)	-9.85	-13.70	½
10	SKNK 17	79.17	6.06	0.59 (2)	-47.65	-49.89	0/2
11	SKNK 18	80.17	5.87	0.87 (2)	-21.92	-25.25	0/2
12	SKNK 19	76.17	6.02	1.67 (2)	49.39	43.01	½
13	SKNK 21	76.83	6.08	1.25 (2)	11.51	6.74	0/2
14	GK-1 ©	77.50	5.90	1.17 (2)	4.46	-	-
Trial mean		78.52	5.99	1.12			

Table 82. Seed Yield (q/ha) in Advanced Varietal Trial in Kalingada: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		Mandor		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	
1	SKNK 1	1.64	4	0.60	8	1.12	7	0/2
2	SKNK 2	1.53	6	1.10*	3	1.31	4	½
3	SKNK 3	1.72	3	1.70*	1	1.71	1	½
4	SKNK 4	1.63	5	0.50	9	1.07	8	0/2
5	SKNK 5	0.60	11	0.60	8	0.60	12	0/2
6	SKNK 6	1.64	4	0.70	7	1.17	6	0/2
7	SKNK 11	0.83	10	0.80	6	0.82	11	0/2
8	SKNK 15	1.40	7	1.30*	2	1.35	3	½
9	SKNK 16	1.02	9	1.00*	4	1.01	9	½
10	SKNK 17	0.47	12	0.70	7	0.59	13	0/2
11	SKNK 18	1.15	8	0.60	8	0.87	10	0/2
12	SKNK 19	2.45*	1	0.90*	5	1.67	2	2/2
13	SKNK 21	1.80	2	0.70	7	1.25	5	0/2
14	GK-1 ©	1.64	4	0.70	7	1.17	6	
Mean		1.39		0.85		1.12		
C.D. (5%)		0.29		0.16				
CV (%)		34.29		11.33				

Table 83. Days to Flowering in Advanced Varietal Trial in Kalingada: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		Mandor		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	SKNK 1	51.33	6	44.33	3	47.83	4
2	SKNK 2	49.33	2	47.00	8	48.17	6
3	SKNK 3	49.67	3	45.00	4	47.33	2
4	SKNK 4	52.67	10	44.33	3	48.50	8
5	SKNK 5	52.00	8	44.00	2	48.00	5
6	SKNK 6	50.00	4	46.00	6	48.00	5
7	SKNK 11	50.00	4	46.00	6	48.00	5
8	SKNK 15	51.00	5	48.33	10	49.67	9
9	SKNK 16	51.33	6	44.00	2	47.67	3
10	SKNK 17	50.00	4	42.00	1	46.00	1
11	SKNK 18	47.33	1	48.00	9	47.67	3
12	SKNK 19	50.00	4	46.33	7	48.17	6
13	SKNK 21	52.33	9	44.33	3	48.33	7
14	GK-1 ©	51.67	7	45.33	5	48.50	8
Mean		50.62		45.36		47.99	
CD (5%)		4.12		4.81			
CV (%)		4.84		6.31			

Table 84. Days to Maturity in Advanced Varietal Trial in Kalingada: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		Mandor		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	SKNK 1	90.00	8	68.00	6	79.00	7
2	SKNK 2	88.67	5	67.00	5	77.83	6
3	SKNK 3	90.00	8	68.33	7	79.17	8
4	SKNK 4	89.67	7	69.00	8	79.33	9
5	SKNK 5	88.67	5	66.00	3	77.33	3
6	SKNK 6	87.67	2	70.67	12	79.17	8
7	SKNK 11	89.00	6	66.33	4	77.67	5
8	SKNK 15	90.00	8	69.67	9	79.83	10
9	SKNK 16	90.33	9	70.00	10	80.17	11
10	SKNK 17	88.00	3	70.33	11	79.17	8
11	SKNK 18	88.00	3	72.33	13	80.17	11
12	SKNK 19	88.33	4	64.00	1	76.17	1
13	SKNK 21	88.33	4	65.33	2	76.83	2
14	GK-1 ©	86.67	1	68.33	7	77.50	4
Mean		88.81		68.24		78.52	
CD (5%)		5.69		4.07			
CV (%)		3.81		3.55			

Table 85. 100 Seed Weight (g) in Advanced Varietal Trial in Kalingada: 2003 (Plains)

S. No.	Genotypes	S.K. Nagar		Mandor		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	SKNK 1	6.10	9	6.00	2	6.05	4
2	SKNK 2	6.25	2	5.70	7	5.98	7
3	SKNK 3	5.90	12	5.93	3	5.92	10
4	SKNK 4	6.05	11	5.83	5	5.94	9
5	SKNK 5	6.20	5	6.03	1	6.12	1
6	SKNK 6	6.15	7	5.90	4	6.03	5
7	SKNK 11	6.10	9	5.80	6	5.95	8
8	SKNK 15	6.21	4	5.70	7	5.95	8
9	SKNK 16	6.30	1	5.60	9	5.95	8
10	SKNK 17	6.19	6	5.93	3	6.06	3
11	SKNK 18	6.08	10	5.67	8	5.87	12
12	SKNK 19	6.13	8	5.90	4	6.02	6
13	SKNK 21	6.23	3	5.93	3	6.08	2
14	GK-1 ©	6.19	6	5.60	9	5.90	11
Mean		6.15		5.82		5.99	
CD (5%)		0.24		0.33			
CV (%)		2.28		3.35			

Table 86. Yield attributes in Advanced Varietal Trial in Kalingada: 2003 (Plains)

S. No.	Genotypes	Mandor						S.K. Nagar					
		Fruit Yield (q/ha)		Fruit Yield/plot (g)		Seed yield/plot (g)		Days to fruit setting		Number of Fruits/Plot		Green weight/plot (kg)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	SKNK 1	12.00	10	1080.00	8	54.00	9	68.00	6	43.00	3	23.33	3
2	SKNK 2	15.45	5	1390.67	5	99.33	3	67.00	5	39.67	4	20.67	4
3	SKNK 3	37.48	1	3373.33	1	153.33	1	68.33	7	32.67	8	20.67	4
4	SKNK 4	7.56	12	680.00	12	45.33	11	69.00	8	33.00	7	13.67	10
5	SKNK 5	12.00	10	1080.00	8	54.00	9	66.00	3	12.33	14	11.33	13
6	SKNK 6	11.26	11	1013.33	11	63.33	7	70.67	12	34.00	6	16.33	6
7	SKNK 11	16.80	4	1512.00	4	72.00	6	66.33	4	20.00	12	14.17	9
8	SKNK 15	16.95	3	1525.33	3	117.33	2	69.67	9	28.00	9	16.17	7
9	SKNK 16	17.06	2	1535.67	2	90.33	4	70.00	10	26.00	10	13.33	11
10	SKNK 17	13.23	8	1190.67	6	62.67	8	70.33	11	16.67	13	14.50	8
11	SKNK 18	12.86	9	1073.33	9	53.67	10	72.33	13	23.00	11	12.50	12
12	SKNK 19	14.11	6	1134.00	7	81.00	5	64.00	1	48.33	1	28.00	1
13	SKNK 21	13.26	7	1065.33	10	62.67	8	65.33	2	43.67	2	23.67	2
14	GK-1 ©	13.26	7	1065.33	10	62.67	8	68.33	7	34.33	5	20.00	5
	Mean	15.23		1247.93		76.55		68.24		31.05		17.74	
	CD (5%)	2.65		241.85		14.74		4.07		16.66		9.16	
	CV (%)	10.35		10.75		11.45		3.55		31.91		30.79	

Table 87. Advanced Varietal Trial in Kankoda: Kharif 2003 (Ambikapur)

S. No.	Genotypes	Days to Fruit Setting		Number of Pickings/Plant		Number of fruits/plant		Fruit yield (q/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	RMF 7-P-1	60.00	1	82.00	3	53.00	4	20.40	3
2	RMF 5-P-4	61.00	2	84.00	1	55.00	2	19.40	4
3	RMF 1	62.00	3	84.00	1	48.00	6	14.60	6
4	RMF 17	63.00	4	83.00	2	50.00	5	17.50	5
5	RMF 27	60.00	1	81.00	4	54.00	3	22.30	2
6	RMF 37	62.00	3	80.00	5	62.00	1	25.50	1
Mean		61.33		82.33		53.67		19.95	

Table 88: Performance of Tumba entries in Advanced Varietal Trial during 2003 (Plains).

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over location (q/ha)	Percent increase/ decrease over trial mean	Frequency
1	GP 3	133.00	2.66	1.75 (2)	-10.05	½
2	GP 59	134.63	2.64	2.18 (2)	12.11	½
3	GP 119	136.88	2.63	2.17 (2)	11.60	½
4	GP 172	137.75	2.79	1.76 (2)	-9.28	0/2
5	GP 181	135.38	2.72	1.60 (2)	-17.78	0/2
6	GP 183	133.25	2.77	2.24 (2)	15.21	½
7	GP 194	136.50	2.66	1.93 (2)	-0.52	0/2
8	GP 285	137.63	2.68	1.94 (2)	0.00	0/2
Trial mean		135.63	2.69	1.94		

Table 89. Seed Yield (q/ha) in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	
1	GP 3	1.35	8	2.14*	2	1.75	7	½
2	GP 59	2.43*	2	1.92	4	2.18	2	½
3	GP 119	2.25	1	2.08*	3	2.17	3	½
4	GP 172	1.67	6	1.85	5	1.76	6	0/2
5	GP 181	1.41	7	1.78	6	1.60	8	0/2
6	GP 183	2.07	5	2.40*	1	2.24	1	½
7	GP 194	2.19	3	1.67	8	1.93	5	0/2
8	GP 285	2.12	4	1.76	7	1.94	4	0/2
	Mean	1.94		1.95		1.94		
	CD (5%)	0.21						
	CV (%)	19.91						

Table 90. Days to Flowering in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	83.00	1	52.75	3	67.88	1
2	GP 59	87.00	2	53.25	5	70.13	2
3	GP 119	89.00	4	53.00	4	71.00	5
4	GP 172	89.00	4	54.50	7	71.75	6
5	GP 181	89.67	5	51.00	1	70.33	3
6	GP 183	88.33	3	52.50	2	70.42	4
7	GP 194	90.67	6	53.75	6	72.21	7
8	GP 285	89.00	4	53.00	4	71.00	5
	Mean	88.21		52.97		70.59	
	CD (5%)	4.87		4.01			
	CV (%)	3.15		5.15			

Table 91. Days to Maturity in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	174.00	1	92.00	7	133.00	1
2	GP 59	181.00	4	88.25	1	134.63	3
3	GP 119	184.00	7	89.75	3	136.88	6
4	GP 172	182.00	5	93.50	8	137.75	8
5	GP 181	180.00	3	90.75	5	135.38	4
6	GP 183	177.00	2	89.50	2	133.25	2
7	GP 194	183.00	6	90.00	4	136.50	5
8	GP 285	184.00	7	91.25	6	137.63	7
	Mean	180.63		90.63		135.63	
	CD (5%)	6.84		3.84			
	CV (%)	2.16		2.88			

Table 92. Seed weight/fruit (g) in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	10.75	8	10.40	6	10.58	8
2	GP 59	12.97	5	10.28	8	11.62	7
3	GP 119	12.38	7	11.13	4	11.75	6
4	GP 172	12.60	6	11.70	3	12.15	4
5	GP 181	13.25	4	10.33	7	11.79	5
6	GP 183	17.10	2	10.51	5	13.81	2
7	GP 194	17.82	1	13.71	1	15.77	1
8	GP 285	13.58	3	11.76	2	12.67	3
	Mean	13.81		11.23		12.52	
	CD (5%)	3.70		3.81			
	CV (%)	15.25		23.06			

Table 93. No. of fruits/plot in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	22.80	5	49.50	2	36.15	5
2	GP 59	34.00	1	47.75	4	40.88	1
3	GP 119	33.00	2	48.25	3	40.63	2
4	GP 172	24.00	4	46.50	6	35.25	6
5	GP 181	19.20	7	44.00	7	31.60	8
6	GP 183	22.20	6	47.75	4	34.98	7
7	GP 194	22.80	5	50.00	1	36.40	4
8	GP 285	28.20	3	46.75	5	37.48	3
	Mean	25.78		47.56		36.67	
	CD (5%)	5.80		11.01			
	CV (%)	12.81		15.73			

Table 94. 100 seed weight in Advanced Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	2.60	5	2.73	4	2.66	5
2	GP 59	2.76	3	2.53	7	2.64	6
3	GP 119	2.58	6	2.69	6	2.63	7
4	GP 172	2.84	1	2.74	3	2.79	1
5	GP 181	2.65	4	2.78	1	2.72	3
6	GP 183	2.79	2	2.74	3	2.77	2
7	GP 194	2.54	7	2.77	2	2.66	5
8	GP 285	2.65	4	2.72	5	2.68	4
	Mean	2.68		2.71		2.69	
	CD (5%)	0.21		0.21			
	CV (%)	4.43		5.18			

Table 95. Yield attributes in Advanced Varietal Trial in Tumba: 2003 (Plains)-Mandor

S. No.	Genotypes	Fruit Weight (g)		Circumference of fruits (cm)		No. of fruits/plant		Days to harvest		Fresh fruit yield/plot (g)		Fruit yield (kg/ha)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GP 3	136.67	8	16.50	7	3.80	5	174.00	1	3066.00	8	1701.67	8
2	GP 59	196.10	5	21.40	1	5.67	1	181.00	4	6534.00	1	3626.33	1
3	GP 119	184.33	6	21.20	2	5.50	2	184.00	7	5872.00	2	3259.00	2
4	GP 172	161.27	7	18.30	5	4.00	4	182.00	5	3873.67	7	2149.67	7
5	GP 181	216.77	3	17.40	6	3.20	7	180.00	3	4147.00	6	2301.33	6
6	GP 183	233.67	2	19.20	4	3.70	6	177.00	2	5121.67	5	2842.33	5
7	GP 194	246.67	1	20.80	3	3.80	5	183.00	6	5522.33	4	3065.00	4
8	GP 285	205.50	4	21.20	2	4.70	3	184.00	7	5754.67	3	3194.00	3
	Mean	197.62		19.50		4.30		180.63		4986.42		2767.42	
	CD (5%)	24.40		4.15		0.85		6.84		491.72		272.75	
	CV (%)	7.03		12.13		11.31		2.16		5.62		5.61	

Table 96. Performance of Tumba entries in Initial Varietal Trial (IVT) during 2003 (Plains)

S. No.	Genotypes	Mean maturity duration (days)	Mean 100 seed weight (g)	Mean yield over location (q/ha)	Percent increase/ decrease over trial mean	Frequency
1	GP 27	132.67	2.76	1.07 (2)	-25.53	0/2
2	GP 31	133.33	2.82	1.37 (2)	-5.14	0/2
3	GP 45	133.33	2.74	1.56 (2)	8.37	0/2
4	GP 84	137.17	2.79	1.68 (2)	16.83	½
5	GP 142	137.83	2.73	1.31 (2)	-8.87	0/2
6	GP 144	137.17	2.62	1.54 (2)	6.95	0/2
7	GP 161	138.67	2.66	1.57 (2)	8.72	0/2
8	GP 233	131.67	2.74	1.80 (2)	24.83	2/2
9	GP 255	137.50	2.72	1.80 (2)	24.94	2/2
10	GP 290	141.00	2.68	1.26 (2)	-12.27	0/2
11	GP 3	132.50	2.69	1.05 (2)	-27.38	0/2
12	GP 172	137.33	2.79	1.24 (2)	-13.97	0/2
Trial mean		135.85	2.73	1.44		

Table 97. Seed Yield (q/ha) in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	
1	GP 27	1.47	10	0.67	11	1.07	10	0/2
2	GP 31	1.96	6	0.77	7	1.37	6	0/2
3	GP 45	2.30	4	0.82	6	1.56	4	0/2
4	GP 84	2.35*	3	1.01	1	1.68	2	½
5	GP 142	1.86	7	0.76	8	1.31	7	0/2
6	GP 144	2.26	5	0.82	6	1.54	5	0/2
7	GP 161	2.26	5	0.87	4	1.57	3	0/2
8	GP 233	2.70*	1	0.90*	3	1.80	1	2/2
9	GP 255	2.63*	2	0.97*	2	1.80	1	2/2
10	GP 290	1.79	8	0.74	10	1.26	8	0/2
11	GP 3	1.34	11	0.75	9	1.05	11	0/2
12	GP 172	1.64	9	0.84	5	1.24	9	0/2
	Mean	2.05		0.83		1.44		
	CD (5%)	0.29		0.07				
	CV (%)	8.29		14.67				

Table 98. Days to flowering in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 27	81.33	1	48.67	3	65.00	1
2	GP 31	81.33	1	49.67	5	65.50	2
3	GP 45	83.67	3	49.67	5	66.67	4
4	GP 84	84.00	4	53.00	8	68.50	5
5	GP 142	86.00	5	56.33	11	71.17	9
6	GP 144	86.00	5	47.00	2	66.50	3
7	GP 161	88.00	6	45.33	1	66.67	4
8	GP 233	81.33	1	56.00	10	68.67	6
9	GP 255	84.00	4	49.33	4	66.67	4
10	GP 290	86.00	5	51.33	7	68.67	6
11	GP 3	82.67	2	55.33	9	69.00	7
12	GP 172	89.00	7	50.67	6	69.83	8
	Mean	84.44		51.03		67.74	
	CD (5%)	5.36		6.39			
	CV (%)	3.76		7.41			

Table 99. Days to Maturity in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 27	173.00	1	92.33	7	132.67	3
2	GP 31	173.00	1	93.67	9	133.33	4
3	GP 45	181.33	4	85.33	1	133.33	4
4	GP 84	182.00	5	92.33	7	137.17	5
5	GP 142	188.00	6	87.67	4	137.83	6
6	GP 144	188.33	7	86.00	2	137.17	5
7	GP 161	191.00	8	86.33	3	138.67	8
8	GP 233	174.00	2	89.33	5	131.67	1
9	GP 255	181.00	3	94.00	10	137.50	6
10	GP 290	188.00	6	94.00	10	141.00	9
11	GP 3	174.00	2	91.00	6	132.50	2
12	GP 172	182.00	5	92.67	8	137.33	7
	Mean	181.31		90.39		135.85	
	CD (5%)	7.57		8.39			
	CV (%)	2.47		5.49			

Table 100. No. of fruits/plot in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 27	18.00	10	43.67	10	30.83	10
2	GP 31	24.00	6	48.33	8	36.17	9
3	GP 45	24.33	5	56.33	5	40.33	4
4	GP 84	22.00	8	60.67	2	41.33	3
5	GP 142	19.00	9	56.00	6	37.50	7
6	GP 144	29.33	2	44.33	9	36.83	8
7	GP 161	25.33	3	48.33	8	36.83	8
8	GP 233	24.33	5	58.33	4	41.33	3
9	GP 255	30.33	1	62.67	1	46.50	1
10	GP 290	25.00	4	52.67	7	38.83	5
11	GP 3	23.00	7	52.67	7	37.83	6
12	GP 172	24.00	6	59.67	3	41.83	2
	Mean	24.06		53.64		38.85	
	CD (5%)	5.51		13.42			
	CV (%)	13.55		14.80			

Table 101. 100 seed weight in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor		S.K. Nagar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank
1	GP 27	2.63	5	2.88	1	2.76	3
2	GP 31	2.80	1	2.85	2	2.82	1
3	GP 45	2.67	4	2.81	4	2.74	4
4	GP 84	2.77	2	2.81	4	2.79	2
5	GP 142	2.73	3	2.73	8	2.73	5
6	GP 144	2.63	5	2.60	10	2.62	10
7	GP 161	2.53	7	2.78	5	2.66	9
8	GP 233	2.73	3	2.74	7	2.74	4
9	GP 255	2.67	4	2.77	6	2.72	6
10	GP 290	2.67	4	2.69	9	2.68	8
11	GP 3	2.57	6	2.81	4	2.69	7
12	GP 172	2.73	3	2.84	3	2.79	2
	Mean	2.68		2.78		2.73	
	CD (5%)	0.09		0.21			
	CV (%)	2.10		4.39			

Table 102. Yield attributes in Initial Varietal Trial in Tumba: 2003 (Plains)

S. No.	Genotypes	Mandor																S.K. Nagar	
		No. of Fruit/Plant		Fruit weight (g)		Fruit circumference (cm)		Seed weight/fruit (g)		Days to harvest		Fresh fruit yield/plot (g)		Fresh fruit yield/ha (kg)		Seed yield/plot (g)		Green weight/plot (kg)	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	GP 27	6.00	11	132.22	4	15.33	7	7.45	7	173.00	1	2355.00	9	2616.67	9	132.30	10	10.07	11
2	GP 31	8.00	7	117.76	7	17.00	5	7.40	8	173.00	1	2805.00	6	3116.67	6	176.70	6	12.17	9
3	GP 45	8.10	6	101.62	9	16.33	6	8.56	4	181.33	4	2460.00	8	2733.33	8	206.70	4	13.23	6
4	GP 84	7.33	9	147.52	1	16.33	6	9.66	2	182.00	5	3225.00	4	3583.33	4	211.50	3	15.70	1
5	GP 142	6.33	10	137.79	3	18.00	3	9.11	3	188.00	5	2541.00	7	2823.33	7	167.40	7	13.17	7
6	GP 144	9.77	2	124.35	5	18.33	2	7.06	9	188.33	7	3616.67	2	3866.67	2	203.40	5	12.17	9
7	GP 161	8.47	3	114.16	8	13.33	10	8.06	5	191.00	8	2892.00	5	3213.33	5	203.40	5	11.30	10
8	GP 233	8.13	5	143.18	2	17.33	4	10.10	1	174.00	2	3444.00	3	3826.67	3	243.00	1	15.40	2
9	GP 255	10.13	1	121.17	6	18.67	1	7.91	6	181.00	3	3624.00	1	4026.67	1	236.70	2	14.13	4
10	GP 290	8.33	4	83.56	10	14.33	9	6.49	10	188.00	6	2076.00	10	2306.67	10	161.40	8	14.33	3
11	GP 3	7.67	8	66.72	12	14.33	9	5.40	12	174.00	2	1491.00	12	1656.67	12	120.30	11	12.67	8
12	GP 172	8.00	7	79.42	11	14.67	8	6.22	11	182.00	5	1848.00	11	2053.33	11	147.60	9	13.67	5
	Mean	8.02		114.12		16.17		7.79		181.31		2698.14		2985.28		184.20		13.17	
	CD (5%)	1.61		29.84		3.41		2.22		7.57		359.39		330.96		25.81		3.65	
	CV (%)	11.90		15.47		12.48		16.89		2.47		7.88		6.56		8.29		16.40	

Table 103. Performance of Jatropha entries in Initial Varietal Trial during 2003 (Plains)

S. No.	Genotypes	Mean 100 seed weight (g)	Mean yield over location (q/ha)	Percent increase/ decrease over trial mean	Frequency
1	Hansaraj	48.55	2.13 (2)	-18.13	0/2
2	S.K. Nagar (Big)	43.04	2.68 (2)	3.12	½
3	Urlikanchan	51.23	2.57 (2)	-1.06	½
4	Chhatrapti	50.16	3.40 (2)	30.82	2/2
5	Local	38.22	2.22 (2)	-14.47	½
Trial mean		46.24	2.60		

Table 104. Seed yield (q/ha) in Initial Varietal Trial in Jatropha species: 2003 (Plains)

S. No.	Genotypes	Bhubaneswar		Hisar		Overall		Frequency
		Mean	Rank	Mean	Rank	Mean	Rank	
1	Hansaraj	1.60		2.66		2.13		0/2
2	S.K. Nagar (Big)	2.63*		2.73		2.68		½
3	Urlikanchan	2.15		3.00		2.57		½
4	Chhatrapti	2.80*		4.00*		3.40		2/2
5	Local	1.12		3.33*		2.22		½
	Mean	2.06		3.14		2.60		
	CD (5%)	0.11						
	CV (%)	3.53						

Table 105. Plant height (cm) in Initial Varietal Trial in Jatropha species: 2003 (Plains)

S. No.	Genotypes	Mandor		Hisar		Bhubaneswar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	Hansaraj	55.00	1	136.62	2	277.25	4	156.29	3
2	S.K. Nagar (Big)	52.75	2	141.00	1	334.75	1	176.17	1
3	Urlikanchan	27.00	5	121.28	4	321.00	2	156.43	2
4	Chhatrapti	51.50	3	109.02	5	304.75	3	155.09	4
5	Local	48.25	4	139.60	3	195.50	5	127.78	5
	Mean	46.90		129.50		286.65		154.35	
	CD (5%)	3.90				15.20			
	CV (%)	31.75				3.44			

Table 106. Stem girth (cm) in Initial Varietal Trial in Jatropha species: 2003 (Plains)

S. No.	Genotypes	Mandor		Bhubaneswar		Hisar		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	Hansaraj	10.00	1	10.03	4	7.82	3	9.28	3
2	S.K. Nagar (Big)	9.13	2	11.88	3	9.60	1	10.20	1
3	Urlikanchan	6.17	5	13.48	2	7.06	5	8.90	4
4	Chhatrapti	9.13	3	13.88	1	7.38	4	10.13	2
5	Local	8.13	4	8.48	5	8.32	2	8.31	5
	Mean	8.51		11.55		8.04		9.36	
	CD (5%)	3.90		0.53					
	CV (%)	31.75		2.99					

Table 107. 100 seed weight (g) in Initial Varietal Trial in Jatropha species: 2003 (Plains)

S. No.	Genotypes	Bhubaneswar		Overall	
		Mean	Rank	Mean	Rank
1	Hansaraj	48.55	3	48.55	3
2	S.K. Nagar (Big)	43.04	4	43.04	4
3	Urlikanchan	51.23	1	51.23	1
4	Chhatrapti	50.16	2	50.16	2
5	Local	38.22	5	38.22	5
	Mean	46.24		46.24	
	CD (5%)	0.17		0.17	
	CV (%)	0.23		0.23	

GERMPLASM EVALUATION

III. GERMPLASM EVALUATION

3.1 HILLS

Multilocational germplasm evaluation was planned to be conducted on grain amaranth, buckwheat and rice bean in augmented design with standard check cultivars.

3.1.1 AMARANTHS (*Amaranthus* spp.)

Germplasm screening nursery consisting 50 accessions supplied by NBPGR, Shimla was to be evaluated at three locations viz. GBPUAT, Ranichauri; HPKV, Palampur and NBPGR, Shimla. However, the results were received on twelve characters from GBPUAT, Ranichauri and on ten characters from NBPGR, Shimla. The checks used were PRA 1, PRA 2 and Annapurna. At GBPUAT, Ranichauri a set of fifty three genotypes including checks were evaluated. None of genotype found to be better than checks in respect of seed yield. Genotype IC 5527 was early flowering (59 days) and early maturing (127 days) followed by IC 3549 with 75 and 135 days respectively. The range of mean and CV% for all characters have been presented in Table 108. A total of 60 genotypes were evaluated at NBPGR, Shimla with same checks. Early flowering was observed in genotype IC 7836 (56 days) followed by IC 4204 and IC 4200 (61 days) whereas early maturity was observed in IC 3549 (137 days) followed by IC 1733 and IC 5527 with 150 days. The genotype IC 4204 was highest yielder with a yield 246.12 g/plant followed by IC 5916 (210.58 g/plant). The mean, SD and CV (%) of all attributes, have been given in Table 109. The promising genotypes with range of means for yield related characters at Ranichauri and Shimla have also been presented in Table 110.

3.1.2 BUCKWHEAT (*Fagopyrum esculentum*)

Germplasm accessions belonging to *Fagopyrum esculentum* and *Fagopyrum tataricum* species, including new collections, were evaluated at two locations viz. NBPGR, Umiam (Shillong) and GBPUAT, Ranichauri. A set of seventy eight accessions were evaluated for seven characters at NBPGR, Umiam (Shillong). The maximum seed yield was recorded in IC 310104 (53.75 g) followed by IC 18864 (53.28 g). The maximum plant height was observed in IC 319581 (147.30 cm). IC 13145 ranked second (140.60 cm). The data on other characters, mean, SD and CV (%) have been given in Table 111. A set of 25 genotypes were also evaluated at GBPUAT, Ranichauri for eleven yield related characters.

The highest seed yield/plant was recorded in EC 323731 (62.73 g), followed by Koge (49.50 g). Genotype Koge was observed early maturing (121 days) whereas EC 323731 ranked second with 122 days. The genotype IC 89385 ranked first for plant height (195 cm) followed by VHC 26 and IC 6465 with 193.33 and 189.00 cm respectively.

The data on other yield related characters have been given in Table 112. The promising genotypes with range of mean for all characters have been presented in Table 113.

3.1.3 RICE BEAN (*Vigna umbellata*)

Rice bean germplasm comprising 125 accessions were planned to be evaluated at five locations viz. HPKV, Palampur; GBPUAT, Ranichauri; PAU, Ludhiana; UAS, Bangalore and NBPGR, New Delhi. Results have been received only from four locations viz. Ranichauri, Palampur, Bangalore and Delhi. A total of 275 genotypes including four checks were evaluated for four yield related characters at HPKV, Palampur. Out of 275 genotypes, LRB 292 and LRB 202 were high yielder with 70.00 g seed per plant. The data on other yield related characters, mean and CV (%) have been presented in Table 114. A set of 48 genotypes including checks PRR 2, RBL 1 and RBL 6 were evaluated for eight yield related characters at GBPUAT, Ranichauri. Among all the genotypes, accession LRB 6 produced the maximum seed yield per plant (73.02 g) against the check PRR 2 (50.45 g). Genotypes LRB 1, LRB 97, LRB 132 and LRB 201 were early in maturity. The data on other yield characters, mean, range and CV (%) have been presented in Table 115. Hundred accessions with checks RBL 1 and RBL 6 were evaluated at UAS, Bangalore for four important characters. The genotype LRB 453 was found better than check RBL 1 in respect of seed yield per plant while number of pods per plant were found maximum in LRB 125 (31.20). Data on important yield related character have been given in Table 116. A set of nineteen newly collected accessions were evaluated for nine characters at NBPGR, New Delhi. The genotype DPRS 158 and check BRS 1 ranked first for flowering, whereas DPRS 158 ranked first for days to maturity. For seed yield per plot, none of the genotypes found superior than check variety PRR 1. The data for other characters have been given in Table 117. The promising lines and the range for important characters at all the locations have been presented in Table 118.

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

At set of forty four genotypes were evaluated for five yield related characters at NBPGR, Umiam (Shillong) along with one local check. For seed yield the genotype H 2287 ranked top with 29.06 q/ha followed by DKH 7 (27.81 q/ha). Maximum plant height was observed in genotype RS/FDI/319 (304 cm) followed by DSK 370 (299.50 cm) and highest number of tillers were observed with genotype H 2215 (3.50). Genotype H 732 ranked second with 3.30 number of tillers. The data for yield and other character have been presented in Table 119.

Table 108. Evaluation of germplasm in grain amaranth (Ranichauri)

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of leaves/plant	Length of leaf (cm)	Width of leaf (cm)	Plant girth at base	No. of fingers	10 ml seed weight (g)	Seed yield/plant (g)
1	IC 385	80.00	141.00	141.16	52.66	11.60	31.50	10.33	6.00	2.08	47.16	11.02	114.18
2	IC 1733	81.00	143.00	135.00	42.83	6.53	17.83	11.00	6.33	2.15	34.16	10.32	85.69
3	IC 3549	75.00	135.00	87.33	39.50	9.36	12.33	10.50	5.40	1.08	20.16	9.33	30.75
4	IC 3560	82.00	145.00	128.33	39.00	9.76	17.33	11.00	6.45	1.75	39.83	11.08	32.92
5	IC 3599	90.00	150.00	124.00	32.33	9.56	25.33	10.66	5.66	1.46	74.66	10.00	85.98
6	IC 4200	86.00	147.00	119.00	30.49	6.85	19.66	13.00	7.33	1.55	38.83	10.64	102.55
7	IC 4201	92.00	153.00	100.66	35.16	7.01	14.50	12.66	6.50	1.13	30.33	9.64	78.14
8	IC 4202	90.00	150.00	130.58	31.66	7.30	16.66	12.00	6.00	1.05	30.83	11.64	70.00
9	IC 4203	94.00	156.00	103.66	33.83	8.11	17.16	9.66	4.66	1.66	36.33	11.40	30.86
10	IC 4204	81.00	142.00	130.66	32.49	8.38	21.33	12.00	6.66	1.00	27.16	10.48	33.40
11	IC 4207	75.00	137.00	126.83	31.83	9.85	12.33	11.40	5.00	1.80	38.00	11.00	80.92
12	IC 4208	86.00	146.00	113.16	30.00	11.53	25.33	11.66	6.00	1.05	27.50	9.79	75.10
13	IC 4209	86.00	147.00	125.16	29.33	9.65	22.50	8.44	4.35	1.16	51.66	9.50	60.42
14	IC 5527	59.00	127.00	92.33	38.16	6.26	16.66	10.33	5.00	1.05	15.66	11.45	26.86
15	IC 5564	94.00	154.00	112.83	27.16	8.60	23.03	9.66	5.00	1.08	28.00	10.42	41.32
16	IC 5565	86.00	147.00	105.00	25.16	7.26	17.50	9.83	5.50	1.33	32.66	10.00	95.82
17	IC 5569	90.00	151.00	107.50	28.83	5.66	15.50	9.50	4.33	1.08	41.00	10.62	77.50
18	IC 5574	75.00	136.00	85.00	21.50	6.51	21.83	7.16	3.83	1.73	13.66	9.42	101.82
19	IC 5575	85.00	148.00	102.50	32.00	6.38	10.83	8.83	4.83	1.05	40.66	10.12	35.02
20	IC 5576	86.00	147.00	121.50	32.16	9.27	18.33	9.83	4.75	1.55	24.33	10.22	30.72

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of leaves/plant	Length of leaf (cm)	Width of leaf (cm)	Plant girth at base	No. of fingers	10 ml seed weight (g)	Seed yield/plant (g)
21	IC 5621	90.00	150.00	137.66	56.50	15.85	19.83	10.66	5.50	1.50	52.50	9.80	60.29
22	IC 5627	80.00	142.00	140.83	41.83	10.45	22.16	11.33	5.16	1.73	39.50	10.68	75.81
23	IC 5916	86.00	147.00	126.83	35.66	10.66	21.66	12.16	6.00	1.83	39.33	8.92	50.00
24	IC 5917	90.00	151.00	123.83	37.00	8.93	25.50	9.83	5.16	2.00	70.33	10.33	65.72
25	IC 6645	86.00	147.00	145.50	47.83	6.81	18.66	9.66	5.33	1.90	45.83	9.32	52.52
26	IC 6646	90.00	150.00	140.33	35.83	6.68	21.33	9.00	5.50	2.24	35.00	12.04	80.40
27	IC 7220	75.00	136.00	137.66	31.50	8.28	19.16	9.83	5.48	1.33	38.16	11.40	62.75
28	IC 7836	90.00	151.00	134.83	39.00	9.26	22.66	10.50	5.83	1.50	34.33	9.80	45.21
29	IC 7916	86.00	147.00	142.50	35.00	8.73	29.83	11.50	5.33	1.58	33.16	11.82	50.69
30	IC 7932	88.00	150.00	139.16	36.33	8.75	28.33	10.16	6.33	1.30	41.66	10.68	88.42
31	IC 17099	86.00	148.00	155.83	47.50	11.41	24.50	11.00	4.66	1.33	29.50	10.85	35.26
32	IC 17436	84.00	143.00	120.33	27.50	6.26	19.83	10.16	5.66	1.65	30.80	11.20	28.12
33	IC 17447	80.00	142.00	128.50	33.58	7.56	21.66	8.66	3.66	1.41	35.83	11.94	38.70
34	IC 17906	86.00	147.00	127.50	28.16	6.90	18.83	11.00	6.33	1.81	35.33	11.70	62.05
35	IC 17920	85.00	145.00	132.50	33.83	7.20	16.00	9.66	5.98	1.59	34.33	10.40	72.40
36	IC 17923	80.00	143.00	129.67	33.63	6.16	18.66	9.50	6.00	1.40	35.00	9.65	50.40
37	IC 17925	86.00	147.00	148.00	47.16	9.00	23.33	11.16	7.41	1.81	42.50	11.90	45.56
38	IC 17926	86.00	147.00	157.16	52.00	15.80	22.00	12.83	8.73	1.90	52.66	11.52	62.81
39	IC 17927	90.00	150.00	148.50	44.00	7.10	25.00	12.16	6.66	2.06	50.10	12.40	88.85
40	IC 17928	86.00	147.00	152.83	44.66	10.50	15.50	11.33	5.55	1.58	62.66	12.72	104.42
41	IC 17929	81.00	141.00	112.50	37.00	8.06	17.50	11.83	7.16	1.58	46.33	11.40	92.42
42	IC 17930	82.00	143.00	144.83	42.66	6.15	17.83	10.83	5.66	1.66	42.33	11.52	32.23

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Finger length (cm)	No. of leaves/plant	Length of leaf (cm)	Width of leaf (cm)	Plant girth at base	No. of fingers	10 ml seed weight (g)	Seed yield/plant (g)
43	IC 17931	80.00	141.00	164.16	46.00	6.53	21.33	12.00	5.00	1.83	46.66	10.72	70.05
44	IC 17932	86.00	147.00	147.66	41.66	9.18	20.33	12.10	5.50	1.83	55.00	12.00	68.09
45	IC 17933	90.00	150.00	183.33	66.33	9.41	29.00	15.16	7.33	1.75	58.00	10.00	66.76
46	IC 17934	86.00	147.00	217.16	72.13	11.68	35.31	14.50	6.50	2.16	99.66	10.65	90.83
47	IC 17935	90.00	150.00	170.00	51.33	8.55	22.33	11.66	6.75	1.91	75.50	8.95	60.66
48	IC 17936	85.00	145.00	240.00	61.66	9.66	28.41	13.50	7.00	2.33	106.33	10.40	118.94
49	IC 17937	86.00	147.00	189.41	60.83	9.78	25.33	10.83	5.50	1.83	78.83	12.42	84.81
50	IC 17938	81.00	141.00	203.50	79.00	12.60	36.50	14.83	6.83	2.00	110.66	11.42	48.72
51	PRA 1	78.00	138.00	175.91	48.49	10.19	24.08	10.91	6.77	1.74	70.24	12.46	230.44
52	PRA 2	81.00	144.00	170.55	51.08	12.32	25.16	10.95	5.89	1.62	71.83	11.38	257.66
53	ANNAPUR NA	86.00	146.00	162.16	46.84	9.53	29.14	11.74	6.04	1.95	64.24	10.00	197.40
	Mean	84.43	145.51	138.55	40.75	8.89	21.59	10.99	5.81	1.61	46.35	10.76	74.14
	Range	59.00-94.00	127.00-156.00	85.00-240.00	21.50-79.00	6.16-15.80	10.83-36.50	7.16-15.16	3.66-8.73	1.00-2.33	13.66-110.66	8.92-12.72	28.12-257.66
	STDEV	5.91	5.27	30.79	12.02	2.25	5.42	1.56	0.96	0.35	21.07	0.96	45.47
	CV (%)	7.00	3.62	22.22	29.50	25.32	25.12	14.17	16.56	21.74	45.46	8.95	61.33

Table 109. Amaranth Germplasm Screening Nursery 2003-2004 (Shimla)

S. No.	Accession Number	Stem thickness (cm)	Leaf length (cm)	Petiole length (cm)	Days to 50% flowering	Plant height (cm)	Lateral spikelet length (cm)	Inflorescence length (cm)	Days to 80% maturity	Seed yield/plant (gm)	1000 seed weight (gm)
1	IC-385	2.59	19.70	14.50	64.00	243.60	10.25	61.40	159.00	182.08	0.60
2	IC-1733	2.80	20.00	13.70	64.00	288.15	17.95	66.95	150.00	36.81	0.60
3	IC-3549	1.45	16.35	12.45	61.00	143.45	8.65	35.20	137.00	42.50	0.70
4	IC-3560	2.25	19.15	11.30	64.00	239.90	11.30	58.00	166.00	54.21	0.60
5	IC-3599	2.32	21.60	13.00	64.00	269.60	16.15	69.90	168.00	51.80	0.70
6	IC-4200	2.44	21.75	13.95	61.00	257.25	10.15	71.75	168.00	81.68	0.60
7	IC-4201	2.33	18.45	6.85	74.00	231.40	12.85	51.90	166.00	170.80	0.60
8	IC-4202	2.49	23.55	11.00	76.00	270.30	22.45	59.10	168.00	62.98	0.60
9	IC-4203	2.61	23.90	12.00	76.00	270.90	15.30	71.50	168.00	67.67	0.60
10	IC-4204	3.01	21.15	11.25	61.00	268.80	13.70	62.40	164.00	246.12	0.50
11	Annapurna	3.01	22.20	12.25	66.00	286.70	17.45	72.45	164.00	62.50	0.50
12	PRA-1	3.17	23.95	13.70	62.00	288.70	17.85	56.00	164.00	128.35	0.70
13	PRA-2	2.50	22.75	11.15	72.00	252.85	13.35	57.00	164.00	51.53	0.60
14	IC-4207	2.68	24.65	10.35	65.00	250.35	9.15	54.15	154.00	52.71	0.60
15	IC-4208	2.61	20.70	9.70	73.00	273.65	19.80	59.70	160.00	64.18	0.60
16	IC-4209	2.45	18.05	9.30	73.00	286.30	20.25	63.30	160.00	54.06	0.60
17	IC-5527	2.45	23.75	16.85	63.00	194.55	7.15	56.95	150.00	56.53	0.70
18	IC-5564	3.28	25.35	12.70	83.00	273.35	11.35	56.45	161.00	56.61	0.50
19	IC-5565	2.49	20.40	10.50	71.00	270.85	12.85	69.30	155.00	120.13	0.50

S. No.	Accession Number	Stem thickness (cm)	Leaf length (cm)	Petiole length (cm)	Days to 50% flowering	Plant height (cm)	Lateral spikelet length (cm)	Inflorescence length (cm)	Days to 80% maturity	Seed yield/plant (gm)	1000 seed weight (gm)
20	IC-5569	2.40	23.00	11.95	84.00	260.35	17.70	63.00	160.00	67.36	0.70
21	IC-5574	2.32	24.75	16.85	66.00	162.15	9.15	48.80	150.00	42.76	0.60
22	IC-5575	3.11	23.40	12.15	74.00	276.40	19.40	73.30	160.00	60.03	0.70
23	IC-5576	3.21	27.25	16.45	75.00	280.75	7.45	62.15	161.00	65.46	0.40
24	PRA-1	3.26	21.90	11.85	76.00	261.60	9.50	63.15	168.00	71.15	0.60
25	PRA-2	2.68	23.30	12.35	76.00	285.85	13.15	59.50	168.00	80.20	0.50
26	IC-5621	3.36	23.05	10.00	76.00	284.75	6.80	53.00	168.00	58.99	0.60
27	IC-5627	2.62	20.70	12.25	65.00	190.30	4.75	51.00	160.00	165.51	0.60
28	IC-5916	2.72	16.15	8.85	62.00	300.15	13.20	72.30	163.00	210.58	0.40
29	IC-5917	2.43	23.95	13.30	76.00	263.00	11.70	68.15	169.00	71.51	0.50
30	IC-6645	2.37	20.95	10.00	62.00	269.30	8.45	73.20	164.00	57.46	0.60
31	IC-6646	2.22	20.60	10.95	62.00	240.35	22.35	72.65	163.00	157.88	0.60
32	IC-7220	1.74	20.75	12.25	64.00	213.20	12.70	45.00	161.00	51.45	0.70
33	IC-7836	3.07	24.35	12.55	56.00	287.35	14.70	76.80	169.00	122.47	0.60
34	IC-7916	2.80	24.35	13.90	62.00	263.80	11.15	63.15	161.00	52.10	0.60
35	IC-7932	2.64	23.15	8.30	65.00	278.30	21.85	74.00	169.00	48.46	0.60
36	PRA-1	2.90	23.45	11.05	86.00	295.30	15.00	75.85	169.00	87.65	0.60
37	PRA-2	2.36	22.25	9.65	86.00	240.35	9.00	71.00	169.00	118.75	0.60
38	Annapurna	2.75	25.40	13.80	63.00	276.80	16.20	68.75	169.00	80.72	0.60
39	IC-17436	2.45	21.35	12.15	64.00	269.30	11.45	73.65	168.00	108.20	0.50
40	IC-17447	2.24	25.45	15.50	70.00	104.85	7.00	70.50	157.00	78.25	0.60

S. No.	Accession Number	Stem thickness (cm)	Leaf length (cm)	Petiole length (cm)	Days to 50% flowering	Plant height (cm)	Lateral spikelet length (cm)	Inflorescence length (cm)	Days to 80% maturity	Seed yield/plant (gm)	1000 seed weight (gm)
41	IC-17906	1.69	20.85	13.40	6.90	188.16	7.80	35.05	150.00	75.57	0.60
42	IC-17920	3.34	21.90	14.75	86.00	310.30	22.95	72.40	166.00	116.80	0.70
43	IC-17923	3.01	22.05	13.60	90.00	290.85	13.90	64.15	162.00	70.19	0.60
44	IC-17925	2.78	22.55	12.25	85.00	262.00	11.45	71.10	169.00	63.77	0.60
45	IC-17926	3.08	21.45	12.25	86.00	261.50	12.05	58.30	169.00	98.02	0.70
46	IC-17927	2.57	20.45	13.70	87.00	244.00	7.00	58.50	169.00	40.53	0.60
47	IC-17928	2.08	16.15	8.45	74.00	246.85	18.25	68.15	169.00	160.52	0.60
48	IC-17929	2.45	20.35	8.70	72.00	263.50	20.45	46.00	169.00	56.46	0.70
49	IC-17930	3.34	19.25	10.25	70.00	245.40	10.55	62.20	161.00	98.20	0.60
50	IC-17931	2.73	23.65	12.20	72.00	295.25	16.15	44.95	166.00	44.35	0.60
51	IC-17932	2.84	22.10	11.90	61.00	282.40	15.70	70.80	154.00	96.70	0.60
52	IC-17933	2.95	22.10	12.00	74.00	282.50	9.70	70.00	168.00	73.18	0.70
53	IC-17934	2.91	21.30	11.50	75.00	248.30	17.35	70.65	168.00	56.26	0.60
54	IC-17935	2.33	21.70	9.95	88.00	246.15	10.50	68.50	169.00	48.02	0.60
55	IC-17936	2.25	19.00	7.85	87.00	303.40	11.90	69.40	169.00	46.93	0.60
56	IC-17937	3.37	22.60	9.40	86.00	266.35	17.80	53.30	169.00	48.57	0.60
57	IC-17938	2.61	21.05	10.95	94.00	273.75	18.65	58.75	168.00	88.21	0.60
58	PRA-1	2.52	20.50	10.85	84.00	264.55	14.20	56.15	161.00	58.47	0.60
59	PRA-2	3.12	21.05	11.90	84.00	310.25	10.00	61.50	161.00	53.08	0.60
60	Annapurna	3.72	16.40	14.10	84.00	310.60	14.70	68.15	161.00	72.85	0.60
	Mean	2.67	21.72	11.88	71.82	259.35	13.53	62.67	163.17	82.78	0.60
	STDEV	0.43	2.37	2.13	12.85	39.13	4.53	9.67	6.54	44.49	0.07
	CV (%)	16.28	10.89	17.94	17.89	15.09	33.52	15.43	4.01	53.75	11.06

Table 110. Promising lines in grain amaranth germplasm

Centres	Days to 50% flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Seed yield/plant (g)
GBPUA&T, Ranichauri (53)					
Promising accession	IC 5527, IC 5574, IC 4207, IC 3549, IC 7220, PRA 1	IC 5527, IC 3549, IC 5574, IC 7220, IC 4207, PRA 1	IC 17937, IC 17934, IC 17938, IC 17937, IC 17933	IC 17938, IC 17934, IC 17933, IC 17936, IC 17937	PRA 2, PRA 1, Annapurna, IC 17936, IC 385
Range	59.00-94.00	127.00-156.00	85.00-240.00	21.50-79.00	28.12-257.66
NBPGR, Shimla (60)*					
Promising accession	IC 7836, IC 4200, IC 4204, IC 3549, IC 6645, IC 5916, IC 7916	IC 3549, IC 17906, IC 17932, IC 17447, IC 1733, IC 5527, IC 5574	Annapurna, IC 17920, PRA 2, IC 17936, IC 5916	PRA 1, IC 7932, IC 17417, IC 5575, IC 6645	IC 4204, IC 5916, IC 385, IC 4201, IC 5627
Range	56.00-94.00	137.00-169.00	194.55-310.60	35.20-75.85	36.81-246.12

* Figure in parenthesis is the number of genotypes grown at the location

Table 111. Germplasm evaluation of Buckwheat at NBPGR, Umiam

S. No.	Accession No.	Plant population	Plant height (cm)	No. of branches/ plant	100-seed weight (g)	Days to maturity	Seed yield (q/ha)	Biomass (fresh) weight (g)
1	EC- 323729	155.00	125.60	28.30	2.50	73.00	6.25	52.50
2	VL-7	140.00	123.66	41.66	2.70	73.00	7.50	41.25
3	VHC- 27	162.00	123.66	32.00	2.50	73.00	5.50	47.50
4	H-3959	136.00	126.00	42.00	2.50	73.00	6.25	43.00
5	IC-13376	143.00	116.00	37.00	2.50	73.00	3.13	35.00
6	IC-188669	162.00	107.00	42.66	2.50	73.00	3.00	38.75
7	IC-18889	116.00	102.66	34.33	2.70	73.00	7.50	30.75
8	VHC-26	182.00	119.30	38.00	2.70	73.00	3.13	32.50
9	IC-323729 A	190.00	122.60	48.60	2.60	73.00	6.25	27.50
10	EC-323724	167.00	104.60	46.00	2.60	73.00	6.25	23.75
11	BDS-1354	175.00	100.30	33.30	2.60	73.00	5.00	28.75
12	PRB-9001	168.00	136.60	36.00	2.50	73.00	6.25	30.00
13	IC-13145	163.00	140.60	49.30	2.60	73.00	6.25	28.75
14	IC-13141	196.00	126.60	121.00	2.60	73.00	5.25	50.00
15	IC-13411	186.00	113.30	55.30	3.00	73.00	6.25	47.50
16	IC-13751	149.00	116.60	49.30	2.70	73.00	5.75	25.00
17	Kulugangri	187.00	138.60	49.60	2.70	73.00	16.25	40.50
18	EC-323731	157.00	133.60	51.30	2.40	73.00	5.75	32.50
19	VL-7-A	166.00	131.60	41.60	2.50	73.00	3.13	30.00
20	H-3956	146.00	120.00	45.60	2.70	73.00	5.25	36.25

S. No.	Accession No.	Plant population	Plant height (cm)	No. of branches/ plant	100-seed weight (g)	Days to maturity	Seed yield (q/ha)	Biomass (fresh) weight (g)
21	IC-319588	149.00	121.60	29.30	2.60	73.00	6.25	37.50
22	IC-324313	172.00	137.60	41.00	2.70	73.00	5.00	30.75
23	IC-330442	158.00	130.30	56.00	2.50	73.00	3.13	27.50
24	IC-319581	165.00	147.30	40.30	2.50	73.00	6.25	50.00
25	IC-319595	162.00	128.30	49.00	2.70	73.00	11.25	48.50
26	IC-319637	157.00	127.30	36.60	2.80	73.00	12.50	30.00
27	IC-324264	135.00	123.00	45.00	2.70	73.00	7.75	33.75
28	BW-1	142.00	123.00	35.30	2.50	73.00	8.13	40.50
29	BW-2	152.00	115.60	41.30	2.60	73.00	9.38	24.25
30	BW-3	138.00	111.30	35.60	2.70	73.00	15.00	26.25
31	IC-319581A	110.00	104.60	42.00	2.60	73.00	8.75	32.50
32	IC-324264A	162.00	108.30	39.60	2.60	73.00	7.50	40.00
33	AKABRA-307	152.00	104.60	41.60	2.60	73.00	6.25	30.25
34	IC-340274	105.00	106.60	40.30	2.50	73.00	5.00	30.00
35	IC-340307	196.00	118.30	49.00	2.60	73.00	7.75	33.75
36	IC-340325	125.00	115.00	42.00	2.50	73.00	6.25	41.75
37	IC-340361	95.00	102.60	32.60	2.60	73.00	7.50	45.88
38	IC-340363	126.00	110.60	45.30	2.40	73.00	6.25	26.00
39	IC-340367	150.00	116.60	45.80	2.70	73.00	10.00	26.50
40	DG-1	180.00	106.00	49.60	2.60	75.00	4.33	28.75
41	DG-12	120.00	103.30	32.60	2.50	75.00	5.00	37.50
42	DG-13	75.00	89.60	23.30	2.40	75.00	6.25	26.25

S. No.	Accession No.	Plant population	Plant height (cm)	No. of branches/ plant	100-seed weight (g)	Days to maturity	Seed yield (q/ha)	Biomass (fresh) weight (g)
43	DG-32	96.00	115.30	34.60	2.70	75.00	5.63	40.63
44	DG-52	89.00	88.60	30.30	2.40	75.00	4.38	43.75
45	ALBW-02-115	145.00	110.30	33.60	2.70	75.00	3.13	26.75
46	ALBW-01-94	162.00	117.60	47.00	2.50	75.00	6.25	35.00
47	SMBR-123	156.00	102.60	28.00	2.40	75.00	3.13	40.00
48	SMBR-266	136.00	105.60	31.30	2.40	75.00	6.25	35.50
49	SMBR-274	118.00	108.00	31.00	2.40	75.00	6.25	48.75
50	SMBR- 75	190.00	113.60	42.00	2.60	75.00	5.63	30.00
51	SMBR-749	183.00	113.00	42.00	2.60	75.00	5.63	35.63
52	DRLT -804	138.00	109.00	36.60	2.50	75.00	6.25	40.00
53	DRLT-1005	68.00	109.00	37.30	2.40	75.00	5.63	36.25
54	Phesru-42	132.00	101.00	34.30	2.70	73.00	5.00	23.75
55	IC-274435	146.00	120.00	49.30	2.70	75.00	8.25	35.00
56	IC-274429	161.00	115.60	48.60	2.50	75.00	7.50	30.00
57	IC-274423	203.00	122.00	50.80	2.80	75.00	3.75	52.50
58	IC-18869	138.00	106.30	42.30	2.70	75.00	8.75	47.50
59	IC-313468	126.00	106.00	29.00	2.60	75.00	10.00	45.00
60	IC-310104	149.00	108.60	43.00	2.60	75.00	6.25	53.75
61	Sabrash	128.00	123.30	33.60	2.30	75.00	3.75	51.25
62	EC-213685	164.00	112.00	43.60	2.60	75.00	4.38	43.75
63	EC-125357	206.00	123.00	46.60	2.50	75.00	6.25	48.75
64	IC-318859	192.00	115.00	33.00	2.50	75.00	7.50	42.00

S. No.	Accession No.	Plant population	Plant height (cm)	No. of branches/ plant	100-seed weight (g)	Days to maturity	Seed yield (q/ha)	Biomass (fresh) weight (g)
65	IC-18889	126.00	115.30	50.60	2.50	75.00	3.13	45.50
66	IC-18864	162.00	123.60	52.60	2.60	75.00	5.50	53.25
67	IC-310047	136.00	111.30	33.60	2.50	75.00	6.25	30.00
68	IC-313470	146.00	112.30	43.60	2.70	75.00	12.50	33.75
69	IC-274040	159.00	117.30	52.30	2.50	75.00	11.88	50.00
70	IC-310046	138.00	115.60	37.30	2.60	75.00	18.75	27.50
71	Rasluwate	190.00	110.60	52.60	2.60	75.00	15.00	31.25
72	EC-58322	192.00	128.30	58.30	2.70	75.00	9.38	24.50
73	KUPRA-2	186.00	126.60	53.00	2.70	75.00	18.75	50.00
74	RSDV -6	160.00	117.30	46.60	2.50	75.00	15.00	48.75
75	EC 216627	120.50	27.17	102.50	2.55	73.00	55.00	7.82
76	EC 216628	133.67	59.33	138.00	2.45	73.00	48.75	3.91
77	PRB 9001	119.00	51.00	172.50	2.70	73.00	42.75	3.31
78	Kulugangri	123.00	58.83	128.00	2.60	73.00	40.63	4.69
	Mean	149.86	112.82	47.25	2.58	73.87	9.21	35.19
	STDEV	29.24	18.72	24.40	0.12	1.00	9.53	11.21
	CV (%)	19.51	16.59	51.65	4.56	1.35	103.47	31.86

Table 112. Evaluation of germplasm in buckwheat (Ranichauri)

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves/plant	No. of primary branches/plant	No. of secondary branches/plant	Plant girth at base	No. of inter nodes/plant	No. of raceno/plant	100 seed weight	Seed yield/plant (g)
1	PRB 1 ©	52.00	129.00	165.18	31.70	6.34	14.02	1.25	16.70	35.42	2.08	35.97
2	IC 6465	54.00	134.00	189.00	40.20	7.40	12.90	1.15	19.00	43.20	2.00	37.28
3	IC 89383	53.00	130.00	179.20	35.10	6.60	11.60	1.05	20.80	34.70	2.15	22.40
4	IC 89384	50.00	129.00	188.55	34.60	6.70	11.50	1.10	21.40	35.40	1.66	27.58
5	IC 89385	56.00	135.00	195.00	42.00	6.40	12.10	1.10	21.20	36.00	1.79	25.30
6	VHC 26	53.00	130.00	193.33	38.00	6.60	11.70	1.15	21.25	32.70	1.85	42.38
7	DS 1345	57.00	134.00	187.00	43.20	7.70	14.20	1.20	21.00	40.50	1.64	20.13
8	IC 13411	56.00	135.00	170.00	36.70	5.80	10.40	1.05	19.00	33.70	2.04	16.75
9	IC 1314	54.00	134.00	172.00	30.80	5.80	10.60	1.00	19.70	27.50	1.71	22.18
10	IC 13376	55.00	138.00	161.55	30.00	5.30	10.30	1.00	17.50	28.00	1.95	15.40
11	IC 18889	52.00	129.00	178.80	20.10	5.50	10.90	1.05	15.70	27.00	1.88	20.94
12	VL 7	47.00	122.00	153.00	16.90	4.70	9.50	1.00	13.60	23.20	2.00	22.05
13	EC 3237244	53.00	129.00	95.90	17.70	4.30	8.10	1.00	15.20	21.40	1.75	20.97
14	EC 323729	56.00	135.00	161.00	20.00	5.00	10.30	1.20	19.30	24.85	2.10	20.25
15	EC 323731	48.00	122.00	148.50	31.50	6.00	11.90	1.00	17.00	40.20	2.06	62.73
16	GALU	55.00	134.00	163.00	26.00	5.80	10.70	1.15	16.90	42.40	2.16	26.02
17	GUSHAL	54.00	134.00	150.00	40.70	6.90	12.10	1.15	15.30	40.60	2.23	18.09
18	TARAUULA	50.00	139.00	136.00	30.70	6.20	11.40	1.12	16.50	34.80	2.40	24.61
19	KOGE	47.00	121.00	153.50	40.00	6.00	11.30	1.05	18.50	42.00	1.82	49.50

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of leaves/plant	No. of primary branches/plant	No. of secondary branches/plant	Plant girth at base	No. of inter nodes/plant	No. of raceno/plant	100 seed weight	Seed yield/plant (g)
20	CHIRUEME	52.00	127.00	167.00	29.70	4.90	10.40	1.05	15.60	35.90	2.05	14.73
21	KUPPICE	55.00	134.00	163.00	35.50	5.90	11.00	1.30	15.00	40.80	2.36	32.20
22	PHAFRA 42	56.00	136.00	154.00	39.10	5.85	11.50	1.05	14.50	39.40	1.76	24.79
23	IC 89390	46.00	122.00	162.95	30.20	5.30	10.40	1.00	10.01	43.80	1.94	20.24
24	LOCAL 1	51.00	127.00	146.00	31.40	5.40	9.40	1.00	12.10	45.40	1.89	34.23
25	LOCAL 2	52.00	129.00	156.50	27.30	5.90	10.30	1.00	12.90	38.25	2.29	30.00
	Mean	52.56	130.72	163.60	31.96	5.93	11.14	1.09	17.03	35.48	1.98	27.47
	Range	46.00-56.00	121.00-139.00	95.90-195.00	16.90-43.20	4.30-7.70	8.10-14.20	1.00-1.30	10.01-21.40	21.40-45.40	1.64-2.40	14.73-49.50
	STDEV	3.12	5.14	21.14	7.53	0.81	1.34	0.09	3.10	6.80	0.21	11.28
	CV (%)	5.94	3.94	12.92	23.57	13.60	12.06	8.05	18.19	19.15	10.66	41.06

Table 113. Promising lines in buckwheat germplasm

NBPGR, Shillong (78)*	No. of branches/plant	Days to maturity	Plant height (cm)	100 seed weight (g)	Seed yield (q/ha)
Promising accession	PRB 9001, EC 216628, Kuluganagari, IC 13141, EC 216627	Most of the variety matured in 73 days	IC 319581, IC 13145, Kulugangari, IC 324313, PRB 9001	IC 13411, IC 319637, IC 274423	EC 216627, EC 216628, PRB 9001, Kulugangari, KUPRA 2, IC 310046
Range	28.30-172.50	73.00-75.00	27.17-147.00	2.40-3.00	3.13-55.00
GBPUA&T, Ranichauri (25)*	Days to flowering	Days to maturity	Plant height (cm)	100 seed weight (g)	Seed yield/plant (g)
Promising accession	IC 89390, Koge, EC 323731, VL 7, IC 89384, Local 1	Koge, EC 323731, VL 7, Local 1, EC 3237244, IC 18889, IC 89384	IC 89385, VHC 26, IC 6465, IC 89385, DS 1345	Taraula, Kuppice, Local 2, Gushal, Galu	EC 323731, Koge, VHC 26, IC 6565, PRB 1
Range	46.00-57.00	121.00-138.00	95.90-195.00	1.64-2.40	14.73-62.73

* Figure in parenthesis is the number of genotypes grown at the location

Table 114: Germplasm evaluation on rice bean at CSK HPKV, Palampur

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
1	LRB 1	80.00	121.00	145.00	45.00
2	LRB 2	77.00	116.00	175.00	45.00
3	LRB 3	82.00	119.00	202.00	50.00
4	LRB 4	79.00	118.00	151.00	50.00
5	LRB 5	85.00	127.00	147.00	50.00
6	LRB 6	78.00	121.00	157.00	25.00
7	LRB 7	75.00	119.00	197.00	45.00
8	LRB 8	110.00	148.00	160.00	25.00
9	LRB 9	112.00	147.00	165.00	45.00
10	LRB 10	113.00	152.00	145.00	25.00
11	LRB 12	75.00	120.00	167.00	25.00
12	LRB 13	118.00	137.00	164.00	50.00
13	LRB14	116.00	139.00	163.00	50.00
14	LRB 15	119.00	142.00	141.00	45.00
15	LRB 16	123.00	142.00	151.00	45.00
16	LRB 17	116.00	138.00	172.00	25.00
17	LRB 18	118.00	141.00	165.00	25.00
18	LRB 19	109.00	132.00	160.00	25.00
19	LRB 20	115.00	134.00	192.00	50.00
20	LRB 21	120.00	134.00	202.00	20.00
21	LRB 21-1	120.00	134.00	170.00	25.00
22	LRB 21-2	120.00	141.00	147.00	25.00
23	LRB 22	124.00	140.00	180.00	25.00
24	LRB 22-1	130.00	145.00	190.00	25.00
25	LRB 23	121.00	151.00	167.00	25.00
26	LRB 24	119.00	144.00	159.00	50.00
27	LRB 25	119.00	147.00	160.00	25.00
28	LRB 26	82.00	147.00	145.00	25.00
29	LRB 27	114.00	134.00	137.00	50.00
30	LRB 28	111.00	143.00	147.00	25.00
31	LRB 29	111.00	140.00	162.00	25.00
32	LRB 30	120.00	137.00	167.00	20.00
33	LRB 31	116.00	141.00	171.00	20.00
34	LRB 31-1	96.00	152.00	175.00	25.00
35	LRB 32	102.00	137.00	176.00	45.00
36	LRB 33	116.00	153.00	159.00	25.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
37	LRB 33-1	112.00	150.00	161.00	45.00
38	LRB 34	110.00	145.00	171.00	25.00
39	LRB 35	105.00	140.00	172.00	45.00
40	LRB 35-1	107.00	145.00	137.00	50.00
41	LRB 36	109.00	137.00	145.00	25.00
42	LRB 37	111.00	141.00	175.00	25.00
43	LRB 38	111.00	138.00	166.00	25.00
44	LRB 39	107.00	138.00	145.00	25.00
45	LRB 40-1	97.00	132.00	143.00	45.00
46	LRB 40-2	99.00	137.00	157.00	45.00
47	LRB41	102.00	142.00	172.00	45.00
48	LRB 42	102.00	145.00	161.00	20.00
49	LRB 43	107.00	141.00	177.00	25.00
50	LRB 44	31.00	132.00	130.00	25.00
51	CI	81.00	124.00	173.00	55.00
52	C2	84.00	123.00	149.00	45.00
53	C3	116.00	127.00	147.00	40.00
54	C4	112.00	125.00	152.00	35.00
55	C5	119.00	126.00	161.00	35.00
56	LRB 45	82.00	128.00	160.00	50.00
57	LRB 46	110.00	142.00	175.00	25.00
58	LRB 47	112.00	140.00	148.00	50.00
59	LRB 48	114.00	140.00	144.00	25.00
60	LRB 49	81.00	132.00	132.00	50.00
61	LRB 50	71.00	136.00	151.00	50.00
62	LRB 51	87.00	134.00	139.00	50.00
63	LRB 52	104.00	136.00	141.00	45.00
64	LRB 53	112.00	147.00	173.00	25.00
65	LRB 54	110.00	162.00	145.00	45.00
66	LRB 55	106.00	145.00	162.00	45.00
67	LRB 68	115.00	145.00	156.00	50.00
68	LRB 69	117.00	155.00	157.00	50.00
69	LRB 69-2	127.00	165.00	176.00	20.00
70	LRB 70	115.00	166.00	189.00	45.00
71	LRB 71	114.00	144.00	192.00	50.00
72	LRB 71-1	116.00	160.00	170.00	45.00
73	LRB 71-3	119.00	149.00	160.00	50.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
74	LRB 72-1	86.00	152.00	175.00	25.00
75	LRB72-2	109.00	135.00	178.00	50.00
76	LRB 73-1	101.00	141.00	167.00	40.00
77	LRB 74-1	119.00	147.00	199.00	50.00
78	LRB 75-1	120.00	160.00	185.00	35.00
79	LRB 76	111.00	151.00	215.00	50.00
80	LRB 78	112.00	165.00	224.00	50.00
81	LRB 81	112.00	157.00	159.00	50.00
82	LRB 84	117.00	162.00	210.00	30.00
83	LRB 85	105.00	155.00	178.00	25.00
84	LRB 86	110.00	146.00	193.00	50.00
85	LRB 87	112.00	152.00	216.00	25.00
86	LRB 88	103.00	143.00	206.00	50.00
87	LRB 89	120.00	158.00	225.00	45.00
88	LRB 90	105.00	141.00	255.00	25.00
89	LRB 91	100.00	147.00	229.00	15.00
90	LRB 92	115.00	143.00	185.00	40.00
91	LRB 93	115.00	139.00	220.00	50.00
92	LRB 94	119.00	142.00	186.00	40.00
93	LRB95	105.00	143.00	189.00	40.00
94	LRB 96	115.00	143.00	183.00	45.00
95	LRB 98	110.00	143.00	245.00	25.00
96	LRBI00	105.00	139.00	191.00	30.00
97	LRB 101	113.00	145.00	215.00	30.00
98	LRB 102	103.00	139.00	191.00	40.00
99	LRB 103	99.00	137.00	231.00	20.00
100	LRB 105	110.00	142.00	176.00	50.00
101	LRB 108	115.00	143.00	188.00	50.00
102	LRB 109	105.00	143.00	171.00	50.00
103	LRB 111	105.00	145.00	177.00	45.00
104	LRB 114	119.00	147.00	151.00	50.00
105	LRB 115	105.00	151.00	145.00	55.00
106	C3	110.00	141.00	175.00	30.00
107	C5	105.00	137.00	190.00	30.00
108	C4	110.00	142.00	190.00	40.00
109	CI	105.00	139.00	200.00	50.00
110	C2	103.00	136.00	176.00	50.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
111	LRB 116	105.00	143.00	199.00	40.00
112	LRB 117	110.00	139.00	178.00	40.00
113	LRB 118	118.00	145.00	146.00	50.00
114	LRB 119	110.00	146.00	194.00	50.00
115	LRB 121	101.00	139.00	175.00	50.00
116	LRB 122	105.00	143.00	184.00	5.00
117	LRB 124	114.00	139.00	159.00	25.00
118	LRB 126	115.00	142.00	158.00	40.00
119	LRB 127	102.00	138.00	159.00	55.00
120	LRB 128	110.00	139.00	146.00	50.00
121	LRB 129	102.00	141.00	155.00	25.00
122	LRB 130	110.00	152.00	150.00	25.00
123	LRB 132	110.00	140.00	176.00	35.00
124	LRB 133	115.00	143.00	179.00	40.00
125	LRB 134	105.00	142.00	159.00	30.00
126	LRB 135	111.00	142.00	140.00	40.00
127	LRB 136	115.00	143.00	191.00	40.00
128	LRB 137	109.00	142.00	190.00	20.00
129	LRB 138	114.00	139.00	179.00	100.00
130	LRB 139	103.00	139.00	178.00	40.00
131	LRB 140	103.00	139.00	189.00	50.00
132	LRB 141	112.00	143.00	186.00	50.00
133	LRB 142	102.00	139.00	173.00	50.00
134	LRB 143	103.00	142.00	160.00	20.00
135	LRB 148	117.00	144.00	222.00	30.00
136	LRB 149	119.00	147.00	216.00	30.00
137	LRB 151	113.00	144.00	178.00	35.00
138	LRB 152	109.00	141.00	156.00	25.00
139	LRB 155	115.00	142.00	191.00	45.00
140	LRB 156	111.00	143.00	210.00	50.00
141	LRB 158	116.00	143.00	196.00	40.00
142	LRB 159	119.00	143.00	180.00	20.00
143	LRB 160	116.00	147.00	215.00	5.00
144	LRB 162	102.00	142.00	231.00	50.00
145	LRB 164	104.00	140.00	192.00	40.00
146	LRB 166	114.00	147.00	166.00	30.00
147	LRB 168	103.00	137.00	169.00	50.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
148	LRB 170	103.00	141.00	175.00	30.00
149	LRB 172	105.00	142.00	165.00	35.00
150	LRB 173	104.00	140.00	219.00	30.00
151	LRB 176	114.00	142.00	184.00	50.00
152	LRB 178	112.00	139.00	185.00	35.00
153	LRB 180	105.00	141.00	203.00	25.00
154	LRB 181	102.00	137.00	199.00	25.00
155	LRB 182	104.00	137.00	188.00	20.00
156	LRB 183	117.00	151.00	219.00	50.00
157	LRB 184	115.00	143.00	189.00	30.00
158	LRB 187	103.00	137.00	184.00	15.00
159	LRB 188	105.00	132.00	189.00	50.00
160	LRB 189	110.00	139.00	199.00	15.00
161	C2	105.00	137.00	190.00	50.00
162	C1	110.00	142.00	220.00	50.00
163	C5	102.00	139.00	135.00	30.00
164	C3	104.00	130.00	125.00	45.00
165	C4	102.00	145.00	140.00	40.00
166	LRB 190	102.00	139.00	178.00	25.00
167	LRB 191	105.00	152.00	186.00	50.00
168	LRB 192	110.00	142.00	185.00	50.00
169	LRB 193	115.00	147.00	200.00	25.00
170	LRB 194	115.00	147.00	161.00	30.00
171	LRB 195	102.00	141.00	162.00	35.00
172	LRB 196	102.00	141.00	179.00	30.00
173	LRB 197	103.00	141.00	186.00	25.00
174	LRB 198	105.00	142.00	194.00	50.00
175	LRB 199	105.00	140.00	181.00	30.00
176	LRB 201	110.00	139.00	199.00	50.00
177	LRB 202	106.00	142.00	181.00	30.00
178	LRB 203	112.00	142.00	185.00	50.00
179	LRB 204	110.00	143.00	171.00	50.00
180	LRB 205	105.00	139.00	215.00	50.00
181	LRB 206	110.00	139.00	199.00	30.00
182	LRB 207	115.00	147.00	191.00	30.00
183	LRB 208	107.00	141.00	180.00	40.00
184	LRB 209	103.00	139.00	186.00	30.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
185	LRB 210	103.00	139.00	169.00	20.00
186	LRB 211	105.00	150.00	210.00	20.00
187	LRB 212	106.00	152.00	220.00	35.00
188	LRB 213	105.00	142.00	205.00	25.00
189	LRB 214	111.00	141.00	213.00	40.00
190	LRB 215	116.00	141.00	189.00	35.00
191	LRB 216	116.00	137.00	245.00	30.00
192	LRB 217	105.00	137.00	159.00	50.00
193	LRB 218	110.00	147.00	146.00	30.00
194	LRB 219	110.00	161.00	165.00	30.00
195	LRB 220	109.00	147.00	182.00	30.00
196	LRB 222	120.00	155.00	162.00	30.00
197	LRB 226	105.00	141.00	166.00	25.00
198	LRB 227	105.00	141.00	215.00	30.00
199	LRB 229	105.00	141.00	230.00	30.00
200	LRB 230	105.00	143.00	226.00	25.00
201	LRB 231	113.00	139.00	255.00	30.00
202	LRB 232	109.00	142.00	200.00	30.00
203	LRB 241	111.00	141.00	165.00	30.00
204	LRB 244	113.00	149.00	179.00	20.00
205	LRB 245	102.00	147.00	178.00	5.00
206	LRB 246	111.00	139.00	200.00	3.00
207	LRB 250	109.00	147.00	179.00	35.00
208	LRB 251	109.00	139.00	165.00	35.00
209	LRB 252	111.00	147.00	203.00	30.00
210	LRB 253	114.00	143.00	175.00	30.00
211	LRB 254	114.00	143.00	206.00	25.00
212	LRB 255	114.00	143.00	222.00	20.00
213	LRB 256	103.00	139.00	190.00	40.00
214	LRB 257	109.00	142.00	145.00	30.00
215	LRB 258	103.00	142.00	156.00	30.00
216	C4	96.00	130.00	145.00	40.00
117	C5	90.00	137.00	125.00	30.00
218	C1	110.00	142.00	205.00	50.00
219	C2	100.00	140.00	210.00	55.00
220	C3	95.00	133.00	155.00	40.00
221	LRB 259	103.00	142.00	188.00	35.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
222	LRB 260	101.00	143.00	146.00	20.00
223	LRB 261	103.00	144.00	130.00	15.00
224	LRB 262	102.00	145.00	204.00	50.00
225	LRB 263	111.00	145.00	165.00	20.00
226	LRB 264	115.00	151.00	212.00	25.00
227	LRB 265	111.00	139.00	188.00	30.00
228	LRB 266	110.00	144.00	174.00	30.00
229	LRB 267	105.00	147.00	160.00	50.00
230	LRB 268	105.00	147.00	227.00	30.00
231	LRB 269	105.00	147.00	169.00	25.00
232	LRB 270	111.00	145.00	180.00	25.00
233	LRB 271	115.00	144.00	175.00	30.00
234	LRB 272	114.00	139.00	160.00	30.00
235	LRB 273	115.00	139.00	177.00	25.00
236	LRB 274	109.00	147.00	215.00	25.00
237	LRB 275	119.00	143.00	210.00	25.00
238	LRB 276	119.00	147.00	220.00	25.00
239	LRB 277	116.00	149.00	210.00	30.00
240	LRB 278	115.00	143.00	199.00	50.00
241	LRB 279	105.00	142.00	189.00	30.00
242	LRB 280	99.00	132.00	174.00	30.00
243	LRB 281	99.00	132.00	155.00	30.00
244	LRB 282	102.00	141.00	179.00	70.00
245	LRB 283	115.00	143.00	195.00	4.00
246	LRB 284	112.00	143.00	205.00	5.00
247	LRB 285	116.00	142.00	166.00	50.00
248	LRB 286	105.00	142.00	176.00	25.00
249	LRB 287	105.00	142.00	219.00	2.00
250	LRB 290	105.00	142.00	176.00	25.00
251	LRB 291	103.00	142.00	166.00	20.00
252	LRB 292	115.00	143.00	171.00	70.00
253	LRB 293	112.00	142.00	183.00	20.00
254	LRB 294	115.00	139.00	147.00	40.00
255	LRB 295	105.00	139.00	191.00	25.00
256	LRB 296	104.00	141.00	205.00	20.00
257	LRB 297	103.00	139.00	171.00	40.00
258	LRB 298	110.00	139.00	162.00	10.00

S. No.	Line	Days to 50% flowering	Days to 75% maturity	Plant height (cm)	Yield (g)
259	LRB 299	110.00	141.00	161.00	25.00
260	LRB 300	109.00	142.00	174.00	25.00
261	LRB 408	102.00	137.00	200.00	25.00
262	LRB 410	112.00	135.00	220.00	40.00
263	LRB 417	110.00	146.00	199.00	35.00
264	LRB 429	105.00	141.00	189.00	50.00
265	LRB 430	112.00	142.00	195.00	40.00
266	LRB 431	82.00	133.00	165.00	50.00
267	LRB 432	112.00	134.00	172.00	20.00
268	LRB 433	115.00	141.00	167.00	30.00
269	LRB 434	115.00	135.00	185.00	30.00
270	LRB 435	93.00	139.00	175.00	25.00
271	C3	96.00	133.00	145.00	30.00
272	C2	110.00	145.00	210.00	50.00
273	C5	96.00	130.00	159.00	40.00
274	CI	108.00	145.00	220.00	55.00
275	C4	95.00	133.00	147.00	45.00
	Mean	106.99	141.53	178.98	35.36
	STDEV	11.92	7.45	25.05	13.02
	CV (%)	11.14	5.26	14.00	36.83

Table 115: Evaluation of germplasm of Ludhiana rice bean (Ranichauri)

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield/plant (g)
1	LRB 1	70.00	150.00	165.66	10.33	40.30	9.00	35.00	50.25
2	LRB 6	78.00	157.00	140.50	10.55	50.44	9.50	40.45	73.02
3	LRB 35	75.00	156.00	145.30	8.66	45.00	8.45	50.00	48.90
4	LRB 50	78.00	158.00	135.66	10.00	30.66	8.00	30.66	45.38
5	LRB 95	80.00	161.00	148.40	9.66	40.33	6.50	40.60	40.00
6	LRB 97	70.00	151.00	118.33	10.00	32.00	8.45	35.33	38.25
7	LRB 99	78.00	158.00	125.45	10.33	20.25	7.40	30.33	25.18
8	LRB 100	82.00	162.00	145.33	9.85	21.00	7.00	38.60	35.44
9	LRB 109	78.00	157.00	70.66	10.66	30.66	7.00	25.35	40.32
10	LRB 130	75.00	155.00	133.60	8.75	14.15	7.80	31.66	20.64
11	LRB 131	83.00	164.00	120.33	9.00	20.00	6.40	34.00	25.65
12	LRB 132	70.00	151.00	80.50	11.20	15.66	9.50	25.60	28.30
13	LRB 133	82.00	162.00	112.00	9.00	10.33	7.00	20.00	25.35
14	LRB 134	80.00	160.00	50.66	8.45	11.22	5.60	15.75	30.50
15	LRB 136	75.00	156.00	125.00	7.60	16.66	6.40	17.33	35.60
16	LRB 140	72.00	153.00	70.25	6.50	10.66	4.40	18.00	22.75
17	LRB 141	81.00	161.00	88.66	7.00	8.50	3.40	22.40	30.33
18	LRB 163	78.00	158.00	105.32	10.50	10.40	7.00	25.00	24.20
19	LRB 164	83.00	164.00	125.30	8.55	11.45	6.50	20.00	20.33
20	LRB 165	77.00	156.00	150.00	9.50	9.70	5.60	15.18	30.48

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield/plant (g)
21	LRB 166	72.00	152.00	58.60	10.66	10.00	8.30	20.19	20.17
22	LRB 167	81.00	160.00	60.50	10.33	8.70	4.30	13.15	18.85
23	LRB 168	78.00	158.00	50.70	7.66	7.60	4.45	20.40	25.00
24	LRB 169	83.00	164.00	50.33	5.75	8.50	5.00	25.00	35.66
25	LRB 170	80.00	160.00	120.45	6.66	30.33	4.70	30.33	42.21
26	LRB 171	75.00	156.00	150.33	10.00	28.66	7.33	35.50	45.50
27	LRB 172	82.00	162.00	120.66	9.60	27.66	6.00	30.00	25.62
28	LRB 173	74.00	155.00	110.00	9.50	20.70	5.45	32.35	25.60
29	LRB 175	78.00	158.00	115.55	10.00	30.35	5.00	40.00	42.38
30	LRB 176	72.00	153.00	130.50	11.33	18.35	9.35	35.00	25.80
31	LRB 198	80.00	160.00	85.60	9.60	12.00	8.60	26.00	18.45
32	LRB 199	75.00	155.00	95.60	10.33	16.35	9.33	20.33	21.50
33	LRB 200	78.00	159.00	88.50	6.78	5.66	5.00	25.00	18.90
34	LRB 201	70.00	151.00	80.66	9.00	5.35	4.00	14.00	15.75
35	LRB 202	83.00	164.00	70.80	7.50	4.40	3.50	18.60	17.86
36	LRB 203	78.00	158.00	75.15	8.60	7.45	8.60	20.00	21.40
37	LRB 204	80.00	162.00	80.66	8.75	5.66	4.94	30.00	19.80
38	LRB 206	82.00	163.00	78.00	7.00	5.00	3.30	10.60	20.85
39	LRB 207	77.00	156.00	66.00	4.00	4.00	3.00	12.00	15.19
40	LRB 208	78.00	158.00	50.00	5.50	6.80	2.70	14.80	21.80
41	LRB 210	72.00	152.00	82.50	4.80	5.40	3.00	15.60	20.13
42	LRB 211	70.00	150.00	70.33	4.30	4.50	4.35	14.50	20.55

S. No.	Entry	Days to 50% flowering	Days to maturity	Plant height (cm)	Pod length (cm)	No. of pod/plant	No. of seed/pod	No. of leaves/plant	Seed yield/plant (g)
43	LRB 212	80.00	159.00	85.43	5.40	4.00	3.75	18.33	15.17
44	LRB 213	72.00	152.00	79.95	4.80	4.15	3.00	20.00	18.22
45	LRB 214	75.00	155.00	80.66	7.00	6.50	5.53	12.00	20.18
46	PRR 2 ©	79.50	158.66	76.78	10.75	12.55	8.66	30.00	50.45
47	RBL 6 ©	79.75	160.50	87.97	9.88	14.33	9.50	28.70	35.00
48	RBL 1 ©	78.75	160.00	102.66	10.00	11.66	8.88	35.70	28.33
	Mean	77.25	157.52	99.20	8.57	16.17	6.26	25.40	29.11
	Range	70.00-83.00	150.00-164.00	50.00-165.66	4.00-11.33	4.00-50.44	2.70-9.50	10.60-50.00	15.17-50.45
	STDEV	4.01	4.02	31.69	1.98	11.93	2.12	9.29	11.92
	CV (%)	5.19	2.55	31.94	23.06	73.82	33.88	36.57	40.95

Table 116: Germplasm Evaluation of Rice bean-2003 (Bangalore)

S. No.	Entries	Plant height (cm)	Days to maturity	Pod/plant	Seed yield/plant (g)
1	RBL 1	38.60	71.00	24.00	16.70
2	RBL 6	40.40	75.00	6.00	2.30
3	RBL 33-1	38.00	73.00	7.20	3.40
4	RBL 35	34.60	71.00	7.90	2.20
5	RBL 50	36.00	71.00	5.60	3.80
6	LRB 22-1	48.20	73.00	1.40	1.00
7	LRB 32	45.40	76.00	5.00	3.20
8	LRB 35-1	32.40	71.00	23.00	11.30
9	LRB 125	30.40	72.00	31.20	13.90
10	LRB 126	40.80	72.00	5.00	4.50
11	LRB 156	29.60	72.00	18.00	5.10
12	LRB 160	39.60	74.00	16.00	3.90
13	LRB 179	31.40	76.00	3.00	2.00
14	LRB 216	32.60	74.00	4.40	3.60
15	LRB 226	37.00	74.00	14.00	10.10
16	LRB 228	38.20	76.00	2.00	1.60
17	LRB 235	29.40	74.00	4.00	2.40
18	LRB 236	33.00	73.00	6.00	5.80
19	LRB 297	28.00	72.00	14.80	2.30
20	LRB 298	24.80	72.00	10.00	1.70
21	LRB 304	28.20	78.00	5.00	2.60
22	LRB 305	34.20	74.00	17.80	5.00
23	LRB 306	45.00	72.00	1.40	1.00
24	LRB 308	34.80	71.00	6.40	2.50
25	LRB 309	33.20	71.00	2.00	1.50
26	LRB 311	32.20	72.00	8.00	5.00
27	LRB 312	27.80	72.00	2.40	1.50
28	LRB 316	24.80	73.00	9.60	2.00
29	LRB 317	23.60	77.00	1.50	1.00
30	LRB 324	43.00	77.00	1.00	0.60
31	LRB 234	22.80	74.00	7.80	1.40
32	LRB 339	47.80	74.00	4.00	1.00
33	LRB 511	40.50	75.00	16.00	8.00
34	LRB 517	35.60	72.00	8.50	2.50
35	LRB 341	37.40	74.00	3.20	2.40

S. No.	Entries	Plant height (cm)	Days to maturity	Pod/plant	Seed yield/plant (g)
36	LRB 242	35.60	75.00	23.00	2.50
37	LRB 357	37.40	74.00	1.20	1.00
38	LRB 358	35.20	75.00	4.00	2.00
39	LRB 360	35.60	76.00	2.20	1.20
40	LRB 364	38.40	73.00	10.60	5.50
41	LRB 365	28.80	76.00	6.40	3.50
42	LRB 366	28.40	75.00	10.00	2.20
43	LRB 375	36.60	73.00	15.80	9.60
44	LRB 438	44.00	74.00	9.60	4.70
45	LRB 439	35.80	73.00	4.40	3.60
46	LRB 441	27.00	75.00	10.30	5.40
47	LRB 444	29.60	75.00	8.00	3.60
48	LRB 447	34.20	75.00	13.40	7.70
49	LRB 448	33.00	75.00	8.50	6.40
50	LRB 449	32.00	74.00	10.60	5.70
51	LRB 450	27.20	74.00	4.40	3.80
52	LRB 452	24.20	73.00	15.20	13.60
53	LRB 453	41.00	74.00	23.20	18.10
54	LRB 454	39.20	74.00	9.00	5.90
55	LRB 455	37.00	78.00	13.00	2.40
56	LRB 456	26.40	77.00	20.00	9.00
57	RBL 33-1	40.00	79.00	16.60	14.80
58	RBL 35	35.60	72.00	10.00	3.50
59	RBL 50	54.80	76.00	4.00	3.60
60	LRB 457	50.40	73.00	7.40	7.00
61	LRB 458	42.60	74.00	5.60	4.00
62	LRB 459	30.40	76.00	16.20	3.00
63	LRB 460	37.80	75.00	12.20	2.80
64	LRB 461	50.40	76.00	3.60	1.20
65	LRB 513	45.00	75.00	8.50	3.50
66	LRB 518	38.50	74.00	15.00	5.20
67	LRB 462	29.00	74.00	1.80	1.00
68	LRB 463	44.80	75.00	2.50	2.20
69	LRB 464	55.00	78.00	2.00	1.00
70	LRB 465	48.20	78.00	13.40	9.60
71	LRB 466	27.00	74.00	9.60	3.70

S. No.	Entries	Plant height (cm)	Days to maturity	Pod/plant	Seed yield/plant (g)
72	LRB 467	39.20	79.00	8.50	8.00
73	LRB 468	28.40	73.00	13.60	1.90
74	LRB 470	30.60	73.00	18.40	3.20
75	LRB 471	41.00	72.00	5.40	4.90
76	LRB 472	36.50	78.00	4.60	4.30
77	LRB 473	37.80	77.00	3.20	2.30
78	LRB 474	25.80	74.00	15.00	1.90
79	LRB 478	37.00	79.00	4.40	4.00
80	LRB 482	27.80	76.00	1.60	1.00
81	LRB 483	31.40	77.00	2.80	1.50
82	LRB 484	35.60	78.00	5.50	2.00
83	LRB 485	32.80	74.00	3.20	1.00
84	LRB 486	30.80	76.00	1.20	1.00
85	LRB 487	27.00	79.00	1.00	1.00
86	LRB 488	26.20	80.00	14.20	2.70
87	LRB 490	26.60	74.00	10.60	1.80
88	LRB 491	32.00	76.00	5.20	3.80
89	LRB 492	38.20	82.00	6.90	4.00
90	LRB 494	46.20	79.00	8.00	7.50
91	LRB 495	38.40	79.00	5.00	4.70
92	LRB 496	32.80	77.00	12.00	10.40
93	LRB 498	37.40	76.00	3.60	1.50
94	LRB 499	45.80	78.00	8.00	5.00
95	LRB 503	45.00	78.00	8.00	6.70
96	LRB 504	23.20	76.00	8.40	1.40
97	LRB 506	45.20	78.00	6.00	3.50
98	LRB 507	40.20	76.00	20.00	12.50
99	LRB 515	53.40	78.00	25.60	16.70
100	LRB 519	40.00	75.00	8.40	2.40
	Mean	35.88	74.92	8.93	4.45
	STDEV	7.41	2.37	6.41	3.83
	CV (%)	20.66	3.17	71.79	86.07

Table 117: Germplasm evaluation of rice bean at New Delhi

S. No.	Accession No.	Days to flowering	Days to maturity	Plant height (cm)	No. of branches per plant	No. of pods per plant	Pod length (cm)	No. of grain per pods	yield per plot (g)	100 seed weight (g)
1	RBL-6 ©	70.00	120.00	175.80	4.20	40.80	8.52	7.60	135.00	5.10
2	RPD-3 (IC 364041)	83.00	126.00	96.00	8.00	38.50	6.90	6.50	20.00	5.08
3	RPD-9 (IC 364047)	79.00	131.00	204.80	5.00	22.80	8.88	6.40	40.00	10.00
4	PRD-16 (IC 364054)	77.00	137.00	150.20	3.20	45.40	9.66	7.20	50.00	14.00
5	RPD-23 (IC 364061)	85.00	136.00	160.60	4.60	135.40	7.24	8.40	110.00	5.12
6	RPD-28 (IC 364066)	83.00	131.00	145.60	3.80	52.40	8.26	7.40	120.00	5.25
7	RPD-41 (IC 364079)	81.00	137.00	149.80	2.80	31.00	7.38	7.40	35.00	8.00
8	RPD-42 (IC 364080)	83.00	136.00	143.80	3.00	60.40	8.10	7.60	10.00	8.40
9	RPD-43 (IC 364081)	79.00	137.00	155.20	2.40	26.00	8.38	7.00	40.00	9.00
10	JBT-34/51	94.00	141.00	142.40	2.80	25.00	12.00	9.40	15.00	8.75
11	BRS-1 ©	64.00	139.00	123.00	3.80	23.20	8.00	7.40	90.00	4.40
12	AKP 10-27	88.00	137.00	155.00	2.60	11.40	8.90	6.20	150.00	7.00
13	VKG 23-51	94.00	137.00	133.20	2.40	17.00	8.38	7.60	25.00	4.15
14	JBT 34-30	100.00	140.00	163.40	2.20	8.80	9.98	6.60	20.00	8.20
15	AKP 10-26	103.00	138.00	169.00	2.60	6.00	11.26	8.37	20.80	9.75
16	DPRR 158	64.00	84.00	50.00	3.00	3.50	4.10	6.00	5.42	3.16
17	RPD-1 (IC 364039)	85.00	123.00	143.80	3.00	8.80	8.00	8.40	35.00	10.50
18	PRR-1 ©	72.00	109.00	149.00	3.80	4.70	7.50	9.00	300.00	7.20
19	MNPL-2 (Veg. Type)	77.00	135.00	111.66	3.67	7.20	9.67	7.00	23.00	15.08
	Mean	82.16	130.21	143.28	3.52	29.91	8.48	7.45	65.49	7.80
	STDEV	10.73	13.81	32.55	1.33	30.69	1.69	0.94	72.55	3.22
	CV (%)	13.05	10.60	22.72	37.91	102.60	19.96	12.58	110.79	41.24

Table 118. Promising genotype of rice bean germplasm (Hills & Plains)

Centre	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of pods/plant	Seed yield/plant (g)	Seed yield/plot (g)
CSK HPKV, Palampur (275)						
Promising accession	LRB 50, LRB 12, LRB 7, LRB 2, LRB 6, LRB 4	LRB 2, LRB 4, LRB 3, LRB 7, LRB 12, LRB 6, LRB 1	LRB 231, LRB 98, LRB 162, LRB 103, LRB 90, LRB 229, LRB 91		LRB 292, LRB 127, LRB 281, LRB 115	
Range	71.00-130.00	116.00-161.00	125.00-255.00		3.00-70.00	
GBPUA&T, Ranichauri (48)						
Promising accession	LRB 201, LRB 176, LRB 140, LRB 66, LRB 1, LRB 97, LRB 132	LRB 1, LRB 21, LRB 201, LRB 132, LRB 97, LRB 166	LRB 1, LRB 171, LRB 95, LRB 35, LRB 6		LRB 6, PRR 2, LRB 1, LRB 35, LRB 171	
Range	70.00-83.00	150.00-164.00	50.00-165.66		15.17-50.45	
UAS, Bangalore (100)						
Promising accession		RBL 1, RBL 33-1, LRB 35-1, LRB 308, LRB 309, LRB 311, LRB 312	LRB 464, RBL 50, LRB 515, LRB 461, LRB 457, LRB 22-1	LRB 125, LRB 515, RBL 1, LRB 453, LRB 242	LRB 453, RBL 1, RBL 33-1, LRB 125, LRB 452	
Range		71.00-80.00	22.80-55.00	1.00-31.20	1.00-18.10	
NBPGR, New Delhi						
Promising accession	BRS 1, RBL 6, PRR 1, MNPL 1, PRD 16	DPRR 158, PRR 1, RBL 6, RPD 1, RPD 3		PRD 23, RPD 42, RPD 28, RPD 16, RBL 6		PRR 1, ADP 10-27, RBL 6, RPD 28, RPD 23
Range	64.00-103.00	84.00-140.00		3.50-135.40		5.42-300.00

Figure in parenthesis is the number of genotypes grown at the location

Table 119. Germplasm evaluation on Job's tear at NBPGR, Shillong

S. No.	Collection No.	Plant height (cm)	Nodes per tiller	Tillers per plant	Brace roots per plant	Yield (q/ha)
1	H-303	270.00	13.30	3.15	2.80	15.31
2	H-2333	275.50	14.30	2.30	2.65	16.25
3	NH6/22	269.50	12.50	2.80	2.65	20.94
4	H-2279	290.00	13.30	2.65	3.15	15.31
5	BDS-1872	271.50	12.15	3.15	2.80	12.81
6	H-2215	248.50	11.80	3.50	2.95	15.31
7	H-696	279.50	12.15	2.15	2.95	14.69
8	BD-3	269.00	10.60	2.00	2.10	10.94
9	BDS-865	273.00	11.80	2.65	2.45	11.56
10	H-3768	250.00	11.15	2.15	1.65	12.81
11	H-3638	271.00	10.45	2.00	2.15	15.94
12	H-306	278.00	12.15	2.15	1.65	17.19
13	BDS-1870	277.50	11.30	2.80	2.30	24.06
14	H-3767	280.00	11.80	2.50	2.30	17.81
15	BDS-1868	282.50	12.00	2.15	2.30	20.00
16	H-547	274.00	11.30	3.15	2.30	25.31
17	H-557	271.50	10.52	2.95	2.50	21.56
18	H-626	273.00	11.00	2.80	2.95	20.00
19	DKH-7	278.50	11.45	2.80	1.80	27.81
20	POUIN	265.50	11.10	2.60	2.45	26.88
21	AAH/33	278.50	11.15	2.60	1.95	21.25
22	IDvi-3026	274.50	12.30	1.65	1.80	20.31
23	H-2287	277.50	12.45	2.65	1.95	29.06
24	BDS-1872	281.50	12.60	2.30	1.95	19.38
25	HM-2902	265.00	12.15	2.95	2.15	22.81
26	H- 732	265.50	11.65	3.30	1.65	17.50
27	H-306	262.50	11.80	2.10	1.65	25.00
28	H-2213	289.50	12.30	3.10	2.10	22.50
29	H-300	290.50	13.00	2.15	2.45	15.00
30	Shillong Local	276.00	12.45	3.10	2.30	23.44
31	H-1871	265.50	12.45	3.30	1.95	26.25
32	H-305	266.00	12.45	2.45	2.00	16.88
33	H-656	260.50	12.15	2.15	2.65	25.63
34	Mayun	299.50	12.65	2.50	2.00	12.81

S. No.	Collection No.	Plant height (cm)	Nodes per tiller	Tillers per plant	Brace roots per plant	Yield (q/ha)
35	RVN-90	287.50	12.80	2.00	2.00	25.00
36	D8K-422	287.00	12.80	2.15	2.15	24.38
37	D8K-370	299.50	12.45	2.50	2.30	25.63
38	D8K-414	275.00	12.60	2.45	2.30	19.69
39	R8-FDI/319	304.00	13.30	2.10	2.83	19.38
40	R8-FDI/342	243.00	10.65	2.15	2.15	23.44
41	R8-FDI/380	251.50	11.80	2.15	2.45	25.94
42	FDI-API/33	264.00	12.15	2.15	2.45	19.19
43	FDI-API/40	268.50	13.65	2.80	2.45	23.13
44	FDI-API/01	275.50	11.30	1.45	2.83	25.00
	Mean	274.00	12.07	2.51	2.30	20.25
	STDEV	12.93	0.86	0.47	0.40	4.83
	CV (%)	4.72	7.10	18.61	17.16	23.87

3.2 PLAINS

3.2.1 AMARANTHS (*Amaranthus* spp.)

In grain amaranth germplasm screening nursery, a set of 100 genotypes along with three checks GA 2, Annapurna and Suvarna were planned to be evaluated in augmented design at Akola, Bangalore, S.K. Nagar, Mandor, Rahuri, Ludhiana, Faizabad, Hisar, Bhubaneswar and Ambikapur. But due to non availability of seeds at NBPGR, Akola, the screening nursery was carried out with 100 genotypes at four locations viz. Akola, Mandor, Hisar and Bangalore and 42 newly collected accessions were also characterized at NBPGR, New Delhi. The promising genotypes and the range in all characters have been presented in Table 120. A total of 94 genotypes grown at NBPGR, Akola, IC 35735 was early in flowering (50 days) and maturity (91 days) followed by IC 35734 with 93 days. Longest inflorescence (28 cm) was observed in IC 21790-A followed by IC 21925 (27 cm). The data on other characters have been given in Table 121. A total of 135 genotypes were grown at RAU, Mandor and eight yield characters were recorded. The accession RUK was found superior for seed yield followed IC 35661. Early maturity was observed in genotype IC 42015 (111 days) followed by RMA 2 (112 days). The data on yield related characters and mean have been shown in Table 122. A total of 90 accessions were evaluated for five important characters at UAS, Bangalore without any standard check variety. The highest grain yield per plant was observed in genotype IC 420050 (9.60 g) followed by IC 35616 (9.10 g). Accession IC 95317 ranked first for early flowering and maturity. Longest panicle (42 cm) was observed in IC 420050, while genotype IC 21940 ranked second with 39.80 cm long panicle. The mean, CV (%) and other yield characters have been presented in Table 123. A set of 93 accessions included three checks, Suvarna, GA 1 and GA 2 were grown at CCS HAU, Hisar for recording seven major characters. Highest seed yield per plant was observed in genotype IC 35706 (30.40 g) followed by IC 35546 (30.10 g). No accession was found early maturing than check GA 1. The data on other yield characters have been shown in Table 124. A total of 42 accessions, most by the newly collected ones were grown at NBPGR, New Delhi. Highest seed yield per plot was observed in accession U53/VR/165 (1040 g) whereas 900 g seed yield was recorded in VR 72. Accessions IC 243177 and KG/ZH/BLM 86 were found early maturing (144 days). Longest panicle (92.50 cm) was found in RJR/SCC/1/142 followed by AG 114 (92.33 cm). Data on other yield characters have been shown in Table 125.

3.2.2 FABIA BEAN (*Vicia faba*)

A set of 340 accessions along with three national checks viz. Vikrant, PRT 7 and PRT 12 were grown for ten yield characters at NBPGR, New Delhi. The promising genotypes and the range values have been presented in Table 126. The genotypes IC 117753 and EC 243770 ranked first with seed yield per plot (1350 g). Early flowering was observed in genotype VKS-11/61 (70 days) followed by VKS/SCC 9/110. Genotype EC 117740 was found early maturing (127 days) followed by IC 267690. Data on other yield and its related characters have been presented in Table 127.

3.2.3 TUMBA (*Citrullus colocynthis*)

A set of a nineteen lines were sown at RAU, Mandor for five major characters. The maximum seed yield per plant was observed in genotype GP 23 (146 g) followed by GP 68 (92 g) with range of 8.00 g to 146.00 g in all the genotypes. The highest fruit weight (2200 g/plant) was observed in genotype GP 68, followed by GP 22 (950 g). Much variability was observed in fresh fruit yield/plant. Genotype GP 23 was the highest fruit producer with 21 number fruits per plant followed by GP 12 with 14 fruits per plant.

The data on important yield characters, mean, range, SD and CV (%) have been presented in Table 128.

3.2.4 JATROPHA (*Jatropha curcas*)

A set of nine genotypes were maintained at NBPGR, New Delhi. Jatropha-2 was the highest yielder with 300 g seeds per plant followed by J 3 (280 g). Maximum plant height (6.15 m) was also observed in Jatropha-2 followed by Jatropha-1 (5.78 m). The other details have been given in Table 129.

Table 120. Promising genotype of grain amaranth germplasm at five locations (Plains)

Centre	Plant height (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Seed yield (q/ha)
NBPGR, Akola (94)					
Promising accession	IC 35783, IC 35686, IC 95332, IC 35732, IC 35701	IC 35735, IC 35754, IC 35647, IC 35715, IC 41983	IC 35735, IC 94649, IC 35754, IC 95276, IC 95287	IC 21790-A, IC 21925, IC 35438, IC 35754, IC 35777	
Range	66.60-110.00	50.00-76.00	91.00-110.00	7.00-28.00	
RAU, Mandor (135)					
Promising accession	Suvarna, GA 1, IC 95376, IC 35673, RUK, IC 35661	Annapurna, IC 35727, RMA 2, IC 35654, IC 42258, IC 81702	IC 42015, RMA 2, IC 35680, IC 35684, IC 35694	IC 35732, IC 35673, GA 1, IC 35661, IC 95317	RUK, IC 35661, RMA 2, IC 35694, IC 35677
Range	41.00-127.30	34.00-65.00	111.00-125.00	25.00-65.00	1.86-39.99
UAS, Bangalore (90)					
Promising accession	IC 41997, IC 35808, IC 35445, IC 35612, IC 35616	IC 35781, IC 418989, IC 35370, IC 21925, IC 35555, IC 5553	IC 35791, IC 95317, IC 35414, IC 95332, IC 35574, IC 35650	IC 420050, IC 21940, IC 21790, IC 35701, IC 41997	IC 420050, IC 35616, IC 35494, IC 41997, IC 35440
Range	28.50-118.00	50.00-60.00	75.00-99.00	13.50-42.00	
CCS HAU, Hisar (93)					
Promising accession	IC 35546, GA 1, IC 35414, IC 21810, IC 35706	IC 35732, IC 35783, IC 38243, IC 41989, IC 35624, IC 42015	IC 35446, GA 1, IC 35409, IC 35589, IC 21925, IC 21790-A		IC 35706, IC 35546, IC 35647, IC 35694, IC 35624
Range	12.30-63.20	63.00-100.00	185.00-211.00		
NBPGR, New Delhi (42)					
Promising accession	SKJ 1/61, MKSR 103, IC 243177, AG 114	IC 120588, RGAS 99-2-4, U 53/VR-24, DPRR 119	VR 72, U 53/VR-165, IC 120588, IC 243176, U 53/VR 24	BKS 1/79, RSR/SCC 1/142, JBT 30/161, U 53/VR 24	U 53/VR 24, IC 120588, VR 72, JPM/TKO 116
Range	50.00-193.00	79.00-90.00	146.00-159.00	27.50-96.00	

Figure in parenthesis is the number of genotypes grown at the location

Table 121: Preliminary characterization of amaranth germplasm Rabi 2002-03 (Akola)

S. No.	Nursery trial	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Pod length (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Bulk weight (g)
1	IC 1493	88.00	11.30	6.00	6.60	66.00	110.00	23.00	40.00
2	IC 21790-A	86.00	13.60	6.60	6.00	69.00	105.00	28.00	15.00
3	IC 21806	85.00	12.00	6.30	9.60	65.00	101.00	9.00	65.00
4	IC 21810	86.30	11.60	6.60	5.60	71.00	103.00	16.30	65.00
5	IC 21923	70.00	12.00	5.60	6.00	68.00	102.00	7.00	32.00
6	IC 21925	86.60	12.30	6.30	6.00	61.00	104.00	27.00	30.00
7	IC 21938	84.60	16.00	8.00	9.60	59.00	105.00	23.30	38.00
8	IC 21940	95.00	12.60	7.60	9.30	64.00	107.00	20.30	40.00
9	IC 35370	66.00	8.30	5.30	5.00	59.00	105.00	23.60	30.00
10	IC 35391	88.66	13.30	6.00	7.00	61.00	103.00	21.60	28.00
11	IC 35399	1.30	13.30	6.60	10.30	64.00	111.00	18.30	35.00
12	IC 35409	81.30	12.60	7.00	9.30	69.00	108.00	20.00	26.00
13	IC 35414	87.00	11.00	7.30	8.30	63.00	105.00	19.00	20.00
14	IC 35438	77.00	14.30	7.60	5.30	64.00	105.00	27.00	18.00
15	IC 35439	81.60	15.30	8.60	10.00	71.00	108.00	11.00	17.00
16	IC 35440	85.60	15.00	8.30	7.30	73.00	108.00	17.60	40.00
17	IC 35445	85.30	14.60	7.60	10.30	67.00	104.00	22.60	52.00
18	IC 35446	74.30	10.00	7.00	5.30	69.00	105.00	11.00	28.00
19	IC 35452	84.30	11.00	6.60	6.00	59.00	100.00	20.00	30.00
20	IC 35494	94.30	14.30	8.30	8.30	64.00	101.00	17.00	30.00

S. No.	Nursery trial	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Pod length (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Bulk weight (g)
21	IC 35501	90.30	11.60	10.30	10.30	65.00	106.00	16.30	52.00
22	IC 35505	82.00	14.30	9.00	10.30	59.00	102.00	18.30	38.00
23	IC 35520	81.30	14.30	7.30	8.00	63.00	103.00	17.00	28.00
24	IC 35534	85.30	16.00	6.30	6.00	66.00	105.00	17.60	32.00
25	IC 35536	85.30	10.00	6.60	5.30	66.00	108.00	14.30	32.00
26	IC 35538	95.00	12.30	6.60	8.00	71.00	109.00	19.00	28.00
27	IC 35544	90.00	14.60	7.60	6.30	68.00	108.00	16.60	30.00
28	IC 35546	100.00	13.60	7.60	7.60	67.00	103.00	11.60	35.00
29	IC 35543	90.60	14.60	6.60	7.60	63.00	105.00	13.00	65.00
30	IC 35554	85.00	11.60	8.00	8.60	71.00	108.00	15.00	39.00
31	SUVARNA	85.00	16.00	9.00	10.00	73.00	109.00	5.00	20.00
32	IC 120588	78.30	12.00	8.00	6.00	68.00	105.00	15.00	25.00
33	IC 35555	88.00	14.60	7.30	6.30	66.00	110.00	15.30	32.00
34	IC 35567	77.60	11.30	5.60	6.30	67.00	109.00	11.30	33.00
35	IC 35574	82.30	11.60	6.00	7.30	69.00	108.00	12.60	30.00
36	IC 35575	82.00	11.30	7.00	5.60	65.00	109.00	11.30	28.00
37	IC 35580	80.00	13.60	6.60	6.30	69.00	103.00	10.30	18.00
38	IC 35589	70.60	12.60	6.30	5.30	71.00	102.00	13.30	42.00
39	IC 35593	66.00	11.60	5.60	9.60	71.00	104.00	9.60	26.00
40	IC 35596	92.00	12.60	6.60	6.30	63.00	104.00	10.30	30.00
41	IC 35597	72.00	13.30	5.30	6.30	69.00	107.00	11.00	36.00
42	IC 35598	78.30	14.60	7.30	7.00	61.00	110.00	16.60	55.00

S. No.	Nursery trial	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Pod length (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Bulk weight (g)
43	IC 35602	66.60	13.00	6.30	5.30	65.00	110.00	20.30	30.00
44	IC 35608	67.30	13.30	7.30	10.00	67.00	111.00	11.30	26.00
45	IC 35612	80.00	11.00	6.30	6.30	72.00	106.00	11.30	50.00
46	IC 35616	91.00	13.60	7.60	7.00	61.00	105.00	16.30	35.00
47	IC 35624	91.60	11.00	6.00	6.00	76.00	108.00	18.60	28.00
48	IC 35626	78.60	12.30	7.30	6.30	61.00	108.00	19.60	29.00
49	IC 35627	87.00	12.00	6.60	5.60	64.00	105.00	16.60	60.00
50	IC 35635	75.60	14.30	6.60	6.30	66.00	105.00	10.60	15.00
51	IC 35643	95.60	13.60	8.30	6.60	56.00	99.00	10.30	40.00
52	IC 35647	90.60	14.30	8.30	7.60	51.00	94.00	12.60	52.00
53	IC 35650	100.00	12.00	5.60	6.30	58.00	99.00	16.30	110.00
54	IC 35654	102.60	14.00	6.30	6.60	63.00	103.00	17.00	35.00
55	IC 35661	98.30	13.60	6.30	5.60	71.00	105.00	24.00	45.00
56	IC 35673	101.00	16.00	8.30	12.60	64.00	111.00	21.80	65.00
57	IC 35675	102.00	14.30	6.60	7.30	71.00	111.00	15.00	58.00
58	IC 35677	105.00	13.60	6.30	7.60	71.00	110.00	13.00	40.00
59	IC 35680	108.60	14.30	6.60	8.30	70.00	111.00	15.00	115.00
60	IC 35684	101.60	13.30	6.60	8.60	67.00	106.00	10.00	65.00
61	IC 35694	106.00	12.60	6.60	7.00	69.00	110.00	15.60	53.00
62	IC 35701	106.30	14.30	7.60	7.00	63.00	108.00	16.30	100.00
63	SUVARNA	103.00	20.00	13.00	10.00	71.00	106.00	7.00	30.00
64	IC 120588	105.00	14.00	9.00	7.00	65.00	102.00	18.00	110.00

S. No.	Nursery trial	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Pod length (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Bulk weight (g)
65	IC 35606	105.00	14.30	8.60	6.30	69.00	107.00	14.30	50.00
66	IC 35709	103.30	15.60	11.00	7.30	66.00	108.00	15.30	110.00
67	IC 35715	98.30	14.60	7.30	6.60	51.00	101.00	14.30	80.00
68	IC 35718	105.60	12.00	6.00	6.00	66.00	104.00	23.00	150.00
69	IC 35721	99.00	17.00	5.60	7.00	64.00	106.00	20.30	85.00
70	IC 35727	103.30	17.30	6.30	8.00	62.00	99.00	24.80	55.00
71	IC 35732	106.60	16.30	6.30	10.00	56.00	97.00	14.30	80.00
72	IC 35735	103.60	15.00	6.60	9.60	50.00	91.00	17.60	42.00
73	IC 35754	103.30	13.60	5.30	6.30	50.00	93.00	26.00	48.00
74	IC 35757	89.00	17.60	8.60	9.60	65.00	108.00	13.60	52.00
75	IC 35777	85.30	10.60	6.60	6.30	56.00	100.00	26.30	55.00
76	IC 35780	91.00	11.30	5.30	5.60	54.00	99.00	25.30	65.00
77	IC 35781	105.60	12.30	6.30	6.00	52.00	96.00	21.60	145.00
78	IC 35783	110.00	14.00	5.00	5.30	58.00	97.00	19.60	70.00
79	IC 35791	104.30	12.30	5.30	7.30	54.00	99.00	17.60	145.00
80	IC 38343	98.60	11.30	5.60	5.60	52.00	94.00	21.60	85.00
81	IC 41983	103.30	13.60	6.30	6.30	51.00	93.00	18.30	68.00
82	IC 41989	106.60	12.30	6.30	6.60	54.00	94.00	23.30	100.00
83	IC 41991	98.30	16.00	6.00	8.30	54.00	95.00	15.30	68.00
84	IC 41997	101.00	14.30	6.30	6.00	69.00	105.00	15.00	100.00
85	IC 42002	104.30	16.30	7.60	7.30	70.00	107.00	11.00	38.00
86	IC 42015	80.00	13.60	7.00	5.30	66.00	99.00	13.60	65.00

S. No.	Nursery trial	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Pod length (cm)	Days to flowering	Days to maturity	Inflorescence length (cm)	Bulk weight (g)
87	IC 42258	96.60	17.60	5.60	7.30	69.00	103.00	20.60	85.00
88	IC 81702	96.60	14.31	7.00	7.60	62.00	105.00	24.60	150.00
89	IC 93962	93.30	12.30	6.00	7.00	57.00	95.00	18.30	105.00
90	IC 94649	95.30	14.60	5.00	6.00	56.00	92.00	11.00	88.00
91	IC 95276	104.00	16.30	5.00	6.30	52.00	93.00	13.60	105.00
92	IC 95287	92.00	13.00	6.30	6.60	53.00	94.00	15.30	39.00
93	IC 95317	104.30	14.30	5.60	6.00	52.00	91.00	17.60	45.00
94	IC 95332	107.60	12.00	6.00	8.00	53.00	96.00	20.60	100.00
	Mean	90.25	13.49	6.88	7.23	63.43	103.52	16.73	54.22
	STDEV	14.67	1.93	1.30	1.59	6.50	5.36	5.03	32.46
	CV (%)	16.26	14.27	18.88	21.93	10.26	5.17	30.06	59.86

Table 122. Grain amaranth germplasm evaluation at RAU, Mandor

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
1	IC 1491	22.00	53.00	122.00	34.00	67.30	0.14	9.46	40.00
2	IC 21790-A	20.00	47.00	115.00	39.70	85.30	0.17	11.60	49.00
3	IC 21806	26.00	45.00	119.00	43.30	84.00	0.26	17.33	30.00
4	IC 21810	15.00	51.00	119.00	36.70	53.30	0.15	9.99	22.00
5	IC 21923	14.00	53.00	119.00	25.00	57.00	0.14	9.33	50.00
6	IC 21925	17.00	52.00	125.00	39.70	90.30	0.29	19.33	83.00
7	IC 21938	21.00	60.00	125.00	42.00	78.30	0.12	7.99	60.00
8	IC 21940	18.00	49.00	125.00	43.70	83.70	0.10	6.66	20.00
9	IC 35370	14.00	39.00	121.00	34.00	50.00	0.08	5.33	24.00
10	IC 35391	13.00	62.00	125.00	50.70	85.00	0.24	15.66	70.00
11	GA 1	12.00	59.00	125.00	44.00	90.70	0.09	5.99	30.00
12	SUVARNA	9.00	65.00	117.00	31.00	10.40	0.18	11.73	40.00
13	ANNAPURNA	17.00	40.00	117.00	45.00	50.30	0.11	7.59	14.00
14	RMA 2	19.00	45.00	117.00	44.70	95.00	0.27	17.99	40.00
15	RUK	26.00	56.00	119.00	37.00	68.30	0.39	25.99	35.00
16	IC 35399	25.00	51.00	117.00	28.00	72.70	0.28	18.33	23.00
17	IC 35409	23.00	60.00	117.00	41.30	80.00	0.17	11.33	30.00
18	IC 35414	30.00	45.00	118.00	50.00	96.00	0.38	25.33	45.00
19	IC 35438	28.00	44.00	115.00	31.70	69.30	0.32	21.06	30.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
20	IC 35439	30.00	52.00	119.00	33.70	64.70	0.31	20.79	25.00
21	IC 35440	26.00	53.00	120.00	43.80	94.00	0.40	26.33	50.00
22	IC 35445	22.00	52.00	121.00	45.70	81.30	0.44	29.33	65.00
23	IC 35446	14.00	61.00	119.00	43.70	82.30	0.29	19.33	40.00
24	IC 35452	22.00	45.00	119.00	43.70	92.70	0.27	17.99	50.00
25	IC 35494	24.00	47.00	120.00	35.70	84.70	0.29	18.99	40.00
26	GA 1	15.00	63.00	117.00	38.30	84.00	0.11	7.59	20.00
27	SUVARNA	11.00	65.00	119.00	37.70	104.30	0.15	9.66	85.00
28	ANNAPURNA	13.00	42.00	115.00	36.70	44.00	0.04	2.33	22.00
29	RMA 2	12.00	49.00	118.00	48.70	80.70	0.28	18.33	24.00
30	RUK	25.00	53.00	118.00	35.00	79.00	0.36	23.99	40.00
31	IC 35501	22.00	45.00	119.00	45.30	101.00	0.33	22.26	28.00
32	IC 35505	14.00	55.00	119.00	38.00	61.70	0.12	7.99	30.00
33	IC 35520	12.00	53.00	120.00	39.70	66.30	0.06	3.59	25.00
34	IC 35534	11.00	52.00	119.00	32.00	64.30	0.16	10.66	25.00
35	IC 35536	15.00	51.00	120.00	57.00	109.00	0.30	19.99	80.00
36	IC 35538	23.00	48.00	117.00	43.30	87.30	0.42	28.13	30.00
37	IC 35544	23.00	49.00	119.00	37.30	86.30	0.45	30.00	33.00
38	IC 35546	9.00	52.00	119.00	32.00	54.30	0.10	6.66	53.00
39	IC 35553	14.00	52.00	119.00	50.00	94.70	0.22	14.66	70.00
40	IC 35554	11.00	53.00	119.00	33.00	56.70	0.12	7.73	30.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
41	GA 1	12.00	54.00	122.00	37.70	90.70	0.20	13.33	37.00
42	SUVARNA	9.00	65.00	117.00	31.00	104.00	0.18	11.73	35.00
43	ANNAPURNA	15.00	32.00	117.00	31.30	50.30	0.16	10.66	25.00
44	RMA 2	17.00	50.00	117.00	39.70	66.70	0.25	16.33	30.00
45	RUK	15.00	53.00	121.00	36.00	78.00	0.40	26.66	70.00
46	IC 35555	17.00	52.00	118.00	34.70	74.30	0.30	19.99	28.00
47	IC 35567	19.00	49.00	119.00	38.30	83.30	0.28	18.66	18.00
48	IC 35574	18.00	48.00	117.00	44.70	89.30	0.37	24.66	35.00
49	IC 35575	15.00	53.00	118.00	31.70	61.70	0.18	12.66	27.00
50	IC 35586	22.00	49.00	119.00	31.70	64.00	0.39	25.66	45.00
51	IC 35589	23.00	52.00	117.00	35.70	68.70	0.29	19.33	50.00
52	IC 35593	18.00	50.00	118.00	32.70	73.70	0.35	23.33	50.00
53	IC 35596	22.00	46.00	117.00	49.30	97.70	0.45	29.66	60.00
54	IC 35597	10.00	49.00	119.00	47.70	95.00	0.30	19.99	50.00
55	IC 35598	22.00	48.00	117.00	49.70	99.30	0.25	16.66	50.00
56	GA 1	18.00	50.00	121.00	64.30	120.30	0.41	26.99	45.00
57	SUVARNA	17.00	61.00	121.00	33.00	115.00	0.21	13.66	160.00
58	ANNAPURNA	16.00	34.00	119.00	43.30	49.00	0.07	4.39	28.00
59	RMA 2	17.00	45.00	117.00	43.00	90.70	0.51	33.66	110.00
60	RUK	20.00	51.00	121.00	42.70	104.70	0.60	39.99	75.00
61	IC 35602	13.00	61.00	120.00	41.00	64.00	0.14	8.99	34.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
62	IC 35608	10.00	60.00	121.00	53.30	93.00	0.14	8.99	35.00
63	IC 35612	15.00	53.00	121.00	46.70	68.30	0.15	9.99	60.00
64	IC 35616	8.00	54.00	119.00	45.00	76.70	0.12	7.99	15.00
65	IC 35624	13.00	51.00	121.00	47.30	77.30	0.24	15.99	50.00
66	IC 35626	12.00	51.00	121.00	50.70	80.70	0.23	15.33	80.00
67	IC 35627	12.00	50.00	120.00	56.70	100.70	0.32	20.99	110.00
68	IC 35635	10.00	50.00	120.00	50.70	79.30	0.20	13.33	45.00
69	IC 35643	11.00	53.00	121.00	42.30	70.30	0.09	5.99	25.00
70	IC 35647	3.00	53.00	121.00	50.30	62.70	0.03	1.86	24.00
71	GA 1	4.00	65.00	121.00	50.00	85.30	0.11	7.33	28.00
72	SUVARNA	11.00	65.00	119.00	35.00	122.00	0.17	11.33	30.00
73	ANNAPURNA	5.00	47.00	117.00	38.30	41.00	0.02	1.59	13.00
74	RMA 2	22.00	45.00	117.00	54.70	97.00	0.40	26.66	55.00
75	RUK	14.00	49.00	119.00	51.30	110.70	0.27	17.66	58.00
76	IC 35650	24.00	48.00	119.00	51.70	101.00	0.31	20.66	90.00
77	IC 35654	16.00	43.00	119.00	58.70	116.30	0.27	17.99	33.00
78	IC 35661	16.00	44.00	119.00	60.30	122.70	0.56	37.33	55.00
79	IC 35673	12.00	45.00	115.00	64.70	125.30	0.31	20.66	45.00
80	IC 35625	17.00	45.00	115.00	55.30	111.30	0.37	24.33	50.00
81	IC 35677	23.00	57.00	117.00	57.00	124.00	0.47	31.33	80.00
82	IC 35680	21.00	54.70	117.00	54.70	105.30	0.39	25.99	70.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
83	IC 35684	24.00	58.00	114.00	58.00	120.30	0.36	23.99	75.00
84	IC 35694	20.00	50.30	113.00	50.30	102.70	0.49	32.33	60.00
85	IC 35701	27.00	61.70	113.00	61.70	111.70	0.38	25.33	100.00
86	GA 1	21.00	51.30	121.00	51.30	102.30	0.31	20.53	70.00
87	SUVARNA	18.00	42.70	119.00	42.70	138.70	0.27	17.99	55.00
88	ANNAPURNA	10.00	44.70	117.00	44.70	51.30	0.06	3.66	5.00
89	RMA 2	27.00	47.00	118.00	47.00	87.00	0.47	31.33	35.00
90	RUK	18.00	46.70	119.00	46.70	95.70	0.40	26.66	50.00
91	IC 35706	20.00	52.00	119.00	50.30	91.00	0.34	22.66	35.00
92	IC 35709	21.00	51.00	119.00	52.70	99.00	0.33	21.99	70.00
93	IC 35715	7.00	53.00	119.00	42.30	63.00	0.05	3.33	23.00
94	IC 35718	18.00	52.00	119.00	39.30	69.00	0.45	29.66	50.00
95	IC 35721	6.00	51.00	119.00	52.30	86.00	0.39	25.99	30.00
96	IC 35727	20.00	42.00	119.00	45.00	87.30	0.19	12.33	120.00
97	IC 35732	8.00	44.00	120.00	65.00	112.30	0.29	19.33	62.00
98	IC 35735	9.00	49.00	120.00	40.00	65.00	0.17	10.99	30.00
99	IC 35754	16.00	48.00	121.00	58.30	100.00	0.24	15.66	42.00
100	IC 35757	18.00	47.00	121.00	58.70	92.70	0.36	23.99	30.00
101	GA 1	11.00	61.00	121.00	54.70	124.30	0.21	13.66	35.00
102	SUVARNA	11.00	65.00	119.00	35.00	122.30	0.20	13.33	33.00
103	ANNAPURNA	17.00	47.00	117.00	45.30	53.70	0.08	5.59	30.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
104	RMA 2	16.00	52.00	119.00	35.70	72.30	0.38	24.99	50.00
105	RUK	17.00	63.00	119.00	31.00	59.30	0.20	13.33	70.00
106	IC 35777	21.00	62.00	120.00	41.00	67.70	0.16	10.66	28.00
107	IC 35780	19.00	59.00	119.00	47.00	72.70	0.24	15.99	45.00
108	IC 35781	13.00	53.00	120.00	49.30	76.70	0.40	26.33	33.00
109	IC 35783	19.00	49.00	119.00	40.00	94.30	0.35	23.33	65.00
110	IC 35791	22.00	50.00	119.00	38.70	79.70	0.43	18.33	50.00
111	IC 38243	32.00	48.00	119.00	39.00	75.70	0.44	29.33	45.00
112	IC 41983	20.00	49.00	119.00	35.30	67.70	0.18	11.99	20.00
113	IC 41989	24.00	49.00	117.00	41.70	81.70	0.43	28.33	50.00
114	IC 41991	17.00	50.00	117.00	33.30	71.00	0.26	16.99	28.00
115	IC 41997	13.00	45.00	119.00	31.00	105.30	0.36	23.99	46.00
116	GA 1	14.00	51.00	120.00	47.00	112.30	0.25	16.66	47.00
117	SUVARNA	16.00	52.00	119.00	32.30	116.70	0.23	15.33	45.00
118	ANNAPURNA	19.00	35.00	117.00	38.30	41.70	0.08	4.99	15.00
119	RMA 2	17.00	47.00	117.00	45.00	99.30	0.56	37.32	80.00
120	RUK	15.00	50.00	119.00	39.00	89.00	0.28	18.33	40.00
121	IC 42002	7.00	48.00	119.00	46.70	83.70	0.19	12.33	33.00
122	IC 42015	14.00	45.00	111.00	47.70	91.00	0.14	9.33	55.00
123	IC 42258	18.00	43.00	114.00	42.30	80.00	0.21	13.99	11.00
124	IC 81702	12.00	48.00	117.00	44.00	99.70	0.29	19.33	65.00

S. No.	Entries	Plant population (No./plot)	Days to flowering	Days to maturity	Inflorescence length (cm)	Plant height (cm)	Seed yield (Kg/plot)	Seed yield (q/ha)	Single plant straw yield (g)
125	IC 93962	11.00	43.00	115.00	48.30	91.70	0.20	12.99	65.00
126	IC 94649	16.00	47.00	118.00	55.30	110.30	0.25	16.66	80.00
127	IC 95376	12.00	46.00	119.00	60.00	126.70	0.19	12.53	140.00
128	IC 95387	17.00	44.00	113.00	51.30	111.30	0.28	18.33	50.00
129	IC 95317	16.00	47.00	113.00	60.70	123.00	0.32	21.33	30.00
130	IC 95332	15.00	45.00	115.00	35.30	105.30	0.20	13.46	100.00
131	GA 1	16.00	52.00	120.00	44.30	117.30	0.40	26.66	82.00
132	SUVARNA	15.00	63.00	121.00	31.70	127.30	0.19	12.66	22.00
133	ANNAPURNA	11.00	40.00	117.00	30.00	40.00	0.05	3.59	40.00
134	RMA 2	14.00	43.00	112.00	36.70	92.30	0.33	22.66	42.00
135	RUK	11.00	47.00	119.00	55.00	124.70	0.54	35.99	80.00
	Mean	16.57	50.61	118.60	43.71	86.18	0.26	17.43	47.44
	STDEV	5.63	6.54	2.44	8.83	22.77	0.13	8.45	25.54
	CV (%)	33.98	12.93	2.06	20.21	26.42	48.40	48.46	53.83

Table 123. Germplasm Evaluation of Amranth-2003 (Bangalore)

S. No.	Entries	Plant height (cm)	Panicle length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
1	IC 35608	102.60	30.30	59.00	88.00	2.30
2	IC 35675	118.00	31.40	54.00	91.00	3.50
3	IC 35586	55.50	22.60	56.00	89.00	1.60
4	IC 35589	78.50	17.50	56.00	89.00	2.50
5	IC 35398	79.80	24.00	56.00	91.00	1.70
6	IC 35593	56.00	14.30	58.00	90.00	2.00
7	IC 35596	82.00	31.50	55.00	83.00	3.50
8	IC 35597	72.50	24.50	56.00	92.00	2.50
9	IC 38243	73.40	26.80	51.00	85.00	1.60
10	IC 35780	46.80	23.60	51.00	80.00	1.30
11	IC 35777	67.20	22.80	53.00	83.00	1.50
12	IC 35757	96.80	36.00	53.00	85.00	1.90
13	IC 41991	85.00	34.00	56.00	85.00	4.00
14	IC 41983	93.60	37.60	50.00	83.00	3.10
15	IC 35602	77.00	32.00	59.00	89.00	5.80
16	IC 93962	80.00	31.00	51.00	88.00	4.70
17	IC 81702	95.00	30.00	54.00	89.00	3.90
18	IC 42250	70.60	30.00	56.00	85.00	2.40
19	IC 420050	104.00	42.00	57.00	85.00	9.60
20	IC 92587	64.00	27.20	56.00	83.00	2.40
21	IC 94649	97.60	27.80	56.00	81.00	3.20
22	IC 35673	66.50	20.50	56.00	88.00	2.60
23	IC 35654	67.50	25.60	52.00	82.00	2.00
24	IC 35661	55.00	14.00	56.00	85.00	4.80
25	IC 35626	84.00	29.40	55.00	84.00	1.80
26	IC 35627	74.00	28.60	59.00	83.00	5.10
27	IC 35635	85.00	27.50	60.00	90.00	3.60
28	IC 35399	48.00	22.50	56.00	88.00	3.20
29	IC 35391	28.50	9.50	60.00	99.00	1.30
30	IC 35409	38.40	16.60	58.00	84.00	1.20
31	IC 21810	76.40	31.00	56.00	85.00	4.50
32	IC 21923	67.50	28.20	56.00	85.00	4.10
33	IC 21925	76.60	34.00	51.00	83.00	3.00
34	IC 35452	33.50	13.50	60.00	85.00	3.00

S. No.	Entries	Plant height (cm)	Panicle length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
35	IC 35494	102.40	27.80	58.00	84.00	7.60
36	IC 35505	52.50	18.50	55.00	81.00	1.60
37	IC 35440	100.00	30.60	58.00	85.00	6.00
38	IC 35445	114.60	33.40	56.00	84.00	2.30
39	IC 35441	79.60	27.00	56.00	90.00	2.40
40	IC 35624	91.00	37.60	56.00	89.00	2.30
41	IC 35612	107.80	34.20	57.00	88.00	4.60
42	IC 35616	104.50	34.50	54.00	99.00	9.10
43	IC 35555	95.50	33.40	52.00	94.00	4.60
44	IC 35520	65.40	28.60	53.00	92.00	2.60
45	IC 35534	75.40	32.30	54.00	88.00	3.70
46	IC 35536	90.50	35.20	58.00	95.00	4.20
47	IC 5553	50.50	26.60	52.00	85.00	2.10
48	IC 35554	67.80	30.10	55.00	88.00	3.20
49	IC 35727	75.50	34.10	54.00	85.00	2.60
50	IC 35721	90.50	36.50	57.00	88.00	3.20
51	IC 35718	100.00	32.60	59.00	86.00	5.20
52	IC 35684	70.50	33.20	56.00	87.00	3.10
53	IC 35694	68.70	28.80	52.00	83.00	2.00
54	IC 35706	105.50	35.50	56.00	85.00	4.10
55	IC 35754	60.60	24.20	56.00	87.00	2.60
56	IC 35735	96.50	32.60	57.00	89.00	2.20
57	IC 35732	68.50	29.50	52.00	80.00	1.90
58	IC 35715	78.20	29.50	55.00	87.00	1.80
59	IC 35701	86.50	30.20	54.00	84.00	3.60
60	IC 35709	81.70	37.00	56.00	91.00	5.20
61	IC 42002	60.50	28.80	51.00	80.00	2.00
62	IC 35781	70.50	30.00	50.00	81.00	1.80
63	IC 41989	60.80	29.50	52.00	85.00	2.10
64	IC 41997	122.80	36.80	58.00	87.00	7.00
65	IC 35370	90.40	30.20	52.00	84.00	1.50
66	IC 21940	92.80	39.80	53.00	85.00	4.00
67	IC 21938	77.00	34.20	57.00	87.00	2.40
68	IC 35439	76.80	31.20	59.00	89.00	1.70
69	IC 35438	60.50	28.50	50.00	78.00	2.20
70	IC 35414	50.80	30.60	50.00	76.00	1.80

S. No.	Entries	Plant height (cm)	Panicle length (cm)	Days to 50% flowering	Days to maturity	Grain yield/plant (g)
71	IC 35783	70.50	29.50	52.00	79.00	2.40
72	IC 35791	60.80	30.00	53.00	75.00	2.30
73	IC 21790	82.20	38.20	59.00	86.00	3.60
74	IC 21806	50.30	25.50	52.00	80.00	2.10
75	IC 1493	60.50	28.50	51.00	79.00	2.00
76	IC 95276	70.60	30.20	53.00	78.00	2.20
77	IC 95317	50.20	28.00	50.00	75.00	1.80
78	IC 95332	55.30	29.00	51.00	76.00	1.90
79	IC 35574	54.50	28.00	51.00	77.00	1.80
80	IC 35571	66.50	29.00	54.00	80.00	2.80
81	IC 35567	68.00	30.00	55.00	82.00	1.90
82	IC 35546	50.50	28.60	53.00	79.00	2.10
83	IC 35544	60.80	30.00	52.00	82.00	2.20
84	IC 35538	68.50	31.00	53.00	80.00	2.10
85	IC 35677	67.50	32.00	54.00	82.00	2.30
86	IC 35675	50.60	28.00	51.00	80.00	1.80
87	IC 35680	55.50	27.00	50.00	78.00	1.70
88	IC 35643	52.50	29.00	52.00	79.00	1.90
89	IC 35647	60.80	30.00	53.00	78.00	2.00
90	IC 35650	59.80	29.10	52.00	77.00	2.10
	Mean	73.95	29.13	54.54	84.70	2.98
	STDEV	19.30	5.76	2.79	4.94	1.61
	CV (%)	26.10	19.78	5.11	5.84	53.97

Table 124. Germplasm evaluation in Grain Amaranth during rabi 2002-03 at Hisar

Sr. No.	Genotypes	Days to 50% flowering	Days to maturity	Plant height	Branches/ plant	Cluster/plant	Seed weight on volume basis	Seed yield/plant (g)
1	IC-35624	67.00	193.00	41.50	17.00	31.40	8.10	25.40
2	IC-35675	71.00	195.00	28.10	7.00	24.10	6.50	15.00
3	IC-41989	68.00	199.00	18.00	3.00	19.00	7.00	12.50
4	IC-38243	67.00	194.00	18.60	3.00	17.40	7.60	13.20
5	IC-35783	65.00	196.00	12.30	3.00	8.50	7.00	7.30
6	IC-35732	63.00	191.00	16.10	2.00	4.10	6.80	5.50
7	IC-35735	86.00	211.00	15.20	4.00	8.10	7.30	6.70
8	IC-35754	96.00	211.00	21.40	5.00	13.10	7.00	10.10
9	IC-35616	71.00	206.00	24.30	5.00	12.10	7.50	8.40
10	IC-35677	69.00	198.00	27.70	2.00	10.30	6.70	7.50
11	IC-35680	70.00	195.00	25.10	6.00	6.20	7.00	7.40
12	IC-35612	86.00	208.00	31.10	5.00	17.30	7.30	20.50
13	IC-41991	89.00	201.00	18.10	4.00	8.50	6.80	4.10
14	IC-95317	71.00	210.00	35.50	8.00	18.40	6.90	7.20
15	IC-42015	69.00	208.00	19.90	11.00	8.30	7.20	10.40
16	IC-41997	75.00	191.00	44.60	13.00	18.30	6.90	9.40
17	IC-42258	71.00	196.00	39.20	10.00	16.30	7.40	8.10
18	IC-81702	73.00	195.00	41.30	11.00	19.00	6.50	7.80
19	IC-95332	73.00	196.00	44.00	7.00	21.50	7.10	11.90
20	IC-42002	75.00	195.00	34.00	10.00	20.40	6.30	20.50
21	IC-95276	89.00	203.00	30.50	8.00	20.40	6.40	17.70

Sr. No.	Genotypes	Days to 50% flowering	Days to maturity	Plant height	Branches/ plant	Cluster/plant	Seed weight on volume basis	Seed yield/plant (g)
22	IC-95287	71.00	199.00	30.60	7.00	15.40	6.80	10.20
23	IC-93962	88.00	210.00	30.20	12.00	15.30	7.20	15.40
24	IC-94649	71.00	193.00	26.20	4.00	15.30	6.80	5.50
25	IC-35777	69.00	195.00	30.20	7.00	17.00	6.60	17.40
26	IC-35757	75.00	195.00	44.40	7.00	18.60	7.40	12.40
27	IC-35783	85.00	207.00	39.50	12.00	17.60	6.50	20.60
28	IC-35791	70.00	194.00	36.30	8.00	15.60	6.00	7.60
29	IC-35781	69.00	191.00	31.50	8.00	16.60	7.20	12.40
30	IC-35780	73.00	196.00	31.40	10.00	14.40	7.50	9.60
31	IC-35701	74.00	201.00	37.80	6.00	17.30	6.40	8.40
32	IC-35684	85.00	200.00	53.20	8.00	22.20	7.30	21.20
33	IC-35694	79.00	193.00	53.20	13.00	22.20	6.40	27.90
34	IC-35494	86.00	204.00	32.20	6.00	14.10	7.20	9.80
35	IC-35555	92.00	206.00	32.20	7.00	13.00	6.60	11.70
36	IC-35567	96.00	205.00	42.30	9.00	18.00	7.30	8.90
37	IC-35706	69.00	211.00	57.40	18.00	25.40	7.50	30.40
38	IC-35709	86.00	201.00	45.60	10.00	22.30	6.60	15.40
39	IC-35715	93.00	209.00	28.50	12.00	14.30	6.50	8.70
40	IC-35505	88.00	204.00	42.00	7.00	18.30	7.40	11.90
41	IC-35718	86.00	199.00	51.30	11.00	24.30	6.50	21.70
42	IC-35627	86.00	193.00	35.30	7.00	10.30	7.10	9.20
43	IC-35635	80.00	191.00	38.30	11.00	19.60	6.50	8.70

Sr. No.	Genotypes	Days to 50% flowering	Days to maturity	Plant height	Branches/ plant	Cluster/plant	Seed weight on volume basis	Seed yield/plant (g)
44	IC-35574	79.00	201.00	29.30	6.00	19.30	6.80	9.20
45	IC-35580	90.00	206.00	39.00	7.00	20.30	6.30	10.10
46	IC-35534	91.00	202.00	29.10	5.00	17.30	7.20	5.70
47	IC-35452	95.00	200.00	52.10	9.00	21.30	6.80	15.40
48	IC-35501	89.00	201.00	28.30	6.00	16.60	6.40	11.40
49	IC-35727	86.00	203.00	28.30	5.00	15.60	6.30	8.20
50	IC-35626	96.00	200.00	46.30	11.00	23.30	7.30	22.00
51	IC-35721	90.00	203.00	28.40	5.00	16.60	6.70	15.10
52	IC-35643	83.00	207.00	56.50	10.00	22.30	7.60	16.70
53	IC-35647	91.00	193.00	30.30	13.00	20.30	6.30	29.50
54	IC-35650	86.00	200.00	16.20	2.00	8.30	7.40	4.90
55	IC-35654	81.00	203.00	32.20	3.00	15.60	6.30	5.70
56	IC-35661	89.00	195.00	42.10	6.00	19.60	7.20	10.90
57	IC-35673	86.00	192.00	32.20	4.00	17.60	6.50	7.60
58	IC-35598	79.00	196.00	49.50	9.00	20.30	7.20	15.40
59	IC-35602	89.00	190.00	40.30	5.00	18.60	7.90	11.00
60	IC-35608	91.00	191.00	22.40	3.00	10.60	6.50	5.00
61	IC-35593	86.00	193.00	35.10	6.00	16.30	6.70	12.20
62	IC-35594	92.00	191.00	24.30	5.00	10.60	7.40	6.50
63	IC-35370	82.00	195.00	30.30	5.00	16.30	6.80	6.30
64	IC-35596	94.00	195.00	29.00	6.00	14.30	7.40	7.90
65	IC-35597	93.00	191.00	33.00	7.00	16.30	7.00	11.80

Sr. No.	Genotypes	Days to 50% flowering	Days to maturity	Plant height	Branches/ plant	Cluster/plant	Seed weight on volume basis	Seed yield/plant (g)
66	IC-35538	93.00	196.00	26.60	4.00	11.30	6.80	8.30
67	IC-35536	95.00	197.00	24.60	6.00	12.60	6.50	6.20
68	IC-35544	96.00	199.00	39.60	10.00	21.00	6.60	15.40
69	IC-35546	93.00	201.00	63.20	10.00	28.60	6.90	30.10
70	IC-35553	70.00	191.00	41.60	9.00	16.60	6.50	9.70
71	IC-35575	91.00	206.00	38.60	6.00	15.30	6.50	5.90
72	IC-21940	69.00	200.00	32.30	5.00	14.60	7.50	7.40
73	IC-21938	96.00	199.00	29.00	5.00	13.30	5.50	4.50
74	IC-35439	99.00	195.00	43.00	7.00	18.30	6.50	8.40
75	IC-35438	97.00	190.00	50.00	7.00	17.00	6.80	9.20
76	IC-35414	94.00	191.00	58.10	8.00	21.60	7.70	15.40
77	IC-35445	96.00	193.00	35.30	4.00	16.60	7.30	7.60
78	IC-35446	93.00	185.00	40.30	8.00	17.60	7.20	9.40
79	IC-35589	99.00	189.00	36.10	7.00	18.30	6.60	4.80
80	IC-35586	93.00	191.00	34.10	4.00	16.30	6.80	3.80
81	IC-35440	98.00	190.00	31.30	3.00	11.30	6.90	4.10
82	IC-21806	100.00	192.00	31.60	6.00	14.30	7.10	5.60
83	IC-35409	98.00	193.00	45.30	6.00	17.30	6.80	8.90
84	IC-35399	82.00	186.00	35.00	14.00	14.30	7.10	19.20
85	IC-35391	91.00	190.00	32.60	9.00	13.30	7.60	17.40
86	IC-21810	90.00	192.00	58.60	6.00	23.60	5.80	11.90
87	IC-21923	85.00	191.00	24.60	6.00	10.30	6.70	6.20

Sr. No.	Genotypes	Days to 50% flowering	Days to maturity	Plant height	Branches/ plant	Cluster/plant	Seed weight on volume basis	Seed yield/plant (g)
88	IC-21925	82.00	189.00	30.00	6.00	13.30	6.90	5.30
89	IC-21790-A	83.00	189.00	44.30	7.00	15.10	6.40	9.20
90	IC-1493	88.00	190.00	40.30	5.00	14.00	6.50	6.10
91	Suyama	75.00	192.00	46.60	6.00	10.40	6.90	7.20
92	GA-1 (Ch)	78.00	185.00	60.10	10.00	7.20	6.30	4.70
93	GA-2 (Ch)	72.00	190.00	56.60	6.00	6.50	6.00	7.70
	Range	63.00-100.00	185.00-211.00	12.30-60.10	2.00-18.00	4.10-31.40	5.80-8.10	3.80-30.40
	Mean	83.54	197.09	35.69	7.23	16.31	6.87	11.29
	STDEV	10.11	6.52	11.10	3.17	4.92	0.47	6.15
	CV (%)	12.10	3.31	31.09	43.91	30.17	6.84	54.52

Table 125: Grain amaranth germplasm evaluation at New Delhi

S. No.	Accession	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	No. of branches/plant	Plot yield (g)	10 ml volume seed (g)
1	Rasana-2	83.00	149.00	91.33	39.50	8.33	150.00	7.24
2	RGAS 99-2-7	81.00	151.00	103.67	45.67	15.67	170.00	7.24
3	IC 42262-1	84.00	155.00	77.33	54.33	7.67	270.00	7.72
4	RMA-1	81.00	153.00	118.33	78.00	7.67	250.00	6.39
5	IC 243178	83.00	153.00	92.67	77.67	3.33	350.00	7.61
6	IC 120588	79.00	147.00	95.00	51.67	6.67	300.00	7.11
7	IC 38236	85.00	159.00	69.33	56.33	7.67	300.00	7.80
8	Annapurna	81.00	151.00	77.00	56.00	4.00	185.00	7.37
9	IC 243176	79.00	147.00	63.67	47.33	10.33	10.00	7.63
10	IC 38184	85.00	150.00	108.00	36.00	10.00	225.00	5.89
11	AG 114	81.00	147.00	127.00	92.33	5.67	115.00	6.00
12	IC 243179	83.00	148.00	105.00	80.00	2.00	10.00	6.79
13	IC 243177	88.00	144.00	124.67	51.00	4.00	675.00	7.96
14	Simla A-2	82.00	147.00	100.33	31.33	4.00	20.00	6.54
15	RGAS 99-2-4	80.00	153.00	110.33	66.00	8.00	560.00	6.66
16	IC 35407	86.00	155.00	61.00	38.00	25.00	145.00	7.19
17	SKNA-13	81.00	153.00	110.00	50.00	12.00	175.00	7.44
18	AG 114	85.00	150.00	121.33	65.33	4.33	150.00	6.08
19	IC 347985	83.00	148.00	68.00	56.33	8.67	15.00	8.50
20	IC 120588	80.00	147.00	75.67	48.67	7.33	165.00	6.02

S. No.	Accession	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	No. of branches/plant	Plot yield (g)	10 ml volume seed (g)
21	IC 347984	81.00	149.00	151.67	75.33	8.33	7.00	5.42
22	JBT-30/161	83.00	154.00	88.00	86.33	1.00	625.00	6.42
23	SKJ-1/112	84.00	148.00	73.50	71.50	4.00	15.00	7.90
24	RJR/SCC-1/142	81.00	150.00	93.00	92.50	19.50	100.00	7.72
25	BKS-1/79	86.00	155.00	101.00	90.00	6.00	270.00	5.92
26	RSR/SCC-1/45	88.00	155.00	125.00	56.00	7.00	220.00	6.00
27	JBT-30/104	90.00	157.00	117.00	75.00	8.00	20.00	6.79
28	U 53/VR/50	83.00	152.00	112.00	57.67	3.67	195.00	6.19
29	VR-72	82.00	146.00	97.00	60.33	5.67	900.00	6.57
30	U 53/VR/165	81.00	146.00	84.00	45.00	8.00	15.00	6.79
31	JPM/TKD-116	84.00	154.00	109.33	45.67	5.33	875.00	6.86
32	U 53/VR/24	80.00	147.00	103.33	72.00	7.00	1040.00	5.86
33	U 53/VR/23	85.00	150.00	64.33	33.67	12.00	870.00	5.86
34	D/P/SA/ASC-53	84.00	151.00	54.33	55.00	10.00	650.00	6.40
35	KG/ZH/BLM-86	81.00	144.00	78.33	50.00	13.33	770.00	6.20
36	DRA-91	82.00	150.00	114.00	56.00	7.67	370.00	6.41
37	MKSR-103	84.00	151.00	118.67	59.67	4.00	375.00	5.86
38	DPRR-126	81.00	147.00	55.67	28.00	7.67	240.00	7.05
39	DPRR-119	80.00	156.00	64.50	57.50	1.50	70.00	7.00
40	DPRR-95	83.00	152.00	56.50	36.00	1.00	235.00	6.06
41	DPRR-154	86.00	155.00	56.00	41.33	2.33	70.00	7.10
42	VKS-11/14	81.00	149.00	47.67	34.00	1.00	180.00	7.00
	Mean	82.86	150.60	92.01	57.14	7.29	294.10	6.78
	STDEV	2.52	3.62	24.94	17.27	4.82	281.51	0.73
	CV (%)	3.05	2.41	27.11	30.22	66.06	95.72	10.73

Table 126. Promising genotype in faba bean germplasm at New Delhi

Characteristic	Range	Promising
Yield (g) per plot	10.00 – 1350.00	IC 117753, EC 243170, EC 243893, VKS 12/32, EC 243790
Days to 50% flowering	70.00 – 87.00	VKS-11/61, VKS/SCC-9/110, VKS 12/51, VKS/SCC-1/51, VKS 11/60
Days to maturity	127.00 – 145.00	EC 117749, IC 267690, PRT 12, VKS 11/61
Plant height (cm)	27-50 – 76.50	EC 243772, NAZ/BP/MY-07, EC 329723, NAZ/BP/MA-48, EC 329724
100 Seed weight (g)	13.40 – 45.52	EC 354985, VKG 11/61, VKG 13/88, EC 117749
No. of pods per plant	7.80 – 74.40	EC 117748, EC 25083, PRT 12, EC 243596

Table 127. Faba bean germplasm evaluation at New Delhi

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
1	VH 82-1	80.00	135.00	59.40	4.40	0.58	34.80	5.74	2.60	260.00	24.34
2	EC 116634	85.00	140.00	78.00	5.00	0.72	49.60	5.58	3.20	300.00	26.00
3	EC 117207	80.00	136.00	59.80	4.20	0.52	47.40	4.50	2.60	275.00	24.66
4	EC 108908	86.00	140.00	59.80	6.40	0.60	50.20	4.78	2.80	610.00	26.04
5	EC 25083	84.00	140.00	71.80	6.60	0.62	67.20	5.18	2.80	600.00	27.38
6	EC 25085	82.00	137.00	55.80	4.20	0.58	43.60	5.00	3.40	790.00	32.41
7	EC 34374	85.00	142.00	42.20	2.80	0.48	25.00	5.38	3.40	325.00	36.62
8	PRT 12	80.00	134.00	67.60	3.60	0.62	68.20	4.70	3.00	1000.00	27.02
9	EC 107845	82.00	137.00	58.60	4.00	0.54	26.40	4.88	2.60	500.00	31.16
10	EC 107842	82.00	136.00	56.60	3.60	0.56	38.20	3.74	3.00	500.00	31.16
11	EC 107720	84.00	142.00	54.20	5.00	0.52	44.60	4.44	3.00	240.00	24.55
12	EC 34710	80.00	135.00	50.00	3.20	0.56	24.20	4.24	2.60	650.00	24.64
13	PRT 12	73.00	131.00	48.40	3.60	0.54	49.60	4.12	2.60	885.00	26.82
14	EC 117748	79.00	132.00	52.80	6.00	0.48	72.40	3.72	3.00	530.00	27.72
15	EC 117749	71.00	127.00	56.80	4.00	0.44	19.20	4.84	2.60	725.00	39.63
16	EC 117753	80.00	136.00	53.80	3.80	0.52	28.60	4.84	3.00	1350.00	33.18
17	EC 117755	76.00	133.00	53.80	3.80	0.56	33.40	4.18	2.60	825.00	30.30
18	EC 117758	73.00	128.00	49.20	4.60	0.48	44.80	3.58	2.60	485.00	32.00
19	EC 117765	78.00	136.00	46.10	2.40	0.58	17.00	4.44	2.60	800.00	24.61
20	EC 117784	75.00	133.00	47.40	2.80	0.54	14.80	5.04	2.80	375.00	35.58
21	EC 117792	79.00	134.00	50.00	2.60	0.66	26.00	4.68	2.80	740.00	26.09

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
22	EC 117795	79.00	135.00	55.00	2.40	0.48	19.80	5.40	3.20	900.00	34.51
23	PRT 12	82.00	137.00	55.00	2.60	0.72	22.40	4.60	2.80	500.00	24.65
24	EC 117799	84.00	141.00	49.20	2.40	0.58	26.60	4.40	3.00	550.00	25.08
25	EC 354985	72.00	132.00	59.60	2.20	0.68	7.80	5.04	2.80	625.00	45.52
26	EC 343749	76.00	135.00	56.80	2.00	0.58	13.00	3.86	2.60	535.00	30.22
27	EC 322967	76.00	133.00	58.40	2.80	0.76	28.80	5.38	3.00	850.00	34.06
28	PRT 12	73.00	131.00	51.40	2.20	0.58	20.00	4.34	2.80	650.00	26.63
29	EC 343793	79.00	136.00	47.90	2.60	0.64	27.80	4.80	3.00	750.00	28.51
30	EC 351999	82.00	139.00	53.00	2.80	0.60	31.40	4.64	3.00	550.00	24.22
31	EC 343855	79.00	135.00	47.60	2.20	0.58	18.00	4.10	2.40	550.00	24.00
32	EC 117724	80.00	137.00	60.62	3.20	0.60	26.80	4.96	2.80	490.00	21.58
33	EC 329003	83.00	140.00	46.60	2.80	0.52	12.60	3.96	2.80	490.00	21.58
34	VH 82-1	80.00	140.00	53.60	3.00	0.58	23.20	4.40	3.00	450.00	27.32
35	EC 343808	75.00	132.00	43.00	2.80	0.46	15.20	5.00	3.20	535.00	32.60
36	EC 359685	79.00	133.00	49.20	2.60	0.60	20.60	4.82	3.20	575.00	29.90
37	EC 343823	73.00	132.00	43.40	2.60	0.60	11.00	4.76	3.00	350.00	29.00
38	EC 329686	80.00	134.00	50.20	3.20	0.46	13.00	4.10	3.20	275.00	29.67
39	VKG-13/88	75.00	132.00	54.60	3.00	0.48	15.60	3.30	2.20	250.00	43.02
40	EC 329682	73.00	131.00	48.80	3.20	0.50	16.80	3.50	3.20	600.00	30.30
41	PRT 12	80.00	135.00	60.40	3.00	0.62	32.40	4.14	3.00	965.00	23.20
42	EC 323731	80.00	135.00	58.60	2.40	0.64	15.60	4.60	3.00	485.00	29.21
43	VKG-13/106	71.00	132.00	46.80	2.80	0.58	22.60	3.46	3.20	315.00	30.06
44	IC 3767642	75.00	135.00	43.00	2.80	0.46	16.20	3.45	3.00	460.00	24.74

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
45	EC 329681	73.00	131.00	39.80	3.40	0.42	22.80	3.82	3.20	310.00	23.01
46	VH 82-1	80.00	135.00	57.00	3.20	0.62	40.40	4.54	3.20	535.00	27.28
47	VKG-13/113	76.00	136.00	56.60	2.60	0.54	17.40	4.52	2.80	500.00	26.58
48	EC 329662	80.00	136.00	41.54	3.00	0.40	24.20	3.82	2.60	525.00	18.58
49	EC 343808	82.00	139.00	48.00	2.80	0.48	19.00	4.48	2.60	525.00	25.10
50	EC 117745	76.00	135.00	52.60	3.00	0.54	17.80	4.46	3.00	500.00	28.72
51	EC 329683	79.00	135.00	47.80	2.80	0.54	16.00	4.24	3.20	525.00	29.13
52	VKG-13/30	82.00	136.00	53.80	3.00	0.64	31.00	4.88	2.80	450.00	39.38
53	EC 324644	71.00	132.00	46.40	3.20	0.68	24.60	5.28	3.00	460.00	25.36
54	EC 267651	83.00	141.00	51.50	2.25	0.46	22.75	5.35	2.75	275.00	31.59
55	EC 117734	77.00	134.00	39.68	2.40	0.56	9.00	4.54	2.80	300.00	26.11
56	VKG-13/25	80.00	135.00	44.98	2.20	0.58	8.80	4.70	2.60	335.00	27.42
57	EC 243596	82.00	142.00	47.84	2.40	0.66	18.60	5.14	2.00	400.00	34.52
58	EC 117722	82.00	141.00	47.32	2.40	0.56	19.80	5.10	2.80	425.00	28.70
59	EC 329707	82.00	142.00	44.80	2.00	0.54	11.40	4.54	2.60	500.00	26.17
60	PRT 12	80.00	136.00	48.66	2.20	0.52	17.20	4.20	2.60	885.00	27.00
61	EC 324644	80.00	135.00	46.74	2.20	0.62	21.80	5.12	2.80	535.00	28.90
62	EC 243781	76.00	134.00	50.80	2.60	0.64	25.40	4.20	2.40	470.00	27.35
63	EC 117705	79.00	134.00	50.11	2.00	0.66	24.80	5.80	3.40	510.00	24.95
64	PRT 12	82.00	139.00	53.42	2.00	0.52	15.40	22.10	2.40	935.00	22.11
65	EC 329122	80.00	136.00	42.34	2.20	0.50	23.80	4.64	2.00	100.00	23.57
66	EC 117744	80.00	135.00	50.60	2.40	0.46	21.40	5.62	3.00	875.00	27.22
67	EC 247592	82.00	139.00	55.84	2.40	0.52	23.40	4.42	3.00	525.00	25.04

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
68	VH 82-1	76.00	134.00	52.73	2.00	5.00	26.00	3.97	2.67	545.00	28.58
69	EC 327901	83.00	140.00	47.94	2.40	0.38	34.00	3.94	2.80	250.00	23.26
70	EC 117741	82.00	137.00	53.26	2.60	0.52	31.20	4.78	2.60	500.00	30.44
71	EC 329691	78.00	134.00	43.58	2.00	0.48	19.80	3.62	2.60	425.00	25.56
72	EC 117726	78.00	135.00	50.12	2.40	0.52	29.80	3.96	2.60	425.00	26.30
73	EC 329680	84.00	141.00	46.36	2.00	0.30	18.20	4.30	2.60	410.00	27.56
74	VKG-13/101	75.00	134.00	38.50	2.20	0.40	15.40	3.32	2.40	50.00	23.62
75	EC 354984	79.00	136.00	43.02	2.00	0.48	12.00	3.66	2.20	250.00	29.96
76	EC 329692	75.00	133.00	36.48	2.20	0.40	12.60	3.90	2.60	225.00	30.07
77	EC 354951	78.00	137.00	44.98	2.00	0.44	14.60	4.74	2.60	425.00	27.13
78	PRT 12	83.00	141.00	49.72	3.00	0.52	25.20	4.46	3.00	380.00	27.17
79	EC 329609	82.00	136.00	42.48	2.60	0.52	9.80	4.30	2.60	350.00	27.44
80	EC 324677	82.00	139.00	46.44	2.40	0.54	17.00	3.98	2.80	300.00	21.08
81	EC 329679	84.00	142.00	49.80	3.20	0.64	21.80	4.90	3.20	550.00	30.44
82	VKG-13/53	79.00	135.00	31.80	2.80	0.36	13.40	3.92	2.80	240.00	18.88
83	VKG-13/68	75.00	133.00	34.60	3.00	0.38	21.00	3.92	3.00	285.00	11.02
84	IC 267690	72.00	130.00	36.80	2.20	0.40	17.00	3.94	2.80	250.00	21.88
85	EC 344731	79.00	135.00	43.60	2.40	0.48	27.00	4.32	2.60	300.00	19.45
86	VH 82-1	75.00	134.00	48.20	2.40	0.58	16.40	4.12	2.80	540.00	28.29
87	EC 117739	77.00	135.00	40.40	2.20	0.40	14.20	3.76	2.60	360.00	32.38
88	EC 117385	82.00	137.00	31.40	2.20	0.32	18.00	3.42	3.00	525.00	27.40
89	IC 248948	75.00	135.00	30.80	2.40	0.32	19.40	3.32	3.00	200.00	22.28
90	PRT 12	75.00	135.00	42.60	2.20	0.34	17.60	3.16	2.80	700.00	25.43

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
91	IC 267641	73.00	133.00	33.60	2.80	0.50	18.60	3.74	3.00	490.00	23.50
92	IC 267642	73.00	131.00	38.00	2.40	0.36	15.00	3.18	2.60	325.00	25.57
93	EC 32790	82.00	140.00	37.80	3.20	0.48	24.20	4.12	3.00	500.00	26.94
94	IC 248945	79.00	137.00	39.60	2.40	0.36	18.80	3.76	3.00	325.00	26.58
95	EC 239714	73.00	132.00	50.20	2.80	0.50	22.20	4.32	2.80	575.00	28.64
96	EC 243808	75.00	134.00	46.20	2.80	0.58	15.80	4.58	3.20	550.00	26.00
97	EC 329669	85.00	143.00	51.40	2.80	0.56	24.80	4.45	3.20	450.00	25.66
98	EC 117705	82.00	139.00	42.00	2.60	0.46	23.40	3.92	3.00	600.00	30.41
99	EC 243268	82.00	137.00	47.80	2.60	0.56	17.00	4.56	2.60	450.00	26.00
100	EC 117818	83.00	141.00	46.80	3.00	0.56	19.80	3.02	2.60	485.00	28.52
101	PRT 12	80.00	136.00	51.80	2.80	0.60	31.00	3.78	2.80	675.00	26.70
102	EC 243761	77.00	134.00	49.80	3.00	0.68	23.80	4.10	3.00	460.00	29.42
103	EC 243781	73.00	132.00	47.80	2.60	0.64	25.60	3.56	3.20	470.00	26.00
104	EC 243107	75.00	135.00	46.20	3.20	0.54	44.20	3.20	3.00	350.00	23.40
105	EC 243584	72.00	132.00	54.00	2.60	0.52	19.60	3.62	3.00	310.00	25.67
106	EC 10719	75.00	133.00	63.20	3.00	0.66	18.60	4.78	3.40	475.00	25.00
107	PRT 12	72.00	133.00	40.60	3.00	0.48	24.20	4.06	3.00	390.00	26.35
108	EC 248946	73.00	131.00	42.40	3.00	0.68	33.20	4.02	3.00	450.00	25.40
109	EC 11721	85.00	144.00	52.20	3.20	0.66	32.60	3.48	3.20	300.00	30.90
110	EC 117739	82.00	140.00	50.40	2.80	0.58	26.80	4.48	3.20	750.00	29.91
111	IC 248948	82.00	141.00	37.60	2.40	0.34	13.80	3.28	2.80	525.00	22.78
112	IC 267649	83.00	141.00	41.00	3.20	0.50	36.80	3.76	2.80	250.00	24.05
113	EC 329699	83.00	141.00	48.40	2.80	0.58	25.80	4.04	2.50	300.00	35.14

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
114	VH 82-1	82.00	141.00	55.60	3.20	0.64	33.20	4.82	3.20	700.00	28.30
115	EC 329667	83.00	142.00	44.20	3.00	0.46	23.80	4.14	2.80	490.00	30.44
116	IC 249947	79.00	137.00	45.40	2.80	0.42	30.80	3.84	3.00	460.00	22.56
117	EC 329708	76.00	137.00	52.60	2.60	0.58	21.20	5.18	3.00	675.00	27.33
118	EC 321003	80.00	137.00	56.00	2.60	0.64	24.60	4.54	2.80	625.00	27.00
119	PRT 12	80.00	139.00	61.80	3.20	0.68	35.20	4.56	3.00	680.00	21.38
120	EC 329707	79.00	139.00	55.00	2.60	0.56	28.00	4.22	3.00	525.00	33.00
121	EC 243764	76.00	136.00	54.80	2.80	0.62	40.60	3.72	3.00	575.00	39.25
122	EC 117809	84.00	142.00	50.00	3.00	0.70	38.20	4.12	3.00	485.00	28.20
123	EC 243782	82.00	142.00	46.20	2.40	0.54	20.40	4.70	2.80	350.00	36.40
124	EC 117808	85.00	145.00	49.60	3.00	0.60	28.40	4.24	3.00	260.00	27.14
125	EC 248953	80.00	137.00	46.06	2.40	0.50	21.00	4.32	2.60	375.00	20.20
126	VKS-3/4	84.00	141.00	37.60	3.00	0.52	33.40	3.84	2.80	160.00	18.54
127	EC 248952	76.00	135.00	40.00	2.60	0.54	19.80	3.76	2.60	875.00	22.07
128	EC 117842	85.00	145.00	57.00	2.60	0.50	31.80	4.94	3.00	585.00	29.63
129	EC 117848	85.00	143.00	58.60	2.80	0.56	27.80	4.70	3.00	585.00	27.83
130	EC 117724	76.00	137.00	60.00	2.20	0.52	29.40	4.54	3.00	760.00	31.26
131	EC 117361	80.00	140.00	44.20	2.60	0.58	19.20	4.84	3.00	375.00	31.16
132	PRT 12	79.00	136.00	60.00	3.00	0.52	31.60	4.12	3.00	735.00	27.20
133	IC 248951	79.00	141.00	62.20	3.00	0.54	23.00	4.44	3.00	620.00	24.00
134	IC 267643	73.00	133.00	55.20	2.80	0.54	34.00	4.36	3.00	550.00	26.94
135	EC 10720	86.00	143.00	46.80	3.00	0.64	28.80	4.02	2.80	600.00	24.34
136	EC 329710	84.00	141.00	46.00	2.80	0.44	19.20	3.80	3.00	195.00	27.17

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
137	VH 82-1	80.00	135.00	52.25	3.00	0.45	27.25	4.08	3.00	785.00	27.90
138	EC 329696	86.00	144.00	40.25	2.50	0.48	36.50	4.53	3.25	575.00	27.29
139	EC 329700	85.00	144.00	54.60	2.80	0.58	26.40	4.88	2.80	625.00	25.82
140	PRT 12	86.00	143.00	52.50	3.25	0.53	23.25	5.25	3.00	300.00	21.80
141	EC 267639	79.00	135.00	45.75	3.00	0.50	40.75	4.18	3.00	550.00	18.60
142	EC 329647	79.00	137.00	53.75	3.75	0.60	42.75	5.28	2.75	610.00	22.73
143	EC 243608	80.00	138.00	55.70	3.25	0.55	22.50	4.98	3.25	225.00	26.00
144	EC 243596	82.00	141.00	69.75	3.50	0.63	49.75	5.38	3.25	785.00	35.19
145	VKG-13/135	80.00	138.00	59.00	2.75	0.50	38.75	4.35	3.00	600.00	18.63
146	EC 329712	82.00	142.00	61.25	3.75	0.63	43.00	3.85	2.75	985.00	32.05
147	VKG-16/19	76.00	136.00	58.50	3.25	0.58	38.25	3.78	2.50	600.00	26.56
148	EC 243825A	86.00	143.00	60.00	3.50	0.63	47.00	4.05	3.00	650.00	25.80
149	EC 329723	80.00	137.00	69.25	3.75	0.65	42.50	3.30	2.75	500.00	29.43
150	EC 243791	86.00	142.00	52.25	2.75	0.60	18.25	3.93	2.50	600.00	25.49
151	EC 329605	82.00	139.00	61.25	2.25	0.53	30.25	3.48	2.75	775.00	28.62
152	PRT 12	80.00	138.00	62.50	3.75	0.60	31.00	4.28	3.00	275.00	25.90
153	EC 243790	80.00	135.00	73.25	4.00	0.58	36.00	4.30	3.00	1200.00	33.32
154	EC 243820	79.00	137.00	59.25	3.00	0.50	18.25	3.63	2.50	730.00	33.39
155	EC 24312	76.00	135.00	65.38	3.25	0.53	21.75	5.05	2.75	1010.00	23.29
156	EC 243770	78.00	135.00	64.00	4.25	0.70	42.00	4.00	2.75	1350.00	32.83
157	EC 329662	78.00	137.00	57.50	3.75	0.60	20.50	4.93	3.00	650.00	28.37
158	EC 343696	76.00	136.00	54.25	3.00	0.65	29.50	5.43	3.00	750.00	31.45
159	EC 343690	78.00	136.00	44.25	2.50	0.48	13.25	4.18	2.50	800.00	30.72

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
160	VH 82-1	82.00	139.00	48.50	2.25	0.50	20.75	4.55	3.00	465.00	28.28
161	PRT 12	82.00	140.00	51.00	2.75	0.53	24.75	4.43	3.00	610.00	24.92
162	EC 243588	82.00	139.00	44.75	2.75	0.40	21.25	4.08	2.75	850.00	36.44
163	EC 243743	78.00	138.00	57.75	3.25	0.60	31.75	4.18	2.75	610.00	27.69
164	EC 117744	77.00	139.00	60.75	3.00	0.58	35.25	5.38	3.00	875.00	28.37
165	IC 267645	73.00	133.00	51.75	3.25	0.58	31.00	4.03	3.00	490.00	23.92
166	EC 329631	76.00	134.00	53.75	2.75	0.58	37.50	4.13	3.00	875.00	28.30
167	PRT 12	79.00	135.00	49.25	4.25	0.50	32.50	3.88	2.75	495.00	26.45
168	EC 243756	79.00	137.00	53.50	2.75	0.48	24.50	4.93	3.00	900.00	28.27
169	EC 243784	82.00	139.00	57.50	3.50	0.60	24.00	5.25	3.00	775.00	35.42
170	IC 267648	76.00	136.00	57.50	3.50	0.50	37.50	4.13	3.00	705.00	25.63
171	EC 329648	82.00	139.00	45.50	4.25	0.40	30.00	4.53	2.75	525.00	32.31
172	PRT 12	78.00	136.00	57.00	3.25	0.60	31.50	5.08	3.00	630.00	23.36
173	EC 329646	79.00	136.00	63.25	3.25	0.53	33.75	4.75	2.75	700.00	29.11
174	EC 329670	79.00	137.00	46.75	2.75	0.58	29.00	4.43	3.00	750.00	29.60
175	EC 243630	76.00	137.00	54.25	3.00	0.58	38.25	4.70	3.00	600.00	35.82
176	VH 82-1	79.00	135.00	54.25	2.25	0.58	29.00	4.38	3.00	600.00	27.94
177	EC 329696	80.00	135.00	53.67	3.00	0.63	27.00	4.70	3.00	485.00	42.00
178	EC 329730	76.00	135.00	50.33	2.67	0.67	29.00	4.83	3.00	730.00	36.19
179	EC 117734	76.00	136.00	48.67	2.33	0.47	22.67	3.80	3.00	300.00	27.56
180	EC 329728	83.00	141.00	57.33	3.00	0.67	32.33	4.00	2.67	300.00	35.66
181	EC 25192	78.00	137.00	61.00	4.00	0.76	29.80	4.78	3.20	625.00	25.42
182	VKG-16/9	78.00	136.00	45.40	3.40	0.56	35.40	3.14	3.00	400.00	22.72

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
183	EC 329713	76.00	134.00	66.40	5.20	0.74	43.20	4.20	3.00	485.00	34.13
184	EC 243772	76.00	134.00	75.60	2.60	0.62	23.00	4.62	3.00	500.00	37.70
185	VH 82-1	79.00	138.00	65.00	3.00	0.90	26.00	4.60	3.00	1450.00	28.18
186	EC 329609	79.00	137.00	61.67	3.33	0.93	25.00	5.07	3.33	885.00	35.24
187	PRT 12	79.00	137.00	55.67	3.00	0.80	26.00	3.93	3.00	505.00	27.02
188	EC 243709	76.00	135.00	60.33	3.00	0.67	21.67	4.73	3.67	600.00	26.00
189	HB-13/47	76.00	134.00	60.33	3.00	0.63	14.67	4.23	3.33	800.00	31.46
190	EC 243637	76.00	137.00	60.00	3.33	0.83	26.00	4.43	3.00	825.00	35.24
191	EC 248710	78.00	136.00	56.33	2.67	0.70	26.00	4.27	2.67	700.00	28.12
192	EC 25072	78.00	135.00	60.83	3.00	0.60	51.67	4.63	3.33	750.00	25.61
193	EC 329725	84.00	142.00	59.67	2.33	0.70	25.00	4.13	3.00	510.00	23.52
194	EC 243631	82.00	140.00	61.50	2.00	0.63	17.00	4.70	2.67	800.00	29.47
195	PRT 12	76.00	134.00	49.83	2.67	0.63	28.33	4.83	3.00	380.00	21.78
196	EC 329818	76.00	133.00	52.33	2.33	0.53	13.00	4.50	2.67	465.00	32.87
197	EC 243786	78.00	139.00	58.00	2.33	0.57	16.67	4.03	3.00	510.00	37.05
198	EC 329608	79.00	137.00	54.67	2.33	0.67	24.67	3.70	2.33	585.00	33.34
199	VH 82-1	83.00	140.00	52.80	3.20	0.64	29.40	3.92	2.80	375.00	28.52
200	EC 1177	85.00	140.00	52.00	3.60	0.72	39.00	4.54	3.20	500.00	30.36
201	EC 329658	85.00	141.00	58.00	3.60	0.60	36.00	4.48	3.20	325.00	27.65
202	EC 329677	76.00	134.00	40.64	2.40	0.52	20.00	4.08	2.80	240.00	20.16
203	EC 7853	79.00	136.00	52.66	3.40	0.70	35.80	5.08	3.00	500.00	25.10
204	EC 243629	80.00	138.00	49.84	3.00	0.70	26.00	4.52	3.20	629.00	30.07
205	EC 117745	83.00	140.00	46.24	2.60	0.54	19.00	3.88	2.80	375.00	29.12

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
206	EC 243626	83.00	141.00	45.60	2.80	0.56	26.40	4.52	3.20	225.00	29.41
207	EC 5864	80.00	137.00	42.64	3.20	0.60	25.00	4.94	3.20	335.00	27.57
208	IC 267644	77.00	135.00	44.04	3.00	0.56	29.00	4.26	3.00	175.00	26.66
209	PRT 12	84.00	140.00	48.88	2.80	0.46	14.00	4.44	3.20	330.00	22.09
210	EC 251014	84.00	140.00	41.60	2.80	0.38	20.40	4.84	3.00	400.00	25.50
211	EC 243764	82.00	139.00	44.40	3.40	0.58	24.40	5.22	3.20	550.00	30.76
212	EC 248950	84.00	140.00	42.62	2.60	0.48	16.40	3.98	3.20	510.00	20.97
213	EC 329672	76.00	134.00	54.08	3.00	0.60	31.20	4.56	3.20	375.00	25.52
214	IC 267646	76.00	134.00	48.00	2.60	0.56	23.40	5.08	3.20	200.00	28.03
215	PRT 12	79.00	138.00	48.04	2.40	0.52	14.80	4.92	2.80	600.00	27.12
216	PBJ/SGC-2/77	79.00	137.00	47.80	3.40	0.54	36.40	4.34	3.00	215.00	26.46
217	EC 329724	76.00	135.00	63.00	2.00	0.58	15.00	4.60	3.25	250.00	29.76
218	HB-13/43	79.00	135.00	29.80	2.60	0.36	16.20	3.56	3.00	525.00	28.55
219	EC 243823	82.00	139.00	45.70	2.80	0.56	25.60	5.26	3.00	125.00	20.90
220	EC 117722	76.00	134.00	52.20	2.80	0.44	32.20	4.68	3.40	300.00	27.54
221	IC 248955	79.00	137.00	49.00	3.40	0.46	34.60	4.00	2.80	450.00	20.20
222	EC 117385	82.00	137.00	46.90	2.60	0.50	28.00	3.84	2.60	525.00	23.59
223	PRT 12	73.00	133.00	50.80	2.40	0.60	23.20	4.54	3.20	870.00	22.37
224	PBJ/SGC-2/39	83.00	140.00	39.24	3.00	0.52	22.00	4.72	3.00	400.00	24.17
225	EC 293713	83.00	140.00	45.42	2.60	0.52	19.40	4.18	2.40	400.00	33.82
226	VH 82-1	85.00	140.00	45.24	3.20	0.60	22.40	5.12	3.00	940.00	28.41
227	EC 243594	80.00	138.00	52.20	2.40	0.50	23.00	5.68	3.20	500.00	35.57
228	EC 329715	79.00	137.00	48.02	2.60	0.46	19.00	4.86	3.00	800.00	29.44

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
229	EC 329679	76.00	134.00	47.62	2.80	0.60	21.00	5.22	3.20	550.00	30.44
230	VKG-16/52	72.00	132.00	44.26	2.40	0.50	26.40	4.74	3.40	30.00	27.27
231	BLM/K/S-79	79.00	134.00	42.70	2.80	0.60	25.00	3.86	3.40	200.00	27.64
232	EC 329675	82.00	138.00	47.64	2.60	0.62	28.80	4.54	2.80	315.00	29.35
233	PBJ/SSC-2/21	75.00	133.00	45.84	2.40	0.54	9.20	4.18	3.20	285.00	22.23
234	IC 361435	72.00	131.00	45.44	2.40	0.30	19.20	3.46	2.60	450.00	22.75
235	IC 361496	72.00	132.00	46.33	5.00	0.70	48.33	3.43	2.67	815.00	23.61
236	VKS-11/33	75.00	136.00	42.33	4.00	0.47	38.33	2.90	2.33	575.00	24.40
237	VKS/SSC-11/26	78.00	136.00	35.67	2.67	0.37	31.00	3.57	3.00	440.00	31.27
238	VKS-12/11	76.00	137.00	39.33	4.00	0.30	33.00	3.80	3.33	400.00	17.30
239	PRT 12	82.00	139.00	57.17	3.67	0.47	43.00	3.40	2.67	550.00	25.00
240	EC 243755	78.00	137.00	54.67	3.33	0.67	25.00	3.07	2.33	600.00	30.01
241	EC 243865	79.00	137.00	41.07	3.33	0.50	25.00	4.87	3.67	625.00	30.85
242	EC 243793	79.00	136.00	49.33	3.33	0.60	29.67	3.70	3.00	500.00	28.56
243	PRT 12	76.00	134.00	51.00	2.33	0.50	14.67	4.17	3.33	620.00	26.17
244	EC 243860	74.00	133.00	45.00	4.33	0.47	31.67	3.30	2.33	775.00	38.55
245	EC 329638	76.00	135.00	40.00	3.33	0.67	22.00	3.60	2.67	750.00	30.02
246	EC 243893	76.00	137.00	51.00	4.33	0.60	37.00	3.87	3.33	125.00	25.12
247	EC 329628	83.00	140.00	41.00	2.33	0.47	14.33	3.60	2.67	700.00	28.32
248	VH 82-1	83.00	139.00	50.33	3.33	0.43	27.67	3.93	3.33	335.00	27.38
249	EC 243624	78.00	137.00	51.67	3.00	0.63	26.67	4.10	3.00	925.00	26.68
250	EC 329645	86.00	141.00	42.67	3.67	0.53	24.67	4.27	3.67	745.00	28.41
251	EC 117726	77.00	137.00	61.33	4.00	0.63	35.67	4.67	3.33	625.00	32.41

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
252	EC 329637	82.00	138.00	55.33	3.67	0.57	25.33	3.50	2.67	900.00	30.79
253	VKS-11/51	79.00	139.00	32.00	1.67	0.40	10.00	3.27	2.33	400.00	22.16
254	IC 361427	82.00	139.00	34.00	2.67	0.37	18.00	2.80	2.00	125.00	15.50
255	VKS-12/32	80.00	138.00	37.67	5.00	0.47	41.00	3.37	2.67	125.00	24.05
256	VKS-12/46	82.00	140.00	31.67	3.67	0.33	26.00	4.03	3.00	850.00	24.90
257	IC 361495	76.00	134.00	39.00	3.33	0.47	25.00	3.77	2.33	590.00	24.56
258	VKS/SSC-11/59	83.00	140.00	35.67	3.33	0.50	18.00	3.77	3.00	760.00	23.29
259	PRT 12	76.00	133.00	59.67	4.33	0.73	41.67	3.50	3.00	400.00	21.11
260	IC 361429	78.00	137.00	49.00	3.33	0.47	21.00	3.00	2.00	400.00	23.78
261	IC 361419	77.00	137.00	49.67	3.33	0.50	18.33	3.43	3.00	700.00	22.54
262	VKS/SSC-11/13	76.00	134.00	35.33	3.00	0.53	17.67	3.17	3.00	350.00	20.24
263	VKS-11/3	72.00	133.00	47.00	4.00	0.60	32.33	3.40	2.67	575.00	25.15
264	IC 361501	77.00	137.00	40.00	3.33	0.47	15.00	3.50	2.67	800.00	29.71
265	PRT 12	80.00	136.00	50.00	3.67	0.57	31.67	4.93	3.00	460.00	27.01
266	VKS/SSC-11/16	72.00	132.00	39.00	3.67	0.50	23.33	5.07	3.33	975.00	16.80
267	IC 361434	72.00	131.00	43.00	3.33	0.43	22.00	2.87	2.33	490.00	15.38
268	VH 82-1	73.00	132.00	53.00	3.33	0.63	26.33	3.67	3.00	490.00	28.31
269	IC 361437	75.00	132.00	36.00	3.00	0.33	11.33	2.80	3.33	275.00	23.10
270	IC 361493	72.00	133.00	42.00	2.00	0.47	12.33	2.63	2.00	850.00	24.90
271	VKS-11/1	72.00	131.00	39.33	3.00	0.50	16.33	3.87	3.00	650.00	25.00
272	VH 82-1	82.00	138.00	53.00	3.33	0.60	14.00	3.70	3.00	385.00	30.00
273	IC 361491	76.00	137.00	42.67	3.33	0.47	19.00	3.20	2.33	1000.00	19.75
274	VKS-12/3	72.00	132.00	36.00	3.00	0.33	10.33	3.07	2.33	585.00	21.30

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
275	VKS-12/34	73.00	132.00	34.33	2.67	0.40	10.67	3.87	3.00	600.00	20.43
276	VKS-12/38	72.00	133.00	39.33	2.33	0.50	14.00	3.53	3.00	400.00	18.44
277	VKS-11/8	72.00	133.00	40.33	4.00	0.50	35.00	3.53	3.00	495.00	19.35
278	PRT 12	76.00	137.00	53.67	2.67	0.60	11.67	3.90	3.00	370.00	27.00
279	VKS-11/62	72.00	133.00	43.00	3.00	0.50	16.00	3.60	2.67	350.00	35.07
280	IC 361490	79.00	137.00	51.33	4.33	0.50	33.33	3.87	3.33	643.00	17.32
281	VKS-11/61	70.00	130.00	54.67	3.00	0.70	21.33	5.67	4.00	745.00	44.17
282	IC 361438	70.00	130.00	49.00	5.00	0.67	31.00	3.53	2.67	735.00	33.04
283	VKS-11/39	73.00	131.00	51.00	4.00	0.40	27.00	3.60	2.67	1000.00	19.75
284	IC 361478	72.00	131.00	52.00	3.33	0.60	24.33	3.67	3.00	835.00	21.60
285	PRT 12	80.00	136.00	62.33	5.67	0.70	52.00	3.43	2.67	625.00	21.77
286	VKS-11/60	70.00	131.00	60.00	5.00	0.60	42.00	3.87	3.00	510.00	36.70
287	IC 248954	75.00	135.00	41.83	2.67	0.47	35.00	2.97	2.33	284.00	18.07
288	IC 361488	72.00	135.00	58.00	3.00	0.37	34.67	3.50	3.00	758.00	17.84
289	IC 361432	72.00	133.00	56.50	2.67	0.77	23.67	4.33	3.00	535.00	36.00
290	VKS-11/11	79.00	135.00	42.00	2.60	0.78	22.60	3.44	3.00	250.00	21.48
291	IC 361492	79.00	136.00	53.60	3.60	0.68	24.80	3.26	2.60	500.00	16.02
292	AT-2/NK-1/29	76.00	135.00	35.40	3.00	0.70	17.80	3.14	2.80	200.00	13.40
293	IC 361481	72.00	133.00	33.20	3.20	0.72	14.80	4.60	3.20	210.00	35.07
294	PRT 12	84.00	141.00	53.80	3.80	0.64	31.40	5.26	3.20	945.00	21.80
295	VKS-9/3	76.00	134.00	42.40	4.20	0.35	33.20	2.68	3.00	545.00	15.85
296	VKS/SSC-7/3	75.00	135.00	44.00	3.40	0.68	25.00	3.50	3.00	375.00	17.12
297	PRT 12	82.00	139.00	57.60	3.40	0.70	31.20	4.06	3.40	500.00	25.95

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
298	VKS/SSC-7/28	76.00	133.00	46.60	3.40	0.30	30.80	3.00	2.60	485.00	17.00
299	VKS/SSC-7/39	78.00	136.00	36.00	3.00	0.50	32.40	3.32	2.80	300.00	20.15
300	VKS/SSC-1/2	72.00	132.00	37.80	3.60	0.36	34.60	4.10	3.60	545.00	21.43
301	VKS/SSC-7/15	72.00	132.00	36.20	3.00	0.34	25.20	4.04	3.00	250.00	20.26
302	VH 82-1	75.00	135.00	46.20	3.20	0.32	34.40	0.36	3.20	750.00	28.15
303	RSR/SCC-1/16	72.00	133.00	44.00	3.00	0.32	25.20	0.34	2.80	450.00	18.00
304	VKS/SSC-9/10	70.00	131.00	31.80	3.00	0.34	21.80	0.34	3.00	225.00	27.50
305	RSR/SCC-1/25	75.00	136.00	56.80	2.60	0.48	26.40	3.22	3.00	500.00	17.46
306	IC 331549	73.00	134.00	29.33	2.33	0.22	12.33	2.73	3.00	325.00	16.90
307	IC 331575	73.00	133.00	55.00	6.20	0.60	48.20	3.26	3.00	250.00	30.18
308	VKS/SSC-7/62	70.00	131.00	55.60	3.40	0.62	33.80	3.38	3.00	350.00	22.49
309	RSR/SCC-1/51	70.00	132.00	37.60	3.00	0.46	22.40	3.94	3.00	445.00	23.05
310	RSR/SCC-1/28	72.00	131.00	52.80	3.20	0.46	24.00	3.08	3.00	625.00	36.16
311	RSR/SCC-1/54	72.00	133.00	58.20	3.40	0.58	43.60	3.56	3.00	525.00	27.26
312	PRT 12	75.00	136.00	43.20	3.80	0.40	31.80	3.64	3.00	265.00	26.97
313	SKJ-1/17	73.00	134.00	49.00	2.60	0.58	26.80	3.56	3.00	325.00	17.62
314	RSR/SCC-1/62	72.00	130.00	46.50	3.25	0.50	32.50	3.50	3.00	500.00	18.68
315	SKJ-1/63	70.00	132.00	47.80	2.80	0.44	19.40	2.68	2.40	345.00	28.44
316	JBT-30/98	76.00	137.00	45.40	3.00	0.46	16.20	3.00	2.80	145.00	16.62
317	PRT 12	80.00	138.00	62.20	3.00	0.60	35.00	4.70	3.00	650.00	23.12
318	IC 342754	72.00	133.00	38.20	2.60	0.46	19.60	3.20	3.00	310.00	26.00
319	VKG-21/185	72.00	132.00	36.20	2.60	0.44	17.40	2.40	2.90	200.00	24.00
320	RSR/SCC-1/35	75.00	136.00	37.40	2.80	0.50	23.00	3.10	2.80	675.00	20.47

S. No.	Accession	Days to Flowering	Days to maturity	Plant height (cm)	No. of branches	Pod thickness	No. of pods/plant	Pod length	No. of grain/pod	Plot yield (g)	100 seed weight (g)
321	VKS/SSC-7/70	73.00	134.00	36.40	3.20	0.30	14.60	2.64	2.40	520.00	21.00
322	VKS/SSC-7/48	72.00	131.00	36.00	3.00	0.32	14.40	2.74	2.40	300.00	17.12
323	VKG-21/175	72.00	131.00	34.80	3.40	0.40	21.00	3.64	2.60	275.00	16.51
324	RSR/SCC-1/55	75.00	132.00	43.80	3.00	0.46	18.00	3.74	2.60	725.00	36.57
325	VH 82-1	75.00	133.00	51.60	3.20	0.46	22.20	3.76	2.80	740.00	28.20
326	VKG-21/144	75.00	136.00	39.20	3.40	0.44	19.20	3.44	2.80	300.00	21.78
327	VKS/SSC-7/66	75.00	136.00	39.80	3.00	0.46	16.80	3.02	2.60	365.00	18.00
328	IC 347916	79.00	135.00	44.80	2.60	0.54	19.40	3.48	2.80	665.00	22.40
329	VKG-21/93	82.00	141.00	33.60	3.00	0.34	17.40	2.82	2.60	770.00	19.22
330	PRT 12	80.00	138.00	51.00	3.40	0.64	28.00	4.20	3.20	850.00	26.81
331	VKS/SSC-7/52	79.00	138.00	35.60	2.40	0.26	12.80	3.04	2.80	610.00	23.47
332	IC 342755	78.00	138.00	37.60	2.40	0.34	18.80	3.48	3.20	485.00	21.37
333	JBT-30/72	87.00	143.00	44.80	4.80	0.44	41.40	3.54	3.20	350.00	12.60
334	PRT 12	82.00	138.00	53.40	3.00	0.48	24.20	4.18	3.20	350.00	23.78
335	TRS/RKL-1103	82.00	137.00	48.00	3.40	0.48	19.60	3.84	3.00	275.00	23.70
336	IC 248958	83.00	137.00	39.00	3.40	0.48	22.00	3.40	2.80	90.00	18.07
337	IC 342751	80.00	135.00	37.40	3.40	0.50	21.60	4.00	3.00	150.00	15.20
338	VKG-19/115	79.00	137.00	54.40	3.80	0.54	27.80	4.52	3.20	50.00	22.82
339	NAZ-BP/M4-07	82.00	139.00	69.33	4.00	0.70	2.33	2.77	2.00	100.00	34.38
340	NAZ-BP/M4-48	82.00	140.00	69.67	8.00	0.53	21.33	2.57	1.33	130.00	28.35
	Mean	78.22	136.25	49.24	3.07	0.55	25.82	4.15	2.89	520.54	26.62
	STDEV	4.05	3.32	8.68	0.78	0.27	10.01	1.24	0.31	227.19	5.45
	CV (%)	5.17	2.44	17.64	25.29	48.17	38.77	29.96	10.65	43.64	20.48

Table 128. Tumba germplasm evaluation trial: 2003 (Mandor)

S. No.	Genotype	Fruit number/plant	Largest fruit weight (g)	Fresh fruit yield/plant (g)	100 seed weight (g)	Seed yield/plant (g)
1	GP 12	14.00	390.00	900.00	2.25	48.00
2	GP 21	8.00	500.00		2.75	66.00
3	GP 22	10.00	240.00	950.00	2.50	54.00
4	GP 23	21.00	300.00		2.65	146.00
5	GP 30	7.00	80.00	340.00	2.40	34.00
6	GP 39	1.00	280.00	280.00	2.80	22.00
7	GP 42	4.00	220.00	650.00	2.35	38.00
8	GP 43	1.00	120.00	120.00	2.45	14.00
9	GP 44	5.00		150.00	2.35	30.00
10	GP 58	1.00	380.00	380.00	2.90	24.00
11	GP 68	9.00	244.00	2200.00	2.80	92.00
12	GP 74	1.00	240.00	240.00	2.60	18.00
13	GP 78	3.00	140.00	400.00	2.35	24.00
14	GP 121	2.00	50.00	100.00	1.90	8.00
15	GP 143	6.00	180.00	390.00	1.65	12.00
16	GP 149	1.00	100.00	100.00	2.25	14.00
17	GP 169	1.00	250.00	250.00	2.95	16.00
18	GP 327	2.00		660.00	2.55	46.00
19	GP 356	1.00	210.00	210.00	2.70	16.00
	Mean	5.16	230.82	489.41	2.48	38.00
	Range	1.00-21.00	50.00-500.00	100.00-2200.00	1.65-2.95	8.00-146.00
	STDEV	5.41	118.37	512.98	0.33	33.84
	CV (%)	104.86	51.28	104.81	13.30	89.04

Table 129. Jatropha germplasm maintained at New Delhi

S. No.	Accession No.	Plant height (m)	No. of branches per plant	Seed yield per plant
1	J-1	5.78	7.00	50.00
2	J-2	6.15	12.00	300.00
3	J-3	5.40	10.00	280.00
4	J-4	5.25	8.00	215.00
5	J-5	5.10	7.00	50.00
6	J-6	5.30	10.00	220.00
7	J-7	5.00	13.00	250.00
8	J-8	4.65	8.00	235.00
9	J-9	3.90	14.00	240.00
	Mean	5.17	9.89	204.44
	Rnage	3.90-6.15	7.00-14.00	50.00-300.00
	STDEV	0.64	2.62	91.63
	CV (%)	12.47	26.49	44.82

QUALITY ANALYSIS

IV. QUALITY ANALYSIS

Seed samples of nine underutilized crops were analysed for quality traits. Crop/trial-wise details are discussed below:

AVT on Grain Amaranth, Mettupalayam Centre (Table 130): Sixteen samples of grain amaranth were analysed for protein, lysine, albumin + globulin + NPN, Prolamine and glutelin content. Protein content varied from 11.7 to 13.7 percent, lysine content from 4.7 to 5.8 percent, albumin + globulin + NPN content from 53.1 to 58.2 percent, prolamine and glutelin from 0.8 to 1.8 percent and from 16.2 to 19.2 percent respectively. Available lysine content was very high with an average value of 5.2% and ranged from 4.7 to 5.8 percent.

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

Genotypes	Protein (%)	Genotypes	Lysine (%)
SKNA-7	13.70	IC-35696	5.80
RMA-3	13.60	MGA-1	5.60
PGAS-92-10-1	13.60	SKNA-21	5.60
IC-41989	13.60	RMA-2	5.60

The promising genotypes having high content of albumin + globulin + NPN were

Genotypes	Albumin + globulin + NPN (%)
BGA-3	58.20
IC-35696	58.20
PGAS-92-10-1	58.10
SKNA- 7	57.30
Suvama	57.30

The promising genotypes having high prolamine and glutelin content were

Genotypes	Prolamine (%)	Genotypes	Glutelin (%)
PGAS-92-10-1	1.8	MGA-2	19.2
SKNA-7	1.5	MGA-1	18.8
IC-32195	1.5	BGA-2	18.6
Suvama	1.5	IC-A1989	18.3
RMA-2	1.5		

AVT on Faba bean Hisar Centre (Table 131): Fourteen genotypes from Hisar centre were analysed for its protein and vicine-convicine content. Protein content varied from 21.0 to 24.8% and vicine-convicine content from 0.72 to 1.22% with an average value of 23.1 and 0.85% respectively.

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

Genotypes	Protein (%)	Genotypes	Vicine-convicine (%)
HB-131	24.80	HB-405	0.72
PRT-12	24.30	HB-193	0.73
BSH-9	23.80	PRT-7	0.75
PRT-7	23.10	NDF-1	0.75
HB-180	23.10		

AVT on Rice bean Hisar Centre (Table 132): Twenty one genotypes from Hisar centre were analysed for its protein, phenol, tryptophan and Methionine content. Protein content varied from 18.2 to 22.6%, phenol content from 0.15 to 0.24%, tryptophan from 4.3 to 6.9% and methionine from 0.82 to 0.97% with an average value of 19.8,0.19,5.6 and 0.87%.respectively.

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

Genotypes	Protein (%)	Genotypes	Tryptophan (%)
LRB-330	22.6	LRB-122	6.9
KHRB-2	22.1	LRB-197	6.8
LRB-351	21.2	LRB-199	6.8
RBL-6	21.0	RBL-99	6.7

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

Genotypes	Phenol (%)	Genotypes	Methionine (%)
LRB-199	0.15	RBL-33-1	0.97
LRB-122	0.15	PRR-2	0.94
LRB-188	0.15	PRR-9901	0.93
LRB-224	0.18	RBL-36	0.92
LRB-234	0.15	LRB-224	0.91

IVT on Tumba at Mandor centre (Table 133): Eight genotypes of the year 2002 were analysed for its crude protein, true protein, non protein nitrogen in the defatted seed cake and fatty acid composition of the oil.

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

Genotypes	Crude Protein (%)	True protein (%)	Non protein nitrogen (%)
GP-3	47.70	36.80	1.104
GP-119	43.80	37.30	1.310
GP-59	42.10	35.70	1.020
GP-172	41.70	34.20	1.200

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

Genotypes	Oleic acid (%)	Linoleic acid (%)
GP-119	18.6	59.6
GP-183	18.1	58.6
GP-172	17.8	59.8
GP-285	17.8	59.6

AVT on Tumba, Mandor centre (Table 134): Eight genotypes of the year 2003 were screened for its oil content, protein content in the defatted seed cake and fatty acid composition of the oil. Oil content varied from 43.26 to 48.64 percent and the protein content in the defatted seed cake from 39.7 to 44.4 percent. The palmitic, stearic, oleic and linoleic acids were in the range of 10.3 to 16.9%, 7.6 to 10.1%, 15.1 to 17.5% and 59.3 to 64.3% respectively.

The genotypes with high percentage of oil and protein content were:

Genotypes	Oil (%)	Genotypes	Protein (%)
RMT-194	48.64	RMT-3	44.4
RMT-119	45.04	.RMT-59	42.3
RMT-285	44.44	RMT-172	42.5
		RMT -285	42.8

The genotypes having high oleic and linoleic acid contents were:

Genotypes	Oleic acid (%)	Genotypes	Linoleic acid (%)
RMT-194	17.5	RMT-183	64.3
RMT-59	17.3	RMT-119	62.0
RMT-181	16.2	RMT-3	62.2
RMT-285	16.1	RMT-59	61.6

AVT on Karingada, S.K. Nagar (Table 135): Fourteen varieties of Karingada of S.K. Nagar, Gujarat were analysed for protein content on defatted seed cake, oil content and its fatty acid composition. Protein in the defatted seed cake and oil content varied from 29.2 to 34.2

and 33.9 to 36.7 percent respectively. Among the fatty acids, palmitic and stearic acid ranged from 11.2 to 12.7 and 11.6 to 16.1 percent respectively. Oleic and linoleic acids, the desirable fatty acids, were in the high amount and ranged from 13.1 to 16.9 and 54.1 to 58.7 percent with a mean value of 15.5 and 56.6 percent respectively. Linolenic acid which is undesirable fatty acid was in very small amount.

The genotypes having high protein and oil content were:

Genotypes	Protein (%)	Genotypes	Oil (%)
SKNK-6	34.2	SKNK-I	36.7
SKNK-I	33.2	SKNK-18	36.3
SKNK-15	32.7	SKNK-4	36.2
Karingada Local	32.6	SKNK-16	36.1

The genotypes having high oleic and linoleic acid content were:

Genotypes	Oleic acid (%)	Genotypes	Linoleic acid (%)
SKNK-2	16.9	SKNK-2	58.7
SKNK-21	16.4	SKNK-17	58.2
SKNK-I	16.1	SKNK-5	58.1
SKNK-19	16.1	SKNK-I	57.6

AVT on Jatropha, S.K. Nagar, (Table 136): Four genotypes of Jatropha were evaluated for its protein content in the defatted seed cake, oil content in seed kernel and its fatty acid composition. Protein content in the defatted seed cake was high which ranged from 46.2 to 47.8% and oil content varied from 44.2 to 49.2 percent. Among the fatty acid composition the desirable fatty acids i.e. oleic acid and linoleic acid were in high amount which ranged from 42.6 to 45.4 and 33.2 to 35.7 percent respectively.

The genotype with high protein content and oil content were:

Genotypes	Protein (%)	Genotypes	Oil (%)
Jatropha (Chhatrapati)	47.8	Jatropha (Chhatrapati)	49.2
Jatropha (SKN - Big)	47.1	Jatropha (Hansraj)	45.7

The genotypes having high contents of oleic acid and linoleic acid were:

Genotypes	Oleic acid (%)	Genotypes	Linoleic acid (%)
Jatropha (Hansraj)	45.4	Jatropha (Urlikanchan)	35.7
Jatropha (Urlikanchan)	44.0	Jatropha (Chhatrapati)	34.8

AVT on Adzukibean, Palampur centre (Table 137): Twenty one genotypes of Adzukibean were analysed for its protein and phenol content. Protein content varied from 19.8 to 23.2%

and phenol content was in the range 0.14 to 0.28 percent.

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

Genotypes	Protein (%)	Genotypes	Phenol (%)
EC-340263	23.2	EC-15256	0.14
HPAU	22.8	SMLAB-2	0.16
EC-108080	22.8	HPAU-27	0.16
HBAB-25	22.6	HPAB-4	0.18
A-I	22.3		

Buckwheat at Hisar and Sangla Centre (Table 138): Fifteen genotypes each from Hisar and Sangla centre were analysed for protein content, which varied from 8.7 to 13.9 and 8.1 to 13.4 percent at Hisar and Sangla centre respectively.

The promising genotypes were:

Genotypes	Protein (%)
OC-2	13.9
IC-18045	13.4
IC-258240	12.6
IC-258243	12.4
IC-18864	12.4

Table 130: Grain Amaranth AVT, Mettupalayam Centre, Coimbatore

S. No.	Genotypes	Protein (%)	Lysine (g/16 g N)	Albumin + Globulin + NPN (%)	Prolamin (%)	Glutelin (%)
1	BGA-3	13.1	4.8	58.2	1.3	18.1
2	Suyama	12.4	5.4	57.3	1.5	17.4
3	IC-41989	13.6	5.1	56.8	1.2	18.3
4	BGA-2	13.3	4.7	55.9	0.9	18.6
5	RMA-3	13.6	4.8	56.2	1.3	17.2
6	IC-35696	12.2	5.8	58.2	1.2	16.8
7	MGA-1	11.7	5.6	54.5	1.1	18.8
8	RMA-4	11.7	5.1	55.1	0.9	17.2
9	GA-1	13.4	5.4	54.8	0.8	16.6
10	IC-120588	13.2	5.2	53.2	1.2	16.2
11	IC-32195	13.0	5.0	55.6	1.5	17.5
12	SKNA-21	11.8	5.6	53.1	1.1	16.7
13	RMA-2	12.5	5.6	54.4	1.5	16.8
14	PGAS-92-10-1	13.6	5.1	58.1	1.8	17.5
15	SKNA- 7	13.7	5.3	57.3	1.5	18.1
16	MGA-2	11.7	5.4	55.1	1.2	19.2
Range		11.7-13.7	4.7-5.8	53.1-58.2	0.8-1.8	16.2-19.2
Mean		12.8	5.2	55.9	1.3	17.6

Table 131. Faba bean AVT, Hisar Centre

S. No.	Genotypes	Protein (%)	Vicine-convicine (%)
1	HB-123	22.6	0.98
2	HB-180	23.1	0.92
3	BSH-9	23.8	1.06
4	HB-428	22.2	0.76
5	Vikrant	23.6	0.88
6	PRT-7	23.1	0.75
7	HB-405	21.0	0.72
8	PRT-12	24.3	1.22
9	HB-430	22.4	0.76
10	HB-115	22.6	0.74
11	HB-193	22.9	0.73
12	HB-43	23.8	0.82
13	HB-131	24.8	0.80
14	NDF-1	22.8	0.75
Mean		23.1	0.85
Range		21.0-24.8	0.72-1.22

Table 132. Rice bean AVT, Hisar Centre

S. No.	Genotypes	Protein (%)	Phenol (%)	Tryptophan in protein (%)	Methionine (%)
1	KHRB-I	18.9	0.19	4.4	0.84
2	KHRB-2	22.1	0.22	5.9	0.84
3	PRR-2	20.8	0.24	4.4	0.94
4	RBL-50 (A VT-I)	18.4	0.21	5.8	0.85
5	LRB-330 (A VT-I)	22.6	0.21	4.3	0.94
6	RBL-I (A VT-I)	19.4	0.20	5.2	0.89
7	LRB-349 (A VT-I)	17.9	0.21	6.7	0.87
8	RBL-99 (A VT-I)	19.4	0.21	6.1	0.82
9	RBL-33-I (A VT -2)	20.1	0.22	5.5	0.97
10	PRR-9402 (A VT -2)	19.8	0.22	5.0	0.83
11	RBL-35 (A VT -2)	19.7	0.22	5.2	0.82
12	PRR-9901 (A VT-2)	20.3	0.24	4.7	0.93
13	LRB-234 (A VT)	20.8	0.18	4.6	0.87
14	LRB-197	18.2	0.19	6.8	0.84
15	LRB-199	18.5	0.15	6.8	0.85
16	RBL-36	19.0	0.19	6.2	0.92
17	LRB-351	21.2	0.20	4.5	0.83
18	RBL-6	21.0	0.18	6.6	0.90
19	LRB-122	20.5	0.15	6.9	0.83
20	LRB-188	19.7	0.15	6.0	0.87
21	LRB-224	18.4	0.18	5.5	0.91
	Range	18.2-22.6	0.15-0.24	4.3-6.9	0.82-0.97
	Mean	19.8	0.19	5.6	0.87

Table 133. Tumba IVT, Mandore Centre

S. No.	Genotypes	Oil (%)	Crude Protein (%)	True Protein (%)	Non protein nitroen (%)	CI6	CI8	CI8:I	C18:2	C18:3
1	GP-3	48.5	47.7	36.8	1.104	8.8	8.1	17.8	58.9	0.28
2	GP-59	48.3	42.1	35.7	1.024	8.9	8.7	17.3	58.7	0.32
3	GP-119	48.6	43.8	37.3	1.310	8.6	8.2	18.6	59.6	0.31
4	GP-172	47.1	41.7	34.2	1.200	8.8	8.6	17.8	59.8	0.32
5	GP-181	46.0	41.2	33.8	1.176	8.2	9.0	17.2	59.6	0.31
6	GP-183	49.9	38.9	32.9	0.968	9.1	8.8	18.1	58.6	0.34
7	GP-194	48.9	39.2	33.3	0.944	8.4	8.9	17.2	58.1	0.32
8	GP-285	47.1	41.5	33.8	1.228	9.2	8.8	17.8	59.6	0.36
	Mean	48.05	42.01	34.72	1.119	8.8	8.6	17.2	59.1	0.32

Table 134. Tumba A VT Mandore Centre (Year 2003)

Sr. No.	Genotypes	Oil (%)	C₁₆	C₁₈	C_{18:1}	C_{18:2}	Protein in defatted seed cake (%)
1	RMT-3	43.26	14.4	7.6	15.1	62.2	44.4
2	RMT -59	43.65	10.3	7.6	17.3	61.6	42.3
3	RMT-119	45.04	10.7	8.2	15.6	62.0	41.7
4	RMT-172	44.02	11.5	9.7	16.0	58.8	42.5
5	RMT-181	43.49	16.9	10.1	16.2	54.3	41.8
6	RMT-183	43.49	12.3	7.9	13.3	64.3	39.7
7	RMT-194	48.64	12.9	8.1	17.5	59.3	41.2
8	RMT-285	44.44	14.4	8.1	16.1	60.3	42.8
Mean		44.50	12.9	8.4	15.9	60.4	42.1
Range		43.26-48.64	10.3-16.9	7.6-10.1	15.1-17.5	59.3-64.3	39.7-44.4

Table 135. Karingada A VT, S.K. Nagar, Gujarat

S. No.	Genotypes	Protein (%) in defatted seed cake	Oil (%)	Fatty acid composition				
				C ₁₆	C ₁₈	C _{18:1}	C _{18:2}	C _{18:3}
1	SKNK-1	33.2	36.7	11.8	11.7	16.1	57.6	0.12
2	SKNK-2	32.1	35.8	12.7	11.6	16.9	58.7	0.10
3	SKNK-3	30.7	35.9	11.2	12.8	13.1	55.2	0.09
4	SKNK-4	29.8	36.2	11.7	13.1	15.6	54.1	0.06
5	SKNK-5	31.8	33.9	12.3	12.2	14.7	58.1	0.08
6	SKNK-6	34.2	35.2	11.2	12.4	15.1	56.8	tr
7	SKNK-15	32.7	35.9	11.8	16.1	15.2	55.1	0.06
8	SKNK-16	30.2	36.1	12.2	14.1	14.7	55.8	tr
9	SKNK-17	29.8	35.2	11.6	12.8	14.8	58.2	0.08
10	SKNK-18	32.1	36.3	12.2	12.7	15.6	57.1	tr
11	SKNK-19	31.8	35.2	11.8	12.8	16.1	56.8	tr
12	SKNK-21	29.2	36.1	12.2	13.6	16.4	55.9	tr
13	Karingada local	32.6	35.2	12.6	13.1	15.7	56.2	tr
14	GK-1	34.1	34.8	11.8	12.7	16.8	56.7	tr
Mean		31.7	35.6	11.9	12.9	15.5	56.6	
Range		29.2-34.2	33.9-36.7	11.2-12.7	11.6-16.1	13.1-16.9	54.1-58.7	

Table 136. Jatropha, S.K Nagar, Gujarat

S. No.	Genotypes	Protein (%) in defatted seed cake	Oil (%)	Fatty acid composition			
				C ₁₆	C ₁₈	C _{18:1}	C _{18:2}
1	Jatropha (Hansraj)	46.2	45.7	11.8	7.2	45.4	33.2
2	Jatropha (Chhatrapati)	47.8	49.2	12.9	7.1	43.1	34.8
3	Jatropha (Urlikanchan)	46.8	45.1	11.1	6.8	44.0	35.7
4	Jatropha (SKN Big)	47.1	44.2	13.6	6.9	42.6	34.2
Mean		46.9	46.1	12.4	7.0	43.8	34.5
Range		46.2-47.8	44.2-49.2	11.1-13.6	6.8- 7.2	42.6-45.4	33.2-35.7

Simarouba glauca from Mettupalayam Centre

1	Protein in defatted seed cake	37.1 %
2	Oil (in seed kernel)	59.3 %
3	Fatty acid composition	9.5 %
4	Palmictic acid	28.7%
5	Oleic acid	56.3 %
6	Linoleic acid	3.2 %

Table 137. Adzuki bean AVT Palampur centre

S. No.	Genotypes	Protein (%)	Phenol (%)
1	EC-241041	20.8	0.22
2	EC-108080	22.8	0.25
3	EC-15256	20.9	0.14
4	SMLAB-3	20.6	0.19
5	Shimla-4	21.5	0.22
6	A-I	22.3	0.20
7	HP AB-4	22.0	0.18
8	SMLAB-2	20.7	0.16
9	HP AU-9	19.8	0.2
10	HP AU-27	21.2	0.16
11	EC-120460	19.8	0.25
12	Shimla-1	20.9	0.23
13	SMLAB-4	21.5	0.28
14	EC-340263	23.2	0.25
15	HPAB-25	22.6	0.22
16	HPAB-21	20.9	0.25
17	SMLAB-5	22.2	0.23
18	Shimla-3	20.4	0.25
19	SMLAB-I	22.3	0.23
20	HPAU-31	22.8	0.26
21	EC-340281	20.4	0.25
Range		19.8-23.2	0.14-0.28
Mean		21.4	0.22

Table 138. Buckwheat Hisar and Sangla Centre for Protein content

S. No.	Genotypes	Hisar centre	Sangla centre
1	IC-258237	10.6	11.5
2	IC-258240	10.2	12.6
3	IC-258241	10.1	10.8
4	IC-258239	9.3	10.0
5	IC-258235	12.4	10.7
6	IC-258238	8.7	10.3
7	Sangla B-6	9.6	10.2
8	IC-258236	8.7	10.3
9	IC-18864	10.5	12.4
10	IC-18045	9.6	13.4
11	EC-323731	11.6	9.6
12	IC-258243	11.4	12.4
13	OC-2	13.9	8.9
14	IC-37281	10.1	9.8
15	Sangla B-1	9.9	8.1
	Mean	10.4	10.7
	Ran2e	8.7-13.9	8.1-13.4

AGRONOMY

V. AGRONOMY

A total of 10 agronomic experiments were conducted to standardize cultivation practices of various underutilized crops in different agro-climatic regions of the country. Out of 32 trials, results of 19 trials were received. Centre-wise details of trials conducted/allotted are presented in Table 139. The experiments comprised of three studies on grain amaranth, four investigations on rice bean and one experiment each on buckwheat, Jatropha and karingada. Findings of these experiments are discussed below:

5.1 GRAIN AMARANTH

Experiment No. 1 : Response of promising Amaranth genotypes to different doses of Nitrogen

Experimental Details

Year of start	:	1998
Objective	:	To work out N requirement of grain amaranth genotypes in the pipe line.
Locations	:	Bangalore, Bhubaneswar, Hisar, S.K. Nagar (Plains), Sangla, Ranichauri (Hills).
Treatments	:	a) Genotypes : BGA-2, RMA-2, IC-32145, SKNA-7 (Plains); PRA 9401, IC 35407, Sangla A-1, Sangla A-2. PRA 2 (Hills), b) Nitrogen dose (kg/ha) : 20,40,60, 80 (Plains) 40, 70 100 (Hills)
Design	:	Split plot
Replications	:	3
Plot size	:	5 x 3.6 m ² (Plains) 3 x 3.6 m ² (Hills)
Spacing	:	45 x 15 cm

RESULTS

A. Hills

A perusal of results presented in Table 140 revealed that a nitrogen dose of 100 kg N/ha resulted in the highest grain yield of amaranth both at Ranichauri and Sangla, which

was followed by N₇₀ and N₄₀ treatments, in the descending order. Among the genotypes, while PRA 9401 gave the highest grain yield at Ranichauri. Performance of Sangla A-1 was observed to be the best at Sangla.

B. Plains

Data on yield of grain amaranth (Table 141) indicated that the crop of grain amaranth responded to N application upto a dose of 60 kg N/ha at all the three locations in plains. Among the genotypes tested, RMA 2 was observed to be the highest grain yielder at Bangalore, BGA 2 at Bhubaneswar and IC 120588 and SKNa 7 at S.K. Nagar.

Experiment No. 2 : Intercropping studies on grain amaranth

Experimental Details

Year of start : 2002
Objective : To find out suitable row arrangement between grain amaranth and other major crops of the region.

Location : Ranichauri

Treatments :

1. Rice bean (sole crop)
2. Cowpea (sole crop)
3. French bean (sole crop)
4. Finger millet (sole crop)
5. Soybean (sole crop)
6. Grain amaranth (sole crop)
7. Rice bean + Grain amaranth in 2:1 ratio
8. Cowpea + Grain amaranth in 2:1 ratio
9. French bean + Grain amaranth in 2:1 ratio
10. Finger millet + Grain amaranth in 2:1 ratio
11. Soybean + Grain amaranth in 2:1 ratio

Design : RBD

Replications : Three

RESULTS

Intercropping french bean and grain amaranth in 2: 1 row ratio was observed to result in highest amaranth grain equivalent yield, gross income (Rs.30329/- per ha), net return (Rs.9754/- per ha) and benefit-cost ratio (1.47). The second most remunerative intercrop

treatment was found to be rice bean-grain amaranth in 2: 1 row ration (Table 142). Thus, it was concluded that amaranth can be profitably intercropped with fresh bean and rice bean in the mid hills of Uttaranchal by growing one row of grain amaranth after every two rows of the pulse crop.

Experiment No. 3 : Integrated nutrient management studies in grain amaranth

Experimental Details

Year of start : 2002

Objective : To work out a combination of organic manure and inorganic fertilizer requirement for grain amaranth.

Locations : S.K. Nagar, Bhubaneswar, Mettupalayam Hisar and Ranichauri

Treatments :

a) S.K. Nagar and Hisar :

1. 100% N through chemical fertilizer (N60 P40- RDF)
2. 75% NRDF + 25% through FYM
3. 75% NRDF + 25% through castor cake (CC)
4. 50% NRDF + 50% through FYM
5. 50% NRDF + 50% through castor cake (CC)
6. 25% NRDF + 75% through FYM
7. 25% NRDF + 75% through castor cake (CC)
8. Control

B) Bhubaneswar and Mettupalayam :

1. 100% N through chemical fertilizer (N60 P40-RDF)
2. 75% NRDF + 25% through FYM
3. 75% NRDF + 25% through Neem cake
4. 50% NRDF + 50% through FYM
5. 50% NRDF + 50% through Neem cake
6. 25% NRDF + 75% through FYM
7. 25% NRDF + 75% through Neem cake
8. Control

c) Ranichauri :

1. FYM @ 5 t/ha
2. FYM @ 10 t/ha

3. N40 P20 (RDF)
4. FYM 5 t/ha. + 75% RDF
5. FYM 10 t/ha. + 75% RDF
6. FYM 5 t/ha. + 100% RDF
7. FYM 10 t/ha. + 50% RDF
8. Control

Design : RBD
Replications : Four

RESULTS

Application of nutrients was observed to result in increase in yield of amaranth grain both at Bhubaneswar and Meetupalayam (Table 143). However, the differences among different integrated nutrient management treatments were significant only at Bhubaneshwar, where substituting 25% N requirement by FYM or Neem Cake resulted in higher grain yield as compared to the treatment where the recommended N dose was applied through chemical fertilizer.

At Ranichauri (Table 144), the recommended dose of fertilizer ($N_{40}P_{20}$ kg/ha) gave significantly higher grain yield (9.21 q/ha) followed by FYM @ 5 t/ha + 75% RDF (7.40 q/ha) which was no par with FYM @ 10 t/ha (7.16 q/ha). However, increased fertilizer dose did not show any increasing trend in grain yield.

5.2 BUCKWHEAT:

Experiment No. 4 : Response of promising buckwheat genotypes to fertilizer doses

Experimental Details

Year of start : 1999
Objective : To work out fertilizer requirement of buckwheat genotypes in the pipe line

Treatments	:	a) Fertilizer dose: N ₁₅ P ₁₅ K ₁₅ (Farmer's practice) N ₄₀ P ₄₀ (Recommended) N ₄₀ P ₄₀ K ₂₀ N ₆₀ P ₄₀ K ₂₀ b) Genotypes: Sangla B1, Sangla B3, Himpriya (C) Shimla B1, KBB-3, PRB-1(C)
Design	:	Factorial RBD
Replications	:	Three
Location	:	Sangla, Ranichauri, Almora

RESULTS

Grain yield of buckwheat (Table 145) increased with fertilizer application upto a dose of N₄₀P₄₀K₀ (Recommended fertilizer dose) at Ranichauri. On the other hand, an additional application of K @ 20 kg/ha gave favourable response at Sangla. Among the genotypes, none of the tatar buckwheat genotypes was found to be better than Himpriya at Ranichauri while genotype Sangla B-3 gave the highest grain yield at Sangla.

The performance of common buckwheat genotype Shimla B-1 was better at Ranichauri as compared to KBB 3, which was the highest grain yielder at Sangla.

5.3 RICE BEAN:

Experiment No. 5 : Response of promising rice bean genotypes to varying N doses

Experimental Details

Year of start	:	1998
Objective	:	To work out N requirement of rice bean entries in the pipe line
Treatments	:	a) Genotypes: RBL-35, LRB-355, LRB-349, LRB-354, RBL-6 (c) – Plains; PRR-9302 PRR-9402, BRS-1, LRB-122, PRR-1 (C) – Hills b) N dose: 20, 40, 60 kg/ha
Design	:	Split plot

Replications : Three
Location : Mettupalayam, Bangalore, Bhubaneswar, Hisar, Ludhiana (Plains),
Ranichauri, NEH, Umiam (Hills)

RESULTS

A. Hills

Response of promising genotypes was observed to vary but the difference was not significant (Table 146). Genotype PRR 2 proved better yield or than check and other all genotypes. N-dose of 40 kg/ha gave higher seed yield than that of 20 and 60 kg N respectively but their differences was not significant.

B. Plains

Data presented in Table 147 revealed that the promising genotypes of rice bean responded to nitrogen fertilizer application upto a dose of 40 kg N/ha at Bhubaneswar and upto a dose of 60 kg N/ha at Bangalore. While none of the new genotypes gave better yield than the check (RBL 6)

Experiment No. 6 : Performance of rice bean based crop rotations under varying fertility conditions

Experimental Details

Year of start : 1996
Objectives : 1. To find out suitable crop rotation for rice bean
2. To work out fertilizer requirement of rice bean in different crop rotations

Treatments : a) Crop rotation (Hisar)

- i) Rice bean – Wheat
- ii) Rice bean – Mustard
- iii) Rice bean – Barley
- iv) Rice bean – Berseem
- v) Rice bean – Oats
- vi) Rice bean – Gram

b) Crop rotation (Ranichauri)

- i) Rice bean – Wheat
- ii) Rice bean – Mustard

- iii) Rice bean – Peas (Vegetable)
- iv) Rice bean – Barley
- v) Rice bean – Lentil

c) Fertilizer dose: (For rice bean)

- i) N_0P_0
- ii) $N_{20}P_{20}$
- iii) $N_{20}P_{40}$

Design : Strip plot
 Replications : Three
 Plot size : 4.5 x 3.0 m
 Locations : Ranichauri, Hisar

RESULTS

A perusal of data in Table 148 a and b indicated that growing rice bean in rotation with pea gave maximum returns and B: C ratio followed by rice bean-mustard and others in the decreasing order. Also, rice bean was observed to respond well to fertilizer application upto a dose of $N_{20}P_{20}$ over all the crop rotations. The seed yields were significantly superior over control and $N_{20}P_{40}$ kg/ha. Application of P_{40} kg/ha did not show any positive trend in yield. It is concluded that growing of pea after rice bean with a fertilizer dose of $N_{20}P_{20}$ prove to be the most profitable rotation than others. Interaction effect between crop rotations and N doses was significant.

Experiment No. 7 : Intercropping studies in Rice bean

Experimental Details

Year of start : 2002
 Objective : To identify suitable row arrangement for intercropping rice bean with major crops.

Location : Bhubaneshwar

- Treatments :
1. Sunflower (sole crop)
 2. Maize (sole crop)
 3. Sorghum (sole crop)
 4. Pearl millet (sole crop)

5. Rice bean (sole crop)
6. Pigeonpea (sole crop)
7. Maize + Rice bean (1:2)
8. Sorghum + Rice bean (1:2)
9. Pearl millet + Rice bean (1:2)
10. Pigeonpea + Rice bean (1:2)
11. Sunflower + Rice bean (1:2)

Design : RBD

Replications : Four

RESULTS

The highest rice bean equivalent yield of 14.00 q/ha was recorded with maize + rice bean intercropping system with a land equivalent ratio of 1.33 (Table 149). But the highest benefit: cost ratio of 1.59 was obtained with pigeon pea + rice bean intercropping system. Sunflower + rice bean intercropping system recorded the lowest yield equivalent among the systems.

Experiment No. 8 : Optimization of sowing time in rice bean

Experimental Details

Objective : To find out the optimal sowing time for introduction of rice bean in existing cropping systems in Karnataka and rice fallows in Orissa

Year of start : 2003

Location : Bangalore and Bhubaneswar

Treatments	:	Bangalore	Bhubaneswar
		a) Date of sowing: D ₁ – June 16-30 D ₂ – July 1-15 D ₃ – July 16-31 D ₄ – August 1-15 D ₅ – August 16-31 b) Genotypes: KHRB-1, LRB-355	b) Date of sowing: Sept.15. Oct. 15, Nov. 15 b) Crop : Rice bean (RBL-6) Lathyrus (Ratan) Black gram (PDM-19)

Design : Spit plot
Replications : Four

RESULTS

Irrespective of genotypes, sowing on 20th July and 5th August recorded significantly higher yields, over other dates. Sowing on 20 June also reduced the yield due to higher vegetative growth. Similarly, sowing after 1st week of August reduced the yield of rice bean genotypes. The interaction effect of sowing dates and genotypes was also significant where, RBL 6 recorded the highest grain yield of 712 kg/ha when sown on 5th August. But there was severe reduction in yield of RBL 6 when sown on 5th September than other genotypes. LRB 355 was the early maturing genotype whereas RBL 6, BRB 1 and KHRB 1 were the late maturing genotypes in the study (Table 150).

5.4 JATROPHA:

Experiment No. 9 : Effect of spacing and nutrients in Jatropa

Experimental Details

Year of start : 2000
Objective : To workout spatial and fertilizer requirement of Jatropa
Treatments : **a) Spacing:** 1 x 1 m, 2 x 1 m,
1.5 x 1.5 m, 2 x 2 m
a) Fertilizer dose: N₀P₀K₀, N₁₅P₁₀K₁₀,
N₃₀P₂₀K₂₀, N₄₅P₃₀K₃₀

Design : Split plot
Replications : Three
Plot size : 6 x 6 m
Locations : Bhubaneswar, Mettupalayam, Hisar, S.K. Nagar

RESULTS

Irrespective of spacing, fertilizer levels increased the seed yield significantly. But closer spacing recorded significantly higher yield at no fertilizer level, than the wider spacing. The interaction effect was also significant. The highest seed yield of 451.80 kg/ha was recorded at 2 m x 1 m spacing with N₄₅P₃₀K₃₀ fertilizer dose. This was followed by the seed yield obtained by 1.5 m x 1.5 m spacing with N₄₅P₃₀K₃₀ (Table 151).

5.5 KARINGADA:

Experiment No. 10 : Response of promising genotypes of karingada to varying doses of Nitrogen

Experimental Details

Objective : To work out N requirement of promising genotypes of Karingada

Treatments : **a) Genotypes:** SKNK-4, SKNK-13, GK-1(C)
a) N dose: 0, 20, 40 kg/ha

Design : Split plot

Replications : Three

Spacing : 3 x 1 m

Plot size : 6 x 6 m

Location : S.K. Nagar

RESULTS

A perusal of data in Table 152 indicated that days to flowering, time taken to mature, green fruit yield and seed yield remained unaffected by genotype as well as nitrogen fertilizer application at S.K. Nagar. However, number of fruits per plot was observed to be highest in local, and it increased with application of fertilizer N upto a dose of 20 kg N/ha.

Table 139 Centre-wise details of agronomic experiments on underutilized crops.

S. No.	Experiment	Bangalore	Bhubaneswar	Hisar	Mettupalayam	Ludhiana	S.K. Nagar	Almora	Ranichauri	Umiam	Sangla	Total
1	Response of promising amaranth genotypes to N-doses	Y	Y	N	-	-	Y	-	Y	-	Y	5 (6)
2	Intercropping studies on grain amaranth	-	-	-	-	-	-	-	Y	-	-	1 (1)
3	Integrated nutrient management studies in grain amaranth	-	Y	N	Y	-	N	-	Y	-	-	3 (5)
4	Response of promising buckwheat genotypes to fertilizer doses	-	-	-	-	-	-	N	Y	-	Y	2 (3)
5	Response of promising rice bean genotypes to varying N-doses	Y	Y	N	N	N	-	-	Y	N	-	3 (7)
6	Performance of rice bean based crop rotations under varying fertility conditions	-	-	N	-	-	-	-	Y	-	-	1 (2)
7	Intercropping studies in rice bean	-	Y	-	-	-	-	-	-	-	-	1 (1)
8	Optimization of sowing time in rice bean	N	Y	-	-	-	-	-	-	-	-	1 (2)
9	Effect of spacing and nutrients in Jatropha	-	Y	N	N	-	N	-	-	-	-	1 (4)
10	Response of promising Karingada genotypes to doses of N	-	-	-	-	-	Y	-	-	-	-	1 (1)
	Total	2 (3)	6 (6)	0 (5)	1 (3)	0 (1)	2 (4)	0 (1)	6 (6)	0 (1)	2 (2)	19 (32)

NOTE: Figures in parenthesis indicate the number of trials allotted

Table 140. Effect of N-doses and genotypes a grain yield (Kg/ha) of amaranth in Hills.

Treatment	Ranichauri	Sangla
PRA 9401	1305	764
IC 35407	1111	531
Sangla A-1	1199	1101
Sangla A-2	1217	997
PRR 2 ©	1252	774
CD (5%)	N.S.	166
N0	-	494
N40	1015	711
N70	1095	1006
N100	1539	1122
CD (5%)	280	106

Table 141. Effect of genotypes and N-doses on grain yield (kg/ha) of amaranth in Plains

Treatment	N ₂₀	N ₄₀	N ₆₀	N ₈₀	Mean
A. Bangalore					
BGA 2	429	521	750	699	600
RMA 2	824	876	1046	1272	1000
IC 32195	306	463	554	902	557
SKNA 7	414	580	704	974	668
Mean	493	610	764	962	
CD at 5% V	NS				
N	20.36				
V x N	NS				
CV (%)	21.90				
B. Bhubaneswar					
	N ₀	N ₂₀	N ₄₀	N ₆₀	
BGA 2	336	705	917	1014	743
BGA 3	320	598	750	802	617
IC 35696	263	500	646	687	524
GA 2	280	498	626	701	526
IC 120588	235	465	600	652	488
Suvarna	315	639	824	902	670
Mean	291	567	727	793	
CD at 5% V	66				
N	48				
V x N	236				
C. S.K. Nagar					
	N ₄₀	N ₆₀	N ₈₀	N ₁₀₀	
IC 120588	1128	1978	2007	2062	1793
AG 114	1258	1609	1517	1729	1528
GA 2	1350	1674	1757	2127	1727
SKNA 7	1822	1924	2072	1933	1937
Mean	1389	1796	1838	1962	
CD at 5% V	NS				
N	154				
V x N	NS				

Table 142. Effect of different intercrop treatments on yield (kg/ha), gross income, net income (Rs./ha) and cost benefit ratio (2003-04) in amaranth

Treatment	Grain yield (kg/ha)	Straw yield (kg/ha)	Grain amaranth equivalent grain yield (kg/ha)	Returns (Rs./ha)		B.C. Ratio
				Gross	Net	
T1-Rice bean (Sole crop)	288.07	6296.30	480.10	7201.00	-11223.25	0.39
T2-Cow pea (Sole crop)	152.26	4786.01	304.52	4567.80	-15782.20	0.22
T3-French bean (Sole crop)	699.59	4485.60	1632.37	24485.65	3785.65	1.18
T4-Finger millet (Sole crop)	292.18	1888.89	116.86	1753.20	-17944.80	0.18
T5-Soybean (Sole crop)	164.61	3271.61	219.47	3292.20	-14707.80	0.18
T6-Grain amaranth (Sole crop)	1234.57	6882.31	1234.57	18518.55	70.55	0.93
T7-Rice bean + G.A. in 2:1 ratio	1358.02	5689.03	1474.62	29218.00	9368.00	1.34
T8-Cow pea + G.A. in 2:1 ratio	823.04	6501.73	1069.96	20370.30	545.30	1.03
T9-French bean + G.A. in 2:1 ratio	1061.72	5069.97	1680.38	30329.35	9754.35	1.47
T10-Finger millet + G.A. in 2:1 ratio	726.62	4325.14	90.53	6975.27	-12735.73	0.35
T11-Soybean + G.A. in 2:1 ratio	1181.07	4991.78	1207.13	15942.39	-2812.61	0.86
SEm±	72.99	454.46				
CD (5%)	230.00	1431.94				
CV (%)	17.40	15.98				

Table 143. Effect of different integrated nutrient management treatments on grain yield of amaranth (q/ha)

S. No.	Treatment	Bhubaneswar	Mettupalayam
1	100% N through chemical fertilizer (RDF = N ₆₀ P ₄₀ K ₂₀)	8.98	4.37
2	75% N through chemical fertilizer + 25% N through FYM	9.74	4.77
3	75% N through chemical fertilizer + 25% N through Neem cake	10.22	4.09
4	50% N through chemical fertilizer + 50% N through FYM	7.43	4.22
5	50% N through chemical fertilizer + 50% N through Neem cake	7.86	3.40
6	25% N through chemical fertilizer + 75% N through FYM	6.61	4.74
7	75% N through chemical fertilizer + 25% N through Neem cake	6.78	5.77
8	Control	3.83	1.96
	CD at 5%	0.43	0.82

Table 144. Influence of integrated nutrient management treatments on grain amaranth at Ranichauri

Treatments	Plant stand 000/ha at 60 DAS	Plant stand 000/ha at harvest	Plant height (cm) 60 DAS	Plant height (cm) harvest	Grain yield (kg/ha)	Straw yield (kg/ha)
FYM 5 t/ha	17206.00	16049.33	39.66	63.66	654.32	2600.83
FYM 10 t/ha	18107.00	15226.33	53.55	99.11	716.05	2427.99
N ₄₀ P ₂₀ (RDF)	18518.67	20164.67	31.66	79.00	921.81	2020.53
FYM 5 t/ha + 75% (RDF)	16872.67	16461.00	42.33	90.00	740.63	2432.10
FYM 10 t/ha + 75% (RDF)	18852.00	14403.33	55.22	97.77	567.89	3052.27
FYM 5 t/ha + 100% (RDF)	18930.00	15226.33	29.44	70.22	695.47	3234.57
FYM 10 t/ha + 50% (RDF)	15226.33	18518.67	40.44	82.11	674.89	3523.64
Control	15560.00	13580.33	52.11	91.44	555.56	925.92
SEm±	2244.05	1952.82	8.55	15.14	30.24	205.63
CD (5%)	NS	NS	NS	NS	101.58	690.66
CV (%)	22.32	20.87	34.41	31.15	7.58	14.09

Table 145. Effect of different doses of fertilizer on grain yield (kg/ha) of buckwheat genotypes

Treatment	Ranichauri	Sangla
A. Fertilizer doses		
N ₁₅ P ₁₅ K ₁₅ (FP)	281	2105
N ₄₀ P ₄₀ K ₀ (RDF)	378	2481
N ₄₀ P ₄₀ K ₂₀	295	2619
N ₆₀ P ₄₀ K ₂₀	255	2683
CD at 5%	38	129
B. Genotypes		
Sangla B-1	293	2931
Sangla B-3	308	3094
Himpriya ©	356	1062
Shmila B-1	473	2517
KBB 3	129	2921
PRB 1 ©	256	2274
CD at 5%	47	158

Table 146. Effect of N dose on grain yield of promising rice bean genotypes at Ranichauri

Genotypes	Plant stand 000/ha at 60 DAS	Plant stand 000/ha at harvest	Plant height (cm) 60 DAS	Plant height (cm) harvest	Grain yield (kg/ha)	Straw yield (kg/ha)
PRR 9302	2333.00	24315.55	75.73	141.29	735.19	8061.11
PR 9402	23228.89	21662.22	83.32	141.74	740.51	7997.26
PRR 2	25552.22	23080.00	88.99	146.96	769.44	8675.04
PRR 9301	29996.67	23575.55	84.10	142.73	649.07	9258.34
PRR 1 ©	21662.22	24192.22	75.77	147.29	740.86	10185.06
SEm±	3096.13	1523.86	2.33	2.28	113.61	813.09
CD (5%)	NS	NS	3.30	NS	NS	NS
CV (%)	36.03	19.56	-	4.76	46.88	27.60
N Levels (kg/ha)						
N 20	27107.33	24031.33	91.50	139.57	708.19	7512.23
N 40	26107.33	246.24.00	91.12	142.13	806.10	9027.23
N 60	24108.67	21440.00	62.12	150.31	666.74	9966.63
SEm±	1895.52	899.42	5.11	3.18	78.75	847.32
CD (5%)	NS	1271.98	7.23	NS	NS	NS
CV (%)	28.48	14.90	-	8.55	41.95	37.14

Table 147. Effect of different nitrogen doses on seed yield (kg/ha) of promising rice bean genotypes

Treatment		Bangalore	Bhubaneswar
RBL 35	N ₀	-	302
	N ₂₀	214	545
	N ₄₀	221	610
	N ₆₀	347	507
LRB 355	N ₀	-	276
	N ₂₀	214	491
	N ₄₀	306	558
	N ₆₀	406	490
LRB 349	N ₀	-	333
	N ₂₀	147	517
	N ₄₀	188	618
	N ₆₀	325	571
LRB 354	N ₀	-	288
	N ₂₀	166	486
	N ₄₀	203	592
	N ₆₀	369	509
RBL 6 ©	N ₀	-	361
	N ₂₀	306	643
	N ₄₀	502	728
	N ₆₀	732	598
BRB 1	N ₀	-	323
	N ₂₀	-	586
	N ₄₀	-	609
	N ₆₀	-	538
CD (5%)	G	103.5	47
	N	80.2	37
	G X N	NS	174

Table 148 a. Performance of the rice bean based crop rotations during 2002-03

Treatments	Rice bean yield (q/ha)	2 nd crop yield (q/ha)	Rice bean equivalent yield of the system (q/ha)	Total cost of cultivation (Rs.)	Gross return (Rs.)	Net return (Rs.)	Benefit cost ratio
Rice bean-wheat N ₀ P ₀	0.94	9.67	4.80	16680.00	12000.00	-4680.00	0.71
Rice bean-wheat N ₂₀ P ₂₀	1.39	15.33	7.52	19206.50	18800.00	-406.50	0.79
Rice bean-wheat N ₂₀ P ₄₀	1.39	13.67	6.85	19513.00	17125.00	-2388.00	0.87
Rice bean-mustard N ₀ P ₀	0.94	9.17	6.44	17320.00	16100.00	-1220.00	0.92
Rice bean-mustard N ₂₀ P ₂₀	1.28	14.00	9.68	17846.50	24200.00	+6353.50	1.35
Rice bean-mustard N ₂₀ P ₄₀	1.28	12.00	8.48	18153.00	21200.00	+3047.00	1.16
Rice bean-pea N ₀ P ₀	0.89	15.67	9.66	18820.00	24150.00	+5330.00	1.28
Rice bean-pea N ₂₀ P ₂₀	1.17	25.00	15.17	19346.50	37925.00	+18578.50	1.96
Rice bean-pea N ₂₀ P ₄₀	1.17	7.00	5.09	19653.00	12725.00	-6928.00	0.64
Rice bean-barley N ₀ P ₀	1.00	4.67	2.68	18680.00	6700.00	-11980.00	0.35
Rice bean-barley N ₂₀ P ₂₀	1.39	9.33	4.75	19206.50	11875.00	-7331.50	0.61
Rice bean-barley N ₂₀ P ₄₀	1.33	6.67	3.73	19513.00	9325.00	-10188.00	0.47
Rice bean-lentil N ₀ P ₀	0.79	4.33	4.25	17420.00	10650.00	-6770.00	0.61
Rice bean-lentil N ₂₀ P ₂₀	1.22	7.00	6.82	17946.50	17050.00	-896.50	0.95
Rice bean-lentil N ₂₀ P ₄₀	1.24	6.00	6.03	18253.00	15075.00	-3178.00	0.82
CD (5%)			2.00				
Fertilizers			1.97				
Interaction			2.74				

Table 148 b. Performance of rice bean based crop rotations under varying fertility conditions for the period Kharif, 2003

S. No.	Crop rotations with fertility levels	Fertilizer dose for rice bean	Kharif, 2003			Profit (+) or loss (-) Rs./ha	
			Yield (kg/ha)	Cost (Rs./ha)	Income (Rs./ha)		
1	Rice bean-wheat	N ₀ P ₀	9.05	12120.00	22625.00	+10505.00	8068.50
2		N ₂₀ P ₂₀	8.89	12646.00	22225.00	+9578.50	
3		N ₂₀ P ₄₀	6.83	12953.00	17075.00	+4122.00	
4	Rice bean-mustard	N ₀ P ₀	6.44	12120.00	16100.00	+3980.00	7101.83
5		N ₂₀ P ₂₀	8.11	12646.50	20275.00	+7628.50	
6		N ₂₀ P ₄₀	9.06	12953.00	22650.00	+9697.00	
7	Rice bean-pea	N ₀ P ₀	8.11	12120.00	20275.00	+8155.00	7568.50
8		N ₂₀ P ₂₀	7.67	12646.50	19175.00	+6528.50	
9		N ₂₀ P ₄₀	8.39	12953.00	20975.00	+8022.00	
10	Rice bean-barley	N ₀ P ₀	7.55	12120.00	18875.00	+6755.00	4776.83
11		N ₂₀ P ₂₀	7.22	12646.50	18050.00	+5403.50	
12		N ₂₀ P ₄₀	6.05	12953.00	15125.00	+2172.00	
13	Rice bean-lentil	N ₀ P ₀	5.67	12120.00	14175.00	+2055.00	3168.50
14		N ₂₀ P ₂₀	7.05	12646.50	17625.00	+4978.50	
15		N ₂₀ P ₄₀	6.17	12953.00	15425.00	+2472.00	

Table 149. Grain yield, land equivalent ratio (LER), and economics of different intercropping systems involving rice bean

S. No.	Treatments	1 st crop yield (q/ha)	Rice bean yield (q/ha)	Rice bean equivalent yield (q/ha)	LER	B:C ratio
1	Maize (Sole crop)	27.20	-	12.40	1.00	1.44
2	Sorghum (Sole crop)	18.60	-	8.50	1.00	1.17
3	Pearl millet (Sole crop)	17.50	-	7.90	1.00	1.16
4	Pigeon pea (Sole crop)	10.20	-	12.30	1.00	1.50
5	Sunflower (Sole crop)	6.20	-	6.80	1.00	0.88
6	Rice bean (Sole crop)	8.10	-	8.10	1.00	1.19
7	Maize + Rice bean (1:2)	20.20	4.80	14.00	1.33	1.54
8	Sorghum + Rice bean (1:2)	13.80	4.30	10.60	1.27	1.37
9	Pearl millet + Rice bean (1:2)	12.80	4.20	10.00	1.25	1.37
10	Pigeon pea + Rice bean (1:2)	7.40	4.80	13.70	1.32	1.59
11	Sunflower + Rice bean (1:2)	4.20	3.80	8.30	1.14	1.01
	CD (5%)			0.36		

Table 150. Yield performance of rice bean genotypes as affected by sowing dates at Bhubaneswar

Treatment	Genotypes	Seed yield (kg/ha)
D ₁	V ₁	560.00
	V ₂	566.70
	V ₃	594.30
	V ₄	580.00
D ₂	V ₁	588.00
	V ₂	596.00
	V ₃	620.00
	V ₄	609.30
D ₃	V ₁	607.30
	V ₂	622.30
	V ₃	646.70
	V ₄	630.30
D ₄	V ₁	620.70
	V ₂	631.70
	V ₃	712.00
	V ₄	680.00
D ₅	V ₁	552.70
	V ₂	574.70
	V ₃	582.00
	V ₄	529.00
D ₆	V ₁	295.00
	V ₂	326.00
	V ₃	261.70
	V ₄	282.00
CD (5%)	Date of sowing (D)	21.84
	Genotypes (V)	16.17
	D x V	79.34

Table 151. Effect of spacing and nutrients on seed yield of Jatropha

Treatment	Fertilizer	Seed yield (kg/ha)
S ₁	F ₀	138.80
	F ₁	239.30
	F ₂	294.50
	F ₃	320.50
S ₂	F ₀	114.00
	F ₁	269.30
	F ₂	380.30
	F ₃	451.80
S ₃	F ₀	105.50
	F ₁	261.00
	F ₂	355.50
	F ₃	409.50
S ₄	F ₀	81.50
	F ₁	200.50
	F ₂	269.50
	F ₃	302.00
CD (5%)	Spacing (S)	14.82
	Fertilizer (F)	9.83
	S x F	19.66

Table 152. Response of promising genotypes of karingada to varying doses of nitrogen

S. No.	Treatment		Days to flowering	Days to maturity	No. of fruits/plot	Green fruit yield (kg/ha)	Seed yield (kg/ha)
1	SKNK 4	N ₀	50.00	90.00	7.00	2493.00	83.10
2		N ₂₀	48.00	83.00	12.00	2105.20	72.02
3		N ₄₀	52.00	86.00	9.00	1939.00	77.56
4	SKNK 7	N ₀	50.00	88.00	13.50	2991.60	77.56
5		N ₂₀	52.00	86.00	7.50	2880.80	47.09
6		N ₄₀	54.00	87.00	12.00	2520.70	105.26
7	SKNK 13	N ₀	51.00	86.00	6.00	1939.00	63.71
8		N ₂₀	51.00	83.00	5.50	1772.80	85.87
9		N ₄₀	52.00	83.00	10.80	2243.70	96.95
10	Local	N ₀	55.00	89.00	6.00	1052.60	72.02
11		N ₂₀	54.00	89.00	18.00	3961.10	144.04
12		N ₄₀	55.00	87.00	18.20	3933.40	91.41
Mean			52.00	86.42	10.46	2486.08	84.72
Main plot G			2.30	NS	1547.00	NS	NS
Sub plot N			NS	NS	NS	NS	NS
Interaction G x N			NS	NS	2521.00	1208.00	47.80

CENTRE REPORT

VI. CENTRE REPORT

6.1 HILLS

GBPUA&T, RANICHAURI

6.1.1 GRAIN AMARANTH

6.1.1.1 F₁ generation evaluation

Twenty four crosses and their 13 parents were evaluated in an RBD. Wide variation was observed for seed yield and their component characters. Performance of some of the crosses viz. Shimla A-1 x PRA 2000, PRA 2000 X Shimla A-1 and VL 33 x PRA 2 were very good in respect of grain yield.

6.1.1.2 Extent of heterosis of F₁

Extent of heterosis was studied in 24 single crosses. Per cent heterosis ranged from 5.84 to 35.38% for grain yield. Heterosis for other characters ranged from low to medium.

6.1.1.3 F₂ generation evaluation

Seventeen crosses in their F₂ generation was evaluated along with 11 parents. Observation on 5 single plants in each cross showed considerable variation both within and between the crosses was observed for seed yield and other component characters studied.

6.1.1.4 F₃ generation evaluation

One hundred eighty lines of 18 crosses were evaluated in a plant to progeny row trial along with 10 parental checks. Seed yield per plot varied widely both within and between the crosses. In general parental means were higher than the progeny row (plot) means.

6.1.1.5 F₄ bulk testing

Three hundred twenty two bulks of F₃ lines were tested in single rows along with two check varieties, PRA 1 and PRA 2. Seed yield per plot of some of the crosses like PLP 1 x VL 44 (500.00 g) were quite high.

6.1.1.6 F₅ bulk testing

Sixty bulk of six crosses were tested along with parental checks. Seed yield per plot of the bulks ranged from 158.33 to 412.08 g.

6.1.1.7 F₆ yielding testing

Seventy four superior lines and bulks of four crosses were tested along with six checks. Seed yield of the lines and bulks ranged from 278.33 to 666.66 g per plot.

6.1.1.8 Germplasm evaluation (Old)

Fifty germplasm lines maintained at the centre were evaluated in an augmented design with three check varieties. Wide variations were observed for the 12 morphological characters studied including seed yield that ranged from 20.18 – 206.31 g per plant.

6.1.1.9 Germplasm evaluation (Local)

One hundred eighty four germplasm lines were evaluated along with three check varieties. A few lines did not show germination. Seed yield of the lines ranged from 17.34 to 42.27 g/plant. Wide variations were observed with respect to other characters.

6.1.1.10 Evaluation germplasm (Taiwan)

Sixteen germplasm lines of vegetable amaranth received from AVRC, Taiwan were evaluated along with check cultivars. Wide variations were observed for fresh plant weight (75.00 – 500.00 g) and a number of morphological characters. Variation for leaf colouration was also substantial. A few of the entries did not set seed.

6.1.1.11 Hybridization programme

Twelve promising lines were involving in a new hybridization programme to generate twelve new single crosses. The hybridization work was done following contact method.

6.1.1.12 Demonstration on improved varieties

Ten improved varieties and elite lines were grown in large plots for demonstration purposes. Seed yield of the varieties ranged from 5.71 to 21.71 q/ha, the variety PRA 1 performing the best.

6.1.2 RICE BEAN

6.1.2.1 F₁ generation evaluation

Twenty four single crosses and their 11 parents were evaluated in widely spaced rows. Seed yield per plant and other morphological characters recorded showed wide variation among the crosses. Seed yield of the crosses ranged from 10.12 to 120.48 g per plant.

6.1.2.2 F₂ generation evaluation

Twenty crosses and their parents were evaluated in F₂ generation. Data on single F₂ plants were recorded for seed yield and other characters. Considerable variation was observed for seed yield per plant and other characters.

6.1.2.3 F₃ generation evaluation

On hundred twenty three F₂ lines were evaluated along with parental checks in single progeny rows. Seed yield and other morphological characters were recorded. Wide variation was recorded for seed yield and other characters among the lines of a cross as well as among the lines of various crosses.

6.1.2.4 F₄ generation evaluation

One hundred sixty selected lines of 27 crosses were evaluated along with parental checks in single row plots. Seed yield and other characters showed wide variation among the lines of the crosses.

6.1.2.5 Narrow leaf and early maturing selection

Narrow leaved and early maturing segregants derived in the F₂ generation of some crosses were evaluated in the F₃ generation in plant to progeny rows. Wide variation was observed among the lines with respect to seed yield, maturity and other morphological traits.

6.1.2.6 Hybridization programme

Twelve parents were involved in a crossing programme to generate 15 single crosses. The success was quite low but, a few seeds have been obtained in some of the crosses.

6.1.2.7 Demonstration on improved varieties

Demonstration on six improved varieties and elite lines were conducted in large plots. The seed yield of the entries was comparatively low possibly because of the heterogeneity of soil. It ranged from 2.56 to 3.33 q/ha for PRR 9401 and PRR 2, respectively.

6.1.3 PERILLA

6.1.3.1 Observation rows

Three local germplasm lines were evaluated in an observation row after raising the seedlings in a nursery. Seed yield of the entries was quite low ranging from 0.60 to 0.93 q/ha.

6.2 PLAINS

RAU, MANDOR

6.2.1 STATION TRIAL ON GRAIN AMARANTH

Three station evaluation trial on grain amaranth were conducted with 15, 12 and 9 elite genotypes along with three checks viz. Suvarna, Annapurna and local check at RAU, Mandor and S.K. Nagar. Observations recorded on yield characters viz. plant population, days to flowering, days to maturity, plant height, inflorescence length, single plant straw, seed yield per 9 sq m and seed yield q/ha have been presented in Tables 153, 154, 155. Among these three trials, the genotype RMA 8 was observed promising with 32.21 q/ha seed yield followed by RMA 7 with an average seed yield of 31.10 q/ha. None genotype was found superior than check variety Annapurna and Local check for earliness. Longest inflorescence length (67.00 cm) was observed in genotype IC 55142-1 followed by RMA 4 with 62.33 cm inflorescence length.

6.2.2 STATION TRIAL ON TUMBA

An station trial with sixteen genotypes on tumba was grown at RAU, Mandor for three major yield related characters. Maximum number of fruits (19.00) fresh fruit yield (3640 g) and seed yield per plot (132.00 g) was observed in genotype B 1 GP 4 SPP 5-85 whereas genotype B2 GP-34 TLC 221 ranked second with fresh fruit number (7), fresh fruit yield per plot (1500 g) and seed yield per plot (68 g). The mean, range, SD and CV (%) have been given in Table 156.

6.2.3 FIELD DEMONSTRATION ON TUMBA

Field demonstrations trial on tumba were carried out with five genotype along with local check at 10 farmers field for important characters. Genotype RMT 59 performed better for all characters among all genotypes with general mean of fresh fruit yield 12.11 kg/plot, fruit yield 4036 kg/ha, seed yield 0.83 kg/plot and seed yield 277.80 kg/ha. The data and general mean for all varieties have been presented in Table 157 a, b. c.

Adaptability studies on grain amaranth genotypes were also carried out at four RAU, research stations on different dates of sowing at ATC, Rampura, ATC, Nachna, ATC, Jaisalmer, ARS, Jalore and farmer fields under ATC. All results showed that genotype RMA 2, RMA 3 and RMA 4 were significantly superior as compared to checks Suvarna and GA 1.

Agronomical studies on response of grain amaranth genotype RMA 2 to nitrogen application at different crop geometry were conducted at ARS, Mandor. On the basis of two year pooled data it was observed that the genotype RMA 2, significantly responded to 60 kg/N and increased the seed yield by 38.30% over control (1282 kg/ha) and plant population of 3.33 lacs plants/ha (30 x 10 cm) and 2.22 lacs/ha were found at par at crop geometry of 30 x 15 cm and 45 x 10 cm. 60 kg N/ha and 2.22 lac plants/ha. Population at 30 x 15 cm crop geometry could be recommended to the farmers. The details of the studies and data have been presented in Table 158.

Table 153. Grain amaranth preliminary evaluation trial-I (Mandor)

S. No.	Variety	Plant population (lac/ha)	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Single plant straw weight (g)	Seed yield (kg/9 sq. m.)	Seed yield (q/ha)
1	IC 35377	141.33	44.67	121.00	103.00	49.33	29.00	1.20	13.33
2	IC 35423-2	183.67	43.67	118.33	95.00	44.67	30.67	1.23	13.70
3	IC 35430-3	166.67	45.00	120.33	94.67	44.67	32.00	1.17	12.96
4	IC 35450-1	155.33	49.67	119.33	98.00	45.00	29.00	0.53	5.92
5	IC 35470	147.33	41.00	119.00	103.33	49.00	86.00	1.37	15.18
6	IC 35570-1	138.67	47.67	121.00	99.00	56.00	63.00	1.27	14.07
7	IC 35663	120.33	43.67	120.33	101.00	56.67	89.33	1.40	15.55
8	IC 35693	178.00	40.67	118.33	101.33	52.00	56.67	1.57	17.40
9	IC 35758	145.33	42.33	118.00	99.33	45.00	68.00	1.20	12.22
10	IC 95290	147.67	39.67	118.00	103.67	39.33	85.00	0.63	7.03
11	SPS 10	164.00	41.33	122.33	105.67	42.00	71.33	1.50	16.66
12	GA 1 ©	139.00	57.33	123.67	120.00	54.00	55.33	1.30	14.44
13	Suvarna ©	149.33	48.67	123.00	120.33	45.33	49.33	1.23	13.70
14	Annapurna ©	147.00	35.67	111.67	58.67	35.00	30.33	1.00	11.11
15	Local check	140.67	41.00	116.33	74.00	41.33	42.33	1.07	11.85
	Mean	150.96	44.13	119.38	98.47	46.62	54.49	1.18	13.01
	CD (5%)	23.86	3.83	2.79	6.70	6.22	11.00	0.62	6.80
	CV (%)	9.44	5.19	1.40	4.07	7.97	12.06	31.46	31.26

Table 154. Grain amaranth preliminary evaluation trial-II (Mandor)

S. No.	Variety	Plant population (lac/ha)	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Single plant straw weight (g)	Seed yield (kg/9 sq. m.)	Seed yield (q/ha)
1	IC 32186	183.00	31.33	116.00	103.00	59.00	72.67	1.67	18.51
2	IC 55142-1	183.33	34.67	116.33	106.33	67.00	71.67	1.63	18.14
3	IC 81698-B	176.33	33.33	117.00	105.33	59.00	62.67	1.30	14.44
4	IC 81708-A	180.00	32.33	117.67	104.67	57.33	54.33	1.63	18.14
5	IC 95385	179.00	33.33	115.00	58.67	46.33	49.00	0.67	7.40
6	IC 95414	180.33	31.00	114.33	48.00	38.33	21.33	0.50	5.55
7	IC 95429	172.00	33.00	117.67	57.00	43.67	35.00	1.07	11.85
8	IC 95473	183.67	37.33	116.00	89.00	57.33	51.67	1.57	17.40
9	GA 1 ©	174.67	57.00	121.00	124.00	52.33	53.00	1.60	17.77
10	Suvarna ©	182.33	51.00	122.00	121.67	43.33	46.00	1.43	15.92
11	Annapurna ©	169.00	37.00	108.67	50.33	38.33	41.33	1.17	12.96
12	Local check	182.33	42.00	116.00	69.00	39.67	44.00	1.07	11.85
	Mean	178.83	37.78	116.47	86.42	50.14	50.22	1.28	14.16
	CD (5%)	12.14	3.53	4.36	10.27	8.38	7.64	0.34	3.75
	CV (%)	4.02	5.52	2.22	7.03	9.89	9.00	15.69	15.69

Table 155. Grain amaranth preliminary evaluation trial-III (Mandor)

S. No.	Variety	Plant population (lac/ha)	Days to flowering	Days to maturity	Plant height (cm)	Inflorescence length (cm)	Single plant straw weight (g)	Seed yield (kg/9 sq. m.)	Seed yield (q/ha)
1	RMA 3	178.33	45.00	123.00	98.00	46.67	48.33	2.20	24.44
2	RMA 4	179.00	44.33	120.67	107.67	62.33	70.00	2.50	27.77
3	RMA 6	180.00	47.00	123.33	87.33	58.33	49.00	2.17	24.07
4	RMA 7	184.33	46.67	120.00	84.33	54.33	65.67	2.80	31.10
5	RMA 8	181.00	46.00	123.00	85.67	61.67	56.67	2.90	32.21
6	GA 1 ©	186.33	56.67	122.67	121.00	51.33	52.00	1.60	17.77
7	Suvarna ©	179.67	49.67	121.67	124.00	47.00	51.33	1.47	16.29
8	Annapurna ©	184.67	37.00	110.67	54.00	37.33	43.33	1.20	13.33
9	Local check	177.67	40.67	117.33	64.33	42.67	47.67	0.90	9.99
	Mean	181.22	45.89	120.26	91.81	51.30	53.78	1.97	21.89
	CD (5%)	8.14	3.25	2.68	6.76	4.52	10.91	0.20	2.20
	CV (%)	2.59	4.09	1.29	4.25	5.09	11.72	5.82	5.82

Table 156. Tumba varietal station trial: 2003 (Mandor)

S. No.	Genotype	Fruit number/plot	Fresh fruit yield/plot (g)	Seed yield/plot (g)
1	B1 GP 4 SPP 5-85	19.00	3640.00	132.00
2	B2 GP 22 SPP 24-85	1.00	240.00	14.00
3	B2 GP 34 TLC 221	1.00	150.00	6.00
4	B2 GP 39 TLC 225	1.00	340.00	10.00
5	B3 GP 42 TLC 228	4.00	950.00	42.00
6	B3 GP 43 TLC 229	2.00	420.00	22.00
7	B3 GP 67 TLC 245	6.00	550.00	30.00
8	B2 GP 34 TLC 221	1.00	120.00	8.00
9	B2 GP 34 TLC 221	7.00	1500.00	68.00
10	B2 GP 34 TLC 221	1.00	150.00	6.00
11	B2 GP 34 TLC 221	1.00	250.00	12.00
12	B2 GP 34 TLC 221	2.00	250.00	10.00
13	B2 GP 34 TLC 221	5.00	340.00	20.00
14	B2 GP 34 TLC 221	2.00	420.00	18.00
15	B2 GP 34 TLC 221	1.00	180.00	12.00
16	B2 GP 34 TLC 221	2.00	160.00	30.00
	Mean	3.50	603.75	27.50
	Range	1.00-19.00	120.00-3640.00	6.00-132.00
	STDEV	4.58	885.30	32.19
	CV (%)	130.72	146.63	117.04

Table 157 a. Tumba on farm varietal demonstration: 2003 (Mandor)

S. No.	Farmer's name & address	RMT 59				RMT 119			
		Fresh fruit yield		Seed yield		Fresh fruit yield		Seed yield	
		kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha
1	Sh. Birda Ram, S/o Shera Ram, V/PO, Basani Danwara-Osian	10.90	3633.00	0.75	250.00	9.80	3266.00	0.67	223.00
2	Sh. Bhura Ram, S/o Deva Ram, V/PO, Basani Danwara-Osian	13.10	4360.00	0.90	300.00	11.80	3919.00	0.80	266.00
3	Sh. Phoola Ram, S/o Shankarji, V/PO, Basani Danwara-Osian	12.50	4167.00	0.86	287.00	11.30	3767.00	0.77	257.00
4	Sh. Khuma Ram, S/o Kenra Ram, V/PO, Govindpura, Danwara-Osian	12.80	4267.00	0.88	293.00	11.60	3867.00	0.79	263.00
5	Sh. Jasa Ram, S/o Nawala Ram, V/PO, Govindpura, Danwara-Osian	11.50	3833.00	0.79	263.00	10.40	3467.00	0.71	237.00
6	Sh. Jetha Ram, S/o Chima Ram, V/PO, Govindpura, Danwara-Osian	9.70	3233.00	0.67	223.00	8.80	2933.00	0.60	200.00
7	Sh. Chetan Ram, S/o Harkha Ram, V/PO, Bara Khurd-Osian	11.60	3867.00	0.80	267.00	10.50	3500.00	0.72	240.00
8	Sh. Beenja Ram, S/o Maga Ram, V/PO, Bara Khurd-Osian	13.90	4633.00	0.96	319.00	12.60	4200.00	0.86	287.00
9	Sh. Tara Chand, S/o Tulcha Ram, V/PO, Chandrakh-Osian	13.20	4400.00	0.91	303.00	11.90	3967.00	0.82	273.00
10	Sh. Narayan Ram, S/o Tulcha Ram, V/PO, Chandrakh-Osian	11.90	3967.00	0.82	273.00	10.70	3567.00	0.74	247.00
General Mean		12.11	4036.00	0.83	277.80	10.94	3645.30	0.75	249.30

Table 157 b. Tumba on farm varietal demonstration: 2003 (Mandor)

S. No.	Farmer's name & address	RMT 285				RMT 3 (Check)			
		Fresh fruit yield		Seed yield		Fresh fruit yield		Seed yield	
		kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha
1	Sh. Birda Ram, S/o Shera Ram, V/PO, Basani Danwara-Osian	9.60	3200.00	0.64	213.00	5.10	1700.00	0.40	133.00
2	Sh. Bhura Ram, S/o Deva Ram, V/PO, Basani Danwara-Osian	11.50	3840.00	0.77	256.00	6.10	2040.00	0.48	159.00
3	Sh. Phoola Ram, S/o Shankarji, V/PO, Basani Danwara-Osian	11.00	3667.00	0.74	247.00	5.80	1933.00	0.46	153.00
4	Sh. Khuma Ram, S/o Kenra Ram, V/PO, Govindpura, Danwara-Osian	11.30	3767.00	0.76	253.00	6.00	2000.00	0.47	157.00
5	Sh. Jasa Ram, S/o Nawala Ram, V/PO, Govindpura, Danwara-Osian	10.10	3367.00	0.68	227.00	5.40	1800.00	0.42	140.00
6	Sh. Jetha Ram, S/o Chima Ram, V/PO, Govindpura, Danwara-Osian	8.60	2867.00	0.58	193.00	4.50	1500.00	0.36	120.00
7	Sh. Chetan Ram, S/o Harkha Ram, V/PO, Bara Khurd-Osian	10.30	3433.00	0.70	233.00	5.40	1800.00	0.43	143.00
8	Sh. Beenja Ram, S/o Maga Ram, V/PO, Bara Khurd-Osian	12.30	4100.00	0.84	280.00	6.50	2167.00	0.51	170.00
9	Sh. Tara Chand, S/o Tulcha Ram, V/PO, Chandrakh-Osian	11.70	3900.00	0.79	263.00	6.10	2033.00	0.48	160.00
10	Sh. Narayan Ram, S/o Tulcha Ram, V/PO, Chandrakh-Osian	10.50	3499.00	0.71	237.00	5.50	1833.00	0.43	143.00
General Mean		10.69	3564.00	0.72	240.20	5.64	1880.60	0.44	147.80

Table 157 c. Tumba on farm varietal demonstration: 2003 (Mandor)

S. No.	Farmer's name & address	RMT 172 (Check)				Local Check			
		Fresh fruit yield		Seed yield		Fresh fruit yield		Seed yield	
		kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha	kg/plot	kg/ha
1	Sh. Birda Ram, S/o Shera Ram, V/PO, Basani Danwara-Osian	6.40	2133.00	0.50	167.00	5.20	1733.00	0.43	143.00
2	Sh. Bhura Ram, S/o Deva Ram, V/PO, Basani Danwara-Osian	7.70	2560.00	0.60	200.00	6.20	2080.00	0.52	172.00
3	Sh. Phoola Ram, S/o Shankarji, V/PO, Basani Danwara-Osian	7.30	2433.00	0.57	190.00	5.90	1967.00	0.49	163.00
4	Sh. Khuma Ram, S/o Kenra Ram, V/PO, Govindpura, Danwara-Osian	7.50	2500.00	0.59	197.00	6.10	2033.00	0.50	167.00
5	Sh. Jasa Ram, S/o Nawala Ram, V/PO, Govindpura, Danwara-Osian	6.70	2233.00	0.53	177.00	5.50	1833.00	0.45	150.00
6	Sh. Jetha Ram, S/o Chima Ram, V/PO, Govindpura, Danwara-Osian	5.70	1900.00	0.45	150.00	4.70	1567.00	0.38	127.00
7	Sh. Chetan Ram, S/o Harkha Ram, V/PO, Bara Khurd-Osian	6.80	2267.00	0.54	180.00	5.60	1867.00	0.46	153.00
8	Sh. Beenja Ram, S/o Maga Ram, V/PO, Bara Khurd-Osian	8.20	2733.00	0.65	217.00	6.70	2233.00	0.55	183.00
9	Sh. Tara Chand, S/o Tulcha Ram, V/PO, Chandrakh-Osian	7.80	2600.00	0.62	207.00	6.40	2133.00	0.52	173.00
10	Sh. Narayan Ram, S/o Tulcha Ram, V/PO, Chandrakh-Osian	7.00	2333.00	0.56	187.00	5.80	1933.00	0.47	157.00
General Mean		7.11	2369.20	0.56	187.20	5.81	1937.90	0.48	158.80

Table 158. Effect of N application to grain amaranth culture RMA 2 at different crop geometry

S. No.	Treatments	Grain yield (Kg/ha) 01-02	Grain yield (Kg/ha) 02-03	Pooled	Total dry matter (kg/ha)	Plant stand 000/ha (Final)	No. of spikes/plant	Length of spike (cm)	Plant height (cm)	Harvest index (%)
Crop geometries										
1	30 x 10 cm (3.33 Lac plants/ha)	1322.00	2127.00	1725.00	9925.00	304.00	26.80	21.90	131.90	21.30
2	30 x 15 cm (2.22 Lac plants/ha)	1250.00	2066.00	1658.00	9468.00	207.00	27.60	21.00	126.00	21.80
3	45 x 10 cm (2.22 Lac plants/ha)	1207.00	1962.00	1585.00	9196.00	206.00	26.90	21.60	127.30	21.40
4	45 x 15 cm (1.48 Lac plants/ha)	1056.00	1820.00	1438.00	8640.00	134.00	27.30	20.80	125.20	21.00
	S.Em.±	43.00	71.00	59.00	333.00	2.40	0.80	0.50	1.90	0.50
	CD (5%)	124.00	204.00	169.00	NS	6.80	NS	NS	NS	NS
N application (kg/ha)										
1	0	990.00	1574.00	1282.00	8113.00	210.00	24.10	20.00	122.30	19.40
2	30	1166.00	1927.00	1547.00	9300.00	214.00	26.90	21.30	127.80	20.80
3	60	1331.00	2214.00	1773.00	9815.00	214.00	28.30	21.80	129.50	22.60
4	90	1348.00	2260.00	1804.00	10000.00	213.00	29.30	22.20	130.80	22.60
	S.Em.±	43.00	71.00	59.00	333.00	2.40	0.80	0.50	1.90	0.50
	CD (5%)	124.00	204.00	169.00	959.00	NS	2.20	1.60	5.40	1.40
	CV (%)	12.40	12.30	12.70	12.40	3.80	9.70	89.70	5.10	7.80

SUMMARY

VII. A SUMMARY OF RESEARCH ACHIEVEMENTS DURING 2003

A total of 190 trials were allotted during 2003 on germplasm evaluation, breeding, quality and agronomic aspects of underutilized crops at twenty locations in different agro-climatic zones of the country. Out of these 107 trials were carried out. A summary of research achievements is given below:

7.1 PLANT BREEDING

Sixty-five varietal trials, twenty-six in hills and thirty nine in plains, were conducted on fourteen underutilized crops in order to identify improved varieties of various underutilized crops. Details of trials, entries, number of locations and highest yielding entries are given below in table:

Table 1: Best genotypes in different crop trials coordinated at multilocations during 2003

Crops		Entries	Locations	Top yielder	Yield (q/ha)
HILLS					
Amaranth	AVT	15	5	Annapurna (C)	22.31
	IVT	21	3	RGAS 92-10-1	29.44
Buckwheat	AVT	12	4	Sangla B-5	25.03
Chenopodium	ORT	15	1	CHLKW 6	17.12
Rice bean	AVT (ND)	12	5	RBL 35	15.57
Rice bean	AVT (ED)	17	2	LRB 351	15.88
Adzuki bean	ORT	20	3	HPAB 31	12.57
Faba bean	AVT	19	1	HB 188	23.70
				HB 115	62.95 (Pods)
Job's tear	AVT	17	1	BDS 1668	0.67
Perilla	ORT	17	1	H 1099	8.44
PLAINS					
Amaranth	AVT	19	7	RMA 4	12.77
Rice bean	AVT (ND)	20	7	LRB 188	6.92
Rice bean	AVT (ED)	17	4	KHRB 1	8.11
Faba bean	AVT	15	4	HB 131	24.02
Winged bean	ORT	10	3	IC 26945	8.43
Kalingada	AVT	14	2	SKNK 3	1.71
Kankoda	AVT	6	1	RMF 37	25.50
Tumba	AVT	8	2	GP 183	2.24
Tumba	IVT	12	2	GP 233, 255	1.80
Jatropha	AVT	5	2	Chhatrapati	3.40

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

Table 2: List of the promising genotype based on three years performance

Crop	Genotype	Average seed yield (q/ha)	Increase/decrease over check (%)	
			First check	Second check
HILLS				
Amaranth	IC 35407	21.50	8.92 (PRA 9401)	7.50 (Annapurna)
Buckwheat	Sangla B-5	14.35	6.74 (Himpriya)	6.71 (PRB 1)
Rice bean (Normal duration)	PRR 9402	15.64 (132.00 days)	5.05 (PRR 1)	12.09 (PRR 2)
Rice bean (Early duration)	LRB 351	12.68 (145.14 days)	31.18 (PRR 2)	32.42 (RBL 6)
Adzuki bean	IC 241041	15.70	No check used	
PLAINS				
Amaranth	RGAS 92-10-1	10.20	-5.01 (Suvarna)	30.02 (GA 1)
Rice bean (Normal duration)	RBL 35	9.12 (97.00 days)	3.23 (RBL 6)	14.09 (RBL 1)
Rice bean (Early duration)	LRB 224	9.69 (98.00 days)	6.36 (RBL 6)	31.56 (PRR 2)
Faba bean	HB 180	19.86	5.75 (Vikrant)	
Winged bean	Dwarf Mutant	6.73	12.91 (AKWB 1)	
Kalingada	SKNK 6	2.75	20.90 (Trial Mean)	
Tumba (AVT)	GP 255	2.48	23.04 (Trial Mean)	
Tumba (IVT)	GP 285	2.39	15.34 (Trial Mean)	
Jatropha	Chhatrapati	3.76	43.69 (Trial Mean)	
Kankoda	RMF 37	30.38	14.65 (Trial Mean)	

7.2 GERMPASM EVALUATION

Over fifteen hundred accessions, some of them tested at more than one location, were evaluated at seventeen locations during 2003. Crop-wise details of accessions, locations and promising germplasm lines are as follows:

Crops	No. of Accessions	Location	Best accession (Yield g/plant)
HILLS			
Amaranth	53	Ranichauri	PRA 2 (C) (257.60); PRA 1
	60	Shimla	IC 4204 (246.12); IC 5916
Buckwheat	78	Shillong	EC 216627 (55.00 q/ha); EC 216628
	25	Ranichauri	EC 323731 (62.73); Koge
Rice bean	275	Palampur	LRB 292 (70.00); LRB 281
	48	Ranichauri	LRB 6 (50.48); PRR 2
	100	Bangalore	LRB 453 (18.10); RBL 1
	19	New Delhi	PRR 1 (300.00 g/plot); AKP 10-27
Job's tear	44	Shillong	H 2287 (29.06 q/ha); DKH 7
PLAINS			
Amaranth	94	Akola	IC 35718 (150.00); IC 81702
	135	Mandor	RUK (39.99 q/ha); IC 35661
	90	Bangalore	IC 420050 (9.60); IC 35616
	93	Hisar	IC 35706 (30.40_); IC 35546
	42	New Delhi	U 53/VR-124 (1040.00 g/plot); VR 72
Faba bean	340	New Delhi	IC 117753 (1350 g/plot); EC 243770
Tumba	19	Mandor	GP 23 (146.00); GP 68
Jatropha	9	New Delhi	J 2 (300.00); J 3

7.3 QUALITY

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

Crops	Best genotypes
Faba bean	Protein (HB-131 – 24.80%) Vicine – convicine (HB-405 – 0.72%)
Rice bean	Protein (LRB 330 – 22.60%) Tryptophan (LRB 122 – 6.90%) Methionine (RBL 33-1 – 0.97%) Phenol (LRB 199 – 0.15%)
Amaranth	Protein (SKNA 7 – 13.70%) Lysine (IC 35696 – 5.80%)
Buckwheat	Protein (OC 2 – 13.90%)
Kalingada	Protein (SKNK 6 – 34.20%) Oil (SKNK-1 – 36.70%) Oleic acid (SKNK-2 – 16.90%)
Tumba (AVT)	Protein (RMT 3 – 44.40%) Oleic acid (RMT 194 – 17.50%)
Tumba (IVT)	Crude protein (GP 3 – 47.70%) Oleic acid (GP 119 – 18.60%)
Adzuki bean	Protein (EC 340263 – 23.20%) Phenol (EC 15256 – 0.14%)
Jatropha	Protein in defatted seed cake (Chhatrapati – 47.80%) Oil in seed kanel (Chhatrapati – 49.20%)

7.4 AGRONOMY

Ten agronomic experiments were conducted on five underutilized crops at different centres of the project during 2003. These consisted of three investigations on grain amaranth, one on buckwheat, four on rice bean and one each on kalingada and Jatropha. Some of the salient findings are given below:

S. No.	Experiment	Finding
1.	Response of promising amaranth genotypes to N-doses	A dose of 100 kg N in hills and 60 kg N in plains resulted in higher grain yield of amaranth.
2.	Intercropping studies on grain amaranth	Intercropping french bean and amaranth in 2:1 proportion resulted in highest grain yield and gross income
3.	Integrated nutrient management studies in grain amaranth	Substitution of 25% N by FYM or Neem cake resulted in higher yield than applied through chemical fertilizer alone.
4.	Response of promising buckwheat genotypes to fertilizer doses	Promising buckwheat genotypes gave more grain yield under recommended fertilizer dose ($N_{40}P_{40}K_0$). However, at Sangla addition of K_{20} gave favourable response.
5.	Response of promising rice bean genotypes to varying N-doses	N_{40} kg/ha gave higher yield than that of 20 and 60 kg/ha but differences were not significant.
6.	Performance of rice bean based crop rotations under varying fertility conditions	Growing rice bean in rotation with pea gave maximum returns and B:C ratio followed by rice bean-mustard.
7.	Intercropping studies in rice bean	The highest rice bean equivalent yield of 14.00 q/ha was recorded with maize + rice bean intercrop.
8.	Optimization of sowing time in rice bean	Sowing on 20 th July and 5 th August recorded significantly higher yield than the crop sown earlier or later.
9.	Effect of spacing and nutrients in Jatropha	A spacing of 2 x 1 m and fertilizer dose of $N_{45}P_{30}K_{30}$ resulted in highest seed yield
10	Response of promising Karingada genotypes to doses of N	Karingada gave no response to N application irrespective of genotypes.

ANNEXURES

Annexure-I

Table 1. Weighted mean seed yield (q/ha) of grain amaranth varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check		
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		PRA 2	Annapurna	PRA 9401
1	PRA 9801	18.75	5	17.60	5	19.07	5	18.47	15		0.38	-7.93	-6.72
2	PRA 2001	14.49	5	19.04	5	21.19	5	18.24	15		-0.89	-9.10	-7.89
3	PLP 1	16.69	5	18.12	5	17.29	5	17.37	15		-5.63	-13.45	-12.30
4	Shimla A-1	15.02	5	13.77	5	22.04	4	16.58	14		-9.91	-17.37	-16.28
5	Shimla A-2	15.48	5	13.11	5	14.81	5	14.47	15		-21.39	-27.90	-26.95
6	IC 35407	21.98	5	21.45	5	21.28	5	21.57	15	I	17.21	7.50	8.92
7	Sangla A-1	17.90	5	19.54	5	18.54	4	18.67	14		1.44	-6.96	-5.73
8	Sangla A-2	16.74	5	19.36	5	25.13	4	20.07	14	II	9.07	0.04	1.36
9	PRA 2 ©	17.30	5	17.21	5	20.70	5	18.40	15		0.00	-8.28	-7.07
10	Annapurna ©			17.82	5	22.31	5	20.07	10	II	9.03	0.00	1.32
11	PRA 9401 ©	20.16	5	19.99	5	19.26	5	19.80	15	III	7.61	-1.30	0.00
	Mean	17.45		17.91		20.15		18.52					

Table 2. Weighted mean seed yield (q/ha) of buckwheat varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check		
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		Himpriya	VL 7	PRB 1
1	KBB 3	7.05	4	11.62	4	19.39	4	12.69	12		-5.63	58.58	48.27
2	Sangla B1	10.71	4	11.54	4	16.05	4	12.77	12	III	-5.03	59.58	49.20
3	Sangla B2	8.45	4	10.49	4	18.98	4	12.64	12		-5.98	58.00	47.72
4	Sangla B3	8.57	4	10.22	4	17.25	4	12.01	12		-10.64	50.17	40.40
5	Sangla B5	7.87	4	10.15	4	25.03	4	14.35	12	I	6.74	79.38	67.71
6	Sangla B6	10.27	4	10.43	4	16.85	4	12.52	12		-6.89	56.46	46.28
7	Sangla B7	7.13	4	10.37	4	16.99	4	11.50	12		-14.48	43.71	34.36
8	Shimla B1	6.55	4	10.00	4	17.50	4	11.35	12		-15.57	41.88	32.65
9	Himpriya ©	7.33	4	11.84	4	21.16	4	13.44	12	II	0.00	68.04	57.11
10	VL 7 ©	5.96	4	9.01	4	9.03	4	8.00	12		-40.49	0.00	-6.51
11	PRB 1 ©	4.65	4	10.15	4	10.87	4	8.56	12		-36.35	6.96	0.00
Mean		7.69		10.53		17.19		11.80					

Table 3. Weighted mean seed yield (q/ha) of rice bean (Normal duration) varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		PRR 1	PRR 2
1	RBL 33-1	9.89	6	13.80	4	14.58	4	12.35	14		-17.09	-11.53
2	RBL 35	14.25	6	13.95	4	15.57	5	14.61	15		-1.89	4.68
3	LRB 188	17.25	6	13.58	4	12.91	4	14.96	14	II	0.47	7.20
4	PRR 9301	14.77	5	14.66	4	14.82	5	14.76	14	IV	-0.91	5.73
5	PRR 9302	12.39	5	16.45	4	13.89	5	14.09	14		-5.41	0.92
6	PRR 9401	14.25	6	14.85	4	10.67	5	13.22	15		-11.25	-5.30
7	PRR 9402	16.70	5	16.78	4	13.68	5	15.64	14	I	5.05	12.09
8	Naini	14.98	6	13.83	4	11.54	5	13.53	15		-9.17	-3.08
9	BRS 1	13.20	6	16.26	4	12.67	5	13.84	15		-7.07	-0.84
10	PRR 1 ©	14.67	6	16.29	4	14.04	5	14.89	15	III	0.00	6.70
11	PRR 2 ©	13.70	6	15.80	4	12.79	5	13.96	15		-6.28	0.00
Mean		14.19		15.11		13.38		14.17				

Table 3A. Weighted mean for days to maturity of rice bean (Normal duration) varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		PRR 1	PRR 2
1	RBL 33-1	136.58	6	141.07	4	134.63	4	137.31	14		6.24	6.65
2	RBL 35	136.28	6	139.99	4	125.97	5	133.83	15		3.55	3.95
3	LRB 188	146.78	6	136.74	4	129.96	4	139.11	14		7.63	8.05
4	PRR 9301	129.87	5	132.58	4	119.97	5	127.11	14	I	-1.65	-1.27
5	PRR 9302	135.13	5	134.99	4	122.63	5	130.63	14		1.07	1.46
6	PRR 9401	130.22	6	134.66	4	121.23	5	128.41	15	II	-0.65	-0.26
7	PRR 9402	133.40	5	135.23	4	123.03	5	130.22	14		0.76	1.15
8	Naini	130.28	6	133.60	4	122.63	5	128.62	15	III	-0.49	-0.10
9	BRS 1	131.81	6	134.75	4	124.83	5	130.27	15		0.79	1.18
10	PRR 1 ©	133.53	6	133.33	4	120.83	5	129.24	15		0.00	0.39
11	PRR 2 ©	131.17	6	133.32	4	122.17	5	128.74	15	IV	-0.39	0.00
Mean		134.10		135.48		124.35		131.22				

Table 4. Weighted mean seed yield (q/ha) of rice bean (Early duration) varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	PRR 2
1	KHRB 1	12.70	2	6.26	2	14.06	2	11.01	6	III	14.97	13.90
2	KHRB 2	9.18	2	6.81	2	6.26	2	7.42	6		-22.53	-23.25
3	RBL 33-1	11.62	2	5.75	2	9.42	2	8.93	6		-6.72	-7.59
4	RBL 35	11.59	2	5.74	2	9.77	2	9.03	6		-5.64	-6.52
5	RBL 99	10.07	2	5.57	2	13.87	1	9.03	5		-5.68	-6.55
6	LRB 122	14.07	2	7.59	2	10.52	2	10.73	6		12.05	11.00
7	LRB 224	13.34	2	0.70	1	11.97	2	10.26	5		7.21	6.22
8	LRB 234	9.70	2	5.94	2	11.65	2	9.10	6		-4.98	-5.86
9	LRB 351	12.62	2	9.53	2	15.88	2	12.68	6	I	32.42	31.18
10	PRR 9401	9.17	2	1.15	1	24.56	1	11.01	4	III	15.03	13.96
11	PRR 9402	9.28	2	1.12	1	26.00	1	11.42	4	II	19.29	18.18
12	RBL 6 ©	11.03	2	6.01	2	11.68	2	9.57	6		0.00	-0.93
13	PRR 2 ©	7.81	2	8.50	2	12.68	2	9.66	6		0.94	0.00
Mean		10.94		5.44		13.72		9.99				

Table 4A. Weighted mean days to maturity of rice bean (Early duration) varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	PRR 2
1	KHRB 1	154.34	2	138.65	2	150.50	2	147.83	6	III	-3.27	0.95
2	KHRB 2	156.50	2	166.32	2	148.50	2	157.11	6		2.80	7.29
3	RBL 33-1	157.17	2	164.84	2	150.50	2	157.50	6		3.06	7.56
4	RBL 35	158.17	2	165.99	2	150.50	2	158.22	6		3.53	8.05
5	RBL 99	154.17	2	161.65	2	170.66	1	160.46	5		4.99	9.58
6	LRB 122	150.84	2	164.32	2	146.17	2	153.78	6		0.62	5.01
7	LRB 224	154.67	2	177.30	1	146.00	2	155.73	5		1.90	6.34
8	LRB 234	158.17	2	164.15	2	140.17	2	154.16	6		0.87	5.28
9	LRB 351	143.84	2	153.32	2	139.17	2	145.44	6	I	-4.83	-0.68
10	PRR 9401	136.00	2	165.60	1	161.00	1	149.65	4		-2.08	2.19
11	PRR 9402	138.84	2	172.60	1	170.66	1	155.24	4		1.58	6.01
12	RBL 6 ©	152.00	2	154.65	2	151.83	2	152.83	6		0.00	4.36
13	PRR 2 ©	139.34	2	155.80	2	144.17	2	146.44	6	II	-4.18	0.00
Mean		150.31		161.94		151.53		153.41				

Table 5. Weighted mean seed yield (q/ha) of Adzuki bean varieties tested for the last three years: Hills

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Increase/decrease over mean trial (%)
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	EC 241041	11.71	4	24.25	3	12.48	3	15.70	10	I	4.06
2	EC 108080	10.80	4	24.83	3	10.39	3	14.89	10	III	-1.35
3	HPAB 4	9.95	4	25.69	3	10.41	3	14.81	10		-1.86
4	HPAB 9	10.30	4	23.92	3	10.59	3	14.47	10		-4.09
5	HPAB 31	10.15	4	25.75	3	12.57	3	15.56	10	II	3.09
Mean		10.58		24.89		11.29		15.09			

Table 6. Weighted mean seed yield (q/ha) of grain amaranth varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		Suvarna	GA 1
1	RMA 2	6.60	9	9.98	11	12.53	7	9.51	27		-11.41	21.26
2	SKNA 7	8.70	10	9.90	11	12.54	7	10.13	28	III	-5.67	29.13
3	RGAS 92-10-1	9.27	10	9.49	11	12.65	7	10.20	28	II	-5.01	30.02
4	IC 120588	9.14	9	8.66	11	13.84	5	9.87	25	IV	-8.11	25.78
5	GA 1 ©	8.39	10	7.27	10	7.90	6	7.85	26		-26.94	0.00
6	Suvarna ©	10.07	10	10.94	11	11.64	5	10.74	26	I	0.00	36.88
Mean		8.70		9.37		11.85		9.72				

Table 7. Weighted mean seed yield (q/ha) of rice bean (Normal duration) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	RBL 1
1	RBL 35	8.86	7	10.90	8	7.35	7	9.12	22	I	3.23	14.09
2	RBL 36	8.85	7	10.26	8	5.71	7	8.36	22		-5.35	4.61
3	RBL 50	8.25	7	10.23	8	6.53	7	8.42	22		-4.68	5.35
4	LRB 188	8.92	7	9.74	8	6.92	7	8.58	22		-2.88	7.34
5	LRB 197	9.10	7	10.62	8	6.48	7	8.82	22	III	-0.19	10.31
6	LRB 199	8.43	7	10.77	8	6.02	7	8.51	22		-3.64	6.49
7	LRB 224	8.61	7	10.67	8	5.98	7	8.52	22		-3.55	6.60
8	LRB 234	8.31	7	11.04	8	6.28	7	8.66	22	V	-2.03	8.28
9	LRB 303	8.63	7	10.35	4	6.49	6	8.28	17		-6.30	3.56
10	LRB 349	8.39	7	11.22	8	5.58	6	8.67	21	IV	-1.93	8.38
11	BRB 1	5.52	3	6.21	3	6.57	2	6.04	8		-31.63	-24.44
12	RBL 99	8.21	7			6.27	6	7.31	13		-17.22	-8.51
13	LRB 202	8.55	7			5.52	2	7.88	9		-10.86	-1.48
14	BRB 2	6.57	5			8.47	2	7.11	7		-19.50	-11.03
15	RBL 1 ©	8.24	7	9.57	8	5.95	7	8.00	22		-9.52	0.00
16	RBL 6 ©	9.31	7	10.39	7	6.47	6	8.84	20	II	0.00	10.52
Mean		8.30		10.15		6.41		8.20				

Table 7A. Weighted mean days to maturity of rice bean (Normal duration) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	RBL 1
1	RBL 35	97.96	7	96.46	8	97.71	7	97.34	22	III	-2.46	-0.60
2	RBL 36	99.17	7	96.79	8	97.75	7	97.85	22	IV	-1.94	-0.07
3	RBL 50	100.29	7	96.68	8	98.32	7	98.35	22		-1.44	0.44
4	LRB 188	102.50	7	97.22	8	96.96	7	98.82	22		-0.97	0.91
5	LRB 197	101.61	7	98.94	8	98.71	7	99.72	22		-0.07	1.83
6	LRB 199	100.75	7	97.39	8	96.82	7	98.28	22		-1.51	0.36
7	LRB 224	99.32	7	96.79	8	98.43	7	98.12	22		-1.67	0.20
8	LRB 234	100.43	7	97.22	8	98.00	7	98.49	22		-1.30	0.58
9	LRB 303	100.32	7	97.36	4	96.50	6	98.28	17		-1.52	0.36
10	LRB 349	99.11	7	95.93	8	92.29	6	95.95	21	II	-3.85	-2.01
11	BRB 1	99.67	3	93.38	3	87.63	2	94.30	8	I	-5.50	-3.70
12	RBL 99	101.36	7			100.71	6	101.06	13		1.28	3.20
13	LRB 202	96.39	7			87.63	2	94.44	9		-5.36	-3.55
14	BRB 2	102.30	5			101.25	2	102.00	7		2.22	4.16
15	RBL 1 ©	100.25	7	97.07	8	96.57	7	97.92	22		-1.87	0.00
16	RBL 6 ©	100.14	7	98.61	7	100.75	6	99.79	20		0.00	1.90
Mean		100.10		96.91		96.63		98.17				

Table 8. Weighted mean seed yield (q/ha) of rice bean (Early duration) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	PRR 2
1	KHRB 1	8.49	4	9.12	5	8.11	4	8.62	13		-5.45	8.07
2	KHRB 2	10.45	4	10.11	5	6.70	4	9.17	13	IV	0.59	14.97
3	RBL 33-1	9.29	4	9.94	5	6.07	4	8.55	13		-6.17	7.24
4	RBL 35	9.92	4	11.51	5	6.26	4	9.41	13	II	3.22	17.98
5	RBL 99	9.84	4	9.89	5	6.14	4	8.72	13		-4.29	9.39
6	LRB 122	8.91	4	10.69	5	6.62	4	8.89	13		-2.43	11.51
7	LRB 224	9.99	4	12.06	5	6.43	4	9.69	13	I	6.36	21.56
8	LRB 234	9.34	4	10.93	5	6.80	3	9.37	12	III	2.81	17.50
9	LRB 351	8.67	4	10.06	5	7.08	4	8.72	13		-4.35	9.32
10	PRR 9401	7.71	4	9.15	4	4.47	3	7.35	11		-19.33	-7.81
11	PRR 9402	6.82	4	9.13	5	6.48	4	7.60	13		-16.55	-4.62
12	RBL 6 ©	9.53	4	10.57	5	6.87	4	9.11	13	V	0.00	14.29
13	PRR 2 ©	6.69	4	8.96	5	8.02	4	7.97	13		-12.50	0.00
Mean		8.90		10.16		6.62		8.70				

Table 8A. Weighted mean days to maturity of rice bean (Early duration) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check	
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		RBL 6	PRR 2
1	KHRB 1	96.92	4	94.06	5	103.04	4	97.70	13		-2.09	3.34
2	KHRB 2	98.67	4	94.50	5	101.75	4	98.01	13		-1.78	3.66
3	RBL 33-1	97.42	4	93.95	5	100.96	4	97.17	13		-2.62	2.78
4	RBL 35	96.08	4	91.36	5	99.86	4	95.43	13	IV	-4.37	0.93
5	RBL 99	99.42	4	94.84	5	100.63	4	98.03	13		-1.76	3.68
6	LRB 122	100.42	4	94.00	5	101.38	4	98.25	13		-1.54	3.91
7	LRB 224	101.50	4	93.14	5	100.71	4	98.04	13		-1.75	3.69
8	LRB 234	99.67	4	94.66	5	103.50	3	98.54	12		-1.25	4.22
9	LRB 351	99.00	4	90.89	5	101.58	4	96.67	13		-3.12	2.25
10	PRR 9401	91.25	4	89.50	4	97.00	3	92.18	11	I	-7.62	-2.50
11	PRR 9402	93.92	4	89.64	5	100.15	4	94.19	13	II	-5.61	-0.38
12	RBL 6 ©	100.92	4	96.96	5	102.19	4	99.79	13		0.00	5.54
13	PRR 2 ©	93.92	4	90.06	5	100.79	4	94.55	13	III	-5.25	0.00
Mean		97.62		92.89		101.04		96.81				

Table 9. Weighted mean seed yield (q/ha) of faba bean varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check Vikrant
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	HB 43	20.09	5	15.77	4	23.40	4	19.78	13	II	5.31
2	HB 115	20.54	5	13.92	4	22.81	4	19.20	13	V	2.24
3	HB 123	18.45	5	13.61	4	25.51	4	19.13	13		1.87
4	HB 131	19.03	5	14.61	4	24.02	4	19.21	13	IV	2.26
5	HB 180	21.25	5	16.80	4	21.19	4	19.86	13	I	5.75
6	HB 193	18.74	5	13.92	4	21.34	4	18.06	13		-3.86
7	HB 324	17.88	5	10.21	3	7.73	1	14.20	9		-24.42
8	BSH 9	20.94	5	15.22	4	20.92	4	19.17	13		2.09
9	PRT 12	20.59	5	10.99	3	19.85	4	17.94	12		-4.46
10	PRT 7	19.18	5	15.90	4	22.78	4	19.28	13	II	2.65
11	Vikrant ©	19.72	5	15.57	4	20.82	4	18.78	13		0.00
Mean		19.67		14.23		20.94		18.60			

Table 10. Weighted mean seed yield (q/ha) of winged bean varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over check
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		AKWB 1
1	EC 178313	10.36	1	3.50	4	8.23	2	5.83	7		-2.20
2	EC 178271	8.86	1	3.32	4	8.20	2	5.51	7		-7.67
3	EC 178331	10.58	1	3.39	4	7.41	2	5.57	7		-6.66
4	EC 142665	9.08	1	3.65	4	8.15	2	5.71	7		-4.22
5	EC 38955	8.72	1	2.56	4	7.43	2	4.83	7		-18.97
6	EC 26945	11.60	1	3.90	4	8.43	2	6.29	7	III	5.56
7	NBRI Sel	7.74	1	5.15	4	8.29	2	6.42	7	II	7.62
8	Mysore Local	8.61	1	4.30	4	7.75	2	5.90	7		-1.03
9	Dwarf Mutant	12.89	1	4.57	4	7.98	2	6.73	7	I	12.91
10	AKWB 1 ©	10.34	1	4.23	4	7.24	2	5.96	7		0.00
Mean		8.98		3.51		7.19		5.34			

Table 11. Weighted mean seed yield (q/ha) of kalingada varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over mean
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	SKNK 1	2.57	3	2.60	4	1.12	2	2.26	9		-0.51
2	SKNK 2	3.31	3	2.45	4	1.31	2	2.48	9	IV	9.27
3	SKNK 3	3.72	3	2.04	4	1.71	2	2.53	9	III	11.18
4	SKNK 4	3.02	3	2.43	4	1.07	2	2.32	9		2.28
5	SKNK 5	2.57	3	2.03	4	0.60	2	1.89	9		-16.74
6	SKNK 6	3.97	3	2.62	4	1.17	2	2.75	9	I	20.90
7	SKNK 7	3.26	3	2.32	3	0.82	2	2.30	8		1.09
8	SKNK 11	3.60	3	1.94	4	1.35	2	2.36	9	V	3.94
9	SKNK 15	3.11	3	2.41	4	1.01	2	2.33	9		2.62
10	SKNK 16	2.81	3	1.83	4	0.59	2	1.88	9		-17.23
11	SKNK 17	4.12	3	2.24	4	0.87	2	2.56	9	II	12.74
12	SKNK 18	2.55	3	1.44	4	1.67	2	1.86	9		-18.11
13	SKNK 19	3.30	3	1.95	4	1.25	2	2.24	9		-1.24
14	SKNK 21	2.65	3	2.02	4	1.17	2	2.04	9		-10.19
Mean		3.18		2.17		1.12		2.27			

Table 12. Weighted mean seed yield (q/ha) of tumba (AVT) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over mean
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	GP 3	1.98	2	1.70	2	1.75	2	1.81	6		-12.65
2	GP 59	2.44	2	2.53	2	2.17	2	2.38	6	II	14.86
3	GP 119	2.58	2	2.07	2	2.17	2	2.27	6	III	9.71
4	GP 172	1.97	2	1.69	2	1.76	2	1.81	6		-12.81
5	GP 181	1.89	2	1.31	2	1.60	2	1.60	6		-22.78
6	GP 183	2.11	2	2.09	2	2.24	2	2.15	6	V	3.60
7	GP 194	2.69	2	1.89	2	1.93	2	2.17	6	IV	4.73
8	GP 285	2.51	2	2.72	2	1.94	2	2.39	6	I	15.34
Mean		2.27		2.00		1.95		2.07			

Table 13. Weighted mean seed yield (q/ha) of tumba (IVT) varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over mean
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	GP 27	1.62	2	2.56	1	1.07	2	1.59	5		-21.09
2	GP 31	1.95	2	2.55	1	1.37	2	1.84	5		-8.66
3	GP 45	1.96	2	2.60	1	1.56	2	1.93	5		-4.19
4	GP 84	2.43	2	3.00	1	1.68	2	2.24	5	III	11.51
5	GP 142	1.93	2	3.10	1	1.31	2	1.92	5		-4.79
6	GP 144	2.67	2	2.60	1	1.54	2	2.20	5	IV	9.52
7	GP 161	1.66	2	2.80	1	1.57	2	1.85	5		-7.97
8	GP 233	2.71	2	2.70	1	1.80	2	2.34	5	II	16.48
9	GP 255	2.99	2	2.80	1	1.80	2	2.48	5	I	23.04
10	GP 290	1.81	2	3.00	1	1.26	2	1.83	5		-9.16
11	GP 3	2.14	2	3.10	1	1.05	2	1.90	5		-5.78
12	GP 172	2.22	2	3.25	1	1.24	2	2.03	5	V	1.08
Mean		2.17		2.84		1.44		2.01			

Table 14. Weighted mean seed yield (q/ha) of Jatropha varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over mean
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	Hansaraj	0.38	1	3.94	2	2.13	2	2.50	5	IV	-4.21
2	S.K. Nagar (Big)	0.41	1	4.32	2	2.60	2	2.85	5	II	9.03
3	Urlikanchan	0.40	1	3.62	2	2.57	2	2.56	5	III	-2.22
4	Chhatrapati	0.50	1	5.74	2	3.40	2	3.76	5	I	43.69
5	Local	0.24	1	1.17	2	2.22	2	1.40	5	V	-46.29
Mean		0.39		3.76		2.58		2.61			

Table 15. Weighted mean seed yield (q/ha) of kankoda varieties tested for the last three years: Plains

S. No.	Genotype	2001		2002		2003		Weighted		Rank	Per cent increase/decrease over mean
		Mean	Locations	Mean	Locations	Mean	Locations	Mean	Locations		
1	RMF 7-P-1	35.78	1	27.98	1	20.40	1	28.05	3	II	5.88
2	RMF 5-P-4	32.19	1	19.34	1	19.40	1	23.64	3	V	-10.77
3	RMF 1	40.78	1	13.65	1	14.60	1	23.01	3		-13.16
4	RMF 17	43.13	1	18.69	1	17.50	1	26.44	3	IV	-0.21
5	RMF 27	33.13	1	26.93	1	22.30	1	27.45	3	III	3.61
6	RMF 37	37.97	1	27.66	1	25.50	1	30.38	3	I	14.65
Mean		37.16		22.38		19.95		26.50			

Annexure-II

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

Name of centre	Allotted					Conducted					
	Breeding/ Germplasm	Agronomy	Adaptive	Quality	Total	Breeding/ Germplasm	Adaptive	Agronomy	Quality	Total	Per cent
Bangalore	8	3	-	-	11	6	-	2	-	8	72.73
S.K. Nagar	10	4	-	-	14	4	-	2	-	6	42.86
Rahuri	8	-	-	-	8	3	-	-	-	3	37.50
Mettupalayam	5	3	-	-	8	2	-	1	-	3	37.50
Bhubaneswar	9	6	-	-	15	4	-	6	-	10	66.67
Ranichauri	12	6	-	-	18	11	-	6	-	17	94.44
Hisar	10	5	2	12	29	5	-	-	9	14	48.28
Ranchi	7	-	-	-	7	4	-	-	-	4	57.14
Ludhiana	7	1	-	-	8	-	-	-	-	-	-
Faizabad	8	-	2	-	10	-	-	-	-	-	-
Ambikapur	9	-	-	-	9	6	-	-	-	6	66.67
Mandor	7	-	1	-	8	7	-	-	-	7	87.50
Palampur	8	-	-	-	8	7	-	-	-	7	87.50
Sangla	3	2	-	-	5	2	-	2	-	4	80.00
Shimla	8	-	-	-	8	6	-	-	-	6	75.00
Shillong	3	-	-	-	3	4	-	-	-	4	133.33
Almora	3	1	-	-	4	3	-	-	-	3	75.00
Delhi	9	-	-	-	9	3	-	-	-	3	33.33
Akola	4	-	-	-	4	2	-	-	-	2	50.00
Bhowali	2	-	-	-	2	-	-	-	-	-	-
Lucknow	1	-	-	-	1	-	-	-	-	-	-
NEH ICAR, Shillong	-	1	-	-	1	-	-	-	-	-	-
Total	141	32	5	12	190	79		19	9	107	56.31

List of Underutilized Crops Identified for Research Work

I. FOOD CROPS

A. PSEUDOCEREALS

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

B. FOOD LEGUMES/ PULSES

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

C. OILSEEDS

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

D. VEGETABLES

Kankoda (*Momordica dioica*)
Winged bean (*Psophocarpus tetragonolobus*)
Salt bush (*Atriplex* spp.)

II. FODDER CROPS

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

III. ENERGY, HYDROCARBON AND INDUSTRIAL PLANTS

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

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

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

	Fax	Phone (O)	Phone (R)
Dr. O.P. Nehra Agronomist			
Dr. M. Khabiruddin Jr. Phytochemist			
4. Forest College & Research Institute (TNAU), Mettupalayam – 641 301			
Dr. Mohed Yasin Assoc. Prof. (Agronomy)	04254-225064	04254-222010	(M) 04223211733
Dr. K. Bhawani Shankar Asstt. Prof. (Plant Breeding)			
5 Mahatma Phule Agricultural University, Rahuri – 413 722			
Dr. S.D. Sarode Plant Breeder	02426-243223	02426-243249	
6 Birsa Agricultural University, Ranchi – 834 006			
Dr. K.D. Prasad Sr. Scientist	0651-2455850	0651-2455621	0651-2555716
7 College of Forestry & Hill Agriculture (GBPUAT), Ranichauri – 249 199			
Dr. M. Dutta Plant Breeder & TPL (PL. Br.)	01376-252138	01376-252121, 252119	
Dr. T.P. Singh Agronomist			
8 Regional Research Station (GAU), Sardar Krishinagar, Distt. Banaskantha – 385 506			
Dr. Y. Ravinder Babu Assoc. Res. Sci. (Pl.Br.)	02748-278433		02748-279003
Dr. B.N. Patel Asstt. Res. Sci. (Agronomy)			
9 Punjab Agricultural University, Ludhiana – 141 004			
Dr. Gurtej Singh Brar Ext. Specialist (FC)	0161-2400945	0161-2401960 Ext. 435	
10 Agricultural Research Station (RAU), Mandor, Jodhpur – 342 304			
Dr. M.M.C. Bhandari Assoc. Director Research	0291-2571909	0291-2571813	0291-2571847, 2613869

	Fax	Phone (O)	Phone (R)
11 CSK Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur – 176 062			
Dr. S.R. Thakur Asstt. Prof. Plant Breeding	01894-230511	0184-230391	
12 Zonal Agricultural Research Station (IGKV), Ambikapur – 497 001			
Dr. M.K. Singh Scientist incharge (Underutilized Crops)	07774-230986, 220099	07774-230815, 230986	07774-220069
13 Narendra Dev University of Agriculture & Technology, Faizabad – 224 229			
Dr. C.B. Yadav Scientist incharge Underutilized Crops		05270-262051	05270-220977

C. COOPERATING CENTRES

Dr. V.D. Verma Officer incharge NBPGR Regional Station Shimla	0177-2235453	0177-2235453, 22355459	0177-2235453
Dr. N.K. Dwivedi Officer incharge NBPGR Regional Station Jodhpur	0291-2740490	0291-2740490	0291-2744162
Dr. I.P. Singh Officer incharge NBPGR Regional Station Akola	0724-2258067	0724-2258067	0724-2421849
Dr. D.K. Hore Officer incharge NBPGR Regional Station Shillong	0364-2570651	0364-2570193	0364-2570194
Dr. K.S. Negi Officer incharge NBPGR Regional Station Bhowali	05942-220027	05942-220027	05942-220038

D. VOLUNTARY CENTRES

1 National Botanical Research Institute, Lucknow

Dr. R.M. Pandey Head, Cytogenetic Lab	0522-205839, 205836	0522-205831- 35, 205848, 205839	
--	------------------------	---------------------------------------	--

Dr. Sudhir Shukla
Scientist
Deptt. Pl. Br. & Gen.

2 Vivekananda Parvatiya Krishi Anusandhan Shala, Almora

Dr. Arun Gupta 05962-231539 05962-230060
Scientist

3 Himachal Pradesh Krishi Vishwavidyalay, Palampur

Dr. K.C. Dhimman
Incharge
Regional Research Station
HPKVV, Sangla

TECHNOLOGIES IDENTIFIED DURING 2003

Varieties

CROP	VARIETY	FEATURE	AREA	DEVELOPED BY
Grain amaranth	PRA 9401	High yield	North-west hills	Dr. M. Dutta, GBPUA&T, Ranichauri
Rice bean	BRS 1	High yield, early maturity	North-west hills	Dr. K.S. Negi, NBPGR RS, Bhowali
	RBL 35	Early maturity	Plains	Dr. Bhupinder Singh, PAU, Ludhiana
	RBL 50	Green seeded	Plains	Dr. Bhupinder Singh, PAU, Ludhiana

Cultivation Practices

- ❖ Grain amaranth-red gram - an appropriate intercrop system for Tamil Nadu.
- ❖ Pre-emergent application of alachlor @ 1.5 kg/ha - an effective chemical weed control in buckwheat.