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Chickpea Breeding
Progress Report 32

Chickpea Breeding

Report of Work
June 1985 - May 1986

Projects

C-103(85)IC: Breeding short duration desi chickpeas for stability and high yield
C-104(85)IC: Breeding long duration desi chickpeas for stability and high yield - International
C-106(85)IC: Breeding kabuli chickpeas for stability and high yield in semi-arid tropics
C-108(85)IC: Breeding chickpeas for adaptation to early and late planting, and to increased inputs
C-109(85)IC: Studies on genetics and breeding methods of chickpea

ICRISAT

International Crops Research Institute for the Semi-Arid Tropics
Patancheru, Andhra Pradesh 502 324, India

1986

For

The External Review of ICRISAT's work programs in 1984 and subsequent in-house reviews during 1984-85 resulted in significant changes in the chickpea breeding research projects. Where we had 11 projects before, apart from those conducted at ICARDA and in Pakistan, the number now was reduced to 6. Consequently the Progress Reports have been altered. The 1984-85 Reports are in 6 volumes, but the 1985-86 Progress Reports have now been condensed in 4 volumes:

No. 32 covers the actual breeding and research aspects of the program

No. 33A presents the details of chickpea materials distributed to cooperators during June 1985-May 1986

No. 33B reports on the results of the International Chickpea Nurseries during June 1985-May 1986.

No. 33C gives appendices to reports 33A and B.

As previously the Reports intend to give a complete record of our activities. It may be stated here, to avoid repetition in the Reports, that all field tests were sown in rows 4 m long. Trials of F_2 and more advanced materials were at a spacing of 10 cm in rows 30 cm apart, and other materials at 20 cm x 60 cm unless otherwise stated.

Climatological data for Hyderabad and Hisar, where most of the work was conducted, and a brief description of growing conditions are given on page 2 of this Report. A list of the staff is also here on page i. The projects and the scientists responsible are shown on page 1, and the full contents are presented on pages ii and iii.

We acknowledge most thankfully the enormous contribution of all cooperators both within and outside ICRISAT; without their assistance the achievements could not have been made, and the report could not have been published.

CHICKPEA BREEDING SUBPROGRAM STAFF

Dr H.A. van Rheenen	Principal Chickpea Breeder
Dr K.B. Singh	Plant Breeder (Chickpea) (ICARDA, Aleppo, Syria)
Dr Onkar Singh	Plant Breeder II
Dr S.C. Sethi	Plant Breeder II
Dr C.L.L. Gowda	Plant Breeder II
Dr Jagdish Kumar	Plant Breeder II (Hisar)
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Mr M.S. Raghavan	Stenographer
Mr Mewa Singh	Clerk/Typist (Hisar)
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Mr Phul Singh	Driver/General Asst (Hisar)
Mr Kashi Ram	Security Guard II (Hisar)
Mr Md Asifuddin	Field Attendant
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Mr G. Tirupathi Reddy	Field Attendant
Mr M. Yesudas	Field Attendant
Mr B. Nagasatyam	Field Attendant
Mr B. Nagappa	Field Attendant
Mr P. Anthi Reddy	Field Attendant
Mr J. Ananthaiah	Field Attendant
Mr Md Yousuf	Field Attendant

CONTENTS

CHICKPEA BREEDING

List of Approved Projects

Project Number	Title	Project Scientist
C-102(85)IC	International trials for the semi-arid tropics	H.A. van Rheenen Onkar Singh S.C. Sethi C.L.L. Gowda Jagdish Kumar
C-103(85)IC	Breeding short duration desi chickpeas for stability and high yield	Onkar Singh S.C.Sethi M.V. Reddy S.S. Lateef N.P. Saxena
C-104(85)IC	Breeding long duration desi chickpeas for stability and high yield - International	Jagdish Kumar C.L.L. Gowda S.S. Lateef N.P. Saxena M.V. Reddy
C-106(85)IC	Breeding kabuli chickpeas for stability and high yield in semi-arid tropics	S.C. Sethi Jagdish Kumar M.V. Reddy S.S. Lateef N.P. Saxena
C-108(85)IC	Breeding chickpeas for adaptation to early and late planting, and to increased inputs	C.L.L. Gowda Onkar Singh M.V. Reddy N.P. Saxena S. Sithanantham
C-109(85)IC	Studies on genetics and breeding methods of chickpea	H.A. van Rheenen Onkar Singh S.C. Sethi C.L.L. Gowda Jagdish Kumar

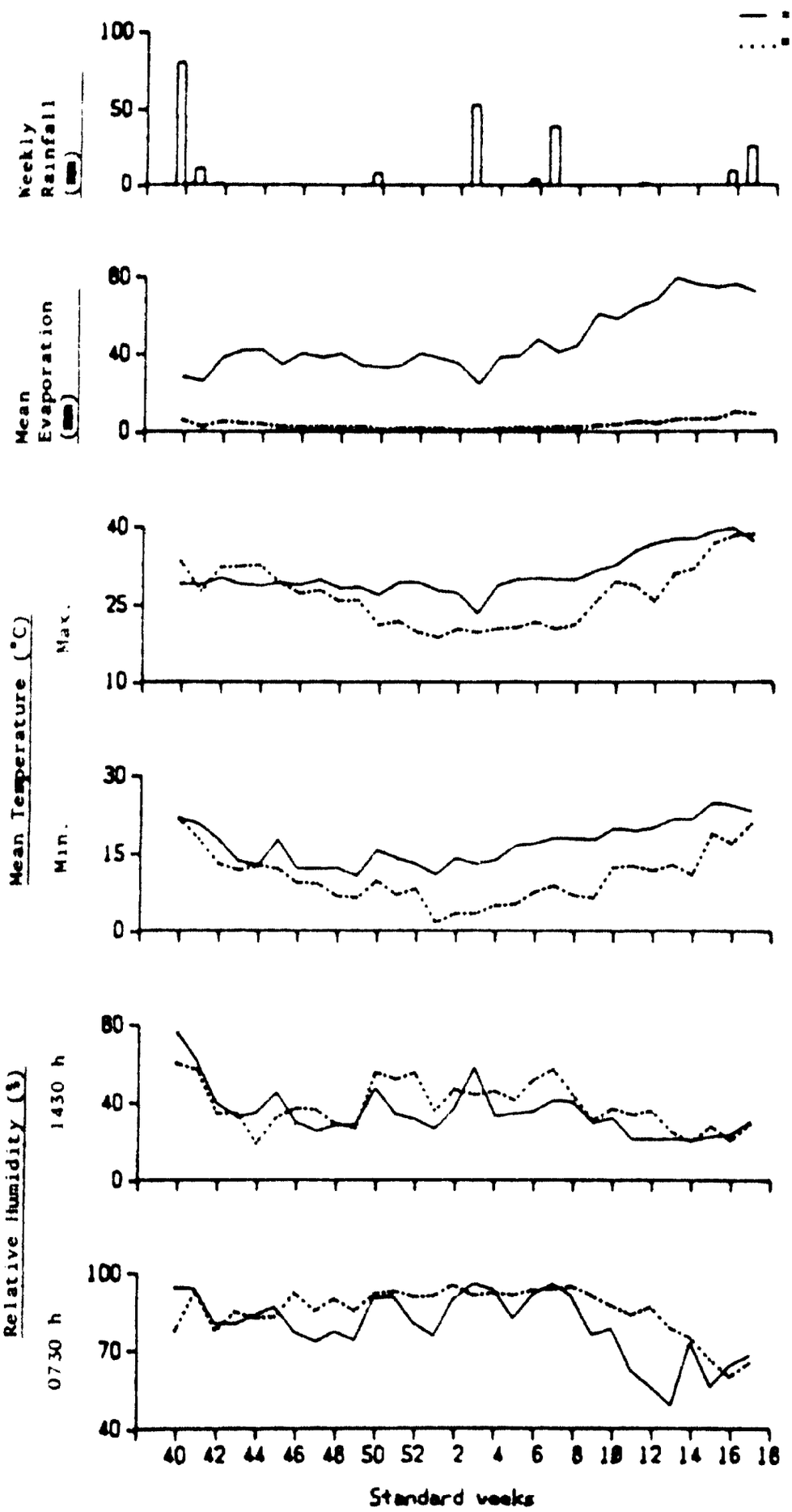

Figure 1. Graphic representation of weather data at ICRISAT Center and HAU farm, Hisar during chickpea growing season, 1985/86.

Summary

Project C-103(85)IC: Breeding short duration desi chickpeas for stability and high yield

- The crossing block had 43 short duration parents for use in the crossing program.

- We made 125 crosses involving 36 parents. We also made 45 three-way crosses to incorporate additional resistance factors - such as disease and *Heliothis* resistance.

- We advanced 220 F_1 crosses in the off-season nursery. Out of these 171 F_1's were again grown during the post rainy season to make three-way crosses.

- We screened 258 F_2 populations in wilt-sick plot to select wilt resistant plants. This year we also screened a few F_2's in the combined wilt and *Heliothis* nursery.

- We screened 104 F_3 bulks and 440 F_3 progenies in wilt-sick plots, and 588 F_3 progenies in the wilt and *Heliothis* nursery.

- Fifty six F_4 bulk populations were planted in normal field and 2540 single plants were selected for further evaluation.

- We planted 7223 F_4 to F_8 progenies for yield evaluation in normal fields. Wherever seed was available, one row of these progenies was also planted in the wilt-sick plot to check for wilt reaction, and in unsprayed fields for checking on *Heliothis* resistance. Promising and high yielding progenies (599) having resistance to wilt and/or *Heliothis* were selected for replicated trials next year.

- We conducted 24 preliminary yield trials, and selected 41 entries for International Chickpea Screening Nursery (ICSN) - short duration, and 25 entries for ICSN - medium duration.

- Two advanced yield trials were conducted. From these, we contributed 6 entries to ICSN - short and medium duration.

Project C-104(85)IC: Breeding long duration desi chickpeas for stability and high yield - International

- The crossing block had 60 genotypes of which 52 lines were used in making crosses.

- We made 14 three-way and 144 single crosses. Most of these crosses involved high yielding lines and sources of resistance to fusarium wilt, ascochyta blight, stunt, botrytis gray mold and to *Heliothis* pod borer. In addition to these, crosses were also made to study

the inheritance and to increase levels of resistance to ascochyta blight and botrytis gray mold.

- We grew 180 F_1's and harvested F_2 seed from 159 crosses (21 crosses were killed). In the off-season nursery we advanced 152 crosses made this season.

- Out of 336 F_2 populations available, we screened 18 in wilt-sick fields, 8 in ascochyta blight nursery, 15 in Heliothis nursery and 8 in normal fields. Remaining populations will be screened in wilt-sick plot next year.

- We evaluated 8 F_3 bulks and 2646 F_3 progenies. Remaining 145 F_3 bulks and 1029 progenies will be planted in wilt-sick fields in the coming season.

- We grew 132 F_4 bulk populations and selected 4002 single plants for further evaluation.

- We evaluated 5639 progenies in F_5 to F_8 generations in normal fields under commercial spacing. Wherever seed was available, one row each of these progenies was planted in wilt-sick plot, ascochyta blight nursery and Heliothis nursery for evaluation. Promising, uniform and high yielding progenies were individually bulked for replicated trials next year - 312 for Preliminary Yield Trial (PYT) and 7 for Advanced Yield Trials (AYT).

- We conducted 28 PYT's. From these we selected 47 lines for International Chickpea Screening Nursery (ICSN) - desi long duration, 12 lines for ICSN - medium duration and 4 lines for International Chickpea Cooperative Trial (ICCT) - desi long duration trials.

- Four AYT's were conducted at both Hisar and Gwalior. Three lines were selected for ICSN - desi long duration, and 2 lines for ICCT - desi long duration trials. Two highly promising lines were contributed to the AICPIP trials in India.

Project C-106(85)IC: Breeding kabuli chickpeas for stability and high yield in semi-arid tropics

- The cultivar ICCC 32 was identified for NWPZ and NEPZ in India and minikit trials were sent to eight states; Bihar, Punjab, Haryana, Rajasthan, U.P., M.P., Maharashtra and Gujarat.

- Twenty nine kabuli parents were used in crosses.

- Wemade 57 single, nine three way and 25 double crosses primarily to improve seed size, stability and yield.

- Eighty three F_1's made in 1984-85 were advanced in the off-season nursery at Tapperwaripora in J & K.

- Of the 83 F_2 populations, some were screened for wilt at ICRISAT Center (the remaining will be screened next year). Twenty four populations were planted in HAU blight nursery, 23 in normal fields and 24 in unsprayed fields. We selected 45, 209 and 228 plants respectively, from these populations.

- In the F_3 to F_7 generations, 1751 progenies were planted in normal fields and 1478 of these also in the wilt-sick plots. We bulked 111 progenies for PYT's and 128 single plants for progeny rows.

- From the five PYT's we selected eight entries for ICCT-K and 29 for advanced trials.

- Because of their good performance in advanced trials, we contributed two entries, ICCV 13 and -14 to AICPIP coordinated GCVT (K).

- ICCC 49 continued its good performance in GCVT (K).

Project C-108(85)IC: Breeding chickpeas for adaptation to early and late planting, and to increased inputs.

A Breeding for adaptation to early sowing

We made 26 crosses between lines adapted to early sowing and sources of resistance to diseases and pod borer.

We evaluated 1331 F_3 to F_5 progenies under early sown conditions for checking their yield potential in normal fields, and 954 of the progenies were also tested for wilt resistance in wilt-sick field.

We advanced 714 wilt-resistant and high yielding progeny bulks for further testing.

We bulked 46 F_5 progenies that were high yielding and uniform for testing in replicated yield trials next year.

In the early vs. normal sown comparison trial, the early (mid-September) sown trial gave a mean yield of 1115 kg ha^{-1} compared to 735 kg ha^{-1} in normal (mid-October) sown trial. The advantage of early planting is impressive inspite of the prevailing drought this year.

B. Breeding for adaptation to late sowing

- We continued to search and develop genotypes adapted to late-sowing at Hisar and Gwalior.

- We made 51 single crosses between adapted parents and sources of resistance to wilt, ascochyta blight, and podborer.

Nearly 600 F_3 to F_7 progenies were evaluated under late-sowing; 173 single plants and 34 progeny rows were selected for further tests.

Forty-six desi and 23 kabuli breeding lines were late-sown in three replicated yield tests; several lines produced more than controls and 23 most promising ones were selected for advanced yield tests.

Twenty-three lines each in desi and kabuli types were tested in advanced yield trials and one desi (ICCV 15) and one kabuli line (ICCV 16) with superior performance were contributed to late sown AICPIP trials.

C. Breeding for adaptation to high inputs

- A program of screening chickpea genotypes for response to high inputs was initiated for the first time at Hisar. More than 300 mid-tall desi and kabuli germplasm lines were grown under high inputs for preliminary screening.

Project C-109(85)IC: Studies on genetics and breeding thods of chickpea

A. Breeding Methods

- We made 51 biparental crosses among the selected F_3 plants to recombine the desirable characteristics of parents Annigeri, K 850, JG 62, ICC 506, and ICCL 83151.

- In F_3 progenies of double-crosses, 70 single plants combining the desired characteristics were selected for progeny tests.

- From among the 57 wilt resistant and 75 wilt susceptible F_5 progeny bulks, derived from original single crosses, 23 each were selected for replicated yield tests and for comparison.

B. Double-podded and Multiseeded Characters

- A cross between a double-podded and a multiseeded line was made to initiate a new study to determine the role of these two characteristics towards seed yield.

C. Studies on desi-kabuli introgression

- We compared the F_3 bulks from cycle I (27 bulks) with cycle II (17 bulks) alongwith 5 checks.

- The trial was conducted both at ICRISAT Center and Hisar.

- The interaction of seed types (desi, kabuli, intermediate) with crosses was significant; and so was interaction of location with crosses.

- The variability in cycle II was comparatively lesser than the cycle I. The trial will be repeated one more season for confirmation.

D. Male sterility

- In the recurrent selection program, the selected S_1 plants intermated to get S_2 seed for further evaluation.

- A new male sterility gene MS_2 has been confirmed as being different from the earlier MS_1 gene. This gene is monogenic recessive.

- A study of inheritance of cylindrical pods indicated polygenic nature of the character. More crosses have been made for further studies.

- The inheritance of long-and-narrow leaf (LNL) mutant appears to be controlled by two genes.

- An open flower, and a protruding anther type are being maintained by sib-mating for possible future use.

Project C-103(85)IC: Breeding Short Duration Desi Chickpeas for Stability and High Yield

Objectives

1. To breed short duration desi chickpeas for the following desirable characters: high and stable yield; resistance to Fusarium wilt and root rots; resistance to Heliothis.

Introduction

We made a shift in our breeding strategy from this year by making disease and insect resistance mandatory for all the breeding material. We have, therefore, culminated early generation testing, swapping F_2 and F_3 germination trials and replaced these with the screening for disease resistance followed by Heliothis resistance. This approach, in our opinion, will integrate all the disciplines of crop improvement in our endeavour to breed for yield and stability of performance. The various ongoing projects like breeding for disease resistance, breeding for Heliothis resistance and breeding for newer plant types were thus merged with the major projects like 'desi and kabuli' to make them more of product than discipline oriented.

The other change we made was that all the progenies were planted on a commercial planting density of 30 x 10 cm so as to carry the material the way it is finally to be planted. An additional row of each plant progeny was planted in the wilt-sick plot to examine its wilt reaction and finally select those with good yield and wilt resistance. All the entries in the preliminary and advanced yield trials were also checked for their wilt reaction by planting a row in the wilt-sick plot.

We developed a wilt-sick plot in the insecticide-free area enabling us to plant and screen material for Heliothis and wilt resistance, simultaneously.

Crossing block

The crossing block nursery included 43 short duration desi parents and was planted at ICRISAT Center twice with a time lag of 20 days in the two plantings. This was done to synchronize flowering between early and late cultivars for such combination.

Crosses made

We made 125 single crosses which involved 36 parents (Table 3.1). We also accomplished 45 threeway crosses with parents drawn to complement the deficient components in the F_1 (Table 3.2). Crossing program was heavily biased towards the incorporation of stress

Table 3.1 List of single crosses (short duration) made during 1985/86.

Cross Number	Parentage
850151	Annigeri x ICC 12237
850152	Annigeri x ICC 10466
850153	Annigeri x ICC 12437
850154	Annigeri x ICC 2862
850155	Annigeri x ICCL 85233
850156	Annigeri x ICCL 82108
850157	Annigeri x Narsingpur bold
850158	Annigeri x MS 2
850159	Annigeri x ICCL 85216
850160	Annigeri x GW 5/7
850161	Annigeri x P 422
850162	Annigeri x Dharwar Local Selection
850163	RSG 44 x ICC 12237
850164	RSG 44 x ICC 10466
850165	RSG 44 x ICC 12437
850166	RSG 44 x ICC 2862
850167	RSG 44 x ICCL 85233
850168	RSG 44 x ICCL 82108
850169	RSG 44 x Narsingpur bold
850170	RSG 44 x MS 2
850171	RSG 44 x ICCL 85216
850172	RSG 44 x GW 5/7
850173	RSG 44 x P 422
850174	RSG 44 x Dharwar Local Selection
850175	ICCC 37 x ICC 12237
850176	ICCC 37 x ICC 10466
850177	ICCC 37 x ICC 12437
850178	ICCC 37 x ICC 2862
850179	ICCC 37 x ICCL 85233
850180	ICCC 37 x ICCL 82108
850181	ICCC 37 x Narsingpur bold
850182	ICCC 37 x MS 2
850183	ICCC 37 x ICCL 85216
850184	ICCC 37 x GW 5/7
850185	ICCC 37 x P 422
850186	ICCC 37 x Dharwar Local Selection
850187	ICCC 42 x ICC 12237
850188	ICCC 42 x ICC 10466
850189	ICCC 42 x ICC 12437
850190	ICCC 42 x ICC 2862
850191	ICCC 42 x ICCL 85233
850192	ICCC 42 x ICCL 82108
850193	ICCC 42 x Narsingpur bold
850194	ICCC 42 x MS 2
850195	ICCC 42 x ICCL 85216

Table 3.1 contd.

Cross Number	Parentage
850196	ICCC 42 x GW 5/7
850197	ICCC 42 x P 422
850198	ICCC 42 x Dharwar Local Selection
850199	PHULE G-5 x ICC 12237
850200	PHULE G-5 x ICC 10466
850201	PHULE G-5 x ICC 12437
850202	PHULE G-5 x ICCL 82108
850203	PHULE G-5 x Narsingpur bold
850204	PHULE G-5 x MS 2
850205	PHULE G-5 x ICCL 85216
850206	PHULE G-5 x GW 5/7
850207	PHULE G-5 x P 422
850208	PHULE G-5 x Dharwar Local Selection
850209	K 850 x ICC 12159
850210	K 850 x ICC 1072
850211	K 850 x ICC 2566
850212	K 850 x ICC 1156
850213	K 850 x ICC 1163
850214	K 850 x ICC 2233
850215	K 850 x ICC 5114
850216	K 850 x ICC 7352
850217	K 850 x ICC 12569
850218	K 850 x ICC 9560
850219	K 850 x ICC 14067
850220	K 850 x ICC 10647
850221	K 850 x ICC 11888
850222	K 850 x ICC 12124
850223	ICCC 40 x ICC 12159
850224	ICCC 40 x ICC 1072
850225	ICCC 40 x ICC 2566
850226	ICCC 40 x ICC 1156
850227	ICCC 40 x ICC 1163
850228	ICCC 40 x ICC 2233
850229	ICCC 40 x ICC 5114
850230	ICCC 40 x ICC 12569
850231	ICCC 40 x ICC 14067
850232	ICCC 40 x ICC 10647
850233	ICCC 40 x ICC 11888
850234	ICCC 40 x ICC 12124
850235	PHULE G-8 x ICC 12159
850236	PHULE G-8 x ICC 1072
850237	PHULE G-8 x ICC 2566
850238	PHULE G-8 x ICC 1156
850239	PHULE G-8 x ICC 1163
850240	PHULE G-8 x ICC 2233
850241	PHULE G-8 x ICC 5114
850242	PHULE G-8 x ICC 12569

Table 3.1 contd.

Cross Number	Parentage
850243	PHULE G-8 x ICC 9560
850244	PHULE G-8 x ICC 14067
850245	PHULE G-8 x ICC 10647
850246	PHULE G-8 x ICC 11888
850247	PHULE G-8 x ICC 12124
850248	BDN 9-3 x ICC 12159
850249	BDN 9-3 x ICC 1072
850250	BDN 9-3 x ICC 2566
850251	BDN 9-3 x ICC 1156
850252	BDN 9-3 x ICC 1163
850253	BDN 9-3 x ICC 2233
850254	BDN 9-3 x ICC 5114
850255	BDN 9-3 x ICC 7352
850256	BDN 9-3 x ICC 12569
850257	BDN 9-3 x ICC 9560
850258	BDN 9-3 x ICC 14067
850259	BDN 9-3 x ICC 10647
850260	BDN 9-3 x ICC 11888
850261	BDN 9-3 x ICC 12124
850262	ICCV 1 x ICC 12159
850263	ICCV 1 x ICC 1072
850264	ICCV 1 x ICC 2566
850265	ICCV 1 x ICC 1156
850266	ICCV 1 x ICC 1163
850267	ICCV 1 x ICC 2233
850268	ICCV 1 x ICC 5114
850269	ICCV 1 x ICC 7352
850270	ICCV 1 x ICC 12569
850271	ICCV 1 x ICC 9560
850272	ICCV 1 x ICC 14067
850273	ICCV 1 x ICC 10647
850274	ICCV 1 x ICC 11888
850275	ICCV 1 x ICC 12124

Table 3.2 List of three-way crosses made during 1985/86.

Cross number	Parentage
850276	(Annigeri x BG(M)-417) x BN 31
850277	(Annigeri x RSG 44) x ICCL 85232
850278	(Annigeri x RSG 132) x ICC 12237
850279	(Annigeri x MS 2) x MS 2
850280	(Annigeri x ICCC 37) x ICC 12269
850281	(Annigeri x ICCC 40) x ICCL 82108
850282	(Annigeri x PBNG 69) x ICC 12454
850283	(GW 5/7 x BG(M) 417) x ICC 2346
850284	(GW 5/7 x RSG 44) x ICC 2233
850285	(K 850 x BG(M) 417) x ICC 11551
850286	(K 850 x RSG 44) x ICC 11315
850287	(K 850 x RSG 132) x ICC 11320
850288	(K 850 x ICCC 22) x ICC 12257
850289	(K 850 x ICCC 37) x ICC 12159
850290	(K 850 x ICCC 40) x ICC 1072
850291	(K 850 x PBNG 69) x ICC 2566
850292	(WR 315 x BG(M) 417) x Narsingpur bold
850293	(WR 315 x RSG 44) x ICCC 42
850294	(WR 315 x RSG 132) x K 850
850295	(WR 315 x ICCC 22) x Dharwar local selection
850296	(WR 315 x ICCC 40) x ICCX 730020-11-1-1H-BH
850297	(WR 315 x PBNG 69) x ICC 1156
850298	(P 326 x BG(M) 417) x JG 74
850299	(P 326 x RSG 44) x ICC 12237
850300	(ICC 1403 x BG(M) 417) x MS 2
850301	(ICC 1403 x RSG 44) x ICCL 85216
850302	(ICC 1403 x RSG 132) x Dharwar local selection
850303	(ICC 1403 x ICCC 22) x Narsingpur bold
850304	(ICC 1403 x ICCC 37) x ICC 12437
850305	(ICC 1403 x ICCC 40) x PHULE G-5
850306	(ICC 1403 x PBNG 69) x Annigeri
850307	(BG(M) 417 x ICC 12237) x GW 5/7
850308	(BG(M) 417 x ICC 12269) x ICC 10647
850309	(RSG 44 x ICC 12237) x ICC 12124
850310	(RSG 44 x ICC 12269) x ICCX 810565-29P-BPWR-BP
850311	(RSG 132 x ICC 12237) x ICCX 810557-12P-BPWR-BP
850312	(RSG 132 x ICC 12269) x ICCC 37
850313	(ICCC 37 x ICC 12237) x ICCL 82108
850314	(ICCC 37 x ICC 12269) x ICCL 85233
850315	(Annigeri x ICC 12237) x ICCL 85232
850316	(Annigeri x ICC 12269) x ICCL 85234
850317	(ICCC 42 x ICC 12237) x ICCL 85216
850318	(ICCC 42 x ICC 12269) x MS 2
850319	(ICCC 43 x ICC 12237) x PRR 1
850320	(ICCC 43 x ICC 12269) x PHULE G-5

resistance factors e.g. disease and insect pests resistances to the otherwise good agronomic backgrounds. Other characteristics considered for crossing were, seed size, double-podded, multiseeded, good plant habit, high protein, drought tolerance, and geographical diversity.

F_1 Generation

We advanced 220 F_1 in the offseason nursery at Tapperwaripora in Kashmir in summer 1985 and brought them back to the Center as F_2. However, we repeated 171 of these F_1s in 1985/86 so as to make threeway crosses and also to multiply these for seed supply.

F_2 Generation

We had been following the early generation testing in the project for the past several years. All F_2s and F_3s used to be tested in replicated trials and only the best selected populations used to be grown in F_4 for single plant selection. But due to reorganization of the projects making wilt resistance mandatory for all breeding materials generated by ICRISAT, we gave up the early generation testing from this year and started early generation screening against wilt and root rots.

We screened 258 F_2 populations of crosses made last season among short- and medium duration adapted cultivars and genotypes with resistance to wilt and root rots, double-podded and multiseeded characters, and tall and erect growth habit in the wilt-sick plots at ICRISAT Center. The population size was up to 1500 plants per population. All surviving plants were bulk-harvested in each population for second screening in 1986/87.

The F_2 populations from another set of crosses between wilt and Heliothis resistant genotypes were grown in a wilt-sick plot in the unsprayed area to identify segregants combining wilt and Heliothis resistance and good agronomic characteristics. Four hundred and twenty three single plants with wilt resistance, low borer damage, and high yield were selected for progeny tests.

F_3 Generation

We screened 104 F_3 bulks and 440 mid-tall progenies in the wilt-sick plot and 588 progenies in a wilt-sick plot in the unsprayed area for screening against wilt, and wilt and Heliothis together, respectively. We raised upto 900 plants per population in wilt-sick plot and 20 plants per progeny in the wilt-sick plot in the unsprayed area. All the diseased plants were removed in the wilt-sick plot and the surviving ones were harvested population-wise to plant these as spaced bulks next year for single plant selection. We selected 194 single plants from the wilt-sick plot in the unsprayed ara.

F_3 single plant progenies - 213 - from among the plant selections made in the wilt-sick plot last year were planted in the normal fields with Annigeri, the check, after every 10 progenies. We selected 44 plants from these.

F_4 bulks

Fifty-six F_4 bulks of crosses selected on the bases of their performance in F_2 and F_3 replicated trials (both single and multilocation) were space planted (60 cm x 20 cm) in a normal field at ICRISAT Center for single plant selection. There were 1000 plants in each population. All bulks were scored for maturity and visual appearance and 2540 single plants with desirable characteristics were selected for progeny tests in 1986/87.

F_4-F_8 Progenies

We planted 563 F_4, 3878 F_5, 1935 F_6, 690 F_7, and 157 F_8 progenies in the normal fields on 3 m beds at 30 cm row to row spacing and 10 cm plant to plant. The corresponding 326, 3352, 1681, 671 and 141 respectively of single rows of 20 seeds each were planted in the multiple disease sick plot to check for their disease reaction. This information was utilized for making further selection. In the normal fields we included Annigeri as the check for short duration and K 850 for short to medium duration materials. These were planted after every 10 progenies. The material emnating from the Heliothis resistance project was planted in the unsprayed block in the same manner as progenies from the normal breeding project. We planted 774 F_4-F_7 progenies in the insecticide-free area and an additional row for wilt and Heliothis reaction together, in wilt-sick plot in the unsprayed area. Disease reaction for early and late wilt and possibly root rot was noted for each and every progeny. At the time of visual evaluation at maturity, progenies with high disease incidence were outrightly rejected. Single plant selection, 1-3 per progeny, in good but not too uniform progenies was carried out. The progenies that were uniform, possessed low to moderate level of wilt resistance and had a good visual score were individually bulk harvested. The yields of these progenies were measured and comparisons made against the check cultivar. Progenies that otherwise exceeded in yield but had moderate to high disease incidence were retained for use in the crossing, but those having good appearance score, yielding sufficiently high compared to check and possessed wilt resistance, were finally selected for conducting preliminary yield trials next year. We selected 599 progenies for this purpose.

Similarly progenies in the unsprayed blocks were checked for Heliothis resistance and their corresponding reaction for wilt and Heliothis in wilt-sick plot in the unsprayed area. We selected progenies that were exceptionally good for Heliothis resistance regardless of their wilt reaction so as to make their further use in the crossing program. We, however, indivudually bulked 23 F_5-F_7 progenies (Table 3.3) which survived in wilt-sick plot in the unsprayed area (wilt resistant), possessed low borer damage and had

Table 3.3 List of Heliothis and wilt resistant lines bulked at ICRISAT Center, 1985/86.

S.no.	Selection number	Parentage
1	ICCX 800775-1PUY-1PLB-1PLB	C 104 x ICC-2996-EB3
2	ICCX 811014-3PUY-2PLB-1PLB	ICC-6663-EB x ICCX 730020-11-1-1H-B-EB
3	ICCX 811037-7PUY-2PWR-1PLB	ICC-10817-EB x JG 315
4	ICCX 811037-9PUY-1PWR-1PLB	ICC-10817-EB x JG 315
5	ICCX 800757-6PLB-1PWR-1PLB	BDN 9-3 x ICC-6663-EB4
6	ICCX 800584-32P-1P-3PLB-2PUY	JG 74 x ICC 506-EB
7	ICCX 800584-32P-1P-3PLB-3PUY	JG 74 x ICC 506-EB
8	ICCX 800584-32P-1P-4PLB-1PLB	JG 74 x ICC 506-EB
9	ICCX 800769-2PLB-11PUY-4PLB-1PLB	K 850 x ICC-506-EB
10	ICCX 800584-1P-2P-1PUY-1PLB	JG 74 x ICC 506-EB
11	ICCX 800584-1P-2P-1PUY-3PLB	JG 74 x ICC 506-EB
12	ICCX 800584-1P-2P-2PUY-1PLB	JG 74 x ICC 506-EB
13	ICCX 800584-22P-2P-1PHB-1PLB	JG 74 x ICC 506-EB
14	ICCX 800584-22P-2P-1PHB-2PLB	JG 74 x ICC 506-EB
15	ICCX 800584-22P-2P-1PHB-3PLB	JG 74 x ICC 506-EB
16	ICCX 800584-32P-1P-2PLB-1PLB	JG 74 x ICC 506-EB
17	ICCX 800584-32P-1P-2PLB-2PLB	JG 74 x ICC 506-EB
18	ICCX 800584-32P-1P-2PLB-3PLB	JG 74 x ICC 506-EB
19	ICCX 800584-32P-1P-3PLB-4PLB	JG 74 x ICC 506-EB
20	ICCX 800584-32P-1P-3PLB-5PLB	JG 74 x ICC 506-EB
21	ICCX 800584-32P-1P-5PLB-1PLB	JG 74 x ICC 506-EB
22	ICCX 790212-21PLB-11PUY-11PLB-2PLB-2PLB	(ICC 506-2EB x ICC 1381-2EB) x WR 315
23	ICCX 780288-21PLB-12PLB-12PLB-5PLB-1PUY	ICC-506-2EB x ICC-7770-2EB

good yield. These will be tested in the preliminary yield trials and at the same time the best 3-4 will be used in the crossing program. This is a significant achievement since the Heliothis x wilt resistance combinations were not hitherto available in the early material.

We also bulked 56 other progenies that showed low borer damage and (or) gave good yield in the unsprayed blocks.

Preliminary Yield Trials

At the Center we conducted 24 preliminary yield trials of 25 entries each with two checks Annigeri and K 850 included for comparison, where as 6 of these were also conducted at Gwalior. The 25 entries were planted in a 5x5 quadruple lattice design on 4 m long beds with row to row spacing of 30 cm and plant to plant 10 cm. One row of each of the entry was also planted in the wilt-sick plot and for some in the insecticide-free area too. Data were recorded in each of the trials for days to flowering, days to maturity, 100-seed weight and yield, wilt percent and borer damage in some cases.

Based on results, we contributed 41 entries to International Chickpea Screening Nursery Desi Short Duration, 25 to Desi Medium Duration. We, however, retained 122 entries for further tests in the advanced yield trials next year, because these were good in yield and also possessed low to moderate levels of disease incidence (Tables 3.4 to 3.26). Of these, two trials PYT 17 and PYT 18 were conducted in the insecticide-free areas and borer damage was recorded in addition to other characters (Tables 3.27 and 3.28). Entries with quite low borer damage values were selected for their use in crossing program and for further pyramiding of the resistant genes to Heliothis resistance.

Advanced Yield Trials

We conducted two advanced yield trials for the entries selected out of the desi breeding project and one trial of Heliothis resistant lines was planted both in normal fields as well as insecticide-free areas. These trials like the PYTs were planted in a 5x5 quadruple lattice and had the same plot size. Data on days to flower, maturity, 100-seed weight and seed yield were collected and analysed (Tables 3.29 to 3.31). The Heliothis resistant lines trial in the normal field was damaged due to wilt as almost all these entries turned out to be susceptible. However, the trial in the unsprayed blocks was free from wilt and we collected additional data on borer damage %.

We contributed 6 entries to International Chickpea Screening Nurseries - Desi short and Medium Duration, 21 to International Chickpea Heliothis Resistant Nursery and 28 to the entomological trials of All India Coordinated Pulse Improv nt Project. We retained 16 entries in these trials for further testing next year

Table 3.4. Characteristics of entries in Preliminary Yield Trial 1 - DS at ICRISAT Center, 1985/86.

Ent. No.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-800004-BP-BP-5P-BP	JG 74 x K 850	49.6	109	26.7	2870	12	17	6
2	ICCX-800004-BP-BP-13P-BP@	JG 74 x K 850	49.7	113	21.3	3080	3	30	6
3	ICCX-800004-BP-BP-16P-BP	JG 74 x K 850	47.9	108	23.8	2730	17	60	7
4	ICCX-800004-BP-BP-19P-BP	JG 74 x K 850	49.5	112	23.5	2750	14	74	7
5	ICCX-800004-BP-BP-26P-BP	JG 74 x K 850	48.4	109	28.3	2750	15	33	6
6	ICCX-800004-BP-BP-28P-BP	JG 74 x K 850	50.1	111	23.0	2980	9	44	7
7	ICCX-800004-BP-BP-29P-BP@	JG 74 x K 850	47.9	109	24.0	3070	5	13	7
8	ICCX-800005-BP-BP-2P-BP	JG 74 x P 1675	44.8	113	20.7	2890	11	22	7
9	ICCX-800007-BP-BP-12P-BP	JG 74 x Phule G 4	46.1	111	21.9	2760	13	44	6
10	ICCX-800007-BP-BP-14P-BP	JG 74 x Phule G 4	34.8	109	21.5	2520	21	24	7
11	ICCX-800007-BP-BP-16P-BP	JG 74 x Phule G 4	35.1	110	25.2	2730	16	60	6
12	ICCX-800007-BP-BP-25P-BP	JG 74 x Phule G 4	35.8	108	24.3	2990	8	47	7
13	ICCX-800007-BP-BP-36P-BP*	JG 74 x Phule G 4	42.8	111	18.1	3190	1	50	7
14	ICCX-800007-BP-BP-38P-BP*	JG 74 x Phule G 4	41.3	107	22.2	3040	7	30	7
15	ICCX-800007-BP-BP-48P-BP@	JG 74 x Phule G 4	52.8	112	19.1	3130	2	33	6
16	ICCX-800010-BP-BP-5OP-BP	P 127 x BDN 9-3	39.3	112	16.7	1680	25	100	7
17	ICCX-800012-BP-BP-14P-BP	P 127 x K 850	34.8	109	16.7	3050	6	33	7
18	ICCX-800012-BP-BP-37P-BP	P 127 x K 850	34.7	108	16.5	2690	19	65	7
19	ICCX-800012-BP-BP-39P-BP	P 127 x K 850	59.2	113	15.1	2060	24	100	7
20	ICCX-800013-BP-BP-10P-BP	P 127 x P 1675	42.1	106	21.0	2710	18	31	7
21	ICCX-800014-BP-BP-5P-BP	P 127 x Phule G 1	36.8	112	25.1	2370	22	76	7
22	ICCX-800017-BP-BP-13P-BP*	P 324 x Annigeri	36.4	103	18.4	2950	10	35	7
23	ICCX-800020-BP-BP-13P-BP	P 324 x K 850	52.1	115	16.4	2670	20	24	8
24	ICC 4918	Annigeri	42.5	112	21.0	3070	4		
25	ICC 5003	K 850	60.0	114	28.4	2330	23		
		Mean	44.6	110	21.6	2760			
		SE±	0.87	1.2	0.60	132.4			
		CV(%)	3.9	2.3	5.6	9.6			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.5 Characteristics of entries in Preliminary Yield Trial 2 - DS at ICRISAT Center, 1985/86

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-800021-BP-BP-6P-BP	P 324 x P 1675	41.8	111	21.5	2430	23	75	7
2	ICCX-800023-BP-BP-10P-BP	P 324 x Phule G 4	39.1	111	24.0	3020	7	82	7
3	ICCX-800023-BP-BP-25P-BP	P 324 x Phule G 4	38.8	113	23.1	3050	6	65	7
4	ICCX-800030-BP-BP-31P-BP	P 326 x Phule G 1	42.7	111	19.3	2700	20	100	7
5	ICCX-800046-BP-BP-4P-BP	ICCL 78005 x Phule G 1	39.8	108	20.3	1210	25	100	6
6	ICCX-800049-BP-BP-23P-BP	ICCL 78021 x Annigeri	35.5	112	19.0	2810	17	90	7
7	ICCX-800051-BP-BP-32P-BP@	ICCL 78021 x ICCC 9	34.8	111	18.5	3110	3	42	7
8	ICCX-800066-BP-BP-2P-BP	ICCL 78043 x BDN 9-3	39.2	110	16.0	2680	21	33	7
9	ICCX-800066-BP-BP-5P-BP	ICCL 78043 x BDN 9-3	43.5	110	15.8	2820	14	17	7
10	ICCX-800066-BP-BP-7P-BP	ICCL 78043 x BDN 9-3	46.7	112	20.4	2820	13	20	6
11	ICCX-800066-BP-BP-9P-BP@	ICCL 78043 x BDN 9-3	40.0	107	21.8	3240	2	27	7
12	ICCX-800066-BP-BP-11P-BP	ICCL 78043 x BDN 9-3	40.8	112	15.8	2770	19	53	7
13	ICCX-800066-BP-BP-15P-BP	ICCL 78043 x BDN 9-3	40.0	108	15.7	2850	12	17	7
14	ICCX-800066-BP-BP-17P-BP*	ICCL 78043 x BDN 9-3	46.1	112	18.0	2980	9	30	7
15	ICCX-800066-BP-BP-21P-BP*	ICCL 78043 x BDN 9-3	36.9	108	19.2	2880	10	19	7
16	ICCX-800066-BP-BP-23P-BP	ICCL 78043 x BDN 9-3	35.9	111	17.4	2780	18	**	7
17	ICCX-800066-BP-BP-32P-BP	ICCL 78043 x BDN 9-3	37.9	110	16.5	2820	15	5	7
18	ICCX-800066-BP-BP-34P-BP*	ICCL 78043 x BDN 9-3	39.8	110	18.1	3020	8	20	7
19	ICCX-800066-BP-BP-36P-BP	ICCL 78043 x BDN 9-3	38.4	111	16.7	2820	16	18	7
20	ICCX-800066-BP-BP-37P-BP@	ICCL 78043 x BDN 9-3	38.7	109	15.7	3060	5	20	7
21	ICCX-800066-BP-BP-39P-BP	ICCL 78043 x BDN 9-3	41.4	112	19.5	2480	22	23	7
22	ICCX-800066-BP-BP-44P-BP	ICCL 78043 x BDN 9-3	41.8	110	18.8	2880	11	20	7
23	ICCX-800066-BP-BP-45P-BP@	ICCL 78043 x BDN 9-3	42.5	110	17.3	3250	1	25	7
24	ICC 4918	Annigeri	41.0	113	20.9	3070	4		
25	ICC 5003	K 850	60.0	115	25.4	2280	24		
		Mean	40.9	111	19.0	2790			
		SE±	1.07	1.3	1.23	152.0			
		CV(%)	5.3	2.4	12.9	10.9			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.
** Data not available

Table 3.6 Characteristics of entries in Preliminary Yield Trial 3 - DS at ICRISAT Center, 1985/86.

Pnt. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-800066-BP-BP-47P-BP*	ICCL 78043 x BDN 9-3	41.1	109	17.3	2630	15	27	7
2	ICCX-800066-BP-BP-62P-BP*	ICCL 78043 x BDN 9-3	35.3	110	19.5	2670	13	15	7
3	ICCX-800068-BP-BP-17P-BP	ICCL 78043 x K 850	44.3	110	23.1	3030	6	100	8
4	ICCX-800068-BP-BP-35P-BP	ICCL 78043 x K 850	47.6	112	22.3	2870	11	86	7
5	ICCX-800068-BP-BP-36P-BP	ICCL 78043 x K 850	45.8	109	23.8	3000	8	80	8
6	ICCX-800068-BP-BP-37P-BP$	ICCL 78043 x K 850	51.2	113	20.8	3460	1	40	7
7	ICCX-800068-BP-BP-45P-BP	ICCL 78043 x K 850	53.4	108	21.7	1660	23	95	7
8	ICCX-800068-BP-BP-53P-BP	ICCL 78043 x K 850	47.9	105	18.1	2110	20	73	7
9	ICCX-800071-BP-BP-10P-BP	ICCL 78043 x Phule G 4	36.8	109	17.5	1910	22	100	7
10	ICCX-800071-BP-BP-12P-BP	ICCL 78043 x Phule G 4	47.3	111	20.5	2280	19	100	6
11	ICCX-800071-BP-BP-14P-BP	ICCL 78043 x Phule G 4	42.3	110	23.7	2350	18	100	5
12	ICCX-800071-BP-BP-18P-BP	ICCL 78043 x Phule G 4	37.6	110	27.0	2690	12	81	7
13	ICCX-800081-BP-BP-3P-BP@	ICCL 78073 x Annigeri	40.3	110	23.8	3130	4	24	6
14	ICCX-800081-BP-BP-12P-BP	ICCL 78073 x Annigeri	35.1	107	22.2	2040	21	100	7
15	ICCX-800081-BP-BP-19P-BP	ICCL 78073 x Annigeri	35.0	105	19.7	2390	17	29	7
16	ICCX-800081-BP-BP-22P-BP@	ICCL 78073 x Annigeri	38.9	110	23.8	2900	10	11	8
17	ICCX-800081-BP-BP-30P-BP@	ICCL 78073 x Annigeri	38.3	108	19.1	2970	9	12	7
18	ICCX-800081-BP-BP-32P-BP*	ICCL 78073 x Annigeri	35.6	105	20.1	3010	7	37	6
19	ICCX-800082-BP-BP-12P-BP	ICCL 78073 x BDN 9-3	40.7	110	20.7	1050	25	100	6
20	ICCX-800082-BP-BP-21P-BP	ICCL 78073 x BDN 9-3	41.9	106	18.6	2640	14	72	6
21	ICCX-800082-BP-BP-26P-BP$	ICCL 78073 x BDN 9-3	48.6	112	19.0	3350	2	25	4
22	ICCX-800082-BP-BP-32P-BP*	ICCL 78073 x BDN 9-3	40.3	107	17.6	3180	3	41	6
23	ICCX-800082-BP-BP-36P-BP@	ICCL 78073 x BDN 9-3	40.4	105	19.2	3040	5	24	7
24	ICC 4918	Annigeri	40.7	110	21.4	2530	16		
25	ICC 5003	K 850	60.0	117	25.1	1310	24		
		Mean	42.7	109	21.0	2570			
		SE±	1.37	1.5	1.43	236.6			
		CV(%)	6.4	2.7	13.6	18.4			

@ Selected for ICSN-DS, 1986/87
$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.7 Characteristics of entries in Preliminary Yield Trial 4 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-800085-BP-BP-27P-BP@	ICCL 78073 x P 1675	56.6	111	23.8	2650	3	41	6
2	ICCX-800085-BP-BP-29P-BP	ICCL 78073 x P 1675	52.5	111	23.4	1990	9	75	6
3	ICCX-800085-BP-BP-46P-BP	ICCL 78073 x P 1675	36.2	106	18.7	2410	5	100	7
4	ICCX-800086-BP-BP-15P-BP	ICCL 78073 x Phule G 1	43.2	110	21.0	1860	14	77	7
5	ICCX-800097-BP-BP-49P-BP	ICCL 79004 x Annigeri	49.6	106	19.9	1180	22	100	6
6	ICCX-800097-BP-BP-54P-BP	ICCL 79004 x Annigeri	53.8	113	20.0	2250	7	75	7
7	ICCX-800110-BP-BP-3P-BP	ICCL 79006 x Phule G 1	51.5	108	17.6	2120	8	74	6
8	ICCX-800110-BP-BP-49P-BP	ICCL 79006 x Phule G 1	41.5	108	17.4	1680	16	89	6
9	ICCX-800111-BP-BP-16P-BP*	ICCL 79006 x Phule G 4	53.3	111	20.0	2540	4	30	6
10	ICCX-800114-BP-BP-14P-BP	ICCL 79008 x BDN 9-3	34.5	108	15.6	1970	11	55	7
11	ICCX-800115-BP-BP-6P-BP	ICCL 79008 x ICCC 9	35.0	108	16.7	2410	6	69	7
12	ICCX-800115-BP-BP-23P-BP	ICCL 79008 x ICCC 9	36.4	107	15.3	1560	17	93	7
13	ICCX-800115-BP-BP-27P-BP	ICCL 79008 x ICCC 9	32.4	105	16.8	1980	10	100	6
14	ICCX-800115-BP-BP-40P-BP	ICCL 79008 x ICCC 9	33.9	106	15.4	1310	20	100	7
15	ICCX-800115-BP-BP-61P-BP	ICCL 79008 x ICCC 9	52.0	113	20.8	2690	2	71	6
16	ICCX-800117-BP-BP-2P-BP	ICCL 79008 x P 1675	54.4	110	15.7	1430	18	95	7
17	ICCX-800117-BP-BP-13P-BP	ICCL 79008 x P 1675	48.6	108	19.4	1680	15	94	5
18	ICCX-800119-BP-BP-4P-BP	ICCL 79008 x Phule G 4	36.1	106	16.4	1350	19	85	5
19	ICCX-800119-BP-BP-20P-BP	ICCL 79008 x Phule G 4	35.3	106	18.7	1910	12	43	3
20	ICCX-800119-BP-BP-26P-BP	ICCL 79008 x Phule G 4	39.2	100	14.9	660	24	100	5
21	ICCX-790010-BP-BP-2P-BP	K 850 x Phule G 3	53.9	108	19.4	1170	23	80	4
22	ICCX-790010-BP-BP-10P-BP	K 850 x Phule G 3	37.6	110	21.6	1190	21	100	7
23	ICCX-790010-BP-BP-17P-BP	K 850 x Phule G 3	35.5	105	18.9	360	25	100	6
24	ICC 4918	Annigeri	39.8	111	21.7	2710	1		
25	ICC 5003	K 850	59.0	112	23.3	1880	13		
		Mean	44.1	108	18.9	1800			
		SE±	1.82	1.7	0.77	216.8			
		CV(%)	8.3	3.2	8.2	24.1			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.8 Characteristics of entries in Preliminary Yield Trial 5 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-790013-BP-BP-28P-BP	K 850 x 24 B	49.3	111	21.2	1590	18	24	6
2	ICCX-790010-BP-BP-21P-BP	K 850 x Phule G 3	41.0	111	25.1	1350	20	29	6
3	ICCX-790014-BP-BP-10P-BP	K 850 x BDN 9-3	42.8	114	15.3	2270	9	26	8
4	ICCX-790014-BP-BP-11P-BP	K 850 x BDN 9-3	38.8	104	19.2	1590	19	6	6
5	ICCX-790019-BP-BP-11P-BP*	Phule G 3 x P 1198-1	37.0	112	21.1	2290	8	23	7
6	ICCX-790019-BP-BP-13P-BP$	Phule G 3 x P 1198-1	50.8	112	18.9	2680	2	30	7
7	ICCX-790027-BP-BP-15P-BP	P 4203 x BDN 9-3	44.8	109	14.6	1210	21	100	7
8	ICCX-790027-BP-BP-47P-BP	P 4203 x BDN 9-3	47.5	106	16.1	1940	12	100	7
9	ICCX-790027-BP-BP-52P-BP	P 4203 x BDN 9-3	48.3	110	16.2	2130	10	100	7
10	ICCX-790027-BP-BP-64P-BP	P 4203 x BDN 9-3	42.8	114	17.3	1040	24	100	7
11	ICCX-790038-BP-BP-10P-BP	24 B x P 1675	33.3	107	20.2	1030	25	100	7
12	ICCX-790041-BP-BP-28P-BP	BDN 9-3 x P 1675	35.5	110	15.7	1840	14	11	5
13	ICCX-790041-BP-BP-39P-BP	BDN 9-3 x P 1675	39.8	110	18.2	1130	22	93	6
14	ICCX-790041-BP-BP-43P-BP*	BDN 9-3 x P 1675	34.0	110	20.4	1920	13	10	6
15	ICCX-790046-BP-BP-1P-BP	Annigeri x ICCC 7	39.8	110	18.2	1690	15	100	6
16	ICCX-790046-BP-BP-8P-BP	Annigeri x ICCC 7	39.8	109	17.1	2010	11	100	7
17	ICCX-790046-BP-BP-10P-BP	Annigeri x ICCC 7	39.5	107	17.3	1600	17	100	7
18	ICCX-790046-BP-BP-27P-BP	Annigeri x ICCC 7	39.5	108	17.9	1110	23	100	7
19	ICCX-790047-BP-BP-1P-BP@	Annigeri x ICCC 9	41.3	112	22.1	2580	4	18	7
20	ICCX-790047-BP-BP-15P-BP@	Annigeri x ICCC 9	46.5	113	19.0	2560	5	6	7
21	ICCX-790047-BP-BP-17P-BP@	Annigeri x ICCC 9	42.0	113	18.4	2790	1	14	7
22	ICCX-790047-BP-BP-30P-BP@	Annigeri x ICCC 9	43.5	114	19.1	2680	3	18	6
23	ICCX-790049-BP-BP-3P-BP*	Annigeri x ICCC 15	49.0	114	17.7	2530	6	40	6
24	ICC 4918	Annigeri	42.8	111	20.0	2320	7		
25	ICC 5003	K 850	59.5	113	24.4	1680	16		
		Mean	42.7	111	18.8	1900			
		SE±	1.53	1.6	0.99	250.7			
		CV(%)	7.2	2.9	10.5	26.4			

@ Selected for ICSN-DS, 1986/87
$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.9 Characteristics of entries in Preliminary Yield Trial 6 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-790052-BP-BP-27P-BP*	Annigeri x (K 850 x H 208)	48.6	113	15.4	1860	3	40	5
2	ICCX-790052-BP-BP-32P-BP	Annigeri x (K 850 x H 208)	45.0	111	17.1	1680	6	82	5
3	ICCX-790063-BP-BP-15P-BP*	Phule G 4 x (K 850 x N 59)	46.5	107	19.9	1520	13	23	7
4	ICCX-790063-BP-BP-24P-BP	Phule G 4 x (K 850 x N 59)	46.1	108	17.6	1630	7	87	7
5	ICCX-790065-BP-BP-19P-BP	Phule G 4 x (H 208 x N 59)	43.4	114	20.7	1580	9	61	3
6	ICCX-790065-BP-BP-24P-BP	Phule G 4 x (H 208 x N 59)	47.7	115	15.5	1770	4	71	5
7	ICCX-790077-BP-BP-39P-BP	ICGC 4 x ICGC 9	38.6	115	17.3	1430	14	69	6
8	ICCX-790078-BP-BP-16P-BP	ICGC 4 x ICGC 14	41.6	115	18.3	1560	11	71	6
9	ICCX-790198-BP-1P-1P-BP	ICGC 6 x ICC 1381-EB-EB	41.3	109	17.7	1060	20	76	7
10	ICCX-790198-BP-3P-2P-BP*	ICGC 6 x ICC 1381-EB-EB	41.5	111	15.8	1600	8	50	6
11	ICCX-790198-BP-36P-1P-BP	ICGC 6 x ICC 1381-EB-EB	38.5	104	19.1	960	21	89	7
12	ICCX-790198-BP-45P-1P-BP	ICGC 6 x ICC 1381-EB-EB	38.5	109	15.9	1560	12	87	5
13	ICCX-790198-BP-92P-1P-BP	ICGC 6 x ICC 1381-EB-EB	43.6	107	18.7	770	23	94	6
14	ICCX-790054-BP-3P-1P-BP	Annigeri x (K 850 x F 378)	39.6	111	19.0	1410	15	100	7
15	ICCX-790064-BP-45P-1P-BP	Phule G 4 x (K 850 x F 378)	43.6	107	19.2	1200	17	100	6
16	ICCX-800113-BP-2P-1P-BP	ICGL 79008 x Annigeri	40.2	105	16.7	750	25	97	8
17	ICCX-790042-BP-BP-21P-1P-BP	EBN 9-3 x P 1353	39.5	109	17.7	860	22	100	7
18	ICCX-790047-BP-BP-5P-1P-BP@	Annigeri x ICGC 9	35.6	113	21.4	2010	1	16	7
19	ICCX-790047-BP-BP-40P-1P-BP@	Annigeri x ICGC 9	46.6	113	20.9	1990	2	13	7
20	ICCX-790047-BP-BP-48P-1P-BP	Annigeri x ICGC 9	41.5	108	18.3	760	24	100	6
21	ICCX-790057-BP-BP-21P-1P-BP	Phule G 4 x ICGC 9	34.7	108	19.3	1160	18	100	6
22	ICCX-790061-BP-BP-18P-1P-BP	Phule G 4 x (JG 62 x Radhey)	45.2	113	19.4	1200	16	100	7
23	ICCX-790063-BP-BP-22P-1P-BP	Phule G 4 x (K 850 x N 59)	35.2	106	21.7	1580	10	63	7
24	ICC 4918	Annigeri	42.4	112	20.3	1710	5		
25	ICC 5003	K 850	58.5	111	20.9	1090	19		
		Mean	42.5	110	18.6	1390			
		SE±	1.57	2.6	1.20	208.3			
		CV(%)	7.4	4.7	12.9	30.0			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.10 Characteristics of entries in Preliminary Yield Trial 7 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-790067-BP-BP-39P-1P-BP*	JG 74 x ICCC 9	42.4	107	19.5	1170	8	42	7
2	ICCX-790072-BP-BP-23P-2P-BP	JG 74 x (K 850 x H 208)	42.3	105	16.1	1580	3	68	6
3	ICCX-790078-BP-BP-15P-1P-BP	ICCC 4 x ICCC 14	49.6	101	19.9	560	19	100	5
4	ICCX-790078-BP-BP-28P-1P-BP	ICCC 4 x ICCC 14	41.3	100	18.4	300	25	100	7
5	ICCX-790084-BP-BP-5P-1P-BP	ICCC 4 x (K 850 x F 378)	43.6	108	13.0	350	24	100	6
6	ICCX-780631-BP-BP-1P-1P-BP*	Annigeri x GIZA	41.0	104	21.7	950	12	17	7
7	ICCX-780634-BP-BP-35P-1P-BP@	Annigeri x JG 62	41.1	108	16.5	1770	2	24	7
8	ICCX-780063-BP-BP-8P-2P-BP	(K 850 x F 378) x K 850	39.2	102	22.4	710	15	100	7
9	ICCX-780085-BP-BP-21P-1P-BP	(JG 62 x F 496) x Chaffa	43.9	104	15.9	600	18	100	7
10	ICCX-780077-BP-BP-40P-1P-BP	(K 850 x F 378) x P 436	42.8	106	17.2	380	23	100	6
11	ICCX-780077-BP-BP-41P-1P-BP	(K 850 x F 378) x P 436	42.8	103	14.2	700	17	85	6
12	ICCX-780081-BP-BP-10P-1P-BP	(JG 62 x F 496) x BDN 9-3	42.1	106	15.2	460	22	100	7
13	ICCX-780085-BP-BP-1P-1P-BP*	(JG 62 x F 496) x Chaffa	41.1	105	15.7	1320	6	50	7
14	ICCX-790047-BP-BP-81P-1P-BP*	Annigeri x ICCC 9	42.2	96	16.3	1020	10	13	6
15	ICCX-790049-BP-BP-22P-1P-BP	Annigeri x ICCC 15	37.4	103	18.5	960	11	64	7
16	ICCX-790054-BP-BP-5SP-1P-BP	Annigeri x (K 850 x F 378)	41.2	131	23.0	1320	5	69	7
17	ICCX-790055-BP-BP-18P-1P-BP	Annigeri x (H 208 x N 59)	39.7	92	17.2	500	20	94	7
18	ICCX-790055-BP-BP-20P-1P-BP*	Annigeri x (H 208 x N 59)	35.7	111	20.4	1350	4	6	6
19	ICCX-790063-BP-BP-45P-1P-BP	PHULE G 4 x (K 850 x N 59)	49.8	103	21.3	820	13	45	5
20	ICCX-790063-BP-BP-47P-1P-BP	PHULE G 4 x (K 850 x N 59)	38.0	106	19.3	1040	9	100	6
21	ICCX-790063-BP-BP-51P-1P-BP	PHULE G 4 x (K 850 x N 59)	39.7	105	23.4	1230	7	82	4
22	ICCX-790073-BP-BP-37P-1P-BP	JG 74 x (K 850 x N 59)	45.0	100	14.8	710	16	72	7
23	ICCX-780379-BP-BP-44P-1P-BP	ICCC 4 x F1 (Annigeri x Pant G 114)	43.7	113	16.6	1860	1	100	7
24	ICC 4918	Annigeri	39.7	108	19.2	820	14		
25	ICC 5003	K 850	58.6	108	19.8	490	21		
		Mean	42.6	105	18.2	920			
		SE±	1.19	6.6	1.29	185.7			
		CV(%)	5.6	12.4	14.1	40.4			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.11 Characteristics of entries in Preliminary Trial 8 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-780631-BP-BP-27P-1P-BP	Annigeri x GIZA	47.6	102	19.4	150	24	92	7
2	ICCX-780631-BP-BP-30P-1P-BP	Annigeri x GIZA	42.5	103	17.4	570	8	14	6
3	ICCX-7806314-BP-BP-46P-1P-BP	Annigeri x GIZA	41.6	99	17.9	250	22	96	6
4	ICCX-780639-BP-BP-20P-1P-BP	Annigeri x K 850	44.2	105	27.3	660	6	95	5
5	ICCX-780639-BP-BP-28P-1P-BP	Annigeri x K 850	44.1	101	23.1	560	9	25	6
6	ICCX-780639-BP-BP-43P-1P-BP*	Annigeri x K 850	43.5	100	24.5	620	7	39	7
7	ICCX-780063-BP-BP-48P-1P-BP	(K 850 x F 378) x K 850	41.6	104	24.0	460	11	37	5
8	ICCX-780070-BP-BP-7P-1P-BP	(K 850 x F 378) x GW 5/7	38.7	99	19.8	290	19	53	6
9	ICCX-780070-BP-BP-22P-1P-BP	(K 850 x F 378) x GW 5/7	50.4	102	22.2	340	16	67	6
10	ICCX-780070-BP-BP-37P-1P-BP	(K 850 x F 378) x GW 5/7	45.4	105	25.4	270	21	67	7
11	ICCX-780070-BP-BP-98P-1P-BP	(K 850 x F 378) x GW 5/7	41.4	107	23.7	440	13	18	4
12	ICCX-780070-BP-BP-109P-1P-BP	(K 850 x F 378) x GW 5/7	47.8	98	20.9	290	20	100	6
13	ICCX-780085-BP-BP-55P-1P-BP	(JG 62 x F 496) x Chaffa	41.6	102	15.0	450	12	100	4
14	ICCX-780090-BP-BP-30P-1P-BP	(JG 62 x F 496) x GW 5/7	42.1	95	19.9	150	25	83	5
15	ICCX-780099-BP-BP-32P-1P-BP	(JG 62 x F 496) x ICGC 1	40.8	103	18.0	520	10	86	6
16	ICCX-780073-BP-BP-16P-1P-BP*	(K 850 x F 378) x P 180-1	42.9	105	20.4	700	5	13	7
17	ICCX-780073-BP-BP-17P-1P-BP*	(K 850 x F 378) x P 180-1	42.8	107	18.3	750	4	10	6
18	ICCX-780073-BP-BP-22P-1P-BP*	(K 850 x F 378) x P 180-1	46.1	109	21.1	800	2	5	7
19	ICCX-780077-BP-BP-58P-1P-BP	(K 850 x F 378) x P 436	42.8	106	17.7	330	17	77	5
20	ICCX-780083-BP-BP-58P-1P-BP	(JG 62 x F 496) x K 850	50.7	105	18.4	760	3	82	5
21	ICCX-790054-BP-BP-60P-1P-BP	Annigeri x (K 850 x F 378)	37.3	100	19.4	380	14	14	5
22	ICCX-780070-BP-BP-95P-1P-BP	(K 850 x F 378) x GW 5/7	38.2	97	21.1	370	15	35	7
23	ICCX-780077-BP-BP-53P-2P-BP	(K 850 x F 378) x P 436	42.7	97	21.3	250	23	93	7
24	ICC 4918	Annigeri	38.2	107	19.6	890	1		
25	ICC 5003	K 850	48.0	106	23.5	300	18		
		Mean	43.3	103	20.8	460			
		SE±	2.01	2.5	1.44	112.9			
		CV(%)	9.3	4.9	13.9	48.9			

* Selected for AYT, 1986/87.

Table 3.12 Characteristics of entries in Preliminary Yield Trial 9 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-800002-BP-BP-21P-BP@	JG 74 x BDN 9-3	41.1	106	16.8	1690	2	10	7
2	ICCX-800003-BP-BP-19P-BP@	JG 74 x ICCC 9	44.1	109	20.0	2090	1	35	6
3	ICCX-800063-BP-BP-9P-BP	ICCL 78023 x Phule G 4	41.2	108	16.5	970	6	100	6
4	ICX-800086-BP-BP-10P-BP*	ICCL 78073 x Phule G 1	53.2	113	18.6	960	7	25	3
5	ICCX-800097-BP-BP-37P-BP	ICCL 79004 x Annigeri	37.8	101	16.2	580	15	83	7
6	ICCX-790019-BP-BP-9P-BP	Phule G 3 x P 1198-1	40.8	101	16.6	750	9	73	7
7	ICCX-790039-BP-BP-20P-BP	24-B x P 1353	37.6	107	16.4	410	21	92	7
8	ICCX-790057-BP-BP-2SP-1P-BP	Phule G-4 x ICCC 9	32.1	102	17.2	680	11	87	7
9	ICCX-790084-BP-BP-2P-1P-BP	ICCC 4 x (K 850 x P 378)	31.1	101	19.3	460	19	56	6
10	ICCX-780070-BP-BP-3P-1P-BP*	(K 850 x P 378) x GW 5/7	35.1	101	25.9	1150	5	33	6
11	ICCX-810470-1P-1P-BP	(BMS 4 x MP 81) x 2375	36.6	96	21.1	550	17	43	6
12	ICCX-810470-1P-2P-BP	(BMS 4 x MP 81) x 2375	39.7	101	16.1	640	14	54	7
13	ICCX-810470-5P-1P-BP*	(BMS 4 x MP 81) x 2375	35.7	99	26.2	1180	4	0	6
14	ICCX-810473-3P-8P-BP	(BMS 4 x P 4203) x H 76-49	39.7	101	23.3	410	22	100	6
15	ICCX-810473-3P-9P-BP	(BMS 4 x P 4203) x H 76-49	40.1	96	17.9	340	23	100	7
16	ICCX-810473-3P-10P-BP	(BMS 4 x P 4203) x H 76-49	40.8	104	19.5	570	16	100	7
17	ICCX-810478-1P-4P-BP	(BMS 5 x JG 62) 2375	37.4	104	18.8	910	8	60	7
18	ICCX-810498-1P-3P-BP	(BMS 23 x ICCC 15) x BDNG 20	43.0	111	20.9	330	24	100	6
19	ICCX-790164-BH-BP-1P-1P-BP	P 272 x BMS 23	44.8	106	20.9	660 *	13	100	7
20	ICCX-790164-BH-BP-1P-3P-BP	P 272 x BMS 23	39.1	102	21.7	440	20	100	7
21	ICCX-790165-BH-BP-1P-2P-BP	P 272 x BMS 28	39.2	99	17.5	660	12	100	7
22	ICCX-790181-BH-BP-2P-1P-BP	Pant G 120 x BMS 28	41.1	104	17.9	710	10	100	6
23	ICCX-790182-BH-BP-4P-4P-BP	Pant G 120 x BMS 30	36.1	96	20.0	520	18	100	7
24	ICC 4918	Annigeri	41.2	107	18.0	1350	3		
25	ICC 5003	K 850	58.8	106	19.8	330	25		
		Mean	40.3	103	19.3	770			
		SE±	1.57	3.2	1.49	206.8			
		CV(%)	7.8	6.1	15.4	53.8			

@ Selected for ICSN-DS, 1986/87.
* Selected for AYT, 1986/87.

Table 3.13 Characteristics of entries in Preliminary Yield Trial 10 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-810468-6P-1P-BP	(BMS 4 x JG 62) x Phule G 5	40.6	102	23.3	1330	17	95	7
2	ICCX-810468-7P-1P-BP*	(BMS 4 x JG 62) x Phule G 5	42.6	109	26.8	1760	8	59	5
3	ICCX-810468-29P-1P-BP	(BMS 4 x JG 62) x Phule G 5	41.9	100	26.6	1140	22	100	6
4	ICCX-810468-29P-2P-BP	(BMS 4 x JG 62) x Phule G 5	43.3	100	26.1	1240	19	100	6
5	ICCX-810470-11P-1P-BP	(BMS 4 x MP 81) x Z375	40.7	107	25.1	1490	14	31	6
6	ICCX-810470-18P-1P-BP*	(BMS 4 x MP 81) x Z375	40.2	100	26.3	1860	3	27	5
7	ICCX-810470-21P-1P-BP*	(BMS 4 x MP 81) x Z375	40.9	102	24.1	1660	11	27	6
8	ICCX-810470-36P-1P-BP*	(BMS 4 x MP 81) x Z375	41.4	101	27.2	1530	12	47	7
9	ICCX-810470-48P-1P-BP*	(BMS 4 x MP 81) x Z375	40.7	101	24.7	1520	13	27	7
10	ICCX-810470-48P-2P-BP	(BMS 4 x MP 81) x Z375	40.6	100	26.2	1820	5	77	7
11	ICCX-810470-54P-1P-BP*	(BMS 4 x MP 81) x Z375	40.8	101	25.2	1810	6	27	6
12	ICCX-810470-66P-1P-BP	(BMS 4 x MP 81) x Z375	40.3	100	26.7	1870	2	61	6
13	ICCX-810470-70P-2P-BP@	(BMS 4 x MP 81) x Z375	41.0	100	26.8	1850	4	22	7
14	ICCX-810478-8P-2P-BP	(BMS 5 x JG 62) x Z375	40.8	103	22.9	1190	20	100	7
15	ICCX-810478-28P-2P-BP	(BMS 5 x JG 62) x Z375	41.6	99	19.2	1280	18	95	6
16	ICCX-810478-43P-2P-BP	(BMS 5 x JG 62) x Z375	41.0	100	21.2	1060	23	100	7
17	ICCX-810480-93P-2P-BP	(BMS 5 x MP 81) x BONG 20	44.8	103	23.2	1670	9	60	6
18	ICCX-810484-27P-3P-BP	(BMS 6 x MP 81) x ICCC 30	41.2	100	20.0	410	25	100	6
19	ICCX-810486-13P-1P-BP	(BMS 6 x P 2994) x ICCL 80074	43.7	100	18.9	1760	7	75	7
20	ICCX-810488-11P-1P-BP	(BMS 6 x P 4203) x Z375	41.1	102	23.2	1420	16	75	7
21	ICCX-810488-13P-1P-BP	(BMS 6 x P 4203) x Z375	40.7	101	26.2	1170	21	88	6
22	ICCX-810488-18P-1P-BP	(BMS 6 x P 4203) x Z375	43.5	105	24.7	1490	15	88	6
23	ICCX-810488-22P-1P-BP	(BMS 6 x P 4203) x Z375	45.2	104	23.7	1010	24	100	6
24	ICC 4918	Annigeri	41.0	109	20.9	2030	1		
25	ICC 5003	K 850	60.8	110	24.7	1670	10		
		Mean	42.4	102	24.2	1480			
		SE±	1.16	1.6	1.25	212.0			
		CV(%)	5.5	3.1	10.4	28.6			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.14 Characteristics of entries in Preliminary Yield Trial II - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-810488-24P-1P-BP	(HMS 6 x P 4203) x 2375	38.3	99	20.6	1450	17	100	6
2	ICCX-810488-25P-2P-BP	(HMS 6 x P 4203) x 2375	37.5	101	21.8	1560	16	92	7
3	ICCX-810488-32P-2P-BP	(HMS 6 x P 4203) x 2375	41.0	102	26.4	1600	14	76	7
4	ICCX-810488-48P-1P-BP	(HMS 6 x P 4203) x 2375	33.8	102	29.9	2120	5	71	6
5	ICCX-810488-52P-1P-BP	(HMS 6 x P 4203) x 2375	34.5	105	20.9	1070	19	94	6
6	ICCX-810492-1P-2P-BP	(HMS 13 x MP 81) x Phule G-5	39.8	105	19.3	1890	10	59	7
7	ICCX-810494-45P-1P-BP*	(HMS 13 x P 2994) x BDNG 20	46.5	106	21.3	2030	6	50	6
8	ICCX-810494-45P-2P-BP*	(HMS 13 x P 2994) x BDNG 20	35.5	100	29.0	1770	11	29	6
9	ICCX-810496-14P-2P-BP*	(HMS 13 x RPSP 322-1) x 2375	32.5	99	26.8	2320	3	60	7
10	ICCX-810496-35P-1P-BP	(HMS 13 x RPSP 322-1) x 2375	32.5	102	26.9	2160	4	100	7
11	ICCX-810498-24P-1P-BP	(HMS 23 x ICCC 15) x BDNG 20	45.5	102	22.3	1960	8	87	4
12	ICCX-800494-5P-1P-1P-BP@	HMS 4 x Annigeri	43.3	108	19.0	2380	2	26	3
13	ICCX-790161-5P-1P-1P-BP	P 272 x HMS 13	46.5	106	19.8	830	22	100	3
14	ICCX-790165-12P-1P-1P-BP	P 272 x HMS 28	50.3	106	20.4	220	25	100	5
15	ICCX-790173-12P-1P-1P-BP	P 502 x HMS 28	50.3	105	18.9	830	21	100	6
16	ICCX-800450-28P-2P-1P-BP	HMS 4 x ICCC 15	41.0	104	16.5	1940	9	90	7
17	ICCX-800451-20P-2P-1P-BP	HMS 4 x JG 62	44.0	106	17.2	2000	7	75	5
18	ICCX-800451-24P-2P-1P-BP	HMS 4 x JG 62	37.8	97	17.7	1710	12	100	6
19	ICCX-790164-BH-BP-29P-1P-BP	P 272 x HMS 23	47.0	101	15.3	390	24	100	5
20	ICCX-790182-BH-BP-22P-1P-BP	Pant G 120 x HMS 30	44.0	103	22.5	950	20	100	5
21	ICCX-780323-26P-BP-2P-BP-BP	JG 62 x HMS 2	48.3	106	19.0	620	23	100	5
22	ICCX-780375-5P-BP-1P-3P-2P-BP	HMS 10 x (P 436 x H 223)	48.3	106	17.9	1690	13	92	4
23	ICCX-780375-5P-BP-2P-BP-1P-BP	HMS 10 x (P 436 x H 223)	49.8	103	16.2	1220	18	91	4
24	ICC 4918	Annigeri	40.0	109	22.2	2680	1		
25	ICC 5003	K 850	60.9	111	26.2	1600	15		
		Mean	42.7	104	21.4	1560			
		SE±	1.87	1.9	1.45	223.2			
		CV(%)	8.7	3.7	13.6	28.6			

@ Selected for ICSN-DS, 1986/87
* Selectred for AYT, 1986/87.

Table 3.15 Characteristics of entries in Preliminary Yield Trial 12 - DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-810634-23P-BP-BP*	BDN 9-3 x JG 74	48.0	112	17.1	2510	12	15	3
2	ICCX-810656-18P-BP-BP@	ICCC 30 x P 436-2	47.0	106	19.5	2740	6	24	4
3	ICCX-810715-19P-BP-BP*	Annigeri x NEC 1166	45.8	107	17.7	2690	9	24	5
4	ICCX-811064-4P-BP-BP	ICC 10619 EB x CPS 1	48.3	112	18.4	2210	18	4	6
5	ICCX-811064-11P-BP-BP	ICC 10619 EB x CPS 1	48.0	113	18.8	2130	21	11	3
6	ICCX-811064-25P-BP-BP	ICC 10619 EB x CPS 1	50.3	114	20.0	2020	23	**	4
7	ICCX-811064-27P-BP-BP	ICC 10619 EB x CPS 1	47.5	110	18.8	2050	22	30	5
8	ICCX-811064-35P-BP-BP	ICC 10619 EB x CPS 1	48.5	111	19.0	2140	20	21	5
9	ICCX-800552-27P-BP-2P-BP@	CPS 1 x JG 74	40.8	105	16.5	2760	5	28	6
10	ICCX-800553-17P-BP-2P-BP*	JG 74 x VR 315	45.5	112	18.1	2710	7	38	5
11	ICCX-800582-6P-BP-2P-BP*	Barigantas x JG 74	42.3	109	18.4	2700	8	18	6
12	ICCX-800564-19P-BP-1P-BP	CPS 1 x NEC 790	48.0	113	16.3	2440	14	32	6
13	ICCX-780397-2P-1P-1P-15P-BP*	USA 613 x F1 (PRR 1 x CAINA)	47.0	110	17.7	2580	10	25	4
14	ICCX-780119-13P-1P-BP-1P-1P-BP@	PANT G-114 x T 3(Qualior)	45.8	111	14.2	2810	2	29	4
15	ICCX-780119-13P-1P-BP-1P-3P-BP@	PANT G-114 x T 3(Qualior)	47.5	109	15.0	2770	4	29	5
16	ICCX-780125-28P-1P-BP-1P-1P-BP@	BDN 9-3 x P 436-2	35.5	106	17.4	2800	3	24	5
17	ICCX-780125-29P-2P-BP-1P-1P-BP*	BDN 9-3 x P 436-2	43.8	109	18.3	2520	11	48	5
18	ICCX-780167-106P-1P-1P-1P-4P-BP	CPS 1 x T 3(Qualior)	41.8	106	15.0	2310	16	9	4
19	ICCX-780130-31P-1P-BP-1P-1P-BP	BDN 9-3 x P 6244	43.0	110	15.7	2270	17	38	5
20	ICCX-780169-114P-1P-BP-1P-2P-BP	CPS 1 x BG 212	42.0	109	17.7	2150	19	15	4
21	ICCX-761472-9P-1P-BP-BP-2P-1P-BP	(JG 62 x VR 315) x (P 1363-1 x PRR 1)	35.0	117	34.3	1850	25	12	5
22	ICCX-780127-59P-2P-BP-BP-2P-BP	BDN 9-3 x P 4237	36.8	108	18.2	2400	15	18	5
23	ICCX-780172-38P-2P-BP-BP-3P-BP@	T 3 (Qualior) x C 104	46.5	112	16.8	3480	1	9	5
24	ICC 4918	Annigeri	39.5	105	19.7	2490	13		
25	ICC 5003	K 850	59.1	113	23.7	1910	24		
		Mean	44.9	110	18.5	2460			
		SE±	0.86	1.7	1.05	155.5			
		CV(%)	3.8	3.2	11.3	12.7			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87
** Data not available.

Table 3.16 Characteristics of entries in Preliminary Yield Trial-13 DS at ICRISAT Center, 1985-86.

Ent. No.	Selection no./name	Parentage	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield kg/ha	Rank	Wilt %
1	ICCX-770475-BP-BP-3P-2P-1P-BP	Rabat x P 538	56.0	109.4	16.6	2721	18	100.0
2	ICCX-770475-BP-BP-18P-1P-1P-BP	Rabat x P 538	57.5	108.7	16.8	2622	19	100.0
3	ICCX-770147-BP-BP-28P-1P-1P-BP	JCC 1 x PANT G-114	41.8	101.6	20.7	2730	17	78.3
4	ICCX-770795-BP-BP-70P-1P-1P-BP	P 436 x ICCX-760903-F1	57.5	107.4	16.2	562	25	100.0
5	ICCX-770475-BP-BP-29P-1P-1P-BP	Rabat x P 538	57.1	108.5	17.1	2052	23	100.0
6	ICCX-770019-BP-BP-35P-1P-1P-BP*	Annigeri x K 850	44.4	105.7	18.3	3417	6	15.4
7	ICCX-770060-BP-BP-39P-1P-1P-BP	ICCC 1 x NEC 802	43.6	106.9	20.1	3554	4	88.5
8	ICCX-770029-BP-BP-15P-1P-1P-BP	Annigeri x G 130	55.0	106.8	17.3	3000	13	47.6
9	ICCX-770029-BP-BP-30P-2P-1P-BP	Annigeri x G 130	52.0	105.1	18.1	2916	15	42.9
10	ICCX-770029-BP-BP-76P-1P-1P-BP	Annigeri x G 130	52.9	104.2	16.0	2971	14	45.8
11	ICCX-770029-BP-BP-85P-1P-1P-BP@	Annigeri x G 130	44.7	105.1	17.9	3755	2	11.5
12	ICCX-770018-BP-BP-38P-1P-1P-BP	Annigeri x ICCC 1	42.5	102.1	19.1	2614	20	66.7
13	ICCX-770147-BP-BP-78P-2P-1P-BP	JCC 1 x PANT G-114	43.4	101.0	19.3	1972	24	95.5
14	ICCX-770026-BP-BP-39P-1P-2P-BP@	Annigeri x E 100	47.5	108.5	21.6	3588	3	10.5
15	ICCX-770026-BP-BP-40P-1P-1P-BP*	Annigeri x E 100	49.8	107.4	18.1	3441	5	11.1
16	ICCX-770028-BP-BP-52P-1P-1P-BP*	Annigeri x ICCX-730213-9-3-B-BP	50.1	104.7	15.4	3053	12	3.6
17	ICCX-770028-BP-BP-61P-1P-1P-BP	Annigeri x ICCX-730213-9-3-B-BP	55.1	108.4	15.8	2793	16	47.8
18	ICCX-770021-BP-BP-13P-1P-1P-BP	Annigeri x F 496	49.0	105.5	14.6	2444	22	100.0
19	ICCX-770147-BP-BP-23P-1P-1P-BP	JCC 1 x PANT G-114	42.2	103.0	24.1	3137	10	60.9
20	ICCX-770147-BP-BP-64P-1P-1P-BP	JCC 1 x PANT G-114	38.5	102.3	15.2	3110	11	41.7
21	ICCX-770029-BP-BP-38P-1P-1P-BP	Annigeri x G 130	48.7	105.5	16.5	3305	7	88.9
22	ICCX-770024-BP-BP-41P-1P-1P-BP	Annigeri x NEC 802	40.2	104.4	21.0	3275	9	54.6
23	ICCX-770026-BP-BP-24P-1P-1P-BP*	Annigeri x E 100	54.3	110.4	19.4	3275	8	22.2
24	Annigeri		45.6	106.0	20.1	3893	1	
25	K 850		59.6	109.9	25.1	2485	21	
	Mean		49.16	105.94	18.41	2907.4		
	SE±		1.26	1.09	0.51	251.1		
	CV(%)		5.15	2.05	5.58	17.3		

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.17 Characteristics of entries in Preliminary Yield Trial-14 DS at ICRISAT Center, 1985-86.

Ent. No.	Selection no./name	Parentage	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield kg/ha	Rank	Wilt %
1	ICCX-770148-BP-BP-7P-1P-1P-BP	JGC 1 x ICCC 1	49.4	105.0	32.1	2738	14	31.6
2	ICCX-770150-BP-BP-18P-1P-1P-BP	JGC 1 x ICCC 3	37.8	99.1	21.1	1034	25	95.2
3	ICCX-770029-BP-BP-27P-1P-1P-BP	Annigeri x G 130	53.4	105.1	16.3	2647	16	42.9
4	ICCX-770017-BP-BP-37P-1P-1P-BP	Annigeri x CAINA	43.3	101.8	18.1	1940	22	100.0
5	ICCX-770001-BP-BP-28P-1P-1P-BP*	PRR 1 x Annigeri	42.0	102.8	18.7	2983	13	7.1
6	ICCX-770148-BP-BP-10P-1P-1P-BP@	JGC 1 x ICCC 1	36.0	100.2	32.8	3508	2	0.0
7	ICCX-770148-BP-BP-33P-1P-1P-BP*	JGC 1 x ICCC 1	38.0	99.8	27.9	2604	17	6.9
8	ICCX-770004-BP-BP-5P-1P-1P-BP*	PRR 1 x ICCC 1	36.2	98.4	27.7	3150	9	5.3
9	ICCX-770148-BP-BP-20P-1P-1P-BP	JGC 1 x ICCC 1	53.0	104.8	31.3	2313	21	29.2
10	ICCX-760203-BP-BP-3P-1P-1P-1P-BP	T 103 x P 619-1	53.1	102.2	14.3	1493	24	100.0
11	ICCX-760445-BP-BP-34P-1P-1P-1P-BP$	JG 62 x ICCX-730076-15-2-B	53.8	102.7	17.2	3240	5	13.6
12	ICCX-760686-BP-BP-10P-2P-1P-1P-BP*	H 208 x BDN 9-3	40.9	102.3	15.6	3138	10	4.0
13	ICCX-760792-BP-BP-37P-1P-1P-1P-BP	P 1181-A x NEC 426	52.5	103.8	18.3	3047	11	100.0
14	ICCX-761159-BP-BP-17P-1P-1P-1P-BP	CHAFFA x ICCX-750534-F1	39.2	101.5	15.9	2493	18	28.6
15	ICCX-761191-BP-BP-1P-1P-1P-1P-BP*	NEC 495 x ICCX-750929-F1	49.7	104.9	16.5	3188	8	8.0
16	ICCX-761204-BP-BP-5SP-2P-1P-1P-BP$	WP 2654-A x ICCX-750847-F1	52.2	104.6	21.8	3443	4	21.1
17	ICCX-761945-BP-BP-61P-1P-1P-1P-BP	F2[P9669R(10-2-3DP-472)]-1 x ICCX-741557-F2-1	51.5	102.9	20.2	2734	15	88.2
18	ICCX-760635-BP-BP-45P-5P-1P-1P-BP	H 208 x Annigeri-1	44.7	102.3	16.3	2368	20	73.9
19	ICCX-760640-BP-BP-2P-5P-1P-1P-BP@	F 378 x Annigeri-1	42.9	103.2	18.8	4012	1	0.0
20	ICCX-760640-BP-BP-10P-2P-1P-1P-BP*	F 378 x Annigeri-1	40.5	101.4	17.5	3237	7	7.7
21	ICCX-760640-BP-BP-13P-2P-1P-1P-BP	F 378 x Annigeri-1	45.8	102.9	16.9	1763	23	61.9
22	ICCX-760640-BP-BP-14P-1P-1P-1P-BP$	F 378 x Annigeri-1	50.6	106.1	20.6	3239	6	8.7
23	ICCX-760640-BP-BP-23P-1P-1P-1P-BP@	F 378 x Annigeri-1	42.8	106.3	20.9	3487	3	38.1
24	Annigeri		43.7	105.9	21.0	3028	12	
25	K 850		58.9	108.5	26.5	2448	19	
	Mean		46.08	103.14	20.97	2770.9		
	SE±		0.67	0.63	0.47	258.8		
	CV(%)		2.92	1.21	4.44	18.7		

@ Selected for ICSN-DS, 1986/87
$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.18 Characteristics of entries in Preliminary Yield Trial-15 DS at ICRISAT Center, 1985-86.

Ent. No.	Selection no./name	Parentage	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield kg/ha	Rank	Wilt %
1	ICCX-760654-BP-BP-30P-1P-1P-1P-BP	JG 62 x NBC 802	47.9	101.4	19.1	2944	11	33.3
2	ICCX-760695-BP-BP-4P-1P-1P-1P-BP*	C 214 x BDN 9-3	46.4	102.6	15.1	2883	12	6.9
3	ICCX-761131-BP-BP-10P-1P-1P-1P-BP*	Chaffa x ICCX-750877-F1	40.2	101.2	18.4	2639	17	9.1
4	ICCX-761131-BP-BP-39P-2P-1P-1P-BP*	Chaffa x ICCX-750877-F1	40.0	103.9	18.3	3104	6	7.4
5	ICCX-760368-BP-BP-5P-2P-1P-1P-BP	H 208 x P 2571	40.3	102.4	15.8	2469	22	4.2
6	ICCX-761229-BP-BP-7P-1P-1P-1P-BP	ICCX-750693-F1 x ICCX-750816-F1	48.0	106.0	16.1	2611	18	12.0
7	ICCX-761229-BP-BP-7P-2P-1P-1P-BP$	ICCX-750693-F1 x ICCX-750816-F1	46.3	104.4	16.5	3305	2	16.0
8	ICCX-760800-BP-BP-29P-2P-1P-1P-BP	P 1181-A x NBC 970	42.1	103.5	20.5	2439	23	8.0
9	ICCX-761175-BP-BP-82P-1P-1P-1P-BP*	Chaffa x ICCX-750848-F1	41.6	101.0	18.2	3046	8	16.7
10	ICCX-761175-BP-BP-82P-1P-1P-1P-BP@	Chaffa x ICCX-750848-F1	43.1	102.4	18.9	3198	3	9.1
11	ICCX-761467-BH-BH-13H-1P-1P-1P-BP$	ICCX-750169-F2-1 x ICCX-750159-F2-1	48.8	101.4	18.0	3707	1	15.0
12	ICCX-760218-BP-BP-43P-1P-1P-1P-BP	P 45 x P 9668	57.3	107.5	19.7	3044	9	50.0
13	ICCX-761051-BP-BP-3P-1P-1P-1P-BP	H 208 x ICCX-750997-F1	46.3	104.6	20.2	2567	19	66.7
14	ICCX-761365-BP-BP-29P-2P-1P-1P-BP*	P 514 x ICCX-730089-F5	38.4	101.0	23.2	2702	15	10.5
15	ICCX-760789-BP-BP-70P-1P-1P-1P-BP	P 6090 x P 9668	43.6	101.7	18.3	2546	21	35.0
16	ICCX-761687-BP-BP-61P-1P-1P-1P-BP	ICCX-730170-F5 x ICCX-730062-F5	39.0	102.2	18.7	2552	20	4.8
17	ICCX-761687-BP-BP-61P-2P-1P-2P-BP*	ICCX-730170-F5 x ICCX-730062-F5	39.9	102.7	19.8	2997	10	6.9
18	ICCX-761687-BP-BP-61P-3P-1P-1P-BP*	ICCX-730170-F5 x ICCX-730062-F5	39.7	103.1	20.1	3055	7	11.1
19	ICCX-761687-BP-BP-61P-3P-1P-1P-BP*	ICCX-730170-F5 x ICCX-730062-F5	40.7	103.5	19.3	2836	13	16.0
20	ICCX-761687-BP-BP-61P-3P-1P-2P-BP*	ICCX-730170-F5 x ICCX-730062-F5	41.0	103.3	19.6	3156	5	12.5
21	ICCX-761131-BP-BP-27P-2P-1P-1P-BP	Chaffa x ICCX-750877-F1	39.9	103.9	17.9	2644	16	27.6
22	ICCX-761365-BP-BP-25P-1P-1P-1P-BP	P 514 x ICCX-730089-F5	38.7	105.8	25.8	2438	24	42.9
23	ICCX-811065-BP-11PLB-BP#R	ICC-10619-EB x WR 315	46.2	105.3	17.2	2421	25	8.3
24	Annigeri		43.2	103.7	20.8	3161	4	
25	Dharwar Local Selection		42.6	104.1	36.5	2778	14	
	Mean		43.25	103.31	19.68	2849.6		
	SE±		0.91	0.67	0.33	187.6		
	CV(%)		4.21	1.30	3.38	13.2		

@ Selected for ICSN-DS, 1986/87
$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.19 Characteristics of entries in Preliminary Yield Trial-16 DS at ICRISAT Center, 1985-86.

Ent. No.	Selection no./name	Parentage	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield kg/ha	Rank	Wilt %
1	ICCX-790104-4P-1P-1P-BP	BDN 9-3 x K 1170	40.7	108.2	19.7	2356	15	9.8
2	ICCX-790106-6P-1P-1P-BP*	BDN 9-3 x K 1184	57.9	109.0	27.0	2380	11	11.1
3	ICCX-790106-19P-1P-1P-BP	BDN 9-3 x K 1184	39.3	106.0	23.4	2470	7	5.6
4	ICCX-790107-9P-1P-1P-BP@	BDN 9-3 x K 1258	39.0	108.0	21.8	2823	3	14.3
5	ICCX-790107-9P-1P-2P-BP	BDN 9-3 x K 1258	38.0	108.2	22.4	1938	23	81.0
6	ICCX-790108-1P-1P-1P-BP	BDN 9-3 x K 1480	43.2	111.3	23.7	1940	22	17.7
7	ICCX-790108-13P-1P-2P-BP	BDN 9-3 x K 1480	39.3	101.8	28.3	2252	16	0.0
8	ICCX-790109-2P-1P-1P-BP*	BDN 9-3 x K 1481	38.8	103.2	19.1	2469	8	6.3
9	ICCX-790119-1P-1P-1P-BP	F 378 x P-9847	55.6	106.1	21.8	2189	17	100.0
10	ICCX-790116-1P-1P-1P-BP	F 378 x K 1480	42.0	106.9	18.5	2376	12	7.7
11	ICCX-790116-1P-1P-2P-BP	F 378 x K 1480	38.7	103.3	22.6	2375	13	4.6
12	ICCX-800425-3P-1P-1P-BP*	ICCX-750073-4-1P-1P-BP x ICCX-750073-74-1P-3P-BP	38.7	102.6	22.2	2803	4	12.5
13	ICCX-790126-4P-1P-1P-1P-BP*	PANT G 114 x K 56567	52.4	105.6	20.9	2528	6	9.1
14	ICCX-770350-BP-2P-1P-1P-1P-BP@	Annigeri x K 1174	38.1	101.6	21.6	2853	2	0.0
15	ICCX-770909-BH-2H-1P-1P-2P-BP	K 850 x ICCX-760492-F1	59.5	112.1	33.0	2105	20	50.0
16	ICCX-770909-BH-7H-1P-1P-2P-BP	K 850 x ICCX-760492-F1	58.3	110.0	20.6	2083	21	100.0
17	ICCX-770910-BH-6H-1P-1P-2P-BP	G 130 x ICCX-760493-F1	58.6	108.0	13.3	1504	25	100.0
18	ICCX-770913-BH-22H-1P-1P-1P-BP	G 130 x ICCX-760502-F1	58.6	109.3	19.8	1626	24	100.0
19	ICCX-770914-BH-15H-1P-1P-1P-BP	PANT G-115 x ICCX-760502-F1	58.4	108.0	19.4	2372	14	47.8
20	ICCX-770943-BH-1H-1P-1P-1P-BP	PANT G-115 x ICCX-760732-F1	40.3	101.4	21.2	2168	18	25.0
21	ICCX-761337-13P-2H-1H-1P-1P-1P-BP	JG 62 x ICCX-750070-F3	56.2	104.0	21.1	2112	19	81.3
22	ICCX-761337-13P-2H-1H-1P-2P-1P-BP	JG 62 x ICCX-750070-F3	50.2	104.3	20.9	2401	10	100.0
23	ICCX-811065-BP-13PLB-BPMR	ICC-10619-EB x WR-315	48.2	107.8	17.6	2432	9	13.6
24	Annigeri		44.5	107.4	22.7	3164	1	
25	K 850		59.0	108.9	26.8	2607	5	
	Mean		47.75	106.52	21.98	2333.0		
	SE±		1.23	0.86	0.68	192.0		
	CV(%)		5.15	1.61	6.20	16.5		

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.20 Characteristics of entries in Preliminary Yield Trial 19-EM at ICRISAT Center (P) and Gwalior (G), 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering		Days to maturity		Weight of 100 seeds (g)		Seed yield (kg/ha)				% damage due to wilt	Insect damage score
			P	G	P	G	P	G	P	Rank	G	Rank	P	P
1	ICCX-800003-EP-EP 36P-EP	JG 74 x ICCC 9	53.5	78.7	114	150	19.1	16.8	2330	17	1840	24	25	5
2	ICCX-800004-EP-EP-25P-EP	JG 74 x K 850	50.3	71.9	114	149	19.4	14.3	2470	14	1700	25	33	4
3	ICCX-800004-EP-EP-31P-EP	JG 74 x K 850	51.5	60.4	113	147	17.6	14.3	2400	16	2100	20	100	4
4	ICCX-800004-EP-EP-32P-EP	JG 74 x K 850	51.0	62.7	112	149	19.8	15.2	2730	5	1950	22	68	4
5	ICCX-800012-EP-EP-17P-EP$	P 127 x K 850	51.3	64.0	112	146	18.9	16.6	2890	2	2250	17	11	5
6	ICCX-800012-EP-EP-19P-EP	P 127 x K 850	50.0	62.9	113	151	15.7	15.8	2570	10	2140	19	67	6
7	ICCX-800012-EP-EP-24P-EP*	P 127 x K 850	53.3	70.5	113	148	16.2	15.4	2730	4	2210	18	26	6
8	ICCX-800012-EP-EP-39P-EP	P 127 x K 850	51.8	75.2	113	152	16.6	16.0	2790	3	2090	21	93	4
9	ICCX-800020-EP-EP-5P-EP	P 324 x K 850	60.0	77.3	113	147	15.9	13.6	2490	13	2460	7	94	6
10	ICCX-800030-EP-EP-33P-EP$	P 326 x Phule G 1	52.0	66.9	113	149	16.6	15.8	2160	21	2900	5	36	6
11	ICCX-800044-EP-EP-27P-EP	ICCL 78005 x K 850	64.0	74.9	113	147	15.2	15.1	2150	22	2370	9	100	6
12	ICCX-800044-EP-EP-29P-EP	ICCL 78005 x K 850	55.8	70.5	113	145	20.8	22.3	1980	25	2290	14	76	5
13	ICCX-800057-EP-EP-4P-EP*	ICCL 78023 x Annigeri	54.0	69.4	113	151	24.4	26.9	2230	18	2460	6	47	3
14	ICCX-800057-EP-EP-11P-EP	ICCL 78023 x Annigeri	52.8	76.8	113	148	26.8	26.1	2190	19	2300	13	100	5
15	ICCX-800057-EP-EP-14P-EP	ICCL 78023 x Annigeri	55.1	73.6	114	155	26.6	26.5	2560	11	2330	12	100	4
16	ICCX-800062-EP-EP-14P-EP	ICCL 78023 x Phule G 1	52.0	63.5	112	149	16.9	17.7	2020	24	2340	11	86	5
17	ICCX-800063-EP-EP-3P-EP*	ICCL 78023 x Phule G 4	56.3	78.0	112	150	17.1	18.5	2620	8	1920	23	39	5
18	ICCX-800066-EP-EP-13P-EP*	ICCL 78043 x BDN 9-3	48.3	60.1	115	151	18.2	17.6	2140	23	2290	15	22	7
19	ICCX-800068-EP-EP-3P-EP$	ICCL 78043 x K 850	61.3	77.9	113	149	19.2	19.8	2520	12	3090	2	14	6
20	ICCX-800068-EP-EP-8P-EP$	ICCL 78043 x K 850	49.8	77.8	113	151	20.0	24.9	2990	1	2980*	4	17	6
21	ICCX-800068-EP-EP-14P-EP$	ICCL 78043 x K 850	51.3	67.4	114	147	27.1	25.3	2630	7	2350	10	29	6
22	ICCX-800068-EP-EP-21P-EP$	ICCL 78043 x K 850	50.3	70.2	109	147	19.6	20.1	2610	9	3180	1	35	5
23	ICCX-800068-EP-EP-34P-EP	ICCL 78043 x K 850	52.3	78.8	112	147	20.6	21.2	2720	6	3060	3	100	5
24	ICC 4918(P)/ICC 5003(G)	Annigeri/K 850	41.8	76.9	114	148	20.1	27.6	2170	20	2260	16		
25	ICC 5003(P)/ICC 5215(G)	K 850/Gwalior 2	59.5	68.2	114	153	22.4	13.4	2620	15	2380	8		
		Mean	53.1	71.0	113	149	19.6	19.1	2460		2370			
		SE±	1.67	3.40	0.5	2.2	0.88	0.49	178.8		109.9			
		CV(%)	6.3	9.6	0.8	2.9	8.9	5.2	14.5		9.3			

$ Selected for ICSN-EM, 1986/87
* Selected for AYT, 1986/87.

Table 3.21 Characteristics of entries in Preliminary Yield Trial 20-DM at ICRISAT Center (P) and Gwalior (G), 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering		Days to maturity		Weight of 100 seeds (g)		Seed yield (kg/ha)				% damage due to wilt	Insect damage score
			P	G	P	G	P	G	P	Rank	G	Rank	P	P
1	ICCX-800068-BP-BP-39P-BP$	ICCL 78043 x K 850	53.3	75.6	112	150	20.3	20.4	2540	4	2560	9	35	5
2	ICCX-800068-BP-BP 45P-BP$	ICCL 78043 x K 850	54.3	64.4	110	148	21.7	23.3	2420	6	3130	1	22	5
3	ICCX-800068-BP-BP-54P-BP*	ICCL 78043 x K 850	48.5	60.9	112	152	24.5	25.2	2070	19	2230	20	38	5
4	ICCX-800071-BP-BP-4P-BP*	ICCL 78043 x Phule G-4	50.2	60.1	114	148	26.3	23.8	2270	9	2340	15	56	5
5	ICCX-800071-BP-BP-12P-BP*	ICCL 78043 x Phule G-4	52.9	59.1	113	148	21.5	19.0	2130	16	2130	22	21	6
6	ICCX-800071-BP-BP-20P-BP*	ICCL 78043 x Phule G-4	58.2	60.5	112	148	22.6	19.0	2090	17	2270	18	47	4
7	ICCX-800082-BP-BP-9P-BP*	ICCL 78073 x BDN 9-3	55.3	59.0	114	149	15.5	14.0	1760	23	2290	17	18	3
8	ICCX-800082-BP-BP-23P-BP	ICCL 78073 x BDN 9-3	58.9	65.4	112	152	23.6	19.0	2190	12	2040	25	85	3
9	ICCX-800085-BP-BP-5P-BP$	ICCL 78073 x P 1675	53.8	65.5	108	149	26.2	24.2	2380	7	2570	8	36	3
10	ICCX-800085-BP-BP-7P-BP	ICCL 78073 x P 1675	55.0	71.7	113	146	21.5	15.3	2180	13	2250	19	100	4
11	ICCX-800085-BP-BP-11P-BP	ICCL 78073 x P 1675	55.6	68.3	114	151	24.6	25.1	2060	20	2530	12	100	3
12	ICCX-800085-BP-BP-18P-BP	ICCL 78073 x P 1675	53.1	58.6	114	150	19.1	14.4	1760	24	2060	24	100	4
13	ICCX-800085-BP-BP-21P-BP	ICCL 78073 x P 1675	55.6	64.3	109	148	25.1	24.1	2540	3	2540	11	77	4
14	ICCX-800085-BP-BP-26P-BP*	ICCL 78073 x P 1675	56.1	66.2	110	151	25.2	24.1	2170	14	2570	7	60	4
15	ICCX-800085-BP-BP-40P-BP*	ICCL 78073 x P 1675	58.2	62.4	111	149	26.1	23.0	1970	21	2400	14	40	4
16	ICCX-800100-BP-BP-23P-BP	ICCL 79004 x K 850	59.5	80.1	113	153	18.6	16.9	2760	1	2290	16	100	4
17	ICCX-800111-BP-BP-1P-BP	ICCL 79006 x Phule G-4	50.9	59.7	111	150	21.8	19.8	1910	22	2620	5	76	5
18	ICCX-800111-BP-BP-9P-BP	ICCL 79006 x Phule G-4	58.4	80.7	113	150	22.0	20.9	2640	2	3060	2	84	4
19	ICCX-800111-BP-BP-20P-BP	ICCL 79006 x Phule G-4	53.6	60.9	112	146	24.4	22.7	2470	5	2570	6	82	3
20	ICCX-800111-BP-BP-24P-BP	ICCL 79006 x Phule G-4	52.7	62.2	112	145	24.1	25.7	2080	18	2540	10	84	5
21	ICCX-800111-BP-BP-46P-BP	ICCL 79006 x Phule G-4	58.3	69.5	113	152	22.0	18.9	2140	15	2960	3	80	4
22	ICCX-800111-BP-BP-48P-BP	ICCL 79006 x Phule G-4	53.4	66.6	112	150	22.4	21.6	2250	10	2750	4	90	5
23	ICCX-800111-BP-BP-51P-BP	ICCL 79006 x Phule G-4	55.2	72.9	113	150	22.3	20.0	2290	8	2440	13	91	5
24	ICC 4918(P)/ICC 5000(G)	Annigeri/K 850	42.2	73.3	106	148	22.5	27.9	1640	25	2090	23		
25	ICC 5003(P)/ICC 5215(G)	K 850/Gwalior 2	56.0	65.4	113	148	27.0	13.8	2240	11	2170	21		
		Mean	54.4	66.1	112	149	22.9	20.9	2200		2460			
		SE±	1.42	3.45	1.1	2.5	0.90	0.80	148.9		98.8			
		CV(%)	5.2	10.4	2.0	3.4	7.8	7.6	13.5		8.0			

$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.22 Characteristics of entries in Preliminary Yield Trial 21-EM at ICRISAT Center (P) and Sanlier (G), 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering		Days to maturity		Weight of 100 seeds (g)		Seed yield (kg/ha)				% damage due to wilt	Insect damage score
			P	G	P	G	P	G	P	Rank	G	Rank	P	P
1	ICCX-800119-BP-BP-33P-BP	ICCL 79008 x Phule G 4	58.1	66.2	114	148	18.9	17.6	1600	13	1980	13	67	5
2	ICCX-790013-BP-BP-32P-BP	K 850 x 24 B	51.8	67.6	113	147	22.1	19.6	1460	19	1940	16	100	4
3	ICCX-790014-BP-BP-13P-BP	K 850 x BDN 9-3	52.8	69.8	116	155	14.3	13.2	1830	7	2470	1	74	4
4	ICCX-790027-BP-BP-6P-BP	P 4203 x BDN 9-3	50.1	64.1	114	147	16.7	17.1	1470	16	1880	19	90	3
5	ICCX-790027-BP-BP-52P-BP	P 4203 x BDN 9-3	49.7	61.5	113	149	15.7	15.7	1580	14	1860	20	100	4
6	ICCX-790039-BP-BP-38P-BP	24 B x P 1353	65.1	70.5	116	151	15.5	14.4	1380	22	1970	14	68	4
7	ICCX-790046-BP-BP-2P-BP	Annigeri x ICCC 7	53.6	68.7	113	148	16.5	18.0	1450	20	1920	17	8	5
8	ICCX-790052-BP-BP-27P-BP*	Annigeri x (K 850 x H 208)	53.4	63.0	114	149	16.8	18.5	1830	8	2400	2	46	4
9	ICCX-790065-BP-BP-19P-BP*	Phule G 4 x (H 208 x N 59)	59.1	67.5	115	148	22.7	20.5	1630	11	1710	21	24	4
10	ICCX-790065-BP-BP-24P-BP	Phule G 4 x (H 208 x N 59)	59.3	64.3	115	148	15.5	15.0	1670	10	2340	3	94	3
11	ICCX-790091-BP-BP-48P-BP*	H 208 x (JG 62 x RADHEY)	55.2	65.2	113	146	17.1	17.3	1930	6	2130	10	42	3
12	ICCX-790067-BP-BP-53P-1P-BP	JG 74 x ICCC 9	56.4	66.3	114	148	24.6	23.7	1470	17	2140	9	90	4
13	ICCX-780633-BP-BP-70P-1P-BP*	Annigeri x ICCC 2	43.0	63.3	111	147	17.7	14.8	1520	15	1440	23	36	3
14	ICCX-780654-BP-BP-5P-1P-BP$	ICCC 1 x K 850	58.5	66.2	114	155	24.0	20.9	1760	9	2020	12	27	4
15	ICCX-780083-BP-BP-63P-1P-BP*	(JG 62 x F 496) x K 850	52.8	65.9	113	151	24.1	21.0	1970	4	1900	18	29	4
16	ICCX-810480-92P-2P-BP	(HMS 5 x NP 81) x BDNG 20	52.8	66.4	112	155	23.6	21.5	1960	5	2110	11	93	2
17	ICCX-810486-6P-1P-BP*	(HMS 6 x P 2994) x ICCL 80074	57.6	66.1	113	151	14.7	16.2	2200	1	2310	6	69	3
18	ICCX-810492-3P-1P-BP$	(HMS 13 x NP 81) x Phule G 5	56.0	63.6	114	149	23.7	20.9	1620	12	2300	7	21	2
19	ICCX-810494-42P-2P-BP	(HMS 13 x P 2994) x BDNG 20	47.1	68.0	111	150	21.8	20.9	1380	21	1950	15	31	3
20	ICCX-810494-46P-1P-BP	(HMS 13 x P 2994) x BDNG 20	56.5	68.5	114	152	20.3	18.7	1290	24	1860	20	14	4
21	ICCX-810494-47P-1P-BP*	(HMS 13 x P 2994) x BDNG 20	57.5	70.0	113	150	17.8	17.7	1180	25	1690	22	25	4
22	ICCX-810494-48P-1P-BP	(HMS 13 x P 2994) x BDNG 20	61.8	74.2	114	149	19.7	16.5	1470	18	1430	24	35	5
23	ICCX-810498-14P-1P-BP$	(HMS 23 x ICCC 15) x BDNG 20	58.6	69.5	114	148	23.9	22.0	2040	3	2320	4	36	4
24	ICC 4918 (P) / ICC 5003 (G)	Annigeri/K 850	42.6	68.7	112	152	20.1	27.0	1310	23	2320	5		
25	ICC 5003 (P) / ICC 5215 (G)	K 850/Gwalior 2	59.6	65.1	114	159	29.0	16.2	2040	2	2190	8		
		Mean	54.8	66.8	114	150	19.9	18.6	1640		2020			
		SE±	1.47	2.07	1.0	2.2	0.59	0.88	146.7		134.0			
		CV(%)	5.4	6.2	1.7	2.9	6.0	9.4	17.9		13.2			

$ Selected for ICSN-EM, 1986/87
* Selected for AYT, 1986/87.

Table 3.23 Characteristics of entries in Preliminary Yield Trial 22-DM at ICRISAT Center (P) and Gwalior (G), 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering		Days to maturity		Weight of 100 seeds (g)		Seed yield (kg/ha)				% damage due to wilt	Insect damage score
			P	G	P	G	P	G	P	Rank	G	Rank	P	P
1	ICCX-810498-36P-1P-BP 31746	(HMS 23 x ICCC 15) x BDNG 20	50.9	71.3	103	150	21.7	18.5	1950	5	1530	20	100	6
2	ICCX-780357-118P-BP-1P-1P-BP$	K 850 x HMS 8	59.1	87.6	110	152	17.6	14.8	2020	4	2100	6	38	5
3	ICCX-780357-208P-BP-1P-1P-BP$	K 850 x HMS 8	57.8	87.0	110	151	19.1	21.4	2590	1	1770	12	32	4
4	ICCX-780362-1P-BH-1P-1P-1P-BP	JG 62 x HMS 18	60.6	87.8	111	153	16.5	14.6	1430	18	2110	5	86	6
5	ICCX-810472-1P-1P-BP	(HMS 4 x P 4203) x BDNG 20	49.1	66.9	106	152	19.0	17.4	1830	12	2450	2	78	6
6	ICCX-810473-4P-2P-BP	(HMS 4 x P 4203) x H 76-49	58.5	88.6	107	151	16.1	14.6	1010	24	2370	3	81	4
7	ICCX-810475-1P-1P-BP	(HMS 4 x RPSP 322-1) x GL 920	52.8	85.1	111	149	25.7	24.5	2170	3	1640	17	95	4
8	ICCX-810476-1P-4P-BP*	(HMS 5 x ICCC 15) x Phule G 5	52.5	82.5	106	153	24.6	23.8	1000	25	2210	4	11	5
9	ICCX-810477-1P-1P-BP$	(HMS 5 x ICCC 15) x BG 254	60.3	88.1	113	156	15.4	14.4	1860	8	1790	11	19	4
10	ICCX-810478-5P-1P-BP	(HMS 5 x JG 62) x 2375	42.9	83.7	98	153	27.5	22.5	1830	10	1230	24	67	5
11	ICCX-810478-5P-2P-BP	(HMS 5 x JG 62) x 2375	45.5	88.6	98	154	23.8	20.2	1850	9	1010	25	80	4
12	ICCX-810478-6P-2P-BP	(HMS 5 x JG 62) x 2375	49.6	86.2	101	150	21.7	20.6	1590	15	1360	23	50	5
13	ICCX-810480-2P-4P-BP*	(HMS 5 x NP 81) x BDNG 20	55.1	86.1	109	154	21.3	21.3	1620	14	1680	14	42	5
14	ICCX-810483-1P-3P-BP*	(HMS 5 x P 4203) x GL 920	57.8	91.2	109	154	18.7	18.4	1260	21	2530	1	21	5
15	ICCX-810494-3P-2P-BP$	(HMS 13 x P 2994) x BDNG 20	51.5	76.5	108	149	23.7	22.4	1560	16	1740	13	11	5
16	ICCX-790161-BH-BP-2P-1P-BP	P 272 x HMS 13	61.1	89.7	106	152	13.1	13.6	1470	17	1530	21	57	5
17	ICCX-790161-BH-BP-2P-2P-BP	P 272 x HMS 13	57.5	89.4	110	152	14.3	13.4	1360	19	1620	18	59	4
18	ICCX-790181-BH-BP-1P-1P-BP	Pant G 120 x HMS 28	55.4	88.7	108	150	20.0	20.7	1240	22	1660	15	88	6
19	ICCX-790181-BH-BP-1P-2P-BP	Pant G 120 x HMS 28	54.9	84.0	113	154	18.3	19.1	1190	23	1900	8	100	5
20	ICCX-790019-BP-BP-4P-BP	Phule G 3 x P 1198-1	52.2	90.8	105	157	18.7	17.4	2310	2	1650	16	100	5
21	ICCX-800086-BP-BP-3P-BP	ICCL 78073 x Phule G 1	61.6	86.7	112	159	21.2	18.3	1340	20	1480	22	100	5
22	ICCX-800012-BP-BP-21P-BP	P 127 x K 850	54.0	86.4	110	151	21.7	22.8	1940	6	1790	10	92	5
23	ICCX-800074-BP-BP-10P-BP	ICCL 78054 x BDN 9-3	55.9	86.4	107	151	19.8	22.8	1690	13	2070	7	73	6
24	ICC 4918 (P) / ICC 5003 (G)	Annigeri/K 850	43.4	78.7	106	149	22.5	27.3	1830	11	1860	9		
25	ICC 5003 (P) / ICC 5215 (G)	K 850/Gwalior 2	60.1	87.7	111	154	28.3	13.6	1920	7	1600	19		
		Mean	54.4	85.0	107	152	20.4	19.1	1670		1790			
		SE±	1.45	3.08	1.8	1.8	1.02	0.53	203.2		142.6			
		CV(%)	5.3	7.2	3.4	2.3	10.0	5.5	24.3		16.0			

$ Selected for ICSN-DM, 1986/87
* Selected for AYT, 1986/87.

Table 3.24 Characteristics of entries in Preliminary Trial [illegible]

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering		Days to maturity		Weight of 100 seeds (g)		Seed yield (kg/ha)				% damage due to wilt	Insect damage score
			P	G	P	G	P	G	P	Rank	G	Rank	P	P
1	ICCX-811064-12P-BP-BP	ICC 10619 EB x CPS 1	50.2	76.2	108	154	18.8	16.1	1930	17	1530	23	44	4
2	ICCX-811064-15P-BP-BP	ICC 10619 EB x CPS 1	50.1	69.6	107	152	20.3	17.1	1940	16	1560	22	70	4
3	ICCX-800553-21P-BP-1P-BP*	JG 74 x WR 315	45.8	70.8	98	149	19.7	16.8	1580	23	2150	10	32	4
4	ICCX-800553-65P-BP-1P-BP	JG 74 x WR 315	48.5	66.1	103	151	18.9	14.4	2210	9	2170	9	100	4
5	ICCX-800553-70P-BP-2P-BP	JG 74 x WR 315	45.6	71.4	100	153	18.7	14.9	1910	18	2110	12	100	4
6	ICCX-800581-1P-BP-1P-BP	Harigantas x WR 315	46.5	71.0	105	152	17.4	14.6	2450	4	1980	14	100	5
7	ICCX-800564-79P-BP-2P-BP	CPS 1 x NEC 790	44.6	70.4	100	157	21.9	17.8	1720	21	1230	25	100	5
8	ICCX-800565-29P-BP-1P-BP	CPS 1 x JG 62	42.8	73.6	99	156	21.6	19.1	1790	20	1500	24	100	6
9	ICCX-780391-2P-1P-1P-1P-BP	Annigeri x (P 36 x WR 315)	54.1	73.7	110	149	18.8	16.6	2270	8	2190	8	77	5
10	ICCX-780391-2P-1P-1P-2P-BP	Annigeri x (P 36 x WR 315)	54.1	70.4	112	151	18.9	16.5	2010	15	2110	11	100	5
11	ICCX-780391-2P-1P-1P-3P-BP	Annigeri x (P 36 x WR 315)	53.2	75.3	109	153	22.5	18.2	2110	13	1810	17	94	4
12	ICCX-780391-2P-2P-1P-1P-BP	Annigeri x (P 36 x WR 315)	54.2	74.9	110	149	19.0	16.9	1810	19	1930	15	73	5
13	ICCX-780391-2P-2P-2P-1P-BP	Annigeri x (P 36 x WR 315)	53.7	73.1	111	152	22.0	17.8	1710	22	1790	18	53	5
14	ICCX-780131-46P-2P-BP-1P-1P-BP	K 468 x T 3(Qualior)	56.0	84.2	113	152	14.9	13.4	2030	16	1770	19	93	5
15	ICCX-780131-79P-2P-BP-1P-1P-BP	K 468 x T 3(Qualior)	49.9	72.9	106	150	19.2	15.5	2170	12	1570	21	100	6
16	ICCX-780129-28P-1P-1P-1P-3P-BP	BDN 9-3 x P 6067	61.5	72.5	114	152	14.8	13.5	2350	6	2570	3	100	6
17	ICCX-780125-39P-1P-BP-1P-2P-BP	BDN 9-3 x P 436-2	50.3	75.0	110	147	20.2	19.8	2330	7	2640	2	100	5
18	ICCX-770596-112P-2P-BP-1P-2P-BP	P 6099 x P 45	55.5	80.4	114	151	19.8	15.0	1360	25	1640	20	100	5
19	ICCX-761471-6P-2P-BP-BP-1P-1P-BP	(JG 62 x WR 315) x (P 1363-1 x PRR 1)	51.2	70.3	111	150	20.8	17.7	2420	5	2320	4	100	5
20	ICCX-761472-9P-1P-BP-BP-1P-2P-BP*	(JG 62 x WR 315) x (P 1363-1 x PRR 1)	58.0	88.5	115	151	17.2	15.0	2200	10	2110	13	29	6
21	ICCX-761471-6P-2P-BP-BP-1P-1P-BP	(JG 62 x WR 315) x (P 1363-1 x PRR 1)	52.3	71.6	109	156	24.4	25.8	2560	1	2290	5	70	6
22	ICCX-770553-14P-1P-BP-BP-2P-BP	JGC 1 x WR 315	48.8	75.3	103	151	17.8	16.4	2470	3	1830	16	85	6
23	ICCX-780125-39P-1P-BP-1P-2P-BP	BDN 9-3 x P 436-2	51.8	75.7	109	152	20.9	19.2	2550	2	2680	1	100	6
24	ICC 4918(P)/ICC 5003(G)	Annigeri/K 850	42.7	73.8	101	150	22.5	27.5	1450	24	2230	7		
25	ICC 5003(P)/ICC 5215(G)	K 850/Qualior 2	57.3	73.0	110	154	27.6	13.2	2190	11	2230	6		
		Mean	51.1	74.0	107	152	19.9	17.2	2060		2000			
		SE±	1.09	3.20	1.0	2.2	0.67	0.40	150.2		109.2			
		CV(%)	4.3	8.6	1.8	2.8	6.8	4.6	14.6		10.9			

* Selected for AYT, 1986/87.

Table 3.25 Characteristics of entries in Preliminary Yield Trial-24 EM at ICRISAT Center, 1985/86.

Ent. No.	Pedigree	Days to 50% flowering		Days to mature		100-seed weight(g)		Seed yield kg/ha		Rank		Wilt%
		P	G	P	G	P	G	P	G	P	G	P
1	ICCX-771121-BP-BP-9P-1P-1P-BP (751245-F2-2 x 750877-F2-1)	54.8	72.3	106.2	151.7	21.8	18.0	2573	1992	6	10	90.0
2	ICCX-770781-BP-BP-21P-1P-1P-BP (JG 221 x 760953-F1)	56.3	73.6	102.5	154.4	17.5	14.7	1574	1623	25	22	100.0
3	ICCX-770475-BP-BP-26P-1P-1P-BP (RABAT x P 538)	53.5	73.2	107.3	154.5	21.0	15.4	2515	1832	9	13	95.2
4	ICCX-770475-BP-BP-27P-1P-1P-BP (RABAT x P 538)	54.3	63.7	107.4	153.8	21.6	15.7	2720	1731	1	20	100.0
5	ICCX-770475-BP-BP-28P-1P-1P-BP (RABAT x P 538)	54.3	71.4	106.9	149.7	19.4	17.3	2336	1884	16	12	100.0
6	ICCX-770475-BP-BP-33P-1P-1P-BP (RABAT x P 538)	56.5	70.0	105.8	151.3	20.1	16.0	2270	1792	18	16	100.0
7	ICCX-770148-BP-BP-2P-1P-1P-BP (JGC 1 x ICCC 1)	41.0	66.7	103.7	149.6	23.7	25.6	2450	1806	14	15	89.5
8	ICCX-770019-BP-BP-3P-2P-1P-BP$ (Annigeri x K 850)	50.0	70.9	102.9	150.0	17.9	17.5	2518	2216	8	7	18.2
9	ICCX-770148-BP-BP-37P-1P-1P-BP (JGC 1 x ICCC 1)	40.5	70.9	103.4	153.3	27.9	30.9	1970	1923	23	11	45.5
10	ICCX-770148-BP-BP-67P-1P-1P-BP@ (JGC 1 x ICCC 1)	52.0	69.1	105.2	151.6	28.4	32.1	2621	2259	5	6	8.3
11	ICCX-770795-BP-BP-49P-1P-1P-BP (P 436 x 760903-F1)	41.8	71.0	103.3	153.6	25.1	23.1	2316	1819	17	14	13.3
12	ICCX-770024-BP-BP-31P-1P-1P-BP (Annigeri x NEC 802)	44.3	72.0	104.9	150.6	21.9	20.9	2248	1570	20	23	92.3
13	ICCX-770026-BP-BP-34P-1P-2P-BP (Annigeri x E 100)	51.5	70.8	104.5	154.0	20.0	19.1	2690	1290	2	25	0.0
14	ICCX-770793-BP-BP-28P-1P-1P-BP (P 1209-1 x 760900-F1)	55.3	79.0	104.5	152.4	21.1	17.4	1667	2019	24	9	100.0
15	ICCX-770029-BP-BP-53P-1P-1P-BP (Annigeri x G 130)	45.3	73.5	108.7	151.3	22.5	20.9	2259	1717	19	21	20.0

Table 3.25 contd.

Ent. No.	Pedigree	Days to 50% flowering		Days to maturity		100-seed weight (g)		Seed yield kg/ha		Rank		Wilt%
		P	G	P	G	P	G	P	G	P	G	P
16	ICCX-770028-BP-BP-19P-1P-1P-BP (Annigeri x 730213-9-3-B-BP)	49.8	68.9	104.6	152.3	21.7	18.5	2222	1731	21	19	14.3
17	ICCX-770148-BP-BP-36P-1P-1P-BP (JGT 1 x ICCC 1)	52.5	69.3	106.8	155.4	25.9	27.5	2205	1774	22	18	7.1
18	ICCX-760218-BP-BP-10P-1P-1P-1P-BP@ (P 45 x P 9668)	51.0	67.6	108.5	156.6	21.2	21.6	2337	2424	15	2	30.8
19	ICCX-760232-BP-BP-28P-1P-1P-1P-BP (P 6099 x JG 71)	43.8	76.9	103.5	152.9	19.8	14.6	2497	1782	10	17	0.0
20	ICCX-761340-BP-BP-1P-2P-1P-1P-BP (P 2559 x 730349-F5)	40.3	74.5	104.0	151.6	19.4	18.5	2635	2102	4	8	75.0
21	ICCX-760654-BP-BP-1P-1P-1P-1P-BP (JG 62 x NEC 802)	48.8	76.1	103.3	150.3	22.9	23.1	2545	2560	7	1	100.0
22	ICCX-760654-BP-BP-27P-2P-1P-1P-BP (JG 62 x NEC 802)	48.8	71.0	102.2	150.1	19.1	15.1	2455	2282	13	5	100.0
23	ICCX-761229-BP-BP-2P-1P-1P-1P-BP (750693-F1 x 750816-F1)	53.0	78.7	103.5	151.0	16.7	13.3	2459	1558	11	24	20.8
24	ICC 5003 R 850	62.3	72.4	108.5	155.2	29.0	26.8	2638	2416	3	3	
25	Local check	50.5	74.4	106.8	152.6	22.3	12.9	2455	2331	12	4	
	Mean	50.06	71.92	105.16	152.39	21.91	19.86	2367.0	1937.3			
	SE±	1.22	2.65	0.97	1.66	0.96	0.44	168.9	146.8			
	CV(%)	4.88	7.36	1.84	2.18	8.55	4.43	14.3	15.2			

@ Selected for ICSN-06, 1986/87
$ Selected for ICSN-04, 1986/87.

P = Patancheru
G = Quilior

Table 3.26 Characterisitics of entries in Multiseeded Lines Trial at ICRISAT Center, 1985/86.

Ent. no.	Selection	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	Multiseeded-10-2P-BP	41.8	98	13.1	1350	11	100	6
2	Multiseeded-10-4P-BP	41.3	103	13.7	1220	14	100	7
3	Multiseeded-16-2P-BP	48.0	113	22.7	1580	4	100	4
4	Multiseeded-16-5P-BP	57.3	113	17.3	1380	8	100	4
5	Multiseeded-20-3P-BP	46.3	110	16.5	890	23	100	6
6	Multiseeded-20-4P-BP	46.5	108	15.2	790	24	100	6
7	Multiseeded-23-5P-BP	46.3	109	15.1	1010	20	100	5
8	Multiseeded-30-4P-BP	45.0	104	13.1	1160	16	95	6
9	Multiseeded-34-5P-BP	46.0	108	14.5	780	25	100	5
10	Multiseeded-43-4P-BP	49.8	113	14.4	1680	1	95	4
11	Multiseeded-43-5P-BP	50.8	113	15.2	1540	5	94	5
12	Multiseeded-54-5P-BP@	44.5	109	17.3	1630	2	24	6
13	Multiseeded-2	45.0	113	16.1	1070	18	100	4
14	Multiseeded-13	45.3	101	18.3	1160	17	100	5
15	Multiseeded-24	51.5	107	14.7	930	22	100	5
16	Multiseeded-28	62.0	112	14.4	1370	9	100	3
17	Multiseeded-46	44.3	109	16.2	1190	15	100	5
18	Multiseeded-49	47.0	101	13.7	940	21	100	5
19	Multiseeded-59	51.5	114	15.1	1370	10	100	4
20	Multiseeded-60	47.5	103	15.4	1340	12	100	5
21	Multiseeded-62	50.0	106	12.8	1470	7	100	4
22	Multiseeded-66	45.8	109	13.1	1300	13	100	5
23	ICCL 82108	50.8	112	17.0	1620	3	17	5
24	ICC 4918 Annigeri	43.3	110	20.9	1520	6		
25	ICC 4951 JG 62	47.3	112	15.1	1030	19		
	Mean	47.8	108	15.6	1250			
	SE±	1.68	2.6	1.32	163.5			
	CV(%)	7.1	4.7	16.9	26.1			

@ Selected for ICSN-DS, 1986/87.

Table 3.27 Characteristics of entries in Preliminary Yield Trial-17 DS at ICRISAT Center, 1985/86.

Ent. No.	Selection No./name	Parentage	Days to 50% flowering	Borer damage%	Seed yield kg/ha	Rank	Wilt %
1	ICCX-800584-1P-2P-1PUY-8PLB*	JG 74 x P 386	60.0	4.7	832	21	25.0
2	ICCX-800584-3ZP-1P-2PLB-8PLB	JG 74 x P 386	56.0	4.0	729	23	100.0
3	ICCX-790197-1PLB-11PLB-11PLB-1PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	43.8	5.4	1011	1	100.0
4	ICCX-790197-3PLB-1ZPLB-3PLB-1PLB-8PLB	ICGC 4 x ICC-506-EB-EB	42.5	7.9	940	11	100.0
5	ICCX-790197-3PLB-1ZPLB-3PLB-7PLB-8PLB	ICGC 4 x ICC-506-EB-EB	43.8	5.9	842	20	100.0
6	ICCX-790197-3PLB-1ZPLB-11PLB-4PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	43.0	4.4	986	3	100.0
7	ICCX-790197-23PLB-11PLB-1ZPUY-2PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	43.3	5.6	919	13	100.0
8	ICCX-790197-23PLB-1ZPLB-1PLB-1PUY-8PLB	ICGC 4 x ICC-506-EB-EB	43.5	4.6	906	16	100.0
9	ICCX-790197-23PLB-1ZPLB-2PUY-1PUY-8PLB*	ICGC 4 x ICC-506-EB-EB	43.5	5.8	986	4	100.0
10	ICCX-790197-23PLB-1ZPLB-11PLB-3PUY-8PLB	ICGC 4 x ICC-506-EB-EB	43.5	5.6	907	15	100.0
11	ICCX-790197-24PLB-11PLB-1PUY-1PLB-8PLB	ICGC 4 x ICC-506-EB-EB	43.8	4.3	919	12	100.0
12	ICCX-790197-24PLB-11PLB-1PUY-2PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	43.8	4.8	974	5	100.0
13	ICCX-790197-24PLB-11PLB-2PUY-2PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	44.3	4.8	969	7	100.0
14	ICCX-790197-24PLB-11PLB-2PUY-5PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	42.8	5.4	966	8	100.0
15	ICCX-790197-25PLB-11PLB-11PLB-2PLB-8PLB*	ICGC 4 x ICC-506-EB-EB	43.0	6.6	1010	2	100.0
16	ICCX-790197-25PLB-1ZPLB-4PLB-2PUY-8PLB*	ICGC 4 x ICC-506-EB-EB	44.3	5.2	959	9	100.0
17	ICCX-790197-25PLB-1ZPLB-3PLB-1PLB-8PLB	ICGC 4 x ICC-506-EB-EB	42.5	6.5	971	6	100.0
18	ICCX-790197-25PLB-1ZPLB-4PLB-1PUY-8PLB	ICGC 4 x ICC-506-EB-EB	44.5	4.3	896	17	100.0
19	ICCX-790197-25PLB-1ZPLB-11PUY-2PLB-8PLB	ICGC 4 x ICC-506-EB-EB	45.8	8.1	852	19	100.0
20	ICCX-790197-25PLB-1ZPLB-11PUY-3PLB-8PLB	ICGC 4 x ICC-506-EB-EB	44.3	6.8	946	10	100.0
21	ICCX-790197-34PLB-11PLB-5PLB-3PUY-8PLB	ICGC 4 x ICC-506-EB-EB	44.3	5.7	894	18	100.0
22	ICCX-790212-21PLB-11PUY-11PLB-2PLB-8PLB*	ICCX-780286 x MR 315	63.3	5.4	719	24	50.0
23	ICCX-790212-21PLB-11PUY-11PLB-4PLB-8PLB	ICCX-780286 x MR 315	63.8	5.6	658	25	90.5
24	Annigeri		46.0	18.9	765	22	
25	ICC 506		45.3	5.9	918	14	
	Mean		46.56	6.09	898.9		
	SE±		0.37	0.69	45.3		
	CV(%)		1.60	22.74	10.1		

* Selected for AYT, 1986/87.

Table 3.28 Characteristics of entries in Preliminary Yield Trial-18 DS at ICRISAT Center, 1985/86.

Ent. No.	Selection No./Name	Parentage	Days to 50% flowering	Borer damage %	Seed yield kg/ha	Rank	Wilt %
1	ICCX-780286-5PLB-5PLB-1PLB-2PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	58.3	9.2	854	13	100.0
2	ICCX-780286-12PLB-4PLB-3PHB-1PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	51.8	6.7	800	16	100.0
3	ICCX-780286-12PLB-4PLB-5PLB-7PHB-BPLB*	ICC-506-EB-EB x ICC-1381-EB-EB	44.0	9.4	926	2	100.0
4	ICCX-780286-17PLB-2PLB-1PLB-2PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	41.8	5.2	881	7	100.0
5	ICCX-780286-17PLB-2PLB-11PUY-6PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	41.5	6.9	864	10	100.0
6	ICCX-780286-18PLB-11PLB-11PLP-1PUY-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	46.3	4.8	833	15	100.0
7	ICCX-780286-20PLB-11PLB-11PUY-1PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	49.5	5.4	835	14	100.0
8	ICCX-780286-22PLB-1ZPLB-11PLB-3PUY-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	47.3	9.7	771	19	100.0
9	ICCX-780286-29PHB-3PLB-3PUY-3PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	50.0	6.5	859	12	100.0
10	ICCX-780286-29PHB-3PLB-5PUY-1PLB-BPLB*	ICC-506-EB-EB x ICC-1381-EB-EB	46.3	7.8	899	4	100.0
11	ICCX-780286-29PHB-3PLB-2PHB-2PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	48.5	5.3	870	9	100.0
12	ICCX-780286-29PHB-3PLB-2PHB-4PUY-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	42.8	8.5	889	6	100.0
13	ICCX-780286-29PHB-3PLB-3PLB-1PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	46.8	6.7	775	18	100.0
14	ICCX-780287-14PHB-1ZPLP-11PUY-3PUY-BPLB*	ICC-506-EB-EB x ICC-3316-EB-EB	44.3	5.7	890	5	100.0
15	ICCX-780288-1ZPLB-3PLB-1ZPUY-6PUY-BPLB*	ICC-506-EB-EB x ICC-7770-EB-EB	40.5	5.8	1035	1	100.0
16	ICCX-780288-1ZPLB-11PLB-11PUY-1PLB-BPLB*	ICC-506-EB-EB x ICC-7770-EB-EB	40.8	4.0	904	3	76.2
17	ICCX-790212-20PLB-11PLB-BPWR-BPWR-BPLB*	ICCX-780286 x WR 315	40.3	12.7	796	17	16.6
18	ICCX-790212-21PLB-11PUY-BPWR-BPWR-BPLB@	ICCX-780286 x WR 315	43.5	10.8	871	8	11.1
19	ICCX-790212-31PLB-11PLB-BPWR-BPWR-BPLB*	ICCX-780286 x WR 315	55.8	6.8	662	25	10.5
20	ICCX-790212-51PLB-11PUY-BPWR-BPWR-BPLB*	ICCX-780286 x WR 315	40.3	12.0	676	24	37.5
21	ICCX-780287-2PLB-BP-9PLB-4PUY-2PLB-BPLB	ICC-506-EB-EB x ICC-3316-EB-EB	60.5	4.1	726	22	100.0
22	ICCX-780287-2PLB-BP-9PLB-1PLB-1PLB-BPLB*	ICC-506-EB-EB x ICC-3316-EB-EB	64.8	3.5	707	23	96.6
23	ICCX-780287-2PLB-BP-9PLB-1PLB-4PLB-BPLB*	ICC-506-EB-EB x ICC-3316-EB-EB	61.5	3.6	864	11	90.1
24	Annigeri		44.5	18.4	759	20	
25	ICC 506		42.8	4.6	734	21	
	Mean		47.75	7.37	827.1		
	SE±		0.29	0.88	70.0		
	CV(%)		1.21	23.76	16.9		

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.29 Characteristics of entries in Advance Yield Trial - 1 DS at ICRISAT Center, 1985/86.

Ent. no.	Pedigree/ICC no.	Parentage/name	Days to 50% flowering	Days to maturity	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank	Wilt %	Insect damage score
1	ICCX-790047-BP-BP-13P-BP-BP	Annigeri, x ICCC 9	42.8	106	18.3	2710	10	0	5
2	ICCX-790073-BP-BP-29P-BP-BP	JG 74 x (K 850 x N 59)	44.0	100	19.2	2700	11	17	6
3	ICCX-780379-BP-BP-16P-BP-BP*@	ICCC 4 x F1 (Annigeri x Pant G 114)	40.3	103	17.8	2840	4	47	5
4	ICCX-780100-BP-BP-15P-BP-BP	(JG 62 x F 496) x Annigeri	40.8	99	17.3	2790	7	17	6
5	ICCX-780083-BP-BP-16P-BP*@	(JG 62 x F 496) x K 850	37.0	103	18.0	2930	1	22	4
6	ICCX-780085-BP-BP-39P-BP-BP*@	(JG 62 x F 496) x CHAFFA	38.3	100	17.5	2860	2	26	4
7	ICCX-790067-BP-BP-67P-BP-BP*@	JG 74 x ICCC 9	38.5	104	19.1	2840	5	11	6
8	ICCX-780654BP-BP-18P-BP-BP	ICCC 1 x K 850	49.8	111	36.8	2210	20	71	5
9	ICCX-780070-BP-BP-50P-BP-BP	(K 850 x F 378) x GW 5/7	39.5	101	26.2	2380	17	18	3
10	ICCX-780070-BP-BP-56P-BP-BP	(K 850 x P 378) x GW 5/7	35.3	105	35.8	2360	18	18	6
11	ICCX-780100-BP-BP-52P-BP-BP*@	(JG 62 x F 496) x Annigeri	35.0	100	18.0	2850	3	29	6
12	ICCX-790057-BP-BP-24P-BP-BP	Phule G 4 x ICCC 9	40.5	113	23.3	2210	19	6	7
13	ICC 8474	JM 502	36.3	105	32.6	2470	15	13	6
14	ICCX-780374-46P-BP-1P-BP-BP	Annigeri x F1 (P 436 x H 223)	42.0	100	17.2	2140	23	12	5
15	ICCX-790161-BH-BP-37P-BP-BP	P 272 x PMS 13	44.3	101	15.9	2200	21	8	4
16	ICCX-790242-BT-BP-11P-BP-BP@	Annigeri x ICCC 1	40.0	104	22.8	2750	8	18	3
17	ICCX-770534-2P-4P-BP-BP-BP	C 214 x CPS 1	45.0	106	16.5	2500	14	5	3
18	ICCX-770553-18P-1P-BP-BP-BP	JGC 1 x MR 315	40.3	105	27.8	2020	25	16	6
19	ICCX-780128-4P-5P-BP-BP-BP	BDN 9-3 x P 4321-2	42.0	109	17.1	2730	9	32	4
20	ICCX-780129-34P-1P-1P-BP-BP	BDN 9-3 x P 6067	40.5	105	16.3	2830	6	38	5
21	ICCX-780166-94P-1P-1P-BP-BP	MR 315 x P 436-2	43.0	106	21.3	2620	12	22	4
22	ICCX-800582-13P-BP-BP-BP	PARIGAMDAS x JG 74	43.3	104	18.6	2430	16	19	5
23	ICCX-790172-BH-BP-20P-BP-BP	P 502 x PMS 23	45.0	101	15.5	2110	24	5	3
24	ICC 4918	Annigeri	42.0	109	21.1	2530	13		
25	ICC 5003	K 850	56.8	113	27.6	2160	22		
		Mean	41.7	105	21.5	2530			
		SE±	1.19	1.8	0.75	180.3			
		CV(%)	5.7	3.4	7.0	14.3			

@ Selected for ICSN-DS, 1986/87
* Selected for AYT, 1986/87.

Table 3.30 Characteristics of entries in Advanced Yield Trial-2 DS at ICRISAT Center, 1985/86.

Ent. No.	Selection No./Name	Parentage	Days to 50% flowering	Days to mature	100-seed weight (g)	Seed yield kg/ha	Rank	Wilt %
1	ICGX-770795-BP-BP-116P-1P-BP	P-436 x ICGX-760903-F1	50.8	101.8	16.0	1828	24	100.0
2	ICGX-770019-BP-BP-29P-1P-BP	Annigeri x K 850	44.8	101.8	17.8	2950	5	18.8
3	ICGX-770024-BP-BP-21P-1P-BP	Annigeri x NEC 802	40.5	105.5	24.1	2903	7	5.9
4	ICGX-770024-BP-BP-36P-1P-BP	Annigeri x NEC 802	40.5	102.5	18.2	2809	9	78.6
5	ICGX-770147-BP-BP-64P-1P-BP	JGG 1 x PANT G-114	40.5	102.8	16.9	2917	6	90.5
6	ICGX-761945-BP-BP-60P-3P-1P-BP	F2[P9669R(10-2-3CP-472)]-1 x ICGX-741557-F2-1	41.3	101.0	17.2	1890	23	100.0
7	ICGX-770782-BP-BP-8P-1P-BP	ICGG 2 x ICGX-760936-F1	40.8	104.0	15.0	3054	1	36.8
8	ICGX-770148-BP-BP-20P-1P-BP	JGG 1 x ICGG 1	41.5	101.0	30.5	2492	15	83.3
9	ICGX-761159-BP-BP-25P-1P-1P-BP	CHAFFA x ICGX-750534-F1	47.0	103.3	19.0	2813	8	76.5
10	ICGX-761193-BP-BP-82P-2P-1P-BP	NEC 556 x ICGX-750876-F1	37.3	113.8	20.8	1936	21	100.0
11	ICGX-760634-BP-BP-5P-1P-1P-BP	H 208 x NEC 802	56.8	103.5	16.6	3022	3	81.3
12	ICGX-760716-BP-BP-1P-1P-1P-BP	G 130 x Annigeri	45.3	107.3	15.9	3038	2	30.8
13	ICGX-790126-4P-1P-1P-BP	PANT G-114 x K 56567	38.0	105.3	20.7	2449	16	93.8
14	ICGX-770909-BH-2H-1P-1P-BP	K 850 x ICGX-760492-F1	61.0	111.8	27.4	2519	13	100.0
15	ICGX-770914-BH-15H-1P-1P-BP	PANT G-115 x ICGX-760502-F1	59.8	109.8	18.9	2039	20	94.1
16	ICGX-770943-BH-1H-1P-1P-BP	PANT G-115 x ICGX-760732-F1	41.8	109.8	19.3	2497	14	82.6
17	ICGX-751251-19H-1P-BP-1P-1P-1P-BP	P 2974 x NEC 139	60.0	106.8	18.9	2424	18	57.9
18	ICGX-750012-22-1P-1P-2H-1P-1P-1P-BP	Annigeri x K 1480	60.5	110.0	16.7	1932	22	94.4
19	ICGX-770788-BP-BP-17P-1P-BP	K 468 x ICGX-760864-F1	60.0	108.8	15.0	2331	19	64.7
20	ICGX-770488-BP-BP-13P-1P-BP	ICC 8209 x C 104	51.5	107.5	15.3	2734	10	81.3
21	ICGX-770784-BP-BP-17P-1P-BP	PANT G-115 x ICGX-760852-F1	60.5	109.0	12.8	2527	12	96.0
22	ICGX-770784-BP-BP-23P-1P-BP	PANT G-115 x ICGX-760852-F1	55.8	105.3	12.2	1436	25	100.0
23	ICGX-770782-BP-BP-19P-1P-BP	ICGG 2 x ICGX-760936-F1	44.3	116.0	14.3	2439	17	100.0
24	Annigeri		44.5	103.3	21.0	2982	4	•
25	K 850		60.5	109.0	26.4	2715	11	
	Mean		48.99	106.40	18.67	2507.0		
	SE±		1.02	0.80	0.77	201.5		
	CV(%)		4.18	1.50	8.23	16.1		

Table 3.31 Characteristics of entries in Advanced Yield Trial-3 DS at ICRISAT Center, 1985/86.

Ent. No.	Selection No./Name	Parentage	Days to 50% flowering	Borer damage %	Seed yield kg/ha	Rank	Wilt %
1	ICCX-790197-1PLB-11PLB-12PLB-BPLB	ICGC 4 x ICC-506-EB-EB	43.0	6.1	774	23	94.1
2	ICCX-790197-3PLB-1PLB-4PUY-BPLB	ICGC 4 x ICC-506-EB-EB	42.8	6.2	895	8	100.0
3	ICCX-790197-23PLB-12PLB-2PUY-BPLB	ICGC 4 x ICC-506-EB-EB	42.5	4.9	853	13	100.0
4	ICCX-790197-25PLB-11PLB-11PLB-BPLB	ICGC 4 x ICC-506-EB-EB	42.5	5.2	894	9	100.0
5	ICCX-790197-25PLB-12PLB-3PLB-BPLB*	ICGC 4 x ICC-506-EB-EB	42.8	4.1	853	12	100.0
6	ICCX-790197-25PLB-12PLB-5PUY-BPLB	ICGC 4 x ICC-506-EB-EB	42.5	6.6	834	16	100.0
7	ICCX-780286-3PLB-11PHB-11PLB-BPLB*	ICC-506-EB-EB x ICC-1381-EB-EB	43.8	9.2	935	3	100.0
8	ICCX-780286-17PLB-5PLB-2PHB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	42.5	5.3	870	11	100.0
9	ICCX-780286-22PLB-11PUY-2PUY-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	42.5	15.3	825	19	100.0
10	ICCX-780286-22PLB-11PUY-3PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	43.5	11.6	806	20	100.0
11	ICCX-780286-29PHB-12PLB-11PUY-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	47.3	7.4	827	17	100.0
12	ICCX-780288-12PLB-4PLB-11PLB-BPLB*	ICC-506-EB-EB x ICC-7770-EB-EB	43.0	6.0	890	10	82.3
13	ICCX-780288-13PLB-12PLB-12PUY-BPLB	ICC-506-EB-EB x ICC-7770-EB-EB	42.0	9.1	786	21	100.0
14	ICCX-790197-3PLB-3PLB-BPLB*	ICGC 4 x ICC-506-EB-EB	43.0	6.1	954	1	100.0
15	ICCX-790197-23PLB-11PLB-BPLB*	ICGC 4 x ICC-506-EB-EB	42.8	5.5	904	6	100.0
16	ICCX-780286-5PLB-2PLB-BPLB*	ICC-506-EB-EB x ICC-1381-EB-EB	42.0	7.3	938	2	100.0
17	ICCX-790197-3PLB-4PLB-BPLB	ICGC 4 x ICC-506-EB-EB	43.0	5.0	895	7	100.0
18	ICCX-780286-5PLB-2PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	42.5	7.0	906	5	100.0
19	ICCX-780286-5PLB-11PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	46.3	6.8	906	4	100.0
20	ICCX-780288-12PLB-5PLB-BPLB	ICC-506-EB-EB x ICC-7770-EB-EB	42.0	4.8	852	15	100.0
21	ICCX-780286-32PHB-1PLB-BPLB	ICC-506-EB-EB x ICC-7770-EB-EB	42.5	8.9	826	18	100.0
22	ICCX-780286-4PLB-11PLB-BPLB	ICC-506-EB-EB x ICC-1381-EB-EB	43.5	10.3	852	14	100.0
23	ICC 506		43.5	5.0	776	22	100.0
24	Annigeri		44.0	21.0	599	25	
25	K 850		59.3	14.8	712	24	
	Mean		43.79	7.98	846.5		
	SE±		0.25	0.81	50.3		
	CV(%)		1.16	20.41	11.9		

Selected for AYT, 1986/87.

Project C-104(85)IC: Breeding long duration desi chickpeas for stability and high yield - International

Objectives:

(1) To breed long duration desi type cultivars with high yield, and stability, and consumer acceptance,

(2) To contribute early generation and advanced generation breeding materials to chickpea growing countries.

Introduction

During the year we re-organized the research projects to emphasise the stability of performance in the breeding program. Earlier, we had seperate projects for breeding for high yield, disease resistance and insect resistance. Considering that we need to incorporate the resistances to different stress factors, along with yield, for stability, the projects were re-organized combining different projects. This project now deals with breeding desi chickpeas for long duration environments.

Until last year, we were testing early generation (F_2/F_3) bulks in replicated tests; and the selected F_4 bulks were space planted for deriving single plants. We did not find the early generation testing to be useful in selecting high yielding progenies. The high yielding progenies in F_5/F_6 generations did not show any correlation with their early generation (F_2/F_3) performances.

Resistance to Fusarium wilt is mandatory in the breeding material, because the disease is widespread. Therefore, all crosses are screened in F_2/F_3 stage for wilt resistance. These will be screened for other resistances such as stunt, Ascochyta blight, Heliothis, etc., in appropriate nurseries in later generations (F_4/F_5). Progenies will be evaluated in F_5 and F_6 generations, and the selected progenies will be included in replicated trials. Promising lines from these trials will be contributed to international nurseries.

Hybridization

The crossing block had 60 genotypes, and we used 52 lines for hybridization. Apart from these, the crossing block had 131 lines that were planted as a working collection. We made 14 three-way, and 144 single crosses (Table 4.1). Among the single crosses, 15 were for combining Ascochyta blight resistance with high yield; 27 for combining wilt, stunt and Ascochyta blight resistance with yield; 23 were for combining resistance to wilt, stunt, botrytis gray mold with high yield; 10 were for combining resistance to Ascochyta blight, Botrytis gray mold and stunt with wilt and dry root rot resistances; and the remaining 69 crosses involved high yielding strains with

Table 4.1 Crosses made in 1985/86 to combine high yield and resistance to various biotic factors into desi long duration chickpea.

Cross No.	Female Parent	Male Parent
Three-way crosses		
Aschocyta blight and high yield		
850321	(ICC 1069 x C 235)	Pant G-114
850322	(ICC 1069 x C 235)	BG-261
850323	(ICC 1069 x C 235)	GL 769
850718	Pant G-114	(ICC 12237 x ILC 202)
850719	BG 256	(ICC 11321 x ICC 6988)
850720	BG 256	(235-38 x GL 1002)
850721	Pant G-114	(H 83-23 x ICC 12269)
850722	GNG 146	(ICC 3274 x ILC 202)
850723	BG 256	(ICC 3274 x NEC 138-2)
850724	Pant G-114	(H 83-24 x NEC 138-2)
850725	GNG 146	(ICC 8383 x ICCL 80004)
850726	ICCC 40	(ICC 1069 x ICC 12237)
850727	Pant G-114	(H 83-24 x ICC 12237)
850728	GNG 146	(H 83-24 x ICC 12237)
Single Crosses		
Ascochyta blight and High yield		
850324	ICC 1069	GNG 146
850325	ILC 3279	C 235
850326	ILC 3279	GNG 146
850371	ICC 3935	Pant G-114
850372	ICC 3935	GNG 146
850373	ICC 3935	GL 1002
850374	ICC 3935	H 81-200
850375	H 81-73	Pant G-114
850376	H 81-73	GNG 146
850377	H 81-73	GL 1002
850378	H 81-73	H 81-200
850379	235-38	Pant G-114
850380	235-38	GNG 146
850381	235-38	GL 1002
850382	235-38	H 81-200

Table 4.1 contd.

Cross No.	Female Parent	Male Parent
(Wilt + Stunt) x Ascochyta blight		
850327	ICC 12237	ILC 202
850328	ICC 12237	ILC 3279
850329	ICC 12237	ICC 6988
850331	ICC 12237	H 76-66
850332	ICC 12269	ILC 202
850333	ICC 12269	ILC 3279
850334	ICC 12269	ICC 6988
850336	ICC 12269	H 76-66
850347	ICC 12435	ILC 202
850348	ICC 12435	ILC 3279
850350	ICC 12435	ICC 6988
850351	ICC 12435	H 76-66
850352	ICC 11320	ILC 202
850353	ICC 11320	ILC 3279
850355	ICC 11320	ICC 6988
850356	ICC 11320	H 76-66
850357	ICC 3274	ILC 202
850358	ICC 3274	ILC 3279
850360	ICC 3274	ICC 6988
850361	ICC 3274	H 76-66
850362	H 83-23	ILC 202
850363	H 83-23	ILC 3279
850365	H 83-23	ICC 6988
850366	H 83-23	H 76-66
850367	H 83-24	ILC 202
850368	H 83-24	ILC 3279
850370	H 83-24	ICC 6988
(Wilt + Stunt) x (Ascochyta blight + Botrytis + High yield)		
850330	ICC 12237	NEC 138-2
850335	ICC 12269	NEC 138-2
850337	ICC 11321	ILC 202
850338	ICC 11321	ILC 3279
850339	ICC 11321	ICC 6988
850340	ICC 11321	NEC 138-2
850341	ICC 11321	H 76-66
850342	ICCL 80004	ILC 202
850343	ICCL 80004	ILC 3279
850344	ICCL 80004	ICC 6988
850345	ICCL 80004	NEC 138-2
850346	ICCL 80004	H 76-66

Table 4.1 contd.

Cross No.	Female Parent	Male Parent
850349	ICC 12435	NEC 138-2
850354	ICC 11320	NEC 138-2
850359	ICC 3274	NEC 138-2
850364	H 83-23	NEC 138-2
850369	H 83-24	NEC 138-2
850384	ICC 1069	ICC 12269
850385	ICC 1069	ICC 11321
850386	ICC 1069	ICCL 80004
850390	ICC 8383	ICCL 80004
850394	H 83-23	ICCL 80004
850398	H 83-24	ICCL 80004
(Ascochyta + Botrytis/Stunt) x (Wilt + Dry root rot)		
850383	ICC 1069	ICC 12237
850387	ICC 8383	ICC 12237
850388	ICC 8383	ICC 12269
850389	ICC 8383	ICC 11321
850391	H 83-23	ICC 12237
850392	H 83-23	ICC 12269
850393	H 83-23	ICC 11321
850395	H 83-24	ICC 12237
850396	H 83-24	ICC 12269
850397	H 83-24	ICC 11321
High yield x Geographical diversity		
850399	C 235	ICC 5332
850400	C 235	ICC 7777
850401	C 235	ICC 8265
850402	C 235	ICC 996
850403	C 235	ICC 1163
850404	C 235	ICC 8589
850405	C 235	ICC 8542
850406	C 235	ICC 7734
850407	C 235	ICC 2210
850408	C 235	ICC 4454
850409	Pant G-114	ICC 5332
850410	Pant G-114	ICC 7777
850411	Pant G-114	ICC 8265
850412	Pant G-114	ICC 996
850413	Pant G-114	ICC 1163
850414	Pant G-114	ICC 8542
850415	Pant G-114	ICC 8542

Table 4.1 contd.

Cross No.	Female Parent	Male Parent
850416	Pant G-114	ICC 7734
850417	Pant G-114	ICC 4454
850418	Pant G-114	ICC 4454
850419	GNG 146	ICC 5332
850420	GNG 146	ICC 7777
850421	GNG 146	ICC 8265
850422	GNG 146	ICC 996
850423	GNG 146	ICC 1163
850424	GNG 146	ICC 8589
850425	GNG 146	ICC 8542
850426	GNG 146	ICC 7734
850427	GNG 146	ICC 2210
850428	GNG 146	ICC 4454
850429	GL 769	ICC 5332
850430	GL 769	ICC 7777
850431	GL 769	ICC 8265
850432	GL 769	ICC 996
850433	GL 769	ICC 1163
850434	GL 769	ICC 8589
850435	GL 769	ICC 8542
850436	GL 769	ICC 7734
850437	GL 769	ICC 2210
850438	GL 769	ICC 4454
850439	BGM 419	ICC 5332
850440	BGM 419	ICC 7777
850441	BGM 419	ICC 8265
850442	BGM 419	ICC 996
850443	BGM 419	ICC 1163
850444	BGM 419	ICC 8589
850445	BGM 419	ICC 8542
850446	BGM 419	ICC 7734
850447	BGM 419	ICC 2210
850448	BGM 419	ICC 4454
850449	GL 1002	ICC 5332
850450	GL 1002	ICC 7777
850451	GL 1002	ICC 8265
850452	GL 1002	ICC 996
850453	GL 1002	ICC 1163
850454	GL 1002	ICC 8589
850455	GL 1002	ICC 8542
850456	GL 1002	ICC 7734
850457	GL 1002	ICC 2210
850458	GL 1002	ICC 4454
850459	ICC 671	ICC 5332
850460	ICC 671	ICC 7777

Table 4.1 contd...

Cross No.	Female Parent	Male Parent
850461	ICC 671	ICC 8265
850462	ICC 671	ICC 996
850463	ICC 671	ICC 1163
850464	ICC 671	ICC 8589
850465	ICC 671	ICC 8542
850466	ICC 671	ICC 7734
850468	ICC 671	ICC 4454
Botrytis mold tolerance		
850729	ICC 1069	ICC 5035
850730	ICC 1069	ICC 6299
850731	IGC 1069	ICC 10302
850732	ICC 1069	ICC 12961
850733	ICC 5035	ICC 6299
850734	ICC 5035	ICC 10302
850735	ICC 5035	ICC 12961
850736	ICC 6299	ICC ICC 10302
850737	ICC 6299	ICC 12961
Ascochyta blight resistance - Desi and Kabuli		
850738	ICC 10302	ICC 12961
850739	ICC 1416	ICC 6988
850740	ICC 1416	ICC 5035
850741	ICC 1416	ICC 5127
850742	ICC 1416	ICC 13817
850743	ICC 1416	ICC 5124
850744	ICC 1416	ICC 12961
850745	ICC 1416	ICC 11874
850746	ICC 1416	ILC 3279
850747	ICC 1416	ICC 12952
850748	ICC 6988	ICC 5035
850749	ICC 6988	ICC 5127
850750	ICC 6988	ICC 13817
850751	ICC 6988	ICC 5124
850752	ICC 6988	ICC 12961
850753	ICC 6988	ICC 11874
850754	ICC 6988	ILC 3279
850755	ICC 6988	ICC 12952
850756	ICC 5035	ICC 5127
850757	ICC 5035	ICC 13817
850758	ICC 5035	ICC 5124
850759	ICC 5035	ICC 12961
850760	ICC 5035	ICC 11874

Table 4.1 contd.

Cross No.	Female Parent	Male Parent
850761	ICC 5035	ILC 3279
850762	ICC 5035	ICC 12952
850763	ICC 5127	ICC 13817
850764	ICC 5127	ICC 1524
850765	ICC 5127	ICC 12961
850766	ICC 5127	ICC 11874
850767	ICC 5127	ILC 3279
850768	ICC 5127	ICC 12952
850769	ICC 13817	ICC 5124
850770	ICC 13817	ICC 12961
850771	ICC 13817	ICC 11874
850772	ICC 13817	ILC 3279
850773	ICC 13817	ICC 12952
850774	ICC 5124	ICC 12961
850775	ICC 5124	ICC 11874
850776	ICC 5124	ILC 3279
850777	ICC 5124	ICC 12952
850778	ICC 12961	ICC 11874
850779	ICC 12961	ILC 3279
850780	ICC 12961	ICC 12952
850781	ICC 11874	ILC 3279
850782	ICC 11874	ICC 12952
850783	ILC 3279	ICC 12952
Back Crosses		
850596	(WR 315 x T 3)	T 3
850597	(P 436-2 x C 235)	C 235

geographically diverse lines. In addition to these, we made 10 and 45 crosses, respectively for increasing levels of resistance to Botrytis and Ascochyta and to study inheritance of resistance to these diseases. Some single crosses will be used to make three-way crosses next year.

F_1 Generation

Remnant seeds of 180 F_1's from the previous season (1984/85) were planted for advancement. Twenty-one crosses were killed due to soil salinity. We harvested the remaining 159 crosses. One hundred and fiftytwo crosses made during this season were planted in the off-season nursery at Tapperwaripora (Jammu and Kashmir) to advance the generation.

F_2 Populations

We had 336 F_2 populations for planting but could accommodate only 18 in wilt sick plot, 8 in Ascochyta blight nursery, 15 in Heliothis nursery and 6 in in normal fields. The remaining F_2's which could not be accommodated in the wilt sick plot, will be planted next year (Table 4.3).

F_3 Generation

We grew 8 bulks and 2646 progenies for evaluation and selection, and selected 545 single plants and 371 bulks for further evaluation. We could not accommodate 145 F_3 bulks and 1029 F_3 progenies in the wilt sick fields (Table 4.3). These will be planted next year.

F_4 Generation

We grew 132 bulks in normal fields for deriving single plants. Each bulk was grown in up to 50 rows. The row length was 4 m, with rows spaced at 60 cm and plants at 20 cm. From these bulks we selected 4002 single plants. One hundred and sixty three bulks were also planted in the wilt sick plots, and we selected 28 wilt resistant plants for further evaluation.

Progeny rows

The numbers of progenies grown and single plants selected are given in Table 4.2. All progenies were planted as 4 row plots (except F_4's which had 2 row plots) of 4 m length, with row to row spacing 30 cm, and plant to plant 10 cm. Two checks, H 208 and K 850, were planted after every 18 progenies. Most of these progenies were also planted as one-row plots in wilt sick fields. Those progenies showing >80% susceptibility to wilt were rejected. Progenies showing <30% wilt were considered for selection as progeny bulks. Single plants were selected in progenies showing 30% to 80% wilt incidence.

Table 4.2 The numbers of populations/progenies grown and selections made in 1985/86 at Hisar.

	Grown						Selected					
	Populations/Bulks			Progenies			Populations/Bulks			Single plants		
	NF	WSP	US	NF	WSP	US	NF	WSP	US	NF	WSP	US
F1	144	-	-	-	-	-	120	-	-	38	-	-
F2	6	18	15	-	-	-	77	-	-	-	38	580
F3	8	-	-	1016	541	60	350+21*	4	-	262	39	244
F4	132	163	-	944	731	-	7+13*	9+3*	-	4002	28	-
F5	355	318	-	2962	2740	266	108*+3^	1*	23*+1^	490	4	371
F6	65	24	-	1841	1959	143	56*+2^	1*	11*	311	18	77
F7	61	61	-	586	865	349	32*+1^	27*	26*	59	95	-
F8	34	34	-	250	479	233	17*	1*	9*	9	22	-
Total	805	618	15	7599	7315	1051	554+247*+6^	13+33*	69*+1^	5171	244	1272

* Contributed to PYTs, 1986/87
^ Contributed to AYTs, 1986/87
NF = Normal field
WSP = Wilt sick plot
US = Unsprayed

Table 4.3 The numbers of F2-F5 populations/ progenies which could not be accommodated in wilt sick plot in 1985/86.

General	Populations/Bulks	Progenies
F2	289	-
F3	145	1029
F5	-	164

Resistant progenies with high yielding ability (based on visual evaluation and uniformity were bulk harvested. Single plants were selected from non-uniform progenies. The numbers of uniform and high yielding bulks that were selected for replicated trials are indicated in the Table 4.2. Six selected progenies having kabuli seed type were included in the yield trials of kabuli types (Table 4.4).

Preliminary Yield Trials

There were 28 preliminary yield trials (PYT). All trials, except two, had 23 bulked lines (F_5/F_8 generations) and two checks, H 208 and K 850. These were planted in 5 x 5 quadruple lattice square designs, with four replications. The PYT of multiseeded lines had 33 entries and three checks, H 208, K 850 and HMS 8 and was planted in a 6 x 6 triple lattice design. The PYT for ascochyta blight resistant lines had 14 entries and two checks, H 208 and K 850. It was planted in a randomised complete block design with four replications. Excepting the trials for Heliothis resistant lines all other trials were planted at the Cattle breeding farm. The Heliothis resistant lines trials were planted in unsprayed fields at the HAU farm. All the trials had four-row plots of four meter length. Row to row spacing was 30 cm and plant to plant 10 cm. Observations on plant stand, days to 50% flowering and maturity, 100 seed weight, and seed yield were recorded on the whole plot.

PYT - desi long duration lines

There were ten preliminary yield trials consisting of long duration desi lines. The results are presented in Tables 4.5 to 4.14. A few entries have significantly out yielded the checks. From these trials we selected 18 lines for International Chickpea Screening Nursery (ICSN)-desi long duration (DL), 2 lines for ICSN-desi medium duration (DM), and 4 lines for International Chickpea Cooperative Trial (ICCT)-DL.

PYT - mid-tall plant types

There were two trials of mid-tall plant types. The results are presented in Tables 4.15 and 4.16. We selected 2 lines for inclusion in ICSN-DL and 1 in ICSN-DM.

PYT - multi-seeded and double podded lines

We planted five trials consisting of multi seeded and double podded lines; and one trial of multiseeded lines. The characteristics recorded in these are given in Tables 4.17 to 4.22. From these we selected 9 lines for including in ICSN-DL and 8 lines in ICSN-DM.

Table 4.4 List of promising long duration entries with kabuli seed type contributed to yield trials of kabuli type entries.

S.No.	Entry	Parentage
1	ICCX-810922-BH-BH-2H-BT	ILC 484 x ICCL 81001
2	ICCX-810922-BH-BH-3H-BT	ILC 484 x ICCL 81001
3	ICCX-810922-BH-BH-11H-BT	ILC 484 x ICCL 81001
4	ICCX-810808-1H-BH-BH-BT-2H	ILC 3279 x ICCC 33
5	ICCX-780302-5PLB-12PLB-3HLB-1HLP-BH	BG 203 x *ICCX-730001-9-2-B-EB
6	ICCX-780302-5PLB-12PLB-3HLB-2HLB-BH	BG 203 x *ICCX-730001-9-2-B-EB

*ICCX-730001 = H 208 x F 61

Table 4.5 Characteristics of entries in Preliminary Yield Trial - 1 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800059-BP-7H-3H-BH ICCL 78023 x ICCC 9	86.0	166.9	19.7	2606	13
2	800059-BP-9H-1H-BH ICCL 78023 x ICCC 9	62.3	161.5	13.1	2690	11
3	800060-BP-6H-1H-BH $ ICCL 78023 x K 850	89.0	165.9	17.4	3093	2
4	800067-BP-3H-1H-BH ICCL 78043 x ICCC 9	97.3	166.1	15.7	2768	10
5	800067-BP-6H-1H-BH ICCL 78043 x ICCC 9	81.1	162.9	19.2	2959	6
6	800075-BP-14H-2H-BH @ ICCL 78054 x ICCC 9	61.3	162.4	15.3	2997	5
7	800075-BP-19H-1H-BH ICCL 78054 x ICCC 9	86.0	164.9	11.8	2396	18
8	800075-BP-21H-1H-BH ICCL 78054 x ICCC 9	87.6	165.9	13.2	2421	16
9	800075-BP-24H-1H-BH ICCL 78054 x ICCC 9	85.1	163.0	12.0	2016	24
10	800075-BP-27H-1H-BH ICCL 78054 x ICCC 9	62.2	161.1	15.1	2560	14
11	800075-BP-67H-2H-BH ICCL 78054 x ICCC 9	85.2	164.8	14.8	2309	21
12	800075-BP-73H-1H-BH ICCL 78054 x ICCC 9	83.4	162.4	11.6	2081	23
13	800075-BP-73H-2H-BH ICCL 78054 x ICCC 9	82.1	161.5	11.9	2375	19
14	800076-BP-9H-1H-BH ICCL 78054 x K 850	84.2	163.9	14.9	2512	15
15	800076-BP-10H-2H-BH ICCL 78054 x K 850	87.9	166.6	15.5	2655	12
16	800076-BP-43H-1H-BH ICCL 78054 x K 850	83.1	163.7	15.4	3093	2
17	800076-BP-49H-2H-BH ICCL 78054 x K 850	80.6	162.6	14.6	2356	20
18	800076-BP-55H-1H-BH ICCL 78054 x K 850	87.4	164.8	12.5	2233	22
19	800076-BP-57H-1H-BH ICCL 78054 x K 850	85.5	165.0	21.4	2403	17
20	800106-BP-4H-1H-BH ICCL 79006 x BDN 9-3	78.6	162.1	13.8	1911	25
21	800031-BP-2H-2H-BH P 326 x PHULE G-4	85.1	165.2	15.7	2799	8

Table 4.5 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800031-BP-24H-1H-BH P 326 x PHULE G-4	84.6	165.8	18.7	3079	4
23	800045-BP-2H-1H-BH ICCL 78005 x P 1675	99.2	168.7	17.8	3144	1
24	ICC 4954 H 208	89.4	166.1	12.4	2938	7
25	ICC 5003 K 850	81.8	164.2	27.3	2785	9
	Mean	83.04	164.32	15.63	2607.2	
	SE±	1.78	1.23	0.35	158.1	
	CV(%)	4.29	1.50	4.51	12.1	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.6 Characteristics of entries in Preliminary Yield Trial - 2 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800045-BP-2H-2H-BH ICCL 78005 x P 1675	90.9	165.2	17.9	2588	18
2	800045-BP-3H-2H-BH ICCL 78005 x P 1675	87.8	163.4	19.0	1887	25
3	800045-BP-4H-1H-BH ICCL 78005 x P 1675	86.9	161.8	16.9	2125	22
4	800045-BP-14H-1H-BH ICCL 78005 x P 1675	87.5	162.6	15.8	2690	15
5	800069-BP-44H-1H-BH ICCL 78043 x P 1675	88.4	163.1	15.8	2375	21
6	800102-BP-14H-1H-BH ICCL 79004 x PHULE G-1	87.0	163.0	14.8	1937	23
7	800184-4H-1H-2H-BH ICCC 17 x PANT G-114	87.5	163.3	12.6	2873	11
8	800184-4H-1H-3H-BH * ICCC 17 x PANT G-114	88.1	162.8	13.7	3195	2
9	800168-3H-1H-1H-BH ICCC 4 x PANT G-114	89.1	163.8	12.7	3032	7
10	800203-7H-1H-1H-BH $ ICCL 79080 x G 130	91.0	163.0	13.0	3125	4
11	800123-BH-BH-50H-BH BG 209 x G 130	85.1	162.6	13.2	2394	20
12	800123-BH-BH-54H-BH BG 209 x G 130	84.3	159.7	11.8	3454	1
13	800124-BH-BH-21H-BH BG 209 x H 208	85.6	160.6	13.2	3032	7
14	800124-BH-BH-36H-BH BG 209 x H 208	86.9	162.8	13.0	2926	10
15	800217-BH-BH-1H-BH BG 209 x K 850	103.9	167.5	14.0	3088	6
16	800217-BH-BH-23H-BH BG 209 x K 850	96.8	165.8	13.0	2630	17
17	800129-BH-BH-30H-BH GL 769 x C 235	87.9	162.3	11.6	2476	19
18	800129-BH-BH-54H-BH $ GL 769 x C 235	86.3	162.6	12.8	3127	3
19	800129-BH-BH-77H-BH GL 769 x C 235	88.3	162.0	12.1	2697	14
20	800130-BH-BH-12H-BH GL 769 x F 378	88.4	164.5	12.7	3098	5
21	800130-BH-BH-20H-BH GL 769 x F 378	88.6	163.0	13.9	2862	12

Table 4.6 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800130-BH-BH-31H-BH GL 769 x F 378	84.4	161.4	13.2	2942	9
23	800130-BH-BH-39H-BH GL 769 x F 378	87.3	162.6	13.7	2678	16
24	ICC 4954 H 208	87.7	165.2	12.8	1911	24
25	ICC 5003 K 850	84.5	161.7	24.6	2709	13
	Mean	88.41	163.06	14.31	2714.1	
	SE±	1.79	0.94	0.31	243.0	
	CV(%)	4.05	1.16	4.40	17.9	

$ Contributed to ICSN-DL
* Contributed to ICCT-DL

Table 4.7 Characteristics of entries in Preliminary Yield Trial - 3 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Yield (kg/ha)	Rank
1	800131-BH-BH-27H-BH GL 769 x G 130	104.5	168.1	13.3	2362	25
2	800131-BH-BH-29H-BH GL 769 x G 130	93.3	166.6	22.7	3216	12
3	800131-BH-BH-41H-BH GL 769 x G 130	89.9	167.1	24.7	3028	17
4	800131-BH-BH-57H-BH GL 769 x G 130	100.1	166.3	13.8	3541	5
5	800135-BH-BH-32H-BH GL 769 x P 2161	104.6	166.3	13.1	2392	24
6	800135-BH-BH-47H-BH GL 769 x P 2161	87.2	166.2	12.1	3716	2
7	800135-BH-BH-62H-BH GL 769 x P 2161	88.9	164.9	13.2	3003	18
8	800135-BH-BH-65H-BH GL 769 x P 2161	88.8	170.4	12.3	3080	15
9	800135-BH-BH-75H-BH GL 769 x P 2161	106.1	165.5	13.4	2570	23
10	800135-BH-BH-79H-BH GL 769 x P 2161	100.5	168.0	12.7	2842	21
11	800138-BH-BH-35H-BH GNG 16 x F 378	91.7	165.9	12.2	3818	1
12	800150-BH-BH-21H-BH H 76-49 x P 326	89.7	167.2	16.0	3244	11
13	800150-BH-BH-61H-BH H 76-49 x P 326	88.5	164.2	12.4	3534	6
14	800150-BH-BH-62H-BH H 76-49 x P 326	87.1	166.4	12.5	3598	4
15	800160-BH-BH-3H-BH $ ICCC 3 x PANT G-114	97.1	171.3	13.4	3477	9
16	800160-BH-BH-27H-BH ICCC 3 x PANT G-114	88.9	168.1	12.1	3487	8
17	800160-BH-BH-28H-BH ICCC 3 x PANT G-114	87.0	164.6	12.6	3187	14
18	800160-BH-BH-39H-BH ICCC 3 x PANT G-114	86.8	165.6	11.9	2890	20
19	800161-BH-BH-9H-BH ICCC 4 x C 235	96.1	171.2	13.8	3699	3
20	800161-BH-BH-15H-BH ICCC 4 x C 235	95.3	168.6	14.3	3434	10
21	800161-BH-BH-26H-BH ICCC 4 x C 235	92.6	167.8	13.4	3523	7

Table 4.7 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800162-BH-BH-32H-BH ICCC 4 x F 378	90.4	166.7	12.5	3043	16
23	800163-BH-BH-1H-BH ICCC 4 x G 130	99.4	166.8	12.0	3198	13
24	ICC 4954 H 208	86.8	162.7	12.5	2909	19
25	ICC 5008 K 850	82.6	165.5	23.9	2756	22
	Mean	92.96	166.88	14.27	3181.9	
	SE±	1.94	1.32	0.46	208.0	
	CV(%)	4.17	1.58	6.44	13.1	

$ Contributed to ICSN-DL

Table 4.8 Characteristics of entries in Preliminary Yield Trial - 4 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800163-BH-BH-12H-BH ICCC 4 x G 130	89.4	163.4	12.9	3250	9
2	800163-BH-BH-17H-BH * ICCC 4 x G 130	91.8	167.7	14.9	3539	2
3	800163-BH-BH-20H-BH ICCC 4 x G 130	107.6	169.4	13.4	3257	6
4	800163-BH-BH-26H-BH ICCC 4 x G 130	101.0	167.2	13.1	3152	12
5	800165-BH-BH-7H-BH ICCC 4 x NEC 177	98.6	166.5	14.1	3333	5
6	800165-BH-BH-9H-BH ICCC 4 x NEC 177	90.8	166.4	14.4	3055	16
7	800165-BH-BH-47H-BH ICCC 4 x NEC 177	90.1	166.7	13.7	3165	11
8	800174-BH-BH-20H-BH ICCC 13 x P 326	88.2	165.6	12.3	3257	6
9	800174-BH-BH-42H-BH $ ICCC 13 x P 326	87.4	163.9	13.2	3379	4
10	800225-BH-BH-44H-BH ICCC 17 x BG 203	100.3	167.9	16.2	3116	13
11	800185-BH-BH-13H-BH ICCC 20 x C 235	102.5	167.6	13.3	2858	23
12	800185-BH-BH-16H-BH ICCC 20 x C 235	97.5	166.6	14.4	3004	17
13	800185-BH-BH-27H-BH ICCC 20 x C 235	92.4	167.0	13.1	3213	10
14	800241-BH-BH-5H-BH $ ICCL 79065 x BG 203	92.0	166.0	10.1	3414	3
15	800241-BH-BH-11H-BH ICCL 79065 x BG 203	87.1	165.1	12.1	2887	19
16	800241-BH-BH-14H-BH ICCL 79065 x BG 203	85.9	161.7	12.3	3078	14
17	800241-BH-BH-34H-BH ICCL 79065 x BG 203	90.4	165.8	11.3	2656	25
18	800241-BH-BH-37H-BH ICCL 79065 x BG 203	91.7	166.0	11.0	2871	21
19	800241-BH-BH-40H-BH ICCL 79065 x BG 203	86.9	163.0	12.2	3060	15
20	800241-BH-BH-61H-BH ICCL 79065 x BG 203	88.7	166.0	12.5	3709	1
21	800241-BH-BH-81H-BH ICCL 79065 x BG 203	88.7	165.1	12.3	3257	6

Table 4.8 contd.

Sl. No.	ICGX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800244-BH-BH-39H-BH ICCL 79080 x BG 203	87.8	164.9	12.0	2864	22
23	800244-BH-BH-55H-BH ICCL 79080 x BG 203	89.6	165.7	11.8	2773	24
24	ICC 4954 H 208	88.1	166.4	12.5	2882	20
25	ICC 5003 K 850	83.3	163.5	26.3	2998	18
	Mean	91.91	165.80	13.41	3121.1	
	SE±	1.72	0.98	0.27	203.7	
	CV(%)	3.74	1.19	4.07	13.1	

$ Contributed to ICSN-DL
* Contributed to ICCT-DL

Table 4.9 Characteristics of entries in Preliminary Yield Trial - 5 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800201-BH-BH-10H-BH ICCL 79080 x C 235	90.1	164.4	12.0	2692	19
2	800201-BH-BH-40H-BH ICCL 79080 x C 235	89.7	165.0	12.1	2448	22
3	800201-BH-BH-45H-BH ICCL 79080 x C 235	86.7	164.0	13.6	3193	7
4	800201-BH-BH-47H-BH ICCL 79080 x C 235	88.6	163.8	12.4	2930	14
5	800201-BH-BH-51H-BH ICCL 79080 x C 235	89.6	165.1	11.6	2823	16
6	800201-BH-BH-52H-BH ICCL 79080 x C 235	90.3	165.2	11.3	2557	20
7	800204-BH-BH-17H-BH $ ICCL 79080 x H 208	92.3	165.5	13.7	3533	2
8	800204-BH-BH-49H-BH ICCL 79080 x H 208	87.2	163.5	13.7	1993	25
9	800204-BH-BH-50H-BH ICCL 79080 x H 208	89.9	167.0	12.5	2739	17
10	800212-BH-BH-8H-BH $ ICCL 79085 x H 208	85.7	162.4	13.6	3400	3
11	800212-BH-BH-20H-BH ICCL 79085 x H 208	92.8	166.7	12.4	2931	13
12	800212-BH-BH-51H-BH ICCL 79085 x H 208	87.6	164.2	11.7	3377	4
13	800212-BH-BH-68H-BH ICCL 79085 x H 208	87.1	166.7	16.7	3683	1
14	800216-BH-BH-3H-BH ICCL 79085 x PANT G-114	85.4	163.0	14.1	3043	10
15	800216-BH-BH-6H-BH ICCL 79085 x PANT G-114	94.2	166.0	12.3	2425	23
16	800224-BH-BH-19H-BH ICCC 13 x K 850	94.3	165.0	13.3	2989	12
17	800224-BH-BH-45H-BH ICCC 13 x K 850	90.6	165.8	14.4	3311	5
18	800152-BH-BH-3H-BH H 76-49 x PANT G-114	87.1	166.1	12.5	3202	6
19	800152-BH-BH-35H-BH H 76-49 x PANT G-114	90.6	166.0	12.9	2483	21
20	800152-BH-BH-44H-BH H 76-49 x PANT G-114	84.9	162.1	25.1	2243	24
21	800205-BH-BH-14H-BH ICCL 79080 x NEC 177	89.1	164.3	12.9	2732	18

Table 4.9 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800205-BH-BH-51H-BH ICCL 79080 x NEC 177	87.2	162.5	13.4	3002	11
23	800205-BH-BH-58H-BH ICCL 79080 x NEC 177	92.8	165.7	12.9	3161	8
24	ICC 4954 H 208	89.5	166.2	12.5	2873	15
25	ICC 5003 K 850	84.3	166.1	26.5	3099	9
	Mean	89.10	164.89	13.99	2914.4	
	SE±	1.77	1.21	0.33	258.1	
	CV(%)	3.97	1.47	4.66	17.7	

$ Contributed to ICSN-DL

Table 4.10 Characteristics of entries in Preliminary Yield Trial - 6 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800205-BH-BH-71H-BH ICCL 79080 x NEC 177	94.9	165.6	13.0	1926	10
2	790374-BG BH-3H-BH L 550 x P 4353-1	81.5	160.2	16.2	1913	11
3	HAU.3-9H-BH	88.0	164.3	12.3	1644	20
4	HAU.3-11H-BH	84.5	161.9	15.7	1295	25
5	790009-BG BH-12H-BH ICCC 4 x P 1353	99.0	166.1	20.7	1862	13
6	790035-BG BH-22H-BH P-1198-1 x P 1353	94.8	165.1	14.9	1972	5
7	790070-BG BH-3H-BH JG 74 x ICCC 16	90.2	164.9	13.1	2110	3
8	790059-BG BH-6H-BH PHULE G-4 x ICCC 15	89.4	165.3	13.0	1935	9
9	790375-BH-BH-3H-1H-BH L 550 x PANT G-114	81.8	162.3	13.5	1674	18
10	790375-BH-BH-5H-1H-BH L 550 x PANT G-114	84.3	162.2	18.2	1732	17
11	790375-BH-BH-23H-1H-BH L 550 x PANT G-114	81.0	162.4	13.2	1739	16
12	790375-BH-BH-28H-1H-BH L 550 x PANT G-114	83.3	161.7	13.6	1664	19
13	790383-BH-BH-6H-1H-BH NEC 177 x P 324	86.8	162.6	14.6	1941	7
14	790383-BH-BH-23H-1H-BH NEC 177 x P 324	93.3	165.3	16.1	1625	22
15	790383-BH-BH-50H-1H-BH NEC 177 x P 324	98.7	166.7	15.6	1936	8
16	790383-BH-BH-52H-2H-BH NEC 177 x P 324	99.3	165.5	14.5	1944	6
17	790391-BH-BH-30H-1H-BH $ P 324 x P 2161	95.4	165.9	13.9	1983	4
18	790391-BH-BH-35H-1H-BH P 324 x P 2161	89.3	162.5	15.5	1760	15
19	790391-BH-BH-42H-1H-BH P 324 x P 2161	92.5	164.1	14.9	1643	21
20	790391-BH-BH-53H-1H-BH P 324 x P 2161	83.6	162.0	13.6	1342	24
21	790393-BH-BH-9H-1H-BH $ P 324 x PANT G-114	90.4	165.7	15.4	2156	2

Table 4.10 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Days to maturity	of 100 seeds(g)	Yield (kg/ha)	Rank
22	790393-[illegible]-47H-1H-[illegible] P 324 x PANT G-114	92.0	167.0	13.9	1850	14
23	790393-[illegible]-77H-1H-[illegible] P 324 x PANT G-114	87.5	163.1	13.5	2490	1
24	ICC 4954 H 208	93.3	164.4	12.6	1407	23
25	ICC 5003 R 850	84.7	161.2	26.7	1886	12
	Mean	89.58	163.92	15.12	1817.2	
	SE±	1.74	0.98	0.40	139.5	
	CV(%)	3.89	1.19	5.23	15.4	

$ Contributed to ICSN-DL

Table 4.11 Characteristics of entries in Preliminary Yield Trial - 7 DL at Hisar in 1985/86.

Sl No	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790393-BH-BH-83H-1H-BH P 324 x PANT G-114	87.5	12.9	2203	12
2	790394-BH-BH-9H-1H-BH P 2161 x P 4353-1	88.0	13.5	2284	8
3	790394-BH-BH-13H-1H-BH $ P 2161 x P 4353-1	88.5	14.1	2313	5
4	790394-BH-BH-38H-1H-BH P 2161 x P 4353-1	90.3	13.3	1831	24
5	790412-BH-BH-7H-2H-BH PANT G-114 x ICCC 20	89.3	12.4	2087	13
6	790412-BH-BH-8H-1H-BH PANT G-114 x ICCC 20	89.3	12.3	2171	14
7	790430-BH-BH-4H-1H-BH ICCC 13 x ICCC 18	88.3	12.2	2713	1
8	790435-BH-BH-2H-1H-BH $ ICCC 13 x ICCX-730007-18-1-B	87.0	14.7	2389	3
9	780507-BH-BH-18H-1H-BH PANT G-114 x ICCX-730367-11-4-1P-BH-BH	86.3	13.6	2286	7
10	780510-BH-BH-1H-1H-BH PANT G-114 x NEC 240	90.3	12.1	2101	16
11	780510-BH-BH-7H-1H-BH PANT G-114 x NEC 240	90.0	13.9	2162	15
12	780510-BH-BH-20H-1H-BH PANT G-114 x NEC 240	89.0	13.8	2171	13
13	780510-BH-BH-25H-2H-BH PANT G-114 x NEC 240	94.8	14.8	2236	10
14	780510-BH-BH-34H-1H-BH PANT G-114 x NEC 240	87.8	12.3	1764	25
15	780513-BH-BH-2H-1H-BH PANT G-114 x H 223	86.0	12.1	2071	18
16	780513-BH-BH-6H-1H-BH PANT G-114 x H 223	84.3	11.9	2302	6
17	780513-BH-BH-21H-1H-BH PANT G-114 x H 223	87.3	13.0	2052	20
18	780513-BH-BH-39H-1H-BH PANT G-114 x H 223	88.0	12.8	2229	11
19	780515-BH-BH-3H-1H-BH PANT G-114 x P 2994	90.3	23.2	2249	9
20	780515-BH-BH-5H-1H-BH PANT G-114 x P 2994	98.5	12.8	2058	19
21	780515-BH-BH-18H-1H-BH PANT G-114 x P 2994	90.3	19.2	2004	21

Table 4.11 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	780518-BH-BH-7H-1H-BH $ PANT G-114 x NEC 177	87.8	13.5	2333	4
23	780519-BH-BH-14H-1H-BH PANT G-114 x P 992	90.8	13.2	2518	2
24	ICC 4954 H 208	90.5	13.1	1996	22
25	ICC 5003 K 850	85.0	25.0	1950	23
	Mean	88.98	14.22	2178.9	
	SE±	1.57	0.47	141.1	
	CV(%)	3.53	6.61	12.9	

$ Contributed to ICSN-DL

Table 4.12 Characteristics of entries in Preliminary Yield Trial - 8 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	780519-BH-BH-17H-1H-BH PANT G-114 x P 992	72.9	15.1	1965	22
2	780519-BH-BH-21H-1H-BH PANT G-114 x P 992	91.5	19.0	2289	17
3	780541-BH-BH-11H-1H-BH ICCC 4 x C 214	93.7	13.2	2791	2
4	790414-BH-BH-9H-1H-BH PANT G-114 x ICCX-730167 -5-3-B	88.2	13.3	2465	12
5	790414-BH-BH-18H-1H-BH PANT G-114 x ICCX-730167 -5-3-B	91.0	12.5	2540	8
6	790414-BH-BH-21H-2H-BH PANT G-114 x ICCX-730167 -5-3-B	88.7	12.4	2944	1
7	790414-BH-BH-29H-2H-BH PANT G-114 x ICCX-730167 -5-3-B	86.2	12.6	2439	13
8	790414-BH-BH-33H-1H-BH PANT G-114 x ICCX-730167 -5-3-B	84.3	12.5	2634	7
9	790359-BH-BH-20H-1H-BH * H 208 x P 4353-1	88.8	12.3	2752	3
10	790359-BH-BH-21H-1H-BH $ H 208 x P 4353-1	92.3	12.9	2712	5
11	790359-BH-BH-24H-2H-BH H 208 x P 4353-1	88.4	13.5	2742	4
12	770431-B-BH-16H-1H-1H-BH F 378 x SL 972-A	89.8	12.6	1989	21
13	770431-B-BH-20H-1H-2H-BH F 378 x SL 972-A	89.5	12.8	2699	6
14	770436-B-BH-8H-1H-1H-BH F 404 x JG 39	94.3	12.9	2153	20
15	770436-B-BH-19H-1H-1H-BH F 404 x JG 39	85.3	11.6	2398	15
16	770447-B-BH-4H-1H-1H-BH NEC 550 x ICC 6371	98.9	20.8	2181	19
17	770447-B-BH-4H-3H-1H-BH NEC 550 x ICC 6371	89.9	12.6	2493	11
18	770142-B-BH-2H-2H-1H-BH JG 39 x PANT G-114	91.0	12.2	2523	9

Table 4.12 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
19	770142-B-BH-31H-1H-1H-BH JG 39 x PANT G-114	89.6	11.9	1875	24
20	771154-B-BH-2H-1H-1H-BH [F2(GL 651 x P 1092)-2]x [F2(NEC 30 x BENGAL GRAM-2]	96.4	17.3	2523	9
21	771154-B-BH-3H-2H-1H-BH [F2(GL 651 x P 1092)-2]x [F2(NEC 30 x BENGAL GRAM-2]	94.3	19.7	1797	25
22	780522-B-BH-1H-2H-1H-BH BG 203 x P 326	91.0	12.1	2437	14
23	780509-BH-BT-11H-1H-1H-BH PANT G-114 x P 4353-1	89.8	11.6	2317	16
24	ICC 4954 H 208	88.3	13.1	1964	23
25	ICC 5003 K 850	86.8	24.8	2271	18
	Mean	89.64	14.21	2395.8	
	SE±	1.91	0.40	188.3	
	CV(%)	4.26	5.57	15.7	

$ Contributed to ICSN-DL
* Contributed to ICCT-DL

Table 4.13 Characteristics of entries in Preliminary Yield Trial - 9 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	780520-BH-BT-21H-1H-1H-BH PANT G-114 x NEC 2368	97.5	12.3	2850	14
2	780454-BH-BT-2H-1H-1H-BH (F 404 x JG 39) x P 326	91.8	11.4	3348	1
3	780454-BH-BT-9H-2H-2H-BH (F 404 x JG 39) x P 326	93.6	11.5	2886	11
4	790359-BH-BT-2H-1H-1H-BH H 208 x P 4353-1	89.6	11.9	2249	21
5	770058-B-BH-9H-1H-1H-BH ICCC 1 x P 992	90.4	12.1	2883	12
6	771111-B-BH-9H-1H-1H-BH P 992 x G 130	90.6	11.6	2364	20
7	780537-B-BH-10H-1H-1H-BH BG 203 x G 543	88.3	12.1	2187	23
8	780083-B-BH-18H-1H-1H-BH ICCX-730167-5-3-B-BP x K 850	84.8	13.4	2677	16
9	780083-B-BH-27H-1H-1H-BH ICCX-730167-5-3-B-BP x K 850	85.8	21.7	2919	9
10	780520-BH-BT-43H-1H-1H-BH PANT G-114 x NEC 2368	89.0	12.5	3157	4
11	780521-BH-BT-1H-1H-1H-BH BG 203 x C 214	86.9	11.5	3076	5
12	770918-9H-1H-1H-1H-1H-BH PANT G-115 x (NEC 140 x NEC 847)	87.7	12.9	2668	18
13	760550-B-BP-BH-11H-1H-1H-BH NEC 123 x NEC 847	90.4	13.6	2754	15
14	760550-B-BP-BH-20H-1H-1H-BH NEC 123 x NEC 847	83.5	19.2	1715	24
15	760550-B-BP-BH-28H-1H-1H-BH NEC 123 x NEC 847	81.7	24.8	1448	25
16	760600-B-BP-BH-1H-1H-1H-BH $ NEC 249 x GL 630	89.4	13.5	3166	3
17	760639-B-BP-BH-23H-2H-1H-BH F 378 x NEC 802	88.9	13.8	2670	17
18	760683-B-BP-BH-17H-1H-1H-BH H 208 x L 550	84.3	15.5	2209	22
19	761423-B-BP-BH-10H-1H-1H-BH F2(NEC 143 x C 214)-2 F2(B-108 x WR 315)-2	89.1	12.3	2949	8
20	760343-B-BP-BH-2H-2H-1H-BH (K 850 x F 100) x GL 651	89.2	12.1	3014	7
21	ICC 5003 K 850	88.1	11.5	2853	13

Table 4.13 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	760705-BH-BH-1H-1H-1H-1H-BH @ K 468 x Annigeri	84.3	16.5	3171	2
23	760367-BH-BH-4H-1H-1H-1H-BH H 208 x P 2236	85.8	12.0	3026	6
24	ICC 4954 H 208	90.5	12.4	2599	19
25	ICC 5003 K 850	83.9	26.4	2895	10
	Mean	88.20	14.34	2709.3	
	SE±	1.85	0.42	191.7	
	CV(%)	4.19	5.83	14.2	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.14 Characteristics of entries in Preliminary Yield Trial - 10 DL at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	760367-BH-BH-4H-1H-2H-1H-BH H 208 x P 2236	89.0	12.5	2778	21
2	760367-BH-BH-6H-2H-2H-1H-BH H 208 x P 2236	89.0	12.8	3019	13
3	760928-BH-BH-17H-1H-2H-1H-BH P 1363-1 x K 468	85.3	12.3	3576	1
4	760947-BH-BH-6H-2H-1H-1H-BH NEC 989 x NO.501	103.4	12.9	2771	22
5	761889-BH-BH-6H-1H-1H-1H-BH $ F2(L 550 x NP 34)-2 F2(JG 39 x C 375)-2	94.3	13.7	3360	4
6	761876-BH-BH-2H-1H-1H-1H-BH F2(G 130 x NP 34)-2 x F2(JG 62 x LEBANESE LOCAL)-2	94.4	14.7	3101	11
7	761876-BH-BH-2H-1H-1H-2H-BH F2(G 130 x NP 34)-3 F2(JG 62 LOCAL)-3	99.5	13.9	2895	16
8	760379-BH-BH-7H-1H-2H-1H-BH C 214 x P 2718-1	97.5	12.5	2984	15
9	760379-BH-BH-16H-1H-1H-1H-BH C 214 x P 2718-1	101.1	13.6	3146	9
10	760629-BH-BH-13H-1H-2H-1H-BH C 214 x NEC 802	97.8	13.6	3198	8
11	761981-BH-BH-16H-1H-1H-1H-BH ICCX-730047-2-2-1H x F 378	97.8	12.6	3114	10
12	761983-BH-BH-9H-2H-1H-1H-BH ICCX-730087-3-1-2H x H 208	93.5	13.9	3001	14
13	760877-BH-BH-19H-1H-1H-1H-BH P 1363-1 x ICCX-730032-7-2-B	88.1	12.6	2817	20
14	761889-BH-BH-3H-2H-1H-1H-BH F2(L 550 x NP 34)-2 F2(JG 62 x C 235)-3	92.3	14.2	2866	17
15	761889-BH-BH-6H-3H-1H-1H-BH $ F2(L 550 x NP 34)-2 F2(JG 62 x C 235)-3	98.8	13.5	3410	3
16	761889-BH-BH-10H-1H-1H-1H-BH F2(L 550 x NP 34)-2 F2(JG 62 x C 235)-3	94.3	15.0	3320	5
17	761889-BH-BH-12H-4H-2H-1H-BH F2(L 550 x NP 34)-2 F2(JG 62 x C 235)-3	94.3	11.5	2851	18

Table 4.14 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
18	760379-BH-BH-16H-4H-2H-1H-BH C 214 x P 2718-1	94.6	13.9	3262	6
19	761767-BH-BH-11H-1H-1H-1H-BH (P 1013 x P 1869)-2 (H 208 x K 1258)-2	86.2	13.8	3229	7
20	760367-BH-BH-9H-3H-1H-1H-BH H 208 x P 2236	89.0	12.9	2848	19
21	761721-BH-BH-7H-1H-1H-1H-BH * [(F 61 x T 103)-2 (NEC 1639 x NEC 1614)-1]	102.4	12.9	3465	2
22	761791-BH-BH-8H-1H-1H-1H-BH [(P 1265 x P 1092)-2 (NEC 240 x K 4)-2]	93.0	15.1	2642	24
23	760449-BH-BH-13H-3H-1H-1H-BH K 850 x ICCX-730032-7-2-B	91.9	13.2	2668	23
24	ICC 4954 H 208	91.2	12.3	3039	12
25	ICC 5003 K 850	84.1	26.4	2523	25
	Mean	93.71	13.84	3035.4	
	SE±	1.61	0.65	176.1	
	CV(%)	3.43	9.36	11.6	

$ Contributed to ICSN-DL
* Contributed to ICCT-DL

Table 4.15 Characteristics of entries in Preliminary Yield Trial - 1 DL-Tall at Hisar in 1985/86.

Sl No	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790121-1P-1H-BH PANT G-114 x K 1174	88.6	13.7	2287	14
2	770943-BH-8H-2H-BH PANT G-115 x ICCX-760732-F1	86.0	13.2	2971	2
3	750016-1P-1H-1H-2H-1H-1H-BH NEC 240 x NEC 139	83.8	15.2	2359	13
4	770943-BH-8H-1H-BH @ PANT G-115 x ICCX-760732-F1	76.7	14.4	2840	3
5	800390-2H-BH K 1184 x K 850	97.8	13.3	3171	1
6	770940-BH-7H-1H-1H-BH PANT G-114 x (K 1480 x NFC 1135	91.1	14.0	2526	7
7	780237-3P-1H-1H-BH L 550 x K 1174	87.2	20.1	2257	16
8	780239-1P-2H-2H-BH L 550 x K 1189	86.8	22.0	2066	18
9	790098-1P-1H-1H-BH ICCC 4 x K 1184	79.6	12.5	1967	19
10	790099-9P-1H-1H-BH ICCC 4 x K 1258	66.1	13.3	1705	23
11	790112-1P-1H-1H-BH F 378 x K 1170	74.4	15.1	1592	24
12	790148-6P-1H-1H-BH F 378 x K 1189	55.3	13.4	2268	15
13	790123-2H-1H-1H-BH PANT G-114 x K 1258	90.7	13.4	2564	6
14	800388-2H-2H-1H-BH $ K 1184 x ICCC 10	100.4	15.4	2611	5
15	800389-15H-2H-2H-BH K 1184 x ICCC 13	78.1	13.8	1590	25
16	800402-4H-1H-1H-BH K 1480 x F 378	84.8	12.9	2158	17
17	770377-BP-1P-1H-1H-BH PANT G-115 x K 1174	90.6	16.2	1828	20
18	770377-BP-1P-1H-2H-BH PANT G-115 x K 1174	86.5	14.4	2429	12
19	770956-BP-6P-1H-1H-BH P 36 x ICCX-750070-11-1P	90.2	15.9	1784	22
20	770914-BH-3H-1H-1H-BH PANT G-115 x (K 1189 x CHAFFA)	87.0	15.7	2464	10
21	780238-5P-1H-1H-1H-BH L 550 x K 1184	91.6	22.2	1789	21

Table 4.15 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	790121-11P-1H-1H-1H-BH PANT G-114 x K 1174	84.8	15.8	2655	4
23	770913-BH-6H-BH	71.0	14.8	2438	11
24	ICC 4954 H 208	91.2	12.5	2470	8
25	ICC 5003 K 850	88.5	26.5	2470	8
	Mean	84.35	15.58	2290.3	
	SE±	3.00	0.45	167.6	
	CV(%)	7.11	5.78	14.6	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.16 Characteristics of entries in Preliminary Yield Trial - 2 DL-Tall at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790151-3P-1H-1H-1H-BH PANT G-114 x JM 564	89.3	13.3	2187	23
2	790151-3P-1H-1H-2H-BH PANT G-114 x JM 564	86.2	15.6	2520	18
3	790124-1P-1H-1H-3H-BH PANT G-114 x K 1480	91.2	13.4	2733	12
4	770943-BH-10H-1H-1H-1H-BH PANT G-115 x (K 1481 x BDN 9-3)	92.2	15.8	2280	22
5	770914-BH-16H-2H-1H-1H-BH PANT G-115 x (K 1189 x CHAFFA)	87.4	12.2	2961	6
6	770918-BH-11H-2H-1H-2H-BH PANT G-115 x (NEC 140 x NEC 847)	89.5	11.9	3145	3
7	770918-BH-11H-2H-1H-3H-BH PANT G-115 x (NEC 140 x NEC 847)	89.3	12.4	2712	13
8	770939-BH-2H-1H-1H-1H-BH $ C 214 x (K 1480 x NEC 18)	96.8	13.1	3055	4
9	770939-BH-4H-2H-1H-1H-BH C 214 x (K 1480 x NEC 18)	94.1	15.5	2930	7
10	770940-BH-7H-1H-1H-1H-BH PANT G-114 x (K 1480 x NEC 1135)	94.8	14.5	3052	5
11	770367-BP-2H-1H-1H-1H-BH H 355 x K 1174	96.6	14.0	2174	24
12	770367-BP-9H-1H-2H-3H-BH H 355 x K 1174	93.5	17.4	2553	15
13	770376-BP-1H-2H-1H-1H-BH PANT G-115 x K 1170	90.2	11.8	2743	11
14	770376-BP-4H-1H-1H-1H-BH PANT G-115 x K 1170	80.1	13.5	2536	17
15	770376-BP-5H-1H-1H-1H-BH PANT G-115 x K 1170	81.7	14.7	2349	20
16	770376-BP-6H-1H-1H-2H-BH PANT G-115 x K 1170	81.2	13.1	1636	25
17	770378-BH-4H-1H-1H-1H-BH PANT G-115 x K 1184	88.3	11.7	2394	19
18	770378-BH-4H-1H-1H-3H-BH PANT G-115 x K 1184	82.8	11.2	2782	10
19	770381-BP-9H-1H-1H-1H-BH PANT G-115 x K 1481	80.3	17.6	2541	16
20	770382-BP-1H-1H-1H-2H-BH PANT G-115 x K 56567	83.2	18.2	3574	2
21	770918-2H-1H-1H-1H-2H-BH PANT G-115 x (NEC 140 x NEC 847)	83.4	12.3	2295	21

Table 4.16 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	761954-41H-2H-1H-1H-1H-2H-BH [F2(GIZA X (P 1054 X NEC 249))-2 F2(B 110 x NEC 139)-2]	93.6	13.4	2707	14
23	770913-BH-6H-BH	72.2	13.6	3607	1
24	ICC 4954 H 208	90.4	12.3	2878	9
25	ICC 5003 K 850	85.2	24.0	2921	8
	Mean	87.75	14.26	2690.5	
	SE±	1.64	0.53	207.5	
	CV(%)	3.75	7.50	15.4	

$ Contributed to ICSN-DL

Table 4.17 Characteristics of entries in Preliminary Yield Trial - 1 DL-MS/DP at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	780325-15H-1H-BH JG 62 x HMS 4	95.8	15.8	2298	15
2	780369-21H-1H-BH PANT G-120 x HMS 30	85.5	29.1	3363	1
3	790162-18P-BH-BH P 272 x HMS 18	88.5	14.9	2665	8
4	790164-3P-BH-BH P 272 x HMS 23	86.8	13.4	2245	18
5	800475-29H-BH HMS 23 x JG 62	91.5	11.8	2181	21
6	780351-44P-BH-BH-BH-1H-1H-BH HYB 16-3 x HMS 5	95.5	14.6	2168	23
7	780351-44P-BH-BH-BH-5H-1H-BH HYB 16-3 x HMS 5	90.5	14.0	2749	6
8	780351-44P-BH-BH-BH-11H-1H-BH HYB 16-3 x HMS 5	89.0	14.3	2294	16
9	780351-45P-BH-BH-BH-3H-1H-BH HYB 16-3 x HMS 5	96.5	16.0	2725	7
10	780351-45P-BH-BH-BH-8H-1H-BH $ HYB 16-3 x HMS 5	94.5	13.8	3019	4
11	780351-45P-BH-BH-BH-9H-1H-BH HYB 16-3 x HMS 5	83.0	20.3	2443	12
12	780336-8P-BH-BH-BH-8H-BH P 436 x HMS 5	85.0	14.1	2129	24
13	780336-8P-BH-BH-BH-10H-BH P 436 x HMS 5	90.8	13.5	2632	10
14	780351-23P-BH-BH-BH-11H-BH $ HYB 16-3 x HMS 5	89.8	13.6	3198	3
15	780351-44P-BH-BH-BH-4H-BH HYB 16-3 x HMS 5	89.3	12.4	2169	22
16	780351-44P-BH-BH-BH-5H-BH HYB 16-3 x HMS 5	92.0	13.6	2183	20
17	780362-18P-BH-BH-BH-10H-BH JG 62 x HMS 18	93.5	12.5	2385	14
18	780362-18P-BH-BH-BH-14H-BH JG 62 x HMS 18	92.5	12.1	2665	8
19	780337-9P-BH-1H-1H-BH P 436 x HMS 6	86.3	14.1	2605	11
20	780337-9P-BH-1H-2H-BH P 436 x HMS 6	89.3	14.1	2058	25
21	790184-BH-3H-BH-1H-BH HYB 16-3 x HMS 8	89.8	21.7	3322	2

Table 4.17 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	790160-19P-BH-1H-1H-BH P 272 x HMS 8	78.3	15.8	2201	19
23	780362-4H-1H-BH-1H-BH JG 62 x HMS 18	86.0	11.6	2256	17
24	ICC 4954 H 208	94.0	12.5	2419	13
25	ICC 5003 K 850	85.3	27.0	2868	5
	Mean	89.54	15.48	2529.6	
	SE±	1.60	0.40	218.8	
	CV(%)	3.56	5.15	17.3	

$ Contributed to ICSN-DL

Table 4.18 Characteristics of entries in Preliminary Yield Trial - 2 DL-MS/DP at Hisar in 1985/86.

Sl No	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	780362-9H-1H-BH-1H-BH @ JG 62 x HMS 18	75.0	17.4	2296	6
2	780369-21H-1H-BH-1H-BH @ PANT G-120 x HMS 30	82.8	14.2	2422	3
3	790168-137P-BP-BP-1H-BH P 502 x HMS 8	82.5	12.7	1840	20
4	780351-5P-BP-BP-1H-BH $ HYB 16-3 x HMS 5	85.7	15.4	2440	2
5	790185-11H-1H-1H-BH HYB 16-3 x HMS 13	90.9	22.5	2163	9
6	800479-19H-1H-1H-BH HMS 23 x RPSP 322-1	93.0	12.2	2068	13
7	800448-5H-BH-1H-BH HMS 6 x HMS 23	88.7	12.4	2281	7
8	790160-1H-1H-1H-BH P 272 x HMS 8	78.9	13.6	2116	10
9	790164-5H-1H-1H-BH P 272 x HMS 23	83.6	12.8	1119	25
10	790188-6H-2H-2H-BH HYB 16-3 x HMS 23	80.1	11.4	1573	22
11	790188-10H-1H-1H-BH HYB 16-3 x HMS 23	88.2	13.2	2314	5
12	790188-10H-2H-1H-BH HYB 16-3 x HMS 23	87.4	13.6	1543	23
13	790188-12H-2H-2H-BH HYB 16-3 x HMS 23	92.9	15.0	1314	24
14	800441-3H-2H-1H-BH HMS 4 x HMS 6	84.7	11.9	1964	18
15	800441-5H-2H-2H-BH HMS 4 x HMS 6	66.3	13.9	2055	16
16	800441-26H-2H-1H-BH HMS 4 x HMS 6	87.6	13.6	2068	13
17	800443-3H-1H-1H-BH HMS 4 x HMS 23	97.5	12.8	2320	4
18	800443-3H-2H-2H-BH HMS 4 x HMS 23	87.3	11.6	2168	8
19	800443-4H-2H-1H-BH HMS 4 x HMS 23	58.2	12.7	1839	21
20	800443-5H-1H-1H-BH HMS 4 x HMS 23	103.7	12.3	2090	12
21	800443-11H-1H-1H-BH HMS 4 x HMS 23	108.1	11.8	1942	19

Table 4.18 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	800444-3H-1H-1H-BH HMS 5 x HMS 6	93.9	11.6	2017	17
23	800444-4H-1H-1H-BH HMS 5 x HMS 6	63.6	12.7	2058	15
24	ICC 4954 H 208	91.5	12.7	2477	1
25	ICC 5003 K 850	85.7	27.8	2101	11
	Mean	85.51	14.06	2023.4	
	SE±	2.43	0.45	160.2	
	CV(%)	5.68	6.46	15.8	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.19 Characteristics of entries in Preliminary Yield Trial 3 DL-MS/DP at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800444-6H-1H-1H-BH HMS 5 x HMS 6	90.5	12.0	1744	23
2	800444-8H-1H-1H-BH @ HMS 5 x HMS 6	62.3	11.9	2233	5
3	800446-5H-1H-1H-BH HMS 5 x HMS 23	86.8	12.1	2288	4
4	800448-2H-1H-1H-BH HMS 6 x HMS 23	89.1	10.9	1632	25
5	800448-2H-1H-2H-BH HMS 6 x HMS 23	88.4	11.6	1809	21
6	800448-7H-1H-1H-BH HMS 6 x HMS 23	81.9	11.1	2049	9
7	800449-4H-1H-1H-BH HMS 13 x HMS 23	83.2	12.7	2025	10
8	800449-8H-2H-1H-BH $ HMS 13 x HMS 23	85.1	12.8	2553	3
9	800482-11H-2H-1H-BH HMS 6 x BG 203	82.8	11.2	1980	12
10	800482-13H-1H-1H-BH HMS 6 x BG 203	83.2	11.9	2136	6
11	800486-19H-2H-1H-BH $ HMS 23 x ICCC 11	87.8	13.4	2674	2
12	800486-20H-1H-1H-BH HMS 23 x ICCC 11	80.5	11.4	2025	10
13	800486-26H-1H-1H-BH HMS 23 x ICCC 11	81.8	14.2	1888	17
14	800482-3H-1H-1H-BH HMS 6 x BG 203	82.9	12.3	1860	19
15	790182-18P-1P-1H-BH PANT G-120 x HMS 30	86.0	13.2	2088	8
16	800462-25P-BP-2H-BH HMS 6 x ICCC 15	82.4	12.4	1921	15
17	800470-2P-1P-2H-BH HMS 13 x NP 81	63.8	12.2	1916	16
18	800470-2P-2P-1H-BH HMS 13 x NP 81	61.6	12.9	1975	13
19	790164-BH-5H-1H-BH P 272 x HMS 23	84.2	12.6	1922	14
20	790172-BH-2H-1H-BH P 502 x HMS 23	82.9	12.6	1868	18
21	790180-BH-11H-1H-BH PANT G-120 x HMS 23	84.6	11.2	1772	22

Table 4.19 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	790180-BH-26H-BH-BH PANT G-120 x HMS 23	86.3	12.0	1674	24
23	790180-BH-34H-1H-BH PANT G-120 x HMS 23	86.7	11.9	1859	20
24	ICC 4954 H 208	79.5	12.4	2699	1
25	ICC 5003 K 850	83.7	26.5	2132	7
	Mean	81.92	12.78	2028.9	
	SE±	2.15	0.29	182.1	
	CV(%)	5.25	4.57	18.0	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.20 Characteristics of entries in Preliminary Yield Trial 4 DL-MS/DP at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790188-BH-17H-1H-BH HYB 16-3 x HMS 23	84.3	13.1	1633	25
2	780362-7H-1H-BH JG 62 x HMS 18	83.7	15.7	2613	8
3	780346-14H-1H-BH PANT G-120 x HMS 6	85.2	11.4	2124	20
4	780346-27H-1H-BH PANT G-120 x HMS 6	86.6	12.5	1990	21
5	780346-39H-1H-BH PANT G-120 x HMS 6	82.1	12.3	1879	23
6	780327-12P-1H-1H-BH JG 62 x HMS 6	81.8	13.9	2318	15
7	780357-202P-BH-1H-BH @ K 850 x HMS 8	77.7	14.1	2817	3
8	790170-4P-BH-BH P 502 x HMS 18	66.9	14.1	2184	18
9	810506-10H-1H-BH (HMS 4 x HMS 5) x Annigeri	89.5	12.4	2748	6
10	810506-21H-2H-BH $ (HMS 4 x HMS 5) x Annigeri	88.6	12.5	2769	5
11	810508-4H-1H-BH (HMS 4 x HMS 5) x BDN 9-3	69.4	14.3	2278	16
12	810508-25H-1H-BH (HMS 4 x HMS 5) x BDN 9-3	65.8	14.8	1829	24
13	810508-34H-1H-BH @ (HMS 4 x HMS 5) x BDN 9-3	79.6	14.3	2965	1
14	810508-39H-1H-BH (HMS 4 x HMS 5) x BDN 9-3	78.9	13.4	1931	22
15	810510-4H-1H-BH (HMS 4 x HMS 13) x PHULE G-4	84.9	16.6	2360	14
16	810510-18H-1H-BH (HMS 4 x HMS 13) x PHULE G-4	101.7	18.4	2216	17
17	810510-40H-1H-BH @ (HMS 4 x HMS 13) x PHULE G-4	78.0	15.5	2877	2
18	810512-21H-1H-BH (HMS 4 x HMS 13) x P 502	78.3	12.0	2463	10
19	810512-40H-1H-BH (HMS 4 x HMS 13) x P 502	65.5	13.9	2421	12
20	810515-20H-1H-BH @ (HMS 4 x HMS 23) x JG 62	84.9	13.7	2777	4
21	810515-27H-1H-BH (HMS 4 x HMS 23) x JG 62	83.8	14.9	2630	7

Table 4.20 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	810515-60H-1H-BH (HMS 4 x HMS 23) x JG 62	82.0	14.7	2163	19
23	810518-3H-1H-BH (HMS 13 x HMS 23) x F 404	83.5	11.4	2427	11
24	ICC 4954 H 208	85.6	12.4	2403	13
25	ICC 5003 K 850	83.4	26.1	2568	9
	Mean	81.27	14.33	2375.3	
	SE±	3.42	0.34	183.2	
	CV(%)	8.41	4.71	15.4	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.21 Characteristics of entries in Preliminary Yield Trial - 5 DL-MS/DP at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800441-BH-4H-1H-BH @ HMS 4 x HMS 6	79.8	13.2	3334	4
2	800441-BH-10H-1H-BH HMS 4 x HMS 6	72.0	13.0	3184	10
3	800442-BH-3H-1H-BH HMS 4 x HMS 13	85.3	16.1	3223	6
4	800442-BH-8H-1H-BH HMS 4 x HMS 13	85.5	16.2	2615	20
5	ICC 4954 x H 208	86.0	12.4	2848	15
6	800444-BH-6H-1H-BH HMS 5 x HMS 6	86.0	12.0	2384	25
7	800444-BH-9H-1H-BH HMS 5 x HMS 6	77.5	11.9	2579	21
8	800444-BH-13H-1H-BH HMS 5 x HMS 6	62.3	12.4	2508	23
9	800444-BH-26H-1H-BH HMS 5 x HMS 6	68.8	12.5	2433	24
10	800444-BH-29H-1H-BH HMS 5 x HMS 6	94.8	11.1	2851	14
11	800446-BH-2H-1H-BH HMS 5 x HMS 23	93.8	11.1	2578	22
12	800447-BH-1H-1H-BH HMS 6 x HMS 13	91.0	11.5	3220	7
13	800447-BH-3H-1H-BH HMS 6 x HMS 13	93.3	11.1	3217	8
14	800447-BH-5H-1H-BH HMS 6 x HMS 13	89.0	11.3	2886	13
15	800447-BH-11H-1H-BH HMS 6 x HMS 13	85.8	13.2	2678	18
16	800447-BH-9H-2H-BH HMS 6 x HMS 13	91.8	12.3	3188	9
17	800447-BH-14H-1H-BH $ HMS 6 x HMS 13	87.0	12.6	3299	5
18	800447-BH-14H-2H-BH HMS 6 x HMS 13	90.5	13.0	3833	2
19	800447-BH-19H-1H-BH HMS 6 x HMS 13	81.3	12.7	3158	11
20	800448-BH-3H-1H-BH $ HMS 6 x HMS 23	88.8	12.1	3665	3
21	800449-BH-12H-2H-BH HMS 13 x HMS 23	87.8	11.7	2807	17

Table 4.21 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	810484-108H-BH-BH (HMS 6 x NP 81) x ICCC 30	63.3	12.0	2650	19
23	810491-7H-1H-BH (HMS 6 x RPSP 322-1) x H 76-49	86.3	16.3	3097	12
24	ICC 4954 H 208	89.0	12.0	3957	1
25	ICC 5003 K 850	83.5	25.4	2847	16
	Mean	83.98	13.17	3001.7	
	SE±	3.10	0.26	226.4	
	CV(%)	7.38	4.01	15.1	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.22 Characteristics of entries in Preliminary Yield Trial - 1 DL-MS at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	800482-21H-1H-BH HMS 6 x BG 203	95.6	14.5	2558	5
2	800498-12H-3H-BH HMS 13 x GL 629	99.7	17.6	2302	18
3	800497-4H-1H-BH $ HMS 8 x L 550	97.1	16.9	2668	4
4	790177-BH-6H-1H-BH PANT G-120 x HMS 13	90.0	15.3	2504	8
5	790179-BH-17H-2H-BH PANT G-120 x HMS 22	93.0	15.2	2405	11
6	790180-BH-11H-1H-BH PANT G-120 x HMS 23	92.3	11.0	2324	16
7	790186-BH-2H-1H-BH HYB 16-3 x HMS 18	98.7	17.3	2137	21
8	790186-BH-2H-2H-BH HYB 16-3 x HMS 18	89.6	18.9	2114	25
9	790186-BH-2H-3H-BH HYB 16-3 x HMS 18	99.6	18.0	2023	29
10	790186-BH-3H-1H-BH HYB 16-3 x HMS 18	93.3	16.4	2026	28
11	790188-BH-15H-1H-BH HYB 16-3 x HMS 23	99.8	15.0	2517	6
12	780325-13H-1H-1H-BH JG 62 x HMS 4	87.5	14.6	1779	35
13	780325-13H-1H-2H-BH JG 62 x HMS 4	89.2	12.1	1908	31
14	780362-16H-1H-1H-BH JG 62 x HMS 18	80.7	17.0	2370	12
15	780362-25H-1H-1H-BH JG 62 x HMS 18	79.0	13.1	2330	14
16	780352-1H-1H-1H-BH HYB 16-3 x HMS 8	108.0	13.8	2001	30
17	780352-1H-1H-2H-BH HYB 16-3 x HMS 8	93.4	16.1	1888	32
18	780352-9H-1H-1H-BH HYB 16-3 x HMS 8	90.9	16.1	2427	10
19	780356-33H-1H-1H-BH G 130 x HMS 8	89.3	13.5	2517	6
20	780359-4H-1H-1H-BH H 208 x HMS 5	92.6	14.1	3003	1
21	780351-5P-1H-1H-BH HYB 16-3 x HMS 5	95.0	17.2	2833	3

Table 4.22 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	790162-18P-BH-1H-BH P 272 x HMS 18	96.1	14.7	1868	33
23	800441-18H-1H-BH HMS 4 x HMS 6	95.8	14.3	2123	23
24	800461-4H-1H-BH HMS 5 x RPSP 322-1	97.5	10.6	2968	2
25	800461-8H-1H-BH HMS 5 x RPSP 322-1	105.3	11.3	1823	34
26	800466-13H-1H-BH HMS 6 x P 4203	85.8	13.2	2479	9
27	780351-BH-BH-BH-4H-BH HYB 16-3 x HMS 5	91.1	13.9	2183	20
28	780351-BH-BH-BH-8H-BH HYB 16-3 x HMS 5	91.3	13.3	2188	19
29	780351-BH-BH-BH-23H-BH HYB 16-3 x HMS 5	111.0	12.4	2303	17
30	780351-BH-BH-BH-27H-BH HYB 16-3 x HMS 5	96.3	19.1	2326	15
31	780351-BH-BH-BH-28H-BH HYB 16-3 x HMS 5	82.4	17.0	2120	24
32	780351-BH-BH-BH-30H-BH HYB 16-3 x HMS 5	94.6	21.1	2032	27
33	780351-BH-BH-BH-31H-BH HYB 16-3 x HMS 5	93.1	26.2	1307	36
34	ICC 4954 H 208	89.7	12.1	2054	26
35	ICC 5003 K 850	85.1	25.3	2360	13
36	ICC 12208 HMS 8	95.7	13.5	2131	22
	Mean	93.47	15.61	2247.3	
	SE±	2.75	0.72	219.7	
	CV(%)	5.10	7.94	16.9	

$ Contributed to ICSN-DL

PYT - wilt resistant lines

There were three trials of wilt resistant lines. The results are presented in Tables 4.23 to 4.25. We selected 6 lines for ICSN-DL.

PYT - Ascochyta blight and Botrytis gray mold resistant lines

We planted three trials comprising of lines resistant to Botrytis gray mold and/or ascochyta blight. The results are presented in Tables 4.26 to 4.28. From these we selected 4 lines for inclusion in ICSN-DL and 1 in ICSN-DM.

PYT - stunt resistant lines

We had one trial consisting of lines resistant to stunt caused by pea leaf roll virus. Table 4.29 contains the data on plant and yield characters. We chose 2 lines for including in ICSN-DL.

PYT - Heliothis resistant lines

Three trials, having lines resistant to Helitohis pod borer, were planted. The data on yield and pod borer damage are given in Tables 4.30 to 4.32. We selected 6 entries for inclusion in ICSN-DL.

Advanced Yield Trials

The advanced yield trials (AYT) included lines promoted for a second year's testing from the PYT's, or highly promising bulked lines. There were four trials, three of which were planted both at Hisar and Gwalior and are planted at Hisar only. Spacing and observations recorded were same as in the PYT's. The plot size was six rows of four meters. The results from both the locations are presented in Tables 4.33 to 4.36. Five lines were retained for further testing. Three lines were selected for ICSN-DL and two lines for ICCT-DL. We also selected two lines for inclusion in the Gram Initial Evaluation Trial of All India Coordinated Pulses Improvement Project.

Ascochyta blight screening nursery

We screened 8 bulks and 1082 progenies in the joint HAU-ICRISAT ascochyta blight nursery at Hisar, and selected 144 single plants and 12 bulks.

Botrytis gray mold screening nursery

In collaboration with the G.B. Pant University of Agriculture and Technology, Pantnagar, we screened 406 progeny bulks in the Botrytis gray mold nursery and selected 97 bulks and 175 single plants for yield evaluation next year.

Table 4.23 Characteristics of entries in Preliminary Yield Trial 1 DL-WR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790306-BH-11H-1H-BH-BH $ PANT G-114 x ICCC 10	90.0	12.8	3575	3
2	761710-BH-BH-27H-2H-1H-BH-BH [F2(NEC 249 x P 2994)-1 F2(C 214 x NP 34)-1]	88.0	12.8	2560	24
3	760757-BH-BH-14H-2H-BH-BH K 468 x NEC 2561	88.8	12.6	3252	12
4	790345-BH-BH-3H-BH-BH P 753 x P 9800	96.8	15.7	2958	16
5	790313-BH-BH-1H-BH-BH PANT G-114 x P 1353	89.0	12.1	2629	22
6	790316-BH-BH-4H-BH-BH PANT G-114 x P 180-1	95.0	13.5	2807	18
7	790324-BH-BH-4H-BH-BH BG 203 x T 3(GWALIOR)	88.8	11.8	2335	25
8	790349-BP-14P-BP-1H-BH PPK 1 x BG 203	88.5	12.6	3604	1
9	790334-BH-BH-1H-2H-BH K 4 x C 104	90.3	13.8	3339	10
10	790334-BH-BH-2H-2H-BH K 4 x C 104	91.5	14.1	3399	7
11	790336-BH-BH-3H-1H-BH BG 203 x P 1805	97.3	11.8	3405	6
12	790338-BH-BH-1H-1H-BH BG 203 x K 468	89.3	11.6	2767	20
13	790338-BH-BH-3H-1H-BH BG 203 x K 468	88.8	12.6	3037	15
14	790340-BH-BH-7H-1H-BH BG 203 x P 4353-1	90.0	11.1	3423	5
15	790340-BH-BH-7H-2H-BH $ BG 203 x P 4353-1	91.3	11.2	3432	4
16	ICC 10136 PANT G-114	88.5	11.3	3602	2
17	790340-BH-BH-8H-1H-BH BG 203 x P 4353-1	90.8	10.9	3139	14
18	790341-BH-BH-1H-1H-BH P 9800 x PANT G-114	87.5	17.8	2583	23
19	790345-BH-BH-1H-1H-BH P 753 x P 9800	98.3	14.4	3214	13
20	790345-BH-BH-1H-2H-BH P 753 x P 9800	95.0	14.7	2681	21
21	780439-BH-BH-8H-1H-BH (CPS 1 x ICCC 2) x NEC 695	89.8	12.5	2850	17

Table 4.23 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	790313-BH-BH-2H-1H-BH PANT G-114 x P 1353	86.3	13.1	3341	9
23	780186-BH-BH-1H-1H-BH P 992 x RABAT	97.8	14.1	2802	19
24	ICC 4954 H 208	92.3	12.4	3376	8
25	ICC 10136 PANT G-114	89.0	12.1	3254	11
	Mean	91.12	12.93	3094.5	
	SE±	1.13	0.28	215.1	
	CV(%)	2.47	4.26	13.9	

$ Contributed to ICSN-DL

Table 4.24 Characteristics of entries in Preliminary Yield Trial - 2 DL-WR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	790320-BH-BH-4H-1H-1H-BH BG 203 x P 324	88.6	13.4	2470	18
2	790321-BH-BH-3H-1H-BH BG 203 x CPS 1	90.8	11.2	2485	17
3	790324-BH-BH-3H-1H-BH $ BG 203 x T 3(GWALIOR)	96.0	13.6	3059	3
4	790324-BH-BH-3H-2H-BH BG 203 x T 3(GWALIOR)	96.7	13.3	3404	1
5	790327-BH-BH-3H-1H-BH BG 203 x BG 212	86.5	12.6	2468	19
6	790327-BH-BH-4H-1H-BH BG 203 x BG 212	90.2	13.1	2406	21
7	790327-BH-BH-4H-2H-BH BG 203 x BG 212	94.8	12.6	2621	12
8	790328-BH-BH-1H-2H-BH BG 203 x P 212-1	90.6	12.1	2488	16
9	790329-BH-BH-2H-1H-BH BG 203 x P 180-1	90.7	12.8	2512	15
10	790330-BH-BH-6H-2H-BH BG 203 x P 1786	91.1	12.5	2643	10
11	790330-BH-BH-7H-2H-BH BG 203 x P 1786	91.2	13.0	2872	5
12	780186-BH-BH-1H-2H-BH P 992 x RABAT	93.8	14.8	2323	22
13	770586-33P-1P-BP-BH-1H-BH CPS 1 x P 6099	95.5	11.3	2310	23
14	750788-46H-BH-1H-1H-1H-BH-BH H 208 x NP 34	91.8	18.5	2793	7
15	790328-BH-BH-4H-2H-BH BG 203 x P 212-1	93.2	10.5	2460	20
16	780215-127T-2P-1P-BP-BH-BH ICCX-770647-F1 x BG 203	84.7	11.5	2035	25
17	760129-23P-1P-BP-4P-BP-BH (JG 71 x PG 72-8) (PRR 1 x P 1265)	93.3	20.6	2544	14
18	780215-56-8P-BP-1P-BP-BH-BH $ [BG 203 x (WR 315 x BG 203)] x BG 203	89.3	11.5	2893	4
19	780215-56T-2P-BP-2P-BP-BH-BH [BG 203 x (WR 315 x BG 203)] x BG 203	89.6	12.3	2805	6
20	750840-1H-BH-1H-2H-1H-2H-BH P 1231 x CPI 36071	96.6	13.9	2666	9
21	760718-4P-1P-BT-1H-1H-1H-BH G 130 x BEG 482	85.6	12.6	2632	11

Table 4.24 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	750898-48P-BP-1P-1H-1H-1H-BH P 1661 x P 1214	86.7	12.2	2570	13
23	750734-12H-BP-1P-1H-1H-1H-BH P 1013 x P 993	96.4	13.0	2067	24
24	ICC 4954 H 208	93.0	12.4	2676	8
25	ICC 10136 PANT G-114	89.5	13.5	3298	2
	Mean	91.45	13.15	2619.9	
	SE±	1.00	0.65	179.0	
	CV(%)	2.18	9.90	13.7	

$ Contributed to ICSN-DL

Table 4.25 Characteristics of entries in Preliminary Yield Trial - 3 DL-WR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	761433-2P-1P-1P-BP-1H-1H-BH [F2(JG 62 x P 36)-3 F2(T 103 x JM-530)-3]	92.4	12.5	2391	12
2	740599-6H-1H-1P-BH-1H-1H-1H-1H-BH (K 850 x RS 11) (BEG 482 x L 2)	95.5	12.8	2140	22
3	740599-6H-1H-1P-BH-1H-1H-1H-2H-BH (K 850 x RS 11) (BEG 482 x L 2)	93.8	13.3	1996	23
4	810671-BH-BW-2H-BH BG 209 x WR 315	83.6	15.5	1845	25
5	810685-BH-BW-2H-BH PANT G-114 x P 436-2	89.8	11.0	2531	10
6	810671-BH-BW-7H-BH BG 209 x WR 315	89.1	13.4	2752	6
7	810671-BH-BW-8H-BH BG 209 x WR 315	88.0	13.4	2330	15
8	810671-BH-BW-18H-BH BG 209 x WR 315	90.0	13.6	2215	20
9	810685-BH-BW-6H-BH PANT G-114 x P 436-2	85.0	12.0	2163	21
10	810685-BH-BW-7H-BH PANT G-114 x P 436-2	89.8	11.3	2357	13
11	810686-BH-BW-1H-BH BG 209 x P 436-2	92.4	11.1	2285	18
12	810686-BH-BW-4H-BH BG 209 x P 436-2	93.5	11.3	2298	17
13	810686-BH-BW-5H-BH BG 209 x P 436-2	90.1	11.3	2553	9
14	810686-BH-BW-10H-BH BG 209 x P 436-2	93.1	11.5	1975	24
15	810686-BH-BW-12H-BH $ BG 209 x P 436-2	88.0	12.2	2780	4
16	810686-BH-BW-13H-BH BG 209 x P 436-2	94.3	10.7	2349	14
17	810686-BH-BW-23H-BH BG 209 x P 436-2	89.7	12.6	2409	11
18	810686-BH-BW-26H-BH BG 209 x P 436-2	94.5	11.6	2313	16
19	810686-BH-BW-27H-BH $ BG 209 x P 436-2	93.5	12.9	2899	2
20	810686-BH-BW-28H-BH BG 209 x P 436-2	89.4	11.5	2582	8

Table 4.25 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
21	810847-BP-4P-BH [BG 203 x {(BG 203 x (WR 315 x BG 203)) x BG 203} x BG 203]	89.3	11.3	2591	
22	810846-BP-5P-BH [{(H 76-49XWR 315) x H 76-49} x H 76-49]	89.5	18.0	2266	19
23	800550-BP-3P-BH [{(BG 203 x (WR 315 x BG 203) x BG 203} x BG 203]	93.3	11.0	2755	
24	ICC 4954 H 208	91.3	12.3	2828	3
25	ICC 10136 PANT G-114	89.9	12.6	3097	1
	Mean	90.75	12.44	2428.0	
	SE±	1.25	0.32	201.4	
	CV(%)	2.75	5.14	16.6	

$ Contributed to ICSN-DL

Table 4.26 Characteristics of entries in Preliminary Yield Trial 1 DL-AB+BH at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	810950-BH-BW-4H-BH C 235 x PHULE G-7	91.9	14.8	2822	24
2	810950-BH-BW-18H-BH C 235 x PHULE G-7	93.6	16.3	2998	19
3	810968-BH-BW-5H-BH BG 209 x H 75-35	89.3	18.2	3056	17
4	810968-BH-BW-6H-BH BG 209 x H 75-35	89.7	21.9	3446	6
5	810968-BH-BW-10H-BH BG 209 x H 75-35	89.5	19.2	3252	9
6	810968-BH-BW-17H-BH BG 209 x H 75-35	90.6	22.2	3221	11
7	810968-BH-BW-22H-BH BG 209 x H 75-35	88.7	18.5	2963	21
8	810968-BH-BW-28H-BH BG 209 x H 75-35	85.4	16.5	3343	7
9	810968-BH-BW-42H-BH BG 209 x H 75-35	89.2	18.8	3451	4
10	810968-BH-BW-43H-BH BG 209 x H 75-35	88.9	20.6	2955	22
11	810968-BH-BW-45H-BH BG 209 x H 75-35	87.8	20.3	3024	18
12	810968-BH-BW-49H-BH BG 209 x H 75-35	88.7	19.8	3116	14
13	810968-BH-BW-53H-BH BG 209 x H 75-35	89.2	21.9	3134	13
14	810968-BH-BW-58H-BH BG 209 x H 75-35	87.3	21.2	2971	20
15	810969-BH-BW-1H-BH GL 769 x GG 588	89.3	11.8	2865	23
16	810969-BH-BW-3H-BH GL 769 x GG 588	89.2	12.2	3759	1
17	810969-BH-BW-7H-BH GL 769 x GG 588	91.5	11.2	3277	8
18	810969-BH-BW-8H-BH GL 769 x GG 588	89.4	12.5	3607	2
19	810969-BH-BW-9H-BH $ GL 769 x GG 588	88.9	13.1	3474	3
20	810969-BH-BW-11H-BH GL 769 x GG 588	88.7	12.7	3176	12
21	810969-BH-BW-21H-BH GL 769 x GG 588	92.5	11.6	3099	15

Table 4.26 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	810969-BH-BW-24H-BH GL 769 x GG 588	91.6	11.5	2643	25
23	810969-BH-BW-27H-BH GL 769 x GG 588	91.2	11.3	3446	5
24	ICC 4954 H 208	89.5	11.4	3064	16
25	ICC 10136 PANT G-114	88.2	12.3	3224	10
	Mean	89.60	16.07	3175.4	
	SE±	0.79	0.57	200.3	
	CV(%)	1.76	7.04	12.6	

$ Contributed to ICSN-DL

Table 4.27 Characteristics of entries in Preliminary Yield Trial - 2 DL-AB+BM at Hisar in 1985/86.

Sl No	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	810969-BH-BW-28H-BH GL 769 x GG 588	89.8	12.0	2552	12
2	810969-BH-BW-29H-BH GL 769 x GG 588	89.0	13.9	2503	16
3	810969-BH-BW-37H-BH GL 769 x GG 588	86.5	18.9	2642	8
4	810969-BH-BW-44H-BH @ GL 769 x GG 588	83.5	13.8	2823	3
5	810969-BH-BW-64H-BH GL 769 x GG 588	87.5	11.9	3131	1
6	810970-BH-BW-6H-BH GL 769 x H 75-35	80.0	20.7	2448	18
7	810970-BH-BW-7H-BH GL 769 x H 75-35	88.3	13.8	2642	9
8	810970-BH-BW-25H-BH GL 769 x H 75-35	89.3	20.9	1788	25
9	810970-BH-BW-62H-BH GL 769 x H 75-35	89.3	22.9	2507	15
10	810970-BH-BW-63H-BH GL 769 x H 75-35	88.0	11.3	2492	17
11	810970-BH-BW-67H-BH $ GL 769 x H 75-35	85.3	18.5	2766	4
12	810970-BH-BW-70H-BH GL 769 x H 75-35	90.5	19.8	2731	6
13	810971-BH-BW-3H-BH H 208 x GG 588	86.5	12.9	2172	23
14	810971-BH-BW-4H-BH H 208 x GG 588	88.8	12.1	2174	22
15	810971-BH-BW-5H-BH H 208 x GG 588	87.8	21.9	2231	21
16	810971-BH-BW-8H-BH H 208 x GG 588	87.5	11.9	2532	13
17	810972-BH-BW-24H-BH H 208 x H 75-35	88.8	19.5	2586	11
18	810972-BH-BW-49H-BH H 208 x H 75-35	89.5	19.9	2647	7
19	810974-BH-BW-2H-BH G 130 x H 75-35	89.3	18.5	2403	20
20	810974-BH-BW-23H-BH G 130 x H 75-35	89.3	17.3	2427	19
21	810974-BH-BW-34H-BH G 130 x H 75-35	89.5	21.6	2516	14

Table 4.27 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	810974-BH-BW-51H-BH G 130 x H 75-35	90.0	21.7	2083	24
23	810976-BH-BW-32H-BH C 235 x H 75-35	85.0	15.4	2766	5
24	ICC 4954 H 208	87.5	12.7	2620	10
25	ICC 10136 PANT G-114	87.0	12.4	2845	2
	Mean	87.72	16.65	2521.0	
	SE±	0.98	0.42	219.9	
	CV(%)	2.24	5.03	17.4	

@ Contributed to ICSN-DM
$ Contributed to ICSN-DL

Table 4.28 Characteristics of entries in Preliminary Yield Trial - I DL-AB at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	810800-3H-BW-BH-BH $ GL 629 x ILC 202	97	13.6	3065	2
2	810800-9H-BW-BH-BH GL 629 x ILC 202	90	13.3	1594	16
3	780302-5PLB-12PLB-3HLB-1HLP-BH BG 203 x ICCX-730001-9-2-B-EB	90	24.7	2935	4
4	810803-22H-BW-BH-BH ICCC 32 x ILC 202	89	11.8	2849	5
5	810806-26H-BW-4H-BH $ GL 629 x ILC 3279	90	17.7	2955	3
6	810807-3H-BW-4H-BH ILC 3279 x ICCC 34	87	15.1	2481	13
7	810807-4H-BW-2H-BH ILC 3279 x ICCC 34	89	13.2	2057	15
8	810808-16H-BW-1H-BH ILC 3279 x ICCC 33	88	11.5	2713	10
9	810818-7H-BW-BH-BT-BH ILC 3279 x PANT G-114	92	20.1	2474	14
10	810818-41H-BW-BH-BT-BH ILC 3279 x PANT G-114	90	18.6	2643	12
11	780302-5PLB-12PLB-3HLB-2HLB-BH BG 203 x ICCX-730001-9-2-B-EB	87	24.1	3442	1
12	810819-27H-BW-BH-BT-BH ILC 3279 x BG 209	91	17.1	2700	11
13	810819-37H-BW-BH-BT-BH ILC 3279 x BG 209	82	13.3	2825	7
14	810990-BH-BW-10H-BH L 550 x H 75-35	89	19.8	2841	6
15	ICC 4954 H 208	89	12.1	2822	8
16	ICC 10136 PANT G-114	87	12.8	2781	9
	Mean	89.0	16.17	2698.4	
	SE±	1.0	0.64	254.8	
	CV(%)	2.2	7.88	18.9	

$ Contributed to ICSN-DL

Table 4.29 Characteristics of entries in Preliminary Yield Trial 1 DL-STR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	810781-6H-1H-BH BG 209 x P 2151-1	94.6	13.6	1980	22
2	810781-7H-2H-BH BG 209 x P 2151-1	90.7	13.2	2109	13
3	810782-4H-1H-BH BG 209 x P 4341-2 x	95.2	13.0	1847	24
4	810783-2H-1H-BH BG 209 x NEC 417	99.4	17.8	2055	19
5	800718-20H-1H-1H-BH COLL-327 x PANT G-114	100.8	11.4	2229	10
6	800720-6H-BH-5H-BH COLL-327 x ICCC 24	108.6	11.9	2307	8
7	770601-BH-4H-BH-1H-BH P 4353-1 x PANT G-114	90.8	12.6	2169	11
8	770603-BH-6H-BH-2H-BH P 4353-1 x WR 315	91.2	12.8	2368	5
9	770603-BH-9H-BH-4H-BH P 4353-1 x WR 315	91.2	12.4	2323	7
10	770603-BH-18H-BH-4H-BH P 4353-1 x WR 315	91.7	12.9	2354	6
11	770603-BH-19H-BH-3H-BH P 4353-1 x WR 315	93.8	12.0	2107	14
12	770603-BH-21H-BH-3H-BH $ P 4353-1 x WR 315	91.7	13.4	2371	4
13	770603-BH-21H-BH-4H-BH P 4353-1 x WR 315	92.8	12.1	2550	1
14	770604-BH-16H-BH-1H-BH P 4353-1 x K 850	98.1	16.0	2045	20
15	770604-BH-29H-BH-3H-BH P 4353-1 x K 850	90.5	16.3	2080	17
16	780183-BH-BH-16H-1H-1H-BH P 992 x K 468	94.4	19.2	2096	15
17	780184-BH-BH-7H-1H-1H-BH NEC 240 x BG 203	91.2	13.0	1808	25
18	770603-50P-1H-4H-1H-1H-BH P 4353-1 x WR 315	97.9	13.8	2258	9
19	770606-BH-BH-7H-BH-1H-BH P 4353-1 x F 370	103.3	11.9	1960	23
20	780183-BH-BH-5H-BH-1H-BH P 992 x K 468	91.6	19.5	2091	16
21	780186-BH-BH-2H-BH-2H-BH P 992 x RABAT	97.0	14.6	2021	21

Table 4.29 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
22	770603-18P-2H-2H-BH-1H-BH P 4353-1 x WR 315	93.2	14.1	2077	18
23	770603-18P-2H-2H-BH-2H-BH $ P 4353-1 x WR 315	91.1	12.8	2443	2
24	ICC 4954 H 208	90.0	12.5	2139	12
25	ICC 10136 PANT G-114	92.3	12.1	2438	3
	Mean	94.52	13.79	2169.0	
	SE±	1.69	0.39	197.3	
	CV(%)	3.57	5.69	18.2	

$ Contributed to ICSN-DL

Table 4.30 Characteristics of entries in Preliminary Yield Trial - 1 DL-HR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
1	800763-15PLB-1PLB-3HLB-BHLB H 208 x ICC-1477-EB4	81.8	4	13.0	12.7	27.0	2435	18
2	800763-19PLB-11PLB-5HLB-BHLB H 208 x ICC-1477-EB4	81.8	3	13.2	10.4	16.2	2409	21
3	800771-10PLB-11PUY-3HUY-BHLB P 326 x ICCX-730129-24-1-1H-B-EB3	92.5	4	13.6	10.6	19.3	2744	13
4	800771-7PLB-3PLB-2HUY-BHLB P 326 x ICCX-730129-24-1-1H-B-EB3	87.5	4	7.8	12.3	18.2	2943	8
5	800771-22PLB-3PHB-2HLB-BHLB $ P 326 x ICCX-730129-24-1-1H-B-EB3	84.8	3	21.5	11.6	21.8	3248	3
6	800762-9PLB-5PUY-2HLB-BHLB H 76-49 x ICC-4662-EB4	78.5	3	2.7	12.9	18.5	2492	16
7	800762-16PLB-4PUY-1HLB-BHLB H 76-49 x ICC-4662-EB4	80.0	3	4.5	18.0	13.9	2076	23
8	800763-22PLB-4PUY-6HLB-BHLB H 208 x ICC-1477-EB4	79.8	4	15.8	13.0	21.5	2954	7
9	800767-23PLB-12PLB-1HLB-BHLB ICCC 13 x ICCX-730008-8-1-1P-BP-EB3	80.0	3	3.6	11.8	14.0	2047	24
10	800771-22PLB-5PLB-6HLB-BHLB $ P 326 x ICCX-730129-24-1-1H-B-EB3	80.0	4	21.1	11.6	57.7	4415	1
11	800771-22PLB-3PHB-1HLB-BHLB P 326 x ICCX-730129-24-1-1H-B-EB3	81.8	3	16.2	11.8	19.7	3660	2
12	780302-26PLB-11PLB-5HUY-1HUY-BHLB BG 203 x ICCX-730001-9-2-B-EB	91.5	5	30.5	11.4	19.0	2499	15
13	780305-19PLB-11PLB-3HLB-1HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	82.0	3	8.9	11.8	23.1	2462	17
14	780307-6PLB-11PLB-1HUY-1HUY-BHLB ICCX-730001-9-2-B-EB x ICCC 1	79.5	3	7.8	14.3	26.8	2904	9
15	790203-27PLB-11PLB-2HUY-2HLB-BHLB P 326 x G 130-EB-EB	89.8	3	14.1	11.9	21.3	3086	4
16	790210-18PMB-11PLB-1HUY-2HLB-BHLB L 534 x ICC-5264-EB-EB	79.8	3	6.0	12.6	25.2	1744	25
17	780287-23PMB-11PLB-3HLB-2HLB-BHLB ICC-506-EB-EB x ICC-3316-EB-EB	94.3	4	21.5	10.1	15.3	2265	22
18	780302-26PLB-11PLB-5HUY-1HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	79.0	5	36.3	11.9	14.2	2821	11
19	780302-31PLB-11PLB-1HLB-1HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	84.0	3	9.7	10.5	22.8	2871	10
20	780305-13PLB-11PLB-3HUY-2HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	82.8	4	9.6	10.8	19.4	2669	14
21	780305-19PLB-11PLB-1HLB-1HUY-BHLB H 208 x ICCX-730001-9-2-B-EB	81.5	3	21.2	11.4	18.0	2753	12

Table 4.30 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
22	780306-Z7PHB-11PLB-2HLB-2HLB-BHLB ICCX-730001-9-2-B-EB x ICCC 4	91.5	4	28.0	11.6	16.0	2413	20
23	790191-3PLB-11PLB-4HLB-1HLB-BHLB ICC-7770-EB-EB x ICC-2793-EB-EB	81.0	3	19.4	13.3	22.8	2418	19
24	ICC 4954 H 208	84.8	3	14.5	11.2	20.2	2961	6
25	730020-11-2-EB	85.5	3	14.5	10.1	22.8	2992	5
	Mean	83.80	3.4	15.01	11.98	21.39	2731.2	
	SE±	1.56	0.5	7.53	0.92	8.18	406.4	
	CV(%)	3.73	31.2	100.30	15.31	76.53	29.8	

$ Contributed to ICSN-DL

Table 4.31 Characteristics of entries in Preliminary Yield Trial - 2 DL-HR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
1	780306-18PLB-1ZPLB-1HLB-2HLB-BHLB ICCX-730001-9-2-B-EB x ICCC 4	83.9	3	2.3	13.5	18.3	2275	21
2	790214-3PMB-3PLB-1HLB-2HLB-BHLB (ICC-1381-EB-EB x ICC-3316-EB-EB) x CPS 1	77.1	3	4.9	14.5	27.4	3327	4
3	780288-30PMB-3PLB-1HLB-1HLB-BHLB ICC-506-EB-EB x ICC-7770-EB-EB	88.4	3	9.2	12.3	14.4	2787	13
4	780302-5PLB-1ZPLB-5HUY-1HLB-BHLB $ BG 203 x ICCX-730001-9-2-B-EB	83.7	3	11.0	12.6	20.0	3204	5
5	780305-2PLB-11PLB-2HLB-2HUY-BHLB H 208 x ICCX-730001-9-2-B-EB	80.7	3	6.6	12.5	20.6	2921	10
6	790202-16PLB-1ZPLB-1HLB-2HLB-BHLB P 324 x ICC-7770-EB-EB	90.9	3	7.0	11.4	21.3	2900	11
7	790203-38PLB-11PLB-1HLB-1HLB-BHLB P 326 x G 130-EB-EB	82.7	3	9.0	12.1	36.9	3523	2
8	780286-10PLB-1ZPLB-5HLB-2HLB-BHLB ICC-506-EB-EB x ICC-1381-EB-EB	78.6	4	8.0	16.1	15.0	2418	19
9	780302-31PLB-11PLB-2HUY-1HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	89.8	4	27.1	11.5	47.8	3727	1
10	780305-1PLB-11PLB-2HUY-1HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	91.3	4	18.6	12.8	19.7	3169	6
11	780288-30PMB-3PLB-1HLB-2HLB-BHLB ICC-506-EB-EB x ICC-7770-EB-EB	78.2	3	12.1	12.3	17.4	3054	7
12	780297-39PLB-BP-1PLB-3HLB-2HLB-BHLB $ H 208 x ICC-3340-EB-EB	82.9	4	14.8	11.9	24.8	3365	3
13	780297-59PLB-BP-3PLB-6HUY-1HLB-BHLB H 208 x ICC-3340-EB-EB	77.8	3	3.7	11.5	14.3	2391	20
14	780297-83PLB-BP-11PLB-3HLB-1HLB-BHLB H 208 x ICC-3340-EB-EB	78.7	2	7.9	11.6	20.7	2975	8
15	780297-83PLB-BP-11PLB-4HLB-2HUY-BHLB H 208 x ICC-3340-EB-EB	78.8	3	7.5	11.5	13.5	2435	18
16	780302-7PLB-BP-3PLB-3HUY-3HUY-BHLB BG 203 x ICCX-730001-9-2-B-EB	92.1	3	7.6	11.3	14.2	2855	12
17	780308-27PLB-BP-6PLB-7HLB-2HLB-BHLB PANT G-118 x ICC-7559-EB-EB	86.7	3	7.0	12.9	16.0	2458	17
18	780294-8PLB-BP-5PMB-4HLB-2HLB-BHLB ICC-3928-EB-EB x G 130-EB-EB	88.4	3	9.7	12.2	18.9	2653	16
19	780294-36PLB-BP-4PLB-2HUY-2HUY-BHLB ICC-3928-EB-EB x G 130-EB-EB	78.8	3	4.6	10.6	11.4	2785	14
20	780294-38PLB-BP-4PLB-1HUY-2HLB-BHLB ICC-3928-EB-EB x G 130-EB-EB	83.4	2	3.4	12.4	17.2	1670	23

Table 4.31 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
21	780297-12PHB-HP-5PHB-4HLB-2HLB-HHLB H 208 x ICC-3340-EB-EB	89.6	4	15.6	13.7	17.6	2250	22
22	780297-23PLB-HP-5PLB-4HLB-1HLB-HHLB H 208 x ICC-3340-EB-EB	78.6	3	5.2	11.2	13.3	1557	25
23	780297-39PLB-HP-1PLB-3HLB-1HLB-HHLB H 208 x ICC-3340-EB-EB	78.0	3	2.6	12.0	11.5	1624	24
24	ICC 4954 H 208	88.1	4	11.3	12.1	19.4	2765	15
25	730020-11-2-EB	91.4	4	26.4	11.9	19.6	2928	9
	Mean	83.95	3.2	9.73	12.34	19.65	2720.7	
	SE±	1.57	0.3	3.34	0.30	8.37	292.8	
	CV(%)	3.74	21.6	68.64	4.80	85.17	21.5	

$ Contributed to ICSN-DL

Table 4.32 Characteristics of entries in Preliminary Yield Trial - 3 DL-HR at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
1	780297-59PLB-BP-3PLB-1HLB-2HLB-BHLB H 208 x ICC-3340-EB-EB	78.5	3	4.3	11.3	17.3	2463	20
2	780297-83PLB-BP-11PLB-2HLB-1HLB-BHLB H 208 x ICC-3340-EB-EB	78.0	3	4.3	13.4	23.0	2582	15
3	780297-83PLB-BP-11PLB-4HLB-1HLB-BHLB H 208 x ICC-3340-EB-EB	81.0	3	8.9	11.7	16.4	2481	18
4	780302-15PLB-BP-5PLB-1HLB-2HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	83.7	3	15.0	10.6	24.3	2892	7
5	780302-18PLB-BP-11PLB-3HUY-3HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	82.0	3	4.2	13.1	22.2	2764	10
6	780308-17PLB-BP-8PLB-4HUY-1HUY-BHLB PANT G-118 x ICC-7559-EB-EB	78.0	3	16.5	12.6	20.4	3045	5
7	780308-22PLB-BP-7PLB-1HLB-1HLB-BHLB PANT G-118 x ICC-7559-EB-EB	78.0	3	4.6	17.1	18.3	1996	24
8	780308-27PLB-BP-6PLB-3HUY-2HLB-BHLB PANT G-118 x ICC-7559-EB-EB	78.0	2	2.3	12.9	22.2	2743	11
9	780308-27PLB-BP-6PLB-3HUY-3HLB-BHLB PANT G-118 x ICC-7559-EB-EB	80.2	2	5.2	13.5	18.8	2481	18
10	780308-27PLB-BP-6PLB-6HLB-2HLB-BHLB PANT G-118 x ICC-7559-EB-EB	78.0	2	9.1	12.4	25.8	2846	9
11	780308-33PLB-BP-1PLB-1HLB-4HLB-BHLB PANT G-118 x ICC-7559-EB-EB	78.0	2	1.4	14.6	16.6	2143	22
12	780305-1PLB-11PLB-1HMR-1HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	82.0	3	10.2	12.3	24.5	2399	21
13	780305-20PLB-11PLB-2HMR-1HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	80.0	2	2.8	16.1	33.0	1713	25
14	780305-26PLB-12PLB-1HMR-2HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	79.0	2	5.4	11.9	30.4	2632	13
15	780302-47PMB-11PLB-BHMR-1HLB-BHLB $ BG 203 x ICCX-730001-9-2-B-EB	79.8	3	8.1	12.6	21.7	3248	2
16	780305-21PLB-11PLB-BHMR-1HLB-BHLB H 208 x ICCX-730001-9-2-B-EB	78.0	3	6.0	12.3	22.9	2885	8
17	780305-21PLB-11PLB-BHMR-2HUY-BHLB H 208 x ICCX-730001-9-2-B-EB	78.0	3	14.6	13.4	19.4	3182	4
18	780305-34PMB-11PLB-BHMR-1HMB-BHLB H 208 x ICCX-730001-9-2-B-EB	79.0	3	5.2	12.0	15.2	2685	12
19	780306-2PLB-11PLB-BHMR-3HUY-BHLB ICCX-730001-9-2-B-EB x ICCC 4	83.2	3	10.9	16.3	14.2	2066	23
20	790195-22PLB-12PLB-BHMR-1HLB-BHLB ICC-2793-EB-EB x ICC-1981-EB-EB	80.5	3	6.2	12.3	25.7	2518	17
21	780302-7PLB-BP-10PLB-BHMR-2HLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	84.3	3	6.3	12.1	17.1	2571	16

Table 4.32 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Borer damage score	Borer damage %	Weight of 100 seeds(g)	Per plant yield (g)	Seed Yield (kg/ha)	Rank
22	800750-2PLB-2PLB-1BBR-BBR $ ICCX-730020-11-2-1B-B-EB3 x ICCX-730213-9-1-3B-B-EB3	81.7	3	13.2	11.4	21.3	3233	3
23	800750-2PLB-1PLB-1BBR-BBR ICCX-730020-11-2-1B-B-EB3 x ICCX-730213-9-1-3B-B-EB3	83.5	3	6.5	12.2	24.5	2617	14
24	ICC 4954 H 208	80.0	3	9.7	12.0	12.6	2895	6
25	730020-11-2-EB	88.0	4	15.4	12.3	22.0	3373	1
	Mean	80.42	2.8	7.85	12.90	21.20	2658.1	
	SE±	1.42	0.4	4.37	0.63	3.42	280.0	
	CV(%)	3.54	29.0	111.27	9.73	32.28	21.1	

$ Contributed to ICSN-IL

Table 4.33 Characteristics of entries in Advanced Yield Trial -1 DL grown at Hisar (H) and Gwalior (G) in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G	H	G	H	r	G	r
1	ICCL 83409 [(GL 651 x P 1092)-2 (NBC 30 x BENGAL GRAM)-2]	102.1	92.7	157.1	73.6	18.4	18.4	2716	20	1969	7
2	751245-BH-BH-BH-10H-BH-BH $ P 2974 x P 36	94.5	89.6	150.7	70.1	13.3	12.1	3303	4	1531	23
3	770114-B-BH-3H-BH-BH NBC 989 x G 130	87.2	87.5	151.0	73.7	11.6	10.4	3442	1	1806	16
4	780520-BH-BT-23H-BH-BH $ PANT G-114 x NBC 2368	86.7	88.8	149.5	65.3	12.2	10.2	3354	3	2071	3
5	750754-BP-BP-27P-1P-1H-BH-BH *** P 1013 x G 130	83.7	89.9	151.9	63.1	12.6	11.6	3262	6	2328	1
6	ICC 1762 P 1443-3 $	95.6	90.0	147.2	71.9	11.7	10.6	3269	5	1530	24
7	ICCL 81297 [(K 850 x H 223) (BEG 482 x BG 1)]	87.5	90.5	149.0	68.0	12.2	10.8	2881	16	1818	14
8	750768-BH-BH-BH-1H-2H-BH-BH P 1363-1 x K 100	86.3	90.1	150.8	71.7	14.1	12.4	2771	18	1928	10
9	790383-BH-BH-47H-BH-BH NBC 177 x P 324	98.2	90.3	153.3	65.5	13.7	12.4	3119	9	1830	12
10	761707-BH-BH-1H-1H-1H-BH-BH [(RAKA x C 235)-3 (P 1013 x L 534)-1]	96.3	89.7	156.1	72.2	14.6	12.3	2755	19	1535	22
11	770376-BP-12H-2H-BH PANT G-115 x K 1170	88.0	90.5	152.1	72.9	17.7	17.3	2710	21	1685	19
12	800456-36H-BH HMS 5 x ICOC 15	89.0	89.6	147.2	70.7	12.7	12.5	3191	7*	2045	5
13	771167-P2D-6H-BH-1H-BH GL 629 x P 404	103.0	95.6	155.7	66.7	19.6	16.9	2618	23	1823	13
14	780506-7H-BH-BH-BH PANT G-114 x ICCX-730167-5-3-B-BP	88.3	89.3	154.8	69.3	16.4	13.6	2995	12	1945	9

Table 4.33 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G	H	G	H	r	G	r
15	761889-HH-HH-1H-HH [(L 550 x NP 34)-2 (JG 39 x C 375)-2]	87.1	88.3	152.5	70.0	12.0	10.9	2972	15	1735	18
16	750736-4H-1P-HP-1H-1H-HH P 1013 x P 992	98.0	91.4	157.2	72.7	13.9	13.1	3011	11	2022	6
17	741167-1H-1H-HH-1H-HH ** F 61 x T 103	92.1	89.5	147.5	69.5	12.4	11.3	3394	2	1963	8
18	760718-2P-1P-HP-HH G 130 x HHG 482	80.0	92.7	155.5	71.0	18.1	16.7	2980	13	1767	17
19	770607-HH-HH-5H-HH-HH P 4353-1 x H 208	96.9	91.3	151.0	76.1	18.4	17.0	3123	8	1649	20
20	790201-9PHB-5PHY-2HLB-HHLB * PANT G-114 x ICC-3316-HB-HB	85.6	89.0	150.7	63.2	12.2	11.1	3116	10	2323	2
21	790302-7PLB-HP-3PLB-2HBY-HHLB L 550 x P 212-1	90.6	87.7	150.5	66.0	12.8	10.2	2832	17	1635	21
22	780308-27PLB-HP-6PLB-7HLB-HHLB PANT G-118 x ICC-7559-HB-HB	85.9	90.7	155.2	68.1	13.6	12.7	2703	22	2059	4
23	780308-33PLB-HP-1PLB-1HLB-HHLB PANT G-118 x ICC-7559-HB-HB	84.2	91.6	151.8	71.8	11.7	9.5	2139	25	1523	25
24	ICC 4954 H 208	88.2	89.4	151.6	67.0	12.4	11.3	2976	14	1873	11
25	ICC 5003 H 850	82.8	89.2	155.3	70.3	26.5	25.6	2613	24	1815	15
	Mean	90.3	90.2	152.2	69.6	14.6	13.2	2970		1848	
	SE±	1.7	1.0	1.7	2.2	0.5	0.3	160		127	
	CV(%)	3.8	2.1	2.2	6.2	6.4	4.5	11		14	

$ Contributed to ICSH-HL
* Contributed to ICCT-HL
** Contributed to GHRT (AICPIP)

Table 4.34 Characteristics of entries in Advanced Yield Trial -1 DL-HR grown at Hisar (H) and Gwalior (G) in 1985/86.

Sl. No.	ICCX NO./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G	H	G	H	r	G	r
1	761431-2P-1P-1P-HP-HH [F2(P 2974 x JG 62)-2 F2(H 208 x HR 315)-2]	89.5	89.8	148.1	56.5	13.5	12.7	2086	16	2061	5
2	780215-37T-1P-4P-HP-HH [(BG 203 (HR 315 x BG 203)) x BG 203]	88.5	89.0	147.8	63.7	11.6	11.5	2210	11	1939	13
3	741167-1H-1H-HH-1H-HH-HH F 61 x T 103	84.8	88.0	149.6	58.8	11.3	10.5	2563	3	1783	23
4	790462-7H-1H-HH-HH HMS 19 x G 130	94.5	88.2	148.4	58.3	13.0	12.6	2584	2	2351	1
5	790462-8H-1H-HH-HH HMS 19 x G 130	92.3	88.7	148.2	57.0	12.8	11.7	2096	15	1803	22
6	750898-1P-HP-1H-1H-HH-HH P 1661 x P 1214	80.3	86.6	150.5	57.9	13.4	13.6	1607	25	1944	12
7	750736-19H-HP-1H-1H-HH-HH P 1013 x P 992	83.8	88.4	150.4	55.9	12.9	12.1	2300	7	1952	9
8	751239-5H-HP-2H-1H-HH-HH C 214 x L 550	85.0	89.0	146.5	59.0	11.2	10.9	2235	9	1852	18
9	750736-13H-HP-1P-1H-HH-HH P 1013 x P 992	90.3	88.6	148.4	58.5	13.1	12.6	2097	14	1832	19
10	750736-15H-HP-1P-1H-HH-HH P 1013 x P 992	94.5	88.4	147.9	59.6	12.8	12.5	2148	12	1951	10
11	760718-2P-1P-HP-HH-HH G 130 x HHG 482	86.3	90.2	149.6	54.7	11.8	12.2	2077	19	1925	14
12	760718-3P-1P-HP-HH-HH G 130 x HHG 482	92.8	90.4	147.2	57.1	13.8	12.7	2078	17	2261	2
13	761431-18P-2P-2P-HP-HH-HH [F2(P 2974 x JG 62)-2 (H 208 x HR 315)-2]	83.0	88.4	149.6	58.6	12.9	10.6	2321	6	2120	3
14	750841-18P-HP-1P-1H-1H-HH-HH P 1231 x P 1265	89.8	89.1	147.9	61.7	11.1	10.3	2053	20	1804	21

Table 4.34 contd

Sl. No.	ICCX NO./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G	H	G	H	r	G	r
15	750790-12H-HP-1P-1H-1H-HH-HH NRC 835 x NP 34	87.3	92.0	149.7	57.9	13.7	13.6	1995	22	1913	15
16	750736-4H-1P-HP-1H-1H-HH-HH P 1013 x P 992	87.8	88.9	148.2	61.6	15.1	13.0	2147	13	1681	25
17	740132-8-4H-1H-1P-HP-HH-HH G 130 x BG 1	95.8	89.0	150.8	60.0	12.1	12.5	2288	8	1956	8
18	770532-22P-HY-HH-HH-HH K 468 x P-1863	86.8	89.5	148.3	58.3	11.0	11.3	2356	5	1976	7
19	741229-7H-1H-HH-1H-HH-HH P 472 x PANT G-104	85.5	88.5	146.9	62.0	10.6	11.0	2232	10	1912	16
20	751679-50P-1P-2P-HY-HH-HH NRC 802 x (P 1863 x P 3827)	97.3	88.7	153.6	57.8	14.0	12.5	2077	18	1890	17
21	752305-20P-1P-1P-HY-HH-HH [G 130 x (K 850 x CHAFFA) x (K 100 x NP 34) x (L 550 x Redbay)]	90.5	89.2	150.8	57.1	18.2	14.8	2387	4	1738	24
22	771147-HP-3H-HH-HH [F2(VR 315 x NP 34)-1 F2(GL 651 x P 1092)-1]	95.5	87.8	149.7	57.0	19.6	17.4	2032	21	1946	11
23	770606-HH-HH-7H-HH-HH-HH P 4353-1 x P 370	95.3	90.2	151.6	58.9	12.2	11.7	1862	26	1884	20
24	ICC 4954 K 208	92.8	89.9	148.8	59.3	12.1	11.7	1942	23	2076	4
25	ICC 10136 PANT G-114	87.0	88.8	149.7	57.8	12.7	11.7	2586	1	2008	6
	Mean	89.4	89.0	149.1	58.6	13.1	12.3	2174		1940	
	SE±	1.8	0.9	1.4	2.9	0.4	0.4	151		132	
	CV(%)	4.1	2.1	1.8	9.8	5.4	7.0	14		14	

Table 4.35 Characteristics of entries in Advanced Yield Trial -2 DL-W grown at Hisar in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
1	750963-5-1H-BH-BH-BH P 1214 x AYLET	81.3	13.3	2550	15
2	780215-67T-2P-1P-BP-BH [{BG 203 x (WR 315 x BG 203)} x BG 203]	82.0	11.4	2883	5
3	780215-130T-1P-2P-BP-BH [{BG 203 x (WR 315 x BG 203)} x BG 203]	82.6	11.7	3189	1
4	752539-5P-1H-BH-1H-BH-BH [F3(C 235 x T 3) F3(P 1786 x PB 7)]	92.0	13.8	2501	18
5	790454-4H-2H-BH-BH ICC 10597 x G 130	92.8	12.4	2562	13
6	750754-6H-BH-1H-1H-BH-BH P 1013 x G 130	93.5	13.4	2828	8
7	790340-BH-BH-1H-BH-BH BG 203 x P 4353-1	96.9	13.5	2615	10
8	790340-BH-BH-7H-BH-BH BG 203 x P 4353-1	95.2	15.7	2863	7
9	750756-17H-BP-3H-1H-BH-BH P 1013 x C 214	95.1	12.9	2391	22
10	760058-3H-BP-1H-1H-BH-BH G 130 x (P 1081 x P 2974)	96.2	12.3	2520	17
11	750744-13H-BH-1P-2H-BH-BH P 1013 x PG 72-8	80.6	17.4	2521	16
12	750734-1H-BP-1P-1H-BH-BH P 1013 x P 993	81.3	17.0	2391	23
13	790340-BH-BH-12H-BH-BH BG 203 x P 4353-1	83.4	14.7	2408	20
14	780215-67T-1P-2P-BP-BH-BH [{BG 203 x (WR 315 x BG 203)} x BG 203]	96.1	13.8	2563	12
15	761277-37P-1P-2P-BP-BH-BH K 850 x F2(NEC 1639 x NEC 1640)	85.8	14.3	2973	3
16	761431-35P-1P-1P-BP-BH-BH [F2(P 2974 x JG 62)-2 F2(H 208 x WR 315)-2]	95.7	13.0	2385	24
17	761431-35P-2P-3P-BP-BH-BH [F2(P 2974 x JG 62)-2 F2(H 208 x WR 315)-2]	86.5	12.8	2760	9

Table 4.35 contd

Sl. No.	ICCX No./ Pedigree	Days to 50 % flowering	Weight of 100 seeds(g)	Seed Yield (kg/ha)	Rank
18	780215-129T-1P-1P-BP-BH-BH [{BG 203 x (WR 315 x BG 203)} x BG 203]	83.7	13.1	2397	21
19	780215-132T-2P-2P-BP-BH-BH * [{BG 203 x (WR 315 x BG 203)} x BG 203]	85.1	13.5	3050	2
20	770606-BH-BH-8H-BH-BH-BH P 4353-1 x F 370	81.3	11.5	2272	25
21	770607-BH-BH-13H-BH-BH-BH P 4353-1 x H 208	79.2	17.6	2611	11
22	770607-BH-BH-5H-BH-BH-BH P 4353-1 x H 208	89.7	16.2	2869	6
23	810781-15H-BH-BH BG 209 x P 2151-1	94.6	11.4	2492	19
24	ICC 4954 H 208	84.4	12.5	2562	14
25	ICC 10136 PANT G-114	83.3	12.6	2890	4
	Mean	87.93	13.67	2641.7	
	SE±	1.46	0.34	150.9	
	CV(%)	3.31	5.01	11.4	

* Contributed to ICCT-DL

Table 4.30 Characteristics of entries in Advanced Yield Trial -I DL-HR grown at Hisar (H) and Gwalior (G) in 1985/86.

Sl. No.	ICCX No./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Borer damage VS %		Per plant yield (g)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G		H	H	H	G	H	r	G	r
1	790201-9PMB-5PUY-2HLB-BHLB PANT G-114 x ICC 3316-EB-EB	85.8	94.7	145.9	70.6	7	39.9	9.9	10.1	13.9	2290	16	2708	1
2	790203-29PLB-11PLB-1HLB-BHLB P 326 x G 130-EB-EB	86.1	93.4	146.6	60.6	7	35.5	12.6	11.8	16.5	1979	22	1986	17
3	780302-4PLB-11PLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	93.8	91.9	146.8	70.7	6	30.3	11.3	11.0	14.8	2463	10	2337	7
4	780302-31PLB-11PLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	84.8	92.8	146.0	68.0	7	39.3	11.2	10.4	13.4	2709	4	2144	13
5	780302-47PMB-11PLB-BHLB BG 203 x ICCX-730001-9-2-B-EB	91.2	95.0	149.1	69.5	7	49.9	12.2	11.4	11.3	2324	15	2254	9
6	790203-20PLB-11PLB-BHLB P 326 x G 130-EB-EB	86.4	89.9	145.5	62.2	6	17.6	12.1	10.9	11.3	2197	21	1876	21
7	780294-34PLB-BP-2PLB-2HLB-BHLB ICC-3928-EB-EB x G 130-EB-EB	82.2	90.8	144.5	71.1	5	21.2	11.3	10.8	13.7	2802	1	1943	20
8	780294-38PLB-BP-4PLB-1HUY-BHLB ICC-3928-EB-EB x G 130-EB-EB	89.3	92.7	144.6	60.3	5	27.4	12.1	12.7	11.8	2701	6	2502	3
9	780302-7PLB-BP-3PLB-2HUY-BHLB BG 203 x ICCX-730001-9-2-B-EB	88.3	92.9	145.8	66.1	5	17.5	10.3	10.4	19.9	2425	13	2071	16
10	780302-15PLB-BP-6PLB-1HUY-BHLB BG 203 x ICCX-730001-9-2-B-EB	81.5	93.1	143.2	63.1	7	17.9	11.3	10.8	13.6	2548	8	2160	12
11	780308-9PLB-BP-6PUY-2HUY-BHLB PANT G-118 x ICC-7559-EB-EB	90.1	95.8	146.5	72.0	5	10.1	21.2	22.0	18.2	1858	24	1716	24
12	780308-27PLB-BP-6PLB-6HLB-BHLB PANT G-118 x ICC-7559-EB-EB	89.1	91.5	145.9	68.0	6	19.8	12.1	12.6	11.4	1897	23	2435	6
13	780308-33PLB-BP-1PLB-1HLB-BHLB PANT G-118 x ICC-7559-EB-EB	82.3	95.4	151.0	69.1	4	12.6	9.8	9.3	18.7	2440	11	2229	10
14	780308-36PLB-BP-1PLB-2HLB-BHLB PANT G-118 x ICC-7559-EB-EB	84.0	93.4	148.6	67.7	5	12.5	14.9	14.8	19.8	2271	18	1853	22

Table 4.36 contd.

Sl. No.	ICCX No./ Pedigree	Days to 50% flowering		Days to mature	Plant height (cm)	Borer damage		Per plant yield (g)	Weight of 100 seeds (g)		Seed Yield (kg/ha)			
		H	G	G	G	VS	% H	H	H	G	H	r	G	r
15	800771-7PLB-3PLB-2BUY-BBLB P 326 x ICCX-730129-24-1-1H-B-EB3	94.1	94.4	146.6	65.3	7	39.3	11.2	10.8	14.3	1808	25	2642	5
16	780306-18PLB-12PLB-1BLB-2BLB-BBLB ICCX-730001-9-2-B-EB x ICCC 4	84.4	94.9	145.2	64.7	5	22.4	13.7	13.7	18.6	2263	19	2449	4
17	790308-15PBB-5PLB-5BLB-2BLB-BBLB P 9047 x ICC-5264-EB-EB	84.4	91.2	153.2	67.4	5	27.8	17.5	16.5	22.8	2351	14	1649	25
18	780288-30PBB-3PLB-1BLB-2BLB-BBLB ICC-506-EB-EB x ICC-7770-EB-EB	86.9	96.1	145.2	64.8	5	26.0	11.5	11.3	18.1	2702	5	1946	19
19	780294-34PLB-BP-2PLB-2BLB-3BLB-BBLB ICC-3928-EB-EB x G 130-EB-EB	84.0	95.0	150.4	67.0	5	16.9	10.4	11.5	13.0	2776	3	2303	8
20	780294-38PLB-BP-4PLB-1BUY-2BLB-BBLB ICC-3928-EB-EB x G 130-EB-EB	86.8	91.4	142.6	73.1	5	10.3	11.2	11.5	19.4	2667	7	2106	15
21	780297-39PLB-BP-1PLB-3BLB-2BLB-BBLB H 208 x ICC-3340-EB-EB	86.0	92.1	146.6	70.3	6	31.6	11.5	11.6	18.2	2287	17	1966	18
22	780308-28PLB-BP-8PLB-6BLB-4BLB-BBLB PANT G-118 x ICC-7559-EB-EB	85.8	92.9	148.3	68.1	5	15.7	16.8	16.4	35.3	2440	11	2163	11
23	780302-31PLB-11PLB-BBLB-3BUY-BBLB BG 203 x ICCX-730001-9-2-B-EB	83.9	96.6	148.3	62.9	6	31.2	11.6	10.9	13.0	2492	9	2113	14
24	ICC 4954 H 208	85.2	93.5	147.8	67.2	6	32.4	10.9	11.2	19.1	2784	2	1792	23
25	730020-11-2-EB	96.3	93.0	147.1	67.9	6	22.4	10.6	11.0	17.6	2221	20	2518	2
	Mean	86.9	93.4	146.9	67.1	6	25.1	12.4	12.2	16.7	2388		2147	
	SE±	2.3	1.3	1.9	3.0	1	5.7	0.4	0.4	3.0	265		107	
	CV(%)	5.4	2.7	2.6	9.1	20	45.0	6.6	6.2	35.4	21		10	

Project C-106(85)IC: Breeding Kabuli Chickpeas for Stability and High Yield in Semi-arid Tropics

Objectives

1. To breed high yielding, disease resistant kabuli cultivars with good consumer acceptance.

2. To contribute advanced breeding lines and segregating populations to the national programs in kabuli-producing countries.

Introduction

Major thrust in kabuli types, as in desis, remained in the incorporation of resistance to biotic stress factors, screening for the diseases resistance in the early generations followed by Heliothis resistance. Since kabulis get a higher premium for seed size, we exercised a high selection pressure for this character all through the generations. There is an awareness and interest of growing kabuli types in peninsular India, Ethiopia, Burma, Nepal, where early to medium maturing material will only fit. With the availability of early, wilt resistant kabuli lines, it was possible to make such a material available to some locations in India.

The high yielding and wilt resistant cultivar, ICCC 32, already identified for release in Central Zone was also proposed for identification for Seed of ICCC 32 was sent for minikit trials in Bihar, Punjab, Haryana, Rajasthan, Uttar Pradesh Madhya Pradesh, Maharashtra and Gujarat.

Hybridization

We planted 20 kabuli entries in the crossing block at ICRISAT Center and Hisar, the countrywise break up is given in Table 6.1. Those actually involved in the crosses were 29. We made 57 single crosses, 9 threeway and 25 double-crosses primarily to improve yield and stability of performance, and seed size of the kabuli types. All the crosses are listed in Table 6.2.

F_1 Generation

83 crosses made in 1984-85 for the improvement of kabuli types were sent to Tapperwaripora, Kashmir, for offseason advancement and seed was brought back for planting at Hisar and some early crosses at ICRISAT Center.

Table 6.1. List of parents grown in the crossing block, 1985/86.

Origin	Number
ICRISAT	11
India	2
Iran	1
Mexico	1
Portugal	1
Spain	1
Syria	1
Tunisia	1
Turkey	1
Total	20

Table 6.2. List of crosses made during 1985/86

Cross number	Parentage
Single crosses	
850469	ICCV 2 x ICC 12435
850470	ICCV 2 x ICCL 83005
850471	ICCV 2 x ICCX 730244-17-2-2H-5EB
850472	ICCV 2 x ICC 2352
850473	ICCV 3 x ICC 12435
850474	ICCV 3 x ICCL 83005
850475	ICCV 3 x ICCX 730244-17-2-2H-5EB
850476	ICCV 4 x ICC 12435
850477	ICCV 4 x ICCL 83005
850478	ICCV 4 x ICCX 730244-17-2-2H-5EB
850479	ICCV 5 x ICC 12435
850480	ICCV 5 x ICCL 83005
850481	L 550 x ICCL 81001
850482	L 550 x ICC 3935
850483	L 550 x ICCL 80004
850484	L 550 x ICC 3354
850485	L 550 x ICC 8933
850486	L 550 x ICC 1069
850487	L 550 x ICC 698
850488	L 550 x ICC 8383
850489	L 550 x ICCL 81014
850490	L 550 x ICC 6254
850491	L 550 x ICCX 730244-17-2-2H-5EB
850492	L 550 x L 144
850493	L 550 x ICCV 3
850494	ICCC 32 x ICCL 81001
850495	ICCC 32 x ICC 3935
850496	ICCC 32 x ICCL 80004
850497	ICCC 32 x ICC 3354
850498	ICCC 32 x ICC 8933
850499	ICCC 32 x ICC 1069
850500	ICCC 32 x ICC 698
850501	ICCC 32 x ICC 8383
850502	ICCC 32 x ICCL 81014
850503	ICCC 32 x ICC 6254
850504	ICCC 32 x ICCX 730244-17-2-2H-5EB
850505	ICCC 32 x L 144
850506	ICCC 32 x ICCV 3
850507	ICCC 33 x ICCL 81001
850508	ICCC 33 x ICC 3935
850509	ICCC 33 x ICCL 80004
850510	ICCC 33 x ICC 3354
850511	ICCC 33 x ICC 8933
850512	ICCC 33 x ICC 1069

Table 6.2 contd

Cross number	Parentage
850513	ICCC 33 x ICC 698
850514	ICCC 33 x ICC 8383
850515	ICCC 33 x ICCL 81014
850516	ICCC 33 x ICC 6254
850517	ICCC 33 x ICCX 730244-17-2-2H-5EB
850518	ICCC 33 x L 144
850519	ICCC 33 x ICCV 3
850520	ICCC 34 x ICC 2588
850521	ICCC 34 x ICC 6188
850522	ICCC 34 x ICC 6240
850523	ICCC 34 x ICC 7676
850524	ICCC 34 x ICC 9497
850525	ICCC 34 x ICC 10696
850561	ICCX 790265-24H-7H-BH x ICCC 32
850562	ICCX 790265-24H-7H-BH x ICC 10466
850563	ICCX 790265-24H-7H-BH x ICCC 49
850564	ICCC 34 x ICCC 32
850565	ICCC 32 x ICCX 740649-14P-1P-1H-2H-BH
850566	ICCC 32 x ICCX 741106-3P-1H-1P-1H-1H-BH
850567	ICCC 32 x ICCX 730048-13H-1P-1H-BH
850568	ICCC 32 x ICCX 780581-BH-10H-BH
850569	ICCC 32 x L 550
850570	ICCC 32 x ICCC 33
850571	ICCX 750946-24H-7H-BH x ICCC 32
Three-way Crosses	
850551	(ILC 202 x ICCL 83006) x L 550
850552	(ILC 202 x ICCL 83006) x ICCC 32
850553	(ILC 202 x ICCL 82001) X L 550
850554	(ILC 202 x ICCL 82001) x ICCC 32
850555	(ILC 3279 x ICCL 82001) x L 550
850556	(ILC 3279 x ICCL 82001) x ICCC 32
850557	(ILC 3279 x ICCL 83006) x L 550
850558	(ILC 3279 x ICCL 83006) x ICCC 32
850559	(ICCC 32 x HK 81-69) x L 144
850560	ICCX 790265-24H-7H-BH x (ICCC 32 x ICC 10466)
850572	(ILC 202 x ICCL 82001) x ICCC 32
Double Crosses	
850526	(ILC 202 x ICCC 32) x (ICCC 32 x ICC 10466)
850527	(ILC 202 x ICCC 33) x (ICCC 32 x HK 81-69)
850528	(ILC 202 x GL 629) x (ICCC 32 x ICC 10466)
850529	(ILC 3279 x C 104) x (ICCC 32 x ICC 10466)

F_2 Generation

Seed of 83 F_2 population that was brought from Tapperwaripora for planting in the wilt sick plot and blight nursery could not all be accommodated in the wilt sick nursery owing to shortage of space. The seed for remnant of the populations were kept in the cold store for planting next season. However, we did plant 24 crosses in the HAU blight nursery and 23 crosses in the normal fields and selected 45 plants in the former and 209 in the latter. We also planted 24 F_2 populations in the unsprayed blocks and selected 228 plants in these.

F_3-F_{7+} Progenies

We grew 1751 F_3-F_{7+} progenies in the normal fields and 1478 of these in the wilt sick plot also either at the ICRISAT Center or at Hisar (Table 6.3). In the normal field, F_3-F_4 progenies were in a spaced planting at 60x20 cm whereas the higher generation material was on a cropping density of 30x10 cm, however, progenies in the wilt sick plot were all at the cropping density. We selected 43 single plants in F_3 and F_4 generations and 85 in the later generations. The uniform, high yielding and wilt resistant progenies with good seed size were selected for further tests, we individually bulked 111 progenies for conducting PYTs next year.

Yield trials

We conducted 5 preliminary yield trials (PYTs) of 23 entries each, with L 550 and ICCC 32 included as the check cultivars. Each trial was in a 5x5 quadruple lattice with a plot size of 4 rows 4 m long and 30 cm apart. In addition, an advanced yield trial (AYT) of 23 entries and the same two checks was also conducted at Hisar as well as at Gwalior. The design and the plot size was the same as in the PYTs.

Observations were recorded on days to 50% flowering, 100-seed weight, wilt % and seed yield. All the trials were in good shape, which is as well reflected from the low CV values.

In PYT-1 one entry ICCX 780670-BH-BH-24H-BH gave significantly higher yield (3660 kg ha^{-1}) than the check L-550 and also possessed a much higher seed size (31.0 g/100 seeds) than L-550 (22 g). We selected 2 entries for contributions to International Chickpea Cooperative Trials-Kabuli (ICCT-K) and 5 for inclusion in advanced yield trials (Table 6.4).

In the PYT-2, entry ICCX 770198-BH-7H-BH-BH-BH yielded 3021 kg ha^{-1} which was significantly better than L 550. It was slightly better than the checks in seed size. We contributed 2 entries from this trial to ICCT-K and selected 6 entries for advanced yield trial (Table 6.5).

Table 6.3. List of F_3-F_{7+} progenies grown during 1985/86.

Generation	Hisar	ICRISAT Center
F_3	-	51
F_4	-	261
F_5	-	315
F_5/F_6	-	342
F_6	281	-
F_{7+}	228	-
Total	509	969

Table.6.4. Characteristics of entries in Preliminary Yield Trial 1 at Hisar, 1985/86.

Ent No.	Selection No. /Name	Parentage	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-790265-4H-BH-1H-BH@*	L 550 x Kourosh	89.8	25.5	3234	4
2	ICCX-800284-BH-BH-24H-BH	JG 74 x ICCC 24	89.7	22.8	3133	8
3	ICCX-800286-BH-BH-10H-BH	JG 74 x ICCC 26	82.0	29.8	2630	21
4	ICCX-800286-BH-BH-19H-BH	JG 74 x ICCC 26	91.5	28.4	2624	22
5	ICCX-800286-BH-BH-25H-BH	JG 74 x ICCC 26	89.3	30.1	2840	17
6	ICCX-800287-BH-BH-45H-BH	JG 74 x GL 633	90.5	21.9	3144	7
7	ICCX-800289-BH-BH-5H-BH	JG 74 x GL 637	92.0	25.3	2885	14
8	ICCX-800289-BH-BH-7H-BH	JG 74 x GL 637	93.2	24.7	2488	23
9	ICCX-800289-BH-BH-10H-BH	JG 74 x GL 637	91.0	24.0	3097	9
10	ICCX-800289-BH-BH-12H-BH	JG 74 x GL 637	93.2	25.4	2926	12
11	ICCX-780670-BH-BH-13H-BH	No. 501 x P 2591	90.0	30.2	2777	19
12	ICCX-780670-BH-BH-19H-BH@*	No. 501 x P 2591	87.0	30.6	3258	3
13	ICCX-780670-BH-BH-20H-BH	No. 501 x P 2591	90.0	31.6	2865	16
14	ICCX-780670-BH-BH-22H-BH*	No. 501 x P 2591	86.5	30.4	3271	2
15	ICCX-780670-BH-BH-24H-BH*	No. 501 x P 2591	84.7	31.0	3660	1
16	ICCX-780670-BH-BH-25H-BH	No. 501 x P 2591	87.2	31.6	2889	13
17	ICCX-780670-BH-BH-27H-BH*	No. 501 x P 2591	87.5	29.1	3196	5
18	ICCX-790270-BH-BH-43H-BH	L 550 x NEC 139	90.0	25.5	3073	10
19	ICCX-780677-BH-BH-10H-BH	No. 501 x P 9623	92.5	26.0	2420	24
20	ICCX-780677-BH-BH-21H-BH	No. 501 x P 9623	94.2	25.8	2638	20
21	ICCX-780677-BH-BH-45H-BH	No. 501 x P 9623	90.5	27.2	2248	25
22	ICCX-800315-BH-BH-3H-BH	PANT G-114 x ICCC 25	86.8	29.5	3009	11
23	ICCX-790265-BH-BH-11H-BH	L 550 x Kourosh	85.5	24.7	2880	15
24	ICCC 32		90.0	19.9	3149	6
25	L 550		87.5	22.1	2818	18
	Mean		89.29	26.91	2926.2	
	SE±		1.30	0.59	203.0	
	CV%		2.90	4.35	13.9	

@ Selected for ICCT-K, 1986/87.
* Selected for AYT, 1986/87.

Table 6.5. Characteristics of entries in Preliminary Yield Trial 2 at Hisar, 1985/86.

Ent No.	Selection No./Name	Parentage	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-790265-[illegible]	L 550 x Kourosh	94.0	28.6	2692	12
2	ICCX-790265-[illegible]*	L 550 x Kourosh	89.3	25.5	2896	5
3	ICCX-790265-[illegible]	L 550 x Kourosh	86.0	24.0	2863	6
4	ICCX-790265-[illegible]	L 550 x Kourosh	83.5	22.7	2774	8
5	ICCX-780670-[illegible]	No. 501 x P 2591	86.3	30.2	2580	16
6	ICCX-780670-[illegible]	No. 501 x P 2591	85.3	29.4	2639	14
7	ICCX-780677-[illegible]	No. 501 x P 9623	94.3	25.1	2712	11
8	ICCX-780677-[illegible]	No. 501 x P 9623	90.8	30.6	2332	24
9	ICCX-780681-[illegible]@*	No. 501 x NEC 141	94.5	31.5	2935	3
10	ICCX-780681-[illegible]	No. 501 x NEC 141	89.8	29.4	2324	25
11	ICCX-780681-[illegible]	No. 501 x NEC 141	87.5	29.7	2734	9
12	ICCX-800289-[illegible]	JG 74 x GL 637	94.0	25.4	2541	17
13	ICCX-810387-[illegible]	C 104 x ICCC 33	96.5	23.3	2332	23
14	ICCX-800286-[illegible]	JG 74 x ICCC 26	86.5	30.9	2514	20
15	ICCX-790278-[illegible]	ICCX-730078-18-5-2H-[illegible] x GL 629	82.5	26.1	2532	18
16	ICCX-770198-[illegible]*	No. 501 x H 208	80.8	25.5	3021	1
17	ICCX-770222-[illegible]*	ICCX-730057-12-3-B-[illegible] x ICCC 2	91.5	29.1	2849	7
18	ICCX-770222-[illegible]	ICCX-730057-12-3-B-[illegible] x ICCC 2	96.8	26.7	2728	10
19	ICCX-790476-[illegible]*	ICCX-730058-8-2-B-[illegible] x GL 629	90.5	31.7	3000	2
20	ICCX-790476-[illegible]	ICCX-730058-8-2-B-[illegible] x GL 629	90.3	25.1	2441	22
21	ICCX-790481-[illegible]	ICCX-730047-6-4-B-[illegible] x L 532	90.3	34.8	2643	13
22	ICCX-790481-[illegible]	ICCX-730047-6-4-B-[illegible] x L 532	89.3	29.0	2507	21
23	ICCX-790481-[illegible]@*	ICCX-730047-6-4-B-[illegible] x L 532	91.3	29.1	2906	4
24	ICCC 32		87.3	19.4	2531	19
25	L 550		88.3	25.1	2592	15
	Mean		89.38	27.51	2664.7	
	SE±		1.83	0.88	147.7	
	CV%		4.09	6.39	11.1	

@ Selected for ICCT-W, 1986/87.
* Selected for AYT, 1986/87.

The top two entries in PYT-3, ICCX 790506-BH-BH-29H-2H-BH and ICCX 790265-9H-BH-BH-1H-BH, yielded 3231 and 3129 kg ha^{-1} and had seed size of 30.3 and 32.3 g/100 seeds, respectively. Two entries from this trial were contributed to ICCT-K and 5 entries were selected for advanced yield trials (Table 6.6).

In PYT-4, entry ICCX 790280-BH-1H-BH-BH and ICCX 761293-5H-4H-1H-BH were the two top most yielders giving 3046 and 3042 kg ha^{-1} with a seed size of 25.7 and 23.6 g/100 seeds respectively. From this trial we contributed 2 entries to ICCT-K and selected 7 entries for advanced yield trials (Table 6.7).

A preliminary yield trial (PYT-5) of wilt and ascochyta blight resistance was conducted and only two entries gave higher yield than the checks (Table 6.8). The seed size of these entries was quite low. We selected 6 entries for AYTs.

In the advanced yield trial conducted at Hisar and Gwalior many entries yielded well at one and not at the other location; as such there was not much consistency in ranks (Table 6.9). However, three entries yielded equally well at the two locations viz. ICCX 741106-3P-1H-1P-1H-1H-BH-BH (ICCC 49), ICCX 780581-BH-10H-BH and ICCX 760282-BH-BH-15H-BH, giving on an average 2238, 2272 and 2218 kg ha^{-1}, respectively. The first entry was a contribution to Gram Coordinated Varietal Trial-Kabuli (GCVT-K), of AICPIP last year as ICCC 49, whereas the other two were contributed to these trials as ICCV 13 and ICCV 14 this year.

Table 6.6. Characteristics of entries in Preliminary Yield Trial 3 at Hisar, 1985/86.

Ent No.	Selection No./Name	Parentage	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-790488-BH-BH-5H-1B-BH	ICCX-730047-6-4-B-BH x K 4	82.2	27.0	2705	15
2	ICCX-790488-BH-BH-9H-1B-BH	ICCX-730047-6-4-B-BH x K 4	89.0	17.6	2813	8
3	ICCX-790490-BH-BH-11H-1B-BH	ICCX-730085-17-2-B-BH x C 104	96.9	26.3	2763	11
4	ICCX-790492-BH-BH-2H-1B-BH	ICCX-730085-17-2-B-BH x GL 622	85.4	29.0	2622	20
5	ICCX-790492-BH-BH-15H-1B-BH	ICCX-730085-17-2-B-BH x GL 622	84.3	29.7	2536	23
6	ICCX-790506-BH-BH-13H-2H-BH	ICCX-730069-5-3-1P-BP x GL 629	93.9	26.9	2882	7
7	ICCX-790506-BH-BH-29H-1B-BH	ICCX-730069-5-3-1P-BP x GL 629	94.6	29.3	2779	10
8	ICCX-790506-BH-BH-29H-2H-BH*	ICCX-730069-5-3-1P-BP x GL 629	81.3	30.3	3231	1
9	ICCX-790506-BH-BH-33H-1B-BH	ICCX-730069-5-3-1P-BP x GL 629	93.6	26.4	2500	24
10	ICCX-790470-BH-BH-3H-1B-BH	ICCX-730058-8-2-8-BH x C 104	92.2	27.8	2957	6
11	ICCX-780666-BH-BH-6H-2H-BH	JH 482 x No. 501	92.2	27.8	2586	22
12	ICCX-780666-BH-BH-6H-1B-BH	JH 482 x No. 501	93.1	28.4	2665	18
13	ICCX-790264-1H-BH-BH-1B-BH	L 550 x K 56567	84.3	22.8	2707	14
14	ICCX-790264-2H-BH-BH-1B-BH@*	L 550 x K 56567	81.9	24.1	3024	4
15	ICCX-790265-1H-BH-BH-1B-BH@*	L 550 x Kourosh	89.5	26.6	3054	3
16	ICCX-790265-1H-BH-BH-2H-BH	L 550 x Kourosh	93.8	26.8	2691	16
17	ICCX-790265-1H-BH-BH-3H-BH	L 550 x Kourosh	86.0	29.4	2637	19
18	ICCX-790265-4H-BH-BH-1B-BH	L 550 x Kourosh	81.8	28.1	2713	13
19	ICCX-790265-9H-BH-BH-1B-BH*	L 550 x Kourosh	81.5	32.3	3129	2
20	ICCX-790278-BH-10H-BH-1B-BH	ICCX-730078-18-5-2H-BH x GL 629	86.8	26.2	2447	25
21	ICCX-780651-BH-6H-BH-1B-BH	ICCC 1 x No. 501	80.5	26.6	2747	12
22	ICCX-780676-BH-1B-BH-2H-BH*	No. 501 x GL 629	91.9	30.9	2968	5
23	ICCX-790476-BH-BH-32H-1B-BH	ICCX-730058-8-2-8-BH x GL 629	93.1	27.1	2609	21
24	ICCC 32		82.2	18.4	2791	9
25	L 550		84.1	21.1	2668	17
	Mean		87.84	26.66	2769.1	
	SE±		1.33	0.60	182.8	
	CV%		3.04	4.53	13.2	

@ Selected for ICCT-K, 1986/87.
* Selected for AVT 1986/87.

Table 6.7. Characteristics of entries in Preliminary Yield Trial 4 at Hisar, 1985-86.

Ent No.	Selection No./Name	Parentage	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-790476-[illegible]	ICCX-730058-8-2-B-[illegible] x GL 629	93.1	27.9	2665	15
2	ICCX-790481-[illegible]	ICCX-730047-6-4-B-[illegible] x L 532	90.2	30.7	2706	13
3	ICCX-790496-[illegible]	ICCX-730085-17-2-B-[illegible] x GL 629	88.2	26.8	2583	17
4	ICCX-790496-[illegible]	ICCX-730085-17-2-B-[illegible] x GL 629	80.1	25.2	2679	14
5	ICCX-780677-[illegible]	No. 501 x P 9623	92.8	36.5	2052	25
6	ICCX-790492-[illegible]*	ICCX-730085-17-2-B-[illegible] x GL 622	84.7	30.6	2939	6
7	ICCX-780604-[illegible]*	ICCC 4 x GE2A	87.2	21.8	3005	3
8	ICCX-780581-[illegible]	PANT G-114 x GL 629	86.0	20.3	2659	16
9	ICCX-780581-[illegible]	PANT G-114 x GL 629	86.2	24.5	2507	22
10	ICCX-761293-[illegible]*	L 550 x ICCX-750073-F3	76.2	23.6	3042	2
11	ICCX-770171-[illegible]*	K 4 x No. 501	86.2	30.9	2944	5
12	ICCX-770173-[illegible]	K 4 x ICCX-730057-12-3-B-[illegible]	89.5	28.5	2839	9
13	ICCX-761287-[illegible]*	G 130 x ICCX-751290-F2	89.8	29.4	2927	7
14	ICCX-761301-[illegible]	L 550 x F3 (NEC 143 x K 1286)	82.8	24.0	2525	20
15	ICCX-751261-[illegible]	NEC 1572 x L 550	89.5	21.8	2791	10
16	ICCX-790280-[illegible]*	ICCX-730078-18-5-2B-[illegible] x GL 651	85.3	25.7	3046	1
17	ICCX-750946-[illegible]	GL 629 x P 1092	86.4	26.0	2520	21
18	ICCX-770314-[illegible]*	ICCX-730058-8-2-B-[illegible] x P 1209-1	89.2	21.6	2971	4
19	ICCX-770314-[illegible]	ICCX-730058-8-2-B-[illegible] x P 1209-1	89.8	21.6	2846	8
20	ICCX-780682-[illegible]	No. 501 x L 532	89.5	26.0	2492	23
21	ICCX-780682-[illegible]	No. 501 x L 532	90.2	25.3	2780	11
22	ICCX-780682-[illegible]	No. 501 x L 532	89.7	26.1	2724	12
23	ICCX-790282-[illegible]	K 4 x HYB 16-3	77.8	22.5	2554	18
24	ICCC 32		85.3	19.5	2254	24
25	L 550		88.5	23.2	2553	19
	Mean		86.97	25.60	2704.1	
	SE±		1.42	0.75	200.6	
	CV%		3.26	5.90	14.8	

@ Selected for ICCT-K, 1986/87.
* Selected for AYT, 1986/87.

Ent No.	Selection No./Name	Parentage	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-810829-1R-1R-0R	ICCL 81001 x ICGC 33	66.5	25.6	1616	14
2	ICCX-810830-3R-1R-0R	ICGC 33 x ICCL 81001	90.2	19.8	2072	1
3	ICCX-810836-3R-1R-0R	ICGC 33 x ICCX-752770-13P-2P-8P-8P	87.1	17.9	1632	12
4	ICCX-810829-8R-2R-0R	ICCL 81001 x ICGC 33	60.3	19.3	1490	17
5	ICCX-810829-8R-3R-0R	ICCL 81001 x ICGC 33	68.5	21.5	1965	2
6	ICCX-810829-8R-10R-0R	ICCL 81001 x ICGC 33	92.1	26.3	1434	20
7	ICCX-810829-8R-12R-0R	ICCL 81001 x ICGC 33	97.4	21.5	1664	10
8	ICCX-810829-8R-18R-0R	ICCL 81001 x ICGC 33	89.9	21.3	1809	6
9	ICCX-810830-8R-3R-0R	ICGC 33 x ICCL 81001	88.7	19.4	1854	5
10	ICCX-810795-9R-8M-1R-0R	ICGC 26 x ILC 72	109.6	13.1	1358	21
11	ICCX-810807-6R-8M-3R-0R	ILC 3279 x ICGC 34	98.7	17.9	1717	8
12	ICCX-810808-1R-8M-0R-8T-0R	ILC 3279 x ICGC 33	87.2	19.0	1651	11
13	ICCX-810808-7R-8M-0R-8T-0R	ILC 3279 x ICGC 33	86.3	24.0	1469	18
14	ICCX-810808-16R-8M-0R-8T-0R	ILC 3279 x ICGC 33	67.4	22.5	1628	13
15	ICCL 83002*		87.0	24.9	1134	23
16	ICCL 83005*		91.4	24.8	1251	22
17	ICCL 83008*		80.0	25.1	1500	16
18	ICCL 83019*		91.3	28.6	774	24
19	ICCL 83020*		90.2	22.4	1683	9
20	ICCL 83024*		92.8	22.0	1602	15
21	ICCL 83025		81.1	19.0	750	25
22	ICCL 83027		79.4	20.8	1800	7
23	ICCL 83024		96.2	20.3	1447	19
24	L 550		90.7	22.6	1871	3
25	ICGC 32		90.3	19.2	1866	4
	Mean		86.41	21.54	1561.5	
	SE±		3.54	1.57	174.8	
	CV%		8.19	14.54	22.4	

* Selected for AYT, 1986/87.

Table 6.9. Characteristics of entries in Advanced Yield Trial, 1985/86.

Ent. No.	Selection No./Name	Parentage	Days to 50% flowering		Weight of 100 seeds (g)		Seed yield (kg/ha)		Rank	
			I	G	I	G	I	G	I	G
1	ICCX-760701-96P-2P-[illegible]	K 468 x L 550	80.5	91.1	22.4	20.5	2627	1417	8	16
2	ICCX-740649-14P-1P-1[illegible]*	ICCX-740111-F1 x ICCX-740146-F1	80.8	89.0	22.2	22.7	2427	1873	13	2
3	ICCX-751270-[illegible]*	L 550 x NEC 139	80.9	95.0	23.9	24.6	2276	1921	20	1
4	ICCX-751271-[illegible]	L 550 x NEC 108	85.1	92.1	22.3	22.7	2008	1271	24	23
5	ICCX-741106-3P-1[illegible]	CEYLON-2 x L 550	81.9	90.5	24.2	23.3	2726	1749	4	6
6	ICCX-750946-24[illegible]*	GL 629 x P 1092	80.6	88.7	26.0	25.2	2727	1567	3	13
7	ICCX-750946-24[illegible]	GL 629 x P 1092	84.8	93.2	33.4	29.6	2149	1494	23	14
8	ICCX-750946-24[illegible]	GL 629 x P 1092	81.8	92.6	29.6	28.0	2300	1400	19	18
9	ICCX-751287-[illegible]	No. 301 x K 1480	84.3	88.2	27.3	25.5	2384	1397	16	19
10	ICCX-730048-13[illegible]	L 550 x C 235	80.8	83.1	21.4	22.5	2624	1568	9	12
11	ICCX-780581-[illegible]	PANT G-114 x GL 629	80.9	94.4	22.6	22.2	2733	1811	2	4
12	ICCX-741300-7P-1[illegible]	JG 39 x K 4	83.0	95.3	23.8	22.4	1945	1430	25	15
13	ICCX-750265-3[illegible]	ICCX-740981-F1 x ICCX-741310-F1	80.6	89.8	26.7	27.4	2322	1619	18	10
14	ICCX-770173-[illegible]*	K 4 x ICCX-730057-12-3-8-[illegible]	87.1	91.4	30.1	28.7	2711	1328	5	21
15	ICCX-760282-[illegible]	C 104 x ICCX-730058-8-1-B	84.4	89.9	25.7	25.7	2219	1407	22	17
16	ICCX-760282-[illegible]	C 104 x ICCX-730058-8-1-B	80.6	92.5	22.3	22.7	2664	1773	6	5
17	ICCX-761293-[illegible]	L 550 x ICCX-750073-F3	78.1	91.1	21.6	20.6	2753	1246	1	24
18	ICCX-761293-[illegible]	L 550 x ICCX-750073-F3	85.2	91.2	22.1	21.3	2664	1187	7	25
19	ICCX-770173-[illegible]	K 4 x ICCX-730057-12-3-8-[illegible]	88.9	93.7	27.6	26.6	2513	1365	10	20
20	ICCX-751268-[illegible]	L 550 x NEC 141	82.5	90.8	24.9	25.7	2346	1579	17	11
21	ICCX-750705-25[illegible]	P 30 x P 9623	84.5	93.9	24.6	24.2	2239	1659	21	7
22	ICCX-751230-[illegible]	JG 62 x L 550	81.7	89.4	23.1	25.1	2453	1626	12	9
23	ICCX-760282-[illegible]	C 104 x ICCX-730058-8-1-B	93.8	91.2	25.8	24.9	2492	1272	11	22
24	ICGC 32		83.0	86.0	19.4	18.7	2422	1834	14	3
25	L 550		81.4	92.6	22.2	21.2	2385	1646	15	8
	Mean		83.09	91.06	24.61	24.08	2444.4	1536.3		
	SE±		1.62	2.43	0.74	0.66	164.1	99.1		
	CV%		3.90	5.34	6.04	5.46	13.4	12.9		

@ Selected for ICCT-K, 1986/87.
* Selected for AYT, 1986/87.
I = [illegible], G = [illegible].

Project C-108(85)IC: Breeding chickpeas for adaptation to early and late planting, and to increased inputs

Objectives

To breed chickpeas adapted to early sowing, with the desirable characters: high and stable yield, resistance to Fusarium wilt and root rots; resistance to Heliothis.

To breed chickpeas adapted to late sowing, with the desirable characters: high and stable yield, resistance to Fusarium wilt, Ascochyta blight, Botrytis gray mold, and stunt; resistance to Heliothis.

To breed chickpeas responsive to higher inputs, with desirable characters: high and stable yield; resistance to lodging; resistance to diseases and to Heliothis.

A. Breeding for adaptation to early sowing

Introduction

Chickpea yield seems to be directly correlated with the length of crop duration. In peninsular India, chickpea is normally planted around mid-October, and harvested by early February. Thus, the crop duration is about 100-110 days. Yields are lower in peninsular India compared to northern India, where the crop duration is also much longer (160-170 days). Rising summer temperatures and depleted soil moisture do not allow crop growth at the end of season. Therefore, increasing crop duration by planting earlier than the normal planting was considered as a possible way of increasing crop duration and thereby yield.

We screened several hundred germplasm lines and breeding selections; and have selected lines adapted to mid-September sowing. A set of 49 selected lines was tested both in normal (mid-October) and early (mid-Septembr) sowing for comparison. Wherever comparisons were possible early sown chickpeas have yielded better than those sown at normal time, both under irrigated and non-irrigated situations. During 1984/85 season also, early sown chickpeas yielded an average of 1840 kg ha^{-1} compared to 1090 kg ha^{-1} of those sown at normal time.

Crosses made

We made 26 crosses between lines adapted to early planting and sources of resistance to wilt, dry root rot, Colletotrichum blight and Heliothis pod borer. Details of the crosses are in Table 8.1.

Table 8.1. Crosses made in 1985/86 to incorporate high yield and resistance to various diseases in chickpea types adapted to early planting in peninsular India.

Cross No.	Female Parent	Male Parent
850573	P 18	ICC 12237
850574	P 1067	ICC 12269
850575	P 1329	ICC 10466
850576	ICC 12435	P 4089-1
850577	ICC 11315	BN 31
850578	ICCX-810565-29P-BPWR-BP	ICC 506-EB
850579	ICCX-810565-29P-BPWR-BP	ICCL 81012
850580	ICCX-810565-29P-BPWR-BP	ICCC 42
850581	ICCX-810565-29P-BPWR-BP	ICC 8589
850582	ICCX-810565-29P-BPWR-BP	H 208
850600	ICCX-810565-29P-BPWR-BP	H 81-200
850583	ICCX-810557-12P-BPWR-BP	ICC 6663-EB
850584	ICCX-810557-12P-BPWR-BP	ICCC 37
850585	ICCX-810557-12P-BPWR-BP	RSG 44
850586	ICCX-810557-12P-BPWR-BP	C 235
850587	ICCL 81014	ICCX-810557-12P-BPWR-BP
850588	ICC 8209	ICCX-810557-12P-BPWR-BP
850589	P 18	ICC 10243
850590	P 1067	ICCL 81012
850591	P 1329	ICC 10243
850592	P 4089-1	ICCL 81012
850593	ICC 10243	BN 31
850594	P 18	P 1329
850595	P 1329	ICCC 42
850598	P 18	ICC 12271
850599	P 1329	ICC 12271

ICCX-810557	P 1067-1 x NEC 1166	
ICCX-810565	K 4-1 x NEC 1166	

F_3 to F_5 progenies

The numbers of progenies grown and single plant selections made are given in Table 8.2. A second set of material (one row each) was planted in the wilt sick plot for those progenies that were not selected earlier for Fusarium wilt resistance.

The prevailing drought conditions restricted the crop growth, and podding was poor. Several medium maturing lines, which were high yielding in previous years, were able to put up very few pods under the limiting soil moisture conditions. All progenies were rated visually for yielding ability. Progenies susceptible to wilt in the sick plot were rejected, even if they were high yielding. Resistant segregants from promising lines were harvested from the wilt sick plot for further evaluation next year.

A few high yielding and wilt resistant F_5 progenies were bulked for testing in replicated trials next season.

Comparison of early vs. normal sowing

We selected 23 lines that were promising in the previous years' experiments. It included six lines from the previous years early vs. normal sown experiment, as they show consistently good performance. We selected seven, five and four entries from three early sown screening trials 1, 2 and 3 respectively. Two wilt resistant and high yielding F_5 progenies were also included. P 1329 and Annigeri were included as checks. The trial was a 5 x 5 balanced lattice square design with six replications. Each entry was planted as 6 row plot of 4 m length. Row to row spacing was 30 cm, and plant to plant 10 cm. The early sown trial was planted on 14 September 1985 and the normal sown trial on 12 October 1985. No irrigation was given to either of the trials.

Observations on days to 50% flowering and maturity, flowering duration and reproductive period and pod damage score were recorded on each plot. Plant height; numbers of primary and secondary branches, and pod and seed number per plant; seeds per pod and 100 seed weight were recorded on 5 random plants per plot. Seed yield was recorded from 3.5 m from the central 4 rows of plot.

The combined analysis of variance is presented in Table 8.3; and the mean values for different phenological and yield characters in Tables 8.4 to 8.6. The entries differed significantly for all the characters studied. Mean squares for date of planting effect were significant for days to 50% flowering and end of flowering, flowering duration, reproductive period, plant height and seed yield (kg ha^{-1}). The interaction of date of planting with genotypes was significant for all characters except pod borer damage percentages, seeds per pod, 100-seed weight and seed yield.

Both plantings matured taking the same number of days, although the early planted genotypes had taken slightly more time to flower. This could be due to low moisture availability due to drought.

Table 8.2 The numbers of populations/progenies grown and selections made in 1985/86 at ICRISAT Center.

	Grown		Selected		
Generation	NF@	WSP	NF	WSP	Total
F3	271	271	13	74	87
F4	471	471	157	86	243
F5	589	212	298+45$	40+1$	384

@ NF = Normal field, WSP = Wilt sick plot
$ Selected bulks for testing in replicated trials in 1987/88.

Table 8.3 Mean squares for various characters from a combined analysis of variance of early and normal sown trials at ICRISAT Center in 1985/86.

Source of variation	df	Days to 50% flowering	Days to end of flowering	Flowering duration	Reproductive duration	Days to mature	Pod damage work	Borer damage (%)
Sowing date (D)	1	392.16**	1756.92**	488.96**	582.41*	18.75	13.230	1063.71
Error (a)	10	15.34	18.72	32.76	78.70	121.61	3.033	1400.58
Entry (E)	24	502.74**	478.61**	60.33**	637.57**	1972.75**	0.99**	112.85**
D X E	24	16.99**	17.79**	17.97**	34.53*	48.74**	7.63**	58.36
Error (b)	240	2.69	6.54	7.41	18.80	15.99	0.61	40.95

* Significant at 5% probability level.
** Significant at 1% probability level.

Contd...

Plant height (cm)	Primary branches/ plant	Secondary branches/ plant	Pods/ plant	Seeds/ plant	Seeds/ pod	Weight of 100 seeds (g)	Per plant yield (g)	Seed yield (kg/ha)
354.47**	0.009	24.197	429.84	376.54	0.077	0.002	21.547	10267130**
35.12	2.291	10.329	612.66	529.88	0.074	9.067	18.095	768618
88.26**	0.502**	2.915**	311.15**	518.94**	0.161**	431.235**	4.760**	10844346**
7.93**	0.140**	1.122**	76.48**	87.91**	0.037	3.977	3.456**	55717
2.53	0.075	0.407	26.41	33.35	0.035	3.429	1.244	39983

* Significant at 5% probability level.
** Significant at 1% probability level.

Table 8.4 Characteristics of entries in Early vs Normal soon Trial at ICRISAT center, 1985/86.

Sl. No.	Entry name	Days to 50% flowering		Days to end of flowering		Flowering duration		Reproductive period		Days to mature	
		Early	Normal	Early	Normal	Early	Normal	Early	Normal	Early	Normal
1	ICC 1565	56.0	56.2	79.9	83.0	24.2	26.9	62.6	69.3	118	126
2	ICC 8932	43.8	38.7	69.4	60.6	25.1	22.0	50.5	52.0	94	91
3	ICC 3405	57.8	57.5	77.9	71.7	20.4	14.1	52.9	61.6	111	119
4	ICC 25	54.0	50.5	75.9	72.4	22.0	22.0	50.1	52.6	104	103
5	ICC 1156	57.5	62.8	86.1	84.3	28.6	21.5	62.3	62.7	120	125
6	ICC 1502	57.0	52.6	82.7	78.8	25.8	26.2	67.6	74.9	125	128
7	ICC 4554	47.3	45.3	70.6	66.3	23.0	21.1	47.9	47.1	95	92
8	ICC 4863	49.5	45.8	74.3	71.9	24.7	26.2	53.7	60.0	103	105
9	ICC 10536	52.7	48.8	73.6	69.2	20.8	20.4	54.9	62.9	108	112
10	ICC 11044	43.9	41.6	68.3	62.7	24.3	21.1	48.3	50.3	92	92
11	ICC 11051	44.0	40.9	68.3	60.2	24.6	19.0	50.5	49.0	94	90
12	ICC 12365	60.4	61.3	81.2	77.9	20.9	16.7	59.3	63.9	120	125
13	ICC 8405	45.0	40.4	69.3	63.2	24.2	22.7	50.7	50.0	96	91
14	ICC 3497	47.1	45.2	70.8	65.7	23.8	20.5	44.5	45.1	91	90
15	ICC 7689	42.7	39.0	68.3	61.8	25.7	22.9	48.1	49.0	91	88
16	ICC 7695	43.5	40.9	66.2	60.0	22.7	18.9	49.3	51.6	93	93
17	ICC 8619	47.8	45.7	70.7	66.8	23.4	21.0	45.2	45.3	93	91
18	ICC 6064	53.8	50.6	74.4	70.2	20.5	19.7	47.7	48.6	101	99
19	ICC 7701	43.4	43.3	69.8	63.2	26.1	19.8	48.9	45.5	92	89
20	ICC 11542	58.4	55.6	77.2	73.1	18.8	17.6	55.4	65.4	114	121
21	ICC 11969	48.3	44.2	71.4	64.9	23.2	20.7	45.0	45.5	93	90
22	ICCX-810565 -29P-BPWR	47.5	46.2	70.9	65.8	23.4	19.6	54.6	55.2	102	101
23	ICCX-810577 -12P-BPWR	50.6	45.3	72.6	65.4	22.2	20.2	52.3	57.9	103	103
24	ICC 4918	44.9	40.5	70.8	63.3	25.6	22.9	51.2	54.8	96	95
25	ICC 1565	57.8	58.7	83.6	81.0	26.0	22.4	64.9	68.0	123	127
	Mean	50.18	47.89	73.77	68.93	23.59	21.00	52.73	55.52	102.9	103.4
	SE±	0.73	0.63	1.95	1.98	0.97	1.10	1.56	1.92	1.7	1.7
	CV(%)	3.54	3.24	3.14	3.48	10.09	12.82	7.23	8.45	3.6	4.1

Table 8.5 Characteristics of entries in Early vs Normal sown Trial at ICRISAT center, 1985/86

Sl. No.	Entry name	Borer damage (visual score)		Per cent borer damage		Plant height (cm)		Primary branches/ plant		Secondary branches/ plant	
		E	N	E	N	E	N	E	N	E	N
1	IOC 1565 P 1329	7	4	34.0	18.1	32.3	32.0	2.5	2.7	4.5	4.1
2	IOC 8932 N.31	5	5	22.0	18.2	29.6	28.2	2.1	2.1	3.5	2.6
3	IOC 3405 P 4089-1	6	4	22.0	8.1	28.0	28.1	2.7	2.7	4.8	3.4
4	IOC 25 P 18	6	4	19.0	20.3	31.4	27.9	2.4	2.6	3.8	4.5
5	IOC 1156 P 1067-1	7	3	28.0	21.1	32.3	31.3	2.6	3.0	4.4	4.5
6	IOC 1502 P 1293-2	6	4	22.0	13.6	31.6	32.7	2.6	3.1	4.7	4.8
7	IOC 4554 P 6099-2	4	5	15.0	14.9	29.7	28.5	2.4	2.3	4.2	3.5
8	IOC 4863 P 9650	6	5	29.0	19.0	35.9	33.9	2.4	2.1	3.3	2.5
9	IOC 10536 RPSP 267	6	4	22.0	16.3	28.3	26.7	2.6	2.5	3.9	4.1
10	IOC 11044 RPSP 431-1	4	6	18.0	15.4	30.2	28.5	2.2	2.3	3.8	3.5
11	IOC 11051 RPSP 437	5	6	16.0	19.8	29.4	27.1	2.3	2.3	3.7	3.5
12	IOC 12365 PHULE G-5	6	3	24.0	9.1	33.3	32.2	2.5	2.8	3.9	3.7
13	IOC 8405 T 113	4	6	21.0	19.4	31.0	29.2	2.3	2.1	3.2	2.2
14	IOC 3497 P 4197-2	5	5	16.0	20.5	30.3	25.8	2.4	2.2	3.8	3.7
15	IOC 7689 1-209-15	4	6	11.0	17.1	26.7	24.3	2.5	2.3	4.5	3.0
16	IOC 7695 2-57-61	5	5	15.0	14.4	25.5	23.9	2.4	2.1	4.0	3.0
17	IOC 8619 WP 2654-A	4	7	16.0	15.1	30.1	24.8	2.5	2.2	4.2	3.5
18	IOC 6064 JG 37	5	5	18.0	12.3	27.1	23.5	2.5	2.3	4.2	3.6
19	IOC 7701 63-1	5	5	11.0	9.2	29.0	24.8	2.4	2.3	4.0	4.1
20	IOC 11542 IOCC 21	5	4	21.0	15.6	33.1	30.8	2.5	2.8	4.4	3.8
21	IOC 11969 NEC 2820	5	6	14.0	21.7	30.5	25.8	2.5	2.2	4.2	3.8
22	IOCX-810565-2SP-BPWR-BP	5	5	20.0	13.6	34.9	31.0	2.4	2.3	4.3	3.3
23	IOCX-810577-12P-BPWR-BP	6	5	19.0	10.7	28.9	26.3	2.3	2.6	4.4	3.5
24	IOC 4918 Annigeri	5	6	23.0	15.6	27.2	24.3	2.4	2.4	4.6	2.7
25	IOC 1565 P 1329	6	3	30.0	18.7	31.7	31.7	2.8	2.8	4.9	4.3
	Mean	5.3	4.8	20.21	15.91	30.32	28.14	2.50	2.44	4.13	3.57
	SE±	0.3	0.3	3.75	3.08	0.67	0.57	0.11	0.10	0.23	0.28
	CV(%)	13.3	16.7	45.49	47.45	5.42	4.98	11.21	10.30	13.8	19.4

Table 8.6 Characteristics of entries in Early vs Normal sown Trial at ICRISAT center, 1985/86.

Sl. No.	Entry name	Pods/plant		Seeds/plant		Seeds/pod		Weight of 100 seeds (g)		Seed yield/ plant(g)		Seed yield (kg/ha) with ranks			
		E	N	E	N	E	N	E	N	E	N	E		N	
1	P 1329	16.4	22.3	16.2	24.6	1.0	1.1	19.5	18.0	4.1	5.5	549	23	392	22
2	H.31	19.3	18.1	15.9	15.6	0.8	0.9	37.7	36.5	6.9	6.0	1272	12	839	11
3	P 4089-1	25.1	23.9	25.6	25.0	1.0	1.0	15.5	16.4	4.4	4.3	926	18	467	21
4	P 18	22.1	19.7	23.4	22.4	1.0	1.1	16.8	17.8	4.3	4.3	1050	16	570	18
5	P 1067-1	13.9	13.4	15.5	11.2	1.1	0.9	21.8	20.3	4.1	3.6	580	22	257	25
6	P 1293-2	18.8	21.6	19.4	21.0	1.0	1.0	24.2	23.9	5.6	5.8	528	24	294	24
7	P 6099-2	32.6	27.8	36.6	34.2	1.1	1.3	14.9	14.5	5.6	5.0	1444	3	1009	3
8	P 9650	28.5	27.4	35.0	32.9	1.2	1.1	13.1	14.9	4.8	4.6	988	17	641	16
9	ICPSP 267	24.1	25.6	24.5	28.2	1.0	1.1	16.0	16.2	4.3	4.8	915	19	575	17
10	ICPSP 431-1	23.9	24.4	24.1	25.2	1.0	1.0	20.3	19.6	5.3	5.1	1366	6	893	10
11	ICPSP 437	26.9	19.7	30.7	23.4	1.1	1.3	18.6	16.8	6.0	4.1	1348	8	928	9
12	PHULE G-5	12.2	17.3	8.3	12.4	0.7	0.7	30.3	30.0	3.9	5.3	654	21	486	20
13	T 113	19.6	18.9	15.7	16.4	0.8	0.9	36.6	35.7	6.9	6.0	1226	14	961	5
14	P 4197-2	31.5	23.6	33.0	24.1	1.1	1.0	17.9	17.5	6.2	4.3	1398	5	1029	2
15	1-209-15	37.8	29.1	39.4	30.5	1.1	1.1	15.7	16.2	6.3	4.8	1498	1	1069	1
16	2-57-61	30.7	25.0	29.4	23.2	1.0	1.0	19.2	21.8	6.1	5.2	1300	10	935	8
17	MP 2654 A	31.5	23.4	33.4	24.1	1.0	1.1	17.0	17.3	6.0	4.1	1361	7	970	4
18	JG 37	21.0	18.2	20.6	20.4	1.0	1.1	21.8	21.9	5.1	4.7	1283	11	821	12
19	63-1	29.8	22.9	30.6	22.5	1.0	1.0	18.5	17.6	5.9	4.1	1428	4	820	13
20	ICCC 21	18.4	18.2	19.3	16.9	1.0	0.9	25.4	27.6	5.2	5.8	860	20	567	19
21	NEC 2820	34.8	22.9	36.0	23.5	1.1	1.0	17.5	17.7	6.6	4.4	1446	2	959	6
22	(X 4-1 x NEC 1166)	26.4	18.0	26.6	22.1	1.0	1.4	23.3	22.8	6.4	5.0	1327	9	788	15
23	(ICPSP 333 x P 436-2)	29.8	26.9	27.1	26.9	0.9	1.0	20.0	19.0	5.9	5.3	1216	15	808	14
24	Annigeri	27.2	24.9	26.1	20.9	1.0	0.8	19.3	20.6	5.8	4.6	1227	13	953	7
25	P 1329	14.5	22.9	14.2	23.0	1.0	1.0	19.5	19.6	3.9	5.5	433	25	344	23
	Mean	24.64	22.25	25.06	22.82	1.01	1.04	20.8	20.8	5.4	4.9	1105.0		735.0	
	SE±	2.28	1.84	2.34	2.25	0.04	0.10	0.6	1.0	0.5	0.4	75.72		68.10	
	CV(%)	28.0	28.3	28.8	28.1	10.8	26.4	7.2	11.3	21.3	28.4	16.8		28.7	

Flowering duration was marginally higher in early planting, while reproductive period was more in normal planted crop. Damage by Heliothis pod borer was more in the early than the normal planted crop. Plant height, number of primary and secondary branches, pods and seeds per plant, and seed yield per plant and per hectare were higher in early planted than the normal planted crop. Seeds per pod and 100-seed weight did not show any difference between the two planting dates. The early planting has given significantly higher yield of 1115 kg ha^{-1} compared to 735 kg ha^{-1} in normal planting. Line 1-209-15 (ICC 7689) has given the highest yield in both plantings. The rankings of other genotypes vary slightly.

Spraying of insecticide (Endosulfan) did not show any significant effect on any plant character (including borer damage percent) except for the reproductive period. The spray treatment x genotype interaction was significant for days to maturity and yield.

Screening for early planting

Like the previous years we continued screening germplasm lines and breeding material under early planting. The early sown screening trial-1 had 21 bulked progeny lines in F_5 and F_6 generations and four checks. The germplasm lines were grouped in to three trials depending on their flowering time from previous data. Trial-2 had entries taking <50 days, trial-3 had entries taking 51 to 55 days, and trial-3 had entries taking 56 to 60 days to flower. Each of these latter three trials had 47 germplasm lines plus two checks. Mean values for different plant and yield characteristics are presented in Tables 8.7 to 8.12.

All trials were affected by atypical drought that prevailed during the crop period. In the previous years, the medium maturing lines were doing well taking advantage of prolonged reproductive period. However, this year the very early maturing lines have given higher yields. Considering that the last year's drought was an aberrant situation, we propose to repeat Trial-1, retain most of the medium materials in trials in trials 2, 3 and a few entries from trial-4 for testing again in the coming season.

Correlations

The correlation co-efficients between seed yield and other characters in different trials are given in Table 8.13. As expected, days to 50% flowering, end of flowering, and maturity have shown significantly negative correlation with seed yield. Unexpectedly, reproductive period has also shown negative correlations with seed yield. Flowering duration has shown significant and positive correlation with seed yield in all trials except the normal sown trial. Pod borer damage had negative and significant correlation; while pod and seed number per plant had positive correlation with seed yield.

Table 8.7 Characteristics of entries in Early Soon Screening Trial - 1 at ICRISAT center, 1985/86.

Sl. No.	Entry name/ Parentage	Days to 50% flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Borer damage (score)	Plant height (cm)	Primary branches/ plant	Secondary branches/ plant
1	ICCX-790217-BP-4P-BP K 850 x (JG 62 x No. 42)	58.1	76.4	18.3	60.7	118.7	6.11	32.4	2.55	4.24
2	ICCX-790217-BP-9P-BP K 850 x (JG 62 x No. 42)	59.5	75.4	16.0	57.3	116.4	6.36	36.5	2.51	4.31
3	ICCX-790217-BP-11P-BP K 850 x (JG 62 x No. 42)	64.2	86.1	22.0	61.7	125.9	6.34	32.6	2.48	5.83
4	ICCX-790217-BP-13P-BP K 850 x (JG 62 x No. 42)	63.6	82.9	19.3	59.5	123.3	6.00	33.6	2.89	5.50
5	ICCX-790217-BP-19P-BP K 850 x (JG 62 x No. 42)	65.0	81.9	17.0	57.5	122.3	6.75	35.9	2.88	5.27
6	ICCX-790223-BP-22P-BP (JG 62 x No. 42) x P 4089-1	55.7	76.0	20.3	65.6	121.6	6.54	33.8	2.57	5.07
7	ICCX-790223-BP-47P-BP (JG 62 x No. 42) x P 4089-1	56.6	74.5	17.9	60.5	117.2	5.97	35.1	2.60	5.40
8	ICCX-790224-BP-5P-BP (K 850 x F 378) x P 690	46.8	69.7	22.8	51.4	98.2	5.49	30.7	2.41	3.69
9	ICCX-790224-BP-6P-BP (K 850 x F 378) x P 690	49.5	72.7	23.0	67.6	117.2	5.59	31.7	2.47	3.96
10	ICCX-790224-BP-8P-BP (K 850 x F 378) x P 690	46.2	71.0	24.8	59.9	106.1	5.95	35.1	2.44	4.00
11	ICCX-790224-BP-20P-BP (K 850 x F 378) x P 690	52.7	74.7	21.8	62.2	115.0	5.59	34.9	2.61	4.32
12	ICCX-810570-33P-BPMR-BP (L 550 x CP 66) x NEC 1166	54.3	75.0	20.5	51.9	106.3	5.70	29.8	2.58	4.90
13	ICCX-810572-22P-BPMR-BP (K 850 x H 208) x NEC 1166	52.1	73.9	21.6	52.1	104.4	4.83	32.1	2.49	4.78
14	ICCX-810572-32P-BPMR-BP (K 850 x H 208) x NEC 1166	53.8	74.8	21.0	58.2	112.1	5.57	33.1	2.71	3.59
15	ICCX-810578-5P-BPMR-BP (BPSP 333 x NEC 1166)	49.9	71.9	21.9	48.4	98.2	6.31	29.6	2.44	4.27
16	ICCX-810560-5P-1PMR-BP (P 4089-1 x NEC 1166)	51.2	72.7	21.5	52.0	103.3	4.98	32.5	2.56	4.54

Table 8.7 contd.

Sl. No.	Entry name/ Parentage	Days to 50% flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Borer damage (score)	Plant height (cm)	Primary branches/ plant	Secondary branches/ plant
17	ICCX-810560-17P-1PMR-BP (P 4089-1 x NBC 1166)	55.0	74.6	19.9	52.0	106.9	4.97	30.6	2.47	5.19
18	ICCX-810560-28P-1PMR-BP (P 4089-1 x NBC 1166)	57.3	76.3	19.1	59.6	116.8	5.75	30.0	2.40	5.61
19	ICCX-810563-74P-BPMR-BP (P 18 x NBC 1166)	51.0	74.0	22.9	51.3	102.3	5.69	32.8	2.39	4.39
20	ICCX-810563-77P-BPMR-BP (P 18 x NBC 1166)	49.9	72.4	22.3	49.4	99.4	4.95	33.0	2.48	4.73
21	ICCX-810565-42P-BPMR-BP (IC 4-1 x NBC 1166)	45.3	70.6	25.3	54.1	99.7	5.74	34.0	2.43	3.83
22	ICC 25 P 18	54.0	74.5	20.6	51.6	105.7	5.42	33.0	2.77	4.67
23	ICC 1565 P 1329	56.7	80.4	23.9	62.8	119.2	7.49	32.4	2.62	5.87
24	ICC 4918 Annigeri	46.2	70.7	24.5	51.1	97.2	5.44	28.4	2.70	4.92
25	ICC 1565 P 1329	58.0	78.0	20.1	60.9	118.8	7.33	32.7	2.70	5.19
	Mean	54.10	75.24	21.14	56.8	110.87	5.87	32.64	2.57	4.72
	SE±	2.4	2.9	9.1	7.0	3.7	13.6	4.1	11.3	16.3
	CV(%)	0.54	0.90	0.79	1.61	1.66	0.33	0.54	0.12	0.31

Table 8.8 Characteristics of entries in Early Sown Screening Trial - 1 at ICRISAT cente 1985/86.

Sl. No.	Entry/name parentage	Pods per plant	Seeds per plant	Seeds per pod	Weight of 100 seeds (g)	Yield per plant	Seed yield (kg/ha)	Ran
1	ICCX-790217-BP-4P-BP K 850 x (JG 62 x No. 42)	12.9	12.0	1.0	24.4	3.0	360	19
2	ICCX-790217-BP-9P-BP K 850 x (JG 62 x No. 42)	5.5	5.4	1.0	29.6	1.7	270	22
3	ICCX-790217-BP-11P-BP K 850 x (JG 62 x No. 42)	19.3	21.7	1.0	17.4	3.9	233	23
4	ICCX-790217-BP-13P-BP K 850 x (JG 62 x No. 42)	19.0	17.1	1.1	22.6	4.0	325	20
5	ICCX-790217-BP-19P-BP K 850 x (JG 62 x No. 42)	14.0	15.1	1.2	21.8	3.1	170	25
6	ICCX-790223-BP-22P-BP (JG 62 x No. 42) x P 4089-1	21.6	20.6	1.1	18.6	3.7	367	18
7	ICCX-790223-BP-47P-BP (JG 62 x No. 42) x P 4089-1	19.4	19.0	1.0	18.3	3.6	643	16
8	ICCX-790224-BP-5P-BP (K 850 x F 378) x P 690	17.4	16.8	1.1	25.8	4.3	971	4
9	ICCX-790224-BP-6P-BP (K 850 x F 378) x P 690	19.2	19.3	1.0	24.3	4.7	778	10
10	ICCX-790224-BP-8P-BP (K 850 x F 378) x P 690	17.3	17.8	1.0	26.5	4.7	915	5
11	ICCX-790224-BP-20P-BP (K 850 x F 378) x P 690	21.8	20.3	1.1	18.6	3.8	718	15
12	ICCX-810570-33P-BPWR-BP (L 550 x CP 66) x NEC 1166	26.8	28.9	0.9	18.8	5.5	806	8
13	ICCX-810572-22P-BPWR-BP (K 850 x H 208) x NEC 1166	18.7	20.6	0.9	23.0	4.8	874	6
14	ICCX-810572-32P-BPWR-BP (K 850 x H 208) x NEC 1166	17.7	19.2	1.0	19.8	3.7	773	11
15	ICCX-810578-5P-BPWR-BP (BPSP 333 x NEC 1166)	26.0	28.0	0.9	16.6	4.7	1013	2

Table 8.8 contd.

Sl. No.	Entry/name parentage	Pods per plant	Seeds per plant	Seeds per pod	Weight of 100 seeds (g)	Yield per plant	Seed yield (kg/ha)	Rank
16	ICCX-810560-5P-1PMR-HP (P 4089-1 x NEC 1166)	15.1	13.2	1.1	20.6	2.7	744	13
17	ICCX-810560-17P-1PMR-HP (P 4089-1 x NEC 1166)	22.2	21.2	1.1	16.2	3.5	737	14
18	ICCX-810560-28P-1PMR-HP (P 4089-1 x NEC 1166)	17.9	19.0	0.9	16.1	3.2	537	17
19	ICCX-810563-74P-HPMR-HP (P 18 x NEC 1166)	18.5	17.1	1.0	20.0	3.5	870	7
20	ICCX-810563-77P-HPMR-HP (P 18 x NEC 1166)	26.8	26.9	1.0	20.6	5.5	1040	1
21	ICCX-810565-42P-HPMR-HP (K 4-1 x NEC 1166)	15.0	15.8	1.0	30.4	4.4	797	9
22	ICC 25 P 18	20.1	20.9	1.0	17.3	3.4	767	12
23	ICC 1565 P 1329	17.3	16.7	1.2	21.6	3.4	307	21
24	ICC 4918 Annigeri	25.6	27.5	1.0	19.5	5.2	973	3
25	ICC 1565 P 1329	11.2	11.9	0.9	19.4	2.3	184	24
	Mean	18.65	18.89	1.02	21.11	3.85	646.9	
	SE±	1.67	2.02	0.09	1.01	0.42	46.1	
	CV(%)	21.96	26.18	20.92	11.72	26.50	17.4	

Table 8.9 Characteristics of entries in Early Soon Screening Trial - 2 at ICRISAT center, 1985/86.

Sl. No.	Entry	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Borer damage (score)	Plant height (cm)	Primary branches/ plant	Secondary branches/
1	ICC 5	54.2	75.4	21.3	69.4	123.7	5.5	29.8	2.6	3.8
2	ICC 62	58.0	78.9	20.8	50.9	108.8	5.6	30.2	3.0	4.1
3	ICC 187	60.9	81.5	20.7	59.8	120.7	6.6	31.6	3.0	4.4
4	ICC 193	63.7	86.2	22.4	58.2	122.0	6.6	30.9	2.9	4.0
5	ICC 204	57.6	80.4	22.6	59.2	116.8	5.9	28.1	3.1	4.3
6	ICC 488	45.5	70.6	25.0	47.7	93.3	4.5	28.0	2.7	3.2
7	ICC 490	46.2	69.8	23.6	50.9	96.9	5.3	26.9	2.8	2.5
8	ICC 495	44.0	69.2	25.2	48.1	92.2	5.0	27.6	2.7	2.8
9	ICC 506	48.0	70.2	22.1	49.2	97.2	4.1	30.7	2.7	2.5
10	ICC 780	54.8	74.9	20.2	54.2	108.9	6.0	33.3	2.9	3.6
11	ICC 927	56.8	79.3	22.5	59.3	116.0	5.5	30.5	3.3	4.2
12	ICC 949	56.8	78.5	21.5	59.2	116.0	6.0	32.1	3.0	3.2
13	ICC 1304	50.5	73.0	22.7	47.1	97.4	5.6	28.9	2.6	3.2
14	ICC 1327	54.1	82.0	27.6	64.0	118.1	6.4	34.0	2.7	4.5
15	ICC 3277	50.5	74.3	23.7	48.5	99.2	5.4	30.4	2.7	3.8
16	ICC 4348	49.0	71.3	22.3	45.8	94.8	5.5	30.8	3.1	2.6
17	ICC 4436	49.8	71.6	21.8	46.4	96.1	5.4	30.4	2.9	3.6
18	ICC 4874	43.7	67.6	23.9	47.9	91.7	4.8	31.2	2.6	2.5
19	ICC 5166	46.5	69.6	23.3	47.8	94.1	5.3	29.2	2.6	3.1
20	ICC 5714	48.2	70.5	22.5	51.9	100.0	4.9	25.1	2.8	2.5
21	ICC 5744	45.5	68.5	22.8	49.1	94.5	5.1	31.7	2.8	1.7
22	ICC 5929	45.8	69.3	23.4	45.4	91.1	5.6	25.3	2.6	3.3
23	ICC 6098	49.1	70.4	21.0	46.2	95.3	5.4	31.0	2.8	2.6
24	ICC 6122	46.2	69.0	22.9	49.9	96.0	5.2	33.2	2.9	2.4
25	ICC 6671	57.8	77.7	19.9	53.8	111.5	5.8	29.0	2.7	4.3
26	ICC 8345	45.5	67.7	22.3	47.1	92.5	5.0	30.2	2.6	3.0
27	ICC 10071	44.7	68.4	23.9	48.5	93.2	4.7	31.7	2.6	3.0
28	ICC 10450	47.5	71.7	24.2	48.3	95.8	5.3	27.1	2.7	3.6
29	ICC 10530	53.3	79.0	25.7	59.9	113.2	5.7	26.9	3.1	3.5
30	ICC 10531	55.7	78.9	23.3	62.5	118.0	6.3	29.1	2.9	3.0
31	ICC 10532	56.2	76.2	20.0	58.2	114.4	6.1	30.7	3.2	4.1
32	ICC 10533	55.2	77.2	22.0	55.9	111.2	6.0	27.6	3.0	3.9
33	ICC 11009	53.7	76.1	22.4	54.5	108.2	5.9	27.5	2.9	3.9
34	ICC 11021	47.7	70.2	22.6	48.9	96.5	5.2	30.7	2.8	3.3
35	ICC 11036	50.5	71.9	21.5	46.8	97.4	5.0	29.7	2.6	3.3
36	ICC 12333	46.8	69.3	22.5	50.0	96.9	4.7	32.6	2.4	3.3
37	ICC 12395	57.2	82.2	25.1	67.1	124.1	6.1	34.0	3.2	3.9
38	ICC 12473	53.8	75.6	21.6	50.5	104.4	5.9	28.4	3.1	4.6

Table 8.9 contd.

Sl. No.	Entry	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Borer damage (score)	Plant height (cm)	Primary branches/ plant	Secondary branches/
39	ICC 12831	51.0	74.3	23.4	54.5	105.5	6.8	38.2	2.7	3.2
40	ICC 12841	52.0	78.1	26.0	59.3	111.3	7.2	36.2	2.9	3.6
41	ICC 13052	50.5	72.6	21.9	47.5	97.9	5.3	27.1	2.8	2.9
42	ICC 13101	47.3	68.4	21.1	48.2	95.5	4.9	30.6	2.5	3.0
43	ICC 13151	48.5	74.2	25.5	51.0	99.7	4.1	27.4	3.1	3.3
44	ICC 13197	56.2	77.3	21.3	60.8	117.1	6.0	30.3	3.2	4.4
45	ICC 13200	45.8	69.5	23.5	50.2	96.2	5.4	30.6	2.4	2.1
46	ICC 13219	53.2	73.2	20.1	54.8	108.1	5.8	29.6	2.9	2.8
47	ICC 13573	55.3	78.6	23.2	63.9	119.3	6.4	33.9	3.2	2.9
48	ICC 4918	48.5	70.6	22.2	48.8	97.5	5.8	28.3	2.8	2.7
49	ICC 1565	58.0	83.7	25.7	65.6	123.7	6.3	31.9	3.0	3.3
	Mean	51.37	74.17	22.80	53.32	104.69	5.57	30.21	2.84	3.32
	SE±	0.64	0.86	0.92	1.43	1.47	0.28	0.89	0.17	0.52
	CV(%)	2.49	2.33	8.08	5.37	2.81	10.23	5.87	12.19	31.27

Table 8.10 Characteristics of entries in Early Sown Screening Trial - 2 at ICRISAT center, 1985/86

Sl. No.	Entry/name parentage		Pods per plant	per plant	Seeds per pod	Weight of 100 (g)	Yield per plant	yield (kg/ha)	Rank
1	ICC 5	P 3	36.4	42.3	0.9	15.0	6.3	528	45
2	ICC 62	P 48	20.9	22.0	1.0	16.4	3.4	706	41
3	ICC 187	P 152-1	20.5	22.8	0.9	17.6	4.1	534	44
4	ICC 193	P 159-1	21.9	31.0	0.8	17.1	5.1	508	46
5	ICC 204	P 167	30.2	33.5	0.9	13.7	4.0	869	31
6	ICC 488	P 371	43.3	42.2	1.0	16.7	7.0	1582	2
7	ICC 490	P 372-1	36.4	35.9	1.0	14.8	5.4	1268	14
8	ICC 495	P 375	33.1	38.8	0.8	15.9	6.4	1533	3
9	ICC 506	P 386	39.7	44.8	0.9	17.9	8.3	1511	4
10	ICC 780	P 619-1	17.2	16.1	1.1	26.7	4.2	735	40
11	ICC 927	P 736	29.4	27.3	1.1	15.8	4.6	735	39
12	ICC 949	P 748	21.5	24.8	0.9	15.7	3.8	590	43
13	ICC 1304	P 1191	34.0	40.5	0.8	16.9	6.2	1244	17
14	ICC 1327	P 1203-1	16.8	14.7	1.2	21.3	2.9	649	42
15	ICC 3277	P 3871	25.0	26.6	0.9	17.8	4.8	1206	20
16	ICC 4348	P 5324	29.7	29.5	1.0	19.9	5.9	1291	13
17	ICC 4436	P 5424-1	29.4	45.4	0.7	18.8	8.4	1263	15
18	ICC 4874	P 9669	17.1	15.5	1.1	46.6	6.8	1482	5
19	ICC 5166	G 2-61	22.5	21.2	1.1	39.7	7.7	1317	9
20	ICC 5714	BIPINNATE	27.3	32.8	0.8	16.5	5.5	1213	19
21	ICC 5744	C.VAR MAJOR	19.3	18.5	1.0	27.2	5.0	1165	24
22	ICC 5929	T 54-A	28.3	34.1	0.9	17.3	5.9	1311	12
23	ICC 6098	JG 74	24.6	22.2	1.3	21.6	4.6	1314	11
24	ICC 6122	JG 113	19.3	15.9	1.1	40.2	6.7	1315	10
25	ICC 6671	NEC 790	14.0	19.6	0.8	23.0	4.2	1026	28
26	ICC 8345	GRAM G.P CUNNAGAR	22.4	16.8	1.3	26.7	4.5	1195	21
27	ICC 10071	ANM 120-1	16.4	17.5	1.0	41.9	7.0	1348	6
28	ICC 10450	RPSP 184	38.4	39.5	1.0	22.2	8.6	1703	1
29	ICC 10530	RPSP 261	37.2	37.2	1.0	17.4	6.5	1126	26
30	ICC 10531	RPSP 262	18.3	21.0	0.9	16.8	3.5	832	33
31	ICC 10532	RPSP 263	25.6	25.7	1.0	16.6	4.4	821	34
32	ICC 10533	RPSP 264	21.7	27.6	0.9	16.7	4.6	849	32
33	ICC 11009	RPSP 400	23.8	25.6	0.9	17.5	4.6	877	30
34	ICC 11021	RPSP 410	30.6	31.6	1.0	20.3	6.7	1329	7
35	ICC 11036	RPSP 425	21.3	22.0	1.0	20.6	4.6	1254	16
36	ICC 12333	2375	19.0	16.9	1.1	31.3	5.4	1021	29
37	ICC 12395	RB-15	14.6	15.0	1.1	26.1	3.8	290	49

Table 8.10 contd.

Sl. No.	Entry/name parentage	Pods per plant	Seeds per plant	Seeds per pod	Weight of 100 seeds (g)	Yield per plant	Seed yield (kg/ha)	Rank
38	ICC 12473 ADILABAD LOCAL	34.0	40.3	0.8	16.1	6.3	1080	27
39	ICC 12831 RFA 177-1	16.5	20.9	0.8	14.1	2.9	782	37
40	ICC 12841 RFA 183-3	32.6	37.7	0.9	13.9	5.4	792	35
41	ICC 13052 P 565	29.9	32.0	1.0	17.2	5.3	1190	22
42	ICC 13101 P 1179	32.2	31.7	1.0	18.9	5.9	1319	8
43	ICC 13151 P 1952	39.0	40.9	1.0	14.9	6.1	1227	18
44	ICC 13197 P 2351	29.5	29.5	1.0	17.8	5.4	784	36
45	ICC 13200 P 2388	27.4	28.3	1.0	35.7	8.4	1169	23
46	ICC 13219 P 3046	19.9	23.4	0.9	15.8	3.7	770	38
47	ICC 13573 P 6137	15.3	15.2	1.1	22.3	3.4	489	47
48	ICC 4918 Annigeri	28.5	29.3	1.0	20.7	6.0	1145	25
49	ICC 1565 P 1329	14.5	16.3	0.9	18.8	2.9	332	48
	Mean	25.84	27.75	0.96	21.03	5.37	1032.9	
	SE±	3.86	3.92	0.09	1.18	0.74	93.2	
	CV(%)	29.91	28.23	19.08	11.22	27.52	18.1	

Table 8.11 Characteristics of entries in Early Sown Screening Trial - 3 at ICRISAT 1985/86.

Sl. No.	Acc. No.	Entry Name	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Wt. of 100-seeds (g)	Per plant yield (g)	Seed yield (kg/ha)	Rank
1	ICC 2	P 1-1	63.2	85.3	22.3	64.3	127.8	16.6	2.1	390	32
2	ICC 40	P 33	63.2	88.1	25.0	61.3	124.5	14.5	3.5	762	17
3	ICC 41	P 34	63.5	84.3	20.9	61.5	125.0	13.2	3.3	774	14
4	ICC 53	P 43	62.8	84.2	21.3	62.5	125.3	15.7	2.8	616	25
5	ICC 111	P 88	63.0	85.4	22.4	61.0	124.0	15.5	2.5	495	28
6	ICC 116	P 93	61.9	83.7	21.8	62.8	124.5	14.1	2.8	661	22
7	ICC 142	P 118	66.1	88.8	22.9	60.3	126.5	20.4	1.7	294	43
8	ICC 486	P 369	68.2	90.1	21.9	59.3	127.5	14.1	2.0	350	36
9	ICC 863	P 684-1	64.4	85.3	20.8	59.0	123.3	13.8	2.1	369	34
10	ICC 909	P 722	67.2	87.6	20.3	56.5	123.5	14.5	2.3	486	29
11	ICC 1173	P 1102	54.5	77.2	22.4	51.5	105.8	15.9	6.5	1105	5
12	ICC 1564	P 1328-2	61.2	84.1	23.1	64.0	125.3	12.7	3.0	697	19
13	ICC 1672	P 1389-1	73.7	93.5	19.9	55.5	129.3	16.7	1.6	183	47
14	ICC 1679	P 1395	60.6	81.3	20.9	64.3	125.0	19.8	1.9	370	33
15	ICC 1682	P 1396	70.1	90.1	20.2	56.5	126.8	18.4	0.9	123	48
16	ICC 1692	P 1404	60.4	82.3	21.8	57.5	117.8	22.1	3.1	719	18
17	ICC 2184	P 1761-4	61.2	93.8	32.6	67.3	128.5	23.8	1.4	199	46
18	ICC 3852	P 4500-2	54.9	80.9	25.8	61.3	116.0	19.8	3.2	802	12
19	ICC 10527	RPSP 258	59.2	81.1	21.8	57.5	116.5	16.3	3.9	814	11
20	ICC 10545	RPSP 276	62.0	81.5	19.7	62.3	124.5	16.3	3.5	675	21
21	ICC 11014	RPSP 404-1	57.4	80.3	22.9	56.3	113.8	14.9	4.0	929	7
22	ICC 11366	PR 4341	63.6	85.8	21.8	59.3	122.5	14.7	2.8	542	26
23	ICC 12396	RB 16	57.3	80.8	23.6	70.3	127.8	33.1	1.0	106	49
24	ICC 12500	SABA	62.2	82.8	20.8	57.8	120.3	15.2	2.8	647	23
25	ICC 12566	RPG 29-1	50.7	76.0	25.2	56.3	106.8	12.4	4.5	873	9
26	ICC 12995	P 53	59.5	81.8	22.4	63.8	123.5	15.8	3.3	632	24
27	ICC 12998	P 73	64.8	87.4	22.6	59.8	124.5	16.5	3.8	772	15
28	ICC 13022	P 91	55.9	77.1	21.5	60.0	116.3	14.9	4.2	879	8
29	ICC 13053	P 571	53.0	73.3	20.2	50.0	103.0	19.1	4.7	1204	2
30	ICC 13064	P 686	56.3	80.5	24.2	68.8	125.0	16.1	2.3	280	45
31	ICC 13065	P 687	64.7	88.7	23.9	62.5	127.3	15.7	2.1	311	40
32	ICC 13083	P 1044	56.6	79.6	22.9	62.5	119.0	17.8	3.5	675	20
33	ICC 13103	P 1182	57.9	81.3	23.4	56.0	114.0	13.6	3.4	852	10
34	ICC 13114	P 1303	62.8	86.2	23.4	60.8	123.5	16.3	2.3	475	30
35	ICC 13125	P 1406	60.5	81.5	21.1	66.3	126.8	17.6	2.4	473	31
36	ICC 13143	P 1842	66.2	86.6	20.4	62.0	128.3	15.8	1.9	345	37
37	ICC 13146	P 1876	67.0	85.2	17.9	58.8	125.5	13.6	1.7	336	39

Table 8.11 contd.

Sl. No.	Acc. No.	Entry Name	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Wt. of 100-seeds (g)	Per plant yield (g)	Seed yield (kg/ha)	Rank
38	ICC 13193	P 2308	69.0	96.5	27.7	61.8	131.0	15.4	2.9	311	41
39	ICC 13213	P 2731	59.6	78.7	19.2	59.8	119.3	14.2	2.6	798	13
40	ICC 13216	P 2962	56.8	79.8	23.2	60.8	117.8	21.0	2.7	769	16
41	ICC 13248	P 3403	52.4	72.9	20.3	51.8	104.0	18.9	4.5	1153	4
42	ICC 13539	P 5422	65.2	93.8	28.5	63.5	128.5	13.5	1.5	351	35
43	ICC 13570	P 6132	59.2	83.9	24.7	66.0	125.3	19.8	2.7	530	27
44	ICC 13572	P 6135	61.1	82.9	21.7	56.5	117.5	13.8	4.1	982	6
45	ICC 13591	P 6289	65.2	83.0	17.5	59.8	124.8	16.7	1.9	341	38
46	ICC 13594	P 6304	69.9	87.9	18.2	56.0	126.0	13.3	2.3	308	42
47	ICC 13818	Al-97	48.7	71.9	23.2	49.3	98.0	20.8	5.2	1259	1
48	ICC 4918	Annigeri	47.5	71.8	24.0	50.8	98.0	20.6	4.1	1159	3
49	ICC 1565	P 1329	58.6	85.0	26.3	65.3	123.8	18.9	1.8	283	44
		Mean	61.04	83.49	22.46	59.95	120.98	16.82	2.88	601.2	
		SE±	0.86	1.34	1.29	1.65	1.60	0.62	0.55	106.4	
		CV(%)	2.83	3.21	11.47	5.52	2.65	7.38	38.46	35.4	

Table 8.12 Characteristics of entries in Early Scan Screening Trial - 4 at ICRISAT center, 1985/86.

Sl. No.	Acc. No.	Entry Name	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period, (days)	Days to maturity	Weight of 100-seeds (g)	Seed yield (kg/ha)	Rank
1	ICC 43	P 36	66.8	92.8	25.1	56.7	123.6	14.8	486	8
2	ICC 104	P 82	66.3	90.0	23.1	56.8	123.2	13.6	496	7
3	ICC 140	P 116	64.4	87.0	22.7	63.0	127.3	19.6	272	25
4	ICC 1045	P 877-1	70.1	96.4	26.3	59.5	129.8	13.4	228	27
5	ICC 1448	P 1268	79.5	100.7	21.3	52.9	132.3	16.8	157	37
6	ICC 1563	P 1328-1	67.7	89.9	22.4	59.5	127.3	14.0	446	12
7	ICC 1613	P 1353-2	65.5	84.6	19.6	57.6	123.0	19.8	339	20
8	ICC 1628	P 1359	79.4	97.5	19.3	49.7	128.9	23.2	149	39
9	ICC 1683	P 1396-1	78.0	98.6	20.8	52.0	130.0	13.9	135	41
10	ICC 1906	P 1534	78.1	99.5	21.1	53.1	131.3	20.7	114	45
11	ICC 1931	P 1558-1	73.8	95.5	22.0	57.2	131.0	18.5	206	31
12	ICC 2731	P 2854	80.5	105.3	24.2	55.0	135.5	13.3	350	18
13	ICC 3129	P 3650	62.2	86.8	24.1	70.8	133.0	34.5	31	48
14	ICC 3716	P 4341	62.2	85.1	23.9	68.6	130.6	28.9	127	43
15	ICC 5250	GL 629	91.9	108.1	16.2	44.0	136.0	24.4	130	42
16	ICC 5476	V 18	64.7	86.9	22.7	63.5	128.1	22.1	286	23
17	ICC 5618	1250 x ZIABT-2	72.1	93.2	21.8	55.8	127.8	19.0	177	35
18	ICC 7418	T 114-B	68.7	93.0	24.9	64.2	132.8	13.8	223	28
19	ICC 10307	JM 2085	61.9	85.0	23.0	70.6	132.4	28.1	91	47
20	ICC 10477	RPSP 208	72.8	98.5	25.2	59.3	132.3	14.2	195	33
21	ICC 10480	RPSP 211	81.8	103.7	21.0	52.3	134.1	14.6	136	40
22	ICC 10488	RPSP 219	71.9	94.6	22.1	59.2	131.1	15.5	173	36
23	ICC 10489	RPSP 220	73.9	98.2	24.5	55.9	129.8	14.5	181	34
24	ICC 10515	RPSP 246	70.4	95.0	24.3	59.9	130.5	15.7	271	26
25	ICC 10537	RPSP 268	63.7	87.9	24.1	58.6	122.5	14.7	628	4
26	ICC 10566	RPSP 297	82.1	104.8	22.2	51.6	133.8	15.6	222	29
27	ICC 10574	RPSP 305	94.4	113.0	18.7	45.5	140.0	14.9	119	44
28	ICC 10576	RPSP 307	85.9	109.7	23.3	49.6	135.6	14.9	153	38
29	ICC 10582	RPSP 313	95.9	114.6	18.4	39.1	135.1	13.3	100	46
30	ICC 10729	CRIC 34899	63.3	83.5	20.4	67.5	130.7	35.8	-34	49
31	ICC 11094	BGS 390	64.5	88.1	23.9	59.9	124.4	14.0	636	3
32	ICC 12408	RB 28	62.8	85.8	23.1	66.1	129.0	14.5	384	14
33	ICC 12448	H 208	68.6	95.3	26.1	63.2	131.9	14.4	289	22
34	ICC 12490	C 235	69.9	92.1	22.8	60.7	130.5	16.0	212	30
35	ICC 12597	RPG 43-1	52.0	73.0	21.5	56.9	108.7	13.7	357	17
36	ICC 12996	P 64	63.1	85.3	22.5	59.0	122.0	15.5	666	2
37	ICC 13031	P 361	64.1	86.4	22.4	60.9	124.9	15.7	461	10

Table 8.12 contd.

Sl. No.	Acc. No.	Entry Name	Days to 50 % flowering	Days to end of flower	Flowering duration (days)	Reproductive period (days)	Days to maturity	Weight of 100-seeds (g)	Seed yield (kg/ha)	Rank
38	ICC 13066	P 696	64.8	91.9	27.6	62.7	127.4	16.0	380	15
39	ICC 13079	P 901	73.9	101.9	27.5	58.4	132.4	14.9	291	21
40	ICC 13154	P 1961	68.1	95.3	26.8	59.3	127.4	19.7	457	11
41	ICC 13223	P 3110	57.9	86.4	29.2	66.5	124.4	23.6	343	19
42	ICC 13470	P 4299	63.3	91.0	27.4	59.1	122.5	16.0	485	9
43	ICC 13567	P 6122	66.6	91.8	24.2	58.4	125.1	13.2	556	5
44	ICC 13574	P 6140	66.0	86.1	20.6	58.2	124.1	20.2	499	6
45	ICC 13580	P 6169	68.8	96.2	26.7	58.8	127.7	13.3	416	13
46	ICC 13587	P 6219	70.9	95.9	25.2	56.7	127.6	13.3	274	24
47	ICC 13589	P 6252	71.7	94.9	23.6	53.6	125.2	13.7	205	32
48	ICC 4918	Annigeri	46.6	70.7	23.6	52.6	99.1	21.3	1238	1
49	ICC 1565	P 1329	60.3	88.4	27.9	64.5	124.8	19.7	370	16
		Mean	70.08	93.38	23.29	58.05	128.13	17.65	308.2	
		SE±	1.90	2.39	1.92	2.22	1.22	0.64	75.6	
		CV(%)	5.41	5.11	16.49	7.66	1.91	7.20	49.1	

Table 8.13 Correlation coefficients between seed yield (kg/ha) and other characters in Early vs Normal soon and Early soon Screening Trials at ICRISAT center in 1985/86.

Character	Early vs Normal					
	Early	Normal	ESST-1	ESST-2	ESST-3	ESST-4
Days to 50% flowering	-0.6681**	-0.6359**	-0.7212**	-0.7104**	-0.5894**	-0.4726**
Days to end of flowering	-0.5777**	-0.5897**	-0.5187**	-0.5738**	-0.3993**	-0.2217**
Flowering duration (days)	0.1535**	0.0618	0.5257**	0.2812*	0.2213**	0.5146**
Reproductive period (days)	-0.6515**	-0.7404**	-0.4142**	-0.7185**	-0.3004**	0.0838
Days to maturity	-0.7521**	-0.7813**	-0.6818**	-0.7843**	-0.5944**	-0.6026**
Pod borer damage score	-0.6273**	0.2777**	-0.5231**	-0.6139**	-	-
Pod borer damage (%)	-0.5951**	-0.4171**	-	-	-	-
Plant height at harvest (cm)	-0.2198**	-0.4615**	-0.3192**	-0.3599**	-	-
Primary branches /plant	-0.3186**	-0.4556**	-0.3408**	-0.2453**	-	-
Secondary branches/plant	-0.0206	-0.3598**	-0.0179	-0.2746**	-	-
Pods/plant	0.7428**	0.5619**	0.5861**	0.4988**	-	-
Seeds/plant	0.7148**	-0.4807**	0.5778**	0.4594**	-	-
Seeds/pod	0.1578	-0.0161	-0.2219**	-0.0232	-	-
Weight of 100 seeds (g)	-0.1252	-0.0566	-0.0287	0.1920**	-0.0324	-0.0820
Seed yield/ plant	0.7050**	0.3680**	0.6459**	0.6812**	0.8574**	-

*,** Significant at 5% and 1% levels of probability, respectively.

B. Adaptation to late sowing

There is a growing interest in introducing legumes into new areas and cropping systems, particularly in late-vacated cotton and rice fallows in south and southeast Asia. We continued our efforts at Hisar and Gwalior to identify and develop chickpea genotypes adapted to late-sowing in northern India.

Hybridization

We made 51 single crosses between desi and kabuli parents adapted to late-sowing and genotypes resistant to wilt, ascochyta blight, and Heliothis pod borer (Tables 8.14 and 8.15).

Single-plant progeny rows

We evaluated 354 F_3, 97 F_6, and 115 F_7 progenies of single plants, selected in the previous season at Hisar or ICRISAT Center. One set of the progenies was sown late (December) in normal fields at Hisar and one set in wilt-sick plots at ICRISAT Center or Hisar at the normal sowing time (late-October to mid-November). Appropriate checks were sown at regular intervals for comparison. All progenies were scored for flowering, maturity, expected yield, and for resistance/susceptibility to wilt and stunt diseases.

Based on visual observations, actual yields, and reaction to diseases, we selected 136 single plants/progenies in F_3 and 21 in F_6 generations for further progeny tests (Table 8.16). Thirty-three progenies in F_6/F_7 generations with superior agronomic performance and resistance to wilt and stunt were separately bulked for replicated yield tests in 1986/87.

Preliminary yield trials

We conducted two yield tests of desi and one of kabuli breeding lines at Hisar. All were late-sown 5 x 5 quadruple lattices. Two desi (H 208 and K 850) and two kabuli cultivars (L 550 and ICCC 32) were included as controls in desi and kabuli trials, respectively. All the three trials were late-sown (13 December) and were scored for phenological and agronomical characteristics.

In preliminary yield trial 1, none of the test entries gave significantly higher yield than controls. However, the highest yielding entry ICCX-790518-BT-BH-BH-7H-BH produced 2930 kg ha^{-1} compared to 2480 kg ha^{-1} produced by control K 850 (Table 8.17). In preliminary trial 2, the best control was ranked 15 in yield and highest yields were obtained from entries ICCX-790518-49H-BH-1H-1H-BH (3140 kg) and ICCX-790519-BT-BH-BH-14H-1H-BH (3110 kg) (Table 8.18). In the kabuli preliminary yield trial, entry ICCX-790525-15H-BH-1H-1H-BH produced 3180 kg ha^{-1} compared to 2400 kg ha^{-1} obtained from the best control ICCC 32 (Table 8.19). In all, 23 most promising lines as indicated in the tables were selected for

Table 8.14 Parents used in crosses for breeding for adaptation to late sowing in 1985/86.

Parents adapted to late sowing

Desi	ICCC 14
	ICCC 41
	H 208
	GL 769
	BGM 431
	Radhey
	BG 261
	K 850
	Pant G-114
	JG 74
	ICCL 85501
	ICCL 85502
	ICCL 85503
Kabuli	ICCC 32
	ICCL 85504
	ICCL 85505
	ICC 10647

Parents resistant to wilt and ascochyta blight

ICC 3935
E 100 Y(M)

Parent resistant to wilt and *Heliothis* pod borer

ICCX-730020-11-1-1H-BH

Table 8.15 Crosses made in 1985/86 for breeding for adaptation to late sowing in northern India.

Cross No.	Female Parent	Male Parent
17 x 13 Line x Tester		
850601	ICCC 14	ICC 3935
850602	ICCC 14	E 100Y(M)
850603	ICCC 14	ICCX-730020-11-1-1H-BH
850604	ICCC 41	ICC 3935
850605	ICCC 41	E 100Y(M)
850606	ICCC 41	ICCX-730020-11-1-1H-BH
850607	H 208	ICC 3935
850608	H 208	E 100Y(M)
850609	H 208	ICCX-730020-11-1-1H-BH
850610	GL 769	ICC 3935
850611	GL 769	E 100Y(M)
850612	GL 769	ICCX-730020-11-1-1H-BH
850613	BGM 431	ICC 3935
850614	BGM 431	E 100Y(M)
850615	BGM 431	ICCX-730020-11-1-1H-BH
850616	Radhey	ICC 3935
850617	Radhey	E 100Y(M)
850618	Radhey	ICCX-730020-11-1-1H-BH
850619	K 850	ICC 3935
850620	K 850	ICC 3935
850621	K 850	ICCX-730020-11-1-1H-BH
850622	PANT G-114	ICC 3935
850623	PANT G-114	E 100Y(M)
850624	PANT G-114	ICCX-730020-11-1-1H-BH
850625	JG 74	ICC 3935
850626	JG 74	E 100Y(M)
850627	JG 74	ICCX-730020-11-1-1H-BH
850628	BG 261	ICC 3935
850629	BG 261	E 100Y(M)
850630	BG 261	ICCX-730020-11-1-1H-BH
850631	ICCL 85501	ICC 3935
850632	ICCL 85501	E 100Y(M)
850633	ICCL 85501	ICCX-730020-11-1-1H-BH
850634	ICCL 85502	ICC 3935
850635	ICCL 85502	E 100Y(M)
850636	ICCL 85502	ICCX-730020-11-1-1H-BH
850637	ICCL 85503	ICC 3935

Table 8.15 contd.

Cross No.	Female Parent	Male Parent
850638	ICCL 85503	E 100Y(M)
850639	ICCL 85503	ICCX-730020-11-1-1H-BH
850640	ICCC 32	ICC 3935 .
850641	ICCC 32	E 100Y(M)
850642	ICCC 32	ICCX-730020-11-1-1H-BH
850643	ICCL 85504	ICC 3935
850644	ICCL 85504	E 100Y(M)
850645	ICCL 85504	ICCX-730020-11-1-1H-BH
850647	ICCL 85505	E 100Y(M)
850648	ICCL 85505	ICCX-730020-11-1-1H-BH
850649	ICC 10647	ICC 3935
850650	ICC 10647	E 100Y(M)
850651	ICC 10647	ICCX-730020-11-1-1H-BH

ICCX-730020 = H 208 x RS 11

Table 8.16 The numbers of progenies grown and single plants and progeny bulks selected at Hisar, 1985/86.

	Progenies grown		Selected		
			Progeny bulks		Single plants
Generation	NF	WSP	NF	WSP	NF
F3	354	346	10*	26	110
F6	97	95	7*	-	21
F7	115	113	16*	-	-

NF = Normal field, WSP = Wilt-sick plot.

* Bulks selected for testing in replicated yield trial in 1986/87.

Table 8.17 Characteristics of entries in Preliminary Yield Trial 1, late planted at Niamey, 1985/86.

Ent. No	Pedigree/ICC No.	Parentage/name	Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-800354-8H-9B-1B-8H	H 208 x ICCX-730058-6-2-8H-8P)	81	11.0	2000	22
2	ICCX-800361-8H-8B-1B-8H	K 850 x ICCX-730058-6-2-8H-8P)	81	25.6	2160	19
3	ICCX-800362-8H-21B-1B-8H	K 850 x NEC 989	83	18.2	1760	25
4	ICCX-800362-8H-27B-1B-8H	K 850 x NEC 989	83	25.0	2190	18
5	ICCX-800373-8H-6B-1B-8H	L 550 x No.501	83	15.0	2260	13
6	ICCX-800353-8H-3B-1B-8H	(H 208 x ICCX-730057-22-3-8-8H)	82	11.0	2080	21
7	ICCX-800360-8H-1B-1B-8H	K 850 x No.501	81	14.6	1820	24
8	ICCX-800369-1B-1B-1B-8H	ICCX-730058-6-2-8H-8P x ICCX-730057-22-3-8-8H	79	13.0	2270	12
9	ICCX-790518-1H-1B-1B-1B-8H	H 208 x K 850	82	18.9	2100	20
10	ICCX-790510-6H-8H-1B-1B-8H	H 208 x ICCX-730032-7-3-8-8H @	82	10.9	2600	4
11	ICCX-790510-18H-8H-1B-1B-8H	H 208 x ICCX-730032-7-3-8-8H	83	11.9	2230	16
12	ICCX-790512-1H-8H-1B-1H-8H	H 208 x ICCX-730057-22-3-8-8H	84	13.0	2220	17
13	ICCX-790512-18H-8H-1B-1H-8H	H 208 x ICCX-730057-22-3-8-8H	84	12.6	2240	15
14	ICCX-790513-23H-8H-1H-1H-8H	H 208 x ICCX-730111-7-2-8-8H	84	12.3	2250	14
15	ICCX-790513-26H-8H-1H-1B-8H	H 208 x ICCX-730111-7-2-8-8H	82	9.8	2340	11
16	ICCX-790514-6H-8H-1H-1B-8H	H 208 x ICCX-730308-1-1-1B-8H	83	12.4	2000	22
17	ICCX-790514-17H-8H-1H-1B-8H	H 208 x ICCX-730308-1-1-1B-8H @	80	13.8	2460	7
18	ICCX-790514-26H-8H-1H-1H-8H	H 208 x ICCX-730308-1-1-1B-8H	83	12.9	2420	8
19	ICCX-790515-9H-8H-1H-1H-8H	H 208 x G 543 @	84	12.4	2660	2
20	ICCX-790515-23H-8H-1H-1H-8H	H 208 x G 543 @	84	12.4	2550	5
21	ICCX-790518-8T-8H-8H-7H-8H	H 208 x K 850 @	82	19.0	2930	1
22	ICCX-790529-24H-8H-1H-1H-8H	L 550 x H 208 @	80	22.7	2620	3
23	ICCX-790518-17H-8H-1H-1H-8H	H 208 x K 850	85	22.4	2350	10
24	ICC 5003	K 850	82	24.7	2480	6
25	ICC 4954	H 208	83	10.9	2380	9
	Mean		82.4	15.45	2300	
	SE±		0.5	0.57	222.5	
	CV(%)		1.2	7.39	19.4	

ICCX-730032 = H 208 x P 370
ICCX-730057 = L 550 x K 468
ICCX-730058 = L 550 x K 4
ICCX-730111 = K 850 x H 208
ICCX-730308 = P 378 x USA 613

@ Selected for advanced yield testing in 1986/87.

Table 8.18 Characteristics of entries in Preliminary Yield Trial 2, late planted at Hisar, 1985/86.

Ent. no	Pedigree/ICC no	Parentage/name		Days to 50% flowering	Weight of 100 seeds (g)	Seed yield (kg/ha)	Rank
1	ICCX-790518-26B-BH-1B-1B-BH	H 208 x K 850		84.5	12.6	2500	19
2	ICCX-790518-27B-BH-1B-1B-BH	H 208 x K 850		81.5	23.3	2590	16
3	ICCX-790518-28B-BH-1B-1B-BH	H 208 x K 850		81.5	23.4	2580	17
4	ICCX-790518-49B-BH-1B-1B-BH	H 208 x K 850	@	84.3	12.9	3140	1
5	ICCX-790515-BT-BH-BH-1B-1B-BH	H 208 x G 543		84.8	12.7	2700	11
6	ICCX-790515-BT-BH-BH-22B-1B-BH	H 208 x G 543		86.0	12.7	2660	12
7	ICCX-790515-BT-BH-BH-26B-1B-BH	H 208 x G 543		82.5	12.8	2310	23
8	ICCX-790515-BT-BH-BH-27B-1B-BH	H 208 x G 543	@	84.3	12.9	2900	4
9	ICCX-790515-BT-BH-BH-28B-1B-BH	H 208 x G 543	@	85.8	12.8	2840	5
10	ICCX-790515-BT-BH-BH-29B-1B-BH	H 208 x G 543		84.8	12.2	2400	20
11	ICCX-790517-BT-BH-BH-12B-1B-BH	H 208 x P 1784		83.3	21.4	2520	18
12	ICCX-790517-BT-BH-BH-15B-1B-BH	H 208 x P 1784	@	79.3	19.3	2780	7
13	ICCX-790519-BT-BH-BH-7B-1B-BH	K 850 x (H 208 x P 370)	@	81.0	26.8	3050	3
14	ICCX-790519-BT-BH-BH-14B-1B-BH	K 850 x (H 208 x P 370)	@	81.8	25.1	3110	2
15	ICCX-790519-BT-BH-BH-16B-1B-BH	K 850 x (H 208 x P 370)		85.7	19.8	2040	24
16	ICCX-790521-BT-BH-BH-1B-1B-BH	K 850 x (K 850 x E 100)	@	83.8	20.5	2740	9
17	ICCX-790521-BT-BH-BH-6B-1B-BH	K 850 x (K 850 x E 100)	@	83.8	18.9	2730	10
18	ICCX-790521-BT-BH-BH-10B-1B-BH	K 850 x (K 850 x E 100)		86.3	20.7	2650	13
19	ICCX-790518-BT-BH-BH-1B-1B-BH	H 208 x K 850	@	83.8	19.3	2760	8
20	ICCX-790518-BT-BH-BH-4B-1B-BH	H 208 x K 850		84.5	27.5	2320	22
21	ICCX-790518-BT-BH-BH-7B-1B-BH	H 208 x K 850	@	82.0	20.1	2790	6
22	ICCX-790518-BT-BH-BH-9B-1B-BH	H 208 x K 850		85.3	24.1	2630	14
23	ICCX-790524-BT-BH-BH-2B-1B-BH	K 850 x NBC 989		81.5	23.6	2390	21
24	ICC 5003	K 850		80.8	25.2	1850	25
25	ICC 4954	H 208		82.8	11.4	2620	15
		Mean		83.4	18.9	2620	
		SE±		0.75	0.41	179.7	
		CV(%)		1.8	4.3	13.7	

@ Selected for advanced yield testing in 1986/87.

Table 8.19 Characteristics of entries in Preliminary Yield Trial 3 - late planted at Bisec, 1985/86.

Ent. No.	Pedigree/ICC No.	Parentage/name	Days to 50% flowering	Weight of 100 seeds(g)	Seed yield (kg/ha)	Rank
1	ICCX-800062-[illegible]	K 850 x NEC 989	78.8	20.7	1660	14
2	ICCX-800370-[illegible]	L 550 x (K 850 x P 208)	76.6	21.4	1890	11
3	ICCX-800374-[illegible]	L 550 x (L 550 x K 4)	80.8	24.1	1420	18
4	ICCX-800376-[illegible]	L 550 x F 61	81.3	27.0	2310	6
5	ICCX-790525-[illegible]	L 550 x Ryb 16-3 @	77.5	24.7	2840	2
6	ICCX-790525-[illegible]	L 550 x Ryb 16-3 @	80.0	24.0	2640	4
7	ICCX-790525-[illegible]	L 550 x Ryb 16-3	80.3	19.9	1530	16
8	ICCX-790525-[illegible]	L 550 x Ryb 16-3 @	80.9	26.7	3180	1
9	ICCX-790525-[illegible]	L 550 x Ryb 16-3 @	80.2	20.3	2740	3
10	ICCX-790525-[illegible]	L 550 x Ryb 16-3	81.0	27.8	1770	12
11	ICCX-790526-[illegible]	L 550 x (L 550 x Radhey)	81.5	29.5	900	25
12	ICCX-790526-[illegible]	L 550 x (L 550 x Radhey)	81.2	28.4	1030	24
13	ICCX-790526-[illegible]	L 550 x (L 550 x Radhey) @	80.7	28.4	2120	8
14	ICCX-790529-[illegible]	L 550 x H 208	80.6	19.4	1300	21
15	ICCX-790525-[illegible]	L 550 x Ryb 16-3	82.0	21.8	1580	15
16	ICCX-790527-[illegible]	L 550 x (L 550 x K 4)	79.9	21.9	1370	20
17	ICCX-790527-[illegible]	L 550 x (L 550 x K 4)	80.8	22.2	1080	23
18	ICCX-790527-[illegible]	L 550 x (L 550 x K 4)	81.0	27.3	1710	13
19	ICCX-790528-[illegible]	L 550 x No. 501 @	78.8	29.3	2250	7
20	ICCX-790529-[illegible]	L 550 x H 208	80.5	22.5	1210	22
21	ICCX-790530-[illegible]	L 550 x K 850 @	79.3	30.7	2100	9
22	ICCX-790530-[illegible]	L 550 x K 850	79.5	29.9	1480	17
23	ICCX-790530-[illegible]	L 550 x K 850	78.9	28.8	1950	10
24	ICC 12339	ICGC 32	77.5	19.6	2400	5
25	ICC 4973	L 550	81.7	21.0	1390	19
		Mean	80.0	24.7	1830	
		SE±	0.60	0.82	235.6	
		CV(%)	1.5	6.6	25.7	

@ Selected for advanced yield testing in 1986/87.

testing in advanced yield trial next season.

Advanced yield trials

We conducted two advanced yield trials, one each of desi and kabuli breeding and germplasm lines at Hisar and Gwalior. Desi trial was a 5 x 5 quadruple lattice and kabuli trial a RCB with 4 replicates and 6-row plots. The controls were same as in case of preliminary yield trials. Days to 50% flowering, weight of 100 seeds and seed yields were recorded in each plot.

In desi trial, one entry at Hisar (ICCX-800356-BH-4H-BH) and two entries at Gwalior (ICCX-790519-BT-BH-BH-15H-BH and -790515-BT-BH-BH-22H-BH) outyielded their best respective controls (Table 8.20). However, only the latter one maintained its superiority over both locations and was contributed, as ICCV 15, to the late-sown trials of AICPIP. Six lines (indicated in the Table) were retained for further testing.

In kabuli trial, only one entry ICCX-790527-4H-1H-1H-BH produced more seed yield than the best control at the two locations (Table 8.21) and was contributed to kabuli trials of AICPIP as ICCV 16.

Germplasm screening

A set of 312 desi and kabuli germplasm lines was late-sown in December at Hisar for screening for adaptation to late sowing. Appropriate checks were also planted at regular intervals for comparison. All entries were scored for flowering, maturity, seed yield, and wilt reaction. Actual yields were recorded in progenies that were rated high and out of these most promising 23 lines were selected for replicated yield test in 1986/87.

C. Adaptation to high input conditions

Chickpeas generally put on excessive vegatative growth when sown under high input conditions (irrigation and fertilizers). We have been observing over past several years that the mid-tall and erect-growing lines with stiff stems developed through breeding between the conventional and tall Russian germplasm accessions have stood better than conventional bushy types in high input conditions. We pooled 312 such mid-tall lines with erect growth habit from various chickpea breeding projects and sowed them under high input conditions at Hisar for observing their lodging-resistance. The soil-salinity problem at Hisar, however, caused variation in growth, and only a part of material could be scored for lodging-tolerance. In all, 218 lines were retained for further testing in 1986/87.

Table 8.20 Characteristics of [redacted] in late [redacted] Yield Trial-Desi at Hisar and Ouilor, 1985/86.

Ent. No	Pedigree/ICCC No	Parentage/name	Days to 50% flowering	Weight of 100 seeds (g)		Seed yield (kg/ha)			
			H	H	C	H	r	C	r
1	ICCC 14 (ICCL 78000)	K 850 x P 61	81.4	18.0	19.0	1800	21	1190	16
2	ICCC 41	P 272 x (P 61 x L 900)	82.2	14.7	13.0	1730	24	1320	6
3	ICCX-730002-11-4-2[redacted]	H 208 x P 370	84.0	11.9	10.9	1600	25	1270	10
4	ICCX-730002-12-4-1[redacted]	H 208 x P 370	83.2	11.6	10.9	2050	19	1290	8
5	ICC 440	P 326	83.2	12.0	11.7	1780	22	1125	19
6	ICC 788	P 623	83.2	10.8	10.6	2180	11	1260	11
7	ICC 11097	GG 550	83.2	12.7	10.8	1730	23	1380	4
8	ICCX-800356-[redacted]-1[redacted]	H 208 x BG 203	82.1	11.1	10.1	1980	20	1390	3
9	ICCX-800356-[redacted]-3[redacted]	H 208 x BG 203	82.2	11.1	12.6	2170	13	940	25
10	ICCX-800356-[redacted]-4[redacted]	H 208 x BG 203 @	81.9	10.6	10.6	2940	1	1320	7
11	ICCX-800360-[redacted]-1[redacted]	K 850 x Ho 501	80.3	16.3	14.0	2410	6	992	24
12	ICCX-800376-[redacted]-5[redacted]	L 550 x P 61 @	81.4	15.4	14.3	2390	7	1380	5
13	ICCX-790520-138-2[redacted]	K 850 x (K 850 x P 61)	83.1	12.5	12.3	2350	9	1090	21
14	ICCX-790510-188-[redacted]-1[redacted]	H 208 x (H 208 x P 370)	82.9	11.9	11.4	2120	14	1050	23
15	ICCX-790510-208-[redacted]-1[redacted]	H 208 x (H 208 x P 370) @	83.5	11.2	10.6	2500	4	1280	9
16	ICCX-790510-248-[redacted]-1[redacted]	H 208 x (H 208 x P 370)	82.9	12.2	11.3	2180	12	1080	22
17	ICCX-790514-128-[redacted]-1[redacted]	H 208 x (P 378 x UBA 613)	82.9	12.6	11.0	2330	10	1200	14
18	ICCX-790518-78-[redacted]-1[redacted]	H 208 x K 850 @	82.0	20.1	19.4	2570	2	1110	20
19	ICCX-790520-[redacted]-2[redacted]	K 850 x (K 850 x P 61)	79.9	25.4	21.9	2350	8	1180	17
20	ICCX-790515-[redacted]-1[redacted]	H 208 x G 543	84.6	12.9	10.6	2100	16	1230	12
21	ICCX-790515-[redacted]-22[redacted]	H 208 x G 543 @,&	82.0	12.7	11.6	2530	3	1400	2
22	ICCX-790519-[redacted]-14[redacted]	K 850 x (H 208 x P 370) @	80.7	21.6	22.7	2420	5	1210	13
23	ICCX-790519-[redacted]-15[redacted]	K 850 x (H 208 x P 370) @	81.7	14.5	13.4	2090	17	1460	1
24	ICC 5003	K 850	81.6	24.8	22.8	2070	18	1160	18
25	ICC 4954	H 208	81.9	11.1	11.6	2110	15	1200	15
		Mean	82.3	14.4	13.6	2180		1220	
		SE±	0.51	0.66	0.98	200.8		69.1	
		CV(%)	1.2	9.2	12.5	18.4		9.8	

H = Hisar, C = Ouilor.

[redacted] for advanced yield testing in 1986/87.
[redacted] to late sown trials of AICPIP.

Table 8.21 Characteristics of entries in Late Sown Advanced Yield Trial - Kabuli at Hisar and Gwalior, 1985/86.

Ent. No	Pedigree/ICC No	Parentage/name	Days to 50% flowering	Weight of 100 seeds (g)		Seed yield (kg/ha)			
			H	H	G	H	r	G	r
1	ICCX-800373-[illegible]	L 550 x No 501	82.0	19.2	16.4	1560	10	1470	7
2	ICCX-800376-[illegible]	L 550 x F 61	83.3	24.8	24.3	1680	6	1060	12
3	ICCX-790527-[illegible]	L 550 x (L550 x K 4) $	81.0	27.6	20.1	2010	2	1790	1
4	ICCX-800374-[illegible]	L 550 x (L 500 x K 4)	76.8	28.7	28.2	2050	1	1360	10
5	ICCX-790530-[illegible]	L 550 x K 850	83.5	20.2	18.0	1470	11	1690	4
6	ICCX-790527-[illegible]	L 550 x (L 550 x K 4)	79.5	27.6	26.8	1840	4	1430	8
7	ICCX-800373-[illegible]	L 550 x No 501	80.5	25.9	26.7	1630	9	1370	9
8	ICCX-730058-3-2-[illegible]	L 550 x K 4	79.8	21.9	19.9	1660	7	1660	5
9	ICCX-800373-[illegible]	L 550 x No 501	79.5	27.0	26.3	1680	5	1700	3
10	ICCX-730262-17-2-[illegible]	K 4 x L 144	83.0	21.9	23.0	1270	12	1510	6
11	ICC 12339	ICCC 32	78.3	17.7	17.4	1840	3	1730	2
12	ICC 4973	L 550	79.8	20.2	19.5	1660	8	1310	11
		Mean	80.5	23.6	22.2	1690		1510	
		SE±	0.53	0.49	0.67	129.8		95.5	
		CV(%)	1.3	4.2	6.0	15.3		12.7	

H = Hisar, G = Gwalior.

$ Contributed to late sown trials of AICPIP.

Project C-109(85)IC: Studies on Genetics and Breeding Methods of Chickpea

Objectives

1. To generate information on suitable breeding methods and related information for developing high yielding cultivars.

2. To collect information on mode of inheritance of qualitative and quantitative characters of interest.

3. To introgress desirable characteristics from desi to kabuli types and vice versa and to study the variability in desi x desi, desi x kabuli and kabuli x kabuli crosses.

A. Breeding Methods

Recombination breeding. We continued our efforts to recombine the desirable characterstics of selected parents (Annigeri, K 850, JG 62, ICC 506, ICCL 83151) at ICRISAT Center. Twenty-four biparental F_1 crosses made in 1984/85 (R.O.W. 1984/85) among the selected plants in F_3 segregating progenies were advanced to F_2 in the off-season at Tapperwaripora in Kashmir. The F_2s were then grown in a newly developed wilt-sick plot at the Center for screening for wilt resistance. As the field did not turnout to be sufficiently wilt-sick, all F_2's were bulk-harvested for further screening in the wilt-sick plot next season.

Thirty-three F_3 progenies from plants selected in F_2s of double-crosses in a wilt-sick field last season were grown in a normal field and 51 biparental crosses were made among the plants selected from these progenies in order to compliment the desired characteristics of the original parents (Table 9.1). In addition to their use in inter-crosses, the F_3 progenies were also evaluated for various agronomic characteristics and 70 single plants were selected for further progeny tests.

We also evaluated 57 wilt resistant and 75 wilt susceptible F_5 progeny bulks selected from earlier single crosses. These were grown in 2-row plots with appropriate controls at regular intervals and were scored for flowering, maturity and expected yield. Actual yields were recorded in promising bulks and 23 lines each in resistant and susceptible groups with better performance than controls were selected for replicated yield tests and for comparison.

B. Double-podded and Multiseeded Characters

In order to determine the relative contributions of double-podded and multiseeded characters to seed yield in chickpea, we initiated a new study at ICRISAT Center. A multi-seeded line MB24 was crossed onto a double-podded cultivar JG 62; the reciprocal F_1 seeds were also

Table 9.1 List of biparental crosses made during 1985/86.

S.No.	Cross No.	Female parent	Male parent
1	850652	ICCX-820774-1P	ICCX-820773-5P
2	850653	ICCX-820774-2P	ICCX-820773-5P
3	850654	ICCX-820774-3P	ICCX-820773-5P
4	850655	ICCX-820771-3P	ICCX-820773-5P
5	850656	ICCX-820772-7P	ICCX-820773-5P
6	850657	ICCX-820772-8P	ICCX-820773-5P
7	850658	ICCX-820772-9P	ICCX-820773-5P
8	850659	ICCX-820772-10P	ICCX-820773-5P
9	850660	ICCX-820772-11P	ICCX-820773-5P
10	850661	ICCX-820772-12P	ICCX-820773-5P
11	850662	ICCX-820773-2P	ICCX-820773-5P
12	850663	ICCX-820772-2P	ICCX-820772-9P
13	850664	ICCX-820773-10P	ICCX-820772-9P
14	850665	ICCX-820772-2P	ICCX-820772-1P
15	850666	ICCX-820772-4P	ICCX-820772-1P
16	850667	ICCX-820772-5P	ICCX-820772-1P
17	850668	ICCX-820772-9P	ICCX-820772-1P
18	850669	ICCX-820773-3P	ICCX-820772-1P
19	850670	ICCX-820773-4P	ICCX-820772-1P
20	850671	ICCX-820773-5P	ICCX-820772-1P
21	850672	ICCX-820773-7P	ICCX-820772-1P
22	850673	ICCX-820773-11P	ICCX-820772-1P
23	850674	ICCX-820773-12P	ICCX-820772-1P
24	850675	ICCX-820773-13P	ICCX-820772-1P
25	850676	ICCX-820773-14P	ICCX-820772-1P
26	850677	ICCX-820773-15P	ICCX-820772-1P
27	850678	ICCX-820772-7P	ICCX-820772-4P
28	850679	ICCX-820772-11P	ICCX-820772-4P
29	850680	ICCX-820773-3P	ICCX-820772-4P
30	850681	ICCX-820773-5P	ICCX-820772-4P
31	850682	ICCX-820773-7P	ICCX-820772-4P
32	850683	ICCX-820773-11P	ICCX-820772-4P
33	850684	ICCX-820773-14P	ICCX-820772-4P
34	850685	ICCX-820773-15P	ICCX-820772-4P
35	850686	ICCX-820773-2P	ICCX-820772-SP
36	850687	ICCX-820773-5P	ICCX-820772-SP
37	850688	ICCX-820773-10P	ICCX-820772-SP
38	850689	ICCX-820773-14P	ICCX-820772-SP
39	850690	ICCX-820773-15P	ICCX-820772-SP
40	850691	ICCX-820772-2P	Annigeri DPM

Table 9.1 contd

S.No.	Cross No.	Female parent	Male parent
41	850692	ICCX-820772-4P	Annigeri DPM
42	850693	ICCX-820772-5P	Annigeri DPM
43	850694	ICCX-820772-6P	Annigeri DPM
44	850695	ICCX-820772-9P	Annigeri DPM
45	850696	ICCX-820773-4P	Annigeri DPM
46	850697	ICCX-820773-5P	Annigeri DPM
47	850698	ICCX-820773-13P	Annigeri DPM
48	850699	ICCX-820774-1P	ICCX-820773-13P
49	850700	ICCX-820774-2P	ICCX-820773-13P
50	850701	ICCX-820772-7P	ICCX-820773-13P
51	850702	ICCX-820773-2P	ICCX-820773-13P

obtained. These alongwith the two parents, two F_2's, and eight backcrosses will be evaluated in a replicated experiment next season to determine the contribution of the two characteristics to seed yield.

The proportion of double-podded nodes among the double-podded genotypes varies a great deal. During the past few years, we have identified a number of breeding lines that showed a relatively higher proportion of double podded nodes than some of the best double-podded lines available in our germplasm bank. We sowed 49 such lines for further tests in a 7 x 7 balanced lattice design with 4 replicates at ICRISAT Center. The trial failed due to very high incidence of wilt in the field and surviving plants were harvested for multiplication and retesting.

C. Studies on desi-kabuli introgression

Introduction

During the last season (1984/85) we studied variability in F_2's of cycle 2 introgression. The three seed type bulks (desi, kabuli and intermediate) were similar in generating variability for the characters studied. Crosses with a kabuli parent tended to increase days to flowering and maturity, plant height and seed size, while crosses with a desi parent had increased pod and seed number per plant.

Comparison of cycle 1 and cycle 2 F_3 bulks

The F_3 bulks of Cycle 1 introgression were preserved in the cold store for comparison with the Cycle 2 F_3 bulks. In the Cycle 1 crossing, we had 9 desi x kabuli crosses, and in each cross the F_2 seed was seperated in to desi type, kabuli type and intermediate type seed bulks. Thus we had 27 bulks in Cycle 1 crossing. After replicated testing, we selected high yielding three bulks (one each from desi, kabuli and intermediate seed types). The three selected bulks were crossed on to a desi (WR 315) and a kabuli (No. 501) parent. Thus, we had six crosses in the Cycle 2 introgression. The F_2 seed of these crosses again seperated into three seed type groups - desi (D), kabuli (K), and intermediate (I). The desi seed bulks crossed to desi paent (WR 315) had only desi and intermediate seed types. Thus we had 17 seed type bulks from six crosses of Cycle 2 introgression. The 27 seed type bulks from Cycle 1, 17 seed type bulks from Cycle 2 and five checks - CPS 1, Annigeri, L 550, ICCC 32 and H 208 were planted as a 7 x 7 lattice with four replications both at ICRISAT Center and Hisar. Plot size was 4 rows of 4 meters, with rows spaced at 30 cm, and seeds within a row at 10 cm. Germination was poor in the Cycle 1 bulks, possibly because of longer storage. Observations on days to 50% flowering and seed yield were recorded on plot basis. Observations on plant height, number of primary and secondary branches, number of pods and seeds, 100 seed weight and plant yield were recorded on five random plants from each plot. At

ICRISAT Center, the season was dry without much rainfall, and plants experienced drought stress. Plant growth was restricted and yield was low. However, where plant stand was low (in Cycle 1 bulks) the plants were more vigorous compared to the plants in Cycle 2 bulks which had reasonably good plant stand. At Hisar the crop did not experience any drought stress, but plant stand was again poor in Cycle 1 bulks.

The combined analysis of variance is presented in Table 9.2. Mean squares for crosses were significant for all characters studied. The seed types (D,K,I) had significant mean squares only for days to flowering, pods and seeds per plant and seed yield (kg ha^{-1}). The interaction of locations with crosses was significant for all characters except numbers of primary and secondary branches. The interaction of crosses with seed types was significant for all the characters.

The mean values for different characters studied are presented in Table 9.3 to 9.12. The desi bulks were earlier to flower and kabulis were later, both at ICRISAT Center and Hisar (Table 9.3). Plants were generally taller at Hisar (Table 9.4). There were interactions of seed type with locations for plant height. There were no differences for the number of primary branches (Table 9.5). The number of secondary branches (Table 9.6) were more at Hisar than at Patancheru; and the intermediate seed type bulks tended to have more branches than others. Plans at Hisar produced more pods (Table 9.7) and seeds (Table 9.8) than at ICRISAT Center. Kabuli bulks tended to have more pods than desi types. This is possibly because the kabuli bulks had poor plant stand thereby each single plant had more space and produced more pods than the plants in desi bulk. The number of seeds per pod (Table 9.9) were more at Hisar, but there were no differences between bulks in a location. ICRISAT Center produced heavier seeds than Hisar (Table 9.10). Among the seed types, the intermediate seed bulks had higher seed weight than others. As expected, the single plant yield and seed yield (kg ha^{-1}) were much greater at Hisar than at ICRISAT Center. Single plant yields of K bulks is higher than D and I bulks at both locations (Table 9.11). This could be due to poor plants in K bulks as explained earlier. The seed yield (kg ha^{-1}), on the other hand, was higher in D bulks, followed by I bulks. K bulks had lowest seed yield (Table 9.12).

The mean squares of combined analysis for comparing crosses against checks and to compare Cycle 1 and Cycle 2 bulks are given in Table 9.13. The crosses had significant mean squares for primary branches, 100-seed weight and seed yield (kg ha^{-1}). The mean squares for all characters (except days to 50% flowering) were higher in Cycle 1 than in Cycle 2. This suggests that the variability may be reduced in the second cycle of introgression.

The mean and range of values in each cross for Cycle 1 and Cycle 2 bulks are given in Table 9.14. The variability in Cycle 2 bulks is lower than the variability in Cycle 1 bulks for all the characters studied, indicating that second Cycle of crossing has reduced the variability. However, if we look at the seed yield per plant and seed yield (kg ha^{-1}), we find that the range in variability has shifted to the positive side. This means that we are getting higher yielding

Table 9.2 Mean squares from combined analysis of variance of D X K F3 lines trial at ICRISAT Center and Hisar in 1985/86.

Source	df	Days to 50% flowering	Plant height (cm)	Primary branches/ plant	Secondary branches/ plant	Pods/ plant	Seeds/ plant	Seeds/ pod	Wt. of 100-seeds (g)	Seed yield/ plant (g)	Seed yield (kg/ha)
Locations (L)	1	71039.4**	56443.9	0.57	6697.05**	1740113*	4227654*	11.503	472.4	106314.4*	1060719168*
Error	6	41.5	344.6	0.61	18.39	4670	11592	0.050	30.9	306.9	1235413
Crosses (C)	14	300.7**	139.1**	0.39**	19.53**	15098**	33651**	0.160**	116.4**	513.5**	3554546**
Seed type(s)	1	264.9**	69.7	0.32	24.77	20460*	46748*	0.081	67.2	739.4	5862513
L x C	14	165.2**	301.4**	0.18	5.62	8810**	23338**	0.062**	18.5*	430.4**	2681840**
L x S	2	17.1	176.3	0.19	6.36	5681	14322	0.007	2.8	295.6	4181683
C x S	27	40.9**	52.1**	0.17*	7.75**	3965**	9298**	0.041**	41.8	266.1*	448191**
L x C x S	27	19.4*	57.3**	0.12	6.59*	2560**	5780**	0.030*	7.8	196.7	442016
Error	258	9.8	14.1	0.08	3.33	1014	2332	0.016	6.9	121.2	112066

*, ** significant at 5% and 1% levels of probability, respectively.

Table 9.3 Days to 50 percent flowering of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	52.5	59.3	63.3	58.3	88.5	89.3	92.9	90.2	70.5	74.3	78.1	74.3
2	790230	47.8	53.5	57.0	52.8	83.5	86.8	87.0	85.8	65.6	70.1	72.0	69.3
3	790231	53.5	52.3	52.3	52.7	90.5	91.0	93.0	91.5	72.0	71.6	72.6	72.1
4	790233	66.8	65.0	65.5	65.8	86.5	88.5	88.7	87.9	76.6	76.8	77.1	76.8
5	790234	61.8	57.3	61.0	60.0	86.5	88.3	85.8	86.8	74.1	72.8	73.4	73.4
6	790235	66.0	66.0	68.0	66.7	91.3	89.5	94.0	91.6	78.6	77.7	81.0	79.1
7	790236	65.0	58.8	64.5	62.8	87.8	83.8	88.8	86.8	76.4	71.3	76.6	74.8
8	790237	57.3	62.8	62.0	60.7	85.0	87.3	88.8	87.0	71.1	75.0	75.4	73.8
9	790238	65.8	66.0	66.5	66.1	85.3	87.3	89.3	87.3	75.5	76.9	77.9	76.7
10	830569	47.0	47.5	50.0	48.2	82.5	82.5	84.5	83.2	64.8	65.0	67.3	65.7
11	830570	69.0	65.8	61.0	65.3	88.5	85.8	86.3	86.8	78.8	75.8	73.6	76.0
12	830571	46.8	50.3	60.8	52.6	84.3	83.3	86.0	84.5	65.5	66.8	73.4	68.5
13	830572	52.5	62.0	64.3	59.6	85.0	84.3	89.8	86.3	68.8	73.1	77.0	73.0
14	830573	49.5	59.5	-@	54.5	84.0	87.0	-@	85.5	66.8	73.3	-@	70.0
15	830574	58.8	57.3	60.0	58.7	85.3	83.8	85.5	84.8	72.0	70.5	72.8	71.8
	SE±		1.34		0.77		1.76		1.10		1.11		0.64
	Mean	57.3	58.9	61.1	59.1	86.3	86.5	88.6	87.1	71.8	72.7	74.9	73.1
	SE±		0.35				0.45				0.29		

@ No kabuli type segregants in desi bulk x desi parent (HR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	46.5	81.5
2. Annigeri	40.3	79.0
3. L 550	56.5	86.5
4. ICCC 32	60.0	86.0
5. H 208	65.3	88.8

Table 9.4 Plant height (cm) of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	35.2	36.2	39.3	36.9	59.8	53.9	61.7	58.5	47.5	45.1	50.5	47.7
2	790230	39.8	38.8	38.7	39.1	63.1	53.2	59.2	58.5	51.5	46.0	48.9	48.8
3	790231	37.1	39.5	38.3	38.3	61.8	52.1	60.5	58.1	49.5	45.8	49.4	48.2
4	790233	33.5	37.3	36.5	35.7	59.4	51.7	45.3	52.1	46.4	44.5	40.9	43.9
5	790234	36.8	41.0	39.8	39.2	59.8	51.3	62.4	57.9	48.3	46.2	51.1	48.6
6	790235	36.5	40.7	37.3	38.2	63.9	56.6	52.7	57.7	50.2	48.7	45.0	47.9
7	790236	35.7	34.2	35.3	35.1	71.6	56.4	53.7	60.6	53.7	45.3	44.5	47.8
8	790237	41.8	41.6	42.0	41.8	59.2	64.0	58.1	60.4	50.5	52.8	50.1	51.1
9	790238	32.9	38.3	37.3	36.2	60.4	54.3	52.0	55.6	46.6	46.3	44.6	45.9
10	830569	31.2	34.3	32.2	32.6	60.1	66.2	70.7	65.7	45.7	50.3	51.4	49.1
11	830570	39.7	34.7	37.8	37.4	64.9	62.3	67.3	64.9	52.3	48.5	52.5	51.1
12	830571	34.1	32.8	35.8	34.2	67.8	68.9	74.1	70.3	51.0	50.8	54.9	52.2
13	830572	37.7	35.8	35.1	36.2	65.6	69.5	75.4	70.2	51.6	52.7	55.3	53.2
14	830573	31.8	32.0	-@	31.9	69.2	65.6	-@	67.4	50.5	48.8	-@	49.7
15	830574	34.4	36.4	35.5	35.5	63.4	66.6	68.2	66.1	48.9	51.5	51.9	50.8
	SE±		1.48		0.85		2.21		1.28		1.33		0.77
	Mean	35.9	36.9	37.2	36.7	63.3	59.5	61.5	61.4	49.6	48.2	49.4	49.1
	SE±		0.38				0.57				0.34		

@ No kabuli type segregants in desi bulk x desi parent (HR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	32.5	71.4
2. Annigeri	24.8	59.6
3. L 550	33.1	62.8
4. ICCC 32	33.8	67.9
5. H 208	33.8	59.1

Table 9.5 Numbers of primary branches per plant of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	2.7	2.3	2.8	2.6	2.5	2.2	2.4	2.3	2.6	2.3	2.6	2.5
2	790230	2.5	2.4	2.4	2.4	2.3	2.5	2.5	2.4	2.4	2.5	2.5	2.4
3	790231	2.3	3.0	2.4	2.6	2.4	2.2	2.5	2.3	2.3	2.6	2.4	2.5
4	790233	2.5	2.6	2.6	2.6	2.4	2.5	2.9	2.6	2.4	2.6	2.7	2.6
5	790234	2.5	2.7	2.5	2.6	2.4	2.5	3.0	2.7	2.5	2.6	2.8	2.6
6	790235	2.3	2.6	2.6	2.5	2.6	2.8	2.3	2.6	2.5	2.7	2.5	2.6
7	790236	2.4	2.2	2.6	2.4	2.5	2.4	2.3	2.4	2.4	2.3	2.5	2.4
8	790237	2.5	2.2	2.4	2.3	2.8	2.3	2.8	2.7	2.6	2.2	2.6	2.5
9	790238	2.0	2.5	2.7	2.4	2.5	2.5	2.9	2.6	2.2	2.5	2.8	2.5
10	830569	2.0	2.0	2.2	2.1	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2
11	830570	2.3	2.3	2.3	2.4	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4
12	830571	2.2	2.3	2.2	2.2	2.0	2.2	2.2	2.2	2.1	2.3	2.2	2.2
13	830572	2.5	2.5	2.0	2.3	2.5	2.3	2.5	2.5	2.5	2.4	2.3	2.4
14	830573	2.0	2.4	-@	2.2	2.3	2.6	-@	2.5	2.2	2.5	-@	2.4
15	830574	2.2	2.3	2.2	2.2	2.3	2.5	2.4	2.4	2.2	2.4	2.3	2.3
	SE±		0.16		0.09		0.12		0.07		0.10		0.06
	Mean	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.4
	SE±		0.04				0.03				0.03		

@ No kabuli type segregants in desi bulk x desi parent (HR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	2.0	2.2
2. Annigeri	2.1	2.4
3. L 550	2.4	2.5
4. ICCC 32	2.2	2.3
5. H 208	2.5	2.3

Table 9.6 Numbers of secondary branches per plant of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	4.1	4.7	7.3	5.3	14.7	10.5	13.1	12.8	9.4	7.6	10.2	9.1
2	790230	4.8	4.3	6.4	5.2	11.4	15.9	13.7	13.7	8.1	10.1	10.1	9.4
3	790231	4.7	6.3	6.6	5.8	13.0	11.9	13.1	12.7	8.9	9.1	9.9	9.3
4	790233	5.3	6.8	7.3	6.5	11.8	15.8	18.8	15.5	8.6	11.3	13.0	11.0
5	790234	4.9	6.3	5.9	5.7	14.4	14.0	15.1	14.5	9.7	10.1	10.6	10.1
6	790235	5.6	6.2	5.3	5.7	12.7	15.5	12.4	13.5	9.1	10.9	8.9	9.6
7	790236	6.1	4.1	5.1	5.1	10.9	14.1	11.9	12.3	8.5	9.1	8.5	8.7
8	790237	4.0	4.8	5.6	4.8	16.3	13.9	15.9	15.4	10.1	9.4	10.8	10.1
9	790238	4.1	4.8	6.8	5.2	12.4	15.7	15.4	14.5	8.2	10.3	11.0	9.9
10	830569	4.7	4.3	3.8	4.3	9.7	13.7	12.8	12.1	7.2	9.0	8.3	8.2
11	830570	4.3	5.2	3.8	4.4	12.1	12.8	11.9	12.3	8.3	9.0	7.9	8.4
12	830571	4.0	4.4	4.0	4.1	9.4	13.6	11.3	11.5	6.7	9.0	7.6	7.8
13	830572	5.1	3.6	3.6	4.1	13.1	11.8	10.8	11.9	9.1	7.7	7.2	8.0
14	830573	4.2	5.3	-@	4.8	12.9	13.1	-@	13.0	8.6	9.2	-@	8.9
15	830574	4.5	4.0	3.5	4.0	12.7	13.6	12.4	12.9	8.6	8.8	7.9	8.4
	SE±		0.60		0.35		1.14		0.66		0.65		0.37
	Mean	4.7	5.0	5.4	5.0	12.5	13.7	13.5	13.2	8.6	9.4	9.4	9.1
	SE±		0.15				0.30				0.17		

@ No kabuli type segregants in desi bulk x desi parent (WR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	3.6	10.6
2. Annigeri	3.4	16.1
3. L 550	4.4	11.9
4. ICCC 32	4.3	10.2
5. H 208	4.5	12.2

Table 9.7 Numbers of pods per plant of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl. No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	27.4	30.9	82.9	47.0	150.9	92.0	162.7	135.2	89.1	61.4	122.8	91.1
2	790230	22.1	37.5	54.8	38.1	153.5	123.2	196.9	157.9	87.8	80.4	125.8	98.0
3	790231	22.6	39.9	54.2	38.9	153.7	175.2	279.1	202.7	88.1	107.6	166.6	120.0
4	790233	14.3	41.2	57.1	37.5	181.1	237.9	345.8	254.9	97.7	139.5	201.4	146.2
5	790234	26.2	60.6	24.6	37.1	209.6	214.4	284.6	236.2	117.9	137.5	154.6	136.7
6	790235	20.0	44.6	29.6	31.4	159.6	195.1	144.2	166.3	89.8	119.8	86.9	98.8
7	790236	27.2	11.3	20.2	19.5	123.0	156.6	175.2	151.6	75.1	84.0	97.7	85.6
8	790237	17.9	22.1	29.3	23.1	186.8	170.7	215.6	191.0	102.3	96.4	122.4	107.0
9	790238	20.3	33.5	32.9	28.9	135.2	239.4	243.8	206.1	77.7	136.4	138.4	117.5
10	830569	13.9	20.3	26.1	20.1	110.8	128.0	142.2	127.0	62.3	74.1	84.2	73.5
11	830570	20.5	15.7	13.7	16.6	152.4	190.5	113.9	152.3	86.4	103.1	63.8	84.4
12	830571	16.2	17.0	17.4	16.8	92.4	158.4	113.9	121.6	54.3	87.7	65.7	69.2
13	830572	15.4	12.0	11.3	12.9	128.2	113.7	99.1	113.7	71.8	62.9	55.2	63.3
14	830573	19.1	22.4	-@	20.8	164.5	126.9	-@	144.7	91.8	73.6	-@	82.8
15	830574	14.6	17.1	12.2	14.6	134.1	103.1	122.0	119.7	74.3	60.1	67.1	67.2
	SE±		6.97		4.03		21.4		12.4		11.26		6.5
	Mean	19.8	28.4	33.3	27.2	149.0	161.5	188.5	166.3	84.4	95.0	110.9	96.8
	SE±		1.80				5.5				2.91		

@ No kabuli type segregants in desi bulk x desi parent (HR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	21.1	52.7
2. Annigeri	31.9	209.3
3. L 550	16.8	119.4
4. ICCC 32	20.3	122.0
5. H 208	21.8	173.0

Table 9.8 Numbers of seeds per plant of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	34.1	34.9	118.0	62.3	226.1	128.4	242.4	199.0	130.1	81.6	180.2	130.6
2	790230	22.3	40.1	59.7	40.7	174.7	158.2	291.2	208.0	98.5	99.2	175.4	124.3
3	790231	25.4	49.7	67.9	47.7	200.7	233.2	375.2	269.7	113.0	141.5	221.5	158.7
4	790233	16.6	52.8	77.4	48.9	295.0	378.8	585.8	419.9	155.8	215.8	331.6	234.4
5	790234	27.6	66.9	27.1	40.5	314.0	304.2	375.4	331.2	170.8	185.5	201.3	185.9
6	790235	23.5	51.6	36.7	37.2	251.4	298.9	219.3	256.5	137.4	175.2	128.0	146.9
7	790236	37.8	12.9	26.1	25.6	219.7	243.8	308.3	257.3	128.8	128.3	167.2	141.4
8	790237	18.2	24.1	31.5	24.6	285.7	257.9	291.2	278.3	151.9	141.0	161.3	151.4
9	790238	23.9	41.5	37.0	34.1	202.1	368.6	358.0	309.6	113.0	205.1	197.5	171.8
10	830569	14.8	22.9	31.9	23.2	166.1	199.3	212.7	192.7	90.4	111.1	122.3	107.9
11	830570	20.0	16.1	16.0	17.3	218.4	276.8	168.7	221.3	119.2	146.4	92.4	119.3
12	830571	18.7	20.1	21.7	20.2	145.8	212.5	190.5	182.9	82.2	116.3	106.1	101.5
13	830572	17.1	14.0	11.7	14.2	205.5	181.2	153.3	180.0	111.3	97.6	82.5	97.1
14	830573	21.0	26.4	-@	23.7	254.2	212.3	-@	233.3	137.6	119.3	-@	128.5
15	830574	17.1	17.6	13.9	16.2	178.0	169.0	178.3	175.1	97.5	93.3	96.1	95.6
	SE±		9.18		5.3		32.9		19.0		17.1		9.9
	Mean	22.5	32.8	41.1	32.1	222.5	241.5	282.2	157.2	122.5	137.1	161.6	94.5
	SE±		2.4				18.5				4.4		

@ No kabuli type segregants in desi bulk x desi parent (HK 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	24.1	68.4
2. Annigeri	33.7	318.8
3. L 550	17.9	163.4
4. ICCC 32	21.3	171.4
5. H 208	26.1	243.9

Table 9.9 Numbers of seeds per pod of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	1.2	1.1	1.4	1.3	1.5	1.4	1.5	1.5	1.4	1.2	1.5	1.4
2	790230	1.0	1.1	1.1	1.1	1.1	1.3	1.5	1.3	1.1	1.2	1.3	1.2
3	790231	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.3	1.2	1.3	1.3	1.3
4	790233	1.2	1.3	1.3	1.3	1.6	1.6	1.8	1.7	1.4	1.5	1.5	1.5
5	790234	1.0	1.1	1.1	1.1	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.3
6	790235	1.2	1.1	1.3	1.2	1.5	1.6	1.5	1.6	1.4	1.4	1.4	1.4
7	790236	1.3	1.1	1.3	1.2	1.8	1.5	1.8	1.7	1.6	1.3	1.5	1.5
8	790237	1.0	1.1	1.0	1.1	1.5	1.5	1.4	1.5	1.3	1.3	1.2	1.3
9	790238	1.2	1.2	1.1	1.2	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.3
10	830569	1.0	1.1	1.2	1.1	1.5	1.5	1.5	1.5	1.3	1.3	1.4	1.3
11	830570	1.0	1.0	1.1	1.1	1.4	1.4	1.5	1.4	1.2	1.2	1.3	1.2
12	830571	1.1	1.3	1.1	1.2	1.6	1.3	1.7	1.5	1.4	1.3	1.4	1.4
13	830572	1.0	1.1	1.0	1.1	1.6	1.6	1.5	1.6	1.3	1.4	1.3	1.3
14	830573	1.0	1.2	-@	1.1	1.5	1.8	-@	1.7	1.3	1.5	-@	1.4
15	830574	1.2	1.0	1.2	1.1	1.3	1.7	1.5	1.5	1.3	1.4	1.3	1.3
	SE±		0.06		0.04		0.06		0.04		0.04		0.03
	Mean	1.1	1.2	1.2	1.2	1.5	1.5	1.5	1.5	1.3	1.3	1.4	1.4
	SE±		0.02				0.02				0.01		

@ No kabuli type segregants in desi bulk x desi parent (HK 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	1.2	1.4
2. Annigeri	1.1	1.5
3. L 550	1.1	1.4
4. ICCC 32	1.1	1.4
5. H 208	1.2	1.4

Table 9.10 Weights of 100 seeds (g) of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	20.3	27.0	15.9	21.1	16.1	21.3	11.6	16.3	18.2	24.1	13.8	18.7
2	790230	28.4	24.6	22.0	25.0	21.0	22.8	17.7	20.5	24.7	23.7	19.8	22.8
3	790231	19.1	20.2	16.5	18.6	17.9	17.1	16.8	17.3	18.5	18.7	16.6	17.9
4	790233	18.1	16.4	17.8	17.4	16.1	14.9	14.2	15.1	17.1	15.7	16.0	16.2
5	790234	20.8	20.5	21.1	20.8	18.4	18.7	20.2	19.1	19.6	19.6	20.7	19.9
6	790235	17.9	18.7	16.6	17.7	16.4	15.0	15.9	15.8	17.1	16.9	16.3	16.8
7	790236	17.0	24.2	18.7	20.0	15.1	21.3	15.3	17.2	16.1	22.8	17.0	18.6
8	790237	26.4	24.6	20.6	23.9	15.4	20.3	15.9	17.2	20.9	22.4	18.2	20.5
9	790238	15.5	16.8	18.0	16.8	14.6	17.3	17.0	16.3	15.0	17.1	17.5	16.5
10	830569	17.7	18.0	16.0	17.2	15.6	16.3	14.4	15.5	16.7	17.2	15.2	16.4
11	830570	18.0	20.4	23.3	20.6	16.6	19.3	24.8	20.2	17.3	19.8	24.0	20.4
12	830571	18.4	16.2	18.5	17.7	18.0	14.9	16.3	16.4	18.2	15.5	17.4	17.1
13	830572	19.0	20.5	22.6	20.7	19.6	19.8	19.5	19.7	19.3	20.2	21.1	20.2
14	830573	18.7	15.3	-@	16.6	15.3	13.5	-@	14.2	17.0	14.4	-@	15.4
15	830574	17.9	26.3	21.5	21.9	19.5	20.9	22.5	21.0	18.7	23.6	22.0	21.5
	SE±		1.52		0.88		1.06		0.61		0.93		0.54
	Mean	19.5	20.7	19.2	19.5	17.0	18.2	17.3	17.5	18.3	19.4	18.3	18.5
	SE±		0.39				0.27				0.24		

@ No kabuli type segregants in desi bulk x desi parent (WR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	19.2	17.4
2. Annigeri	20.0	19.5
3. L 550	24.4	21.7
4. ICCC 32	20.2	19.2
5. H 208	14.2	14.5

Table 9.11 Seed yields per plant (g) of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	6.7	9.4	17.8	11.3	32.3	19.2	38.9	30.1	19.5	14.3	28.3	20.7
2	790230	6.3	9.6	14.0	10.0	37.9	25.6	44.8	36.1	22.1	17.6	29.4	23.1
3	790231	4.7	9.4	11.1	8.4	34.8	32.9	56.0	41.2	19.7	21.2	33.6	24.8
4	790233	3.0	8.6	13.6	8.4	42.2	50.2	71.6	54.7	22.6	29.4	42.6	31.5
5	790234	5.8	13.6	5.7	8.4	48.0	42.0	63.0	51.0	26.9	27.8	34.4	29.7
6	790235	4.2	9.3	5.9	6.5	41.7	42.6	31.0	38.4	22.9	25.9	18.5	22.4
7	790236	6.1	2.9	4.9	4.6	33.5	43.4	36.8	37.9	19.8	23.2	20.8	21.3
8	790237	4.4	5.7	6.4	5.5	42.9	46.3	47.7	45.6	23.7	26.0	27.1	25.6
9	790238	3.7	6.8	6.7	5.7	31.3	51.5	55.5	46.1	17.5	29.1	31.1	25.9
10	830569	2.5	3.9	5.0	3.8	27.8	27.0	30.9	28.5	15.2	15.4	18.0	16.2
11	830570	3.6	3.2	3.7	3.5	37.4	44.7	34.0	38.7	20.5	23.9	18.9	21.1
12	830571	3.1	3.2	3.5	3.3	24.9	35.3	31.5	30.6	14.0	19.3	17.5	16.9
13	830572	3.3	2.8	2.6	2.9	33.9	40.0	30.5	24.8	18.6	21.4	16.5	18.8
14	830573	3.9	4.0	-@	4.0	76.4	29.0	-@	52.7	40.1	16.5	-@	28.4
15	830574	3.1	4.8	3.0	3.6	35.9	35.8	40.4	37.4	19.5	20.3	21.7	20.5
	SE±		1.6		1.0		7.6		4.4		3.9		2.3
	Mean	4.3	6.5	7.4	6.1	38.7	37.7	43.8	40.1	21.5	22.1	22.6	23.1
	SE±		0.42				2.0				1.0		

@ No kabuli type segregants in desi bulk x desi parent (NR 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	4.6	10.9
2. Annigeri	6.8	36.5
3. L 550	4.3	32.5
4. ICCC 32	4.2	35.3
5. H 208	3.7	31.8

Table 9.12 Seed yields (kg/ha) of F3 populations in D x K introgression trials at Hyderabad and Hisar, 1985/86.

Sl No.	ICCX-	Hyderabad				Hisar				Mean			
		D	I	K	Mean	D	I	K	Mean	D	I	K	Mean
1	790229	335	405	162	301	739	421	59	406	537	413	111	353
2	790230	314	206	205	242	500	514	666	560	407	360	436	401
3	790231	212	287	318	272	1347	405	834	862	779	346	576	567
4	790233	241	302	253	266	2812	1306	245	1454	1526	804	249	860
5	790234	325	299	305	310	2141	938	842	1307	1233	618	574	808
6	790235	322	263	271	286	2652	1243	1277	1724	1487	753	774	1005
7	790236	348	231	221	267	2439	1329	889	1552	1393	780	555	910
8	790237	305	172	182	220	1799	1184	613	1199	1052	678	397	709
9	790238	430	335	266	344	2441	1311	678	1477	1436	823	472	910
10	830569	394	499	452	448	1979	2381	2330	2230	1187	1440	1391	1339
11	830570	379	140	327	282	2930	2495	2295	2574	1655	1318	1311	1428
12	830571	576	455	313	448	2240	2198	2515	2318	1408	1327	1414	1383
13	830572	397	391	359	382	2170	2488	2396	2351	1283	1439	1377	1367
14	830573	415	390	-@	403	2770	2225	-@	2498	1592	1307	-@	1451
15	830574	430	427	403	420	2747	2762	2208	2572	1588	1594	1306	1496
	SE±		75.7		43.7		224.3		129.5		118.4		68.3
	Mean	361	320	289	320	2114	1547	1275	1645	1238	933	782	985
	SE±		19.5				57.9				30.6		

@ No kabuli type segregants in desi bulk x desi parent (HK 315) cross.

Checks :	Hyderabad	Hisar
1. CPS 1	492	1688
2. Annigeri	634	1298
3. L 550	432	2836
4. ICCC 32	494	2972
5. H 208	377	3012

Table 9.13 Mean squares from combined analysis of variance of D x K F3 lines trial for comparison of crosses and checks, and comparison of cycle 1 and cycle 2 at ICRISAT Center and Hisar in 1985/86.

Source	df	Days to 50% flowering	Plant height (cm)	Primary branches/ plant	Secondary branches/ plant	Pods/ plant	Seeds/ plant	Seeds/ pod	Wt. of 100-seeds (g)	Seed yield/ plant(g)	Seed yield (kg/ha)
Replication	3	83.8	355.9	0.444	35.06	4676	12733	0.050	44.48	337.5	998872
Entries	48	167.8	83.6	0.256**	12.60	8382	19252	0.075	64.56**	350.1	1758017**
Crosses vs checks	1	651.1	51.4	0.929	37.47	11046	34653	0.192	4.12	1268.5	6784793
Crosses	43	135.9	81.0	0.248**	12.37	8348	18894	0.078	64.60**	339.4	1705293**
Checks	4	390.0	119.2	0.181	8.88	8077	19256	0.007	79.21**	235.0	1068108
Cycle 1 vs Cycle 2	1	1080.2	917.5	3.21	172.83	123387	238515	0.010	0.035	2222.2	38955196
Cycle 1	26	89.3	72.0	0.20*	10.98	8136	20434	0.107*	67.85**	308.4	1237526
Cycle 2	16	152.7	43.4	0.134	4.60	1502	2666	0.036	63.36**	272.2	137297
Error	340	249.5	224.0	0.100	23.24	6943	16667	0.053	8.69	448.0	856344

*,** significant at 5% and 1% probability, respectively.

Table 9.14 Mean, SE and Range for cycle '1' and cycle '2' for [illegible] trial, Patancheru and Hisar, 1983/84. in D X R P3

	Days to 50% flowering		Plant height (cm)		Primary br/ plant (No.)		Secondary br/ Plant (No.)		Pods/plant (No.)	
	P	H	P	H	P	H	P	H	P	H
Cycle '1' x	60.6	88.3	37.8	57.7	2.5	2.5	5.5	13.9	33.5	189.1
SE±	0.323	0.430	0.348	0.565	0.158	0.032	0.139	0.276	0.165	5.20
Range	(47.7-66.5)	(83.5-93.0)	(32.9-42.0)	(51.3-64.0)	(1.95-2.88)	(2.15-7.3)	(4.0-18.78)	(10.48-82.9	(11.3-345.8)	(92.0-
Cycle '2' x	56.6	85.2	34.7	67.4	2.2	2.4	4.2	12.2	16.7	129.0
SE±	0.256	0.341	0.276	0.449	0.031	0.025	0.111	0.219	1.31	4.13
Range	(46.7-69.0)	(82.5-89.8)	(31.2-39.7)	(60.1-75.5)	(2.00-2.50)	(2.05-2.58)	(3.45-5.30)	(9.45-13.68)	(11.3-26.1)	(92.4-190.5)
G Mean	59.1	87.1	36.6	61.5	2.4	2.5	5.0	13.2	27.0	165.9
SE±	0.256	0.341	0.276	0.449	0.031	0.025	0.111	0.219	1.31	4.13

P = Patancheru, H = Hisar.

Contd.

Seeds/pl (no.)		Seeds/pod (no.)		Wt. of 100 seeds (g)		Seed yield/ plant(g)		Seed yield (kg/ha)	
P	H	P	H	P	H	P	H	P	H
40.2	281.0	1.20	1.50	20.1	17.2	7.60	42.3	278	1171
2.15	7.95	0.014	0.015	0.358	0.267	0.385	1.77	18.6	53.9
(12.9-118.0)	(128.4-585.8)	(1.0-1.4)	(1.1-1.8)	(15.5-28.4)	(11.6-22.8)	(3.0-17.8)	(19.2-71.6)	(162-430)	(659-2812)
18.9	195.4	1.10	1.50	19.3	18.1	3.50	36.2	397	2419
1.71	6.31	0.011	0.012	0.284	0.212	0.305	1.41	14.8	42.7
(11.7-26.4)	(145.8-276.8)	(1.0-1.25)	(1.3-1.8)	(15.3-26.3)	(13.5-24.8)	(2.6-5.0)	(24.9-76.4)	(140-576)	(1979-2770)
31.9	248.0	1.15	1.50	19.8	17.5	6.04	40.0	324	1653
1.71	6.31	0.011	0.012	0.284	0.212	0.305	1.41	14.8	42.7

[illegible]

segregants from the second Cycle of crossing. However, we have to view this years results with a little caution. The Cycle 1 bulks, especially the kabulis, had poor germination and this may have distorted the observations. This trial will be repeated in the next season for confirmation or otherwise.

D. Male Sterility

Recurrent selection program

Recurrent selection program using male sterility was initiated in 1983-84. It involved 6 parents with good specific characteristics viz., wilt resistance, Heliothis resistance, multiseeded and double podded behaviour, high yielding tall type, high protein and, good agronomic type. The base population was created by crossing the male sterile plants to the artificially created random pollen pooled from the fertile plants in the F_2 of these 6 populations, in 1984-85. The individual progenies from the male sterile plants were grown in the offseason at Tapperwaripora in Kashmir for seed increase. The seed brought for each S_1 progeny was planted two ways; one set was sown earlier than the normal, the common check Annigeri was planted on both sides of each progeny in order to evaluate the performance of these S_1 progenies very thoroughly. The second set was planted some what late in a crossing block nursery with an idea to select the top performing progenies in the first set and cross these in an intermating series in the second set. This would save us one year and the intermating, selecting and testing generation cycle can be effectively completed in a year thereby reducing the time scale of this program. Unfortunately the crossing block nursery had unusually high incidence of wilt and many plants succumbed. However, the surviving plants were examined for male sterility and fertility and the sterile ones were used for making crosses. Although we could evaluate the S_1 progenies in the testing generation yet all the top performing ones could not be used in intermating series because of the elimination of the progenies due to wilt. We, however, used random pollen by pooling together flowers from the healthy fertile plants from all the populations and crossed these to male sterile plants. The intermating generation of the first cycle C_1 was thus created for the seed increase in the offseason 1986. The S_2 seed from the fertiles will be planted in the wilt sick plot, thereby channelling it through the normal breeding program.

Inheritance of male sterility (MS_2)

The new source of male sterility (MS_2) identified in the previous seasons was subjected to inheritance tests. The F_2 of Annigeri x MS_2 was raised in the shelters at ICRISAT Center. Out of a total of 236 plants 62 were found to be male steriles whereas 174 were fertiles. It fitted to a 3:1 ratio ($X^2 = 0.2033$) suggesting a monogenic control. The back-cross to the MS_2 was grown in 1985-86 season and out of 27 plants 13 were fertiles and 14 were male-steriles. These clearly fitted into a 1:1 ratio ($X^2 = 0.0372$) thereby confirming the monogenic inheritance. It was further confirmed by raising F_3 progeny rows from

the F_2 fertile plants and counting the number of progenies segregating and non-segregating for male-sterile character. Out of the 174 progenies 118 segregated and 56 non-segregated for male sterility suggesting a 2:1 ratio (X^2 = P 0.1730) further implying a monogenic inheritance. Similarly in the segregating progenies 1260 plants were fertiles whereas 458 male-steriles and these fitted into a 3:1 ratio (X^2 = 2.4320). All these data suggested that the present male sterility is a monogenic recessive character and we ascribe gene symbols on MS_2MS_2 (since MS_1MS_1 has already been reported elsewhere).

Allelism test

To determine whether MS_1 and MS_2 are two different genes or alleles at the same locus, the F_2 of (Annigeri x MS_1) x MS_2 was grown in the offseason under shelters as well as in 1985-86 season. Among these, 264 plants were fertiles and 140 were male steriles fitting into 2:1 ratio (X^2 = 2.7923). In the offseason 1985 we also made the reciprocal cross viz., (Annigeri x MS_2) x MS_1 in order to further check the probable ratio. The F_1 was grown in 1985-86 where no segregation was observed further suggesting that these may be from two different sources. F_2 of (Annigeri x MS_2) x MS_1 will be grown in offseason 1986 when F_3 of (Annigeri x MS_1) x MS_2 will also be raised. For further confirmation we also made F_1[(Annigeri x MS_1) x MS_2] x F_1 [(Annigeri x MS_2) x MS_1] cross. Their F_1 will be grown in summer 1986 and the F_2 in 1986/87.

E. Inheritance of Cylindrical-pods

The cross Annigeri (normal pod) x cylindrical pod was made in 1983-84 to study the inheritance of pod character. The F_2 data suggested a polygenic nature of the character, however, we raised F_3 progenies in 1985-86 to further confirm the mode of gene action. Since we could not record data on F_1 in the earlier years, we planted F_1 generation, the two parents. Annigeri and cylindrical pod, and the F_3 progeny rows. Data on 100 pods from each of the parents and F_1 were collected for its length and breadth whereas in the progenies, pods were taken from each of the plants. We also attempted backcrosses to Annigeri and cylindrical pods to include back-cross generations in determining the inheritance. All the data on 6 generations P_1/P_2, F_1, BC_1, BC_2, F_2 and F_3 will be put together and Generation Mean analysis will be done. We will also plot the data and confirm the inferences drawn on the basis of generation mean analysis.

F. Inheritance of Long and Narrow Leaves (LNL)

The resistant LNL was crossed with normal leaf cultivar, Annigeri and the F_1 was normal. The F_2, however, segregated in a 12:3:1 ratio suggesting that two gene are involved in the inheritance of leaf character. We raised F_3 bulks in the 1985 offseason shelters at ICRISAT Center and counted number of plants with the three leaf shapes viz., normal (N), long and narrow leaves (LNL) and simple leaves (SL). In the F_3 population there were 361 NL, 65 LNL and 37 SL suggesting a

10:2:1 ratio (X^2 = 1.6145). It further supported the two gene theory earlier arrived at on the basis of F_2 data.

G. Open Flower and Protruding Anthers

These two variants are being maintained by sib ting or from some naturally set pods, for a possible use in the future, in conjunction with the male-sterility.