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**THE PEARL MILLET  
UNIFORM PROGENY NURSERY  
(UPN 85), 1985**

**Pearl Millet Improvement Program  
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## REPORT ON THE UNIFORM PROGENY NURSERY (UPN 85), 1985

### OBJECTIVES

The primary objective of the Uniform Progeny Nursery (UPN) is to provide cooperators with an elite and desirable sample of the newly generated  $F_4$  and  $F_5$  progenies in the ICRISAT Pearl Millet Improvement Program coming from different millet breeding projects.

### ENTRIES

Entries were drawn from both Indian x Indian and Indian x African crosses from different breeding projects at ICRISAT (Table 1). These entries were selected visually from the Preliminary Uniform Progeny Nursery (Pre-UPN) at three locations, ICRISAT Center, Bhevanisagar and Hisar in Kharif, 1984. The seed was increased in the summer 1985 downy mildew nursery at ICRISAT Center, Patancheru. A key to abbreviations used in describing the pedigrees of individual entries is given at the beginning of Table 1.

### LOCATIONS

The nursery was available on request to all cooperators. As in previous years, a list of trials and nurseries (ICRISAT, 1985) was made available at the AICMIP Workshop (Rehuru, April 1985) and to visitors to ICRISAT Center, so that cooperators could choose the trials and nurseries they required.

UPN 85 was grown at 28 locations in India, Pakistan, Cameroon, Niger, Sudan, Zambia and Zimbabwe (Table 2).

### DATA

As the main objective of the nursery is to distribute material from the ICRISAT Pearl Millet Improvement Program the collection of data is

regarded as of secondary and minor importance. However, to monitor the usefulness of the material and downy mildew incidence, cooperators were requested to return the following data:

- i) Downy mildew count,
- ii) Agronomic score, and
- iii) Number of plants selected for each entry.

The cooperators, depending on the availability of time and manpower, were also requested additional information, which they may have collected for their own use, on characters such as time to 50% bloom and plant height.

## RESULTS

Data were returned from 15 locations; data are expected from Zambia and Zimbabwe in late June as the crop season is November to April in these countries.

### Downy Mildew

The downy mildew incidence has been reported in percentages for all the locations. The data for downy mildew at ICRISAT Center downy mildew nursery was the only data from a disease nursery - at the remaining nine locations natural incidence was recorded.

Entries 3, 4, 21, 24, 28, 34, 36, 53, 51, and 93 were among those with higher downy mildew incidence over several locations. Entries 28 and 34 had unusually high downy mildew susceptibility at all the locations. At Jaina, entries 3, 4, 22, 36, 85, and 93 were highly susceptible. For all these entries little or no downy mildew incidence, was recorded at other locations.

Twenty one entries 12, 13, 23, 28, 42, 43, 46, 55, 56, 59, 74, 77, 81, 82, 84, 87, 88, 89, 92, 84, and 95 had no downy mildew at all locations. Last year in UPN only 14 entries were in this category.

### **Agronomic Score and Selections**

Agronomic scores and number of selections were reported from 14 locations (Tables 4 & 5). As in previous years, a few of the cooperators were very selective between entries, while others selected a few plants from many entries.

Over the years, there has been an increasing demand for material from the UPN as can be seen from the table below.

Number of entries selected at different locations

Trial	8 or more	10 or more
UPN 83	11	-
UPN 84	26	6
UPN 85	44	8

Entries 6, 15, 18, 25, 29, 33, 73 and 76 were selected at 10 or more locations (Table 5).

### **Time to 50% Bloom and Plant Height**

Some of the cooperators noted observations on these additional characters. Data on time to 50% bloom was noted at seven locations (Table 8) while plant height was noted at six (Table 7).

Entries 15, 35, 54, 55, 83, 81, 84, and 88 had a minimum flowering time of 41 d or less. The earliest flowering entries across locations were 32, 34, 37, 44, 54, 55, and 87. In general, flowering time was 12-15 d later in the northern Indian locations than in the southern locations. However, there were marked differences in photoperiod sensitivities between the entries; entries 13, 21, 28, 32, 33, 38, 44, 47, 52, and 85 had less than 10 d difference in flowering time between locations compared to entries 8, 17, 18, 26, 35, 43, 48,

54, 55, 72, 81, 84, and 88 which had more than 20 d difference in flowering time across locations (Table 8).

Mean plant height was highest for non- $d_2$  entry 2 (203 cm) and was lowest for  $d_2$  entry 95 (113 cm). The entries that changed least for height across locations were 17, 27, 44, 52, 55, 77, 82, 93, 97, and 99, of these two were  $d_2$  dwarfs (97 and 99). Those that changed most for height were entries 14, 24, 37, 39, 41, 46, 51, and 72 and all of these were above average in height.

KEY TO ABBREVIATIONS USED IN TABLE 1

23D28	Dwarf version of 238 ex Tifton Georgia (23D <sub>2</sub> B)
23D28B	Dwarf maintainer (23D <sub>2</sub> B)
23D8E	Early version of 238 ex Tifton Georgia
23D28 trtr	Dwarf maintainer trichome less (23D <sub>2</sub> B trtr)
3/4	Used with IRAT material to signify dwarf material derived from a first backcross to landrace parent.
50548	Maintainer of 5054A (IARI, Delhi)
700...	Breeding lines from IAR Millet Program, Kano, Nigeria
B18	Maintainer of B1A (ICRISAT)
A...	Breeding line, IARI, New Delhi
B 282	A d <sub>2</sub> dwarf restorer
B B18	Genoplasm restorer
BC	Backcross
B Senegal	Breeding line from Senegal
OSC	Dwarf sidecar project (ICRISAT)
E 29B	Early line
EC	Early Composite (ICRISAT)
EB	Ex Bornu - an improved landrace population from north-east Nigeria.
F <sub>4</sub> FC	F <sub>4</sub> FC line selected from ICRISAT material grown in Upper Volta (F <sub>4</sub> FC)
G73-K77	Variety Gem 73 reselected at Kamboise, Upper Volta and further reselected at ICRISAT
Gen-	Group Amelioration du Mil (Millet Breeding Program Bamby Senegal) (all d <sub>2</sub> material)
HK	Haini-Kirei - landrace from Niger
ICI	ICRISAT Inbred
ICMS	ICRISAT millet synthetic
IVC	Inter Varietal Composite (ICRISAT)
IVS	Inter Varietal Synthetic (ICRISAT)
'J' prefix	Breeding lines originating from Jemnager breeding program
K 560	Male parent of BK 560 hybrid (IARI)
LCBN	Selection from ICRISAT Late Composite (LC) made in Upper Volta
(M)Alichipuram	Collection from Tamil Nadu
MC	Medium Composite (ICRISAT)
NEC	New Early Composite (ICRISAT)
NELC	New Elite Composite (ICRISAT)
NNK	Late Landrace variety from Mali
'P'	IRAT prefix for Pennisetum landrace collection or selection
S10B	Maintainer of S10A (ICRISAT ex Serere)
SC	Serere Composite (Uganda)
SD2	Dwarf Soule line (SD <sub>2</sub> ) (IRAT)
Serere	Material from Serere breeding program, Uganda
Soune	Early-maturing line from Senegal
SRC	Saut Resistant Composite (ICRISAT)
SS	Serie (Upper Volta) Synthetic (very late dwarf population)
WC	World Composite (ICRISAT ex Nigeria)
WC-BC3	World Composite Dwarf version, line from backcross 3 (WC-BC <sub>3</sub> )
WC-C75	ICRISAT released variety

Table 1. List of entries and their pedigrees in UPN 85.

Entry no	Entry	Pedigree
1	UPN 85-1	[[IVS S2-250 x (J 1623 x 700544-13-4-2)]]-1-1-1
2	UPN 85-2	[[700250 x EB-6-2] x No.1]-1
3	UPN 85-3	ICMS 8034-18-2-3
4	UPN 85-4	[[J 25-1 x 700797+] x EB-67+] x [675 FS-171 x (J 1623 x 700544+)]]-2-1-5-1
5	UPN 85-5	[[J 25-1 x 700797+] x EB-67+] x [675 FS-171 x (J 1623 x 700544+)]]-4-1-3-1
6	UPN 85-6	SRC 56
7	UPN 85-7	[SD2 x EB-2(SD-914-3-2-3 x D 178C)]-1
8	UPN 85-8	[SC 14(M)-3 x D 151-2]-1
9	UPN 85-9	[[A 836 x Serere 31] x Souana Sel]-2-3-1-1
10	Check	673-K77
11	UPN 85-11	[[A 836 x Serere 31] x Souana Sel]-2-2-1-1
12	UPN 85-12	23DBE 20-2 x Plot-5
13	UPN 85-13	NELC 183
14	UPN 85-14	NELC 119
15	UPN 85-15	NELC 131
16	UPN 85-16	SRC 160
17	UPN 85-17	SRC 175
18	UPN 85-18	[SD2 x EB-2(SD-914-2-1) x (J 260-1 x 700557-1-4-10-2)]]-1
19	UPN 85-19	[Serere 4A x B Senega]-2-5)-1
20	Check	673-K77
21	UPN 85-21	[[J 25-1 x 700797+] x EB-67+] x [675 FS-171 x (J 1623 x 700544+)]]-4-3-1-1
22	UPN 85-22	WC-C75-15
23	UPN 85-23	[B Senega]-3-3 x (J 934-7 x 700544-7-2-1)]]-1
24	UPN 85-24	NELC 77
25	UPN 85-25	NELC 154

Table 1. List of entries (continued).

Entry no	Entry	Pedigree
26	UPN 85-26	[B Senegal x 7216]-1
27	UPN 85-27	[P 26 x [B 282 x J 804-1-3-11]]-2
28	UPN 85-28	[[[J 934-7x700544+] x J 1644x700480+] x [675 FS-171 x [J 1623 x 700544+]]]-4-3-31
29	UPN 85-29	[[[J 25-1 x 700797+] x BB-87+] x [675 FS-171 x [J 1623 x 700544+]]]-4-3-31
30	Check	673-K77
31	UPN 85-31	ICMB 8008-15-3-2
32	UPN 85-32	WC-C75-54
33	UPN 85-33	WC-C75-57
34	UPN 85-34	NEC 86
35	UPN 85-35	[J 471-7 x [B 282 x J 804-1-3-11]]-2
36	UPN 85-36	[LCSM 282-4-1-1 x S108-38]-25-1-1
37	UPN 85-37	[23DBE 19-2 x S108-106]-2-1-2-4
38	UPN 85-38	[J 1389-1 x 23DBE]-2-2-2-1
39	UPN 85-39	WC-C75-61
40	Check	673-K77
41	UPN 85-41	WC-C75-85
42	UPN 85-42	WC-C75-189
43	UPN 85-43	NEC 87
44	UPN 85-44	NEC 139
45	UPN 85-45	SFC 93
46	UPN 85-46	[B 282 x J 804-1-3-11] x B. Senegal[-1]-3
47	UPN 85-47	[[[J 1623x700544+] x 700651+] x [J 934-7x700544+] x [J 1644x700480+]]]+
48	UPN 85-48	[[[J 25-1x700797+] x BB-87+] x [J 934-7x700544+] x [J 1644x700480+]]]+
49	UPN 85-49	ICMB 8034-22-1-2
50	Check	673-K77



Table 1. List of entries (continued).

Entry no	Entry	Pedigree
51	UPN 85-51	(F4FC 1498-1-1-1 x S108-108)-15-1-1 (LCSN 282-4-1-1 x S108-38)-25-2-1 WC-C75-131 MEC 48 ICMS 8151-10-1-1
52	UPN 85-52	(LCSN 282-4-1-1 x S108-38)-25-2-1 WC-C75-131 MEC 48 ICMS 8151-10-1-1
53	UPN 85-53	WC-C75-131 MEC 48 ICMS 8151-10-1-1
54	UPN 85-54	MEC 48 ICMS 8151-10-1-1
55	UPN 85-55	ICMS 8151-10-1-1
56	UPN 85-56	(LCSN 72-1-2-2 x S108-37)-2-2-4-2 (LCSN 1498-4-3-3 x E 298)-8-1-1-1-1 MELC 65 MELC 169 673-K77
60	Check	673-K77
61	UPN 85-61	WC-C75-45 WC-C75-78 MEC 68 MEC 112 (J 1294 x J 1171)-3-2-8-1
62	UPN 85-62	WC-C75-78 MEC 68 MEC 112 (J 1294 x J 1171)-3-2-8-1
63	UPN 85-63	MEC 68 MEC 112 (J 1294 x J 1171)-3-2-8-1
64	UPN 85-64	MEC 112 (J 1294 x J 1171)-3-2-8-1
65	UPN 85-65	(J 1294 x J 1171)-3-2-8-1
66	UPN 85-66	B 282 x Togo 8-12 E 298 x Togo 2-2
67	UPN 85-67	E 298 x Togo 2-2
68	UPN 85-68	B 282 x Togo 2-2 E 298 x Togo 2-2 ICMS 8151-10-3-1
69	UPN 85-69	ICMS 8151-10-3-1
70	Check	673-K77
71	UPN 85-71	E 298 x Togo 2-2
72	UPN 85-72	S108 x Togo 2-2
73	UPN 85-73	(MC 125 x S 33-4-1) x D 28-P2-10 (LCSN 282-4-1-2 x S108-38)-1-2-2-1
74	UPN 85-74	(LCSN 282-4-1-2 x S108-38)-1-2-2-1
75	UPN 85-75	(23028 tfr x J 104 ST)-4-2-1-2-2 (23028 tfr x J 104 ST)-4-2-1-2-2

Table 1. List of entries (continued).

no	Entry	Padigree
76	UPN 85-76	[LCSN 1438-4-3 x E 298]-6-1-1-1
77	UPN 85-77	[[J 1823 x 700544+] x 700651+] x ([J 834+ x 700544+] x [J 1844 x 700480+]]]-5-3-1-1
78	UPN 85-78	[IVS 52-250 x ([J 1823 x 700544-13-4-2]]]-3-2-2-1
80	Check	873-K77
81	UPN 85-81	Sarefe 10LB-30 x A1/3-1
82	UPN 85-82	[J 1389-1 x 23089]-2-2-1-1
83	UPN 85-83	[LCSN 1438-4-3 x E 298]-6-1-1-1-2
84	UPN 85-84	ICMS 8135-15-2-1
85	UPN 85-85	S108 x Togo 2-1
86	UPN 85-86	[B Sangeel 2-5 x 700651]-1
87	UPN 85-87	[B 282 x S108-38]-37-2-1-1
88	UPN 85-88	SRC 7
89	UPN 85-89	[LCSN 1173-1-9-2 x E 298]-4-2-2
90	Check	873-K77
91	UPN 85-91	[EC 298-2-6- x J 2002-1-2]-1
92	UPN 85-92	[MOB 72-60-63 x EC 298-2-6]-2
93	UPN 85-93	[M] Allichipurem x J 1292]-6-2-3-1
94	UPN 85-94	ICMS 8034-37-3-1
95	UPN 85-95	[[[J 934+x700544+] x [J 1644x700480+]] x [675 FS-171 x [J 1823x700544+]]]]+
96	UPN 85-96	B 282 x Togo 2-3
97	UPN 85-97	B 282 x Togo 15-7
98	UPN 85-98	[J 1398 x B 282]-6-1-2-1-2
99	UPN 85-99	B 282 x Togo 2-6
100	Check	873-K77

**Table 2. Locations and cooperators for UPN 85.**

Location <sup>1</sup>	Cooperator
Ludhiana, Punjab	Dr. D.S. Virk
Hisar, Haryana	ICRISAT/HAU
New Delhi, Union Territory	Dr. O.P. Govila
Kanpur, Uttar Pradesh	Drs. H.N. Singh & U.S. Santosh
Pentnagar, Uttar Pradesh	Dr. D.V.S. Tyagi
Durgapure, Rajasthan	Dr. K.L. Vyas
Jobner, Rajasthan	Drs. J.R. Mathur & B.D. Jotwal
Gwalior, Madhya Pradesh	Dr. G.S. Chauhan
Jamnagar, Gujarat	Dr. H.R. Deva
Amaravati, Maharashtra	Dr. P.R. Bewankar
Aurangabad, Maharashtra	Dr. M.A. Quader
Aurangabad (Nath Seeds), Maharashtra	Mr. Shakir
Jalna, Maharashtra	Dr. R.R. Vohra
Puna, Maharashtra	Dr. G. Harinarayana
Rahuri, Maharashtra	Dr. S.D. Ugale
Gulbarga, Karnataka	Drs. T. Madhava Rao & M.S. Patil
Palam, Andhra Pradesh	Dr. D. Narayana
Patancheru (PHF), Andhra Pradesh	ICRISAT
Patancheru Downy Mildew Nursery (PMDMN)	ICRISAT
Bhavansagar (BSR), Tamil Nadu	ICRISAT/TNAU
Coimbatore, Tamil Nadu	Dr. S. Palanisamy
Kovilpatti, Tamil Nadu	Dr. N. Sunderasan
Pakistan	Dr. Qasim Chatha
Niamey ICRISAT Sahelian Center (Niger)	Dr. K. Anand Kumar
Khartoum (Sudan)	Dr. R.P. Jain
Maroua (Cameroun)	Dr. O.P. Dangi
Zambia	Dr. Bholu Nath
Zimbabwe	Dr. S.C. Gupta

1. In India states are listed from North to South.

Table 2. Downy mildew incidence (%) at 10 locations in India and Africa.

Entry no	Ludhiana	Kanpur	Durgapura	Anaravati	Aurangabad	Jalna	PHF	PMOHN	Kovilpatti	Mtasey
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.4	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	33.3	1.7	2.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	25.0	1.5	5.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
9	2.4	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0**
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
14	0.0	0.0	0.0	0.0	0.0	0.0	1.5	4.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
20	0.0	0.0	0.0	1.0	0.0	0.0	0.0	4.0	0.0	0.0
21	0.0	1.0	0.0	0.0	0.0	0.0	1.7	19.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	20.0	0.0	2.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0'
24	17.1	1.0	0.0	0.0	2.4	33.3	3.6	7.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

\* Downy mildew free

\*\*Check

Table 3. Downy mildew incidence (continued).

Entry no	Ludhiana	Kanpur	Durgapure	Ansarvati	Aurangabad	Jalna	PhF	PHDMN	Kovfipetti	Misney
26	0.0	0.0	0.0	0.0	0.0	0.0	7.4	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
28	0.0	0.0	16.0	1.0	0.0	28.5	3.2	30.0	16.7	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0**
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	0.0
34	0.0	0.0	37.5	0.0	0.0	26.7	0.0	10.0	8.8	0.0
35	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	2.0	0.0	50.0	0.0	7.0	12.9	0.0
37	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0	0.0	3.2	1.0	0.0	0.0**
41	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.0	0.0	0.0
42	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0
46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
47	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
48	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
49	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	2.0	0.0
50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0**

\* Downy mildew free

\*\*Check

Table 3. Downy mildew incidence (continued).

Entry no	Ludhiana	Kanpur	Durgapura	Amaravati	Aurangabad	Jalna	PHF	PHDMN	Kovilpatti	Misney
51	0.0	0.0	0.0	0.0	21.8	0.0	0.0	2.0	0.0	0.0
52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
53	4.4	0.0	13.8	0.0	0.0	0.0	0.0	4.0	5.4	0.0
54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
57	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
58	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0**
61	5.3	0.0	0.0	0.0	3.5	0.0	1.4	9.0	34.3	0.0
62	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.0	9.4	0.0
63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0
64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
65	0.0	1.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0
67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
68	0.0	0.0	30.0	0.0	0.0	0.0	0.0	3.0	0.0	1.0
69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
70	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0*
71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
72	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
73	0.0	0.0	0.0	0.0	0.0	0.0	4.5	3.0	0.0	0.0
74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
75	0.0	0.0	0.0	0.0	0.0	0.0	3.5	4.0	0.0	1.0

\* Downy mildew free

\*\* Check

Table 3. Doney mildew incidence (continued).

Entry no	Ludhiana	Kanpur	Durgapure	Aasravati	Aurangabad	Jaina	PHF	PHDM	Kovilpatti	Nisamoy
76	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0
77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
78	0.0	0.0	0.0	0.0	0.0	0.0	1.9	8.0	12.9	0.0
79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0
80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0**
81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
84	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
85	0.0	0.0	0.0	0.0	0.0	20.0	0.0	1.0	0.0	0.0
86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
87	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0**
91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
93	0.0	0.0	0.0	0.0	0.0	82.5	0.0	2.0	0.0	0.0
94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0*
96	4.8	0.0	0.0	0.0	0.0	0.0	1.4	7.0	2.8	0.0
97	0.0	0.0	0.0	0.0	0.0	12.5	0.0	1.0	0.0	0.0
98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0
100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0**

\* Doney mildew free

\*\* Check

Table 4. Agronomic Score at 13 Locations in India.

Entry no	Hisar	New Delhi	Kanpur	Durgapura	Amarvati	Aurangabad	Nath	Jalna	PHF	PHDMN	Bhavani-sagar	Coimbatore	Kovil-patti	Mean	Min	Max
1	8	9	6	8	4	7	0	3	6	5	7	5	5	5.8	3	9
2	6	7	4	6	4	7	1	3	4	6	5	7	4	4.9	1	7
3	7	7	7	7	5	9	0	3	4	5	4	5	5	5.7	3	9
4	5	9	7	8	5	7	1	3	6	5	4	5	4	5.3	1	9
5	5	7	8	7	4	8	1	3	5	5	4	3	3	4.8	1	8
6	5	7	9	8	4	8	1	2	4	4	5	5	5	5.2	1	9
7	4	7	5	8	4	8	5	0	7	5	6	7	4	5.8	4	9
8	7	9	7	9	4	10	3	0	7	7	6	7	4	6.7	3	10
9	5	7	7	8	4	8	5	0	6	6	5	5	5	5.9	4	8
10	6	7	7	5	3	8	5	2	6	6	5	7	4	5.5	2	8
11	6	9	8	8	3	8	1	0	4	4	4	3	5	5.3	1	9
12	6	5	8	8	3	10	1	0	5	5	6	5	5	5.6	1	10
13	4	3	7	9	4	10	1	0	6	6	3	3	5	5.1	1	10
14	5	7	9	9	4	8	3	0	7	5	6	7	6	6.3	3	9
15	5	7	9	9	5	6	2	0	4	5	5	5	6	5.7	2	9
16	7	5	8	9	4	8	1	0	4	5	5	5	6	5.6	1	9
17	6	7	7	7	4	7	2	0	5	4	5	7	5	5.5	2	7
18	8	3	7	3	4	8	1	3	5	3	3	5	4	4.8	1	9
19	8	5	9	4	3	8	2	3	5	5	5	7	5	5.2	2	8
20	5	7	8	5	3	8	2	3	6	6	6	5	4	5.3	2	8
21	4	5	7	6	3	8	2	0	5	5	3	5	4	4.8	2	8
22	4	5	9	9	4	8	2	3	6	6	4	3	5	5.2	2	8
23	8	5	9	8	4	7	2	3	6	6	6	7	5	5.7	2	9
24	7	7	7	9	3	8	2	3	5	5	6	5	5	5.5	2	9
25	6	7	8	5	4	8	2	3	5	5	6	7	5	5.5	2	8



Table 4. Agronomic score (continued).

Entry no	Hisar	New Delhi	Kanpur	Durgapura	Amerpeti	Aurangabad	Nath	Jalna	PHF	PHDM	Bhevanti-sagar	Colaba-tore	Kovil-patti	Meen	Min	Max
26	6	3	7	6	4	10	3	3	5	5	5	5	5	5.2	3	10
27	5	3	9	8	4	8	1	4	5	5	4	5	4	5.0	1	9
28	5	5	9	8	4	10	1	2	7	7	4	3	7	5.5	1	10
29	3	5	9	9	4	8	3	4	4	4	6	5	4	5.2	3	9
30	6	7	7	5	4	7	5	3	5	5	4	7	4	5.3	3	7
31	5	3	9	8	4	9	1	4	5	5	4	5	5	5.1	1	9
32	4	7	9	5	5	8	1	3	4	4	8	5	5	5.1	1	9
33	5	3	7	8	5	8	3	2	5	5	3	5	5	4.9	2	8
34	5	5	8	8	5	8	1	3	6	6	4	7	7	5.6	1	8
35	4	7	9	7	6	8	1	3	4	4	5	7	5	5.4	1	9
36	4	7	8	7	5	10	1	0	4	4	6	5	6	5.8	1	10
37	5	9	8	6	5	7	5	2	3	3	3	7	6	5.3	2	9
38	5	7	8	8	5	8	5	3	6	6	5	5	6	5.9	3	8
39	6	7	8	9	5	10	3	3	5	5	4	5	5	5.8	3	10
40	5	7	7	7	4	8	5	2	5	5	5	5	4	5.3	2	8
41	5	5	9	7	4	8	1	3	6	6	4	7	5	5.3	1	9
42	5	7	3	8	5	8	1	0	6	4	6	5	5	5.3	1	8
43	3	7	6	6	5	10	1	0	6	4	3	5	5	5.1	1	10
44	3	7	9	6	5	8	3	2	4	4	5	7	5	5.2	2	8
45	4	7	9	6	4	6	1	3	6	4	5	5	5	5.0	1	9
46	6	7	7	9	4	8	1	3	6	6	5	7	6	5.8	1	9
47	6	7	7	7	6	8	1	3	6	5	8	7	5	5.7	1	8
48	6	5	7	7	4	8	1	0	4	5	4	7	6	5.3	1	8
49	6	5	8	8	5	8	1	0	3	6	6	5	5	5.5	1	8
50	6	7	6	6	3	8	5	2	6	6	5	5	4	5.3	2	8

Table 4. Agronomic score (continued).

Entry no	New		Durga-		Auran-		Nath	Jalna	PHF	PHDM	Bhavani- sagar	Colaba- core	Kovli- patti	Mean	Min	Max
	Hisar	Dehri	Kanpur	pura	Amavati	gabad										
51	5	7	8	7	4	7	5	0	5	4	3	5	4	5.3	3	8
52	5	7	9	9	5	10	3	0	3	4	6	5	5	5.8	3	10
53	6	7	9	7	5	8	5	3	4	5	6	7	5	5.9	3	9
54	6	7	7	8	6	8	1	0	5	5	6	5	6	5.8	1	8
55	5	5	9	8	6	9	1	0	5	5	5	3	5	5.3	1	8
56	4	7	8	7	4	10	3	0	5	6	4	5	5	5.7	3	10
57	4	7	8	8	5	9	3	0	6	6	4	5	6	5.9	3	9
58	8	3	9	7	6	8	5	2	5	6	6	7	6	5.8	2	9
59	5	7	9	8	5	8	5	2	5	6	6	5	6	5.9	2	9
60	6	7	8	6	4	8	5	0	7	6	6	5	4	6.0	4	8
61	6	3	8	8	4	7	5	3	6	6	4	5	6	5.5	3	8
62	6	5	8	7	4	6	3	3	6	3	5	5	6	5.1	3	8
63	4	3	8	8	5	7	1	0	4	4	5	7	6	5.2	1	8
64	5	1	8	9	5	8	1	0	5	5	4	9	5	5.4	1	8
65	6	3	8	8	5	7	1	3	4	4	5	5	4	4.8	1	8
66	5	5	8	9	4	7	5	0	5	4	6	7	6	5.8	4	9
67	5	7	9	7	5	7	1	0	5	5	6	3	5	5.4	1	9
68	6	5	8	9	4	8	1	3	6	6	6	5	5	5.5	1	9
69	3	7	8	9	5	10	5	0	3	3	6	5	5	5.8	3	10
70	6	7	8	7	4	7	5	2	5	6	6	7	4	5.7	2	8
71	7	7	7	9	4	7	3	0	6	5	5	3	5	5.6	3	9
72	6	5	8	9	5	6	3	0	6	5	5	3	5	5.5	3	9
73	5	3	8	7	3	7	3	0	5	4	5	8	4	5.3	3	9
74	4	5	8	7	4	6	5	0	6	4	6	5	4	5.3	4	8
75	5	3	8	7	4	9	3	0	6	6	5	7	5	5.7	3	9

Table 4. Agronomic score (continued).

Entry no	Hisar	New Delhi	Kanpur	Durgapura	Amravati	Aurangabad	Nashik	Jalna	PHF	PMOHM	Bhavani-sagar	Colaba-tora	Kovil-patti	Mean	Min	Max
76	3	7	7	9	5	9	5	2	4	5	5	3	5	5.3	2	9
77	4	7	8	9	3	9	5	0	5	5	5	5	5	5.8	3	9
78	6	7	8	8	4	7	5	2	6	6	6	5	5	5.8	2	8
79	5	5	8	8	5	7	3	0	4	4	4	7	5	5.4	3	8
80	6	7	8	6	4	5	5	2	6	6	6	5	4	5.4	2	8
81	5	7	7	9	4	9	3	0	5	5	6	3	5	5.7	3	9
82	0	9	9	9	6	7	5	0	3	5	6	5	5	6.3	3	9
83	4	7	9	8	4	7	5	2	5	6	5	5	5	5.5	2	9
84	6	5	9	8	4	8	5	0	7	6	6	3	5	6.0	3	9
85	6	5	9	4	5	4	3	2	6	4	4	7	5	5.2	2	9
86	7	7	7	4	3	7	5	0	7	6	6	5	5	6.1	3	8
87	7	3	9	9	5	10	3	0	7	6	6	5	5	6.3	3	10
88	7	7	9	9	4	8	5	0	6	5	6	3	5	6.2	3	9
89	5	5	8	8	4	7	5	3	6	6	6	3	5	5.4	3	8
90	6	7	8	7	3	3	5	0	6	6	5	5	4	5.4	3	8
91	4	3	8	9	5	5	5	3	3	2	4	5	6	4.7	2	9
92	5	1	8	8	5	8	1	2	5	5	5	7	6	5.1	1	8
93	5	5	0	6	5	5	1	3	5	5	5	5	6	4.8	1	8
94	5	3	8	9	4	10	1	0	6	6	6	3	6	5.6	1	10
95	6	7	8	9	5	8	1	2	5	6	4	5	5	5.5	1	9
96	5	1	5	6	6	7	1	3	5	6	4	3	5	4.8	1	9
97	6	3	8	8	4	8	0	3	6	5	5	3	5	5.3	3	8
98	6	3	8	8	4	6	0	3	6	5	4	5	5	5.2	3	8
99	7	3	8	9	5	8	1	0	7	6	6	5	5	5.8	1	9
100	0	7	8	6	4	5	0	2	6	6	6	5	4	5.4	2	8

Table 5. Number of plants selected in the entries at 14 locations in India and Africa.

Entry no	New Delhi		Aare-Kanpur		Aare-Gabad		Nash	Jaina	PHF	Phuket	Bhavani-sagar	Coimbatore	Kovil-patti	Maisy	No. of loc. selected at
	Hisar	Delhi	Kanpur	velli	Aare-	Gabad-									
1	1	0	1	0	2	0	0	1	1	2	0	1	0	2	8
2	1	1	2	0	2	0	1	2	2	1	3	0	0	0	9
3	1	0	2	0	2	0	0	1	1	2	5	0	0	4	8
4	1	0	2	0	2	0	1	0	0	0	1	0	0	2	6
5	0	1	2	0	2	0	1	2	2	1	1	2	0	0	9
6	1	2	1	0	2	0	1	1	1	2	1	0	0	1	10
7	1	2	1	3	0	0	1	1	0	1	1	0	0	1	9
8	1	1	1	0	2	0	1	0	0	0	2	0	2	4	8
9	0	1	1	0	2	2	1	1	0	1	2	1	0	0	9
10	1	0	0	0	2	0	1	0	0	0	0	0	0	0	3
11	1	2	0	0	2	0	1	0	1	2	3	2	0	0	8
12	1	0	2	0	2	3	1	0	0	0	1	0	0	0	6
13	0	0	2	0	2	2	1	1	0	0	4	0	0	0	7
14	2	0	2	0	2	0	3	1	0	0	1	0	0	0	6
15	1	1	2	0	2	3	2	3	2	1	2	1	0	0	10
16	0	1	2	0	2	0	1	2	2	1	2	0	0	0	9
17	0	2	1	0	2	0	2	0	1	2	2	0	0	1	8
18	1	3	3	2	2	2	1	2	1	3	4	0	2	2	13
19	1	0	2	0	2	0	2	1	2	0	2	0	0	0	7
20	1	1	1	6	2	0	2	0	0	0	0	0	0	0	6
21	1	1	2	0	0	0	3	2	0	1	3	0	0	0	8
22	1	0	2	0	2	0	2	0	0	0	2	1	0	0	6
23	2	0	2	0	2	0	2	2	0	0	2	0	0	0	6
24	2	1	1	0	2	0	2	0	1	1	1	0	0	0	8
25	1	1	1	0	1	0	2	2	1	1	2	0	1	0	10

Table 5. Number of plants selected in the entries at 14 locations.

Entry no	New		Aara-		Nach	Jaina	PhJ	PQMN	Bhavani- sagar	Coimbe tors	Kovil- patti	No. of Loc.	
	Dalhi	Kanpur	veti	gabad								Missey	selected at
26	1	0	2	0	2	2	0	0	2	0	0	0	6
27	1	0	2	0	2	2	1	1	3	0	0	0	8
28	2	1	2	0	1	0	0	0	2	2	0	0	7
29	2	3	2	0	1	2	2	2	4	1	0	0	10
30	0	0	0	0	2	0	0	0	0	0	0	0	2
31	1	3	2	0	2	2	0	0	3	0	0	0	7
32	1	2	1	0	2	2	0	0	4	0	0	0	7
33	2	2	2	4	2	1	2	2	4	0	0	0	11
34	1	1	1	0	2	0	0	0	2	0	0	0	6
35	1	3	2	0	2	0	2	2	2	0	0	0	8
36	2	2	2	0	1	0	1	1	2	1	0	0	9
37	0	1	1	0	2	1	2	2	2	0	0	0	9
38	1	1	2	0	1	0	1	0	2	0	0	0	8
39	1	0	1	0	2	2	1	1	1	0	0	0	8
40	2	0	0	0	1	0	0	0	0	0	0	0	3
41	1	1	2	0	1	2	0	0	2	0	0	0	7
42	1	2	2	2	1	0	0	2	1	1	0	0	9
43	2	3	2	0	2	1	0	0	0	1	0	0	8
44	1	3	2	0	2	2	1	2	0	0	0	0	7
45	1	1	2	0	1	2	0	2	2	0	0	0	8
46	2	0	2	0	1	2	0	0	2	0	0	0	6
47	2	0	2	0	1	1	0	0	0	1	0	0	7
48	2	0	2	0	1	1	2	0	3	0	0	0	7
49	2	0	2	0	2	0	3	0	2	0	0	0	6
50	0	0	0	0	1	0	0	0	0	0	0	0	2

Table 5. Number of plants selected in the entries at 14 locations.

Entry no	New		Amara-		Nath		Jalna		PHF		PMDM		Bhavn-		Coimbe		Kovil-		No. of loc. selected at
	Ludhiana	Hisar	Delhi	Kanpur	Amara- vati	Auran- gabad	Nath	Jalna	PHF	PMDM	Bhavn- sagar	Coimbe tora	Kovil- patti	Niamey					
51	1	0	2	0	2	4	2	0	0	0	2	2	0	2	0	0	0	0	8
52	1	2	0	0	2	0	2	1	1	1	2	3	0	0	0	0	0	0	8
53	0	0	0	0	2	0	3	1	0	0	0	1	0	0	0	0	0	0	4
54	1	0	2	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	5
55	2	1	2	0	2	0	1	0	0	0	0	1	2	0	0	0	0	0	7
56	2	2	2	0	2	0	2	1	1	1	0	2	0	0	0	0	0	0	8
57	1	3	2	0	2	0	2	1	0	0	0	4	0	0	0	0	0	0	7
58	1	0	2	0	2	0	2	1	0	0	0	1	0	0	0	0	0	0	6
59	1	2	2	0	2	0	2	2	0	0	0	2	1	0	0	0	0	0	6
60	1	1	2	0	2	0	2	0	0	0	0	1	0	0	0	0	0	0	3
61	0	0	2	0	2	0	2	1	0	0	0	2	0	0	0	0	0	0	5
62	1	0	2	0	2	0	2	1	0	0	3	0	0	0	0	0	0	1	7
63	1	2	2	0	2	0	1	0	2	1	0	0	0	0	0	0	0	0	7
64	1	0	0	0	2	0	1	1	0	1	4	0	0	0	0	0	0	0	6
65	1	0	2	0	2	0	2	1	1	1	1	2	0	0	0	0	0	2	9
66	1	0	2	0	2	0	2	1	0	0	2	0	0	0	0	0	0	1	7
67	1	0	2	0	2	0	1	1	0	1	0	0	0	0	0	0	3	7	
68	1	0	2	0	1	0	1	1	0	0	0	2	0	0	0	0	0	0	6
69	2	4	2	0	2	0	2	0	3	3	3	3	0	2	0	0	0	0	9
70	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	3
71	1	0	2	1	1	0	1	0	1	2	3	1	0	0	0	0	0	0	9
72	1	0	3	0	2	0	1	0	0	0	2	0	0	0	0	0	0	0	5
73	1	1	2	0	2	4	2	1	1	1	2	0	1	1	1	0	1	1	12
74	1	3	2	0	2	0	2	0	0	1	1	0	0	0	0	0	0	0	7
75	1	1	2	0	2	0	2	1	0	0	2	0	0	0	0	0	0	0	7

Table 5. Number of plants selected in the entries at 14 locations.

Entry no	New Ludhiana		Anand		Aurangabad		Nath	Jaina	PHF	PQMN	Bhavani-sagar	Colaba-tore	Kovil-patti	No. of loc. selected at	
	Hisar	Dathi	Kanpur	vati	Gabed	Bhavan-								Niamy	
76	1	3	2	2	0	1	1	1	1	1	3	0	0	0	10
77	2	2	0	2	0	1	1	1	1	1	2	0	0	0	8
78	1	0	2	0	2	1	1	0	0	1	1	1	1	0	8
79	1	0	2	0	2	2	1	2	2	4	0	0	1	0	9
80	1	0	0	2	0	1	0	0	0	0	0	0	0	0	3
81	1	0	2	10	1	0	2	1	0	0	1	0	0	0	7
82	1	0	2	0	2	0	1	1	0	0	2	0	2	0	8
83	1	0	2	0	2	0	2	1	0	0	2	0	0	0	6
84	0	0	2	0	2	0	1	1	0	0	2	0	0	0	5
85	1	2	2	0	2	5	1	0	0	2	2	0	0	0	8
86	0	0	2	6	2	0	1	1	0	0	2	0	0	0	6
87	1	0	2	0	2	0	1	0	0	0	0	0	0	0	4
88	0	0	2	0	2	0	2	1	0	1	2	1	0	1	8
89	1	1	2	0	2	0	1	2	0	0	2	2	1	0	9
90	0	0	0	0	2	0	1	0	0	0	0	0	0	0	2
91	1	4	0	0	2	0	2	2	3	3	5	0	0	0	9
92	1	2	2	0	2	0	1	0	0	0	0	0	0	0	5
93	1	2	0	2	0	1	0	1	0	0	2	0	0	0	7
94	0	0	2	0	2	0	1	1	0	0	3	1	0	0	6
95	0	0	2	0	2	0	1	1	2	0	4	0	0	0	6
96	0	1	2	0	2	0	1	2	2	0	1	0	0	0	7
97	1	0	2	0	2	0	0	0	0	0	2	0	1	0	5
98	1	0	2	0	2	4	0	2	0	0	4	0	0	0	6
99	1	0	2	0	2	0	1	2	0	0	2	0	0	0	5
100	0	1	0	0	2	0	0	0	0	0	0	0	0	0	2

**Table 6. Time to 50% bloom (d) at seven locations in India and Africa.**

Entry no	Hisar	Nath	PHF	PMDMN	Bhavani-sager	Kovil-patti	Niamey	Mean	Min	Max	Range
1	62	-	53	49	51	46	58	53.2	46	62	16
2	63	56	60	57	54	47	61	56.9	47	63	16
3	64	-	54	50	50	46	52	52.7	46	64	18
4	51	51	51	47	42	43	54	48.4	42	54	12
5	49	49	49	45	45	46	57	48.6	45	57	12
6	57	50	52	49	47	45	60	51.4	45	60	15
7	60	51	56	52	50	50	51	52.9	50	60	10
8	70	47	65	57	57	51	61	58.3	47	70	23
9	62	48	55	49	51	50	61	53.7	48	62	14
10	50	51	49	47	43	44	48	47.4	43	51	8
11	49	52	51	45	42	44	57	48.6	42	57	15
12	64	54	56	52	54	51	56	55.3	51	64	13
13	53	53	52	47	48	50	56	51.3	47	56	9
14	53	55	50	45	42	45	56	49.4	42	56	14
15	52	56	46	45	41	43	51	47.7	41	56	15
16	57	57	48	47	42	44	61	50.9	42	61	19
17	64	58	51	47	42	45	51	51.1	42	64	22
18	70	48	52	47	47	50	51	52.1	47	70	23
19	64	49	59	53	51	48	64	55.4	48	64	16
20	49	55	50	47	45	44	53	49.0	44	55	11
21	49	56	49	47	47	50	51	49.9	47	56	9
22	45	57	53	49	43	46	-	48.8	43	57	14
23	54	49	52	47	50	47	62	51.6	47	62	15
24	64	51	63	52	55	48	-	55.5	48	64	16
25	65	49	62	55	60	50	-	56.8	49	65	16



**Table 6. Time to 50% bloom (continued).**

Entry no	Hisar	Nath	PHF	PMDMN	Bhavani-sagar	Kovil-patti	Niamey	Mean	Min	Max	Range
26	70	58	58	47	57	51	76	59.3	47	78	29
27	65	57	50	47	47	50	-	52.7	47	65	18
28	57	54	49	47	45	44	54	50.0	44	57	13
29	49	49	50	49	50	52	-	49.8	49	52	3
30	53	51	49	47	47	44	-	48.5	44	53	9
31	64	50	54	56	52	51	-	54.5	50	64	14
32	49	48	49	47	46	45	-	47.3	45	49	4
33	52	49	49	45	48	45	-	48.0	45	52	7
34	46	50	46	42	38	43	56	45.9	38	56	18
35	47	55	47	46	41	45	77	51.1	41	77	36
36	47	56	54	48	55	47	-	51.2	47	56	9
37	49	57	48	42	41	42	-	46.5	41	57	16
38	54	54	50	45	46	44	-	48.8	44	54	10
39	60	52	52	52	51	50	-	52.8	50	60	10
40	54	53	49	47	41	44	-	48.0	41	54	13
41	49	49	49	42	46	45	55	47.9	42	55	13
42	63	51	52	49	50	47	63	53.6	47	63	16
43	53	57	48	47	42	43	68	51.1	42	68	26
44	48	46	49	47	45	44	-	46.5	44	49	5
45	49	45	49	45	47	44	57	48.0	44	57	13
46	64	46	58	49	53	46	69	55.0	46	69	23
47	48	47	51	47	47	50	51	48.7	47	51	4
48	48	55	49	45	50	45	61	50.4	45	61	16
49	44	54	48	45	46	50	48	47.9	44	54	10
50	52	52	50	47	46	45	47	48.4	45	52	7

**Table 8. Time to 50% bloom (continued).**

Entry no	Hisar	Nath	PHF	PMDMN	Bhavani-sagar	Kovil-patti	Nisamey	Mean	Min	Max	Range
51	51	53	50	47	45	50	57	50.4	45	57	12
52	57	54	58	55	52	51	-	54.5	51	58	7
58	57	56	51	49	47	44	-	50.7	44	57	13
54	49	57	48	43	35	43	-	45.8	35	57	22
55	51	58	46	40	36	42	-	45.5	36	58	22
56	52	57	48	44	41	44	56	48.9	41	57	16
57	52	54	52	49	49	50	65	53.0	49	65	16
58	45	55	47	44	44	48	56	48.4	44	56	12
59	47	56	50	46	50	51	61	51.6	46	61	15
60	48	57	52	47	46	50	57	51.0	46	57	11
61	51	53	53	49	49	51	61	52.4	49	61	12
62	51	52	49	45	42	44	61	49.1	42	61	19
63	52	53	44	41	41	42	61	47.7	41	61	20
64	51	54	52	48	49	44	45	49.0	44	4	10
65	53	50	53	49	50	44	45	49.6	44	4	3
66	57	49	57	47	43	44	47	49.1	43	57	14
67	56	46	50	44	43	43	45	47.0	43	56	13
68	57	54	51	45	49	42	45	49.0	42	57	15
69	53	55	48	42	41	44	45	46.9	41	55	14
70	49	54	48	48	42	45	45	47.3	42	54	12
71	64	55	58	48	49	45	56	53.6	45	64	19
72	56	50	50	44	48	45	66	51.3	44	66	22
73	47	54	48	42	45	43	57	48.0	42	57	15
74	49	50	50	49	49	48	61	50.9	48	61	13
75	47	54	55	47	46	45	56	50.0	45	56	11

**Table 8. Time to 50% bloom (continued).**

Entry no	Hisar	Nath	PHF	PHDMN	Bhavani-sagar	Kovil-patti	Niamey	Mean	Min	Max	Range
76	51	54	50	49	47	45	61	51.0	45	61	16
77	52	49	47	42	43	44	56	47.6	42	56	14
78	57	46	56	49	51	47	61	52.4	46	61	15
79	57	49	53	46	52	44	61	51.7	44	61	17
80	48	50	50	47	45	44	54	48.3	44	54	10
81	65	49	53	45	43	41	64	51.4	41	65	24
82	62	54	54	52	50	49	61	54.6	49	62	13
83	53	55	52	50	47	44	61	51.7	44	61	17
84	44	56	47	42	41	42	66	48.3	41	66	25
85	55	54	52	44	48	44	61	51.1	44	61	17
86	49	50	50	49	50	44	60	50.3	44	60	16
87	50	57	49	47	50	45	60	51.1	45	60	15
88	57	58	48	42	41	41	60	49.6	41	60	19
89	51	49	53	49	47	47	65	51.6	47	65	18
90	50	54	51	48	47	44	60	50.6	44	60	16
91	62	54	53	47	46	46	61	52.0	46	62	16
92	48	54	56	48	46	43	65	51.4	43	65	22
93	48	56	52	44	47	44	61	50.3	44	61	17
94	47	57	48	42	45	49	51	48.4	42	57	15
95	60	49	59	49	52	45	58	53.0	45	60	15
96	43	50	46	40	41	43	49	44.6	40	50	10
97	52	-	-	45	6	43	58	49.5	43	58	15
98	54	-	50	53	50	45	56	53.0	45	60	15
99	57	52	54	49	52	45	61	51.4	45	61	16
100	48	-	1	47	44	43	50	47.2	43	51	9

**Table 7. Plant height (cm) at six locations in India and Africa.**

Entry no	Ludhiana	PHF	PMDMN	Bhavanisagar	Kovilpatti	Niamey	Mean	Min	Max	Range
1	184	252	190	190	164	215	199	164	252	88
2	193	247	210	230	134	205	203	134	247	113
3	180	230	190	240	120	220	197	120	240	120
4	190	222	195	210	153	225	199	153	225	72
5	181	202	155	190	170	145	174	145	202	57
6	164	185	160	210	141	130	165	130	210	80
7	114	237	190	210	145	145	174	114	237	123
8	129	195	160	200	140	150	162	129	200	71
9	000	228	160	240	162	150	188	150	240	90
10	125	140	000	235	130	133	153	125	235	110
11	207	227	170	170	130	125	172	125	227	102
12	163	198	140	220	148	125	166	125	220	95
13	167	202	170	220	147	125	172	125	220	95
14	182	210	170	170	138	84	159	84	210	126
15	130	180	140	150	146	64	135	64	180	116
16	162	178	155	170	136	54	143	54	178	124
17	169	200	180	170	163	150	172	150	200	50
18	200	227	200	210	145	150	189	145	227	82
19	194	205	180	200	154	82	169	82	205	123
20	155	148	000	210	132	89	147	89	210	121
21	203	202	140	150	173	128	166	128	203	75
22	185	168	140	200	158	000	170	140	200	60
23	182	183	160	180	141	85	152	85	183	118
24	000	227	160	18	141	65	155	65	227	162
25	226	228	175	20	147	000	195	147	228	81

**Table 7. Plant height (continued).**

Entry no	Ludhiana	PHF	PMOHN	Bhavenisagar	Kovilpatti	Niamey	Mean	Min	Max	Range
26	156	180	150	160	122	80	141	80	180	100
27	181	185	160	180	154	000	172	154	185	31
28	153	197	160	170	123	80	147	80	197	117
29	158	183	160	200	144	000	169	144	200	56
30	144	138	150	130	130	000	138	130	150	20
31	172	200	140	190	150	000	170	140	200	60
32	183	190	130	180	142	000	161	130	190	60
33	183	182	145	200	141	000	170	141	200	59
34	181	202	000	190	144	146	173	144	202	58
85	130	188	150	150	155	117	148	117	188	71
36	160	240	155	210	173	000	188	155	240	85
37	000	240	180	200	151	83	171	83	240	157
38	178	212	155	150	117	88	150	88	212	124
39	131	195	150	180	152	42	142	42	195	153
40	138	143	000	170	131	125	141	125	170	45
41	195	228	145	220	165	98	175	98	228	130
42	183	217	160	200	145	110	169	110	217	107
43	152	170	145	180	111	70	138	70	180	110
44	164	197	150	170	152	000	167	150	197	47
45	183	218	175	160	135	115	164	115	218	103
46	190	243	150	180	133	117	168	117	243	126
47	144	213	140	170	131	137	156	131	213	82
48	205	212	140	190	150	95	155	95	212	117
49	140	195	145	170	147	80	146	80	195	115
50	154	138	000	150	144	130	143	130	154	24

Table 7. Plant height (continued).

Entry no	Ludhiana	PHF	PHDMN	Bhaveinsagar	Kovlpateti	Niswhey	Mean	Min	Max	Range
51	140	180	140	139	139	55	139	135	180	126
52	141	188	135	138	180	000	156	135	188	53
53	000	220	160	165	190	000	184	160	220	60
54	175	180	170	118	130	000	155	118	180	62
55	150	177	150	126	140	000	149	126	177	51
56	158	178	160	123	170	97	148	97	178	81
57	147	175	120	133	180	70	138	70	180	110
58	000	197	150	138	160	84	146	84	197	113
59	170	205	170	114	190	145	170	114	205	91
60	134	132	000	130	190	115	140	115	190	75
61	000	200	175	151	140	125	158	125	200	75
62	181	207	170	166	150	135	168	135	207	72
63	172	202	150	143	180	99	158	99	202	103
64	158	198	160	139	160	147	160	139	198	59
65	170	223	150	156	180	195	179	150	223	73
66	200	218	155	130	180	176	183	130	218	88
67	197	212	165	155	190	180	183	155	212	57
68	188	217	170	147	170	138	172	138	217	79
69	183	190	145	143	150	155	161	143	190	47
70	155	143	000	132	145	130	141	130	155	25
71	196	225	170	164	210	145	185	145	225	80
72	146	228	155	179	210	66	164	66	228	162
73	143	208	140	163	190	120	161	120	208	88
74	183	196	160	129	180	115	161	115	196	81
75	205	227	100	150	170	170	170	100	227	127

Table 7. Plant height (continued).

Entry no	Luthiana	PHF	PHDM	Bhavantsagar	Kovilpatti	Nisamey	Mean	Min	Max	Range
76	118	145	100	190	125	100	130	100	190	90
77	132	160	120	140	127	115	132	115	160	45
78	221	190	125	160	165	127	134	125	221	96
79	183	193	140	150	134	116	135	116	193	77
80	135	000	000	170	200	139	172	123	208	85
81	208	190	170	200	172	123	172	123	208	85
82	128	135	100	150	134	101	125	100	150	50
83	161	80	180	148	147	135	147	135	180	100
84	154	178	138	165	144	000	155	135	175	40
85	196	215	165	200	143	150	178	143	215	72
86	162	203	150	190	125	110	157	110	203	93
87	143	178	100	170	133	90	136	90	178	88
88	197	232	120	230	180	145	181	120	232	112
89	186	190	140	180	151	118	161	116	190	74
90	140	128	000	140	131	85	125	85	140	55
91	177	178	130	160	138	79	144	79	178	98
92	163	150	150	149	131	131	152	131	167	36
93	145	175	150	165	129	125	148	125	175	50
94	153	157	165	190	146	146	157	130	190	60
95	122	103	110	140	103	100	113	100	140	40
96	000	143	95	145	93	100	115	93	145	52
97	130	135	130	135	118	135	131	118	135	17
98	121	103	90	120	133	121	131	90	133	43
99	114	112	115	120	114	100	116	100	140	40
100	132	128	000	120	120	126	126	120	132	12