

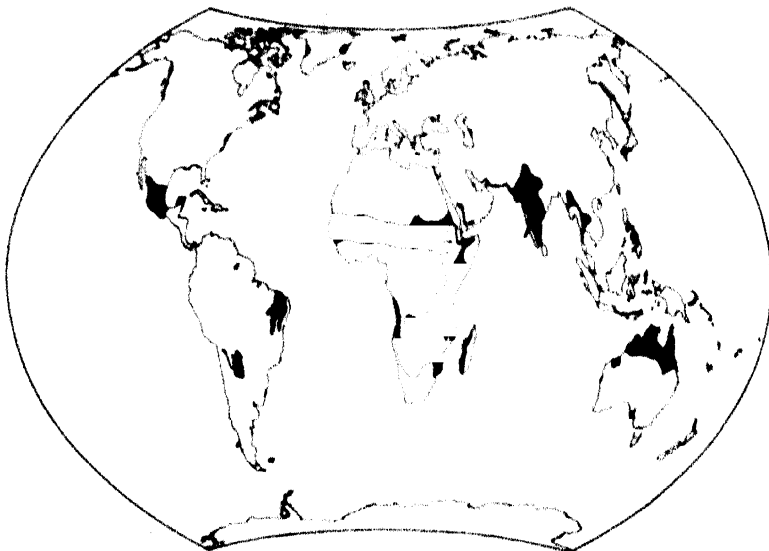
**INTERNATIONAL PEARL MILLET DISEASE RESISTANCE TESTING PROGRAM  
(IPMDRTP)**

**Progress Report: P.M. Path. 80**

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**REPORT OF  
THE 1982 INTERNATIONAL PEARL MILLET DOWNY MILDEW NURSERY  
(IPMDMN)**



**ICRISAT**

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1983

## ABSTRACT

In the 1982 International Pearl Millet Downy Mildew Nursery (IPMDMN), 45 entries were evaluated of reactions to downy mildew (DM) by co-operators at 14 locations in India and West Africa. The results were received from 12 locations. Kamboise in Upper Volta provided the most severe DM pressure followed by ICRISAT Center and Mysore. No entry was DM free at all locations. Three entries — ICH 415, P-433 and P-93 had less than 10 percent DM at all the locations. Other entries that performed well were P-100, P-2830, P-1930, 700512 and 700516 with maximum of 12 percent DM at any location. Two entries — 700651 and 700516 showed consistently high levels of DM resistance in this seventh year of test.

## RESUME

En 1982, les 45 entrées de la Pépinière internationale du mildiou de petit mil (IPMDMN) ont été évaluées par des coopérateurs à 14 points d'essai en Inde et en Afrique de l'Ouest. Les résultats portant sur la réaction au mildiou ont été reçus de 12 emplacements. L'infestation de mildiou la plus sévère a été enregistrée à Kamboisé en Haute-Volta suivi du Centre ICRISAT et Mysore. Aucune entrée n'était exempte de mildiou à tous les emplacements. Une incidence inférieure à 10% a été constatée chez trois entrées dont ICH 415, P-433 et P-93. D'autre part, parmi les entrées ayant un bon comportement figurent P-100, P-2830, P-1930, 700512 et 700516 dont l'incidence maximum est de 12%. Deux entrées — 700651 et 700516 — ont manifesté un niveau très élevé de résistance pour la septième année de suite.

# INTERNATIONAL PEARL MILLET DOWNY MILDEW NURSERY

(IPMDMN)

## INTRODUCTION

The International Pearl Millet Disease Resistance Testing Program (IPMDRTP) was initiated in 1976 with the establishment of the International Pearl Millet Downy Mildew Nursery (IPMDMN). The IPMDMN program is an international cooperative activity through which pearl millet cultivars are tested for degree and stability of resistance to downy mildew (DM). The results of the previous years' IPMDMN, which were tested by cooperators at more than 20 locations in six countries in Africa and Asia, indicated major difference between test entries in the level and stability of DM resistance, and between locations in the severity and virulence of the DM pathogen (*Sclerospora graminicola*). As the trial provided valuable information there was considerable support for it to continue. In 1982 the seventh IPMDMN was distributed to cooperators at 10 locations in India and at 5 locations in 4 countries in Africa. At the time of preparation of this report results have been received from 12 locations. The report is being prepared at this time in order that the data and entries may be used in the 1983 main growing season.

## TEST LOCATIONS AND COOPERATORS

Details of the test locations and the cooperators from whom data were received by January 31, 1982 are given in Table 1. The locations represent an excellent coverage of Indian and West African millet

growing regions where DM occurs in severe form.

## ENTRIES

The trial contained 45 test entries and cooperators were invited to include a local susceptible check after every 10 test entries to act as "indicator" of local DM pressure. The majority of the 1982 IPMDMN entries were those that had performed well at all locations in the 1981 PRE-IPMDMN, the 13 best entries from the 1981 IPMDMN were also included.

## RESULTS

Three infection parameters were calculated:

- i) Percent infection 30 days after planting (% INF 30)
- ii) Percent infection at final scoring (Incidence)
- iii) A combination of incidence and severity termed infection index (severity)

Detailed results from each location are presented in Tables 2 to 6.

Plant population was more than 30 for all entries at Mysore, Ludhiana, Kovilpatti, Aurangabad and Nioro-de-Rip. At other locations some of the entries had less than 30 plants.

### DM Pressure at Test Locations

ICRISAI Center: Five entries -- P-433, P-110, P-460, P-100 and P-965 were DM free and 32 entries developed less than 10 percent DM. BJ-104 developed 54 percent DM and 7042 and NHB-3, the two standard

susceptible checks had 79 and 91 percent DM, respectively. Local susceptible check averaged 96 percent mean DM severity Table 2.

Mysore: Three entries -- P-460, P-93 and ICH-415 were DM free and 27 entries including P-7, 700251 and 700516 developed less than 10 percent DM. NHB-3 and 7042 developed 30 and 47 percent DM, respectively. Local susceptible check developed 57 percent mean DM severity, Table 2.

Ludhiana: Fifteen entries were free and all the remaining entries except 700546 (24% DM) had less than 5 percent DM. 7042 developed only 18 percent DM. Local susceptible check averaged 48 percent DM severity, Table 3.

Jamnagar: Thirty entries were DM free and with the exception of SDN 503 (14% DM) other entries also developed less than 10 percent DM. DM severity on NHB-3 and 7042 was 62 and 56 percent, respectively. Local susceptible check averaged 65 percent DM, Table 3.

Aurangabad: All the test entries except 7042-3-1-2-2-2 (11% DM) were either DM free or had less than 5 percent DM. NHB-3 and 7042 had only 37 and 23 percent DM, respectively. Local susceptible check averaged 51 percent DM, Table 4.

Kamboinse: No entry was DM free and only six entries had less than 10 percent DM. DM severity in the local susceptible check ranged from 17-67 percent with a mean of 35 percent. Entry 7042-3-1-2-2-2 a DM resistant version of standard susceptible check 7042 that showed high levels of DM resistance at all Indian locations, developed heavy DM at Kamboinse (87% DM), Table 4.

Nioro-de-Rip: All the test entries except P-2902, were either free or had less than 10 percent DM severity. As usual, in Senegal, NHB-3 developed exceedingly low DM (2% DM). 7042 and its version that

is resistant in India, were highly susceptible. Local susceptible check showed high DM resistance, Table 5.

Hisar: Twenty eight entries were DM free and the majority of the remaining entries had less than 10 percent DM. BJ-104 developed 37 percent DM severity. NHB-3 had 89 percent DM while 7042 surprisingly developed only 9 percent DM. Local susceptible checks averaged 59 percent DM, Table 5.

Kovilpatti: Eleven entries were DM free and 27 had less than 10 percent DM. BJ-104 developed 58 percent DM at this location. Local susceptible check averaged 73 percent DM severity, Table 6.

Coimbatore: All the test entries were either free or had less than 10 percent DM. NHB-3 and 7042 had 36 and 39 percent DM, respectively. Local susceptible check averaged 31 percent DM, Table 6.

Data from Samaru and Pudukkottai are not included due to low plant population and certain other discrepancies.

#### Performance of Entries Across Locations:

Across location performance of entries are presented in Table 7. Entries were ranked on mean DM severity values.

No entry was DM free at all locations. Twenty three entries had less than 5 percent across-location mean DM severities and included 700516 and 700651 which have performed best in all the preceding years' IPMDMN trials. The remaining entries also had less than 10 percent across location mean DM severities except 7042-3-1-2-2-2 (20% DM). The reactions of the five best entries -- SDN-503, P-7, 700251, 700516 and 700651--have been similar to their DM reactions in previous

years, Table 8.

## OTHER DISEASES

Records on natural occurrence (unless otherwise mentioned) of ergot, smut and rust were taken at several locations.

Ergot: Ergot records were taken at Coimbatore, Hissar, ICRISAT, Jamnagar and Kovilpatti. At ICRISAT Center where entries were inoculated artificially, ergot was most severe. No entry showed an acceptable level of resistance. Conversely at Kovilpatti ergot was just in traces on a few entries only. Detailed data for all locations are presented in Table 9.

Smut: Records on smut were taken at Coimbatore, Kovilpatti, ICRISAT, Jamnagar and Hissar. No entry at Kovilpatti and Coimbatore developed smut. Smut was most severe at Hissar followed by Jamnagar where no entry (except 700512 and 700546 at Jamnagar) had less than 12 percent smut. At ICRISAT Center smut pressure was moderate with 20 entries having less than 10 percent smut, Table 10.

Rust: Records on rust incidence were taken at Coimbatore, Jamnagar, ICRISAT and Kovilpatti. Rust pressure was most severe at Coimbatore followed by Kovilpatti and Jamnagar. No entry was rust free at these locations. However maximum rust was not more than 40 percent on any entry at any of these locations. At ICRISAT Center rust pressure was extremely low and the majority of the entries were rust free, Table 11.

Blast: Light incidence of blast on 700651, ICH-105, P-462, IP-1930, IP-2058, EB-83-2 and 7042-3-1-2-2-2 was recorded only at Kovilpatti.

## DISCUSSION

Downy mildew pressure as evidenced by heavy DM severities on the local susceptible checks at the majority of the test locations, has been adequate. Thus the screening of test entries has been effective. Freedom from DM or extremely low levels of DM recorded on many entries at Indian locations are due to their high resistance to DM.

The performance of the five best entries including SDN-503, P-7, 700251, 700516 and 700651 has been consistent over seven years. Slight increases in the DM-severity of P-7, SDN-503 and 700251 at ICRISAT Center over the previous years has been probably due to the inadequate plant population. In addition, performance of IP-193, EB-83-2, MPP-7147-2-1, E-298-2-1-8, 700546, 700512 and SDN-714 has been consistently good ( $\leq 10\%$  DM severities) over 3-4 years. Thus these are other extremely good sources of stable DM resistance.

The performance of 7042-3-1-2-2-2, a DM resistant version of 7042 selected at the ICRISAT Center, is exciting. It has shown high levels of resistance at all the Indian locations. However, at Kamboise and Niore-de-Rip it was highly susceptible. This shows that for resistance developed this way to be stable, it is essential that the process of reselection should be at a location where the pathogen is most aggressive. The reaction of this entry also confirms the differences in the virulence of the DM-pathogen between India and West Africa.

High levels of DM on BJ-104 at ICRISAT Center, Hissar and at Kovilpatti indicate that the resistance in this hybrid is gradually becoming ineffective. It would therefore be appropriate to replace this hybrid by the resistant one or an attempt should be made to



increase its resistance to DM.

#### The 1983 IPMDMN

The IPMDMN will be continued in 1983 with a selection of the best 1982 IPMDMN entries and those lines that performed well in the 1982 PRE-IPMDMN.

#### SEED SUPPLY

Any scientist who would like to receive seed of any entry listed in this report should send a request to the Millet Pathologist at ICRISAT (address given on inside back cover of this report) indicating that the seed request is from the 1982 IPMDMN entries.

Table 1. Cooperators and locations in the 1982 IPMDMN from whom results were received by January 31, 1983

Cooperators	Locations	Country
S.S. Chahal	Ludhiana	India
D.P. Thakur	Hissar	India
S.D. Singh & P.M. Reddy	ICRISAT Center	India
S.D. Nafade & H.R. Dave	Jamnagar	India
N.B. Pawar & S.S. Ghuge	Aurangabad	India
K.M. Safceulla	Mysore	India
S. Eshwaramurthy	Coimbatore	India
D.S. Aaron	Kovilpatti	India
S. Muthusamy <sup>a</sup>	Pudukkottai	India
Sereme Paco	Kamboinse	Upper Volta
S.C. Gupta	Nioro-de-Rip	Senegal
P.D. Tyagi <sup>a</sup>	Samaru	Nigeria

<sup>a</sup> Data were not included in the report

Table 2. Plant population, downy mildew incidence (%) and infection indices (%) (severity) of 45 entries and local susceptible in the 1982 IPMDMN at ICRISAT Center and Mysore

Entry	ICRISAT Center						Mysore					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700251	59	43	17	12	16	12	46	43	11	5	8	3
700512	43	61	9	11	9	10	71	63	1	3	0	2
700516	44	39	0	8	0	8	37	105	16	5	11	3
700546	83	51	1	4	1	4	42	83	21	11	14	7
700651	48	33	2	6	1	6	41	44	0	30	0	20
SDN-503	16	24	31	17	22	15	30	22	13	32	11	19
SDN-714	42	20	2	5	2	3	58	67	36	4	26	3
P-7	28	24	14	25	14	25	39	35	13	0	9	0
P-88	40	51	3	8	1	6	72	40	3	0	1	0
P-93	37	30	3	3	3	3	70	91	0	0	0	0
P-100	17	39	0	0	0	0	47	62	0	3	0	2
P-106	38	41	3	7	3	7	29	105	0	5	0	4
P-110	57	59	0	0	0	0	27	7	7	0	3	0
P-120	41	58	24	17	22	14	40	14	18	0	13	0
P-433	13	11	0	0	0	0	10	34	0	12	0	8
P-435	28	44	0	2	0	2	29	82	31	0	23	0
P-437	48	44	2	7	1	6	65	60	22	0	14	0
P-456	61	52	0	4	0	2	59	51	7	2	6	0
P-460	24	15	0	0	0	0	11	28	0	0	0	0
P-461	59	65	5	8	3	8	80	83	6	25	4	17
P-462	43	51	0	2	0	2	83	45	8	0	6	0
P-466	29	62	3	2	3	2	69	56	12	0	10	0
P-491	44	18	9	0	9	0	18	114	6	0	1	0
P-519	47	58	2	14	2	11	18	23	0	9	0	5
P-535	39	36	0	3	0	3	42	92	0	12	0	7
P-537	72	53	0	6	0	4	50	50	4	14	2	9
P-598	59	31	8	6	8	6	26	144	0	3	0	2
P-965	21	26	0	0	0	0	50	15	24	40	19	20
P-2830	17	49	0	2	0	2	74	62	19	15	14	10
P-2902	52	5	6	0	5	0	35	80	0	9	0	6
P-2927	11	35	0	9	0	7	40	65	25	5	16	3
P-2941	64	75	2	0	2	0	26	62	42	35	36	23
P-2951	21	65	5	3	5	2	39	28	15	0	8	0
P-2952	30	68	10	7	10	7	40	37	5	0	2	0
IP-1930	36	30	3	3	1	2	21	81	0	28	0	19

Table 2. (Contd..)

Entry	ICRISAT Center						Mysore					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
IP-2058	67	43	3	2	2	2	31	88	19	10	16	7
EB-83-2	40	64	0	2	0	2	24	42	0	5	0	3
E-298-2-1-8	44	70	9	6	6	6	55	33	22	27	14	18
MPP-7147-2-1	31	36	10	11	10	8	39	72	31	4	29	2
WC C75	60	32	3	3	3	3	39	62	3	10	3	6
7042-3-1-2-2-2	44	41	9	7	8	5	64	44	13	11	9	8
NHB-3	40	76	95	95	92	90	65	65	55	26	42	18
BJ-104	62	63	52	62	45	62	94	42	0	2	0	1
7042	55	66	80	86	76	81	31	47	65	70	46	48
ICH-415	76	52	7	2	4	1	78	45	0	0	0	0
Local suscep- tible <sup>a</sup>	155	130	97	98	96	96	51	61	72	66	59	55

a Mean of five plots in each replication.

Table 3. Plant population, downy mildew incidence (%) and infection indices (%) (severity) of 45 entries and local susceptible in the 1982 IP:SDN at Ludhiana and Jammagar

Entry	Ludhiana						Jammagar					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700251	38	45	0	0	0	0	42	37	2	3	2	3
700512	47	45	4	7	3	5	47	29	0	0	0	0
700516	36	47	0	74	0	50	29	47	3	0	3	0
700546	40	30	0	77	0	48	61	74	0	1	0	1
700651	45	38	0	3	0	1	32	46	3	0	2	0
SDN-503	45	39	0	0	0	0	17	20	24	10	19	9
SDN-714	48	48	4	0	3	0	45	49	0	0	0	0
P-7	38	40	3	3	2	2	38	48	0	0	0	0
P-88	39	48	3	0	1	0	6	41	0	0	0	0
P-93	48	45	0	0	0	0	54	42	0	0	0	0
P-100	39	45	0	0	0	0	38	28	0	0	0	0
P-106	38	49	5	2	5	1	23	46	0	2	0	2
P-110	45	48	0	0	0	0	43	35	0	0	0	0
P-120	50	38	2	0	2	0	27	29	4	0	1	0
P-433	38	46	0	4	0	3	20	18	0	0	0	0
P-435	52	47	0	0	0	0	19	21	0	0	0	0
P-437	52	38	2	0	0	0	38	44	0	0	0	0
P-456	51	34	0	12	0	8	19	2	0	0	0	0
P-460	46	29	0	7	0	3	5	31	0	0	0	0
P-461	45	35	2	0	2	0	32	44	0	0	0	0
P-462	50	34	0	15	0	10	54	57	0	0	0	0
P-466	46	48	2	2	2	1	6	22	0	0	0	0
P-491	45	37	0	0	0	0	11	26	0	0	0	0
P-519	38	47	0	0	0	0	30	24	0	4	0	4
P-535	45	38	0	0	0	0	39	32	0	0	0	0
P-537	45	38	2	3	2	1	35	29	0	0	0	0
P-598	38	45	3	0	2	0	20	39	0	0	0	0
P-965	48	50	0	2	0	2	33	45	0	2	0	2
P-2830	50	49	0	2	0	1	45	52	0	0	0	0
P-2902	47	27	4	0	4	0	16	29	0	0	0	0
P-2927	40	37	0	0	0	0	38	29	0	0	0	0
P-2941	52	37	2	0	1	0	50	29	4	3	4	3
P-2951	42	40	0	3	0	1	38	61	0	0	0	0
P-2952	47	38	0	3	0	1	50	39	0	0	0	0
IP-1930	42	50	2	0	1	0	45	56	0	0	0	0

Table 3. (Contd..)

Entry	Ludhiana						Jammar					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
IP-2058	32	47	13	2	7	2	34	18	0	0	0	0
EB-83-2	36	38	0	0	0	0	34	28	0	0	0	0
E-298-2-1-8	37	38	0	0	0	0	51	40	0	0	0	0
MPP-7147-2-1	46	48	0	0	0	0	24	51	4	6	3	6
WC C75	48	53	4	2	2	1	24	44	4	2	4	2
7042-3-1-2-2-2	45	36	11	3	4	1	23	39	0	0	0	0
NHB-3	48	39	79	3	58	1	29	49	76	65	64	61
BJ-104	46	38	0	0	0	0	43	48	7	13	6	13
7042	52	48	77	0	35	0	48	49	75	55	66	46
ICH-415	42	45	0	0	0	0	52	65	0	0	0	0
Local suscep- tible <sup>a</sup>	53	53	82	84	45	51	53	47	62	79	55	74

a Mean of five plots in each replication.

**Table 4. Plant population, downy mildew incidence (%) and infection indices (%) (severity) of 45 entries and local susceptible in the 1982 IPMDDV at Aurangabad and Kamboinse**

Entry	Aurangabad						Kamboinse					
	Total plants		Inci-dence		Seve- rity		Total plants		Inci-dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700251	65	71	0	0	0	0	32	40	44	33	39	32
700512	74	64	0	0	0	0	54	25	24	12	17	6
700516	78	61	1	0	1	0	43	39	19	5	17	4
700546	83	77	0	0	0	0	31	48	48	13	43	9
700651	61	73	3	3	1	3	56	33	13	24	13	23
SDN-503	46	59	9	2	4	2	14	22	29	23	21	20
SDN-714	78	84	0	0	0	0	39	51	23	22	21	18
P-7	51	82	4	0	1	0	36	39	25	26	22	22
P-88	84	91	0	0	0	0	61	43	25	30	21	29
P-93	63	61	0	2	0	2	55	32	5	9	5	8
P-100	62	55	0	0	0	0	35	31	14	6	13	6
P-106	78	80	0	0	0	0	35	26	63	12	60	12
P-110	59	64	0	0	0	0	25	38	36	18	33	17
P-120	47	58	6	0	2	0	29	15	24	7	22	7
P-433	47	50	0	0	0	0	17	19	0	11	0	9
P-435	47	66	0	0	0	0	31	45	29	18	27	18
P-437	78	69	0	0	0	0	35	17	23	18	19	15
P-456	55	68	0	0	0	0	30	16	13	25	10	17
P-460	45	40	0	0	0	0	18	19	17	5	17	5
P-461	80	78	1	1	0	1	52	46	33	20	28	18
P-462	57	73	0	0	0	0	64	48	25	25	24	20
P-466	64	58	0	0	0	0	24	22	83	45	81	42
P-491	49	62	0	0	0	0	32	34	66	38	61	29
P-519	63	44	0	0	0	0	26	20	62	45	59	45
P-535	61	67	0	0	0	0	21	29	29	55	23	53
P-537	63	63	2	0	2	0	43	27	44	50	42	47
P-598	80	81	0	0	0	0	44	53	20	38	18	38
P-965	41	41	2	0	2	0	45	42	36	26	29	25
P-2830	71	72	0	0	0	0	32	52	6	0	6	0
P-2902	64	70	3	1	1	1	21	19	43	47	40	45
P-2927	69	58	3	0	1	0	36	27	56	48	41	45
P-2941	58	58	2	3	2	3	28	49	46	61	46	61
P-2951	53	59	0	0	0	0	39	33	23	42	22	35
P-2952	69	67	0	3	0	3	40	16	38	38	35	38
IP-1930	90	75	0	0	0	0	36	50	3	0	1	0

Table 4. (Contd..)

Entry	Aurangabad						Kamboise					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
IP-2058	50	68	4	4	2	4	52	35	13	29	12	26
EB-83-2	82	69	5	1	5	1	43	34	33	12	26	10
E-298-2-1-8	67	55	0	0	0	0	31	44	10	14	7	11
MPP-7147-2-1	60	83	3	1	3	1	46	35	10	14	6	13
WC C75	78	82	0	1	0	1	45	46	27	7	21	6
7042-3-1-2-2-2	72	75	21	9	13	9	30	44	100	80	100	79
NFB-3	66	50	45	42	39	35	58	53	59	75	54	69
BJ-104	71	65	6	2	6	2	49	61	16	13	11	9
7042	67	73	30	26	22	24	38	62	79	97	78	96
ICH-415	94	87	0	0	0	0	38	44	8	9	7	7
Local susceptible <sup>a</sup>	63	65	66	53	58	45	54	54	35	39	34	37

<sup>a</sup> Mean of five plots in each replication.



Table 5. Plant population, downy mildew incidence (%) and infection indices (%) (severity) of 45 entries and local susceptible in the 1982 IPMOMN at Micro-de-Rip and Hissar

Entry	Micro-de-Rip						Hissar					
	Total plants		Inci-dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700251	47	43	2	7	1	3	40	26	0	8	0	7
700512	53	43	2	2	1	1	42	17	0	0	0	0
700516	39	47	0	4	0	2	41	56	0	0	0	0
700546	52	50	4	10	2	4	15	45	0	0	0	0
700651	52	51	2	6	1	2	53	46	0	2	0	2
SDN-503	37	41	5	7	3	3	2	2	0	0	0	0
SDN-714	51	49	6	12	3	7	44	48	0	4	0	2
P-7	49	45	2	2	1	1	5	11	0	9	0	2
P-88	49	52	0	0	0	0	44	40	0	0	0	0
P-93	49	49	4	4	3	2	42	56	0	0	0	0
P-100	43	41	0	0	0	0	19	26	0	0	0	0
P-106	41	42	0	7	0	4	17	44	0	0	0	0
P-110	49	45	4	0	3	0	7	17	0	0	0	0
P-120	46	45	2	2	1	1	42	4	0	25	0	6
P-433	42	27	5	0	3	0	-	6	-	0	-	0
P-435	34	43	0	7	0	5	32	1	0	0	0	0
P-437	52	49	4	0	3	0	48	23	0	0	0	0
P-456	41	39	5	3	2	1	27	7	0	0	0	0
P-460	45	41	0	0	0	0	5	11	0	0	0	0
P-461	48	56	0	0	0	0	22	45	0	0	0	0
P-462	53	47	0	0	0	0	38	15	0	0	0	0
P-466	46	43	0	2	0	1	33	36	30	0	19	0
P-491	46	43	4	26	2	11	39	19	0	0	0	0
P-519	48	52	4	2	3	1	31	58	0	0	0	0
P-535	33	38	0	0	0	0	9	16	0	6	0	5
P-537	53	41	6	2	2	1	31	26	0	0	0	0
P-598	50	45	0	0	0	0	38	25	0	0	0	0
P-965	49	44	0	2	0	1	40	26	0	0	0	0
P-2830	51	53	0	0	0	0	48	54	6	7	4	6
P-2902	36	35	6	31	3	18	55	17	0	0	0	0
P-2927	48	53	4	0	2	0	15	28	0	0	0	0
P-2941	48	44	4	11	3	8	28	2	0	0	0	0
P-2951	49	45	0	2	0	1	36	36	0	0	0	0
P-2952	40	55	0	2	0	0	18	16	0	0	0	0
IP-1930	51	51	0	0	0	0	21	35	0	0	0	0

Table 5. (Contd..)

Entry	Micro-de-Rip						Missar					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
IP-2058	41	56	10	5	6	3	41	46	0	7	0	2
EB-83-2	36	51	6	0	2	0	7	31	14	0	4	0
E-298-2-1-8	50	49	0	0	0	0	10	32	20	0	8	0
MPP-7147-2-1	49	56	4	4	2	2	40	9	15	67	8	28
WC C75	50	47	0	6	0	4	37	51	0	8	0	4
7042-3-1-2-2-2	35	37	80	86	74	77	53	51	9	6	5	3
NH8-3	51	56	2	4	1	2	72	35	90	89	59	51
BJ-104	55	35	0	0	0	0	45	62	73	71	36	39
7042	50	45	76	71	65	65	32	35	9	23	7	11
ICH-415	52	49	0	0	0	0	5	8	0	0	0	0
Local suscep- tible <sup>a</sup>	47	49	8	6	5	3	42	36	92	94	57	61

<sup>a</sup> Mean of five plots in each replication.

Table 6. Plant population, downy mildew incidence (%) and infection indices (%) (severity) of 45 entries and local susceptible in the 1982 IPMDMN at Kovilpatti and Coimbatore

Entry	Kovilpatti						Coimbatore					
	Total plants		Inci-dence		Seve-rity		Total plants		Inci-dence		Seve-rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700251	61	58	2	0	2	0	61	40	2	0	1	0
700512	61	48	0	2	0	2	51	43	0	2	0	2
700516	52	22	0	18	0	9	54	36	0	6	0	5
700546	68	70	4	0	4	0	64	50	0	4	0	4
700651	66	50	0	4	0	4	71	40	0	3	0	1
SDN-503	26	-	8	-	5	-	28	36	4	0	4	0
SDN-714	70	59	1	0	1	0	56	59	2	0	1	0
P-7	60	48	0	6	0	6	25	40	0	5	0	5
P-88	70	40	0	0	0	0	26	47	4	0	2	0
P-93	69	45	1	0	1	0	43	38	0	0	0	0
P-100	65	58	0	0	0	0	13	26	0	0	0	0
P-106	54	38	0	21	0	17	26	31	0	3	0	3
P-110	66	46	3	2	3	2	17	22	0	0	0	0
P-120	70	67	3	4	2	4	34	27	3	0	2	0
P-433	51	68	0	7	0	3	17	17	0	0	0	0
P-435	62	49	0	0	0	0	36	22	0	0	0	0
P-437	61	50	0	2	0	2	24	28	0	0	0	0
P-456	51	55	0	0	0	0	40	31	5	3	4	2
P-460	70	22	4	55	4	49	34	28	3	0	3	0
P-461	70	58	1	3	1	3	38	35	0	3	0	3
P-462	49	47	0	0	0	0	66	37	6	0	5	0
P-466	27	26	0	0	0	0	55	19	0	0	0	0
P-491	57	44	0	0	0	0	69	20	1	5	1	3
P-519	50	9	0	22	0	22	31	21	0	5	0	4
P-535	66	41	0	49	0	45	40	28	0	4	0	4
P-537	56	12	16	17	13	15	30	30	0	0	0	0
P-598	70	37	0	3	0	3	29	32	3	0	3	0
P-965	70	56	1	2	1	2	28	32	0	3	0	2
P-2830	68	23	0	0	0	0	53	46	0	0	0	0
P-2902	61	23	7	0	7	0	30	36	3	8	3	8
P-2927	54	37	0	24	0	22	36	42	0	2	0	2
P-2941	70	66	3	2	3	2	52	39	0	3	0	1
P-2951	67	55	0	0	0	0	34	37	0	0	0	0
P-2952	60	49	2	4	2	3	54	8	2	0	2	0
IP-1930	70	68	0	0	0	0	43	32	0	6	0	5

Table 6. (Contd..)

Entry	Kovilpatti						Coimbatore					
	Total plants		Inci- dence		Seve- rity		Total plants		Inci- dence		Seve- rity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
IP-2058	59	39	0	5	0	4	53	42	2	2	2	1
EB-83-2	66	63	2	0	2	0	31	48	0	0	0	0
E-298-2-1-8	44	69	2	6	1	5	54	39	0	0	0	0
MPP-7147-2-1	69	46	0	2	0	1	61	42	0	7	0	7
WC C75	69	39	0	0	0	0	54	33	0	3	0	3
7042-3-1-2-2-2	70	30	1	3	1	2	31	29	0	0	0	0
NHB-3	70	70	4	7	4	5	52	56	27	79	22	50
BJ-104	66	41	92	71	68	48	52	42	0	5	0	5
7042	69	42	26	19	26	19	29	44	41	57	31	47
ICH-415	79	59	1	0	1	0	45	52	0	2	0	0
Local suscep- tible <sup>a</sup>	67	54	92	86	71	75	52	71	40	56	28	35

<sup>a</sup> Mean of five plots in each replication.

Table 7. Percent infection indices<sup>a</sup> of 45 IPDMN entries at 10 test locations compared with infection indices of local susceptibles and the location mean for all these entries

Entry	Locations <sup>b</sup>										Mean sev.
	1	2	3	4	5	6	7	8	9	10	
ICM-415	0	<1	0	0	0	1	0	0	2	7	1
P-100	0	0	0	0	0	0	0	1	0	10	1
P-433	0	0	0	1	0	1	1	4	0	5	1
P-93	1	0	0	0	0	1	2	0	3	6	1
IP-1930	0	3	0	1	0	0	0	10	2	<1	1
P-2830	0	0	5	1	0	0	0	12	1	3	2
P-456	0	3	0	4	0	0	2	3	1	14	3
EB-83-2	3	0	2	0	0	1	1	1	1	18	3
700512	0	1	0	4	0	1	1	1	10	12	3
P-110	0	0	0	0	0	2	1	1	0	25	3
P-437	0	0	0	<1	0	1	2	7	3	17	3
P-88	0	1	0	1	0	0	0	1	4	25	3
WC C75	<1	2	2	2	3	0	2	5	3	14	3
P-462	0	2	0	5	0	0	0	3	1	22	3
700516	<1	2	0	3	2	5	1	7	4	10	3
P-2951	0	0	0	1	0	0	1	4	4	28	4
E-298-2-1-8	0	0	4	0	0	3	0	16	6	9	4
P-435	0	0	0	0	0	0	2	12	1	23	4
700651	2	<1	1	1	1	2	2	10	4	18	4
P-598	0	2	0	1	0	1	0	1	7	28	4
P-460	0	1	0	1	0	27	0	0	0	11	4
P-461	1	1	0	1	0	2	0	10	5	23	4
SDN-714	0	1	1	1	0	1	5	15	2	19	4
IP-2058	3	1	1	4	0	2	5	11	2	19	5
P-120	1	1	3	1	<1	3	1	7	18	15	5
P-2952	1	1	0	1	0	2	<1	1	9	36	5
P-965	1	1	0	1	1	2	1	20	0	27	5
P-7	<1	3	1	2	0	3	1	4	20	22	6
P-106	0	2	0	3	1	9	2	2	5	36	6
P-491	0	2	0	0	0	0	6	1	5	45	6
MPP-7147-2-1	2	3	18	0	5	1	2	16	9	9	6
700251	0	1	3	0	3	1	2	5	14	35	6
P-2927	<1	1	0	0	0	11	1	9	4	43	7
P-537	1	0	0	1	0	14	2	5	2	44	7
P-535	0	2	2	0	0	22	0	4	1	38	7

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Table 7. (Contd..)

Entry	Locations <sup>a</sup>										Mean sev.
	1	2	3	4	5	6	7	8	9	10	
P-2902	1	6	0	2	0	3	11	3	2	43	7
700546	0	2	0	24	1	2	3	11	3	26	7
P-519	0	2	0	0	2	11	2	3	7	52	8
SDN-503	3	2	0	0	14	5	3	15	18	21	8
P-466	0	0	9	1	0	0	1	5	3	62	8
P-2941	3	1	0	<1	4	2	6	29	1	54	10
BJ-104	4	2	37	0	9	58	0	<1	54	10	17
7042-3-1-2-2-2 11	0	0	4	3	0	1	75	9	7	89	20
NIB-3	37	36	55	30	62	5	2	30	91	62	41
7042	23	39	9	18	56	22	65	47	79	87	44
Location mean for entries <sup>c</sup>	2	3	3	3	4	5	5	8	9	27	7
Local susceptibles <sup>d</sup>	52	31	59	48	65	73	4	57	96	35	52

a Means rounded-off to the nearest number except <1.

b 1. Aurangabad; 2. Coimbatore; 3. Hissar; 4. Ludhiana; 5. Jamnagar; 6. Kovilpatti; 7. Nioro-de-Rip; 8. Mysore; 9. ICRISAT Center, and 10. Kamboinse.

c Means calculated before the values were "Rounded-off".

d Mean of five plots in each replication.

Table 8. Performance of five best entries and standard susceptible checks included in the IPMDN trial for 4-7 years

Entry	Mean severity (%)								Max. severity (%)							
	76	77	78	79	80	81	82	76	77	78	79	80	81	82		
SDN 503	<1	1	3	3	8	9	8	2	8	10	14	29	53	21		
700251	1	2	2	1	9	6	6	5	9	11	5	31	33	35		
700516	1	3	2	1	7	5	3	15	35	12	6	30	32	10		
P-7	3	2	3	3	9	6	6	11	11	12	8	38	48	22		
700651	<1	3	4	1	10	6	4	3	28	29	3	34	47	18		
J-1593 <sup>a</sup>	31	28	14	8	17	15	-	78	78	38	27	54	52	-		
7042 <sup>a</sup>	-	-	-	58	63	68	44	-	-	-	91	98	100	87		

a Standard susceptible checks.

Table 9. Percent ergot severities on 45 1982 IPMOMN entries and local susceptible checks at five locations

Entry	Locations				
	Coimbatore	Hissar	ICRISAT	Jam-nagar	Kovil-patti
700251	3	17	48	1	0
700512	5	13	49	21	0
700516	5	28	47	12	0
700546	8	18	58	4	0
700651	5	10	62	4	0
SDN-503	8	0	58	10	0
SDN-714	5	33	64	8	0
P-7	5	42	66	4	1
P-88	3	17	63	7	0
P-93	0	27	58	5	0
P-100	3	18	45	2	1
P-106	5	50	39	1	0
P-110	13	35	95	1	0
P-120	3	17	52	12	0
P-433	5	67	79	15	0
P-435	5	20	60	14	0
P-437	5	40	57	11	0
P-456	5	27	71	7	0
P-460	5	20	25	0	0
P-461	5	35	40	10	0
P-462	3	35	62	24	1
P-466	5	32	14	0	0
P-491	3	30	52	0	0
P-519	5	40	36	5	0
P-535	4	25	62	7	0
P-537	0	32	81	7	0
P-598	0	26	44	24	0
P-965	8	10	61	7	1
P-2830	0	17	66	12	0
P-2902	3	25	42	12	0
P-2927	5	40	69	9	0
P-2941	3	35	68	5	0
P-2951	0	40	70	16	0
P-2952	3	32	65	13	0
IP-1930	5	23	48	5	0



Table 9. (Contd..)

Entry	Locations				
	Coimbatore	Hissar	ICRISAT	Jam- nagar	Kovil- patti
IP-2058	8	15	67	11	0
EB-83-2	8	13	68	10	0
E-298-2-1-8	13	25	86	8	1
MPP-7147-2-1	5	0	67	4	0
WC C75	5	13	60	8	0
7042-3-1-2-2-2	3	0	86	11	1
NHB-3	8	25	74	8	3
BJ-104	10	34	84	1	1
7042	5	10	91	2	1
ICH-415	5	0	82	2	0
Local suscep- tible <sup>a</sup>	6	23	89	6	<1

a Mean of five plots in each replication.

Table 10. Percent smut severities on 45 1982 IPMDMN entries and local susceptible checks at three locations

Entry	Locations		
	Hissar	ICRISAT	Jamnagar
700251	28	17	41
700512	43	13	9
700516	40	8	29
700546	40	8	6
700651	30	16	32
SDN-503	33	20	35
SDN-714	26	39	31
P-7	33	1	18
P-88	36	24	40
P-93	23	21	33
P-100	35	1	45
P-106	50	1	58
P-110	25	5	53
P-120	37	2	29
P-433	40	21	68
P-435	50	28	12
P-437	30	7	38
P-456	38	8	43
P-460	39	0	14
P-461	33	-	56
P-462	38	14	29
P-466	33	1	61
P-491	35	1	12
P-519	38	1	42
P-535	50	5	20
P-537	28	1	41
P-598	35	2	18
P-965	33	2	43
P-2830	28	25	21
P-2902	20	30	36
P-2927	30	17	15
P-2941	25	25	58
P-2951	40	11	39
P-2952	30	12	32
IP-1930	44	16	29

Table 10. (Contd..)

Entry	Locations		
	Hissar	ICRISAT	Jamnagar
IP-2058	35	10	31
EB-83-2	17	6	24
E-298-2-1-8	23	17	39
MPP-7147-2-1	43	4	22
NC C75	43	4	20
7042-3-1-2-2-2	25	78	29
NHB-3	37	13	33
BJ-104	43	45	38
7042	43	14	18
ICH-415	40	56	12
Local suscep- tible <sup>a</sup>	37	35	36

a Mean of five plots in each replication.

Table 11. Percent rust incidence on 45 1982 IPMDDN entries and local susceptible checks at four locations

Entry	Locations			
	Coimbatore	ICRISAT	Jamnagar	Kovilpatti
700251	40	0	25	25
700512	25	5	38	10
700516	40	0	25	10
700546	40	5	83	25
700651	40	3	10	10
SDN-503	40	5	10	10
SDN-714	40	3	33	5
P-7	40	5	100	25
P-88	40	0	18	10
P-93	40	0	25	10
P-100	25	0	10	10
P-106	40	0	18	25
P-110	25	0	10	10
P-120	40	0	10	10
P-433	40	0	10	25
P-435	40	0	10	25
P-437	40	0	10	40
P-456	40	0	10	25
P-460	40	0	25	25
P-461	25	0	10	25
P-462	40	0	10	25
P-466	40	0	10	10
P-491	40	0	18	40
P-519	40	0	10	25
P-535	40	0	10	10
P-537	10	0	10	25
P-598	40	0	10	10
P-965	40	0	10	25
P-2830	25	0	18	5
P-2902	25	3	18	10
P-2927	25	0	10	10
P-2941	25	0	10	10
P-2951	10	0	55	10
P-2952	25	0	10	10
IP-1930	25	0	25	10

Table 1 L (Contd..)

Entry	Locations			
	Coimbatore	ICRISAT	Jamnagar	Kovilpatti
IP-2058	40	3	33	10
EB-83-2	40	3	25	10
E-298-2-1-8	40	3	18	25
MPP-7147-2-1	40	3	18	10
WC C75	40	5	25	10
7042-3-1-2-2-2	40	15	25	10
NHB-3	40	33	33	25
BJ-104	40	40	63	25
7042	40	23	63	25
ICH-415	65	8	53	40
Local suscep- tible <sup>a</sup>	40	17	47	36

a Mean of five plots in each replication.

This report was compiled by S.D. Singh and P. Malla Reddy and R. Gopinath, Plant Pathologist and Technical Assistants, Pearl Millet Improvement Program, ICRISAT. They are indebted to all the Cooperators who give so much of their valuable time and facilities to provide the data used in this report.