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INTERNATIONAL PEARL MILLET DISEASE RESISTANCE TESTING PROGRAM

(IPMDRTP)

Progress Report P M Path 50

REPORT OF THE 1980 PRE IPMDMN

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ABSTRACT

In the 1980 PRE-International Pearl Millet Downy Mildew Nursery (PRE-IPMDMN) 150 pearl millet entries were evaluated for their reactions to downy mildew at the ICRISAT Center, near Hyderabad, India; Samaru, Nigeria and Kamboinse, Upper Volta. Highest DM pressure occurred at Samaru. One entry P-1423 was downy mildew free at all the locations Twenty seven entries averaged less than 2 percent across-locations mean. Seven of these including UPN-3$_{p1-1}$, NC-9040, SSC-9053, NC-9053, NC-9092, SSC-9114 and J-1644 x 700490-3-1-1 are breeding lines. All these entries had less than 5 percent downy mildew at any location. In addition 33 entries had less than 10 percent downy mildew at all locations. The majority of these entries will enter the 1981 IPMDMN.

RESUME

Dans le cadre de la Pépinière pré-internationale pour le mildiou de mil à chandelle de 1980 (PRE-IPMDMN), 150 entrées de mil à chandelle ont été évaluées, pour leur réaction au mildiou, au Centre ICRISAT, près de Hyderabad en Inde, ainsi qu'à Samaru, au Nigéria, et à Kamboinsé, en Haute-Volta. L'incidence de mildiou la plus sévère a été enregistrée à Samaru. Une entrée, P-1423, n'a eu aucune réaction au mildiou, sur aucun des emplacements. Pour 27 entrées, la sévérité au mildiou a été inférieure à 2% en moyenne sur l'ensemble des emplacements. Sept d'entre elles, les entrées UPN-3$_{p1-1}$, NC-9040, SSC-9053, NC-9053, NC-9092, SSC-9114 et J-1644 x 700490-3-1-1 sont des lignes de sélection. Pour toutes ces entrées, la sévérité de mildiou a été inférieure à 5% sur tous les emplacements. En outre, pour 33 entrées, la sévérité de mildiou a été de moins de 10% sur l'ensemble des emplacements. La majorité de ces entrées seront intégrées à la Pépinière internationale pour le mildiou de mil à chandelle de 1981.

INTRODUCTION

The acceptance of the concept of multilocational testing for identification of stable disease resistance led in 1976 to the establishment of the International Pearl Millet Disease Resistance Testing Program containing the International Pearl Millet Downy Mildew Nursery (IPMDMN). In the IPMDMN 45 elite resistant materials are tested by cooperators throughout India and West Africa for reactions to the local downy mildew populations. From the results of the 1976 IPMDMN (and other trials) it was obvious that certain locations (particularly some in West Africa) provided much more severe downy mildew (DM) pressure than others. In early 1977, in discussion with several pathologists from other programs, it was decided that a PRE-IPMDMN trial should be established in which a large number of IPMDMN candidate entries are tested at a few key locations. Those succeeding would then go into the IPMDMN in the following year. So in 1977 the PRE-IPMDMN program was initiated with the co-operation of colleagues at Hissar in India and at Samaru, Nigeria and Kamboinse, Upper Volta in West Africa. The results from the 1978 and 1979 PRE-IPMDMN were interesting and useful (see Report on the 1978 and 1979 PRE-IPMDMN) and it was decided to continue this nursery annually. In 1980 the trial was conducted at 3 locations.

COOPERATORS IN THE 1980 PRE-IPMDMN

J.A. Prowd - Kamboinse, Upper Volta

N.V. Sundaram - Samaru, Nigeria

S.D. Singh - ICRISAT Center, India

TEST ENTRIES

The 150 test entries consisted of promising population progenies DM resistant in the ICRISAT Center DM-screening nursery, and new germplasm and breeders lines from regions that had previously been shown to be good sources of DM resistance. Cooperators were requested to plant a local susceptible check at intervals throughout the trial.

NURSERY MANAGEMENT

Cooperators were requested to plant the trial in two replications in a DM nursery with assured high inoculum provided by earlier planted infector rows and/or the use of a DM sick plot. The local susceptible was to be planted after every 10 test entries throughout the nursery.

RESULTS

The detailed data for each location by replication including plant population and final incidence and infection index (severity) values are presented in Tables 1 and 2.

Plant population was good at ICRISAT Center. At Kamboinse and Samaru many entries had low plant population. We believe that at least 30 plants are needed to give a reliable DM rating and that the entry should be replicated.

Performance of Entries

A summary of results is presented in Table 3 and entries ranked on across location mean severity values.

SAMARU: Highest DM pressure on the test entries occurred at Samaru and the severity ranged from 0 to 100 percent. Five entries P-1423, P-13, P-58, P-452 and P-508 were DM free and 58 had less than 10 percent DM. Local susceptible check averaged 15 percent DM with a range of 5 to 24 percent.

KAMBOINSE: DM pressure on test entries was much less compared with Samaru. Highest DM severity on test entry was 47 percent (P-945). Fifty nine entries were DM free and 73 had less than 10 percent DM. The local susceptible check averaged 8 percent DM and the range was from 1 to 22 percent.

ICRISAT Center: Fifty entries were DM free and 94 entries had less than 10 percent DM. On the ramaining 6 entries DM severity ranged from 11 to 25 percent. Local susceptible check averaged 95 percent DM with a range from 87 to 95 percent.

Overall performance: One entry P-1423 was free at all the locations. Ninety five entries had less than 10 percent across-location DM severity. Of these, 60 entries were either free or had less than 10 percent DM at any location and an additional 15 entries had no more than 15 percent DM at any location. Approximately 40 best entries from these will enter the 1981 IPMDMN trial for wide scale testing.

Distinct differential reactions were evident for several entries. These entries were either free or had less than 10 percent DM at ICRISAT Center and Kamboinse but heavy DM severity at Samaru. There was no entry with heavy DM level at ICRISAT Center or Kamboinse and resistant at Samaru.

Other Diseases

ICRISAT Center: Ergot and rust were present in traces on few test entries. There was no incidence of smut and blast.

Samaru: Ergot, smut, rust and and blast were observed in various severities under natural conditions. Ergot was most severe and with the exception of P-29 (7.5% ergot), mean ergot incidence ranged from 30-83 percent. Smut was less severe. Six entries-P-2629, P-284, B-282 x J-804, LCSN # 54-1-2, NELC-9067 and IB-4-2 were smut free and 101 test entries had $\leq$ 10 percent smut and maximum severity on test entries was 28 percent. The majority of the test entries were free from rust and on the remaining the incidence was from traces to light with the exception of P-23 and P-66 which showed moderately susceptible reactions. Ninety five entries developed blast and 13 of these showed moderately high susceptibility to this disease.

No data on the incidence of other diseases was available from Kamboinse.

DISCUSSION

As expected, based on previous years' experience, highest DM pressure of all the locations occurred at Samaru. At ICRISAT Center the local susceptible check developed more than 90% DM indicating thereby that the level of inoculum pressure was severe. The low levels of DM severity on the test entries at this Center were due to their resistance against the pathogen populations present. At Kamboinse, on the other hand, neither the test entries developed high DM nor the Check had an acceptible level of DM severity. This shows that general inoculum pressure has been quite low at Kamboinse. Thus the screening of the test entries has not been effective at Kamboinse. At Samaru and ICRISAT Center the test entries received good screening.

Differential reactions of several entries amongst locations are an evidence for the presence of qualitatively variable populations (races) of the pathogen. The entries showing such differences are potentially useful for their utilization in the race identification project. Such entries will again be tested in the IPMDMN trial.

With the availability of large number of DM resistant lines which are being utilized in the breeding program, more effort will not be put to select DM resistant entries with agronomic eliteness. Though 50 entries in this trial are from the breeding group which are good agronomically, entries from germplasm should also be selected for some degree of agronomic eliteness.

ENTRIES FOR THE 1981 PRE-IPMDMN

The bulk of the test entries for the PRE-IPMDMN will come through the ICRISAT Center DM-screening program. Additional entries for this annual trial are welcome from scientists from national and regional programs, provided they have been shown to be DM resistant at the home location. Because of plant quarantine requirements in India, seed sent from abroad will take one year before it can be included in the trial.

SEED SUPPLY

Seeds of entries listed in this report are available to any scientist. Please send seed requests to the Principal Pathologist (Millet) at ICRISAT Center (address is given on the cover of this report) indicating that the seed requested is from the 1980 PRE-IPMDMN entries.

Table 1. Plant population, downy mildew incidence (%) and severity (%) of 150 test entries and local susceptible in the 1980 PRE-IPMDMN at ICRISAT Center and Kamboinse

Entry	ICRISAT Center						Kamboinse					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
700638xSC3(M)-17-1-2-1	101	52	1	4	1	4	35	39	0	0	0	0
700713xSC3(M)-3-7-1-2-1-2	59	57	0	0	0	0	20	18	0	6	0	3
A-836xSC1(S)4-8-1	67	55	5	4	4	4	21	34	10	15	10	4
B-282xJ-804-1-3-6	86	68	5	0	4	0	22	34	0	0	0	0
B-282xJ-804-1-3-9	61	72	3	1	3	1	30	26	0	4	0	2
J-1623x700797-12-2-2	47	48	0	2	0	2	26	25	0	0	0	0
J-1623x700797-12-2-3	47	53	2	0	1	0	22	30	5	0	1	0
70-1x700594-5-3	76	43	1	0	1	0	32	31	9	19	6	13
J-1644x700490-3-1-1	52	49	2	0	2	0	28	29	7	3	5	1
B-816	61	65	2	0	2	0	31	42	0	2	0	1
MC-6096-1	70	58	3	0	3	0	20	15	5	0	3	0
J-1798xMC-15-2-2	62	71	26	14	25	13	33	36	0	6	0	4
LCSN-1173-1-8-1-2	85	79	1	1	1	1	38	15	11	13	8	10
LCSN # 19-1	93	84	0	0	0	0	20	27	0	0	0	0
LCSN # 29-4	73	88	16	2	15	2	29	33	0	9	0	7
LCSN # 54-1-2	87	69	13	0	12	0	27	31	41	26	26	14
LCSN # 71-3-5	29	56	3	11	3	9	24	18	4	11	2	3
CIVT II_2x IVS A-75-17-1	80	82	3	2	3	2	23	36	13	0	10	0
3/4EB x (NLGx 80-25-3)	38	68	0	0	0	0	26	38	0	18	0	9
3/4 Souna x ICS 7705-44-2	58	76	10	1	10	1	33	34	0	0	0	0
UPN 6-2	74	72	0	0	0	0	25	28	0	21	0	15
UPN-$3P_1$-1	75	71	0	0	0	0	32	26	0	0	0	0
D_2-9098	63	51	3	2	3	2	28	26	0	0	0	0
D_2-9102	81	61	10	13	9	12	33	26	0	0	0	0
D_2-9161	58	46	0	2	0	1	32	22	0	0	0	0

Table 1 (Contd.)

Entry	ICRISAT Center						Kamboinse					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
D_2-9174	62	58	2	5	2	5	13	29	39	7	35	7
SC1-9002	73	77	0	1	0	1	37	35	22	49	12	33
SC1-9064	71	92	3	10	3	8	34	30	0	17	0	10
SC1-9124	84	48	2	0	1	0	24	14	29	14	18	4
SC1-9165	83	72	1	0	1	0	20	31	0	0	0	0
SSC-9053	57	56	0	0	0	0	34	23	0	0	0	0
SSC-9083	78	87	2	0	1	0	29	38	0	0	0	0
SSC-9114	75	67	0	0	0	0	33	36	6	6	2	4
NELC-9051	84	101	16	5	14	5	26	38	12	0	12	0
NELC-9067	76	93	0	1	0	1	33	28	0	0	0	0
NELC-9146	80	50	9	0	8	0	35	31	3	3	3	3
NELC-9175	75	89	0	2	0	2	28	34	0	3	0	1
SC2-9181	59	66	3	8	3	6	23	16	24	44	19	16
SC2-9185	80	82	6	7	5	7	28	34	7	9	5	7
SC2-9211	80	51	24	8	22	8	39	29	8	10	5	4
NC-9004	90	83	1	2	1	2	6	25	0	4	0	1
NC-9016	88	65	6	5	3	5	29	31	7	0	7	0
NC-9040	89	46	0	0	0	0	31	37	0	0	0	0
NC-9053	54	73	0	0	0	0	38	29	0	0	0	0
NC-9092	84	87	0	0	0	0	32	28	9	0	6	0
NC-9115	101	56	0	0	0	0	22	19	0	0	0	0
RFS-501-2	80	100	2	3	1	2	32	29	0	7	0	4
RFS-487-1	72	75	13	0	11	0	38	30	3	3	1	1
RFS-716-3	85	71	2	0	2	0	17	32	0	0	0	0
RFS-1-3	60	84	0	0	0	0	30	33	0	15	0	8
IB-4-2	98	80	5	0	5	0	28	37	61	27	30	20
IB-1-2	97	51	0	2	0	1	24	21	13	10	9	8
D-1	74	48	1	2	1	2	22	7	55	0	49	0
D-2	71	69	0	0	0	0	38	28	3	0	3	0
D-3	60	61	3	0	3	0	24	25	0	0	0	0
D-4	38	49	0	0	0	0	26	25	4	0	4	0
D-5	19	46	0	0	0	0	22	-	14	-	8	-
D-6	74	91	14	6	12	6	26	42	39	29	30	23
D-7	89	77	8	0	7	0	29	30	31	23	14	22
D-8	72	97	0	11	0	9	4	35	0	0	0	0

Table 1 (Contd.)

Entry	ICRISAT Center						Kamboinse					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
D-9	114	67	0	0	0	0	28	28	18	4	15	2
D-10	38	102	0	0	0	0	35	30	0	0	0	0
P-5	66	80	2	0	1	0	14	31	0	7	0	4
P-6	42	85	2	4	2	3	37	30	11	3	6	3
P-7	58	59	0	0	0	0	32	27	0	22	0	16
P-8	57	82	4	0	3	0	31	24	0	0	0	0
P-13	82	72	0	1	0	1	36	34	0	0	0	0
P-17	75	112	0	0	0	0	18	33	0	3	0	1
P-20	110	65	1	0	1	0	27	12	0	0	0	0
P-21	87	71	1	3	1	3	29	24	7	0	6	0
P-24	81	52	0	2	0	1	36	38	0	0	0	0
P-26	71	72	0	0	0	0	45	30	0	0	0	0
P-29	34	60	0	0	0	0	13	35	0	0	0	0
P-402	63	71	0	0	0	0	33	22	3	6	1	5
P-46	71	80	1	0	1	0	28	35	0	0	0	0
P-418	107	94	0	0	0	0	36	30	0	0	0	0
P-2623	56	59	2	0	2	0	18	23	0	0	0	0
P-2629	60	86	0	1	0	1	25	29	20	3	14	1
P-237	55	73	0	0	0	0	26	20	0	0	0	0
P-2656	73	72	2	0	1	0	28	28	0	0	0	0
P-58	74	61	1	0	1	0	24	34	0	0	0	0
P-2695	84	66	0	0	0	0	24	39	0	0	0	0
P-2692	30	61	0	0	0	0	19	30	0	0	0	0
P-414	71	56	0	0	0	0	20	25	5	0	5	0
P-66	50	79	2	1	2	1	21	24	19	46	16	41
P-12	76	60	0	0	0	0	33	20	0	0	0	0
P-508	73	53	3	0	1	0	29	24	7	17	7	14
P-2607	60	69	0	0	0	0	12	37	8	0	2	0
P-74	52	54	2	0	2	0	31	13	0	0	0	0
P-218	103	65	0	0	0	0	43	41	7	0	6	0
P-220	79	60	4	0	4	0	23	22	9	0	7	0
P-222	90	104	2	3	2	3	34	34	3	6	2	4
P-227	80	89	0	0	0	0	36	33	0	3	0	1
P-235	74	43	0	0	0	0	29	23	0	0	0	0
P-346	66	54	0	0	0	0	41	31	5	3	3	2

Table 1 (Contd.)

Entry	ICRISAT Center						Kamboinse					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
P-347	59	106	0	0	0	0	29	29	0	3	0	2
P-357	62	66	0	0	0	0	39	28	0	4	0	3
P-366	77	66	4	0	3	0	18	30	0	0	0	0
P-452	80	107	0	1	0	1	33	27	0	0	0	0
P-925	99	51	1	2	1	2	24	6	0	67	0	25
P-945	88	73	14	40	12	37	23	25	52	60	46	49
P-1410	46	34	0	0	0	0	23	19	9	5	5	4
P-1420	69	55	9	2	7	2	18	32	0	6	0	3
P-1423	75	96	0	0	0	0	25	25	0	0	0	0
P-407	69	114	0	0	0	0	31	23	16	0	7	0
P-1431	80	86	8	0	6	0	25	28	8	4	8	2
P-2601	43	81	9	1	9	1	28	26	0	0	0	0
P-1467	94	91	1	1	1	1	23	27	0	4	0	4
P-1491	74	108	8	6	6	4	21	23	0	0	0	0
P-1495	55	77	0	0	0	0	25	35	0	0	0	0
P-1498	48	74	0	0	0	0	24	29	0	0	0	0
P-1417	65	73	0	0	0	0	26	24	0	0	0	0
P-1509	77	75	1	1	1	1	29	29	0	7	0	6
P-1517	88	95	0	0	0	0	22	24	5	8	2	3
P-1522	92	98	5	7	4	6	28	33	4	0	2	0
P-1485	102	86	1	0	1	0	30	30	7	13	6	7
P-1531	108	66	11	14	11	13	34	23	50	30	43	19
P-1515	85	86	2	0	2	0	20	26	0	0	0	0
P-1518	58	92	0	1	0	1	27	38	0	0	0	0
P-1557	95	98	11	8	11	7	35	33	0	9	0	3
P-2616	70	71	3	0	3	0	20	24	0	0	0	0
P-2583	45	74	2	0	2	0	23	33	4	0	4	0
P-2599	72	73	0	3	0	3	24	24	0	0	0	0
P-2594	61	85	0	0	0	0	22	35	5	9	2	5
P-2749	54	86	0	1	0	1	16	28	0	4	0	1

Table 1 (Contd.)

Entry	ICRISAT Center						Kamboinse					
	Total plants		Incidence		Severity		Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
P-234	69	65	1	0	1	0	25	30	8	0	8	0
P-2672	73	72	7	8	7	8	24	36	0	3	0	1
P-2756	87	63	0	0	0	0	31	25	7	40	2	35
P-2776	65	73	5	4	4	2	30	22	0	0	0	0
P-2604	65	46	2	0	2	0	35	25	0	4	0	2
P-2798	92	63	0	0	0	0	29	36	0	6	0	1
ACC No.111	77	88	7	0	7	0	36	24	8	0	3	0
ACC No.116	72	41	5	7	4	4	5	17	0	6	0	2
ACC No.215	84	106	2	0	1	0	33	21	0	5	0	5
Kingal Saouga Nior Local-1	83	48	6	2	6	2	29	29	0	41	0	34
Saouga Local-5	78	95	8	1	6	1	30	33	0	15	0	10
J-1798	106	115	13	15	12	13	34	27	12	26	7	17
P-924	65	53	0	6	0	5	24	20	0	0	0	0
P-80	53	59	2	2	2	2	21	9	0	0	0	0
P-1439	80	93	2	0	1	0	34	35	0	0	0	0
P-77	89	41	0	0	0	0	30	37	0	0	0	0
P-923	56	43	0	0	0	0	36	20	0	15	0	4
P-23	42	76	0	1	0	1	27	27	0	0	0	0
P-38	92	61	0	0	0	0	38	33	3	0	3	0
P-35	88	93	1	1	1	1	37	23	0	0	0	0
P-25	91	103	0	0	0	0	40	28	0	0	0	0
P-1520	59	65	0	0	0	0	18	34	0	0	0	0
P-67	42	52	0	4	0	3	39	37	0	0	0	0
P-2771	67	87	3	0	2	0	32	26	0	4	0	1
P-1381	72	76	1	0	1	0	35	4	3	25	1	25
Local susceptible[a/]	432	383	95	97	94	96	36	34	8	15	6	11

a/ Mean of 15 plots in each replication

Table 2. Plant population, downy mildew incidence (%) and severity (%) of the 150 test entries and local susceptible in the 1980 PRE-IPMDAN at Samaru

Entry	Samaru					
	Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2
700638xSC3(M)-17-1-2-1	16	44	13	25	8	11
700713xSC3(M)-3-7-1-2-1-2	21	29	14	7	10	7
A-836xSC1(S)4-8-1	48	50	83	72	54	46
B-282xJ-804-1-3-6	37	48	51	40	20	25
B-282xJ-804-1-3-9	50	45	48	51	27	31
J-1623x700797-12-2-2	50	45	68	84	50	58
J-1623x700797-12-2-3	41	43	51	65	33	48
70-1x700594-5-3	33	50	58	54	45	38
J-1644x700490-3-1-1	28	27	0	4	0	2
B-816	34	33	21	36	15	30
WC-6096-1	46	46	76	89	60	67
J-1798xWC-15-2-2	40	49	53	43	36	28
LCSN-1173-1-8-1-2	31	46	61	74	40	48
LCSN # 19-1	50	50	76	76	47	48
LCSN # 29-4	45	50	96	98	74	88
LCSN # 54-1-2	50	50	54	60	33	35
LCSN # 71-3-5	14	10	93	90	79	75
CIVT II_2xIVS A-75-17-1	22	27	77	63	64	44
3/4EB x (NLGx80-25-3)	39	25	49	48	26	32
3/4 SounaxICS 7705-44-2	48	36	38	44	30	23
UPN 6-2	13	44	15	5	14	3
UPN-$3P_1$-1	34	37	3	0	3	0
D_2-9098	25	11	32	0	28	0
D_2-9102	30	22	100	100	99	100
D_2-9161	22	37	55	49	49	42
D_2-9174	27	11	48	45	41	41
SC1-9002	50	29	54	59	41	48
SC1-9064	31	44	45	64	31	44
SC1-9124	49	24	82	92	65	81
SC1-9165	40	50	48	36	31	24

Table 2 (Contd.)

Entry	Samaru					
	Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2
SSC-9053	37	32	5	3	3	1
SSC-9083	48	44	73	91	54	80
SSC-9114	48	45	2	7	1	3
NELC-9051	48	50	25	36	16	17
NELC-9067	29	21	31	29	20	14
NELC-9146	27	42	56	55	40	38
NELC-9175	13	12	15	33	8	17
SC2-9181	8	49	88	88	53	70
SC2-9185	11	44	18	11	9	5
SC2-9211	30	26	50	62	29	39
NC-9004	48	45	31	33	22	17
NC-9016	39	44	31	30	22	18
NC-9040	40	36	5	0	3	0
NC-9053	12	42	0	5	0	5
NC-9092	48	45	0	2	0	1
NC-9115	26	28	15	25	11	15
RFS-501-2	50	29	42	62	27	37
RFS-487-1	45	46	13	9	6	6
RFS-716-3	33	44	9	11	5	8
RFS-1-3	26	11	46	73	32	55
IB-4-2	40	49	83	90	50	56
IB-1-2	50	45	64	67	50	56
D-1	12	11	33	55	19	21
D-2	14	12	50	17	38	17
D-3	19	39	11	10	11	5
D-4	42	50	0			
D-5	43	42	100	95	85	73
D-6	48	40	58	65	52	59
D-7	23	39	30	33	19	22
D-8	40	26	20	12	14	12

Table 2 (Contd.)

Entry	Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2
D-9	45	46	89	76	73	56
D-10	26	35	0	6	0	4
P-5	14	29	7	28	4	4
P-6	32	40	44	40	31	29
P-7	32	7	28	43	23	25
P-8	25	26	4	11	4	8
P-13	14	38	0	0	0	0
P-17	18	45	28	40	17	22
P-20	28	31	4	13	4	11
P-21	15	43	80	67	68	58
P-24	18	29	11	3	11	3
P-26	15	7	7	14	7	7
P-29	19	38	0	11	0	8
P-402	15	32	27	16	17	13
P-46	40	22	5	9	5	9
P-418	43	12	5	8	4	8
P-2623	11	22	9	18	9	10
P-2629	15	40	0	18	0	16
P-237	35	34	9	9	5	8
P-2656	29	16	7	19	5	11
P-58	47	38	0	0	0	0
P-2695	25	45	16	18	10	15
P-2692	47	32	6	16	3	9
P-414	48	46	4	9	2	4
P-66	39	40	31	28	22	29
P-12	33	20	6	15	3	6
P-508	38	30	0	0	0	0
P-2607	33	21	9	10	5	6
P-74	10	29	10	17	8	15
P-218	13	21	0	10	0	4

Table 2 (Contd.)

Entry	Cemaru					
	Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2
P-220	18	18	6	17	3	14
P-222	47	39	26	28	21	20
P-227	43	22	0	9	0	5
P-235	32	34	9	15	9	10
P-346	14	22	0	5	0	5
P-347	38	21	11	24	11	17
P-357	39	45	5	0	5	0
P-366	36	48	31	38	19	23
P-452	48	24	0	0	0	0
P-925	36	32	100	97	96	85
P-945	20	7	55	100	55	82
P-1410	5	21	0	10	0	7
P-1420	50	35	24	23	17	17
P-1423	28	32	0	0	0	0
P-407	25	22	4	5	2	5
P-1431	31	49	23	20	13	17
P-2601	21	41	19	37	13	25
P-1467	14	22	7	9	7	8
P-1491	32	49	13	8	10	5
P-1495	29	20	10	10	10	6
P-1498	40	31	28	39	21	27
P-1417	43	43	7	5	7	4
P-1509	41	34	17	9	11	9
P-1517	39	41	5	2	4	2
P-1522	46	50	37	34	29	30
P-1485	43	50	7	8	2	4
P-1531	25	30	72	77	62	54
P-1515	19	29	16	14	12	10
P-1518	35	48	3	6	1	5
P-1557	18	40	17	20	11	13

Table 2 (Contd.)

Entry	Samaru					
	Total plants		Incidence		Severity	
	R1	R2	R1	R2	R1	R2
P-2616	3	23	67	13	33	11
P-2583	23	19	35	21	23	15
P-2599	39	31	28	10	18	7
P-2594	49	45	43	24	31	21
P-2749	29	22	28	32	26	30
P-234	46	50	4	12	4	10
P-2672	14	42	43	45	38	39
P-2756	12	49	67	45	35	34
P-2776	50	41	14	20	8	7
P-2604	35	42	54	57	45	44
P-2798	45	46	36	33	23	17
ACC No. 111	19	17	42	53	30	38
ACC No. 116	28	16	29	25	29	23
ACC No. 215	24	50	0	4	0	4
Kingal Souga Nior Local-1	25	49	32	41	17	29
Souga Local-5	5	22	40	23	25	21
J-1798	36	45	44	64	38	56
P-924	26	37	15	3	10	3
P-80	26	40	0	5	0	4
P-1439	50	43	8	5	7	5
P-77	20	34	0	3	0	3
P-923	8	20	25	55	25	46
P-23	12	21	42	38	38	33
P-38	20	37	20	22	15	14
P-35	36	28	6	0	4	0
P-25	18	44	89	66	75	56
P-1520	46	21	4	0	2	0
P-67	13	14	39	0	27	0
P-2771	47	36	21	22	17	15
P-1381	44	41	5	2	4	2
Local susceptible[a/]	46	46	25	26	15	15

a/ Mean of 15 plots in each replication

Table 3. Percent downy mildew severities in 150 entries at three locations in the 1980 PRB-IPMDMN compared with severity of local susceptibles and location mean for all these entries.

Entry	ICRISAT Center	Kambo-inse	Samaru	Mean
P-1423	0	0	0	0
P-13	0.7	0	0	0.2
P-58	0.7	0	0	0.2
P-452	0.5	0	0	0.2
P-1520	0	0	0.8	0.3
UPN-3P$_1$-1	0	0	1.5	0.5
NC-9040	0	0	1.6	0.5
P-77	0	0	1.5	0.5
D-10	0	0	1.8	0.6
SSC-9053	0	0	2.1	0.7
NC-9053	0	0	2.4	0.8
D-4	0	1.9	0.5	0.8
P-227	0	0.4	2.3	0.9
P-35	1.1	0	2.1	1.1
P-357	0	1.4	2.3	1.2
P-1518	0.6	0	3.1	1.2
P-80	1.8	0	1.9	1.2
NC-9092	0	3.2	0.6	1.3
P-29	0	0	4.0	1.3
SSC-9114	0	2.9	1.9	1.6
P-12	0	0	4.7	1.6
J-1644 x 700490-3-1-1	1.0	3.2	1.0	1.7
P-218	0	3.2	1.8	1.7
P-346	0	2.7	2.3	1.7
Acc.No.215	0.6	2.4	2.0	1.7
P-1417	0	0	5.3	1 8
P-1517	0	2.7	2.8	1.8
P-414	0	2.5	3.2	1.9
P-418	0	0	5.9	2.0
P-2692	0	0	5.9	2.0

Table 3 (contd)

Entry	ICRISAT Center	Kambo-inse	Samaru	Mean
P-237	0	0	6.3	2.1
P-1439	0.3	0	5.9	2.1
P-407	0	3.3	3.3	2.2
P-26	0	0	6.9	2.3
P-2607	0	1.1	5.7	2.3
P-8	1.3	0	5.9	2.4
RFS-716-3	1.3	0	6.7	2.6
P-20	0.3	0	7.5	2.6
P-24	0.5	0	7.3	2.6
P-46	0.7	0	7.1	2.6
P-2656	0.4	0	8.1	2.8
P-1410	0	4.7	3.6	2.8
P-1495	0	0	8.3	2.8
P-924	2.4	0	6.2	2.9
D-3	1.3	0	7.8	3
700713 x SC3(M)-3-7-1-2-1-2	0	1.4	8.2	3.2
P-235	0	0	9.5	3.2
P-1485	0.5	6.3	3.2	3.3
P-1467	0.8	1.9	7.6	3.4
P-2623	0.9	0	9.7	3.5
P-508	0.7	10.2	0	3.6
P-2776	3	0	7.7	3.6
700638 x SC3(M)-17-1-2-1	2.4	0	8.9	3.8
P-5	0.6	2.0	8.7	3.8
P-234	0.7	4.0	6.9	3.9
RFS-487-1	5.4	0.4	6.1	4
P-74	1	0	11.1	4
P-1515	1.2	0	10.7	4
P-2695	0	0	12.5	4.2
P-1491	5.2	0	7.7	4.3

Table 3 (contd)

Entry	ICRISAT Center	Kambo-inse	Samaru	Mean
NC-9115	0	0	13.2	4.4
NELC-9175	1.1	0.4	12	4.5
P-220	1.9	3.3	8.4	4.5
P-2599	1.4	0	12.2	4.5
P-1509	1.3	3	9.9	4.7
P-347	0	0.9	13.6	4.8
P-67	1.5	0	13.5	5
P-2629	0.3	7.5	7.8	5.2
P-38	0	1.3	14.3	5.2
UPN 6-2	0	7.6	8.5	5.4
D2-9098	2.6	0	14	5.5
D-8	4.4	0	12.7	5.7
P-1381	0.7	13.2	3.2	5.7
P-2771	1.1	0.5	15.8	5.8
NELC-9067	0.6	0	17.1	5.9
P-402	0	3	14.6	5.9
SC_2-9185	5.9	5.6	6.8	6.1
P-17	0	0.4	19.2	6.5
P-2798	0	0.7	19.7	6.8
NC-9004	1.5	0.5	19.3	7.1
P-1557	8.6	1.5	11.8	7.3
P-2583	1.1	2.2	18.7	7.3
P-1420	4.2	1.6	16.8	7.5
P-366	1.6	0	21.2	7.6
P-1431	3.2	4.9	14.9	7.7
P-2616	1.5	0	22.1	7.9
B-816	0.8	0.6	22.5	8
P-1498	0	0	24	8
P-2601	5.3	0	19.1	8.1
B-282 x J-804-1-3-6	2.1	0	22.4	8.2
P-222	2.6	3	20.6	8.7
NC-9016	3.7	3.5	20	9.1
SC_1-9165	0.6	0	27.3	9.3
D-2	0	1.3	27.1	9.5
P-2749	0.3	0.5	27.7	9.5

Table 3 (contd)

Entry	ICRISAT Center	Kambo-inse	Samaru	Mean
P-2594	0	3.7	25.7	9.8
Acc.No.116	4	0.8	26	10.3
NELC-9051	9.4	5.8	16.3	10.5
Saouga local-5	3.8	4.9	22.8	10.5
B-282 x J-804-1-3-9	2	1	28.8	10.6
3/4 Souna x ICS 7705-44-2	5.4	0	26.3	10.6
P-7	0	7.9	23.9	10.6
3/4 EB X (NLGx80-25-3)	0	4.6	29.2	11.3
P-1522	5.1	0.9	29.4	11.8
RFS-501-2	1.4	2.2	32.1	11.9
P-23	0.4	0	35.4	11.9
P-6	2.5	4.7	30.2	12.5
P-923	0	1.9	35.7	12.5
Acc.No.111	3.3	1.4	34.3	13
J-1623 x 700797-12-2-3	0.6	0.6	40.3	13.8
Kingal Saouga Nior local-1	4.1	16.8	22.8	14.6
D-7	3.4	17.8	23.8	15
D_2-9161	0.5	0	45.4	15.3
NELC-9146	4.1	3.1	38.7	15.3
D-1	1.7	24.5	19.7	15.3
P-2604	0.8	1	44.3	15.4
P-2672	7.6	0.4	38.4	15.5
RFS-1-3	0	3.8	43.1	15.6
LCSN #19-1	0	0	47	15.7
SC_1-9064	5.5	5.4	37.5	16.1
70-1 x 700594-5-3	0.7	9.2	41.1	17
J-1798 x WC-15-2-2	19.1	1.8	32	17.6
SC_2-9211	14.8	4.4	34.3	17.8
P-2756	0	18.7	34.8	17.8
LCSN-1173-1-8-1-2	1	9	44.1	18

Table 3 (contd)

Entry	ICRISAT Center	Kambo-inse	Samaru	Mean
J-1623 x 700797-12-2-2	1.1	0	53.8	18.3
P-66	1.7	28.1	25.2	18.3
LCSN # 54-1-2	5.8	19.8	34	19.9
A-836 x SC_1(S) 4-8-1	3.7	6.6	49.9	20.1
CIVT II_2 x IVSA-75-17-I	2.5	4.9	53.6	20.3
IB-1-2	0.5	8.9	52.8	20.7
D-9	0	8.5	54.4	21
D_2-9174	3.4	20.8	40.8	21.7
P-25	0	0	65.7	21.9
WC-6096-1	1.5	1.3	63.3	22
SC_1-9002	0.7	22.2	44.7	22.5
SSC-9083	0.7	0	66.9	22.5
P-21	2	3	63	22.7
J-1798	12.3	11.7	46.6	23.5
IB-4-2	2.3	24.6	52.8	26.6
D-5	0	4	78.8	27 6
SC_2-9181	4.9	17.1	61.8	27.9
SC_1-9124	0.6	10.7	73.1	28.1
LCSN # 71-3-5	6.2	2.5	76.8	28.5
D-6	8.9	26.2	55.5	30.2
LCSN # 29-4	8.7	3.4	81	31
P-1531	11.8	30.9	58.1	33.6
P-925	1.3	12.5	90.5	34.8
D_2-9102	10.8	0	99.6	36.8
P-945	24.8	47.4	68.5	46.9
Local mean for test entries	2.1	4	21	
Local susceptible mean	95.1	8.4	15.4	39.6
Range	(87-95)	(2-22)	(5-24)	

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