

**INTERNATIONAL PEARL MILLET DOWNY MILDEW
DIFFERENTIAL IDENTIFICATION PROGRAM
(IPMDMDIP)**

PROGRESS REPORT: PMPDM8003

05234

Rp



**REPORT OF
THE 1978 AND 1979 PEARL MILLET DOWNY MILDEW DIFFERENTIAL TRIAL
(IPMDMDT)**



ICRISAT

International Crops Research Institute for the Semi-Arid Tropics

ICRISAT Patancheru P.O.

Andhra Pradesh, India 502 324

ABSTRACT

The International Pearl Millet Downy Mildew Differential Trial (IPMDMDT) was evaluated in India and West Africa during 1978 (3 locations) and 1979 (5 locations). Seven entries (P-7, P-10, 700651, 700251, 700516, ICI-7530 x 314 EB 21-11, SSC-C x 75) were resistant or moderately resistant at all locations in both years; one entry (7042) was highly susceptible at all locations; and several entries showed variations in reactions among the locations. The entries with differential reactions were classified into several groups based on the pattern of resistance and susceptibility among locations.

RESUME

L'Essai international différentiel pour le mildiou de mil à chandelles (IPMDMDT) a été évalué en Inde ainsi qu'en Afrique de l'Ouest au cours de 1978 (3 emplacements) et de 1979 (5 emplacements). Sept entrées (P-7, P-10, 700651, 700251, 700516, ICI-7530 x 314 EB 21-11, SSC-C x 75) se sont montrées résistantes ou moyennement résistantes à tous les emplacements pour les deux ans; une entrée (7042) a été fortement sensible à tous les emplacements. Les réactions au mildiou (DM) de plusieurs entrées ont varié d'un emplacement à l'autre. Les entrées à réactions différentielles ont été classées en plusieurs groupes selon qu'elles se sont montrées résistantes ou sensibles d'un emplacement à l'autre.

INTRODUCTION

In the 1976 and 1977 multilocational testing program for identification of resistance to pearl millet downy mildew (DM), *Sclerospora graminicola*, several entries showed variation in DM reactions at different locations. Some entries had resistance that was effective at all locations; other entries were highly resistant at one location and highly susceptible at another. Such differences were evident between locations in India and West Africa, and also among West African locations. These variations may be ascribed to variations in the environments and/or in the pathogen populations. Variation in the pathogen populations may be quantitative or qualitative. Knowledge of qualitative variations in pathogenicity is essential for a successful breeding program aiming to produce stable resistance. To accurately classify variable populations of a pathogen, a set of differential hosts is required. In view of this, an International Pearl Millet Downy Mildew Differential Trial (IPMDMDT), containing 22 entries, was initiated in 1978 and sent to cooperators at 5 locations. In 1979, a 25 entry IPMDMDT was sent to cooperators at 6 locations. Results were returned from three locations in 1978 and from five locations in 1979. A brief report of results is presented here.

COOPERATORS AND LOCATIONS

Cooperators and locations in the 1978 IPMDMDT were:

N.V. Sundaram	Samaru	Nigeria
D.P. Thakur	Hissar	India
K.M. Saifeulla	Mysore	India
S.D. Singh	ICRISAT Center	India
S.S. Chahal	Ludhiana	India

Cooperators and locations in the 1979 IPMDMDT were

J.A. Frowd	Koporokeneipe	Mali
J.A. Frowd	Kamboinse	Upper Volta
N.V. Sundaram	Samaru	Nigeria
N.V. Sundaram	Kano	Nigeria
D.P. Thakur	Hissar	India
S.D. Singh	ICRISAT Center	India

No data were received from Mysore and Ludhiana in 1978, nor from Koporokeneipe in 1979.

TEST ENTRIES

Entries included in this trial were inbreds, hybrids and populations selected on the basis of their performance in the 1976 IPMDMN, and the 1977 IPMDMN and PRE-IPMDMN trials. Three types of entries were included; i) resistant at all locations, ii) susceptible at all locations, and iii) entries which gave differential reactions among locations.

NURSERY MANAGEMENT

Cooperators were requested to plant the trial in two replications in a DM nursery with assured high inoculum supply provided by earlier-planted infector rows and/or the use of DM sick-plot. Other details were similar to IPMDMN and PRE-IPMDMN trials.

RESULTS

Three infection parameters were calculated:

1. Percent incidence 30 days after planting (DAP) (% INF 30)
2. Percent incidence at soft dough stage (incidence)
3. A combination of incidence and severity at soft dough stage (severity)

The detailed data for each location by replication including plant

populations, & INF 30, final incidence and severity values are presented in Tables 1 to 3 for 1978 and in Tables 4 to 8 for 1979.

In 1978, plant population was generally adequate at ICRISAT Center, where only 7042 and MBH-110 had less than 30 plants. At Hissar, and Samaru, plant population was also adequate with a few exceptions.

In 1979, plant populations were adequate at ICRISAT Center, Hissar and Kamboinse, and with the exception of 7042, it was adequate at Kano as well. At Samaru most entries had low plant populations and there were large differences between replications for several entries.

DM Pressure at Test Locations During 1978 Rainy Season

ICRISAT Center. DM pressure was severe. No entry was DM free. 7042 developed 96% mean DM incidence. Several entries including BJ-104, MBH-110 and A-836 also showed high DM incidence, ranging from 59 to 95%. (In previous and subsequent tests MBH-110 has not shown more than 15% DM at ICRISAT Center. It appears that the wrong seed had been planted for this entry in 1978).

Hissar. DM pressure was low. SDN-503, P-10 and 700651 were DM free and A-836 showed highest DM incidence (33%). 7042 had 21% mean DM incidence.

Samaru. No entry was DM free. J-1593 had 88% mean DM incidence, and MBH-110, ICH-108, and ICH-105 also showed high DM incidence. 7042 was reported to have only 6% mean DM, probably because most of the DM infected plants of this entry died unnoticed at an early stage (the plant population recorded on this entry in replication 1 was only 3).

DM pressure at Test Locations During 1979 Rainy Season

ICRISAT Center. DM pressure was adequate. 7042, the most susceptible entry, had 94% mean DM followed by Cassady 87-2-2-5 and BJ-104. J-1593, the standard susceptible check, had only 13% DM. P-7, J-2000-1, and 2778-22ME were DM free and 13 additional entries had less than 10% DM.

Hissar. DM pressure was less severe. Fifteen entries were DM free. 7042 had 100% DM incidence followed by Cassady 87-2-2-5. The remaining entries had less than 5% mean DM incidence.

Kamboise. DM pressure was severe. 7042 and Cassady 87-2-2-5 had 100% and 80% DM respectively. NEC-7120 and ICH-107 also were highly DM susceptible. On the remaining entries, DM incidence ranged from 1% to 22%.

Kano. DM pressure was severe. No entry was DM free. 7042 and J-1593 had 100% and 45% DM respectively. On the remaining entries, DM incidence ranged from 4% to 44%.

Samaru. This location provided the highest DM pressure of all the locations tested. No entry was DM free. 7042 had 84% DM. Several other entries including J-1593, ICI-7620-5, 111-B, ICH-105, BD-111, and SC-2 had more than 40% DM incidence.

Performance of Entries Across Location

Across location performance of all promising entries are summarized in Table 9. On the basis of their DM incidence values, entries were classified into following 4 categories:

