

A NEW DOWNY MILDEW ON MAIZE IN RAJASTHAN, INDIA

In Rajasthan maize is mostly cultivated as a rained *Kharif* crop. With the introduction of high yielding maize hybrids and composites, several diseases have assumed the role of limiting factors in the production. Downy mildew is one such disease affecting the highly susceptible hybrids Ganga-5 and Ganga Safed-2. The pathogen was identified as *Sclerospora sorghi* Weston and Uppal (Dange *et al.*)¹. Recent studies have revealed that this fungus is quite different from the one occurring in South India which is *Sclerospora sorghi* Weston and Uppal.

The fungus perpetuates on *Heteropogon contortus* Beauv. (Dange *et al.*)². Both sexual and asexual stages have been found on this host, however, no oospore formation has been observed in the present maize samples.

When the conidial suspension from maize, infected with this downy mildew was sprayed on *Heteropogon contortus*, a collateral host, conidia and oospores were formed on this host. When conidial suspension from this host was used for inoculating maize materials, infection was obtained and conidia were formed but no oospore formation was observed.

A downy mildew susceptible sorghum line DMS 652 (obtained from Dr. K. M. Safeulla), is being inoculated each year for the last four years but no infection has been observed on this sorghum. Same has been the case with other samples also. However, *S. sorghi* from South India readily infects susceptible sorghum materials.

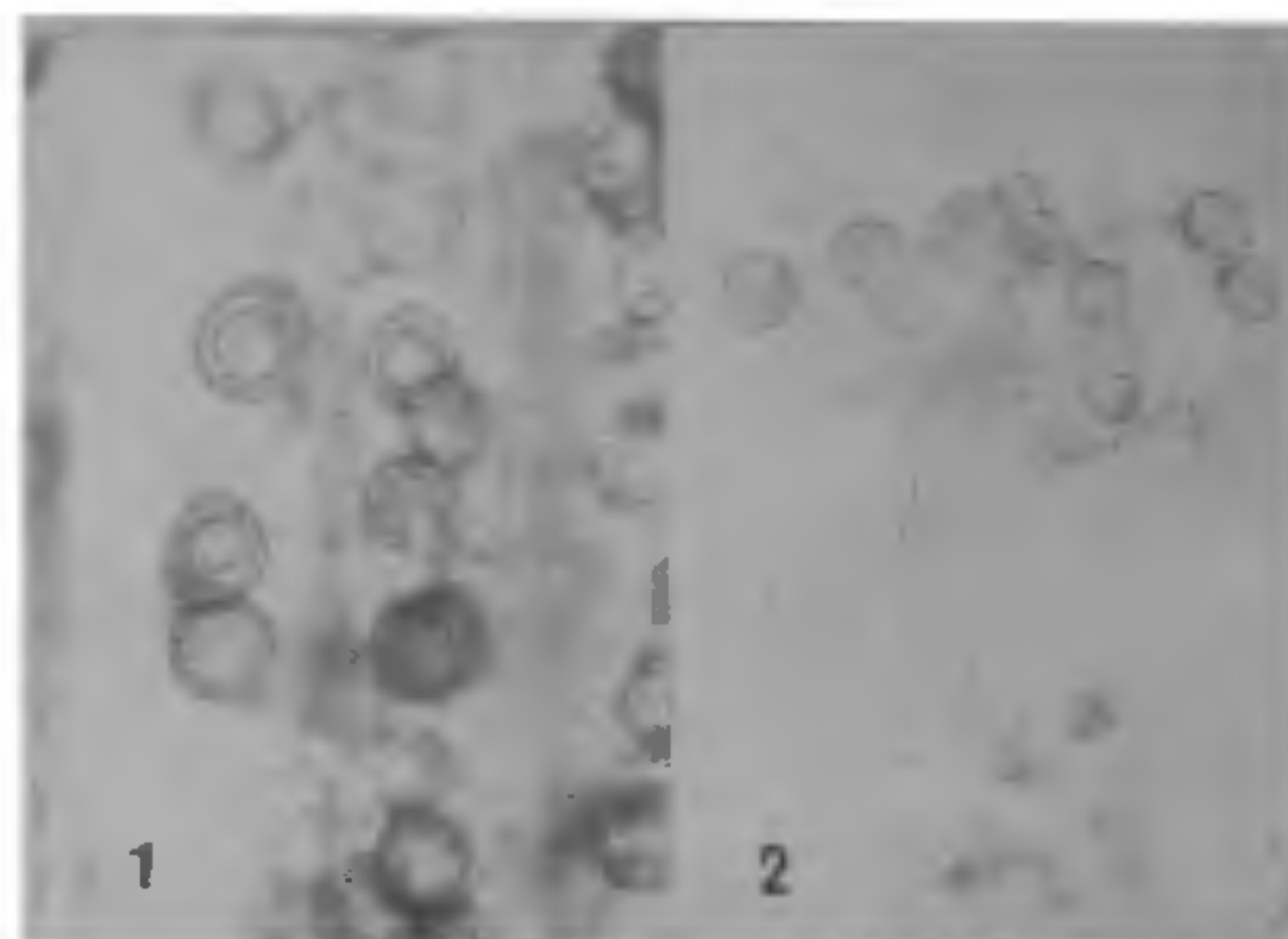
Seeds of *H. contortus* were sent to various workers working on *S. sorghi* in India and abroad but they have reported that their *S. sorghi* does not infect *H. contortus*.

Infected plants of Ganga-5 maize hybrid from Mysore during 1974 were examined. Oospore formation was observed. Leaf shredding and also tassel deformity was observed in some infected plants there. None of these symptoms was observed on infected Ganga-5 plants at this center for the past eight years.

Oospore morphology of the downy mildew from Rajasthan is also different from the one occurring in South India (*S. sorghi*). In the case of Rajasthan downy mildew oospores are tuberculate (Fig. 1). Oospores of *S. sorghi* occurring in Mysore and elsewhere are irregularly polygonally-angled. Oogonial wall is mostly fused to oospore wall. Oospore wall marking and thickness are important characters in determining different species.

Some differences in conidiophore morphology have also been observed. Conidiophores and their branches in Rajasthan maize downy mildew are shorter and stouter. Conidia are also smaller (Fig. 2).

Kaveriappa and Safeulla³ have studied the number of nuclei per conidium of *S. sorghi*. They have reported that the number of nuclei varied from 16 to 34 with an average of 22 per conidium. At this center the number of nuclei has varied from 10 to 26 with an average of 16 per conidium.



FIGS. 1 and 2. *Peronosclerospora heteropogoni* sp. nov. 1. Oospores in a portion of leaf of *Heteropogon contortus* showing the linear arrangement between the fibrovascular bundles. 2. A conidiophore bearing conidia.

In the case of Rajasthan downy mildew no oospore formation on maize takes place. The fungus does not infect even susceptible sorghum but readily infects *H. contortus*. Deformity of tassel and/or shredding of leaves also does not occur in the infected Ganga-5 plants. Oospore and conidiophore morphology is also different. Number of nuclei per conidium is also less.

It is thus evident that the original host of Rajasthan downy mildew is *H. contortus*. When susceptible maize materials were introduced in this part of the country, the fungus moved from this native grass to maize.

Shaw⁴ has suggested erection of a new genus *Peronosclerospora* in which *Sclerospora* producing conidia germinate by producing germ tube have been transferred. In view of the above suggestion, Rajasthan maize downy mildew is named as *Peronosclerospora heteropogoni* Siradhana, Dange, Rathore and Singh sp. nov.

Peronosclerospora heteropogoni sp. nov.

Conidiophori determinati, erecti, robusti cum basi tumido, dichotomico ramosi apex expansus, a basi usque ad ramificationem 81.6-142.8 × 14.3-255.5 μm, i.e., circiter 101.8 × 20.1 μm. Orde ramorum exhibit ramos breves, robustes, primaries, secundaries, tertianos, terminantes in sterigmatibus praecutis.

Conidia nocte formata, globosa, hyalina, cum pariete tenui, mensura variabili inter 14.3–22.4 × 14.3–20.4 (17.7 × 16.2) μm, continus ad apicem, inmutata sine ulla papilla dehiscentiae, germinatus plerumque per tubulam germinalem, nuclecrum numerus 10–26 in singulo conidio.

Oosporae globosae tuberculatae, cum pariete oogonali persistenti, 24.5–36.7 (29.0) μm, contenta tenuiter granulosa et germinantes per zoosporas.

Occurrunt in forma utraque conidiali et oogonali in solo *Heteropogon contortus* Beauv. et in sua forma conidiali in sola zea (*Zea mays* L.) in Rajasthan, India. Feliciter translatus in "teosinte" (*Euchlaena mexicana* L.) sed not in sorghum [*Sorghum bicolor* (L.) Moench], valde perniciosus in zea in regione Udaipur (Rajasthan).

Department of Plant Pathology,
University of Udaipur
Rajasthan College of Agriculture,
Udaipur, May 10, 1979.

BABU SINGH SIRADHANA,*
S. R. S. DANGE,**
R. S. RATHORE,
S. D. SINGH.

Present address : * University of Udaipur, Agricultural Research Station, Durgapura, Jaipur and ** ICRISAT, Patancheru P.O., Andhra Pradesh.

1. Dange, S. R. S., Jain, K. L., Siradhana, B. S. and Rathore, R. S. *Curr. Sci.*, 1973, 42, 834.
2. —, —, — and —, *Plant. Dis. Repr.*, 1974, 58, 285.
3. Kaveriappa, K. M. and Safeulla, K. M., *Indian Phytopathol.*, 1975, 28, 486.
4. Shaw, C. G., *Ibid.*, 1970, 23, 365.

STUDY OF THE EFFECT OF METRONIDAZOLE ON NUCLEAR CONSTITUENT

METRONIDAZOLE (Klont) tablets are generally prescribed by physicians to the patients suffering from disease Trichomoniasis. Earlier its mutagenic properties have been reported in *E. coli*^{5,6} and further, increased incidence of Lung⁶ tumor is also reported. It is therefore desired to test its effect on nuclear constituents, which may provide some indication of the side effects of this drug on the patients. The economic importance of such studies cannot be overemphasised in view of the fact that they have got a profound significance in cell growth, including mutations and chromosomal aberrations.

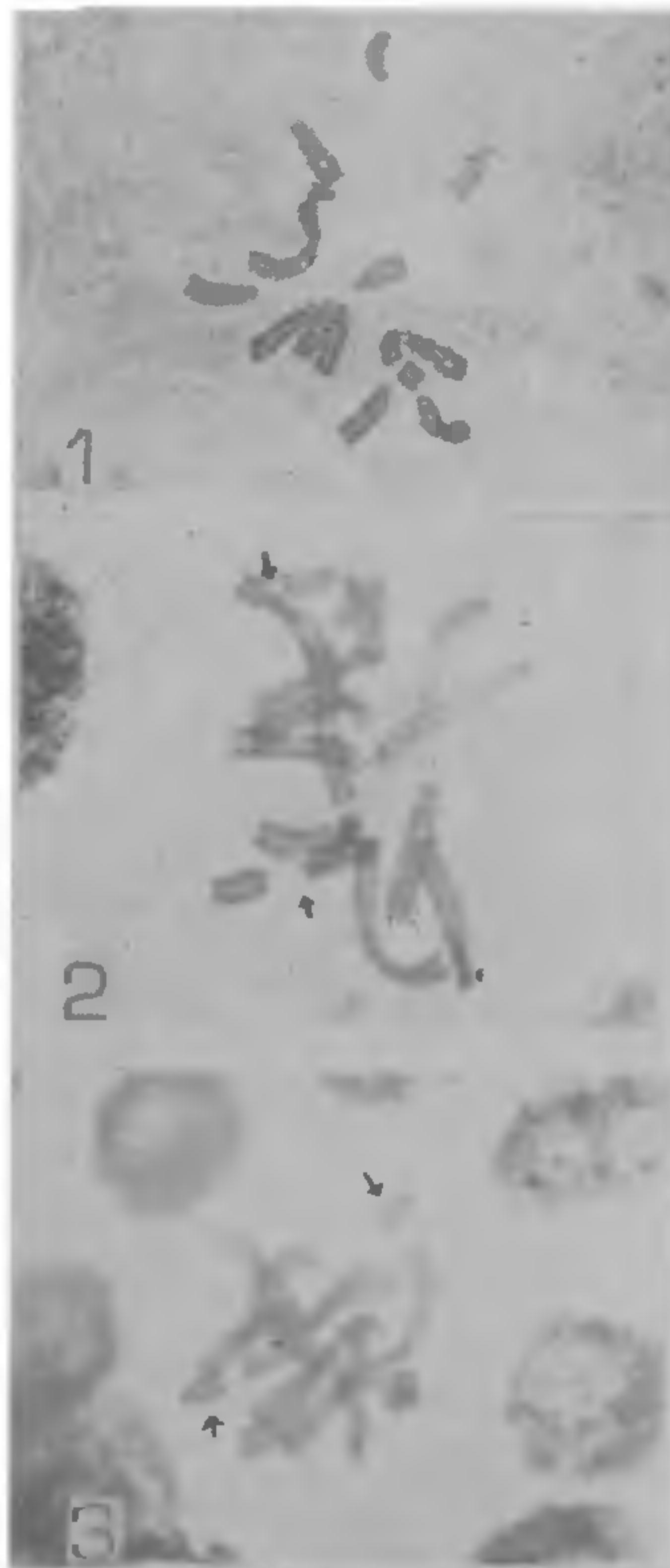
Growing roots of germinating seeds of *Vicia faba* L. were immersed in aqueous solutions of 1%, 0.5%, 0.25%, 0.20% of the drug for 4 hr, 6 hr, 12 hr and 24 hr respectively. For the study of control, germinating seeds with roots were immersed in Knop's solution for the same duration.

After respective treatment, root tips were washed thoroughly, fixed overnight in acetic-ethanol (1:3) and stained in 2% aceto-orcein N. HCl (9:1) mixture and squashed in 45% acetic acid.

Observations were recorded on approximately 500 dividing Cells. The results are given in Table I.

We know that the chromosome complement of *Vicia faba* L. is composed of one long metacentric satellited chromosome pair and five shorter acrocentric or subtelocentric chromosome pair. The long one pair of metacentric satellited chromosome has been used as marker (M) chromosome in this study.

A high frequency of metaphases with scattered chromosomes were induced due to C-mitotic action of this drug in all the concentrations. This indicates the scope of its use as pre-treating agent for chromosomal analysis.



FIGS. 1–3. Fig. 1. Showing scattered metaphase as a result of C-mitotic action, × 2,00. Fig. 2. Showing breaks in the M chromosomes (arrow mark), × 2,100. Fig. 3. Showing two breaks (side view), × 2,100 (arrow mark).