

smooth, dark brown, 6.3–8.0 μm thick at the base and 7.5–10.0 μm at the apex, of variable length. Conidia acropleurogenous, clavate to obovate, smooth, almost always 3-septate, curved, frequently straight also, brown to dark brown, 22.3–38.2 \times 16.0–22.5 μm (average 31.8 \times 19.5 μm), hilum prominently protuberant.

A sub-culture of the present isolate has been deposited at C.M.I., Kew, England under the accession number IMI 213301.

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OCCURRENCE OF A NEW STRAIN OF SORGHUM DOWNY MILDEW *PERONOSCLEROSPORASORGHII* AND ITS OOSPORES ON MAIZE IN RAJASTHAN

DURING surveys in August–September, 1979 a new strain of sorghum downy mildew [*Peronosclerospora sorghi* (Weston and Uppal) C.G. Shaw] of maize was recorded in several fields of Udaipur division in Rajasthan State. Different genotypes of maize crop were found infected by the disease. The disease exhibited symptoms clearly different from those of sorghum downy mildew known in the State since 1968. The affected plants showed long, narrow to broad, regular, white to yellowish streaks and stripes along the length of the leaves of plants of one month age and beyond. The first 3–4 leaves were found free from infection whereas those developing subsequently showed streaks and stripes in increasing acropetal order covering fully the top leaves. A white downy growth developed on both the surfaces of the striped leaves under favourable weather conditions. The stripes in due course of time turned brown and necrotic. The diseased plants remained abortive and rarely bore poor ears with none or few grains.

The Pathogen

The fungus formed abundant conidiophores bearing conidia generally on the lower surface but in favourable weather conditions on the upper surface of leaves also. The conidiophores were hyaline, erect, determinate, macronemous, with a prominent bulbous

base, frequently with one or rarely two septa and developed three branches mostly. The basal cells of conidiophores were knobbed or bulbous at the bottom measuring 38.5–250.2 (105.1) μm in length and 3.85–11.55 (7.9 μm) in width. The main axis from the first septum to the beginning of branch system was 103.9–219.4 (161.1) μm long with the average diameter being 9.1 μm near the base and 28.3 μm near the origin of branches. The main axis was usually more than or equal but rarely less than the length of the basal cell. It ramified in primary, secondary and tertiary branches terminating in tapering horny sterigmata averaging 11.3 μm in length. Conidia borne on sterigmata on tips of branchlets when in place on conidiophores having three primary branches, lie in a hemispherical plane—a feature characteristic of this downy mildew. Conidia were globose to oval, hyaline, thin-walled, 13.5–28.9 \times 13.5–21.2 μm with an average of 18.1 \times 16.0 μm . The conidium always germinated by a germ tube. The oospores were recorded in the brown necrotic stripes abundantly. Oogonia were dark brown in colour and irregular in shape varying from 42.4–61.6 \times 38.5–50.0 μm (49.6 \times 44.5) μm in size. The oospores were spherical enclosed in the thick irregular oogonial wall, golden yellow and were 26.9 to 38.5 μm in diameter (average 33.95–34.65 μm). The presence of oil globules centrally located or eccentrically placed in the body of oospores was noticed.

Discussion and Conclusion

The fungal morphology described here particularly of arrangement of conidia on a hemispherical dome and irregularly polygonally angled oogonial wall resembles that of *Peronosclerospora sorghi*^{3,4}. Payak *et al.*^{2,3} described the presence of three races of *Peronosclerospora sorghi* on the basis of symptomatology and host range, viz., sorghum, sorghum-maize and maize races. The present pathogen does not fit in any of the three races. The sorghum race occurs only on grain sorghum and grain sorghum \times Sudan grass hybrids. The sorghum-maize race attacking different species of sorghum, maize, teosinte and others produces proliferation of vegetative and floral parts; result in leaf shredding and shortening of upper internodes of diseased plants. The absence of any of such symptoms in the present pathogen excludes its possibility of being sorghum-maize race. Moreover, nowhere the disease has been recorded on any of the sorghum genotypes grown near maize fields having the disease. The pathogen also differs from maize race. Maize race has been reported to occur in India (Rajasthan) as well as Thailand and Africa. A comparison of the disease symptoms and morphology of maize race prevailing in Rajasthan State with that of the present pathogen showed that the two are distinctly different. Moreover, occurrence of oospores

has never been recorded in maize race. There is also a marked difference in shape, size, colour and arrangement of oospores of the present fungus with that of the maize race found on *Heteropogon contortus*¹. Therefore, the present pathogen cannot be ascribed to maize race. It, therefore, deserves altogether a separate position. The authors, however, feel that a thorough review of symptoms, morphology and host range of *Peronosclerospora sorghu* is necessary for better understanding.

The presence of oospores in large numbers in the present strain may lead to rapid spread of the disease year after year. Therefore, the disease is being studied in detail.

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A NEW WILT DISEASE OF GRAM CAUSED BY *FUSARIUM MONILIFORME* SHELDT.

Cicer arietinum L. commonly known as gram or chick-pea, is grown over an area of about 8 million hectares in India. During 1978-79 in rabi season, the authors observed a number of wilted plants of gram in the field at Regional Station, I.A.R.I., Kanpur, U.P.

The affected plants were stunted and the chlorosis of leaves beginning at the apex progressed towards the base followed by severe wilting and death of the plants. Infection of vascular tissues also occurred as evidenced by the presence of mycelium in the xylem vessels. The diseased plants were infected in the collar and root region.

Repeated isolations from the root and collar regions of the infected plants yielded a culture of *Fusarium* sp. on potato dextrose agar medium. The pure culture of the fungus was obtained by preparing single cell spore culture and identified as *Fusarium moniliforme* Sheld. Colonies on potato dextrose agar, at first, were cottony white but later changed to light violet. In order to test the pathogenesis of the fungus, 25 days old healthy plants of the gram (B.G. 229) raised from surface sterilized seed, on sterilized soil in pots, were inoculated by removing the top soil around the plants upto 5 cm depth, and replacing it with 5% of soil maize meal medium W/W, infested with *Fusarium moniliforme*. In control pots, the top soil around the plants upto 5 cm depth was replaced with soil maize meal medium without the fungus. All the inoculated plants developed disease symptoms in 15-20 days, similar to those produced in nature. All the inoculated plants were killed within six weeks after inoculation. Reisolations from such infected plants yielded, *Fusarium moniliforme*, which was identical to the original culture. The plants in the control pots remained healthy. Parasitism of *Fusarium moniliforme* has been reported on maize^{2,4-6} mango⁹, sugarcane^{7,8}, sunflower¹; however on gram it is a new record of parasitism of this fungus.

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