

CHARCOAL ROT OF MAIZE CAUSED BY *MACROPHOMINA PHASEOLINA* (TASSI) GOID , A NEW RECORD FROM MYSORE (KARNATAKA)

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Charcoal rot of maize (*Zea mays* L.) caused by *Macrophomina phaseolina* (Tassi) Goid. (= *Rhizoctonia bataticola* (Taub.) Butl.) is found to be widespread in comparatively drier and low rainfall areas where this crop is grown (Livingston, 1945 ; Young, 1949 ; Koehler, 1960). In India, the disease was found to be in epidemic form during 1960 *kharif* season in Kashmir valley. Later it was recorded from Hyderabad (AP) during 1965 '66 *rabi* season and at Pantnagar in 1966 *kharif* season (Payak and Renfro, 1969). In West Bengal (WB) it was reported from 1976 crop season in *rabi* plantation in the Indogangetic plains and its surrounding areas (Kaiser and Das, 1983). The disease is widely prevalent over different parts of India including Himalayan region, North Eastern Plains, North Western Plains and Peninsular India (Kaiser, 1986) and it is, at present, of major importance in this country resulting significant loss in yield and crop value under favourable environmental conditions (Payak and Sharma, 1985).

During the months April-May of 1988 *rabi* season some maize inbred lines (CM materials) grown for evaluation against Turcicum Leaf blight disease (*Exserohilum turcicum* (Pass.) Leon. & Suggs.) on a farm in Nagenahalli area of Mysore in Karnataka exhibited incidence of charcoal rot disease. It contributed to the discolouration of the basal internode and disintegration of pith of the infected stalks resulting premature death of plants in isolated cases. The disease incidence appeared to be correlated with high temperature (average maximum 32°C and minimum 26°C) and low humidity resulting from a dry spell and very low rains in the growing season.

On careful examination of the diseased plants the symptoms on different plant

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parts were recorded as follows. The roots turned brown and the outside of the lower internodes became straw coloured but in few cases it became dark brown. The pith became badly disintegrated and the infected stalks splitted up longitudinally into a mass of fibres. The most distinguishing character of the disease was the presence of small black sclerotia (45-120 μ in diameter) in the pith of affected stalks and in the disorganised tissues of the roots (Fig. 1). In severe case drying of maximum leaves starting from the lowermost one and drying of ear husk from the tip were noticed resulting premature death of the whole plant.

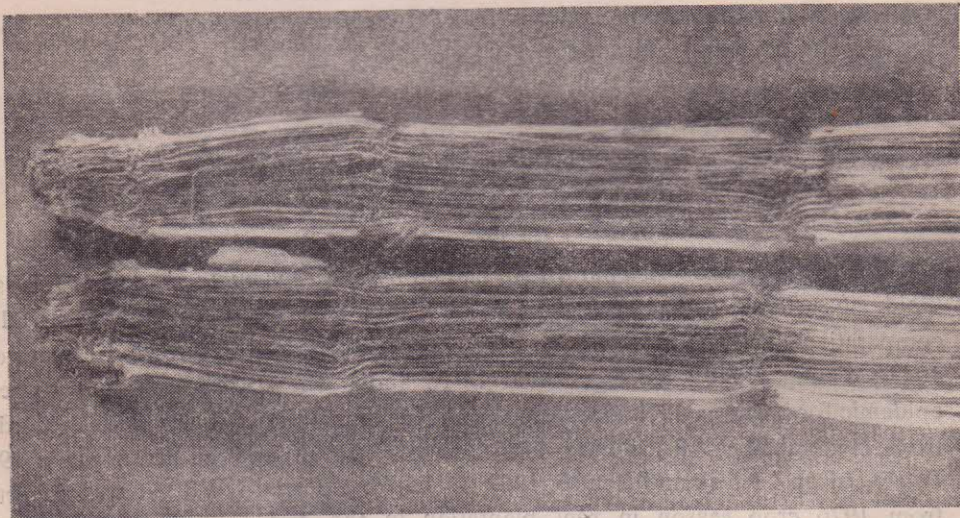


Fig. 1. Pith of the affected stalk due to *M. phaseolina* in maize.

The pathogen was isolated from the infected plant parts and transferred to 10 cm petriplates containing potato dextrose agar (PDA) medium (peeled potato 200 g; dextrose 20 g; distilled water to make 1000 ml). The plates were then incubated at $29 \pm 1^\circ\text{C}$ for about 2 weeks and were periodically observed. The mycelium of the fungus in PDA medium was found initially white up to a period of 3 days and later it gradually turned black to dark brown. When incubated at higher temperature of more than 30°C the mycelium became light pink colour. Pycnidial production, however, was not observed in any case but sclerotial formation started after 8 days. Pycnidial production, was induced on dried autoclaved maize leaves as follows. Dried leaf pieces of maize (3X3 cm) after washing were autoclaved and placed in culture plates on 2% water agar. The leaf pieces were inoculated at the centre with the fungual culture and were incubated at room temperature (25° to 30°C) for about 3 weeks under natural diffused light and protected from sunlight. Pycnidial production occurred within 7 to 10 days. Sclerotial formation, however, started after 15 to 17 days. These morphological features as observed in the

present case were similar to those obtained by different workers (Kulkarni and Patel, 1966 ; Kulkarni *et al.*, 1966 ; Mehta *et al.*, 1972).

The pathogenicity of the causal fungus was tested on a local maize cultivar grown as *spring* maize on a farmer's field in Pundooah of Hooghly district in WB following toothpick inoculation method (Diwakar and Payak, 1974). For this purpose, the fungal culture was multiplied on hard round sterilized bamboo toothpicks (5 cm long) partially submerged in potato dextrose broth (PDB) medium (peeled potato 200 g ; dextrose 15 g ; distilled water to make 1000 ml) supplemented with 0.1% yeast extract in cotton plugged jars. The cottony mycelial growth of the fungus that covered the tapering ends of the toothpicks after incubating at $29 \pm 1^\circ\text{C}$ for about 2 weeks, were then used for inoculation. About 10 plants, already tasselled, were inoculated by inserting toothpicks at the basal internodes. Symptom started developing as black brown discolouration of the pith and in about 21 days the pith upto 50% of the adjacent internode discoloured. In advanced stage typical symptoms of disintegration of the pith and formation of sclerotia were noticed.

The pathogenicity was further tested on a collateral host jute (*Corchorus olitorius* L) by inoculating 15 days old seedlings of a susceptible cultivar JRO-632 under laboratory conditions in pots with the fungal suspension grown in PDA medium. And within 7 days about 50 % of the inoculated seedlings developed damping off symptom under high humid condition.

Although *M. phaseolina* inciting charcoal rot of maize is widely prevalent over different states of India including AP, Bihar, UP, MP, Punjab, Haryana, Delhi, Rajasthan and WB this report constitutes the record of *M. phaseolina* on maize for the first time in Mysore (Karnataka).

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