Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Sclerotium hydrophilum* Causing Stem Rot Disease of Rice in North Eastern Plain Zone of India

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High incidence of stem rot in rice (*Oryza sativa* L.) caused by *Sclerotium hydrophilum* Sacc was observed in the Eastern Gangetic plains of India including eastern Uttar Pradesh and Bihar states in a rice-wheat irrigated ecosystem in the months of August and September of the years 2016 and 2017 at the maximum tillering stage of the crop plants. A survey was conducted for the prevalence of rice diseases in Eastern Uttar Pradesh and Bihar. Stem rot incidence (12 to 14%) was observed in widely cultivated rice varieties, namely, Swarna, Sabour Surbhait, Samba Mahsuri, and Bhagalpur katarani. Brownish to black water-soaked lesions without distinct margins were visually observed on rice leaf sheaths in Pusa, Bihar, and Allahabad, Uttar Pradesh (India). To isolate the causal pathogen, pieces of symptomatic leaf sheaths were treated with 1% sodium hypochlorite solution for 1 min, rinsed with sterile distilled water for 2 min, and then transferred to potato dextrose agar (PDA) medium for incubation at 28°C. The cultivated mycelium was transferred to fresh PDA medium. Colonies of pure cultures on PDA medium were initially white and turned brown about 2 weeks later. The hyphal width was measured with a range of 4.0 to 6.0 µm. Large

numbers of small globose sclerotia were observed on the surface of the colonies at 5 days after subculturing. The sclerotia were white at first and then turned black over time with maturity. The diameters of sclerotia ranged from 0.32 to 0.51 mm with an average of 0.41 mm ($n = 50$). DNA of a representative isolate named SH1 was extracted, and the internal transcribed spacer region was amplified by PCR with universal primer pair ITS1/ITS4 (White et al. 1990). Sequence analysis showed 99.66% identity with *S. hydrophilum* isolate VC228 (accession no. KT362098) and accession number KX181457 was obtained. Phylogenetic analysis based on the neighbor-joining method grouped the isolates along with other isolates from Asia. The pathogen was identified as *S. hydrophilum* on the basis of cultural, morphological, pathogenic, and molecular characteristics. Further, a culture was deposited to the Indian Type Culture Collection (ITCC) at the Indian Agricultural Research Institute, New Delhi, for identification, where it was identified as *S. hydrophilum* with identification number 10039.15. Another culture specimen of the pathogen was also deposited at the ITCC-IARI, New Delhi, with accession number 19160.25. Koch's postulates were completed by inoculating rice plants with PDA disks of 5 mm in size bearing both mycelium and sclerotia of *S. hydrophilum* in 45-day-old plants of rice genotype Samba Mahsuri under glass house conditions. After 4 days, leaf sheath necrosis was observed around the inoculation plugs under field conditions. The same fungus was reisolated from the symptomatic lesions of inoculated plants, fulfilling Koch's postulates. The pathogen was reported with high disease incidence in Northern Karnataka (Pramesh et al. 2017). However, based on literature and fungus-host distribution records, this is the first report of *S. hydrophilum* on leaf sheath of rice from the North Eastern Plains Zone of India.

References:

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