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Commentary

Characteristics and Pathogenecity of *Phomopsis vexans* leading to Decrease in Agriculture Productivity

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DESCRIPTION

Species of *Diaporthe* and their asexual forms (*Phomopsis* species) have broad host range and are widely distributed as plant parasites, endophytes and as saprobes. *Diaporthe* species are also responsible for some of the important crop plants diseases distributed worldwide. The disease includes root rots and fruit rots, dieback, cankers, leaf spots, blights, decay and wilt are the important ones. In the past *Diaporthe* species have been noted to deter herbivory, lingo-cellulolytic activities, or as bio-herbicides. *Phomopsis vexans* is the anamorphic stage of *Diaporthe* on brinjal causing severe damage to the brinjal crop in different regions of the world. The pathogen *P. vexans* associated with brinjal has been reported from many areas in the warmer parts of continents except for Europe and a few African countries. This pathogen is believed to be originated from the South Asia and reported to infect some of the wild *Solanum* species. The fungus is readily transmitted through seeds as internally as well as externally as seed-borne inoculum. *Diaporthe vexans* as teleomorph of *P. vexans* has been invalidly published and the same stage of the fungus is yet to be encountered except for perithecial stage in cultures and considered as synonym to *P. vexans*. Although, earlier this fungus was considered to be specific on brinjal, now it has been reported on other hosts like Acacia, Prunus, Sorghum and Capscicum. Various workers have contributed to establish etiology and identification based on morphology.

The leaf blight disease affects rate of photosynthesis and hence the crop productivity is affected. The cultural practices including sprinkler irrigation pattern adapted during cultivation in recent years might have helped the splash dispersal of soil and fruit-borne conidial propagules and must have caused new infections on the fruits resulting in severe fruit rot incidence. Use of hybrid seeds were less compared to the seeds processed by farmers reduced incidence of Phomopsis blight was observed from hybrid seeds but complete lack of incidence was not recorded. Infected seeds may serve as primary source of inoculums. The appearance of leaf blight disease on brinjal was high during humid conditions, which might have favoured the growth and dispersal of the fungal propagules. It is known that the incidence and severity of plant disease were greatly influenced by the weather. Maintenance of high relative humidity, moisture and optimum temperature for higher yield might have helped the survival of the pathogen that in turn resulted in higher incidence and severity of *P. vexans*. *P. vexans* produced different disease symptoms such as damping off, leaf blight; fruit rot and stem blight on brinjal crop. Damping off of brinjal includes the development of girdling signs at the base of the stem and soil interface. The affected plants toppled and died due to rotting of root system. Pycnidia were noticed on the girdle and the death of whole seedling was observed. Leaves emerged from infected seedlings also showed leaf spot disease due to early infection. Leaf blight symptoms includes the development of tan, brown coloured oval necrotic zones which later turned to irregular and coalesced. Lesions on the petiole or the lower part of the midrib resulted in early senescence, and the blight affected areas produced numerous black pycnidia. At first, the lesions were small, more or less circular, and buff to olive, later becoming cinnamon buff, with an irregular blackish margins. Rotting of fruit was noticed during transit and even after harvest. On stems and aerial branches, elongated, blackish brown lesions were observed. The affected plants produced small leaves and the axillary buds were often killed. When stem girdling was severe, the shoots showed wilting followed by death of infected seedlings. Affected plants toppled by the wind. Pycnidia were seen on lesions on young stems, but rarely on older ones; were Pycnidia on fruit bigger than those produced on stem and leaves. In severe infection, the whole fruit was mummified.

CONCLUSION

Fruit rot symptoms appeared first as a minute sunken grayish spots with a brownish halo, which later enlarge and coalesce to form concentric rings of yellow and brown necrotic zones. The rotten areas increased in size and with the appearance of conidiomata concentric zones. Colonies of *P. vexans* isolates on

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PDA (Potato Dextrose Agar) were white to pale pink with wavy margins at the periphery. Pycnidia were submerged and formed all over the surface of mycelial mat. The number and size of pycnidia vary from isolate to isolate collected from different agro-ecological regions. The mycelia were hyaline and septate; the conidiophores (phialides) within the pycnidium were hyaline, simple, or septate and arose from the innermost layer of cells lining the pycnidial wall. Two types of conidia (alpha and beta) were observed. Alpha conidia were hyaline, single celled, biguttulate and sub cylindrical. Beta conidia were filiform, curved, hyaline and septate. Most of the information related to the identification of *P. vexans* was only on morphocultural studies. Variation in colony morphology and pycnidial development indicate that, isolates from all the represented agro-ecological regions shared maximum similarity though a slight variations can be seen with respect to the colony diameter and number of pycnidia developed. However, regarding the colony types, there are two distinct types of colonies for *P. vexans* and they are G-type (colony characterized by a few aerial hyphae, white to grey and formed abundant small pycnidial stroma with irregular pycnidial locules) and W-type (colony with aerial hyphae, scattered relatively large stromata, irregular pycnidial locules with alpha and beta conidia on PDA). A total of 18 isolates were of G-type, which were represented by isolates from all six agro-ecological regions and the rest of the isolates could not be classified due to lack of uniformity in cultural characteristics and identified to species level by its sequence similarity. Morpho-cultural and molecular shared close genetic relatedness among the different isolates of *P. vexans* with wide geographical areas.