

Host Range of Sheath Blight Pathogen of Rice

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Ten wild rice types, forty eight crop plants and eighty four weed hosts were artificially inoculated with the sheath blight pathogen-*Rhizoctonia solani* and studied the host range of *R. solani*. The wild-rices viz. *Oryza australiensis* and *Oryza nivar* were more susceptible to the disease than others tested. The crop plants viz. *Echinochloa colonum* var. *frumentacea*, *zea mays*, *Eleusine coracana* and *Pennisetum typhoides* were highly susceptible to the disease. The grasses *Eriochloa procera*, *Imperata cylindrica*, *Saccharum spontaneum* and *Urochloa panicoides* were more vulnerable to the disease. The occurrence of *R. solani* was recorded in twenty one new weed hosts under natural conditions.

Sheath blight disease of rice caused by *Rhizoctonia solani* Kuhn (*Thanatephorus cucumeris* (Frank) Donk) is a serious disease in many rice growing areas of Tamil Nadu. With the introduction of high yielding and high fertility strains of rice the incidence of this disease has been found to be severe. The occurrence and severity of sheath blight disease of rice in Tamil Nadu was reported by Venkata Rao and Kannaiyan (1973) and Kannaiyan and Prasad (1976). The reduction in grain yield due to severity of this disease had been estimated to vary from 5.2 to 25 per cent (Ou, 1973 and Lee, 1974).

MATERIAL AND METHODS

(i) Reaction of different species of plants to *R. solani*

Ten wild rice types and 48 other crops were raised in mud pots. They included cereals, pulses, oilseeds, fibres vegetables, green manures and fodder

crops and 84 weeds. The cereal and fodder crops were inoculated with the pathogen by straw bit method developed by Venkata Rao and Kannaiyan (1973). The other crop plants were inoculated by placing a single sclerotium of the pathogen on each of the five leaves which were later covered with absorbent cotton. The inoculated plants were sprayed with sterilized water both in the morning and evening for 3 days. The inoculated and water sprayed plants were covered with polythene sheets in order to develop humidity. The disease reaction was observed.

(ii) Perpetuation of *R. solani* in weed hosts

A field survey was initiated to collect the weed hosts affected by sheath blight disease commonly associated with rice fields. The disease affected weed hosts occurring in the rice field bunds were collected and the pathogen isolated in Rice Agar medium

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(Meyer *et al.*, 1973). The pathogen was inoculated in the susceptible rice variety ADT. 31, and the development of symptoms observed and the identity of the pathogen confirmed.

RESULTS AND DISCUSSION

The results have shown that *Oryza australiensis* and *Oryza nivara* were highly susceptible to the disease. The resistant nature for this disease was observed in *Oryza rufipogon* x *Oryza barthii*. The remaining wild rice types tested were moderately susceptible. Among the graminaceous plants tested *Sorghum vulgare*, *S. sudanense* and *S. halepense*, were least affected by the disease while *Echinochloa colonum* var. *frumentacea*, *Zea mays*, *Eleusine coracana* and *Pennisetum typhoides* were highly susceptible. Among the thirty dicot crop plants tested twenty two have shown positive reaction to the disease. It was found that the grasses *Eriochloa procera*, *Imperata cylindrica*, *Saccharum spontaneum* and *Urochloa panicoides* were highly susceptible to the disease than others. The pathogen was unable to infect *Apluda mutica*, *Scirpus articulatus* and *Aristida depressa*. Of the thirty dicot weeds inoculated nineteen were susceptible to the pathogen. The occurrence of *R. solani* was recorded in twenty one new weed hosts under natural conditions. The occurrence of the sheath blight disease was found to be very severe in *Eriochloa procera*, *Andropogon asper*, *Cynodonon dactylon* and *Ischaemum indicum*. The other weed hosts susceptible to the disease are *Commelina nudiflora*, *Chlonachni koenigii*, *Cyperus rotundus*, *Digitaria*

longiflora, *Merremia emarginata*, *Panicum repens*, *Paspalum scrobiculatum*, *Digitaria adscendens*, *Chloris barbata*, *Paspalidium flavidum*, *Bracharia mutica*, *Fimbristylis ovata*, *Desmodium triflorum*, *Imperata cylindrica*, *Urochloa Panicoides*, *Alysicarpus monilifer*, *Dichanthium caricosum*.

Studies conducted by Kohli (1966) and Roy (1973) revealed that the host range of sheath blight pathogen *R. solani* is restricted to plants belonging to Gramineae, Cyperaceae and Commelinaceae. However, the reports of Mahendra Prabhat *et al.* (1973) revealed that the fungus *R. Solani* was found to infect plants belonging to Pontederiaceae, Zingiberaceae, and Papilionaceae also under artificial inoculation studies. The present results clearly showed that the sheath blight pathogen *R. Solani* can infect a wide variety of host plants belonging to several families viz., Gramineae, Cyperaceae, Papilionaceae, Cruciferae, Cucurbitaceae, Malvaceae, Solanaceae, Pedaliaceae, Compositae, Chenopodiaceae, Umbelliferae, Acanthaceae, Sapindaceae, Boraginaceae, Nyctaginaceae, Rubiaceae, Amaranthaceae, Convolvulaceae, Aizoaceae, Tiliaceae, Campanulaceae, Pontederiaceae, Labiatae, Caesalpinaceae, Marsileaceae and Aristolochiaceae.

Weeds or rotation of crops may be infected with *R. Solani* and may function as a source of inoculum (Baker and Martinson, 1970).

The results indicated that *R. solani* can infect a wide range of hosts, besides rice including numerous economically important cultivated crops as

well as weeds. The results indicated that under favourable environmental conditions, the fungus may become a potential pathogen of other crop plants as well. The results of the present study also clearly shown the ability of the pathogen to perpetuate in weed hosts during the off-season.

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