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Plant Pathology *(Note)*

Rhizoctonia web blight of soybean in Pakistan

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Summary — Rhizoctonia aerial or web blight of soybean (*Glycine max* (L.) Merril) caused by *Rhizoctonia solani* Kuehn was observed for the first time under high humidity and temperatures at the National Agricultural Research Centre, Islamabad in 1983 and again in 1985 and 1987. Pathogenicity tests and reisolation from the inoculated plants confirmed that *Rhizoctonia solani* was the cause of soybean web blight.

***Rhizoctonia solani* – *Glycine max* – web blight – temperature – moisture**

Résumé — Attaques du soja par *Rhizoctonia solani* Kuehn au Pakistan. *Des attaques de* Rhizoctonia solani *Kuehn sur soja* (Glycine max *(L.) Merril) ont été observées pour la première fois au Centre National de Recherches Agricoles d'Islamabad en 1983 dans des conditions d'humidité et de température élevées. D'autres attaques ont ensuite été observées en 1985 et 1987. Des tests et l'isolation à partir d'individus inoculés ont confirmé qu'il s'agissait bien de* Rhizoctonia solani.

Rhizoctonia solani – Glycine max – *rhizoctone brun* – *température* – *humidité*

INTRODUCTION

Web blight of soybean (*Glycine max* (L.) Merril.) caused by *Rhizoctonia solani* Kuehn has been reported in subtropical and tropical regions of the world. It was first reported in the Phillippines (Reinking, 1918; Nacian, 1924) and has since been reported from Brazil (Machado *et al.* 1973), Colombia (Patino, 1967), Egypt (El-Helaly *et al.*, 1972), Germany (Noll, 1939), India (Verma & Thapliyal, 1974), Malaya (Voelcker, 1953), Mexico (Crispin & Gallegos, 1963), Puerto Rico (Hepperly *et al.*, 1982), China (Chein & Chung, 1963), Taiwan and Louisiana (Atkins & Lewis, 1954). In Louisiana, yield losses of 35% have been attributed to web blight (Horn & Fontenot, 1980). In India incidence of web blight reached 80-90% in unsprayed plots, while in benomyl sprayed plots, the disease was controlled and yield increased significantly (Verma & Thapliyal, 1974). Atkins & Lewis (1954) have reported on the host range of the pathogen.

Although *Rhizoctonia* web blight may have been present earlier, it was first observed in soybean experimental plots at the National Agricultural Research Centre, Islamabad (NARC), during September 1983 and then in 1985–1987 under high humidity and warm temperatures.

The purpose of this paper is to report the occurrence, identification and the pathogenicity of the *Rhizoctonia solani* on soybean from Pakistan.

MATERIALS AND METHODS

Disease symptoms of *Rhizoctonia* web blight were first observed at pod filling stage and infected plants of the soybean variety Davis were collected from an experimental plot at NARC, Islamabad. For isolation, 3–4 mm segments of infected leaves were surface sterilized in 0.1% sodium hypochlorite solution for 1 min, rinsed in sterile water and plated on 9 cm Petri-plates containing 15 mL of potato dextrose agar (PDA) and then incubated at 25 °C for 7 days. Observations on cultural characteristics and growth of the fungus were recorded daily.

For determining the pathogenicity a 5–7 day old Petri dish culture of *R. solani* on PDA was comminuted

in 300 mL of distilled water for 5 min in a Waring Blender to prepare an inoculum suspension. Following this 4–5–week old aerial plant parts of the variety "Davis" were artificially inoculated by spraying them with mycelial suspension. Inoculated plants were kept in a moist chamber for 24 h and then transferred to a greenhouse at 30 °C with 95% relative humidity and a 12 h photoperiod.

RESULTS AND DISCUSSION

Natural symptoms

Disease symptoms which developed on the leaves were greenish to reddish brown necrotic areas of circular-irregular shape with reddish brown margins. The affected plants showed 30-80% defoliation. In severe infection, the whole leaflets were blighted and a grey to tan coloured mycelium growth with microsclerotia was observed in the necrotic areas under high humidity and warm temperatures. In addition, lesions formed on the petioles and stem of severely infected plants. Typical sclerotia of irregular shape, dark brown coloured and ranging from 200-260 x 295-480 µm in size were also observed on the leaf lesions.

Isolation and identification

Characteristic mycelium branching at right angles with constrictions at the base of hyphal branches covered the entire PDA plate at 25 °C after 48 h. Sclerotia on PDA were 3-5 mm in diameter, and cinnamon-coloured. Based on the cultural characteristics of mycelium and sclerotia, the pathogen was identified as *Rhizoctonia solani* Kuehn.

Pathogenicity

On the artificially inoculated plants, symptoms first appeared as water soaked circular to irregular spots on the leaves which later turned brown to tan coloured or reddish brown. Our *Rhizoctonia* isolate produced disease symptoms identical to those observed in the naturally infected plants within 7-10 days in the greenhouse. The pathogen was consistently reisolated from the artificially infected plants, confirming its pathogenicity.

The pathogen has a different host range and apart from soybean, it can attack common bean (*Phaseolus vulgaris*), lima bean (*P. limensis*), clover (*Trifolium* spp.), cowpeas (*Vigna* spp.) fescue (*Festuca* spp.), fig (*Ficus* spp.), lespedezas (*Lespedeza* spp.), rice (*Oryza sativa*), wild soybeans (*Glycine javanica*) and tung (*Aleurites* spp.) as reported by Sinclair (1982). Although, the disease has also been reported on mungbean (*V. radiata*) by Alam *et al.* (1985); however, this appears to be the first report of web blight (*R. solani*) on soybean from Pakistan.

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