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Title: MANAGEMENT OF COLLAR ROT DISEASE OF SOYBEAN (*Glycine max* (L.) Merril.) CAUSED BY *Sclerotium rolfsii* Sacc

Publisher: Birsa Agricultural University, Kanke, Ranchi, Jharkhand

Language: en\_US

Type: Thesis

Pages: 59

Agrotags: null

Keywords: MANAGEMENT OF COLLAR ROT DISEASE OF SOYBEAN (*Glycine max* (L.) Merril.) CAUSED BY *Sclerotium rolfsii* Sacc

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**Abstract:** Soybean (*Glycine max* (L.) Merrill.) is a leguminous vegetable of family- Leguminaceae that is grown in tropical, sub-tropical and temperate climates in India. Though, it is a legume crop yet is widely used as oilseed. Like other field crops soybean is also inflicted by many diseases. Occurrence of most of the diseases has been recorded from Jharkhand state. Collar rot caused by *Sclerotium rofsii* Sacc. appears during seedling stage and take heavy losses resulting in uneven stand of crop. The initial symptom of collar rot of soybean was recorded on the leaves in form of slight paleness followed by yellowing of leaves and loss of vigour of plant. Infection usually occurs at the collar region as brownish black discoloration. Gradually the discoloration was found to spread 3-5 cm both upward and downward along the stem and tap root, respectively. In advanced stage of infection, all the leaves shed, turn brown dry and often cling to dead stem. The mycelium of pathogen grows over the diseased tissue and surrounding the soil forming a white mat of mycelial thread with the typical buff brown to chocolate brown mustard seed sized sclerotia. The survey revealed that the disease was prevalent in all area surveyed. The incidence of disease ranged from 4.75 - 9.75 per cent in different locations. Maximum disease incidence (9.75%) was recorded in Korri village of Burmu block. Whereas least disease incidence (4.75%) was recorded in Agronomy research plot of BAU, Kanke. The pathogen was isolated, purified and proved pathogenic by following standard technique. In pathogenicity test soil infestation method showed higher mortality percentage (73.33 %). The mortality was lower (26.66 %) in case of inoculation through soil drenching around the collar region of test plant. Inoculum density level of 2.5 to 10 g significantly increased the pre-emergence rotting from 23.33 per cent to 70.00 per cent and post-emergence rotting from 10.00 percent to 20.00 per cent, but 20 g/kg level was at par with 10 g/kg inoculum density. Most susceptible stage of the crop was recorded (26.66% mortality) during 3rd week of germination. The incidence of disease respectively decreases with the age of the crop. Among 25 varieties/lines of soybean screened against the disease, none was found to be resistant against the pathogen. Three cultivars viz., PS-1477, RKS-63, and PS-1476 showed tolerant reaction and four cultivars viz., B.S.S.-2, KDS-701, MAUS- 504, and RKS-81 were found to be moderately resistant against the pathogen. The rest cultivars were moderately susceptible or susceptible to the pathogen. Out of 10 different plant species, the pathogen was able to establish infection and produce symptoms in seven plant species viz., elephant foot yam, brinjal, wheat, groundnut, mentha, french bean and chilli, which clearly indicate that the pathogen has a wide host range. Among the systemic fungicides Carbendazim 63% + Mancozeb 12%, Vitavax power, Hexaconazole, Propiconazole, and Tebuconazole completely inhibited the radial growth of *S. rolfsii* at all concentration. Least inhibition of mycelial growth was recorded in Carbendazim at 0.025 per cent concentration and among non-systemic fungicide viz., Zineb, Mancozeb and Propineb, completely inhibited the growth at all concentration. 2 Least inhibition of mycelial growth of pathogen was observed in Copper oxychloride at 0.1 per cent concentration. Among the nine plants extract the per cent inhibition of mycelial growth of pathogen was found significantly highest of 56.72 per cent in *Pongamia pinnata* at 10 per cent concentration. *Ipomoea batatas* and *Oscimum sanctum* at 10 per cent concentration were found to be the next best treatment and were at par with each other. However the least per cent inhibition of 2.24 per cent was recorded in the plant extract *Azadirachta indica* at 5 per cent. Among four bioagents *T. viride* (D) showed maximum antifungal activity by inhibiting 74.11 per cent of the mycelium of fungus and least inhibition was noticed in *T. harzianum* (D) 57.9 per cent. Where as in monoculture technique the highest colony diameter was recorded 90.00 mm in *T. viride* (D) and lowest colony diameter 82.33 mm was recorded in *T. harzianum* (D). Among the organic amendments the lowest disease incidence of 31.66 per cent was recorded in the treatment with Karanj cake, followed by 38.33 per cent in FYM which was significantly superior over rest treatments. Next best treatment was 41.66 per cent in vermicompost and maximum disease incidence 66.66 per cent was recorded in treatment with Neem cake. Under both (artificial and natural) condition integration of Seed treatment with Vitavax power @ 0.1% + soil application of FYM enriched with *T. viride* @ 2.5 kg/q manage the disease efficiently with minimum disease intensity (20% and 9.09%) and highest seed yield (1280 kg/ha). Next effective treatments was seed treatment with Vitavax power @ 0.1% + soil application of Karanj cake @ 2 q/ha. Regarding the cost benefit ratio, seed treatment with Vitavax power @ 0.1% was highly economical having ratio of 1:13.11.

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Subject: Plant Pathology

Theme: MANAGEMENT OF COLLAR ROT DISEASE OF SOYBEAN (*Glycine max* (L.) Merrill.) CAUSED BY *Sclerotium rolfsii* Sacc

These Type: M.Sc

Issue Date: 2012

Appears in Thesis (/handle/1/93550)

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