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OCCURRENCE OF BULB ROT DISEASE IN GARLIC *(Allium sativum L.)* IN THE NILGIRIS

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ABSTRACT

Bulb-rot of garlic has assumed serious proportions in the Nilgiris district in Tamil Nadu, India. Rotting of bulb, drying of leaves from the tip, production of side shoots are the characteristic symptoms seen on the plant. *Fusarium oxysporum* Schlect, *Fusarium equiseti* Corda, *Botrytis allii (Munn) and Sclerotium rolfsii* Sacc. were identified as bulb-rot causing organisms. *F. oxysporum, F. equiseti* and *S. rolfsii* were so far not reported earlier and this is the first report.

KEY WORDS : Garlic, Bulbrot

In India, garlic (*Allium sativum L.*) is an important crop cultivated in an area of 79,000 ha with an annual production of 2,71,000 tonnes. Even though garlic has been grown in large area, the average yield in India is around 2,700 kg/ha as compared to 33,000 kg/ha in Egypt. In the Nilgiris also the garlic crop is grown in three seasons April-May, November-December and July-August. In recent years, bulb-rot disease in this district assumed serious proportions in several parts of this district and this disease is a major constraint in the production of garlic. Though the bulb-rot of garlic due to different pathogens have been reported earlier, information on many aspects including the etiology of the disease, pathogens involved, factors influencing the causal agents and control of the pathogens is lacking. Several pathogens were reported to cause bulb rot on garlic and onion. *Botrytis allii* Munn. and *Fusarium oxysporum* Schlect were the most important pathogens reported consistently from all over the world except India. Having this is mind, investigations were taken up with a view to study the etiology of the disease responsible, Isolate the pathogens for the bulb rot infection and to establish pathogenicity.

MATERIALS AND METHODS

Bulb-rot affected garlic plants (123 samples) were collected from Palada, Ketti, Kallatty, Chinna Coonoor, Dhavani, Kollimalai. The causal agents were brought into pure culture following the standard pathological procedures. The fungi isolated were tested for their pathogenicity. The fungi were grown on potato dextrose agar medium in petri dishes for 10 days. The inocula of *F. oxysporum, F. equiseti, B. allii* and *Sclerotium rolfsii* were grown on autoclaved sand maize medium (20:2). To determine the number of viable propagules per gram of inoculum and as a check for contamination, inocula were assayed by serial dilution in 9 ml sterile distilled water blanks and planting on to PDA. Prior to planting, inocula of *F. oxysporum, F. equiseti* Corda, *B. allii and S. rolfsii* Sacc. were added to pots containing sterilized soil and mixed in the upper 10 cm of soil, resulting in initial inoculum densities of 200, 250, 40 6 propagules per cubic centimeter respectively. The plants were observed for infection upto 30 days.

RESULTS AND DISCUSSION

The infected plants yielded four pathogens *viz., Fusarium oxysporum* Schlect, *F. equiseti,*

S. rolfsii and *B. allii*. In addition to four pathogen, garlic mite *Rhizoglyphus echinopus* was found to be frequently associated with the bulb-rot. Out of 123 samples collected 65 per cent yielded *B. allii*, 60 per cent of *F. oxysporum*, 35 per cent of *F. equiseti* and 12 per cent of *S. rolfsii*. The pathogens identified were confirmed by Common Wealth Mycological Institute, England, (CMI 295382, 299489, 299492 and 322230). The pathogenicity of the four pathogens was established. All the four pathogens individually produced typical bulb rot and neck rot symptom, failure of germination and drying of leaves from tip were also observed. Rotting of bulbs and production of side shoots before they die are the most common symptoms produced by *F. oxysporum* and *F. equiseti*. *S. rolfsii* produced lesions on the collar region and the pathogens proceed downward and finally the plant die. *B. allii* inoculated bulbs in addition to rotting of bulbs also infects neck and collar regions. The spot size was ranged from 2 to 3 cm in length and 3 mm to 5 mm in breadth. When all the pathogens were inoculated on leaves, *B. allii* alone produced typical blast symptom.

Table. Disease index and inculcation period of pathogens of Garlic.

Pathogen	Disease index (out of 20 plants) Incubation period		
F. oxysporum	86.0	(68.0)	(15 days)
F. equiseti	38.6	(38.4)	(20 days)
S. rolfsii	100.0	(90.0)	(6 days)
B. allii	54.5	(47.7)	(15 days)

Various fungi have been found to be associated with bulb-rot symptoms of *Allium* spp. and other host plants, *Penicillium corymbiferum* (Smalley and Hanse, 1962; Dercole, 1972; Georgieva and Kotev, 1977; Greathead, 1978); *B. allii* (Munn, 1917, Walker, 1926) and *F. solani* and *F. oxysporum* (Michail *et al.*, 1971; Georgieva and Kotev, 1977). Though *S. rolfsii* has been reported as a pathogen on garlic, this is the first observation of the fungus causing severe bulb-rot in garlic. *F. equiseti* has been reported to have a wide host range.It causes seed rot and seedling blight in mungbean, tuber rot of cycas (Subramaniam *et al.*, 1974), stalk rot of maize (Mensah and Zwatz, 1975) and fruit rot in avacado, banana and citrus (Joffer, 1972). However the fungus has not been reported on garlic and this is the first report of *F. equiseti* affecting garlic. The pathogens *B. allii* and *F. oxysporum* even though reported on garlic from other countries they have not been reported on garlic from India.

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