

Short Communications

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SEED PLANT TRANSMISSION AND CONTROL OF *FUSARIUM MONILIFORME* IN CABBAGE

P. HARBOLA AND R.D. KHULBE

Department of Botany, Kumaun University, Nainital.

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During a course of two years study on fungal diseases associated with cabbage crop, *Fusarium moniliforme* was found to be serious pathogen under different agroclimatic conditions of Kumaun Hills. This fungus was associated with embryos of some seeds *F. moniliforme* caused seedling, leaf and pod infection. Pathogenicity tests under glass house condition revealed its parasitic nature. Seed dressing with Bavistin and Thiram controlled the disease.

Key words : Infection, Seeds of Cabbage, Bavistin.

Cabbage (*Brassica oleracea* Var. *capitata* L.) is an important vegetable crop of Kumaun hills. During the present study, stored and fresh seed, seedlings, leaves and pods of this plant were used to study the association of mycoflora. Of the fungal associates, *Fusarium moniliforme* was detected as a seed - borne pathogen of cabbage and found responsible for moderate to severe losses.

The fungal species associated with seeds collected from 7 villages (Rajpura, Aroli, Tarikhet, and Gagash around the Ranikhet, and Russy, Khurpa Tal and Garampani near Naini Tal) were isolated by standard ISTA (1966) methods.

To study the location of pathogen in the seeds, 100 seeds were soaked in sterile water. They were dissected aseptically and different parts i.e. seed coat, endosperm and embryo, were separated. Each part was pretreated with 1% NaOCl solution, washed by sterilized water and plated on sterile blotter plates. After 7 days of incubation under NUV/darkness cycle at 20°C, seed parts were examined for fungal infection (Mathur *et al.*, 1975).

For pathogenicity test, healthy surface sterilized (with 1% NaOCl solution for 10 min.) seeds were washed in sterile water and dried. The seeds were inoculated by placing them in an actively sporulating culture (Suryanarayana & Bhombe, 1961). Twenty infested seeds were sown in sterilized soil contained in 24 cm. dia. pots and kept in glass house. Uninoculated surface sterilized seeds sown under similar condition served as control. Regular observations were made to study the effect of this pathogen.

In chemical control experiments, healthy, viable and surface sterilized seeds were rolled over actively sporulating culture of *Fusarium moniliforme* and kept under moist condition at 20°C for 48 hour for establishment of pathogen in the seeds. The seeds were washed and dried and dressed by 6 fungicides separately (bavistin, brassicol, captafol, dithane M-45, thiram and vitavax,) at 0.3% concentration of seed weight and plated on moist blotter plates (5 replicates each of 20 seeds in glass petriplates of 7.5 cm diameter) for 14 days at 20±2°C adopting the method of Kadian and Suryanarayana (1979). In other experiment, 100 infested seeds - treated with each fungicide were sown in sterilized soil under glass house condition in 5 replicates. In control, 100 seeds were sown without fungicides.

A total of 32 fungal species were isolated. All the seeds samples showed moderate to heavy infection of *Fusarium moniliforme* which ranged 1 to 42%.

In blotter and agar plate method the pathogen caused seed rot and seedling mortality. Under field conditions it attacked both young and mature leaves from seedling stage till harvesting time. It caused curling, stunting, wilting yellowing and defoliation of the leaves, under seed bed condition. *F. moniliforme* caused reduced seed germination and increase seedling mortality by damping -off and the losses were up to 55%. The seedling also showed rotting of the root system and collar region. During the course of study under field condition, temperature and soil moisture ranged from 18-20°C and 40-65% respectively. The pathogen was detected from wilted plants and showed symptoms which started from apex to downward. The upper leaves showed, drooping, sagging and were

followed by yellowing. Due to drying of the plant the lower leaves withered away and such wilted plants were found in field with one or two leaves attached to shrunken apex of the stem. Internal symptoms like, vascular discolouration, physical presence of hyphae in vascular tissue, occasional formation of tyloses and gel like substance in vessels, showed a typical wilt of disease. The pods yielded shrivelled and light seeds. Khulbe and Harbola (1992) also observed such type of occurrence of *Fusarium moniliforme* in radish seeds. Location of fungus in different parts of cabbage seeds was detected in 7 seed samples showing severe infection. The infection of *Fusarium moniliforme* was 20-25% in seed coats 10-15% in endosperms and 6-10% in embryos. The results indicate internally seed borne nature of the pathogen.

In pathogenicity tests *F. moniliforme* caused 36% seedling out of 85% germinated seed, Mycelium with white powdery mass of microconidia was found on affected seeds and seedlings. Seedlings were free from infection in control. Emerging seeds showed rotting of roots and hypocotyls. Most of the seedlings showed severe fungal infection and were killed between 10th to 20th days of seed sowing. Disease intensity increased rapidly after 7 to 15th day of seed sowing. The infected seedlings showed wilting, yellowing and curling of the seedlings. To confirm KOCH's postulates the pathogen reisolated from rotted seeds and seedlings.

Bavistin was found most effective against seed borne infection of *F. moniliforme*, while efficacy of thiram, captafol and dithane M-45 was found in descending order. Vitavax and brassicol were least effective.

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