

FUNGI AS BIOCONTROL AGENTS IN NATURE: INTERACTION OF FUNGI ON PHYLLOPLANE OF *DATURA METEL* L. AND *VIGNA CATJANG* L.

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Leaf surface is an intensely competitive environment for fungi. Recently, three species of fungi were noticed on phyllaplane of *Datura metel* L. The fungi were *Colletotrichum* sp., *Pseudocercospora* sp. and *Trichoderma viride* Pers. All the three fungi along with *Trichothecium roseum* Link were found on *Vigna catjang* L. Interaction among these fungi on phylloplane of their respective plants are presented in this paper.

Pseudocercospora sp., *Colletotrichum* sp, *Trichoderma viride*, and *Trichothecium roseum* belong to the class Deuteromycetes. *Pseudocercospora* sp. causes indistinct leaf spots with greenish black superficial mycelial growth mostly on ventral surface of leaves. *Colletotrichum* sp. is a facultative parasite, responsible for anthracnose of various economically important plants. *Trichoderma viride* is a well known biocontrol agent throughout the world. *T. roseum* is a saprophytic fungus, sometimes found as laboratory contaminants. It is also an established biocontrol agent. Phylloplane mycoflora on *Vigna sinensis* L, and their interaction was described by Shamsi and Naher (2010).

The biological control of plant disease has recently gaining appreciable importance to Plant Pathologists. Intensive research has been done in this field to avoid the hazardous impact of pesticides and agro-chemicals on ecosystem. The biological agents, the mycoparasites have also attained a significant position. It has been suggested that efforts should be made to investigate the biological control of plant disease through parasitism and predation.

Present study was made to evaluate the antagonistic activities of *T. viride* and *T. roseum* against *Pseudocercospora* sp. and *Colletotrichum* sp. on leaves of *D. metel* and *V. catjang*.

Samples of *D. metel* were collected from Botanic Garden Curzon Hall Campus, Dhaka University, Dhaka. Infected leaf lets of *V. catjang* were collected from New D.O.H.S Mohakhali and Sobhanbag, Dhaka. In total twelve samples were examined for each plant. Freshly collected samples were used for microscopic observation of fungal structures. The fungi associated with *D. metel* and *V. catjang* were isolated following "Tissue Planting" and "Blotter"

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method for further investigations. Organisms from infected area were mounted on slides with lactophenol and cotton blue. Spore colour was examined on slides with water as mounting fluid. Digital and Photomicrographs were made for each samples. Identification of the isolates were determined following the standard literatures (Ellis 1971, 1976 and Sutton, 1980). Samples were deposited in the Mycological Herbarium of Botany Department, University of Dhaka, Bangladesh.

All the isolated fungi were tested for their pathogenic potentiality following "Detached leaf technique" (modified). Moist chamber was prepared by placing small cotton bar at the corner of Petri plate and autoclaved. Six treatments with three replications for each fungi was used as follows: control for unpricked and pricked leaves; dorsally inoculated unpricked and pricked leaves; and ventrally inoculated unpricked and pricked leaves.

During the 3rd week of October, leaves of *Datura metel* were attacked by *Colletotrichum* sp. causing anthracnose symptom, shortly the symptoms were covered by *Pseudocercospora* sp. causing indistinct spots with greenish black effuse fungal colony. Numerous spots covered the entire leaves. From 27th October *Trichoderma viride* started to colonize around *Pseudocercospora* colonies and within 7 days it destroyed conidiophores and conidia of the fungus. Infected leaves became yellowish, dried and dropped earlier. At late stage plants completely died (Plate 1. A -J). *Colletotrichum* sp. and *T. viride* were isolated on PDA medium.

From 5 to 8 August 2010, typical anthracnose symptom was noticed on leaflets of *V. catjang*. Within seven days greenish black colonies of *Pseudocercospora* were visible on necrotic lesions and on fresh leaflets of *V. catjang*. After three to four days white *Trichoderma* colony covered the colonies of *Pseudocercospora* sp. After 3 to 4 days, entire leaflets were covered by white spore dust of *T. roseum*. The entire plants were affected and dried (Plate 2 A-H).

Present studies showed that *Pseudocercospora* sp. suppressed the growth of *Colletotrichum* sp. and *Pseudocercospora* itself was suppressed by *Trichoderma viride*. At the last stage *T. viride* was suppressed by *T. roseum*. It is an excellent example of biocontrol in nature.

In total, six fungi were found associated with phylloplane of *V. catjang*. The isolated fungi were *Aspergillus* sp. with perfect stage, *Colletotrichum* sp., *Curvularia* sp., *Pseudocercospora* sp., *Trichoderma viride* and *Trichothecium roseum* (Plate 3 A-H). *Colletotrichum* sp. was found to be pathogenic to *V. catjang*.

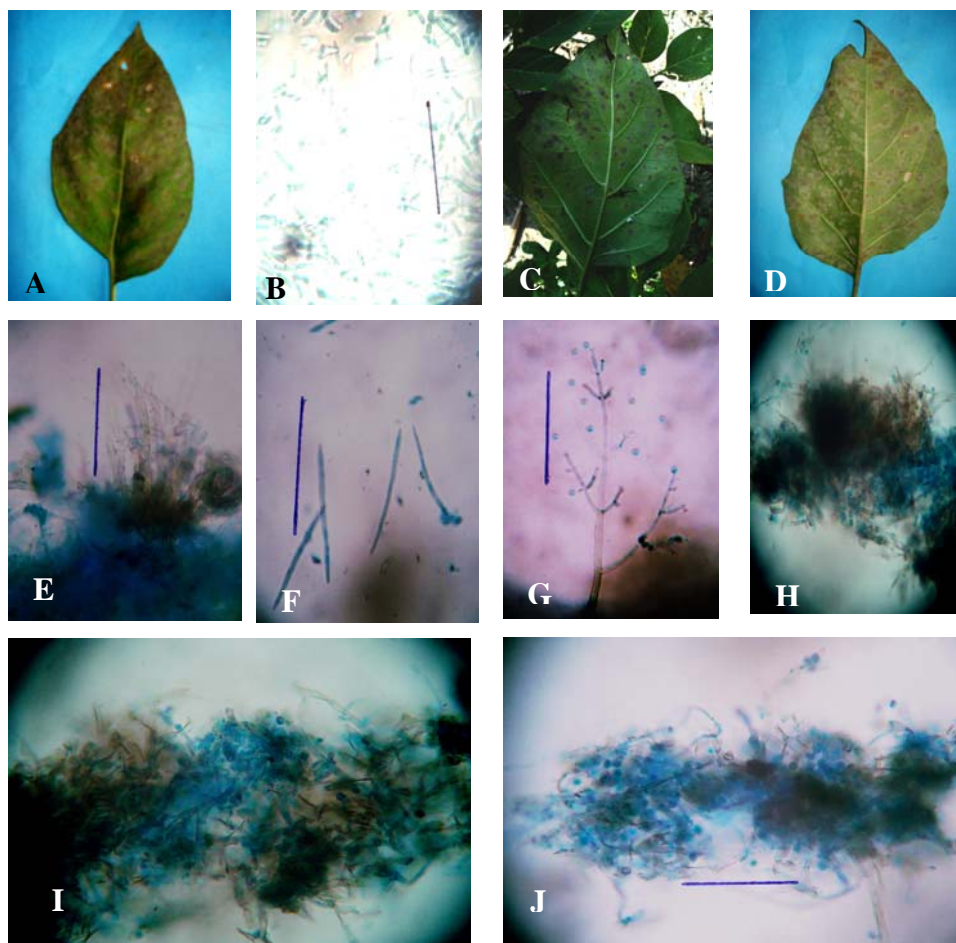


Plate 1. Photograph showing:

- A. Anthracnose symptom on leaf of *Datura matel* .
- B. *Colletotrichum* sp.
- C. *Pseudocercospora* leaf spot of *Datura matel*
- D. Leaf spot suppressed by colonies of *Trichoderma viride*
- E - F. Conidiophore and conidia of *Pseudocercospora* sp.
- G. Conidiophore and conidia of *Trichoderma viride* and
- H- J. Conidiophore and conidia of *Pseudocercospora* sp. suppressed by *Trichoderma viride*. (Bar = 50 μ m)

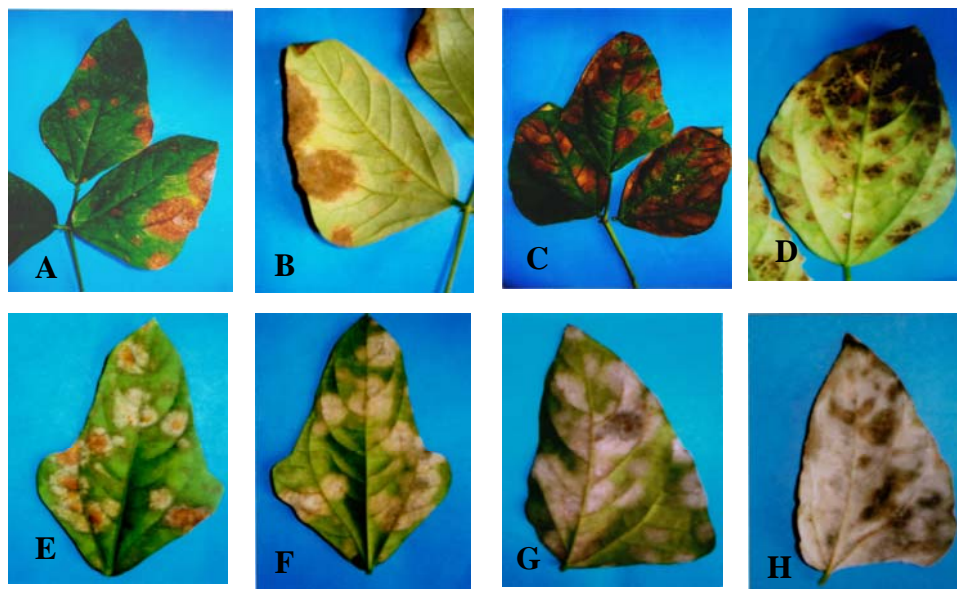


Plate 2. Photograph showing

A – B. Anthracnose symptom on *Vigna catjang* leaf lets (dorsal and ventral view).

C – D. *Pseudocercospora* leaf spot of *V. catjang* dorsal and ventral side of the leaflets

E – F. *Trichoderma* colony suppressing *Pseudocercospora* colony (Initial stage)

G. *Pseudocercospora* colony completely suppressed by *Trichoderma* colony and

H. *Trichoderma* colony gradually suppressing by *Trichothaecium* colony

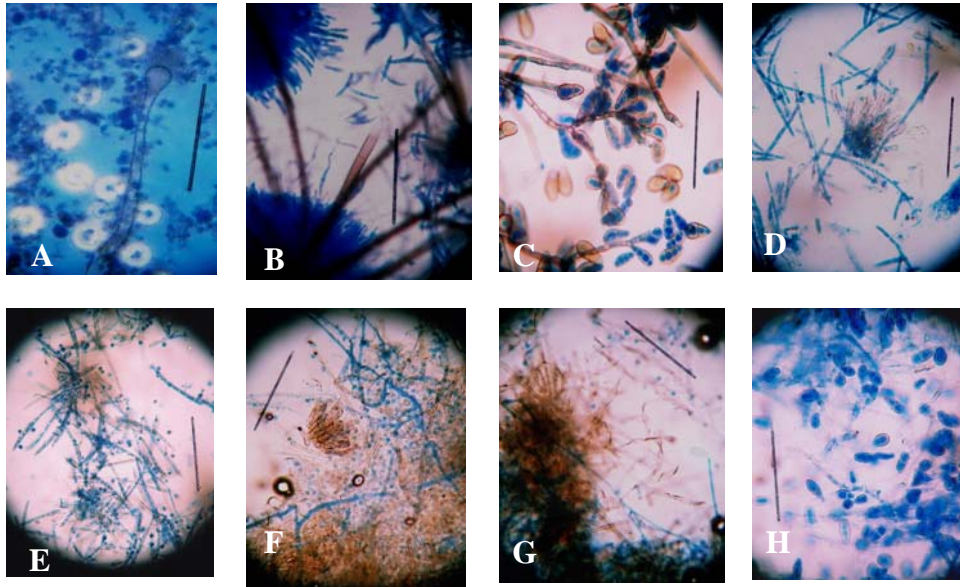


Plate 3. Photomicrographs showing

- A. *Aspergillus* sp. and its perfect stage
- B. Acervulus seti and conidia of *Colletotrichum* sp.
- C. Conidia and conidiophore of *Curvularia* sp.
- D. Conidia and conidiophore of *Pseudocercospora* sp.
- E. *Pseudocercospora* sp. suppressed by *Trichoderma viride*.
- F-G. *Trichoderma viride* completely suppressed conidia and conidiophore of *Pseudocercospora* sp. and initial stage of *Trichothecium roseum* and
- H. *Trichoderma viride* replaced by *Trichothecium roseum*. (Bars = 50 μ m).

This investigation indicates that *Trichoderma viride* and *Trichothecium roseum* are playing significant role in nature as biocontrol agents. This study is an excellent examples of interaction among the fungi in nature.

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