

## Occurrence of soil microbes under Parthenium weed in Tamil Nadu

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### ABSTRACT

A total of 13 microorganisms viz., *Aspergillus niger*, *A. flavus*, *A. fumigatus*, *Chaetomium globosum*, *Corynespora cassicola*, *Curvularia lunata*, *Curvularia* sp., *Eurotium chavelari*, *Fusarium oxysporum*, *F. moniliforme*, *Monilia* sp. *Rhizopus stolonifer* and *Trichoderma harzianum* was isolated from the Parthenium infested soils of Tamil Nadu with various degree of distribution. Among them, *A. niger* and *R. stolonifer* had 100% distribution followed by *A. flavus*, *T. harzianum*, *C. lunata* and *F. moniliforme*.

**Key words :** Soil microbes, Parthenium, Distribution of soil microorganism

*Parthenium hysterophorus* L. a deadly weed introduced into India during 1956 from USA along with the imported wheat seeds under PL 480 scheme. It is an aggressive annual weed well adapted to grow under wide range of soil habitats and reported to produce 20,000 seeds per plant per year. (Butler 1984). Soil is one among the natural ecosystem which harbour lot of living entities. Since fungal flora present in the soil is one among the important constituents, they played an important role in the seed germination. Pitty *et al.* (1987) observed the detrimental effect of *Alternaria alternata*, *Cladosporium cladosporioides*, *Epicoccum purpurescens* on *Setaria* seed germination. A preliminary study was initiated to assess the distribution of soil microorganisms in Parthenium infested soils of Tamil Nadu.

A survey was conducted throughout the Tamil Nadu, to find out the occurrence of various soil microorganisms in the Parthenium infested soil including cropping and non-cropping areas. A taluka was selected from each district and two villages were selected from each taluka using simple random sampling method. A total of 10 soil samples were collected from each taluka (5 sample/village) just below the Parthenium bush along with leaf litters and used for isolation of soil microorganisms.

### Isolation and identification of fungal flora from the soil

The serial dilution of each soil sample was prepared individually in sterile distilled water up to 10<sup>-4</sup> dilutions and the microorganisms present in each sample was isolated using Rose Bengal Medium as suggested by Warcup (1960). The plates were incubated at room temperature (28 ± 2°C) for 3 days aseptically. The fungal colonies from the plates were transferred into agar slants and identified based on their cultural characters and

morphological characters. The help of CAB-International Mycological Institute, Kew, Surrey, England, UK was sought for further confirmation.

*Aspergillus niger*, *A. flavus*, *A. fumigatus*, *Chaetomium globosum*, *Corynespora cassicola*, *Curvularia* sp., *Curvularia lunata*, *Eurotium chevelari*, *Fusarium oxysporum*, *F. moniliforme*, *Monilia* sp., *Rhizopus stolonifer* and *Trichoderma harzianum* were isolated from the Parthenium infested soils of Tamil Nadu with different per cent distribution (Table 1). These organisms were identified with the help of available literatures and further confirmed with IMI, Kew, Surrey, England, UK.

The data reveal that *A. niger* and *R. stolonifer* had 100% distribution followed by *A. flavus*, *T. harzianum*, *C. lunata* and *F. moniliforme*. Luke (1976) isolated 18 mycoflora viz., *A. niger*, *A. flavus*, *Fusarium* sp., *Rhizopus* sp and *Trichoderma viride* from Parthenium rhizosphere during post flowering stage and concluded that the root exudates played an important role in the composition of root mycoflora.

Jeyalakshmi *et al.* (1998) screened the effects of *Trichoderma* sp. on Parthenium seed germination and found that *T. harzianum* exhibited complete inhibition of seed germination both under *in vitro* and *in vivo* conditions. Several previous reports envisaged the pathogenic nature of *Curvularia lunata*, *Fusarium moniliforme* and *F.oxysporum* in Parthenium (Aneja and Kaur 1995, Jeyalakshmi *et al.* 2003). *Curvularia lunata*, *F.moniliforme* and *F.oxysporum* were also found to be associated with diseased Parthenium plants, collected during the survey (Jeyalakshmi *et al.* 2005).

**Table 1. Occurrence of soil-borne pathogens/microorganisms in *Parthenium* infested soil of Tamil Nadu**

| S. No. | Soil microorganisms                                    | IMI Number | Distribution in Tamil Nadu (dt)   | Per cent distribution |
|--------|--|------------|---|-----------------------|
| 1.     | <i>Aspergillus niger</i><br>Van. Tieghem               | -          | All districts   | 100.00                |
| 2.     | <i>A. flavus</i> Link ex. Fr.                          | -          | Coimbatore, Dindigul, Erode, Kanchipuram, Kanyakumari, Karur, Madurai, Nagapattinam, Namakkal, The Nilgris, Ramanathapuram, Salem, Sivagangai, Tanjavur, Trivannamalai, Tiruvarur, Tirunelveli, Trichy, Theni, Vellore, Villupuram and Virudhunagar | 78.57                 |
| 3.     | <i>A. fumigatus</i> Fries.                             | -          | Cuddalore, Dharmapuri, Erode, Kanchipuram, Kanyakumari, Karur, Nagapattinam and Salem   | 28.57                 |
| 4.     | <i>Chaetomium globosum</i><br>Kunze.                   | -          | Coimbatore, Erode, Karur, Madurai, Ramanathapuram, Tiruvannamalai, Tuticorin and Virudhunagar   | 28.57                 |
| 5.     | <i>Eurotium chevelari</i><br>Mangin.                   | 379994     | Dindigul, Dharmapuri, Karur, Nagapattinam, The Nilgris, Pudukottai, Salem, Tanjavur, Tiruvallore, Tiruvarur, Tirunelveli, Trichy and Tuticorin  | 46.43                 |
| 6.     | <i>Curvularia lunata</i> R.R.<br>Nelson & F.A. Haesis  | 378927     | Coimbatore, Dharmapuri, Karur, Madurai, The Nilgris, Pudukottai, Ramanathapuram, Salem, Tiruvannamalai, Tiruvarur, Tirunelveli and Tuticorin  | 42.86                 |
| 7.     | <i>Curvularia</i> sp.                                  | 379999     | Erode, Ramanathapuram, Theni and Vellore  | 14.29                 |
| 8.     | <i>Corynespora cassicola</i><br>Berk & M.A. Curtis     | 379985     | Coimbatore, Erode, Sivagangai, Theni and Vellore  | 17.86                 |
| 9.     | <i>Fusarium oxysporum</i> Sch.<br>Ex. Fries.           | -          | Cuddalore, Dharmapuri, Kanchipuram, Perambalur, Theni and Vellore   | 21.43                 |
| 10.    | <i>F. moniliforme</i> Sheld.                           | -          | Coimbatore, Dharmapuri, Kanchipuram, Karur, Perambalur, Salem, Pudukottai, Ramanathapuram, Tanjavur, Tiruvallore and Theni  | 39.29                 |
| 11.    | <i>Monilia</i> sp.                                     | -          | Cuddalore, Dindigul, Erode, Namakkal and Theni  | 17.86                 |
| 12.    | <i>Rhizopus stolonifer</i><br>(Ehreno. ex. Fr.) Vuill. | -          | All districts   | 100.00                |
| 13.    | <i>Trichoderma harzianum</i><br>Rifai.                 | -          | Coimbatore, Cuddalore, Dindigul, Dharmapuri, Erode, Kanchipuram, Kanyakumari, Karur, Nagapattinam, Madurai, Namakkal, Perambalur, Pudukottai, Ramanathapuram, Salem, Tanjavur, Tirunelveli, Trichy, Theni, Vellore, Villupuram and Virudhunagar     | 78.57                 |

This finding pave way to assess the impact of these organisms in *Parthenium* seed germination and its establishment in the natural.

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