

## A NEW REPORT ON THE BIOLOGICAL SUPPRESSION OF CYST NEMATODE, *HETERODERA ORYZICOLA* (RAO & JAYAPRAKASH, 1978) INFECTING BANANA (*MUSA AAB* CV. NENDRAN) IN KERALA, INDIA

The cyst nematode, *Heterodera oryzicola* (Rao & Jayaprakash, 1978) damaging the banana, *Musa AAB* cv. Nendran has been extensively studied (Charles and Venkitesan, 1984, 1993 and 1995). As nematicides destroy the beneficial organisms which fertilize the soil, a search was made to find out a possible potent natural agent for biological control. During the investigation it was found that 11 species of fungi namely *Alternaria alternata* (Fr) Keissil., *Curvularia lunata* (Wakker) Boedin., *Paecilomyces lilacinus* (Thom) Samson., *Syncephalastrum racemosum* Cohn ex Schrot., *Trichoderma viride* Pers.ex Gray., *Dreschlera tetramera*, *Fusarium* sp., *Monilia* sp., *Pencillium* sp., *Trichophyton* sp., and *Asperigillus* sp. are controlling the population of the nematode pests. These species of fungi were found inside the degenerating nematode cysts. These fungi were found to be effective in controlling the cyst nematode, *Heterodem oryzicola* under in vitro condition.

*Musa AAB* cv. Nendran is the most important fruit crop commercially cultivated throughout Kerala. The nematode pests attacking the banana have been identified as one of the constraints in banana production during the past two decades. The cyst nematode, *Heterodera oryzicola* is the most destructive among the nematode pests. The severity of attack by *H. oryzicola* becomes more serious when banana is cultivated in rice fields in traditional wet lands (Charles and Venkitesan, 1984). One thousand cysts of *H. oryzicola* per plant reduce 86 percent of total weight of feeder roots. For the management of soil borne nematode diseases, using chemical is more costly, inviting environmental hazards and also of a temporary in nature and hence other control measures have been attempted.

Banana roots infested with cyst were surface sterilized by dipping in 0.1 per cent of mercuric chloride and washed in sterile distilled water. The test fungi (11 numbers) were isolated from naturally infected cysts collected from the roots of diseased bananas and maintained in pure culture. Then the cyst were smeared

with the spores / mycelium of pure culture of the test fungi and 10 cysts without roots per petridish were planted on low nutrient agar medium and a total of 60 such plates were incubated at 28°C for five days. An equal number of surface sterilized cysts were planted in the nutrient medium in petridish without smearing with spore / mycelium of fungi served as control. The nematode cysts were transferred to tap water at 27±2°C for hatching. Every 24 hours, juveniles were counted and transferred to fresh tap water. On 21st day, the control cysts hatched but the cysts treated with test fungi failed to hatch. The degenerated cysts were examined and were found to be colonized and parasitised by the respective test fungi. The resultant fungal colonies were re-isolated, purified and identified. Among these, five species were identified with the help of the Division of Plant Pathology, Indian Agricultural Research Institute, New Delhi. They are *Alternaria alternata* (Fr) Keissil., *Curvularia lunata* (Wakker) Boedin., *Syncephalastrum racemosum* Cohn ex Schrot., *Trichoderma viride* Pers.ex Gray and *Dreschlera tetramera*. The six fungi up to generic level identified by the Department of Plant Pathology, College of Horticulture, Trichur are *Asperigillus* sp., *Fusarium* sp., *Alternaria* sp., *Pencillium* sp., *Trichophyton* sp. and *Monilia* sp.

*H. oryzicola* which was known to be one of the major nematode pests of rice in Kerala (Rao and Jayaprakash, 1977; Usha, 1980) was reported to infest the banana, *Musa AAB* cv. Nendran by Charles and Venkitesan (1992, 1993) who observed that 1000 cysts of *H. oryzicola* reduces the total feeder root weight by 86 per cent resulting in the general debility of the plant. *H. oryzicola* was also found to reduce the plant height by 11 per cent, growth by 15 per cent, leaf production by 20 per cent, curvature of fingers by 28 per cent and it delayed flowering by 17 per cent. Charles and Venkitesan (1995) studied the biology and development of *H. oryzicola* in detail.

Eleven fungi namely are *Alternaria alternata* (Fr) Keissil., *Curvularia lunata* (Wakker)

Boedin., *Paecilomyces lilacinus* (Thom) Samson., *Syncephalastrum racemosum* Cohn ex Schrot., *Trichoderma viride* Pers.ex Gray, *Dreschlera tetramera*, *Asperigillus* sp., *Fusarium* sp., *Pencillium* sp., *Trichophyton* sp. and *Monilia* sp. were identified infecting the cysts of *H. orydicola* which affects the banana crops in Kerala. In nature, the fungi infected eggs of *H. orydicola* and the juveniles were found in the different stages of degeneration. In order to verify the effectiveness of these fungi as natural biocontrol agents they were isolated

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and brought into pure culture. They were able to penetrate and colonize inside the eggs resulting in the destruction. This is the first report of its kind where fungi could be used as effective biological control agent of cyst nematode, *H. orydicola* which adversely affects banana and rice.

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