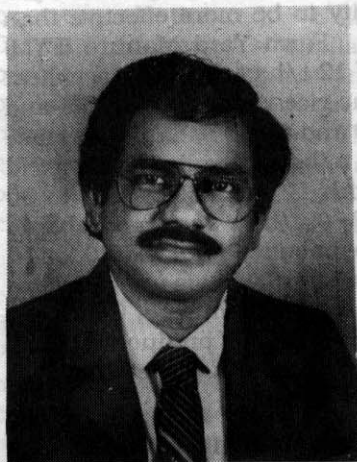


NEMATODES THREAT TO BANANA PLANTATIONS

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The total area under coconut in India during 1989-90 was 15,09,500 ha of which 2,25,900 ha were in Tamil Nadu. Although Kerala ranks first with regard to area under coconut, the productivity is higher in Tamil Nadu. Banana is an intercrop in coconut and arecanut-based cropping systems in Kerala, Karnataka and Tamil Nadu. However, large scale cultivation of banana as a monocrop is also in practice in Tamil Nadu. Banana cultivation in Tamil Nadu covers an area of 60,000 ha of which a large part is in the perennial stretches of Cauvery river belts of Trichy and Thanjavur districts. In recent years, the production as well as area under banana cultivation have reported a decreasing trend. The ravages caused by a number of pests and diseases including plant parasitic nematodes explain this declining trend. Nematodes are found to be one of the important contributing factors for the slow decline in vigour and yield of banana.

Banana has reported 38 species of nematodes belonging to 20 genera. However, only five have proven pathogens of economic importance. The most destructive and widely distributed nematode is the burrowing nematode *Radopholus similis*. The other nematode parasites of bananas are the spiral nematode, *Helicotylenchus multicinctus*, root-knot nematode, *Meloidogyne incognita*, cyst nematode, *Heterodera oryzae* and root lesion nematode, *Pratylenchus coffeae*.

The burrowing nematode affected plants exhibit general decline, stunting, premature defoliation and carry small bunches and fruits. Symptoms on roots are more specific exhibiting small cuticular sunken lesions on young cord roots. On older roots, surface cracks appear. These show extensive reddish brown lesions in the cortex when cut longitudinally. They cause decay and death of distal cells. This nematode is well established in the banana tracts where soil

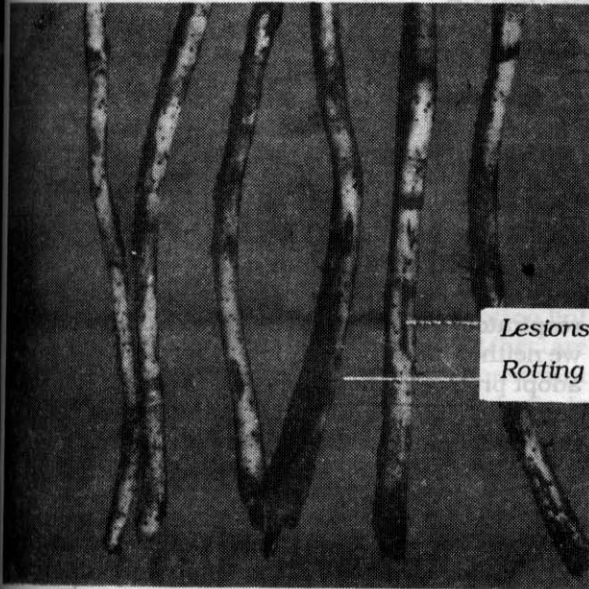
moisture and temperature conditions favourable to the nematode prevail.

In view of the importance of the nematode, a preliminary survey carried out during November, 1990 from banana plantations in the Cauvery belts of Trichirappalli and Thanjavur districts in Tamil Nadu revealed the heavy infestation of burrowing nematode, *Radopholus similis* followed by root-knot nematode, *Meloidogyne incognita*.

The nematode-infested plants are unthrifty, sickly in appearance with drooping leaves. Premature senescence and drying of leaves are observed in advanced stages. Most of the plants flowered and in some cases the bunches were very small. They topple over easily during the wet and windy weather because of inadequate anchorage. Examination of suckers, from such diseased plants, showed medium to large-sized galls produced by root-knot nematode on almost all cords as well as small feeder roots. Besides galling, elongate reddish brown lesions caused by burrowing nematode was noticed on newly produced main feeder roots. Surface-cracks are seen in older roots. The burrowing nematode observed from the rhizome cortex, caused diffuse dark lesions. It was found that more than 60 per cent of the area surveyed in Trichy and Thanjavur districts revealed the incidence of banana decline due to *R. similis* and the soil population ranged from 0 to 715 per 250 ml soil and the root population ranged from 0 to 115 per g root. About 20-45 adult females of root-knot nematode, *M. incognita* with egg masses were recorded per 2.5 centimeter of root. The other nematode recorded from soil around the rhizosphere of such diseased banana plants were the spiral nematode (*Helicotylenchus multicinctus*), root-lesion nematode (*Pratylenchus coffeae*) and lance nematode (*Hoplolaimus* sp).

The damage caused by nematodes could be very devastating, if unchecked. The burrowing nematode is such a devastating pest that it has wiped out 22 million black pepper vines in Bangka Island of Indonesia within two decades. Similarly, spreading decline in citrus caused by this nematode has spread to 6000 ha within 35 years in U.S.A. It causes root-rot, black head toppling disease and decline in banana in all banana growing regions of the world except Israel and Taiwan. Nearly 30 per cent yield

loss in coconut is caused by this burrowing nematode. The entire coffee plantations of Sri Lanka were damaged by the root-lesion nematode, *Pratylenchus coffeae* necessitating their gradual replacement by tea and rubber.



Banana roots infested with burrowing nematode, *Radopholus similis*

The main reason why the problem is so alarming is because of the total ignorance of farmers about the existence of the worm as a pest of plants. Since, nematodes are not visible to the naked eye, the damage caused by them is not as clear as that caused

by insects or fungi. The nematode symptoms on plants such as yellowing of leaves, delay in flowering and slow decline in plant-growth are misconstrued by farmers as that caused by nutrient deficiency in soil, lack of moisture or other physiological defects. The damage caused by nematodes is insidious and normally the farmer is able to notice the damage only after two to three years of infestation and after the progressive nature of yield reduction.

Considering the pathogenic nature of the burrowing and root-knot nematodes it is necessary to take precaution to prevent its spread to other banana growing areas through infested soil and roots adhered to suckers. The suckers removed for transplanting from nematode infected banana clumps and planted in new areas produced infected plants. The transmission of the organisms is, therefore, presumed to be through suckers used for propagating the crop. Control of nematodes results in better establishment of the transplants and their uniform growth. Some attempts have been made to control this nematode by using chemicals, combining chemicals with paring and pralinage etc. Among the chemicals in general, carbofuran, phorate and fenamiphos have been reported to be effective. Pralinage combined with carbofuran was found more effective in controlling the nematode and increasing yield. Hot water treatment of banana suckers at 55°C for 20 minutes and paring, both individually and in integration with chemical or neem cake are the most effective in reducing *Radopholus similis* population and improving plant growth. †

PARTHENIUM - THE PROBLEM WEED

PARTHENIUM, the problem weed can now be controlled. A number of experiments have been conducted on the control of this weed at different centres of the All India Co-ordinated Research Programme on weed control and also by different state agricultural universities. Some of the chemical control measures that have been suggested are:

In non-cropped situation foliar application of 2, 4-D, from 1.0 - 1.5 kg. per hectare or 15% solution of common salt (NaCl) before flowering state. In case of heavily infested fields growing maize, sorghum, bajra or sugarcane, application of 2, 4-D or atrazine at recommended doze helps in the control of Parthenium weed. In cotton fields, use of diuron at recommended rate could help reducing this weed menace. Paraquat at 0.5 to 1.0kg. per hectare was found ineffective at P.A.U.

Regarding its use as manure, some studies have revealed that Parthenium biomass when incorporated as green manure at 5 ton per hectare supplied 25 to 30 kg N, 8 to 10 kg P and 45 to 50 kg K, the green weed plants decompose fast (C/N ration, 30-40) resulting in increased availability of NPK which reached peak in 45 days. The nutrients are released quickly to the crop.

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