Pest Management in Horticultural Ecosystems
Vol. 30, No.2 pp 371-372 (2024)
DOI Number : 10.5958/0974-4541.2024.00062.0

RESEARCH NOTE

Record of severe infestation of root-knot nematode (*Meloidogyne incognita*) in the Mangalore Spinach (*Basella alba)* in and around Bengaluru, India

M. A. RASHMI[1], ABRAHAM VERGHESE[2] and M. S. RAO[3]

[1]Rashvee-International Phytosanitary Research and Services Pvt. Ltd., Bengaluru, India
[2]Former Director, ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, India
[3]Former Principal Scientist, ICAR-Indian Institute of Horticultural Research, Bengaluru, India

***E-mail:** abraham.avergis@gmail.com

ABSTRACT: Mangalore spinach (*Basella alba*) is a widely cultivated leafy vegetable known for its nutritional benefits. During a field survey in and around Bengaluru rural areas, it was observed that *B. alba* was severely affected (60-80% plants) by the root-knot nematode (*Meloidogyne incognita*). It warrants an integrated approach to manage the root knot nematode to protect this economically important crop. Different cultural, physical and biological means of management are discussed.

Keywords: *Basella alba*, spinach, root knot nematode, biopesticides

Mangalore spinach (*Basella alba*) is a widely cultivated leafy vegetable known for its nutritional benefits. However, its cultivation is often hampered by the root-knot nematode (*Meloidogyne incognita*), which causes significant damage to the plants. A survey conducted in and around Bengaluru revealed a notable increase in nematode infestation following rainfall. Infested plants exhibited symptoms such as stunted growth, yellowing, and drying up. One of the most telling signs of nematode presence is the formation of galls or knots on the roots, which disrupts the plant's ability to absorb water and nutrients effectively. These symptoms collectively hinder the overall health and productivity of the plants, necessitating timely and effective management strategies.

Soil samples were collected from the rhizosphere of infested plants from four locations *viz.*, Varadenahalli, Kodihalli, Mandibelle, (Bengaluru Rural District) and Gundligurki, from Chikkaballapur District, Karnataka.The Baermann funnel technique was used for nematode extraction. Soil samples were placed on a mesh or tissue paper supported by a funnel filled with water. The setup was allowed to sit for 24-48 h, enabling nematodes to migrate out of the soil and into the water. Nematodes were collected from the water and counted under a microscope to assess infestation levels.

In every plot examined, 14 out of 20 vines (70%) in the first plot, 16 out of 20 vines (80%) in the second plot, 12 out of 20 vines (60%) in the third plot, and 13 out of 20 vines (65%) in the fourth plot were affected by the root-knot nematode infestations. To manage root-knot nematode infestations in Mangalore spinach, several strategies were employed. Solarization involved uprooting affected plants and exposing the soil to direct sunlight, which helped reduce nematode populations by heating the soil to lethal temperatures for nematodes and other soil-borne pathogens. Organic treatment included mixing Rashvee liquid herbal soap (at 1ml/l of water) with neem cake (50g/plant) and applying it to the soil after uprooting. This method effectively eliminated nematodes without harming beneficial microorganisms, as neem cake acted as a natural nematicide and the herbal soap enhanced its efficacy. Biological control was achieved by using nematode-trapping fungi such as *Purpureocillium lilacinum*, which parasitize nematodes and reduce their population in the soil. This eco-friendly approach maintained soil health and biodiversity. Additional measures included crop rotation with non-host crops to break the nematode life cycle, using nematode-resistant varieties of Mangalore spinach if available, incorporating organic matter such as compost or green manure to improve soil health and suppress nematode populations, and applying organic mulch to maintain soil moisture and temperature, which helped reduce nematode activity.

Fig. 1 *Meloidogyne incognita* infected roots of *Basella alba*

The management of root-knot nematodes in Mangalore spinach requires an integrated approach combining cultural, organic, and biological methods. Solarization is effective in reducing nematode populations by utilizing high soil temperatures, which are lethal to nematodes. Organic treatments, such as the application of neem cake and herbal soap, provide a sustainable alternative to chemical nematicides, preserving beneficial soil microorganisms. By adopting these integrated pest management strategies, Mangalore spinach cultivation can be sustained, promoting eco-friendly home garden practices. These methods not only manage nematode infestations effectively but also enhance soil health and productivity.

REFERENCES

Katan, J. 1981. Solar heating (solarization) of soil for control of soilborne pests. *Annual Review of Phytopathology*, **19**:211-236.

Akhtar, M. and Malik, A. 2000. Roles of organic soil amendments and soil organisms in the biological control of plant-parasitic nematodes: a review. *Bioresource Technology*, **74**: 35-47.

Kerry, B. R. 2000. Rhizosphere interactions and the exploitation of microbial agents for the biological control of plant-parasitic nematodes. *Annual Review of Phytopathology*, **38**: 423-441.

Sikora, R. A. and Fernandez, E. 2005. Nematode parasites of vegetables. In M. Luc, R. A. Sikora, & J. Bridge (Eds.), *Plant Parasitic Nematodes in Subtropical and Tropical Agriculture* (pp. 319-392). CABI Publishing.

Trudgill, D. L. and Blok, V. C. 2001. Apomictic, polyphagous root-knot nematodes: exceptionally successful and damaging biotrophic root pathogens. *Annual Review of Phytopathology*, **39**:53-77.

Stirling, G. R. 1991. *Biological Control of Plant Parasitic Nematodes: Progress, Problems and Prospects*. CAB International.

McSorley, R. 1998. Alternative practices for managing plant-parasitic nematodes. *American Journal of Alternative Agriculture*, **13**: 98-104.

MS Received: 20 November 2024
MS Acceptance: 10 January 2025