

## OCCURRENCE OF THE ROOT-KNOT NEMATODES *MELOIDOGYNE INCOGNITA* AND *M. ARENARIA* IN SOILLESS CULTURES OF ROSE

F.P. d'Errico<sup>1</sup> and E. Ingenito<sup>2</sup>

<sup>1</sup> Dipartimento di Entomologia e Zoologia Agraria, Università di Napoli, 80055 Portici (NA)

<sup>2</sup> Agronomo, Via trav. Vicinale Messigno n°9, 80045 Pompei (NA), Italy

**Summary.** The occurrence of infestation of soil-less cultures of rose by the root-knot nematodes *Meloidogyne incognita* and *M. arenaria* is reported.

Soil-borne parasites, including fungi, bacteria, nematodes and insects constitute a major phytopathogenic problem in flower and ornamental crops. Over the last 20 years soil fumigation with methyl bromide has been used as the common practice to control these parasites. However, in the last few years the limitations imposed on the use of methyl bromide, whose agricultural application must be terminated by 2005, requires the development and introduction of novel methods for the control of soil borne parasites; soil-less cultures have been proposed as a possible alternative.

In November 2001 plants of roses grown in soil-less cultures were received from Sicily. These plants displayed scrubby growth and intense foliar chlorosis. Visual observation of the roots of the plants clearly revealed the presence of infestations of the root-knot nematodes of the genus *Meloidogyne* Goeldi. On this basis, specific laboratory analysis was then started to better characterize the parasitic attack.

### MATERIALS AND METHODS

Rose plants were collected randomly from a six-month-old glasshouse soil-less culture in the area of Ragusa (Sicily). The inert material for cultivation consisted of lapillus of a local stone (Lapillo di Lipari). The nutritive solution was circulated in a closed cycle through the inert material. Collected plants were individually packed in polythene bags and transferred to the laboratory for further analysis. The aerial part of the plants, including vascular tissues, did not display any symptoms of specific pathogens. However, a number of knots were observed on the roots and from these adult females of nematodes of the genus *Meloidogyne* could be observed. Roots were thoroughly washed in water and cut into small pieces. The nematodes present in the knots were stained by submerging root pieces in a hot solution of acid fucsin (0.05% w/v) dissolved in phenol and lactic acid (lactophenol). Female individuals were collected from knots with the help of a dissecting microscope and put in lactophenol.

The morphology of the perineal pattern of a number of these individuals was examined for determination of their species.

### RESULTS AND DISCUSSION

Microscopic examination of the perineal pattern of the collected nematodes revealed the occurrence of two species: *Meloidogyne incognita* (Kofoid et White) Chitw. and *M. arenaria* (Neal) Chitw., mostly the first species. This situation is reminiscent of that observed in Sicilian soils where both species are present and cause severe damage to many crops, including rose, especially in glasshouse conditions.

This is the first report of the occurrence of root-knot nematodes in soil-less cultures. This demonstrates that soil-less cultures are not immune from phytopathogenic problems caused by nematodes. In these conditions, problems caused by nematodes can be exacerbated by the absence of natural antagonists and by the fact that their diffusion is strongly facilitated by the circulation of the nutritive solution. For the latter reason, in soil-less cultures damage can be uniformly distributed throughout the entire culture rather than in spots, as normally occurs in cultivated soil. On the other hand in soil-less cultures the efficacy of treatments with nematicides is enhanced because of their ready distribution through the nutritive solution to all sites of the substrate, with consequent complete eradication of the parasitic populations. Such a result is hardly possible with traditional soil cultures.

Studies on the efficacy of the sanitation of the nutritive solution in soil-less culture conditions of several agricultural crops have been conducted (Runia and Am-sing, 1996). Other studies (Wang *et al.*, 1997) showed that the presence of organic matter in the nutritive solution enhances the damage caused by the nematodes.

The design and validation of novel nematode control strategies has to consider the results of these studies and of the epidemiological peculiarities of nematode infections in soil-less cultures.

## LITERATURE CITED

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- Wang K.H., Sipes B.S. and Kuehnle A.R., 1997 - Effect of soilless media on the growth of *Anthurium andreanum* infected by *Radopholus similis*. *Nematropica*, 27: 77-84.

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