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DAMAGE BY *MELOIDOGYNE JAVANICA* ON VINES IN SOUTH AFRICA

by
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Summary. A declining vineyard in the district of Worcester, South Africa, was found heavily infested by *Meloidogyne javanica*. Roots were distorted and swollen, forming small galls. The feeding sites of the nematodes comprised the typical giant cells with granular cytoplasm and numerous hypertrophied nuclei. Vascular tissue within the galls was disorganized. From each gall protruded one or more females of the nematode with 200 to 450 eggs in each gelatinous matrix.

During a survey of virus vector nematodes in South Africa, in May 1989, a vineyard on Jacques rootstock, at Goudini in the District of Worcester, was observed to have patches of vines with unthrifty growth and stunted vegetation (Figs 1 and 2). Secondary roots were distorted and swollen (Figs 3 and 4) indicating that perhaps nematodes could be involved. They were taken to the laboratory and examined under a stereoscope. A heavy infestation of *Meloidogyne javanica* (Treub) Chitw. was detected.

Since root-knot nematodes are major parasites of vines (Raski and Krusberg, 1984) and are also widely spread in the vineyards of South Africa (Loubser, 1988), it was thought worthwhile to describe the morphological and cytological modifications induced in the vine roots.

Materials and methods

Roots were gently rinsed free of soil and individual galls were excised, fixed in FAA, dehydrated in tertiary butyl alcohol series and embedded in Jung-Histowax with a melting point of 57- 58°C. Sections 12 µm thick were cut and stained with safranin and fast green, mounted in Dammar xylene and examined under a microscope (Johansen, 1940).

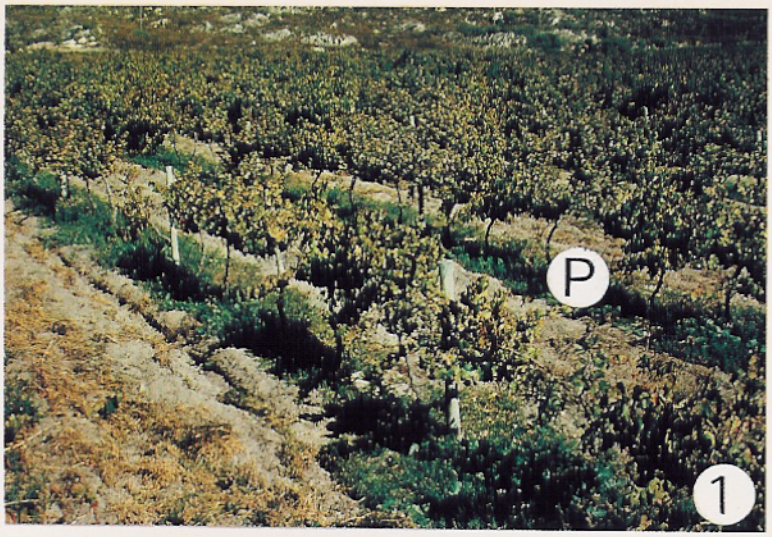
Observations

Root galls commonly occurred individually or in clusters with evident distortions of the entire root circumference (Fig. 3). Swellings along the root axis were spheroid with a diameter as large as two to four times that of uninfected roots. One female was usually present in each of the 28 randomly selected galls which were observed, but in some cases two or three mature females were detected. Eggs were laid in a gelatinous matrix protruding from the root surface and each contained 200 to 450 eggs (Fig. 4). Necrotic areas were evident in the cortical parenchyma near the body of the nematode (Fig. 5). Stained sections revealed that both hypertrophy and hyperplasia were responsible for the spheroid appearance of galls (Figs 3 and 6). Vascular tissues within the galls appeared disorganized. Feeding sites of the nematode comprised five to eight giant cells surrounding the nematode anterior extremity within the central cylinder (Fig. 6). Young giant cells contained granular cytoplasm, a few small vacuoles and numerous hypertrophied nuclei (Fig. 6). Females were within cavities in a compressed cortical parenchyma (Fig. 7).

In conclusion, the modifications induced by the trophic action of *M. javanica* in vine roots are similar to those produced by this and other *Meloidogyne* species on numerous plants (Huang, 1985). The feeding site extends within the stele with the female body embedded in the cortex.

Literature cited

HUANG C. S., 1985 - Formation, anatomy and physiology of giant cells induced by root-knot nematodes. *In*: An Advanced Treatise on *Meloidogyne*, Vol. 1: Biology and Control (J. N. Sasser and L. C. Carter, Eds.), Raleigh, N. Carolina State Univ. Graphics, pp. 155-164.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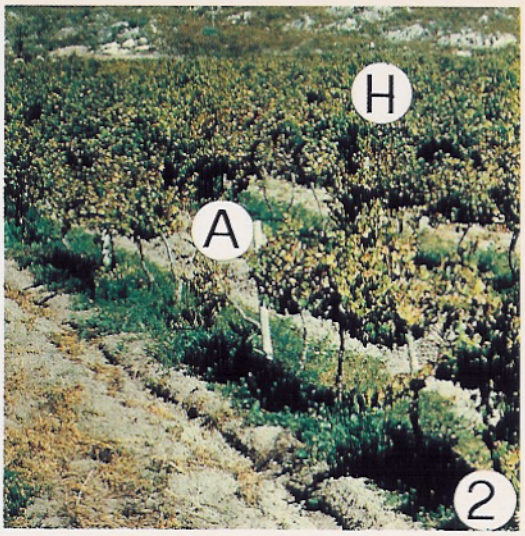
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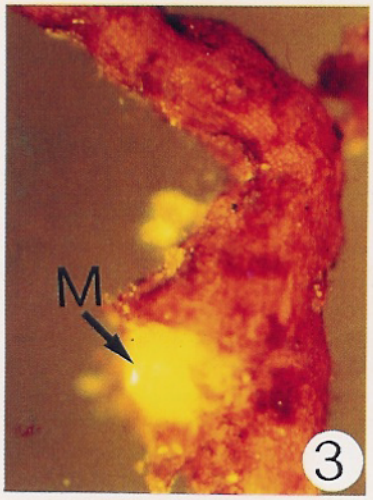
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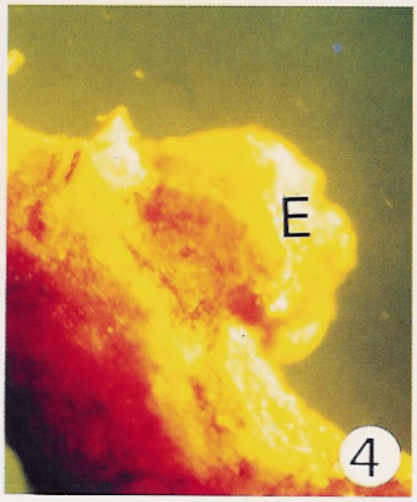
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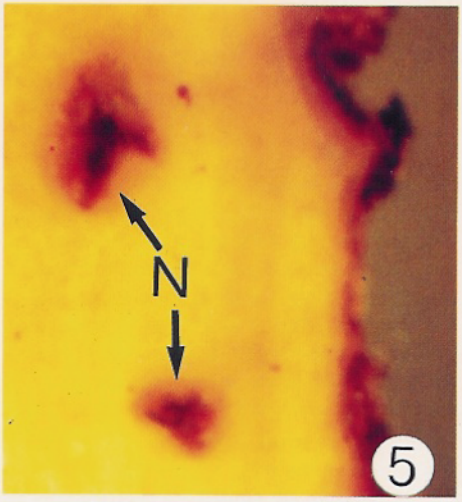
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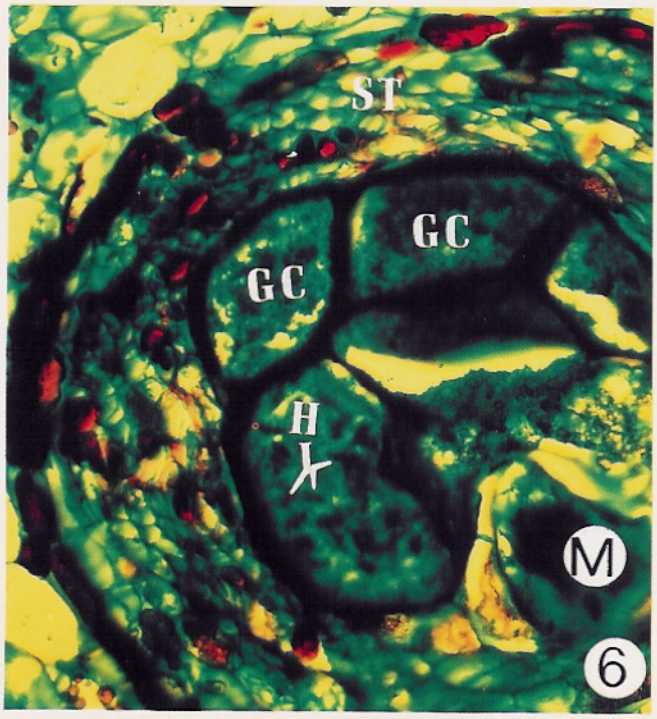
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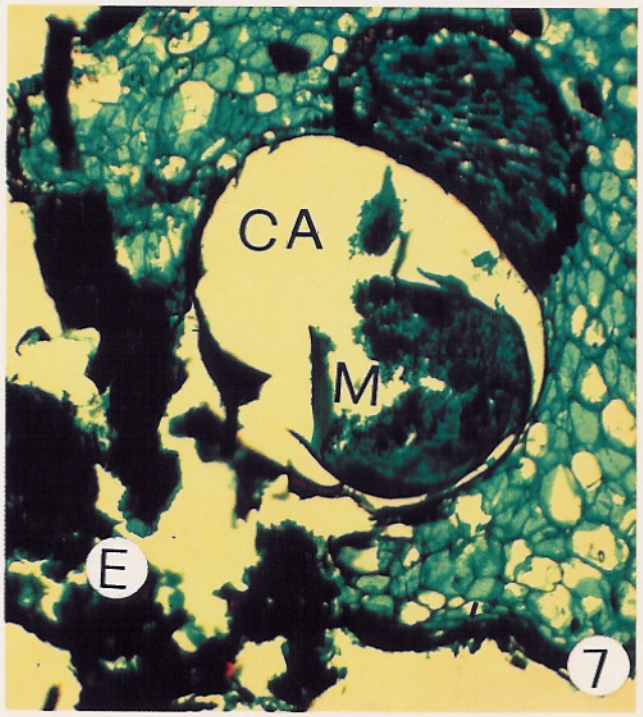
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JOHANSEN D. A., 1940 - Plant Microtechniques. McGraw Hill, New York, 523 pp.

LOUBSER J. T., 1988 - Occurrence and pathogenicity of root- knot nematodes (*Meloidogyne* species) in South African vineyards. *S. Afr. J. Enol. Vitic. 9 (2)*: 21-27.

RASKI D. J. and KRUSBERG L. R., 1984 - Nematode parasites of grapes and other small fruits. *In*: Plant and Insect Nematodes (W. R. Nickle, Ed.) Marcell Dekker, New York and Basel, pp. 457-506.

Figs. 1-7 (*Front page*) — *Meloidogyne javanica* on vines in South Africa: 1) patch of unthrifty vines (P); 2) affected vines (A) compared to healthy ones (H); 3) distorted secondary root with the nematode protruding (M); 4) egg mass (E) protruding from a root; 5) necrotic areas (N) near the nematode body; 6) cross section of a young root showing disorganized stelar area (ST) with compressed vascular elements and giant cells (GC) surrounding the nematode body (M), (H indicates hypertrophied nuclei); 7) cross section of a root with a large cavity within the stele (CA) containing a nematode female body (M) extruding into the cortex (E indicates nematode eggs).

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