

*Imperial College Field Station,
Silwood Park, Sunninghill, Berkshire, U.K.*

A NEMATOLOGICAL SURVEY OF VINEYARDS IN CYPRUS

by
MARIA ANTONIOU

The importance of parasitic nematodes in grape production has only been appreciated in the last 20 years. Several genera are considered of economic importance and their pathogenicity has been studied extensively (Raski *et al.*, 1973).

In Cyprus, Philis and Siddiqi (1976) included vineyards in a general survey of crops and found 21 nematode species in the rhizosphere of *Vitis vinifera*, in commercial vineyards. The results presented here are from a survey carried out in May 1979.

Materials and Methods

A total of 75 samples were collected from 35 sites from early table-grapevine growing areas and from 4 sites on the Troodos mountain, where vines for wine production are cultivated. Most of the early table-grapevine fields in each area were inspected before sampling. In each area an apparently healthy field and one or two fields with stunted plants were chosen, and in each of these, soil and roots were collected from 20 plants, at 20 to 30 cm depth and 30 cm away from the stem.

In all, samples were taken from 7 different grapevine varieties: Sultanina, Cardinal, Perlette, Fraula and the local Black and White wine varieties. The soil type in all samples collected was calcareous but ranged from heavy clay, through clay loam, silt loam to sandy

loam. The table-grapevines sampled were from 6 to 37 years old and vines for wine production were up to 50 years old.

Nematodes were extracted using a tray technique and a sieving and sedimentation method. Roots were stained in hot cotton blue lactophenol and were cleared in lactophenol for one week; the root tissue was then teased apart and examined at 50 magnification with a stereoscopic microscope.

Results and Discussion

The following 21 genera of stylet-bearing nematodes were found: *Aphelenchoides* Fisher, 1894; *Aphelenchus* Bastian, 1865; *Boleodorus* Thorne, 1941; *Coslenchus* de Man, 1921; *Criconemoides* Taylor, 1936; *Ditylenchus* Filipjev, 1936; *Helicotylenchus* Steiner, 1945; *Macroposthonia* de Man, 1880; *Merlinius* Siddiqi, 1970; *Paratylenchus* Micoletzky, 1922; *Pratylenchoides* Winslow, 1958; *Pratylenchus* Filipjev, 1934; *Psilenchus* de Man, 1921; *Quinisulcius* Allen, 1955; *Rotylenchoides* Whitehead, 1958; *Rotylenchus* Filipjev, 1936; *Thada* Thorne, 1941; *Tylenchorhynchus* Cobb, 1913; *Tylenchus* Bastian, 1865; *Xiphinema* Cobb, 1913; *Zygotylenchus* Siddiqi, 1963.

Fifteen species were identified and these occurred in the localities indicated in Table I.

The genera *Psilenchus* and *Zygotylenchus* and the species *C. amorphus*, *H. tunisiensis*, *Q. capitatus*, *T. latus* and *X. italiae* are reported for the first time from Cyprus. The genera *Criconemoides*, *Macroposthonia*, *Pratylenchoides* and *Quinisulcius* have been reported from other crops in Cyprus (Philis and Siddiqi, 1976) but not from grapevine. A new species of *Rotylenchus*, *R. cypriensis* was also found during this survey (Antoniou, 1980).

Criconemoides, *Helicotylenchus*, *Pratylenchus*, *Rotylenchus*, *Tylenchorhynchus*, *Xiphinema* and *Aphelenchus* were commonly found.

X. pachtaicum was found at high population densities (up to 300 nematodes per 200 ml of soil), in nearly all fields sampled, in all soil types. This agrees with the results of Choleva (1975) who reported this nematode in light to heavy texture soils throughout Bulgaria. *X. pachtaicum* was one of the few nematodes found in relatively large numbers, in two fields near Kyperounda, in soil with a high proportion of asbestos and where great fluctuations in temperature occur during the year.

Table I - *Species of plant parasitic nematodes found in vineyards in Cyprus.*

Nematode species	District	% frequency of occurrence
<i>Aphelenchus avenae</i> Bastian, 1865	Paphos, Limassol, Nicosia, Larnaca	97
<i>Coslenchus costatus</i> (de Man, 1921)	Paphos, Limassol, Nicosia, Larnaca	72
<i>Criconemoides amorphus</i> de Grisse, 1967	Paphos	4
<i>Helicotylenchus tunisiensis</i> Siddiqi, 1963	Paphos, Limassol, Larnaca	32
<i>Merlinius brevidens</i> (Allen, 1955) Siddiqi, 1970	Paphos	5
<i>Pratylenchus thornei</i> Sher et Allen, 1953	Paphos, Limassol	8
<i>Quinisolchus capitatus</i> (Allen, 1955) Siddiqi, 1971	Limassol, Nicosia, Larnaca	13
<i>Rotylenchus cypriensis</i> Antoniou, 1980	Paphos	8
<i>Thada cancellata</i> Thorne, 1941	Paphos, Limassol	8
<i>Tylenchorhynchus latus</i> Allen, 1955	Paphos	8
<i>Xiphinema index</i> Thorne et Allen, 1950	Limassol	4
<i>Xiphinema italiae</i> Meyl, 1953	Nicosia	1
<i>Xiphinema pachtaicum</i> (Tulaganov, 1938) Kirjanova, 1951	Paphos, Limassol, Nicosia, Larnaca	92
<i>Xiphinema ingens</i> Luc et Dalmasso, 1963	Nicosia	3
<i>Zygotylenchus guevarai</i> (Tobar Jimenez, 1963) Braun et Loof, 1966	Paphos, Limassol	10

X. index, *X. italiae* and *X. ingens* were found on 3, 1 and 2 occasions respectively out of 35 fields sampled. *X. index* was found in clay loam and silt loam soils.

Coslenchus costatus occurred in most vineyards sampled, in all different soil types in moderate to high numbers. The species is cosmopolitan and is found in both wet and dry soils in the rhizosphere of many plants, including grapevine (Colbran, 1964).

H. tunisiensis was the only *Helicotylenchus* sp. identified. Up to 400 nematodes per 200 ml of soil occurred in all soil types except clay. No *Helicotylenchus* species were found in the vineyards in the

mountains. In this study *Helicotylenchus* sp. was found in the tissue of one root sample only, 3 nematodes per g of root tissue.

The distributions of *Rotylenchus* and *Tylenchorhynchus* were similar to that of *Helicotylenchus*. Little is known about their pathogenicity to grapevine; Bhatti and Gupta, 1973 reported *Tylenchorhynchus* sp. in India, associated with grapevines which showed stunted foliage and brown edged leaves. *Tylenchorhynchus* sp. was recovered from grape roots during the survey (3 nematodes per g of root tissue).

Pratylenchus spp. occurred in all soil types in most vineyards, including the mountainous region. *P. thornei* was identified, but this species is not believed to be of importance to vines (Raski *et al.*, 1973). *Pratylenchus* sp. and *Pratylenchoides* sp. were found in root tissue examined during the survey.

In all 4 fields where *Zygotylenchus guevarai* was found, the soil was clay loam.

Philis and Siddiqi (1976) reported the following nematode genera in the rhizosphere of *Vitis vinifera* in Cyprus, which were not found in the present survey: *Basiroides*, *Meloidogyne*, *Neopsilenchus*, *Nothotylenchus* and *Trichodorus*.

Thanks are due to Dr. M. R. Siddiqi for helping with the nematode identification, to Dr. J. Bridge for his guidance throughout the course of this work, and Dr. N. Vovlas for reading the manuscript.

S U M M A R Y

A survey of nematodes of vineyards in Cyprus was carried out in May 1979. A total of 71 samples were collected from 35 sites throughout the island's early table growing areas, and 4 samples from 4 sites throughout the Troodos mountain, where vines for wine production are cultivated.

Twentyone genera of stylet-bearing nematodes were identified. *Xiphinema pachtaicum* was found in nearly all fields sampled. The genera *Psilenchus* and *Zygotylenchus* are reported for the first time in Cyprus. This is also the first record of the species *Criconemoides amorphus*, *Helicotylenchus tunisiensis*, *Quinisulcius capitatus*, *Tylenchorhynchus latus*, *Xiphinema italiae* and *X. ingens*. A new species of *Rotylenchus*, *R. cypriensis* was found in low numbers in the Paphos and Limassol areas.

L I T E R A T U R E C I T E D

- ANTONIOU M., 1980. *Rotylenchus cypriensis* sp. n. (Nematoda: Hoplolaimidae) from Cyprus. *Nematol. medit.*, 8: 137-140.
- BHATTI D.S. and GUPTA D.C., 1973. Populations of *Tylenchorhynchus* sp. in grapes. *Haryana Agric. Univ. J. Res.*, 3: 193-194.
- CHOLEVA B., 1975. Nematodes of the family Longidoridae in Bulgaria. In: Nematode vectors of plant viruses (eds F. Lamberti, C. E. Taylor and J.W. Seinhorst), *Plenum Press*, London and New York, 355-356.
- COLBRAN R.C., 1964. Studies of plant and soil nematodes 7. Queensland records of the order Tylenchida and the genera *Trichodorus* and *Xiphinema*. *Queensland J. Agr. Sci.*, 21: 77-123.
- PHILIS J. and SIDDIQI M.R., 1976. A list of plant parasitic nematodes in Cyprus. *Nematol. medit.*, 4: 171-174.
- RASKI D.J., HART W.H. and KASIMATIS A.N., 1973. Nematodes and their control in vineyards. *Calif. Agric. Exp. Sta. Ext. Serv. Circ.*, 533, 20 pp.

Accepted for publication on 28 March 1981.