

Research note

Occurrence of *Xiphinema* species in grapevine areas of Tyrnavos with comments on the distribution of *X. italiae* in Greece

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Summary

A survey for presence of *Xiphinema* species was undertaken in the viticulture areas of Tyrnavos, Thessally, Greece. Soil samples were collected from existing vineyards and from fields where grapevines had been uprooted and were currently under fallow or a cereal crop. The species *X. index*, *X. italiae* and *X. pachtaicum* were present in 37 % of the samples with a prevalence of the last two species in uprooted fields. The occurrence of *X. italiae* in association with light sandy soils is discussed and compared with similar findings from other Greek grapevine areas.

Key words: *Xiphinema index*; *X. pachtaicum*; *X. italiae*; vineyards; Greece

Introduction

In autumn 2003 and spring 2004, a survey was undertaken in viticulture areas in Tyrnavos, Thessally, to determine the occurrence of *Xiphinema* species. This was done when a “replanting scheme” had begun due to a severe frost damage of grapevines at the beginning of 2002. Grapevines had been uprooted in several sites and fields had remained in fallow or under a cereal crop. From a practical view, the work aimed to assess the presence of *X. index* that can be a potential threat to new plantings due to the transmission of the grapevine fanleaf virus.

Material and Methods

During the autumn, a total of 102 soil samples were taken from an area of approximately 2 000 hectares using a soil auger to a depth of 30 cm. The 54 samples came from fields where vineyards had been uprooted 10 – 12 months previously. These were divided into two groups: a) deeply ploughed within 2 – 3 months after uprooting and remaining in fallow (24) b) left unploughed and remaining in fallow with weeds, or being under spring cereal cultivation, with the field having either the dried residues of the

last harvested cereal crop and / or associated weeds (30). The remaining 48 samples were collected from the rhizosphere of surviving and productive vineyards. In the spring of 2004, a further 20 soil samples were collected from productive vineyards.

Soil samples were put in plastic bags and transported to the Plant Protection Institute, Heraklion, Crete. Nematodes were extracted by a modified decanting and sieving method (Brown & Boag, 1988) with a final separation from fine soil particles after migration through 95 µm filters. The *Xiphinema* species were identified with a stereoscope and microscope using the key of Loof and Luc (1990).

Results and Discussion

The three *Xiphinema* species common in the Mediterranean region were recorded in 37 % of the samples collected during the autumn. In some samples more than one species occurred. Their distribution per field type is presented in Table 1. The most prevalent species was *X. italiae* (19 %) followed by *X. pachtaicum* (17 %) and *X. index* (7 %). *X. italiae* and *X. pachtaicum* have been found in association with various plant species in Mediterranean basin (Lamberti, 1981). Therefore, their presence in noncultivated fields with weeds or at the end of the cereal crops, indicate either a host association with these plants or a survival from the previous grapevine crop. In contrast, *X. index* has a limited host range and, except for grapevines, was found only in two fields that had been uprooted one year previously and ploughed three months later, thus indicating a long survival period after vine uprooting. The occurrence of *X. index* in 10 % of the vineyards emphasizes its potential threat and the need for measures to minimize its epidemiological significance. After uprooting, population decrease to non detectable levels can take up to 3 – 4 years in Cyprus (Philis, 1994).

In previous surveys of vineyards in several Greek islands, *X. italiae* was not found in Rhodes (Avgelis *et al.*, 1993)

Table 1. Occurrence of *Xiphinema* species in soil samples - nematode positive - from the viticulture areas of Tyrnavos, Greece

Species	Percentage (%) of nematode presence ¹		
	Grapevines	Ploughed fields	Fallow or cereal crop
<i>X. index</i>	10	8	0
<i>X. italiae</i>	21	17	20
<i>X. pachtaicum</i>	27	4	10

¹reference on the number of samples where nematodes were found

but occurred in about 7 % of vineyards sampled in the islands of Samos (Avgelis & Tzortzakakis, 1997), Paros (Avgelis & Tzortzakakis, 2001) and Crete, Heraklion (Vovlas & Avgelis, 1988; Tzortzakakis, unpublished). It also occurred in about 15 % of soil samples collected from vineyards on Lemnos (Avgelis & Tzortzakakis, 2001).

In Spain, *X. italiae* is regarded as a characteristic species of Mediterranean sandy littoral fauna (Arias & Navacerrada, 1973). A subsequent sample collection from arable soils, and natural vegetation revealed that its distribution was independent of climate and vegetation but that it was closely associated with sandy-loam or loamy-sand soils containing low percentages of fine particle fractions (Navas & Arias, 1986).

The soil types of Lemnos and Samos have been determined at different periods by the Institute of Soil Classification and Mapping, Larissa. In viticulture areas on Lemnos where *X. italiae* occurred, have predominantly sandy soils. In Samos, *X. italiae* had been found in seven fields representative of four grapevine areas and the soil classification of these areas based on 17 samples in total, indicated that 50 % of them were sandy loam and sandy clay loam. For the areas of Paros and Crete there are no available data on soil types, except from one site of Crete where the soil was sandy loam (sand 65 %, loam 30 %).

In the fields on Tyrnavos where the autumn sampling was conducted, *X. italiae* was restricted mostly to sandy loam and to a lesser degree to sandy clay loam soils (sand: 50 – 67 %, loam: 16 – 29 %) whereas *X. pachtaicum* and *X. index* occurred in all soil types including clay loam and loam. In the spring sampling *X. italiae* was present in 30 % of the samples and soil analysis confirmed its exclusive presence on the soil types mentioned previously.

The occurrence of *X. italiae* in the investigated viticulture areas of Greece appears to be in close association with light sandy soils. This confirms similar observations for restriction of the species to such soils in Cyprus (Philis, 1993) and the Slovak Republic (Lišková *et al.*, 1993; Lišková, 1997).

Acknowledgments

That work was financed by the Greek Organization of

Agricultural Insurance, ELGA (project ANAPTYR coordinated by Professor M. Stavrakakis, Agricultural University of Athens). The efficient cooperation of A. Panagiotou, D. Gatziroulis, H. Tsikos, C. Makagios (agronomists of Wine Cooperation of Tyrnavos, Agricultural Service of Tyrnavos and Agricultural Cooperation of Damasi), A. Papras (director of Wine Cooperation of Tyrnavos) and N. Panagoulis (Institute of Soil Classification and Mapping, Larissa) is greatly acknowledged. We also thank Professor D. Brown for making comments on the manuscript.

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