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Plant Parasitic Nematodes in Vineyards of Tripoli and Zawia Regions

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ABSTRACT

A survey of 42 vineyards in Tripoli and Zawia regions indicated the occurrence of seventeen genera of nematodes. Some of the nematodes of major economic importance such as *Meloidogyne* spp, *Pratylenchus* spp. were widely distributed. Their infestation was low to moderate in the plantations surveyed. The genera *Tylenchorhynchus*, *Ditylenchus*, *Tylenchus*, *Rotylenchus* and *Macroposthonia* were also commonly found associated with the plants. The remaining nine genera were rarely encountered.

Meloidogyne spp. were more prevalent in the irrigated vineyards than in the rainfed. Other plant parasitic nematodes showed no significant variation in their distribution in the irrigated or non irrigated grapevines. Young plants of 5–10 years of age were more infested with root-knot nematodes than the old ones. The heavy infections of root-knot nematodes caused yellowing of leaves twig dieback poor growth and sometimes death of large number of young plants.

INTRODUCTION

Grapes are one of the most important fruit crops in Libya. It is grown throughout the country and occupies about 7,500 hectares. The annual production is approximately 1,600 tons. More than half i.e. 64% of grape cultivation is concentrated in Zawia (37%) and Tripoli (27%) regions producing about 65% of the total tonnage.

The impact of plant parasitic nematodes on grape production has recently been appreciated. Several genera have been found associated with grape but only few are of major economic importance. The root-knot nematodes, *Meloidogyne* spp. and the root-lesion nematodes, *pratylenchus* spp. are the most common and important nematodes associated with grapes (1, 5, 7, 8, 11). *Xiphinema* spp., *Tylenchulus semipenetrans* and *Macroposthonia xenoplax* have also been reported to cause considerable damage (2, 3, 7, 10, 12, 13). Other nematodes, frequently encountered in soil around the roots of grape are *Criconemoides* spp., *Paratylenchus* spp., *Tylenchorhynchus* spp., *Rotylenchulus* spp., *Helicotylenchus* spp., *Hemicriconemoides* spp., *Longidorus* spp. and *Belonolaimus* spp. (4, 6, 7, 14, 15, 16).

The first report on nematode infestation in vineyards in Jamahiriya, is that of Pucci (9) who observed *M. incognita* and *Tylenchorhynchus* spp. associated with grape

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plants at Hadba Khadra. No other attempt has been made to survey the vineyards in Libya for nematode infestations. To begin with, therefore, the vineyards located in Tripoli and Zawia regions were surveyed systematically to identify the plant parasitic nematodes associated with different grapevines and determine their frequency and distribution.

MATERIALS AND METHODS

A total of 42 vineyards were surveyed from irrigated as well as rainfed areas of Zawia and Tripoli regions. Most of the vineyards surveyed were of 5–25 hectares in area and of 5–40 years in age. From each orchard, a composite soil sample was taken to a depth of 60 cm around the rhizosphere of trees. Composite soil sample was made by mixing five sub-samples. Nematodes were extracted by processing 250 ml soil from each composite soil sample by a modification of Cobb's sifting and gravity method for the estimation of nematode population. The perineal patterns of adult females of *Meloidogyne* spp. was mounted in glycerine for species identification.

RESULTS AND DISCUSSION

Seventeen genera of plant parasitic nematodes were found associated with grapes (Table 1). *Tylenchorhynchus goffarti*, *T. cylindricus* and *Tylenchorhynchus* spp. were

Table 1. Population of nematodes around the roots of rainfed and irrigated grapevines.

Location	Tylen*	Mac†	Nematode Population/250 ml soil Dit†	Pra†	Me†	Tyl†	Rot†	Xip†
RAINFED VINEYARDS								
Tripoli	115 b	45	0	15	30	430	35	0
Tajoura	63 ab	38	6	19	0	25	0	19
Garabuli	12 a	43	0	0	0	55	25	0
Zawia	162 b	0	0	0	0	62	0	12
Aljelat	50 ab	25	0	50	0	0	0	25
Zawara	50 ab	38	0	62	0	25	0	38
IRRIGATED VINEYARDS								
Swani	44 ab	116* c	31	38	13	13	0	90
Junzoor	138 c	0 a	0	0	44	6	25	63
Zahra	38 b	46 b	4	8	46	0	46	13
Zawia	13 a	9 ab	0	0	1,500	0	26	62
Sabrata	145 c	12 ab	25	0	25	20	90	12
Serman	85 bc	20 ab	58	25	0	0	0	0
Kasar-Ben Ghashir	25 ab	0 a	30	68	67	25	0	0

* Means followed by the same letter do not differ significantly (p = 0.05) according to Duncans Multiple range test.

† Nematodes do not differ significantly from place to place.

Mac = *Macroposthonia* spp.,
Dlt = *Ditylenchus* spp.,
Tyl = *Tylenchus* spp.,
Xip = *Xiphinema* spp.,
Tylen = *Tylenchorhynchus* spp.,
Mel = *Meloidogyne* spp.,
Rot = *Rotylenchus* spp.,
Pra = *Pratylenchus* spp.

most frequently encountered, appearing in 76% of the soil samples, followed by *Macroposthonia* spp. (48%) and *Tylenchus* spp. (35%). Other commonly encountered species in decending order of frequency (29–21%) were *Meloidogyne javanica, M. incognita Rotylenchus goodeyi, Xiphinema italiae, Pratylenchus* spp. and *Ditylenchus* spp.

Nematodes of the genera, *Paratylenchus, Aphelenchoides, Longidorus, Helicotylenchus, Hemicycliophora, Hemicrico-nemoides, Hoplolaimus, Trichodorus* and *Tylenchulus* were rarely encountered. (2–5% cases) and their population was low.

It was also observed that the population of *Tylenchorhynchus* spp. and *Macroposthonia* spp. significantly varied from place to place. The population of *Tylenchorhynchus* spp. was higher in Tripoli, Junzoor, Zawia, Sarman and Sabrata while the population of *Macroposthonia* spp. was more in Sawani. The population and distribution of other nematodes did not vary significantly from place to place in irrigated or rainfed vineyards.

The frequency of occurrence of root-knot nematodes was significantly more in irrigated vineyards (42%) as compared to rainfed vineyards (6%). However, *M. javanica* was most common than *M. incognita*. The root-knot nematodes *Meleidogyne* spp., produced numerous galls on roots and sometimes completely destroyed the root system (Fig. 1–2). Their heavy infection caused poor growth, yellowing of leaves, twig dieback and in some areas death of large number of plants.

The other economically important nematodes such as *Xiphinema, Pratylenchus* and *Macroposthonia* were frequently encountered in irrigated as well as in rainfed areas. These nematodes damage the plants by causing root-lesions, distorting and killing of feeder roots (1, 8). The occurrence of other nematode species, reported herein may be considered of little significance to grape production in Jamahiriya.

The condition of most of the vineyards may be improved by the application of post planting nematicides. Young plants of 5–10 years age, need special attention, as in sandy soils, the root-knot nematode infestation during early stage of plant growth may eventually make the plantation unproductive.

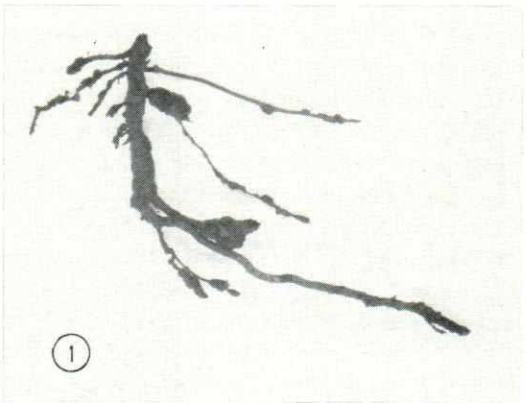

Fig. 1. Roots from a grapevine showing galls caused by *Meloidogyne incognita*.

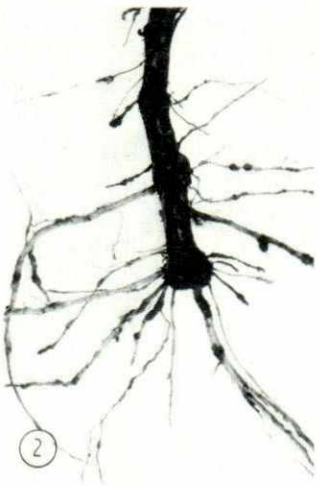

Fig. 2. Severe root galling of a young grapevine caused by *M. javanica.*

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الديدان الثعبانية المتطفلة بحقول العنب في منطقتي طرابلس والزاوية

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المستخلـص

تم حصر للديدان الثعبانية في بعض حقول العنب في منطقتي طرابلس والزاوية ووجد سبعة عشر جنساً من هذه الديدان في ٤٢ حقل عنب . كان من بينها الديدان الثعبانية المهمة إقتصاديا مثل *Meloidogyne* spp., *Pratylenchus* spp. والمنتشرة بكثرة في هذه المناطق . بالاضافة إلى *Tylenchrhynchus* spp. *Macropathonia* spp. . أما بقية الأجناس فهي نادرة . *Ditylenchus* spp., *Tylenchus* spp. *Rotylenchus* spp.

الجنس *Meloidogyne* spp. وجد في حقول العنب المروية أكثر منها في الحقول البعلية ، أما الأجناس الأخرى فلا يوجد اختلاف في توزيعها في الحقول . وقد وجد أن النباتات الصغيرة من ٥ — ١٠ سنوات مصابة بديدان التعقد أكثر من النباتات الاكبر سنا . حيث كانت النباتات المصابة مصفرة الأوراق وبها موت رجعي ونمو ضعيف وموت عدد كبير من النباتات الصغيرة .