Nematode Problems in Fruit Tree Nurseries in Libya

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ABSTRACT

A survey of some fruit tree nurseries in Libya indicated the presence of seventeen genera of plant parasitic nematodes. The important endoparasites, *Meloidogyne* spp and *Pratylenchus* spp were widely distributed. Almost every nursery surveyed was infested with at least one of these endoparasities. The citrus nematode,*Tylenchulus semipenetrans* was also found associated with twig dieback of citrus seedlings.

In the present survey, nine species viz. *Aphelenchoides bicaudatus*, *Longidorus sylphus*, *Macroposthonia curvata*, *Paurodontella* sp., *Pratylenchoides* spp, *Scutylenchus mamillatus*, *Rotylenchus goodeyi*, *Safianema siddiqii and Xiphinema italiae* are recorded for the first time in Libya. During 1979–80, the losses due to discarded seedlings of Peach, almond, and grapes infected by *M. javanica*, and *M. incognita* ranged from 16–100% in many nurseries.

INTRODUCTION

The production of fruit tree seedlings in Jamahiriya is fast increasing. During 1970–71 available fruit tree seedlings totalled 0.56 million, of which 55% were produced locally and the remaining were imported. During 1977–78, the local production increased to 3.1 million.

Nurseries in which the same or similar plant species are grown within the same area continuously, result in heavy build up of nematode population and pose some of the most difficult pest problems in seedling production. Losses due to nematode infection

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on fruit tree seedlings appear in different forms. The most common are (a) the loss due to rejection of unmarketable infected seedlings (b) the loss due to decline of orchards because of plantations of nematode infected seedlings (c) the ensuing loss due to contamination and spread of nematodes in uninfested lands. As most of the nematode problems of fruit trees originate from infested nurseries, (4, 5) therefore, a preliminary survey was made to investigate the nematode problems in fruit tree nurseries in Jamahiriya.

MATERIALS AND METHODS

Soil samples from around the roots of almond, apricot, apple, citrus, fig, grape, peach pear, plum and pomegranate seedlings were collected randomly from different nurseries in the Jamahiriya. The quantity of soil per sample varied from 0.5–1 kg and, often consisted of 5 subsamples. Later, 250 ml of soil from each sample was processed by a modification of Cobb's sieving technique (2, 3). To indicate the level of infestation, the nematode population was arbitrarily grouped as low 1–100, Moderate-101–1,000, High-1,001–10,000 and very high above 10,000 per 250 ml soil.

About 100 seedlings/ha from each nursery were also uprooted randomly to observe the percentage infection of root-knot nematode Roots collected from each nursery were stained in 0.1% cotton blue lactophenol and examined for the presence of endoparasites.

In most of the nurseries, the number of peach, almond or plum seedlings were about 30,000/ha and those of grape, fig and pomegranate about 50,000/ha. For loss assessment the price of a single seedling was considered as LD 0.700 for peach and plum, LD 0.500 for almond and LD 0.050 for grape, fig or pomegranate.

RESULTS AND DISCUSSION

Seventeen genera of plant parasitic nematodes were encountered in different fruit tree nurseries in Libya. *Meloidogyne* and *Pratylenchus* were widely distributed. (Table 1).

The root-knot nematodes, *Meloidogyne javanica* and *M. incognita* were recorded from all the fruit tree seedlings except pear and apple. *M. javanica* was more prevalent than *M. incognita*. The population of *Meloidogyne* larvae in soil ranged from low to high in Ajdaida, Bu Saleem, Abu Aisha, Ganima, Tarhuna, Azizia, Zawia, Garian, Gerabuli, Zurda and Alfataya nurseries.

The root-lesion nematodes, *Pratylenchus* spp were also recorded from almost all the fruit tree seedlings. Low to moderate population of this nematode was encountered in most of the nurseries. The citrus nematode, *Tylenchulus semipenetrans* was obtained in

very high number (14,000/250 ml soil) from citrus seedlings in Ajdaida nursery. The affected seedlings showed twig dieback and lesions on their roots.

The stunt nematodes, *Tylenchorhynchus* spp and *T. goffarti* were most common. The

Table 1. Distribution of *Meloidogyne* spp and other nematodes in different nurseries.

Nursery	Seedling	Nematode Population/250 ml Soil				
		Mel	Pra	Tyl	Ty	Dit
Ajdaida	ALMOND	175	—	250	—	—
	APRICOT	350	—	125	25	—
	GRAPE	1,250	625	15	25	—
	PEACH	1,500	50	—	35	75
	APRICOT	150	50	75	125	50
	PEACH	250	50	75	125	50
Libyan Rumaina Co.	ALMOND	6,500	—	15	—	—
Azizia	GRAPE	1,500	175	250	—	—
	PEACH	650	—	175	—	210
Zawia	ALMOND	1,500	—	175	—	—
Zawia	FIG	750	—	125	—	—
	GRAPE	2,600	—	250	—	—
	POMEGRANATE	3,500	120	75	—	—
Abuaisha	ALMOND	1,500	—	275	—	—
Gerabuli	ALMOND	1,260	—	60	—	—
	PLUM	660	40	120	—	—
Ganima	PEACH	50	75	25	—	—
Junduba	APRICOT	100	250	125	175	150
Zurda	FIG	10	75	525	25	—
	APRICOT	125	—	400	—	75

Pra = *Pratylenchus* spp.

Ty = Tylenchus spp.

Mel = *Meloidogyne* spp.

Tyl = *Tylenchorhynchus* spp.

Dit = *Ditylenchus* spp.

genera *Ditylenchus* and *Tylenchus* were also frequently encountered. The population of all these genera ranged from low to moderate. The genera *Helicotylenchus* and *Trichodorus* were rarely encountered and their population was generally low. Nine

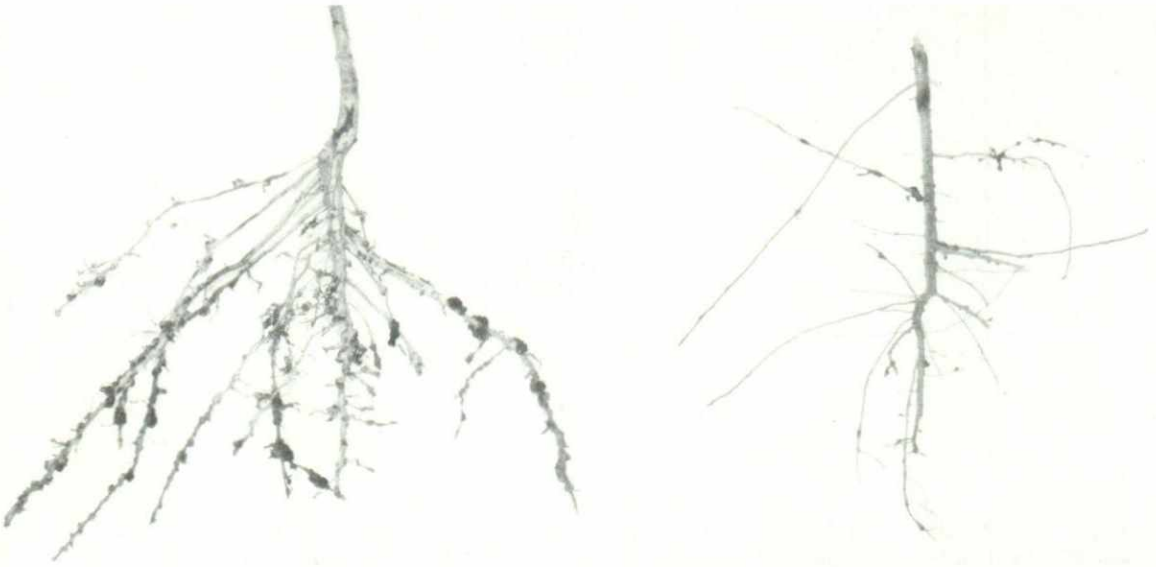

Fig. 1–2. Root-knots on peach and apricot seedlings respectively caused by *Meloidogyne incognita.*

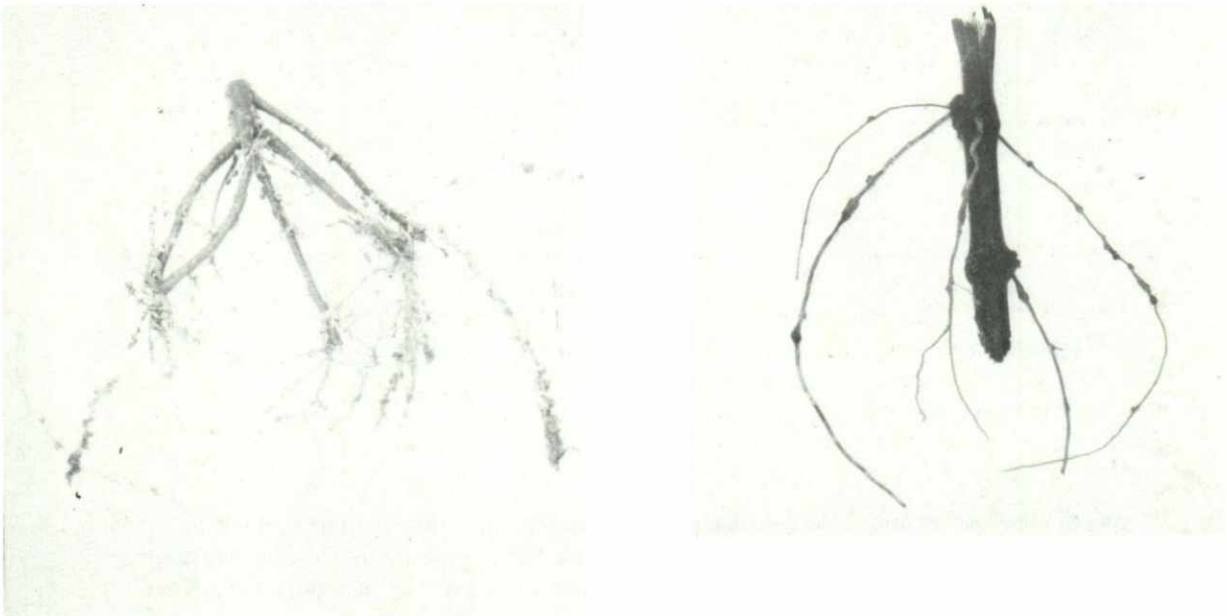

Fig. 3–4. Root-knots on almond and grape seedlings respectively caused by *Meloidogyne javanica.*

species of rare occurrence and also the first records in Libya were *Aphelenchoides bicaudatus* from peach and almond in Azizia, *Longidorus sylphus*, *Paurodontella* sp, *Pratylenchoides* sp, *Safianema siddiqii* and *Scutylenchus mamillatus* from around the roots of plum in Tarhuna, *Marroposthonia curvata* from citrus and plum in Ajdaida, *Rotylenchus goodeyi* from pear in Ganima and *Xiphinema italiae* from peach and pear in Ajdaida and Junduba nurseries respectively. However, in each case, the population was low. All these nematode species are considered to be of minor importance due to their population, mode of parasitism and rare occurrence.

In the present survey, the species of *Meloidogyne* appears to be the most important nematodes associated with fruit tree seedlings. The affected seedlings showed numerous galls on main as well as on lateral roots (Figs. 1–4). High root-knot nematode infection caused yellowing, stunting and often death of young seedlings.

Frequent visits to different nurseries indicated an alarming situation due to infestation of root-knot nematodes. In nurseries at Ajdaida (4 ha) and Gerabuli ($\frac{1}{2}$ ha), about 90% peach seedlings were moderately to heavily infected with *M. incognita*: Similarly, in Libyan Rumanian Co. nursery at Azizia (6 ha), peach seedlings showed 5–25% infection of *M. javanica*. The losses in these nurseries ranged from 25% in Azizia to 100% in Ajdaida and Gerabuli due to rejection of nematode infected peach seedlings.

In Gerabuli about two thousand peach seedlings imported from Italy died within few months of plantation due to heavy infection of *M. javanica*. The total loss during 1979–80 was estimated as 115, 500 Libyan Dinars in Ajdaida, Azizia and Gerabuli nurseries.

Almond seedlings showed 50–90% infection with *M. javanica* in Azizia (6 ha), Abu Aisha (15 ha), Gerabuli ($\frac{1}{2}$ ha) and Zawia (1 ha). The total loss during 1980 was estimated as 330,000 LD due to discarding of 50% of the almond seedlings in Zawia and 100% in Azizia, Abu Aisha and Gerabuli.

The infection of *M. javanica* on grape seedlings was 16, 60, 80 and 90% in Azizia (5 ha), Bu Saleem (2ha) Ajdaida (1 ha) and Zawia ($\frac{1}{2}$ ha) respectively. The total loss during 1980 was estimated as 5,500 LD due to root-knot nematode infection on grape seedlings.

In Zawia most of the fig (2 ha), pomegranate ($\frac{1}{2}$ ha) and olive seedlings showed light to heavy infection of *M. javanica*. Similarly, plum seedlings ($\frac{1}{2}$ ha) in Gerabuli showed light infection of *M. javanica*. The losses in all these cases could not be estimated.

It was also observed that in some nurseries, after discarding, the root-knot nematode infected seedlings, apparently healthy ones with trace to light infection were selected for plantation. In sandy soils, at the initial stage of plant growth, even this trace to light infection soon build up to damaging levels. Such infected transplants either fail to establish or soon show dieback symptoms. The removal of many years, old poorly growing, infected trees followed by fumigation and replanting is an expensive operation. Therefore, it is most important to produce healthy seedlings in disease free fumigated nurseries (1, 6) to save the future plantation in Jamahiriya. This will also help to prevent the contamination and establishment of nematodes in newly reclaimed uninfested lands.

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