A PRELIMINARY REPORT OF SURVEY OF PLANT PARASITIC NEMATODES OF LEGUMINOUS CROPS IN SYRIA

by

N. Greco, M. Di Vito, M. V. Reddy and M. C. Saxena

Leguminous crops, such as chickpea (Cicer arietinum L.), lentil (Lens culinaris Medic.) and faba bean (Vicia faba L.) are of major economic importance in Syria. Plant parasitic nematodes are among the pathogens that limit their productivity. However, there is little information on the species involved or their geographical distribution. A preliminary survey of these parasites, was undertaken in May 1983.

Materials and Methods

Soil and plant samples were collected mostly from chickpea fields (44) and also from lentil (2), faba bean (4), alfalfa (Medicago sativa L.) (2) and a non leguminous crop, onion (Allium cepa L.) (1). Five hundred cm$^3$ of soil per sample were processed by Cobb's sieving and decanting method. Five grams of root samples were also incubated (Young, 1954) or comminuted (Fallis, 1943) to extract endoparasitic migratory and sedentary nematodes, respectively. The nematodes were fixed in 5\% hot formalin and mounted for species identification.

Results

Nematodes found associated with leguminous crops

Tables 1 and 2 show that 12 nematode genera occurred in soil
and root samples of the five leguminous crops sampled. Among them Heterodera, Meloidogyne, Pratylenchus, Ditylenchus and Aphelenchoides are usually considered to be of most economic importance. Also present were the genera Pratylenchoides, Helicotylenchus, Tylenchorhynchus and Xiphinema that are reported in the literature to damage several crops. Genera of less economic importance were Paratylenchus, Trophurus and Tylenchus.

Heterodera sp. 24% of the chickpea root samples were infested with a species of Heterodera. Infested fields showed poor growth of the plants and yellowish foliage, indicating that the nematode causes considerable damage to chickpea; peas appeared to be less susceptible and faba bean resistant or a non host. Infestations were mostly found south of Aleppo where the area between Idleb and Saraqeb appeared to be extensively infested. In this area chickpea is the prevalent crop and in almost all fields there were patches of stunted plants and in some the crop was badly damaged.

All the nematode populations detected in the infested fields showed morphological features of the Heterodera trifolii group and were close to H. rosii Duggan et Brennan. However, males which are very important in distinguishing species of this group were not found in all the populations, probably because the crops were senescent at the time of sampling.

Meloidogyne artiellia. A species identified as M. artiellia Franklin was present in 12% of the chickpea samples. Infested fields showed patches in which plants were yellow, stunted and produced few pods.

Ditylenchus dipsaci. D. dipsaci (Kuehn) Filipjev was extracted from 13% of the soil samples. It is suspected of reducing the yield of faba beans, and is also a problem because at harvest fourth stage juveniles of the nematode may survive within the seeds and thus present serious quarantine implications for their export as many countries require nematode-free seed stock.

Pratylenchus thornei. It appears that P. thornei Sher et Allen is very common in Syria. It was detected in 60% of the samples including chickpea, faba bean, lentil and alfalfa. Chickpea seemed to be severely damaged by attacks of P. thornei and 74% of the samples were found
Table I - Nematodes per 500 cm³ soil of each soil sample of legumes collected in Syria.

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1) Juveniles + males.
infested with this parasite. Infested chickpea showed reduced growth and many lesions on the roots.

Other nematodes. Among other nematodes, Tylenchorhynchus spp. occurred in 73% of the samples, Tylenchus spp. 60%, Helicotylenchus spp. 50%, Pratylenchoides spp. 6%, Aphelenchoides spp. 4%, Paratylenchus spp. 4%, Tropheurus spp. 6%, and Xiphinema spp. 2%. Most of these nematodes are ectoparasitic in habit and were found on the roots and in the rhizosphere of several plants, but there were no symptoms of damage associated with their presence.

Discussion

These preliminary results indicate that Heterodera sp., M. artiellia, P. thornei and D. dipsaci should be considered as serious pests of many leguminous crops of Syria. Large numbers of these species were extracted from the rhizosphere or from the roots of chickpea plants that were heavily injured. Cyst forming and root-knot nematodes appeared to be the most pathogenic, but the former were more widespread and should be regarded as one of the main chickpea pathogens in the Idleb area.

Different nematode populations of Heterodera sp. are being reared at the Istituto di Nematologia Agraria, Italy, for characterizing all the developmental stages and for species confirmation. H. rosii has been reported only on Rumex sp. and no other hosts are known for this species. A Heterodera sp. similar to H. rosii has also been reported from Syria by Mamluk et al. (1983) on chickpea, pea, vetch and alfalfa. Further investigations, including the host range of the cyst nematode population, will provide useful information on the identity of the species.

Meloidogyne artiellia was first reported in England and thereafter in the Mediterranean area on cereals and legumes, including chickpea (Alcala et al. 1970; Kyrou, 1969; Taylor and Sasser, 1978; Tobar Jimenez, 1973). It is a severe pathogen of chickpea in Syria and according to Mamluk et al. (1983) it may also infest vetch, pea and alfalfa.

Pratylenchus thornei was widespread in the sampled area, but appears to be less pathogenic than Heterodera sp. and M. artiellia on chickpea. P. thornei had been reported from many countries infesting cereals and legumes. It may reduce the drought resistance of infested
Table II - Nematodes per 5 g roots of each root sample of legumes collected in Syria.

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1) All stages.
plants because of damage caused to the feeder roots (Orion et al. 1982).

The stem and bulb nematode *D. dipsaci* is very harmful to faba bean, oat, alfalfa, strawberry, onion and bulbous flowers. It is very common in Mediterranean countries (Lamberti, 1981).

Among the leguminous crops, the yield of faba beans and peas may be greatly reduced by *D. dipsaci* in conditions of mild weather and rain. Some races of the stem nematode may also infest oat, alfalfa and clover. Though other nematodes are very common in Syria, they are not suspected of causing severe yield losses unless they interact with other pathogens.

The survey was limited to the northern part of Syria and it should be extended to other major food legume areas to obtain more knowledge on the geographical distribution of the species reported above. Moreover, more investigations should be undertaken to provide information on the biology, population dynamics, host-parasite relationship and pathogenicity of these nematodes under different farming systems. The host range of these nematodes, tolerance limits of the susceptible crops, and the reaction of the available cultivars and lines to these parasites should also be studied to predict yield losses and determine resistant or tolerant sources. The expected information will enable agriculturalists to suggest management practices to avoid or reduce the damage caused by the most noxious nematodes.

**SUMMARY**

A survey of plant parasitic nematodes of leguminous crops was undertaken in northern Syria in 1983. 12 nematode genera *Aphelenchoides*, *Ditylenchus*, *Helicotylenchus*, *Heterodera*, *Meloidogyne*, *Paratylenchus*, *Pratylenchus*, *Pratylenchoides*, *Trophurus*, *Tylenchorhynchus*, *Tylenchus*, and *Xiphinema*, were found in the sampled area. *Heterodera* sp., *M. artiellia* and *Pratylenchus thornei* were extracted from 24%, 12% and 60% of the samples, respectively, and appeared to be the most damaging nematodes of many leguminous crops in this country.

**LITERATURE CITED**


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