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PLANT PARASITIC NEMATODES IN AL-KHARJ REGION OF SAUDI ARABIA

by

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During the past few years the cultivated area in the Kingdom of Saudi Arabia has increased considerably and in 1980 was approximately 800,000 hectares (Anon, 1980). Al-Kharj region with a cultivated area of about 12,000 hectares is one of the largest and most productive areas of crop production in the Central Province (El-Khatib, 1980). Here the light sandy soil is irrigated by pumping the underground water. In this region and elsewhere, plant parasitic nematodes especially root-knot nematodes (*Meloidogyne* spp.) are a serious problem and cause 30-60% loss of crop yields (Eissa, 1977).

There has been no comprehensive survey of plant-parasitic nematodes in the Kingdom but there have been occasional reports. Abdu (1972) reported five species on 15 different vegetable crops and associated weeds in Al-Kharj and Riyadh regions and Eissa (1977) recorded 19 genera in the Kingdom, including Al-Kharj region. Root-knot nematodes are considered to be widespread (Talhouk, 1957; Ayoub, 1959; Abdu, 1972; Eissa, 1977). *Meloidogyne javanica* (Treub) Chitw. has been found in several regions and *M. incognita* (Kofoid et White) Chitw. in Al-Qatif (Eissa et al., 1980).

The present survey is part of a 3-year research project sponsored by the Saudi Arabian National Centre for Science and Technology (SANCST) to study plant diseases caused by nematodes, fungi, bacteria, and viruses in Al-Kharj region.

A total of 1124 soil and plant samples were collected from Al-Kharj region during September 1980 to December 1981. Nematodes from

soil samples were extracted by a decanting and sieving method (Thorne, 1961) and from plant tissues by comminuting in a blender for 10-20 seconds at high speed and then by mist extraction. Eggs of *Meloidogyne* spp. were extracted from infected roots with 0.5% sodium hypochlorite (Barker, 1978).

More than 50% of the collected samples contained plant-parasitic nematodes (Table I). *Meloidogyne javanica* was present in 24% of the samples and caused severe damage to eggplants, okra, and tomatoes. These are the main crops in this region, and heavy infestation early in the season killed many of the plants. The plants that survived grew poorly and the yield losses were roughly estimated to be 50-60%. Heavy root rot caused by *Fusarium* sp. and *Rhizoctonia solani* Khün was frequently associated with root-knot infestation. Eighteen other plant-parasitic nematode genera were found, the stunt, lesion, and dagger nematodes being the most frequently recorded (Table I). The citrus nematode, *Tylenchulus semipenetrans* Cobb, was found in several citrus orchards, where many trees showed symptoms of slow decline and yield was reduced by up to 50%. *Meloidogyne incognita* was a major problem in many vineyards. The wheat gall nematode, *Anguina tritici* (Steinbuch) Chitw., was recovered a few times at low densities in association with the newly introduced Mexican wheat varieties. Although Abdu (1972) reported a *Heterodera* sp. in Al-Kharj region, it was not found in the present survey; Eissa (1977) reported *Heterodera* spp. in Al-Gassim but not in Al-Kharj region.

Thirty-five crops were found to be infested with plant-parasitic nematodes. Cucumber and squash were frequently infested with *M. javanica*, but these tolerate infestation much better than okra and tomato. Alfalfa was mainly infested with lesion, dagger, spiral and stem and bulb nematodes; infestation was low and thus does not seem to be a serious problem, at least at present.

Because the two summer season crops overlap with those of the winter season in the region, the hosts of many plant-parasitic, and especially the root-knot, nematodes are usually present throughout the year. However, population densities of most nematode species were higher during mid-autumn to early winter (November, December, and January) when the average soil temperatures at 20 cm depth were 23, 18, and 15°C, respectively.

The survey showed that the root-knot nematode, *M. javanica*, is a serious problem for vegetable production in the region, and most probably throughout the Kingdom of Saudi Arabia. Citrus nematode

Table I - Association of plant-parasitic nematodes with plants grown in Al-Kharj region (Sept. 1980 - Dec. 1981) ^a.

Nematodes	Host
<i>Anguina tritici</i> (Steinbuch) Chitw.	Wheat.
<i>Aphelenchoides</i> spp.	Egg plant, Okra, Pumpkin, Green beans, Snake Cucumber.
<i>Aphelenchus avenae</i> Bastian	Eggplant, Okra, Tomato, Cowpea, Squash, Citrus, Wheat, Green beans, Cassia, Lettuce.
<i>Aphelenchus</i> spp.	Cowpea, Watermelon, Spinach, Sudan grass.
<i>Belonolaimus longicaudatus</i> Rau	Green beans.
<i>Criconemoides</i> sp.	Alfalfa.
<i>Ditylenchus dipsaci</i> (Kühn) Filipjev	Alfalfa, Onion
<i>Helicotylenchus dihystrera</i> (Cobb) Sher	Tomato, Alfalfa, Citrus, Banana Date-palm.
<i>Helicotylenchus</i> spp.	Eggplant, Alfalfa, Citrus, Broad beans, Poplar.
<i>Hoplolaimus</i> spp.	Pepper, Onion.
<i>Longidorus africanus</i> Merny	Eggplant, Okra, Tomato, Cucumber, Alfalfa, Pepper, Potato, Cowpea, Squash, Radish, Sorghum, Corn, Citrus, Pomegranate, Table Beet, Onion, Wheat, Green beans, Cabbage.
<i>Longidorus</i> sp.	Corn.
<i>Macroposthonia</i> sp.	Alfalfa.
<i>Meloidogyne incognita</i> (Kofoid et White) Chitw.	Grapevines Pear, Pepper, Pomegranate.
<i>M. javanica</i> (Treub) Chitw.	Eggplant, Okra, Tomato, Cucumber, Alfalfa, Pepper, Cowpea, Squash, Corn, Citrus, Pumpkin, Onion, Green beans, Snake cucumber, Broad beans, Cabbage, Radish, Cassia, Carrot, Watermelon, Sunflower, Chenopodium, Convolvulus.
<i>Paralongidorus</i> sp.	Okra.
<i>Paratylenchus</i> sp.	Alfalfa, Green beans.
<i>Pratylenchus</i> spp.	Eggplant, Alfalfa, Cowpea, Squash, Wheat, Green beans, Banana, Fig.
<i>P. zea</i> . Graham	Sorghum, Corn, Broad beans.
<i>Trichodorus</i> spp.	Okra, Alfalfa, Corn, Citrus.
<i>Tylenchorhynchus</i> spp.	Eggplant, Tomato, Cucumber, Alfalfa, Cowpea, Squash, Sorghum, Corn, Pomegranate, Onion, Green beans, Snake cucumber, Broad beans, Cabbage, Banana, Grapevine.
<i>Tylenchulus semipenetrans</i> Cobb	Citrus, Pear.
<i>Xiphinema americanum</i> Cobb	Okra, Alfalfa, Pepper, Cowpea, Squash, Pomegranate, Green beans, Banana.
<i>Xiphinema</i> sp.	Okra.

^a The listing does not necessarily indicate that all nematodes associated with a given plant are pathogenic to that plant.

is the second major problem in the area. Immediate action should be taken to control, or at least to limit, their damage and spread in the region.

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