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ON THE HOST RANGE OF *MELOIDOGYNE ARTIELLIA*

by
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Meloidogyne artiellia Franklin was first reported on oat (Franklin, 1961). Since then this root-knot nematode has been found in association with several crops in Europe. In the perimediterranean area *M. artiellia* causes severe yield losses of wheat in Greece (Kyrou, 1969), chickpea in Spain (Alcala *et al.*, 1970; Tobar Jimenez, 1973), Italy (Greco, 1984) and Syria (Mamluk *et al.*, 1983; Greco *et al.*, 1984) and vetch in Syria (Mamluk *et al.*, 1983).

Chemical control of the nematode in the crops referred to above is not feasible because of their relatively low value and the high cost of treatment. Crop rotation could provide an easy and cheap way for reducing yield losses caused by *M. artiellia*, but unfortunately information on the host range of the nematode, needed for suggesting the most useful crop sequence, is scanty. Therefore an investigation was undertaken in 1984, to assess the host status for *M. artiellia* of several plant species of economic importance in Mediterranean countries.

Materials and Methods

Clay pots of 12 cm diameter were filled with 750 cm^3 of a steam sterilized sandy loam soil and arranged on benches in a greenhouse kept at 18-24°C. The experiment was a completely randomized design with five replicates of each plant species. The pots were sown or transplanted on 8 June.

Table I - *Plant species tested as hosts for* Meloidogyne artiellia.

Common name	Botanical name	Cultivar, hybrid or line	Nematode specimens in 5 g roots	Host status
Leguminosae:				
Bean	(*Phaseolus vulgaris* L.)	La Victoire	69	p(1)
Chickpea	(*Cicer arietinum* L.)	ILC 482	1230	gg
Cowpea	(*Vigna unguiculata* Walp.)	Azuki	0	nh
Crimson clover	(*Trifolium incarnatum* L.)	Local Italian	235	g
Faba bean	(*Vicia faba* L.)	Local Syrian	230	g
Gross pea	(*Lathyrus sativus* L.)	Acc. 347	229	g
Lentil	(*Lens culinaris* Medic.)	ILL 4400	25	p
Lupin	(*Lupinus albus* L.)	Local Italian	0	nh
Annual medics	(*Medicago rigidula* Desr.)	Sel. 716 Acc. 811	1427	gg
Alfalfa	(*Medicago sativa* L.)	Bresaola	161	g
Pea	(*Pisum sativum* L.)	Progress 9	203	g
Soybean	(*Glycine hispida* Moench.)	Kent	2	pp
Vetch	(*Vicia sativa* L.)	Acc. 2541	459	g
Spanich espercei	(*Hedysarum coronarium* L.)	Local Italian	436	g
Sainfoin	(*Onobrychis viceifolia* Scop.)	Local Italian	1*	nh
White clover	(*Trifolium repens*. L.)	Nano Huia	969	gg
Graminaceae:				
Barley	(*Hordeum vulgare* L.)	Aramir	550	gg
Bread wheat	(*Triticum vulgare* Vill.)	Fortunato	940	gg
Maize	(*Zea mays* L.)	Lorena hybrid	0	nh
Durum wheat	(*Triticum durum* Desf.)	Creso	1259	gg
Oat	(*Avena sativa* L.)	Rogar 8	21	p
Sorghum	(*Sorghum vulgare* Pers.)	N-K 180	289	g
Triticale	(*Triticasecale* Wittmack)	Driva out cross 7 Syria	520	gg
Solanaceae:				
Egg plant	(*Solanum melongena* L.)	Bellezza Nera	0	nh
Pepper	(*Capsicum annuum* L.)	Yolo Wonder	0	nh
Potato	(*Solanum tuberosum* L.)	Elvira	26*	nh
Tomato	(*Lycopersicon esculentum* Mill.)	Ventura	53	p
Cruciferae:				
Cabbage	(*Brassica oleracea* L.)	Cuore di bue	2393	gg
Cauliflower	(*Brassica oleracea* var. *botrytis* L.)	Gigante di Napoli	1309	gg
Rashad	(*Nasturtium fontanum* Asch.)	Local Syrian	944	gg
Turnip	(*Brassica rapa* L.)	Precoce natalino	3928	gg

Tab. I - Continued

Umbelliferae:				
Carrot	(*Daucus carotae* L.)	Sel. 92	0	nh
Celery	(*Apium graveolens* L.)	Tall Utah	0	nh
Coriander	(*Coriandrum sativum* L.)	Local Syrian	1	pp
Fennel	(*Foeniculum vulgare* Mill.)	Grosso romanesco	0	nh
Parsley	(*Petroselinum hortense* L.)	Local Italian	1*	nh
Liliaceae:				
Garlic	(*Allium sativum* L.)	Local Italian	0	nh
Onion	(*Allium cepa* L.)	Bianca di Giugno	0	nh
Chenopodiaceae:				
Sugarbeet	(*Beta vulgaris* L.)	Buramo	0	nh
Spinach	(*Spinacia oleracea* L.)	Riccio d'America	77	p
Compositae:				
Artichoke	(*Cynara scolymus* L.)	Romanesco	0	nh
Lettuce	(*Lactuca sativa* L.)	Verde degli ortolani	2*	nh
Sunflower	(*Helianthus annuus* L.)	Sole d'oro	9*	nh
Cucurbitaceae:				
Cucumber	(*Cucumis sativus* L.)	Mezzo lungo verde	72*	nh
Gourd	(*Cucurbita ficifolia* L.)	Local Syrian	1*	nh
Melon	(*Cucumis melo* L.)	Cantalupo di Charentais	21	p
Pumpkin	(*Cucurbita pepo* L.)	Local Syrian	3	pp
Watermelon	(*Citrullus vulgaris* Schrad.)	Sugar Baby	1*	nh
Zucchini	(*Cucurbita pepo* L.)	Ambassador hybrid	2	pp
Malvaceae:				
Cotton	(*Gossypium herbaceum* L.)	Local Syrian	8*	nh
Okra	(*Hibiscus esculentus* L.)	Local Syrian	3	pp
Rosaceae:				
Strawberry	(*Fragaria x ananassa* D.)	Tioga	1*	nh
Linaceae:				
Flax	(*Linum usitatissimum* L.)	Local Syrian	0	nh
		LSD P=0.05	359	
		P=0.01	707	

(1) no specimen or only males = nh (non host); 1-20 = pp (very poor host); 21-100 = p (poor host); 101-500 = g (good host); > 500 = gg (very good host); * = males only.

Fifty four plant species belonging to twelve botanical families were tested (Tab. I). When the seeds had germinated the pots were thinned to a variable number of plant per pots, according to the mature plant size. An Italian population of *M. artiellia* had been reared on chickpea in a greenhouse and when large egg masses were formed, the inoculum was collected by the sodium hypochlorite method (Hussey and Barker, 1973). Each pot was inoculated on 19 June with 20,000 eggs in water suspension, poured into four holes equally distributed around the plant(s).

Forty five days later the plants were uprooted, washed free of soil particles and weighed. Developmental stages of *M. artiellia*, extracted separately from each pot by the method of Coolen (1979), were counted and recorded per 5 g of roots. Data were then statistically analyzed and LSDs determined.

Results and Discussion

The numbers of the various stages of *M. artiellia* recovered from the roots (Tab. I) clearly show that most of the species belonging to Leguminosae and Graminaceae were good to very good hosts for the nematode.

All the four species of Cruciferae tested can also be considered to be good hosts for *M. artiellia*. However, most of members of the Solanaceae, Umbelliferae, Chenopodiaceae, Cucurbitaceae and Malvaceae were poor or non hosts. The species of Compositae, Liliaceae, Linaceae and Rosaceae that were tested were non hosts.

Adults of the nematode were found in all host plants but only males were recovered from some of the non hosts. Among the Leguminosae and Graminaceae, cowpea, lupin and maize were non hosts, and bean, lentil, soybean, sainfoin and oat were poor to very poor hosts.

The host status is confirmed for several crop species as previously repoterd (authors as in introduction, above) and a wider prospective is provided on the host range of *M. artiellia*. The range of host species could increase the soil population of the nematode or at least maintain it at a level above the tolerance limit of several crops, so that severe losses of some future crops might be expected, especially with Leguminosae, Graminaceae and Cruciferae, which are cultivated on a large scale in many countries.

All non host and poor host species could usefully be included in a rotation programme aimed at limiting yield losses caused by *M. artiellia*. Although most of the non host and poor host species are limited in the extent to which they are grown, some of them, such as lentil, oat, sunflower, sugarbeet, cotton and flax, are cultivated on large areas in many Mediterranean countries.

These results have been obtained under greenhouse condition and all tested species grew equally well. In the field they are cultivated either as winter or spring crops and thus might differently affect the reprodution of the nematode. Further, the amount of root (food supply for the nematode) in the soil will vary according to the type of crop. Therefore it is suggested that most of the poor host species should be tested under field conditions to evaluate their effect on the dynamics of the nematode, before final conclusions are reached on their use in rotations.

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SUMMARY

Fifty four plant species of economic importance in the perimediterranean countries were assessed as host for *Meloidogyne artiellia*. Most of the Leguminosae and Graminaceae were hosts for the nematode and only cowpea, lupin, sainfoin and maize were non hosts. All Cruciferae tested were good hosts. Members of the Umbelliferae, Chenopodiaceae, Cucurbitaceae, Malvaceae and Solanaceae were non or poor hosts. Compositae, Liliaceae, Linaceae and Rosaceae were non hosts.

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