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REACTIONS OF SOME GRAMINEOUS AND LEGUMINOUS PLANT CULTIVARS TO *MELOIDOGYNE INCOGNITA* AND *M. JAVANICA*

by

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Summary. The reactions of 6 corn, 8 wheat and 24 leguminous plant cultivars to *Meloidogyne incognita* race 1 and *M. javanica* were studied in pot experiments. All corn cultivars tested were susceptible to both nematodes except that cv. Cairo 1 was moderately resistant to *M. incognita* and cv. TH 310 was moderately resistant to *M. javanica*. Wheat cvs Giza 160, Sakha 8, Sakha 61, Sakha 69 and Stork were resistant, whereas cvs Giza 157 and Land Race were susceptible or moderately susceptible to both nematode species. Most of the leguminous cultivars tested were susceptible whereas alfalfa cv. Cuf 101 was resistant to the root-knot nematodes. Lupin cvs Giza 1 and Giza 2 were resistant to *M. javanica* and peanut cv. Giza 4 was resistant to *M. incognita*.

Root-knot nematodes (*Meloidogyne* spp.) are very common in Egypt and are important pests on many crop plants. Both *M. incognita* race 1 and *M. javanica* are of widespread occurrence and adversely affect crop production (Ibrahim and Rezk, 1988; Ibrahim, 1990). Resistance of plant cultivars to root-knot nematodes has been the subject of several studies (Kheir *et al.*, 1979; Oteifa and El-Gindi, 1982; Ibrahim *et al.*, 1983 and 1988). These studies showed that the gramineous and leguminous plant cultivars tested had different degrees of susceptibility to certain biotypes of *M. incognita* and *M. javanica*. Resistant plant cultivars are needed to effectively manage root-knot nematode populations in Egypt. The present study describes the reactions of 14 graminaceous and 24 leguminous plant cultivars to *M. incognita* (Kofoid *et White*) Chitw. race 1 and *M. javanica* (Treib) Chitw.

Materials and methods

The investigation was undertaken in a glasshouse. Seeds of each cultivars were sown in 15-cm diameter clay pots containing antoclaved sandy loam soil. A week after emergence, seedlings were thinned to two/pot and the soil was inoculated with 5,000 nematode eggs per pot. Nematode treatments and untreated control were replicated 5 times. Roots of plants harvested 9 weeks after inoculation were freed of soil and stained for 15 min. in an aqueous solution of Phloxine B (0.15 g/l water). Egg mass rating was made on a 0-5 scale (0 = 0, 1 = 1-2, 2 = 3-10, 3 = 11-30, 4 = 31-100, and 5 = greater than 100 egg masses). The roots were then cut into small pieces and nematode

eggs were extracted from roots using the NaOC1 method and counted (Hussey and Barker, 1973). Oostenbrink's (1966) reproduction factor (RF) (final egg number/initial egg number) was determined for each cultivar-nematode treatment. Treatments with RF = 0 were considered resistant, RF = 0.1-1 moderately resistant, RF = 1.1-2 moderately susceptible, RF = 2.1-5 susceptible and RF = greater than 5 as highly susceptible.

Results and discussion

The reactions of the corn and wheat cultivars to *M. incognita* and *M. javanica* are given in Table I. Wheat cvs Giza, 160, Sakha 8, Sakha 61, Sakha 69 and Stork were resistant to both nematode species. Wheat cv. Giza 155 was resistant to *M. incognita* but susceptible to *M. javanica*, whereas cv. Giza 157 was moderately susceptible to both nematode species. Cv. Land Race was susceptible to *M. incognita* and moderately susceptible to *M. javanica* (Table I).

The corn cultivars tested were either susceptible or highly susceptible to both nematode species except cv. Cairo 1 moderately resistant to *M. incognita* and cv. TH 310 moderately resistant to *M. javanica*. It is evident that *M. incognita* and *M. javanica* were pathogenic to most corn cultivars. Moreover, *M. incognita* showed greater values of the reproduction factor than *M. javanica* on the tested corn cultivars, except cvs Cairo 1 and DH 202. Most of the wheat cultivars tested were resistant and did not support any development of root-knot nematodes. There were no females or egg masses of these nematodes on the roots of the tested wheat cultivars except cvs Giza 155, Giza 157

and Land Race. Similar studies have shown that corn cultivars are susceptible to *Meloidogyne* spp. (Ibrahim et al. 1983). Also, Kheir et al. (1979) found that *M. javanica* suppressed the growth of wheat cv. Giza 155 and Ibrahim et al. (1988) showed that *M. javanica* significantly reduced root and shoot dry weight of wheat cvs Giza 155 and Giza 157.

Data presented in Table II show that most of the leguminous plant cultivars tested were susceptible or highly susceptible to *M. incognita* and *M. javanica*. Chick-pea cv. Giza 1, Egyptian clover cv. Fahl and lentil cvs Giza 9 and

Giza 370 were moderately susceptible to *M. incognita*. Also, pea cvs Little Marvel and Perfection were moderately susceptible to *M. javanica*. On the other hand, alfalfa cv. Cuf 101 was resistant to both nematode species. Lupin cvs Giza 1 and Giza 2 were moderately resistant to *M. incognita* and resistant to *M. javanica*. Peanut cv. Giza 4 was resistant to *M. incognita*. In a similar study, Ibrahim et al. (1983) showed that tested leguminous plant cultivars had different degrees of susceptibility to some populations of *Meloidogyne* spp. and indicated that lupin cv. Baladi and fenugreek cv. Baladi were resistant to *M. javanica*.

TABLE I - Reaction of some corn and wheat cultivars to *Meloidogyne incognita* race 1 and *M. javanica*.

Plant Cultivars	<i>M. incognita</i>			<i>M. javanica</i>		
	Egg mass index	RF	Reaction	Egg mass index	RF	Reaction
Corn (<i>Zea mays</i> L.)						
Cairo 1	2	0.1	MR	3	3.7	S
DH 202	3	2.3	S	5	10.0	HS
DH 204	5	6.5	HS	3	2.8	S
DH 215	5	8.3	HS	3	2.4	S
Giza 21	5	10.0	HS	4	6.0	HS
TH 310	4	3.7	S	1	0.3	MR
Wheat (<i>Triticum aestivum</i> L.)						
Giza 155	1	0	R	4	2.6	S
Giza 157	3	1.3	MS	3	2.0	MS
Giza 160	0	0	R	0	0	R
Land Race	5	4.0	S	3	2.0	MS
Sakha 8	0	0	R	0	0	R
Sakha 61	0	0	R	0	0	R
Sakha 69	0	0	R	0	0	R
Stork	0	0	R	0	0	R

RF: reproduction factor; S: susceptible; HS: highly susceptible; R: resistant; MR: moderately resistant; MS: moderately susceptible.

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TABLE II - Reaction of some leguminous plant cultivars to *Meloidogyne incognita* race 1 and *M. javanica*.

Plant Cultivar	<i>M. incognita</i>			<i>M. javanica</i>		
	Egg mass index	RF	Reaction	Egg mass index	RF	Reaction
Alfalfa (<i>Medicago sativa</i> L.)						
Cuf 101	0	0	R	0	0	R
Broad bean (<i>Vicia faba</i> L.)						
Baladi	5	2.7	S	4	6.0	HS
Giza 2	5	3.9	S	5	8.4	HS
Giza 3	5	2.3	S	5	4.3	S
Giza 402	5	2.5	S	3	3.1	S
Chick-Pea (<i>Cicer arietinum</i> L.)						
Giza 1	5	1.8	MS	5	9.6	HS
Egyptian Clover (<i>Trifolium alexandrinum</i> L.)						
Fahl	3	1.8	MS	5	35.3	HS
Meskawy	4	4.0	S	5	16.3	HS
Cowpea (<i>Vigna sinensis</i> Savi)						
Baladi	6	18.2	HS	5	7.3	HS
Gream 7	4	4.1	S	3	5.6	HS
Fenugreek (<i>Trigonella foenum-graecum</i> L.)						
Giza 3	5	8.7	HS	5	4.9	S
Kidney bean (<i>Phaseolus vulgaris</i> L.)						
Giza 3	5	45.2	HS	5	11.5	HS
Giza 4	5	36.6	HS	5	9.5	HS
Mareglobe	4	11.4	HS	3	2.3	S
Lentil (<i>Lens culinaris</i> Medik)						
Giza 9	5	1.4	MS	3	2.5	S
Giza 370	3	1.5	MS	4	5.9	HS
Lupin (<i>Lupinus termis</i> L.)						
Giza 1	1	0.6	MR	0	0	R
Giza 2	2	0.2	MR	0	0	R
Pea (<i>Pisum sativum</i> L.)						
Little Marvel	5	2.7	S	3	1.6	MS
Lincoln	5	2.6	S	3	2.2	S
Perfection	5	3.1	S	3	1.8	MS
Peanut (<i>Arachis hypogaea</i> L.)						
Giza 4	0	0	R	3	2.1	S
Soybean (<i>Glycine max</i> Merr.)						
Clark	4	6.6	HS	4	3.2	S
Crawford	5	6.8	HS	4	3.1	S

RF: reproduction factor; S: susceptible; HS: highly susceptible; R: resistant; MR: moderately resistant; MS: moderately susceptible.