Nematol. medit. (1982), *10*: 135-139.

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REACTION OF FIFTEEN MALVACEOUS PLANT CULTIVARS TO ROOT-KNOT NEMATODES, *MELOIDOGYNE* SPP.

by
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Resistance of malvaceous crop plants to root-knot nematodes (*Meloidogyne* spp.) has been the subject of several studies. Wiles (1957) found that *M. hapla, M. arenaria* and *M. javanica* caused no visible galling on upland cotton (*Gossypium hirsutum* L.) cvs. Auburn 56, Coker 100, Alabama Hybrid 81-14 and Empire. Minton (1962) studied the development of root-knot nematodes in 7 cotton cultivars and showed that *M. incognita acrita* matured in cvs. Rowden, Auburn 56, Mexican (*G. hirsutum*) and a wild selection of *G. barbadense* L.; *M. incognita* matured in Rowden, Empire and Auburn 56, whereas *M. arenaria* matured in Rowden only.

Brodie and Cooper (1964) demonstrated that isolates of *M. incognita, M. arenaria, M. javanica* and *M. hapla* were able to penetrate roots of upland cotton (*G. hirsutum*) seedlings in equal numbers and significantly reduce the growth of seedlings. Only one isolate of *M. incognita* reached the egg-laying stage, while the other isolates did not develop beyond the second larval stage. Khalil (1977) detected an isolate of *M. javanica* which reproduced in and reduced the growth of the cotton (*G. barbadense*) cv. Giza 69.

Pate *et al.* (1958) reported that kenaf (*Hibiscus cannabinus* L.) was extremely susceptible to root-knot nematodes. Wilson and Summers (1966) detected a wild strain of kenaf from Kenya possessing a significant level of resistance to root-knot nematodes; they also found that the fibre-type cultivars of roselle (*H. sabdariffa* L.) were moderately to highly resistant. Adeniji (1970) reported that all of the 8 roselle cultivars that he tested were resistant to *M. incognita acrita, M. incognita, M. arenaria* and *M. javanica*. Minton and Adamson

(1979) found that the roselle breeding line A59-56 was highly resistant to *M. javanica* and *M. arenaria.*

The present study was undertaken to determine the reaction of 15 malvaceous plant cultivars to the common species and races of root-knot nematodes in northern Egypt.

Materials and Methods

The malvaceous plants tested in this study are listed in Table I. Seeds of each plant were sown in 25 cm diameter clay pots containing autoclaved sandy loam soil. A week after emergence, the seedlings were thinned to two/pot and inoculated with 5000 eggs of each of *M. incognita* (Kofoid and White) Chitw. (Race 2, Race 3 and Race 4), *M. javanica* (Treub) Chitw. or *M. arenaria* (Neal) Chitw. (Race 1) as identified with Sasser's differential hosts (Sasser 1979). There were 4 replicates of each treatment.

The plants were harvested 75 days after nematode inoculation and rated for relative degree of galling and egg mass production according to an index 0-5, as indicated in Table I. Plants with ratings 0-2 were considered to be resistant and those with ratings 3-5 were considered to be susceptible.

Results and Discussion

Nine tested cotton cultivars were resistant to *M. incognita* Race 2, *M. javanica* and *M. arenaria* Race 1 with the exception of Giza 69 which was susceptible to *M. javanica* (Table I). The cultivars Giza 68, Giza 70 and Giza 75 were resistant to *M. incognita* Race 3 and Race 4 while Giza 67, Giza 69, Bahtim 110, and Deltapine 16 were susceptible to them. The most resistant cotton cultivars were Acala 4-42 and Acala 67A while the most susceptible ones were Giza 69 and Bahtim 110. It is also evident that the commercial cultivars of kenaf, mallow and okra were susceptible to the nematode populations used in the tests. In contrast, the roselle cultivar exhibited an immune reaction to these nematode populations.

The cotton cultivar Bahtim 110 (gossypol-free) had a lower infection index to *M. incognita* Race 3 than Giza 69 which methylates gossypol. This observation might indicate that factors other than

Table I - *Reaction of 15 malvaceous plant cultivars to* Meloidogyne incognita *(Race 2, Race 3 and Race 4),* M. javanica *and* M. arenaria *(Race 1).*

Plant Cultivar	*M. incognita* R. 2			*M. incognita* R. 3			*M. incognita* R. 4			*M. javanica*			*M. arenaria* R 1		
	Galls	Egg masses		Galls	Egg masses		Galls	Egg masses		Galls	Egg masses		Galls	Egg masses	
Cotton (*Gossypium barbadense* L.)															
Giza 67	0	0	R	4	3	S	3	3	S	2	0	R	0	0	R
Giza 68	0	0	R	3	2	R	3	1	R	2	0	R	0	0	R
Giza 69	0	0	R	5	5	S	4	4	S	3	3	S	0	0	R
Giza 70	0	0	R	3	2	R	3	2	R	2	0	R	0	0	R
Giza 75	0	0	R	3	2	R	3	1	R	2	0	R	0	0	R
Bahtim 110	0	0	R	4	4	S	4	3	S	2	0	R	0	0	R
Cotton (*G. hirsutum* L.)															
Deltapine 16	0	0	R	4	3	S	3	3	S	2	0	R	0	0	R
Acala 4-42	0	0	R	3	0	R	2	0	R	2	0	R	0	0	R
Acala 67A	0	0	R	3	0	R	2	0	R	2	0	R	0	0	R
Kenaf (*Hibiscus cannabinus* L.)															
Giza 1	4	3	S	5	5	S	5	5	S	5	5	S	5	4	S
Giza 2	4	3	S	5	5	S	5	5	S	5	5	S	4	4	S
Okra (*H. esculentus* L.)															
Clemson Spineless	5	5	S	5	5	S	5	5	S	5	5	S	3	3	S
Baladi	4	3	S	5	5	S	5	5	S	5	5	S	4	4	S
Mallow (*Malva parviflora* L.)															
Baladi	5	4	S	5	5	S	5	4	S	4	4	S	4	4	S
Roselle (*H. sabdariffa* L.)															
Baladi	0	0	R	0	0	R	0	0	R	0	0	R	0	0	R

Index ratings: 0 = 0, 1 = 1-2, 2 = 3-10, 3 = 11-30, 4 = 31-100, 5 more than 100 galls or egg masses/root system. Reaction: R = Resistant; S = Susceptible.

gossypol regulate the resistance of cotton plants to root-knot nematodes. The present results attained on cotton largely agree with those of Minton (1962) and Brodie and Cooper (1964) who pointed out that certain populations of *M. incognita* are capable of attacking cotton plants and are able to reproduce on them.

The kenaf, mallow and okra cultivars were susceptible to the root-knot nematode populations. Summers *et al.* (1958) tested 89 kenaf cultivars, introductions and selections and found that all were susceptible to *M. incognita* and *M. incognita acrita*. Several researchers have observed that okra (*H. esculentus* L.) is readily infected by root-knot nematodes (Littrell, 1966; Singh and Sitaramaiah, 1966 and Singh *et al.*, 1967).

Roselle cv. Baladi was highly resistant to the nematode populations, this observation agreeing with the results of Adeniji (1970), who found that the eight roselle cultivars that he tested were resistant to the common species of root-knot nematodes.

SUMMARY

Fifteen malvaceous (9 cotton, 2 kenaf, 2 okra, 1 mallow, 1 roselle) cultivars were exposed in pot experiments to *Meloidogyne arenaria* (Race 1), *M. incognita* (Race 2, Race 3, Race 4), and *M. javanica*. Cotton (*Gossypium barbadense* L.) cv. Giza 69 was resistant to *M. arenaria* and *M. incognita* Race 2. Cotton (*G. barbadense*) cvs. Giza 67, Bahtim 110, and (*G. hirsutum* L.) cv. Deltapine 16 were resistant to *M. arenaria, M. incognita* Race 2 and *M. javanica*, whereas cotton (*G. barbadense*) cvs. Giza 68, Giza 70, Giza 75, and (*G. hirsutum*) cvs. Acala 4-42 and Acala 67A as well as roselle (*Hibiscus sabdariffa* L.) cv. Baladi were resistant to all the nematodes. Egyptian mallow (*Malva parviflora* L.), kenaf (*H. cannabinus* L.) cvs. Giza 1 and Giza 2, and okra (*H. esculentus* L.) cvs. Clemson Spineless and Baladi were susceptible to all the nematode populations.

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Accepted for publication on 10 March 1982.