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HOST-PARASITE RELATIONSHIPS OF *PSIDIUM GUAJAVA* CULTIVARS AND *MELOIDOGYNE INCOGNITA*

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Summary. Shade-house and laboratory experiments were conducted to establish the host-parasite relationship between four guava cultivars and *Meloidogyne incognita*. Roots of the guava cvs. were infested by the nematode immediately after germination and galls were observed 4 days after germination in cv Webber Supreme and 8 days after germination in cv. Branca. All juvenile stages of the nematode developed within the roots of all the guava varieties. Eggs were observed on the roots of cv. Webber Supreme 25 days after germination and 31 days after germination in cv. Branca. Growth decreased significantly with increasing inoculum level of the nematode in all the varieties after 16 weeks from inoculation. Dry matter accumulation and plant height were most severely affected in cv. Allahabad.

Meloidogyne species constitute a major pest of guava, *Psidium guajava* L. in Nigeria (Babatola, 1985). Severely infected trees decline rapidly and eventually die. Moderate infestations are associated with general chlorosis and nutrient deficiency symptoms, reduced flowering and fruit set, reduced fruit size and unthrifty growth. Roots of infected trees show multiple galls and secondary infections by other soil micro-organisms.

The current studies report aspects of the host-parasite relationship of four guava cultivars and the root-knot nematode, *Meloidogyne incognita* (Kofoid *et* White) Chitw.

Materials and methods

Eggs of *M. incognita* used in all the experiments were extraced using NaOCl (Hussey and Barker, 1973). About 100 seeds each of four guava cvs., Supreme, Webber Supreme, Branca and Allahabad were planted in separate 7.5 cm deep plastic seed trays filled with steam-pasteurised sandy loam soil. Inoculation was carried out using 60,000 eggs *M. incognita* per tray. The control was left uninoculated. After seed germination which occured after 2 weeks of planting, three seedlings per cv. were randomly selected daily, gently uprooted, washed and stained in 0.1% acid fuchsin in lactophenol. Stained roots were observed for galls and dissected under a stereoscopic microscope. Juvenile stages in the roots and date were recorded. Observations were discontinued when adult females and eggs were detected in each cv.

In a second experiment, twenty-eight day old non-infected seedlings of each of the four cvs. were transplanted into twenty five 5 l capacity black polybags filled with steam-pasteurised sandy loam soil. Five replicates of each cv. were inoculated with 5, 10, 20, and 40 thousand eggs of *M. incognita* respectively 5 days after transplanting. Five replicates of each cv. served as uninfected controls. The plants were watered daily and 5g of N.P.K. 15:15:15 fertilizer were incorporated into each bag 15 days after inoculation. Data on plant height and leaf numbers were recorded weekly for 16 weeks. Dry matter accumulation and root gall index according to Taylor and Sasser (1978) were recorded at the 16th week. All data were subjected to ANOVA and mean differences partitioned by Duncan's multiple range test. This experiment was done in 1987 and repeated in 1988.

Results

All the guava cvs. tested were good hosts of *M. incognita*. Second stage juveniles were found in stained roots of cv. Webber Supreme four days after germination. In cv. Allahabad, first juvenile invation was observed 8 days after germination. Adult stages were observed 30 days after germination in cv. Webber Supreme and 32 days after germination in cv. Supreme. The adult stages were observed 33 and 47 days after germination in cvs. Branca and Allahabad respectively (Table I). Eggs in gelatinous matrices were observed 36, 37, 38 and 53 days after germination in cv. Supreme, Webber Supreme, Branca and Allhabad respectively. Galls were observed around juveniles inside root tissue 7 and 12 days respectively after germination in cvs. Webber Supreme and Allahabad. In both cvs. Supreme and Branca, galls were observed 9 days after germination (Table II).

Infected plants were generally chlorotic. Plant height and leaf numbers were severely limited by nematode attack from the 4th week after inoculation depending on the inoc-

Table I - *Infection and development of* Meloidogyne incognita *in guava roots.*

Developmental Stages	Cultivars: Webber Supreme	Supreme	Branca	Allahabad
	Days after seed germination			
J2	4a	6a	5a	8a
J3	10a	12b	12b	14c
J4	19a	20a	21a	25b
Adult	30a	32a	33a	47b
Eggs	36a	37ab	38b	53c

Figures followed by the same letters in the rows are not significantly different at P = 0.05.

Table II - *Life cycle of* M. incognita *in four guava cvs.*

Cultivars	Days after guava seed germination: Invasion	Gall formation	Adult Stage	Oviposition
Webber Supreme	4a	7a	30a	36a
Supreme	6a	9a	32a	37a
Branca	5a	9a	33a	38a
Allahabad	8a	12a	47b	53b

Figures followed by the same letters in the columns are not significantly different at P = 0.05.

ulum level in the four guava cvs. Allahabad followed by Webber Supreme had the lowest rate of growth in terms of the plant height and leaf numbers compared to the controls 16 weeks after inoculation (Table III). Dry matter accumulation also decreased with increasing inoculum level irrespective of the cvs. The highest dry matter acumulation reduction occured in 1988 in cv. Supreme (Table III). In all the cvs. inoculation with 5,000 eggs of *M. incognita* showed significant reductions in dry matter content. Webber Supreme at this level recorded 64% dry matter content loss.

Table III - *Plant height and leaf number of four guava cvs. 16 weeks after inoculation with* M. incognita.

cv.	inoculum level (in thousand)	Plant height (cm) 1987	1988	Leaf number 1987	1988	Dry weights (g) 1987	1988	Root gall index 1987	1988
Allahabad	0	54.1 f	59.2 f	33 cd	39 cd	23.4 f	29.2 hi	0.0	0.0
	5	47.4 e	55.7 e	30 c	39 cd	8.7 de	10.6 e	2.0	1.8
	10	34.2 c	41.6 c	24 b	35 c	3.6 a	6.6 c	2.4	3.4
	20	23.1 b	30.3 ab	21 ab	30 b	3.1 a	4.5 ab	5.0	4.0
	40	18.7 a	24.4 a	19 ab	21 a	2.9 a	3.6 a	5.0	5.0
Branca	0	47.2 e	50.0 de	30 c	41 d	25.2 f	30.8 i	0.0	0.0
	5	44.8 e	47.7 cd	31 c	39 cd	10.1 e	13.6 f	0.8	2.0
	10	39.9 d	41.3 c	26 bc	35 c	5.8 bc	5.6 bc	1.2	2.8
	20	22.2 a	30.8 ab	21 ab	31 bc	5.5 bc	4.6 ab	2.2	3.8
	40	20.5 a	22.1 a	17 a	23 ab	4.1 ab	3.8 a	3.0	4.6
Supreme	0	45.5 e	55.8 e	34 cd	40 cd	24.9 f	26.7 g	0.0	0.0
	5	45.8 e	53.4 e	30 c	38 cd	8.2 d	9.1 de	0.4	2.2
	10	34.2 c	41.0 bc	26 bc	31 bc	6.8 c	5.1 b	2.4	3.6
	20	26.8 b	34.3 b	24 b	28 b	5.0 b	4.2 ab	3.2	4.2
	40	20.5 a	24.1 a	21 ab	26 ab	3.4 a	3.0 a	3.4	5.0
Webber Supreme	0	42.5 de	58.5 ef	36 d	39 cd	22.2 f	28.1 h	0.0	0.0
	5	40.9 d	56.9 ef	31 c	37 cd	9.5 de	10.2 e	3.0	2.0
	10	32.7 c	42.0 c	27 bc	33 c	6.4 c	8.2 cd	4.0	3.6
	20	28.9 c	34.5 b	24 b	27 b	5.2 b	7.4 c	4.8	4.2
	40	17.6 a	24.7 a	20 ab	22 ab	3.8 a	4.1 ab	4.8	5.0

Figures followed by the same letters in the column are not significantly different at P = 0.05.

Root gall index generally indicated severe infections when 40,000 eggs of *M. incognita* were inoculated per pot (Table III).

Discussion

All the four guava cvs. were successfully infected by the root knot nematode, *M. incognita*. They supported its development and reproduction, though Allahabad took significantly longer days from infection to reproduction than the other varieties. Root gall symptoms were however more pronounced on it than on the other cultivars.

Growth was considerably reduced in the inoculated plants as compared with the control and it also decreased with increasing levels of inoculum. Such infected seedings usually suffer severe declines in the field (Ruehle, 1972). Although records of growth parameters were comparatively lower in 1987 than in 1988, there appears to be no significant differences among the guava cvs.

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