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THE RESISTANCE OF EIGHT COWPEA CULTIVARS TO MELOIDOGYNE JAVANICA

by

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Summary. In a greenhouse experiment, eight cowpea (*Vigna unguiculata*) cultivars were grown in pots of sterilized soil and inoculated with *Meloidogyne javanica* juveniles. On the basis of root galling, cv IT82E-77 was considered to be the most resistant. Cvs IT82D-714, IT82E-60, Ife Brown and K-59 were the most susceptible. Cvs IT82D-1228-15, IT82D-15, IT82D-1228-16 and FARV-13 were moderately resistant.

Most cowpea [*Vigna unguiculata* (L.) Walp.] cultivars are severely damaged by root-knot nematodes, *Meloidogyne* spp., resulting in decreased yield and loss of quality (Anon, 1966). In early work on screening and breeding for resistance to root-knot nematodes in grain legumes, Hare (1959) found that cowpea cv. Iron and four other breeding lines were resistant to *M. incognita*, *M. incognita acrita*, *M. javanica* and *M. arenaria*. In Nigeria, Caveness (1965) evaluated the reactions of 362 cowpea lines to *M. incognita*, *M. arenaria* and *M. javanica* but found no satisfactory level of resistance. This study examines the pathogenicity of *M. javanica* (Treub) Chitw. on eight cowpea cultivars and the rate of entry of the juveniles into roots of K-59 cv.

Materials and methods

Seeds of eight cowpea cultivars (Table I) were collected from plots at the Agriculture Faculty farm. The seeds of each cultivar were selected for uniformity of size and smoothness. They were surface sterilized by immersion in 10 per cent NaOCl for two minutes and rinsed several times before sprouting them at room temperature in petri dishes moist filter papers. Sixty four 15 cm diam. clay pots were each filled with about 1 kg steam sterilised sandy loam soil (pH 5.7). A small hole about 1 cm was made in the soil in the centre of each pot, into which was placed a single sprouted seed and then a suspension of 500 second stage juveniles of *M. javanica*. The holes in each pot were then filled with soil and the pots watered. Each of the nematode-inoculated cultivars and the uninoculated controls were replicated four times. The pots were arranged on a green house bench in a completely randomized design.

After 36 days the plants were evaluated for degree of galling on the roots, plant heights were measured and fresh tops and roots were weighed. The degree of galling was considered to be the most suitable criterion for determining susceptibility to *M. javanica* and was scored on a scale 0-4. where 0 represents no infection and 4 represents severe infection (31-100 + galls) (Ogbuji, 1971).

Pre-germinated K-59 cowpea seeds were transplanted, one each into twelve 15 cm diam. clay pots containing steamed soil. Each seedling was inoculated with 100 *M. javanica* juveniles. At intervals of 1, 5, 10, 15, 25 and 35 days after inoculation, seedlings in two pots were removed, washed free of soil, stained with cotton blue and examined with a stereo microscope. The numbers of nematode juveniles within each root system were counted and the mean taken.

Results and discussion

Vegetative growth of all inoculated cowpea cultivars, except IT82E-77, showed varying degrees of stunting, chlorosis and wilting. The extent of galling varied between cultivars; cvs K-59, IT82D-714, IT82E-60 were the most severely galled and cv IT82E-77 was the least galled (Table I). The fresh top weights of cvs IT82D-714, FARV 13, IFE BROWN and K-59 were significantly lower than the uninoculated controls. In contrast, only the fresh root weight of K-59 differed significantly from the control (Table I).

Based on the degree of root galling cv. IT82E-77 was the most nematode resistant of the eight cultivars tested. Juvenile entry into K-59 cv roots depended on time.

TABLE I - *Galling responses, fresh top and root weights (g) of eight cowpea cultivars 36 days after inoculation with 500 juveniles of Meloidogyne javanica.*

Cultivar	Degree of galling	Mean top weight (g)		Mean root weight (g)	
		Inoculated	Control	Inoculated	Control
IT82D-714	4.0*	0.9*	1.9	1.0	0.9
IT82D-1228-15	2.5*	3.3	3.7	1.3	1.1
IT82D-1228-16	2.8*	3.3	3.9	1.7	1.4
IT82E-60	4.0*	3.5	4.1	1.6	1.2
IT82E-77	1.8*	3.3	3.8	1.5	1.9
FARV-13	2.5*	2.4*	3.7	1.0	0.9
IFE BROWN	3.8*	2.0*	2.2	1.4	1.2
K-59	4.0*	0.7*	3.7	1.3*	0.7

* Significant with respect to the control for P = 0.05.

Juveniles were present both in the main and secondary roots as following: 11 after 1 day, 24 after 5 days, 47 after 10 days, 63 after 15 days, 280 after 25 days and 325 after 35 days.

Literature cited

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