RESPONSE OF COWPEA CULTIVARS TO *ROTYLENCHULUS RENIFORMIS*

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RESUMEN

Khan, T. A., y S. I. Husain. 1988. Repuesta de cultivares de chícharo de vaca al *Rotylenchulus reniformis*. Nematrópica 18: 159–162.

Veinte cultivares de chícharo de vaca (*Vigna unguiculata*) fueron evaluados de acuerdo a su tolerancia y resistencia al *Rotylenchulus reniformis*. Diez y seis cultivares, IC-RG, CO-4, EC-55171, IC-503, FGR-450, EC-99573, RC-48, EC-101418, IC-244, IC-238, RC-2, EC-4874, Pusa Dophasli, IC-393, IC-200 y Russian Giant mostraron ser altamente intolerantes y altamente susceptibles al *R. reniformis* basado en la reducción del crecimiento y el índice reproductivo, respectivamente. El cultivar IC-I mostró ser intolerante y susceptible mientras que los cultivares EC-4213A y RC-8 resultaron tolerantes y resistentes. Solo cv. S-488 mostró ser altamente tolerante y resistente al *R. reniformis*.

Palabras claves: chícharo de vaca, nematodo reniforme, resistencia, *Rotylenchulus reniformis*, *Vigna unguiculata*.

One of the most economical and effective ways to control plant diseases is by growing resistant cultivars. Unlike chemical methods, nematode management with resistant cultivars requires no special equipment and usually no extra capital investment by growers. In India the reniform nematode (*Rotylenchulus reniformis* Linford and Oliveira) causes significant yield loss in cowpea (*Vigna unguiculata* (L.) Walp.) (2). In order to utilize resistance more effectively, a study was undertaken to evaluate twenty cowpea cultivars against *R. reniformis*.

Surface sterilized seeds of cowpea cvs. S-488, EC-4213A, RC-8, IC-I, IC-RG, CO-4, EC-55171, IC-503, FGR-450, EC-99573, RC-48, EC-101418, IC-244, IC-238, RC-2, EC-4874, Pusa Dophasli, IC-393, IC-200, and Russian Giant were sown in 15-cm-diam pots (one seed/pot) containing 1kg of a potting mixture consisting of sterilized sandy loam soil, sand, and manure in a 3:1:1 ratio. Prior to sowing, seeds were inoculated with *Bradyrhizobium* sp. (*Vigna*). One-wk-old seedlings of each cultivar that were of uniform size were inoculated with 1 000 infective *R. reniformis* females. The nematode suspension was poured uniformly onto exposed roots and covered with soil. Noninoculated plants of each cultivar served as controls. Each treatment was replicated five times and arranged in a completely randomized design on a glasshouse bench. After

Table 1. Response of cowpea cultivars to *Rotylenchulus reniformis*, root nodule production, and nematode population development 2 mo after inoculation with 1 000 infective females.

Cultivar	*R. reniformis*	Plant dry weight (g) (% growth reduction)	Host response to injury	No. of *R. reniformis*				Host response to nematode reproduction	No. of nodules /root (% nodulation reduction)
				Juveniles/ kg of soil	Females/ g of fresh root	Total	Pf/Pi		
S-488	–	5.3	HT[y]	0	0	0	0	HR[z]	66
	+	5.1		900	33	933	0.9		65
		(4)							(1)
EC-4213A	–	6.6	T	0	0	0	0	R	87
	+	6.0		1 867	113	1 980	2.0		83
		(9)							(4)
RC-8	–	6.8	T	0	0	0	0	R	61
	+	6.2		2 333	100	2 433	2.4		57
		(9)							(6)
IC-I	–	9.6*	I	0	0	0	0	S	77*
	+	8.2		5 100	160	5 260	5.3		71
		(14)							(8)
IC-RG	–	5.8*	HI	0	0	0	0	HS	43*
	+	4.2		8 933	167	8 100	8.1		37
		(27)							(14)
CO-4	–	10.7*	HI	0	0	0	0	HS	81*
	+	7.6		12 567	233	12 800	12.8		61
		(29)							(25)
EC-55171	–	6.6*	HI	0	0	0	0	HS	68*
	+	4.6		10 633	247	10 880	10.9		43
		(30)							(37)
IC-503	–	7.3*	HI	0	0	0	0	HS	84*
	+	5.1		13 733	273	14 006	14.0		62
		(30)							(26)
FGR-450	–	7.1*	HI	0	0	0	0	HS	52*
	+	4.7		9 500	200	9 700	9.7		39
		(34)							(25)

EC-99573	−	10.7*	HI	0	0	0	0	HS	72*
	+	7.0		12 533	2 530	12 786	12.8		54
		(34)							(25)
RC-48	−	9.5*	HI	0	0	0	0	HS	45*
	+	6.3		12 933	300	13 233	13.2		32
		(34)							(29)
EC-101418	−	7.1*	HI	0	0	0	0	HS	73*
	+	4.7		14 600	293	14 893	14.9		52
		(34)							(29)
IC-244	−	6.2*	HI	0	0	0	0	HS	63*
	+	4.0		13 533	280	13 813	13.8		43
		(35)							(32)
IC-238	−	5.0*	HI	0	0	0	0	HS	55*
	+	3.2		12 900	260	13 160	13.2		40
		(36)							(27)
RC-2	−	9.1*	HI	0	0	0	0	HS	63*
	+	5.8		13 533	280	13 813	13.8		43
		(36)							(32)
EC-4874	−	9.4*	HI	0	0	0	0	HS	38*
	+	5.8		14 100	313	14 413	14.4		26
		(38)							(31)
Pusa Duphasli	−	8.2*	HI	0	0	0	0	HI	70*
	+	5.0		15 200	307	15 507	15.5		51
		(39)							(27)
IC-393	−	8.0*	HI	0	0	0	0	HS	47*
	+	4.9		16 533	293	16 826	16.8		33
		(39)							(30)
IC-200	−	5.2*	HI	0	0	0	0	HS	60*
	+	3.0		14 833	320	15 153	15.1		37
		(42)							(38)
Russian Giant	−	11.2*	HI	0	0	0	0	HS	78*
	+	6.5		17 233	327	17 560	17.6		41
		(42)							(47)

*Significant difference between inoculated and non inoculated plants according to Student's *t*-test ($P < 0.05$).

[y]HT = highly tolerant, T = tolerant, I = intolerant, and HI = highly intolerant host response to yield suppression caused by *R. reniformis* infection.

[z]HR = highly resistant, R = resistant, S = susceptible, and HS = highly susceptible host response to reproduction.

2 mo, total plant dry weight and the number of nodules per root system were determined. Final nematode populations were extracted from soil by using Cobb's sieving and gravity method followed by Baermann funnels and from roots by macerating in a waring blender (3). A reproductive index was calculated by dividing the final population (Pf) by the initial population (Pi). Data were analyzed and means were compared using Student's *t*-test at $P < 0.05$. The degree of resistance and tolerance of the cowpea cultivars to *R. reniformis* was classified by using Cook's proposal (1).

Host response and nematode reproduction are summarized in Table 1. Cvs. IC-RG, CO-4, EC-55171, IC-503, FGR-450, EC-99573, RC-48, EC-101418, IC-244, IC-238, RC-2, EC-4874, Pusa Dophasli, IC-393, IC-200, and Russian Giant were highly intolerant and highly susceptible to *R. reniformis* based on percentage growth reduction and reproductive index, respectively. 'IG-I' was intolerant and susceptible. 'EC-4213A' and 'RC-8' were tolerant to *R. reniformis* infection with growth reductions of 9 and 9%, respectively. Reduction in growth and nodulation of nematode infected plants was not significantly different in these cultivars. Both cultivars were also resistant to *R. reniformis* with Pf/Pi values of 2.0 and 2.4 for 'EC-4213A' and 'RC-8', respectively. Only cv. S-488 was highly tolerant and highly resistant. Growth and nodulation were reduced to only 4 and 1%, respectively, and Pf/Pi was 0.9. Only 33 females in different stages of development were obtained from infected roots of 'S-488'.

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