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Short note

An assessment of resistance in glasshouse-grown tomato cultivars to *Meloidogyne incognita*, race 2, from Latvia and to *M. javanica* from Russia

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Glasshouse tomato culture is an important horticultural enterprise in the northwest region of Russia. Substantial yield losses are caused by infection of glasshouse soils and substrates with *Meloidogyne incognita* (races 1 and 2) and *M. javanica*, but these nematodes seldom occur as mixed populations (Mustafa, 1982; Marienko, 1989; Al-Bakkur, 1993). Control of the nematodes has usually been achieved by soil-disinfection prior to planting. However, most of the chemicals used for this purpose have high mammalian toxicities and their use is now restricted. Other, environmentally benign, control methods include heat and chemical therapy of planting material and the selection of nematode resistant cultivars (Lashkova & Guskova, 1986). The selection and use of resistant cultivars is dependent on identification of the target nematode species or race and of the initial nematode density prior to planting, otherwise adequate control may not be achieved (Guskova & Lashkova, 1990). Tomato cultivars resistant to *Meloidogyne* spp. and races have been developed worldwide but such cultivars require to be screened for their resistance to local populations of *Meloidogyne* spp. and races to enable the most appropriate cultivars to be selected.

Twenty-five tomato (*Lycopersicon esculentum*) cultivars and six lines of *L. peruvianum*, each considered resistant to *Meloidogyne* nematodes, obtained from the collection held at the N.I. Vavilov All-Russia Scientific Research Institute of Plant Genetic Resources, St. Petersburg, were screened for their resistance to *M. incognita*, race 2, obtained from Riga, Latvia, and to *M. javanica* from Novgorod, Russia. The highly susceptible Russian commercial cv. Zolotoy Rog was used as the control cultivar.

Seven day-old seedlings of each tomato cultivar and line were transplanted into 500 cm^3 pots containing steam-sterilized soil and 200 second stage juveniles of the *Meloidogyne* species were added. Three single plant replicates were completed for each tomato cultivar or line tested. The plants were grown for 45 days then removed from the pots, their roots carefully washed, and root-infection determined by counting and rating the numbers of root-galls and egg-masses on a 0 to 5 scale (Taylor & Sasser, 1978). The final resistance assessment was made for each cultivar using the average infection rate expressed as a percentage of the infection rate of the control cultivar (Metlitskii *et al.*, 1991) with highly resistant being 0-10% infection, resistant being 11-25% infection, moderately resistant being 26-50% infection, moderately susceptible being 51-75% infection and highly susceptible being 76-100% infection.

The results of the resistance screening test are given in Table 1. Three groups of cultivars could be distinguished based on their levels of resistance to *M. incognita*, race 2, *viz.* highly resistant, resistant and moderately resistant. Nine cultivars and hybrids and four lines of *L. peruvianum* were highly resistant and six others were resistant to *M. incognita,* race 2, but only three cultivars were highly resistant and three were resistant to *M. javanica.* Only five tomato cultivars or lines of *L. peruvianum* were highly resistant or resistant to both nematode species, but high resistance to both species was not recorded with an individual cultivar or line. However, the cvs. Marmand, Calmart and Patriot are of particular interest for further study because of their apparent high resistance and resistance to both species of nematodes.

Comparison of our results with similar data obtained by other authors revealed several differences in the level of resistance of some cultivars. For example, Aramov & Dzhuraeva (1990) reported that the cvs. Surkhan 142 and Namuna were highly resistant to *M. javanica* populations from Uzbekistan and Tadzikistan, whereas in our screening study with

Table 1. Assessment of resistance of tomato cultivars to *Meloidogyne incognita*, race 2, from Riga, Latvia and to *M. javanica* from Novgorod, Russia.

Cultivar or line	Origin	*M. incognita* (race 2)		*M. javanica*	
		Susceptibility index	Resistance level*	Susceptibility index	Resistance level*
Vainmon	Russia	not assessed		6	HR
L. peruvianum 3955	Chile	0	HR	13	R
L. peruvianum 3956	Chile	0	HR	20	R
L. peruvianum 3769	Chile	0	HR	26	MR
Surkhan 142	Uzbekistan	0	HR	40	MR
Kires	Netherlands	0	HR	40	MR
Monita	France	0	HR	40	MR
Motabo	France	0	HR	40	MR
Ronita	France	0	HR	46	MR
Dombello	Netherlands	0	HR	not assessed	
Dar Surkhana	Uzbekistan	0	HR	not assessed	
VF 14	USA	0	HR	not assessed	
L. peruvianum var. *dentatum* 3771	Chile	6	HR	46	MR
Hawaii 7792	USA	10	HR	not assessed	
Marmand	Netherlands	13	R	6	HR
Calmart	USA	13	R	6	HR
Patriot	USA	20	R	20	R
Marsol	France	20	R	46	MR
Carpy	Netherlands	20	R	46	MR
Improved Summertime	USA	25	R	46	MR
L. peruvianum 3772	Peru	26	MR	26	MR
Namuna	Uzbekistan	26	MR	26	MR
L. peruvianum 2020	USA	35	MR	26	MR
Ont 7620	Canada	40	MR	46	MR
Pinaldo	Netherlands	40	MR	46	MR
Grezanda	Russia	40	MR	40	MR
Alena	Russia	40	MR	not assessed	
Piernita	France	40	MR	not assessed	
Suzhet	Moldova	46	MR	40	MR
Udarnik	Moldova	46	MR	40	MR
Ont 7619	Canada	not assessed		46	MR

* Resistance levels: HR- highly resistant; R- resistant; MR- moderately resistant.

the Novgorod population of *M. javanica*, they were only moderately resistant. Also, Ignatova & Kondakova (1987) reported that the cvs. Alena and Grezanda, grown in glasshouses in the Moscow region, had a high degree of resistance to *M. incognita* which is widely distributed in the region, however, with the population from Riga, Latvia, used in our study these cultivars were only moderately resistant. A similar situation occurred with the cvs. Suzhet and Udarnik, where they were highly resistant to *M. incognita*, races 1 and 2 from Moldova and Vietnam (Sadykin, 1990; Nguyen *et al.*, 1991) but were only moderately resistant in our tests.

Conversely, cultivars such as cvs. Calmart and Motabo were resistant to a population of *M. javanica* from the Moscow region (Marienko, 1989) and to the Novgorod population used in our test. Also, *L. peruvianum* was highly resistant to *M. incognita* and *M. javanica* from Moldova (Kozhokaru, 1991) and to the populations used in our test.

From comparison of the results obtained in our study with those published previously, it can be concluded that it is probably essential to screen plant cultivars for their resistance to "local" nematode populations. The information provided by such resistance screening tests will enable the most appropriate cultivars, *viz.* most resistant to "local" nematode populations, to be selected for commercial programmes.

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