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PENETRATION AND DEVELOPMENT OF ROOT-KNOT NEMATODE (*Meloidogyne incognita*) IN *IN VITRO* CULTURED EXCISED ROOTS OF VARIOUS CROP PLANTS[1/]

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The root-knot nematode, *Meloidogyne incognita* (Kofoid and White, 1919) Chitwood, 1949, is known to infest a variety of plants throughout India, and is rapidly becoming a serious pest problem of vegetable and pulse crops. Comparative studies on its culture, maintenance, and reproduction on callus and excised roots of okra and sesame have been reported (*1, 2*). The influence of root exudates and their amino acids on the hatching of this nematode have been also studied (*2*). This communication explains the utility of an efficient gnotobiotic system for the screening of germ plasm to the root-knot nematode in crop improvement programs.

In the present investigation, root tips (1-2 cm long) excised from 3-7 day-old aseptically grown seedlings of eggplant (*Solanum melongena* cv. long Pusa Purple), tomato (*Lycopersicon esculentum* cv. Punjab kesri), mung bean or golden gran (*Phaseolus aureus* cv. Moong G-65), arhar or pigeon pea (*Gajanus cajan* cv. I-21), mash, urd or mungo bean (*Phaseolus mungo* cv. Massar 9-12), gram or Bengal-gran (*Cicer arietinum* cv. G-130), and bajra (*Pennisetum typhoides* cv. PHB-14) were cultured on Murashige and Skoog's medium (MS-1962) (*3*), supplemented with IAA (0.1 mg/l) + Kinetin (0.1 mg/l).

The excised roots (2 excised roots per test tube) were inoculated with surface-sterilized (using $HgCl_2$ 0. 1%) eggs of *Meloidogyne incognita* (2 egg masses per test tube; one egg mass containing ca. 400 eggs). Penetration and development were observed after 3 and 25 days, respectively.

All of the excised roots except those of bajra and tomato grew well in Murashige and Skoog's medium. All of the cultures originated from seeds and, perhaps, genetic factors were involved in the variability observed in the root growth. The

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root tips elongated and thickened considerably and showed lateral branches.

Larvae began to hatch within a day or so, moved randomly until the root tips were encountered which were the sites of penetration. Maximum penetration of larvae (Table 1) was recorded in eggplant (265.75 larvae) and tomato (246.50 larvae) which behaved as most susceptible host plants (*4*). Mash had a lower penetration (162,75 larvae), followed by arhar (162.25 adults), mung (154.50 larvae) and gram (149.75), these giving the impression of susceptible host plants (*1*). Bajra was the most resistant crop plant with least penetration (74.25 larvae). In eggplant, the maximum number of larvae developed to the adult stage (70.25 ± 4.5 adults), followed by tomato (51.75 ± 3.3 adults), thus indicating these to be the favourite hosts for the root-knot nematode (*1*).

TABLE 1 - Comparison of the penetration and development of *Meloidogyne incognita* larvae in *in vitro* cultured excised roots of various crop plants (*)

Cultivars	Penetration after 3 days of inoculation	Development after 25 days of inoculation	
	(Mean)	Larvae (Mean ±	Adults S.E.)
Solanum melongena cv. long Pusa purple	265.75	28.00* ± 3.5	70.25 ± 4.5
Lycopersicon esculentum cv. Punjab Kesri	246.50	20.25 ± 3.2	51.75 ± 3.3
Cajanus cajan cv. T-21	154.50	26.50 ± 4.5	31.75 ± 2.5
Phaseolus mungo cv. Masser 9-12	162.75	23.50 ± 4.5	36.00 ± 5.3
Cajanus cajan cv. T-21	162.25	38.50 ± 6.2	37.75 ± 4.5
Cicer arietinum cv. G-130	149.75	32.50 ± 4.0	35.75 ± 3.3
Pennisetum typhoides cv. PHB - 14	74.25	45.75 ± 3.1	38.25 ± 5.2

(*) Average of 5 repetitions

To conclude, the penetration and development of the root-knot nematode under sterile conditions in tissue culture emphasizes the utility of this method as an effective tool for the study of root penetration and development in isolation, and also for the quick screening of germ plasm of various crop plants under strictly controlled environment. There is also the possibility of using this technique for the testing of nematicides for the control of phytonematodes.

RESUMO

Culturas gnotobióticas de nematóides das galhas das raízes foram mantidas em segmentos extraídos das raízes de várias plantas cultivadas. As larvas do nematóide mostraram, para as plantas, diferenças de penetração e desenvolvimento nas raízes. Em condições estritamente controladas de cultura de tecido, esse sistema serve como eficiente e rápido método de triagem de germoplasma das culturas.

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