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STUDIES ON EFFECTS OF CHROMOLAENA ODORATA ROOTS ON ROOT-KNOT NEMATODES (MELOIDOGYNE INCOGNITA)

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Summary. In a greenhouse experiment neither a toxic effect of *Chromolaena odorata* roots on *Meloidogyne incognita* juveniles in soil was observed nor an influence on the multiplication rate of the nematode in roots of tomato plants grown in close contact with *C. odorata* roots.

Chromolaena odorata (L.) King et Robinson (= Eupatorium odoratum), Asteraceae, is a common, introduced weed in Asia and Africa that is sometimes used as green manure. Whereas there is extensive literature on relationships of this plant with insects and other animals and also about antagonists of this vigorously-growing perennial shrub (Audru et al., 1988; Boppré et al., 1994), not much is known about the effects of C. odorata on nematodes. Atu and Ogbuji (1982) found it to be highly "resistant" to the root-knot nematode Meloidogyne incognita race 2, and Subramaniyan (1985) recorded nematicidal effects of water extracts of dried C. odorata plant material on M. incognita juveniles, but did not state which parts of the plants were used. According to Amosu (1981) root exudates of C. odorata inhibit juvenile hatch in M. incognita when tested in vitro. Nematicidal effects on root-knot nematodes were apparent when a mulch of C. odorata was used in a black pepper (Piper nigrum L.) crop (Litzenberger and Ho Tong Lip, 1961).

In a greenhouse experiment we tested the influence of growing *C. odorata* on the multiplication rate of *M. incognita* (Kofoid *et* White) Chitw. and on the galling of roots of tomato (*Lycopersicon esculentum* Mill.) cv. Moneymaker. For comparison *Tagetes erecta* L. and *Crotalaria retusa* L., which are known to have suppressive effects on root-knot nematodes, were included in the experiment.

Materials and methods

Plastic pots (1100 ml) were filled with soil containing 568 *M. incognita* second-stage juveniles per 100 g of soil. The pots were planted as indicated in Table I, each treat-

ment having four replications. After two months in the greenhouse nematodes were extracted from two 50 g soil samples per pot by using the centrifugation method and a modified Baermann funnel technique. The roots were checked for the presence of galls and egg masses and a root gall index from 0 - 3 was determined.

Results and conclusions

The results of the experiment are compiled on Table I, which gives the means for the final nematode densities (P_f) , multiplication rates (P_f/P_i) and the root-knot indices.

All treatments with tomato, alone or in combinations, resulted in high multiplication rates of *M. incognita*, but the population increase was less in combination with *Tagetes* or *Crotalaria* compared with tomato + *Chromolaena* or tomato alone. In the treatment with *Chromolaena* alone the population decrease was about the same as in the pots without plants. The roots of tomato plants were heavily galled after two months. The *Crotalaria* plants exhibited a much lower number of galls and egg masses, whereas a total of only three galls and egg masses was counted on the roots of *Chromolaena*.

The results of the experiment show that there appears to be neither a toxic effect of C. odorata roots on M. incognita juveniles in soil nor an influence on the multiplication rate of the nematode in roots of a good host plant grown in close contact with C. odorata roots. The nonhost status of C. odorata to M. incognita is confirmed.

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| Treatment | Nematodes per 100 ml of soil (P _f) | P _f /P _i | Root-knot index* |
|--|--|--------------------------------|---------------------|
| Chromolaena alone | 132 | 0.23 | 0 |
| Tomato alone | 57 201 | 100.7 | 3 |
| Tomato + <i>Chromolaena</i> Tomato <i>Chromolaena</i> Tomato + <i>Tagetes</i> Tomato | 61 889 27 646 | 109.0 48.7 | 3 0.5 3 |
| Tagetes Tomato + Crotalaria Tomato Crotalaria | 34 221 | 60.2 | 0 3 1.5 |
| Fallow | 57 | 0.10 | - |

TABLE I - Population development of Meloidogyne incognita and root-knot indices two months after transplanting.

* Root-knot indices were 0 = no galls or egg masses, 1 = 1-10, 2 = 11-30, 3 = > 30 galls or egg masses per plant.

Freiburg for supplying *C. odorata* plants originating from West Africa of which series of young plants were reared for the experiment.

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