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**THE EFFECT OF OXAMYL APPLICATIONS ON *MELOIDOGYNE*
INCOGNITA AND *ROTYLENCHULUS RENIFORMIS*
PENETRATION INTO ROOTS OF SOYBEAN (*Glycine max* (L.) Merr.)**

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ABSTRACT

In greenhouse tests, a single foliar application of oxamyl (methyl N, N¹ - dimethyl - N - [(methylcarbamoyl) oxy] - 1 - thiooxamimidate) was applied 24 hr before transplanting soybean (*Glycine max* (L.) Merr.) seedlings in soil infested with *Meloidogyne incognita* and *Rotylenchulus reniformis*. Oxamyl at 600 ppm significantly inhibited penetration of roots by *M. incognita*. No significant penetration of roots by *R. reniformis* was found.

INTRODUCTION

Recently, there has been increasing interest in growing soybean in several territories in the Caribbean. However, little is known concerning the role of plant nematodes on soybean in the region. Field and greenhouse observations showed that nematode damage to soybean involved species of the genera *Meloidogyne*, *Pratylenchus*, *Rotylenchulus*, *Helicotylenchus* and *Tylenchorhynchus*.

There have been several reports on oxamyl (methyl N, N¹ - dimethyl - N - (methylcarbamoyl) oxy - 1 - thiooxamimidate) as a downward - moving systemic nematicide and foliar applications of oxamyl were found to control a number of plant nematodes on several hosts plants (Ayala *et al.*, 1970; Rhoades, 1971; Rich and Bird, 1973; Timmer, 1974). *Meloidogyne incognita* Chitwood, 1949 and *Rotylenchulus reniformis* Linford and Oliveira, 1940 were used in investigations of the effectiveness of oxamyl because of their economic importance (Brathwaite, 1974; Edmunds, 1974; Hutton, 1974; Singh, 1974) and being endoparasites, they can easily be seen on entry into root tissue.

The objectives of this study were to investigate the influence of time and concentration of oxamyl on the penetration of *M. incognita* and *R. reniformis* into soybean roots.

MATERIALS AND METHODS

Test 1:

This trial was conducted to study the effect of oxamyl (908 g/3785 ml formulation) on the control of penetration by *M. incognita* into soybean roots. Soybean (cv. Jupiter F 62/3977) seedlings were grown in a methyl bromide-treated soil mixture and after eight days the foliage was sprayed with a single application of oxamyl at concentrations of 0,600, 1250, 2500 and 5000 ppm active ingredients. Check plants were sprayed simultaneously with water mixed with the emulsifier (Tenac). The leaves were sprayed from a bottle sprayer to "run-off", the soil being protected from the spray by holding each pot on its side while the soil was covered with plastic sheet. After 24 hr, five plants per treatment were transplanted into 8 cm clay pots (one plant/pot) infested with *M. incognita* ($P_1 = 300/125$ g soil). *M. incognita* were obtained from greenhouse stock cultures of tomato plants maintained for experimental purposes. Forty-eight, 72 and 96 hr after transplanting, the roots were washed free of soil, stained with lactophenol cotton blue (s'Jacob and Bezooijen, 1970) and the number of *M. incognita* embedded counted.

Test 2:

The purpose of this trial was to study further the effectiveness of foliar application of oxamyl on the penetration of *R. reniformis* into soybean. The test was conducted similarly to the first. Twenty-four hr after spraying, the seedlings were transplanted in 8 cm clay pots (one plant/pot) infested with *R. reniformis* ($P_1 = 305/125$ g soil) and later assayed as described for the first test. *R. reniformis* was obtained from a stock culture of sweet potato plants.

RESULTS

Penetration of soybean roots by *Meloidogyne incognita* was significantly retarded by 600 ppm oxamyl 48 hr and 96 hr after transplanting the seedlings into infested soil (Table 1). However, 5000 ppm oxamyl was required to significantly retard penetration 72 hr after transplanting.

There were no significant differences in the penetration of soybean roots by *Rotylenchulus reniformis* when the seedlings were treated with oxamyl 24 hr before transplanting them into infested soil (Table 2). Furthermore, penetration by *R. reniformis* did not significantly increase among the three observation dates.

In non-treated seedlings, penetration by *M. incognita* was significantly increased between the 72 - and 96 - hr observations (Table 1).

DISCUSSION

The results indicate that a single foliar application of oxamyl inhibits *M. incognita* penetration of soybean roots. Similar results were reported by previous workers on other plant species (Radewald *et al.* - 1970). This is of particular significance since a reduction of the nematode penetration at, or immediately after planting, may cause less root damage and delay population build up until late in the growing season. No explanation can be given for the lack of any increase in root penetration by *M. incognita* in the non-treated plants between 48 and 82 hr periods. More information is needed on the rate of degradation of the chemical in the plant and time interval between multiple applications before the chemical could be programmed for use to its maximum potential.

The concentration of oxamyl required to inhibit penetration of soybean roots was similar to that reported by previous workers for *R. reniformis* associated with tomato roots (Rich and Bird, 1973). Particularly noteworthy also is that soybean seedlings were more susceptible to *M. incognita* than *R. reniformis*. The low *R. reniformis* counts in the soybean roots after 96 hr indicated low infectivity of the cultivar. Further work will be needed to elucidate root penetration and population development of *R. reniformis* on other soybean cultivars.

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TABLE 1. Influence of foliar applications of oxamyl on penetration of *Meloidogyne incognita* into roots of soybean treated 24 hr before transplanting into infested soil.

Oxamyl (ppm)	Mean number of nematodes per root system		
	48 hr after transplanting	72 hr after transplanting	96 hr after transplanting
5000	0.0 a	0.0 a	2.0 a
2500	0.2 a	1.2 abc	2.4 ab
1250	0.0 a	1.0 abc	3.4 ab
600	0.8 a	1.4 bc	4.4 b
0	2.4 b	2.4 c	11.8 c

¹ Column means followed by the same letter do not differ significantly ($P = 0.05$) according to Duncan's multiple range test.

TABLE 2. Influence of foliar applications of oxamyl on penetration of *Meloidogyne incognita* into roots of soybean treated 24 hr before transplanting into infested soil

Oxamyl (ppm)	Mean number of nematodes per root system		
	48 hr after transplanting	72 hr after transplanting	96 hr after transplanting
5000	0.0	0.0	0.0
2500	0.0	0.0	0.4
1250	0.0	0.0	0.6
600	0.0	0.2	1.0
0	0.0	0.6	1.6