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NEMATOCIDE TRIALS WITH TOBACCO IN THE
1968-69 AND 1969-70 SEASONS

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SUMMARY

In field trials at Beerwah in southern Queensland preplant fumigation with EDB gave a much higher level of control of the root-knot nematode *Meloidogyne javanica* (Treub) than 'Dasanit', 'Lannate', 'Mocap', 'Nemacur', 'Temik' and 'Penphene' + EDB and increased the yield of saleable leaf from the cultivar Hicks Q46 by 17-20%.

I. INTRODUCTION

Soil fumigation with EDB to control root-knot nematodes is a routine operation on Queensland tobacco farms. For the most part, the treatment is satisfactory and there are few failures which cannot be attributed to inadequate soil preparation. Treatment prior to planting, however, increases leaf halides (Colbran and Green 1961) and persistent rain may interfere with soil preparation, diffusion of EDB through the soil and removal of residues prior to planting.

Two field trials were set out at Beerwah in the 1968-69 and 1969-70 seasons to compare the effects of five non-volatile nematocides and a mixture of "Penphene" and EDB with EDB on the root-knot nematode *Meloidogyne javanica* (Treub) and on leaf yield and quality of the tobacco cultivar Hicks Q46.

II. MATERIALS AND METHODS

The chemicals used were:—

- 'Dasanit'.—A granular formulation containing 10% 0,0 diethyl O-p-(methylsulfinyl) phenyl phosphorothioate.
- EDB 15.—Ethylene dibromide in power kerosine, EDB (sp. gr. 25/25 2·17) content 15% v/v.
- 'Lannate'.—A granular formulation containing 5% S-methyl N-((methyl-carbamoyl) oxy) thioacetimidate.
- 'Mocap'.—A granular formulation containing 10% O-ethyl S,S-dipropylphosphorodithioate.
- 'Nemacur G'.—A granular formulation containing 10% ethyl 4-(methylthio)-m-tolyl isopropylphosphoramidate.

'Nemacur P'.—An emulsifiable concentrate containing 43.6% w/v ethyl 4- (methylthio)-m-toyl isopropylphosphoramidate.

'Penphene'.—An emulsifiable concentrate containing 5 lb tetrachlorothiophene per gal (imp.).

'Temik'.—A granular formulation containing 10% 2-methyl-2 (methylthio) propionaldehyde O-(methylcarbamoyl) oxime.

Trial 1 (1968-69) was set out as a 6 x 4 randomized block with 2-row plots 36 ft long and 8 ft wide containing 40 datum plants. The treatments are shown in Table 1.

EDB was applied by hand injector in holes 8 in. deep and 1 ft apart on September 16 when the soil temperature at a depth of 4 in. was 78°F. Dasanit, Lannate and Nemacur G were broadcast and incorporated to a depth of 4-5 in. by rototiller on September 23. Temik was applied in the same manner on September 26. The trial was planted on the following day.

A soil sample consisting of 20 subsamples was taken from each untreated plot on September 26 and the nematodes extracted by the Seinhorst 2-flask technique.

The tobacco was harvested in seven picks between December 1, 1968, and February 17, 1969. The crop was flue-cured and sorted into three grades which were rated for colour, body pliability, grain and maturity. From these ratings a leaf quality index (0-100) for each plot was calculated. The number of plants without a green leaf (classified in Table 1 as 'dead') in each plot was counted on February 19.

After harvesting was completed, 10 datum plants in the middle of each row were dug and the root systems rated for galling. The ratings 0, 1, 2, 3, 4 corresponding to increasing severity of galling were converted to indices (0-100) after the method of Smith and Taylor (1947).

Trial 2 (1969-70) was set out as a 5 x 5 randomized block with 2-row plots 36 ft long and 8 ft wide containing 40 datum plants. The treatments are shown in Table 2.

EDB and Penphene + EDB were applied by hand injector on September 25, in holes 8 in. deep and 1 ft apart, when the soil temperature at a depth of 4 in. was 70°F. Mocap and Nemacur P were broadcast and incorporated to a depth of 4-5 in. by rototiller on October 6. The trial was planted on October 9. On November 11, Nemacur P was sprayed in a band 1 ft wide on each side of each row and covered by hilling.

A soil sample consisting of 20 subsamples was taken from each untreated plot on October 9. The crop was harvested in seven picks between December 9, 1969, and February 16, 1970. On February 26, 10 plants in the middle of each row were dug and rated for galling.

Methods of nematode extraction, calculation of leaf quality indices and root-knot indices were as in trial 1.

III. RESULTS

Results of trial 1 are summarized in Table 1. The mean root-knot nematode larval count in untreated plots at the time of planting was 1 per lb.

Preplant fumigation with EDB gave the highest level of nematode control and yield. A feature of the trial was the premature death of plants in plots treated with Lannate. At the completion of the last pick, plants in plots treated with Lannate were conspicuous because of their dead top leaves.

Results of trial 2 are summarized in Table 2. The mean root-knot nematode larval counts in untreated plots at the time of planting was 37 per lb.

TABLE 1

TRIAL 1: ROOT-KNOT INDICES; SALEABLE LEAF; LEAF QUALITY; PREMATURELY DEAD PLANTS

Chemical	Rate/ac	Root-knot Index	Saleable Leaf (lb/ac)	Leaf Quality Index	Percentage Dead Plants
Nil	65.7	1,976	51.9	8.8
Dasanit	10 lb a.i.	87.2	1,700	59.8	35.5
EDB 15	20 gal.	15.5	2,372	47.1	0
Lannate	10 lb a.i.	93.0	1,576	58.8	51.8
Nemacur G	10 lb a.i.	44.7	2,073	51.1	0.5
Temik	10 lb a.i.	58.2	1,992	51.3	17.5
Necessary differences for significance		29.9 41.3	391 540	7.0 9.7	30.5 42.0
{ 5% 1%					

TABLE 2

TRIAL 2: ROOT-KNOT INDICES; SALEABLE LEAF; LEAF QUALITY

Treatment	Root-knot Index	Saleable Leaf (lb/ac)	Leaf Quality Index
Control	97.0	1,336	63.1
EDB 15 (20 gal/ac)	9.7	1,565	60.7
Nemacur P (2 gal/ac (preplant) plus ½ gal/ac (post-plant))	34.7	1,508	60.3
Mocap (10 lb a.i./ac)	37.7	1,568	59.3
Penphene (0.5 gal/ac) + EDB 15 (12 gal/ac)	36.0	1,585	59.8
Necessary differences for significance		15.2 20.9	185 255
{ 5% 1%			

IV. DISCUSSION

In both trials EDB gave a much higher level of control of the root-knot nematode *Meloidogyne javanica* than the other materials which were tested. The results did, however, indicate that Mocap and Nemacur give a level of control which would justify their use in situations where fumigation is impracticable.

Dasanit and Lannate at 10 lb a.i./ac were ineffective. The failure of Lannate indicates that this material is only effective against some species, as it has given good control of the stubby-root nematode *Trichodorus lobatus* Colbran in Victorian tobacco fields (Meagher, personal communication).

Although most tobacco plants in the untreated plots in both trials were heavily galled at maturity, the plants were not obviously smaller than those in plots treated with EDB. This could be expected as initial nematode counts, particularly in trial 1, were low. There was a tendency for leaf quality in plots treated with EDB to be slightly inferior to that in untreated plots. An examination of the data from trial 1 indicated that the inferiority lay in leaf colour and grain of leaf from the last three picks. This was associated with delayed ripening in the fumigated plots, 54.6% of the leaf being harvested in these picks whereas 42.9% of the leaf from the untreated plots was harvested in the same period. This delayed ripening may have been due to the effect of EDB on soil nitrification, in which case it can be corrected by increasing the period between fumigation and planting (Colbran and Green 1963), or to greater uptake of nitrogen by plants in fumigated soil by virtue of their more extensive root systems. The possibility of an undesirable effect on leaf quality associated with very high levels of nematode control in conjunction with present fertilizer schedules cannot be overlooked.

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