EFFECT OF TWO SOIL TYPES ON INSECTICIDE ACTIVITY AGAINST BLACK BEETLE ADULTS

R. N. WATSON and K. WEBBER

*Soil and Field Research Organisation,
Ruakura Agricultural Research Centre, MAF, Hamilton*

Summary

The effect of a mineral and a peat soil on the activity of fensulfothion granules against black beetle (*Heteronychus arator*) was compared using pots growing maize (*Zea mays*) seedlings. Results indicate that insecticides known to be effective in a mineral soil may be inactivated in a peat soil.

INTRODUCTION

Reports of inadequate control of black beetle (*Heteronychus arator*) with insecticides on peat soils have been backed up by experimental observations by Esson (King and Mercer 1974). The experiment described here is a comparison of the performance of insecticides against black beetle on high and low organic matter (OM) soils under the same conditions.

METHOD

A standard insecticide for the control of black beetle (fensulfothion 10G) was used at two rates (1.1 and 2.2 kg/ha) in pots containing growing maize (*Zea mays*) seedlings. The experiment was conducted in the manner described by Watson (1975). Two soil types, Horotiu sand loam (3.6% OM) and a peat from the Hauraki Plains (65.2% OM) were used. Five beetles were seeded into the pots at four intervals (0, 1, 2 and 4 weeks) after the application of insecticide. Beetle mortality was assessed after 3 days exposure to treatment. CGA 12223 and terbufos, the best rated chemicals from the screening trial (Watson and Webber 1975) were also tested on the peat soil at time 0.

RESULTS

The results are presented in Table 1.

TABLE 1: EFFECT OF TWO SOIL TYPES ON INSECTICIDE
ACTIVITY AGAINST BLACK BEETLE

<i>Treatment</i>	<i>Rate kg/ha</i>	<i>Weeks post-treatment</i>	<i>% Beetles Affected Mineral</i>	<i>Peat</i>
fensulfothion (mean of 1.1 and 2.2)		0	66 bcB	4 a
		1	80 bB	2 a
		2	50 cBC	8 a
		4	14 dCD	12* a
control		0-4	6 dD	6 a
CGA 12223	2.0	0	96 aA	0 a
terbufos	2.0	0	88 aA	8 a

* tested at 2.2 kg/ha rate only.

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Effect of Soil on Pesticides

All chemicals on the mineral soil were significantly different from control (1% level), and CGA 12223 and terbufos were significantly different from fensulfothion (1% level) tested at corresponding times. No significant difference was found between the effects of the two rates of fensulfothion.

In marked contrast to the mineral soil, no treatment was significantly different from control on the peat soil.

DISCUSSION

The inactivation of insecticides and herbicides in soils is apparently caused by physico-chemical adsorption processes, and the extent of inactivation may vary with the chemical, soil type and soil moisture (Harris 1966). The adsorption of chemicals is rapid in peats (Talbert and Fletchall 1964), as indicated in the present experiment by the ineffectiveness of insecticides at time 0, when beetles were seeded into pots within three hours of insecticide application.

This experiment suggests that a different strategy to the application of granular formulations of organophosphates may be required for the control of soil insect pests of maize on high OM soils. The use of foliar applied systemic insecticides and seed dressings may be the most useful avenues for further study.

REFERENCES

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TOPICAL ISSUES AND AQUATIC WEEDS

CHAIRMAN'S SUMMARY

D. D. McPHAIL

Ciba-Geigy New Zealand Limited, Wanganui

Topical Issues:

The paper by Watts refers to the present legislative position regarding the use of aldrin, dieldrin and 2,4,5-T in the USA. Of particular interest and concern is the indication that in the USA at least, indication of carcinogenic activity by a pesticide in any one species is likely to be extrapolated to all other species including man.

It was stated in discussion that while decisions made in other countries regarding the registration of pesticides must be studied here, decisions made by the Agricultural Chemicals Board will be based upon local use-related evidence rather than automatic following of overseas authorities.

Mason's paper reviews the historical developments in the recognition of the health hazards of TCDD and the requirements and steps taken to ensure that 2,4,5-T formulations sold in New Zealand are safe in terms of TCDD content. The point was made in discussion that 2,4,5-T itself, divorced from TCDD, is not teratogenic.

Discussion of the paper presented by Hartill on the development of resistance to fungicides by pathogens referred largely to the tactical recommendations given in the paper and the theories behind them. The possible difference between the academic definition of multiple resistance and the grower interpretation of field results was stressed. The importance of continuing to use non-specific fungicides rather than going overboard for a new, specific material was rightly highlighted.

Aquatic Weed Control:

Foley has provided in his paper a useful summary of the organisations involved and the procedures to be followed in carrying out experimental work or executing aquatic weed control programmes. Reference is made to the recently published guide to the use of aquatic herbicides which is available from the Agricultural Chemicals Board.

The paper by Hughes stresses the need to establish the actual or potential importance of aquatic species in any specific body of water and to obtain detailed information on the overall ecology and biology before planning a control programme. Some details are given of techniques used in New Zealand and Fijian areas.

The use of lake lowering to achieve control of problem species, notably *Lagarosiphon major*, and, temporarily, to throw the balance towards a succession of less harmful species is clearly of interest and Coffey's paper deals with this practice in detail. One point not fully explained in discussion was the very rapid recovery and increase in weed growth in the year following lake lowering at Whakamaru as shown in Table 1.

As distinct from dry land weed control the ecological and biological results of killing large masses of aquatic herbage present major, perpetuating, problems.