EFFECT OF SOIL TYPE ON ETHOFUMESATE ACTIVITY

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Different levels of ethofumesate activity were obtained in a bioassay comparing several important cropping soils. Organic matter content was considered to be an important contributing factor.

Ethofumesate is a herbicide at present being developed in New Zealand for the control of barley grass (*Hordeum* spp.). It is also of special interest for use in beet crops against redroot (*Amaranthus hybridus* and *A. retroflexus*).

This preliminary investigation was carried out to determine whether different soil types affect ethofumesate activity. A bioassay was devised using wheat (*Triticum vulgare*) as the indicator species.

Ethofumesate concentrations of 0, 0.2, 0.4, 0.8, 1.2, 1.6 and 2.0 ppm in air-dry soil were prepared using the following soils:—

		Organic carbon %
Patumahoe clay loam (Pukekohe)	Series 82	2.9
Twyford sandy loam (Hawkes Bay)	Series 6	1.7
Levin silt loam	Series 76	5.0 approx.
Hastings clay loam (Hawkes Bay)	Series 15	3.3
Tongariro silt loam (Ohakune)	Series 65	13.8

It was known from recent work in the Netherlands that ethofumesate is primarily taken up by the shoot of the germinating seed (A. Reisler and Z. Ostojic, pers. comm.). Thus, the coleoptile of the developing seedling was allowed to grow through a layer of treated soil approximately 2 cm deep and after 12 days growth fresh shoot weight was recorded.

The wheat seeds were pre-soaked for four hours, germinated for a further 20 hours at 26°C and then set, 5 per pot, on the surface of 100 g of untreated Levin silt loam soil. Each pot was topped up with 50 g of the test soil which had been thoroughly mixed with the appropriate amount of herbicide in 10 ml of water by shaking in a polythene bag.

The pots used were 150 ml polystyrene drinking cups punched with a small hole in the base and plugged with a cotton wool wick. This ensured uniform sub-irrigation when the pots were stood in trays on a saturated pad of 5 mm thick foam plastic covered with filter paper.

As shown in Fig. 1 several large differences occurred in the reaction of wheat to ethofumesate.

In the Patumahoe clay loam the chemical was twice as active as in the Tongariro silt loam; the three other types gave intermediate results. From the curves of best fit, the equivalent concentrations giving a 50% reduction in wheat shoot weight (ED_{50}) after 12 days were as follows:

Patumahoe clay loam	0.76 ppm
Twyford sandy loam	0.92 ppm
Levin silt loam	1.02 ppm
Hastings clay loam	1.18 ppm
Tongariro silt loam	1.46 ppm

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It can be inferred from these results that soil type should be considered when uses for this herbicide are being developed and it is likely that the organic matter of the soil will exert an important influence on its biological activity.

FIG. 1. EFFECT OF SOIL TYPE ON ACTIVITY OF ETHOFUMESATE

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