TOLERANCE OF FEIJOA TO SOME SOIL-APPLIED HERBICIDES

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There is increasing interest in New Zealand and California, U.S.A. in the commercial production of feijoa (*Feijoa sellowiana*). No information has been published regarding the susceptibility of feijoa to soil applied herbicides and to the best of our knowledge no studies have been conducted evaluating herbicides in feijoa orchards. Herbicides are being used in commercial feijoa orchards in New Zealand and the senior author established a trial in a newly planted orchard in central California in 1985.

The purpose of this glasshouse study was to evaluate the tolerance of young feijoa plants to selected soil-applied herbicides. In selecting the herbicides, their present general use in orchards and potential for commercial registration were considered.

One-year-old feijoa plants were transplanted from 5 cm diameter pots into 12.5 cm pots on 22 November 1985. The roots and tops of the plants were severely pruned before transplanting into a soil mix consisting of 5% Levin silt loam and 95% coarse sand. The mixture contained 0.5% organic matter.

On 3 January 1986, when the new shoot growth length on all plants ranged from 5 to 7.5 cm, the following herbicides were applied as a soil drench at 2.2, 4.4 and 8.9 kg ai/ha:— fluorochloridone (Racer 24 EC), isoxaben (EL-107 75 SC), oxyfluorfen (Goal 23.5 EC), simazine (Gesatop 80 WP), terbutryn (Igran 50 SC), terbutylazine (Gardoprim 80 WP) and diuron (Karmex 80 WP). Oryzalin (Surflan 75 WP) and napropamide (Devrinol 50 WP) were applied at 4.4 and 8.9 kg ai/ha in the same manner. Standard solutions of 1.0 g ai/litre of each herbicide were prepared and the appropriate amount was applied in 75 ml of water per pot. This volume adequately distributed the herbicide over the entire surface of the soil. All treatments were replicated four times and arranged in a randomized block design.

Following herbicide application the pots were irrigated as needed with 100 ml of water daily until 12 February 1986. After this the irrigation water was not measured, but was applied in amounts to minimize drainage. The daytime temperature in the glasshouse ranged from 20 to 34 °C during the trial period.

Visual ratings of phytotoxicity symptoms on a 0-10 scale and % vigour were made seven times.

On 18 January the first evidence of phytotoxicity was observed on plants treated with simazine. The symptoms were interveinal chlorosis, followed by a water soaked appearance, browning, necrosis and shedding of the leaves. These symptoms appeared in fairly rapid succession on plants treated with 8.9 kg ai/ha. Subsequently all simazine treated plants exhibited similar symptoms. New leaves developed on the plants but in 5 to 6 days interveinal chlorosis was evident followed by more severe symptoms.

Terbutryn and terbutylazine treated plants developed very similar symptoms of veinal chlorosis. Necrosis and shedding of the leaves occurred on plants treated with 4.4 and 8.9 kg ai/ha. The symptoms were more severe on plants treated with terbutryn than terbutylazine (Table 1).

Diuron caused mild symptoms of veinal chlorosis at 4.4 kg ai/ha and at 8.9 kg ai/ha the symptoms were more pronounced but did not result in necrosis and shedding of the leaves. Necrotic blotches were evident on two leaves on one plant treated with 8.9 kg ai/ha.

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TABLE 1: Effect of some soil-applied herbicides on young feijoa plants.

Herbicide	kg ai/ha	Phytotoxicity Rating ¹			Vigour Rating %	
		12 Feb	21 Mar	31 Mar	20 Mar	31 Mar
fluorochloridone	2.2	0	0	0	100	100
	4.4	0	0	0	100	100
	8.9	0	0	0	100	100
isoxaben	2.2	0	0	0	100	100
	4.4	0	0	0	90	87
	8.9	0.2	1.2	0	87	85
oxyfluorfen	2.2	0	0	0	100	100
	4.4	0	0	0	100	100
	8.9	0.5	0	0	92	100
terbutryn	2.2	0.7	2.2	2.7	95	97
	4.4	1.0	3.5	4.0	87	77
	8.9	3.5	6.7	7.7	55	37
terbuthylazine	2.2	0.5	1.0	2.2	85	90
	4.4	3.5	5.5	4.7	72	60
	8.9	3.2	4.5	5.0	67	67
simazine	2.2	4.7	5.0	4.7	55	62
	4.4	5.2	7.0	7.5	40	47
	8.9	5.7	7.0	8.0	40	32
diuron	2.2	0	0	0	100	100
	4.4	0	1.2	1.2	95	100
	8.9	0.7	3.5	4.2	90	95
oryzalin	4.4	0	0	0	100	100
	8.9	0	0	0	100	100
napropamide	4.4	0	0	0	100	100
	8.9	0	0	0	100	100
untreated	—	0	0	0	100	100

¹Phytotoxicity rating based on a 0 to 10 scale: 0 = no effect, 10 = death.

Isoxaben did not produce symptoms of phytotoxicity. However, at 8.9 kg ai/ha some reduction in the vigour of growth was evident but did not significantly affect plant weight. Some reduction in root growth was evident near the soil surface.

Oxyfluorfen, fluorochloridone, oryzalin and napropamide caused no phytotoxicity.

The tolerance of young feijoa plants to several soil-applied herbicides was clearly demonstrated. The susceptibility of feijoa to the three selected triazine herbicides was unexpected and is especially important as triazine herbicides are widely used in New Zealand orchards.

Additional studies are warranted in established orchards to investigate the use of triazine herbicides at lower rates (0.5 to 1.0 kg ai/ha) in combination with other herbicides. Combinations of diuron with fluorochloridone, oxyfluorfen or napropamide could be effective for the control of a wide range of annual weeds.