WILLOW TOLERANCE TO OXADIAZON

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SUMMARY

Potted cuttings of the willow clone 'Aokautere' were sprayed once with either 1.5 or 3 kg ai/ha oxadiazon at fortnightly intervals from 3-59 days after planting. Another set, cool-stored in early July, was planted at fortnightly intervals, and half of the cuttings in each planting were sprayed at the two rates 3 days after planting. All showed signs of herbicide damage, but all eventually recovered, those sprayed at the higher rate taking longer. In another trial cuttings of 23 willow clones were sprayed 3½ weeks after planting with both rates of oxadiazon. Again all were affected, particularly those receiving 3 kg/ha, but all recovered. Differences in damage between species were not significantly greater than between clones within species.

INTRODUCTION

Field use of oxadiazon at the recommended rate of 1.5 kg ai/ha has sometimes resulted in damage to willows, while in unpublished experimental work of mine rates of 1.5, 3 and 6 kg ai/ha have been tolerated by cuttings beginning to strike. Pot trials were designed to investigate the effect of time of spraying oxadiazon on the New Zealand hybrid tree willow 'Aokautere' (*Salix matsudana x alba* cl. 'Aokautere') and to identify any differences in tolerance among willow clones.

METHOD

(a) Time of spraying trial

The trial was conducted in two parts.

- (i) On July 8 1983 300 'Aokautere' willow cuttings were planted in sterilised soil in 60 pots, five cuttings per pot, so that 2-3 cm of each cutting projected above the soil surface. On July 11 oxadiazon (Ronstar 25 EC) was applied at 1.5 kg ai/ha to five pots and at 3.0 kg ai/ha to another five pots. At fortnightly intervals thereafter ten more pots were taken and oxadiazon applied at the same two rates.
- (ii) A further 250 cuttings were placed in cool storage on 8 July. Each fortnight thereafter 50 cuttings were planted out, five to a pot, and three days later were sprayed at two rates as above.

Ten control pots were planted on July 11 and another 10 unsprayed pots on September 2. All spraying was carried out in a laboratory spray booth using a single fan nozzle mounted on a travelling overhead carrier. Oxadiazon was applied in 410 litres/ha, water at 138 kPa.

All potted cuttings were kept outdoors in an enclosure, both before and after spraying. The cuttings planted on July 8 came into leaf (flushed) between the 8th and 22nd August sprayings.

(b) Clonal tolerance trial

On July 22nd 1983, 50 cuttings of each of 23 willow clones listed in Table 2 were planted at five to a pot. These were sprayed on 16th August in the same way as the cuttings in the time of spraying trial, i.e. at the same two rates with five replicates. Sterilised soil was used in two or three replicates but weed growth was negligible even in unsterilised soil.

The degree of damage in both trials was visually assessed on September 22nd. There was so little variation within replicates that a single rating was given for each treatment.

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TABLE 1: Aokautere willow injury from oxadiazon sprayed over cuttings, relative to untreated. Assessed 22 September.

Time of spraying (date)	Time of spraying (days before rating)	Rate (kg ai/ha)	Damage (%) (Days between planting and spraying in parenthesis)			
			stored outdoors		cool stored	
11 July 1983	73	1.5	3	(3)		
		3.0	20			
25 July 1983	59	1.5	10	(17)	10	(3)
		3.0	20		20	
8 Aug 1983	45	1.5	20	(31)	20	(3)
		3.0	20		20	
22 Aug 1983	31	1.5	35	(45)	3	(3)
		3.0	35		3	
5 Sept 1983	17	1.5	50	(59)	3	(3)
		3.0	50		3	

TABLE 2: Injury to cuttings of willow clones sprayed with oxadiazon 25 days after planting. Assessed 37 days after spraying.

Salix species and clone		PMC	Damage (%) at	
		Accession No	1.5 kg ai/ha	3.0 kg ai/ha
alba		359	3	35
		1024	3	20
incana x daphnoides	‘Tiritea’	1012	35	50
		227	3	35
matsudana		692	negligible	3
		693	3	10
		694	3	10
		695A	3	10
		695B	3	10
m. x a.	‘Adair’	1143	3	35
		1002	20	35
	‘Cannock’	1001	10	20
	‘Hiwinui’	1130	3	10
	‘Makara’	1179	3	10
	‘Moutere’	1184	10	35
	‘Tangoio’	1040	negligible	3
	‘Te Awa’	1003	10	20
	‘Wairakei’	1149	3	35
purpurea	‘Booth’	249	negligible	10
		605	3	20
	‘Irette’	608	10	35
	‘Pohangina’	1087	35	50
reichardtii (=discolor)	‘B’	215	3	20

RESULTS AND DISCUSSION

(a) Time of spraying trial

Results are shown in Table 1. All treated plants suffered necrosis of buds or leaf margins, but all eventually recovered. At the date of rating, the recovery of those sprayed with 3 kg ai/ha was not as advanced as in those that had received the normal 1.5 kg rate. Any differences that may have occurred with differing times, between planting and spraying before flushing, had disappeared at rating 45 or more days later. Those cuttings sprayed after flushing appear to have suffered greater damage but is more probable that their recovery was not as far advanced at time of rating. On the other hand, those kept in cool storage until after the flushing date and sprayed 3 days after planting had not enough leaves unfolded at the time of rating to show much damage.

When the plants were discarded in mid-November they had all recovered and any apparent differences could only be attributed to edge effects or competition for light.

(b) Clone trial

Results are shown in Table 2. All clones showed some damage from the 3 kg ai/ha rate of oxadiazon. Under the conditions of this experiment the *S. matsudana* clone PMC 692, the 'Tangoio' clone of *matsudana* hybrids, and, to a lesser extent, 'Booth' willow, showed tolerance to oxadiazon applied at bud burst. The purple osier clone 'Pohangina' and the bitter willow hybrid clone 'Tiritea' were moderately susceptible to oxadiazon at the normal 1.5 kg ai/ha rate. The others were slightly susceptible. All, including the 'Aokautere' clone, were more susceptible to the higher rate.

Differences in tolerance between clones within a species were sometimes greater than differences between species. This is illustrated by the differing tolerances of the purple osier clones 'Booth' and 'Pohangina'.

CONCLUSIONS

The 'Aokautere' willow clone was temporarily damaged by recommended or double recommended rates of oxadiazon. Recovery took longer with the double rate but there was no lasting growth reduction. The clone did not appear to be especially sensitive when the cuttings were striking.

Other willow clones were also temporarily damaged by oxadiazon at double the recommended rate, and most at the recommended rate. There were no appreciable differences between species in this trial and clonal differences were not long-lasting. The most tolerant clones were the tree willows 'Tangoio' and PMC 692, the latter a recent introduction from China.

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