NOTE

INITIAL WEED CONTROL IN DOUGLAS FIR NURSERY BEDS AT RANGIORA

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Abstract

Trials at Rangiora Nursery showed that weed control in Douglas fir nursery beds can be obtained by using nitrofen as a pre- and post-emergence herbicide The following treatment gave maximum weed control, without damaging the seedlings:

1. *Post-sowing/pre-emergence application of paraquat at 0.6 kg in 225 litre water/ha.*
2. *Pre-emergence (as first seedlings break soil surface) spray with nitrofen at 7 kg in 225 litre water/ha.*
3. *Repeat of (2) above when a fresh crop of weeds have germinated and have entered the first true-leaf stage.*

Nitrofen gives a good kill of most newly-germinated weeds, but does not completely eradicate Lotus *spp. Rates lower than 7 kg/ha do not appear to give adequate lasting control of* Fumaria *spp. or* Polygonum aviculare, *while rates of up to 16 kg/ha had no apparent adverse effect on Douglas fir seedlings.*

INTRODUCTION

Current weed control practice at Rangiora is to spray Douglas fir seedbeds with light mineral oils (40% aromatics) at rates from 275 to 350 litre/ha prior to emergence. During emergence it is not safe to apply aromatic oils. In order to avoid seedling losses during warm, dry, north-westerly conditions in early summer, Douglas fir is sown in late August/early September. Because of low soil temperatures at this time of the year, emergence tends to take place over a longer period than it would under warmer conditions and this means that seedbeds have to be hand-weeded up to four times: until the youngest tree seedlings are 12 weeks old and robust enough to tolerate effective rates of propazine.

A series of trials was conducted from 1972 to 1974 to find the most suitable treatment for initial weed control in Douglas

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fir nursery beds. Results of trials conducted at the Forest Research Institute (Rotorua), with three chemicals, nitrofen ("TOK-E25"), chloramben ("Amiben") and diphenamid ("Dymid"), to which Douglas fir has shown tolerance, have been summarized by van Dorsser (1973). These were used as the basis for this study.

The most common weeds encountered during the Rangiora trials were fathen (*Chenopodium album*), wireweed (*Polygonum aviculare*), plantain (*Plantago* spp.), lotus (*Lotus penduculatus*), cleavers (*Galium aparine*), chickweed (*Cerastium glomeratum*), fumitory (*Fumaria* spp.) and sorrel (*Rumex acetosa*). These were generally abundant in all plots. Less common weeds were willow weed (red shanks) (*Polygonum persicaria*), cornbind (*Polygonum convolvulus*), dock (*Rumex* spp.), spurrey (*Spergula arvensis*), milkweed (*Euphorbia peplus*) and shepherd's purse (*Capsella bursa-pastoris*).

Pilot trials were laid down in 1972 to determine whether the three chemicals were suitable for weed control before and after seedling emergence.

In the pre-emergence trials it was shown that both chloramben and diphenamid gave inadequate weed control, and that chloramben caused some seedling chlorosis. The best results were obtained with nitrofen at rates of 6.5 kg/ha or more applied 4 weeks after sowing (just before seedling emergence). This gave adequate weed control for 8 weeks. Rates of nitrofen up to 16.5 kg/ha had no apparent effect on Douglas fir seedlings.

In the post-emergence trial, nitrofen was applied 3 weeks after the start of seedling emergence. At this stage some seedlings were still just breaking the soil surface. The minimum rate for satisfactory weed control was 6.5 kg/ha, but no damage to seedlings was observed at a rate of 13.0 kg/ha.

CHEMICAL WEEDING REGIMES

Method

On the basis of the two pilot trials already described, a further trial was established in 1973 to derive an optimum regime for weed control in Douglas fir seedbeds

A bed was sown on 1 October 1973 and divided into 3 m plots with 1 m control strips between each plot. Paraquat was applied as a post-sowing/pre-emergence treatment to all plots at 0.6 kg in 225 litre water/ha. The following treatments were then applied:

1. Nitrofen at 7 kg/ha* just prior to seedling emergence (when seedlings are breaking the soil surface).
   A second application of nitrofen at 7 kg/ha when a fresh crop of weeds was in the first true-leaf stage.

2. As for Treatment 1, except that the second application of nitrofen was at 5 kg/ha.
3. As for Treatment 1, except that the second application of nitrofen was at 3 kg/ha.
4. Nitrofen at 7 kg/ha when weeds were in the first true-leaf stage.
5. Nitrofen at 5 kg/ha when weeds were in the first true-leaf stage.
6. Nitrofen at 3 kg/ha when weeds were in the first true-leaf stage.
7. Nitrofen at 7 kg/ha just prior to seedling emergence. When the succeeding crop of weeds developed, and the tallest were no greater than 5 cm, atrazine at 1 kg/ha and an emulsifiable oil at twelve litres (as a spreader) were applied in 450 litre water/ha.
8. As for Treatment 7, except that the atrazine rate was 0.5 kg/ha.
9. Nitrofen at 7 kg/ha just prior to emergence. When the tallest weeds were no greater than 5 cm, prometryn at 0.5 kg/ha and a non-ionic wetting agent at 0.25% was applied in 225 litre water/ha.
10. As for Treatment 9, except that prometryn rate was 0.25 kg/ha.

All spraying was conducted in the early morning when conditions were cool. A CO_2 spray unit was used at 205 kPA.

An assessment was made of seedling health and weeds present 14 weeks after sowing. This was based on a replicated sub-sampling within each treatment.

RESULTS

It can be seen from Table 1 that all treatments gave good weed control.

Lotus, fumitory and wireweed were persistent, as was sorrel (not shown in table) Other weeds occurred to a lesser degree throughout the plots and were all successfully eradicated.

Wireweed and sorrel tended to encroach on the plots from outside the sprayed regions, whereas fumitory and, in particular, lotus developed from within the sprayed plots Fumitory vigorously reinfested the plots following the first spray of nitrofen. Because of this a second application was necessary

*All nitrofen treatments were applied in 225 litre water/ha.

TABLE 1: EFFECT OF SPRAYING TREATMENTS ON WEED CONTROL AND SEEDLING HEALTH — 9 JANUARY 1974

	Weed Count (Mean of 6 Samples)					*Seedling Health*		
Treatment	*Fathen*	*Lotus*	*Wire-weed*	*Fumitory*	*Plantain*	*Healthy*	*Chlorotic*	*Dead*
1	—	2	—	—	—	47	3	0
2	—	2	—	3	—	47	2	1
3	—	1	1	1	—	56	4	1
Control	83	41	14	16	15	24	0	0
4	—	1	—	—	—	44	2	3
5	—	1	—	—	—	47	4	1
6	1	2	2	—	—	42	4	2
Control	79	43	17	16	16	28	0	2
7	—	—	—	—	—	13	27	12
8	—	—	—	—	—	34	23	9
Control	146	99	11	8	—	32	0	0
9	—	—	—	—	—	15	5	26
10	—	—	1	—	—	24	9	17
Control	51	11	8	43	6	34	0	1

(refer treatments 4, 5 and 6). Following this, fumitory was observed only on the plots receiving the lower rates of nitrofen (5 and 3 kg/ha).

DISCUSSION

It appears from these trials that weed control throughout the germination period of Douglas fir is best achieved by using the regime of Treatment 1.

According to van Dorsser (1971) it is possible to apply propazine for long-term weed control eight weeks after final emergence of Douglas fir seedlings. In Rangiora Nursery the general practice is to apply propazine after twelve weeks. From time of first emergence until propazine can be applied with safety, beds have been hand-weeded. These trials show that nitrofen offers a safe and inexpensive alternative.

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