

# Long-term growth response of radiata pine to herbaceous weed control at establishment

J. Balneaves and M. Christie

Herbaceous vegetation has proved a very effective competitor for soil moisture and nutrients during the establishment phase of a forest crop. Numerous trials have been reported on for short-term periods (up to five years) (e.g. Balneaves, 1984; West, 1984) but the long-term benefits of weed control have seldom been quantified.

Glass (1985) attempted to apply a cost-benefit analysis to one set of growth data from Ashley Forest where selective grass control was carried out in radiata pine plantings and growth monitored for a period of nine years. These data were compared with response of seedlings in an unsprayed control. He concluded that for both untended and tended stands the most economic form of post-planting grass control was spot spraying with hexazinone (Velpar), and the aerial spraying was the least economic. Further, spot spraying was the least sen-

sitive spray treatment when the input data were altered to reflect two management situations, viz. having the growth gain resulting from spraying or the use of follow-up spray applications in the second spring after planting. However, growth data collected for evaluation was limited to one site only.

This note records growth gains on four forest sites 8-11 years after post-plant applications of hexazinone and other herbicides in general use at the time (Table 1).

Where hexazinone was used improvement in diameter and height growth was marked, and was reflected in greater tree volume (Table 1). In the Selwyn Plantation Board trial of dalapon and atrazine, tree survival was higher, but growth and volume were no greater than for the unsprayed control. Where amitrole and atrazine were used (Waihopai Valley and Kaingaroa Forest) growth was greater than for the unsprayed controls, with volume increases of 37% and 10% respectively. The use of hexazinone volume gave increases of 47%-165% (Kaingaroa Forest and Selwyn Plantation Board).

Long-term growth responses of radiata pine to weed control is poorly quantified. The data presented here are indicative only since they are derived from unreplicated trials in four forests, each operating under different management regimes. Unfortunately traditional weed control research has tended to concentrate on the modes and efficacy of various treatments or tools and short-term benefit to the tree crop. There are, in our view, two key considerations that have been largely neglected:

1. What is the relative importance of competition compared to other management factors?
2. How does weed competition affect growth in the long term?

This latter point must be quantified if economic thresholds are to be established.

## REFERENCES

Balneaves, J.M. (1984). Some aspects of grass control for radiata pine establishment in New Zealand. *In: Aspects*

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**Table 1.** Growth response of radiata pine (by forest and herbicide treatment).

Forest (Region)	Crop age (yrs)	Treatment	Survival (%)	dbh (cm)	ht (m)	Vol/ha (m <sup>3</sup> ) at 700 s/ha
Selwyn Plantation Board (Canterbury Plains)	10	unsprayed control	76	11.8	6.8	23
		2kg dalapon, 4kg atrazine <sup>1</sup>	92	10.9	6.9	21
		2kg hexazinone <sup>1</sup>	92	17.0	9.6	61
Ashley Forest (North Canterbury)	10	unsprayed control	25	14.1	11.0	31
		2kg dalapon, 4kg atrazine <sup>2</sup>	89	16.8	12.2	43
		4kg hexazinone <sup>2</sup>	92	21.6	13.6	69
Waihopai Valley (Marlborough)	8	unsprayed control	18	12.4	6.9	27
		0.7kg amitrole, 4kg atrazine <sup>2</sup>	86	13.6	8.3	37
		4kg hexazinone <sup>2</sup>	96	15.4	8.9	49
Kaingaroa Forest (central North Island)	11	unsprayed control	82	25.1	17.1	154
		0.7kg amitrole, 4kg atrazine <sup>3</sup>	89	27.2	16.5	170
		6kg hexazinone <sup>3</sup>	93	30.6	17.8	225

<sup>1</sup> applied as a strip application, using a tractor-mounted boom, in 1m bands centred over the rows of trees.

<sup>2</sup> applied as a 1m spot application using a "spotgun"

<sup>3</sup> applied as a broadcast application by helicopter

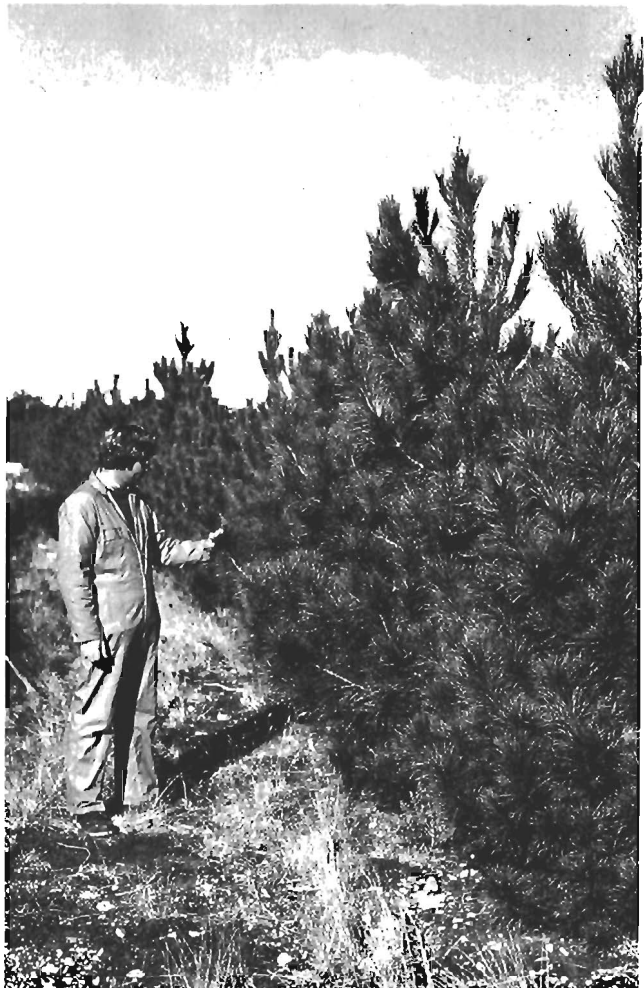
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*Pinus radiata* age 4 planted into a pasture sward in North Canterbury. Unsprayed on left; strip sprayed with hexazinone on right (photos J. Balneaves)



*Pinus radiata* age 4 on the Canterbury plains.  
Left – the dalapon/atrazine spray did not improve growth rates.  
Right – Spraying with hexazinone led to better growth.  
(photos J. Balneaves)

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Authors are encouraged to suggest or include illustrations, photographic or drawn, as this adds interest and clarity. Most papers should aim to have 2-4 such illustrations, but again this will depend on the topic. Feel free to send additional illustrations to be considered for the front cover.

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## Comments from the President

### SOME LESSONS FROM THE AUSTRALIAN CONSERVATION DEBATE

One of the major lessons to emerge from the long and continuing Australian debate is that we must never compromise our professionalism in presenting our case.

For much of the debate the conservation lobby has been able to discredit the various State forestry organizations and industry for originally having considerably overstated the case for exotic plantations in Australia. Now the tables are being turned. It is the conservation lobby whose credibility is now being questioned. This is because they considerably understated the social and economic costs of reducing harvest levels in indigenous plantations and in the alternative plantation effort with indigenous species.

#### The Lesson

The lesson for us is that we must be very careful never to overstate or distort an argument for the sake of an early victory, for that victory may be short-lived and we might lose much more in the end.

### RESOURCE MANAGEMENT LAW REFORM

This exercise by the Department for the Environment in consensus democracy can hardly be regarded as a success. We had the opportunity to see the submissions of other groups and we came to the conclusion that they too had experienced the same troubles as we had in trying to determine exactly what was required. In theory one overall law should be better than several independent laws. In theory too, decisions should be made at the lowest possible level of Government. In practice, this may be much more difficult.

The Institute's submission was of a general nature only.

### PRIVATIZATION OF THE FORESTRY CORPORATION

I am grateful to the many members who offered comments on the privatization question. As we might expect, no true consensus was possible. On the question of whether privatization should proceed there was a spectrum of opinion from those who pleaded for a return to the old Forest Service to those who wanted a complete sell off of the State asset in small parcels. The Institute could therefore take no stand on this question. However, some strategic issues did emerge. A clear majority of members expressed reservations against foreign ownership and control of our forests. Many members were also concerned that our forests might be bought by asset strippers who had no commitment to sustained yield management and replanting. Another area of concern was the possibility of strategic parcels being bought by foreign wood buyers for the purpose of future bargaining.

The treatment of NZ Forestry Corporation staff and the maintenance of public access were also areas of concern. The Government announcement that the forests could be sold separately from the land raised the whole question of lease agreements. The Institute argued that, should the Government proceed, it should avoid any system which results in a Canadian type solution. Evidence from Canada, especially British Columbia, has shown that forestry companies are very reluctant to invest in

forests over which Government retains considerable control and where these controls can be easily changed.

A submission along these lines was made to Treasury.

**W.R.J. Sutton,**  
President

### Changes in Membership

At the Council meeting of September 8, 1988 the following new members were accepted:

- C.I. Poulter (student)
- D.C. Cormack (student)
- M.A. Candish (student)
- T.W. Payn (student)
- A.L. Tyler (student)
- P.A.J. Hayes (student)
- A. Tilling (student)
- R.D. Green (reinstated as associate)
- K. Buck (student)
- C. Weir (student)

Advancements from Associate to Full Member were approved for:

- |                |                |
|----------------|----------------|
| G.N. Patching  | D.M. Robinson  |
| I.L. Currie    | A.P. Wilkinson |
| J.M. Aitken    | D. Hammond     |
| R. Ballard     | A. Peddie      |
| H.A. McKeesick | P. Lavery      |
| D.R. Nicolson  | H. Aitken      |

Advancement from Student to Associate:

I. Blake

The following resignations were accepted:

- |                |              |
|----------------|--------------|
| R.C. Ackland   | I. Rennie    |
| M. Calsaferrri | J.D. Rockell |
| R. Bagnall     | M. Langford  |
| A.G. Cornelius | R. Lloyd     |
| D. Hemphill    | G.H. Green   |
| G.S. Mitchell  | J.W. Goodwin |
| M. McLean      |              |

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