

FOREST HEALTH – AN INDUSTRY PERSPECTIVE OF THE RISKS TO NEW ZEALAND'S PLANTATIONS

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ABSTRACT

Because of the very nature of their business, New Zealand forest managers are familiar with managing for risks. Plantation value losses caused by diseases and insects have been exceeded only by losses caused by wind. The work and educational background of New Zealand's forest supervisors gives them an understanding of control measures but not of preventative measures.

By overseas standards New Zealand's forest plantations have very few significant insect or disease problems but losses due to the most significant disease, *Dothistroma* needle blight, exceed \$7.00/ha/year in the North Island and, locally, leader-dieback associated with *Diplodia* whorl canker can cost more than \$1.30/ha/year.

Forest managers in New Zealand are anxious to see that the New Zealand forest industries and the Ministry of Forestry combine their efforts to ensure an objective approach to forest health risk management and there is a need for the industry as a whole to recognise the risk and the responsibility for minimising it.

Keywords: forest industry; *Dothistroma*; *Diplodia*.

INTRODUCTION

There are risks associated with the growing of any crop and, because of the long-term nature of forest crops, forest managers are very well aware of this risk. So far New Zealand has been fortunate in that its *Pinus radiata* D. Don plantations have suffered, by overseas standards, generally insignificant losses and the associated risks have been manageable. Wind is the most damaging agent followed, in descending order, by pathogens, fire, erosion, and snow or frost damage.

Most New Zealand forest managers approach the management of health risks the same way they would deal with wild fire control. Nearly every forest manager from "tree roots" supervisor to company managing director can quickly and effectively describe how to go about fighting various levels of wild fire outbreaks and the types and quantities of equipment needed. However, very few would be familiar with the actual efficiency of fire tower surveillance and fewer still would have any idea of the effectiveness of money spent on a public fire prevention advertisement.

To carry the analogy further, forest managers can understand and deal with aerial spraying to control *Dothistroma*, modifying site preparation techniques to minimise losses caused by *Armillaria* root-rot, and avoiding over-pruning to reduce *Diplodia* whorl canker. On the other hand, they find it difficult to envisage a prevention/surveillance system to deal with insects and diseases that they have had no experience with. This is not surprising. Unless one has some knowledge of what the risks are and the costs involved might be, it is difficult to come to grips with a system that is intended to minimise the risks and therefore the costs.

I therefore want to focus on two issues that I hope will go some way to filling this gap by:

- (a) Providing information on the historic costs of two significant diseases, and
- (b) Highlighting what I perceive to be the forest industry's concerns about priorities of surveillance and contingency planning.

DOTHISTROMA NEEDLE BLIGHT

Annual co-operative spray programmes for this disease began in 1967 when the seriousness of the growth losses associated with it first became apparent. The number of hectares sprayed each year in the North Island is given in Fig. 1. Since 1967 the total direct costs in controlling this disease which can cause 10–25% periodic increment growth loss have totalled \$35.3 million in current day dollars (to 1988). Even with this preventative treatment there are residual growth losses which must be taken into account. Areas are not usually sprayed until infection levels reach 25% and a review of the work of Woollons & Hayward (1984), van der Pas (1981), and van der Pas, Bulman & Horgan (1984) suggests that losses incurred below this level of infection

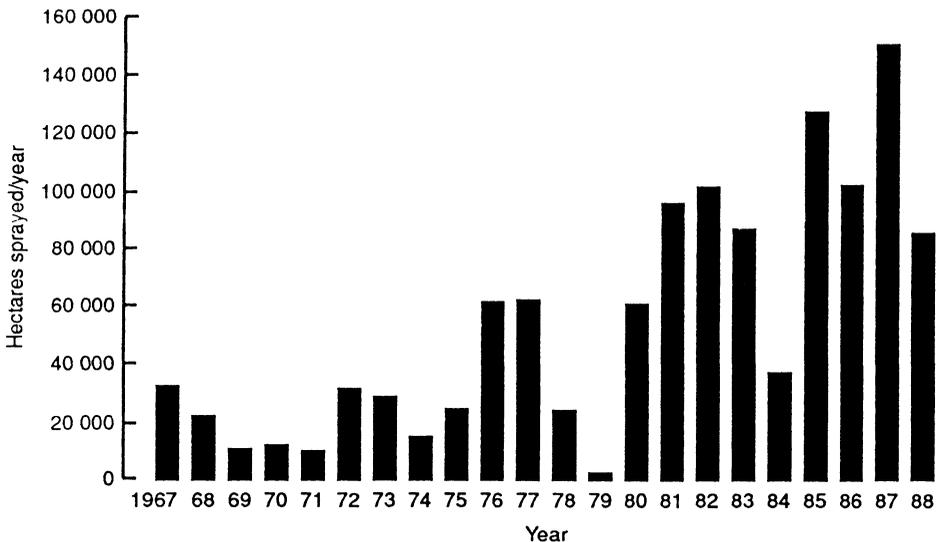


FIG. 1 — Number of hectares sprayed annually for *Dothistroma* in the North Island.

are at least 5% of periodic increment during the first 20 years of the rotation. P. Carter, D. Kershaw and D. New (pers. comm.) estimate that infection regularly exceeds 10% on over 450 000 ha in the North Island and conservatively estimate annual growth losses at 225 000 m³. Thus if we apply a “run of bush” stumpage of \$20.00/m³ to this figure we must add a further \$4.5 million/year to the cost of the disease.

So the total cost of *Dothistroma* is:

1. Direct cost of control per year	= \$1,600,000
2. Residual growth loss per year	= \$4,500,000
	<u>\$6,100,000</u>

Divided by total plantation hectares in the North Island (868 761 ha)
= \$7.02/ha/year

DIPLODIA MALFORMATION

Malformation associated with *Diplodia* leader dieback can be found at economically insignificant levels throughout a large proportion of New Zealand's *P. radiata* estate but can be significant in certain areas such as the sheltered valley systems of the coastal Bay of Plenty plantations (Chou 1984). Although seasonally cyclic in its severity, this malformation has caused significant sawlog downgrading (6–12% of recoverable volume) on over 6000 ha over a range of age classes within Tasman Forestry Ltd's Tarawera Forest. This loss to date over 28 years (one rotation) amounts to \$5.4 million, or for the Tasman Forestry Ltd estate of 147 000 ha a loss of \$1.37/ha/year of rotation.

DISCUSSION

These two examples should, I hope, make it quite clear that, although *Dothistroma* and *Diplodia* might be considered relatively minor diseases by world standards, they have a very significant impact on the profitability of growing *P. radiata* in New Zealand. North American foresters, for example, have far greater problems to deal with and are indeed envious of our situation in New Zealand.

Forest managers should be aware of the real need to adapt and improve our risk management, preventative measures, and contingency planning. Obtaining effective and cost-efficient preventative forest health management is unquestionably the forest industry's collective responsibility. The analogy with fire fighting is again valid – there is an absolute need for a team approach to meeting forest health surveillance needs and a strong systems approach to risk management.

Current major concerns about where the Ministry of Forestry and the industry are headed are:

- (1) The need for a rational and objective system for providing early pest and disease detection with a greater than 95% assurance.
- (2) The Ministry of Forestry must develop forest staff training and certification programmes which should increase the level of in-field surveillance.

(3) Pest outbreak contingency plans are required that better address the need for industry to face up to sizable forest "sanitation" losses whenever there exists even the threat of another *Dothistroma*-type disease.

To provide our industry with the insurance that the investment in forest and manufacturing deserves, we must plan our risk management systems for the worst and be united as an industry in facing the risks that exist.

ACKNOWLEDGMENT

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REFERENCES

- CHOU, C.K.S. 1984: Diplodia leader dieback, Diplodia crown wilt, Diplodia whorl canker. *Forest Research Institute, Forest Pathology in New Zealand No. 7.*
- van der PAS, J.B. 1981: Reduced early growth rates of *Pinus radiata* caused by *Dothistroma pini*. *New Zealand Journal of Forestry Science 11*: 210-20.
- van der PAS, J.B.; BULMAN, L.; HORGAN, G.P. 1984: Disease control by aerial spraying of *Dothistroma pini* in tended stands of *Pinus radiata*. *New Zealand Journal of Forestry Science 14*: 23-40.
- WOOLLONS, R.L.; HAYWARD, W.J. 1984: Growth losses in *Pinus radiata* stands unsprayed for *Dothistroma pini*. *New Zealand Journal of Forestry Science 14*: 14-22.