

High-country future

The future is likely to witness an increase in forested area in the South Island high country and the biophysical impacts need to be assessed as carefully as the economic and social. NZFRI is establishing trial plantations in areas which are cur-

rently treeless, and changes in bird species and numbers are being recorded annually as part of the associated biodiversity monitoring programme.

References

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Winter desiccation of seedlings in a managed NZ black beech (*Nothofagus solandri*) forest – and its potential solution

Platypus pinhole beetle is a major cause of degradation in beech (*Nothofagus*) wood. Removing nesting material in the form of logging debris from the forest can reduce pinhole beetle damage, but, on some sites, may also cause considerable desiccation of newly regenerated seedlings.

This problem was experienced by John Wardle in his managed black beech (*Nothofagus solandri*) forest near Oxford, North Canterbury. John has been sustainably managing this forest since leaving the

Forest Research Institute in 1986.

Harvesting involved a system of small coupe fellings, with individual coupes between 0.20 and 0.25 hectare in area. Pinhole beetle was controlled by removing potential nesting sites, such as the heads of trees, after sawlog extraction. The removed material was sold as firewood. The cleared coupes were then clean seed beds suitable for seedling regeneration.

Good germination usually occurred after the next seed (mast) year, but it was

observed that most of the seedlings died or were knocked back by desiccation during subsequent winters. Advanced growth seedlings, established before the harvest, were also damaged.

The problem was again experienced in the winter of 1994 in coupes logged in 1990 and 1991. Excellent growing conditions were present through the 1993/94 growing season long into the autumn. A cold winter followed, with an unusually high incidence of cool, strong, northwest winds. The cold winds caused desiccation of seedlings' leading shoots and burn-off in the crowns of saplings up to three metres high. Larger coupes, and particularly those exposed to the northwest winds, suffered most.

Some compromise in the goals of the management regime was thought necessary to overcome the desiccation problem.

The Potential Solution

Winter desiccation is caused by the combination of cool soil temperatures and high evapotranspiration losses, usually exacerbated by wind exposure. To prevent desiccation it was thought necessary to insulate the ground and reduce the size of the coupes. Coupe sizes have now been reduced to 0.15 hectare or less, minimising wind exposure.

Logging slash and waste wood less than ten centimetres in diameter will now be left within the coupe, insulating the soil and protecting developing seedlings. This smaller-diameter material is not favoured by pinhole beetles. The understorey of shrubs and ferns provides further protection from the weather.

This new approach may largely overcome winter desiccation in the new crop, without appreciably increasing the ever-present incidence of pinhole beetle.

Ian Platt and John Wardle



The effects of winter desiccation on 3-4-year-old regeneration in a logged coupe. Healthy buds, as yet unopened, on the young trees indicate they will recover. Photo: Ian Platt, Ministry of Forestry