

Protection of pruned stubs against invasion by *Nectria fuckeliana*

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Background

Stem malformation, typically developing after pruning, has become a serious problem in some *Pinus radiata* plantations in the southern part of the South Island. The northern hemisphere fungus *Nectria fuckeliana*, which may gain entry to the stem through the pruned stub, has been implicated as the likely cause of the cankers. Formation of 'pathological heartwood' appears to frequently occur and decay fungi follow. Traditional silvicultural response methods may help minimise infection and a trial that compares season of pruning with other factors, although not yet complete, has already given some useful results. Use of a physical barrier/fungicide combination applied to stubs immediately after pruning has also proved efficacious in limiting the establishment of *N. fuckeliana*. No treatment currently in use is totally effective in preventing infection. Application of a bioprotectant to stubs has been suggested as having considerable potential for preventing infection. No bioprotectants have yet been tested. In this field trial selected formulations of organisms or substances with demonstrated *in vitro* activity against *N. fuckeliana*, or with potent, broad-spectrum antimicrobial activity, will be tested on trees at operational pruning age and compared for efficacy with a fungicide application and a physical barrier. Knowledge gained from the pruned stub trial which was established in 2003 has been used to select the most appropriate season to establish the trial and the most suitable branch size for treatments.

Objective: To evaluate treatments of pruned stubs of *Pinus radiata* to prevent infection by the wound pathogen *Nectria fuckeliana*, comparing bioprotectants with chemicals.

Methods

Treatments

1. Bioprotection 1
2. Bioprotection 2
3. Bioprotection 3
4. Garrison
5. Gelseal (ex Primaxa)
6. Inoculated control
7. Untreated control?

Replicates

One experimental replicate will consist of a stub of suitable size (30- 50mm). At least 100 stubs for each of treatments 1-5 and 7 and 200 for treatment 6.

Trees will be numbered and three whorls selected on each tree. On each of the three whorls (labelled A – C with A being the upper whorl) a spot of paint will be placed above one stub, this will be deemed stub 1 for subsequent evaluations. Stubs will then be assessed in a clockwise direction. Treated stubs within a whorl will have a small spot of paint beneath the stub to

separate them from the smaller untreated stub. Treatments will be randomly assigned within a tree.

The trial will be established in winter 2006. Trees will be pruned and stubs to be treated will be measured and marked. Only stubs over 30 mm diameter will be included for treatment. Treatments will then be applied to stubs. Delay between pruning and treatment will be kept to a minimum. Garrison, Gelseal and the bioprotectants will be applied with a brush. Stubs will be sprayed with a spore suspension of *Nectria fuckeliana* (Acremonium stage 1 x 10⁶ spores/ml in sterilised, distilled water) either the same day or the day after pruning and application of the treatment substance. Each stub will be sprayed (trigger sprayer) with 1/2-2 ml spore suspension. Volume depends on stub diameter as a thorough wetting of the stub is required.

Location

Forest site in Otago or Southland

Assessments

Trees will be evaluated every four months and evaluations will be undertaken on a stub-by-stub basis. Stem fluting and fruit body formation will be recorded. Stem fluting assessments will be classified by length of the flute where 0 = no fluting, 1 = flute < 30 cm, 2 = 31-100 cm, and 3 = >100 cm. Results will be recorded on plot sheets. Destructive sampling might be necessary at the completion of the trial but the need for this will be determined in late 2007

Daily meteorological data (rainfall, minimum and maximum temperatures) will be recorded from the Glenledi station.