

Field Guide to symptoms of *Nectria fuckeliana* cankers

Introduction

Stem malformation, typically developing after pruning, has become a problem in some *Pinus radiata* plantations in part of the South Island of New Zealand over the last 10 years. Infection through the pruned branch stub may result in extensive stain and decay within the stem, although tree crowns remain green and healthy. *Nectria fuckeliana*, a Northern Hemisphere fungus which is commonly recorded there as a saprophyte or weak pathogen of species of *Picea* and *Abies*, is the most commonly isolated fungus from affected trees. *Nectria fuckeliana* had not been recorded in New Zealand prior to 1996, although it may have been present for some years prior to that date.

Research into management of the disease is on-going, and for up to date advice and recommended strategies contact David Thode at PF Olsen.

Objective

The objective of this field guide is to assist in the identification of *Nectria* disease symptoms with particular reference to trees being assessed for pruning and disease incidence assessment. The guide shows characteristics of internal stem damage and fungal fruiting bodies, and will allow the field diagnosis of disease occurrence and severity both within known infested stands and in stands outside the known infested area. Recognition of symptom severity by age class and silvicultural treatment will assist forest managers in disease incidence assessment and tree selection, as well as disease detection. The guide is available in electronic format that will allow users to construct their own strategy specific guides for tree selection or disease assessment purposes.

Nectria disease symptoms

Stem cankers or 'flutes' range in size from minor depressions to flattened areas of the trunk to deep incisions, that may extend for more than a meter in length. Natural depressions, unrelated to any damage to the cambium or sapwood, that mimic *Nectria* infections, may also occur. Fruit bodies of *N. fuckeliana* are distinctive but do not form on all infected trees.

Figure 1. Absent

Indentation or dimple typically associated with a normal branch stub. Not considered a symptom of disease. Current recommendation is to ignore such minor depressions in disease incidence assessment or pruning decisions.



Figure 2. Slight

Flute or depression not obvious and extending less than 5cm above branch stub. Such symptoms may be associated with Nectria disease, but are not currently considered at high risk from pruning if limited to a single branch within a whorl. May or may not be included as a positive for assessment purposes.



Figure 3. Moderate

Flute well defined and extending more than 10cm above branch stub is considered likely evidence of Nectria disease. Current advice is not to prune trees in this category.





Figure 4. Severe

Deep extensive single flute often associated with large branch is indicative of severe Nectria disease, and trees showing such symptoms are not recommended for pruning.





Figure 5. Severe

Multiple deep extensive flutes indicate the most severe incidence of Nectria disease, and it is not recommended such trees be pruned or included in final stand stocking.





Figure 6. Basal fluting

The significance of basal fluting, indicative of Nectria disease, to tree selection and pruning is currently unknown. Such symptoms are indicative of disease presence for assessment purposes.





Figure 7. Stem depressions

Non branch related stem flattening or depressions may or may not be related to Nectria Disease.





Figure 8. Fruiting bodies

Distinctive red (fresh) and rusty brown (aged) *Nectria* fruiting bodies can be found on pruned branch stubs and the bark of infected trees. However, disease is often present without evidence of fruiting bodies.



Nectria disease and branch size

Research trials have shown pruned branch diameter to be strongly related to subsequent Nectria infection. Branches over 3cm diameter have a much greater probability of infection than those under 3cm. Infection of large branch stubs can be reduced by the immediate application of a suitable fungicide to the cut surface. Branch size is therefore important in the selection of trees to be pruned. The likelihood of infection of pruned stubs can be reduced by pruning in summer i.e. at the dryer time of the year.

Figure 9. Branch size

Branches less than 3cm diameter are considered at low risk of infection by Nectria following pruning. Current recommendation is to prune without any further treatment (fungicide application).



Figure 10. Branch size

Typical small branch diameter whorl considered at low risk of Nectria infection.



Figure 11. Branch size

Branches greater than 3cm diameter are of higher risk of Nectria infection following pruning. Current recommendation is to either not prune such trees or to treat the pruned stub with a fungicide.



Figure 12. Branch size

Typical large branch within a whorl that is at high risk of Nectria infection following pruning if not treated with a fungicide.



Nectria disease and internal damage

Nectria infection has been found to be associated with changes to the internal structure of the stem, ultimately leading to extensive decay and loss of value. The development of sectors of dry white wood is followed by the invasion of decay fungi and sometimes insect damage such as huhu.

Figure 13. White wood

Sectors of dry white wood associated with Nectria infection are believed to facilitate the entry of decay fungi.



Figure 14. Internal decay

Advanced Nectria disease is associated with often extensive internal decay of the stem.



Nectria disease sample collection

The confirmation of the presence of Nectria infection in suspect trees and in new areas requires the collection of samples from which the fungus can be cultured in the laboratory. Successful culturing can be enhanced by sampling the most appropriate site and careful treatment of the sample following collection.

Increment core sampling

Suspect Nectria infection should be sampled by increment core taken 5cm above the branch stub within the area of symptom. Samples should be wrapped in plastic film, kept in cool conditions, and forwarded to Ensis for diagnosis at the earliest opportunity. Information on the forest, stand, site (GPS location), tree management, and symptoms, along with the collector's name and contact details should be included with the sample.

Contacts and further information

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