INFECTION OF NURSERY STOCK BY NECTRIA.

INTERIM REPORT JANUARY 2006

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THE JOINT FORCES OF CSIRO & SCION

ensis

Client Report No. 39455

Infection of nursery stock by Nectria. Interim report January 2006.

M. A. Dick

Date: **January 2006**
Client: **FBRC**
Contract No:

EXECUTIVE SUMMARY

Objective

The objective of this work was to determine if nursery seedlings could become infected with *N. fuckeliana*, either symptomatically or asymptomatically, and carry the fungus to new locations.

Key Results

Three months after inoculation in the field, *N. fuckeliana* was recovered from 24% and 7% respectively of seedlings and cuttings. *Nectria* was recovered from only 1of the 111 uninoculated plants tested.

Application of Results

Nectria fuckeliana can remain viable in seedlings and cuttings for three months. The fungus did not appear to cause disease. It remains to be seen if nursery stock could be responsible for spreading *Nectria fuckeliana* to other parts of New Zealand.

Further Work

Further assessments are needed.

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Information for Ensis abstracting:

Contract number	
Client Report No.	39455
Products investigated	
Wood species worked on	Pinus radiata
Other materials used	Nectria fuckeliana
Location	Berwick Forest, Otago

INTRODUCTION

The first confirmed record of the wound pathogen, *Nectria fuckeliana* was from Otago in 1996 and it has since been found extensively in Otago and Southland and in a couple of locations in South Canterbury. During the period 1997- 2004 thousands of *P. radiata* seedlings and cuttings were sourced from South Island nurseries for planting out in a range of locations in the North Island. Although there are no records of *N. fuckeliana* from the North Island there is concern that it may have been, or may in the future be, transported to the North Island via the nursery stock and become established in the plantations there. An additional concern voiced by some has been that plants could become infected with *N. fuckeliana* while young, and continue to carry the fungus within the stem without showing any signs of disease.

As *N. fuckeliana* is a wound pathogen intact seedlings or cuttings are very unlikely to have the opportunity to become infected. If topping of nursery material is undertaken there is theoretically the possibility that, if there is an inoculum source nearby, the wound could become infected. The possibility that dead portions of nursery plants could become colonised with *N. fuckeliana* if inoculum were available has also been raised.

In tests carried out in the Ensis Containment Facility in Rotorua *Nectria* was readily reisolated from nursery stock 6 weeks after inoculation to a freshly created wound. No disease symptoms were apparent and the fungus was only recovered from the area around the wound. *Nectria* could not be re-isolated from branches and stems that were inoculated when already dead and the tissue colonised by other fungi. Results of these tests were discussed in Ensis Report No. 38658.

It is probable that results from inoculation tests undertaken in a field environment may differ from those obtained indoors as both weather and competing microorganisms often have a marked effect on fungal survival and infective capability. Hence a trial to examine infection in a natural situation was established in August 2005. The objective is to determine if nursery plants could become infected with *N. fuckeliana*, either symptomatically or asymptomatically, and thereby be capable of carrying the fungus to new locations.

MATERIALS AND METHODS

A newly planted site adjacent to a known infected stand of *P. radiata* was selected in Berwick Forest and four plots were established containing in total 220 *Pinus radiata* seedlings and 220 cuttings in a randomized block layout. All plants were topped after planting and half were inoculated immediately after topping. A 25 μl droplet of spore suspension was applied to the cut top. The concentration of the spore suspension was 5×10^3 spores/ml giving a 125 spore application to each inoculated plant.

Half of the plants from each treatment were collected for isolations in the laboratory 3 months after trial establishment. The needles were stripped from each stem and the extent of discolouration from the cut top measured. Stems were then surface sterilised and placed onto artificial media.

RESULTS AND DISCUSSION

The recovery of *Nectria* and the extent of stem discolouration are tabulated below.

All of the stems were colonised by several fungi, including those from which *N. fuckeliana* was recovered. Most of the fungi could be identified, at least to genus, and are known saprophytes commonly associated with *P. radiata*. In most cases there were at least 2 fungi obtained from each stem section and sometimes up to 5.

Treatment	**% *Nectria* recovery after 3 months**	**mm discolouration (average)**
Seedlings inoculated	24	2.91
Seedlings uninoculated	2	2.93
Cuttings inoculated	7	3.02
Cuttings uninoculated	0	6.87

Apart from a couple of trees that had not survived establishment there was no sign of disease on any of the seedlings or cuttings. Discolouration in the tissues was consistent with normal response to an injury. Average length of discolouration was highest in the uninoculated cuttings but was still minor.

Three months after inoculation in the field, *N. fuckeliana* was recovered from 24% and 7% respectively of seedlings and cuttings. *Nectria* was recovered from only 1of the 111 uninoculated plants tested.

Nectria was only obtained from the tissue in the top of the plants. It had not grown beyond the top couple of cm.

It is more likely that the positive *Nectria* from an uninoculated plant was the result of cross-contamination from the inoculated plants than from natural inoculum from the surrounding stand.