Evaluation of increment cores as a method for verifying presence of *Nectria* in stems and sampling protocol

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Background

Symptoms typical of infection by *Nectria fuckeliana* can easily be confused with those caused by *Sphaeropsis sapinea*. Surveys to determine the presence of Nectria in regions where the fungus is not known to be present are underway. Visual assessment of symptoms seen must be supported by diagnostic confirmation to eliminate any doubt as to their cause. Sampling by removing chips of bark from a stem flute plus a small piece of the sapwood beneath have not proved to be very successful. In May 2004, flute cankers on three trees were sampled by Rayonier using an increment borer. *Nectria* was obtained from one tree only, from two cores closest to the pruned stub (10 and 50 mm above the stub). It was not obtained from the flute margin at 10 mm, or from the upper tip of the flute. Cores were 70-80 mm long and the fungus developed over half the length of each positive core.

It was felt that his sampling method showed promise but the sample size was too low for confidence. On 2 July 2004, Margaret Dick from Forest Research and Ross Chambers from City Forests Ltd collected further cores to test the method.

Methods

Cores were taken (1 per tree) from just above (about 5-10 mm) pruned stubs. In addition a sequence of 5 cores was taken from one tree with a canker that appeared to originate at, or below, ground level and went up the stem between stubs. Flutes were recorded as small, deep, narrow, wide, flat, long, slight or a combination of descriptive terms. Stub size was estimated for most stubs. A total of 53 cores were taken, including 5 cores from trees without symptoms or fruiting bodies to act as a control. Fruiting bodies were present on 11 trees from 3 sites.

Table 1 - Site information

Forest	Stand	Treatment	Comments
Tokoiti	Orrs Block	Orrs Block, Tokoiti Forest. Pruned stub trial. Site 1.	
Tokoiti	Orrs Block	Orrs Block, Tokoiti Forest. Pruned stub trial. Site 2.	
Tokoiti	Orrs Block, Poverty Hill Rd	Pruned 2000-01	
Glenledi	Cpt 41/01	Planted 1995. 3 pruning lifts..	Control – no symptoms.
Glenledi	Roadside	Pruned 2002.	Malformation common. Fruit bodies on stubs quite common but flutes without fruit bodies were selected.
Takitoa	Takitoa trial site	Planted 1992, pruned 1998-99.	Had to work hard to find flutes though Ross had thought (from an earlier visit) that there would be more malformation
Flagstaff	Flagstaff	Planted 1997, pruned early 2003	
Flagstaff	CFL early growth trial	Planted 1996	

Results

Nectria was not isolated from samples of the 5 trees acting as a control. From the remaining 48 samples, Nectria was isolated from 20 (42%). Of the 10 trees with Nectria fruiting bodies, the fungus was isolated from 6 (60%). *Nectria* was isolated from some flutes recorded as 'small' though more often from those categorised as 'deep'. The inability to isolate Nectria from some of the cores taken above stubs with fruit bodies could indicate that the fungus had not penetrated to the sapwood but remained confined to the branch trace. More tree felling and dissection will be required to clarify this point. At Flagstaff, the 3 trees sampled had very shallow grooved flutes that would not be defined as definite, using the accepted criteria and as shown in Fig. 1.

Table 2: Isolation results

Site	No. cores	No. with fruit bodies	No. Nectria isolated	Nectria isolated from stubs with fruit bodies
Pruned stub trial Site 1	3	-	1	-
Pruned stub trial Site 2	13	6	5	2
Poverty Hill Rd –	3	3	3	3
Glenledi – trial site	5	-	-	-
Glenledi – roadside	11	-	5	-
Takitoa – trial site	9	1	6	1
Flagstaff	3	-	-	-
Flagstaff – trial site –	6	-	-	-
Total	**53**	**10**	**20**	**6**

Based on these results, individual samples from 5 different trees showing symptoms in a stand will give an acceptable probability of detecting Nectria in a stand if it is present.

Sampling protocols

A minimum of 5 trees per stand should be sampled. When sampling without felling an increment core should be taken from trees with fluting (Fig 1) and sent for diagnosis. Cores should be taken just above the fluted stub and the core needs to be deep enough to obtain sapwood from deeper than the branch trace, i.e. about 100 mm. The equipment should be sterilised between sampling individual trees.

a) by placing corer in a screwtop jar of methylated spirits and then flaming and allowing to cool before reusing.
b) dipping the corer into a jar of household bleach

If resin builds up on the corer it can be rubbed off with a rag soaked in methylated spirits.

Individual samples should be packaged separately to avoid cross-contamination. For example each core wrapped in a paper towel or placed in a separate bag or envelope. Each core needs to be individually labelled. If not posted immediately cores should be kept in a fridge (or chilly bin) until a package is prepared.

Whenever fruiting bodies are seen they should be collected (still attached to the bark) and sent to Forest Research for formal identification. This will supplement the core samples. Although it may seem unnecessary to take cores from trees that have fruiting bodies there is a possibility that fruit bodies of other fungi may be mistaken for those of *N. fuckeliana.*

Address all samples to:

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Fig 1 - Definite flute above the right hand stub. At its base near the stub it is at least thumb nail in depth. The folding at the edges, typical of a severe flute, has not yet occurred.