

## FREE-LIVING NITROGEN FIXATION

The significance of non-symbiotic nitrogen fixation is somewhat doubtful, some blue-green algal blooms on lakes may provide significant nitrogen to aquatic communities. Some soil bacteria may also be important but there is little evidence for it.

We have recently discovered that during the decomposition of forest litter, especially kauri, nitrogen fixing bacteria become very important, but only during very specific stages of the decomposition process.

The decomposition of wood tissue, especially sawdust, presents a problem as wood contains much carbon in the form of cellulose and little nitrogen, thus precluding many bacteria. In the USA recently it has been shown that natural decomposition of wood, which occurs so rapidly, involves bacteria which fix nitrogen co-operating with normal saprophytic cellulose decomposers in a form of symbiosis. There is no doubt that this sort of thing goes on in many environments, especially soil, the details are only just now being discovered.

New Zealand therefore offers some interesting problems in the field of nitrogen fixation. We know a great deal about the contribution of white clover to the pasture industry and also now of lupins to the forestry industry. However, with the possibility of using fertilizer nitrogen on pine forest, we find we know very little of the potential of our native plants.

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## UNUSUAL CLADODE FORM ON PHYLLOCLADUS GLAUCUS ?

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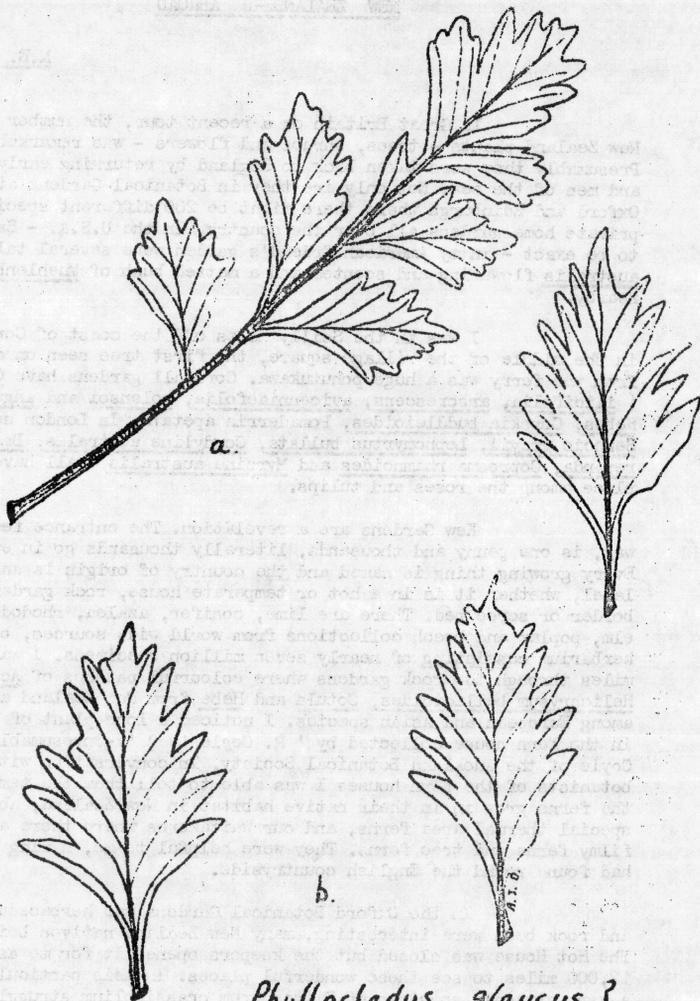
On a recent visit to Little Barrier Island an unusual form of Phyllocladus was spotted on the summit track in kauri forest at an altitude of 8 - 900'. The plant was a young sapling about 10 - 15' tall and 1 - 1½" diameter. Only one plant was sighted.

I place a question mark beside P. glaucus because of the absence of glaucous bloom on the underside of the cladodes, but size of 'foliage' in general indicates P. glaucus - also Hamilton and Atkinson in D.S.I.R. Bull. 137 'Little Barrier Island' p. 183, note that P. glaucus is not uncommon in kauri forest, but they record P. trichomanoides as being absent from this forest type. However, this lack of glaucous bloom on a young sapling is unusual and the plant could well be an odd form of tanekaha.

In the accompanying illustrations - (a) shows a terminal branchlet lobed, but not deeply incised, (b) shows cladodes from branchlets below terminal shoots, deeply incised with a range of sizes up to the largest (illustrated) 74 - 78 mm. long by 35 - 40 mm. wide.

Generally the lower branchlets on the sapling exhibited the most unusual cladode forms and this may be due to shading associated with high humidity.

It is readily observable that many plants on the Island exhibit larger leaf forms than their mainland counterparts and it is likely that this Phyllocladus is just another aberrant form.



*Phyllocladus glaucus?*

Cladodes from small sapling  
on Little Barrier Island.

Natural Size

Dec 1973