

CONIFER AND HARDWOOD PLANTATIONS
AS A HABITAT FOR SHRUBS AND FERNS

Derrick Rooney

Plantations of exotic pines and Douglas fir have been dismissed by some naturalists and botanists as inferior habitats for native flora and fauna, but a recent survey of two small plantations near Coalgate, in Central Canterbury, suggests that the value of these habitats has been much underrated.

The two areas, administered by the Selwyn Plantation Board, are designated as Watsons and Centennial Plantations, and are Numbers 86 and 87 on the board's index of its holdings. Centennial Plantation includes a fairly open area in which a number of more ornamental species were planted in park-like fashion, for recreational use, in the early 1940s and early 1960s.

Backing on to the recreational area is a production forest of mainly Douglas fir, with some pines and macrocarpa, planted between 1940 and 1943. Watson's was originally planted in 1883 in deciduous hardwoods, and oak, ash, and sycamore, with some Pinus radiata and other conifers; it was replanted in 1924-25 in Douglas fir, but a few deciduous trees remain in the north-west corner.

Watson's plantation has been much visited by foresters, because of the excellent growth rate achieved by its Douglas firs, but although both plantations are unfenced from the road and there is no prohibition on access, the public seldom go into them, except the recreational area. This is a pity, because both stands have an interesting understorey of native shrubs and herbs.

On a recent visit, during which I did hasty transects of a small area (about 200 metres square) of each block, I noted, besides the usual exotic woody weeds such as gorse, broom, Himalayan honeysuckle, bittersweet, elderberry, and blackberry, a dozen or more species of native shrubs and lianes (including both species of Parsonsia), and more importantly, some 20 species of ferns and numerous natural hybrids.

Watson's Plantation is also of interest in being the only New Zealand station, as far as is known at present, of the dwarf evergreen spindleberry, Euonymus fortunei, a plant familiar in its

variegated forms in gardens. Like the other berrying shrubs, this was probably introduced to the plantation by birds, which are abundant in the trees; the two plantations appear to have resident populations of bellbirds, grey warblers, silvereyes, and fantails, and various introduced birds, including the rock pigeon. Four plants of Euonymus fortunei were noted, widely separated, and material from three of them has been propagated and is now in cultivation at the D.S.I.R. Botany Division's experimental garden at Lincoln. Even without 20 species of ferns, this would make Watson's Plantation worthy of botanical interest.

A striking feature of the fern population is the number of Asplenium species, seven in all, plus hybrids. In some glades the aspleniums appear to have created hybrid swarms.

The greatest number of Asplenium spp. occurs in Watson's, beneath the Douglas fir where the ground probably remains fairly damp because of the run off from the Harper Hills and the north-west shelter afforded by a spur which runs out to the Coalgate Bluffs. But they are by no means confined to this area, all were noted, though in fewer numbers, in the drier Centennial area. All are quite abundant, with the exception of A. lyallii, of which only a few plants were seen. The presence here of A. lyallii is interesting, because it is not on the checklist of plants of the Malvern Hills area, and because it is growing here in acid leaf-litter; most of the inland populations of this fern are reported from limestone areas.

Pellaea rotundifolia, 'button fern', is also absent from the Malvern Hills checklist, but it is abundant in Watson's, growing in quite deep shade, and occurs sporadically in Centennial.

Phymatosorus diversifolius appears to be confined to Watson's where there are several very large, healthy clumps.

Blechnum penna-marina, the ubiquitous little hard-fern, occurs in many places, even in deep shade, but B. minus is confined to the banks of a water-race which bisects Centennial Plantation and served as one boundary of the surveyed area. Blechnum fluvatile, usually a plant of streamsides and wet shady banks in the nearby Malvern Hills, grows here as a few isolated clumps on the race edge, but can be seen on drier sites also, growing in deep pine litter, which must get very dry in summer. This may happen

because E. minus is better equipped to withstand periodic mechanical cleaning of the race.

The three Hypolepis spp. and Histiopteris incisa are pioneering plants of the small light wells created by tracking work, H. incisa is abundant in some clearings, with fronds growing more than two metres tall.

The two Polystichum are common in both plantations. P. richardii favours more densely shaded places, and seedlings of P. vestitum are abundant on the tracks and in other light wells often competing successfully with Histiopteris incisa. A number of hybrids between the two Polystichum spp. were noted.

Three factors probably combine to create this interesting, and to all appearances fairly stable, ecosystem: the relative long rotation of Douglas fir plantations which has resulted in the buildup of a layer of leaf litter deep enough to sustain small understorey plants; the shelter from north-west winds provided by the spur of the Harper Hills adjoining the plantation; and the good light levels and even temperatures underneath the Douglas fir canopy, there are few plants other than small tree seedlings under the deciduous trees where the shade is denser and the ground drier in summer.

A very low level of public use is probably another factor, but this may change soon, because the Board has announced plans to create a picnic and barbecue area on an adjoining block of land from which pines have been felled. A walkway for public use may be made through the Centennial Plantation and part of Watson's. Otherwise this interesting fern habit seems secure, because in the present management plan the Douglas firs are destined to be grown to large size, and will be harvested for sustained yield after they reach the age of about 90 years, by which time the logs will be worth about \$180 a cubic metre, m^3 , in 1986 dollars.

It is likely that, as is done in the splendid McHugh's Plantation near Darfield, the third-best Douglas fir stand in New Zealand, the trees will be sold as individual logs, and the plantation will be logged on the Swiss femmel coupe (ring) system, which will allow natural regeneration. Barring natural calamities, these interesting and attractive trees and their understorey of native and exotic shrubs and lianes should be maintained in perpetuity.

List of plants found in Watsons and Centennial Plantations, Selwyn Plantation Board Nos 86,87, Coalgate, Central Canterbury.

Location: Coalgate at foot of Harper Hills on Selwyn River Terrace.

Watsons Plantation originally planted in P. radiata, oaks, and other deciduous hardwoods and conifers in 1883; replanted in Douglas fir 1924-25. Centennial Plantation planted 1940, 1941, 1943, 1963-64.

Canopy: predominantly Douglas fir (Pseudotsuga mensiesii some Pinus radiata, P.nigra, and Cupressus macrocarpa; scattered eucalypt and deciduous trees.

New Zealand Species;

Arthropodium candidum	Muehelbeckia complexa
Coprosma propinqua	Parsonsia capsularis
C.sp.cf.parviflora	P. heterophylla
C. rhamnoides	Pittosporum tenuifolium
C. rotundifolia	Solanum laciniatum
Hymenanchera crassifolia	Uncinia sp.bronze leaves
Muehlenbeckia australis	

Adventives:

Euonymus fortunei*	
Tropaeolum speciosum	Chilean Flame Creeper
Berberis vulgaris	Barberry
Leycesteria formosa	Himalyan honeysuckle

* Four plants noted, first recorded station in New Zealand. Three clones now in cultivation at DSIR experimental garden at Lincoln.

Fern species:

Asplenium flaccidum	spleenworts
A. flabellifolium	
A. gracillium	
A. hookerianum	
A. lyallii*	
A. richardii	
A. terrestre	
Blechnum fluvatile	hard ferns
B. minus	
B. penna-marina	
Dryopteris filix-mas	male fern
Histiopteris incisa	water fern
Hypolepis ambigua	creeping fern
H. millefolium	
H. rufobarbata	
Pellaea royundifolia*	
Phymatosorus diversifolius	hound's tongue fern
Polystichum richardii	shield ferns
P. v-stitum	
P. richardii x vestitum	
Pteridium esculentum	bracken

* not on Malvern Hills checklist.

ADDENDUM

On receiving Derrick Rooney's article on 'Conifer and Hardwood plantations', John and Phyllis Thompson and The Editor decided they had to see such treasures for themselves. The first trip was to McHughs, a few kilometers west of Darfield on the West Coast Road, mentioned in Derrick's article. On the way we called in at the Selwyn Plantation Board's office and talked to the Chief Executive, Mr W.P. Studholme, who read Derrick's article, gave us a map showing the sites of the Board's plantations, the whole 95 of them, advice as to how to get to and into them, and wished us well.

McHughs, which is mainly Douglas fir, lived up to what we had been led to expect, yielding a list of 18 ferns, identified by John, compared to 20 in Watsons and Centennial. There were some differences, no Blechnum minus nor B. fluvatile in McHughs, but then there is no water race as well, which could account for the lack of B. minus, at least. We did not find Hypolepis millefolium but did find Pyrrhosia serpens. The following list is not by any means complete.

Plants seen in McHugh's Plantation, Darfield
4 June 1986.

Fern species:

Asplenium flabellifolium	Histiopteris incisa
A. flaccidum	Hypolepis ambigua
A. gracillimum	H. rufobarbata
A. hookerianum	Pellaea rotundifolia
A. lyallii	Phymatosorus diversifolius
A. richardii	Polystichum richardii
A. terrestre	P. vestitum
Blechnum penna-marina	Pteridium esculentum
Dryopteris filix-mas	Pyrrhosia serpens

Species other than ferns:

Acacia sp. wattle	Ilex aquifolium holly
Acaena sp.	Larix decidua larch
Berberis sp. barberry	Muehlenbeckia complexa
Carex sp.	Parsonsia capsularis
C. virgata	var tenuis
Coprosma crassifolia	Pinus radiata
C. propinqua	Pittosporum tenuifolium
C. rigida	Pseudopanax arboreus
C. rotundifolia	Pseudotsuga menziesii
Cordyline australis	Quercus sp.oak (Douglas fir)
Cupressus macrocarpa	Rubus fruticosus blackberry
Cytisus scoparius broom	Solanum laciniatum
Dichondra repens	Uncinia sp.
Helichrysum aggregatum	Wahlenbergia gracilis
Hydrocotyle sp.	

We also paid a visit to Watsons and Centennial plantations and found them equally satisfying botanically. We particularly looked at the ferns. We did not find Asplenium terrestre, Hypolepis millefolium, H. rufobarbata, Phymatosorus diversifolius, and Pteridium esculentum but Paesia scaberula should be added to the list. In Watsons there were several juvenile Coprosma which need further study.

In Journal 6, 1973, Bryony Macmillan gave an account of the shrub layer under the eucalypts in Pages plantation, Selwyn Plantation Board's plantation 70, three miles east of Darfield on the West Coast Road. Here, the shrub layer consists of gorse and broom, and the ground cover is mainly grass and a few herbs. The main interest, apart from two native clematis, were the presence of 15 mosses and two liverworts on bare ground and decaying logs.

There are the possibilities of some interesting comparisons between the differing types of plantations and the expectations of finding orchids in the appropriate season