THE BOTANY OF A SMALL KAHIKATEA-MATAI STAND, GREY RIVER, ASHLEY STATE FOREST

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The Grey River, a tributory of the Ashley River, is located in Ashley State Forest, North Canterbury. The catchment of this river is situated between Mt Karetu (972m) and Mt Grey (934m) and in its upper reaches is largely forested. The east branch of the Grey River drains a large area of beech and beech-podocarp forest. Although preliminary descriptions of these forests have been presented by Williams (B.For.Sc. dissertation, University of Canterbury, 1977), Molloy (Botany Division Vegetation Report 319, 1980) and Jane (New Zealand Forest Service Report, 1986), and incidental comments on the vegetation made elsewhere, no detailed botanical studies have yet been published. This is somewhat surprising given the proximity of the area to Christchurch (only 50km away) and the diversity of the vegetation (e.g. five conifer species present). In this article the vegetation of a small river terrace, now well above present river level as a result of river downcutting, is described.

The upper area of the Grey River catchment is dominated by strongly indurated greywacke and argillite rocks of the Torlesse group, while in the southern part of the catchment, a complex mosaic of Tertiary rocks, including calcareous siltstones, sandstones, and conglomerates, is present. The soft nature of these rocks has facilitated pronounced downcutting by the Grey River to form the present deep gorges. This downcutting has also left old loops of river bed perched above the current river level, and it is on one of these that this study was undertaken.

The climate of the area is likely to be similar to that elsewhere along the Canterbury foothills. Mean total annual rainfall at the Ashley Forest HQ is 825mm (1941-1980 mean) but is probably higher in the Grey River catchment (perhaps up to 1400mm). Snowfall is common, and above 600m elevation can lie on the ground for long periods in winter. Mean annual temperature at lower altitudes in the study area is about 10.2°C, with a mean January temperature of 14.9°C and a mean July temperature of 5.°C. However, topography obviously has a strong influence on local temperature patterns.

The study site is located on the western side of the river (NZMS1 S68 914034) approximately 1km upstream from the Grey River picnic area. The river terrace loop is some 20m wide and 200m long and is now about 3m above the present river level. The surrounding slopes are steep, having resulted from earlier phases of river downcutting.

The vegetation of the study site is largely forest, although a small colony of Carex coriacea occurs at the down-valley end. The forest canopy is dominated by 20-25m tall kahikatea (Dacrycarpus dacrydioides) and occassional matai (Prumnopitys taxifolia). A small grove of adult pokaka (Elaeocarpus hookerianus) is present in the canopy at the up-valley end. Smaller kahikatea and matai, 4m to 20m tall, are common. The fairly open subcanopy layer, between 4m and 8m, is dominated by several hardwood taxa including putaputaweta (Carpodetus serratus), broadleaf (Griselinia littoralis), myrtle (Lophomyrtus obcordata), mahoe (Melicytus ramiflorus), lancewood (Pseudopanax crassifolius), and rare mountain/black beech (Nothofagus solandri). A number of species are important in the shrub layer and include putaputaweta, Coprosma rotundifolia, myrtle, and pepperwood (Pseudowintera colorata). Young individuals of kahikatea and matai are also present in this layer. A dense fern carpet of Asplenium gracillimum, Blechnum chambersii, and Pneumatopteris pennigera covers the forest floor. The vegetation on the old river terrace contrasts markedly with the surrounding hill-slope forests where mountain/black beech and rare red beech (N. fusca) are the dominant canopy taxa and shrubs like mingimingi (Cyathodes juniperina) are common.

It is not possible to accurately determine when the river vacated this area, but examination of the forest structure does give some indication. Careful inspection of the area did not reveal any evidence of old decaying tree stumps so the present canopy trees may have been the first on the site. No evidence of logging was observed. The largest trees are kahikatea and six individuals are over 70cm dbh (diameter at breast height). The remaining 36 kahikatea and all 14 matai trees are under 60cm dbh. If we assume that tree diameter can give us an approximate indication of tree age (often not a very valid assumption), then we can speculate that after the river vacated the area, the six large kahikatea were the first podocarps to establish. The smaller kahikatea and the matai presumably established after this. However, it could be that the matai are slower growing and could therefore have established at the same time as the first kahikatea. Although no firm age data is presently available, this surface may be between 600 and 1000 years old.

As few comparable sites have been located in the Grey River catchment, it is not easy to determine the vegetation changes that have taken place, or are likely to take place. The following outline is therefore speculative: After the river vacated the site, plants like toitoi (Cortaderia richardii), tree tutu (Coriaria arborea), and koromiko (Hebe salicifolia) would have been early colonisers. A recent surface with this type of vegetation can be found opposite the study site. The main hardwood species presently in the subcanopy, together with the first podocarps, would then have established into this association. Although no chemical analyses have been undertaken, the soils on the old river terrace are probably still fertile and able to retain considerable amounts of moisture, even during the driest of summers. Under these conditions the two species of Nothofagus, especially mountain/black beech are out-competed by other species and hence are very rare. However, with decreasing soil fertility as the site becomes older, the relative advantage that the podocarps have may decrease, and Nothofagus is likely to become more important. Another podocarp, rimu (Dacrydium cupressinum), which appears more tolerant of lower levels of nutrients is locally common in the general area,

and could also become established on the study site as soil fertility decreases.

A preliminary species list for the study site is given at the end of this article. A large number of other species has been recorded in indigenous forests elsewhere in the Grey River catchment and it is hoped that a checklist for the entire catchment can be included in the next issue of the journal.

This area of forest is small and therefore vulnerable to damage. Of particular concern at present is the impact of animals. When I first visited the area in September 1985 deer browse, particularly on mahoe, was evident and some soil disturbance, especially in the wetter areas, was also seen. On my most recent visit (June 1986) the area of soil disturbance appeared to have increased considerably and had the appearance of pig rooting. Fresh deer faeces were also observed. Control of these animals is desirable to protect the vegetation and soils in this area.

PRELIMINARY SPECIES LIST

FERNS

Adiantum cunninghamii
Asplenium gracillimum
A. lyallii
A. terrestre
Blechnum chambersii
B. fluviatile
B. procerum
B. sp. ('black spot' form)
Ctenopteris heterophylla
Hymenophyllum multifidum
Hypolepis ambigua
Phymatosorus diversifolius
Pneumatopteris pennigera
Polystichum vestitum

CONIFERS

Dacrycarpus dacrydioides
Prumnopitys ferruginea
P. taxifolia

DICOTYLEDONS

Acaena anserinifolia
Aristotelia serrata
Carpodetus serratus
Clematis paniculata
Coprosma linariifolia
C. lucida
c. microcarpa
C. propinqua
C. rhamnoides
C. robusta
C. rotundifolia
C. propinqua x robusta
Coriaria arborea
Cyathodes juniperina
Elaeocarpus hookerianus
Fuchsia excorticata
Griselinia littoralis
Hebe salicifolia
H. traversii
Helichrysum aggregatum
Hydrocotyle sp.
Leucopogon fasiculatus
Lophomyrtus obcordata
Melicope simplex
Melicytus ramiflorus
Mycelis muralis*
Myrsine australis
Nothofagus fusca
N. solandri
N. solandri x fusca
Olearia avicenniaefolia
Parsonsia heterophylla
Pittosporum tenuifolium
Pseudopanax anomalus
P. arboreus
P. crassifolius
Pseudowintera colorata
Ranunculus hirtus
Rubus cissoides
R. fruticosus*
Schefflera digitata
Sophora microphylla

MONOCOTYLEDONS

Astelia fragrans
A. nervosa
Carex coriacea
Cortaderia richardii
Libertia ixioides
Microlaena avenacea
Uncinia spp.

(* adventive species)