FAIRHALL SWAMP

NEVILLE T. MOAR
Landcare Research, P.O. Box 69, Lincoln 8152

Basher et. al. (1995) state that the Wairau Plains, Marlborough, were once covered by a complex of swampland and podocarp forest including totara, kahikatea, matai, and rimu. Their vegetation reconstruction was based on the identification of wood samples taken from numerous cores collected across the plains during a study to assess long term flood management of the area. Many of their wood samples were radiocarbon dated and of these, six taken from the Fairhall area between Blenheim and Woodbourne, were identified as kanuka, manuka, matai, and totara. Three samples were taken from the now much altered Fairhall Swamp and these were dated at 3300 ± 80 years BP, 3410 ± 70 years BP, and 3750 ± 70 years BP respectively. The oldest of these dates was obtained from an organic silt at a depth of 1.3 m below the ground surface and underlying the peat; the two younger samples, leaf fragments in silt, were taken at a depth of 1.0 m, immediately below the base of the peat. Charred wood at a depth of 1.5 m from alluvial silt and close to the swamp was dated at 1670 ± 50 years BP.

A core from the swamp was collected for pollen analysis and these data are the subject of this note. The core, 1.40 m deep, overlay gravels of the Speargrass Formation and analysis began at 0.10 m below the present surface. The results are presented in the pollen diagram (Fig. 1).

The pollen diagram shows that both podocarps and beech were important components of the local and regional forest. *Prumnopitys taxifolia* (matai), *Podocarpus totara* (totara), and *Dacrycarpus dacrydioides* (kahikatea) were important locally judged by the records obtained by Basher et al. (1995) and by the presence of innumerable matai seeds found some years earlier in a small spring bog at No 6 Green of the Fairhall Golf Club. The low values for kahikatea pollen do not imply that this tree was uncommon for its wood was well represented in the cores and its pollen is generally under-represented in the pollen rain when compared with matai and other podocarps.

Nothofagus, recorded as *Fuscospora* in the pollen diagram to include all species of beech except *N. menziesii*, was probably derived from the regional forest in the hills to the north and inland to the west. These pollen grains are

produced in great numbers, are widely dispersed, and high frequencies do not necessarily imply that the source trees were growing close at hand. On the other hand pollen of *N. menziesii*, like that of kahikatea, is generally under-represented in the pollen rain so that low frequencies should not be taken to imply that this tree was uncommon in the regional forests, especially at higher altitudes. Beech and mixed beech forest is dominant on the Marlborough hills north of the Wairau River, not many kilometers from Fairhall Swamp, and pockets of beech occur on the coastal hills south of the Waima (Ure) River.

Other pollen types derived from locally growing trees are *Carpodetus* (putaputaweta), *Dodonaea* (akeake), *Elaeocarpus* (pokaka), *Fuchsia* (fuchsia), *Hoheria* (lacebark) and *Pseudopanax* (five finger). With the possible exception of akeake the pollen of these trees is not produced in great numbers nor is it widely dispersed. However, with the exception of pokaka none are likely to have been growing in the swamp although most could have grown at or about the swamp margins, and all would have occurred somewhere in the nearby hills, the adjoining fans, or the more distant sand dunes.

The shrub element in the pollen rain was well represented. Of these *Leptospermum* type (kanuka or manuka) is clearly dominant except at the base of the diagram and briefly, in the middle. In contrast, *Coprosma* (coprosma), *Muehlenbeckia* (muehlenbeckia), and *Phormium* (harakeke) are best represented in the lower, or middle part of the profile, and *Myrsine* (mapau), recorded throughout the core, is not all frequent. Harakeke is included here as a shrub because of its role in swamp vegetation. *Leptospermum* type pollen is generally only frequent when the genus is present at the site of deposition and for this reason it is probable that most of the pollen recorded is derived from manuka growing on the poorly drained soils of Fairhall Swamp.

Pollen grains of herbaceous plants are poorly represented in the analysis. Cyperaceae pollen, however, is consistently present, except for two samples, at relatively high values especially in the bottom half of the column. Grass pollen, absent for the most part, increases dramatically from less than 1% of the pollen sum to 23%, between 0.20 m and 0.10 m, and is associated with *Pinus* (pine) pollen and *Pteridium* (bracken). The grass and bracken are considered to signal the beginning of forest clearance by the first Polynesian settlers about 700 years ago; the few pine pollen grains recorded at intervals

down to the 0.90 m level presumably result from contamination during sampling or during transport to the laboratory.

Aquatic or wetland plants were so infrequent that they have not been included in the pollen diagram; those recorded were *Azolla*, *Callitriche, Lemna, Myriophyllum, Potamogeton*, and *Typha.* Of these all occurred in trace amounts (less than 1%) except *Azolla* (2%) and *Potamogeton* (1%) in the uppermost samples although trace amounts of *Lemna* and *Typha* were also present at 130 cm.

What then does the pollen record tell us about the plant history of the Fairhall area? The pollen diagram clearly shows that when peat deposition began the countryside was forested and that podocarps and beech were important elements in that vegetation. It supports the view of Basher et al. (1995) that the Wairau Plains were essentially a mosaic of wetland and forest in which matai, kahikatea and manuka were common elements, and further suggests that forest, mostly matai and totara, covered the slopes of the adjacent hills. There is certainly nothing to suggest that grassland was a major component of the vegetation at the time peat formation began about four thousand years ago, as it had become by the late nineteenth century when the area was first occupied by European settlers. Monro (1868) noted the occurrence of totara logs on the tussock-covered slopes of the Marlborough hills and connected them with early Maori fires. Similarly, Zotov (1938) concluded that because he had no evidence of a changing timber line these logs were the remains of once dominant forests replaced by grassland by some factor other than climate. Today we accept that fire, resulting from human activity, brought about this deforestation.

The swamp vegetation was a mixed one, and there is no doubt that trees and shrubs occurred on the wetter land. However, the Fairhall Swamp at first supported a mixed community of sedges, coprosma, and manuka. This pattern changed as the swamp became drier as evidenced by the rising curve for harakeke, a process which continued as both the harakeke and sedges were replaced by manuka. There is a fundamental change recorded in the pollen spectrum from the top sample. For the first time bracken is recorded, as are the pollen and spores of open water plants such *Azolla* and *Lemna*, albeit in low frequency. More importantly charcoal fragments, noted for the first time and not recorded in the diagram, are present in great number. This, along with the bracken is a clear signal that the landscape had been ravaged by fire, but sadly the changes in the swamp since European settlement,

involving draining and stocking, has led to the reduction of the swamp surface so the detail of this process cannot be traced.

This short pollen diagram, spanning the last 4,000 years BP, offers no dramatic changes of major vegetation or climate change for most of the time recorded, but it does support the findings reported by Basher et al. (1995) and provides some insight into the former plant cover of an area now completely transformed by human activity.

REFERENCES

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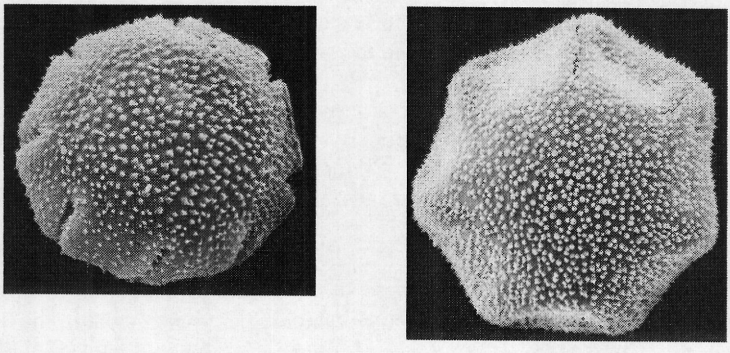

Pollen grains: left, *Nothofagus fusca* (approx 25 μ); right *N. menziesii* (approx 40 μ).
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