

## Notes towards an Excursion Flora: rimu and kahikatea (Podocarpaceae)

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I want the reader to try to look back to the time he or she first learnt of these two great trees, so abundant (once) throughout New Zealand as to practically define our lowland forest zone. No matter how such an apprehension came about - authoritative statement of some lab-coated figure (reeking of clove oil and Cockayne) or through rougher bushman's hints, by gleaning in scholarly fields (Kirk, Cheeseman, Laing & Blackwell) or by feasting on illustrations (Adams, Salmon, Eagle) - it probably seems that one has been familiar with Uncle Rimu (*Dacrydium cupressinum*) and Auntie Kahikatea (*Dacrycarpus dacrydioides*) simply for ever.

Very likely, it was the young plants, seen everywhere in secondary forest, that first came to one's close attention. The drooping long-bristly foliage of a young rimu is very different from that of a young kahikatea, in which flattened feathery short shoots occur together with cord-like lengths where the leaves are small awls or scales.

These and other architectural features of young podocarps were discussed in an innovative article by Philipson and Molloy (1990) but their information was not directed towards answering the question which, essentially, I have been trying to raise: how, if given a single leaf or battered shoot fragment, from juvenile or adult, does one determine it as rimu or kahikatea? Anyone who has had to determine microfossils for archaeologists or vouchers for geneticists will understand the need.

Micromorphological features of the epidermis and stomata of these and other "imbricate-leaved" podocarps were surveyed by Wells & Hill (1989). But without an electron microscope, what can be done? I looked at the very good illustrations in Kirk's Forest Flora (1889) and the even better ones in Moore & Irwin (1978). Especially in the latter a conspicuous difference is shown: the leaves of kahikatea, whether juvenile (feathery or awl-like) or fully adult (almost scale-like), have their apex drawn into a pale non-cellular curved extension, that is a distinct apicule. In rimu, in all its growth phases, the apex of the leaf is rounded and hardly distinct in structure or orientation from the remainder of the leaf. See Fig. 1, top pieces of A and B.

In a wider context, such a distinction can be found in the descriptions of the two genera by de Laubenfels (1988) and Page (1990), although their keys refer only to differences in the reproductive organs; it is also noted in passing by Wells & Hill (1989: 372). Examination of AK material of some foreign species (*Dacrycarpus imbricatus*, *D. kinabaluensis*, *D. viellardii*; *Dacrydium nidulum* juvenile) confirms the usefulness

of the "apiculate/rounded leaf apex" character at the generic level.

Another difference between rimu and kahikatea, this time clear in juveniles only, lies in the location of the stomata. Firstly, it is necessary to observe that the juvenile leaves, particularly of kahikatea, are flattened bilaterally to give a blade ridged along the midline of each side. Thus one can refer to the "upper half" and "lower half" of each side of the cutlass-like blade. As usual in podocarps the stomata lie in bands and are conspicuous particularly in live material because their pale white plugs contrast with the rest of the epidermis.

It is seen immediately that in kahikatea the stomatal bands are equally well-developed along the upper and lower halves of each side of the blade. In rimu though only the upper-half band is present (although there are also a very few stomata in a patch at the leaf base where it curves onto the stem). See Fig. 1, lower pieces of A & B. Interestingly, this difference in stomatal arrangement holds for juvenile foliage of the above-mentioned extra-NZ species. The distinction tends to persist into the adult, so that in order to find stomata on adult rimu foliage one needs to break a shoot and look at the upper (adaxial) leaf surface.

I could say more here particularly about rimu: how it has especially fruitful seasons two or several years apart, and how, despite being such a common tree, it is very under-represented in herbaria (see the map in Figure 1 where there are some curious gaps for the Auckland region).

One bit of data in the literature needs commenting on. The most striking thing about rimu of course is its drooping foliage, and the female fertile shoots are memorable for the way in which the fruits are borne vertically on the upturned last centimeter or so of the otherwise pendent shoot, like candles in the pose favoured by Christmas card artists. It is amusing to see that in his "Pflanzenfamilien" account the scholarly Robert Pilger of Berlin permitted these shoots to be illustrated upside down, and also that the correct posture is only gradually being achieved in the international literature, in the illustration in Page (1990) copied from that of Pilger and turned through a not quite sufficient 90 degrees.

More seriously though, what about the orientation of the pollen cones? Kirk (1889: 31) is definite, saying "male flowers in inconspicuous green catkins at the tips of erect branchlets". He is supported (copied?) by Laing & Blackwell (1964) but not by Franklin (1968) or Norton et al. (1988). Herbarium specimens are not always mounted in natural posture, but I think the few fertile male collections in AK (e.g. 114969, 179256)

have branchlets are that are pendulous and not upturned at their apex, the pollen cone being directed slightly outwards or downwards in continuation of the

direction of the branchlet. To settle this, material with pollen cones should be looked for (high or low ?) next spring.

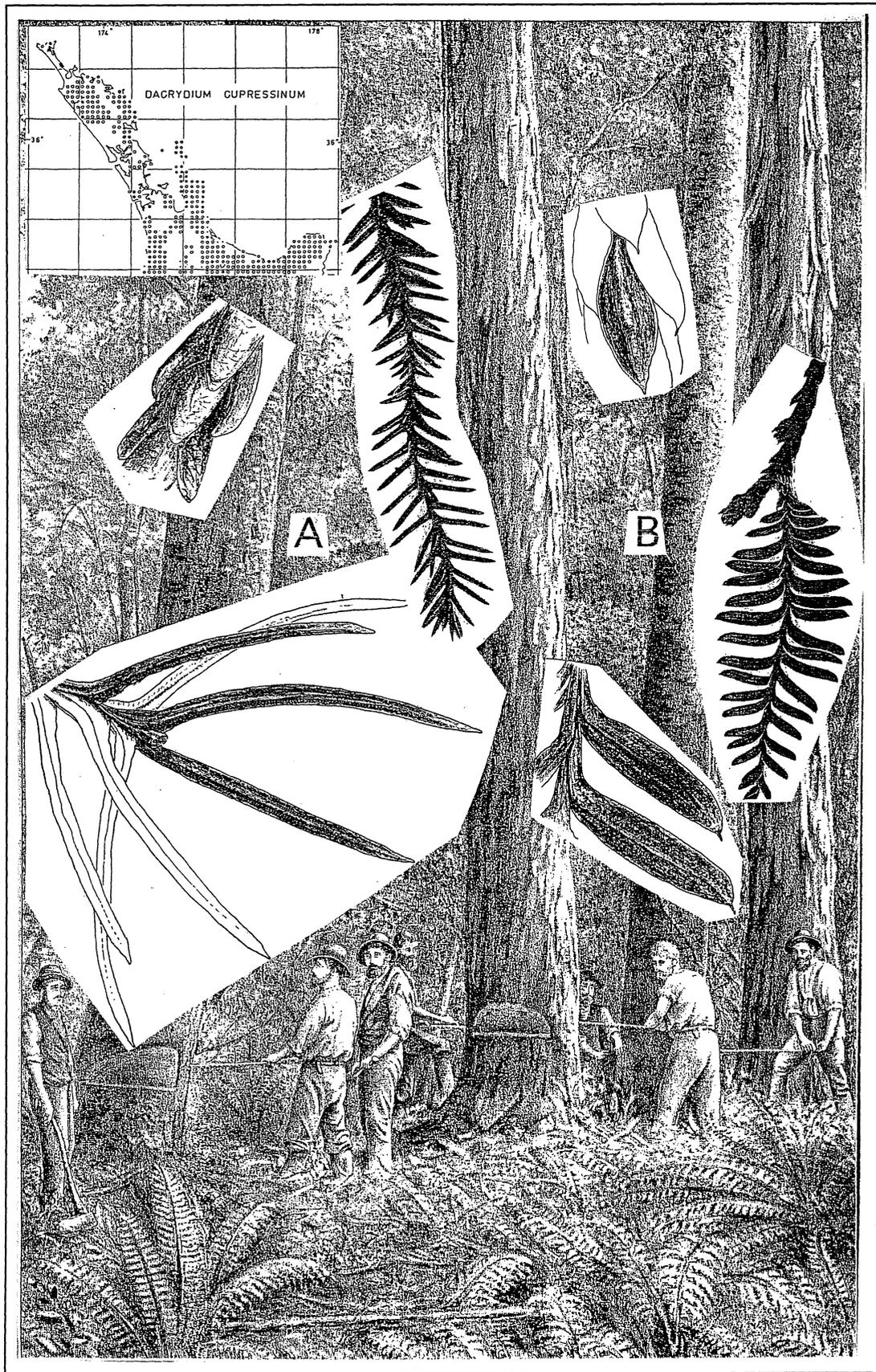
#### Acknowledgments

A misidentified AK sheet of rimu canopy foliage (the collector neither very old nor very young) began my interest in the subject.

#### References

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**Figure 1**  
**A.** Rimu. Clockwise: adult leaves (x7), semi-juvenile shoot (x3), juvenile shoot (x7).  
**B.** Kahikatea. As above.

Map is part of Fig. 1 of Franklin (1968), the distribution of rimu - solid circles represent a voucher and hollow circles a reliable record. Background is Pl. 20 of Kirk (1889), "Felling of Matai and Red Pine in the Seaward Range".