

NOTES ON MIDRIB AND VEIN STRUCTURES ON LEAVES OF SOME SPECIES

OF PSEUDOPANAX

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Some members might recall that during a field trip to Mt. Kohukohurangi, Hunua Ranges in 1972, that we had an interesting discussion on the presence of small 'tooth like' structures on the upper midrib of juvenile Pseudopanax edgerleyi leaves.

The field trip and some additional notes relating to this observation were reported upon by Tony Palmer in the Newsletter of March, 1972. Since then I have had some opportunity to gather further information on the subject and also to make a few observations on other related species.

P. edgerleyi is one member of a closely related local (N.Z.) species group in the genus Pseudopanax. The group contains three species - P. edgerleyi, P. simplex and P. anomalus - these being species in which the juvenile leaves are palmately compound and the adult leaf is simple. In addition the juvenile leaf goes through varying stages and shapes before finally assuming the adult form. This heterophylly (variation in form) is perhaps more marked in P. edgerleyi and P. simplex than in P. anomalus, but is present in all three species to a greater or lesser extent.

This group in Pseudopanax can be contrasted with the so called stipulate species group (3) i.e. P. arboreus, P. colensoi, P. laetus etc. in which the leaves are palmately compound in both young and older plants. Sheathing stipules are also a feature of this group. Variation of leaf form is present to some degree in this group, but is not generally obvious, and the very distinctive juvenile forms are absent.

Although P. edgerleyi is well marked as a member of its group externally, it apparently exhibits variation internally by having 3 - 4 locules in the ovary as against 2 in P. simplex and P. anomalus. (1) In addition the species is also unique in certain features of its anatomy, (2) and the leaves are highly aromatic when crushed. Despite these differences, P. edgerleyi is still regarded as closely related to the other two species when all the characters are considered.

This being a well marked group it seemed reasonable to expect that if these vestures were present in P. edgerleyi, might they not also be present in the other related species? To study this further I collected and grew juvenile plants of the three species (plus one adult plant of P. edgerleyi) in the shadehouse for a period of some months before making the observations described in the accompanying diagrams.

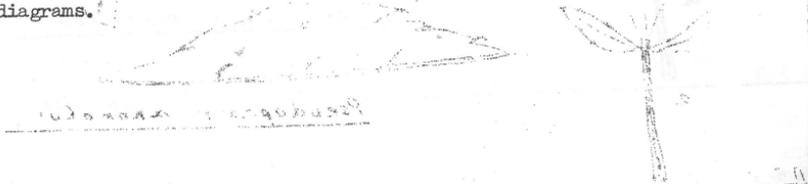
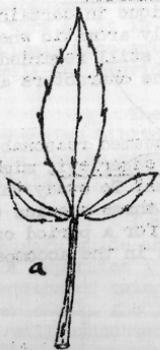


Diagram 2



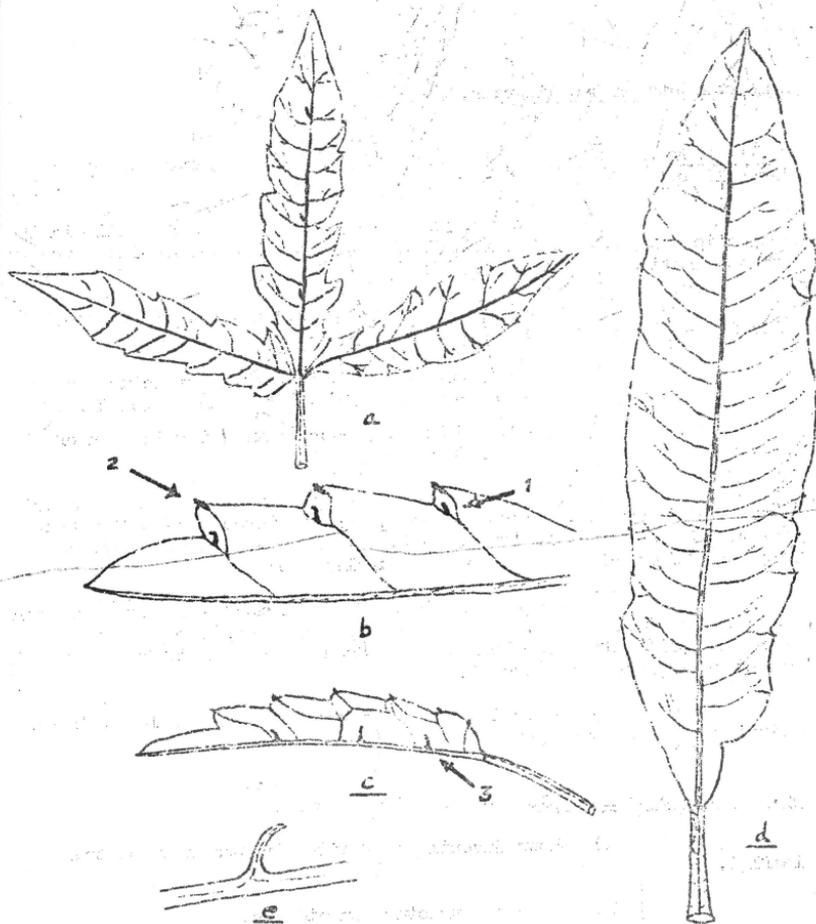
Pseudopanax simplex

Diagram 2a



Pseudopanax anomalu?

Diagram 1



Pseudopanax x edgerleyi
Leaves & Sections
Showing structures on
midrib & leaf margins.

Some comments on the diagrams.

No. 1 Pseudopanax edgerleyi - venation is very apparent in both juvenile and adult leaves.

a) Shows juvenile 3-foliolate leaf with small midrib projections on central leaflet. There was a small denticle-like structure at the junction of lamina and petiole.

b) Showing a leaflet from juvenile plant cut down midvein - the arrows indicate:-

- 1) Position of further small structures near leaflet margin - $\frac{1}{2}$ to 1 mm in length.
- 2) Thickened (mucro-like) termination of lateral vein.

c) A leaflet cut to show position and shape of midrib structures (arrow 3). Structures number one to three per leaflet (but not on all leaflets). Length 1.5 - 1.7 mm and 6 - 7 mm between each. They are fairly rigid and colour is purplish red.

d) Shows adult leaf (newly formed) - one small vesture developed on this leaf c. 2 mm in length, very soft, light green and soon shrivelled after the leaf was cut from the plant. The shape of this structure is shown in sketch f.

e) General shape of structures on juvenile leaflets, pointing towards leaf apex.

No. 2 Pseudopanax simplex - venation obscure.

a) Shows juvenile leaf with structures on central leaflet.

b) Shape of structure on midvein.

There were fewer structures on this species (at least on my specimen), only 1 - 2 per midrib up to 1 mm long. No marginal vestures were seen.

No. 2a Pseudopanax anomalus - venation obscure.

a) Juvenile leaf showing structures on midrib and margins.

b) Leaflet cut along midvein to show central structures, plus others on leaf margin, and some intermediate between midvein and margin. In this species structures appear more hairlike, 3 - 5 per midrib, 0.5 to 1 mm long.

c) Shape of structure on midrib.

d) Shows articulated petiole and further hairlike outgrowths. The articulated petiole is also a feature of P. edgerleyi and P. simplex.

Further to the above, I sent some specimens of P. edgerleyi foliage to Professor Philipson (an authority on N.Z. Araliaceae) at Canterbury University and he kindly sectioned the small projections. His preliminary conclusions are:-

- 1) That "they are not due to any external agent" (such as a gall insect).
- 2) "that we must accept them as structures normal to the plant, though not always present."

It appears then that these structures are part of the vein system, mainly occurring in juvenile foliage of these three related species. Indeed, the structures could be described as an aerial extension of the vein system. Such structures appear to be confined to this group, as a fairly detailed examination of P. arboreus seedlings grown under the same conditions did not reveal a trace of similar vestures on young leaves. However, this cannot be regarded as conclusive until other species in the 'stipulate' group are examined.

One difficulty that arises is - what are these small projections to be called? I have been using the term vesture quite a bit and this means, according to Bailey's botanical glossary, "Anything on or arising from a surface causing it to be other than glabrous." From the same glossary we have "corniculate" which means "Bearing or terminating in a horn-like protuberance or process." Then we have terms like denticle (a minute tooth), prickle (a small sharp outgrowth), plus, no doubt, some more that I haven't come across! I think it prudent to leave it to some person more knowledgeable than I about such matters to provide a suitable term. Such a name may well have to wait until we know more of the anatomy and purpose of these little structures in the juvenile leaf.

It would be interesting to speculate as to the purpose of these vestures (and I already have one or two half formed ideas myself), but it would really be premature to offer explanations or theories at this stage.

A detailed study of the 'edgerleyi' group in Pseudopanax would, I'm sure, yield some rewarding facts, not only about these structures and would also perhaps provide some information about habitat influences and a few reasons for the dissimilar growth habit of the juvenile and adult.

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Some further reading and references:-

1. The N.Z. Genera of the Araliaceae by W.R. Philipson. - N.Z. Journal of Botany Vol.3 No.4. 1965.
2. Comparative Morphology of the N.Z. Species of Pseudopanax and Nothopanax by K. Soper. - Trans. Roy. Soc. N.Z. 84. 1956.
3. The Taxonomy and Distribution of the Stipulate Species of Pseudopanax in N.Z. by P. Wardle. - N.Z. Journal of Botany Vol.6. No.2. 1968.

The publication by Professor Philipson is particularly interesting as in this he carefully explains the reasons for rejecting the names Nothopanax and Neopanax in favour of Pseudopanax for the main araliad group in New Zealand.