

## ***Ficus endochaete* Summerhayes (Moraceae), a fig tree of montane New Guinea**

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Because New Guinea lies entirely within the tropics a scheme of how its plant cover changes with altitude is quite straightforward to draw up—unlike in New Zealand, where variation in latitude has a confounding effect (Note 1). It is generally agreed then that throughout New Guinea 'lowland forest' passes into 'montane forest' at 1500 m a.s.l., which at 3000 m passes into scrubby or herbaceous 'subalpine' and 'alpine' communities.

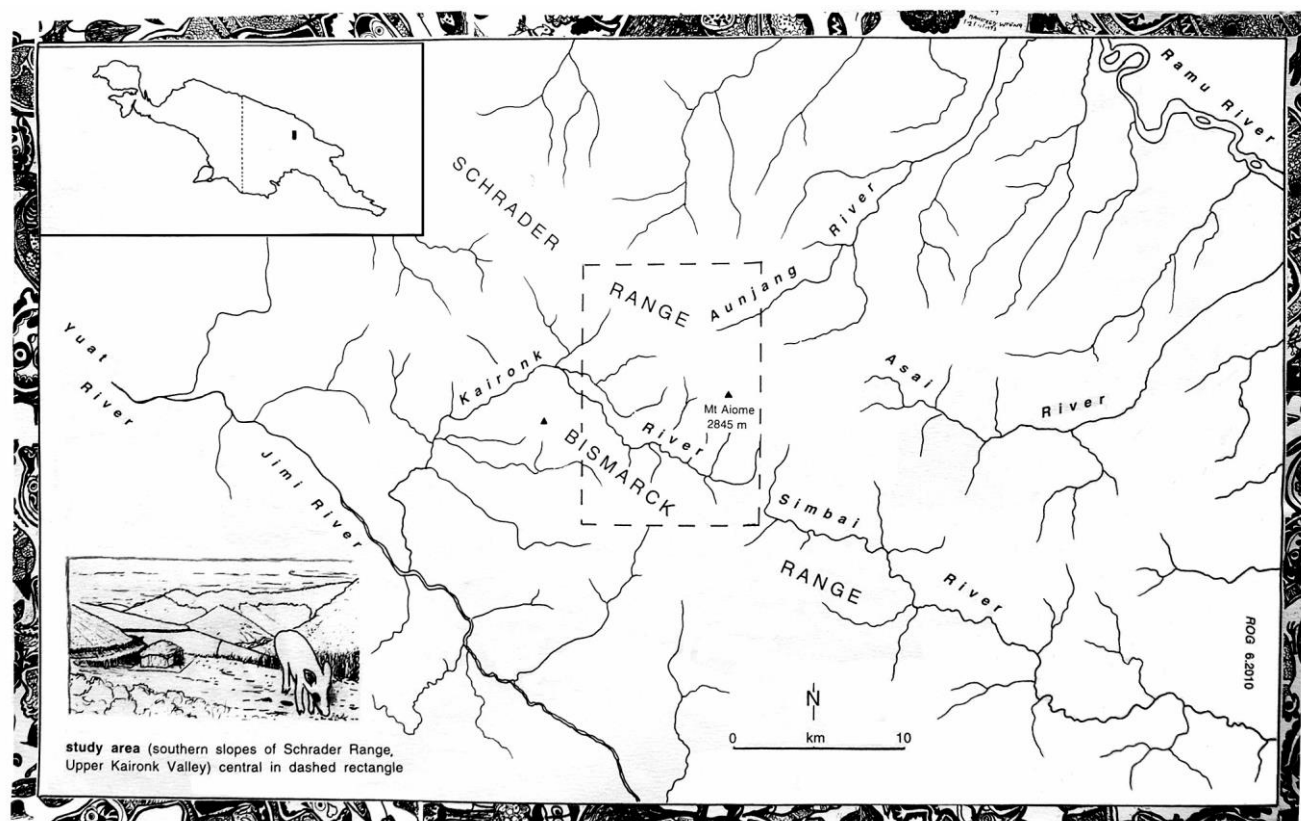
The 3000 m forest limit is reinforced by a significant ecological discontinuity: the genus *Ficus*, a major presence in New Guinea's vegetation, does not grow above this level. The fig tree discussed in this article, *F. endochaete*, along with two others (*F. quercetorum* and *F. saccata*), are the sole representatives of the genus in the island's upper-montane forests (Berg & Corner 2005).

New Guinea's many figs range from giant independent trees and strangler-banyans down to small bushes, scramblers and low climbers. They are diverse and abundant not just in the lowlands but in the montane zone too. Among the collections I made from c. 1500–2300 m in the Schrader Range's Kaironk Valley there were more than twenty

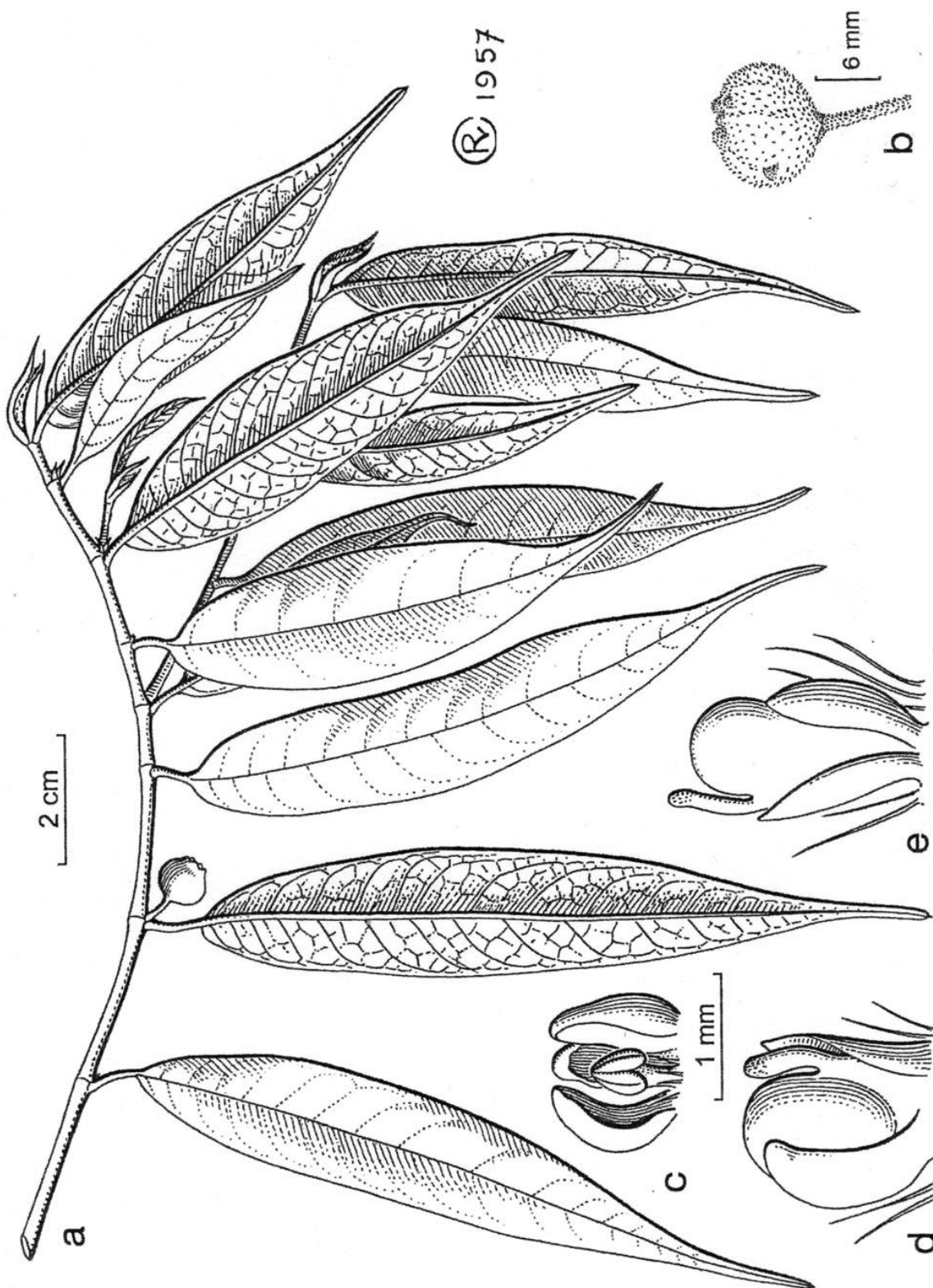
species, all with local names and with their ecology well understood by the valley's Kalam people (Fig. 1; Gardner 2010; Pawley & Bulmer 2011) (Note 2).

*Ficus endochaete* in the Kaironk is found just above c. 2000 m, where the mixed forest gives way to one largely composed of beech species, especially *Nothofagus* (*Brassospora*) *grandis*. The Kalam have given *F. endochaete* one of their easier-to-pronounce names, *kdipling*. I saw it on open rocky streamsides, where the highest potato-garden clearances ran up against beech forest. As I recall, there was nothing particularly graceful about its habit, but the foliage was striking—the branchlets, often horizontal or slightly upcurved, bore shortly petiolate, firm-textured leaves that were directed downwards (just as peach tree leaves often are, although in the fig's case the phyllotaxy is truly distichous). The prominent leaf venation and long, bronze, silky hairs gave the underside of the leaf blades a very attractive appearance.

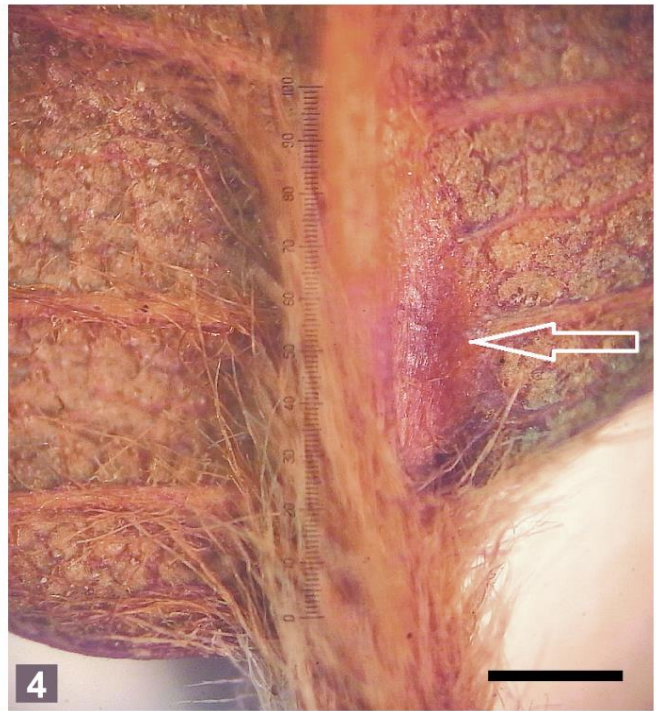
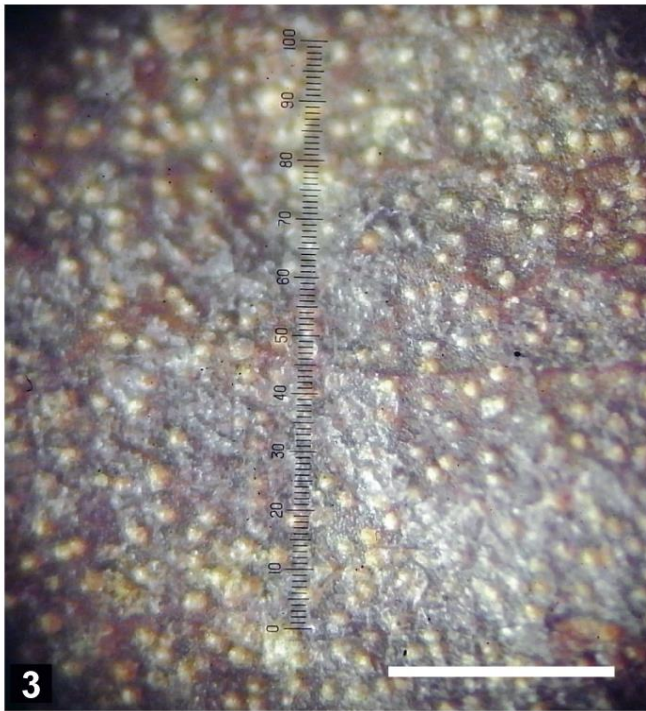
This fig is endemic to the western and central parts of the mountain ranges that form Papua New Guinea's backbone. It belongs to sect. *Adenosperma*, one of the dioecious subgroups, in which a plant



**Fig. 1.** Location of Kaironk Valley, Schrader Range, Papua New Guinea. Mt Aiome is at 5° 10' S, 144° 36' E. Map by author, June 2010.



**Fig. 2.** *Ficus endochaete* **a.** Leafy twig with fig. **b.** Ripe fig, covered in short stiff hairs. **c.** Male flower. **d, e.** Gall flowers. Berg & Corner 2005: 359, fig. 63, which is said to be based on "NGF 5136" [i.e., NGF 5163, Al River, Nondugl, Western Highlands?].



**Figs. 3 & 4.** *Ficus endochaete*. Leaf details. Based on AK 182334, R.N.H. Bulmer 85/251, 8 May 1985, Kaironk Valley. **3.** Adaxial surface, showing abundant cystoliths (c. 0.05 mm diam.). Scale bar = 1 mm. **4.** Abaxial surface, at base of leaf. RH side of midrib with hairs removed to show the waxy gland on the lamina, 2 mm long, glossy, veinlet reticulation not apparent (arrow). Scale bar = 1 mm. Photographs by the author.

bears either male flowers and gall-flowers, or female flowers (which differ from gall-flowers in their longer styles, so preventing the pollinating wasp from inserting an egg into the ovule). Some members of this section, including *F. endochaete*, have figs that for some reason ripen just to greenish yellow rather than the usual orange or red. The apex of the fig is ringed by pyramidal protrusions (bracts) that give it a knurled, coronet-like appearance. Inside, the flowers are separated from one another by stiff, pale bristles, hence the specific epithet.

The foliage, fruit and flowers are illustrated here (Fig. 2) by longtime *Flora Malesiana* illustrator, Ruth van Creveld, a subject entirely suited to her decisive dip-pen. Details of the leaf are shown in the photographs of Figs. 3 & 4: firstly, the cystoliths (little white cellular pimples of calcium carbonate, in this species on both surfaces, but sometimes not, and always a character to be looked at carefully when identifying a fig); and secondly, the 'waxy gland' (a smooth oval flat area free of hairs at the base of the leaf, said to secrete wax, which may be eaten by ants and even parrots—see Berg & Corner 2005: 20 for references).

## Notes

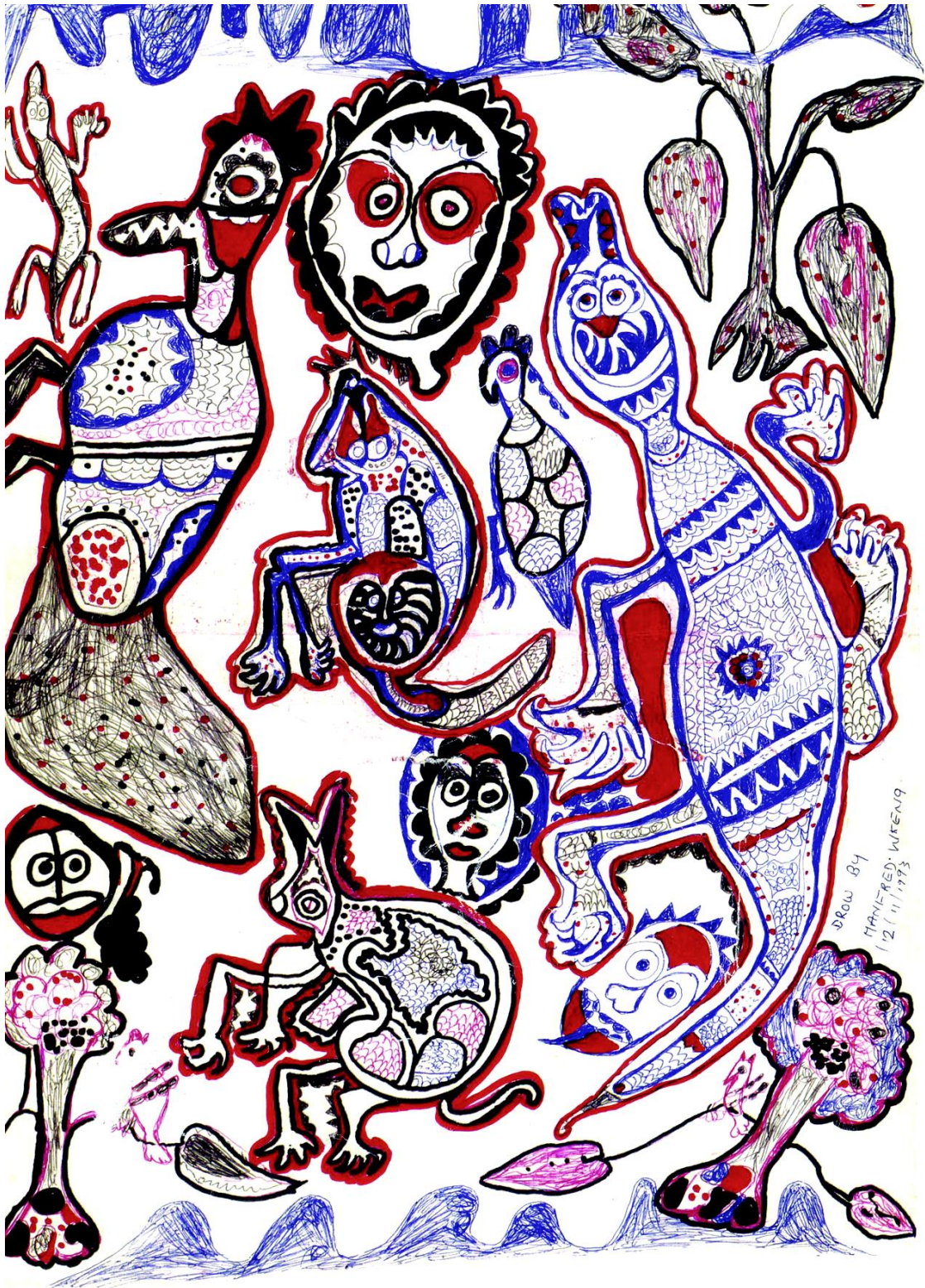
**1.** In discussing the altitudinal variation of New Zealand's forests, Cockayne (1928: 116) wrote that the limits of the various zones (lowland, lower hill, montane, subalpine) could sometimes be seen in

the field but were difficult to define largely because of the changes in forest composition and structure that a change in latitude brings— a lowland forest in Otago is very different from one in North Auckland. In fact, Cockayne never mapped just where in the country those zones were to be found.

Progress in a clever, cutting-the-Gordian knot kind of way was made by John Nicholls (1983) when he defined our 'lowland forests' as those containing rimu (*Dacrydium cupressinum*, Podocarpaceae). By allowing a tree (necessarily widespread and able to grow at sea level) to do the thinking for us, the various and sometimes opposed effects of latitude, elevation, aspect, frequency of morning fog and afternoon cloud, etc., etc., are appropriately weighted and combined. So 'lowland forest' occurs up to a certain altitude in Southland and Otago but to a much higher level in Northland.

(I had not made a search for the Nicholls reference, wanting to avoid turning into "a happy, footnote-drugged maniac" (Nabakov, *Prin Gives a Party*). But Mark Smale has kindly supplied it).

**2.** An "X-ray" style picture (Fig. 5) was dashed off for the author (on a sheet of his pressing-paper) one rainy morning by local Kaironk man Manfred Wkeng, a well-respected PNG artist; I am very glad to share his generous gift with a wider audience.



**Fig. 5.** Untitled [a.k.a. 'Animals the Ancestors Hunted']; ball point pen and fibre-tip colour drawing, by Manfred Wkeng, 1993 (Note 2).

#### References

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