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ALPINIA BOIA - THE WORLD'S LARGEST GINGER :

SOME ECOLOGICAL IMPLICATIONS FOR FIJIAN RAIN FORESTS

BY

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The pantropic ginger family (Zingiberaceae) occupies a wide range of habitats in warm to cool mesic environments and is perhaps best known for the domestic ginger (*Zingiber officinale* Roscoe), which is widely cultivated in Fiji and other tropical countries. Other notable exotic species are the fragrant white and yellow-flowering gingers (*Hedychium coronarium* Konig and *H. gardnerianum* Lindal.) from the Himalays which also ornament Fijian gardens. These are found occasionally along forest edges where, as in other parts of the Pacific, they have become semi-naturalised. Much closer to Fiji is the New Caledonian endemic, *Alpinia purpurata* K. Schum, another floral ornamental ginger now common in tropical gardens around the world. All told seven genera are recorded for Fiji, but only two (*Alinia* and *Geanthus*) endemic (Smith, 1979).

The Fijian *Alpinia* has nine species of which five are indigenous. Of these, the endemic *Alpinia boia* Seem, otherwise known as 'Boia' or 'Vava' in Fijian, is the largest (Smith, 1979) with stems up to 8m long and leaf blades up to 2m long. It is similar in form to another closely related endemic *A. horneana* K. Schum, which has stems up to 7.5m (see also Parham, 1972). *Boia* occurs typically as a single clump of 7 to 12 upright, reddish banana-like stems, often with exposed adventitious roots near the base. The giant herb has a terminal, pendulous inflorescence up to 1.5m long with dull yellowish to greenish white flowers. Different individuals may flower sporadically throughout

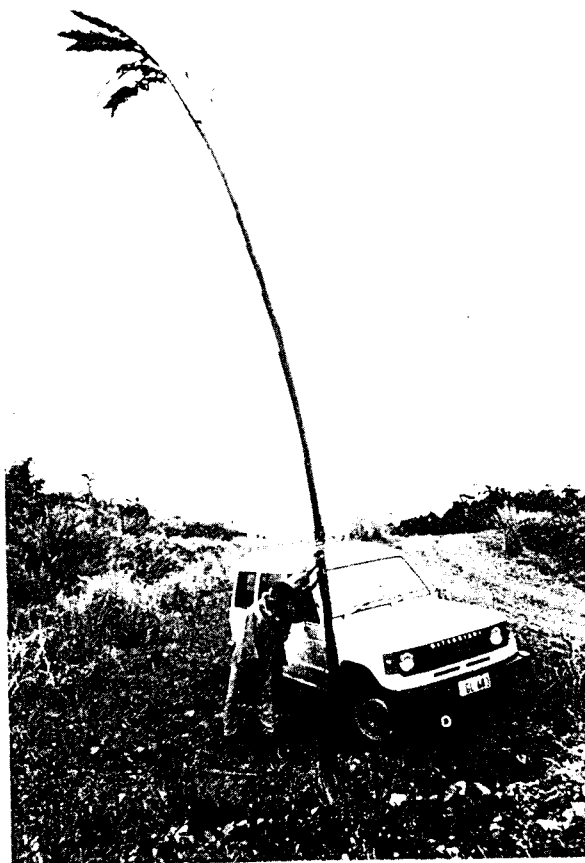
the year. In addition to its occurrence on Viti Levu, Gau, Vanua Levu and Rabi (Smith, 1979), it was observed recently on Taveuni island in secondary forest in the hills above Qeleni at about 400m elevation. (Gillison, pers. obs. 27 Mar. 1992)

While most Fijian alpinias range from coastal to upland habitats, they are most conspicuous as forest edge dwellers or colonisers of disturbed sites or else as codominants in exposed upland shrublands. *Boia* was collected recently by a survey team from the S. Weaver, Maika Savusavu) along the Dogowale coast, on Viti Levu, west of Suva (Lat. 18 15' 10" S., Long. 177 55' 40" E., elevn. 50m a.s.l.). There it is common as a canopy codominant in advanced secondary forest on relatively low nutrient, massive clays. Canopy codominance in rain forest is generally speaking, atypical for Zingiberaceae. From the Dogowale forest, a non-flowering, single stem was recorded with a basal diameter of 130mm and a length of 12.2m (ca. 40.2 feet) with an estimated minimum wet weight (including leaves) of 45kg (Fih. 1). Other large forest genera of Zingiberaceae are also known within the south-west Pacific e.g. *Riedelia* from New Guinea, but throughout the world none appears to attain the magnificent proportions of this latest record of *Alpinia boia*.

Although gigantism is frequent among Pacific insular floras the causes are poorly understood. Under certain conditions, unusually large forms may reflect polyploid development and this could be worth examining for *Boia*. Where forest floras contain relatively few woody canopy species as is often the case in insular groups, a phenomenon known as 'ecological release' may occur where, due to an apparent lowering of species interference, certain plants may occupy species assemblages in similar physical environments. Such a condition may have predisposed the development of *Boia* to its present form in Fiji.

Apart from its massive size, this most recent find at Dogowale demands a closer look at the functional position of Zingiberaceae in the world's rain forests. Any guild structuring of plant functional types must now consider *Alpinia boia* as a highly dynamic self-supporting, canopy element among its more staid woody ecological congeners in the rain forest canopy. As with other hurricane-prone of the south-west Pacific, strong, episodic winds appear to exert a profound influence on structure and function of forest canopy dominants in Fiji. Under such conditions and with relatively few associated woody species, *Boia* may have adapted to a particular kind of gap-phase dynamics where it has become capable of competing favourably with woody dominants e.g. *Hibiscus tiliaceus* and the aggressive canopy lianes *Entada phaseoloides* Merr., *Merremia peltata* Merr. and *Mikania micrantha* H.B. & K.. This being the case it will be of interest to see if *Boia* occupies the same forest niche under species-rich environments with more equable wind regimes.

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Alpinia boia, a single stem measuring 12.2m long and weighing about 45kg. Dogowale area of Viti Levu. (photo A.N. Gillison)

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Alpinia boia as a canopy emergent at high elevation, Monasavu, Viti Levu.



Alpinia boia in its more normal niche as a forest edge species at low elevation in South East Viti Levu.

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Figure Captions

- 1, 2 *Alpinia boia*, a single stem measuring 12.2m long and weighing about 45kg. Dogowale area of Viti Levu. (photo A.N. Gillison)
3. *Alpinia boia* as a canopy emergent at high elevation, Monasavu, Viti Levu.
4. *Alpinia boia* in its more normal niche as a forest edge species at low elevation in South east Viti Levu.

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