

Lepidorrhachis

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1. Aerial view of Lord Howe Island, showing Mt. Gower (far right) and Mt. Lidgbird to the left. Photo: Ian Hutton.



Lepidorrhachis mooreana must surely rate as one of the most narrowly distributed of all palms.

Not only is this monotypic genus endemic to the remote Pacific island of Lord Howe (Fig. 1), 580 km off the eastern coast of Australia, but it is also restricted to the summits of the island's two mountains, Mt. Gower (875 m) and Mt. Lidgbird (777 m), where it occurs above 750 m in dwarf mossy forest. Less than

0.5 km² out of Lord Howe's total land surface area of 12 km² is located above the 750 m contour. The broad summit plateau of Mt. Gower (Fig. 2) accounts for most of the available habitat and sustains the majority of *Lepidorrhachis* individuals. In contrast, Mt. Lidgbird attenuates dramatically into a narrow

ridge surrounded by precipitous cliffs and provides only a very small area with suitable conditions for the genus. The low canopy of the forest in which *Lepidorrhachis* grows includes some extraordinary endemics such as the pumpkin tree (*Negria rhabdothamnoides*), an arborescent member of the African violet family Gesneriaceae, and the giant epacrid *Dracophyllum fitzgeraldii* (Ericaceae). The understorey is notable for its many endemic ferns, and the canopy and forest floor are thick with moss. The Mt. Gower plateau is also of global importance for birds, being the main nesting locality for the providence petrel (*Pterodroma solandri*), which nests in burrows on the forest floor, often among groves of palms, and is a stronghold for the woodhen (*Tricholimnas sylvestris*), an endemic, flightless member of the rail family currently returning from the brink of extinction.

Lepidorrhachis, known to locals as the little mountain palm, is one of three genera endemic to Lord Howe Island. The most well-known of these, *Howea*, comprises two species distributed from sea level to around 400 m, including the famous *Kentia* palm of the

horticultural industry, *H. forsteriana*. The third genus, *Hedyscepe*, contains a single species *H. canterburyana* (big mountain palm), a robust upland palm that grows from 400 m to the mountain summits, overlapping slightly with *Howea* at lower altitudes and co-occurring with *Lepidorrhachis* at the upper part of its range.

The distinctive habit of *Lepidorrhachis* (Figs. 3, 4) cannot be confused with that of *Hedyscepe*. As the local names suggest, *Lepidorrhachis* is much smaller than *Hedyscepe*, its dumpy trunk rarely exceeding 2 m. The stiff, arching leaves resemble those of *Hedyscepe*, but differ in their leaf sheaths, which are relatively short and form a rather indistinct crownshaft, the older leaf sheaths to the exterior splitting longitudinally to the base (Figs. 3–5). The outer surface of the sheaths are coated in a dense layer of buff-colored fuzz, more officially termed indumentum. *Hedyscepe*, on the other hand, bears a stout and well-defined crownshaft with a glistening waxy-white coating. Between August and December, *Lepidorrhachis* comes into bloom, some individuals producing several densely-branched inflorescences along with abundant

2. Mt. Gower from the south, showing the summit plateau, the primary locality for *Lepidorrhachis*. Photo: Ian Hutton.





3. *Lepidorrhachis* sometimes grows in exposed cliff-top locations. Photo: Bill Baker.

crops of marble-sized, red fruit from the previous year's flowering (Fig. 5; Back Cover).

During fieldwork on Lord Howe in 2003, we observed that the inflorescences of *Lepidorrhachis* are unisexual (Figs. 6, 7) and

that inflorescences of both sexes are borne on the same individual. The production of unisexual inflorescences is common in palms, but the majority of cases occur in dioecious genera in which individuals bear inflorescences of one sex only. The presentation of both male



4. Mossy forest on the Mt. Gower summit plateau, with *Lepidorrhachis* in the foreground. Photo: Bill Baker.

5. Sheaths and inflorescences of *Lepidorrhachis mooreana*. Note the deeply split leaf sheath with dense indumentum. Inflorescences with almost ripe fruit and one female inflorescence are visible. Photo: Bill Baker



and female inflorescences on the same individual is known elsewhere only in *Arenga*, *Wallichia*, *Wettinia*, *Marojejya* and *Elaeis*. The condition has not been reported previously in *Lepidorrhachis*.

Being a member of subfamily Arecoideae, *Lepidorrhachis* was expected to present its flower in groups of three, known as triads, with two male flowers flanking a solitary female flower. In *Lepidorrhachis*, however, we noted that inflorescences produced either solitary female flowers or pairs of male flowers; complete triads were not found. In one unusual inflorescence, some branches bore male flowers only, while others bore females alone. This inflorescence was otherwise very distorted and was regarded as aberrant. Microscopic examination of the rachillae from typical inflorescences reveals that the female

flower is subtended by a rachilla bract and three bracteoles, the same number of bracts and bracteoles as occurs in a complete triad. Thus, the solitary female flower appears to be equivalent to a triad in which the two male flowers have not developed. There is no evidence, such as a scar or a vestigial structure, of a male flower itself. The bracteoles within clusters of male flower pairs are indistinct, but there is no evidence of a remnant female flower or a juvenile female bud which might develop at a later stage, as occurs in *Howea* and related genera. The diagnostic plate in *Genera Palmarum* (Uhl & Dransfield 1987; fig. 135b, p. 426), which suggests somewhat schematically that *Lepidorrhachis* produces complete triads, does not correspond with our observations. We suspect that the occurrence of complete triads has been inferred by the artist, rather than observed.



6 (left). Flowers on female inflorescence of *Lepidorrhachis*. 7 (right). Flowers on male inflorescence of *Lepidorrhachis*, with Lord Howe rooting bugs. Photos: Bill Baker.

Lord Howe Island has eroded very rapidly since its formation during a volcanic episode 6.9–6.4 million years ago and it is likely that *Lepidorrhachis*, or at least its ancestors, may have once occupied larger montane areas that have long since disappeared. Unless *Lepidorrhachis* can adapt to life at lower elevations, it is doomed to be eroded to extinction in a few million years time. However, this palm faces more imminent threats, despite being protected within a UNESCO World Heritage Site and a permanent park preserve. Introduced rats (*Rattus rattus*) are common throughout the island and have a very detrimental effect on the fruit yield of *Lepidorrhachis*. At one time, inflorescences were caged to prevent fruit predation, but an active rodent control program on the summit of Mt. Gower has rendered this practice unnecessary. Young seedlings now abound, but the legacy of the rat can be seen in the uneven age structure of the *Lepidorrhachis* population. A more sinister threat comes from global climate

change. The habitat occupied by *Lepidorrhachis* is dependent on the conditions created by near-permanent cloud cover on the mountain tops. If climate change causes the cloud base to rise, the vegetation of the summits will alter radically and numerous endemic plant species, *Lepidorrhachis* included, and the animals that depend on them will inevitably become extinct.

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