

Notes on Micronesian Pteridophyta, III. *Ophioglossum nudicaule* in the Caroline Islands¹

F. R. FOSBERG*

The rather saline environment of a coral atoll seems scarcely the place to look for a terrestrial *Ophioglossum*, and none has heretofore been reported from any atoll to the best of my knowledge. *Ophioglossum pendulum* L., an epiphytic species, has been found on Mili, Namorik, Ebon, and Jaluit atolls, in the southern Marshall Islands (St. John, Occ. Pap. Bishop Mus. **17**: 177–182. 1943; Stone, *Micronesica* **1**: 155. 1964; Fosberg & Sachet, *Atoll Res. Bull.* **92**: 2. 1962).

Hence, my astonishment was great when I spotted a small colony of one of these diminutive plants along a path in a coconut plantation just outside a village while I was hurrying to be picked up by a small boat on Fassarai Islet, Ulithi Atoll, August 17, 1965. I stopped, verified the observation, and hastily collected a few specimens (*Fosberg & Evans* 47400, MICH, UH, US).

Two relatively recent papers treat the genus *Ophioglossum* in the Pacific region (Clausen, *Mem. Torrey Bot. Club.* **19**(2): 1–177. 1938; Wieffering, *Blumea* **12**: 321–337. 1964). The viewpoints and characters used by these authors are very different, and the keys of neither of them work very readily on the Ulithi specimens. However, after studying very carefully the material and the descriptions, as well as specimens from elsewhere, I conclude that the plants seem to fall, according to both treatments, into *Ophioglossum nudicaule* L. f.

The specimens are very slender and delicate, to over 12.5 (usually 8–10) cm tall, with the blade at most 17×12 mm, attached 8–20 mm from the base of the stipe, elliptic to broadly ovate or almost orbicular, sessile, acute to almost truncate at the base, acutish to more usually obtuse to rounded and slightly apiculate at apex, very thin, rather coarsely areolate by rather prominent veins, the areolae becoming smaller and more isodiametric toward the margins, some of them divided by thinner veins into 2 or 3 smaller areolae, or containing 1 or 2 free-ending veins, the marginal cells mostly irregularly elongate parallel with the entire margins, the main basal veins 6–8; in *Fosberg & Evans* 47400 0 (rarely 1 or 2) sterile fronds from the rhizome, these with the stipes about equalling the elliptic, oval, or oboval blades; peduncle to 10.5 cm, usually 6–8 cm, spike 8–16 mm long including the sterile, apical portion, 1.5 mm wide including the sporangia, the sterile portion of the axis between the sporangia 0.2 mm or less wide, sterile apical part, if uninjured, 1–2 mm long, subulate.

An attempt to place this population in one of the varieties recognized by Clausen failed. The plants range in size from small, as in var. *nudicaule* (var. *typicum* of Clausen), to almost the maximum for var. *grandifolium*. Small plants could fit var. *minus*. The blade is the wrong shape for var. *laxum* or var. *tenerum*,

*Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560.

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too small for var. *grandifolium*, the peduncle too long for var. *nudicaule*; the areolae are too long for var. *laxum*, more like those of var. *grandifolium*, to which the plant runs in the key.

This situation supports Wieffering's disregard of all but one of Clausen's varieties, so far as characters of one population could be said to do this. It will be interesting to find out how other atoll populations, if any are found, fit this pattern. Collectors on the wetter coral islands, especially in the western Pacific, should watch for colonies of this species. It has been found on Guam (Wagner 3700, US). The plants of this collection are much smaller and have smaller, thicker blades than the Ulithi material; they were identified as var. *tenerum* by Clausen. *Ophioglossum reticulatum* L. has been reported from Palau, Yap, and Truk by previous authors, but I have not seen the material.

REVIEW

"**ENDEMIC AREAS IN FERNS,**" by Rolla Tryon, *Biotropica* 4: 121-131. 1972.—Phytogeography is an important and often neglected study with respect to the pteridophytes, especially as it relates to the evolution of "geographical species" that form because of spatial isolation. In contrast to the flowering plants, the pteridophytes make ideal subjects for phytogeographic studies because they are fairly equivalent in dispersal capacity. Tryon's study is based primarily on 444 neotropical species in 12 well-monographed genera. Five of the genera are Adiantoids, two each are Cyatheaceae and Polypodiaceae, and one each are Schizaeaceae, Lindsaeaceae, and Pteridaceae. (This, in my estimation, is the only weak point in the analysis: entire families are not present and the sample includes only about 11% of the New World's ferns.) Of the 444 species, 404 are continental, at least in part. The endemics among the continental species are found primarily in the Mexican, Andean, and South Brazilian centers, which have 47%, 39% and 44% endemics, respectively. The Central American and Guayana Highlands centers are secondary and have 12% and 30% endemics, respectively. The areas between the centers have between 0% and 7% endemics. Some endemic genera (e.g., *Pterozonium* and *Doryopteris*) are largely confined to certain rocks and soils derived from them. The affinity of the various pairs of regional centers (i.e., the number of species in common divided by the total number of species less those in common) is directly correlated with the distance between the centers. About a quarter of the 404 continental species have ranges of 300 miles or less; nearly half have ranges of 750 miles or less. A third of them range from 750 to 3000 miles and a sixth range over 3000 miles. The range of apogamous races of some species greatly exceeds that of their parent, sexual races. Large range disjuncts (over 1000 miles) occur in only 112 of the 404 species, and only a third of the vicarious pairs of species are more than 450 miles disjunct. The primary and secondary regional centers are long-time areas of species migration, establishment by long-distance dispersal, and speciation. The intervening areas were or are relatively inhospitable for ferns. This important paper deserves several careful readings and much thought from all who are interested in the phytogeography and evolution of the pteridophyta.—D.B.L.



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