

growing in the City of Hilo for about forty years.

Although most species seed freely, fertile seeds are not always easy to obtain. Tree rats are very fond of them and climb the trees in order to eat them.

Seed which happens to reach the ground is usually eaten by wild pigs, and the seed of some species is attacked by an insect. However, seed is occasionally available and can be supplied to anyone interested in limited quantities.

## Notes on *Pritchardia*

HAROLD ST. JOHN

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### *Nectar Secretion*

The palm trees of the genus *Pritchardia* are known from 38 species: 1 from Cuba and the Isle of Pines in the West Indies, 30 (and 6 varieties) from Hawaii, 2 from Fiji, 2 from the Tuamotus, and 3 from rather indefinite locations in Polynesia.

The genus has recently been given a monographic study by Beccari and Rock in which Professor Beccari states that he has no evidence that the flowers of these palms secrete any nectar.

On collecting trips to the upper ridges of the Koolau Mountains of Oahu I have become acquainted with several of the species. On January 19, 1930, the type locality of *Pritchardia martioides* Rock and Caum was visited. Here on the divide between Kahana and Wahiawa, where they are a conspicuous feature of the vegetation, the trees attain a height of 30 feet in the woods below the crest, whereas at the nearly bare, wind-swept divide the dwarfed trees fruit at a height of 5 feet. Specimens were collected on the Wahiawa side (St. John no. 10180). One of the panicles contained numerous unopened buds. During two days in the laboratory many of its flowers opened. After the dehiscence of the cap of petals, the large anthers radiate out at an angle of 45 degrees. The free tip of each filament is subulate and 2-2.5 mm. long. The anthers are borne by a staminal cup, 6 mm. long, which often protrudes 2 mm. above the calyx. The ovary is seated in the base

of this cup, and the stigma barely equals its rim. Fully formed buds are dry within, but those just mature are found to be nearly filled with liquid. After anthesis, the staminal cup is brimming full of a viscous, yellowish liquid that is perceptibly sweet to the taste. Professor R. S. Bean kindly aided in testing this liquid. With a capillary pipette two large drops were collected from some ten flowers. With Fehling's solution a strong test for sugar was obtained.

Careful dissection did not reveal any localized nectar glands. However, the whole staminal cup is of yellow tissue, 0.5 mm. thick. Its inner surface glistens and seems to be glandular and to secrete the nectar generally over its entire area.

On February 14, 1932, several groves of *P. Rockiana* Beccari were discovered at altitudes of from 1500 to 1800 feet on Laie-Malaekahana Ridge in the Koolau Range, Oahu. The weather was rainy, and the specimens collected (St. John no. 11559) showed no nectar. The next morning fresh flowers opened in the laboratory. All these had their staminal cups filled with sweet nectar.

It can now be stated that, at least in *P. martioides* and *P. Rockiana*, nectar is secreted in abundance.

### *Validity of the Hawaiian Species of Pritchardia*

In 1888 Hillebrand recognized two species and a suggested but unnamed variety of *Pritchardia*. Subsequent local collectors gradually added to the knowl-

edge of this striking group of palms. The work culminated in that of Rock, who made extensive explorations and collections and cooperated with Beccari in a monographic revision of the genus. In the body of the text and the appended section, these authors recognize 25 species and 5 varieties in the Hawaiian islands. This number has been raised by the publication of 5 additional species and 1 variety by Caum.

Of this considerable total, 10 species and 1 variety are from the island of Oahu. The plants are not common; they appear as small groves along the ridges or in the upper valleys of the two principal mountain ranges, the Koolau and the Waianae. The present system of classification has practically resulted in recognizing each grove of trees as a distinct species or variety. This large number of species with minute ranges is uncommon, but not incredible.

In the Koolau Mountains in the valley of Kaluanui Stream at an altitude of 1960 feet on December 8, 1929, I found a small grove of small trees of *Pritchardia*. Flowering and fruiting branches and a leaf were collected and the trees were photographed. On either slope of the valley were a few larger, scattered trees. On checking up the material, I found it to differ in many particulars from any described species. Wishing to verify these observations, I revisited the grove on September 28, 1930, and made additional collections from the same tree. I was much surprised to find on careful study that the 1930 collection differed conspicuously from the 1929 collection, gathered from the same tree. The 1929 specimens showed glabrous floriferous branchlets, and the fruit was subspherical, 4.5 by 4.5 cm. The 1930 specimens had densely rusty tomentose floriferous branchlets, and the fruit ellipsoid, 4.5-4.8 by 2.8-3.2 cm. To be sure, the 1930 fruits were not fully ripe, but they were nearly so, and, I suspect, as much so as many of the specimens upon which species have been based. Several other scattering groups of *Pritchardias* were found on the Pu-

naluu-Kaluanui divide at altitudes between 2200 and 2400 feet. They were in exposed situations and were all low trees with small leaves and short petioles. They were in all stages from bud to fully ripened fruit. The flowering and most of the fruiting branchlets were rusty tomentose, but on the tree with the largest fruits, the fruits were broadly ellipsoid to suborbicular, 4.5-5.5 cm. long and so ripe that they had turned dark brown. On this specimen the panicle was apparently glabrous, though close examination revealed that they were really glabrate. So this grove provided a confirmation of the inconstancy of the pubescence of the floriferous branchlets.

The key in Beccari and Rock's monograph is poorly constructed, but its lengthy paragraphs detail numerous characters and indicate those considered important. Great emphasis is laid on the pubescence of the floriferous branchlets, whether glabrous, glabrate, or permanently rusty tomentose, and on the shape and size of the fruits. Also the length of the petiole and leaf blade and the pubescence are indicated as of fundamental importance.

I have not made lengthy or extensive studies of the Hawaiian *Pritchardias*, but when a tree from an unreported grove is, upon the accepted standards of classification, one new species in 1929 and still a different one in 1930, I feel qualified to report the fact. Incidentally I shall refrain from publishing either of the apparent species. Also I challenge the validity of the taxonomic characters that have been used to divide the genus *Pritchardia* into such a large number of species. Under varying ecological conditions and different stages of maturity, they show considerable variability. Mr. E. L. Caum has observed that many of the species of *Pritchardia* cultivated in Honolulu, including some planted by J. F. Rock from type collections, are now so much modified by their growth under artificial conditions that it is impossible to make them fit into the described species.