

Collecting *Pritchardias* in Hawai'i

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After considerable preparation and a couple of false starts the Smithsonian/World Wildlife Fund-US expedition to study species of *Pritchardia* in their natural habitats finally got off the ground on Friday, the 13th of February 1987. The primary purpose of the trip was to identify correctly certain species that might be in immediate danger of extinction or threatened in one way or another. It is well known that the taxonomy of *Pritchardia* was a morass in need of considerable study and revision. It was toward this end that I visited the Hawaiian Islands in order to gather data for taxonomic studies, determine population size, stability, regeneration, distribution and natural threats to survival. While making the observations we were afforded excellent opportunities to collect mature seed which would have otherwise fallen and been destroyed by rats, pigs, or goats. The wider the distribution of such seed through agencies such as the International Palm Society, the greater the chance for species survival in the hands of botanical gardens and individual expert palm collectors and growers. Betsy, my wife and field assistant, and I visited O'ahu, Kaua'i, Hawai'i, and Maui. Susan Wisner, my research technician, met us first on O'ahu, and again a week later on Kaua'i

where we hiked the Power Line Trail to collect *P. hardyi* and determined *P. waialealeana* (Figs. 2,3) to be an undescribed species. Susan then returned to O'ahu to collect in the Wai'anae Range with Steve Perlman and John Obata, while Betsy and I met up with Don Hodel on the Big Island. We were greeted on Hawai'i by Palm Society members Bob Egge, Suzette Williams and Dan Lutkenhouse, all of whom assisted in many ways to make our trip successful.

Throughout the tropics the cutting of forest, and degradation of the environment by man is usually the greatest danger to many species. This is not necessarily the present major threat to species of *Pritchardia* in Hawai'i. On the island of O'ahu the two widely distinct species, *P. martii* and *P. kaalae* are found mostly on fog shrouded, nearly inaccessible ridges, gulches and stream margins. There appears to be adequate protection from felling of the surrounding forest since the former is commonly in protected watershed areas of the Ko'olau Range and the latter is restricted to nearly inaccessible ledges in highly undesirable reaches of the Wai'anae Range. From what I could see on the Ohikilolo Ridge where the vegetation was low and sparse, the area is highly xeric. John Obata, who knows the region very well,

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1. Bob Read with a plant of *Pritchardia minor* in Koke'e State Park, on cliffs overlooking the Kalalau Valley of Kaua'i.
2. *Pritchardia waialealeana*, a new species formerly confused with *P. hardyi*, along the Power Line Trail overlooking Mt. Waialeale, on Kaua'i, purported to be the wettest spot on earth.
3. Susan Wisner, using climbing irons and a nylon rope, successfully collects a specimen of *Pritchardia waialealeana*, on Kaua'i.
4. Bob Read preparing to collect an inflorescence from *Pritchardia beccariana* along the Kulani Prison Road out of Hilo on the Big Island of Hawai'i.



said that it was normally hot and dry, in spite of the fact that it rained and was windy with a chill factor of about 40° F or less the day we attempted (but failed) to reach a small population on a protected ridge at about 610 m (2,000 ft) elevation. Any threat to *P. kaalae* seems to be from the activities of numerous feral goats which have reduced great areas to stubble. The goats would no doubt eat the fruit and young plants, or even seedlings, should they make it that far. Only a few plants of this species persist in each of the few known localities. Susan collected seeds from a cultivated plant for distribution by the International Palm Society.

On the other hand *P. martii* is widely distributed throughout the length and slopes of the Ko'olau Range. It is fairly common in some localities and fruits abundantly. It is also commonly seen in botanical gardens under various aliases (such as *P. gaudichaudii*, *P. rockiana*, *P. kahanae*, *P. martioides*, *P. kahukuensis*, *P. kamapuanua* and *P. macdanielsii*). Susan collected a good assortment of fruit from several plants in the Ko'olau Range near the junction of Poamoho and the Summit Trail. Susan also reported that in some of the localities at lower elevations, where there were reported to be numerous plants, she found only a few remaining, which were infested with scale insects. She believed the scale was contributing to their demise.

Whether the mongoose has any controlling influence over rats, is a moot point since I am told mongooses are diurnal and rats tend to be nocturnal (but unreliably so). Little damage from rats was noted on O'ahu except in botanical gardens where measures must be taken to prevent loss of mature seed. However, on Kaua'i where there are apparently no mongooses, the rats are having a field day. We found one isolated plant of *P. minor* (*P. eriophora*) (Fig. 1) in the Koke'e State Park where the rats not only apparently prevent regeneration by eating the seed and seedlings, but they have resorted to chewing up the

vegetative parts as well. On one 5 m tall plant half the leaves had been chewed off at the base of the hastula leaving only the petioles. In a nearby population of perhaps 10 individuals, no seedlings or young plants were seen and the ground was seriously disturbed by the rooting of wild pigs. It seems unlikely that any seedlings would survive such disturbance. Even if a seedling were to become established it would be only a matter of time before it was consumed by pigs or rats.

We visited populations of *Pritchardia napaliensis* on the Na Pali trail out of Haena, *P. hardyi* along the Power Line (Pole Line trail) where the forest is already heavily disturbed, and *P. minor* in the Koke'e State Park, but no juvenile plants or seedlings were seen. Only mature or senescent plants were observed, and sadly no mature fruits were collected. The species here seemed to be at the peak of flowering with only a few very immature fruits.

Practically all the species of *Pritchardia* on the Big Island of Hawai'i were in fruit with most of the fruit just approaching full maturity. We were very happy to find *P. schattaueri* dropping fruit everywhere on the ground, and were especially pleased to collect them before the numerous cattle or the more destructive wild pigs got to them. The entire area where the palms grow was formerly ohia (*Metrosideros*) forest that has been cleared for cattle ranching. No plants are known to exist in the remaining uncut ohia forest. The only known plants are so tall, exceeding 20 m height, that it would not have been possible to reach the crown without extreme measures. No younger plants have been found according to Mr. Schattauer, who led our party along with Don Hodel who described the species. Mr. Schattauer said that wild pigs are very numerous in the region, which was obvious from the disturbed ground around the plants. One recently germinated seedling was found and a small barrier of lava rock was erected. I doubt it will survive. Unless a permanent barrier



5. *Pritchardia beccariana* growing in the brush near Volcano National Park, above Hilo on the Big Island of Hawai'i.

6. Betsy Read and Jon Hermsdorf collecting fallen seed of *Pritchardia beccariana* above Hilo on the Big Island of Hawai'i.

is built to exclude cattle and pigs no seedlings will survive to replace the population. On the Kohala Ridge, where the fog shrouded, swamp-like plateau supports numerous plants of *P. lanigera* we obtained a quantity of mature fruit. Here too, the total absence of younger plants is probably the direct result of wild pigs. We noted obvious rooting disturbances throughout the area, as if some careless farmer harrowed the ground, barely missing the scattered shrubby vegetation and palms. A quick trip up to the type locality of *P. eriostachya* also resulted in getting good seed. This species is suspiciously like *P. lanigera*. Although we found only 3 mature individuals, a few very immature plants were also found on rock outcrops nearby. In between the rocks signs of wild pigs were quite evident. Rats were apparently not a real problem although only a few miles down the trail are vast fields of sugar cane, a favorite habitat for rats.

Nearer to Hilo, we visited a population of *P. beccariana* (Figs. 4–6) on a palm collector's property where again the only plants were exceptionally tall, with no immature plants. Two freshly germinated seedlings were found, one was provided a small barrier of sticks and the other was transplanted for better care. Only a few fallen fruits were found here. Nearby, along the old Kulani prison road numerous plants of shorter stature were observed, but none was in flower or fruit. Again no younger immature plants, or seedlings, were observed. In this area, only a narrow border along each side of the road remains uncut, while the areas beyond have been or are being cleared and planted with *Eucalyptus*. We witnessed massive clearing of one area for the purpose of chipping wood for fuel. I do not know how long the road borders, with their scattered palms, will survive and I wondered how extensive the population was. When we flew, via helicopter, along the slope of Mauna Kea out of Hilo, we observed quite a large population of *Pritchardia* throughout a totally

undisturbed region of Ohia forest. I presume they are *P. beccariana* but since they are on the slopes of Mauna Kea at about the same elevation as the type locality of *P. montis-kea* there is a remote possibility of their being that species. This needs further investigation.

Along the Kailua-Kona coast we visited several very small natural populations of *P. affinis* (Figs. 7,8). Only a few individuals remain at each locality on private property in areas under great pressure for development. The largest population, of questionably natural origins, is at the Puna black sand beach site. A number of individuals were obviously formerly planted along what was once the curve in the road. The road is now located further out along the edge of the beach dunes. Next door in a vacant lot there are about 10–20 mature, heavily fruiting individuals. Seed was collected from the trees along the curved drive. It appears that it is only a matter of time before development takes its toll, not only at the black sand beach area but the several other localities as well. Two very interesting populations of *P. affinis* were studied in the very dry zone near the hotels of Kailua-Kona. One population with several individuals, is along the shoreline road in the last remaining relatively undisturbed vacant lot of the area. There is now a sale sign on it. Directly across the street is a public bathing beach. It will be sad if one of the last remaining natural populations, dating from before the advent of the Hawaiians, is not joined to the park across the street and preserved for posterity. The next most interesting population of this species contains about 7 individuals, almost directly uphill, by about 244 m elevation. They too persist in the only remaining vacant lot in a local development. These trees, like the others at the coast, were obviously revered by the early Hawaiians. In the lower population the plants were, as is usual with palms in dry areas, growing near a source of underground seepage. Apparently the early Hawaiians built rock



7. *Pritchardia affinis* above Kailua-Kona on the Big Island of Hawai'i. Several of these trunks have foot notches. There are two or more dead trunks here and plants on the adjoining property have been cut down.
8. *Pritchardia affinis* with climbing notches cut by the ancient Hawaiians for collecting thatch or weaving materials. Notches may have also been used for lookouts.

walls about the water holes, enclosing the palms also. The palms had climbing notches cut in one side which were no doubt used for gathering thatch and perhaps fruit or immature leaves for weaving. At some point, long ago, the cutting of climbing notches was discontinued and the trees continued to grow, with the crown now well out of reach from the top notch. The palm population at the higher elevation was also no doubt in a seepage area, again accounting for the presence of palms in such a dry region. We visited a few scattered individuals in large open fields, but there was insufficient time to test my theory regarding the seepage area and palms. Although naturally occurring plants of *P. affinis* are few and far between, this species is widely cultivated along the Kailua-Kona coast, and may survive only in cultivation

as progress encroaches on the last remaining naturally occurring plants.

Another species, first observed in cultivation, but not yet seen by me in the wild is *P. hillebrandii* from Moloka'i. We collected seed from a cultivated plant above Kailua-Kona with stiff, leathery blue-gray-green glaucous leaves and black shiny fruit. Each fruit has a slight straight ridge down one or both sides which was not observed as clearly on fruit of other species. After careful consideration we decided this must be the species from Moloka'i. Lacking time myself, I asked Don Hodel to have a quick look around Moloka'i on his way back to Honolulu. He later reported that there are numerous plants of the blue-green glaucous form in cultivation on Moloka'i, but there are also numerous gradations to plain green. Quite a bit more work needs to be

done, especially a more thorough visit to Moloka'i.

Meanwhile, Betsy and I went over to Maui where we collected *P. glabrata*, the midget of the genus. Unfortunately after a rather strenuous climb up behind the Iao Needle we found only immature fruits. *Pritchardia glabrata* was found growing on very steep scree slopes where the wind was strong enough to blow you up the hill. If you have never been through a Hau (*Hibiscus tiliaceus*) forest don't try that one. Later at the Maui Zoological Park and Botanical Garden we obtained some ripe seed that were labeled *P. remota*. From having seen *P. remota* in cultivation at Lyon Arboretum and Foster Gardens I believe the identification was fairly accurate.

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