

Rat Damage on Native Hawaiian Palms

MELANY H. CHAPIN
PMB 259
200 Kanoelehua Ave.
Hilo, Hawaii 96720
USA



1. The last living *Pritchardia remota* leaf when this event was discovered.

Rats can cause catastrophic damage to palms in Hawaii and this can be especially annoying when the palm is a prized indigenous rarity such as *Pritchardia remota*.

Hawaii is graced with twenty-three endemic *Pritchardia* (loulu) palms (Chapin et al. 2004). These extraordinary trees are diverse and captivating. Among the array of introduced species that plague native Hawaii *Pritchardia* palms are rats (*Rattus rattus*, *R. exulans*, *R. norvegicus*). Before any human contact, about 400 AD, the Hawaiian archipelago, the most isolated landmass in the world, had only two native mammals, the monk seal (*Monachus schauinslandi*) and hoary bat (*Lasiurus cinereus semotus*) (Burney et al. 2001), along with about twice as many native birds, many of which were flightless (Olson & James 1982 and 1991, Olson 1989, James & Olson 1991). Fossil evidence suggests that loulu palms dominated lowland, coastal and mid-elevation regions of the Hawaiian island chain (Athens & Ward 1993, Burney et al. 2001, Carlquist 1980, Hotchkiss & Juvik 1999). Then, along came the rat. Early travelers, including the Polynesians and the Europeans, had this stow-away in their vessels and the rats multiplied in the favorable environment of Hawaii. The resulting population explosion of rats changed the native biota radically as these pests, eating eggs and fledglings, reduced the flightless bird populations, as well as feeding on native fruits and seeds (Cuddihy & Stone 1990, Staples & Cowie 2001, Chapin et al. 2004). A major item on the rat's menu was and still is *Pritchardia*

fruits, seeds and petioles. It is not uncommon to find isolated populations of *Pritchardia* with immature fruit, no fruit and certainly little or no mature fruit (Chapin et al. 2002), unless the populations are large enough to outnumber the rats and produce more seeds than the rats can devour. The impact of rats is a major factor in the decline of the species. Wild source mature *Pritchardia* seed consistently show up to 100% germination success in cultivation if ripe and fresh (Chapin et al. 2000, Chapin et al. 2001), making seed viability not an issue in the decline.

One day, I came home to find my prized *P. remota* with all but one of its leaves chewed off and only the heart left (Fig. 1). I gathered up the leaves and discovered that each petiole had been devoured one at a time, probably one a night for the last week (Fig. 2). This last one would have been the death of the tree, as it would have included the palm heart. I immediately created an enclosure around the remaining leaf and stem with fencing wire and I set a live trap thinking I would catch the offending rat and resolve the problem. I did catch a roof rat that night (*R. rattus*). I thought it best to reset the trap just in case there were two violators. The second night revealed another rat capture. This continued and eleven nights later there were eleven more rats. They must have been

2. The remains of the *P. remota* leaves minus the petiole. Notice the age of each leaf as one was removed per night.



eating their *Pritchardia* petioles like celery stalks. After another week and a half of empty traps I figured I had caught the whole family, cousins, nephews and the visiting uncle. I was happy because my palm was saved and recovered from this near-death experience. And the rats – well, it was their last supper!

The impact of rats on palm petioles is not only limited to *Pritchardia*. Cultivated palms in Hawaii have also been fodder for rats. For example I observed three *Ptychosperma macarthurii* growing at Na Aina Kai Botanical Garden, Kauai, Hawaii, that had several petioles chewed away leaving the stem and leaflets untouched.

Although the impact of invasive species on palms in Hawaii and other isolated island includes deer, goats, pigs, insects, and invasive weeds, rats play a major role. As indicated here, they are not just a threat to the palm seed, but can cause death by consuming the palm heart.

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