

***Partula gibba* feeding on Mariana fruit bat ejecta of *Pandanus* sp. fruit on Sarigan, Northern Mariana Islands¹**

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Abstract— The diet of the endemic tree snail *Partula gibba* is not well known. Two individuals were observed feeding on the ejecta of Mariana fruit bat, *Pteropus mariannus mariannus*, comprised of masticated *Pandanus* sp. fruit on Sarigan, Northern Mariana Islands. Further studies on the life history of this endangered species are needed.

Introduction

Partula gibba or humped tree snail is an endemic Mariana Islands tree snail. It has been recorded on the islands of Guam, Rota, Aguiguan, Tinian, Saipan, Anatahan, Sarigan, Alamagan and Pagan (Bauman 1996, Smith 2008, Smith et al. 2008, DoN 2014, Hadfield 2015). *P. gibba* is listed as Endangered under the U.S. Endangered Species Act (Department of the Interior 2015) and is identified as a Species of Greatest Conservation Need in the CNMI Wildlife Action Plan (Liske-Clark 2015). The life history of *P. gibba* is not well known, particularly the species' diet in the wild (Cowie 1992, Gouveia et al. 2011). Mariana Islands partulid species have been noted to consume dead or dying plant material (Crampton 1925). Partulid species in Moorea, French Polynesia, have been observed to consume fresh and decaying plant material (Murray et al. 1982). Captive populations of Moorea partulid species are fed a mixture of chalk, grass, trout pellets, dog food and Vitamin E (Wells 1995). Captive *P. gibba* are fed porridge oats, trout pellets, grass pellets, vitamin powder, and powdered cuttlebone (Gouveia et al. 2011).

Sarigan is part of the Mariana Islands chain, Micronesia. It is a small (4.97 km²) uninhabited island with areas of native forest, coconut plantation, grasslands and bare earth. Here I report on an observation of two *P. gibba* individuals consuming the ejecta of Mariana fruit bats on the island of Sarigan.

Materials and Methods

In April to May 2015, while carrying out bird research on the island of Sarigan, I frequently observed the movements of *P. gibba*. The species was seen in abundance throughout the native forest on Sarigan, on many types of plant species, and was impossible to miss.

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Results and Discussion

Two *Partula gibba* individuals were observed from 11:19am to 11:27am May 19, 2015 on the upper slopes of Sarigan within native forest consuming the ejecta from Mariana fruit bats on the leaf of a *Pandanus tectoris*. The two individuals were seen at a single small globule of fresh ejecta about 1 cm diameter (Figure 1). The mouths of the two snails moved constantly picking up ejecta material which could then be seen passing inside the translucent body of the snails. The snails fed almost constantly during the entire 8 minute period and continued feeding after the observation period ended. The behavior was recorded on video, from which stills were captured (Figure 1). The video is also available here:

<http://micronesica.org/sites/default/files/smaller.mp4>

Mariana fruit bats chew on fruits and seeds and spit out the pulp, known as “ejecta”. The bright orange color of the ejecta clearly identified the pulp as that of *Pandanus* sp. fruit. There are no written accounts of *P. gibba* or other partulid species feeding on fruit bat ejecta. Given its status as endangered, further studies on the life history of the species, including diet, are needed.

P. gibba is numerous on the island of Sarigan, particularly in the native forest at higher elevations. Smith (2008) observed high densities in native forest areas on Sarigan in 2006, and Hadfield (2015) observed the species to be abundant there in 2010. I observed *P. gibba* on a wide variety of plant species, although they were most numerous on the trunks of large individuals of *Erythrina variegata*, where they would cluster beneath the branches (Figure 2). Some large individual trees hosted several hundred *P. gibba*.

I did not attempt to estimate the density or population size of *P. gibba* on Sarigan. However, based on current knowledge of abundance and distribution, Sarigan hosts the largest population of any island of the Marianas of this species (Smith 2008, Hadfield 2015). This is probably due to the absence of the predatory New Guinea flatworm (*Platydemus manokwari*) and predatory gastropods, as well as recovery of the native forest after ungulate removal (Kessler 2011), although rats (*Rattus exulans*) do occur on Sarigan (Hawley 2008, Vogt 2008). Rodents are a known predator of partulid snails in other areas (Hadfield 1993).

Given that the Sarigan population may be the only remaining healthy population for the species, it is recommended that the population on Sarigan be monitored so that any future changes can be measured. Life history studies should be conducted on Sarigan in order to better understand the habitat needs and management priorities for the species. Continued efforts to prevent the introduction of *Platydemus manokwari* and predatory gastropods to Sarigan should be of the upmost priority to visitors. Rodent eradication should also be considered to ensure that the rat population does not affect this species.

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Figure 1. Two *Partula gibba* individuals consuming Mariana fruit bat ejecta comprised of masticated *Pandanus* sp. fruits. Photos by Lainie Berry.



Figure 2. Clusters of *Partula gibba* on the underside of branches of *Erythrina variegata*. Photos by Megan Dalton.

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