

Captive breeding of the endemic giant flax snail *Placostylus ambagiosus* in New Zealand

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SUMMARY

Juvenile flax snails *Placostylus ambagiosus* experience high mortality from introduced predators. Snails were kept in a terrarium with constant high humidity, regular moisture and a relatively constant temperature. Leaves, especially from karaka trees *Corynocarpus laevigatus*, were provided as food but the juveniles also fed on the algae allowed to build up within the terrarium. They eventually bred successfully and grew faster than in the wild.

BACKGROUND

The giant endemic flax snail *Placostylus ambagiosus* is a large vegetarian snail listed by the Department of Conservation (New Zealand) as 'national critical'. Its subspecies and populations exist solely under low bush on sand dunes to fragments of forest in the Te Pahi area on the northern most tip of New Zealand. When fully grown, the adult snail has an attractive cone shaped spiral shell up to 8 cm in length. This made it a prime target for shell collectors before the species became protected. Nine subspecies are recognised. In the wild, snails take approximately 4-9 yrs to become adults depending on their environment. Once adult, they can live up to 10 years and a sturdy lip on the shell forms a natural defence against all predators apart from feral pigs *Sus scrofa*. Predation is the primary concern for population survival. Juvenile snails (5-6 mm long at hatching) are extremely vulnerable to introduced mammalian and avian predators such as house mouse *Mus musculus*, rats *Rattus* spp., hedgehog *Erinaceus europaeus* and song thrush *Turdus philomelos* etc. Predator control is complicated with undesired follow-on effects e.g. introduced snails (also predated upon by the introduced predators) thrive and compete for the food with the native *Placostylus*. In addition, most *Placostylus* habitat has been lost to farming or has been burned. Snails are now in isolated habitat patches and are slow to re-colonize regenerating bush. These circumstances meant that recruitment of adults had been almost

reduced to zero, hence the need to develop captive breeding techniques.

ACTION

Establishment of a captive breeding facility and snail collection: A captive breeding facility for *Placostylus* snails was set up at Massey University in Palmerston North (North Island, New Zealand). Two initial collections of snails were made, on 1 and 2 May 1991. These collections comprised four adult *P. a. michiei*, four adult *P. a. paraspiritus*, plus a very small juvenile *P. a. paraspiritus* accidentally included in the leaf litter. Except the juveniles, these all died within a few months. The juveniles grew normally and became adult after 1.4 years. One lived for 4.1 years as an adult.

This suggested that juveniles might survive better than adults when taken from the wild. Therefore on 19 October 1992, nine medium size juveniles and two adults were collected. The juveniles became adults within 0.9-1.1 years and lived for 3.3 years to over 7.1 years (two are still alive) as adults. The snails collected as adults lived for 3.4 and 4.2 years in captivity.

Captive-breeding refinement: Observation of newly hatched juvenile *P. a. michiei* showed that they consumed the algae that built up on the inside of their terrariums – previously they had been kept algae free for cleanliness - but once the algae was allowed to colonise, the

snails survived and grew well. Hatchling snails of *P. a. paraspiritus* also fed on these algae, but were able to survive without it. The snails in the lab were fed once a week mostly on leaves that had fallen naturally from karaka trees *Corynocarpus laevigatus* but also occasionally on kawakawa *Marcopiper excelsum* and kohekohe *Dysoxylum specabile* leaves. Constant high humidity, regular moisture and a relatively constant temperature (16-18.5°C) meant that snails could feed every night, hence they reached adult size much more quickly than in the wild. In the wild snails experience periods of low humidity, cold weather and drought, which all slow growth rate.

CONSEQUENCES

The captive breeding methods employed are deemed to be successful, but it took a lot of time (minimum 2 years) to get adult snails through from eggs. Therefore the initial costs of developing a successful protocol for captive breeding for effective population recovery were high but deemed necessary given the impossibilities of ensuring successful breeding and recruitment of adults in the wild.

Growth in the laboratory environment was faster than in the wild where snails would normally experience periods of low humidity, cold weather and drought. Indeed, population control was eventually necessary in the captive-breeding facilities to avoid overcrowding. After hatching many snails were transferred to other facilities/sites to complete their growth.

For further information see:

<http://www.doc.govt.nz/Conservation/001~Plants-and-Animals/001~Native-Animals/Invertebrates/Giant-Snails.asp>