The Newsletter of the IUCN/SSC Mollusc Specialist Group
Species Survival Commission • International Union for Conservation of Nature

TENTACLE

UNITAS MALACOLOGICA

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EDITORIAL

The biggest ever edition of *Tentacle*! But apologies for its late arrival. The bigger *Tentacle* becomes the more work is needed to put it together. The two associate editors have of course been a great help, once again.

This issue includes some good news – reintroduction of *Partula* to field exclosures in Tahiti – but also ongoing bad news of declines and probable extinctions. The articles are dominated by contributions from South America and the Caribbean, which reflects real commitment to molluscs and their conservation in the region. But there is also a diversity of contributions dealing with Africa, India and Nepal, south-east Asia, Israel, Eastern and Western Europe, North America and of course the Pacific islands. I encourage more of you to submit contributions from other regions and countries rarely represented in the pages of *Tentacle* – I cannot believe that there are no mollusc conservation stories from these places that would be of interest to the readers of *Tentacle*.

Tentacle is an excellent place to publish your news stories – stories that would not normally be published in the peer-reviewed or technical literature. It is a place for news about progress on projects related to conservation and what you have accomplished during the past year or past few years. It is not a place for detailed new research results and in the future will not publish exceptionally long, detailed and dry annotated lists of species recorded in field surveys. Those kinds of results should be published in more formal scholarly journals – they can be summarised in *Tentacle*, mentioning particularly significant species or events, especially if they include attractive illustrations. The key is that *Tentacle* is a newsletter – a publication that people will want to read and enjoy from start to finish. I hope you enjoy this issue.

Robert H. Cowie

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impacted areas and surroundings, considering the threats to the integrity and functioning of freshwater ecosystems and the impacts of water impoundments that have ocurred in recent years, a critical assessment of the current situation in Brasil reveals that the cost-benefit relation has not favoured mollusc conservation at all.

We are grateful to all the collectors who collaborated in the field trips, especially Moises de Souza Oliveira and Ariovaldo Gomes Coelho. This work was sponsored by Fundação Oswaldo Cruz, Eletrobras Furnas, Consórcio Intermunicipal Serra da Mesa and Tractebel Energia.

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LIFE HISTORY AND REPRODUCTIVE AND THERMAL BIOLOGY OF *ASOLENE PLATAE*, AN APPLE SNAIL FROM THE RÍO DE LA PLATA BASIN (ARGENTINA)

By María José Tiecher, Silvana Burela & Pablo R. Martín

The Neotropical apple snails that lay subaquatic, gelatinous egg masses (species of *Asolene*, *Felipponea* and *Marisa*) have received less scientific interest than those apple snails that lay masses of calcareous shelled eggs above the waterline (genus *Pomacea*). Basic and applied research has concentrated so far on two species of *Pomacea* that have become important pests of aquatic crops (mainly rice) as well as drivers of ecosystemic changes in invaded wetlands (Horgan *et al*., 2014; Hayes *et al*., 2015). Up to now, conservation oriented research and conservation efforts have been aimed only at the Florida apple snail, *Pomacea paludosa*, which is the staple food of an endangered raptor, the snail kite (Martín *et al*., 2015).

Like most members of the genus, *Asolene platae* is characterized by striking shell banding (Fig. 1), which is reflected in the name “zebra apple snail” given by aquarium hobbyists to some species of the genus. Although the distribution of *A. platae* is now restricted to the Río de la Plata

Fig. 1. Specimens of *Asolene platae* reared in the Laboratorio de Ecología (INBIOSUR); the snail at the bottom of the photograph is a female that is laying an egg mass. (Photo: M.J. Tiecher)

Fig. 2. Couple of *Asolene platae* in copulation in the Laboratorio de Ecología (INBIOSUR); the male is at the top of the photograph and the female's foot is adhered to the aquarium wall. (Photo: S. Burela)

basin, it may be susceptible to translocation by human action to other regions, as specimens captured from natural populations are reared as aquarium pets (Tiecher *et al*., 2015). As part of a broader research program that commenced five years ago on the natural history, invasion and conservation biology of Argentinean apple snails (Martín *et al*., 2013), we undertook a study of the life cycle and the reproductive and thermal biology of *A. platae* (formerly referred to as *Asolene pulchella*; Tiecher *et al*., 2014; Martín *et al*., 2013).

Our studies on experimental cohorts under laboratory conditions (25 ºC and a photoperiod of 14/10 hours of light/dark) showed that these apple snails live up to four years and that they reach sexual maturity quite late: at an average age of 52 weeks in males and 88 weeks in females (Tiecher *et al*., in press). Growth is slow but continuous during their lifespan, the snails reaching 80 % of their maximum size (which is 25 mm) after one year. On average only 37 % of the hatchlings survive more than eight weeks but most of the snails that get beyond this phase reach sexual maturity (Fig. 2). Fecundity is quite low (1,430 eggs per female) and the hatching success of the egg masses is only 77 %. We have observed a high level of cannibalism on egg masses, which are frequently eaten by the mother during the same night they are laid. Although the hatchlings of *A. platae* look like miniature adults (Fig. 3), they are able to breathe air and eat plant material only after several weeks (Tiecher *et al*., 2014). On the whole, considering activity, mortality and growth, the optimum temperature range for *A. platae* is 25-30 °C; temperatures above 35 °C increase mortality, whereas below 20 °C activity and growth almost stop (Tiecher *et al*., 2015). The information obtained on life history and thermal biology suggests that the life cycle in the wild in their temperate range would be multiannual and iteroparous, with the snails maturing at 2-3 years and reproducing during three successive summers at most.

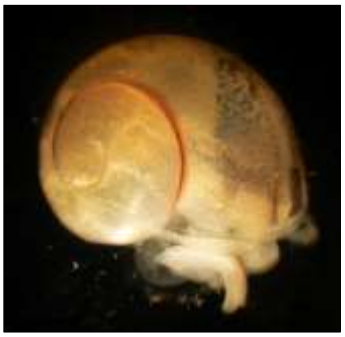

Fig. 3. Hatchling of *Asolene platae* born at the Laboratorio de Ecología (INBIOSUR). (Photo: S. Burela)

Most aspects of the life history of *A. platae* (slow growth, late maturity, low survival and viability) and the narrow range of optimum temperatures indicate a lower invasive potential than that of the most renowned invasive apple snails (*Pomacea canaliculata*, *Pomacea maculata* and *Marisa cornuarietis*). On the other hand, these same traits seem to suggest a low resilience in *A. platae* populations and hence a higher vulnerability to diverse impacts than most wildlife managers would expect from an apple snail.

The conservation status of *A. platae* has not been assessed by IUCN but *A. pulchella*, a junior synonym of the former, has been considered as of Least Concern bcause of its "wide distribution from Argentina to Bolivia, and the absence of any threats to its global distribution" (IUCN, 2015). Nonetheless, the Río de la Plata basin is one of the most heavily populated and modified regions in South America and there are many impacts on rivers and streams that threaten biodiversity (contamination, invasive bivalves and snails and alteration of hydrological regimes by hydroelectric dams; Martín *et al*., 2013, 2015). A further clarification of the conservation status of *A. platae* would depend on a sounder taxonomic definition of all species of *Asolene* and on more direct data on its present distribution and population trends.

Our research on *A. platae* and other species of apple snails is funded by grants from the Universidad Nacional del Sur (UNS, PGI24/B185) and the Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT, PICT 2012-1956), and through doctoral and postdoctoral scholarships granted to María José Tiecher by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET).

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A PRELIMINARY ASSESMENT OF LAND SNAIL DIVERSITY IN THE CHAGGA HOME GARDENS OF KILIMANJARO, TANZANIA

By Christine Ngereza

The Chagga home gardens on Mt. Kilimanjaro in northern Tanzania are often cited as an example of model land use. These gardens, which by oral traditions began in the 12th century, are among the five main ecosystems of Mt. Kilimanjaro (Lambrechts *et al*., 2002) and are estimated to cover 120,000 ha. The gardens have multilayered vegetation structure similar to a tropical montane forest with trees, shrubs, lianas, epiphytes and herbs (Fig. 1). Most of the tree species, lianas and epiphytes are remnants of the former forest cover. Apparently, the old age of these gardens and the vertical stratification of vegetation, which provide a gradient in light and relative humidity, combined to create different niches enabling various species groups to exploit them. However, few biodiversity inventories have been made in these gardens. The gardens maintain a high biodiversity with over 500 plant species including 400 non-cultivated species (Hemp, 2006). About 49 bird species are found in these gardens and it is estimated that 52 species, about a quarter of the entire Saltatoria fauna (bush-crickets, crickets and grasshoppers) of Kilimanjaro, are found in the home gardens (Hemp, 2005).

Land snails remain relatively little studied in the diverse habitats of Tanzania. Published information reports about 450

Fig. 1. A Chagga home garden on Mount Kilimanjaro. (Photo: Sara Costa)

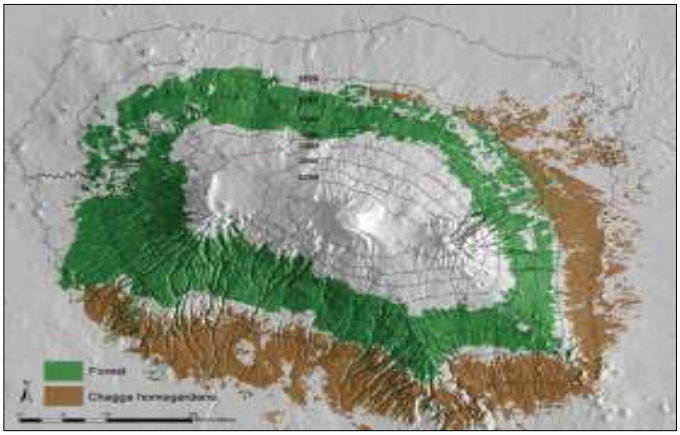

Fig. 2. Distribution of the Chagga home gardens on Mt. Kilimanjaro. (Source: Hemp & Hemp, 2008)

species, with the majority restricted to forest habitats (Emberton *et al*., 1997; Tattersfield, 1998; Seddon *et al*., 2005; Verdcourt, 2006). Published information available on the Kilimanjaro land snail fauna is based on the work of collectors rather than planned surveys, mostly derived from the 1905-1906 Swedish zoological expedition (Verdcourt, 2006). The present survey aimed to shed more light on the importance of these Chagga home gardens in the conservation of biodiversity as well as to serve as an introduction to further detailed studies on patterns of distribution, diversity and endemism of land snails in these gardens as well as in many other Kilimanjaro ecosystems.

The study site is the southern slopes of Kilimanjaro, the highest (5,895 m) mountain in Africa, in the northeastern part of Tanzania (3°4'S 37°22'E). The Chagga home gardens are on the southern and eastern slopes mainly between 900 and 1,800 m above sea level, in the climatically most favorable elevations of these slopes (Fig. 2). Kilimanjaro has a bimodal rainfall pattern of “short rains” from October to December and “long rains” from March to May. The average annual rainfall ranges from 1,000 to 1,700 mm with marked variation depending on elevation, exposure and aspect. Thus Kilimanjaro gets more rainfall on the south-eastern and eastern sides (where the Chagga home gardens are). The average size of a home garden is 0.68 ha with a range of 0.2 to 1.2 ha. The forest-like structural arrangement of plants in these gardens mainly consists of shade trees and the major cash crops coffee (*Coffea arabica*) and banana grown for food and sale. In order to meet their shade requirements, these agricultural crops are well intermixed in a complex arrangement with a higher canopy of indigenous or planted multipurpose trees. There is also a middle canopy of fruit and multipurpose trees/shrubs; the lower ground cover consists of food crops, medicinal plants and annual fodder plants (Fig. 1) (Soini, 2005).

The study was carried out in four randomly selected home gardens, one along each of the four main Kilimanjaro climbing routes, i.e. the Machame, Umbwe, Mweka and Marangu routes. Snails were sampled at the beginning of the long rains in March 2012 and during the short rains in November 2012. Sampling was done using a combination of