

Current knowledge on population studies on five continental molluscs (Mollusca, Gastropoda et Bivalvia) of Santa Catarina State (SC, Central Southern Brazil region)

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ABSTRACT Although still very scarce, available knowledge on population studies on continental (land and freshwater) molluscs in the territory of Santa Catarina State is shortly analyzed and discussed. Based on the IUCN "Restricted Distribution" criterion, a total of 54 nominal species, including 31 terrestrial gastropods, 15 freshwater gastropods and 8 limnic bivalves, were considered strong candidates as threatened taxa. Out of all these endangered species, only 5 limnic forms (2 gastropods and 3 bivalves) were previously analysed, in some way, at population level.

KEY WORDS Biodiversity, Conservation status, Continental mollusc populations, Santa Catarina State, Southern Brazil region.

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INTRODUCTION

As already reported in Moraes (2006), all Brazilian autochthonous continental mollusc species are seriously threatened with extinction. Moreover, there are presumably a high number of taxa still awaiting discovery and numerous others that, as a first step for their conservation, need to be investigated and inventoried with alacrity. Considering the rapid rate of current anthropic environmental degradation, several species will surely become extinct before the scientific community gets to know them all (Simone, 2006).

Besides the environmental degradation (including deforestation for agricultural aims or forest exploitation, mining, pollution of the river basins with dejections and several pollutants, indiscriminate use of agricultural poisons and chemical fertilizers, proliferation of the construction of hydroelectric mills, invasions of natural spaces by town planning enterprises), the Brazilian species face considerable competition with invading forms that, among others, are also

responsible for serious sanitary and agronomic problems (Agudo & Bleicker, 2006a; Agudo-Padrón, 2008; Agudo-Padrón & Lenhard, 2010). Introduced willfully or accidentally, allochthonous invading species are novel to local ecosystems and, for this reason, lack any natural predators, thus achieving an uncontrolled growth of populations with, consequently, extinction of native species and an indiscriminate occupation of native (often under-exploited) niches.

Taking into account that molluscs found in rivers and lakes show extinction rates ranging from four to six times higher than their counterparts in marine or terrestrial habitats, these species are the most threatened globally due to the widespread collapse of such fluvial ecosystems. In particular, freshwater bivalves are very sensitive to trampling, organic and chemical pollution and other different types of environment degradation. Moreover, they show a relatively slow growth rate and don't usually re-settle in previously abandoned/discarded areas. There a few endemic species for each basin and many of them inhabit restricted and seriously

threatened areas suffering from countless environment alterations recently elicited by human activities. This scenario worsened still by the absence of these species from “red lists” provided by ecology centers or units. Nearly nobody wants to preserve a natural area just because of a snail; unfortunately, molluscs, although being fundamental for ecological balance (Moraes, 2006), have a very smaller appeal when compared to any vertebrate species and are considered as non-charismatic species.

In the present work, current knowledge on native continental molluscs of Santa Catarina State is reported by publishing information available from past population studies. As far as available data on autochthonous malacofauna in Santa Catarina State is concerned, reference should be made to Agudo-Padrón (2011). As already underlined in the above mentioned paper, continental forms are currently sub-appraised due to a sensitive lack of population studies coupled with a traditional and historical chronic lack, in the State, of specialists working on continental forms.

In this paper, 54 continental native species - 46 Gastropoda (31 land and 15 freshwater taxa) and 8 limnic Bivalvia (Agudo-Padrón, 2010), along with two recent new registrations for the Extreme Western area of the State, *Macrodonates thielei* Pilsbry, 1930 (Odontostomidae) and *Streptaxis pfeifferi* (Pilsbry, 1930) (Streptaxidae) (Agudo-Padrón & Bleicker, 2011), were considered for inclusion in IUCN categories of specific status of threat and conservation, based on the specific Restricted Distribution Criterion. Out of these taxa only the following five species have been studied, somehow, at population level in Santa Catarina State:

Class GASTROPODA

Prosobranchia/Caenogastropoda

Family AMPULLARIIDAE Gray, 1824

Genus *Pomacea* Perry, 1811

Pomacea lineata (Spix, 1827)

Available preliminary population studies were reported a few years ago (Santos et al., 2005; Quadros et al., 2007). This taxon was included in the specific IUCN category ENDANGERED (EN).

Pomacea lineata (Spix, 1827), also known as apple snail, is a native taxon the rank of which is

still contentious. In fact, it was considered by several authors an essential element of the *canaliculata* complex, but, on the other hand, recognized as a valid species by local specialists (Thiengo, 1987; Cowie & Thiengo, 2003; Simone, 2006). In our opinion, this is a sterile discussion, since, whatever its taxonomic rank might be, we really need to evaluate the conservation status of this taxon in the State, since it inhabits a restricted area (Salto do Rio Caveiras, Santa Catarina plateau) under strong regional threat from hydroelectric development (Santos et al., 2005; Agudo-Padrón, 2008, 2010).

Family HYDROBIIDAE Stimpson, 1865

Genus *Potamolithus* Pilsbry, 1896

Potamolithus kusteri (Ihering, 1893)

For preliminary population studies see Santos et al. (2005) and Quadros et al. (2007). This taxon was included in the specific IUCN category VULNERABLE (VU).

It occurs in a restricted area (Salto do Rio Caveiras, Santa Catarina plateau) under strong regional threat from hydroelectric development (Santos et al., 2005; Agudo-Padrón, 2008, 2010).

Class BIVALVIA

UNIONOIDA (freshwater mussels/naiads)

Family HYRIIDAE Swainson, 1840

Genus *Diplodon*, Spix, 1827

Diplodon parallelipipedon (Lea, 1834)

Preliminary population studies were previously reported (Santos et al., 2005; Quadros et al., 2007). This taxon was included in the specific IUCN category ENDANGERED (EN). It occurs in a restricted area (Salto do Rio Caveiras, Santa Catarina plateau) under strong regional threat from hydroelectric development (Santos et al., 2005; Agudo-Padrón, 2008, 2010).

VENEROIDA (freshwater clams)

Family SPHAERIIDAE Deshayes, 1854

Genus *Pisidium* Pfeiffer, 1821

Pisidium pipoense (Ituarte, 2000)

Preliminary population studies were carried out by Perizzolo (2003) and Agudo-Padrón (2008, 2010). This taxon was included in the

specific IUCN category ENDANGERED (EN). It occurs in a restricted area (Lageado São José, Chapecó municipal district, Uruguay River valley) under severe human influence (water reservoir).

Pisidium taraguyense (Ituarte, 2000)

Preliminary population studies were carried out by Perizzolo (2003) and Agudo-Padrón (2008, 2010). This taxon was included in the specific IUCN category ENDANGERED (EN).

It occurs in a restricted area (Lageado São José, Chapecó municipal district, Uruguay River valley) under severe human influence (water reservoir).

DISCUSSION AND CONCLUSIONS

Out of 54 continental species, only 5 limnic forms (2 gastropods and 3 bivalves) have been preliminarily studied at population level, with none of these studies ever being formally published. Hence, at present, in spite of burgeoning scientific and technological progress, we still have a lot of difficulty in evaluating threats menacing continental mollusc species within the territory of Santa Catarina State, SC, the smallest portion of the Southern Brazil mosaic (Agudo & Bleicker, 2006b; Agudo, 2007). The main reasons for this are, among others, the lack of concrete population data and the extremely small amount of taxonomic specialists on these species living and working in the State.

Personally, during 14 years of work in the field, the author has witnessed the decrease and even the extirpation of certain species from several places and specific areas of the SC State. One example is the native giant snail *Megalobulimus gummatus* (Hidalgo, 1870), a magnificent representative of the family Megalobulimidae in the valley of the Uruguay river basin which was abundant until a few years ago; currently this species is difficult to locate in such an area, probably due to the consequences of the increase of regional agricultural activities (use of pesticides, mainly). Meanwhile, invading exotic species proliferate and colonize larger areas.

Endemic species, such as the small aquatic snail *Potamolithus catharinae* Pilsbry, 1911, representative of the family Hydrobiidae, and the tiny freshwater limpets *Burnupia ingae* Lanzer, 1991 and *Ferrissia gentilis* Lanzer, 1991, family Ancyliidae (Agudo-Padrón, 2008), are particularly vulnerable since their fragile natural habitat is easily altered by a multitude of human activities.

In general, for Brazilian fluvial habitats there is a regrettable lack of basic conservation and management information, particularly dealing with the spatio-temporal dynamics of populations and communities, as well as with the impact of several human activities. Hence, for this reason, it is extremely important to pay great attention to the conservation status of continental molluscs, including those occurring in Santa Catarina State.

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REFERENCES

- Agudo A.I., 2007. Continental land and freshwater molluscs in Santa Catarina State, Southern Brasil: a general review of current knowledge. *Tentacle*, 15: 11-14. Available online at: http://www.hawaii.edu/cowielab/tentacle/tentacle_15.pdf.
- Agudo-Padrón A.I., 2008. Listagem sistemática dos moluscos continentais ocorrentes no Estado de Santa Catarina, Brasil. *Comunicaciones de la Sociedad Malacológica del Uruguay*, 9: 147-179. Available online at: <http://redalyc.uaemex.mx/redalyc/pdf/524/52412049003.pdf>.
- Agudo-Padrón, A.I., 2010. The mollusc fauna of Santa Catarina State, Southern Brasil: knowledge gained from 13 years of research. *Tentacle*, 18: 32-37. Available online at: http://www.hawaii.edu/cowielab/tentacle/Tentacle_18.pdf.
- Agudo-Padrón, A.I., 2011. Mollusca and environmental conservation in Santa Catarina State (SC, Southern Brazil) : current situation. *Biodiversity Journal*, 2 (1): 3-8.
- Agudo A.I. & Bleicker M.S., 2006a. Moluscos exóticos no Estado de Santa Catarina. *Informativo SBMa, Rio de Janeiro*, 37: 6-8.

- Agudo A.I. & Bleicker M.S., 2006b. First general inventory of the malacological fauna of Santa Catarina State, Southern Brasil. *Tentacle*, 14: 8-10. Available online at: http://www.hawaii.edu/cowielab/tentacle/tentacle_14.pdf.
- Agudo-Padrón, A.I. & Bleicker, M.S. 2011. Additional new records on recent marine and continental molluscs of Santa Catarina State, SC, Southern Brazil region: synthesis and check list. *Ellipsaria*. 13: 20-26.
- Agudo-Padrón A.I. & Lenhard P., 2010. Introduced and invasive exotic molluscs in Brazil: an brief overview. *Tentacle*, 18: 37-41. Available online at: http://www.hawaii.edu/cowielab/tentacle/Tentacle_18.pdf.
- Cowie R.H. & Thiengo, S.C., 2003. The apple snails of the Americas (Mollusca: Gastropoda: Ampullariidae: *Asolene*, *Felipponea*, *Marisa*, *Pomacea*, *Pomella*): a nomenclatural and type catalog. *Malacologia*, 45: 41-100.
- Moraes M.S., 2006. O manual dos moluscos do Brasil. São Paulo, SP: *Jornal da USP*, 22: 7.
- Perizzolo R., 2003. Distribuição longitudinal de Mollusca (Bivalvia) no rio Lajeado São José, Chapecó - SC. Chapecó, SC: UNOCHAPECÓ, Dissertação Bacharel em Ciências Biológicas, 25 pp.
- Quadros R.M., Gambá G.A., Santos D.B., Peruzzolo G., Lima L.C. & Marques S.M.T., 2007. A ecologia da malacofauna dulcícola do alagado do Salto do rio Caveiras na serra catarinense, Brasil. Rio de Janeiro, RJ: Resumos XX Encontro Brasileiro de Malacologia: 304.
- Santos D.B. Dos, Peruzzolo G. & Gambá G.A., 2005. O levantamento e a ecologia da malacofauna dulcícola do Alagado do Salto do Rio Caveiras na Serra Catarinense. Lages, SC: UNIPLAC, Relatório de Estágio (Licenciatura Plena em Ciências Biológicas), 157 pp.
- Simone L.R.L., 2006. Land and freshwater molluscs of Brazil. São Paulo, SP: FAPESP, 390 pp.
- Thiengo S. C., 1987. Observations on the morphology of *Pomacea lineata* (Spix, 1827) (Mollusca, Ampullariidae). *Memórias do Instituto Oswaldo Cruz*, 82: 563-570.