SCIENTIFIC COMMUNICATION

A reversed coiled *Neocyclotus prominulus* (d'Orbigny) (Gastropoda, Prosobranchia, Cyclophoridae) from Grande Island, Rio de Janeiro, Brazil

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ABSTRACT. The first case of reversed coiled shell of *Neocyclotus prominulus* is reported here. One specimen out of 282 of *Neocyclotus prominulus* from Grande Island, is sinistral (0.35%). It is represented by a female reaching 3.5 whorls and 0.82 cm of maximum diameter.
KEY WORDS. Right-left reversal; sinistral; terrestrial gastropods.

RESUMO. **Enrolamento reverso em *Neocyclotus prominulus* (d'Orbigny) (Gastropoda, Prosobranchia, Cyclophoridae) de Ilha Grande, Rio de Janeiro, Brasil.** Relatamos o primeiro registro de concha com enrolamento reverso em *Neocyclotus prominulus*. De 282 exemplares de *Neocyclotus prominulus* coletados em Ilha Grande, um (0,35%) é sinistrógiro, representado por uma fêmea com 3,5 voltas e 0,82 cm de diâmetro máximo.
PALAVRAS-CHAVE. Gastrópodes terrestres; reversão direito-esquerdo; sinistrógiro.

We report here the first case of reversed coiled shell (Fig. 1) of ***N****eocyclotus prominulus* (d'Orbigny, 1835) from Grande Island (23º05'-23º15'S; 44º06'-44º23'W), Angra dos Reis municipality, Rio de Janeiro. This species is a characteristically dextral terrestrial (Fig. 2) prosobranch common at the Grande Island Atlantic Forest remnants (*authors observations not published*). The specimen was collected at the Papagaio's Peak Track, on the island continental side, on February 2005, at 400 m height.

The great majority of gastropod species is typically right-handed, that is, the shells coil to the right (dextral) (Vermeij 2002). The estimates goes from "far more than 90%" (van Batenburg & Gittenberger 1996) to "more than 90%" (Asami *et al*. 1998). The evolution of left-handed shells (sinistral) has occurred in hundred of species, and is generally rare (Bromham 2001, Vermeij 2002, Schilthuizen & Davison 2005). Despite the rarity of sinistrality, variation occurs in all taxonomic levels, since rare sinistral specimens in dextral populations as *Helix pomatia* Linnaeus, 1758 to almost entire sinistral families as Clausiliidae (Nordsieck 1963). Variations also occurred spatially: species with dimorphic populations in distinct areas as *Achatinella bulimoides* Swainson, 1828 in Hawaii (Welch 1954); dimorphic species in clines between areas as *Partula suturalis* Pfeiffer, 1855 in Polynesian islands (Clarke & Murray 1969). True dimorphism is very rare indeed and may be restricted to just a few groups as *Euhadra* Pilsbry, 1890 in Japan (Ueshima & Asami 2003, Davison *et al*. 2005) and possibly *Amphidromus* Albers, 1850; *Auriculella* Pfeiffer, 1855; *Corona* Albers, 1850; *Liguus* Montfort, 1810 and *Partulina* Pfeiffer, 1854 (Asami *personal communication in* Schilthuizen & Davison 2005).

Literature shows cases of reversed coiling where a sinistral or dextral pattern is expected (Örstan & Welter-Schultes 2002, Schilthuizen & Davison 2005). Sturtevant (1923) was one of the first to suggest, based on prior data from Crampton (1894) and Boycott & Diver (1923) about inheritance of dextral or sinistral coiling in *Lymnaea* Lamarck, 1799, that the direction of shell coiling of the offsprings is genetically determined by the genotype of the mother snail (Levin & Mercola 1998) and, it is the classical example of "delayed inheritance" (Uit de Weerd *et al*. 2006).

Brazilian sinistral terrestrial shells were reported by Lee (2006) to *Megalobulimus chionostoma* (Mörch, 1852) and *Thaumastus largillierti* (Philippi, 1848) from Arraial do Cabo, Rio de Janeiro. The same author reported dextral shell to the normally sinistral *Corona regalis* (Hupé, 1857) from Mato Grosso and *Corona perversa* (Swainson, 1820) from Amapá; Asami (*personal communication in* Schilthuizen & Davison 2005) mentioned true dimorphism to this genus. Nowadays, snail chirality is being studied by developmental and molecular biology trying to understand how molecular and cellular signalizing processes translate gene information into form (Levin & Mercola 1998).

Figures 1-2. *Neocyclotus prominulus*: (1) sinistral specimen; (2) dextral specimen. Pictures: A.C. Freitas. Bar = 0.5 cm.

The reversed morphological organization causes mating difficult, perhaps impossible, because the different position of genital apparatus that may prevent or complicate the exchange of gametes between snail of opposite coiling (Uit de Weerd *et al*. 2006), and probably explains why reversed coiling is rare in some natural populations (Ueshima & Asami 2003, Schilthuizen & Davison 2005). However, Asami *et al*. (1998) reported that despite reciprocal mating between dimorphic low-spired snails is not usually possible, because the genitalia of a sinistral individual cannot engage with those of a dextral snail, in high-spired dimorphic snail species mating is possible, albeit with some behavioral adjustments, such as *Partula* Férussac, 1821.

We have found only one sinistral living animal (0.35%) from the 282 collected specimens, being 85% only shells. Örstan & Welter-Schultes (2002) found only one dextral specimen in a lot of 261 adult sinistral *Albinaria cretensis* (Rossmässler, 1836). The specimen is a female with almost 3.5 whorls and 0.82 cm of maximum diameter; housed at the Malacological Collection of Universidade do Estado do Rio de Janeiro (Col Mol UERJ 4514).

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