

# First record of *Pseudosuccinea columella* (Say, 1817) from Salta province, northwest Argentina (Mollusca: Gastropoda: Lymnaeidae)

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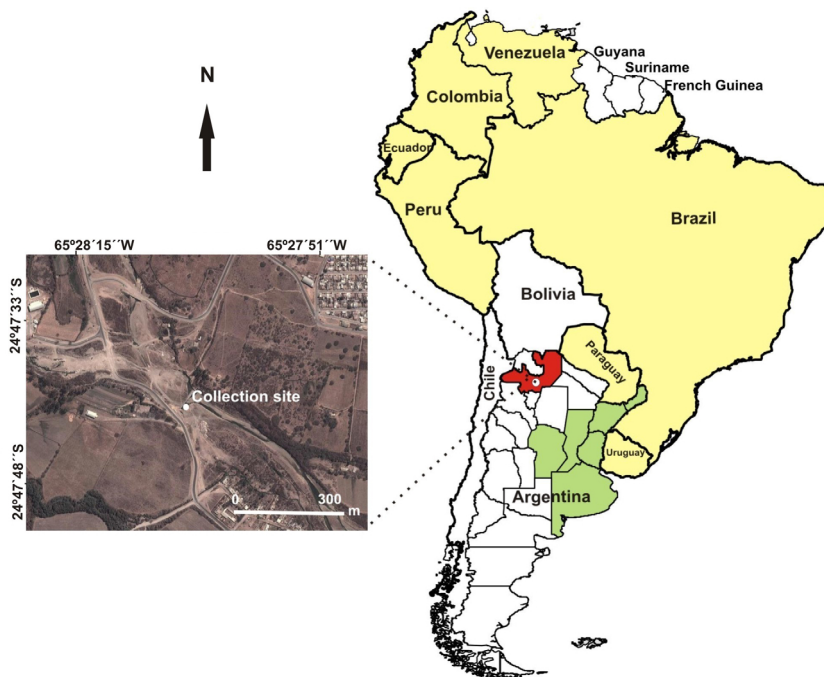
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**ABSTRACT:** *Pseudosuccinea columella* (Say, 1817) is a widely distributed freshwater snail of medical and veterinary interest because it is the first intermediate host of *Fasciola hepatica* (Linnaeus, 1758). It is an invasive species in the Neotropical region and in Argentina is known from the central and the northeast regions. *Pseudosuccinea columella* is reported for the first time from Salta province, northwest Argentina. This new record, the westernmost in Argentina, suggests that *P. columella* continues to increase its geographic distribution in the Neotropical region. Although *P. columella* is naturally infected with *F. hepatica* in northeast Argentina, snails from the new location in Salta province were not found to be infected.

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*Pseudosuccinea columella* (Say, 1817) is a widely distributed freshwater lymnaeid snail (Madsen and Frandsen 1989). Its role in the transmission of *Fasciola hepatica* (Linnaeus, 1758), the causative agent of fasciolosis, has been demonstrated in several countries of South America (Prepelitchi *et al.* 2003; Coelho *et al.* 2003) and Oceania (Boray *et al.* 1984). *Pseudosuccinea columella* was first described in the US (Say 1817), from where it

has spread into every South American country (Paraense 1982) except Chile and Bolivia. In Argentina, *P. columella* was restricted to the northeastern provinces of Misiones (Castellanos and Landoni 1981), Corrientes (Prepelitchi *et al.* 2003) and Entre Ríos (Paraense 1982), and the central provinces of Buenos Aires (Martín and Ovando 2013), Santa Fe (Rumi *et al.* 2008) and Córdoba (Zarco *et al.* 2011) (Figure 1). Its role in the transmission of *F. hepatica*



**FIGURE 1.** Geographical distribution of *Pseudosuccinea columella* in South American countries (in yellow) and in Argentinean provinces (in green), including the new record in Salta province (in red). Satellite image shows the location of collection site within Salta province, Argentina. Source: Google Earth.

was only confirmed in Corrientes province (Prepelitchi *et al.* 2003). The objective of this work is to report for the first time the presence of *P. columella* in Salta province, northwest Argentina.

Snail sampling was carried out at Tres Palmeras, Arias-Arenales River (24°47'41.03" S, 65°28'04.18" W) in the upper basin of Juramento River (Figure 1) at 1100 m a.s.l. (above sea level). This area is located in the Lerma Valley at the centre of Salta province and is characterized by a serrano-subtropical climate with a dry season (Bianchi and Yáñez 1981). Mean annual air temperature is 15.7°C and annual precipitation ranges between 500 and 700 mm.

The study site was recently modified by the construction of a 5 m high wall, which forms a pool and a cascade (Figure 2). Specimens were collected at two separate times in April and May, 2013. Small gastropods were collected from plants and rocks by hand for 30 minutes, and kept alive in plastic containers with wet cotton layers. In the laboratory, snails were maintained in dechlorinated water for a week while assessing the emergence of cercariae on a daily basis. Snails were relaxed, euthanized and preserved in Railliet-Henry solution according to Paraense (1983). Taxonomic determination was carried out by examining features of the shell and internal organs, including the radula and genital system (Paraense 1982).

Snails were measured from the apex to the anterior margin using a 0–150 mm digital caliper. Shell length (L) and width (W), last whorl length (LWL) and aperture length and width (AL and AW) were measured on the largest 25 specimens. The relative proportions LWL/L, W/L, and AL/L were calculated, and all measurements are expressed in mm. Gonads were examined for pre-cercariae larval stages.

Voucher specimens were deposited in the Invertebrates I collection at the Natural Sciences Faculty, Salta National University (UNSa-FCN-I # 0551-552) and in the Colección de Invertebrados del Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” Buenos Aires (MACN-In # 39.454).

A total of 98 specimens of *Pseudosuccinea columella* were collected and found to share their habitat with a population of *Physa* sp. *Pseudosuccinea columella* shells are oval in shape, had a short spire with a pointed apex, a



**FIGURE 2.** Collection site of *Pseudosuccinea columella* in Tres Palmeras, Salta province, Argentina (24°47'41.03" S, 65°28'04.18" W). Photo by Daniel Paredes.

large and expanded body whorl occupying more than two-thirds of the total shell length, and a periostracum with incised spiral lines that cut the growth striations (Figure 3). These characteristics are identical to the description made for *P. columella* by Castellanos and Landoni (1981) and Paraense (1983).

Shell lengths of *P. columella* specimens (N=98) ranged between 3.25 and 13.90 mm (mean: 8.63 mm  $\pm$  SD: 2.29). Shell measurements and proportions obtained from the largest specimens are as follows: L= 8.66–13.90 (11.04 $\pm$ 1.55), W= 3.96–6.95 (5.63 $\pm$ 0.79), LWL= 6.49–11.55 (8.82 $\pm$ 1.79), AL= 4.74–9.19 (6.87 $\pm$ 1.43), AW= 2.88–6.41 (4.69 $\pm$ 1.97), LWL/L= 0.62–0.93 (0.79 $\pm$ 0.09), W/L= 0.39–0.66 (0.51 $\pm$ 0.07) and AL/L=0.49–0.73 (0.62 $\pm$ 0.07).

The radula was rectangular, with a central row of small teeth, and lateral and marginal teeth as described by Castellanos and Landoni (1981) and Paraense (1983). The prostate was small and tubular, thread-like or ribbon-like in shape, and indistinguishable from the vas deferens. The penis sheath length to preputium length ratio was 1:3 to 1:6. The anatomy of the reproductive system concurs with the characteristics described for animals from Argentina (Castellanos and Landoni 1981) and Brazil (Paraense 1983).

None of the observed specimens was parasitized by *Fasciola hepatica* or other digeneans.

Fasciolosis is a sanitary problem in human populations in Andean countries of South America (Mas-Coma *et al.* 1999). In Argentina, human fasciolosis is underestimated due to a lack of medical records (Rubel *et al.* 2005). However, at a veterinary level, fasciolosis constitutes the fourth more important parasitosis for livestock production all over the country (Olaechea 2007). Fasciolosis transmission shows a patchy distribution directly associated with local dispersion of intermediate snail hosts (Mas-Coma *et al.* 1999). Therefore, the discovery of this new population of *P. columella* in Salta province could contribute to the spread of fasciolosis, given that this site is frequently visited by cows, goats and sheep that could potentially represent definitive hosts of *F. hepatica*. In addition, the poor sanitary conditions, especially the discharge of sewage from nearby townships, further complicate the situation.

In Argentina *P. columella* was previously recorded at altitudes ranging from 21 m a.s.l. in Entre Ríos province (Paraense 1982) to 500 m a.s.l. in Córdoba province (Zarco *et al.* 2011). The new population detected in Salta province widens the altitudinal distribution range in Argentina to 1100 m a.s.l. It has been demonstrated that *P. columella* can survive and even transmit *F. hepatica* at 4500 m a.s.l. (Londoño *et al.* 2009), because snails with a prevalence of 36% of parasite infection were found in Cusco, Peru. The risk of expansion of *P. columella* to Bolivia, favored by natural migrations or anthropogenic factors, is increased by the presence of snail populations in Argentina and Peru. This is the first report of *Pseudosuccinea columella* in Salta province, being the westernmost and highest location (1100 m a.s.l.) for this species in Argentina. Although we found no evidence of snail infection by *F. hepatica* in our samples, further studies are needed to evaluate the role of *P. columella* as intermediate host of *F. hepatica* in the area.



**FIGURE 3.** Dorsal view of *Pseudosuccinea columella* from Tres Palmeras, Salta province, Argentina. Scale bar: 5 mm. Photo by Lucila Prepelitchi.

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