

A predatory land snail invades central-western Argentina

Claudio G. De Francesco · Humberto Lagiglia

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Abstract The pulmonate land snail, *Rumina decollata*, is a highly invasive gastropod adapted to arid conditions, and native from the Mediterranean area. It was recorded for the first time in Argentina in 1988, in the northeastern Pampas of the Buenos Aires Province, a region characterized by a humid mesothermal climate with no water deficit. In the present contribution, we report the finding of populations of this species in the semiarid region of La Pampa and Mendoza provinces in central-western Argentina. The present findings extend the invasive distributional range of *R. decollata* westwards through more than 1000 km from the site where it was detected in 1988. Although no damages to agricultural areas have been reported to the moment in Argentina, the presence of *R. decollata* in semiarid areas warns us about its potential as an important plague in the future.

Keywords Argentina · *Rumina decollata* · Terrestrial snail · La Pampa · Mendoza

C. G. De Francesco (✉)
Centro de Geología de Costas y del Cuaternario,
Universidad Nacional de Mar del Plata,
CC 722, 7600 Mar del Plata, Argentina
e-mail: cgdefra@mdp.edu.ar

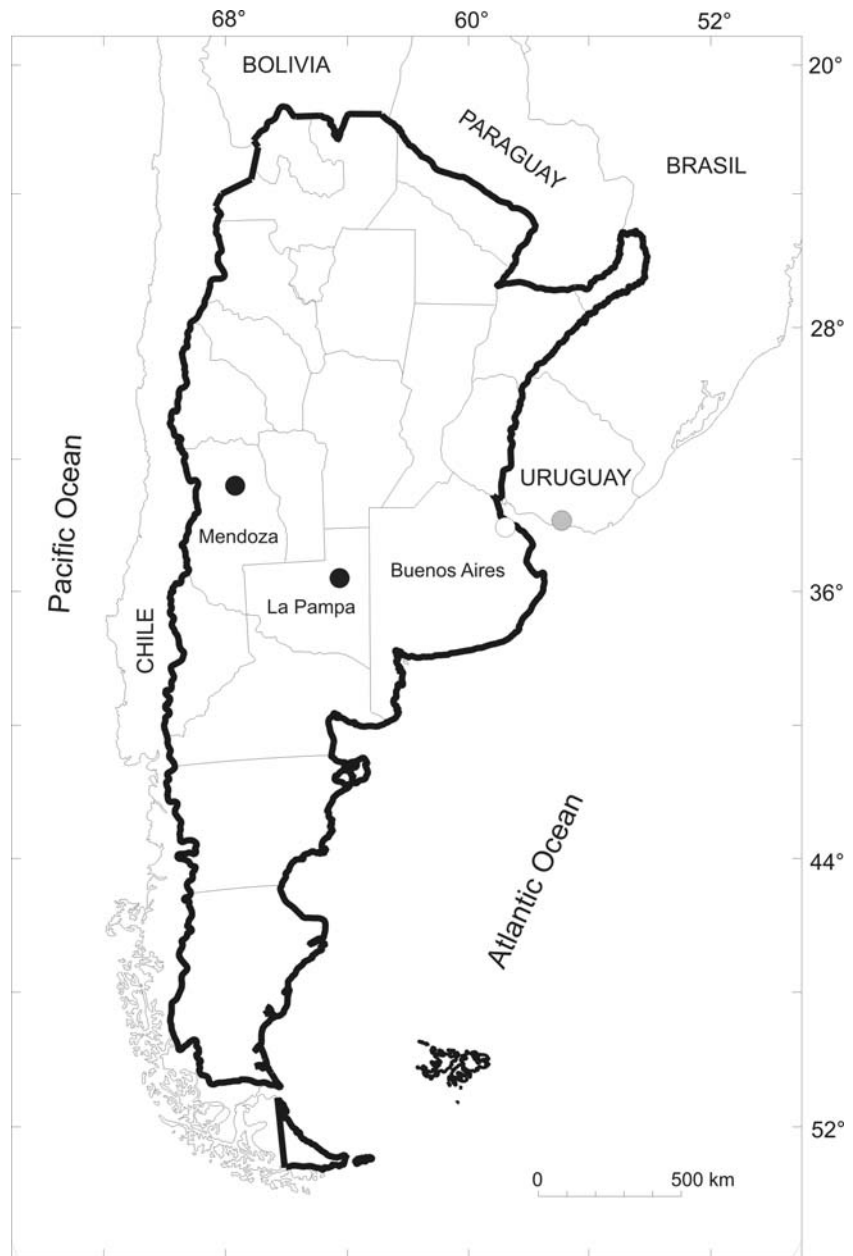
H. Lagiglia
Museo de Historia Natural de San Rafael,
Parque Mariano Moreno, San Rafael 5600, Argentina

Introduction

The pulmonate land snail, *Rumina decollata*, is a highly invasive gastropod native from the Mediterranean area (Cowie 2001). It is likely that the species evolved in the arid environment of North Africa and successfully spread to other continents, where achieved extensive distributions and high population numbers (Selander and Kaufman 1973; Cowie 2001). *R. decollata* was introduced to North America before 1822 and by 1915 it was distributed throughout Mexico, Bermuda and Cuba (Selander and Kaufman 1973). Most of these early introductions were probably accidental with horticultural plants (Cowie 2001). The species was also deliberately introduced into southern California in the 1970s to help control the brown garden snail, *Cornu aspersum*. Since then it has been dispersed relatively indiscriminately not only in California but elsewhere, by the general public, by citrus growers and by official agencies (Cowie 2001).

In 1988, *R. decollata* was recorded for the first time in Argentina, in the northeastern Pampas of the Buenos Aires Province (Miquel 1988; Fig. 1). It has also been reported in other parts of the world, e.g. Uruguay (Miquel et al. 1995), China (Chang and Chung 1993) and Japan (Mashino 1992, 2001; Minato and Uozumi 1992). Whether it was deliberately or inadvertently introduced to those localities is not known (Cowie 2001).

Fig. 1 Location map showing the historical distribution of *Rumina decollata* in Argentina and Uruguay in 1988 (white circle), 1995 (gray circle) and 2003 (black circle) (data from Miquel 1988; Miquel et al. 1995 and present work)



The preliminary findings of *R. decollata* in Argentina were located in a region characterized by a humid mesothermal climate with no water deficit (Prohaska 1976). In this contribution we report the finding of populations of this species in the semiarid region of La Pampa and Mendoza provinces (Fig. 1) in central-western Argentina. We discuss the implications of these findings for the possible spread of this species towards other semiarid regions of South America.

Materials and methods

Between 2003 and 2004, observations and samplings were made of *R. decollata* in urban areas of Santa Rosa city in La Pampa province, Argentina (Fig. 1). Additionally, in October 2005, one of us (H. Lagiglia) accidentally found a lot of specimens of *R. decollata* living in a garden in Mendoza city. The sampled snails were kept in plastic bags and taken to the laboratory.

Measurements of shell length and shell width were taken with a vernier caliper to the nearest 0.1 mm. Voucher specimens were reposit in the mollusk collection of the Museo de Historia Natural de San Rafael, Argentina.

Results and discussion

Snails collected in La Pampa and Mendoza were found alive in household gardens. They were recorded after a rainy period, being easily observed crawling over the ground as well as over garden plants. As snails were not observed in these sites during dry periods, we infer that they would have remained burrowed in the upper centimeters of soil. This particular behavior, that has also been observed in other countries (Fisher et al. 1980), prevents their direct observation and, consequently, the estimation of population densities in a regional extent.

Snails were only recorded in urban areas, which probably relates to the higher availability of plants found there. In the southeastern United States, the species has a spotty distribution, occurring locally in some urban areas. It is much more common and regular in occurrence in Texas, however, where it inhabits gardens and agricultural areas and has also invaded riparian and other native habitats (Selander and Kaufman 1973). Despite the urban distribution of this species observed in Mendoza and La Pampa, we

do not discard its presence in native habitats since these areas have been at present little explored. To the moment, the absence of citations of populations of this species in most argentinean provinces together with the low abundance of snails found in the present study suggest that these sites have been recently colonized. However, a focused survey work is needed to gain a far clearer picture of the real extent of the invasion.

Shell height varied between 1.68 and 2.53 mm (average 2.18 ± 0.27 cm) and exhibited 4–7 whorls (Fig. 2). These dimensions are consistent with the usual sizes reported for specimens from other countries (see Carr 2002). Little is known of the ecology and behavior of *R. decollata*. It is considered an omnivorous snail that preys upon plants and other snails. It has a pronounced predilection for dry climates, while rejects wet ones (Moreno-Rueda 2002). Juveniles grow rapidly and exhibit a high survival rate (Miquel et al. 1995). By reason of its extensive range and regional abundance, *R. decollata* ranks as one of the most successful colonizing snails in North America (Selander and Kaufman 1973). According to its invasive potential, the presence of *R. decollata* may constitute a serious threat for the horticultural productivity. In Argentina, isolated cases of predation on black mulberries, *Morus nigra*, and garden nasturtium, *Tropaeolum majus*, have already been reported (Miquel 1988). In addition, *R. decollata* can prey eggs and juveniles of autochthonous molluscs and,

Fig. 2 Shells of *Rumina decollata* from Mendoza city, Argentina. Scale bar: 0.5 cm



therefore, also represent a threat to the local biodiversity. However, at present time it may be possible to eradicate *R. decollata* from the small semiarid areas where it has been reported through the development of practical actions, such as manual removal of snails. It is known that the rapid discovery of a newly introduced species might allow its elimination on a relatively small scale and with a greater probability of success owing to its less widespread distribution (Myers et al. 2000).

The present findings extended the distributional range of *R. decollata* westwards through more than 1000 km from the site where it was detected for the first time in 1988. With the scattered observations presented here, it is not possible to demonstrate if the snails recorded in La Pampa and Mendoza are the result of a natural expansion from the point of the first finding or would have been transported passively. Therefore, it is not possible at present to demonstrate a significant invasive potential of *R. decollata* in Argentina. The spread of *R. decollata* should be studied at the regional as well as local scale to document its current distribution and potential for spread.

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