



An annotated checklist of the land snail family Orthalicidae (Gastropoda: Pulmonata: Orthalicoidea) in Ecuador, with notes on the distribution of the mainland species

ABRAHAM S.H. BREURE¹ & FRANCISCO J. BORRERO^{2,3}

¹National Museum of Natural History / Naturalis, P.O.Box 9517, Leiden, the Netherlands; E-mail: breure@xs4all.nl

²Cincinnati Museum Center, 1301 Western Avenue, Cincinnati, Ohio 45203, USA; ³Cincinnati Country Day School.

E-mail: borrerof@countryday.net

Table of contents

Abstract	1
Introduction	2
Methods	3
Checklist of species	4
SUBFAMILIA BULIMULINAE	5
Genus <i>Plekocheilus</i> Guilding, 1828	6
Genus <i>Thaumastus</i> Albers, 1860	8
Genus <i>Bostryx</i> Troschel, 1847	10
Genus <i>Bulimulus</i> Leach, 1814	10
Genus <i>Naesiotus</i> Albers, 1850	11
Genus <i>Scutalus</i> Albers, 1850	19
Genus <i>Stenostylus</i> Pilsbry, 1898	19
Genus <i>Drymaeus</i> Albers, 1850	20
Genus <i>Simpulopsis</i> Beck, 1837	26
SUBFAMILIA ORTHALICINAE	26
Genus <i>Sultana</i> Shuttleworth, 1856	26
Genus <i>Orthalicus</i> Beck, 1837	27
Genus <i>Corona</i> Albers, 1850	28
Genus <i>Porphyrobaphe</i> Shuttleworth, 1856	29
Genus <i>Hemibulimus</i> Martens, 1885	30
Incertae sedis	30
Discussion	31
Distribution of genera—modelled by Maxent software	32
Directions for further research	37
Acknowledgements	38
Literature cited	38

Abstract

The family Orthalicidae is wide-spread in the Neotropics and a major member of the land snail fauna of most South American countries. This checklist presents the species known to exist in Ecuador. It is based on data from relevant literature and museums world wide. There are 168 species in total, 63 of which occur on the Galápagos; 9 species are listed for the first time from this country. New synonymies are: *Bulimus abscissus* Pfeiffer, 1855 = *Drymaeus* (*D.*) *fallax* Pfeiffer, 1855.

iffer, 1853; *Bulimus caliginosus* Reeve, 1849 = *Bulimus irregularis* Pfeiffer, 1848 = *Naesiotus quitensis* (Pfeiffer, 1848). In the geographical analysis only the mainland species have been taken into account. The species were sampled at 128 mainland localities, 46 of which have been sampled after 1950, indicating that some parts of the country are undersampled. The potential distribution has been analysed at (sub-)generic level, using Maxent and GIS software. Finally four directions for future research are suggested: strengthening the locality database, improved sampling for better modelling, analysis of models on a greater spatial scale and phylogeographic analyses.

Key words: Mollusca, Bulimulinae, Orthalicinae, systematics, new synonym, endemism, distribution modelling.

Introduction

With the world wide decline of floras and faunas, especially in the tropics, biodiversity research has gained more interest in recent years. Land snails are relatively poorly represented in this type of research. For a better understanding of overall patterns of biodiversity, rates of extinction, areas of endemism and conservation issues would need more attention of malacologists. Malacological papers dealing with the Neotropics mainly concern taxonomy at species level and there are very few comprehensive works that cover higher taxa or country levels. A positive exception is the recent work of Simone (2006) for Brazil. Of the 612 land snails listed for this country, 305 belong to the family Orthalicidae (nearly 50%). Similar rates are known or expected for other South American countries, making this family a major component of the land snail fauna of this continent. The family is relatively well studied at the genus level (Breure 1979 and references therein), but is in need of phylogenetic studies to clarify the relationships between the subfamilies hitherto recognized.

Within South America, Ecuador is generally recognized as one of the countries with a high biodiversity (Myers *et al.* 2000, Brooks *et al.* 2006). The country has 22 provinces (including the Galápagos Islands), covering a total area of 269.939 km². The mainland is divided into three regions: 1) *La Costa*, the low-lying coastal plain in the western part of the country; 2) *La Sierra*, the high-altitude belt running north to south along the center of the country is part of the Andes mountain range; and 3) *El Oriente*, the Amazon rainforest areas in the eastern part of the country (Fig. 1A).

This checklist enumerates the taxa known to (possibly) exist in Ecuador belonging to the land snail family Orthalicidae Albers, 1860 [= Familia Bulimulidae Crosse & Fischer, 1873 (*sensu lato*) = Superfamilia Orthalicoidea Martens, 1860]. The list is based on the taxa mentioned in Breure (1979), on unpublished data from several collections—either personally checked or based on available databases—and on data taken from publications. All taxa are attributed to species following the works of Pilsbry and recent authors. Species are classified in (sub-)genera following the last revision for the subfamily Bulimulinae Tryon, 1867 (Breure 1979) and that of Zilch (1959–1960) for the subfamily Orthalicinae Thiele, 1931. The classification at (sub-)familial level follows Bouchet & Rocroi (2005). A critical review of this list will undoubtedly lead to synonymization of several taxa, thus this document can also be viewed as a longlist of the representatives of this family in the Ecuadorian malacofauna.

The land snail fauna of Ecuador has been sampled mainly during the 19th and 20th centuries. Old localities on the mainland were predominantly in the “Valley of the Volcans” and less often in the coastal area or in the eastern part of the country. The only known comprehensive survey of the continental Ecuadorian malacofauna is the one by Cousin (1887). He lists 96 taxa of what is here considered to be Orthalicidae. Over the past 50 years collections on the mainland were mainly made by K. Campell, R.W. McDiarmid, F.G. Thompson and N.H. Williams, who deposited their material all in museums in the USA. The only known active Ecuadorian malacologist today is M. Correoso from Quito (Correoso 2002).

The Galápagos Islands are a special case. Famous for their unique fauna which inspired Charles Darwin’s “Origin of species”, its land snails belong mainly to the Bulimulinae. They have not been listed before. These snails are resulting from a remarkable radiation which has led to many species occupying a niche habitat on one or a few islands. Many of these are now on the IUCN Red List of endangered species (see Parent 2003).