TERRESTRIAL MOLLUSKS FROM THE REGION OF CORUMBÁ AND MACIÇO DO URUCUM, SW BRAZIL

RODRIGO B. SALVADOR[1,2], EDUARDO COLLEY[3] & LUIZ R.L. SIMONE[3]

[1]Staatliches Museum für Naturkunde Stuttgart. Rosenstein 1, 70191, Stuttgart, Baden-Württemberg, Germany.
[2]Museum of New Zealand Te Papa Tongarewa. 169 Tory Street, 6011, Wellington, New Zealand.
[3]Museu de Zoologia da Universidade de São Paulo. Avenida Nazaré 481, 04263–000, São Paulo, SP, Brazil.

Abstract The city of Corumbá and the neighbouring Maciço do Urucum are located in SW Brazil, at the border with Bolivia. The peculiar biogeographic location, the fact that it is inserted in the unique Pantanal biome and the environmental disturbances caused by mining activities make this area interesting for faunal studies. Since no such studies exist for terrestrial gastropods from this region, herein we studied newly collected material from it alongside historical specimens from several museum collections. Since Corumbá is type locality of several species, examination of type material allowed a taxonomic revision of them. Here, we list 19 species from Corumbá and Urucum and synonymize three of the region's supposed endemics: Drymaeus lynchi *Parodiz, 1946 is considered synonymous with* D. poecilus *(d'Orbigny, 1835);* Megalobulimus bereniceae *(Morretes, 1952) is considered synonymous with* M. intertextus *(Pilsbry, 1895);* Solaropsis paravicinii *(Ancey, 1897) is considered synonymous with* S. heliaca *(d'Orbigny, 1837).* Helicina fulva *d'Orbigny, 1835 is reported for the first time in Brazil and the following three species have their first record from Mato Grosso do Sul state:* Aperostoma inca *(d'Orbigny, 1835),* Naesiotus montivagus *(d'Orbigny, 1835) and* Orthalicus phlogerus *(d'Orbigny, 1835).*

Key words Bolivia, Mato Grosso do Sul, Pantanal, Pulmonata, type locality.

INTRODUCTION

The city of Corumbá, in SW Brazil (Fig. 1) sits on the border with Bolivia, close to Maciço do Urucum ("Urucum Massif"). Urucum is known worldwide for its rich mineral deposits (especially manganese and iron), which are thoroughly exploited (Brito, 2011). Given its peculiar biogeographic location, the fact that it is inserted in the unique Pantanal biome (the world's largest freshwater floodplain) and also the environmental disturbances the mining activities cause (Carvalho *et al*., 2008), Corumbá is an interesting locality for faunal studies.

However, few faunal studies were undertaken in Corumbá, even in typically well-sampled groups such as birds (Tubelis & Tomas, 2003; Nunes *et al*., 2010), and the terrestrial gastropods were never the focus of any studies. Curiously, there have been isolated collection efforts in the region (Corumbá is the type locality of some species) since the mid-19th century and this material was scattered throughout several institutions, mainly in Europe and the United States.

Recently, the Museum of Zoology of São Paulo, Brazil (MZSP) received a donation of land snail shells collected on the Maciço do Urucum region (Fig. 1). These new specimens proved to be very diverse and included some new records for the region, which prompted us to search for more material in the main museum collections worldwide that could harbour specimens from Corumbá and Maciço do Urucum. Therefore, herein we present a list of all known species from this region. Furthermore, examination of type material from Corumbá and comparison with other pertinent types allowed us to undertake a taxonomic revision of some of the supposed endemics. Here, we list 19 species from Corumbá and Urucum and consider three previously recognised species as synonyms.

Contact author : salvador.rodrigo.b@gmail.com

MATERIAL AND METHODS

The material studied in the present work is housed in the following collections: AMNH, ANSP, FLMNH, FMNH, MACN, MNHN, MZSP, NHMUK, NMW, RBINS, UMMZ, USNM, ZSM. The full list of analysed material can be found below under each species entry. The lists indicate only the specimens from the area of interest for the present work; further material studied, such as types, are mentioned in the "Remarks" section of each species when appropriate.

Identification of the species was based on specialised literature (original descriptions, eventual revisionary works and the catalogue by Simone, 2006) and further specimens (including types) from the collections mentioned above.

Figure 1 Map showing the municipalities of Corumbá, in Mato Grosso do Sul state, Brazil, and Puerto Suárez, in Santa Cruz department, Bolivia, as well as the region of the Maciço do Urucum (indicated by the checkered pattern). Abbreviations: Bol=Bolivia; GO=Goiás state; MG=Minas Gerais state; MT=Mato Grosso state; Par=Paraguay; PR=Paraná state; SP=São Paulo state.

Measurements were taken either with a digital caliper (for larger specimens) or with the aid of the software Zeiss Axiovision SE64 Rel 4.8 or ImageJ (Rasband, 2012).

Below is a list of all species known from the region of Corumbá and Maciço do Urucum, in Brazil, and also the material we could find from Puerto Suárez, in Bolivia (right across the border from Corumbá; Fig. 1). The list is based on museum specimens and complemented with literature data when no actual specimens could be located. All species are figured below, with notes on their geographical distribution, eventual range extension, and, when applicable, remarks on their taxonomy and/or conchological characters.

Abbreviations

Institutional collections: AMNH, American Museum of Natural History (New York, USA); ANSP, Academy of Natural Sciences of Drexel University (Philadelphia, USA); FLMNH, Florida Museum of Natural History (Gainesville, USA); FMNH, Field Museum Of Natural History (Chicago, USA); MACN, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Buenos Aires, Argentina); MNHN, Muséum National d'Histoire Naturelle (Paris, France); MZSP, Museu de Zoologia da Universidade de São Paulo (São Paulo, Brazil); NHMUK, Natural History Museum (London, UK); NMW, Amgueddfa Cymru, National Museum Wales (Cardiff, Wales); RBINS, Royal Belgian Institute of Natural Sciences (Brussels, Belgium); UMMZ, University of Michigan Museum of Zoology (Michigan, USA); USNM, Smithsonian National Museum of Natural History (Washington, D.C., USA); ZSM, Zoologische Staatssammlung München (Munich, Germany).

Shell dimensions: H, shell length; D, shell greatest width (perpendicular to H).

Specimen data: col., collector; coll., collection.

Systematics

NERITIMORPHA
Superfamily Helicinoidea
Family Helicinidae
Genus *Helicina* Lamarck, 1799

Helicina fulva d'Orbigny, 1835
(Figs 2–8)

Helicina fulva d'Orbigny, 1835: 28; d'Orbigny, 1837: 558, pl. 46, figs 1–5.

Type locality Bolivia: Chiquitos province.

Known distribution Brazil (Corumbá) and Bolivia (Wagner, 1907–1911).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 14453 (1 shell; Serra do Urucum; K. Lenko & C.T. Carvalho col., 30/xi/1960), MZSP 15244 (1 shell; Serra do Urucum; K. Lenko & C.T. Carvalho col., xi/1960), MZSP 133169 (2 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014).

Remarks The present material compares exceedingly well with the type series of *H. fulva* (Figs 6–8; NHMUK 1845.12.4.282, 9 syntypes). The species can be diagnosed by its rounded profile, the relatively tall spire, the strong spiral ornamentation and the shell colour (yellow to light brown,

Figures 2–8 *Helicina fulva*; shells in scale to one another **2–3** MZSP 24453 (H=8.3mm, D=11.1mm) **4–5** MZSP 15244 (H=8.0mm, D=11.1mm) **6–8** Syntype, NHMUK 1845.12.4.282 (H=8.3mm, D=11.5mm) **9–15** *Aperostoma inca*; shells in scale to one another **9** Operculum, NHMUK 1908.6.12.35–37 (diameter=12.5mm) **10–12** NHMUK 1908.6.12.35–37 (H=19.7mm, D=29.4mm) **13–15** MZSP 133162 (H=18.9mm, D=29.4mm) **16–17** *Angustipes robustus*, holtype, MACN 12257 (body length=approx. 40mm).

with white peristome and "umbilical" area). This species has never been properly reported from Brazil before; Wagner (1907–1911) cites material from Corumbá, but indicates Bolivia rather than Brazil as the country.

CAENOGASTROPODA
Superfamily Cyclophoroidea
Family Neocyclotidae
Genus *Aperostoma* Troschel, 1847

Aperostoma inca (d'Orbigny, 1835)
(Figs 9–15)

Cyclostoma inca d'Orbigny, 1835: 29; d'Orbigny, 1837: 361, pl. 46, figs 21–23.
Cyclostoma Colombiensis Férussac *in* d'Orbigny, 1835: 29 [*non* Da Costa, 1901].

Type locality Bolivia: Santa Cruz department, Yungas.

Known distribution Colombia, Peru, Brazil (Amazonas, Pará, Rondônia and Mato Grosso states), Bolivia, Paraguay and Argentina (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 133162 (13 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014). BOLIVIA. **Santa Cruz**; Puerto Suárez, NHMUK 1908.6.12.35–37 (3 shells +2 opercula).

Remarks The present specimens compare very well to the type material (NHMUK 1854.12.4.286/287, 10 syntypes; Simone, 2006: fig. 45B). The species can be identified by its relatively large size (usually from 3 to 4cm in width), strongly circular aperture and the greenish colour. The present specimens, however, show some variation in shell colour, from green (Figs 10–12) to darker and more brownish tones (Figs 13–15). Despite being a very widespread species (Simone, 2006), this is the first record from Mato Grosso do Sul state.

PULMONATA
Systellommatophora
Superfamily Veronicelloidea
Family Veronicellidae
Genus *Angustipes* Colosi, 1922

Angustipes robustus (Colosi, 1922)
(Figs 16–17)

Vaginula robusta Colosi, 1922: 491,

Type locality Brazil: Mato Grosso do Sul state, Urucum and "Carandasinho".

Known distribution Brazil (Corumbá and Maciço do Urucum), Paraguay and Argentina (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MACN 12257 (holotype).

Remarks This species is only known from its type material.

Stylommatophora
Superfamily Orthalicoidea
Family Bulimulidae
Genus *Bulimulus* Leach, 1814

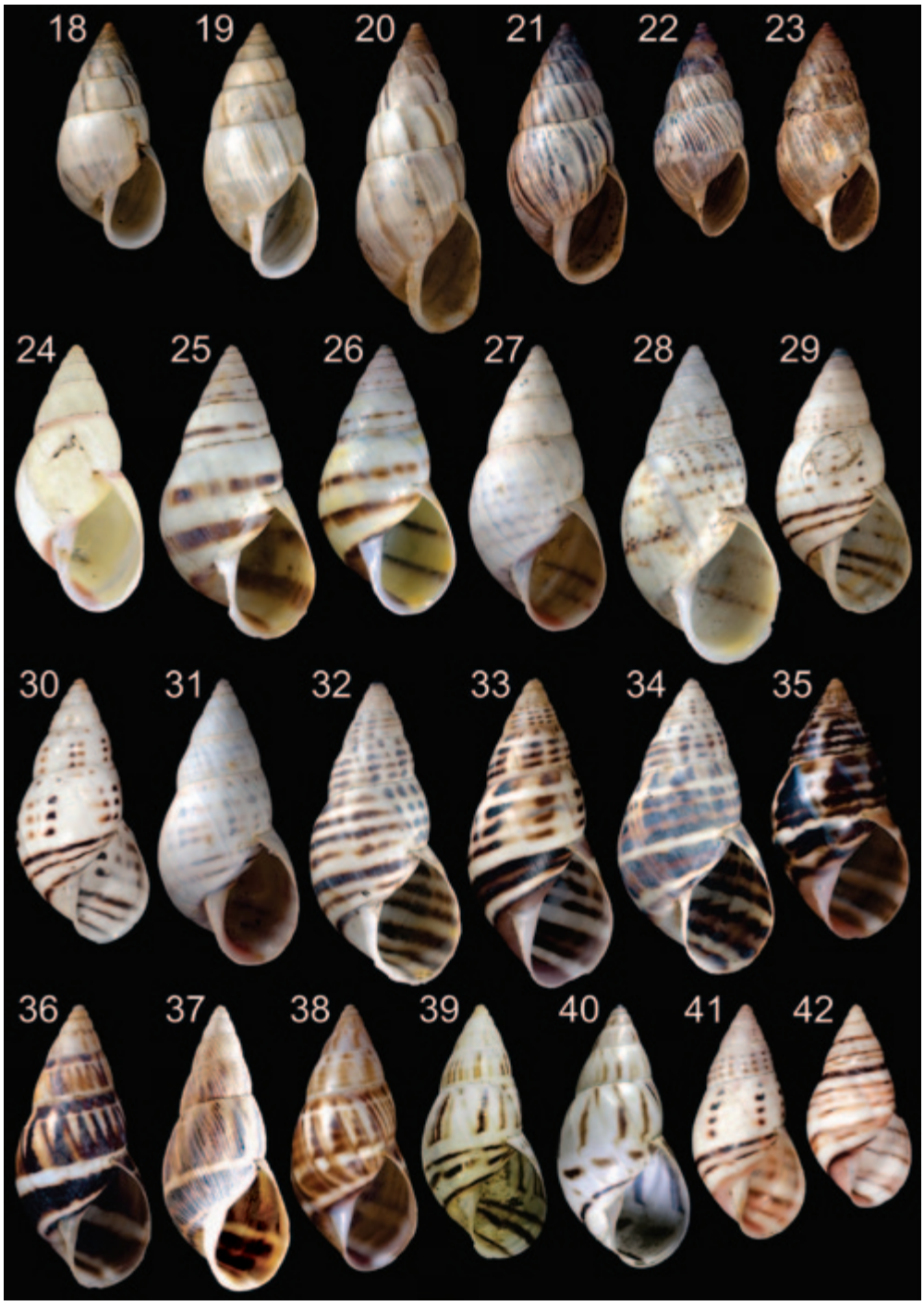
Bulimulus corumbaensis Pilsbry, 1897
(Figs 18–23)

Bulimus amoenus Bonnet, 1864: 70, pl. 6, fig. 2 [*non* Pfeiffer, 1847].
Bulimulus corumbaensis Pilsbry, 1897: 68, pl. 14, figs 3–8.

Type locality Brazil, Mato Grosso do Sul state, Corumbá.

Known distribution Brazil (Mato Grosso and Mato Grosso do Sul states), Paraguay (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, ANSP 25650 (5 shells; H.H. Smith col.), ANSP 156696 (75 shells; on royal palm along street; J.A.G. Rehn col., 18/xi/1931), ANSP 156697 (1 shell, teratological; on royal palm along street; J.A.G. Rehn col., 18/xi/1931), ANSP 426483 (3 shells; north Corumbá; v/1988, I. Wistar Morris III coll.), ANSP 426484 (3 shells; I. Wistar Morris III coll.), ANSP 428482 (3 shells; I. Wistar Morris III coll.), ANSP 428483 (4 shells; I. Wistar Morris III coll.), FLMNH 109609 (2 shells; H.H. Smith col., 1885, T.H. Aldrich coll.), FLMNH 166198 (1 shell; J.D. Haseman col., 11/v/1909, McGinty coll.), FMNH 31258 (2 shells), FMNH 53068 (paratypes, 6 shells; H.H. Smith col., 1896),



Figures 18–23 *Bulimulus corumbaensis*; shells in scale to one another **18** MZSP 16354 (H=24.2mm) **19** MZSP 3391 (H=27.4mm) **20** MZSP 15252, spc #1 (H=33.1mm) **21** MZSP 15252, spc #2 (H=27.9mm) **22** MZSP 15245, spc #1, juvenile (H=23.0mm) **23** MZSP 15245, spc #2 (H=24.5mm) **24–42** *Drymaeus poecilus*; shells in scale to one another **24** RBINS.10591.MT.1881, syntype of *Bulimus poecilus ictericus* (H=29.2mm); image is a courtesy of F. Trus. **25** MZSP 133164, spc #1 (H=34.0mm) **26** MZSP 133164, spc #2 (H=31.3mm) **27** MZSP 29638 (H=33.2mm); figured by Simone (2006: fig. 462) as *D. minor* **28** MZSP 133165 (H=37.0mm) **29** MZSP 3468 (H=31.2mm) **30** ANSP 70394 (H=30.0mm); image is a courtesy of P. Callomon **31** MZSP 29638 (H=33.2mm) **32** MZSP 133166 (H=35.2mm) **33** MZSP 107994 (H=36.0mm) **34** MZSP 133163 (H=34.2mm) **35** MZSP 107993, spc #1 (H=30.1mm); juvenile **36** MZSP 7142 (H=32.7mm) **37** NHMUK 1908.6.12.6–15 (H=32.9mm) **38** MZSP 107993, spc #2 (H=30.8mm); juvenile **39** Paratype of *Drymaeus lynchi*, MACN 1344 (H=28.0mm); juvenile **40** Holotype of *Drymaeus lynchi*, MACN 1344 (H=30.0mm); juvenile **41** ANSP 404329 (H=27.2mm); image is a courtesy of P. Callomon **42** ANSP 179222 (H=24.0mm); image is a courtesy of P. Callomon.

FMNH 57060 (2 shells; M.A. Klappenbach col., 1955), FMNH 57063 (22 shells; M.A. Klappenbach col., ix/1955), FMNH 115876 (9 shells; B. Malkin col., 29/v/1960), FMNH 119257 (2 shells; H.H. Smith col.), FMNH 126212 (2 shells; H.H. Smith col.), FMNH 126888 (2 shells; J.D. Haseman col., 11/v/1909), MZSP 3388 (2 shells; Silvestre col.), MZSP 3391 (3 shells; Steinbach col., 1904), MZSP 7144 (20 specimens; E. Garbe col., x/1917), MZSP 7145 (21 shells; E. Garbe col., x/1917), MZSP 7755 (3 shells; A.M. Ribeiro col.), MZSP 15247 (7 shells; Serra do Urucum; K. Lenko & C.T. Carvalho col., 1960), MZSP 15251 (4 shells; Imbirissú; K. Lenko & C.T. Carvalho col., xii/1960), MZSP 15252 (12 shells; Imbirissú; K. Lenko & C.T. Carvalho col., xii/1960), MZSP 15254 (4 shells; Serra do Urucum; K. Lenko & C.T. Carvalho col., x/1960), MZSP 16354 (100 shells; B. Malkin col., v/1964), MZSP 29740 (8 specimens; K. Lenko & C.T. Carvalho col., xi/1960), MZSP 29802 (9 shells; Serra do Urucum; K. Lenko & C.T. Carvalho col., 30/xi/1960), MZSP 63702 (11 shells; L.R.L. Simone col., 01/iii/1983), MZSP 112553 (4 shells; x/1972, J. Vaz coll.), MZSP 133168 (1 shell; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), NHMUK 1892.9.26.1–6 (6 shells; S. Moore); NHMUK 1903.3.27.17–33 (17 shells; A. Robert), NHMUK 1908.6.12.21–24 (4 shells; Corumbá, Mato Grosso do Sul state), USNM 198331 (3 shells; Rolle col., 1904), USNM 307454 (3 shells), USNM 307455 (>20 shells; Smith coll.), ZSM 20170325 (10 shells; road to airport; M.A. Klappenbach col., W. Blume coll. 11854), ZSM 20170340 (1 shell; F. v. Heimburg coll.). BOLIVIA. **Santa Cruz**; Puerto Suárez, NHMUK 1908.6.12.2–5 (4 shells), NHMUK 1908.6.12.16–20 (5 shells), ZSM 20170327 (86 shells; Zischka col., 1957), ZSM 20170329 (100 shells; Zischka col., 1957).

Remarks This species was originally described from Corumbá and is diagnosed by its tall and narrow (often trapezoid) aperture and by its usual colour pattern (light background with fine axial brown stripes; Figs 18–20), although the latter can be rather variable (Pilsbry 1897; Lanzieri & Rezende, 1965). The shell can go from nearly entirely light with scarce axial brown stripes (Fig. 19) to its apparent reverse, *i.e.*, brown with axial white stripes (Figs 22–23). Intermediate stages of colouration can also be observed (Fig. 21). Finally, the brown portions of the shell can go from very dark (Figs 21–22) to lighter and more yellowish tones (Figs 19, 23).

While most specimens display the typical overall shell shape (Figs 18–19), this can vary somewhat, from taller and slenderer shells (Fig. 20; rare specimens that usually display up to one extra whorl, resulting in an overall larger shell) to broader ones (Fig. 21). The species' anatomy, including radular characters, was described by Lanzieri & Rezende (1965) based on topotypes. The large number of specimens present in museum collections (stemming from only a few collection efforts) seem to indicate that *B. corumbaensis* is very abundant in the area.

Genus *Drymaeus* Albers, 1850

Drymaeus poecilus (d'Orbigny, 1835) (Figs 24–42)

Helix (Cochlogena) pœcila d'Orbigny, 1835: 11.
Bulimus pœcilus d'Orbigny, 1837: 268, pl. 31, figs 1–10.
Bulimus pœcilus var. *major* d'Orbigny, 1837: 269.
Bulimus pœcilus var. *minor* d'Orbigny, 1837: 269.
Bulimus pictus Bonnet, 1864: pl. 5, figs 4–6, pl. 6, fig. 1.
Bulimus poecilus var. *icterica* Ancey, 1892: 92.
Drymaeus lynchi Parodiz, 1946: 1, pl. 1, figs 1–3. [n. syn.]

Type locality Bolivia: Chiquitos province (see also Breure & Ablett, 2014).

Known distribution Bolivia, Brazil (Tocantins, Mato Grosso, Mato Grosso do Sul, Minas Gerais and São Paulo states), Paraguay and Argentina (Cuezzo *et al*., 2013; Birckolz *et al*., 2016).

Material studied BRAZIL. **Mato Grosso and/or Mato Grosso do Sul**; RBINS.10591.MT.1881 (syntype of *Bulimus poecilus icterica*; Dautzenberg coll.). **Mato Grosso do Sul**; Corumbá, AMNH 55695 (3 shells; Urucum; Roosveltian Exp., 1914), ANSP 70394 (7 shells; dry woods, on trees; H.H. Smith col., 1897), ANSP 70395 (6 shells; dry woods, on trees; H.H. Smith col., 1897), ANSP 156698 (1 shell; on royal palm along street; J.A.G. Rehn col., 18/xi/1931), ANSP 167562 (1 shell; P.P. McGinty coll., 1936), ANSP 179222 (2 shells; T.L. McGinty coll., 1943), ANSP 404329 (2 shells; 19°00'N 57°35'W; J. Falco col., 1980, D. Naide & J. Naide coll.), ANSP 448449 (3 shells; near

cemetery; I. Wistar Morris III coll.), ANSP 448463 (2 shells; J. Falco col.; I. Wistar Morris III coll.), FLMNH 109337 (5 shells; H.H. Smith col., 1885, T.H. Aldrich coll.), FLMNH 109338 (1 shell; H.H. Smith col., 1885), FLMNH 109340 (1 shell; H.H. Smith col., 1885, T.H. Aldrich coll.), FLMNH 109341 (1 shell; H.H. Smith, Webber coll.), FLMNH 161283 (1 shell; McGinty coll.), FLMNH 161285 (1 shell; McGinty coll.), FLMNH 176972 (1 shell), FLMNH 482947 (1 shell; near cemetery; E. Hunter), FMNH 53066 (4 shells; H.H. Smith col., 1896), FMNH 53067 (2 shells; H.H. Smith col., 19/xii/1896), FMNH 57058 (6 shells; M.A. Klappenbach col., ix/1955), FMNH 57059 (18 shells; M.A. Klappenbach col., ix/1955), FMNH 100759 (3 shells; upper Paraguay River), FMNH 119260 (2 shells; H.H. Smith col.), FMNH 125874 (2 shells; H.H. Smith col.), FMNH 146886 (1 shell), FMNH 202412 (2 shells), MACN 1344 (holotype +6 paratypes of *Drymaeus lynchi*), MZSP 3467 (1 shell; Rohde col., 1903), MZSP 3468a (1 shell; Steinbach col., 1904), MZSP 3468b (2 shells; Steinbach col., 1904), MZSP 7142 (2 shells; E. Garbe col., xi/1917), MZSP 7148 (5 shells; E. Garbe col., xi/1917), MZSP 7150 (13 shells; E. Garbe col., x/1917), MZSP 7153 (1 shell; E. Garbe col., xi/1917), MZSP 7155 (2 shells; E. Garbe col., xi/1917), MZSP 7660 (2 shells; A.M. Ribeiro col., 1913), MZSP 15236 (1 shell; Fazenda Santa Blanca; K. Lenko & C.T. Carvalho col., xi/1961), MZSP 15246 (2 shells; Serra do Urucum; K. Lenko & C.T. Carvalho col., xii/1960), MZSP 15248 (1 shell; Imbirissú; K. Lenko & C.T. Carvalho col., xii/1960), MZSP 15250 (1 shell; Imbirissú; K. Lenko & C.T. Carvalho col., xi/1960), MZSP 27676 (6 specimens; Imbirissú; K. Lenko & C.T. Carvalho col., 01/xii/1960), MZSP 27677 (8 specimens; Serra do Urucum; K. Lenko & C.T. Carvalho col., 30/xi/1960), MZSP 29638 (4 shell; E. Garbe col., x/1917), MZSP 107993 (7 shells; J. Falco col., J. Vaz coll.), MZSP 107994 (6 shells; J. Vaz coll.), MZSP 132293 (1 shell; J. Vaz coll.); MZSP 133163 (15 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), MZSP 133164 (12 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), MZSP 133165 (17 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), MZSP 133166 (2 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), MZSP 133167 (2 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014), NHMUK 1903.3.27.10–16 (6 shells), NHMUK 1908.6.12.6–15 (10 shells), NHMUK 20170259 (5 shells; H.E.J. Biggs coll.), NHMUK 20170260 (2 shells; H.E.J. Biggs coll.), NHMUK 20170261 (3 shells; V.W. MacAdrew coll.), USNM 198359 (3 shells; Rolle col.), USNM 218987 (1 shell; Felippone col.), USNM 218988 (1 shell; Felippone col.), USNM 307462 (>40 shells; H.H. Smith coll.), USNM 307467 (13 shells; Smith coll.), USNM 307560 (2 shells; Smith coll.), USNM 334539 (2 shells; Felippone col.), USNM 530578 (2 shells; A.C. Fulton coll.), ZSM 20170326 (1 shell; road to airport; M.A. Klappenbach col., W. Blume coll. 11854), ZSM 20170339 (3 shells; H. Rolle col., 1904), ZSM 20170341 (2 shells; W. Blume coll. 10395). BOLIVIA. **Santa Cruz**; Puerto Suárez, NHMUK 20170264 (2 shells), ZSM 20170328 (2 shells; Zischka col., 1957), ZSM 20170330 (2 shells; Zischka col., 1957), ZSM 20170342 (10 shells; Zischka col., 1957).

Remarks This species is extremely variable in colour pattern, as the vast type series shows (NHMUK 1854.12.4.152–157, 53 paralectotypes), with some slight variation in shell shape also occurring (Bonnet, 1864; Pilsbry, 1897; Breure & Ablett, 2014). Colour pattern goes from a variable number of spiral lines (which can be either whole or dotted; Figs 25–32) to dual-coloured spiral bands (Figs 33–35) and axial marks (Figs 39–40), and sometimes even a flame-like appearance similar to some *Leiostracus* spp. (Figs 36–38). There is virtually every possible combination of these colour patterns and some shells are even almost entirely white, except for a single spiral band (Fig. 24).

Some of the smaller specimens (Figs 41–42) show a pattern of several fine spiral bands and a reddish umbilical area (which is sometimes also seen in more "typical" *D. poecilus*: Figs 26, 29, 33); furthermore, in some specimens the areas between pairs of spiral bands may be equally reddish (Fig. 42; again, also seen in more "typical" *D. poecilus*: Figs 33–34). Since only shells are presently available to us, and as the overall shell shape (except for size) and protoconch sculpture (1¾–2 whorls, with reticulate pattern) are the same as typical *D. poecilus*, we consider this as simple morphological variation. In any case, the populations of *D. poecilus* along its

large distribution would no doubt benefit from a genetic study.

Drymaeus minor was originally described as a variety of *D. poecilus* and is usually treated as a synonym in the literature (Pilsbry, 1897; Breure & Ablett, 2014), despite occasionally appearing as a distinct species (*e.g.*, Simone, 2006: fig. 462; reproduced here as Fig. 27). Since *D. minor* is clearly one particular step in the colour variation (whole brown spiral bands on the abapical portion of the whorls and intermittent dotted bands on the apical area) seen in *D. poecilus*, it should be considered synonymous with it.

The same reasoning applies to *D. lynchi*, originally described from "Pozo de Vargas" in Bolivia (likely Santa Cruz department), which shows the coloured spiral bands on the abapical area of the whorls and dark (sometimes flame-like) axial markings on the adapical area (Figs 39–40). This colour pattern is likewise seen in the type series of *D. poecilus*, with the axial markings varying in strength (*e.g.*, Figs 36–38). Moreover, *D. lynchi* cannot be diagnosed by any other conchological trait. Therefore, we consider *D. lynchi* to be synonymous with *D. poecilus*. Actually, when describing this species, Parodiz (1946) recognised it looked like a colour morph of *D. poecilus*, but with the material and information available to him at the time, he considered it a distinct species rather than one step in a continuum of variation.

Overall shell shape also varies slightly in *D. poecilus*, ranging from somewhat narrower shells (*e.g.*, Figs 32, 36) to broader ones (*e.g.*, Figs 25, 34). Although the species show no teleoconch sculpture other than growth lines, there are some specimens (from a single lot, NHMUK 1908.6.12.6–15) curiously exhibiting a pattern of dense axial ribbing (Fig. 37).

Genus *Naesiotus* Albers, 1850

Naesiotus cutisculptus (Ancey, 1901)

Bulimulus cutisculptus Ancey, 1901: 92.

Type locality Brazil: Mato Grosso do Sul state, Corumbá.

Known distribution Brazil (Corumbá) (Simone, 2006).

Material studied None; literature data only.

Remarks *Naesiotus cutisculptus* is known only from its original description and its type material has not been located (Wood & Gallichan 2008). This species could be synonymous with other bulimulids from the region, such as *N. montivagus*.

Naesiotus montivagus (d'Orbigny, 1835)
(Figs 43–45)

Helix montivaga d'Orbigny 1835: 14.
Bulimus montivagus: d'Orbigny 1837: 275, pl. 34, figs 1–3.

Type locality Bolivia: "provincia Lagunensis"; restricted to Santa Cruz department by Breure (1975).

Known distribution Bolivia, Brazil (Mato Grosso state) and Paraguay (Simone, 2006). Although sometimes reported from Argentina (*e.g.*, d'Orbigny, 1835; Morretes, 1949; Breure & Coppois, 1978; Simone, 2006), the species does not occur there (Miquel, 1989; Breure & Ablett, 2014).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, ANSP 25673 (2 shells; H.H. Smith col.), ANSP 97674 (1 shell; Bolivia?; 1909), FLMNH 166197 (1 shell; McGinty coll.), FLMNH 166317 (3 shells; Bolivia?; McGinty coll.), FLMNH 178614 (1 shell; Cullurit col.), FMNH 57062 (10 shells; M.A. Klappenbach col., ix/1955), FMNH 125739 (2 shells; Agosta, Bolivia?), MZSP 3385 (2 shells; Steinbach col., 1904), USNM 198366 (3 shells; Rolle col., 1904). BOLIVIA. **Santa Cruz**; Puerto Suárez, ZSM 20170331 (1 shell; Zischka col., 1957).

Remarks The present specimens compare extremely well to the type material (NHMUK 1854.12.4.170, lectotype +5 paralectotypes; 1854.12.4.167, 8 paralectotypes; 1854.12.4.168, 7 paralectotypes; 1854.12.4.169, 5 paralectotypes; 1854.12.4.172, 5 paralectotypes), showing very little conchological variation except for overall shell colour (Figs 43–45). This is the first record of the species from Mato Grosso do Sul state.

Family Odontostomidae
Genus *Spixia* Pilsbry & Vanata, 1898

Spixia striata (Spix, 1827)
(Figs 46–49)

Figures 43–45 *Naesiotus montivagus*; shells in scale to one another **43** MZSP 3385, spc #1 (H=24.5mm) **44** MZSP 3385, spc #2 (H=24.1mm) **45** ANSP 97674 (H=24.8mm); image is a courtesy of the P. Callomon **46–49** *Spixia striata*; shells in scale to one another **46** ANSP 448443 (H=35.7mm); image is a courtesy of P. Callomon **47** NHMUK 20170268, spc #1 (H=32.8mm) **48** MZSP 3628 (H=36.9mm) **49** NHMUK 20170268, spc #2 (H=33.0mm) **50–51** *Orthalicus phlogerus*, MZSP 133170 (H=33.9mm) **52–54** *Streptartemon comboides*, MZSP 2694 (D=11.6mm); shell in scale with *S. decipiens* **55–57** *Streptartemon decipiens*, MZSP 2695 (D=13.9mm); shell in scale with *S. comboides* **58–60** *Streptaxis pilsbryi*, MZSP 2687 (H=6.8mm, D=10.3mm); shell in scale with *Streptartemon* spp. **61–62** *Anthinus turnix*, MZSP 7143 (H=50.0mm).

Clausilia striata Spix, 1827: pl. 14, fig. 2 [*in* Spix & Wagner, 1827].
Helix spixii d'Orbigny, 1835: 2.
Helix spixii var. *major* d'Orbigny, 1835: 2 [*nomen nudum*].
Helix spixii var. *minor* d'Orbigny, 1835: 2 [*nomen nudum*].
Pupa conspersa Potiez & Michaud, 1836: 160, pl. 16.
Pupa spixii var. *major* d'Orbigny, 1837: 320.
Pupa spixii var. *minor* d'Orbigny, 1837: 320.
Pupa turrita Anton, 1839: 47.
Bulimus wagneri Pfeiffer, 1842: 12.
Odontostomus striatus var. *bolshi* Martens, 1894: 163.
Odontostomus bergi Boettger & Rolle *in* Rolle, 1908: 160.
Odontostomus (*Euodontostomus*) *Saltensis* Holmberg, 1912: 151, figs 9–10.

Type locality Brazil: São Paulo state, São Paulo and São Sebastião.

Known distribution Bolivia, Brazil (Mato Grosso, Mato Grosso do Sul, Rio de Janeiro and São Paulo states), Paraguay and Argentina (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, ANSP 70383 (2 shells; under loose limestone; H.H. Smith col., 1897), ANSP 410131 (1 shell; D. Naide & J. Naide coll.), ANSP 428353 (2 shells; I. Wistar Morris III coll.), ANSP 448443 (3 shells; J. Falco col.; I. Wistar Morris III coll.), FLMNH 55695 (7 shells; mount of Corumbá; E. Duarte col., M.K. Jacobson coll.), FLMNH 166157 (1 shell; on ground in forest; L.P. Rusnov col., McGinty coll.), FLMNH 178688 (1 shell; Cullurit col.), FLMNH 267762 (1 shell; on ground in forest; J. Falco col., 1983), FLMNH 481289 (3 shells; airport; Hausman col., x/1955), FMNH 31440 (1 shell), FMNH 53071 (1 shell; H.H. Smith col., 1896), FMNH 57061 (8 shells; M.A. Klappenbach col.), FMNH 62369 (1 shell; H.H. Smith col.), FMNH 125719 (1 shell; H.H. Smith col.), MZSP 3628 (1 shell; Steinbach col., 1904), NHMUK 20170263 (2 shells; H.E.J. Biggs coll.), NHMUK 20170268 (3 shells; A.S. Kennard coll.), ZSM 20170332 (5 shells), ZSM 20170333 (6 shells; M.A. Klappenbach col., W. Blume coll. 10377), ZSM 20170334 (1 shell; Steinbach col., 1904, F. v. Heimburg).

Remarks This species has a wide distribution and a fair amount of conchological variation, as can be inferred by the several species and varieties now in synonymy (Breure & Schouten, 1985). Moreover, *Spixia paraguayana* (Ancey, 1892), also reported from Corumbá (Simone, 2006), is usually considered a subspecies of *S. striata* (*e.g.*, Breure & Schouten, 1985), although some authors rank it as a distinct species (*e.g.*, Simone, 2006).

Family Orthalicidae
Genus *Orthalicus* Beck, 1837

Orthalicus phlogerus (d'Orbigny, 1835)
(Figs 50–51)

Helix (Achatina) phlogera d'Orbigny, 1835: 8.
Bulimus phlogerus: d'Orbigny, 1837: pl. 29, figs 6–7.

Type locality Bolivia: Chiquitos province.

Known distribution Bolivia, Brazil (Ceará, Goiás, Mato Grosso, Minas Gerais and São Paulo states); there is also a doubtful record from Chile (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 133170 (4 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014).

Remarks Despite the present specimens being juvenile, they agree well with *O. phlogerus*, including comparison with a juvenile from the type series (NHMUK 1854.12.4.86, 6 syntypes). This is the first record of this species from Mato Grosso do Sul state.

Superfamily Streptaxoidea
Family Streptaxidae
Genus *Streptartemon* Kobelt, 1905

Streptartemon comboides (d'Orbigny, 1835)
(Figs 52–54)

Helix comboides d'Orbigny, 1835: 3; d'Orbigny, 1837: 233, pl. 23, figs 14–18.
Helix comboides var. *lævigata* d'Orbigny, 1837: 234.
Helix comboides var. *brasiliensis* Moricand, 1836: 417.

Helix comboides var. *edentula* Moricand, 1846: 154.
Helix comboides var. *elata* Moricand, 1846: 155.

Type locality Bolivia: Chiquitos province.

Known distribution Brazil (Corumbá), Bolivia and Paraguay (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, ANSP 62584 (1 shell; H.J. Campbell coll., 1891), FMNH 36818 (2 shells), FMNH 57055 (5 shells; M.A. Klappenbach col., ix/1955), FMNH 130226 (1 shell), FMNH 160494 (2 shells), MZSP 3694 (3 shells; Steinbach col., 1904), NHMUK 20170265 (1 shell; H.H. Godwin-Austen coll.), RBINS.10591 (2 shells; 16/vii/1907, Rolle col.; Dautzenberg coll.), ZSM 20170335 (2 shells; Morro de Corumbá; M.A. Klappenbach col., W. Blume coll. 9169), ZSM 20170338 (2 shells; F. v. Heimburg coll.).

Remarks Streptartemon comboides (NHMUK 1854.12.4.52/53, 11 syntypes) is characterised by its whorl profile, with bulging penultimate and body whorls (the latter also being markedly displaced from the shell axis) and aperture with three teeth (though the palatal tooth can vary in strength to the point of being almost absent).

Streptartemon decipiens (Crosse, 1865)
(Figs 55–57)

Streptaxis decipiens Crosse, 1865: 228.

Type locality "Chili (teste B. Wright)?" (Crosse, 1865).

Known distribution Brazil (NE region and Corumbá) and possibly Chile, if the type locality is correct (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, FMNH 36826 (1 shell), FMNH 57052 (4 shells; M.A. Klappenbach col., ix/1955), MZSP 3695 (3 shells; Steinbach col., 1904), RBINS.10591 (1 shell; Rolle col., 16/vii/1907, Dautzenberg coll.), ZSM 20170336 (1 shell; Morro de Corumbá; M.A. Klappenbach col., W. Blume coll. 11852).

Remarks Streptartemon decipiens (MNHN-IM-2000–30925, syntype) is distinguished from *S. comboides* by its slightly larger shell width, a larger number of whorls, a more step-like spire, and the body whorl less displaced from the shell axis. The type locality is already considered dubious in the original description (Crosse, 1865) and the records from NE Brazil (Jaeckel, 1952) could not be confirmed by actual specimens. As such, this species might have a more restricted distribution in the region of Mato Grosso do Sul and Bolivia.

Genus *Streptaxis* Gray, 1837

Streptaxis pilsbryi (Solem, 1956)
(Figs 58–60)

Artemon pilsbry Solem, 1956: 11, pl. 1, figs 4–6.

Type locality Brazil: Mato Grosso do Sul state, Salobra municipality.

Known distribution Known only from type locality (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, FMNH 57056 (5 shells; M.A. Klappenbach col., ix/1955), MZSP 2687 (1 shell).

Remarks Despite being all juveniles, the present specimens compare well to *S. pilsbryi*, a species described from the nearby Salobra municipality, also in Mato Grosso do Sul state (UMMZ 184842, holotype; ANSP 194286, paratype). This species is diagnosed by is tall but round whorl profile and large number of whorls for its size. The present record thus slightly expands the species' distribution.

Superfamily Acavoidea
Family Strophocheilidae
Genus *Anthinus* Albers, 1850

Anthinus turnix (Gould, 1846)
(Figs 61–62)

Bulimus turnix Gould, 1846: 101.

Type locality Brazil: Rio de Janeiro state, Serra dos Órgãos.

Known distribution Brazil (Minas Gerais, Rio de Janeiro, São Paulo and Santa Catarina states) and Paraguay (Birckolz *et al*., 2016).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 7143 (2 shells; E. Garbe col., x/1917).

Remarks The species can be identified by its proportionately more convex (when compared to congeners) whorl profile and large aperture. The present record is the first for Mato Grosso do Sul state and fills a gap in the species distribution; it is also the first report of this genus for the Brazilian Pantanal biome.

Genus *Megalobulimus* Miller, 187

Megalobulimus intertextus (Pilsbry, 1895)
(Figs 63–68)

Strophocheilus capillaceus var. *intertextus* Pilsbry, 1895: 32, pl. 17, figs 30–31.
Psiloicus bereniceae Morretes, 1952: 124, pls. 1–2, fig. 1. [n. syn.]

Type locality Brazil, Mato Grosso do Sul state ("Mattogrosso" in original), Corumbá.

Known distribution Brazil (Mato Grosso and Mato Grosso do Sul states), Bolivia, Paraguay and Argentina (Bequaert, 1948; Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, AMNH 115596 (1 shell; M.P. Oliveira col., 1956), ANSP 69158 (lectotype; C.W. Johnson coll.), MZSP 14597 (paratype of *P. bereniceae*; Necholândia; B. Nogueira col.), MZSP 16647 (holotype of *P. bereniceae*; Necholândia; B. Nogueira col.), MZSP 16648 (paratype of *P. bereniceae*; Necholândia; B. Nogueira col.), MZSP 133171 (4 shells; Maciço do Urucum, on a dry river bed, approx. 19°18'S 57°31'W; W. Nogueira col., 19/iii/2014). BOLIVIA. **Santa Cruz**; Puerto Suárez, ZSM 20170343 (13 shells; Zischka col., 1957).

Remarks Originally described from Corumbá as a variety of *M. capillaceus* (Pfeiffer, 1855), a species from the humid forests of the Peruvian and Amazonian Andes, it has been considered a distinct species (Bequaert, 1948; Simone, 2006). Nevertheless, Bequaert (1948) points out that it might be a subspecies of *M. capillaceus*, adapted to the dry grasslands conditions typical of its distribution.

Another species originally described from Corumbá is *M. bereniceae*. Examination of its type material (MZSP 16647, holotype; Figs 67–68) has shown it to be indistinguishable from the lectotype of *M. intertextus* (ANSP 69158; Figs 65–66) in all available conchological characters: shell size, shell shape, aperture shape, peristome, and proto- and teleoconch sculpture. Therefore, *M. bereniceae* is considered here synonymous with *M. intertextus*.

Megalobulimus wohlersi Morretes, 1952
(Figs 69–70)

Megalobulimus (*Megalobulimus*) *wohlersi* Morretes, 1952: 123, pls. 3–4, fig. 3.

Type locality Brazil, Mato Grosso do Sul state, Corumbá.

Known distribution Brazil (Corumbá) (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 16651 (holotype; A. Wohlers col.).

Remarks This species is known only from its holotype.

Superfamily Rhytidoidea
Family Scolodontidae
Genus *Systrophia* Pfeiffer, 1855

Systrophia alcidiana Ancey, 1892
(Figs 71–73)

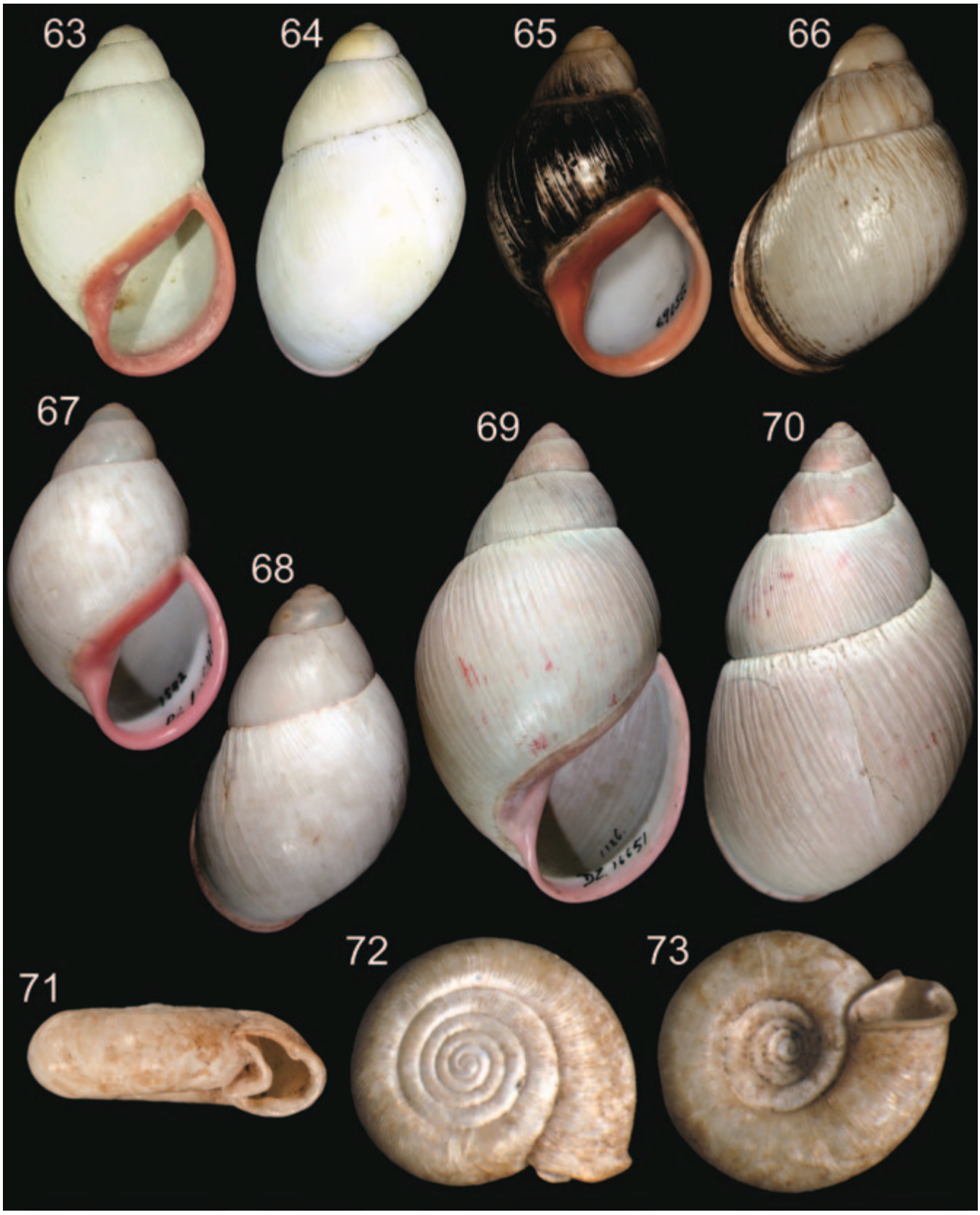
Systrophia alcidiana Ancey, 1892: 91.

Type locality Brazil: Mato Grosso do Sul state, Corumbá.

Known distribution Brazil (Corumbá) (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, ANSP 45634 (1 shell; H.H. Smith col., G.H. Clapp coll.), FMNH 57057 (7 shells; M.A. Klappenbach col., xi/1955), FMNH 30525 (2 shells; H. Rolle col., 1904), NHMUK 20170266 (2 shells; Trenchmann coll.).

Remarks Known only from the type locality. As the species' holotype has not been located (Wood & Gallichan 2008), identification of the present material is based on the original description



Figures 63–70 *Megalobulimus intertextus*; shells in scale to one another **63–64** MZSP 133171 (H=64.8mm) **65–66** Lectotype, ANSP 69158 (H=60.9mm); image is a courtesy of the ANSP **67–68** Holotype of *Psiloicus bereniceae*, MZSP 16647 (H=64.0mm) **69–70** *Megalobulimus wohlersi*, holotype, MZSP 16651 (H=85.0mm); shell in scale with *M. intertextus* **71–73** *Systrophia alcidiana*, ANSP 45634 (D=6.0mm); Fig. 71 is a courtesy of P. Callomon.

(Ancey, 1892) and on a topotype figured by Simone (2006: fig. 841; reproduced here as Figs 71–73).

Genus *Entodina* Ancey, 1887

Entodina cheilostropha (d'Orbigny, 1835)

Helix cheilostropha d'Orbigny, 1835: 3; d'Orbigny, 1837: 255, pl. 23, figs 5–8.

Type locality Bolivia: Santa Cruz de la Sierra and Chiquitos provinces. Label of type material (NHMUK 1854.12.4.103, 3 syntypes) indicates the locality Santo Corazón in Chiquitos province.

Known distribution Brazil (Corumbá) and Bolivia (Simone, 2006).

Material studied None; literature data only.

Remarks This species can be distinguished from *S. alcidiana* by its narrow sickle-shaped aperture (*e.g.*, Simone, 2006). However, its occurrence in Corumbá is from literature record only (Simone, 2006), since no actual specimens could be found. A possible lot of this species (NHMUK 1904.12.11.22–25) could not be traced, but another lot from this same collection was a misidentification of *Systrophia alcidiana* (see above).

Genus *Scolodonta* Doering, 1875

Scolodonta cf. *spirorbis* (Deshayes, 1950)
(Figs 74–76)

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, MZSP 25415 (1 specimen; Serra do Urucum; 29/xi/1960).

Remarks The present specimen greatly resembles *S. spirorbis* (syntype MNHN-IM-2000–31791), albeit being larger. Given that this species is known only from Rio de Janeiro state (Simone, 2006) and that the single specimen available is in poor condition, we prefer to leave this specimen in open nomenclature until more material becomes available.

Superfamily Helicoidea
Family Pleurodontidae
Genus *Solaropsis* Beck, 1837

Solaropsis heliaca (d'Orbigny, 1835)
(Figs 77–85)

Helix heliaca d'Orbigny, 1835: 4; d'Orbigny, 1837: 244, pl. 26, figs 1–5.

Solaropsis Paravicinii Ancey, 1897: 4. [n. syn.]

Type locality Bolivia. The label of the lectotype (designated herein, see below) gives the locality Santa Cruz de la Sierra, Bolivia.

Known distribution Brazil (Mato Grosso do Sul and Minas Gerais states), Bolivia, Paraguay and Argentina (Simone, 2006).

Material studied BRAZIL. **Mato Grosso do Sul**; Corumbá, FLMNH 165515 (1 shell; Bolivia?; McGinty coll.), FMNH 57052 (1 shell; M.A. Klappenbach col., ix/1955), FMNH 57053 (1 shell; M.A. Klappenbach col., ix/1955), FMNH 119224 (1 shell; Agosta, Bolivia?), FMNH 125810 (1 shell; Agosta, Bolivia?), MZSP MZSP 102154 (1 shell; Fazenda São Bento; M.A.O. Bezerra col., xi/1992), NHMUK 1904.12.24.12–13 (2 shells; H. Rolle col.), NHMUK 20170262 (2 shells; H. Rolle col., 1904, V.W. Macandrew coll.), NMW 1458 (syntype of *S. paravicinii*), ZSM 20170337 (2 shells; Morro de Corumbá; M.A. Klappenbach col., W. Blume coll. 7983). BOLIVIA. **Santa Cruz**; Puerto Suárez, NHMUK 20170298 (1 shell; H.E.J. Biggs coll.).

Remarks This species is easily identified by its raised spire, prominent keel on the middle portion of the whorl and relatively large (when compared to most congeners) and laterally elongated aperture. Moreover, when observed in umbilical view, a small bulge can be seen on the basal region of the peristome close to the columellar region (Figs 82, 85).

The type material of the species is housed in the NMHUK under the record numbers 1965127 (1 shell) and 1854.12.4.57/59 (9 shells). The label of the former specimen states that it was selected as lectotype by A. Solem in 1965, but up to our knowledge, this was never duly published. Simone (2006) cites this specimen as being the lectotype, but this is not a valid designation according to the ICZN (International Commission on Zoological Nomenclature, 1999). As such, herein we designate specimen NHMUK 1965127 (from Santa Cruz de la Sierra, Santa Cruz department, Bolivia; Figs 80–82) as the lectotype of *Helix heliaca* d'Orbigny, 1835.

Figures 74–76 *Scolodonta* cf. *spirorbis*, MZSP 25415 (D=9.0mm) **77–85** *Solaropsis heliaca*; shells in scale to one another **77** NHMUK 20170262 (D=26.9mm) **78** FMNH 57053 (D=29.1mm); image is a courtesy of the FMNH **79** FMNH 119224 (D=30.8mm); image is a courtesy of the FMNH **80–82** Lectotype (designate herein), NHMUK 1965127 (D=36.5mm) **83–85** Syntype of *Solaropsis paravicinii*, NMW 1458 (D=30.2mm).

In his study, d'Orbigny (1837) divided his material into two informal varieties: "A *major*" and "B *minor*". As the names imply, variety A (typically from Bolivia) is larger than variety B (typically from Argentina). Both varieties apparently belong to the same species, as no conchological character (other than size) can be used to distinguish them. The difference in size is simply due to variety A having circa one whorl more than variety B; a consequence of this is that juveniles of variety A look like adults of variety B (with the obvious exception of the reflexed peristome). The smaller variety is slightly more common in Corumbá (Fig. 77), albeit some specimens are much closer to the larger variety in size (Fig. 79).

Finally, another species, *Solaropsis paravicinii*, was originally described from Corumbá (Figs 83–85), but aside from its slightly smaller size, it is conchologically indistinguishable from *S. heliaca*. As such, herein the former is considered synonymous with the latter.

Discussion

Only 19 species of terrestrial gastropods are listed here for the region of Corumbá and Urucum. This is a reflection of the scarce collection efforts in the region and the clear collector bias for large and attractive shells such as the orthalicoids. There are no subulinids or charopids reported from the region, which are very common elsewhere; these animals tend to be very small (Charopidae) or have simple shells (Subulinidae) and usually are found on samples of leaf litter. Regardless, the isolated collection activities in the region show that some species, like *B. corumbaensis*, appear to be extremely abundant. It is worthwhile to note that the soil in Corumbá and its surroundings is calcimorphic (Cunha, 1986) and that calcareous soils in general are attractive to land snails.

Corumbá is the type locality of several species, a fact that could indicate a fauna with a high degree of endemicity. Nevertheless, as shown above examination of type material from Corumbá and comparison with other pertinent types allowed the synonymisation of some of the supposed endemics. For the moment, the only true endemics from the region seem to be *Streptaxis pilsbryi* and *Systrophia alcidiana*. The remaining species are more widely distributed and several encompass an area including Mato Grosso do Sul (sometimes also Mato Grosso state, to the north), eastern Bolivia and northern Paraguay. As such, this expanded region might yet prove to be a meaningful biogeographic province for land snails, with its own endemic species.

Finally, given the scant knowledge on the region's fauna and the high impact of mining activities and agriculture, researchers have recently argued for Corumbá and its surrounding to be treated as a priority area for conservation (Tomas *et al*., 2010).

Acknowledgements

We are very grateful to Wagner Nogueira for the collection and donation of the new material from Urucum that sparked the idea for this work. We are also indebted to all curators, collection managers and museum technicians who granted access to the material under their care or provided photos and information on them: Lily Berniker (AMNH), Paul Callomon (ANSP), John Slapcinsky (FLMNH), Jochen Gerber and Gerard D. Gagne (FMNH), Jon Ablett (NHMUK), Yves Samyn and Florence Trus (RBINS), Thomas F. Duda Jr. (UMMZ), Robert Hershler and Courtney Wickel (USNM), and Enrico Schwabe (ZSM). R.B.S. received support from the SYNTHESYS Project (project grant GB-TAF-6613), which is financed by the European Community Research Infrastructure Action under the FP7 Integrating Activities Programme, and an Early Career Research Grant from the Malacological Society of London.

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