

New Charopidae from Chilean — Argentine Patagonia

(Mollusca: Gastropoda: Stylommatophora)

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Abstract

Three new species of Punctoidea from Chilean – Argentine Patagonia are described in the family Charopidae: *Lilloiconcha aysensis* n. sp., *Radiodiscus villarricensis* n. sp. and *Stephadiscus stuardoi* n. sp. The new species of *Lilloiconcha* and *Stephadiscus* are known only from type localities in Chile, at Aysen and Concepción, respectively. In addition to this being the first record of *Lilloiconcha* in Chile; *Stephadiscus celinae* (HYLTON SCOTT 1969) and *S. testalbus* (HYLTON SCOTT 1970) previously known from Argentina are now recorded from southern Chile. The new species of *Radiodiscus* was collected from several localities ranging from Concepción in Chile to National Park Nahuel Huapi in Argentina, and thus extends eastward the range of *Radiodiscus* previously known from southern United States of America to Tierra del Fuego.

Keywords: Punctoidea, South America, *Lilloiconcha*, *Radiodiscus*, *Stephadiscus*

Introduction

In this paper several new species are described, and new information on the geographic range of two previously known species is presented for Charopidae from the Chilean — Argentine Patagonian region of South America.

HAUSDORF (2005) recognized that the suprageneric classification of the Punctoidea is poorly resolved, and argued for adoption of the classification proposed by SOLEM (1976, 1983), pending molecular phylogenetic studies. Further, he highlighted the fact that conchologically similar species can vary substantially in anatomy and thus species assignments can only be tentative in the absence of anatomical information. These problems are particularly acute in genera for which the anatomy of the type species is presently not known. In this paper

the species are considered to belong to the Charopidae, tentatively assign to known genera on the basis of conchological features.

The abbreviations used are:

FMNH	Field Museum of Natural History, Chicago, USA
H	height
HA	aperture height
MACN-In	Invertebrados, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina
MD	main diameter
MLP	Museo de La Plata

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MNHCL	Museo Nacional de Historia Natural, Santiago, Chile	U	umbilicus
		W	whorls
SMF	Forschungsinstitut Senckenberg, Frankfurt am Mani, Germany	WA	aperture width

Systematics

Charopidae HUTTON 1884

Lilloiconcha WEYRAUCH 1965

Lilloiconcha WEYRAUCH 1965: 127 (type species by original designation: *Austrodiscus superbus tucumanus* HYLTON SCOTT 1963).

Zilchogyra (*Trochogyra*) WEYRAUCH 1965: 126 (type species by original designation: *Endodonta superba* THIELE 1927).

Remarks: Based on the classification of SOLEM (1976, 1983), HAUSDORF (2005) placed *Lilloiconcha* in Charopidae. *Lilloiconcha* is a senior synonym of *Trochogyra* WEYRAUCH 1965 (MIQUEL & al. 2007), as the type species of these genera, *Austrodiscus superbus tucumanus* HYLTON SCOTT 1963 and *Endodonta superba* THIELE 1927 respectively, are synonymous (MIQUEL & al. 2007). This genus is characterized by a smooth protoconch and a teleoconch bearing straight axial ribs. It is distributed widely in South America, with species presently known from Colombia, Peru, Brazil, Paraguay and Argentina. These ground-dwelling detritivores are most common in subtropical rainforests in southern Brazil and northern Argentina, between 600–1400 m altitude (THIELE 1927; WEYRAUCH 1965; MIQUEL & al. 2004, 2007; HAUSDORF 2005). Below we describe the first record of *Lilloiconcha* in Chile.

Lilloiconcha aysensis n. sp.

Figs 1–3

Diagnosis: Shell small, discoidal, with nearly four whorls; protoconch with 1.75 smooth whorls; teleoconch with high and straight ribs (80 on body whorl); aperture subcircular; umbilicus small.

Description: Shell small (1.73–1.87 mm diameter in known specimens), discoidal, with 3.75 convex whorls; spire scarcely elevated, embryonic and adult shells well differentiated; protoconch of 1.75 whorls, smooth under low magnification but with a few weak axial ribs or growth lines and weak spiral incised threads when viewed at high magnification; teleoconch with about 115 (80 on body whorl) prominent, straight, orthocone to weakly prosocline ribs; interstitial areas with 12 smaller riblets ornamented with small, irregular nodules at their intersection with vestigial spiral threads; body whorl descending slightly; sutures well impressed; aperture large, subcircular (0.85 shell height) and slightly

Table 1: Shell measurements of *Lilloiconcha aysensis* n. sp.

	MD	H	HA	WA	U	W
Holotype FMNH 312442 (ex 308.206)	1.87	1.07	0.50	0.90	0.60	3.75
Paratype FMNH 308.206	1.73	0.93	0.40	0.80	0.47	3.75

inclined; callus distinct; umbilicus open, about 0.3 shell diameter; periostracum elaborated as lamellae on the summit of riblets and especially the ribs; colour uniform cream-yellow; animal unknown.

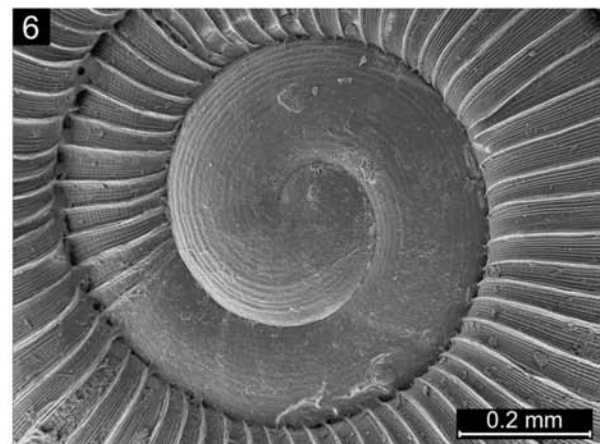
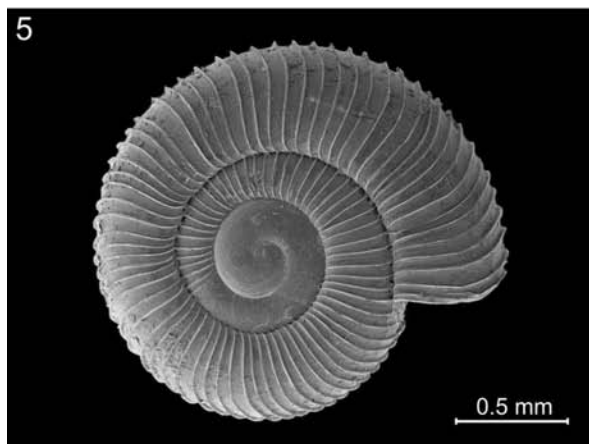
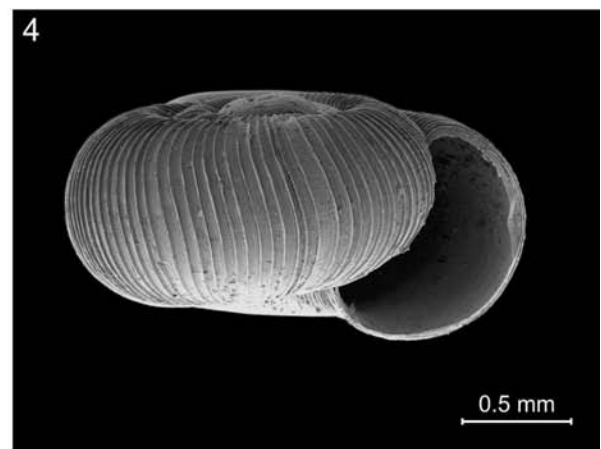
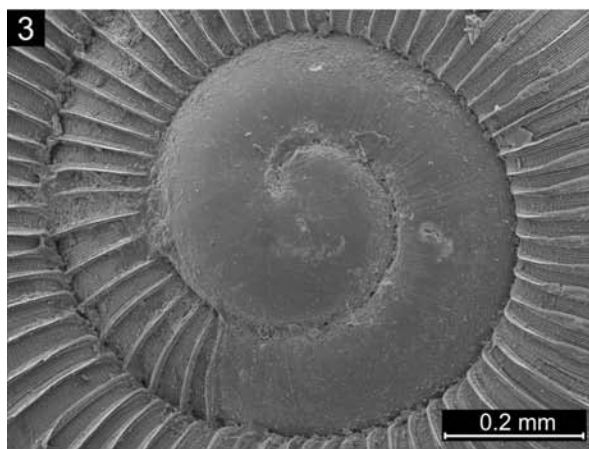
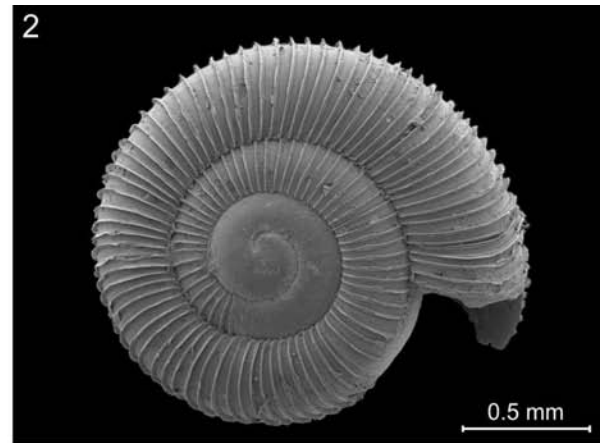
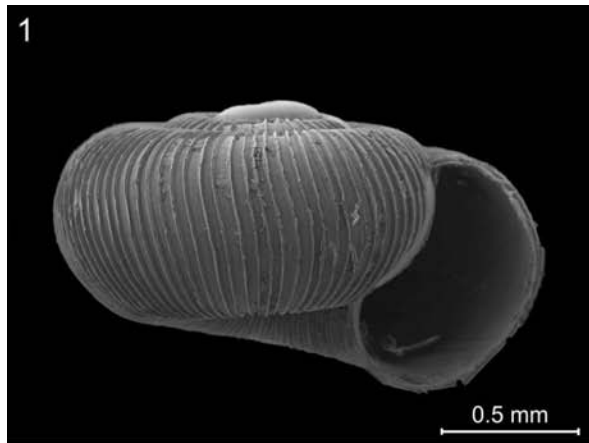
Type locality: Puerto Chacabuco, Aysen, Chile.

Distribution: Southern Chile; presently only known from the type locality (Fig. 11).

Derivation of name: After Aysen, the Chilean province where the species lives.

Material examined: Holotype: FMNH 312442, and 2 paratypes: FMNH 308.206. Puerto Chacabuco, Aysen, Chile, collected by T. CEKALOVIC, 21-II-1982.

Remarks: The new species is readily assigned to *Lilloiconcha* on the basis of the smooth protoconch and the teleoconch having straight axial ribs. *Lilloiconcha aysensis* n. sp. differs from *L. superba* (WEYRAUCH 1965) in its lower spire, smaller size and fewer axial ribs on the teleoconch (70 on the body whorl). By virtue of its lower spire and more numerous axial ribs the new species differs from many other taxa currently assigned to *Lilloiconcha*, including *L. gordurasensis* (THIELE 1927), widely distributed in South America, *L. clara* (THIELE 1927) and *L. zulmae* (MIQUEL, RAMÍREZ & THOMÉ 2004; MIQUEL & al. 2007) of southern Brazil. On the body whorl, *L. clara* has between 35 to 50 adult ribs, *L. gordurasensis*, 65 and *L. zulmae*, between 25 to 38. All of them exhibit a well developed spire and bigger size (main diameter of holotypes: 2.7 mm, 2.1 mm and 2.8 mm, respectively). Conchologically, *L. aysensis* superficially resembles a number of other punctoids represented in Chile, but can be distinguished from species of *Radiodiscus* PILSBRY in PILSBRY & FERRISS 1906 by the lack of spiral lirae on the protoconch, and from species of *Stephadiscus* HYLTON SCOTT 1981 by the lack of prominent axial ribs on the protoconch.



Figures 1–6: Species of Charopidae: 1–3: *Lilloiconcha aysensis* n. sp. 1. Holotype FMNH 312.442; 2. Paratype FMNH 308.206; 3. Protoconch details, paratype. FMNH 308.206. — Figs. 4–6: *Radiodiscus villarricensis* n. sp. 4. Holotype FMNH 312.443; 5. Paratype. FMNH 308.219; 6. Protoconch details, paratype FMNH 308.219.

Radiodiscus PILSBRY in PILSBRY & FERRISS 1906

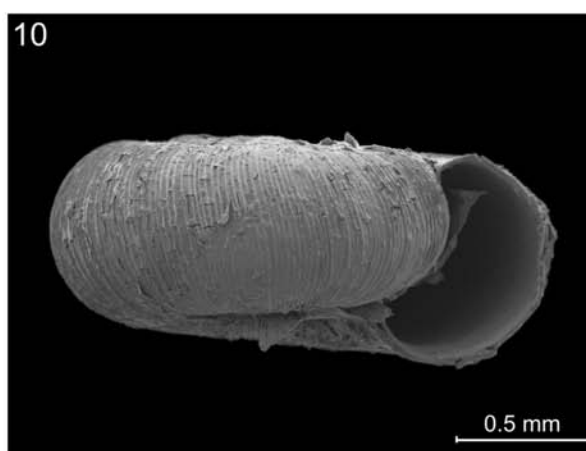
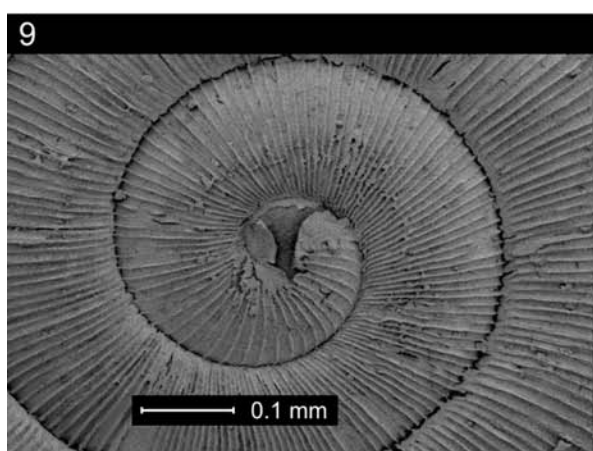
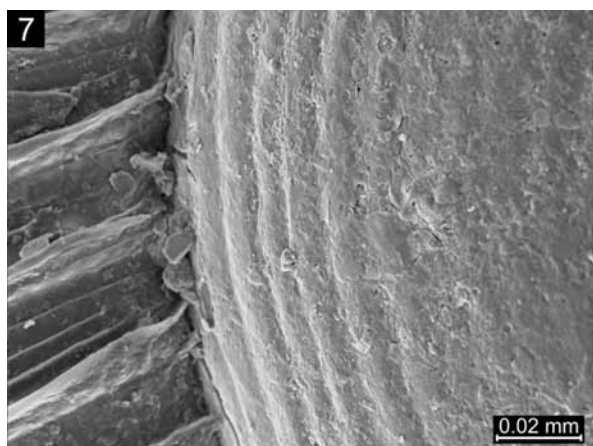
Radiodiscus PILSBRY in PILSBRY & FERRISS 1906: 154.

Type species: *Radiodiscus millicostatus* PILSBRY & FERRISS 1906 by original designation.

Radiodiscus villarricensis n. sp.

Figs 4–7

Diagnosis: Shell small, discoidal, almost planispiral; protoconch with about 15 spiral continuous spiral



Figures 7–10: Species of Charopidae: 7. *Radiodiscus villarricensis* n. sp., protoconch details, paratype FMNH 308.219. — Figs 8–10: *Stephadiscus stuardoi* n. sp. 8. Holotype MNHNCL 6655; 9. Protoconch details, MACN-In 36.142; 10. shell, MACN-In 36.142.

costulae (lirae); teleoconch ornamented with axial ribs, 65 on the body whorl, 7–8 axial riblets between the ribs, and delicate regular spiral cords; umbilicus moderately wide.

Description: Shell small (1.87–2.3 mm diameter), discoidal to almost planispiral, with 3.5–3.75 convex whorls; suture impressed; embryonic and adult shells clearly differentiated; protoconch of 1.75 whorls and ornamented with 15 spiral, low, rounded lirae that are more strongly developed on the first whorl; teleoconch ornamented with about 100 radial, slightly sigmoidal, weakly prosocline ribs (65 on body whorl; about 20 per millimeter on last part); space between major ribs with 7–8 axial riblets reticulated with delicate spiral lirae that are most prominent dorsally in the first-half teleoconch whorl and ventrally on the walls of the umbilicus; aperture subcircular (0.80 shell height), a little excavated from the body whorl; umbilicus open, moderately wide (0.22 greater shell diameter), scarcely perspective; chestnut-coloured, overlain with dark flammulations; animal unknown.

Table 2: Shell measurements of *Radiodiscus villarricensis* n. sp.

	MD	H	HA	WA	U	W
Holotype FMNH 312443 (ex 308.219)	2.27	1.27	0.60	1.00	0.53	3.75
Paratype FMNH 308.219	1.87	1.07	0.47	0.87	0.40	3.75

Type locality: Fundo El Manzano, Concepción, Chile.

Distribution: Southern Chile (Fig. 11).

Derivation of name: For Villarrica, a Chilean town near to where the species has been collected.

Material examined: Holotype: FMNH 312443, and 1 paratype: FMNH 308.219. Fundo El Manzano, Concepción, Chile, collected by T. CEKALOVIC, 7-XII-1996.

Other materials: FMNH 308213, Caracol hill, Concepción, Chile, collected by T. CEKALOVIC, 17-VIII-1996 (1 specimen); MACN-In 37.517, National Park Villarrica, Quetripillén area, Cautín, Chile, collected by M. RAMÍREZ and

F. LABARQUE, 8-II-2005, in forest of *Araucaria*, *Nothofagus* and *Chusquea*, 39°27'42.1"S 71°50'44.2"W, 1280 m (1 specimen); MACN-In 37.518, Victoria Island, National Park Nahuel Huapí, Neuquén, Argentina, collected by S.E. MIQUEL, 5-X-1993 (3 specimens); SMF 333494, Victoria Island, National Park Nahuel Huapí, Neuquén, Argentina, collected by S.E. MIQUEL, 5-X-1993 (1 specimen).

Note: A third specimen of FMNH 312444 (ex 308.219) belongs to *Stephadiscus testalbus* (HYLTON SCOTT 1970).

Remarks: The generic placement of *R. villarricensis* n. sp. is provisional. The placement in *Radiodiscus* is based on the overall similarity of its shell morphologic features. Nevertheless, in the new species the lirae on the protoconch are continuous. By contrast, in the type of *Radiodiscus*, *R. millicostatus* PILSBRY & FERRISS 1906 from North America, the lirae are interrupted. This character was not specifically mentioned in the original or subsequent descriptions by PILSBRY (e.g. PILSBRY in PILSBRY & FERRISS 1906: 154-155; PILSBRY 1948: 654-657), but recognized by SOLEM (1977: figs 7 and 8). Similar protoconch sculpture of interrupted spiral lirae is known from several other charopid genera, including *Retidiscus* FONSECA & THOMÉ 1995 from Brazil (FONSECA & THOMÉ 1995: 63; MIQUEL & STEFFAN 2005: fig. 2D). *Microcharopa* SOLEM 1982 from Fiji (SOLEM 1983: fig. 4), and *Allodiscus* PILSBRY 1892 *sensu lato* Group H (e.g., *Allodiscus undulatus* MARSHALL & BARKER 2008 from New Zealand (MARSHALL & BARKER 2008: 137, fig. 31f). While it is possible that the apical sculpture has been derived independently in several clades, SOLEM (1982: 70) united Charopidae “with apical sculpture of short spirally arranged segments” in the subfamily Rotadiscinae BAKER 1927. What is presently not known is whether the Rotadiscinae are indeed monophyletic, and whether the segmentation of the spiral lirae in the protoconch sculpture is a constant feature or can become obsolete in some species.

While the protoconch sculpture of *Radiodiscus villarricensis* n. sp. is similar to that in *Glabrogyra* FONSECA & THOMÉ 1993a (type species *Radiodiscus kuscheli* HYLTON SCOTT 1957), the new species differs in its planispiral shell shape and ornamentation of the teleoconch with axial ribs without prominent spiral incisure.

It is probable that *Radiodiscus villarricensis* n. sp. belongs to a new genus, but further resolution of taxonomic status will require examination of the anatomy.

Stephadiscus HYLTON SCOTT 1981

Stephadiscus HYLTON SCOTT 1981: 124.

Type species: *Helix (Pyramidula) lyrata* COUTHOUY in GOULD 1846 by original designation.

Remarks: *Stephadiscus* HYLTON SCOTT 1981 has been reported from Patagonia and the Falklands Islands (Islas Malvinas) (HYLTON SCOTT 1973a, b) and, recently,

from Perú (RAMÍREZ & al. 2007). It is well represented in Nahuel Huapí National Park region of Argentina, from which several species have been described (HYLTON SCOTT 1969, 1970). In Chile, STUARDO & VEGA (1985) and VALDOVINOS ZARGES (1999) note the presence of *Stephadiscus* only in the extreme south of the country. The new species described below extends the known distribution of the genus to the Pacific coast of central Chile. *Stephadiscus* is known as an Eocene fossil in central Patagonia (MIQUEL & BELLOSI 2007). *Stephadiscus striatus* HYLTON SCOTT 1981, from the northeast of Argentina and Venezuela, seems to belong to family Punctidae. Others species previously included in this genus in error include *Thysanophora pilsbryi* BAKER 1922 and *Helix binneyana* PFEIFFER 1846 (FONSECA & THOMÉ 1993b) (see comments in MIQUEL & al. 2007).

Stephadiscus stuardoi n. sp.

Figs 8–10

Diagnosis: Shell small, discoidal, almost planispiral, reaching about 4.25 whorls; protoconch and teleoconch ornamented with numerous, closely spaced axial ribs, and teleoconch with microscopic spiral threads; perforate with moderately wide umbilicus.

Description: Shell small (2.0–2.1 mm diameter) discoidal, almost planispiral as apex very slightly elevated; 4.25–4.5 regularly expanding whorls; protoconch indistinct from teleoconch when viewed at low magnification but at high magnification showing only axial ribs, lacking spiral threads; teleoconch sculptured with slightly sigmoidial, weakly prosocline axial ribs, approximately 190 on the body whorl, and weak spiral threads; sutures well impressed; body whorl descending slightly; aperture large, its outer face broadly convex; periostracum present as lamellae on the summit of the ribs on both protoconch and teleoconch; perforate, the umbilicus 0.25 shell diameter, scarcely perspective; colour cream-yellow; animal unknown.

Material examined: Holotype. MNHNCL 6655. Hualpén Botanical Park, Concepción, Chile. MACN-In 36142. Hualpén Botanical Park, Concepción, Chile, collected by G. M. BARKER and S. E. MIQUEL, 13-X-1996, in broadleaf gully forest, adjacent to lake (1 specimen).

Table 3: Shell measurements of *Stephadiscus stuardoi* n. sp.

	MD	H	HA	WA	U	W
Holotype MNHNCL 6655	2.00	0.85	0.80	0.55	0.60	4.25
Topotype MACN-In 36142	2.10	0.80	0.75	0.50	0.60	4.25

Type locality: Hualpén Botanical Park, Concepción, Chile.

Distribution: Hualpén Botanical Park, Concepción, Chile (Fig. 11).



Figure 11: Location map of new species in Chile and Argentina.

Derivation of name: For José R. Stuardo, from Concepción University (Chile), for his contributions to Chilean malacology.

Remarks: *Stephadiscus stuardoi* n. sp. is known only from two specimens. It differs from all other nominal species in *Stephadiscus* by the strongly planispiral form with a characteristic ornamentation comprising a large number of axial ribs on both protoconch and teleoconch. The type species *Stephadiscus lyratus* (COUTHOUY in GOULD 1846) — known from southern Argentina and Chile, including the Falkland Islands (Islas Malvinas), Isla de los Estados, Navarino and Hoste Islands — differs in general shape of the shell with a more elevated spire, a rapidly increasing body whorl, and a larger size (6 mm at 4 whorls). The two species have in common a large number of axial ribs on the body whorl (ca. 210 ribs in *S. lyratus*) a moderately wide umbilicus (0.21 of shell diameter in *S. lyratus*), and the protoconch whorls scarcely elevated and with closely spaced axial ribs. The shell of *S. celinae* (HYLTON SCOTT 1969) — known from Argentina (Chubut, Neuquén, Río Negro, Tierra del Fuego provinces and the

Falkland Islands (Islas Malvinas) — has an elevated spire and widely open umbilicus (0.33 of shell greater diameter), a teleoconch ornamented by widely dispersed ribs (45 ribs on the body whorl), with a pellucid periostracum, and embryonic whorls that are convex with distinctly spaced axial ribs. *Stephadiscus distinctus* (HYLTON SCOTT 1970) — known from Argentina (Chubut and Río Negro provinces) — has a rather low spire approaching that of *S. stuardoi* n. sp., but the umbilicus is more widely open (ca. 0.3 greater shell diameter), and the aperture is subcircular. The teleoconch of *S. distinctus* possesses 115 axial ribs on the body whorl, the protoconch whorls are scarcely convex and have distinctly spaced axial ribs. The shell of *Stephadiscus perversus* (HYLTON SCOTT 1969) — known from Argentina (Río Negro province) — is sinistral and its 4.75 whorls are ornamented by numerous axial ribs (130 on the body whorl), its aperture is subcircular, and the embryonic whorls are convex with distinctly spaced axial ribs. The shell of *Stephadiscus testalbus* (HYLTON SCOTT 1970) — known from Argentina (Chubut, Neuquén and Río Negro provinces) and Chile (Concepción province)

— has 3.75 whorls, ornamented with numerous axial ribs (80–100 ribs on body whorl), and a protoconch that has convex whorls and distinctly spaced axial ribs.

Stephadiscus celinae (HYLTON SCOTT 1969)

Stephanoda celinae HYLTON SCOTT 1969: 59, fig. 1.

Stephadiscus celinae, – HYLTON SCOTT 1981: 125.

Stephadiscus celinae, – MIQUEL, RAMÍREZ & THOMÉ 2003: 236.

Material examined: Holotype MACN-In 27275. Villa La Angostura, Quetrihué Peninsula, Neuquén, Argentina; Paratypes MACN-In 27275-2, Villa La Angostura, Nahuel Huapí National Park, Neuquén, collected by C. MATTERI, XI-1968 (3 specimens); MACN-In 37.051, National Park Huerquehue, Toro lagoon, 995 m, 39°08'18.7"S 71°42'30.9"W, Cautín, Chile, collected by M. RAMÍREZ & F. LABARQUE, 7-II-2005 (3 specimens).

Remarks: Previously *Stephadiscus celinae* (HYLTON SCOTT 1969) was known only from Argentina, from

Neuquén to Tierra del Fuego. We additionally record the species from Cautín, Chile.

Stephadiscus testalbus (HYLTON SCOTT 1970)

Stephanoda testalba HYLTON SCOTT 1970: 284, fig. 4 (1, 2).

Stephadiscus testalbus, – HYLTON SCOTT 1981: 125.

Stephadiscus testalbus, – MIQUEL, RAMÍREZ & THOMÉ 2003: 236.

Material examined: Holotype MLP 10.511, Mascardi Lake area, collected by M. BIRABÉN, 1942; MACN-In 35366, Lanín National Park, route 63, Neuquén, Argentina, collected by G. M. BARKER and S. E. MIQUEL, 17-X-1996, in dry, open scrubland (1 specimen); MACN-In 36.112, Hualpén Botanical Park, Concepción, Chile, collected by G. M. BARKER and S. E. MIQUEL, 13-X-1996 (1 specimen).

Remarks: *Stephadiscus testalbus* (HYLTON SCOTT 1970) was previously known to be distributed from Neuquén to Chubut in Argentina. We here additionally record the species from near Concepción, on the Pacific coast of central Chile.

Discussion

The Chilean punctoids were summarized by STUARDO & VEGA (1985), as Endodontoidea. They listed the genera *Amphidoxa* ALBERS 1850, *Austrodiscus* PARODIZ 1954, *Radiodiscus*, *Stephadiscus* and *Stephanoda* ALBERS 1860 with representatives living in continental region and islands. Rightly, these authors treat most of the species of micromollusks described by PHILIPPI (1855, 1860, 1866) as *incertae sedis*. However, we know that *Flammulina* von MARTENS 1873, *Glabrogyra*, *Payenia* ROCHEBRUNE & MABILLE 1889 and *Rotadiscus* also exist in southern Chile. Recently, two new monotypic genera have been added to the Chilean malacofauna: *Pichikadi* VARGAS ALMONACID & STUARDO 2007 (Punctidae) and *Chellius* VARGAS ALMONACID & STUARDO 2007 (Charopidae). The type species of the first genus, *P. hualpensis* VARGAS ALMONACID & STUARDO

2007 is similar to *Zilchogyra clelia* WEYRAUCH 1965 which is now recognized a junior synonym of *Paralaoma servilis* SHUTTLEWORTH 1852 (MIQUEL & al. 2007). The type of the second genus, *C. pyramidalis* VARGAS ALMONACID & STUARDO 2007 shows similarities with species of *Phrignathus* HUTTON 1883, a genus living in New Zealand, Australia (including Tasmania) and New Guinea.

The description of new three species in *Lilloiconcha*, *Radiodiscus* and *Stephadiscus*, and new range information for an additional two species of *Stephadiscus*, reinforces the concept of the region between 36°S–52°S of Chile as a major centre for biodiversity of Punctoidea in the Americas. Eight punctoid genera and more than twenty species are now known to be represented in this region (also see MIQUEL & CÁDIZ LORCA 2008).

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