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Post Miocene Ostracodes from Pelotas Basin, Southern Brazil. Taxonomy-Part II

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Abstract — This paper presents the taxonomic study of the post Miocene ostracodes that occur in seven drillings made by PETROBRÁS at Pelotas Basin, Rio Grande do Sul State, Southern Brazil, with the description of six new species: *Cypris cassinensis*, *Cyprideis maxipunctata*, *C. mostardensis*, *C. posteroinflata*, *C. sparsopunctata*, and *Costa riograndensis*. Two species, previously described, have been identified: *Cyprideis salebrosa* and *Perissocytheridea kroemmelbeini*. The indetermined species *Krithe* sp. has also been recorded. These ostracodes are encountered on the 2-CA-1-RS, 2-CI-1-RS, 2-MO-1-RS and 2-PN-1-RS, drillings.

Resumo — O presente trabalho compreende o estudo taxonômico dos ostracodos pós-miocênicos contidos em perfurações realizadas pela Petróleo Brasileiro S. A. (PETROBRÁS) na Bacia de Pelotas, no Rio Grande do Sul. São descritas seis espécies novas que ocorrem nas perfurações 2-CA-1-RS, 2-CI-1-RS, 2-MO-1-RS e 2-PN-1-RS: *Cypris cassinensis*, *Cyprideis maxipunctata*, *C. mostardensis*, *C. posteroinflata*, *C. sparsopunctata*, e *Costa riograndensis*. É registrada a ocorrência de *Cyprideis salebrosa*, *Perissocytheridea kroemmelbeini*, e da espécie indeterminada *Krithe* sp.

INTRODUCTION

This paper is the second and the last phase of the taxonomic study of the post Miocene ostracodes that occur in seven PETROBRÁS drillings from the Pelotas Basin, Southern Brazil (Fig. 1). The first paper (Sanguinetti *et al.*, 1991) includes the study of the genera *Brasilicythere*, *Argenticytheretta*, *Cytheretta*, *Protocytheretta*, *Caudites*, *Ambostracon*, *Coquimba*, *Bradleya*, *Quadracythere*, *Henryhowella*, and *Callistocythere*. The genera *Cypris*, *Cyprideis*, *Perissocytheridea*, *Krithe* and *Costa* are studied here occurring in the drillings 2-CA-1-RS, 2-CI-1-RS, 2-MO-1-RS and 2-PN-1-RS. The next phase of this project shall be the application of this taxonomy to the biostratigraphical correlation as to the paleoenvironmental analysis of the post Miocene layers of this Basin.

The type material has been deposited in the Museu de Paleontologia, Universidade Federal do Rio Grande do Sul, UFRGS (nº MP-0-672 to MP-0-755; and MP-0-1455).

TAXONOMY

Ordo Podocopida Müller, 1894
Sub Ordo Podocopina Sars, 1865
Super Familia Cypridacea Baird, 1845
Familia Cyprididae Baird, 1845
Sub Familia Cypridinae Baird, 1845

Cypris Müller, 1776

Cypris cassinensis sp. nov.

Plate 1, Figures 1-7

Derivatio nominis — From the type-locality (Cassino).
Holotypus — Female — Left valve, nº MP-0-672.
Paratypi — Female — Right valve, nº MP-0-673; Male — Right valve nº MP-0-674; Left valves, nº MP-0-675 and 676.
Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-CI-1-RS, core 1 (103, 07-108m).

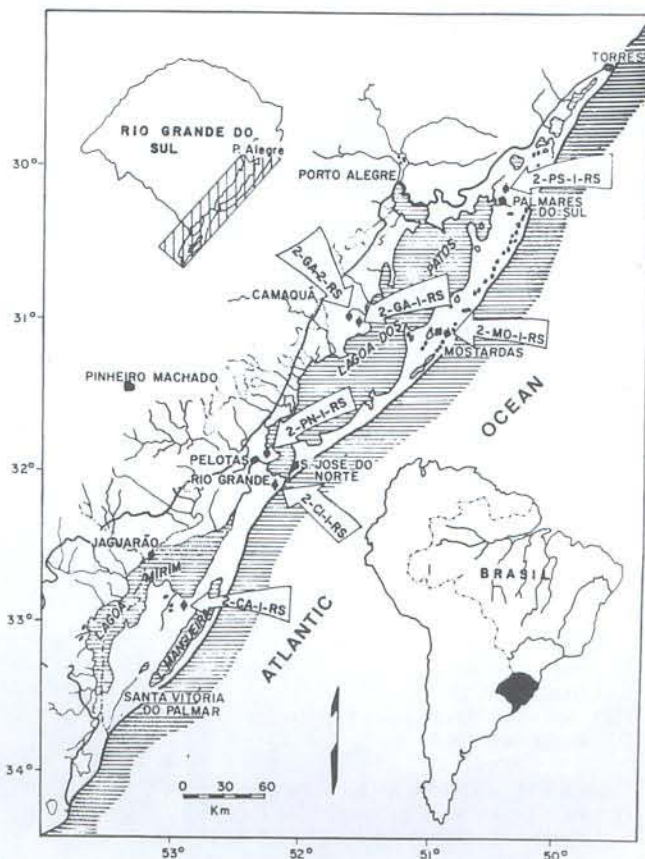


Figure 1 — Location Map of the Drillings (Sanguinetti, 1980).

Diagnosis — Dorsal border with raised central portion similar to a hump. Smooth or finely punctured surface. Large duplicature. Left valve flange and selvage grooves narrow at the anterior end; selvage groove wide at the ventroposterior portion.

Description — External view — The female carapace presents the greatest height at mid-length. Dorsal border strongly convex, presenting the highest part at the mid-length similar to a hump, sloping backwards almost in straight line and reaching the anterior border in a slight concavity. Anterior border projecting forward in an evenly rounded curve, reaching the ventral border in a delicate sinuosity. Ventral border with a slight reentrance at the median portion. Posterior border with a strong and closed curve. The right valve presents a more accentuated anteromedian sinuosity. In dorsal view oval carapace with the greatest width at the median portion. Sexual dimorphism: male with narrower valves. Internal view — The left valve with hinge groove parallel to dorsal border, forming a narrow and elongated socket at the level of the posterior cardinal angle. Hinge groove is limited, in its inner side, by two smooth bars: the posterodorsal elongated, which extends itself forming the selvage through free edge, and, the median one, shorter and thicker. Large duplicature mainly at the anterior and posterior borders. The selvage is far from the flange at both posteroventral and anterior regions, forming two areas of expansion of selvage grooves, being wider at the right valve. Eight central muscle scars.

Dimensions — *Holotypus* — Female, left valve, n° MP-0-672; length: 1.074mm; height: 0.665mm; width: 0.322mm. *Paratypi* — Female, right valve, n° MP-0-673; length: 1.082mm; height: 0.625mm. Male, right valve, n° MP-0-674; length: 1.019mm; height: 0.559mm; width: 0.297mm. Male, left valve, n° MP-0-676; length: 1.172mm; height: 0.639mm.

Remarks — *Cypris cassinensis* sp. nov. is similar to *Cypris decaryi* Gauthier, 1933 pointed out by Neale (1976). Nevertheless, it differs from that one by presenting less anterior accentuated dorsal and ventral reentrances; dorsal border higher at the central portion, looking almost a bunch; wider duplicature; half-moon-shaped expansion of the right valve wider and evenly rounded

extending throughout almost all the anterior portion, and tapering both ventrally and dorsally; left valve selvage groove is narrower anteriorly and larger at the ventroposterior region, gradually tapering at both ends towards the hinge.

Material — Several adult valves, and juvenile instars.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-CI-1-RS, core 1 (103.07-108m); 2-CA-1-RS, core 27 (132.80-135.85m).

Super Familia Cytheracea Baird, 1850

Familia Cytherideidae Sars, 1925

Sub Familia Cytherideinae Sars, 1925

Cyprideis Jones, 1857

Cyprideis maxipunctata sp. nov.

Plate 1, Figures 8-16

Cyprideis sp. In: Bertels, Kotzian & Madeira-Falcetta, 1982, p. 140, pl. 5, Fig. 1.

Derivatio nominis — By the surface strongly punctate.

Holotypus — Female — Right valve, n° MP-0-687.

Paratypi — Female — Left valve, n° MP-0-688; Male — Right valve, n° MP-0-689; Left valve, n° MP-0-690.

Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-CI-1-RS, sampling (42m).

Diagnosis — Subrectangular and unequal valves. Neatly arched dorsal border; strongly punctate surface with a deep sulcus. Right valve with a marked posteroventral spine.

Description — External view — Subrectangular female carapace in lateral view. Right valve with arched dorsal border. Evenly rounded anterior border with a submarginal ridge and five to seven marginal spines. Ventral border with accentuated sinuosity at the anterior third, forming a posteroventral angle with a strong spine. Slightly arched posterior border. Surface strongly punctate. Strong, oblique and almost straight sulcus. Left valve higher with a even more arched dorsal border and softer anterodorsal sinuosity. Posterior border almost truncated and ventral one almost straight. Maximum

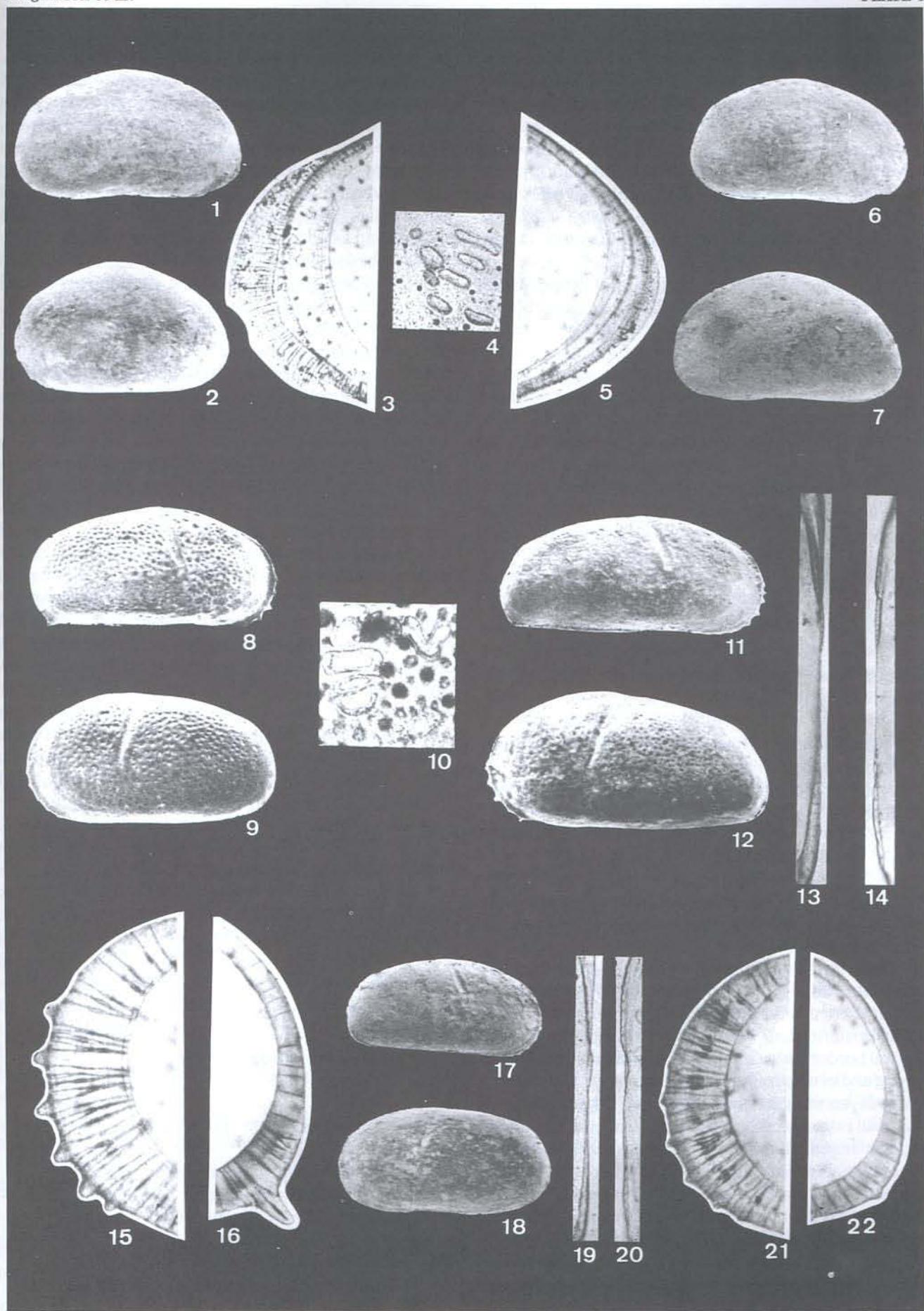
Plate 1

Figures 1-7 - *Cypris cassinensis* sp. nov.
Female, right valve. Paratypus n° MP-0-673.
1 - Lateral view. 39x
Female, left valve. Holotypus n° MP-0-672.
2 - Lateral view. 37.5x
Male, right valve. Paratypus n° MP-0-674.
3 - Anterior marginal pore canals. 117.5x
4 - Central muscle scars. 118.5x
5 - Posterior marginal pore canals. 117x
6 - Lateral view. 39.5x
Male, left valve. Paratypus n° MP-0-676.
7 - Lateral view. 36.5x

Figures 8-16 - *Cyprideis maxipunctata* sp. nov.
Female, right valve. Holotypus n° MP-0-687.
8 - Lateral view. 39x
14 - Hinge. 77x
15 - Anterior marginal pore canals. 127.5x

16 - Posterior marginal pore canals. 127.5x
Female, left valve. Paratypus n° MP-0-688.
9 - Lateral view. 37.5x
10 - Central muscle scars. 136x
13 - Hinge. 78x
Male, right valve. Paratypus n° MP-0-689.
11 - Lateral view. 39x
Male, left valve. Paratypus n° MP-0-690.
12 - Lateral view. 38.5x

Figures 17-22 - *Cyprideis mostardensis* sp. nov.
Female, carapace. Holotypus n° MP-0-691.
17 - Right lateral view. 38.5x
18 - Left lateral view. 41x
19 - Left valve, hinge. 78x
20 - Right valve, hinge. 76x
21 - Right valve, anterior marginal pore canals. 128x
22 - Right valve, posterior marginal pore canals. 130x



height approximately at the anterior third. In dorsal view ovoid carapace, anterior extremity in acute angle and posterior end rounded. Internal view — Hinge and muscle scars typical of the genus. Distinct duplicature with the widest part at the mid-anterior portion. Line of concrescence and inner margin coincident. Numerous straight, ramified and bulbous marginal pore canals. Strong sexual dimorphism. Male, in lateral view, with a more elongated and ovate carapace.

Dimensions — *Holotypus*: Female, right valve, n° MP-0-687; length: 1.168mm; height: 0.539mm; width: 0.259mm. *Paratypes*: Female, left valve, n° MP-0-688, length: 1.219mm; height: 0.613mm; width: 0.297mm. Male, right valve, n° MP-0-689; length: 1.254mm; height: 0.588mm; width: 0.246mm. Male, left valve, n° MP-0-690; length: 1.343mm; height: 0.649mm; width: 0.281mm.

Remarks — *Cyprideis maxipunctata* sp. nov. is similar to *C. tuberculata* (Meher, 1908) pointed out by Carbonnel (1969), but differs from it by presenting a more arched dorsal border, narrower anterior and posterior portions, submarginal row of punctuations, and five to seven marginal spines. Male also differs by presenting the maximum height at the anterior portion of the right valve while in *C. tuberculata* it is at the posterior instars.

Material — Several adult valves and juvenile instars.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-CI-1-RS, samplings (54-57), (66-57m), (66-69m), 198-201m); 2-MO-1-RS, samplings (42m, 45m, 84m, 87m.); 2-CA-1-RS, core 22 (84-87m) and sampling (88-89m). CORSAN drilling: G414-PDS-2 (7.30-14.60m).

Cyprideis mostardensis sp. nov.

Plates 1 and 2, Figures 17-22; 1-6

Derivatio nominis — From the type locality (Mostardas).

Holotypus — Female carapace n° MP-0-691

Paratypes — Female carapace, n° MP-0-692. Male carapaces, n° MP-0-693 and 694.

Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-MO-1-RS, sampling (21m).

Diagnosis — Anterior marginal ridge and short transversal one along the marginal spines, forming small submarginal reticulum.

Description — External view — Female carapace ovate in lateral view. Left valve with dorsal border slightly arched at the anterior half, being almost straight at the posterior one where it forms the cardinal angle. Ventral border with sinuosity just before the mid-length. Strong and evenly rounded anterior border ornated with about seven marginal spines and two ridges; a slightly marginal ridge and a short transversal one corresponding to each marginal spine, forming a small and shallow submarginal reticulum. Smooth surface with sparse normal pore canals and a submarginal row of punctuations. It presents a vertical sulcus slightly sinuous just before the mid-length of the carapace. Right valve with an accentuated and evenly rounded dorsal border. Truncated posterior border forming a posteroventral angle with a very minute spine. The maximum height

is approximately at the median region of the valve. In dorsal view, ovoid elongated carapace; anterior end in acute angle, and posterior one rounded. Internal view — Hinge and muscle scars typical of the genus. Distinct duplicature with its widest part at the mid-anterior portion, where marginal pore canals are numerous, straight, most of them bulbous, but some ramified and usually assembled in groups of three to five. At the anterior margin each free space corresponds to a spine. The line of concrescence and the inner margin are coincident. The selvage forms a concavity at the postero-ventral angle of the right valve. Strong sexual dimorphism. Male presenting a more elongated and ovate carapace in lateral view. Left valve with a slightly more arched posterior half of dorsal border. The greatest width is found after the middle portion. In internal view it presents a slightly wider duplicature.

Dimensions — *Holotypus* — Female, carapace, n° MP-0-691; right valve, length: 0.937mm; height: 0.476mm; left valve, length: 0.951mm; height: 0.487mm; *Paratypes*: Female, carapace, n° MP-0-692; length: 0.921mm; width: 0.445mm; Male, carapace, n° MP-0693: left valve, length: 1.049mm; height: 0.510mm; right valve, length: 1.062mm; height: 0.512mm; Male carapace, n° MP-0-694; length: 1.078mm; width: 0.435mm.

Remarks — *Cyprideis mostardensis* differs from *C. riograndensis* Pinto & Ornellas, 1965 in lateral view, of female and male valves by presenting a more accentuated ventral sinuosity slightly more sinuous and short vertical groove, small anterior submarginal reticulum, ventral half of the left valve posterior border, with closer and accentuated curvature. Female valves also present a more accentuated posterior cardinal angle and the left valve still has a more accentuated curvature of the dorsal anterior half, a slight and almost straight slope of posterior half of the dorsal border and the maximum height at the first third. Male valves present a more accentuated curvature at the dorsal border, and internally, a more accentuated crenulation of the hinge elements and more numerous marginal pore canals.

Material — Few complete carapaces and about two hundred adult valves and juvenile instars.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-MO-1-RS, samplings (15m, 18m, 21m, 24m, 27m, 30m, 33m, 36m, 39m, 42m, 45m, 48m, 84m, 90m, 123m, 138m.); 2-CI-1-RS, samplings (12-15m), (18-21m), (30-33m); 2-CA-1-RS, core 7 (32.15-32.20m); 2-PN-1-RS, sampling (18-21m).

Cyprideis posteroinflata sp. nov.

Plate 2, Figure 7-15

Derivatio nominis — By the presence of a markedly inflated posterior portion.

Holotypus — Female — Carapace, n° MP-0-695.

Paratypes — Female — Carapace, n° MP-0-696. Male — Carapaces, n° MP-0-697 and 698.

Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-CI-1-RS, core 1 (103.07-108m)

Diagnosis — Subrectangular female carapace with

maximum height and inflation at the posterior half. Narrow duplicature without vestibulum; straight and short numerous marginal pore canals.

Description — External view - Subrectangular female carapace, in lateral view. Dorsal border of left valve slightly arched, with the flexure point and the maximum height coincident at the middle of the posterior portion. Large and curved posterior border. Ventral border slightly convex. Narrower anterior border presenting a slight marginal denticulation. Smooth surface with anterior submarginal ridge and mid-dorsal vertical sigmoid sulcus. Right valve presenting in lateral view, a more arched dorsal border. In dorsal view, ovoid carapace. Internal view — Hinge and muscle scars typical of the genus. Narrow duplicature with its widest part at the antero median portion. Line of conrescence and inner margin coincident. Numerous, scattered, mostly straight, and grouping marginal pore canals at the anterior portion. Inconspicuous selvage. Strongly marked sexual dimorphism. Male presents in lateral view a narrower, elongated and ovate carapace with almost parallel dorsal and ventral borders. Dorsal border less arched reaching the posterior region in an oblique curve. Posterior border with closer curvature. Slightly sinuous ventral border. Longer and more sinuous lateral sulcus. Left valve also differs by a more accentuated slope at the posterior dorsal portion and by presenting the maximum height and flexure point coincident at the first anterior third. Ovate-elongated carapace, in dorsal view.

Dimensions — *Holotypus* — Female, carapace, n° MP-0-695; right valve, length: 1.019mm; height: 0.525mm; left valve, length: 1.039mm; height: 0.542mm. *Paratypi* — Female, carapace, n° MP-0-696; length: 1mm; width: 0.460mm. Male, carapace, n° MP-0-697; right valve, length: 1.062mm; height: 1.489mm, left valve, length: 1.080mm; height: 0.512mm. Male, carapace, n° MP-0-698, length: 1.137mm width: 0.476mm.

Remarks — *C. posteroinflata* sp. nov. is similar to *C. heterostigma* (Reuss) presented by Kollmann (1958). Krstic (1968) classifies this species in the genus *Cyprideis*, subgenus *Cyprideis*, *heterostigma* group. The author still registers the following morphological features for this group: parallel or subparallel dorsal and ventral borders, neatly elongated and very inflated carapace, being the width and height almost equal. According to its morphology *C. posteroinflata* sp. nov. falls into the *heterostigma* group, differing from *C. heterostigma* by presenting the carapace with a more arched dorsal border and more accentuated convexity at the posterior half of the ventral border, narrower portion and more inflated posteriorly.

Material — Several carapaces and about eight hundred adult valves and juvenile instars.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-CI-1-RS, core 1 (103.07-108m); 2-CA-1-RS, core 27 (132.80-135.85m).

Cyprideis sparsopunctata sp. nov.

Plates 2 and 3, Figures 16-20; 1-5, 15

Derivatio nominis — By the sparsely punctate carapace

surface.

Holotypus — Female — Left valve, n° MP-0-704.

Paratypi — Female — Right valve, n° MP-0-705; Carapace, n° MP-0-706. Male — Left valve, n° MP-0-707; Right valve, n° MP-0-708; Carapace, n° MP-0-709.

Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-CA-1-RS, core 8 (35.20-38.28m).

Diagnosis — Maximum height at anterior portion. Small spine at posteroventral angle of the right valve. Sparsely punctated surface. In dorsal view, semi-ovoid with the widest part at the central region.

Description — External view — Ovate female carapace in lateral view. Left valve with arched dorsal border at the anterior half, and the posterior one with a very neat cardinal angle. Evenly rounded anterior border with slight marginal ridge and about five to seven evenly spread marginal denticles. Ventral border with slight sinuosity at the anterior third. Oblique posterior border at the dorsal half, and rounded with closer curvature at the ventral one. Smooth surface with sparse punctae, a submarginal row of neat punctuations parallel to the free margin, except at the postero-dorsal portion. Maximum height just before mid-length, where a vertical sinuous sulcus extends. Right valve with inconspicuous posterior cardinal angle, more accentuated ventral sinuosity, and posterior border with less curvature, showing a small spine in posteroventral angle. In dorsal view, ovoid, elongated carapace, with the widest part around the central region. Internal view — Hinge and muscle scars typical of the genus. Distinct duplicature with the widest part at the anteromedian portion. Numerous, sparsely distributed almost straight marginal pore canals, some bifurcated, normally assembled in groups of three to five. At the anterior margin each free space corresponds to a spine. Line of conrescence and inner margin coincident. Selvage groove more conspicuous at the posterior portion. Posteroventral angle accentuated by an ear-shaped small prominence. Quite accentuated sexual dimorphism. Males presenting, in lateral view, ovate, more elongated carapace, and right valve with an accentuated slope at the posterior region of the dorsal border; neater posterior cardinal angle; posterior border formed by a curvature more markedly closed at the ventral half. Well developed posteroventral spine, and slighter ventral sinuosity. In dorsal view, it presents ovate and elongated carapace; and in internal view wider duplicature, more neatly bulbous marginal pore canals, and one selvage concavity at the posteroventral angle of right valve.

Dimensions — *Holotypus* — Female, left valve, n° MP-0-704, length: 1.152mm; height: 0.556mm. *Paratypi* — Female, right valve, n° MP-0-705; length: 1.078mm; height: 0.539mm. Female, carapace n° MP-0-706; length: 1.088mm; width: 0.490mm. Male, left valve, n° MP-0-707; length: 1.215mm; height: 0.555mm. Male, right valve, n° MP-0-708; length: 1.198mm; height: 0.537mm. Male, carapace, n° MP-0-709; length: 1.217mm; width: 0.476mm.

Remarks — *Cyprideis sparsopunctata* differs from *Cyprideis riograndensis*, Pinto & Ornellas, 1965 by

presenting, in lateral view, more elongated valves, dorsal border with more delicate curvature, and a slight slope both forwards and backwards; as well as a more marked posterior cardinal angle, ventral sinuosity, posteroventral angle, curvature of posterior border and vertical dorsoventral sulcus. In dorsal view, more elongated carapace and wider around the central region.

Material — Four complete carapaces, approximately two hundred adult valves and juvenile instars.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-CA-1-RS, core 6 (29.10-32.15m), core 8 (35.20-38.28m), core 9 (38.28-41.30m) and sampling (96-98m); 2-CI-1-RS, core 1 (103.07-108m) and samplings (51m), (66-69m), (198-201m); 2-MO-1-RS, samplings (48m, 51m, 207m); 2-PS-1-RS, samplings (15-18m), (36-39m), (42-45m), (48-51m), (54-57m).

***Cyprideis salebrosa* van den Bold, 1963**

Plate 3, Figures 6-14

Cythere americana Sharpe, 1908 (part), p. 420-421.

Cyprideis locketti (Stephenson), In: Swain, 1955, (part) p. 615; pl. 59, figs. 10a-c (not pl. 64, fig. 13 = *Cyprideis castus* Benson).

Cyprideis torosa (Jones), In: Swain, 1955, pp. 616-617; pl. 59, figs. 8a-b; text-fig. 32c.

Cyprideis littoralis (Brady), In: Byrne, LeRoy & Riley, 1959, p. 241; pl. 4, fig. 11; pl. 5, fig. 12; pl. 6, fig. 14.

Cyprideis n. sp. — LeRoy, In: Byrne, LeRoy & Riley, 1959, pp. 240-241; pl. 6, figs. 10 and 11.

Cyprideis littoralis (Brady), In: Gutentag & Benson, 1962, pp. 47, 49, 50; pl. 2, figs. 4-7; text-figs. 14a-d.

Cyprideis salebrosa n. sp. van den Bold, 1963, pp. 377, 378; pl. 7, figs. 9a-d; pl. 11, figs. 1a-c.

Cyprideis gigantea LeRoy, 1964, p. 1099, pl. 170, fig. 1a-e, 2a-f, 3a-c. *Cyprideis salebrosa* van den Bold, In: Sandberg, 1964a, p. 144; pl. VIII, figs. 10-25; pl. IX, figs. 1-12; pl. 18, fig. 10; pl. XX, figs. 5-10; pl. XXII, figs. 5, 8.

Cyprideis hartmanni Ramirez, 1967, p. 40-42, figs. 74-89.

Cyprideis salebrosa, Ramirez In: Ornellas & Würdig, 1983, pp. 97-105; pls. I and II.

Cyprideis n. sp. Bertels, 1975, p. 350, pl. 5, fig. 1.

Holotypus — Female — Right valve, USNM n° 684068.

Locus typicus — Rohr 14005a (loc. 1), Todds's Road, Northern Basin, Trinidad.

Stratum typicum — Caparo Clay Member of the Talparo Formation, Pliocene.

Homotypi — Female — Right valve, n° MP-0-699; Left valve, n° MP-0-699; Left valve, n° MP-0-700; Carapace, n° MP-0-701; Male — Left valve, n° MP-0-702; Right valve, n° MP-0-703.

Locus — Pelotas Basin, PETROBRÁS drilling: 2-MO-1-RS, sampling (150m).

Dimensions — *Homotypi* — Female, right valve, n° MP-0-1455; length: 1.002mm; height: 0.586mm. Female, left valve, n° MP-0-700, length: 1.039mm, height: 0.606mm. Male, left valve, n° MP-0-702; length: 1.156mm; height: 0.620mm. Male, right valve, n° MP-0-703; length: 1.137mm; height: 0.592mm, width: 0.235mm.

Remarks — Bold (1963) when proposed *Cyprideis salebrosa*, did not present diagnosis. For this reason, the following diagnosis is according to Sandberg (1964b). The specimens of *C. salebrosa* pointed out by Bold and by Sandberg present variations in the height and curvature of the dorsal border of the valves, being more easily perceptible in female carapaces. These variations might lead to erroneous classification within different species when the specimens are found separately. Thus, it was observed at several levels of the 2-MO-1-RS drilling, the occurrence of these variations among specimens of the same population of *C. salebrosa*, being almost infeasible, to establish specific differences among them though. The juvenile instars present smooth and punctate carapaces with two or three nodes at the posterior half of the valves.

Material — Approximately one hundred adult valves and juvenile instars.

Occurrence — Miocene (Duplin Marl), Lumberton, North Carolina. Pliocene of Kansas, Florida and Trinidad. Pleistocene of Kansas (Palmico Formation), Intracostal Canal near Myrtle Beach, South Carolina. Quaternary of Louisiana. Recent of Louisiana, Texas, Mexico (East Coast), Venezuela, Argentina (Plata River), and Quequem Grande River, Eriquillo Lake, Hispaniola; Brighton Beach, Long Island, New York, the mouth of the Metedeconk River, New Jersey, Barataria Bay, Louisiana. Post Miocene of Pelotas Basin, PETROBRÁS drillings: 2-MO-1-RS, samplings (27m, 45m, 48m, 51m, 132m, 135m, 138m, 141m, 144m, 150m, 201m, 207m).

***Perissocytheridea* Stephenson, 1938**

***Perissocytheridea kroemmelbeini* Pinto & Ornellas, 1970**

Plate 2

Figures 1-6 - *Cyprideis mostardensis* sp. nov.

Male, carapace. Paratypus n° MP-0-693.

1 - Right lateral view. 41.5x

2 - Left lateral view. 38x

Female, carapace. Paratypus n° MP-0-692.

3 - Dorsal view. 26x

Male, carapace. Paratypus n° MP-0-694.

4 - Dorsal view. 39x

Female, carapace. Holotypus n° MP-0-691.

5 - Left valve, central muscle scars. 124.5x

6 - Right valve, posterior marginal pore canals. 132.5x

Figures 7-15 - *Cyprideis posteroinflata* sp. nov.

Female, carapace. Holotypus n° MP-0-695.

7 - Right lateral view. 40x

8 - Left lateral view. 37.5x

9 - Left valve hinge. 76.5x

10 - Right valve, hinge. 77x

11 - Right valve, central muscle scars. 121x

14 - Left valve, posterior marginal pore canals. 120. 5x

15 - Left valve, anterior marginal pore canals. 121x

Male, carapace. Paratypus n° MP-0-697.

12 - Right lateral view. 38.5x

13 - Left lateral view. 38x

Figures 16-20 - *Cyprideis sparsopunctata* sp. nov.

Female, right valve. Paratypus n° MP-0-705.

16 - Lateral view. 37x

18 - Central muscle scars. 132.5x

20 - Hinge. 77.5x

Female, left valve. Holotypus n° MP-0-704.

17 - Lateral view. 38x

19 - Hinge. 77x



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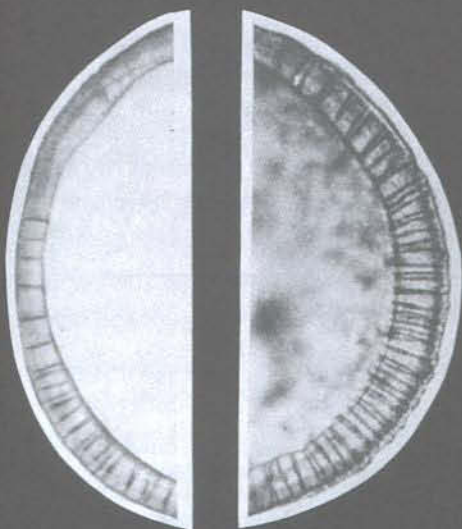
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Holotypus — Female — Carapace, n° MP-0-294.

Locus typicus — Muddy sand from the canal that links Tramandaí Lagoon to the sea, Rio Grande do Sul State, Brazil.

Homotypi — Female — Right valve, n° MP-0-710. Male — Left valve, n° MP-0-711; Carapace, n° MP-0-1455.

Locus — Pelotas Basin, PETROBRÁS drilling: 2-CI-1-RS, sampling (102-105m).

Dimensions — *Homotypi* — Female, right valve, n° MP-0-710; length: 0.544mm; height: 0.279mm. Male, left valve, n° MP-0-711; length: 0.529mm; height: 0.264mm. Male, carapace, n° MP-0-1455, left valve, length: 0.668mm; height: 0.353mm; right valve, length: 0.628mm; height: 0.353mm.

Remarks — This species shows features of *Perissocytheridea kroemmelbeini* Pinto & Ornellas, 1970, with a little less inflated regions.

Material — Rare adult valves and juvenile instars.

Occurrence — Recent: in a muddy sand canal that links Tramandaí Lagoon to the sea. Post Miocene: Pelotas Basin, PETROBRÁS drilling: 2-MO-1-RS, samplings (141m, 156m); 2-CI-1-RS, core 1 (103.07-108m) and sampling (102-105m); 2-CA-1-RS, core 27 (132.80-135.85m).

Familia Krithidae Mandelstam, 1960

Krithe Brady, Crosskey & Robertson, 1874

Ilyobates Sars, 1865 (non *Ilyobates* Kraatz, 1858)

Krithe sp.

Plate 4, Figures 8-14

Hypotypi — Female — Right valve, n° MP-0-712; Left valve, n° MP-0-713.

Locus — Pelotas Basin, PETROBRÁS drilling 2-CI-1-RS, sampling (306-309m).

Dimensions — *Hypotypi* — Female, right valve, n° MP-0-712; length: 0.645mm, height: 0.345mm. Female, left valve, n° MP-0-713, length: 0.649mm; height: 0.355mm.

Remarks — Due to the impossibility of a more

complete study by scarcity of material and bad preservation of the valves, the species is not described.

Material — Rare valves.

Occurrence — Pelotas Basin, PETROBRÁS drilling: 2-CA-1-RS, samplings (300-303m), (306-309m); 2-MO-1-RS, sampling (333m).

Sub Familia Trachyleberidinae Sylvester-Bradley, 1948

Costa Neviani, 1928

Costa riograndensis, sp. nov.

Plate 4, Figures 15-23

Costa perforata Ornellas, 1981 In: Bertels, A. & Martinez, D. E., 1990, p. 159, pl. 4, fig. 41.

Derivatio nominis — From Rio Grande do Sul State:

Holotypus — Female — Left valve, n° MP-0-751

Paratypi — Female — Right valve, n° MP-0-752; Carapace, n° MP-0-753. Male — Left valve, n° MP-0-754; Right valve, n° MP-0-755; Carapace, n° MP-0-756.

Locus typicus — Pelotas Basin, PETROBRÁS drilling: 2-CA-1-RS, core 9 (38.28-41.30m).

Diagnosis — Subrectangular female carapace. Anterior and posterior spines prominent. Surface strongly reticulate, secondarily covered with weak tubercles. Ridges well developed: a dorsal one, sometimes perforated, and a median one, both forming neat, though discontinuous linear protuberances. The third ventral ridge is generally continuous, with an irregular border and a little distal spiniform protuberance.

Description — External view — Left valve slightly larger than the right. In lateral view, female left valve subrectangular. Straight dorsal border sloping backwards. Cardinal angles conspicuous, mainly the prominent posterior one. Well developed eye tubercle coincident with the highest carapace portion. Anterior border obliquely arched. It presents a double row of marginal spines, being most of them sharp-pointed. Ventral border straight and convergent backwardly, posterior border acuminate, with the dorsal half straight and the ventral convex. It presents a double row of submarginal sharp-pointed horizontal spines, almost parallel to the valve length. There are long spines at the postero-ventral border. Surface with strong concentric reticulum at the anteromedian region, recovered by conspicuous and

Plate 3

Figures 1-5, 15 - *Cyprideis sparsopunctata* sp. nov.

Male, right valve. Paratypus n° MP-0-708.

1 - Lateral view. 37.5x

Male, left valve. Paratypus n° MP-0-707.

2 - Lateral view. 37x

Male, carapace. Paratypus n° MP-0-709.

3 - Dorsal view. 40.5x

Female, left valve. Holotypus n° MP-0-704.

4 - Posterior marginal pore canals. 130.5x

5 - Anterior marginal pore canals. 132x

Female, carapace. Paratypus n° MP-0-706.

15 - Dorsal view. 43x

Figures 6-14 - *Cyprideis salebrosa* van den Bold, 1963

Female, right valve. Homotypus n° MP-0-699.

6 - Lateral view. 38x

11 - Hinge. 78.5x

12 - Anterior marginal pore canals. 147x

13 - Central muscle scars. 148x

14 - Posterior marginal pore canals. 146.5x

Female, left valve. Homotypus n° MP-0-700.

7 - Lateral view. 38x

10 - Hinge. 76.5x

Male, right valve. Homotypus n° MP-0-703.

8 - Lateral view. 38x

Male, left valve. Homotypus n° MP-0-702.

9 - Lateral view. 40x



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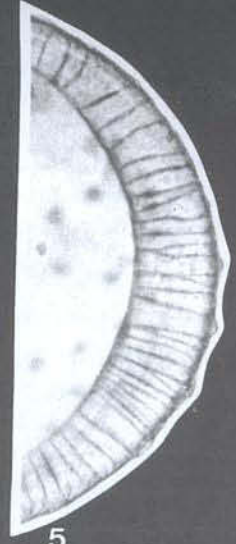
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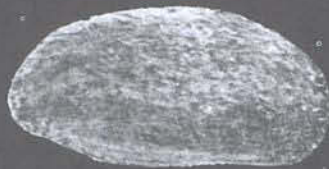
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small tubercles or spines; and a depression area that runs along the whole free margin, which is almost smooth, mainly at the posterior and anterior ends. The surface also presents a small but neat laminar submarginal, slightly undulated ridge, and three longitudinal ridges: a dorsal one, straight, irregular and inclined backwards, sometimes perforated; a median one, slightly arched approaching the dorsal ridge at the posterior region, both forming neat, though discontinuous linear protuberances. Finally a third one ventral, generally continuous, with irregular border and one distal spiniform protuberance. In dorsal view, ovate carapace, with almost parallel sides and an irregular outline due to the presence of ridges. It presents an anterior and widened prominence as consequence of antero submarginal ridge. The terminal portion of the carapace tapers brusquely to form the posterior extremity which is shorter and narrower than the anterior. Right valve a little smaller and presenting a posterior extremity with a slightly closer terminal angle. Internal view — Left valve hinge presents one anterior "stepped" socket, a short tooth, a long bar and one posterior socket. Line of concrescence coincident with inner margin, both approximately parallel to the flange. Marginal pore canals mostly grouped at the antero-ventral region, irregularly spread, mostly simple, almost straight, long, penetrating in marginal spines; very few are bifurcated, crossed or with distal extremities fused. Muscle scars typical of the genus. Sexual dimorphism neat: male carapace is narrower and more elongated.

Dimensions — *Holotypus* — Female, left valve, n° MP-0-751; length: 0.843mm; height: 0.437mm. *Paratypus* — Female, right valve, n° MP-0-752; length: 0.422mm. Male, left valve, n° MP-0-754; length: 0.902mm; height: 0.459mm. Male, right valve, n° MP-0-755; length: 0.882mm; height: 0.421mm.

Remarks — Compared to *Costa hasenbankae* Bertels, 1973, the present species shows the following differences: female carapace higher and shorter; more straight ventral ridge not arched downwards; caudal process less prominent and with quite developed spines; surface strongly reticulate and secondarily covered with weak tubercles; the three longitudinal ridges are more

developed, being the dorsal perforate and the median ones neat though discontinuous. In dorsal view the ridges, the anterior and posterior ends are more developed due to the strong ornamentation.

Marginal pore canals less numerous, mostly grouped at the anteroventral portion.

Material — Several adult valves and few carapaces.

Occurrence — Pelotas Basin, PETROBRÁS drillings: 2-CA-1-RS, core 6 (29.10-32.15m), core 8 (35.20-38.28m), core 9, (38.28-41.30m); 2-MO-1-RS, sampling (15m, 18m). Napostá Grande stream, Quaternary of Buenos Aires Province, Argentina.

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Plate 4

Figure 1-7 - *Perissocytheridea kroemmelbeini* Pinto & Ornellas, 1970
Male, carapace. Homotypus n° MP-0-1455.

1 - Right lateral view. 62x

2 - Left lateral view. 63x

Female, right valve. Homotypus n° MP-0-710.

3 - Anterior marginal pore canals. 127.5x

4 - Posterior marginal pore canals. 126x

6 - Central muscle scars. 130.5x

7 - Hinge. 77.5x

Male, left valve. Homotypus n° MP-0711.

5 - Hinge. 78x

Figures 8-14 - *Krithe* sp.

Female, left valve, Hypotypus n° MP-0-713.

8 - Posterior marginal pore canals. 154.5x

10 - Anterior marginal pore canals. 156x

11 - Hinge. 78x

13 - Lateral view. 77x

Female, right valve. Hypotypus n° MP-0-712.

9 - Central muscle scars. 151x

12 - Hinge. 77x

14 - Lateral view. 78.5x

Figures 15-23 *Costa riograndensis* sp. nov.

Female, right valve. Paratypus n° MP-0-752.

15 - Lateral view. 39x

Female, left valve. Holotypus n° MP-0-751.

16 - Lateral view. 40.5x

Male, right valve. Paratypus n° MP-0-755.

17 - Anterior marginal pore canals. 158.5x

18 - Posterior marginal pore canals. 153.5x

19 - Central muscle scars. 154x

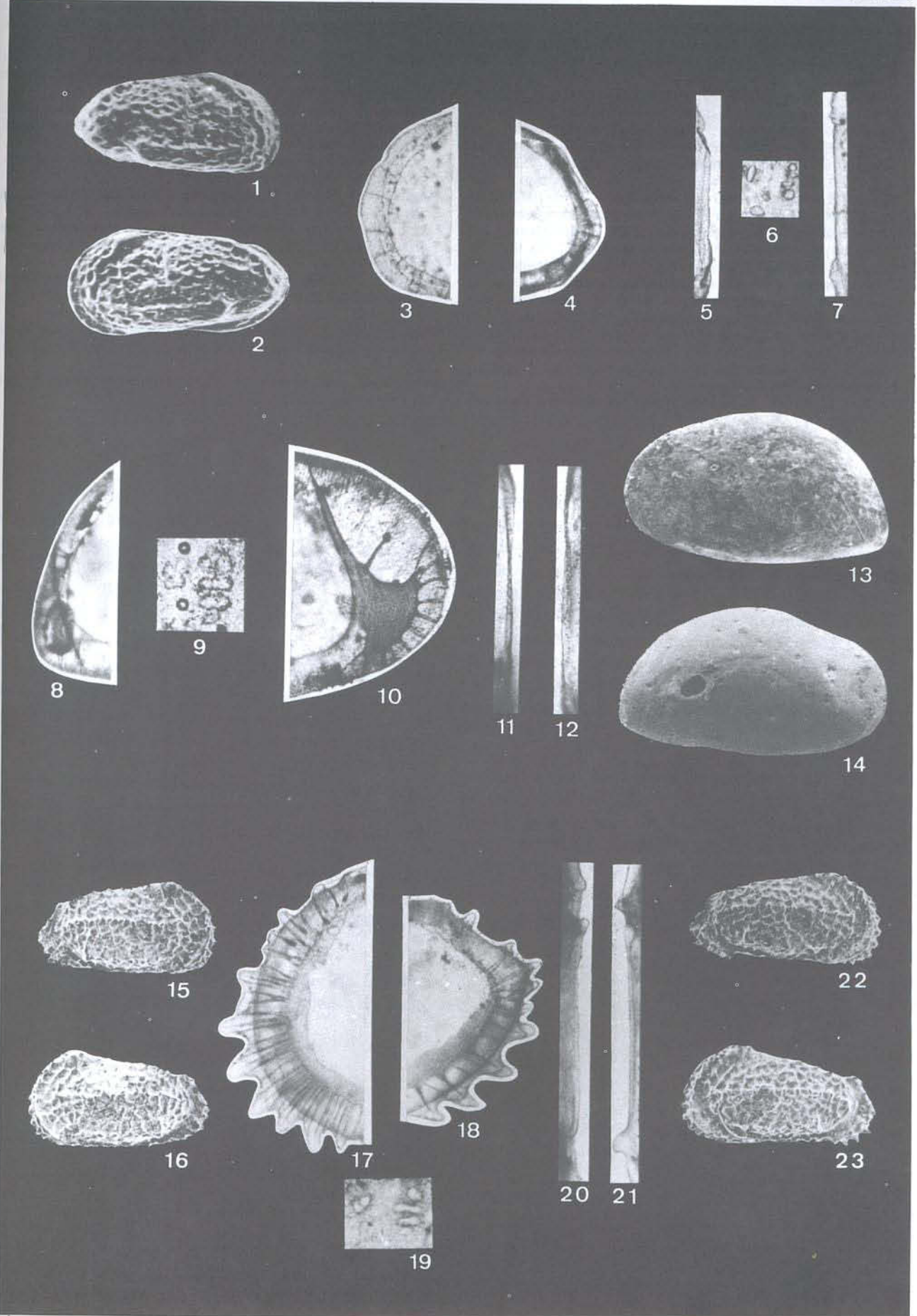
21 - Hinge. 78.5x

22 - Lateral view. 39.5x

Male, carapace. Paratypus n° MP-0-754.

20 - Right valve, hinge. 76x

23 - Left lateral view. 40x.



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