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Ruggiericythere, a new shallow marine ostracod genus from Brazil

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KEY WORDS – *Ostracoda*, *Ruggiericythere*, *Systematics*, *Biogeography*, *Recent*, *Brazil*.

ABSTRACT – The new ostracod genus *Ruggiericythere* (*Hemicytheridae* Puri, 1953) is described and illustrated from Recent sediments of the Brazilian continental shelf. Seven species assigned to the new genus are discussed and figured: four of these, i.e. *R. perspicua*, the type-species, *R. batistae*, *R. purperae* and *R. vixalata*, are described as new species; *Ruggiericythere dimorphica* (Whatley, Moguilevsky, Chadwick, Toy & Ramos, 1998) has been previously described from the Southwestern Atlantic; two species, *Ruggiericythere* sp. 1 and *Ruggiericythere* sp. 2, are left in open nomenclature due to paucity of material. Analysis of 934 samples, recovered on the Brazilian shelf, provided data on the geographical and bathymetric distribution of *Ruggiericythere*. In the study area the genus extends from the coast of Bahia State (17° 59' S) to the Uruguayan continental shelf (35° 14' S), a region which is mainly under the influence of subantarctic waters. Previous records show that *Ruggiericythere* can be found as far South as the Northern Argentinean continental shelf (41° 52' S). The depth distribution of this shallow genus ranges from 3.5 to 165 m.

RIASSUNTO – [*Ruggiericythere*, un nuovo genere di ostracode di piattaforma del Brasile] – Un nuovo genere di ostracodi, *Ruggiericythere* (*Hemicytheridae* Puri, 1953) viene descritto da sedimenti recenti della piattaforma continentale del Brasile. Sette specie attribuite al nuovo taxon sono discusse ed illustrate: quattro delle dette specie, *R. perspicua*, specie tipo del genere, *R. batistae*, *R. purperae* e *R. vixalata*, vengono descritte come nuove; *Ruggiericythere dimorphica* (Whatley, Moguilevsky, Chadwick, Toy & Ramos, 1998) unica specie già precedentemente descritta da sedimenti recenti dell'Atlantico meridionale; altre due specie, *Ruggiericythere* sp. 1 e *Ruggiericythere* sp. 2, sono lasciate in nomenclatura aperta a causa della scarsità del materiale o dell'imperfetto stato di conservazione degli individui rinvenuti. È riportata la distribuzione geografica e batimetrica del genere come delle singole specie, sulla base dello studio di 934 campioni provenienti dalla piattaforma del Brasile. Nell'area studiata la presenza di *Ruggiericythere* viene segnalata a partire dalle coste dello Stato di Bahia, con latitudine pari a 17° 59' Sud, sino alla piattaforma continentale dell'Uruguay (35° 14' Sud), una regione che si trova per buona parte della sua estensione sotto l'influenza di acque subantarctiche. Le precedenti segnalazioni, riportate in letteratura, di specie qui incluse nel nuovo genere, consentono di ampliare la sua distribuzione latitudinale sino alle coste settentrionali argentine (41° 52' S), e la sua distribuzione stratigrafica al Pleistocene. La distribuzione batimetrica nell'Atlantico sud-occidentale è ristretta agli ambienti di piattaforma, a profondità comprese tra 3.5 e 165 metri.

INTRODUCTION

This paper is part of a larger study of the Recent marine Ostracoda of the Brazilian margin. It is concerned exclusively with the taxonomy and zoogeography of the new genus *Ruggiericythere* from the continental shelf. The first comprehensive study of Ostracoda genera from the Brazilian shelf began with Pinto *et al.* (1978), but it is only in the last 20 years that modern researches at species level have been undertaken in this extensive geographical area. The most important studies in the same area, dealing with the taxonomy and zoogeography of various genera and species, are the following: Chukewski & Purper (1985a, b), Ornellas & Coimbra (1985), Coimbra & Ornellas (1986, 1987, 1989), Purper & Ornellas (1987a, b), Dias-Brito *et al.* (1988), Medeiros & Coimbra (1989), Coimbra *et al.* (1992, 1994, 1995, 1999a, b), Ramos (1994, 1996), Carmo & Sanguinetti (1995, 1999), Whatley *et al.* (1998), Fauth & Coimbra (1998), Ramos *et al.* (1999), Coimbra & Carreño (2002), Coimbra & Fauth (2002), Bergue & Coimbra (2002), Machado & Drozinski (2002), Drozinski *et al.* (2003) and Coimbra & Bergue (2003).

The Brazilian continental shelf is located on the Eastern border of the South American continent and is almost 8.000 km in length. According to Chaves (1983), this large area is subdivided into three regions: North, East and South (Text-fig. 1). The continental shelf slopes at an average of 0.1°. The Northern and Eastern shelves extend from the coastline to the isobaths of 40-70 m. The Southern shelf reaches from 100 to 160 m in depth. The maximum shelf width is 330-350 km at the Amazon and Pará river mouths (Martins & Coutinho, 1981). The Northern and Eastern regions are under the influence of the warm waters of the Guyanas (North Region) and the Brazil currents (East Region). On the other hand, the South Region is strongly affected by the subantarctic waters brought northward by the Malvinas (Falkland) Current. The influence of this current on the Brazilian shelf is felt as far north as ~23°S near the town of Cabo Frio, Rio de Janeiro State.

MATERIAL AND METHODS

This study is based on 713 samples of the REMAC Project (coordinated by Petróleo Brasileiro S.A.-PETROBRÁS); 92 of the Geomar VI, 79 of the



Text-fig. 1 - Map of Brazilian continental shelf (after Coimbra & Ornellas, 1989), showing its three principal divisions.

Geomar III and 39 of the Geomar II (these three projects were carried out by Diretoria de Hidrografia e Navegação da Marinha do Brasil) and 11 samples collected by the Researcher Vessel "El Austral" in the southernmost Brazil and northernmost Uruguay.

The majority of these 934 van Veen grab samples (more than 90 %) was collected on the shelf (between 27 and 200 m), while 60 samples were collected in deeper waters (maximum 560 m). One half of these 60 deeper samples (31 samples) was recovered along the Amazonian margin. The others were collected along the East and South shelves (scattered sampling).

The samples showing the presence of *Ruggiericythere* species and the number of specimens for each sample are listed in Tab. 1.

The type material is deposited in the collections of the Museu de Paleontologia of the Universidade Federal do Rio Grande do Sul, Section of Ostracoda, to which the prefix MP-O, for both types and figured specimens, refers.

SYSTEMATIC DESCRIPTIONS

Class OSTRACODA Latreille, 1806
 Subclass PODOCOPA Sars, 1866
 Order PODOCOPIDA Sars, 1866
 Suborder CYTHEROCOPINA Baird, 1850
 Superfamily CYTHEROIDEA Baird, 1850
 Family HEMICYTHERIDAE Puri, 1953

Genus *RUGGIERICYTHERE* gen. nov.

Derivation of name – In honour of Professor Giuliano Ruggieri, an outstanding geologist and palaeontologist, the founder and *maestro* of modern Italian research on ostracods.

Type species – *Ruggiericythere perspicua* sp. nov.

Species included – Listed by original binomen:

- *Ruggiericythere perspicua* sp. nov.
- *Urocythereis dimorphica* Whatley, Mognilevsky, Chadwick, Toy & Ramos, 1998.
- *Ruggiericythere batistae* sp. nov.
- *Ruggiericythere purperae* sp. nov.
- *Ruggiericythere vixalata* sp. nov.

Diagnosis – Carapace thick-shelled, medium to large ($L = 0.70\text{--}0.97$ mm), elongate, subrectangular in lateral view, elongate-ovate in dorsal view. Anterior margin broadly rounded; upper part of the posterior margin concave in the right valve, weakly concave or straight in the left valve; lower part of the posterior margin convex, forming a blunt caudal process, located at or just below mid height; the posterior extension is generally more evident in the right valve. Dorsal and ventral margins straight to slightly convex; a marked postero-dorsal angle is present. Maximum height at anterior cardinal angle. Left valve slightly overlaps the right valve.

Surface of the valves coarsely reticulate. The fossae generally show a subrounded or irregular shape. The sculpture is dominated by riblets (= costulae *sensu* Liebau, 1991) that are primarily longitudinally disposed. The riblet pattern consists of two anterior riblets extending parallel to the anterior margin and connected in the eye tubercle; a subocular diagonal riblet, located between the eye tubercle and the muscle node area, slopes toward the anterior margin; one or two anterior and three or four posterior sublongitudinal riblets radiate from the muscle node area (Text-fig. 2C). The presence of dorsal, ventral and posterior riblets is a feature of specific value. A more or less developed posterior denticulation is ornamental to the

Sample	Leg	Latitude	Longitude	Depth in m	<i>R. batistae</i>	<i>R. dimorphica</i>	<i>R. perspicua</i>	<i>R. purperae</i>	<i>R. vivalata</i>	<i>R. sp. 1</i>	<i>R. sp. 2</i>
3002	1	25°07,3' S	47°24,8' W	35		1					
3003	1	25°16,5' S	47°33,5' W	35		1					
3004	1	25°26,8' S	47°43,5' W	31		1				1	
3006	1	25°46,5' S	48°01,5' W	33		2					
3010	1	26°31,0' S	48°15,0' W	46		313	2				1
3011	1	26°44,7' S	48°16,0' W	49		5					
3012	1	26°55,2' S	48°17,2' W	47		1					
3020	1	28°23,4' S	48°35,5' W	53		1					
3022	1	28°47,3' S	48°51,2' W	55		1	1				
3030	1	29°52,5' S	49°45,1' W	40		7					
3031	1	30°01,4' S	49°52,0' W	38		1					
3036	1	30°45,8' S	50°23,5' W	24			1				
3053	1	32°39,6' S	51°55,8' W	23		1					
3060	1	34°03,8' S	52°57,2' W	31		1					
3065	1	32°38,0' S	50°34,0' W	102		2					
3096	1	29°52,0' S	49°42,0' W	43		6					2
3107	1	31°51,0' S	50°56,0' W	61		2					
3121	1	31°13,0' S	49°51,0' W	138			2				
3122	1	31°02,0' S	49°43,0' W	131	7	7	77				
3132	2	27°23,0' S	47°44,0' W	121	1		4				
3133	2	27°28,0' S	47°34,0' W	136	10	3	42				
3134	2	28°23,0' S	47°34,0' W	153	5	5	4				
3138	2	29°03,0' S	48°06,0' W	127	2	4	18	1			
3143	2	30°26,0' S	49°06,0' W	136	1		3				
3144	2	30°39,0' S	49°16,0' W	146	1	3	2				
3145	2	30°53,0' S	49°24,0' W	158	2	4	7	1			
3154	2	28°53,0' S	48°19,0' W	114		9	1				
3163	2	26°56,0' S	48°25,0' W	36		192					
3171	2	25°24,2' S	47°06,7' W	58		10					
3193	2	24°58,0' S	45°30,0' W	98		2					
3194	2	24°51,0' S	45°14,0' W	104		1					
3195	2	24°41,9' S	45°02,3' W	116	1	4	1	3			
3200	2	23°49,2' S	44°54,4' W	58		2					
3204	2	24°31,0' S	45°56,0' W	58		2					
3206	2	24°49,6' S	46°35,7' W	52		16					
3209	2	25°20,5' S	47°22,7' W	45		51	14				
3215	2	26°14,0' S	46°35,0' W	164		5	2				
3220	2	24°59,5' S	46°08,5' W	98		2					
3221	2	24°47,3' S	46°10,0' W	60		49	2				1
3227	3	24°46,0' S	46°40,0' W	46		61					
3228	3	25°03,0' S	46°39,0' W	51		17	8				
3231	3	25°30,0' S	45°57,0' W	130	1	1	10				
3235	3	23°59,9' S	44°50,0' W	77		4	2	1			
3237	3	23°51,5' S	44°26,0' W	84	1		2				
3238	3	24°05,0' S	44°16,0' W	137	1	1	2				
3240	3	24°05,0' S	43°09,0' W	155				2			
3243	3	23°15,0' S	43°19,0' W	56		2					
3244	3	23°11,0' S	43°32,0' W	51		17	4				
3246	3	23°24,9' S	44°05,0' W	57		1					
3247	3	23°30,0' S	44°20,0' W	55		1					
3250	3	24°02,5' S	44°21,0' W	128			1				
3251	3	23°54,0' S	44°04,0' W	111			1				
3252	3	23°42,5' S	43°44,0' W	110		1					
3255	3	23°20,0' S	43°01,0' W	105			1				
3257	3	23°01,5' S	42°30,0' W	64		3					
3259	3	23°04,5' S	41°35,5' W	84	1						
3260	3	23°04,5' S	41°20,5' W	80		1	1				
3261	3	23°04,5' S	41°03,0' W	91		2					
3262	3	23°20,0' S	41°10,5' W	130				5			
3263	3	23°25,5' S	41°21,5' W	101				4			
3264	3	23°31,0' S	41°32,5' W	128		5					
3266	3	23°39,0' S	42°55,1' W	124				2			
3271	3	23°17,0' S	44°02,5' W	51		1	1				
3275	3	23°19,0' S	42°54,0' W	96		1	1				
3276	3	23°19,5' S	42°37,5' W	102		2	2				
3277	3	23°21,5' S	42°11,0' W	119	2	3	2				
3281	3	23°14,0' S	41°14,9' W	102		1					
3282	3	23°01,0' S	41°07,0' W	93				1			
3283	3	22°46,0' S	40°59,6' W	79		3		3			

Sample	Leg	Latitude	Longitude	Depth in m	<i>R. batistae</i>	<i>R. dimorphica</i>	<i>R. perspicua</i>	<i>R. purperae</i>	<i>R. vivalata</i>	<i>R. sp. 1</i>	<i>R. sp. 2</i>
3284	3	22°35,0' S	40°54,0' W	68		4					
3285	3	22°25,1' S	40°59,8' W	56		1					
3286	3	22°24,5' S	41°19,8' W	34		8					
3287	3	22°33,5' S	41°34,0' W	46		5					
3292	3	23°25,2' S	41°37,6' W	128			1				
3294	3	22°55,1' S	41°19,5' W	75	2						
3295	3	22°50,0' S	41°15,1' W	64				3			
3296	3	22°35,1' S	41°07,5' W	51		4	2				
3297	3	22°21,5' S	40°59,9' W	49	2	11	9				
3298	3	22°08,0' S	40°51,0' W	33		1	1				
3302	3	21°10,0' S	40°41,0' W	13							
3304	3	20°32,5' S	40°12,5' W	35		14				1	
3305	3	20°22,0' S	40°00,0' W	46		6			4		
3308	3	20°21,0' S	40°09,5' W	33						1	
3309	3	20°09,4' S	40°58,5' W	42		15			12		
3311	3	19°45,0' S	39°42,5' W	37		15					
3314	3	19°07,5' S	39°20,1' W	25		1					
3316	3	19°32,0' S	39°39,5' W	27		1			1		
3318	3	19°35,0' S	39°17,0' W	62		18		2	2		
3321	3	18°56,0' S	38°47,5' W	58		1					
3322	3	18°46,5' S	38°39,9' W	57		50					
3325	3	18°27,0' S	39°15,0' W	27		1					
3328	3	18°12,5' S	38°34,0' W	42		1					
3330	3	18°39,9' S	38°25,5' W	60		7					
3857	7	18°35,0' S	38°53,0' W	51		7					
3863	7	18°53,0' S	38°37,0' W	57		1					
3864	7	18°42,0' S	38°35,0' W	59		45					
3892	7	17°59,0' S	38°01,0' W	49		2					
3899	7	18°27,5' S	37°52,0' W	71		4					
3903	7	18°24,0' S	38°43,0' W	42		4					
3915	7	19°53,0' S	39°55,0' W	37		10					
3916	7	20°02,0' S	40°01,0' W	42		38			1		
3917	7	20°16,0' S	40°08,0' W	35		12	3				
3918	7	20°24,0' S	40°13,0' W	31		1			3		
3922	7	20°42,0' S	40°11,0' W	37		4			4		
3923	7	20°36,0' S	40°02,0' W	55		41			9		
3924	7	20°46,0' S	40°06,0' W	48					1		
3927	7	21°54,0' S	40°11,0' W	59							
3929	7	22°01,0' S	40°35,0' W	42	5	96	103			1	2
3931	7	21°52,0' S	40°55,0' W	17		1					
3933	7	21°17,5' S	40°51,0' W	17		4					
3934	7	21°10,0' S	40°44,0' W	13	1						
3935	7	21°02,0' S	40°36,0' W	17		9					
3942	7	22°25,0' S	40°32,0' W	102							
3943	7	22°31,0' S	40°38,0' W	91				6	14		
3945	7	22°18,0' S	40°57,0' W	44	16	43	109				1
3946	7	22°12,0' S	41°06,0' W	20	1	1					
3950	7	22°32,0' S	41°15,0' W	55		1	2				
3951	7	22°39,0' S	41°05,0' W	59	1	17	6	1			
3954	7	22°55,0' S	41°06,0' W	91		1		2			
3955	7	22°55,0' S	41°16,0' W	70		14	4				
3957	7	22°37,0' S	41°39,0' W	46		3					
3963	7	23°07,0' S	42°55,0' W	57		1					
A-6704	El A.	29°04,3' S	49°15,0' W	38	1	22					2
A-6705	El A.	29°32,3' S	49°36,5' W	30		3					
A-6706	El A.	29°56,0' S	49°56,0' W	24		1					
A-6710	El A.	31°48,5' S	50°00,0' W	165	1	24	73	6			
A-6714	El A.	31°38,9' S	51°00,2' W	37		2					
A-6726	El A.	33°52,0' S	52°59,1' W	22		2					
A-6727	El A.	33°53,9' S	53°08,2' W	19		2					
A-6728	El A.	34°11,6' S	53°28,9' W	16		1					
A-6734	El A.	34°51,0' S	52°55,0' W	46		1					
A-6737	El A.	35°14,0' S	53°24,8' W	41		2					
G-333	G. VI	32°57,0' S	50°28,0' W	120		9					
G-349	G. VI	31°24,5' S	50°41,0' W	60		39					
G-361	G. VI	31°14,0' S	49°31,0' W	156	1	1	2	3			
G-362	G. VI	31°06,0' S	49°46,0' W	135	16	48	71	9			
G-370	G. VI	30°37,0' S	49°06,0' W	148	3	21	57				

Tab. 1 - Terrestrial coordinates and depth of

posteroventral margin, that is the lower part of the caudal process. Hinge holamphidont (*sensu* Scott, 1961); posterior hinge groove of the left valve provided with a denticle at the proximal margin, corresponding to a slit-like incision on the inner side of the high posterior hinge tooth (i.e. bilobate) of the right valve. Median element smooth. Inner lamella moderately well developed, containing numerous simple and straight marginal pore canals including a few false ones. Vestibula absent. Fossal pores, situated on the sola, reveal sieve structure partly hidden by a peripheral rim; cone pores, located on the muri, seem simple; they are very probably provided with a less conspicuous sieve structure hidden in the depth of the pore (Liebau, pers. comm.). Central muscle pattern consists in a oblique row of four adductor muscle scars, the middle two subdivided; frontal scar split into three rounded scars (Text-figs 2A, 2B). Ventro-median plus dorsomedian adductor scars each replaced by pairs of rounded scars; the dorsal adductor scar tending to be split, too. Sexual dimorphism: the length of the male exceeds the length of the female shells of about 10%.

Remarks and affinities – The surface of the valves of *Ruggiericythere* shows a reticulum pattern basically consisting of sublongitudinal riblets converging in the muscle node area, and marginal/submarginal riblets. A similar ornamental style also occurs in several other hemicytherid taxa, but the taxonomic value of these features has been frequently underestimated.

For example, Stancheva (1971, 1990) assigned to *Hemicytheria* (*Getocytheria*) Stancheva, 1971, some

species which differ considerably from the type species, *Procytherideis strabella* Stancheva, 1964, in the external characters of the carapace. The Miocene species *H. (G.) firma* Stancheva, 1971, and *H. (G.) inflata* Stancheva, 1971, somehow resemble *Ruggiericythere* in the disposition of the riblets, but they differ due to the higher number (6-7) of posterior sublongitudinal riblets. The assignment of these forms, probably related to the Neogene European genus *Graptocythere* Ruggieri, 1972 (see also *Graptocythere* (*Getocytheria*) cf. *trita* Stancheva in Krstić & Bossio, 1992), to the subgenus *Getocytheria* is, in our opinion, doubtful. Actually, *Getocytheria* s.s. shows keel-like ventral and dorsal ridges lacking both in *Ruggiericythere* and in the above mentioned Maecotian species.

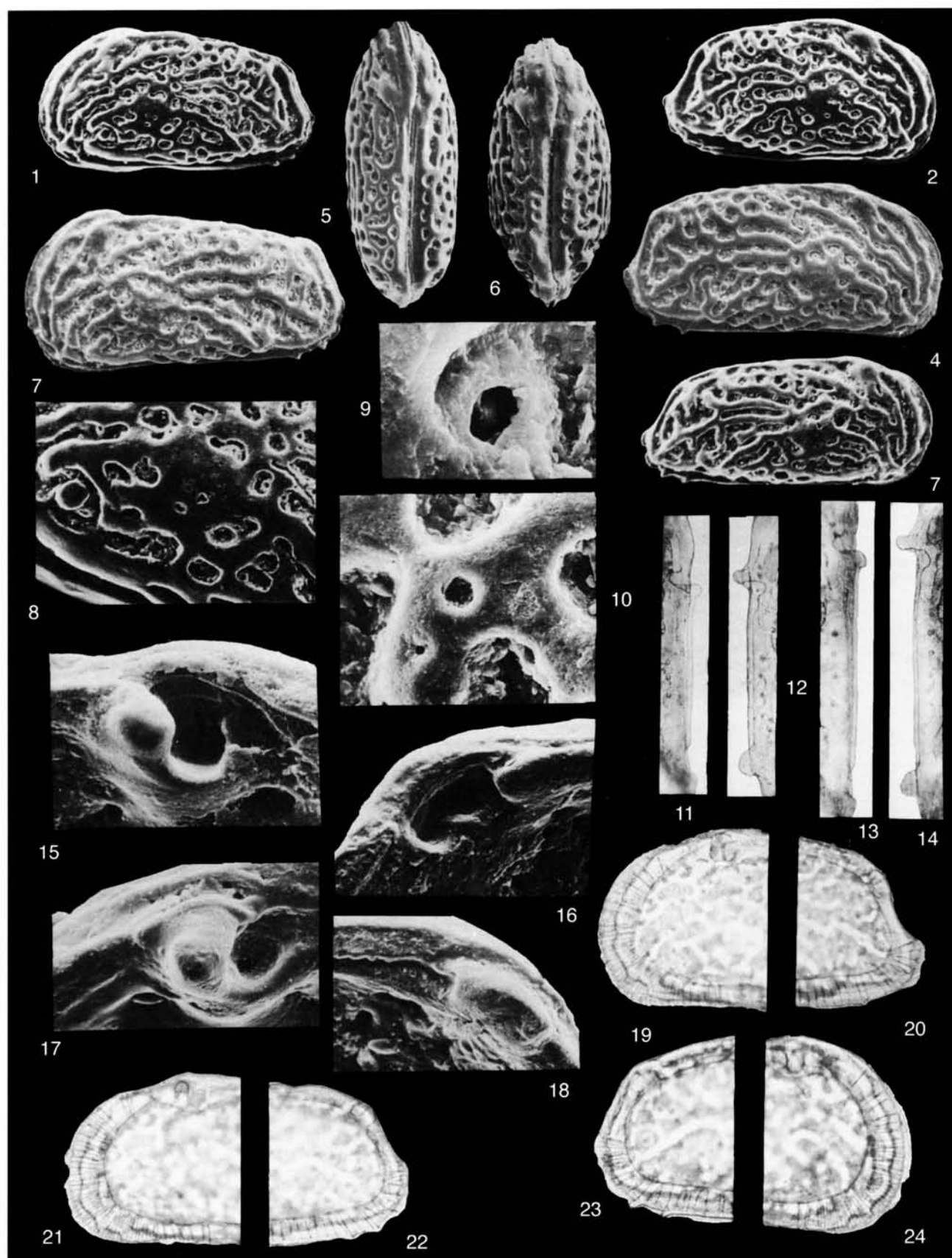
Whatley *et al.* (1998) described *Ruggiericythere dimorphica* from shallow South-Western Atlantic sediments, assigning it to *Urocythereis* Ruggieri, 1950. The species certainly included in this European genus (Athersuch, 1977) show a very different ornamental style, lacking in sublongitudinal riblets.

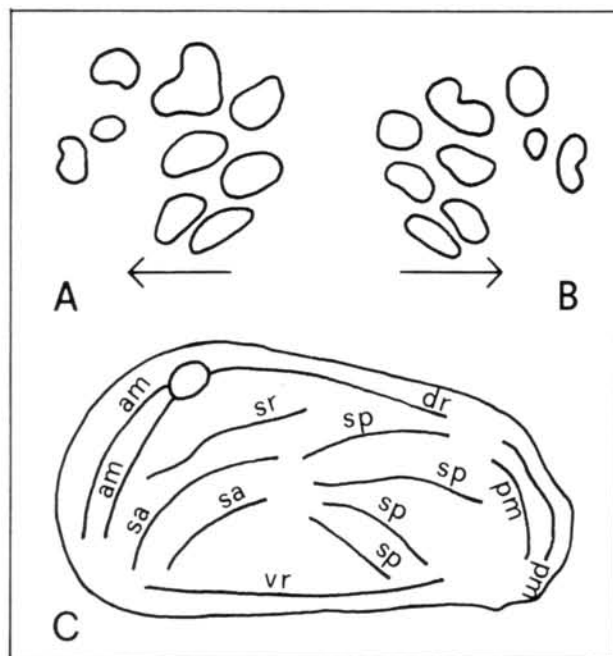
Ruggiericythere shows affinities with the following genera: *Ambostracon* Hazel, 1962, *Gerdella*, Bonaduce, Barra & Aiello, 1996, *Graptocythere* Ruggieri, 1972, *Robustaurila* Yajima, 1982. The structure of the hingement and the muscle scar pattern seem to be unreliable distinctive features in this group of genera. Conversely, the external characters allow the distinction of these taxa. In this number are the two anteromarginal riblets which, in *Ruggiericythere*, join together in the eye tubercle. This distinctive feature is not present in the previously cited genera. A synthesis

EXPLANATION OF PLATE 1

Figs 1-24 - *Ruggiericythere perspicua* sp. nov.

- 1) Holotype, LV, female, sample Remac Leg 7 3945, MP-O-1106 (x 64)
- 2) Holotype, RV, female, sample Remac Leg 7 3945, MP-O-1106 (x 64)
- 3) Paratype, LV, male, sample Remac Leg 7 3929, MP-O-1109 (x 64)
- 4) Paratype, RV, male, sample Remac Leg 7 3929, MP-O-1109 (x 64)
- 5) Paratype, male carapace, sample Remac Leg 7 3945, MP-O-1110, dorsal view (x 56)
- 6) Paratype, female carapace, sample Remac Leg 7 3945, MP-O-1107, dorsal view (x 62)
- 7) Paratype, juvenile (?), RV male, sample El Austral A-6710, MP-O-1160 (x 62)
- 8) Detail of muscle node area, same valve as in fig. 1 (x 150)
- 9) Normal pore-canal in the solum, same valve as in fig. 1 (x 1500)
- 10) Normal pore-canals in the muri, same valve as in fig. 1 (x 600)
- 11) Paratype, hinge in dorsal view, LV female, sample Remac Leg 2 3215, MP-O-1108 (x 84)
- 12) Paratype, hinge in dorsal view, RV female, sample Remac Leg 2 3215, MP-O-1108 (x 82)
- 13) Paratype, hinge in dorsal view, LV male, sample Remac Leg 3 3297, MP-O-1159 (x 86)
- 14) Paratype, hinge in dorsal view, RV male, sample Remac Leg 3 3297, MP-O-1159 (x 78)
- 15) Anterior detail of hinge, same valve as in fig. 1 (x 300)
- 16) Posterior detail of hinge, same valve as in fig. 1 (x 300)
- 17) Anterior detail of hinge, same valve as in fig. 2 (x 300)
- 18) Posterior detail of hinge, same valve as in fig. 2 (x 300)
- 19) Anterior marginal pore-canals, same valve as in fig. 12 (x 82)
- 20) Posterior marginal pore-canals, same valve as in fig. 19 (x 82)
- 21) Anterior marginal pore-canals, same valve as in fig. 14 (x 78)
- 22) Posterior marginal pore-canals, same valve as in fig. 21 (x 78)
- 23) Anterior marginal pore-canals, same valve as in fig. 13 (x 86)
- 24) Posterior marginal pore-canals, same valve as in fig. 23 (x 86)





Text-fig. 2 - Central muscle scars in *Ruggiericythere purperae* sp. nov.; A) RV female, same specimen as in Pl. 3, fig. 21 (x 300); B) LV female, same specimen as in Pl. 3, fig. 22 (x 300); C) Schematic drawing of *Ruggiericythere* costulation and terminology: am = anterior marginal riblet, dr = dorsal riblet, pm = posterior marginal riblet, sa = sublongitudinal anterior riblet, sp = sublongitudinal posterior riblet, sr = subocular riblet, vr = ventral riblet.

of the most important diagnostic features is reported in Tabs 2, 3 and in Text-fig. 3.

RUGGIERICYTHERE PERSPICUA sp. nov.
Pl. 1, figs 1-24

Derivation of name – from Latin *perspicuus* = evident.

Material – 349 valves and 316 carapaces.

Types – Holotype: female carapace, sample Remac Leg 7 3945, MP-O-1106; Paratypes: female carapace, sample Remac Leg 7 3945, MP-O-1107; female carapace, sample Remac Leg 2 3215, MP-O-1108; male carapace, sample Remac Leg 7 3929, MP-O-1109; male carapace, sample Remac Leg 3 3297, MP-O-1159; juvenile (?) carapace, sample El Austral A-6710, MP-O-1160.

Type-locality – Continental shelf of Rio de Janeiro State (Brazil), sample Remac Leg 7 3945, latitude 22° 18.5' S, longitude 40° 57' W, depth 44 m.

Distribution – *Ruggiericythere perspicua* is almost equally distributed over a large area (Text-fig. 4) between latitudes 20° 16' S (sample 3917) and 31° 48.5' S (sample A-6710). It reaches the highest abundance in samples 3929 (depth 42 m, on terrigenous sand and carbonatic gravel, 103 specimens) and 3945 (depth 44 m, on sand and shell debris, 109 specimens).

INTERNAL FEATURES

genus	hinge RV	central muscle scars	normal pore canals	anterior vestibulum	references
<i>Urocythereis</i> Ruggieri, 1950	holamphidont with bilobate posterior tooth	2-3 frontal m.s., 1, 2, 2, 1 adductor m.s.	simple and sieve-type on the muri and on the sola	absent	Ruggieri, 1950 Athersuch, 1977 Athersuch <i>et al.</i> , 1989
<i>Ambostracon</i> Hazel, 1962	holamphidont with bilobate posterior tooth; crenulate groove	3 frontal m.s., 1, 2, 2, 1 adductor m.s.	scattered and inconspicuous or absent	absent	Hazel, 1962
<i>Hemicytheria</i> (<i>Getocytheria</i>) Stancheva, 1971	holamphidont with posterior tooth slightly lobbed; groove smooth	3 frontal m.s., 1, 2, 1, 1 adductor m.s.	—	narrow	Stancheva, 1971
<i>Graptocythere</i> Ruggieri, 1972	holamphidont with bilobate posterior tooth; groove crenulate or smooth	3 frontal m.s. 1, 2, 2, 1 adductor m.s.	sieve-type	absent	Ruggieri, 1972 Bonaduce <i>et al.</i> , 1992 Gross, 2002
<i>Robustaurila</i> Yajima, 1982	holamphidont; groove smooth	3-2 frontal m.s. 1, 2, 1, 1 or 1, 2, 2, 1 adductor m.s.	simple on the muri and sieve-type on the sola	absent	Yajima, 1982
<i>Gerdella</i> Bonaduce, Barra & Aiello, 1996	holamphidont with bilobate posterior tooth; groove smooth, feebly crenulate at posterior extremity	3 frontal m.s. 1, 2, 1, 1 adductor m.s.	—	narrow	Bonaduce <i>et al.</i> , 1996
<i>Ruggiericythere</i> gen. nov.	holamphidont with bilobate posterior tooth; groove smooth	3 frontal m.s. 1, 2, 2, 1 adductor m.s.	simple on the muri and sieve-type on the sola	absent	present paper

Tab. 2 - Comparative scheme of internal features of *Urocythereis*, *Ambostracon*, *Hemicytheria* (*Getocytheria*), *Graptocythere*, *Robustaurila*, *Gerdella*, and *Ruggiericythere*.

EXTERNAL FEATURES

genus	outline in lateral view	rib pattern					denticulation	references
		anterior	central	dorsal	ventral	posterior		
<i>Urocythereis</i> Ruggieri, 1950	elongate-ovate or subrectangular with a weak caudal process	absent	absent	absent	absent	absent	anterior and posterior margins	Ruggieri, 1950 Athersuch, 1977 Athersuch <i>et al.</i> , 1989
<i>Ambostracon</i> Hazel, 1962	oblong with a blunt caudal process	1 marginal rib	1 diagonal rib	1 subdorsal diagonal rib	1 ventrolateral rib	1 rib forming an angle with central diagonal rib	posteroventral	Hazel, 1962 Valentine, 1976 Valicenti, 1977
<i>Hemicytheria</i> (<i>Getocytheria</i>) Stancheva, 1971	subrectangular with caudal process	1 marginal rib	variable (undervalued feature)	1 carina-like peripheral ridge	1 rib forming an angle with central diagonal rib	1 marginal ridge	absent	Stancheva, 1971 Stancheva, 1990
<i>Graptocythere</i> Ruggieri, 1972	subquadrate with caudal process	1 continuous anterior and ventral rib	1-2 anterior and 2 posterior sublongitudinal ribs	1 arched posterodorsal rib	1 marginal ridge	1 arched posterodorsal rib	absent	Ruggieri, 1972 Bonaduce <i>et al.</i> , 1992 Gross, 2002
<i>Robustaurila</i> Yajima, 1982	subquadrate with caudal process	1 marginal rib	1 anterior and 2 posterior sublongitudinal ribs	1 subocular rib	1 ventrolateral rib	1 posterodorsal rib	absent	Yajima, 1982
<i>Gerdella</i> Bonaduce, Barra & Aiello, 1996	subrectangular with a blunt caudal process	1 anterior submarginal rib	1-2 anterior and 1 posterior longitudinal rib	1 posterodorsal rib connected with the posterior end	1 longitudinal rib	1 posterodorsal rib	absent	Bonaduce <i>et al.</i> , 1996
<i>Ruggiericythere</i> gen. nov.	subrectangular with a blunt caudal process	2 ribs parallel to the anterior margin	1-2 anterior and 3-4 posterior sublongitudinal ribs; 1 subocular rib	present as specific feature	present as specific feature	present as specific feature	posteroventral	present paper

Tab. 3 - Comparative scheme of external features of *Urocythereis*, *Ambostracon*, *Hemicytheria* (*Getocytheria*), *Graptocythere*, *Robustaurila*, *Gerdella*, and *Ruggiericythere*.

Dimensions – Holotype, female carapace, MP-O-1106: LV, L = 0.77 mm; H = 0.41 mm (Pl. 1, fig. 1); RV, L = 0.77 mm; H = 0.40 mm (Pl. 1, fig. 2)

Diagnosis – A medium-large (L = 0.78-0.91 mm) species of *Ruggiericythere* characterized by a smooth well developed muscle node area. Marginal riblets: two anterior riblets connected both in the eye tubercle and in the antero-ventral area; two continuous riblets extend parallel to the posterior margin; dorsal and ventral riblets indistinct. Sublongitudinal riblets: two anterior and three-four posterior riblets, radiating from the muscle node area. Subocular riblet connected to the internal anterior marginal riblet. L/H ratio: female valves, LV = 1.88, RV = 1.92; male valves, LV = 2.02, RV = 2.17.

Comparisons – *Ruggiericythere perspicua* sp. nov. differs from both *R. dimorphica* (Whatley *et al.*, 1998) and *R. purpurae* sp. nov. in the different disposition of the posterior marginal riblets, which in the latter spe-

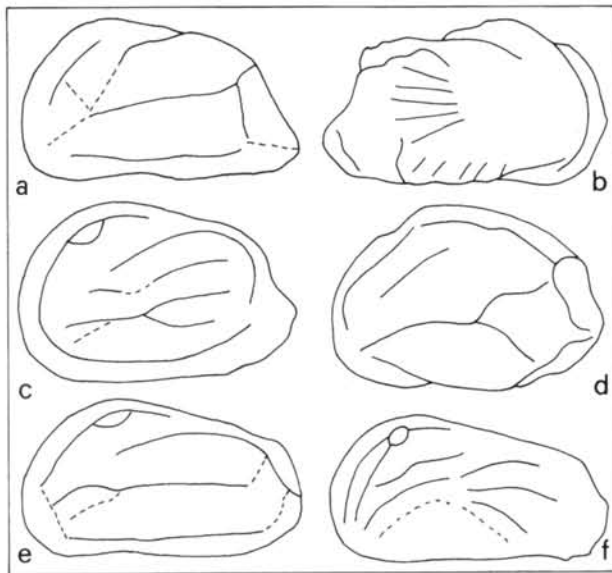
cies are not continuous; moreover in *R. perspicua* the muscle node area is smooth and wider.

RUGGIERICYTHERE BATISTAE sp. nov.
Pl. 4, figs 18-26; pl. 5, figs 1-9

Derivation of name – In honour of Miss Tereza Batista, who used to scan the South Western Atlantic with her eyes.

Material – 55 valves and 31 carapaces.

Types – Holotype: female LV, sample Remac Leg 7 3934, MP-O-1179; Paratypes: female RV, sample Remac Leg 7 3945, MP-O-1180; female carapace, sample Remac Leg 2 3133, MP-O-1181; female RV, sample Remac Leg 7 3945, MP-O-1182; female LV, sample Remac Leg 2 3133, MP-O-1183; female LV, sample Geomar VI G-362, MP-O-1188; male RV, sample Remac Leg 7 39456, MP-O-1184; male LV, sample Remac Leg 2 3143, MP-O-1185; male cara-



Text-fig. 3 - Rib pattern of the following taxa: a) *Ambostracon* Hazel, 1962; b) *Hemicytheria* (*Getocytheria*) *strabella* (Stancheva, 1964), type-species of *Hemicytheria* (*Getocytheria*) Stancheva, 1971; c) *Graptocythera* Ruggieri, 1972; d) *Robustaurila* *assimilis* (Kajiyama, 1913), type-species of *Robustaurila* Yajima, 1982 (*sensu* Yajima, 1982); e) *Gerdella* Bonaduce, Barra & Aiello, 1996; f) *Ruggiericythere* nov. gen. Generic rib pattern drawings realized by comparing ornaments of different species; dashed lines indicate ribs not evident in all the species pertaining to the genus.

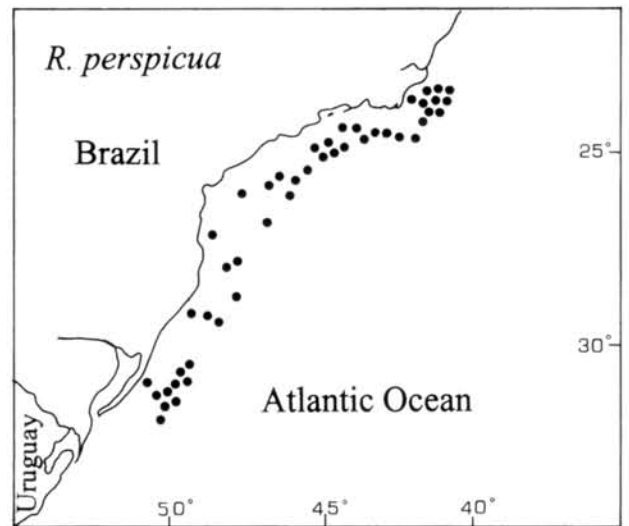
pace, sample Remac Leg 2 3134, MP-O-1186; male RV, sample Geomar VI G-362, MP-O-1187.

Type-locality – Continental shelf of Espírito Santo State (Brazil), sample Remac Leg 7 3934, latitude 21° 10' S, longitude 40° 44' W, depth 13 m.

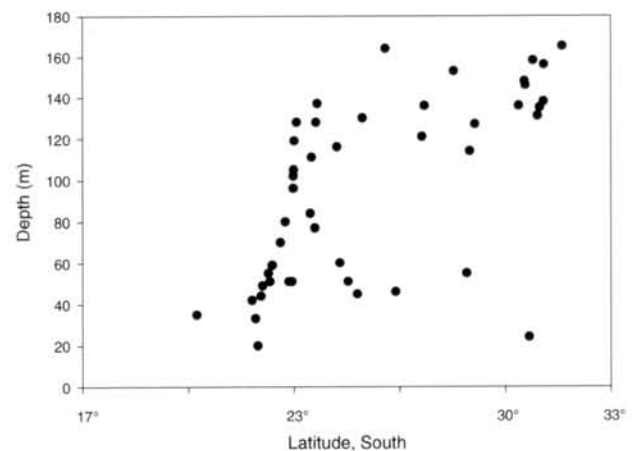
Distribution – The latitudinal distribution of *Ruggiericythere batistae* ranges from the coast of Espírito Santo State (sample 3934, latitude 21° 10' S) to that of Rio Grande do Sul State (sample A-6710, latitude 31° 48.5' S) exclusively in the South Region (Text-fig. 6) and its bathymetric distribution varies between 13 and 165 m, more frequently below 60 m (Text-fig. 7).

Dimensions – Holotype, female LV, MP-O-1179, L = 0.83 mm; H = 0.43 mm (Pl. 4, fig. 17).

Diagnosis – A large (L = 0.83-0.97 mm) species of *Ruggiericythere*, inflated-ovate in dorsal view. In this species the muri, especially in the anterior area, are weakly prominent, consequently the anterior sublongitudinal riblets are not clearly recognizable; 3-4 posterior sublongitudinal riblets are distinct. The reticulum shows a high degree of variability, especially in the ventro-central area: in some specimens the foveolae are anastomosing and their shape is strongly irregular (Pl. 4, fig. 19). Central muscle tubercle ab-



Text-fig. 4 - Geographical distribution of *Ruggiericythere perspicua* sp. nov. on the Brazilian continental shelf.



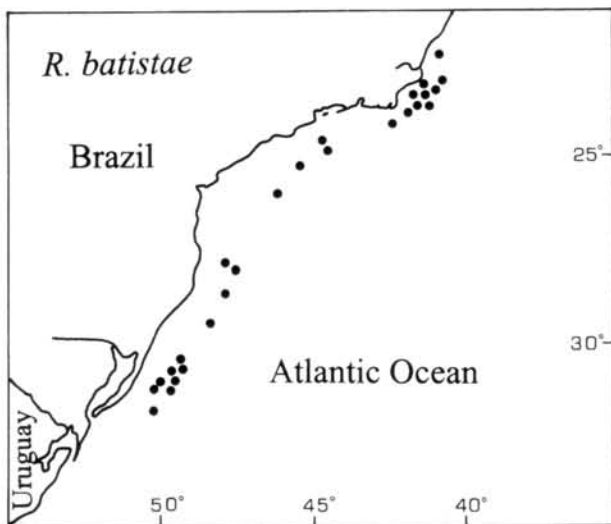
Text-fig. 5 - Bathymetric distribution of *Ruggiericythere perspicua* sp. nov. on the Brazilian continental shelf.

sent. Marginal riblets: dorsal, posterior and anterior riblets indistinct. Posterior denticulation very reduced. L/H ratio: female valves, LV = 1.95, RV = 2.07; male valves, LV = 2.21, RV = 2.42.

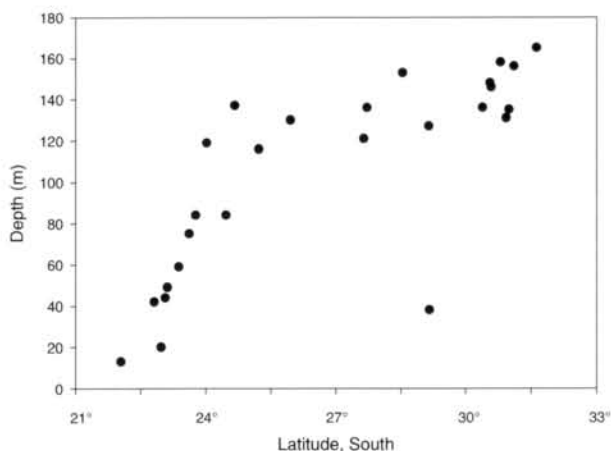
Comparisons – This species differs from all other species of *Ruggiericythere* in its subdued ornament (especially in the absence of posterior marginal riblets) and to the inflated ovate outline in dorsal view.

RUGGIERICYTHERE DIMORPHICA (Whatley, Moguilevsky, Chadwick, Toy & Ramos, 1998)
Pl. 2, figs 1-28

- 1998 *Urocythereis dimorphica* WHATLEY, MOGULEVSKY, CHADWICK, TOY & RAMOS, pp. 103-104, pl. 3, figs 26-31 (*q.v.* for synonymy).
- 2003 *Urocythereis dimorphica* Whatley, Moguilevsky, Chadwick, Toy & Ramos – DROZINSKI *et al.*, pl. 2, fig. 7k.



Text-fig. 6 - Geographical distribution of *Ruggiericythere batistae* sp. nov. on the Brazilian continental shelf.



Text-fig. 7 - Bathymetric distribution of *Ruggiericythere batistae* sp. nov. on the Brazilian continental shelf.

Material – 1209 valves and 343 carapaces.

Distribution – *Ruggiericythere dimorphica* is the most abundant species of *Ruggiericythere* on the Brazilian coast. Sample 3892, latitude 17° 59' S and sample A-6737, latitude 35° 14' S are its respective North and South limits, reaching the Uruguayan coasts (Text-fig. 8) in the studied area. The vertical distribution ranges from 13 to 165 m, being more abundant below 60 m (Text-fig. 9). Numerous specimens have been found in samples 3163 (depth 36 m, on sandy mud, 192 specimens) and 3010 (depth 46 m, on muddy fine sands, 313 specimens).

Whatley *et al.* (1997, 1998) recorded *R. dimorphica* as far South as the Northern Argentinean continental

shelf (41° 52' S), 3.5 to 146 metres of depth.

Vicalvi *et al.* (1977) found the species in two Holocene samples collected on the middle shelf from São Paulo State, latitude 25° 16' S and longitude 46° 56' W; water depth 62 m, 0.1 and 0.35 metres below surface.

Drozinski *et al.* (2003) reported *R. dimorphica* from one sample along Rio Grande do Sul shelf, 160 m in depth.

It also occurs in Pleistocene sediments of Buenos Aires Province, Argentina (Bertels, 1975).

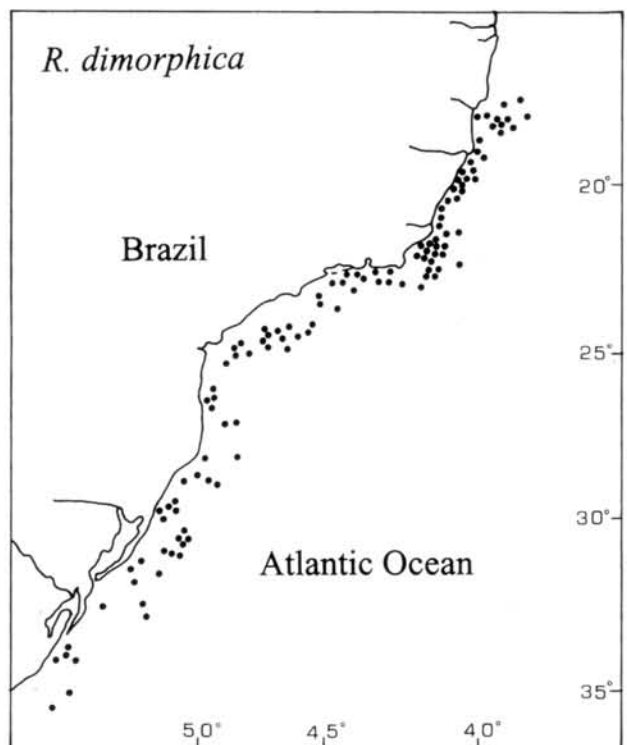
Dimensions – Specimens studied in the present paper show smaller dimensions (males length = 0.78-0.82 mm; females length = 0.70-0.73 mm) in comparison with the individuals described by Whatley *et al.* (1998; males length = 0.85-0.90 mm; L females = 0.75-0.80 mm).

RUGGIERICYTHERE PURPERAE n. sp.

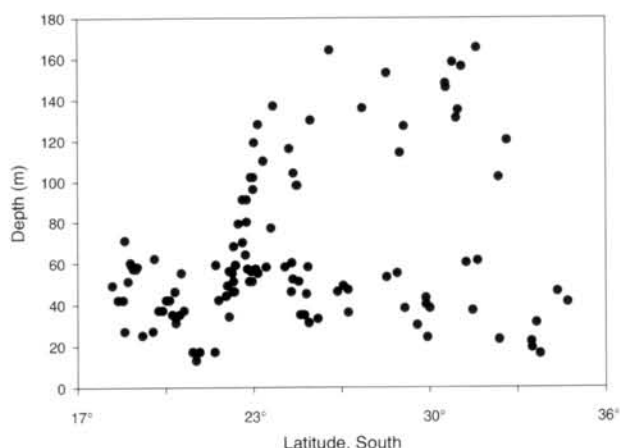
Pl. 3, figs 1-22

Derivation of name – In honour to Dr. Ivone Purper (UFRGS) in recognition of her significant published contributions on ostracods, fish scales and teeth, scolecodonts and fossil insects from Brazil.

Material – 60 valves and 11 carapaces.



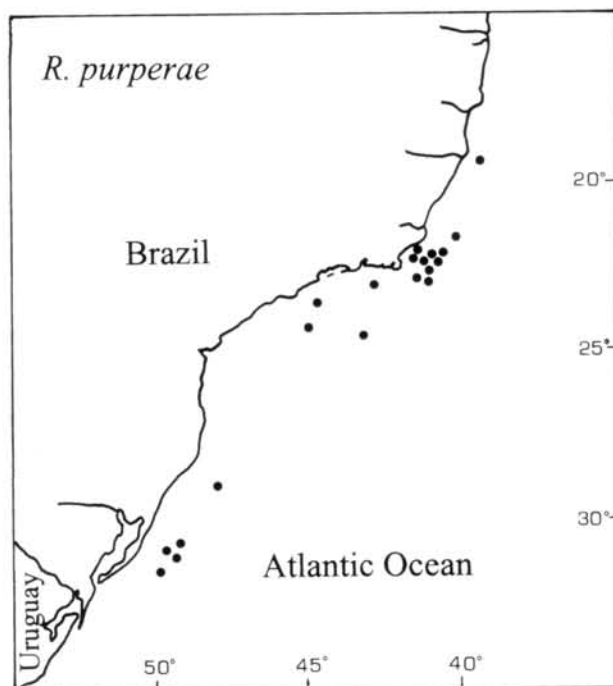
Text-fig. 8 - Geographical distribution of *Ruggiericythere dimorphica* (Whatley, Moguelevsky, Chadwick, Toy & Ramos, 1998) on the Brazilian continental shelf.



Text-fig. 9 - Bathymetric distribution of *Ruggiericythere dimorphica* (Whatley, Moguilevsky, Chadwick, Toy & Ramos, 1998) on the Brazilian continental shelf.

Types – Holotype: female carapace, sample Geomar VI G-361, MP-O-1189; paratypes: female carapace, sample Remac Leg 7 3942, MP-O-1190; female RV, sample Remac Leg 3 3262, MP-O-1191; female LV, sample Remac Leg 3 3262, MP-O-1192; male carapace, sample Remac Leg 3 3262, MP-O-1193; male carapace, sample Remac Leg 3 3266, MP-O-1194; male carapace, sample Remac Leg 3 3283, MP-O-1195; juvenile RV, sample Remac Leg 2 3283, MP-O-1196.

Type-locality – Continental shelf of Rio Grande do Sul State, sample Geomar VI G-361, latitude 31° 14' S, longitude 49° 31' W, depth 156 m.



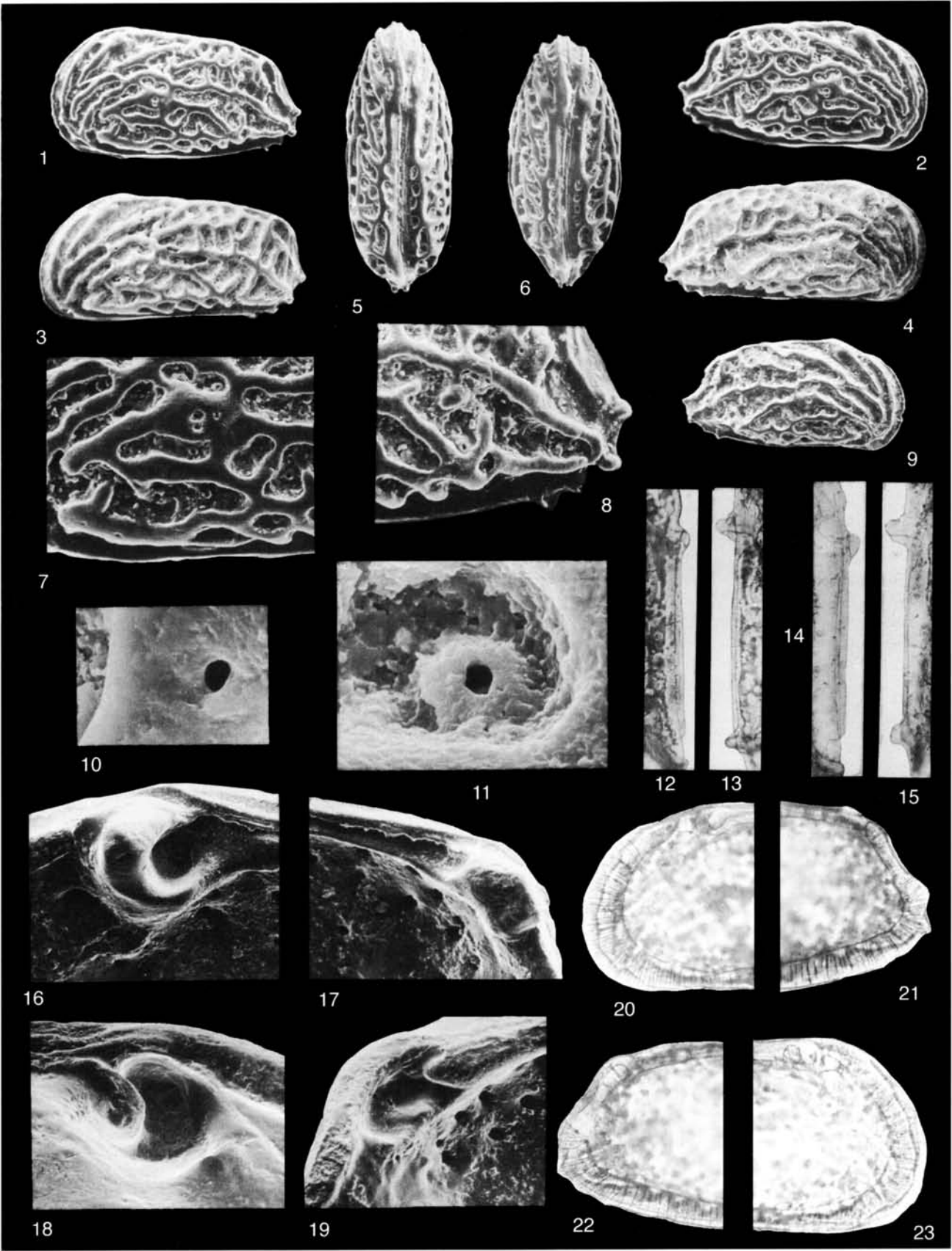
Text-fig. 10 - Geographical distribution of *Ruggiericythere purperae* sp. nov. on the Brazilian continental shelf.

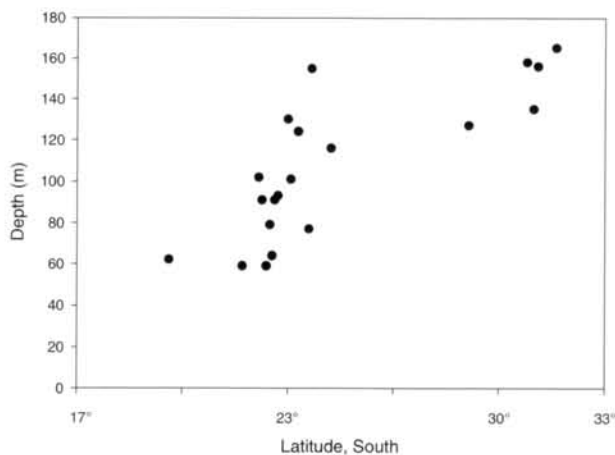
Distribution – The latitudinal distribution of *Ruggiericythere purperae* n. sp. is very similar to that of *R. perspicua*; its southernmost limit being sample A-6710, latitude 31° 48.5' S. Sample 3318, latitude 19° 35' S represents its northernmost record, this latter being the only occurrence in the East Region

EXPLANATION OF PLATE 2

Figs 1-23 - *Ruggiericythere dimorphica* (Whatley, Moguilevsky, Chadwick, Toy & Ramos, 1998)

- 1) LV, female, sample Remac Leg 7 3945, MP-O-1167 (x 64)
- 2) RV, female, sample Remac Leg 7 3945, MP-O-1167 (x 64)
- 3) LV, male, sample Remac Leg 7 3945, MP-O-1173 (x 60)
- 4) RV, male, sample Remac Leg 7 3945, MP-O-1173 (x 60)
- 5) Male carapace, sample Remac Leg 7 3945, MP-O-1174, dorsal view (x 60)
- 6) Female carapace, sample Remac Leg 7 3945, MP-O-1168, dorsal view (x 64)
- 7) Detail of muscle node area, same valve as in fig. 1 (x 150)
- 8) Posterior detail of LV, same valve as in fig. 1 (x 150)
- 9) Juvenile, RV, sample Remac Leg 7 3916, MP-O-1178 (x 60)
- 10) Normal pore-canal, same valve as in fig. 2 (x 1500)
- 11) Normal pore-canal in the solum, same valve as in fig. 1 (x 1500)
- 12) Hinge in dorsal view, LV male, sample Remac Leg 73923, MP-O-1177 (x 84)
- 13) Hinge in dorsal view, RV male, sample Remac Leg 73923, MP-O-1177 (x 84)
- 14) Hinge in dorsal view, LV female, sample Geomar VI G-349, MP-O-1172 (x 94)
- 15) Hinge in dorsal view, RV female, sample Geomar VI G-349, MP-O-1172 (x 94)
- 16) Anterior detail of hinge, same valve as in fig. 2 (x 300)
- 17) Posterior detail of hinge, same valve as in fig. 2 (x 300)
- 18) Anterior detail of hinge, same valve as in fig. 1 (x 300)
- 19) Posterior detail of hinge, same valve as in fig. 1 (x 300)
- 20) Anterior marginal pore-canal, RV male, sample Remac Leg 3 3330, MP-O- 1171 (x 80)
- 21) Posterior marginal pore-canal, same valve as in fig. 20 (x 80)
- 22) Posterior marginal pore-canal, LV male, sample Remac Leg 3 3330, MP-O- 1171 (x 79)
- 23) Anterior marginal pore-canal, same valve as in fig. 22 (x 79).



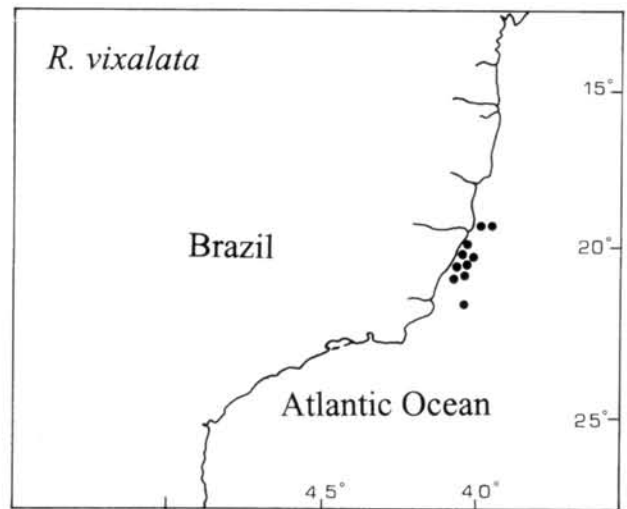


Text-fig. 11 - Bathymetric distribution of *Ruggiericythere purperae* sp. nov. on the Brazilian continental shelf.

(Text-fig. 10). The depth range, from 62 to 165 metres, indicates that *R. purperae* is a circalittoral species (Text-fig. 11).

Dimensions – Holotype, female carapace, MP-O-1189: L = 0.72 mm; H = 0.39 mm (Pl. 3, fig. 1); RV, L = 0.70 mm; H = 0.36 mm (Pl. 3, fig. 2).

Diagnosis – A medium (L = 0.70-0.82 mm) species of *Ruggiericythere*, with subtrapezoidal outline



Text-fig. 12 - Geographical distribution of *Ruggiericythere vixalata* sp. nov. on the Brazilian continental shelf.

of the valves in dorsal view and pronounced postero-dorsal concavity in both right and left valves. The muscle node area shows a subvertical row of 3-4 small foveolae corresponding to the adductor muscle scars. Marginal riblets: two anterior riblets connected both in the eye tubercle and in the antero-ventral area; posterior riblets interrupted in correspondence of the

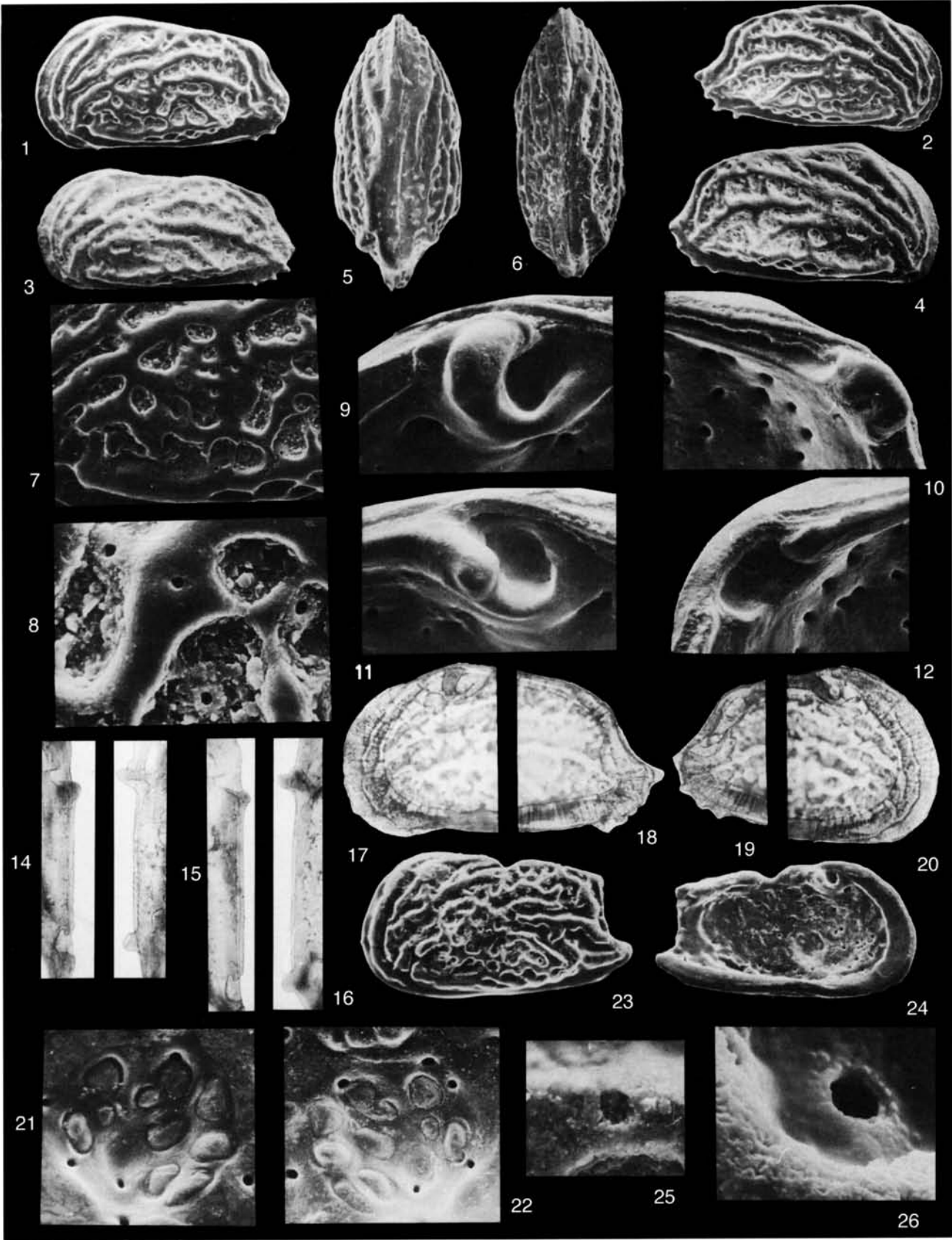
EXPLANATION OF PLATE 3

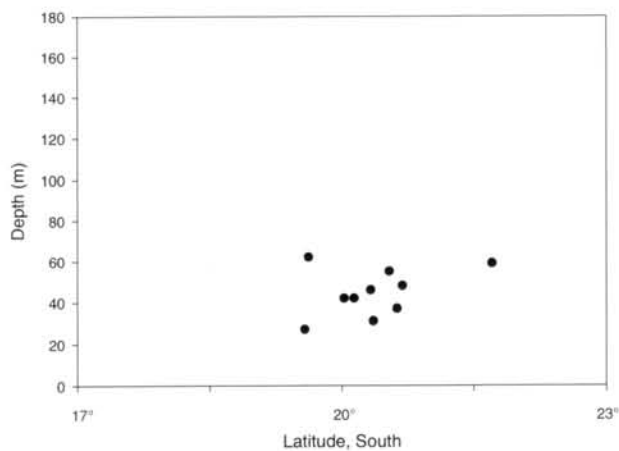
Figs 1-22 - *Ruggiericythere purperae* sp. nov.

- 1) Holotype, LV, female, sample Geomar VI G-361, MP-O-1189 (x 64)
- 2) Holotype, RV, female, sample Geomar VI G-361, MP-O-1189 (x 64)
- 3) Paratype, LV, male, sample Remac Leg 3 3262, MP-O-1193 (x 60)
- 4) Paratype, RV, male, sample Remac Leg 3 3262, MP-O-1193 (x 60)
- 5) Paratype, female carapace, sample Remac Leg 7 3942, MP-O-1190 (x 64)
- 6) Paratype, male carapace, sample Remac Leg 3 3266, MP-O-1194 (x 64)
- 7) Detail of muscle node area, same valve as in fig. 1 (x 150)
- 8) Normal pore-canals in the sola and in the muri, same valve as in fig. 1 (x 600)
- 9) Anterior detail of hinge, same valve as in fig. 2 (x 300)
- 10) Posterior detail of hinge, same valve as in fig. 2 (x 300)
- 11) Anterior detail of hinge, same valve as in fig. 1 (x 300)
- 12) Posterior detail of hinge, same valve as in fig. 1 (x 300)
- 13) Paratype, hinge in dorsal view, LV female, sample Remac Leg 3 3262, MP-O-1192 (x 80)
- 14) Paratype, hinge in dorsal view, RV female, sample Remac Leg 3 3262, MP-O-1191 (x 80)
- 15) Paratype, hinge in dorsal view, LV male, sample Remac Leg 3 3283, MP-O-1195 (x 80)
- 16) Paratype, hinge in dorsal view, RV male, sample Remac Leg 3 3283, MP-O-1195 (x 80)
- 17) Anterior marginal pore-canals, same valve as in fig. 14 (x 80)
- 18) Posterior marginal pore-canals, same valve as in fig. 17 (x 80)
- 19) Anterior marginal pore-canals, same valve as in fig. 13 (x 80)
- 20) Posterior marginal pore-canals, same valve as in fig. 19 (x 80)
- 21) Muscle scars, same valve as in fig. 2 (x 300)
- 22) Muscle scars, same valve as in fig. 1 (x 300)

Figs 23-26 - *Ruggiericythere* sp. 1

- 23) LV, sample Remac Leg 3 3308, MP-O-1201 (x 64)
- 24) Internal view of same valve as in fig. 1 (x 64)
- 25) Normal pore-canal in the murus, same valve as in fig. 1 (x 600)
- 26) Normal pore-canal in the solum, same valve as in fig. 1 (x 1500)





Text-fig. 13 - Bathymetric distribution of *Ruggiericythere vixalata* sp. nov. on the Brazilian continental shelf.

posterior end; dorsal riblet weak or absent; ventral riblet well developed. Sublongitudinal riblets: two anterior and three posterior riblets. Subocular riblet: as in the type species. L/H ratio: female valves, LV = 1.85, RV = 1.94; male valves, LV = 2.08, RV = 1.95.

Remarks – *Ruggiericythere purperae* resembles *R. dimorphica*, but differs in the presence of a foveolate muscle node and a distinct ventral riblet.

RUGGIERICYTHERE VIXALATA sp. nov.
Pl. 5, figs 10-28

Derivation of name – from Latin *vix* + *alatus* = slightly winged.

Material – 11 valves and 27 carapaces.

Types – Holotype: female carapace, sample Remac Leg 3 3309, MP-O-1161; paratypes: female carapace, sample Remac Leg 3 3309, MP-O-1162; sample Remac Leg 3 3309, MP-O-1163; male carapace; sample Remac Leg 3 3309, MP-O-1165.

Type-locality – Continental shelf of Espírito Santo State (Brazil), sample Remac Leg 3 3309, latitude 20° 09.4' S, longitude 40° 58.5' W, depth 42 m.

Distribution – *Ruggiericythere vixalata* occurs in 10 samples, with narrow latitudinal range, from 19° 32' S (sample 3316) to 21° 54' S (sample 3927) (Text-fig.12). All these samples are in the transitional area (according Coimbra *et al.*, 1995); depth distribution 27-62 m (Text-fig. 13).

Dimensions – Holotype, female carapace, MP-O-1161: LV, L = 0.73 mm; H = 0.39 mm (Pl. 5, fig. 10); RV, L = 0.74 mm; H = 0.38 mm (Pl. 5, fig. 11).

Diagnosis – A medium-large (L = 0.73-0.86 mm) species of *Ruggiericythere* with a feebly developed, ridged alar process. Marginal riblets: the two anterior

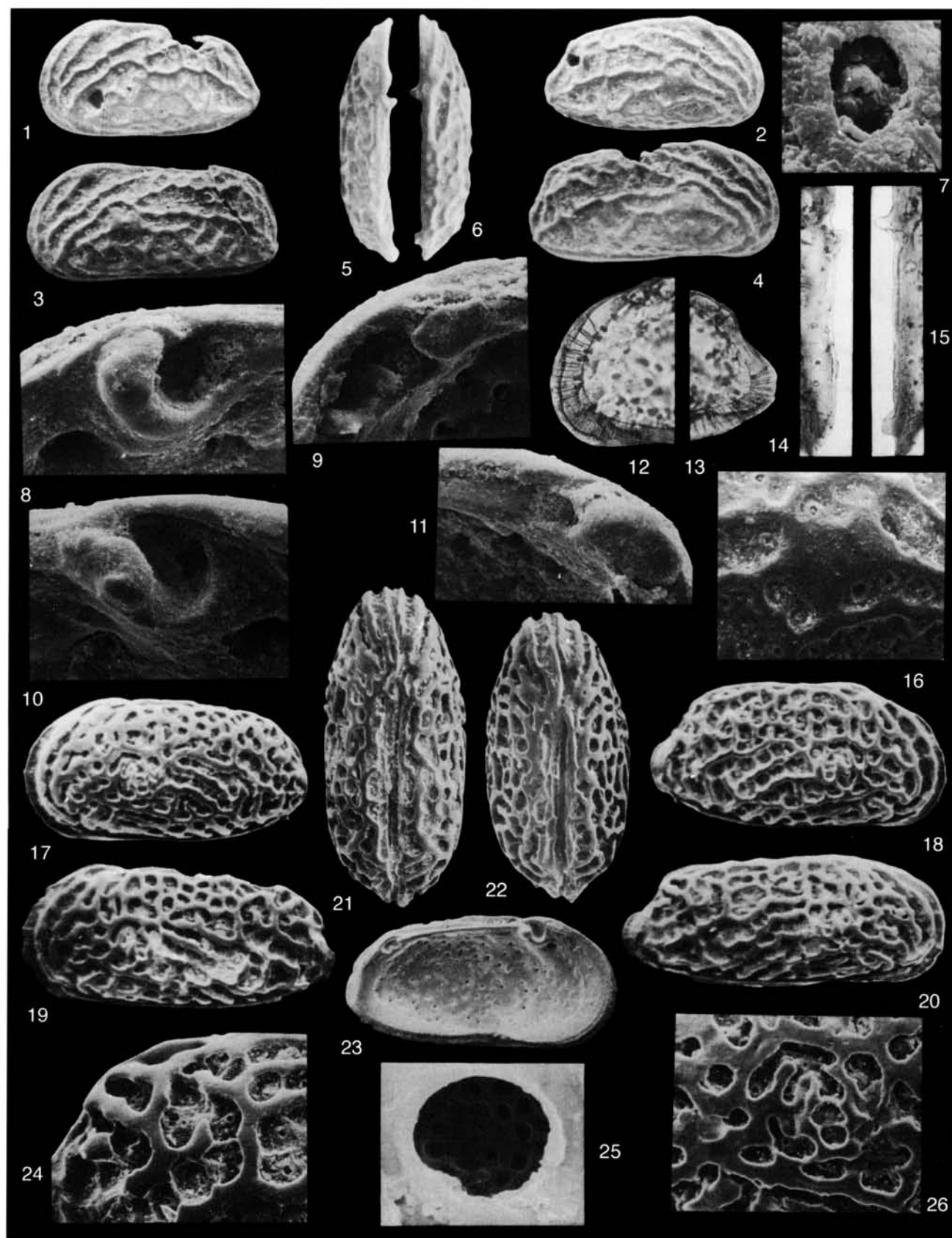
EXPLANATION OF PLATE 4

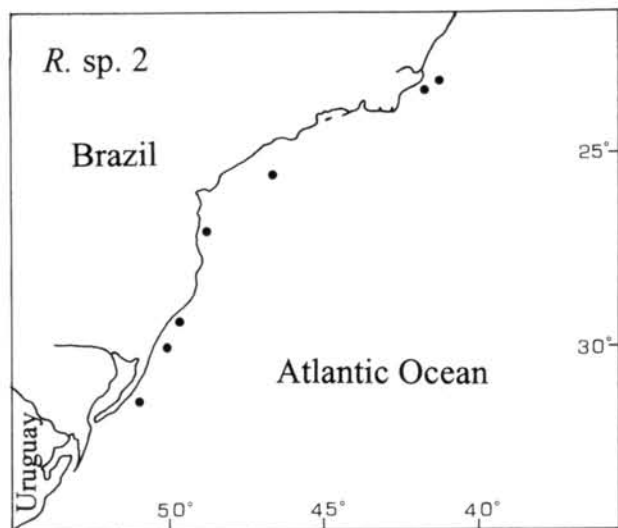
Figs 1-16 - *Ruggiericythere* sp. 2

- 1) Holotype, LV, female, sample Geomar VI G-349, MP-O-1197 (x 48)
- 2) Holotype, RV, female, sample Geomar VI G-349, MP-O-1197 (x 48)
- 3) Paratype, LV, male, sample Geomar VI G-349, MP-O-1199 (x 48)
- 4) Paratype, RV, male, sample Geomar VI G-349, MP-O-1199 (x 48)
- 5) Paratype, LV, male, sample Remac Leg 7 3945, MP-O-1200, dorsal view (x 48)
- 6) Paratype, RV, male, sample Remac Leg 7 3945, MP-O-1200, dorsal view (x 48)
- 7) Normal pore-canal in the solum, same valve as in fig. 1 (x 1500)
- 8) Anterior detail of hinge, same valve as in fig. 1 (x 300)
- 9) Posterior detail of hinge, same valve as in fig. 1 (x 300)
- 10) Anterior detail of hinge, same valve as in fig. 2 (x 300)
- 11) Posterior detail of hinge, same valve as in fig. 2 (x 300)
- 12) Paratype, anterior marginal pore-canals, RV, female, sample El Austral A-6704, MP-O-1198 (x 84)
- 13) Posterior marginal pore-canals, same valve as in fig. 12 (x 84)
- 14) Paratype, hinge in dorsal view, LV, female, sample El Austral A-6704, MP-O-1198 (x 84)
- 15) Hinge in dorsal view, same valve as in fig. 12 (x 84)
- 16) Detail of muscle node area, same valve as in fig. 2 (x 150)

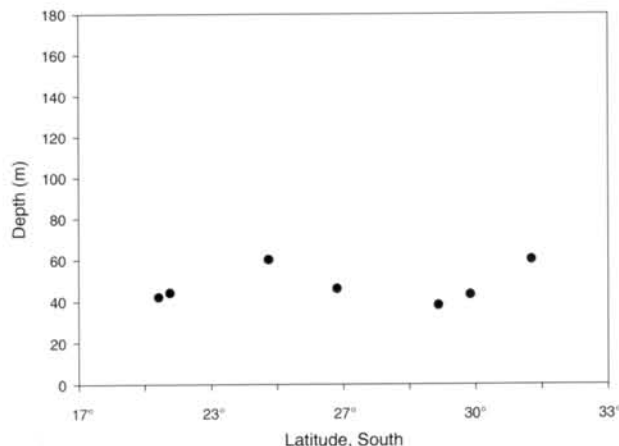
Figs 17-26 - *Ruggiericythere batistae* sp. nov.

- 17) Holotype, LV, female, sample Remac Leg 7 3934, MP-O-1179 (x 60)
- 18) Paratype, RV, female, sample Remac Leg 7 3945, MP-O-1180 (x 60)
- 19) Paratype, LV, male, sample Remac Leg 2 3143, MP-O-1185 (x 60)
- 20) Paratype, RV, male, sample Remac Leg 7 39456, MP-O-1184 (x 60)
- 21) Paratype, male carapace, sample Leg 2 3134, MP-O-1186, dorsal view (x 60)
- 22) Paratype, female carapace, sample Remac Leg 2 3133, MP-O-1181, dorsal view (x 60)
- 23) Internal view of same valve as in fig. 1 (x 60)
- 24) Postero-dorsal detail of same valve as in fig. 20 (x 150)
- 25) Sieve type normal pore-canal, same valve as in fig. 18 (x 3000)
- 26) Detail of muscle node area, same valve as in fig. 17 (x 150)





Text-fig. 14 - Geographical distribution of *Ruggiericythere* sp. 2 on the Brazilian continental shelf.



Text-fig. 15 - Bathymetric distribution of *Ruggiericythere* sp. 2 on the Brazilian continental shelf.

ribblets, repeatedly connected, form a chain of 6-7 anterior marginal fossae; two posterior ribblets, parallel to the margin, more or less continuously; dorsal ribblet weak. Sublongitudinal ribblets: 1-2 anterior and 4 posterior ribblets. Subocular ribblet discontinuous. Muscle node relatively wide, smooth or with sparse, small foveolae. L/H ratio: female valves, LV = 1.87,

RV = 1.95; male valves, LV = 2.10, RV = 2.26.

Comparisons – *Ruggiericythere vixalata* sp. nov. differs from all other species assigned to this genus by virtue of the presence of an alar expansion.

RUGGIERICYTHERE sp. 1
Pl. 3, figs 23-26

Material – 5 valves.

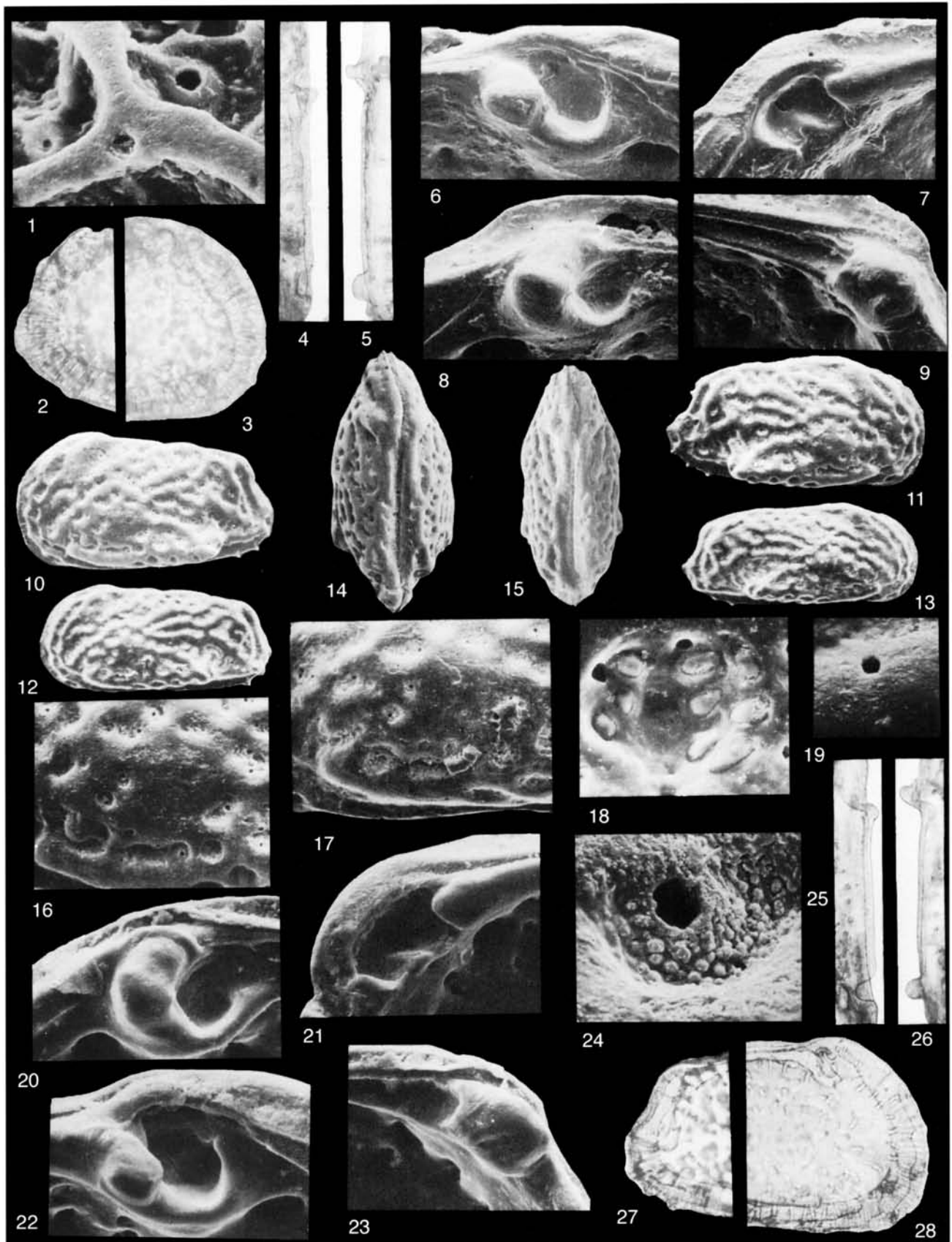
EXPLANATION OF PLATE 5

Figs 1-9 - *Ruggiericythere batistae* sp. nov.

- 1) Normal pore-canals in the muri and in the sola, same valve as in pl. 4, fig. 18 (x 600)
- 2) Paratype, posterior marginal pore-canals, LV, female, sample Remac Leg 2 3133, MP-O-1183 (x 82)
- 3) Anterior marginal pore-canals, same valve as in fig. 2 (x 82)
- 4) Hinge in dorsal view, same valve as in fig. 2 (x 80)
- 5) Hinge in dorsal view, RV, female, sample Remac Leg 7 3945, MP-O-1182 (x 80)
- 6) Anterior detail of hinge, same valve as in Pl. 4, fig. 17 (x 300)
- 7) Posterior detail of hinge, same valve as in Pl. 4, fig. 17 (x 300)
- 8) Anterior detail of hinge, same valve as in Pl. 4, fig. 18 (x 300)
- 9) Posterior detail of hinge, same valve as in Pl. 4, fig. 18 (x 300)

Figs 10-28 - *Ruggiericythere vixalata* sp. nov.

- 10) Holotype, LV, female, sample Remac Leg 3 3309, MP-O-1161 (x 64)
- 11) Holotype, RV, female, sample Remac Leg 3 3309, MP-O-1161 (x 64)
- 12) Paratype, LV, male, sample Remac Leg 7 3923, MP-O-1164 (x 50)
- 13) Paratype, RV, male, sample Remac Leg 7 3923, MP-O-1164 (x 50)
- 14) Paratype, female carapace, sample Remac Leg 3 3309, MP-O-1162, dorsal view (x 60)
- 15) Paratype, male carapace, sample Remac Leg 3 3309, MP-O-1165, dorsal view (x 50)
- 16) Detail of muscle node area, same valve as in fig. 10 (x 150)
- 17) Detail of muscle node area, same valve as in fig. 12 (x 150)
- 18) Muscle scars, same valve as in fig. 11 (x 300)
- 19) Normal pore-canal in the murus, same valve as in fig. 12 (x 600)
- 20) Anterior detail of hinge, same valve as in fig. 11 (x 300)
- 21) Posterior detail of hinge, same valve as in fig. 11 (x 300)
- 22) Anterior detail of hinge, same valve as in fig. 10 (x 300)
- 23) Posterior detail of hinge, same valve as in fig. 10 (x 300)
- 24) Normal pore-canal in the solum, same valve as in fig. 12 (x 1500)
- 25) Paratype, hinge in dorsal view, LV, female, sample Remac Leg 3 3309, MP-O-1163 (x 83)
- 26) Paratype, hinge in dorsal view, RV, female, sample Remac Leg 3 3309, MP-O-1163 (x 83)
- 27) Posterior marginal pore-canals, same valve as in fig. 25 (x 82)
- 28) Anterior marginal pore-canals, same valve as in fig. 25 (x 82)



Distribution – *Ruggiericythere* sp. 1 occurs in only 5 samples with latitudinal range from 20° 21' S (sample 3308) to 29° 52' S (sample 3096) and is distributed in depth varying between 31 and 43 m.

Remarks – This rare species is very probably a new species of *Ruggiericythere*. It somewhat resembles *R. dimorphica*, differing in the strongly irregular shape of the fossae in the central muscle node area. The paucity of the material and the poor state of preservation do not allow the description of a new species.

RUGGIERICYTHERE sp. 2
Pl. 4, figs 1-16

Material – 8 valves and 4 carapaces.

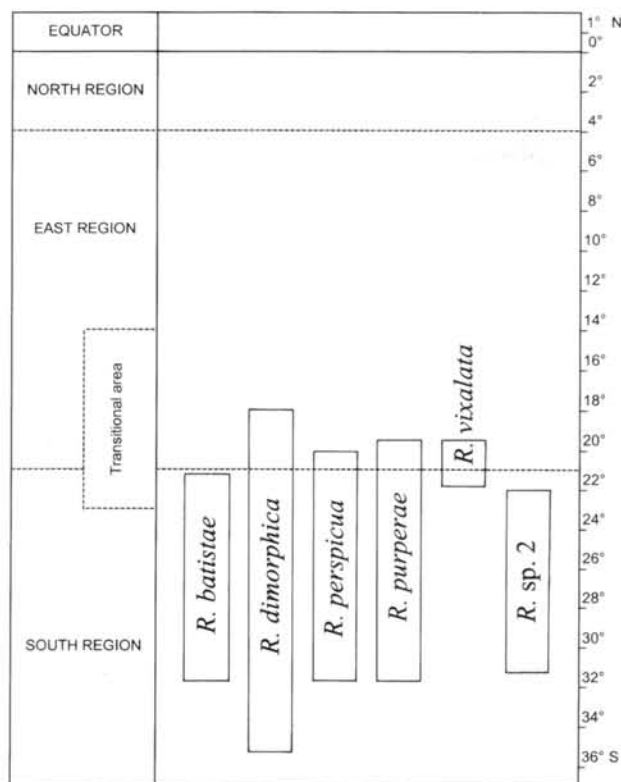
Distribution – *Ruggiericythere* sp. 2 occurs in seven samples in the South Region from the coast of Rio de Janeiro State (sample 3929, latitude 22° 01' S) to that of the Rio Grande do Sul State (sample G-349, latitude 31° 24.5' S; Text-fig. 14). Its depth distribution is 38-60 metres (Text-fig. 15).

Remarks – The specimens herein included in *R. sp. 2* show a strong resemblance to *R. dimorphica*. They differ due to the presence of a smooth subcentral tubercle and of a more delicate reticulum. The shell of this form, both in males and in females, is larger (males: LV, L = 0.94 mm, H = 0.46 mm, Pl. 4, fig. 3; RV, L = 0.94 mm, H = 0.44 mm Pl. 4, fig. 4; females: LV, L = 0.83 mm, H = 0.43 mm, Pl. 4, fig. 1; RV, L = 0.83 mm, H = 0.42 mm, Pl. 4, fig. 2) than in *R. dimorphica*. The material does not allow to establish if we are dealing with a new species or with morphotypes of *R. dimorphica*. L/H ratio of the valves is lower in females (LV = 1.93, RV = 1.98) than in males (LV = 2.04, RV = 2.14).

DISTRIBUTIONAL REMARKS

In Recent sediments the new genus has been found exclusively on the shelf of the South American continent. The latitudinal range is 17° 59' to 41° 52' South latitude and the depth range is 3.5-165 m (this paper, Whatley *et al.*, 1997, 1998). *Ruggiericythere* occurs also in Holocene deposits of the Brazilian shelf (Vicalvi *et al.*, 1977) and in Pleistocene outcrops of the Buenos Aires Province (Bertels, 1975).

On the basis of the distribution pattern of the subfamily Orionininae and of the genus *Callistocythere*, Coimbra & Ornellas (1989) and Coimbra *et al.* (1995) recognize the existence of three assemblages in the Brazilian continental shelf: Northern-Eastern, Southern and Transitional assemblages. The Northern-Eastern Assemblage characterizes warm waters and carbonate sediments, while the Southern Assemblage prefers temperate to cool waters under the influence of subantarctic waters. The Malvinas Current carries these



Text-fig. 16 - Latitudinal distribution of *Ruggiericythere* species on the Brazilian continental shelf.

colder waters to the Southern Brazilian shelf (Martins, 1984). This stream is also responsible for the introduction of terrigenous deposits in this region, which is dominated by terrigenous sedimentation, with small carbonate areas on the outer shelf. According to Kowsmann & Costa (1979), this region has two sedimentary dominions: one terrigenous and one carbonate. The terrigenous dominion is homogeneous and practically continuous along the inner and middle shelves while carbonatic facies are present as spots along the outer shelf, and are more common between Rio de Janeiro and São Paulo states.

The Transitional Assemblage, included by Coimbra & Ornellas (1989) between latitudes 15° S and 21° S, and extended southward as far as 23° S by Coimbra *et al.* (1995), corresponds to the area where elements of both Southern and Northern-Eastern assemblages are mixed.

Ruggiericythere occurs principally in the Southern Assemblage, less frequently in the Southern sector of the Transitional assemblage, while it is absent in the Northern-Eastern Assemblage (Text-fig. 16). Consequently the new genus demonstrates a preference for cool and temperate waters, and it could show a palaeoecological value in palaeoclimatic studies.

The bathymetric distribution (3.5-165 m) of *Ruggiericythere* species shows that this shallow genus

comprises species living at different depths: *R. vixalata*, *R. sp. 1* and *R. sp. 2* occurs only in waters shallower than 60 metres; *R. dimorphica* is more common (not exclusive) in the same interval; *R. purperae* is present in depth exceeding 60 metres, where also *R. batistae* and *R. perspicua* are more frequent.

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