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Cretaceous conchostracans from Alagoas Basin (northeastern Brazil)

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Abstract. Conchostracans from an outcrop of the Maceió Formation (Aptian-Albian, Alagoas Basin) located at Japaratinga Beach (Alagoas State, Brazil) are studied. The fossils comprise a monospecific fauna of *Cyzicus pricei* Cardoso, a frequent Early Cretaceous species in some Brazilian rift basins. The conchostracans from Maceió Formation occur as non-articulated and articulated valves of brownish color. The articulated valves and well preserved isolated ones are indicative of local burial without significant transport. No other fossil groups were found associated with *Cyzicus pricei* in Japaratinga Beach outcrops. Their ecological setting was probably similar to Recent environments: temporary ponds of alkaline freshwater. The existence of some Early Cretaceous African species presenting great morphological similarities with *Cyzicus pricei* [e.g., *Cyzicus kasaiensis* (Marlière) from Congo Basin] suggests that Brazil and Africa shared common conchostracofaunas during the Early Cretaceous.

Keywords. Brazil. Alagoas Basin. Cretaceous. Aptian. Conchostracans.

Introduction

The outcrop of Maceió Formation from where *Cyzicus* specimens were collected is located at Japaratinga Beach, north coast of Alagoas State (northeast Brazil). This outcrop (figure 1) occurs within the Alagoas Graben, a structural compartment of the Alagoas Basin that shows great thickness of Aptian sediments. It consists of coarse sandstones interbedded with two clayey siltstone levels rich in conchostracans (Arienti, 1996). These strata are attributed to rift lakes with negative water balance under arid climate conditions. The studied fossils are from the uppermost clayey siltstone bed.

Systematic study

A monospecific fauna of *Cyzicus pricei* Cardoso composes the identified conchostracofauna from Alagoas Basin. The genus *Cyzicus* has generally an ovate carapace, but it can present a wide variation in shape, size and ornamentation (Tasch, 1969). The species *Cyzicus pricei* was erected by Cardoso (1966) based on specimens from the Candeias Formation (Recôncavo Basin, Neocomian).

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Suborder SPINICAUDATA Linder, 1945
Superfamily CYZICOIDEA Stebbing, 1910
Family CYZICIDAE Stebbing, 1910

Genus *Cyzicus* Audouin, 1837; *emend* Depéret and Mazeran, 1912

Type species. *Cyzicus tetracerus* (Krynicky, 1830)

Cyzicus pricei Cardoso, 1966
Figures 2.A-C

Description. *Cyzicus pricei* has a suboval valve outline (figure 2.A). The anterior curvature is greater than the posterior one, and the straight hinge line equals the height; the posterior height is less developed than the anterior. The umbo is slightly projected at the anterior fourth of the valve. The posterior dorsal angle is approximately 130°. Growth zones are numerous (37 in the holotype), showing a microalveolar sculpture (Cardoso, 1966).

The fossil material from Maceió Formation occurs as articulated and disarticulated chitinous valves. They have as much as 34 growth zones of different width (figure 2.B). The growth lines are punctuated, and the preserved ornamentation is microalveolar (figure 2.C).

In northeastern Brazil, *Cyzicus pricei* is found in Neocomian strata of the Uiraúna, Mangabeira, Malhada Vermelha, Mirandiba, Padre Marcos and Recôncavo basins. Its distribution in younger strata of Aptian and Albian ages is not so wide, occurring only in the Barro, Araripe, Cedro and Alagoas basins

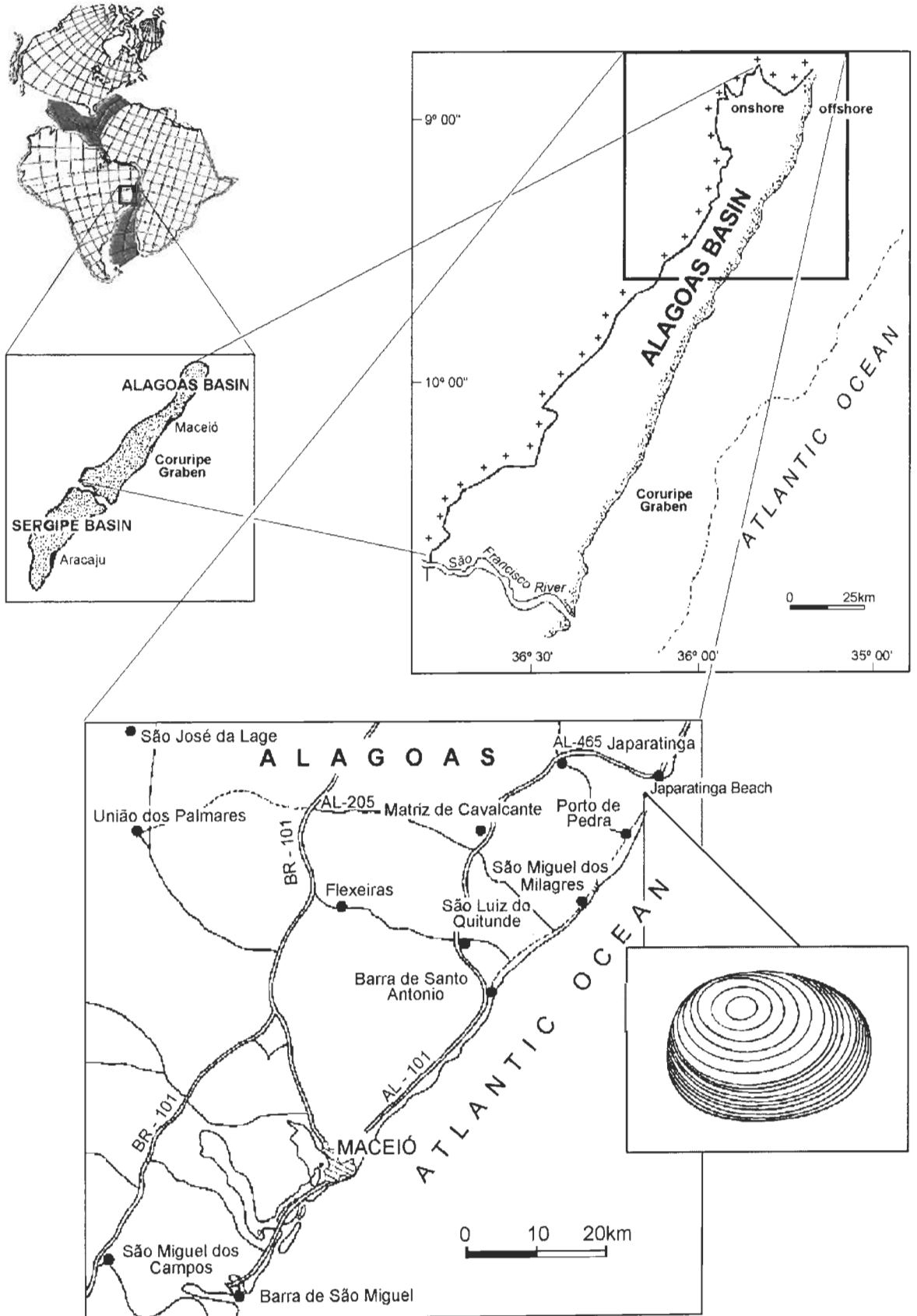


Figure 1. Location map. Aptian paleogeographic reconstitution of South America: upper left.

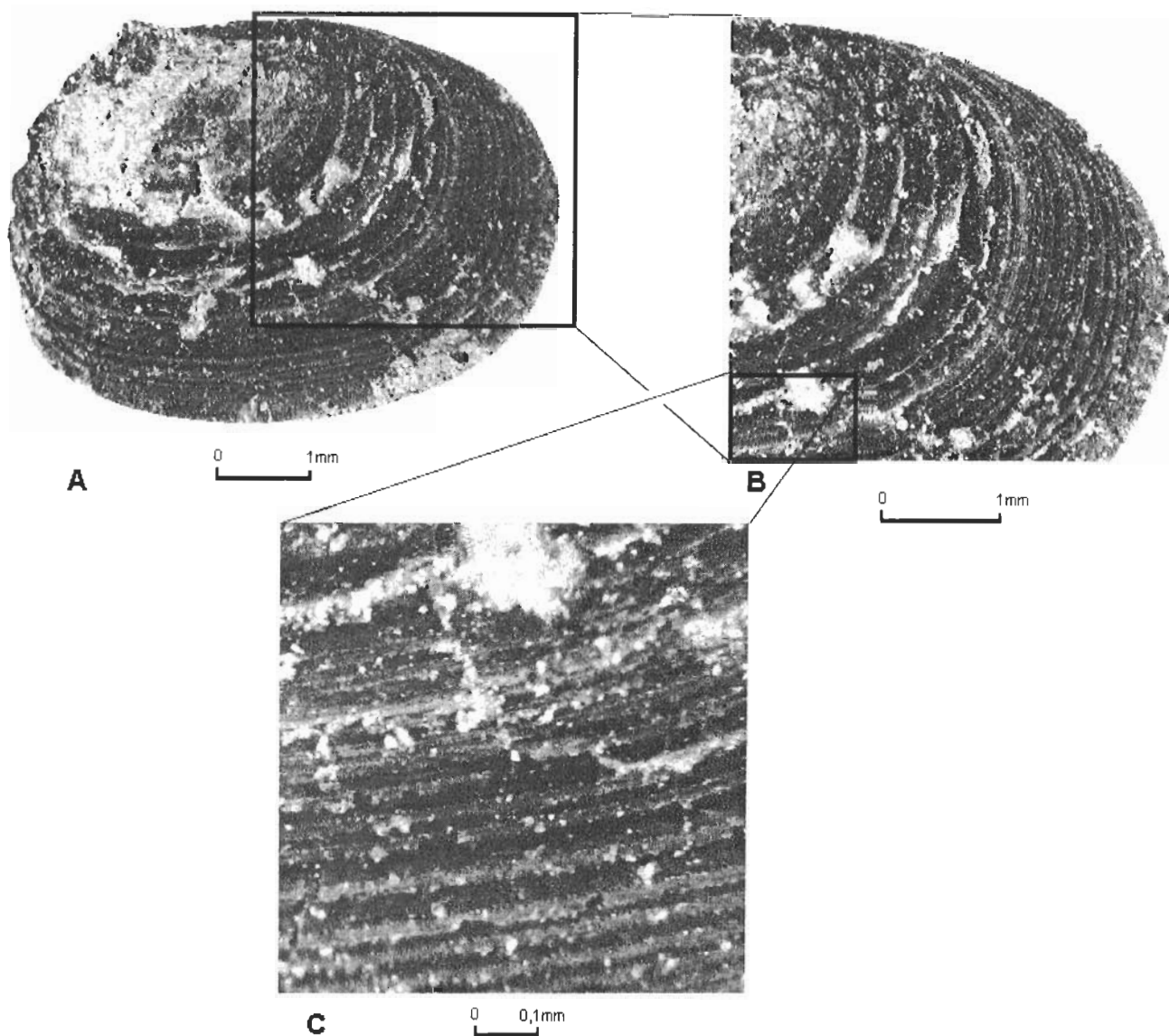


Figure 2. A-C, *Cyzicus pricei* Cardoso, DG/UFRJ Collection N° 065-Co.

(Carvalho, 1993, 1996; Carvalho and Viana, 1993).

Taphonomy and paleoecology. The fossil conchostracans from Maceió Formation occur as single and articulated valves of brownish color. This can be a secondary (thermally induced) color as shown by Tasch (1977). The thermal effects on the superficial cuticle can induce a brown crust under the temperature range of 450°-600°C.

The articulated valves and the well preserved isolated ones are indicative of local burial without extensive transport. These valves, three-dimensionally preserved, always show clear growth lines and microalveolar ornamentation. However, it is difficult to obtain complete specimens, as they frequently break through the bedding planes.

No other fossil groups were found associated with the *Cyzicus pricei* specimens in the Japaratinga

Beach outcrop. Their habitat was probably similar to that of Recent conchostracans, i.e., alkaline temporary freshwater ponds. However, the Maceió Formation includes sedimentary cycles of brackish waters in the upper Alagoas stage and marine environments during Albian times.

The irregular width of growth bands can reflect the ecological conditions in the pool where this species was living. According to Tasch (1979), the valves of fossil conchostracans (particularly *Cyzicus* species) have growth bands that include wide-spaced cycles followed by narrow-spaced ones, which are interpreted as denoting seasonal wetting-drying events in the water body.

Comparison with African species. During the Early Cretaceous, cyzicids spread as far north as the Algerian Sahara as well as to South America and

Australia, and became the commonest conchostracan group. Tasch (1979) explained this as the result of competition in Jurassic lakes with limited food chain.

There is an Early Cretaceous (post-Wealdenian) African species from Congo Basin -*Cyzicus kasaiensis*- that displays great morphological similarities with *C. pricei*, such as their general morphology, umbo position and growth lines. The main difference is the hachure-type ornamentation of *C. kasaiensis* (Marlière, 1950), compared with the microalveolar type of *C. pricei*. This ornamentation difference is considered irrelevant by some authors (Kobayashi, 1954; Musacchio, 1970; Carvalho, 1993) to distinguish conchostracan species.

Early Cretaceous Brazilian and African conchostracofaunas were probably more similar than it is apparent in the literature due to the multiplication of species names as a result of differences in taxonomic procedures. The classification and systematic revisions of conchostraca in Gondwana will certainly permit their use in the biostratigraphy of the continental Cretaceous deposits and improve the knowledge of the ecological changes of terrestrial ecosystems.

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References

- Arienti, L.M. 1996. [Análise estratigráfica, estudo de fluxos gravitacionais e geometria dos depósitos "rift" da Fm. Maceió e Fm. Poço-Bacia de Alagoas. D. Sc. Thesis, Universidade Federal do Rio Grande do Sul (Programa de Pós-Graduação em Geociências), 398 p. Unpublished].
- Audouin, V. 1837. Communications. *Annales de la Société Entomologique de France*, 6: 5-516.
- Cardoso, R.N. 1966. Conchostráceos do Grupo Bahia. *Boletim do Instituto de Geologia, Escola Federal de Minas de Ouro Preto, Minas Gerais* 1: 43-76.
- Carvalho, I.S. 1993. [Os conchostráceos fósseis das bacias interiores do Nordeste do Brasil. D.Sc. Thesis. Universidade Federal do Rio de Janeiro. (Programa de Pós-Graduação em Geologia), 319 p. Unpublished].
- Carvalho, I.S. 1996. A conchostracofauna da bacia de Barro (Cretáceo Inferior, Nordeste do Brasil). *Anais da Academia Brasileira de Ciências* 68: 559-568.
- Carvalho, I.S. and Viana, M.S.S. 1993. Os conchostráceos da bacia do Araripe. *Anais da Academia Brasileira de Ciências* 65: 181-188.
- Depéret and Mazeran, 1912. Les *Estheria* du Permien d'Autun, *Société d' Histoire Naturelle d' Autun Bulletin* 25: 165-173.
- Kobayashi, T. 1954. Fossil estherians and allied fossils. *Journal of the Faculty of Science, Tokyo University* 9: 1-192.
- Marlière, R. 1950. Ostracodes et phyllopodés du Système du Karroo au Congo Belge et les régions avoisinantes. *Annales du Musée du Congo Belge, Série 8, Sciences Géologiques* 6: 11-38.
- Musacchio, E. 1970. Ostracodos de las superfamilias Cytheracea y Darwinulacea de la Formación La Amarga (Cretácico Inferior) en la provincia de Neuquén, República Argentina. *Ameghiniana* 7: 301-316.
- Tasch, P. 1969. Order Conchostraca. In: R.C. Moore (ed.), *Treatise on Invertebrate Paleontology. Arthropoda* 4, Part R, v. 1, The Geological Society of America and The University of Kansas, pp. R141-R163.
- Tasch, P. 1977. Experimental valve geothermometry applied to fossil conchostracan valves, Blizzard Heights, Antarctica. *Symposium on Antarctic Geology and Geophysics. Antarctic Geoscience, Madison*, pp. 661-668.
- Tasch, P. 1979. Crustacean branchiopod distribution and speciation in Mesozoic lakes of the Southern continents. *Terrestrial Biology III, Paper 4, Antarctic Research Series* 30: 65-74.

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