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 Cylcicus pri زي 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 Cylcicus pri ز 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 Cylcicus pri زي (e.g., Cylcicus kaarisiensis (Marlière) from Congo Basin) suggests that Brazil and Africa shared common conchostracans faunas during the Early Cretaceous.

Keywords: Brazil. Alagoas Basin. Conchostraca. Aptian. Conchostracans.

Introduction

The outcrop of Maceió Formation from where Cylcicus 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 Alagoas Basin that shows great thickness of Aptian sediments. It consists of coarse sandstones interbedded with two clayey siltstone levels rich in conchostracans (Arieni, 1996). These strata are attributed to rift lakes with negative water balance under and climatic conditions. The studied fossils are from the uppermost clayey siltstone bed.

Systematic study

A monospecific fauna of Cylcicus pri زي Cardoso comprises the identified conchostracans fauna from Alagoas Basin. The genus Cylcicus has generally an ovate carapace, but it can present a wide variation in shape, size and ornamentation (Tasch, 1969). The species Cylcicus pri زي was erected by Cardoso (1966) based on specimens from the Cardosía Formation (Recôncavo Basin, Neocomian).

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Suborder SYNOEUCATA Linder, 1946
Superfamily CYCLOXEA Stebbing, 1910
Family CYCLOIDE Stebbing, 1910
Genus Cylcicus Audouin, 1836; emend. Depéret and Maiziere, 1912
Type species. Cylcicus bimaculatus (Krynicki, 1830)
Cylcicus pri زي Cardoso, 1966
Figures 2 A-C

Description. Cylcicus pri زي 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 umbilicus 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 microavicular 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 microavicular (figure 2 C).

In northeastern Brazil, Cylcicus pri زي is found in Neocomian strata of the Uirapuru, 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, Arraza, Cedro and Alagoas basins.
Figure 1. Location map. Aptian paleogeographic reconstruction of South America: upper left.

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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 Täsch (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 microvascular 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 Cysticus priscii specimens in the Japaratina 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 Täsch (1979), the valves of fossil conchostracans (particularly Cysticus 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, cysticids spread as far north as the Algerian Sahara as well as to South America and Brazil.


Figure 2. A-C, Cysticus priscii Cardoso, DG/UFRR Collection N°. 069-Co.
Australia, and became the commonest conchostracan Group. Tash (1979) explained this as the result of competition in Jurassic lakes with limited food chain.

There is an Early Cretaceous (post-Waldenian) African species from Congo Basin-Cypris kassemiensis that displays great morphological similarities with *C. pristi*, such as their general morphology, umbo position and growth lines. The main difference is the hatchure-type ornamentation of *C. kassemiensis* (Marilève, 1950), compared with the microvalvear type of *C. pristi*. This ornamentation difference is considered irrelevant by some authors (Kobayashi, 1954; Massamchio, 1970; Carvalho, 1993) to distinguish conchostracan species.

Early Cretaceous Brazilian and African conchos traconaenus 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


