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Studies on Permo-Trias of Madagascar. 5.
Ambilobeia karojoi n. gen., n. sp. (Crustacea,
Decapoda) from the Lower Triassic (Olenekian) of
Ambilobé region (NW Madagascar)

Abstract - The study of *Ambilobeia* n. gen., n. sp. (infraorder Penaeidea de Haan, 1849, family Penaeidae Rafinesque, 1815) increases the knowledge about the rich and important faunal assemblage of decapod crustaceans of the Lower Triassic (Olenekian) of the Ambilobé region (NW Madagascar), already widely analysed by Garassino and Teruzzi (1995). The study specimen, recently collected during a surveying, was discovered in a new outcrop located near the village of Bobasatrana. Some morphological features, such as the very elongate rostrum, lacking supra- and subrostral teeth, the presence of one strong tooth located at the base of rostrum, and pereopods I-III with short and thin chelae, distinguish this new genus from *Ifasya* Garassino and Teruzzi, 1995.

Key words: Crustacea, Decapoda, Lower Triassic, NW Madagascar.

Riassunto - Studi sul Permo-Trias del Madagascar. 5. *Ambilobeia karojoi* n. gen., n. sp. (Crustacea, Decapoda) del Triassico inferiore (Olenekiano) della regione di Ambilobé (Madagascar nordoccidentale).

Lo studio del nuovo genere *Ambilobeia* (infraordine Penaeidea de Haan, 1849, famiglia Penaeidae Rafinesque, 1815) arricchisce le conoscenze dell'importante fauna a crostacci decapodi del Triassico inferiore (Olenekiano) della Regione di Ambilobé, già ampiamente analizzata da Garassino and Teruzzi (1995). L'esemplare esaminato, raccolto in una recente prospezione, è stato rinvenuto in un nuovo affioramento localizzato in prossimità del villaggio di Bobasatrana. Alcuni caratteri morfologici, quali il rostro estremamente allungato, privo di denti sopra- e sotto-rostrali, la presenza di un dente robusto localizzato alla base del rostro e i pereopodi I-III provvisti di chela corte e sottili, discostano questo nuovo genere da *Ifasya* Garassino and Teruzzi, 1995.

Parole chiave: Crustacea, Decapoda, Triassico inferiore, NO Madagascar.

Introduction

The fossiliferous levels of the Lower Triassic marine sediments located S-SW of the village of Ambilobé (Fig. 1), about 150 km SW of Diego Suarez (Antsiranana) have been known since the beginning of last century (Besairie, 1932).

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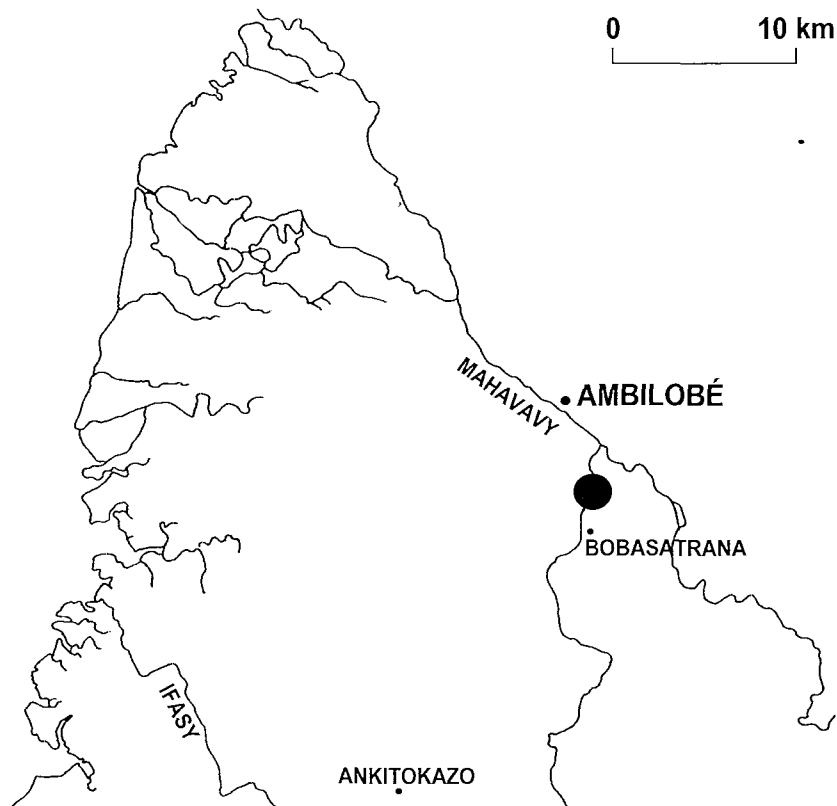


Fig. 1 – The point indicates the Bobasatrana outcrop (Ambilobé region, NW Madagascar) where the study specimen was discovered.

Fig. 1 – Il punto indica il giacimento di Bobasatrana (regione di Ambilobé, NO Madagascar) dal quale proviene l'esemplare studiato.

This paper deals with the description of a new genus of decapod crustacean of the Lower Triassic of the Ambilobé region (NW Madagascar), increasing our knowledge about this decapod faunal assemblage, that has been intensively studied by Garassino and Teruzzi (1995). The fossiliferous rocks are included within a sedimentary succession of Lower Triassic age, forming a discontinuous band, about 120 km long, oriented SW-NE. The band of marine sedimentary rocks lies within a depression between two cuestas, formed by the prepalaeozoic crystalline basement to the NE, and by non-fossiliferous continental Middle and Upper Triassic sandstones (Isalo) to the SW.

According to Besairie (1932, 1972), the Lower Triassic succession in the region includes the following (from bottom to top):

- 1 – Neopermian (*Productus*, *Spirifer* and *Xenaspis* beds)
- 2 – Neopermian (*Cyclolobus* and *Xenaspis* beds)
- 3 – Lower Eotrias (*Claraia* and fish beds)
- 4 – Middle Eotrias (fish and ammonite beds)
- 5 – Upper Eotrias (Iraro shales at W and Barabanja *Flemingites* beds at E)
- 6 – Isalo continental sandstones.

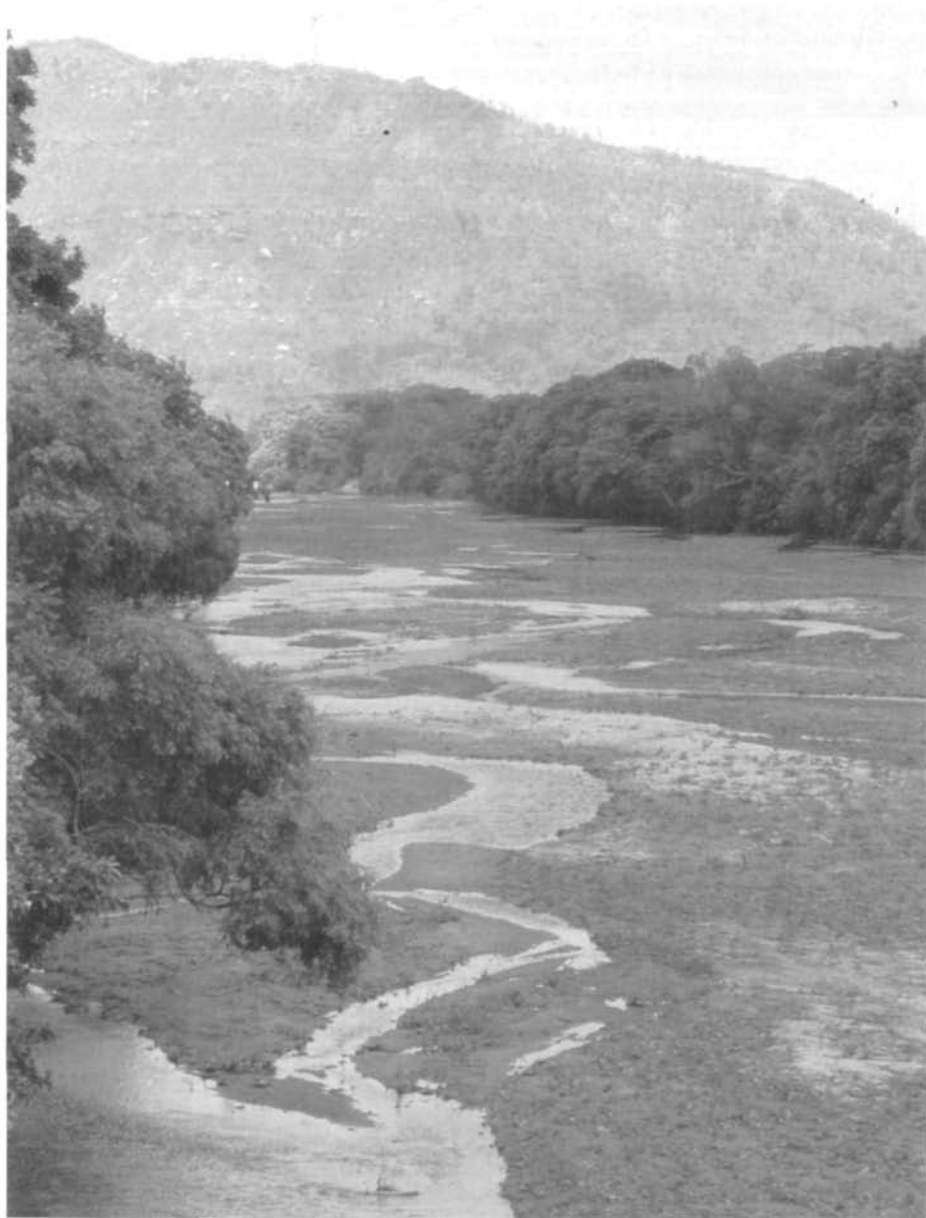


Fig. 2 – Bobasatrana outcrop is located near the Mahavavy river.

Fig. 2 – Il giacimento di Bobasatrana è situato in prossimità del fiume Mahavavy.

The thickness of the various members of the series is highly variable (Besairie, 1972). Permian strata are estimated to be about 100 m thick, the marine Lower Triassic series varies from 600 m in the western parts of the basin, in the Ankitokazo area, to 1,200 m in the Andavakoera Massif region, and to just 300 m in the Barabanja basin, on the eastern margin of the sedimentary band.

Beltan (1996) proposed, for the fossil-bearing beds of the Lower Triassic of the Ambilobé region, a Dienerian age (Lower Triassic), after a correlation with the *Lystrorhynchus* and *Cynognathus* zones of the Beaufort Group (Battail *et al.*, 1987).

Recently, Yanbin *et al.* (2002) studied some conchostracans of the Ambilobé region, ascribing them to *Euestheria* (*Magniestheria*) *truempyi* (Kozur and Seidel, 1983). Since this species was previously discovered also in Bernburg Formation (lowermost Olenekian) of the German basin, we can date the faunal assemblage of Ambilobé region not to Induan (Dienerian), but to Olenekian.

The famous faunal assemblage comprising invertebrates (ammonites, nautiloids, bivalves, annelids, decapod crustaceans, thylacocephalans, cycloids, limulids and conchostracans) and vertebrates (mostly fishes and rare amphibians) is found in the most western outcrops of the band of sedimentary rocks, roughly between the small village of Anaborano Ifasy in the SW and Bobasatrana in the NE (Fig. 1). The first discoveries of fossils in the region was during the fifties of the 20th century, during geological prospecting carried out by Bureau de Géologie du Madagascar to the search of gold deposits. The first scientific paper was by Douvillé (1910). Since then many studies were carried out on the invertebrate fauna, mainly dealing with ammonites and bivalves, but also with nautiloids, crustaceans (decapods and thylacocephalans), and polychaete annelids (Vaillant-Couturier Treat, 1933; Van Straelen, 1933; Collignon, 1933, 1934; Alessandrello, 1990; Arduini, 1990). Recently, fossil bivalves from the Lower Triassic of Ambilobé region, identified as *Bakevellia* sp. cfr. *B. stockleyi* (Cox) (Fang Zhongjie, com. pers.), were found associated with the conchostracan species *Euestheria* (*Magniestheria*) *truempyi* (Kozur and Seidel, 1983). This bivalve was previously discovered in the marine intercalated beds of the upper part of Ruhembe bed in Kidodi area and the Tanganyka and Sakamena beds of SW Madagascar. In Madagascar, this level lies somewhat below the horizon bearing the amphibian *Rhinesuchus*, which is an important element of the Early Triassic *Lystrorhynchus* zone (Beltan, 1996). Therefore, the bivalve-bearing bed is of Early Triassic age. The most recent studies about invertebrates are by Yanbin *et al.* (2002) on conchostracans, by Brambilla *et al.* (in press) on the first record of cycloids in Gondwana, and by Hauschke *et al.* (in press) on the limulids. We point out that the presence of conchostracans, typical organisms of freshwater environments, questions the marine origin of these basins, argued by past and recent studies about the Lower Triassic fauna of Ambilobé region. Also, vertebrates were the subject of many studies, concerning fishes (Priem, 1924), Moy-Thomas (1935), Piveteau (1927, 1934, 1946), Lehman (1948, 1952, 1953, 1956), Beltan (1968, 1996), Olsen (1984) and Barbieri (1991), and amphibians (Lehman, 1955, 1958, 1960, 1963, 1966; Piveteau, 1936, 1938, 1956).

The present research is part of a program of studies started in the eighties of the last century by the Department of the Invertebrate Palaeontology of Museo Civico di Storia Naturale di Milano on the collection of the Lower Triassic fossils of the Ambilobé region. This research program was carried out by the cooperation of the late Dr. Jeannot Rasoanaivo, Director of Service de la Géologie du Madagascar. The specimen subject of this study was collected by one of the authors (G. Pasini).

Previous studies of decapod crustaceans from Ambilobé region

The first description of decapod crustaceans from the Lower Triassic of Madagascar was that of Van Straelen (1933) who described two incomplete specimens from the Ambilobé region, housed in the collection of the Muséum National d'Histoire Naturelle of Paris, ascribing them to *Antrimpos madagascariensis*. Garassino & Teruzzi (1995) enlarged the study of decapod crustaceans of Ambilobé region thanks to a sample of 400 specimens, partly collected during a field mission in 1989 organised by the Department of the Invertebrate Palaeontology of Museo Civico di Storia Naturale di Milano and partly collected in previous years by G. Pasini himself. This research program was allowed by the precious co-operation of the Service de la Géologie du Madagascar. This resulted in recognition of *Ifasya* Garassino and Teruzzi, 1995, with the two species *I. madagascariensis* (Van Straelen, 1933), and *I. straeleni* Garassino and Teruzzi, 1995.

Material

The present study is based on one specimen, discovered in a new outcrop surrounding the village of Bobasatrana (Figs. 1, 2). The specimen is preserved more or less flattened inside a subellipsoidal nodule, 1.5 cm thick, and 6.5 cm long. It consists of the external mould and preserves also the remains of the internal structures, such as the mandible and the thoracic somites.

Acronym: MSNM: Museo Civico di Storia Naturale di Milano.

Systematic Palaeontology

Infraorder Penaeidea de Haan, 1849

Superfamily Penaeoidea Rafinesque, 1815

Family Penaeidae Rafinesque, 1815

Genus *Ambilobeia* nov.

Diagnosis: subrectangular carapace; long rostrum without supra- and subrostral teeth; one strong tooth at the base of the rostrum; cervical spine and hepatic groove present; pereopods I-III with chelae short and stout; somite VI strongly elongate.

Type species: *Ambilobeia karojo* n. sp.

Etymology: the trivial name alludes to Ambilobé village around which the fossiliferous outcrops are located.

Description: same as for the type species.

Ambilobeia karojo n. sp.

Figs. 3, 4

Diagnosis: same as for the genus.

Etymology: the trivial name alludes to Mr. Karojo, a local prospector who donated the study specimen.

Holotype: MSNM i25459.

Type locality: Bobasatrana (Ambilobé region); the study specimen comes from a new outcrop surrounding the village of Bobasatrana, discovered recently by

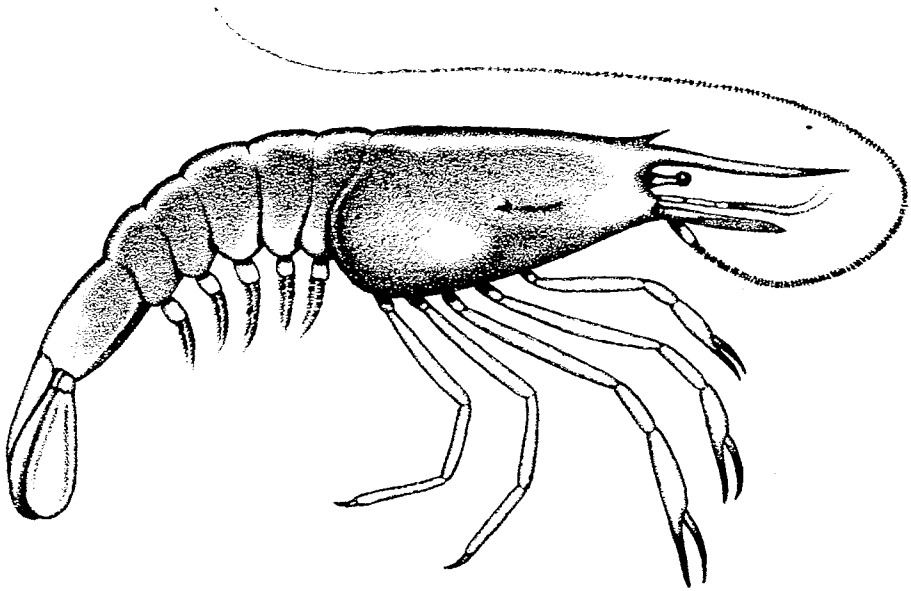


Fig. 3 – *Ambilobeia karoji* n. gen., n. sp., reconstruction (reconstruction of distal extremity of rostrum, tail fan and pleopods are hypothetical).

Fig. 3 - *Ambilobeia karoji* n. gen., n. sp., ricostruzione (la ricostruzione dell'estremità distale del rostro, del ventaglio caudale e dei pleopodi è ipotetica).

deforestation to obtain new agricultural lands, and different from the typical outcrop, reported by French palaeontologists in the second half of the last century.

Geological age: Olenckian (Lower Triassic).

Occurrence and measurements: we ascribe to this species one specimen (MSNM i25459).

MSNM i25459 : total length of the body: 8 cm
 length of rostrum: 1 cm
 length of carapace excluding rostrum: 2.5 cm
 width of carapace: 1.5 cm
 length of abdomen: 4 cm
 length of somite VI: 1 cm

Description. Carapace subrectangular in lateral view (Fig. 3) with ventral margin rising slightly in anterior third. Dorsal margin straight. Rostrum strongly elongate without supra- and subrostral teeth. One strong tooth at base of rostrum. Posterior margin, slightly convex in lower third, strengthened by a thin marginal carina. Ventral margin curvilinear. Ocular incision narrow and shallow. Weak antennal and pterygostomial angles. Dorsal surface of carapace with cervical spine and hepatic groove. Abdominal somites I-V subrectangular, increasing in length posteriorly. Posterior margin of somites I-III straight, while that of somite IV-V posteriorly projecting. Somite VI subrectangular and longer than others. Tail fan incomplete. Eye-stalk short. Scaphocerite with a large lam-

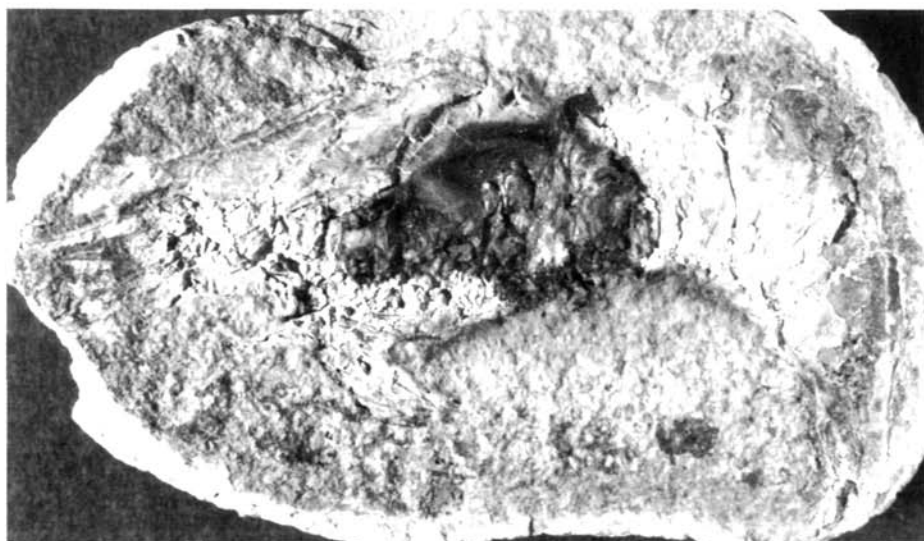
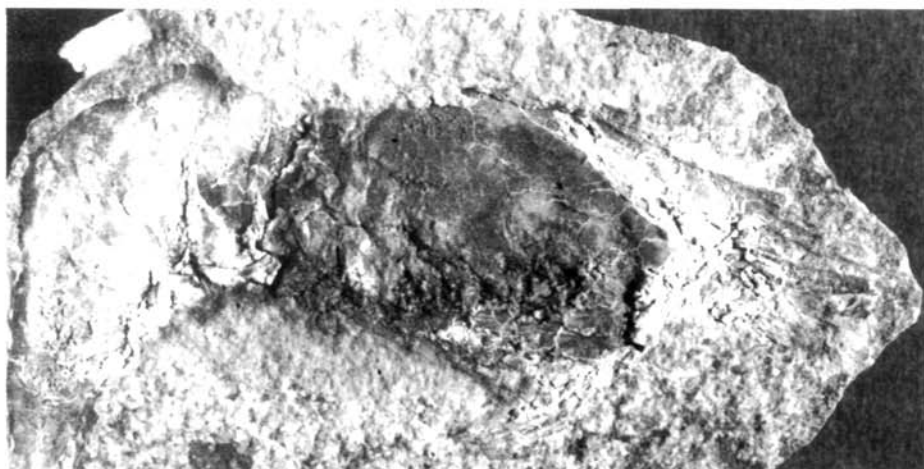


Fig. 4 - *Ambilobeia karojoi* n. gen., n. sp., holotype, n. cat. MSNM i25459 (x1.9).

Fig. 4 - *Ambilobeia karojoi* n. gen., n. sp., olotipo, n. cat. MSNM i25459 (x1.9).

ina rounded at distal extremity, bearing a spine on outer margin. Pereiopods I-III chelate, increasing in length posteriorly. Chelae short and stout. Pleopods not preserved.

Discussion. Garassino and Teruzzi (1995) described the new genus *Ifasya* from Ambilobé region which included *I. straeleni* Garassino and Teruzzi, 1995, and *I. madagascariensis* (Van Straelen, 1933). *Ifasya* Garassino and Teruzzi, 1995 exhibits the following morphological features: subrectangular carapace, long rostrum with or without subrostral median tooth, strong hump at the base of rostrum, deep hepatic groove, weak branchiocardiac groove, gastro-orbital, hepatic and branchiocardiac spines, pereiopods I-III with strong and elongate

chelae, well developed propodus of pereopod III, strongly elongate somite VI, and triangular telson with pointed distal extremity.

The study of this new specimen pointed out some morphological features, such as the elongate rostrum without supra- and subrostral teeth, strong tooth at the base of the rostrum, pereopods I-III with short and stout chelae, that are different from species of *Ifasya* Garassino and Teruzzi, 1995. Therefore, we justify the institution of this new genus.

Only the Upper Triassic genus *Antrimpos* Münster, 1839 could show some morphological affinities in the shape of rostrum and body with *Ambilobeia* n. gen. However, the rostrum with supra- and subrostral teeth, the presence of one strong antennal spine, and the presence of hepatic, orbito-antennal and gastro-frontal grooves distinguishes *Antrimpos* Münster, 1839 from the new genus.

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