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Garassino, A. + G. Teruzzi

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Alessandro Garassino (*) & Giorgio Teruzzi (*)

Studies on Permo-Trias of Madagascar. 3. The decapod crustaceans of the Ambilobé region (NW Madagascar)

Summary — A large decapod crustaceans sample from the Lower Triassic of Madagascar is here described. The specimens, coming from the outcrops S-SW of the village of Ambilobé (NW Madagascar), represent the most ancient, significant decapod crustacean assemblage known to date. The specimens belong to the infraorder Penaeidea de Haan, 1849 within which the new genus *Ifasya* is created, to which the species *I. straeleni* n. sp. and *I. madagascariensis* (Van Straelen, 1933) are assigned.

Résumé — Études sur le Permotrias du Madagascar. 3. Les crustacés décapodes de la région d'Ambilobé (NO Madagascar).

On analyse l'ensemble faunique des crustacés décapodes du Triassic inférieur du Madagascar. Les exemplaires, qui proviennent d'affleurements situés à S-SO de la ville d'Ambilobé (NO Madagascar) représentent l'ensemble faunique des crustacés décapodes plus ancien jamais découvert. Les exemplaires examinés appartiennent à l'infra-ordre Penaeidea de Haan, 1849 dans le milieu duquel le nouveau genre *Ifasya* a été fondé; à le nouveau genre viennent attribuées les espèces *I. straeleni* n. sp. et *I. madagascariensis* (Van Straelen, 1933).

Riassunto — Studi sul Permotrias del Madagascar. 3. I crostacei decapodi della regione di Ambilobé (Madagascar nordoccidentale).

Viene analizzata un'ampia collezione di crostacei decapodi del Triassico inferiore del Madagascar. Gli esemplari, provenienti dagli affioramenti a S-SO della città di Ambilobé (NO Madagascar), rappresentano il complesso faunistico a crostacei decapodi più antico finora conosciuto. Gli esemplari esaminati appartengono all'infraordine Penaeidea de Haan, 1849 nell'ambito del quale è stato istituito il nuovo genere *Ifasya* al quale vengono ascritte le specie *I. straeleni* n. sp. e *I. madagascariensis* (Van Straelen, 1933).

Key words: Crustacea, Decapoda, Triassic, Madagascar

(*) Museo Civico di Storia Naturale, C.so Venezia 55, 20121 Milano.

Introduction

The fossiliferous levels of Permotriassic marine sediments located S-SW of the village of Ambilobé (Fig. 1), about 150 Km SW of Diego Suarez (Antseranana), are known since the beginning of this century.

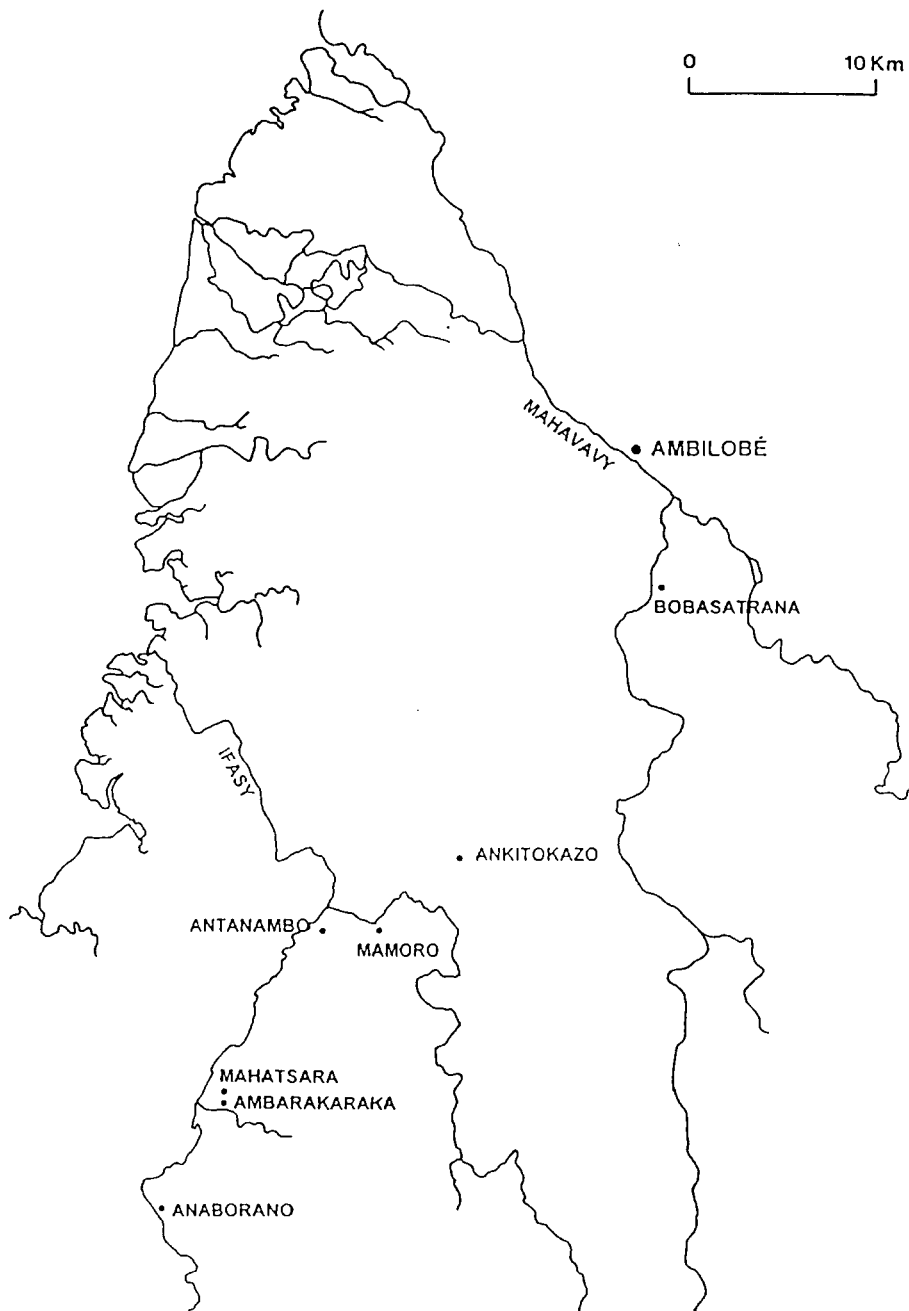


Fig. 1 – Location of outcrops in the N. W. Madagascar.

This paper deals with the description of a large sample of fossil decapod crustaceans of the Lower Triassic of the Ambilobé region (NW Madagascar). The fossiliferous rocks are included into a sedimentary succession of permotriassic age, forming a discontinuous, about 120 Km long band oriented SW-NE; the band of marine sedimentary rocks is placed in a depression included between two cuestas, formed by the prepalaeozoic crystalline basement at NE, and by non-fossiliferous continental Middle and Upper Triassic sandstones (Isalo) at SW. According to Besairie (1932, 1972), the Permotriassic succession in the region is 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 (Iroso shales at W and Barabanja *Flemingites* beds at E)
- 6 - Isalo continental sandstones.

The thickness of the various members of the series is, according to Besairie (1972), highly variable. Permian strata are evaluated to be about one hundred metres thick, the marine Lower Triassic series varies from 600 m in the western parts of the basin, in the Ankitokazo area, to 1200 m in the Andavakoera Massif region, and to just 300 m in the Barabanja basin, at the eastern limits of the sedimentary band.

The famous faunal assemblage comprising invertebrates (ammonites, pelecypods, holothuroids, annelids, decapod crustaceans etc.) and vertebrates (mostly fishes, but also rare amphibians), is found in the most western outcrops of the band of sedimentary rocks, roughly included between the small villages of Anaborano Ifasy at SW and Bobasatrana at NE. The first discoveries of fossils in the region took place at the beginning of this century, during geological prospectings aimed to the search of gold deposits, and the first scientific paper was by Douvillé (1910). Since then many studies were carried out on invertebrate fauna, mainly dealing with ammonites and pelecypods, but also with nautiloids, crustaceans (decapods and thylacoccephalans), echinoderms and polychaete annelids; among these Vaillant-Couturier Treat (1933), Van Straelen (1933), Collignon (1933, 1934), Alesandrello (1990) and Arduini (1990). Also vertebrates were the subject of many researches, both concerning fishes (Priem (1924), Moy-Thomas (1935), Piveteau (1927, 1934, 1946), Lehman (1948, 1952, 1953, 1956), Beltan (1968) and Olsen (1984), and amphibians (Piveteau (1936, 1938, 1946) and Lehman (1955, 1958, 1960, 1963, 1966)).

The present work is part of a programme of studies started by the Museo di Storia Naturale di Milano on the material of its own collection of the Lower Triassic fossils of the Ambilobé region. The material was partly gathered during a mission in 1989 to which the authors and Mr. Giovanni Pasini took part, and partly gathered in the previous years by Mr. Giovanni Pasini himself.

Fossiliferous outcrops

Fossils are preserved inside silicatic nodules rich in iron oxyde, which are found into a formation, about 350 m thick, of marly shales alternated to sandstones (Besairie (1972)). The fossiliferous outcrops have a limited

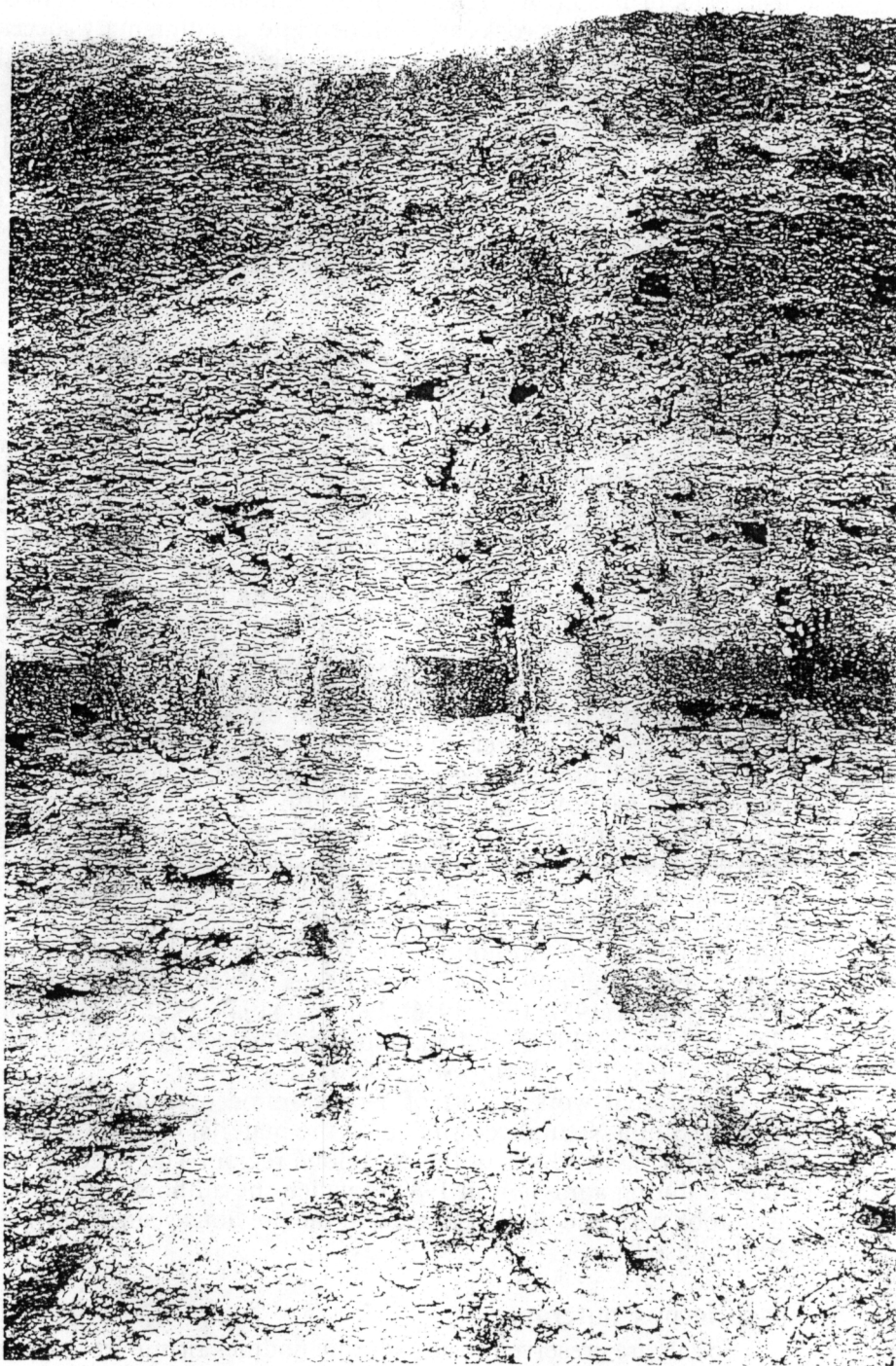


Fig. 2. Section of the beds.

extension, since the region is covered by an open secondary forest, often interrupted by vegetated clearings and with a lateritic soil.

The exposed sections have a maximum thickness of just few metres (Fig. 2) and it is impossible to correlate them each other; moreover the fossiliferous nodules are not very abundant inside the shales (Fig. 3). It is therefore very hard to carry out detailed stratigraphical subdivisions. For instance it is difficult to verify the subdivision into «Lower Eotrias – *Claraia* and fish beds» and «Middle Eotrias – fish and ammonite beds» by Besairie (1972); during our mission we were able to ascertain that in the visited outcrops (located near Ambarakaraka, Mahatsara, Antanambo, Mamoro, Ankitokazo, Ambatolokobé) the decapod crustaceans, the ammonites, the fishes and the pelecypods of the genus *Claraia* are always associated even in the same nodule.

The outcrops usually originate from the intervention of local people, burning small parts of the forest in order to obtain rice-growing ground; on the bare-laying ground the fossiliferous nodules – free by erosion from the most tender matrix surrounding them – accumulate in preferential places, transported by the superficial stream waters (Fig. 4).

The existence of the fossils is well known to the populations of the little villages and perceived as a natural fact, of which however the cultural tradition of the area lacks an explanation. Nevertheless the local dialect has well defined names for the fossiliferous nodules according to their possible contents, which can sometime be ascertained from the shape and the size of the nodule itself. The small subspherical nodules containing decapod crustaceans are in fact called *vato makamba* (from *vato*=stone and *ma-*



Fig. 3 – Nodule within the beds.