

Original article

# Early Paleogene decapod crustaceans from the Sulaiman and Kirthar Ranges, Pakistan

*Crustacés décapodes du Paléogène inférieur des montagnes de Sulaiman et du Kirthar, Pakistan*

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## Abstract

A set of Paleocene and Eocene decapod crustaceans is described from the Sulaiman and Kirthar Ranges of Pakistan. The fossil crabs *Proxicarpilius planifrons* Collins and Morris, 1978 and *Pakicarcinus orientalis* (Collins and Morris, 1978), already known in the Eocene of northern Pakistan, are reported for the first time in the Paleocene of southern Pakistan, enlarging the stratigraphic and the palaeobiogeographical ranges of these species. The callianassid genus *Calliax* de Saint Laurent, 1973 is reported for the first time in the Paleocene of southern Pakistan; this is the oldest record for the genus.

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**Keywords:** Crustacea; Decapoda; Brachyura; Axiidea; *Proxicarpilius*; *Pakicarcinus*; *Calliax*; Paleogene; Pakistan

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## Résumé

Un ensemble de crustacés décapodes est décrit dans le Paléocène et l'Eocène des montagnes de Sumailan et du Kirthar au Pakistan. Les crabes fossiles *Proxicarpilius planifrons* Collins et Morris, 1978 et *Pakicarcinus orientalis* (Collins et Morris, 1978), déjà connus dans l'Eocène du nord du Pakistan, sont signalés pour la première fois dans le Paléocène du sud du Pakistan, élargissant ainsi les répartitions stratigraphiques et paléobiogéographiques de ces espèces. Le genre de callianassidé *Calliax* de Saint Laurent, 1973 est signalé pour la première fois dans le Paléocène du Pakistan ; il s'agit de la plus ancienne occurrence du genre.

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*Mots clés* : Crustacea ; Decapoda ; Brachyura ; Axiidea ; *Proxicarpilius* ; *Pakicarcinus* ; *Calliax* ; Paléogène ; Pakistan

## 1. Introduction

Fossil decapod crustaceans from Pakistan have been the subject of relatively few studies. Stoliczka (1871) and Noetling (1897) reported new species from Pakistan and India and Glaessner (1933) described several new species based upon the collections of the British Museum. Later, Gingerich et al. (1979) reported decapod crustacean remains of some Paleocene and Eocene formations in Pakistan but without formal description. Collins and Morris (1978) contributed to the most important work on Pakistan reviewing all the previously reported fossil crabs and describing two new genera and eight new species. Their work was completed by Glaessner and Secrétan (1987) with fossil crabs from the Eocene of the Sulaiman Range. More recently, Schweitzer et al. (2004) reported a new occurrence of hermit crab, a new species of ghost shrimp, and description of one new genus from Pakistan. Most of these previous studies concerns fossil crabs collected in northern Pakistan.

The current work includes fossil crabs collected during the late 1970s from the middle Eocene (Lutetian, Domanda Formation) of Rakhi Nala, Sulaiman Range, and northern Pakistan. It includes also new crustaceans from the Paleocene (Thanetian? Bara Formation) exposed in the Lakhra Dome, southern Pakistan. These latter occurrences constitute the first report of Paleocene crustaceans in southern Pakistan (Sind, Karachi Arc).

## 2. Geological setting

The Sulaiman and Kirthar Ranges of Pakistan constitute a north-south trending fold and thrust belt which connects the Himalayan continental collision zone to the northeast with the Makran accretionary wedge system to the southwest. The Sulaiman and Kirthar Ranges are generally separated by the Sibi Through, and the Kirthar Range is subdivided into northern and central sectors close to the Sibi Re-entrant, and a southern sector, also called Karachi Arc (Fig. 1).

### 2.1. Eocene deposits of the Sulaiman Range (Upper Indus Basin)

The Sulaiman Range is a north-south trending band of rugged hills rising to 3500 m above sea level that extends along the borders of Balochistan and Punjab Provinces (Fig. 1). Exposures of the middle and upper Eocene marine formations of the Kirthar Group are extensive in the Sulaiman Range, and they have produced the best middle and late Eocene fossil record for the entire subcontinent. Indo-Pakistan was located astride the equator during the early Paleogene, moving northward toward tectonic collision with the rest of Asia (Patriat and Achache, 1984). The east

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