

Cretaceous – Tertiary *Hoploparia* species: Occurrence, paleobiogeography and predation context



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ABSTRACT

The study of *Hoploparia* species in 25 localities in Northern and Southern Hemispheres from Early Cretaceous to Early Miocene reveals the appearance of 51 species in Early Cretaceous, mostly in Northern Hemisphere, 46 species from Late Cretaceous (42 and 4 carryover from the Early Cretaceous), 7 species from Danian (4 plus 3 carryover from the Late Cretaceous), 7 species from Eocene (6 plus one from the Early Cretaceous), 2 species from Lower Oligocene and the last recorded species *Hoploparia* persisted in the Early Miocene of Antarctica. The oldest *Hoploparia* was recorded from Europe and distributed through the Northern and Southern Hemispheres with the facilitation of the Indo-Madagascar sea-way and Hispanic corridor. The tolerance for temperature and water depth as well as the morphological changes in genus *Hoploparia* in the Late Cretaceous and Tertiary periods, helped some species to survive the K/T event. Drill-hole predation in *Hoploparia longimana* (Sowerby, 1826) was recorded for the first time from the Lower Cretaceous (Albian) of Egypt.

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1. Introduction

Genus *Hoploparia* McCoy, 1849 is a well-known, extinct clawed lobster that extended from Early Cretaceous (Valangian) to the Early Miocene. This extremely wide-ranging geologically and geographically genus existed as long as 110 million years (Tshudy et al., 2005).

Genus *Hoploparia* was introduced by McCoy, 1849, who described it as a minutely granulate, oblong, tumid, slightly compressed, and a little deeper than wide carapace, with sharp strong carinate rostrum at the front. He differentiated it from genus *Homarus* Weber, 1795, by attaining sheath-like prolongation of strongly ridged and spinose cheeks with nearly smooth-sided rostrum. McCoy, 1849 presented three new species belonging to genus *Hoploparia*: *H. prismatica*, *H. belli* and *H. gammaroides* from the Middle to the Upper Albian of London clay. He also referred *Astacus longimanus* Sowerby, 1826 to *Hoploparia longimana* (Sowerby, 1826).

Robineau-Desvoidy (1849) described thirty crustacean species found in the Neocomian around Saint-Sauveur-en Puisaye (Yonne) in France. He proposed four genera: *Homarus*, *Nephrops*, *Palcono* and *Glyphoea* and described 16 *Hoploparia* species as *Homarus*

Weber, 1795. He classified these species into 6 categories according to their shape, crenulations and spines in their hands. Pelseeneer (1886) differentiated between *Hoploparia* and *Homarus* with the serrated rostrum of the later.

Van Straelen (1936) identified 5 species from the Neocomian of France and placed most of Robineau-Desvoidy (1849) *Hoploparia* species as a synonymous of *Homarus* and introduced *Homarus pelseeneeri* as a new species.

Wood (1957) mentioned a close phylogenetic relationship between genus *Hoploparia* and genus *Homarus* and explained their morphological differences to retain them as valid genera. Feldmann (1974) believed that *Hoploparia* was probably an ancestor to *Homarus* Weber, 1795 and *Nephrops* Leach 1814. Aguirre-Urreta et al. (1991) noted that, the difference between *Hoploparia* and *Homarus* is in having more ornamented carapace and having spines and ridges behind suborbital spine and the development of the cephalic grooves.

Tshudy (1993) provided a comprehensive list of the 51 named species of *Hoploparia*, discussed the difference between *Hoploparia* and *Homarus* and provided a definition for the genus *Hoploparia* from several morphological aspects including well defined cervical and hepatic grooves and the deeply impressed postcervical groove and the extent of branchiocardiac groove to intersect the hepatic groove.

Tshudy et al. (2005) concluded that, the 51 known *Hoploparia*

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species are as follows: 17 of Early Cretaceous, 27 of Late Cretaceous (26 plus one carryover from Early Cretaceous) and 9 from the Tertiary (8 plus one carryover from the Late Cretaceous). Garassino et al. (2009) noted that Feldmann et al. (2007) gave a check list of forty-eight fossil species belonging to this genus, among them *H. hakelensis* (Fraas, 1878) is considered now belonging to *Homarus* Weber, 1795.

The intent of this work is to present the occurrence of 106 *Hoploparia* species in 25 localities including Northern and Southern Hemispheres, from Early Cretaceous to Early Miocene, to define the paleobiogeography of these species from their first

occurrence to their extinction, to discuss the causes of extinction and the survivorship of some *Hoploparia* species across the K/T event and to report the drill hole predation on *Hoploparia longimana* (Sowerby, 1826) from the Early Cretaceous (Albian) of Egypt.

2. Distribution of *Hoploparia* species

Hoploparia McCoy, 1849 is extremely wide-ranging geologically and geographically genus, which extended from Early Cretaceous to the Early Miocene.

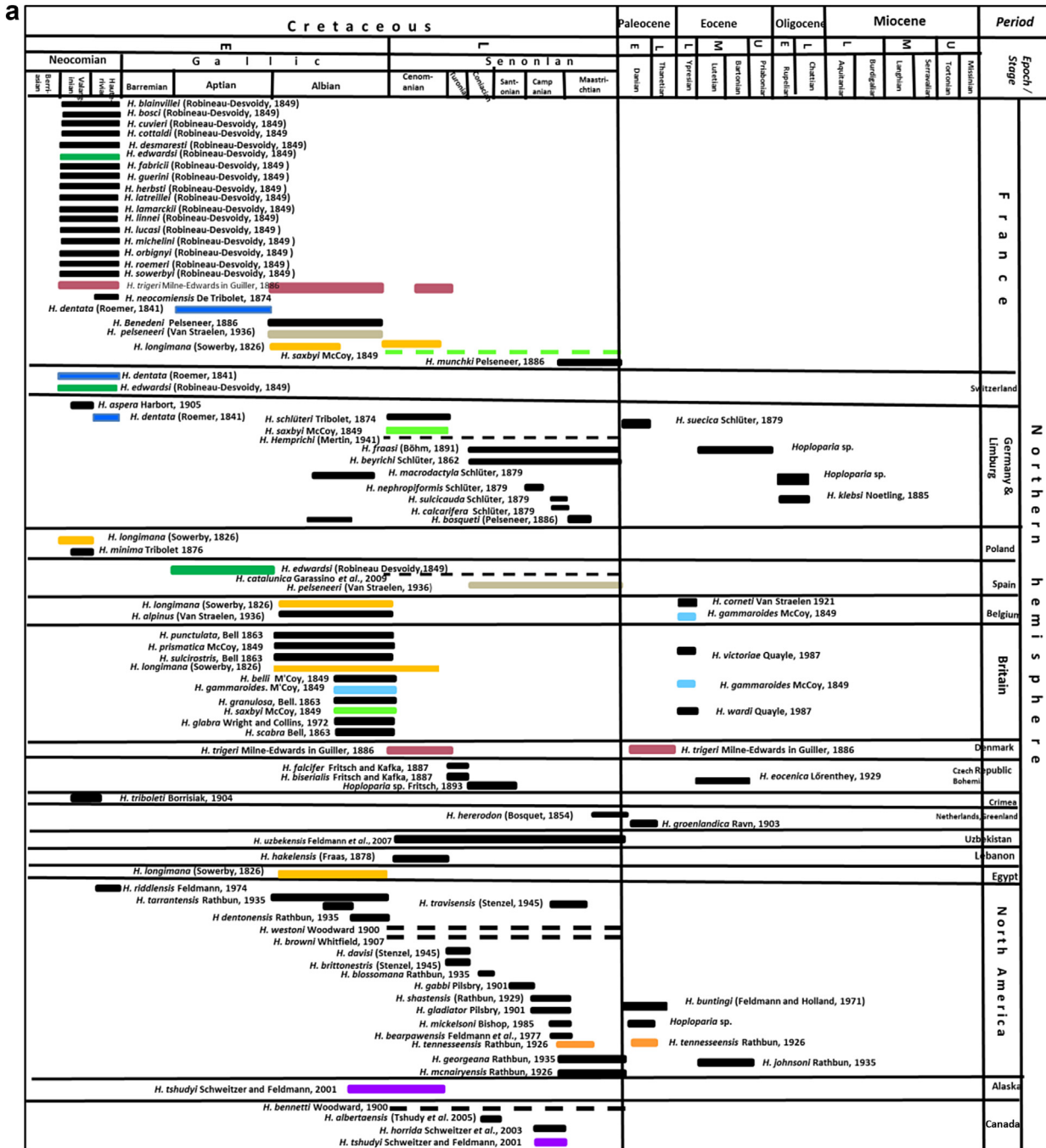


Fig. 1a. Distribution chart of *Hoploparia* species during the Cretaceous and Tertiary periods in Northern Hemisphere.

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