

RESEARCH NOTE

Cretaceous–Palaeogene lobsters, *Hoploparia stokesi* (Weller, 1903), from Antarctica: historical review, and transfer of specimens from the United States Polar Rock Repository

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Abstract

The nephropid lobster *Hoploparia stokesi* (Weller 1903a) is widely distributed among the islands of the Antarctic Peninsula, where it occurs in strata of Cretaceous (Campanian–Maastrichtian) to Palaeogene (Paleocene) age. Specimens of *H. stokesi* collected during expeditions in the 1980s that were in the collection of the United States Polar Rock Repository at The Ohio State University have been transferred to the Orton Geological Museum, joining other geological collections from Antarctica. Some of the transferred specimens are voucher specimens described or illustrated in earlier published work.

Keywords

Decapod; Nephropoidea; concretion; Lagerstätte; Seymour Island

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Abbreviations

BMNH: The Natural History Museum (formerly British Museum [Natural History]), London, UK
FMNH: Field Museum of Natural History, Chicago, IL, USA
NRM: Swedish Museum of Natural History, Stockholm, Sweden
OSU: Orton Geological Museum, The Ohio State University, Columbus, OH, USA
PRI: Paleontological Research Institution, Ithaca, NY, USA
PRR: United States Polar Rock Repository, The Ohio State University, Columbus, OH, USA
USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

Introduction

The nephropid lobster *Hoploparia stokesi* (Decapoda, Astacidea, Nephropoidea, Nephropidae; Fig. 1) is common in Cretaceous (Campanian–Maastrichtian) and Palaeogene (Paleocene) rocks of the Santa Marta, López de Bertodano and Sobral formations (Marambio Group) in the Antarctic Peninsula (Feldmann et al. 1993; Pinheiro et al. 2020). Described under the basionym *Glyphaea stokesi* from Snow Hill Island by Weller (1903a: 418–419, pl. 1, fig. 1), it was among the earliest fossils collected from Antarctica, and the first fossil arthropod described from the continent.

Frank Wilbert Stokes, who collected the holotype of *H. stokesi*, was an American artist aboard the *Antarctica* (Stokes 1903), the ship that serviced the Swedish South Polar Expedition of 1901–03, under the leadership of Otto Nordenskjöld. During two days in February 1902, when ashore in Graham Land, Stokes collected bivalves,

gastropods, ammonites and a decapod (lobster) from talus in Admiralty Sound, Snow Hill Island (Andersson 1906). When Stokes returned to the US in March 1902, ahead of the completion of the Swedish expedition, these became the first fossils brought back from Antarctica. Except for specimens of the ammonite *Hamites*, the fossils were in dense, fine-grained sandstone concretions.

Stuart Weller (1903a, b) published on Stokes' material, reporting erroneously that it was from Admiralty Inlet, Louis Philippe Land. Andersson (1906) identified the locality as Admiralty Sound, Snow Hill Island. Weller (1903a, b) concluded that the fossils were of Middle to Late Cretaceous age. As reported by Ball (1960), who transferred *G. stokesi* to *Hoploparia*, the holotype is in the Stokes Collection of Antarctic Fossils, which was originally part of the University of Chicago's Walker Museum collection (No. 9705). That collection is now incorporated in the collection of the FMNH.

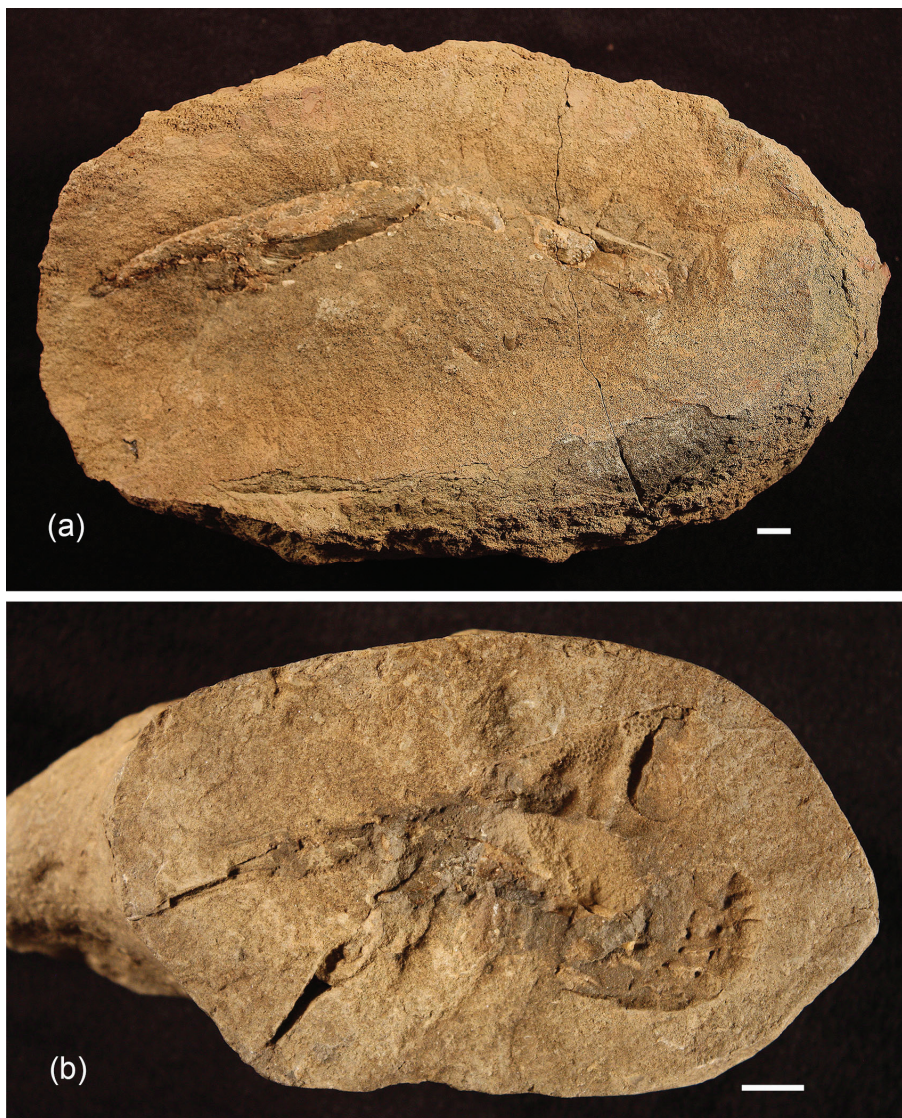


Fig. 1 *Hoploparia stokesi* (Weller, 1903a) from the López de Bertodano Formation (Cretaceous), Seymour Island, Antarctica, preserved in fine-grained, calcareous and glauconitic, sandstone concretions; both were previously referred in text by Tshudy & Feldmann (1988: 292). (a) Large claw, part, OSU 55329A. (b) Left lateral view of moulted exoskeleton, mostly preserved as an external mould, OSU 55328. Bar scales = 1 cm.

The holotype specimen of *H. stokesi* collected by Stokes in Graham Land was one of several decapod fossils found during the Swedish South Polar Expedition. Others, which are repositied in the NRM (NRM Ar. 46059-46065; see Ball 1960), are from Snow Hill Island, Seymour Island and Cockburn Island. Pinheiro et al. (2020) reported that 18 paratype specimens of *H. stokesi* are in the USNM. These specimens were not collected in 1902 and did not constitute material that contributed to Weller's (1903a:418–419) original description of *Glyphaea stokesi*, which was based only on the holotype (refigured by Ball 1960: pl. I, fig. 5). They are, therefore, not paratypes. Instead, they were collected in the 1980s and were

illustrated or referred to in text by Feldmann et al. (1993) and Feldmann & Tshudy (1987).

Subsequent reports show that *H. stokesi* occurs widely through the James Ross Basin area (also published as the James Ross Sub-basin of the Larsen Basin; cf. Elliot 1988; Hathway 2000) on the Antarctic Peninsula and has a considerable stratigraphic range (Feldmann et al. 1993); for stratigraphic details see Rinaldi (1982), Crame et al. (1991, 2004), and Pinheiro et al. 2020). Feldmann (1988) confirmed that *H. stokesi* is present on Snow Island. Ball (1960), Taylor (1973), Feldmann (1988, 1990) and Feldmann et al. (1993) reported *H. stokesi* from James Ross Island. The presence of this species on Seymour

Island was recorded by Ball (1960), del Valle & Renaldi (1975), Feldmann (1985, 1987), Feldmann & Tshudy (1987), Tshudy & Feldmann (1988), Aguirre Urretta (1989), Feldmann et al. (1993) and Pinheiro et al. (2020). In addition, Ball (1960), Feldmann et al. (1993) and Pinheiro et al. (2020) reported *H. stokesi* from Cockburn Island; and Feldmann et al. (1993) and Pinheiro et al. (2020) reported the species from Vega Island and Humps Island. The compilation of Feldmann et al. (1993; see also El-Shazly 2015) shows that *H. stokesi* ranges stratigraphically from the Santa Marta Formation through the López de Bertodano Formation into the Sobral Formation, in total a range of Cretaceous (Campanian–Maastrichtian) through lower Palaeogene (Paleocene).

Most Mesozoic–Cenozoic fossil clawed lobsters reported from Antarctica have been assigned to *Hoploparia*. The genus, which ranges through the Northern and Southern Hemispheres, is diverse (e.g., Tshudy & Sorhannus 2003; Schweitzer et al. 2010; El-Shazly 2015; Tshudy et al. 2018; Pinheiro et al. 2020); more than 65 species have been described (Schweitzer et al. 2010), not counting synonyms. To date, four *Hoploparia* species have been reported from Antarctica: *H. stokesi* (Weller 1903a), *Hoploparia antarctica* Wilckens 1907, *Hoploparia gazdzickii* Feldmann & Crame, 1998, and *Hoploparia echinata* Pinheiro et al. 2020. [Copyeditor: In the preceding sentence, the names/years are provided as taxonomic citations, following zoological convention; they are not regular bibliographical references. Please don't change the formatting, for example do not add parentheses or delete commas. They do not need to be added to the references.] A large majority of specimens collected from Antarctica have been referred to *H. stokesi*, a species that is inferred to have wide morphologic variability (Feldmann et al. 1993). Tshudy & Sorhannus (2003) suggested *Hoploparia* to be a paraphyletic, 'wastebasket' genus (but see Feldmann et al. 2007).

Tshudy & Feldmann (1988) reported on new collections of *H. stokesi* made by William J. Zinsmeister, Carlos E. Macellari, Tonianne F. Pezzetti and Rodney M. Feldmann in the López de Bertodano Formation on Seymour Island during the 1981–82 and 1983–84 field seasons. In subsequent study of the material, Tshudy & Feldmann examined 91 specimens, some of which were restudied by Pinheiro et al. (2020). Most of these specimens were repositied in the USNM.

The numerical abundance of decapod remains in concretions of the López de Bertodano Formation, and similar concretions in the Sobral and La Meseta formations of the Antarctic Peninsula (e.g., Ball 1960; Feldmann & Zinsmeister 1984; Feldmann 1985; Feldmann & Tshudy 1987; Feldmann & Wilson 1988; Tshudy & Feldmann 1988; Feldmann et al. 1993), combined with the observation that many, even moulted, specimens (Feldmann & Tshudy

1987; Fig. 1b), are preserved largely in articulated condition, is noteworthy. Combined, the BMNH, FMNH, NRM, OSU and USNM collections contain at least 118 specimens of *H. stokesi*, and Feldmann et al. (1993: 8) reported that "several hundred specimens" had been collected in total. This number includes specimens previously unreferred in literature that are repositied at the PRI.

All the decapod samples reported here from the López de Bertodano and Sobral formations of Seymour Island (OSU 55325–55333) are preserved in dense, fine-grained, calcareous and glauconitic, quartz–sandstone concretions. This preservation is consistent with that of most previously reported decapod material from Seymour Island and elsewhere in the James Ross Basin area.

In addition to decapods, other invertebrates (Feldmann & Woodburne 1988) and trace fossils (Wiedman & Feldmann 1988) are represented by numerous specimens in the López de Bertodano, Sobral and La Meseta formations. The sheer abundance and richness of palaeontological information shown in decapod and other fossil remains in these strata qualify these deposits as *Lagerstätten* as defined by Seilacher et al. (1985).

***Hoploparia* specimens at The Ohio State University**

The Ohio State University maintains extensive geological and palaeontological collections from Antarctica. Today, these collections are housed in two facilities: the OSU and the PRR.

Five specimens of *H. stokesi* referred to by Tshudy & Feldmann (1988: 292) were stated to be in the collection of The Ohio State University. Originally the specimens were retained in the Institute of Polar Studies, which later became the Byrd Polar and Climate Research Center. Eventually, many of the collections of the former Institute of Polar Studies were incorporated in the PRR. Three specimens of *H. stokesi* were identified by field numbers—37-3, K-150 and K-179—and two were without field numbers.

It was brought to our attention that one *H. stokesi* specimen from the Ohio State series had been misplaced and later recovered, which led to a search for the other specimens. These specimens, along with related correspondence, were found in the collections of the Polar Rock Repository, and the one stray specimen was reunited with the others from the series.

All the specimens in the series have been transferred to the OSU, which is The Ohio State University's repository for type, illustrated and referred fossil material. Catalogue numbers have been assigned to the specimens. The field number 37-3 corresponds to OSU 55325, which

comprises eight pieces, A–H. Field number K-150 corresponds to OSU 55326. Field number K-179 corresponds to OSU 55327. One specimen without a field number corresponds to OSU 55328. The other specimen without a field number corresponds to OSU 55329A (part) and 55329B (counterpart).

OSU 55329A, B provides new information about the size that *H. stokesi* could attain. This specimen is a large claw (Fig. 1a). It represents the largest individual of the species reported to date and one of the largest lobsters known from the fossil record. On the basis of smaller, more complete material (Fig. 1b), it can be extrapolated that this species could reach approximately 32 cm in outstretched length, excluding the antennules and antennae. Previously, Ball (1960: 6) reported that the average cephalothoracic length in this species is 33 mm, which extrapolates to an average overall length of approximately 10 cm, exclusive of the antennules and antennae.

In addition to the previously illustrated and referred material, two other specimens of *H. stokesi*, OSU 55331 (from field locality 784) and OSU 55332 (from field locality 164), plus an undetermined callinassid ghost shrimp (OSU 55333; labeled “C”)—all from the Sobral Formation (Paleocene) on Seymour Island—were also located in the Polar Rock Repository. These too have been transferred from the Polar Rock Repository to the OSU.

The OSU houses one more sample of *H. stokesi*. This specimen, OSU 55330 (from field locality K-21+), from the López de Bertodano Formation on Seymour Island, is part of the Carlos E. Macellari collection of Antarctic fossils (see Macellari 1986).

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Disclosure statement

The authors report no conflict of interest.

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