

An early Pleistocene decapod crustacean fauna from Zululand

M.R. Cooper and B.F. Kensley*

Department of Geology, University of Durban-Westville, Private Bag X54001, Durban, 4000 South Africa, and

*Department of Crustacea, Smithsonian Institution, Washington, D.C., USA

*The early Pleistocene Port Durnford Formation has yielded the first substantial fossil decapod crustacean fauna to be recorded from southern Africa. The fauna is clearly of warm-water Indo-West Pacific origin, and is dominated by the portunid crab *Scylla serrata* (Forsk.), with fewer *Podophthalmus vigil* (Fabricius) and *Myra fugax* (Fabricius). In addition, there are two xanthid crabs of *Atergatis-Atergatis* type, a single example of a portunid identified as *Charybdis* (*Goniohellenus*) cf. *hoplites* var. *longicollis* Leene, and thalassinidean burrows assigned to the ichnogenus *Ophiomorpha*.*

The Port Durnford Formation is a coastal sequence exposed in eroding sea-cliffs along the Zululand littoral, from Cape St Lucia to the Mlalazi estuary. The succession was first described by Anderson¹ and, although best known for its fossil vertebrates, has also yielded a diverse invertebrate fauna indicating normal marine salinities.² It is a back-barrier lagoonal sequence,³ laid down when sea levels were higher than at present.³⁻⁵ Where best known, at Gabhagabha 7 km north of Richards Bay, the formation rests disconformably on mid-Tertiary carbonates of the Uloa Formation and is disconformably overlain, with a rubified palaeosol, by unconsolidated ilmenite-rich aeolianites of the Kwambonambi Formation. At this locality, a fourfold subdivision of the Port Durnford Formation is evident:

- iv) At least 20 m of poorly consolidated, pale yellowish-green to orange aeolianites displaying large-scale dune cross-bedding and with lignitic lenses near the base. The upper part is rubified and capped by a chocolate-brown palaeosol.
- iii) Up to a metre of well-lithified, secondarily ferruginized, orange, cross-bedded sandstone with thin cross-cutting seams of ironstone. Occasional comminuted shell material is encountered.
- ii) Greenish-grey, slightly calcareous mudstones and siltstones with a basal lag characterized by terrestrial vertebrate remains and internal moulds of oysters. The upper part is well bedded but essentially devoid of macrofossils.
- i) A laterally impersistent, channel-fill sequence of greenish-grey to dark greenish-black sandy mudstones with *Solen cylindraceus* and *Dosinia hepatica* in life position, together with abundant barnacle debris and fragments of *Fulvia* and other bivalves.

The fauna to be described here, comprising several hundred more or less fragmentary individuals, represents by far the best-preserved and most complete decapod fauna to come from South African rocks. The decapods are preserved in hard, indurated, greenish-grey mudstone, lithologically similar to unit (ii) of the above succession, thrown up as storm debris onto the modern beaches immediately north of Richards Bay. Since (a) the Port Durnford Formation rests disconformably on sandy limestones, presently to be correlated with the Uloa Formation, (b) coastal erosion along the beaches on which the fauna was found is currently cutting into the Port Durnford Formation, and (c) the lower part of the Port Durnford Formation comprises the only recorded lithology from the Neogene succession of Zululand which resembles the decapod matrix closely, it seems reasonable to assume the fauna derives

from offshore exposures of the Port Durnford Formation. The fact that a similar fauna has not yet been discovered in the onshore exposures suggests substantial facies variation.

The sparse fossil record of southern African decapod Crustacea was outlined by Kensley,⁶ who remarked that '... from such slender records, no useful conclusions can be drawn' (p.14). Consequently, the fossil decapod fauna to be described here is of considerable biogeographical significance.

Systematic palaeontology

All the material described herein is housed in the palaeontological collections of the Durban Museum.

Subtribe Brachyrhyncha Borradaile, 1903

Family Portunidae Dana, 1852

Subfamily Portuninae Dana, 1852

Genus *Scylla* de Haan, 1833

Scylla serrata (Forsk., 1755)

Material. Numerous specimens, including DM-PQPD314, 325, 330-334, and 336-338 (Figs 1, 2.6).

Occurrence. This widespread Indo-Pacific species⁶⁻⁹ frequents muddy lagoons, mangrove swamps, and low-salinity estuaries, often under brackish conditions, as well as extending to shallow infratidal depths offshore.⁶ It ranges from Japan (to 15 m depth), through the Philippines to Vietnam, New Caledonia, Australia and the east coast of Africa where it reaches as far south as the Knysna Lagoon. The present record extends its time range in southern Africa back to the early Pleistocene.

Genus *Charybdis* de Haan, 1833

Charybdis (*Goniohellenus*) cf. *hoplites* var. *longicollis* Leene, 1938

Material. A single specimen, DM-PQPD3262 (Fig. 3.1).

Discussion. The specimen agrees most closely with *C. (Goniohellenus) hoplites* var. *longicollis* Leene, as described by Crosnier,⁷ especially in the shape of the anterolateral carapace teeth, the fairly coarse granulation to the dorsal surface of the carapace, and the transverse lines.

Occurrence. This species is known only from the Red Sea and Madagascar, where it inhabits sandy substrates at 10-55 depth. However, since the Port Durnford fossil is in argillaceous matrix, the species is not restricted to such substrates.

Subfamily Podophthalminae Borradaile, 1907

Genus *Podophthalmus* Lamarck, 1801

Podophthalmus vigil (Fabricius, 1798)

Material. Many specimens, including DM-PQPD324, 326-329, 335 and 339 (Figs 2. 1-5, 7-9).

Occurrence. A shallow infratidal species, extending down to 42 m depth,⁶⁻⁷ but sometimes also found swimming at the surface. It is widely distributed in the Indo-Pacific,^{6-7,9-10} ranging from Japan and Formosa to the Philippines (to 42 m depth), Thailand, New Guinea, Australia, Society Island (18-22 m depth), Hawaii, the Red Sea, Madagascar, and the east coast of Africa as far south as Natal.

Subtribe Oxystomata de Haan, 1841

Family Leucosilidae Dana, 1852

Subfamily Illinae Stimpson, 1871

Genus *Myra* Leach, 1817

Myra fugax (Fabricius 1798)

Material. Five specimens (Figs 2.10–13), DM-PQPD318–319, 321–323, and 3265.

Occurrence. A widely distributed, estuarine to intertidal Indo-Pacific species^{6,9} ranging from Japan, through China, the Phillipines (to 71 m depth), Singapore (at 3.5–7 m), Thailand (to 18 m), India, Cargados Carajos (to 55 m), the Iranian Gulf and, via the Suez Canal, into the eastern Mediterranean (Israel). In addition, it extends down the east coast of Africa as far as Mozambique. The present fossil occurrence represents the most southerly record of the species, and also its first record from South Africa.

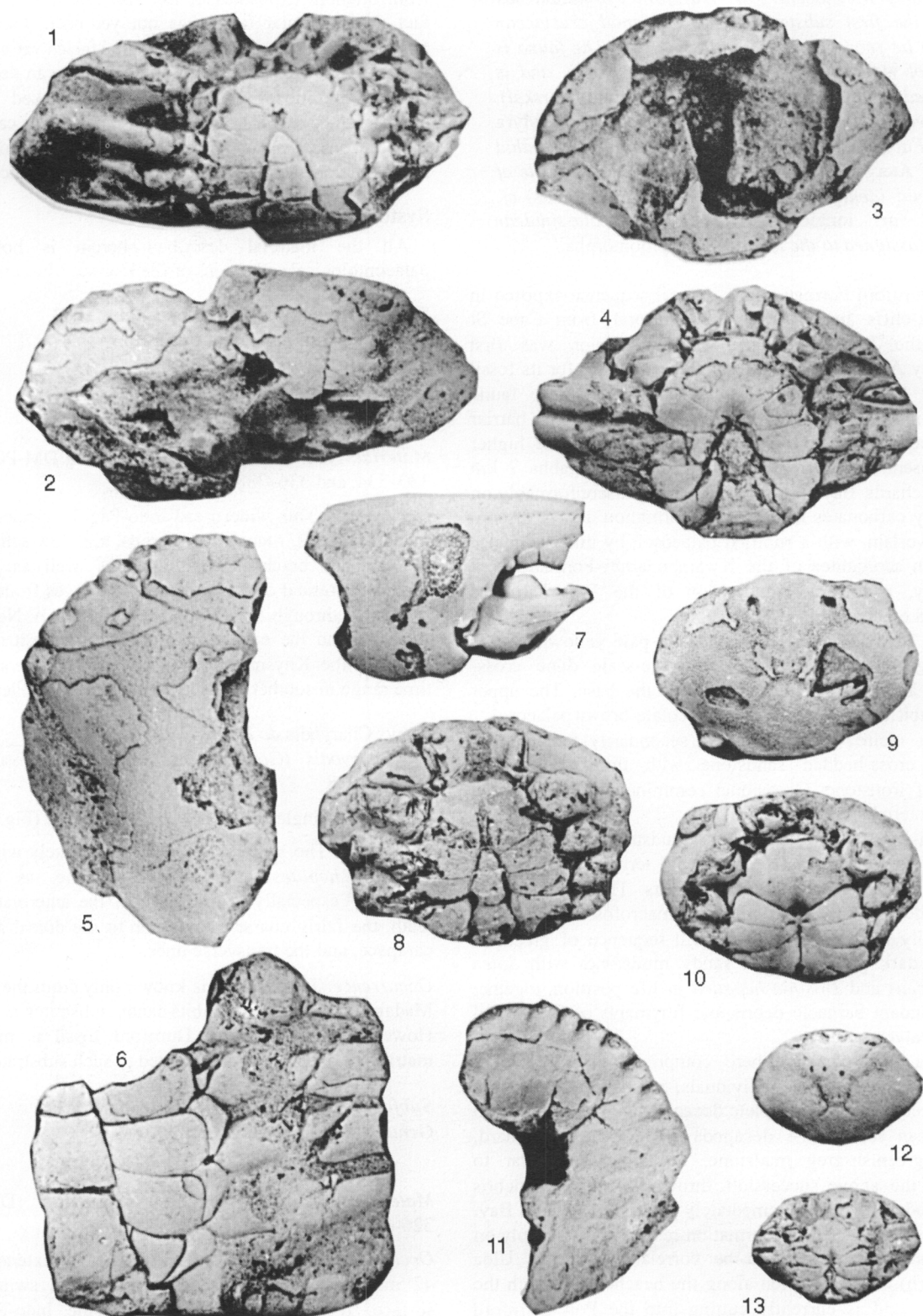


Fig. 1. *Scylla serrata* (Forsk.). 1–2, Abdominal and dorsal views of DM-PQPD333, $\times 0.8$. 3–4 Dorsal and abdominal views of DM-PQPD340, a female, $\times 0.53$. 5–6, Dorsal and abdominal views of DM-PQPD337, $\times 0.53$. 7, Part of a cheliped, DM-PQPD314, $\times 0.8$. 8, Abdominal view of DM-PQPD330, a male, $\times 0.8$. 9–10, Dorsal and abdominal views of DM-PQPD332, a male, $\times 0.8$. 11, Dorsal view of DM-PQPD338, $\times 0.8$. 12–13, Dorsal and abdominal views of DM-PQPD334, a juvenile, $\times 0.8$.