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THE FOSSIL OCCURRENCE
IN SOUTHERN AFRICA OF THE
SOUTH AMERICAN INTERTIDAL MOLLUSC
CONCHOLEPAS CONCHOLEPAS

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Kaapstad

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By

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(With 2 figures)

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ABSTRACT

The occurrence of the thaidid gastropod genus *Concholepas* is recorded from presumed Late Pleistocene coastal deposits in southern South West Africa–Namibia. The material is indistinguishable from *C. concholepas*, a species known from the Pliocene to Recent on the west coast of South America. The living species characteristically occurs in cold-temperate waters from the intertidal to depths of 40 m. It is suggested that the southern African fossils represent a short-lived pioneer population, established by larvae drifting from South America. Other organisms having a similar disjunct distribution are discussed.

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INTRODUCTION

A small collection of fossil mollusc shells from South West Africa–Namibia was submitted to the South African Museum for identification in 1983. The fossils came from Area U of the Consolidated Diamond Mines diamond area number 1, about 21 km north of the Orange River mouth.

The collection contained only three species, two of which, the bivalve *Choromytilus meridionalis*, and the whelk *Nucella squamosa*, have been recorded from the Pleistocene deposits on the west coast (see Barnard 1962; Tankard 1975). The third species is a *Concholepas*, which genus has never been recorded either as fossil or alive from Africa. On searching the Cenozoic invertebrate collections of the South African Museum, two further very worn specimens, also from South West Africa–Namibia, were found. This report describes and records this material and speculates on its history.

SYSTEMATIC DISCUSSION

Family **Thaididae**Genus *Concholepas* Lamarck*Concholepas concholepas* (Bruguière, 1789)

Figs 1, 2

Material

SAM-PQ2407, PN 33, 1 specimen, 107,6 × 75,9 mm (with adherent coarse sand and gravel); PN 34, 1 specimen, 98,3 × 72,3 mm (very worn, smooth); South West Africa, no further collection data.

SAM-PQ2408, 6 specimens, 114,4 × 90,0 mm (with attached barnacle remains), 113,6 × 81,1 mm (with attached barnacle remains), 102,2 × 78,7 mm, ? × 88,7 mm (anterior body whorl damaged), 96,0 × 73,3 mm, 48,7 × 35,2 mm (very worn); Diamond Area no. 1 of Consolidated Diamond Mines (Pty) Ltd., U11 megatrench assemblage, about 21 km north of Orange River mouth.

Description

Shell thick (up to 14 mm at outer lip of largest specimen). Entire shell of 1,5 whorls. Spire submerged, not extending beyond margin of aperture. Earliest visible sculpture cancellate, but with spiral lines stronger than axial lines; 16 spiral lines visible to siphonal ridge, weak and strong lines alternating. Body whorl expanded, aperture flared, oval, with strong siphonal groove present at anterior body whorl, ending in marginal notch; latter with two strong rounded marginal teeth projecting slightly beyond margin in unworn specimens. Outer lip margin faintly crenulate, becoming smooth in columellar region. Body whorl sculpture: 38–40 spiral ridges from apical region to siphonal ridge, 5–6 ridges below siphonal ridge, but rapidly becoming obsolete. Siphonal ridge widening distally, strongly and evenly rounded. Axial sculpture consisting of irregularly spaced growth lines, becoming wavy as margin is approached; none becoming lamellate.

Two specimens have barnacle skeletons and bases in the area of the spire, outer body whorl, as well as submarginally. The apertural margin appears aragonitic, the lining of the body whorl white and lamellar-calcareous. Two of the smaller specimens show red-brown iron-like staining.

DISCUSSION

The genus *Concholepas* contains eight recognized species or subspecies, both fossil and living. Information on geological age and distribution is well summarized in Stuardo (1979, tables 3, 4).

A brief comparative survey of these forms will help to characterize the present fossil material.

Concholepas drezi Vokes, 1972: Chipola Formation, Florida (late Lower Miocene); species with somewhat extended spire.



Fig. 1. *Concholepas concholepas*, SAM-PQ2407, inner and outer view of two specimens from South West Africa–Namibia (no further collection data available). Scale = 10 mm.

Concholepas antiquata Tate, 1894: Eocene of Mornington, Port Philip Bay, and Muddy Creek, Hamilton, Australia; species with strong terminal spire, very strong radial sculpture; aperture outline truncate due to posterior angulation.

Concholepas deshayesi Rambur, 1862: Middle Miocene of Touraine, France; species with spire of 3,25–3,5 whorls; siphonal groove ending in faint bulge on apertural margin; margin smooth, axial sculpture (growth lines) low and non-lamellar.

Concholepas kieneri Hupe, 1854: Mio–Pliocene of Chile; species with spire extending beyond aperture. (Möricke (1896) considered this species closely related to, if not a direct ancestor of, *C. concholepas*.)



Fig. 2. *Concholepas concholepas*. A-F. SAM-PQ2408. Specimens from Diamond Area no. 1, 21 km north of Orange River mouth. G. USNM 32728, Recent specimen from Valparaiso, Chile. Scale = 10 mm.

Concholepas pehuensis (Marwick, 1926): Upper Miocene of North Taranaki, New Zealand; species subdiscoidal, with aperture wider than long. (Originally described as a *Lippistes*.)

Concholepas nodosa Möricke, 1896: Tertiary of Coquimbo, Chile; species with terminal spire, few strongly nodose spiral bands on body whorl.

Concholepas concholepas (Bruguière, 1789), and subspecies *C. c. fernandezianus* Stuardo, 1979 (confined to the Juan Fernandez Archipelago): only living representative of genus; occurring in southern Peru and along the entire coast of Chile. With the local name 'loco', the species is of economic importance as a food-source. Schwabe (1959) records the area of optimum distribution for this species as being between Valparaiso and Corral on the Chilean coast (roughly between 32° and 40°S). The species has been recorded as a fossil from the Pleistocene of Chile and Peru (Herm 1969).

Extensive studies on the morphology and variation of *C. concholepas* from South America have been done, e.g. Schwabe (1959), Lozada *et al.* (1976), and Stuardo (1979). While there would appear to be some variation in the length/width ratio of the shell aperture, most specimens fall within a cluster, as illustrated by Stuardo's figure 3. If the dimensions for the six complete southern African specimens are superimposed on Stuardo's figure 3, these too, fall within this cluster.

While axial sculpture is variable in the living *Concholepas*, with some specimens having almost lamellate ridges, in others this is less marked. Specimens from relatively circumscribed localities tend to have similar sculpture, although this is to some degree also related to ecological conditions (Herm 1969: 136).

No differences either in sculpture or proportions or morphology of the shell can be discerned between the southern African fossils and living South American specimens (of which many have been examined). There is thus no basis for taxonomically separating the southern African specimens from *C. concholepas*.

In South America, the species lives on rocky substrates from the intertidal to a depth of 40 m, usually in association with barnacles, mytilid bivalves, bryozoans, and serpulid polychaetes (Guisado & Castilla 1983). The prey is mainly barnacles and mytilids. The sea-temperature range of the species is in the region of 10–14 °C (Gallardo 1979), i.e. a temperature range similar to that occurring from the Late Pleistocene to the present on the west coast of South Africa and southern South West Africa–Namibia.

Several unanswered questions remain with regard to this record. It is unlikely that the southern African record represents a relict population of a Late Cretaceous range that included the west and south-west coasts of the separating masses of South America and Africa. There are no fossil records of *C. concholepas* earlier than the Pliocene.

What is perhaps more likely, is that the southern African fossils represent a chance pioneer population, established in the Pleistocene, long after the South Atlantic had opened up. With a pelagic life of more than two months (Gallardo 1979), larvae could be carried by the West Wind Drift from southern South

America to the west coast of southern Africa, eventually to settle on the rocky intertidal, there to prey on barnacles and bivalves. A breeding population could have been established, but which later died out either because of localized sea-level or sea-temperature fluctuations. A similar larval-dispersal argument has been used to explain the present-day southern oceanic distribution of the xanthid crab *Pilumnoides perlatus* (Kensley 1981).

A similar west coast South America–west coast southern Africa distribution has been noted for three living mytilid bivalves, viz. *Aulacomya ater*, *Choromytilis meridionalis* (? = *C. chorus* of South America), and *Semimytilus algosus*, and for the brachiopod *Discinisca tenuis* (Kensley & Penrith 1970). Of these species, *A. ater* and *C. meridionalis* have both been recorded from the Pleistocene (Barnard 1962), the latter occurring with the *Concholepas* fossils recorded here.

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