

**Report on the examination of fauna in upholes drilled by Ampolex on the  
northern tip of the Cape Range peninsula in 1995.**

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## **Introduction**

In 1995 Ampolex conducted a petroleum exploration programme on the northern tip of the Cape Range peninsula. The seismic work involved drilling a series of upholes through the karst some of which intercepted the groundwater. The bores could provide access to the groundwater in an area where there is no information about the unique and internationally significant subterranean fauna of the area. The lack of information in this region is problematic as protected subterranean species are present on either side of this northern tip. Hence, at the request of the Western Australian Museum, and after discussion with the Department of Minerals and Energy, Ampolex agreed to leave open for a limited period a number of these upholes and to temporarily secure the top of the holes. Ampolex provided sufficient funding to permit a limited sampling programme for any aquatic fauna in bores. Additional work conducted using other grant funding to the Western Australian Museum permitted limited sampling for any terrestrial component of the fauna.

## **Background to the regional fauna**

The Cape Range peninsula and Barrow Island together contain numerous troglobitic animal species —obligatory inhabitants of subterranean air and water-filled voids — that comprise a series of faunas of great national and international importance. The troglobite fauna is entirely comprised of endemic taxa, often at the generic level (plus one family), to the Cape Range Formation and as such it makes a significant contribution to biodiversity in Australia. It is one of the richest areas in the world for such faunas. Of the described specialist underground fauna known from the worlds tropics, *c.* 11% are known only from this area which comprises only 0.07% of Western Australia (*ibid.*).

A number of the species are listed under Schedule 1 of the *Wildlife and Conservation Act 1950* as amended.

The affinities of the terrestrial troglobitic fauna lie with the litter fauna of closed moist forests, both temperate and tropical, that are today typically found on the eastern seaboard of Australia. The fauna is considered to be relictual, isolated from similar taxa by the onset of aridity in the late Miocene or early Pliocene and it contains some very ancient elements with clear eastern Gondwanan affinities (papers in Humphreys 1993a; 1993d).

The obligatory inhabitants of underground waters (stygofauna) contains the sole representatives known in the southern hemisphere of entire classes, orders, families and genera of animals (Poore and Humphreys, 1992; Bruce and Humphreys, 1993; Yager and Humphreys, 1996), and as such it makes a significant contribution to biodiversity in Australia — it is highly diverse in a world context. The fauna comprises a relict community derived from the ancient Tethys Sea (Humphreys 1993b, 1993c; Knott 1993) that separated the continents of Gondwana and Laurasia and which persisted from the Triassic until the late Eocene (200-40 Ma). It may well have been separated from its relatives with the break-up of Pangea and dispersed by seafloor spreading—in either case the fauna is very ancient.

The fauna has mostly been discovered recently and is sparsely documented. The fauna is of high national estate and scientific significance, and of great conservation value, being endemic to the Cape Range Formation and highly disjunct from related fauna (which, for the most part, occur only in the Canary Islands and the Caribbean region).

### **Methods**

Aquatic fauna were sampled using phreatobiological nets (similar to plankton nets) and by traps (like mini cray-pots) left in place overnight; these have become the standard methods in the area (Humphreys 1994).

The terrestrial fauna was sampled using leaf litter traps left in place for several months (Table 1: see Humphreys 1991; Shear and Humphreys in press).

### **Results**

Both aquatic and terrestrial troglotic fauna were sampled from the upholes as well as a number of epigeal species (Table 2).

The epigeal species included oonopid and desid spiders, polyxenid millipedes and blattids.

Significant increases in the distribution of both the aquatic and terrestrial components of the fauna were made using the upholes. The Blind Gudgeon *Milyeringa veritas*, a listed species, was found to occur to the northern tip of the peninsula at Vlaming head, being taken from uphole number 7. This record is a 4 km extension of the range of the species to the north and shows that the species

occurs to the tip of the peninsula. Both *M. veritas* and the melitid amphipods were taken from bores of high salinity.

A new species of the micro whip-scorpion *Draculoides* sp. nov. was taken from two bores baited with leaf litter (numbers 20 and 'A') and extend the range of this species 27 km NNE of the only other known location. The data demonstrates that components of the terrestrial troglobite fauna occur in karst areas entirely buried by fixed Holocene red dunes, such as the northeast sector of the tip of the peninsula; large areas of southern Cape Range are buried beneath similar dune field that are evidence of a more arid past.

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Table 1: Summary of Ampolex upholes sampled adjacent to North West Cape, 1996.

Uphole	GR	Notes	Aquatic sample?
2	50194400E; 7578830N	Litter trap 13/11/95 No bore ?	No
4	50197667E; 7582465N	Litter trap 13/11/95	Yes: Lost traps
5	50198389E; 7583356N		Yes
7	50200083E; 7585310N		Yes
12	50200413E; 7582560N	Black foul smelling sediment water $\pm$ 1.5m deep	No
13	50201370E; 7584419N	Litter trap 13/11/95; could not get to water table	Yes
14	50201802E; 7585353N	Water rank black sediment ? mangrove	No
15/16		Not found	Yes
20	50203736E; 7580370N	Stinking black sediment too thick to penetrate with net ?algal ooze	Yes
21	50203830E; 7582681N	Litter trap 13/11/95; fine light brown sediment algal bloom type	Yes
22	50203844E; 7584181N		Yes
24	50203480E; 7585150N		Yes
36	50202676E; 7585544N		Yes
A	50200042E; 7577630N	Litter trap 13/11/95; Bore dry	No
B	50198006E; 7577884N	No bore, drilling mud and gravel on ground	No
C	50200965E; 7579203N	No bore, drilling mud and gravel on ground	No
D	50192900E; 7579338N	$\pm$ 3 m to water which is c. 2 m deep	Yes

Table 2: Summary of the salinity and fauna in Ampolex upholes sampled adjacent to North West Cape, 1996.

Uphole	Salinity	Aquatic fauna	Terrestrial fauna
2	-	-	-
4	-	-	-
5	24.7	<i>Milyeringa veritas</i> ; harpacticoid copepods	ant
7	25.7	<i>M. veritas</i> ; meiid amphipods; harpacticoid and calanoid copepods	Polyxenida: Polyxenidae; Diplopoda; blattid; Collembola Nasute termite
12	5.5	-	-
13	-	-	-
14	6.7	-	-
15/16	-	-	-
20	-	-	-
21	12.2	-	Onopidae ( <i>Opopaea</i> sp.); Collembola; Isopods; ?Scutigermorpha; Schizomida ( <i>Draculoides</i> sp. nov.) Ant remains
22	24.8	-	-
24	25.2	-	Blattid; ant
36	20.2	meiid amphipod	-
A	-	-	Isoptera; Schizomida ( <i>Draculoides</i> sp. nov.)
B	-	-	-
C	-	-	-
D	15.1	<i>Milyeringa veritas</i>	Ant; Salicidae (unidentati group); Desidae (? <i>Forsterina</i> juvenile)