

Anchialine Systems in Australia – Why are they so Interesting?

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ABSTRACT

Anchialine habitats are groundwater estuaries, being inland mixohaline groundwaters affected by marine tides, usually with a reduced subaerial exposure. They occur mostly in arid coastal areas in tropical and subtropical latitudes around the globe. The water column characteristically has a stable hydrological stratification with a marked density cline, with the salinity increasing and oxygen decreasing with depth. The systems may show complex microbiological assemblages associated with a nitrogen species cascade and bands of hydrogen sulphide.

Anchialine ecosystems often support diverse crustacean assemblages and from which at least 12 new families and a new class of crustacean has been described recently. Anchialine ecosystems-especially in the oligoxic reaches of the water column-support macroinvertebrate communities the structure of which is highly predictable, mostly comprising biogeographic and/or phylogenetic relicts. Those assemblages occurring in continental or epicontinental waters are remiped-type, while those on remote oceanic islands (mid-ocean ridge islands and sea-mounts) are of the procarid-type. Australia has anchialine systems of both the remiped-type (in the northwest) and the procarid-type (Christmas Island, Indian Ocean) and a synopsis of these Australian anchialine systems is presented.

As found in the amphi-Atlantic sites, the Australian remiped-type anchialine system is composed of atyid shrimps, thermosbaenaceans, hadziid amphipods, cirolanid isopods, remipeds, thaumatoctopodid ostracods, and an array of copepods, including epactericid and psedocyclopid calanoids, halicyclopine cyclopoids, speleophriid misophrioids. So far ridgewayiid calanoids and superornatiremid harpacticoids have not been reported from the Australian anchialine system although they may be expected as they are characteristic in the Northern Hemisphere systems.

The procarid-type anchialine system of Christmas Island is the only one known from the Indian Ocean. All described procaridids are sympatric with one or more species of atyid shrimps. The occurrence of procaridid, alpheid, hippolytid and atyid shrimps in the same anchialine system on Christmas Island mirrors that found on Bermuda. As well as Christmas Island (Indian Ocean), the genus *Procaris* is known from Hawaii, Fiji (Pacific), Ascension Island, Bermuda and Cozumel Island, Quintana Roo, Mexico (Atlantic/Caribbean).

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