

SHORT COMMUNICATION

Infection of *Trapezia* spp. (Decapoda: Xanthidae) by *Hematodinium* sp. (Duboscquodinida: Syndinidae): a new family record of infection

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Hematodinium perezii Chatton & Poisson, 1931, is a parasitic dinoflagellate that lives in the haemolymph of crabs and proliferates by amitosis. It was originally described from the portunid crabs *Carcinus maenas* (L.) and *Portunus depurator* (L.) from France (Chatton & Poisson 1931). Since then, it has been reported from several commercially important crustaceans: the portunid American blue crab, *Callinectes sapidus* Rathbun; the cancer rock crabs, *Cancer irroratus* Say and *C. borealis* Stimpson; the majid tanner and snow crabs, *Chionoectes bairdi* Rathbun and *C. opilio* (Fabricius); the Norway lobster, *Nephrops norvegicus* (L.); the portunid Australian blue crab, *Portunus pelagicus* (L.); and the portunid tropical mud crab, *Scylla serrata* (Forsk.) (Newman & Johnson 1975; MacLean & Ruddell 1978; Meyers, Koeneman, Botelho & Short 1987; Meyers, Botelho, Koeneman, Short & Imamura 1990; Eaton, Love, Botelho, Meyers, Imamura & Koeneman 1991; Field, Chapman, Taylor, Neil & Vickerman 1992; Shields 1992; D. A. Hudson, unpublished results); and from a few ecologically important crustaceans, the portunids, *Ovalipes ocellatus* (Herbst) (MacLean & Ruddell 1978) and *Liocarcinus puber* (L.) (Wilhelm & Boulo 1988), and amphipods (Johnson 1986).

In this paper, the present authors report the presence of *Hematodinium* sp. in a new host family of brachyuran crab, the Xanthidae. The crab, *Trapezia areolata* Dana, was an obligate coral symbiont collected from *Pocillopora damicornis* in 3 m of water near Harry's Bommie, Heron Island (23° 27' S; 151° 55' E), on the Great Barrier Reef, Queensland, Australia, in February 1992. The male crab measured 11 mm in carapace width and had no external signs of disease (e.g. damaged carapace, autotomized legs and lethargy). It was the only infected crab out of five *T. areolata* and 10 *T. coerulea* examined. Two infections of *T. coerulea* were observed on earlier occasions, but tissues were not prepared for electron microscopy. The present authors were alerted to the infection by the presence of milky or chalky haemolymph.

Infected gill tissues were fixed in 3% formalin-sea water/fresh water (1:3) as this was the only fixative available. The tissues were later post-fixed in 3% glutaraldehyde in 0.1 M cacodylate buffer (pH 7.2, 0.25 M sucrose), fixed in 1% osmium tetroxide in 0.1 M cacodylate buffer, *en bloc* stained with 2.0% uranyl acetate, embedded in Spurr's resin, sectioned and stained with lead citrate. Thin sections were examined in an Hitachi H-800 TEM at 75 V. Representative samples were deposited with the Queensland Museum, Accession Numbers GL 18310 and GL 18311.

The parasite was found in the haemal spaces of the gill. Vegetative stages of the parasites

were oval or round and ranged in size from 9.6 to 12.8 μm (mean 11.0 μm , $n = 10$). The cytoplasm of the parasite contained numerous empty vacuoles or vacuoles containing lipophilic or membranous substances (Fig. 1). The cytoplasm contained mitochondria that possessed tubular cristae. Trichocysts were underlying the pellicle (Fig. 2). The nucleus of the parasite ranged in size from 8.0 to 9.6 μm in diameter (mean 8.5 μm , $n = 10$) and a nucleolus was usually present. The nucleoplasm was typical of *Hematodinium* and other dinoflagellates, being irregularly dispersed throughout the nucleus and having beaded or condensed chromatin. We also noted a presumptive infection of *Hematodinium* from another xanthid crab, *Tetralia glaberinma* var. *laevissima* caught in the same location, but the apparent vegetative stages of the parasite lacked trichocysts and condensed chromatin.

The diagnosis of *Hematodinium* was confirmed by the presence of chalky blood, the granular nucleoplasm, a nucleolus, the presence of beaded chromatin and the presence of trichocysts. *Hematodinium* is different from most parasitic forms in that the chromatin remains condensed throughout the life cycle of the parasite (Cachon & Cachon 1987). No other dinoflagellates have been reported from brachyuran crabs.

Transmission of the parasite may be aided by the feeding behaviour of the hosts. Coral crabs feed on mucus secreted by the corals. Some corals filter huge quantities of water (Lewis 1976) and small particles, including eggs and cysts, stick onto these mucus secretions (J. D.

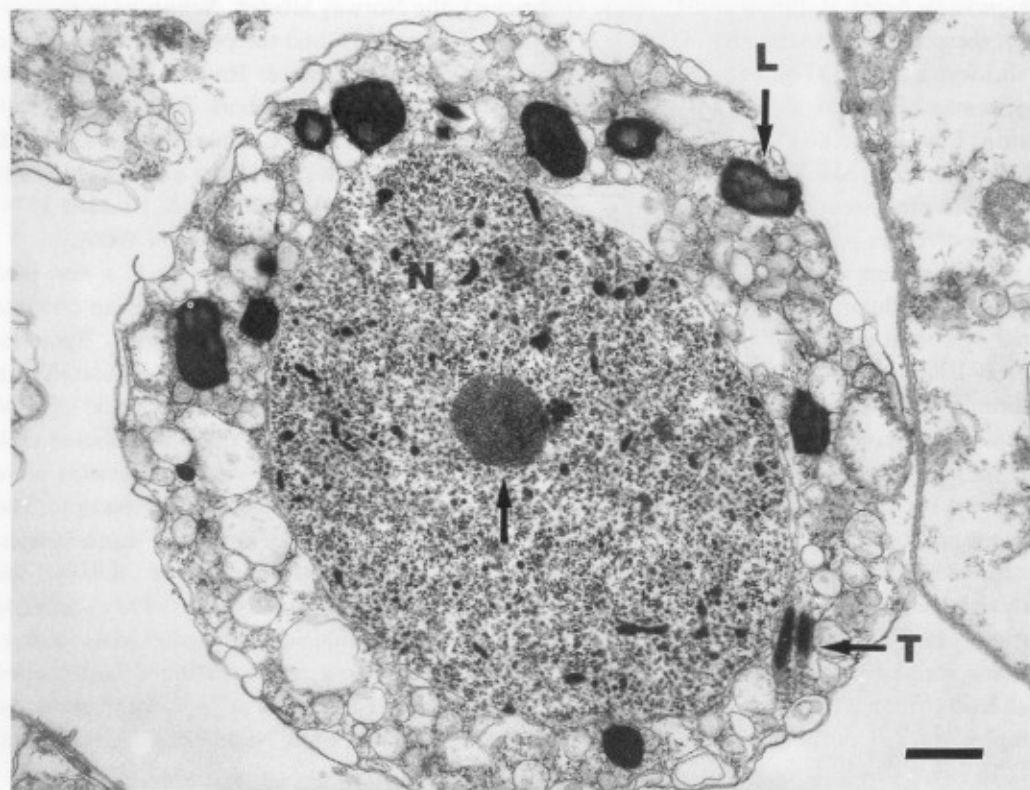


Figure 1. Transmission electron micrograph of a typical vegetative *Hematodinium* cell from *Trapezia areolata* showing nucleus (N) containing condensed and beaded chromatin, a nucleolus (arrow), trichocysts (T), and lipophilic vacuoles (L) ($\times 12\,320$, bar = 1 μm).

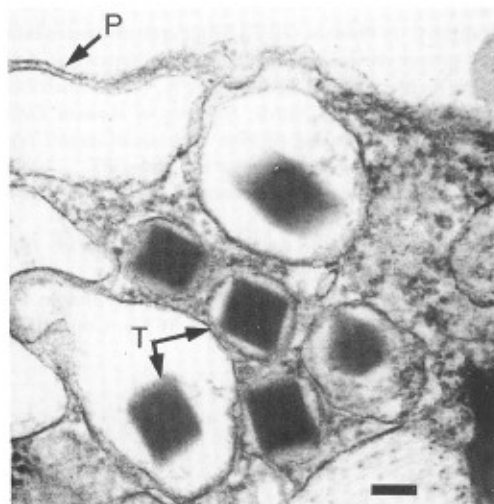


Figure 2. Transmission electron micrograph of a vegetative *Hematodinium* cell showing trichocysts (T) surrounded by membranes, lying close to the pellicle (P) ($\times 60\,000$, bar = $0.1\ \mu\text{m}$).

Shields, personal observation). The only parasites that are prevalent in *Trapezia* spp. are those in which the infective stages have a cuticle (*Nectonema* sp. and *Sacculina* sp.), or pellicle (*Hematodinium*) that is resistant to nematocysts (Shields 1990). In a study of the parasites of 5285 crabs from the Great Barrier Reef, no other hosts were infected with *Hematodinium* (J. D. Shields, unpublished results). The present authors speculate that corals filter and collect dinospores of *Hematodinium* (and other parasites; Shields 1990) from the sea and thereby increase the exposure of the coral-dwelling crabs to infection.

Acknowledgments

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