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A NEW EURYLEPTID FLATWORM (PLATYHELMINTHES, POLYCLADIDA) ASSOCIATED WITH A COLONIAL ASCIDIAN FROM THE GREAT BARRIER REEF

LESLIE J. NEWMAN

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A new polyclad flatworm, *Ascidiophilla alba* gen. et sp. nov. (Platyhelminthes, Polycladida) is described from Lizard Island, north Queensland. This new species was found to be closely associated with the colonial ascidian, *Didemnum molle* (Herdman, 1886). Animals were observed crawling out of their host at night. This new genus possesses characters of both euryleptids (tubular pharynx) and pseudocerotids (single horseshoe-shaped cerebral eye cluster and short pseudotentacles with dorsal and ventral eyes). ❐ *Polycladida, Euryleptidae, flatworm, symbiosis, ascidian, taxonomy.*

L.J. Newman, School of Environmental Science and Management, Southern Cross University, PO Box 157, Lismore 2480 (e-mail: lnewman@scu.edu.au); *received 10 September 2001.*

Recent studies on polyclad flatworms have shown that the pseudocerotids are by far the most conspicuous and diverse family of turbellarians inhabiting coral reefs (Newman & Cannon, 1994a, b, 1995a, 1996a, b, 1997, 1998). However, little is known about the equally diverse and closely related Euryleptidae members of which are often as brilliantly coloured as the pseudocerotids (Newman & Cannon, 2000; Newman et al., 2000).

As with most polyclads, these delicate worms tend to fall apart on fixation so that animals have rarely been properly fixed for histological preparations or taxonomic studies and as a consequence type material is often lacking. Few studies have dealt with living animals and thus many morphological features have not been examined.

According to Prudhoe (1985), polyclads are well known commensuals of a variety of invertebrates including bivalves, crabs and shrimps, sea urchins, nemerteans and corals. However, there are only a handful of reports on biology of the cotyleans. Newman & Cannon (1994b) noted that *Pseudoceros bifurcus* Prudhoe, 1989 was found with and fed on a variety of ascidian species. Furthermore, Crozier (1917) and Newman et al. (2000) showed that the euryleptid, *Maritigrella crozieri* (Hyman, 1939) lived exclusively on the mangrove ascidian, *Ecteinascidia turbinata* Herdman, 1880 and soon died without its host.

A new monotypic genus is described here from Lizard Island, northern Great Barrier Reef. Animals were found to be closely associated with the colonial ascidian, *Didemnum molle*, Herdman, 1886.

METHODS

Animals were hand collected on scuba at night from colonies of *D. molle*, Lizard Island Lagoon, northern Great Barrier Reef, Queensland. Worms were photographed in situ, fixed on frozen polyclad fixative (Newman & Cannon, 1995b) and preserved in 70% ethanol for histological preparations. Whole mounts were stained with Mayer's haemalum, dehydrated in graded alcohols and then mounted in Canada balsam. Longitudinal serial sections of the reproductive region were obtained from specimens embedded in Paraplast (56°C), sectioned at 5-7µm, and then stained with haematoxylin and eosin.

Measurements (mm) of the body were taken from live animals in a relaxed state and are given as length × width. Measurements of the reproductive organs are taken from the paratypes. Reconstruction of the reproductive system is diagrammatic and derived from the sections with minimal interpretation. Drawings were made with the aid of a camera lucida. Material is lodged at the Queensland Museum (QM) as whole mounts (WM), serial sections (LS) and wet specimens (S).

Family EURYLEPTIDAE Stimpson, 1857

Ascidiophilla gen. nov.
(Figs 1,2)

ETYMOLOGY. *Ascidio*: ascidian and *philla*: loving, (L. fem.) for its close association with *D. molle.*

DIAGNOSIS. Emended from Cannon (1986). Euryleptidae with papillate dorsal surface, small folded pseudotentacles, cerebral eyes in a single loose horseshoe-shaped cluster, dorsal and ventral tentacular eyes present. Pharynx tubular and mouth anterior. Copulatory complex behind the pharynx, lying posteriorly to the male pore, penis papilla with a short pointed stylet.

TAXONOMIC REMARKS. The position of this genus is precarious as it shows characteristics of the Pseudocerotidae (simple folded pseudotentacles and a single horseshoe-shaped cerebral eyespot) and the Euryleptidae (tubular pharynx). However, it is placed in the Euryleptidae due to systematic importance of a tubular pharynx as suggested by Faubel (1984) and Cannon (1986).

The Euryleptidae is relatively large with about 14 genera. The majority possess a smooth dorsal surface. According to Faubel (1984) only *Cycloporus* Lang 1884 possesses a 'knobbed' dorsal surface. However, *Cycloporus* lack tentacles, the cerebral eyes are in two elongate clusters and these flatworms possess distinct peripheral vesicles that open to the exterior (Faubel, 1984; Prudhoe, 1985). In comparison, *Ascidiophilla* gen. nov. has distinct folded pseudotentacles, the cerebral eyespots are in a single horseshoe-shaped cluster and there are no peripheral vesicles.

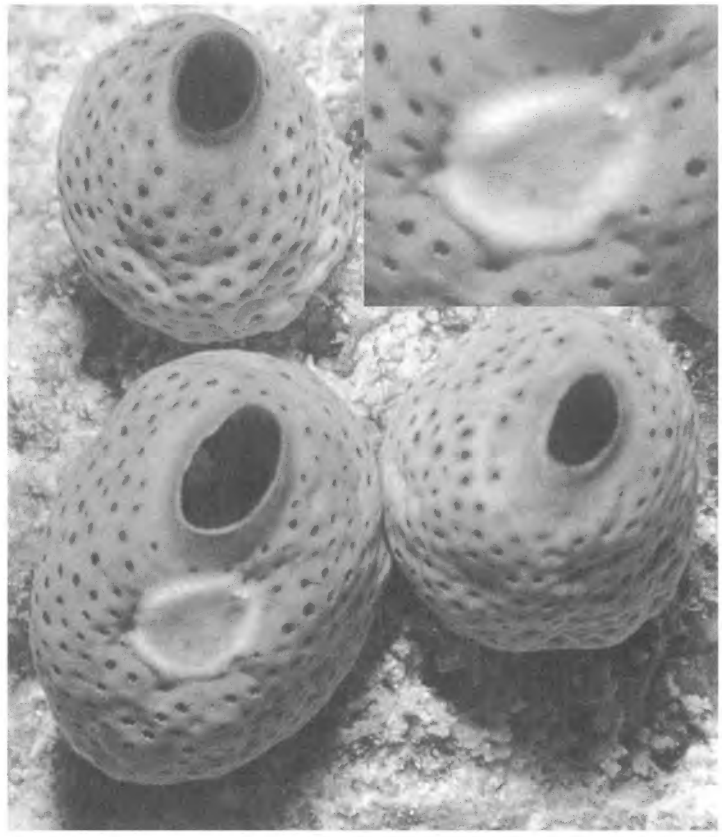

FIG. 1. Colonial ascidian *Didemnum molle* with the flatworm *Ascidiophilla alba* gen. et sp. nov., at night, Lizard Island Lagoon, northern Great Barrier Reef, Australia; insert showing close-up of the flatworm (80 × mag.). (photo A. Flowers & L. Newman)

Ascidiophilla alba sp. nov.

ETYMOLOGY. Latin *alba*, white for its distinctive colour.

MATERIAL. HOLOTYPE. Lizard Island Lagoon, northern Great Barrier Reef (GBR), 2m depth, night, collected from *Didemnum molle*, 10 April 1995, L. Newman and A. Flowers, WM QMG211065. PARATYPES. Same data, S, QMG211181; same data, 7 April, 1995; LS, QMG211075; same data, 10 April, 1995, C. & H. Peterken, LS (QMG211064); same data; WM, QMG211182, same data.

DIAGNOSIS. Small, round, white with red dots on the margin.

DESCRIPTION. Dorsal and ventral surfaces semi-transparent, mottled opaque and transparent white. Dorsal margin opaque with small red dots. Entire dorsal surface covered with about 20 short rounded papillae, cerebral eyespot in light orange-brown area (Fig. 1).

Body small, round, without marginal ruffling (Figs 1, 2A). Marginal tentacles appear as short, folded, pseudotentacles with 6-10 eyes in two scattered clusters (Fig. 2A-C). Cerebral eyespot with a single loose horseshoe shaped cluster of 10- 30 eyes (Fig. 2B, C). Dorsal tentacular eyes in scattered clusters of about 6 eyes each, ventral marginal eyes in loose clusters with 5-10 eyes each. Pharynx small, anterior and tubular (Fig.

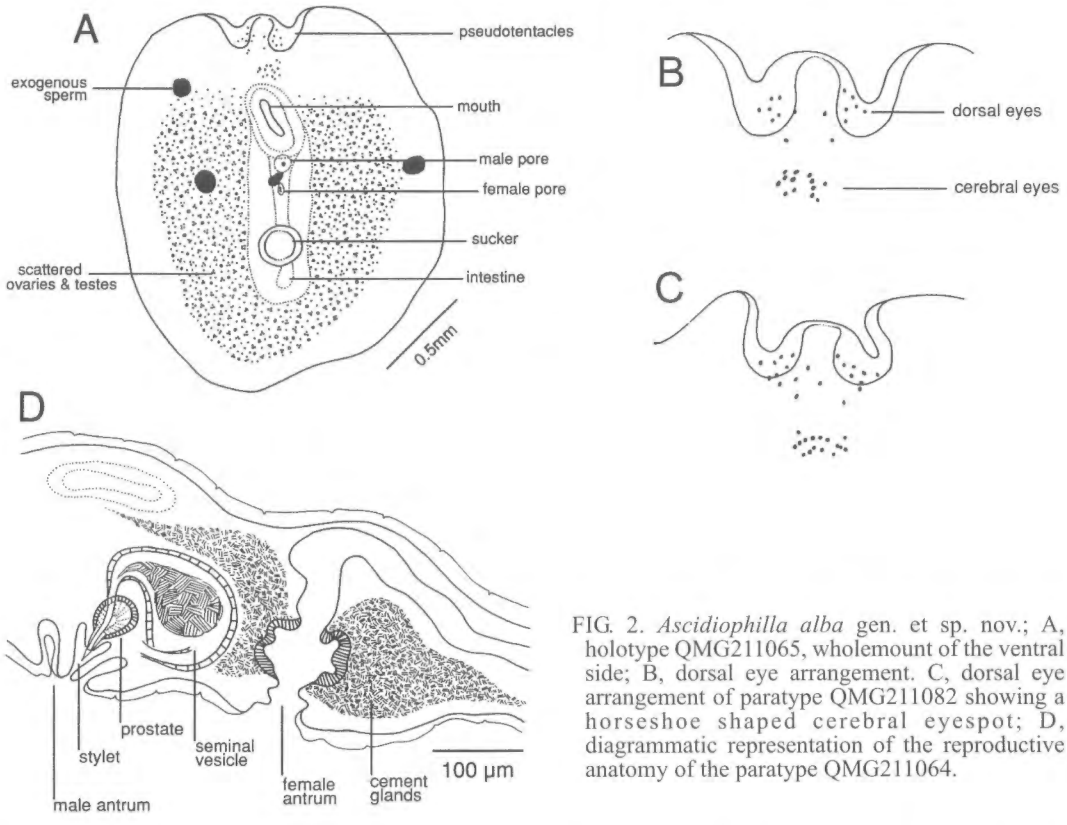

FIG. 2. *Ascidiophilla alba* gen. et sp. nov.; A, holotype QMG211065, wholemount of the ventral side; B, dorsal eye arrangement. C, dorsal eye arrangement of paratype QMG211082 showing a horseshoe shaped cerebral eyespot; D, diagrammatic representation of the reproductive anatomy of the paratype QMG211064.

2A). Sucker large, posterior to the midline. Pseudotentacle terminals held erect when alive (Fig. 1).

Gonopores anterior to the midline, posterior to the pharynx (Fig. 2A). Male pore small, anterior and well separated from the female pore (Fig. 2A, D). Male antrum wide and deep. Prostate rounded oval (55µm long), seminal vesicle rounded oval (170µm long) with thin walls, prostatic duct and ejaculatory ducts straight, not joining and leading separately into the penis papilla. Stylet extremely small (18µm long) and pointed. Female antrum deep and wide with extensive cement glands. Vagina leads dorsally and posteriorly. Size range 4 × 2mm to 5 × 3mm, all mature.

HABITAT AND DISTRIBUTION. Animals were initially observed on the outside of colonies of *D. molle* at night. Specimens of *D. molle* were brought back to the laboratory and worms were observed to crawl out of common atrial opening of individual colonies only at night. No worms were observed on the ascidians during the day either in situ or in the laboratory. Several other species of colonial ascidians retained in the laboratory did not yield flatworms nor would these polyclads retreat into any other ascidian species that was offered. The species is known only from Lizard Island Lagoon, northern Great Barrier Reef.

DISCUSSION. Unlike the pseudocerotids, Newman & Cannon (1994a) noted that euryleptids were relatively rare in Great Barrier Reef waters. However, according to Prudhoe (1985) this family appears to be restricted to cooler waters. On the other hand, Newman et al. (2000) noted that the most common species within warm southwest Atlantic waters was the euryleptid *Maritigrella crozieri*. It appears that there are too few reports on these elusive flatworms to make distributional generalisations.

Members of the euryleptid *Maritigrella* were observed feeding on solitary or colonial ascidians during the day and displayed disruptive colour patterns of transverse stripes and spots (Newman & Cannon, 2000; Newman et al., 2000).

Conversely, *Ascidiophilla* gen. nov. was inconspicuously drab. Perhaps its lack of colour or pattern is due to its nocturnal nature since it would not necessarily need to advertise warning colours during the day to visual predators like so many other polyclads (Ang & Newman, 1998).

Ascidiophilla gen. nov. appears to live within the common atrial cavity of *D. molle* colonies. It is not known whether or not it consumes the whole ascidian colony. In the absence of data to the contrary, it is assumed that this is a commensual relationship in which the worm gains protection from sheltering in the ascidian colony.

Newman et al. (2000) noted that *M. crozieri* contained the same cytotoxic substances known to occur within its prey, *E. turbinata*. These substances were tested in pre-clinical trials as anticancer agents (Carté, 1996). Hence, it is important to not only document the biodiversity of these turbellarians but to also understand their feeding biology.

Systematics of the Euryleptidae remains problematic as taxonomic studies are scarce and type material is scattered or lacking. This study highlights the need for further studies on living animals, use to photography and feeding observations.

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