



## Two new species of *Phyllodistomum* Braun, 1899 (Trematoda: Gorgoderidae Looss, 1899) from Great Barrier Reef fishes

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### Abstract

Two new species of *Phyllodistomum* Braun, 1899 are described from the urinary bladder of fishes of the Great Barrier Reef. *Phyllodistomum hoggettae* n. sp. is described from *Plectropomus leopardus* (leopard coralgroup) (Serranidae) and *P. vaili* n. sp. is described from *Mulloidichthys vanicolensis* (yellowfin goatfish) and *M. flavolineatus* (yellowstripe goatfish) (Mullidae). These species are compared with 26 previously described marine *Phyllodistomum* species and found to be distinct in combinations of body shape, sucker ratio and shape of the gonads. Preliminary molecular data also demonstrate that they are distinct from each other and for those other species for which data are available.

**Key words:** Gorgoderidae, Serranidae, Mullidae, Great Barrier Reef, *Phyllodistomum hoggettae*, *Phyllodistomum vaili*, *Plectropomus*, *Mulloidichthys*

### Introduction

The recent molecular phylogenetic analysis of the Gorgoderidae Looss, 1899 by Cutmore *et al.* (2013) recognised three subfamilies, the Anaporrhutinae Looss, 1901 which infect marine elasmobranchs and turtles, the Degeneriinae Cutmore, Miller, Curran, Bennett & Cribb, 2013 which infect deep-sea teleosts, and the Gorgoderinae Looss, 1899 which infect amphibians and marine and freshwater teleost fishes. Within the Gorgoderinae, *Phyllodistomum* Braun, 1899 is by far the largest genus, containing over 110 species (Kudinova 1994). Indeed, according to Cribb *et al.* (2002), *Phyllodistomum* is one of the two largest genera of trematodes. Species of *Phyllodistomum* are usually parasites of the urinary bladder of fishes but they occasionally infect amphibians and reptiles (Wanson & Larson 1972) and have also been reported from the swim bladder (Bashirullah & Islam 1970) and ovary (Lebedev 1970). As recently reviewed by Campbell (2008), species of the genus are characterised by having a more-or-less foliate hindbody, blind caeca, two testes, the uterus strongly developed in the hindbody but not in the forebody, and a slender excretory vesicle.

Species of *Phyllodistomum* occur in a wide range of both marine and freshwater fishes. Only one *Phyllodistomum* species has been described in Australian waters; *Phyllodistomum magnificum* Cribb, 1987 was found in three families of Australian and New Zealand freshwater fishes (Cribb 1987a). Formally identified species of just two genera of gorgoderines have been reported from marine fishes in Australian waters. *Cetiotrema crassum* Manter, 1970 was reported from the southern bluefin tuna, *Thunnus maccoyii* (Castelnau), by Manter (1970) and three species of *Xystretrum* Linton, 1910 have been reported from triggerfishes and sailfish (Manter 1972; Speare 1995). Cutmore *et al.* (2013) incorporated five unnamed marine species of *Phyllodistomum* in a molecular phylogenetic analysis of the Gorgoderidae. Here we describe two of these species from the urinary bladders of fishes of the Great Barrier Reef for which there is sufficient morphological material to enable a description.

opposed to 0.74–1.12 for *P. vaili* **n. sp.** In having the uterus almost completely intracaecal *P. vaili* **n. sp.** differs from *P. borisbychowskyi*, *P. centropomi*, *P. lancea* and *P. scrippsi* in which the uterus is strongly developed extra-caecally or in the forebody. Finally, in having entire or only very slightly indented vitelline lobes, it differs from *P. acceptum*, *P. crenilabri*, *P. lancea*, *P. leilae*, *P. lewisi*, *P. mirandai*, *P. pomacanthi*, *P. scrippsi*, *P. sobolevi* and *P. tongaatense* in which the lobes are strongly to deeply indented. Overall, *P. vaili* **n. sp.** shows no particular resemblance to any previously described species. The only species known previously from a mullid, *P. sobolevi*, is far larger and has deeply lobed vitelline follicles.

Most marine species of *Phyllodistomum* have been reported only once and from only a single host species. With the addition of the present work, just six named species, *P. acceptum*, *P. lancea*, *P. lewisi*, *P. mamaevi*, *P. thalassomum* and *P. vaili* **n. sp.**, are each known from multiple species (Table 1). Three species, *P. lewisi*, *P. mamaevi* and *P. thalassomum* have been reported from multiple families. *Phyllodistomum mamaevi* Parukhin, 1971 (see Table 1) and *Phyllodistomum* sp. 4 and sp. 5 of Cutmore *et al.* (2013) have all been reported from both labrids and serranids; in the case of the two undescribed species the sharing of hosts being inferred principally from molecular data. *Phyllodistomum lewisi* has been reported from Belontiidae, Channidae, Mastacembelidae and Mugilidae and *P. thalassomum* has been reported from the closely related families Labridae and Scaridae (see Table 1). *Phyllodistomum* thus demonstrates an intriguing range of specificity from apparent oioxenicity to stenoxenicity and euryxenicity. Euryxenicity is seemingly rare in trematodes of tropical marine fishes, except perhaps for some groups of hemiuroids (Miller *et al.* 2011), however it has already been reported for one anaporrhutine gorgoderid species (Cutmore *et al.* 2010). Our understanding of the host-specificity of marine *Phyllodistomum* species is doubtless quite incomplete given that the urinary bladder is easily overlooked in routine dissections; both species reported here were initially found by serendipity rather than directed search.

The 28 described marine species of *Phyllodistomum* (including the two described here) have been reported from 18 families of fishes, a remarkably broad range of hosts. Both families reported here have been reported as hosts previously. For the Serranidae, *P. mamaevi*, *P. marinae* and *P. unicum* have been reported previously and for the Mullidae, *P. sobolevi* is previously reported. Three of the four species known from serranids (*P. hoggettae* **n. sp.**, *P. mamaevi* and *P. marinae*) are distinctive in having the most strongly developed undulations on the lateral body seen in marine representatives of the genus, suggesting that they may be closely related. The figure of *P. unicum* given by Odhner (1910) shows what appear to be only weak undulations on the margins of the hindbody. We detect no special similarity between the two species reported from mullids, *P. vaili* **n. sp.** and *P. sobolevi*, and no particular similarity between the species from other host taxa from which multiple species have been reported: Carangidae, Labroidei (Labridae + Scaridae), Mugilidae, Scombridae, Tetraodontidae, or pleuronectiforms. Given the generally cryptic nature of gorgoderids, we suspect that many more marine species are yet to be described and that patterns of complexes of species associated with host families may become evident when there is a more complete sampling of the global fauna.

Molecular exploration of marine *Phyllodistomum* species is in its infancy. Sequence data have been reported for just five species (Cutmore *et al.* 2013), including the two described here. Cutmore *et al.* (2013) found clear molecular differences between five putative species which were, however, also relatively easily distinguished on the basis of morphology. The potential importance of molecular data in this group has been highlighted by Rosas-Valdez *et al.* (2011) and Peribáñez *et al.* (2011) who have demonstrated the likely existence of complexes of freshwater species of *Phyllodistomum* in North America and Europe respectively. It is thus clear that it is desirable that, where possible, further descriptions or redescriptions of species should be accompanied by molecular data.

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