THE TERTIARY BRYOZOAN FAMILY PROSTOMARIIDAE – MORPHOLOGY AND RELATIONSHIPS

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Abstract


The relationships of the Tertiary Victorian bryozoan genus *Prostomaria* and family Prostomariidae are considered based on SEM examination of well-preserved material. It is concluded that the family is monotypic, the sole included species being *Prostomaria gibbericollis*. Recent species attributed to *Prostomaria* are not related and a new genus and family of Schizoporellidae (*MacGillivrayiidae, Mawatariidae*) are established for a New Zealand species previously attributed to *Prostomaria*. The most likely affinities of the Prostomariidae are with the recent family Urecoliporoidae and a new superfamily, Urecoliporoidae, is erected to accommodate these two families.

Introduction

The monotypic bryozoan genus *Prostomaria* and family Prostomariidae were established simultaneously by MacGillivray (1895) on the basis of fossil specimens from Victoria. The possible affinities of the genus are intriguing, but the refining of taxonomic relationships has been hampered by a lack, in *Prostomaria*, of such helpful characters as avicularia and ovicells. These have never been seen in the many specimens available for examination (P.E. Bock, pers. comm.). Until recently, the family has remained monotypic and is still poorly understood.

Examination of internal and external skeletal structures by scanning electron microscopy of both well-preserved *Prostomaria gibbericollis* and other possibly related genera has provided a better basis for a statement on the taxonomic affinities of the Prostomariidae. The purpose of this paper is to redescribe *Prostomaria gibbericollis*, comment on its likely relationships with other genera, and introduce new supraspecific taxa based on these relationships.

**Prostomaria** MacGillivray

*Prostomaria* MacGillivray, 1895: 105.

*Type species.* *Prostomaria gibbericollis* MacGillivray.

**Prostomaria gibbericollis** MacGillivray

*Prostomaria gibbericollis* MacGillivray, 1895: 105, pl. 3, fig. 28.


**Discussion.** When MacGillivray (1895) established the monotypic genus *Prostomaria*, he underscored its uniqueness by placing it in its own family, Prostomariidae, commenting "its nearest allies [are] the Tubucellariidae". Harmer (1957) compared *Prostomaria gibbericollis* to a new species that he was describing – *Lagenitpora cylindrica* (*Lagenitpora* [sic].) Gordon (1985), commenting on MacGillivray's opinion, compared *Prostomaria* (not having seen specimens,
however) with Margaretta Gray (formerly Tubu-
cellaria d'Orbigny) and Porina d'Orbigny
(Porinidae). Thus three separate families have
been suggested as being related to Prosto-
maria.

Each of these supposed relationships can be
ruled out. Margaretta (a jointed genus of Mar-
garettidae) has an erect colony and a primary
orifice similar to that of Prostomaria. It differs
substantially in having internodes with as many
as ten longitudinal series of zooids (depending
on the species), an ascopore, and peristomial
brood chambers; internodes lack frontal and
abfrontal surfaces.

Harmer's (1957) Lagenipora cylindrica is not a
Lagenipora Hineks (Celleporidae) but appears
rather to belong to Lagenicella Cheetham and
Sandberg, 1964 (Celleporidae). It has little in
common with Prostomaria, being entirely
encrusting and possessing ovicells.

Similarly, the Porinidae are quite unrelated,
with: bilamellar branches (in the type species of
Porina), or cylindrical branches (in Haswellitina
Livingstone) in which zooids open on both (or
all) sides, a peristomial spiramen (superficially
resembling an ascopore), and peristomial ovi-
cells.

A recent study by Gordon (1988) of the fam-
ilies Bifaxarididae and Urecoliporidae suggests
additional, more likely, candidates for close
relationship with Prostomaria, especially the
genera Aberrodomus Gordon and Urecolipora
MacGillivray. Aberrodomus looks, superficially,
quite like Prostomaria. In both genera the zooids
alternate back to back, are regularly and evenly
perforated, and have similar orifices and peris-
tomes. There are significant differences, howev-
er. Aberrodomus is non-articulated (assuming
Prostomaria was articulated in life) and pro-
duces lateral branches. The species of Aberro-
domus also produce avicularia and ovicells. Impor-
tantly, the well-preserved specimens of P. gib-
bericollis that I have examined clearly lack the
separate internal zooidal chamber seen in Aber-
rodomus candidus Gordon for example.

I believe the relationships of Prostomaria and
the Prostomariidae are with the Urecoliporidae.
The Urecoliporidae (comprising Urecolipora
and Reciprocus Gordon) have the following
important features in common with Prosto-
maria – biserial segments of back-to-back zooids
which incline to one side so that each segment
has an oral face and an aboral face; no oral spines
or avicularia, and no internal ultrastructure
(e.g., planar spherulitie) (Figs 5–7) indicating an
umbonuloid frontal wall (see Gordon, 1988).

Urecolipora, particularly, is reminiscent of Pro-
maria because its two species (U. nana
MacGillivray and U. lutida Busk) have a longi-
tudinal ridge on one side of the frontal wall divid-
ing the cryptocyst into two fields – a large one
which includes most of the frontal wall and a
lateral one which includes some of the areolar
pores by which the zooidal body cavity commu-
nicates with the outer hypostegal coelom. This
is exactly the case in Prostomaria (except that a
line replaces the ridge), which argues for a close
relationship between the two genera.

I conclude that the Prostomariidae and
Urecoliporidae are related, but separate,
families. Prostomaria has a frontal wall which is
evenly perforated all over (except in the lateral
field) whereas the pseudopores of Urecolipora
(lacking in Reciprocus) are confined to a cluster
adjacent to the orifice (see Gordon, 1988, figs
76, 77). Further, the orifice of Prostomaria lacks
a sinus, there is a peristome, and ovicells have
not been seen. [Ovicells are lacking in Reci-
procus also but there are recognisable fertile
orifices.]

I have earlier suggested (Gordon, 1988) that
the Urecoliporidae might be accommodated in
the cryptostydican superfamily Schizoporelo-
dae, although “somewhat on the fringe”. With
the association of the Prostomariidae with the
Urecoliporidae it now seems appropriate to
unite these two families into a new superfamily
Urecoliporidae. The outstanding and distinc-
tive features of this superfamily are summarised
below in a formal diagnosis.

Prostomaria and the Prostomariidae are pre-
ently strictly monotypic and known only from
the Tertiary of Victoria. Two recent species
have been described but it is now clear that they
are unrelated to Prostomaria. D'Hondt and
Schopf (1984) described Prostomaria cyclosto-
nata from about 4000 m depth north-west of
Bermuda. Like Prostomaria gibbericollis, it is
erect and biserial with zooids alternating back to
back. However the frontal wall is imperforate.

Figures 1–4. Prostomaria gibbericollis, Schnapper Point, Victoria. Figs 1 and 2, frontal and abfrontal sides,
respectively, of parts of branch segments (× 40). Fig. 3, part of fig. 2 enlarged, showing a series of areolar pores
in the imperforate field of zooidal walls on the abfrontal side of a branch segment (× 72). Fig. 4, internal view of
parts of two zooids showing a primary orifice, connections between adjacent dorsal walls (c), and a line marking
the attachment of the ascus membrane (m) in life (× 175).
Urceoliporidae Bassler, 1936

Diagnosis. Zooids frontally imperforate or with only a cluster of pores near the orifice; orifice with a shallow or distinct sinus and oral processes; no peristome. Ovicells prominent and recumbent, or absent and zooids with dimorphic orifices.

Included genera. Urceolipora MacGillivray, 1881; Reciprocosus Gordon, 1888.

Prostomariidae MacGillivray, 1895

Diagnosis. Zooids with an evenly perforated frontal wall; orifice lacking a sinus; peristome well developed. Ovicells lacking, orifices monomorphic.

Included genera. Prostomaria MacGillivray, 1895

Schizoporelloidea Jullien, 1883


Mawatariidae n. fam.

Diagnosis. Colony erect, uniserial, branching, non-segmented, the zooids facing mainly on one aspect. Frontal wall cryptocystidean, with scattered pores. Primary orifice sunken, with shallow sinus; secondary (peristomial) orifice with pseudosinus. No oral spines. No avicularia. Ovicell peristomial. Ancestrula resembling later zooids, anchored by a chitinous portion.

Included genera. Mawatarius n. gen.

Mawatarius n. gen.


Diagnosis. With characters of the family.

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References


Figures 5-7. Prostomaria gibbericollis, Schnapper Point, Victoria. Fig. 5, enlargement of part of fig. 4, showing an interior view of parts of the peristome (p), distal rim of primary orifice (o), frontal wall (f) and dorsal wall (d) (× 374). Fig. 6, interior of zooidal wall, showing a pseudopore (p), areolar pore (a), and attachment scars of parietal muscles (m) (× 380). Fig. 7, enlargement of part of fig. 6, showing the areolar pore, and the attachment scar of the ascus membrane (m) with no difference in skeletal ultrastructure either side (× 902).


