Commemorative volume for the 80th birthday of Willem Vervoort in 1997

Bargmannia lata, an undescribed species of physonect siphonophore (Cnidaria: Hydrozoa) from Canadian Pacific waters

G.M. Mapstone

Mapstone, G.M. *Bargmannia lata*, an undescribed species of physonect siphonophore (Cnidaria: Hydrozoa) from Canadian Pacific waters.
Zool. Verh. Leiden 323, 31.xii.1998: 141-147, figs 1-3.— ISSN 0024-1652/ISBN 90-73239-68-0.
G.M. Mapstone, The Old Orchard, Sheets Heath Lane, Brookwood, Surrey GU24 OEL, U.K., e-mail: G.Mapstone@btinternet.com.

Key words: Cnidaria; Hydrozoa; Siphonophora; NE Pacific; Vancouver Island; *Bargmannia lata* spec. nov.
A new species of *Bargmannia* Totton, 1954, *Bargmannia lata*, is described from samples collected from Vancouver Island, BC, Canada. Differences from type material of *Bargmannia elongata* Totton, 1954, are noted.

Introduction

Examination of Siphonophora samples collected from Canadian Pacific waters during 1982, 1987 and 1988 (Mapstone & Arai, in press) revealed a number of nectophores which were referable to *Bargmannia* Totton, 1954 (Order Physonectae). Although the majority of the specimens were referable to *B. elongata* Totton, 1954, some were not, and are here described as a new species, *B. lata*.

Collection of material

Specimens were obtained from samples collected by the Groundfish Section of the Pacific Biological Station, Nanaimo, British Columbia. Collection details are given in Mapstone & Arai (in press). Specimens were fixed in 5% formalin buffered by sodium borate.

Nectophore orientation and terminology

Nectophores of long-stemmed physonects are typically described in relation to their position of attachment to the stem and their orientation when placed in a dish for examination. The so-called dorsal surface typically faces uppermost and the term upper surface has been used in many descriptions (Totton 1954: fig. 7 et seq.). The region of stem attachment in a definitive nectophore is the axial surface and its opposite surface is the abaxial (Totton 1932: 318). Adaxial should strictly be used in preference to axial (as in Totton 1954: fig. 20d), but the two are used interchangeably in the literature. In *Bargmannia* species, adaxial and abaxial nectophore surfaces equate to the long dorsal (upper) and ventral (lower) surfaces respectively.

Terms used in the present description are based on those of Totton (1965), Pugh & Harbison (1986), and Kirkpatrick & Pugh (1984).

Bargmannia lata spec. nov.
(figs 1-3)

Material examined.— 66 nectophores and 19 associated bracts of *Bargmannia lata* as listed below. A holotype and paratypes were selected and deposited at the British Columbia Provincial Museum (BCPM), Canada, and the Natural History Museum (NHM), London.
Holotype (BCPM reg. nr 996-203-1): Stn LC 10, 48°22.4'N 126°20.2'W, 700-0 m, 1 nectophore and 1 bract, 24.iv.87; paratype 1 (BCPM reg. nr 996-204-1 #1): Stn LC 10, 48°22.4'N 126°20.2'W, 700-0 m, 7 nectophores and 7 bracts, 24.iv.87; paratype 2 (BCPM reg. nr 996-205-1 #2): Stn LC 10, 48°22.4'N 126°20.2'W, 700-0 m, 6 nectophores and 6 bracts, 24.iv.87; paratype 3 (BCPM reg. nr 996-206-1 #3): Stn A4, 48°15.0'N 126°40.0'W, 500 m, 11 nectophores, 21.iii.87; paratype 4 (BCPM reg. nr 996-207-1 #4): Stn LB17, 47°56.5'N 126°26.1'W, 0-700 m, 8 nectophores, 21.iii.87; paratype 5 (NHM reg. nrs 1996.1234-1238 #5): Stn LB17, 47°56.5'N 126°26.1'W, 700 m, 14 nectophores and 2 bracts, 21.iii.87; paratype 6 (NHM reg. nrs 1996.1239-1240 #6): Stn A4, 48°15.0'N 126°40.0'W, 500 m, 1 bract, 21.iii.87.
Other *Bargmannia lata* spec. nov. material collected and examined included: Stn LC11, 48°19.0'N 126°26.7'W, 500-0 m, 9 nectophores and 2 bracts, 4.iii.88 (NHM reg. nrs 1998.1788-1798); Stn B-7L, 48°43'N 126°39'W, 1200 m, 11 nectophores and 1 bract, 27.ii.82 (NHM reg. nrs 1998.1799-1810).
The holotype of *Bargmannia elongata* Totton, 1954, held at the NHM (NHM reg. nr 1952.11.19.7-25), was also examined.

Diagnosis.— Mature nectophore with large lateral surfaces, which extend ventrally; lateral facet larger than ventral facet; nectosac with small U-shaped muscle-free adaxial face.

Description of material.— Definitive nectophores are elongate and vary in length from 5 to 30 mm, in width from 4 to 12 mm, and in maximum depth (measured to ventral edge of lateral surface) from 5 to 12 mm. Mature nectophores are typically from 22 to 30 mm long and the holotype is 24 mm long. The nectophore body extends to 3/5 of the total height of the nectophore. The surface of the nectophore body has both furrows and ridges (figs 1-2). The following description is based upon mature nectophore characters only.

The dorsal surface has a deep dorsal furrow in the mid-line (fig. 1a) and is delimited by two lateral furrows (fig. 2a). Each lateral surface has a lateral facet enclosed by the lateral furrow and the latero-vertical ridge, and a ventral facet enclosed by the latero-vertical and infra-lateral ridges (fig. 2a).

Three prominent ridges originate from a 3-way junction on the lateral nectophore surface at the base of the thrust block (fig. 2a). The apico-lateral ridge passes diagonally onto the dorsal surface, continues diagonally towards the mid-dorsal line and then curves diagonally outwards. Distally it divides into inner and outer branches as shown in fig. 1a. The apico-lateral is prominent and crested from its origin to the point where it bifurcates, but its branches are inconspicuous and lack crests. The inner branch inserts onto the ostium in a dorso-lateral position and the outer one inserts in a lateral position. The apico-lateral ridge typically forms an obtuse angle distally where it bifurcates, but in some specimens it does not.

The latero-vertical ridge passes from the 3-way junction diagonally across the lateral surface of the nectophore and connects to the infra-lateral ridge (fig. 2a). It is prominent and crested, and delimits the lateral and ventral facets. The infra-lateral ridge is also crested, passes around the ventral border of the ventral facet and continues to the base (ostial end) of the lateral furrow (fig. 2a).

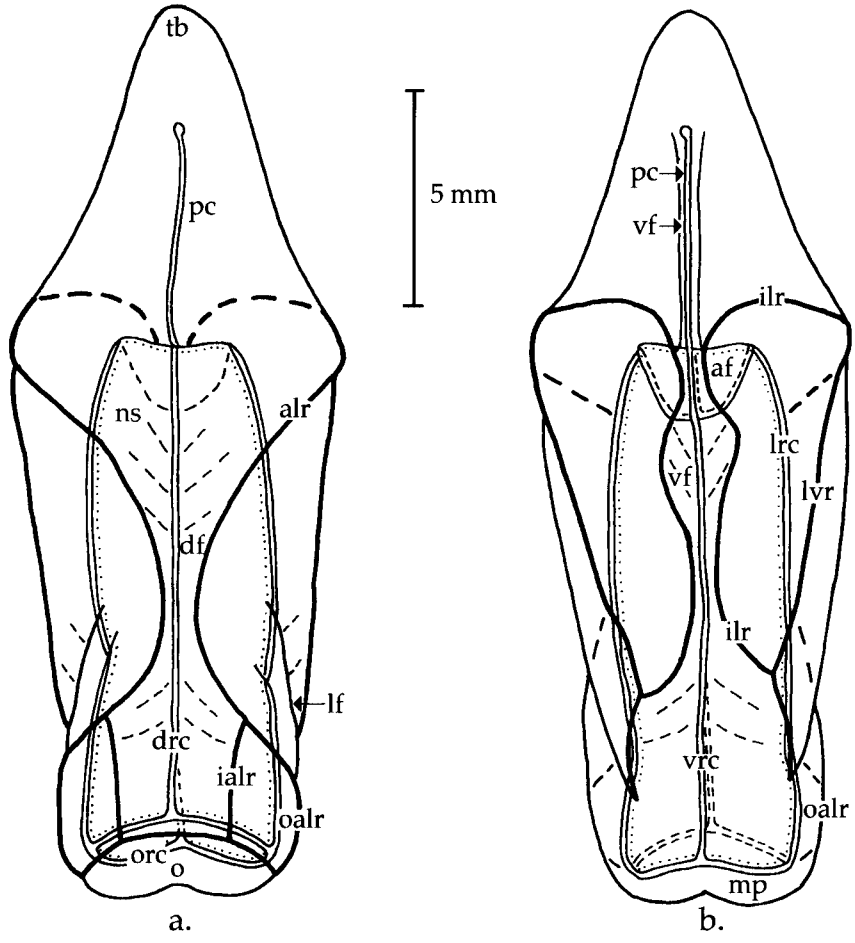

Fig. 1: *Bargmannia lata* spec. nov. nectophore (holotype): a: dorsal (upper) view, b: ventral (lower view): af - adaxial face of nectosac; alr - apico-lateral ridge; drc - dorsal radial canal; df - dorsal furrow; ialr - inner branch of apico-lateral ridge; ilr - infra-lateral ridge; lf - lateral furrow; lrc - lateral radial canal; lvr - latero-vertical ridge; mp - mouthplate; ns - nectosac; o - ostium; oalr - outer branch of apico-lateral ridge; orc - ostial ring canal; pc - pallial canal; tb - thrust block; vf - ventral furrow; vrc - ventral radial canal.

The furrows include a dorsal, a ventral and two laterals. The dorsal furrow extends from the base (abaxial end) of the thrust block, becomes deep between the two apico-lateral ridges, and opens out in the abaxial third of the nectophore where the ridges are further apart (fig. 1a). The ventral furrow extends from near the apex of the nectophore to 1/4 of the nectophore height and is deep throughout; its opening is narrow and slit-like except abaxially where it broadens out (fig. 1b), and there is an indentation in the mid-nectophore region. In some specimens other similar indentations occur above the apex of the nectosac and near the apex of the pallial canal. This furrow is deeper in the new species than in other physonects, although its shape and depth must change when the nectosac expands during swimming. The lateral furrows extend

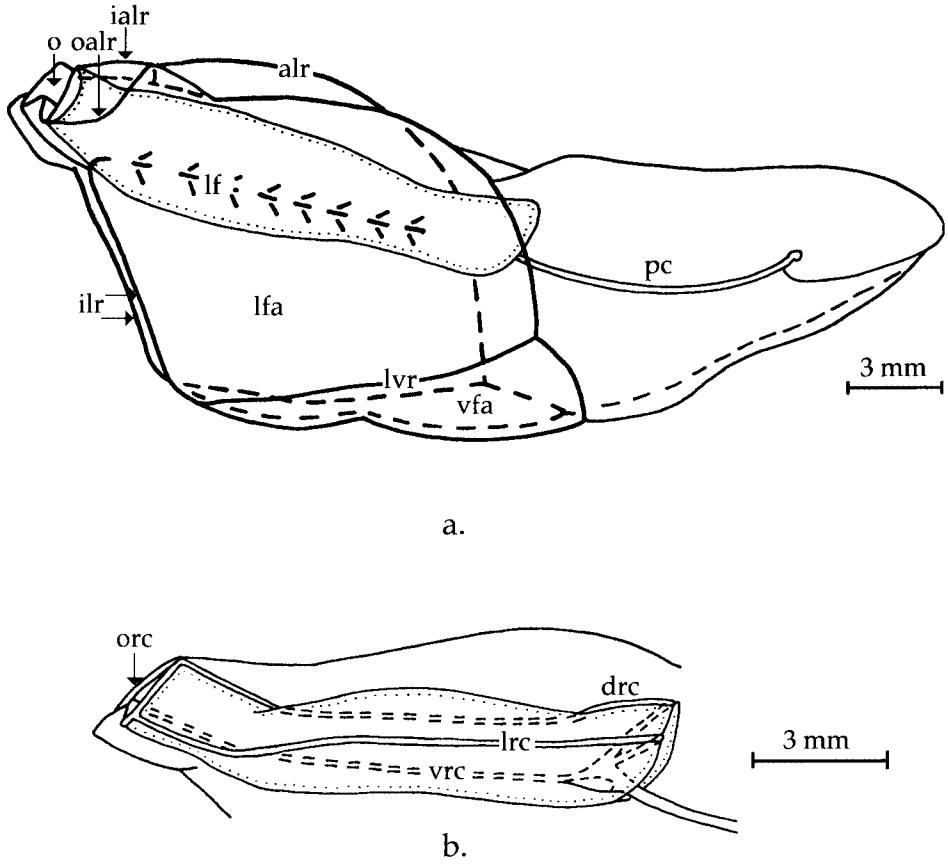

Fig. 2: *Bargmannia lata* spec. nov., a: nectophore, lateral view (from Station B-7L), b: nectosac, lateral view (holotype): alr - apico-lateral ridge; drc - dorsal radial canal; ilr - infra-lateral ridge; lf - lateral furrow; lfa - lateral facet; lr - lateral ridge; lrc - lateral radial canal; lvr - latero-vertical ridge; o - ostium; orc - ostial ring canal; pc - pallial canal; tb - thrust block; vfa - ventral facet; vrc - ventral radial canal.

along each side of the nectophore parallel to its long axis as shown in fig. 2a.

The thrust block is conical and elongate, and contains a thick, distinctive pallial canal. The latter extends from 3/4 to 9/10 of nectophore height, lies adjacent to the ventral nectophore surface, and follows a slightly curved course as seen in lateral view (fig. 2a). The apex of the pallial canal is swollen and projects a short distance into the mesoglea. In life the nectophore is attached to the stem by a muscular lamella along the line of the pallial canal (Totton 1954). In small immature nectophores up to 12 mm long, the thrust block is short relative to the overall nectophore length, and in the smallest it does not extend apically beyond the upper limit of the apico-lateral ridges. It is longest in the largest nectophores (fig. 2a). The mesoglea is typically firmer in large specimens than in small ones, and also typically firmer and more extensive in the axial region than in the abaxial region.

The nectosac is elongate and typically reaches 3/5 nectophore height in mature

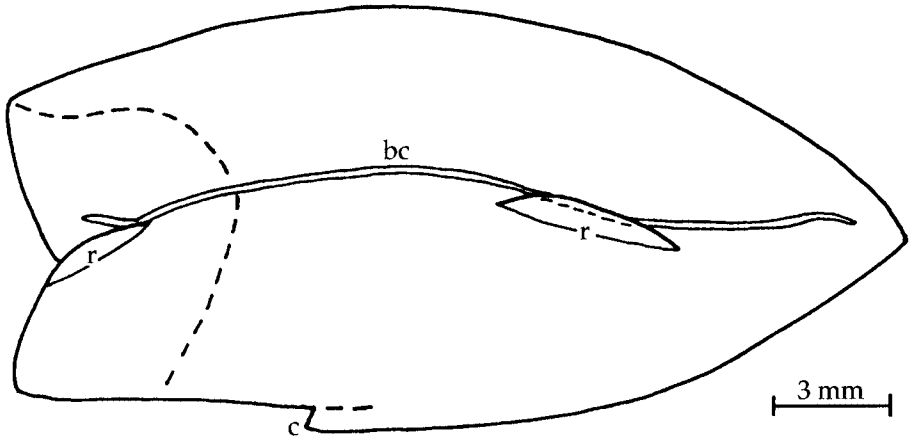

Fig. 3. *Bargmannia lata* spec. nov.: bract (holotype), lower surface: bc - bracteal canal; c - cusp; r - ridge.

nectophores. Its upper surface follows the contours of the dorsal surface of the nectophore, and its ventral surface is deeper on either side of the mid-line; thus the dorsal radial canal lies close to the ventral radial canal for most of its length (fig. 2b). The nectosac is muscular apart from the muscle-free adaxial face, but the nectosac is preserved in only a few of the present specimens. The ostium is typically broad and directed dorsally; a broad and short bilobed mouthplate extends from its abaxial border (fig. 1b).

The pallial canal passes between the two lateral lobes of the nectosac and inserts onto the ventral nectophore surface as shown in figs 1b, 2b. The pedicular canal is short, and connects the pallial canal with the ventral edge of the muscle-free face of the nectosac where it inserts onto the median radial canals. The dorsal canal passes towards the apex of the nectosac and two lateral radial canals arise from it in the centre of the muscle-free face. It then passes to the nectosac apex, bends sharply over it onto the dorsal surface, and continues in a straight line to the ostium. The ventral canal follows a straight course to the ostium. The lateral radial canals each pass to the lateral borders of the nectosac, bend sharply onto the lateral surface, and follow an approximately straight course to the ostium. Each typically lies immediately below a lateral furrow in lateral view, and then passes to the lateral border of the ostium where it inserts onto the ostial ring canal (fig. 2b).

Bracts associated with nectophores occur in 3 samples and are up to 22 mm long and 9 mm wide. They are thick, and their shape resembles a stylised plant-leaf with a truncate base which has a median notch. The bracteal canal is elongate, passes from base to apex, and lies closest to the lower bracteal surface. The upper surface of the bract has a ridge which circumscribes a thinner basal region, and a small gelatinous cusp on the left lateral border. The lower surface has two small median ridges which overlap the bracteal canal (fig. 3).

Etymology.— *Lata* means broad and refers to broad deep lateral surfaces of the nectophores.

Geographic distribution.— Canadian Pacific waters off Vancouver Island. In addi-

tion, a specimen mis-identified as *Bargmannia elongata* by Totton (1954) was previously collected in the S Atlantic at 33°43.3'S 8°38.5'E.

Discussion

Totton (1954) referred a number of nectophores collected by Discovery II to a new monotypic genus *Bargmannia* but gave no description. His text-fig. 28, p. 70, shows nectophores labelled *B. elongata* from three stations in the S Atlantic. The holotype material of *B. elongata*, the type species of the genus, from Station 699, was illustrated as text fig. 28c-d. However, the specimen illustrated by Totton in text-fig. 28e-f from Station 1769 cannot be verified, as the jar in the NHM collection with a label indicating that it contains a specimen of *B. elongata* from this station is empty. Since Totton's fig. of a nectophore from this station shows the diagnostic features of *Bargmannia lata* spec. nov. given above, the text-fig. 28e-f is referred to the new species.

Nectophores collected off Vancouver Island referable to *Bargmannia lata* differ from those of *B. elongata* in several respects. Ridges and furrows typically follow similar courses in the two species, but the point at which the apico-lateral bifurcates is more distal, and closer to the ostium in *B. lata* than in *B. elongata*. The larger ridges are crested in both species, but the two branches of the apico-lateral ridge are not crested in *B. lata*. The angle in the course of the apico-lateral ridge is not present in all specimens of *B. lata*, whereas it is typically present and prominent in specimens of *B. elongata*.

Mature nectophores of *Bargmannia lata* have a longer thrust block and the nectosac is shorter in relation to the length of the nectophore with a smaller muscle-free adaxial face than in those of *B. elongata*. However, the pallial canal inserts onto the nectosac, via the pedicular canal, in approximately the same position in the two species. In *B. lata* the lateral facet is extensive and larger than the ventral facet. In *B. elongata* both facets are smaller than in *B. lata*, with the lateral facet smaller than the ventral facet (illustration, in Mapstone & Arai, in press). In *B. lata* the ventral furrow is deeper and its borders are closer together in firm specimens. In *B. elongata* this furrow is shallower and broader. The mouthplate is much shorter in *B. lata* than in *B. elongata*, and has a broader base.

Acknowledgements

Samples were collected by members of the Groundfish Section of the Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, British Columbia, Canada and sorted by T. Appleton supported by a Department of Fisheries and Oceans grant to M.N. Arai. Sorting the siphonophores and subsequent taxonomic work at the Department of Biological Sciences, University of Calgary was supported by Natural Sciences and Engineering Research Council Grant A2007 to M.N. Arai. Thanks are due to M.N. Arai for this support. I also thank P.R. Pugh for help with separation of the two *Bargmannia* species, P.F.S. Cornelius for facilities at the NHM, London and for taxonomic discussion prior to drafting, and J.C. den Hartog for helpful criticism of the manuscript. My enthusiasm for research into cnidarians was initiated by interaction with colleagues at the then Rijksmuseum van Natuurhistorisch, Leiden, and I

would like to express a special thank-you to W. Vervoort for extending me the privilege to work at the Museum.

References

Kirkpatrick, P.A. & P.R. Pugh, 1984. Siphonophores and velellids.— Synopses of the British Fauna (New Series) nr 29: 1-154.

Mapstone, G.M. & M.N. Arai, in press. Siphonophora (Cnidaria, Hydrozoa) from the coastal waters of British Columbia.— Monograph Series, National Research Council of Canada.

Pugh, P.R. & G.R. Harbison, 1986. New observations on a rare physonect siphonophore, *Lychnagalma utricularia* (Claus, 1879).— J. mar. biol. Ass. U.K. 66: 695-710.

Totton, A.K., 1932. Siphonophora.— Scient. Rep. Gt. Barrier Reef Exped. 4 (10): 317-374.

Totton, A.K., 1954. Siphonophora of the Indian Ocean together with systematic and biological notes on related specimens from other oceans.— Discovery Rep. 27: 1-162.

Totton, A.K., 1965. A Synopsis of the Siphonophora: 1-230.— British Museum (Natural History), London.