Revision of the genus Valvobifarina Hofker, 1951 (Foraminiferida).

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ABSTRACT – The genus Valvobifarina is exhaustively revised to include three species; V. mackinnonii (Millett), the type species, V. robusta (Sidebottom), and V. niobae sp. nov. All species are typified. Bifarina elongata Millett, 1900 is excluded from Valvobifarina.

INTRODUCTION

The genus Valvobifarina is little known, perhaps because of its relative rareness and occurrence in more shallow water zones. Millett (1900) described Bifarina mackinnonii as being very rare in the Malay Archipelago, but he had seen some more specimens in gatherings from Raine Island, the famous ‘Challenger’ Station 185, and from the Straits of Macassar. Heron-Allen and Earland (1915) found two specimens in the Kerimba Archipelago and a few in samples from Madagascar. They commented that the species had a wide distribution in shallow tropical waters.

The genus Valvobifarina was created by Hofker in 1951. He apparently mistook V. mackinnonii for an arenaceous taxon, but described it correctly as lacking any indication of a toothplate. The new genus was classified in the Buliminidae.

Loeblich & Tappan (1964) classified Valvobifarina in the Pavoninidae, close to Reussella. They supported Hofker’s arguments that neither Loxostoma nor Valvobifarina are related to the bolvinids, the former having a granular wall and lacking a toothplate and Valvobifarina having a triserial, rather than a biserial early development. In the discussion of Bigenerina, they indicate that B. elongata Millett, 1900 ought to be removed to Valvobifarina.

In their latest classification, Loeblich & Tappan (1987) reinstated the Reussellidae, including Valvobifarina in this family. No mention is made of the presence or absence of a toothplate.

The generic revision of the reussellid taxa showed that the former having a granular wall and lacking a toothplate and Valvobifarina having a triserial, rather than a biserial early development. In the discussion of Bigenerina, they indicate that B. elongata Millett, 1900 ought to be removed to Valvobifarina.

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along the upper edge of the chamber, bordered by a slightly everted lip; wall calcareous, hyaline, optically distinctly radial, perforate, pores large, at the apex of small mounds, arranged preferentially along the chamber edges.

**Remarks.** The specimens described from Samoa by Cushman are lost (fide Cushman, 1924, p.20).

**Valvobifarina robusta** (Sidebottom, 1918)

(Pl. 2, figs 1-7)

1918 *Bifarina mackinnonii* var. *robusta* Sidebottom: 125, pl. 3, figs 17, 18

1937 *Bifarina mackinnonii* var. *robusta* Sidebottom; Cushman: 201, pl. 23, fig. 8, err. cit.

**Lectotype.** ZF 4900, British Museum (Natural History), London, herein designated.

**Type locality.** East Coast of Australia, 29°22’S 153°51’E, 465 fms, Peronop Odoo, H.M.S. ‘Dart’ Station 19.

**Material examined.** Two syntypes; ‘Challenger’ Station 185, off Raine Island, ex coll. Sidebottom; Timor Sea, -30 fms, ex coll. Heron-Allen & Earland; British Museum (Natural History). Specimens from ‘Galathea’ Station 404, 5°09’N 106°47’E, -62 m, South China Sea; ‘Galathea’ Station 490, 5°25’S 117°03’E, -570 m, Bali Sea.

**Description.** Test free, elongate, early stage irregular in section, later stages laterally compressed, biserial tending towards uniseriality; juvenile chambers rounded to subtetrahedral, rather low and small, calcareous, hyaline, optically distinctly radial, perforate, pores very trapezoidal, upper edge somewhat arched, lateral edges crossing the peripheral edge, lowest edge of the chamber with a strong spine; aperture large, at the apex of small mounds, arranged preferentially along the wall calcareous, hyaline, optically distinctly radial, perforate, pores large, tending to crowd near the chamber borders.

**Remarks.** This species differs from *V. mackinnonii* in possessing much heavier secondary lamination which obscures the individual chambers, chambers which do not cross the periphery and do not bear any form of spinosity. The outer edges of the test and the individual chambers are also much more rounded. There is also a tendency in this species for the chambers not to embrace the previous aperture within their lumen, but to build the chamber on the apertural lip.

**Species excluded from Valvobifarina**

1900 *Bifarina elongata* Millett: 539, pl. 4, figs 1, 2

1937 *Bifarina elongata* (Millett); Cushman: 200, pl. 22, fig. 35

1964 *Valvobifarina elongata* (Millett); Loeblich & Tappan: 654.

**DISCUSSION**

*Valvobifarina* poses some interesting questions concerning the way in which genera are related. Comparing the morphology of the species herein studied with some of the taxa treated earlier (Revets 1991), it has become more difficult to delineate the genera in question as sharply as has been the case until now. *Valvobifarina mackinnonii* is an archetypal example of *Valvobifarina*, but *V. robusta* can be seen as a step towards *Bifarina ryukyuensis* Cushman & Hanzawa. *Bifarina* in its turn could be one step away from *Pavonina*. The underlying trend lies not only in the gradual reduction of the amount and size of the triserially coiled chambers, but also in the increase in embracing of the biserial chambers. The relation between *Valvobifarina* and *Bifariniella* is more strongly pronounced when one takes into account that many *Bifariniella* specimens have at least some semicuneate chambers before building the typically reniform uniserial chambers.

The biogeographic distributions of this genus repeat the pattern found in *Orthoplecta* (see Revets & Whittaker, 1991): there is a distinct clustering in the Malay-Asian part of the Indo-Pacific Province, but specimens have been found in West Africa between Madagascar and the African continent (Fig. 1). This recurrent pattern cannot at present be explained, since the benthic genera found on both sides of the Indian Ocean do not seem to occur in the Indian or Arabian subprovince.
Revision of Valvobifarina
Fig. 1. The biogeographic distribution of the species of *Valvobifarina*. ● *V. mackinnonii*, ■ *V. robusta*, ▲ *V. niobeae*.

Not enough information is at present available to venture any serious suggestions as to the evolutionary history of this enigmatic genus and its species.

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**Explanation of Plate 2**

Figs 1-7, *Valvobifarina robusta* (Sidebottom, 1918). Lectotype, BMNH ZF 4900. Fig.1, Habitus (150µm). Fig. 2, End-view, clearly showing the prominent 'tubulopores' and the aperture (150µm). Fig. 3, Close-up of the aperture. Note the presence of a ridge with multiple gate-like entrances (20µm). Paralectotype, BMNH ZF 4901 Fig. 4, Habitus (200µm). Figs 5-7, Specimens from the Bali Sea. Fig. 5, Habitus (100µm). Fig. 6, An opened specimen, showing the disposition of the individual chamber, with the previous lip protruding into the chamber (20µm).

Figs 8-12, *Valvobifarina niobeae* sp.nov. Holotype, CC21915, Smithsonian Institution. Fig. 8, Habitus (200µm). Fig. 9, Side view of the test (200µm). Fig. 10, Close-up of the aperture (100µm). Fig. 11, Detail of the chamber wall. Note the relatively low 'tubulopores' (50µm). Fig. 12, Specimen from Macassar Straits BMNH ZF 4902, habitus (300µm).
CORRIGENDA

The generic revision of the Reussellids (Foraminiferida) Stefan A. Revets, 1991, *J. micropalaeontol.*, 10 (1), 1-15.

Page 1, last line but one, second column:
"Acostinystalidinella" should read: "Acostina, Chrysalidinella"