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Note on the coral *Blastomussa loyae*, a valid species from the Red Sea

KARL KLEEMANN AND CHRISTIAN BAAL

Department of Palaeontology, University of Vienna, Geozentrum, UZA II, Althanstraße 14, A-1090, Vienna, Austria

The annotated literature of Blastomussa loyae *Head, 1978, together with the comparison of descriptions and figures by various authors, new observations in the field, collected and figured samples from the northern Red Sea provide the basis to regard the species as valid and distinct from* B. merleti *(Wells, 1961).*

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INTRODUCTION

In a revision of the genus *Blastomussa*, Head (1978) clearly distinguished his new species from the other two, *Blastomussa merleti* (Wells, 1961) and *B. wellsi* Wijsman-Best, 1973. It was introduced as *B. (Ceriomorpha) loyae* Head, 1978: (635), 636, (637–639), figure 1 c, d, 2. The holotype, 1977.5.51, and two paratypes, 1977.5.52-3, are deposited at the British Museum (Natural History), London. The type locality is Towartit complex, Sudan, Red Sea. Head (1978: 636) noted that the holotype 'was growing at a depth of 8 m, on the same knoll as was the single *B. (B.) merleti* colony described above' (Head, 1978: 634, figure 1a). Head's species was initially accepted (Sheppard, 1981, 1987; Scheer & Pillai, 1983), but later it was regarded as a mere growth form of *B. merleti* (Sheppard & Sheppard, 1991; Veron, 2000). Herein, arguments and evidence are presented in favour of considering *B. loyae* a valid species from the Red Sea.

MATERIALS AND METHODS

The literature background of *Blastomussa* is one source of information, the others are own observations in the field and samples of *B. loyae* and *B. merleti* collected from the northern Red Sea. Descriptions and illustrations provided by various authors are compared with each other and reviewed in the light of the newly obtained specimens and their herein figured characters. The figured specimens are stored in the collection of the Department of Palaeontology University of Vienna (Institut für Paläontologie der Universität Wien; IPUW).

RESULTS

Veron & Pichon (1980: 234) noted for *Blastomussa* 'Coralla from the western Indian Ocean and the Red Sea are cerioid or nearly so and these become increasingly phaceloid towards the eastern Indian Ocean and the Pacific'. Sheppard (1981: 615) recorded *B. (B.) merleti* and *B. (Ceriomorpha) loyae* from Chagos, Indian Ocean. Neglecting the subgenus, *B. loyae* was accepted by Scheer & Pillai (1983: 150–151, pl. 35, figures 9, 10 & 11 right specimen). In appendix 1, Sheppard (1987: 31) listed all three species as valid (*merleti* in typographic error as *merletti*). However, Sheppard & Sheppard (1991: 111) put *B. loyae* in synonymy with *B. merleti*, as 'numerous observations in the Red Sea have shown that many specimens possess both phaceloid and cerioid calices'. Further, *B. loyae* is not listed as an extant stony coral by Cairns *et al.* (1999: 35), and Veron (2000 3: 4) regarded *B. loyae* as *B. merleti*, forming plocoid colonies in the Red Sea. Nevertheless, the observed features in *B. loyae* specimens as specified and figured below, and the co-occurrence with true *B. merleti* on the same knoll (see above) warrant the species' re-establishment.

Species-specific colony growth of *Blastomussa loyae* results in a solid, sub-plocoid surface with irregular voids (Head, 1978: figure 1 c, d; Sheppard & Sheppard, 1991: figure 113c, pl. 74; Veron, 2000 3: 4, figure 1). New corallites bud extratentacularly, from the rim of mother corallites, staying attached (primary fusions). Through successive budding, buds fuse with neighbouring corallites (secondary fusions), being generally round to oval, leaving some free spaces between them (Head, 1978: figure 2 i a–d & 2 ii). Corallites vary from 4–8 mm, maximum, 10 mm in longest direction (Figure 1).

Being densely covered by minute granules but lacking typical mussid dentation, septa are developed in three cycles (Figures 1–4). Particularly the primary and secondary septa are thickened over the wall and up to 2.5 mm exsert. Descending steeply into the calyx (Figure 2), they attenuate, then widen again somewhat before fusing with the columella, rarely building low paliform lobes (Figure 3).

Particularly in somewhat peripheral corallites, a few septa occasionally appear hollow, a similarity with *Acanthastrea* (see below). Septa from the third, often incomplete cycle do not reach the columella (Head, 1978: 636). Columellae are inconsistent in shape and size diameter, rather large for the size of corallites, mirroring their shape. In the figured specimen, IPUW 6271, columellae appear more often to be solid

Corresponding author:
K. Kleemann
Email: karl.kleemann@univie.ac.at

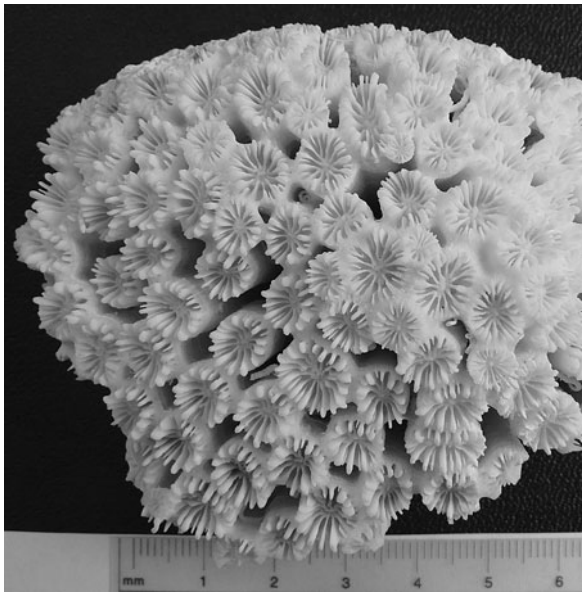

Fig. 1. IPUW 6271, *Blastomussa loyae*, part of a colony collected on 3 August 1987 from 10 m, northern bay of Safaga, Egypt, Red Sea, profile A14 (Piller & Pervesler, 1989). Photograph by C. Baal.

than trabecular, with a papillose or compress–styliform centre. Only a single corallite of the piece IPUW 6271 has no connection to neighbours, thus appearing phaceloid; all others are sub-plocoid (Figures 1–4).

DISCUSSION

Head (1978: 636), in his description of *B. loyae*, noted: 'The first two cycles are exsert to approximately 1 mm. Primary septa are usually somewhat thicker and more exsert than secondaries, and in some calices are considerably thickened and may be hollow, recalling the situation in the related genus *Acanthastrea* (Crossland, 1952, p. 140)'. As shown in Figure 2, septa are definitely more exsert, ~2 mm, and more prominent than in *B. wellsi* (Wijsman-Best 1973: figures 1 & 2; Head 1978: figure 1b; Veron & Pichon 1980: figure 395; Scheer & Pillai 1983: pl. 35, figures 7, 8, [and left specimen in] 10 & 11. Hollow septa were observed. The cause might be erosion.

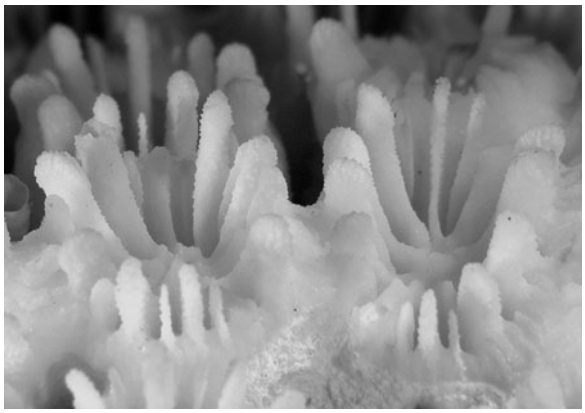

Fig. 2. Detail of IPUW 6271, showing primary and secondary septa, exsert up to 2.5 mm, finely frosted but no teeth developed (same as in IPUW 6273 *B. merleti*, Figure 5). Photograph by C. Baal.

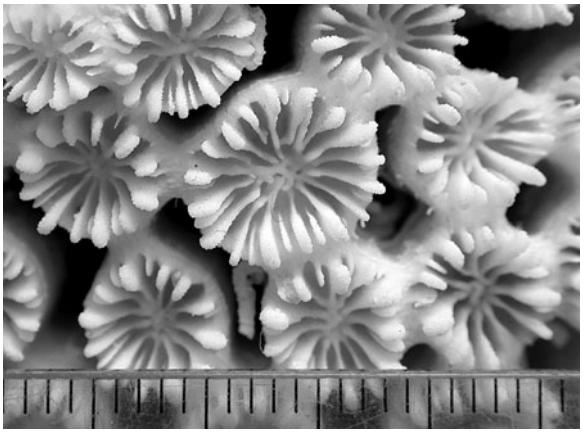

Fig. 3. Detail of IPUW 6271. Note sub-plocoid arrangement of corallites, connection of 1st and 2nd order septa with the columellae, being solid or trabecular. Septa lacking typically mussid septal dentation. Scale in mm.

In a taxonomic note, Veron (2000 3: 4) claimed that *B. loyae* had 'no consistent differences with *B. merleti* Wells, 1961' [sic] [brackets lacking as originally introduced as *Bantamia merleti* Wells, 1961: 189–191, figures 1–4]. Veron (2000 3: 4) described *B. merleti* characters as: 'Colonies are phaceloid [*B. merleti*] to plocoid [*B. loyae*], and consist of a few to large numbers of corallites. Corallites are less than 7 [*B. merleti*, 10 *B. loyae*] millimetres diameter. Septa are mostly in two [sic] cycles of which only the first [sic] reaches the columella. Septa have slightly serrated margins. Primary septa may be exsert. Columellae are poorly [sic; well] developed. Mantles, but not tentacles, are extended during the day and may form a continuous surface obscuring the underlying growth-form.' The characters marked by [sic] differ strongly from those of *B. loyae*, and partly from those of *B. merleti*, for as Wells (1961: 189) noted: 'Septa of first two cycles (12) equal and [one, 1st] extending to columella; a few very thin, short septa of the third cycle developed in some systems [not here]. Columella formed by interlaced loose trabecular processes from inner margins of septa, with one to three granulate papillae arising in bottom of the calice and commonly having a sublamellar aspect'.

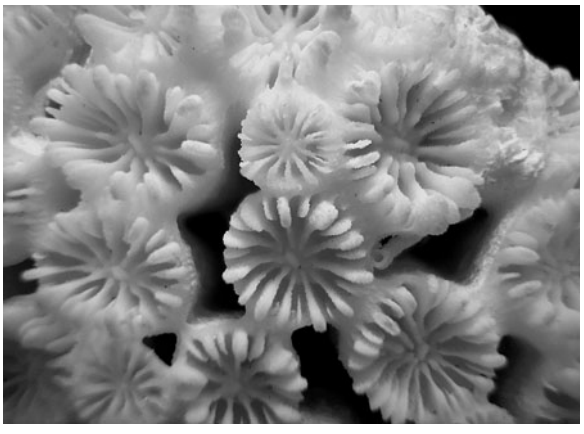

Fig. 4. In this part of IPUW 6271, mainly solid columellae, occasionally pali and hollow septa are developed.

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The figures of *B. merleti* (Head, 1978: figure 1a) and the holotype of *B. loyae* (Head, 1978: figure 1c, d), indicate a clear distinction of the two species. Note that both specimens were taken from the same knoll (Head, 1978: 636). From my [K.K.] experience gained at various dive sites in the northern Red Sea (Aqaba, Dahab, Hurgada, Safaga and Zabargad Island), I cannot corroborate the statement by Sheppard & Sheppard (1991: 111), that many *Blastomussa* specimens possess both phaceloid and cerioid calices. They provided neither figures nor references to specimens in support of their view. The black-and-white image for *B. merleti*, presented by Veron (2000 3: 5), is another good reason to consider *B. loyae* a distinct and a valid species (Figures 1–4 versus 5).

Head (1978) described and figured all three recent *Blastomussa* species. The holotype of *B. loyae* and its mode of colony formation are figured twice (Head, 1978: figures 1c, d & 2). The original description of *B. loyae* is based on a dozen specimens. According to its growth form, being non-phaceloid as in *B. merleti* (Figure 5) and *B. wellsi*, he attributed *B. loyae* to his new subgenus *Ceriomorpha*. In the diagnosis of the subgenus, solid colony formation, the terms 'cerioid' and 'subcerioid' were used (Head, 1978: 636). However, 'cerioid' stands for 'walls of adjacent polygonal [sic] corallites closely united', while 'plocoid' stands for 'corallites with separate walls' in a massive corallum (Moore *et al.*, 1956: F246, F249, respectively). After fusion, corallites of *B. loyae* remain round to oval in shape on the colony surface, generally with distinctly separated perimeters, set off by the highly exsert primary and somewhat less exsert secondary septa (Figure 2). Therefore, in our view, *Ceriomorpha* does not fit as a subgenus name and should not be used, or be replaced by *Plocomorpha*.

Wells (1968: 276, figures 4 & 5) introduced *Blastomussa*, with *Bantamia merleti* Wells, 1961 as type species, on material actually belonging to *B. wellsi*. Wijsman-Best (1973: 154, figures 1 & 2) has characterized her new species as 'Colony phaceloid; budding extratentacular. Calices more or less round, average diameter 11 mm (ranging from 9 to 13 mm); septa ranging in number from 24 to 32 (average 28); septa well developed. Primary septa continuing up to the columella, with four to six teeth. Outer teeth near the theca strong (Mussidae type), giving the corallite a spiny appearance. The teeth continue on the costal ridge up to the edge zone. No paliform lobes present; columella trabecular. Theca septothecal, about 2–3 cm high, occasionally up to 5 cm.'

Therefore, Wells (1968: 276, figures 4 & 5) described *Blastomussa*, in the sense of *B. wellsi*, as 'Colonial; colony formation by extra-tentacular budding from the edge-zone, producing small phaceloid tufts of erect cylindrical corallites. Corallite walls septothecal, costate, with narrow edge-zone and delicate epitheca. Septa stout, mussoid, composed of several fan systems each forming a low, rounded, lobulate tooth. Columella coarsely trabecular. Dissepiments (Fig. 4) coarsely vesicular, steeply inclined downward from the wall and rising axially. Polyps (previously described by Wells) lacking organic connection in adult stage.'

This description cannot be applied to sub-plocoid *B. loyae*, lacking mussid-like dentate septa. The latter can be attributed to *B. wellsi* from Great Palm Island, Eastern Australia, figured in Veron & Pichon (1980: figure 395). As corallites measure up to 30 mm in diameter, the given magnification index of ×1 is in error for ×3.

Fig. 5. Part of IPUW 6273, *Blastomussa merleti*, from 45 m depth, and ~1700 m distance on profile B7, northern bay of Safaga, collected on 15 November 1986 (Piller & Pervesler, 1989). Note phaceloid structure and smaller corallites than in *B. loyae*.

CONCLUSIONS

The separation of *Blastomussa merleti* and *B. loyae* is based: (1) on the different growth form, phaceloid versus sub-plocoid; (2) smaller versus bigger corallite diameter; and (3) on their co-occurrence next to each other. From the above-provided information and evidence, it seems appropriate to regard *B. loyae* as a valid species, while its assignment to Mussidae appears uncertain.

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Correspondence should be addressed to:
K. Kleemann
Department of Palaeontology
University of Vienna, Geozentrum, UZA II
Althanstraße 14, A-1090, Vienna, Austria
email: karl.kleemann@univie.ac.at

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