

Recognition of *Dichotomaria major* (Decaisne) *comb. nov.* (Rhodophyta, Galaxauraceae) from Timor and Australia, based on *Galaxaura major* Decaisne

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In 1842, Decaisne described the new species *Galaxaura major*, with the type statement "Nov. Holl. Iter Freycinet" [Australia] (Decaisne 1842: 115) and including "*Galaxaura umbellata*. – Var. *major*. Lmx herb." Unfortunately, precise locality information was not given, but Louis-Claude Desaulses De Freycinet (1778–1842) was the cartographer-surveyor on board *Le Naturaliste*, part of the Baudin expedition that visited (primarily) the west and south coasts of Australia (Cowan & Ducker, 2007; Marchant & Reynolds, 2021). This taxon was briefly mentioned by Kjellman (1900: 86) in relation to *G. dolicharthra* Kjellman, but its identity was not discussed. The species was also mentioned by Papenfuss & al. (1982: 402), but again no taxonomic judgements were proposed. Since then, the species has seemingly disappeared from view, as it was not treated by Huisman & Borowitzka (1990), or Huisman & Kurihara (2006). Grunow (1874: 37) noted that material he had examined "*entspricht der Harvey schen Abbildung der G. obtusata in der Phycologia australis*" [corresponds to Harvey's illustration of *G. obtusata* in the *Phycologia australis*]. Based upon Decaisne's description and Grunow's observations, *G. major* would appear to be the taxon that is currently known as *Dichotomaria obtusata* in Australia (see Huisman, 2019).

The Lamouroux specimen mentioned by Decaisne (1842) is in CN (Fig. 1) but the locality is Timor, not Australia. We had initially suspected that a second Australian specimen must have been part of the original material, but the CN specimen is clearly labelled "Freycinet" and what may be the number "27", and the Baudin expedition also visited Timor in 1801 (Cowan & Ducker, 2007: 5). Given the near proximity of Timor to Australia (c. 500 km north of the Australian coast) and that precise localities were generally not given, Decaisne attributed the specimen to the more general "Nov. Holl." We therefore suggest that the CN specimen is the only one examined by Decaisne and can be regarded as the holotype.

Based upon its appearance, this specimen agrees with *D. obtusata* as is known in Australia.

Huisman & Borowitzka (1990) and Huisman (2006) followed the lead of Papenfuss & al. (1982) in treating many *Galaxaura* (at the time including *Dichotomaria*) species as taxonomic synonyms, drastically reducing the number of accepted species. However, subsequent molecular analyses (e.g., Huisman & al. 2018) have demonstrated considerable species-level divergence, and the complex task of teasing out the older species that warrant recognition is proceeding. As shown by Schneider & al. (2016), Huisman & al. (2018), and Santos & al. (2020), *Dichotomaria obtusata* appears to be a species complex. Unfortunately, topotype *D. obtusata* does not appear in molecular libraries, and thus comparisons cannot be made with authentic West Indies material; however, *G. obtusata* var. *major* W.R. Taylor is represented based on the type specimen from Bermuda and is clearly distinct from the Australian *D. obtusata*. Given the considerable geographic separation between the West Indies and Australia, it is highly likely that the Australian '*D. obtusata*' represents a separate species. We therefore resurrect the Decaisne species to accommodate the Australian entity and propose the combination in *Dichotomaria*, below.

The CN holotype is not available for sampling and thus cannot be sequenced. As such, we designate as epitype an Australian specimen for which sequences are available, to anchor the concept of the species.

Dichotomaria major (Decaisne) Huisman & Guiry, *comb. nov.*

Basionym: *Galaxaura major* Decaisne, *Annales des Sciences Naturelles, Botanique, Seconde Série* 18: 115.

Homotypic synonym: *Galaxaura obtusata* var. *major* (Decaisne) Grunow (1874: 37)

[*Galaxaura obtusata* auct. non (J.Ellis & Solander) J.V.Lamouroux: Huisman & Borowitzka (1990: 161–162); *Dichotomaria obtusata* auct. non (J.Ellis & Solander) Lamarck; Huisman & Kurihara (2006: 19)]

Holotype: CN, Herb. Lamouroux (Fig. 1).

Type locality: Timor, *Iter* Freycinet.

Epitype (**designated here**): PERTH 08829020 (Cox1: GenBank: MG887862.1). Little Armstrong Bay, Rottnest Island, Western Australia, 27 Jan. 2014, *J.M. Huisman 27.1.14.2.4.* (Fig. 2).

Subsequent to Decaisne's publication, Grunow (1874: 37) placed *G. major* Decaisne as a variety of *Galaxaura obtusata*. In 1960, Taylor proposed the new variety of *Galaxaura obtusata* var. *major* W.R.Taylor, based on specimens from Bermuda. Taylor was clearly unaware of the earlier Grunow combination, and *G. obtusata* var. *major* W.R.Taylor is a later homonym. As this name is illegitimate, it cannot be used as the basionym for a new combination (ICN Art. 6.10; Turland & al., 2008), and Wynne's later placement of this variety in *Dichotomaria* (Wynne, 2005) should be treated as a new name (ICN Art. 58.1) attributed solely to Wynne and cited as:

Dichotomaria obtusata var. *major* M.J.Wynne, 2005: 84.

Replaced synonym: *Galaxaura obtusata* var. *major* W.R.Taylor 1960: 342, *nom. illeg., non Galaxaura obtusata* var. *major* (Decaisne) Grunow 1874.

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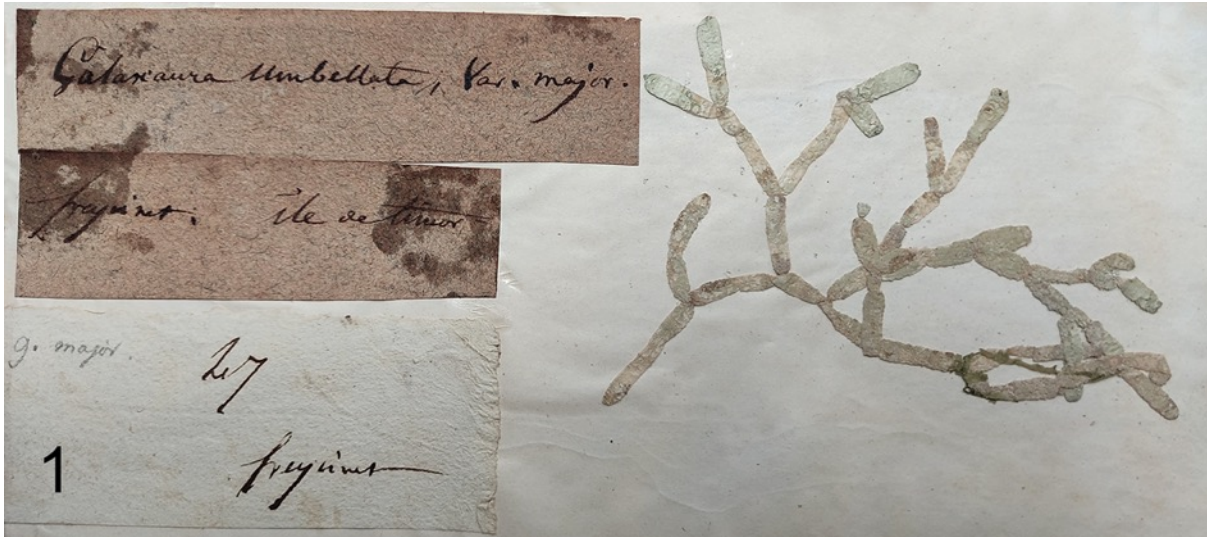


Fig. 1. *Galaxaura major* Decaisne. The holotype specimen from Timor. Annotations written by J.V. Lamouroux. (CN, Herb. Lamouroux). Photo courtesy Anne-Marie Rusig (CN).



Fig. 2. *Dichotomaria major* (Decaisne) Huisman & Guiry. Epitype specimen from Rottneest Island, Western Australia (PERTH 08829020). Scale bar = 1 cm.