

A revision of the Iblidae and the stalked barnacles (Crustacea: Cirripedia: Thoracica), including new ordinal, familial and generic taxa, and two new species from New Zealand and Tasmanian waters

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Abstract

The discovery of two diminutive and very distinct ibliform barnacles from shallow waters off northern New Zealand and northeastern Tasmania provides an opportunity to re-evaluate the Iblidae, the most primitive of the living thoracicans. These are retained within the Superorder Thoracica, but are distinguished at ordinal level from the remainder of the Pedunculata *s.l.* The resultant new order, the Ibliformes *nov.*, comprises barnacles with predominantly chitinous rather than calcareous capitular plates; two families are recognized, the Iblidae *s.s.*, comprising two subfamilies, the Iblinae (*Ibla s.s.*) and the Neoiblinae *nov.* (*Neoibla gen. nov.*), and the Idioiblididae *nov.* comprising the Idioiblinae *nov.* (*Idioibla gen. nov.*) and the Chaetolepadinae *nov.* (*Chaetolepas Studer, 1889* and *Chitinolepas gen. nov.*). The monotypic *Chitinolepas* further highlights the high endemism and relict nature of the New Zealand marine fauna in particular and the southern hemisphere in general. On the basis of morphology and, where possible, genetic and larval work, it is recommended that the remainder of the stalked thoracicans be divided between three new orders, the †Cyprilepadiformes, Ibliformes, Lepadiformes and Scalpelliformes.

Key words: Cirripedia; Thoracica; †Cyprilepadiformes *ord. nov.*; Ibliformes *ord. nov.*; Lepadiformes *ord. nov.*; Scalpelliformes *ord. nov.*; Iblidae; Idioiblididae *fam. nov.*; †*Illilepas incertae sedis*; *Chaetolepas*; *Chitinolepas gen. nov.*; *Ibla*; *Idioibla gen. nov.*; *Neoibla gen. nov.*; apatite-calcite mineralization; naupliar setation, cyprid lattice organs; molecular clock calibration

Introduction

The Iblidae has been interpreted as an ancient clade of thoracican barnacles having roots in the early Palaeozoic (Newman, *et al.*, 1969: Table 3), and molecular genetics has borne this out (Pérez-Losada, *et al.*, 2004). The uniqueness of this group has been known since Darwin (1852), who noted the relatively undifferentiated cirri, the largely chitinous capitular and peduncular armament and the post-oral placement of the carapace adductor muscle, as in what became Acrothoracica and the then yet to be discovered Ascothoracida.

The first iblomorph was described as *Anatifa quadrivalvis* by Cuvier in 1817 from Kangaroo Island, South Australia. Cuvier gave it to Leach (1825) who recognized its uniqueness and proposed the family Iblidae, as well as the genus *Ibla*, to accommodate it. But it was not until Darwin (1852) dissected and described his new species, *Ibla cumingi* from the Philippines (= *I. sibogae* Hoek, 1907 from Malayan waters), that the remarkable sexuality of the genus became known to science. Darwin not only discovered his new species was a female accompanied by a much smaller and somewhat reduced ‘dwarf’