



A cladistic analysis and reclassification of the tribe Bembicini (Hymenoptera: Crabronidae: Bembicinae)

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Abstract

A cladistic analysis of the digger wasp tribe Bembicini based on morphological characters is presented. The underlying data matrix comprises 64 terminal taxa (coded on genus-level) and 54 morphological characters. The resulting strict consensus tree was used as the basis for a revised subtribal classification of the Bembicini. Based on a previously published classification, we herewith propose a number of changes. The subtribe Spheciina Nemkov and Ohl, **subtrib. nov.** (comprising *Ammatomus* A. Costa 1859, *Kohlia* Handlirsch 1895, *Sphecius* Dahlbom 1843, and *Tanyoprymnus* Cameron 1905) is removed from Handlirschiina Nemkov and Lelej 1996. The subtribe Stictiellina Bohart and Horning 1971, **stat. resurr.** (composed of *Chilostictia* Gillaspay 1983, *Glenostictia* Gillaspay in Gillaspay, Evans, and Lin 1962, *Microstictia* Gillaspay 1963, *Steniolia* Say 1837, *Stictiella* J. Parker 1917, and *Xerostictia* Gillaspay 1963) is separated from Bembicina Latreille 1802. The subtribe Argogorytina Nemkov and Lelej 1996 (*Argogorytes* Ashmead 1899, *Neogorytes* Bohart in Bohart and Menke 1976, *Paraphilanthus* Vardy 1995) is synonymized with Exeirina Dalla Torre 1897, **syn. nov.** Finally, the subtribe Trichogorytina Nemkov and Pulawski 2009 (genus *Trichogorytes* Rohwer 1912 only) is synonymized with Gorytina Lepeletier de Saint Fargeau 1845, **syn. nov.** An updated identification key to the subtribes of the Bembicini is provided.

Key words: Digger wasps, sand wasps, phylogeny

Introduction

The Bembicini, as understood here and in the generally accepted classification, *e.g.*, as proposed by W. J. Pulawski (2010) in his internet catalog of apoid wasps, is a large and diverse group of apoid wasps (due to the paraphyletic status of the historical "Sphecidae" with respect to the bees [*e.g.*, Melo (1999); Ohl & Spahn (2010)], it has become quite popular in the literature to refer to the former "Sphecidae" as sphecid, sphecoid, or apoid wasps as an informal grouping within the Apoidea that excludes bees). An appropriate vernacular name for the Bembicini is "sand wasps", first proposed by Evans (1966) as an allusion to the sandy habitats and ground nesting behavior of most species. The Bembicini are probably best represented by one of the best-known wasp genera in all Aculeata, the genus *Bembix* Fabricius 1775. Wasps of this genus are known from all continents, and early in the history of behavioral biology, some species became the favorite target in behavioral studies. Many species are relatively large, have bright color and unique color patterns, build large nesting aggregations and exhibit a complex nesting and predatory behavior. *Bembix* is a very large genus with about 350 currently known valid species (Pulawski 2010), but only for approximately less than 18% of the species, even fragmentary notes on the behavior are known. However, *Bembix* can be regarded as a relatively well-known genus, and is in stark contrast to the behavioral and morphological diversity of its closest relatives, which are grossly understudied. This is not only the case for behavioral studies, which are lacking for the majority of non-*Bembix* bembicines, but also for the higher-level classification within the Bembicini, which is still far from being settled.

The Bembicini comprise more than 1400 recognized species, which are subdivided in 62 genera and eight subtribes (Nemkov & Pulawski 2009, Pulawski 2010). This rather heterogeneous grouping has no formal equivalent in