

## Taxonomic studies on the *Bembidion* ('*Cillenus*') complex (Coleoptera: Carabidae): A revision of the subgeneric taxonomy and description of a new species from Japan

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### Abstract

The supraspecific taxonomy of the coastal carabid *Bembidion* ('*Cillenus*') complex is controversial because a single 'synapomorphy,' a large head with long mandibles, may be the result of functional convergence. This study examined the phylogeny of *B.* ('*Cillenus*') complex based on morphological characters to revise the complicated taxonomy of this group. All type species of the genera concerned were included, and membranous parts of the genitalia (male endophallus and female vagina and spermatheca) were examined for the first time. Because all species are treated under the genus *Bembidion* Latreille (s. l.), *Bembidion umi* nom. nov. is proposed as a new name for *Sakagutia marina* Uéno. In the resultant tree, reciprocal monophyly of most traditional taxa was not supported, whereas a monophyletic group of the following seven species was relatively well supported: *B. seticornis* Lindroth, *B. yokohamae* (Bates), *B. sumaoi* Morita, *B. aestuarii* (Uéno & Habu), *B. tokunoshimanum* (Nakane), *B. tsutsuii* (Uéno), and *B. yakushimanum* sp. nov. Based on these results, the subgenus *Desarmatocillenus* Netolitzky (type species: *B. yokohamae*) was redefined, and two subgenera were synonymised with it: *Novicillenus* Uéno & Habu (type species: *B. aestuarii*) syn. nov., and *Corallicillenus* Uéno (type species: *B. tsutsuii*) syn. nov. *Bembidion* (*Desarmatocillenus*) *yakushimanum* sp. nov. is described from Japan.

**Key words:** Bembidiina, *Bembidion umi* nom. nov., *Bembidion yakushimanum* sp. nov., complicated taxonomy, *Desarmatocillenus*, morphological phylogeny, new synonymy

### Introduction

The *Bembidion* ('*Cillenus*') complex as treated here includes about 20 species. Adults of the group are characterized by a small- to medium-sized body, relatively slender habitus, and large head with long mandibles (Lindroth 1980; Morita 1985, 1993). All species are coastal, inhabiting the tidal zone or at least occurring close to the seashore (Uéno 1955a; Lindroth 1980; Morita 1985, 1993). The distribution is highly disjunct, with a single species in Europe (*B. laterale* (Samouelle)), and the remaining species in the western Pacific, ranging from Australia to the Far East (Lindroth 1980; Marggi *et al.* 2003; Toledano 2005).

Several classificatory schemas have been proposed for this group. Uéno (1952a) did not believe that the Japanese and Taiwanese species were closely related to the European species, and treated all Japanese and Taiwanese species under the genus *Armatocillenus* Dupuis. Nakane (1963) and Morita (1985, 1993) followed him. Lindroth (1980) classified all known species of the group in five subgenera of the genus *Bembidion* Latreille: *Cillenus* (s. str.), *Armatocillenus*, *Desarmatocillenus* Netolitzky, *Chinocillenus* Netolitzky, and *Corallicillenus* Uéno; however, he did not consider these subgenera as constituting a monophyletic group within the genus. In the same paper, Lindroth (1980) described some *Cillenus*-like New Zealand species under the new genus *Zecillenus*, but this genus was later treated as a subgenus of *Bembidion* (cf. Toledano 2005). In the