



## Revision of Palaearctic and Oriental *Necrophila* Kirby & Spence, part 2: subgenus *Chrysozilpha* Portevin (Coleoptera: Silphidae)

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### Abstract

A taxonomic revision of the subgenus *Chrysozilpha* Portevin, 1921 (of the genus *Necrophila* Kirby & Spence, 1828) is presented. Three valid species are recognized: (1) *N. (C.) formosa* (Laporte, 1832), comb. nov. (ex *Silpha* Linnaeus, 1758), widely distributed from Laos and Vietnam through the Malay Peninsula, to Sumatra and Bali, with *Silpha chloroptera* Laporte, 1840 and *Chrysozilpha chloroptera* var. *magnifica* Portevin, 1921 as newly established junior subjective synonyms; (2) *N. (C.) renatae* (Portevin, 1920), comb. nov. (ex *Silpha*), endemic to Sulawesi; and (3) *N. (C.) viridis* (Motschulsky, 1861), comb. nov. (ex *Oiceoptoma* Leach, 1815), endemic to the Philippines. Lectotypes are designated for *Silpha formosa* Laporte, 1832; *Silpha chloroptera* Laporte, 1840 and *Chrysozilpha chloroptera* var. *magnifica* Portevin, 1921. Georeferenced records for all three species are mapped. Parsimony analysis supports the monophyly of *Chrysozilpha*, with *N. (C.) formosa* as the sister to a clade of *N. (C.) renatae* and *N. (C.) viridis*. Geometrical morphometrics (thin-plate spline) discriminated the three species of *Chrysozilpha*; the first two relative warp axes indicated 70.31% shape variation in males and 77.18% in females, which was further confirmed by MANOVA to be highly significant. Canonical variate analysis indicated no overlap between the three taxa and enabled a 100% correct classification of each specimen to its group mean.

**Key words:** taxonomy, new synonymy, new combination, phylogeny, geometric morphometrics, distribution, Oriental region, Wallacea

### Introduction

Portevin (1921) erected *Chrysozilpha* as a separate genus, close to *Calosilpha* Portevin, 1920 (described by Portevin 1920a), to accommodate five species of carrion beetles with colorful adults: *Chrysozilpha formosa* (Laporte, 1832), *C. chloroptera* (Laporte, 1840), *C. renatae* (Portevin, 1920), *C. viridis* (Motschulsky, 1861) and *C. coelestis* (Dohrn, 1875), all from the Oriental region. In the same paper, he also described *C. chloroptera* var. *magnifica*, based on minor differences in shine of the elytral surface (Portevin 1921). Portevin (1926) redescribed the genus, and provided a detailed key and a catalogue. However, *Silpha formosa* Laporte, 1832 was designated as the type species of *Chrysozilpha* only subsequently by Hatch (1928), who also treated *Chrysozilpha* as a subgenus of *Silpha* Linnaeus, 1758. Later, Arnett (1950) treated the only species of this clade from the Philippines as *Oiceoptoma (Thanatophilus) viridis*. Only recently, Peck (2001) and Sikes (2008) listed *Chrysozilpha* along with *Calosilpha*, *Deutosilpha* Portevin, 1920 and *Eusilpha* Semenov, 1890 as subgenera of *Necrophila* Kirby & Spence, 1828, following an unpublished taxonomic revision by A.F. Newton, Jr. This classification is also followed here, and detailed phylogenetic relationships of all subgenera will be treated in a separate study (J. Růžička, unpublished).

Recently, Ikeda *et al.* (2008) published a phylogenetic reconstruction of the Silphinae based on sequences of one mitochondrial gene (16S) and three nuclear genes (28S, wingless (Wg), and phosphoenolpyruvate carboxykinase (PepCK)). Both Bayesian analysis and maximum parsimony produced the following tree topology: *Necrophila* + (*Eusilpha* + (*Calosilpha* + *Chrysozilpha*)) (Ikeda *et al.* 2008: 2072, fig. 1).