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Revision of Palearctic and Oriental *Necrophila* Kirby et Spence, part 3: subgenus *Calosilpha* Portevin (Coleoptera: Silphidae: Silphinae)

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Abstract

A taxonomic revision of the subgenus *Calosilpha* Portevin, 1920 (of the genus *Necrophila* Kirby & Spence, 1828) through Asia is presented. Four valid species are recognized: (1) *Necrophila* (*C.*) *brunnicolis* (Kraatz, 1877), widely distributed from Bhutan and China: Yunnan province to Far East of Russia and Japan (including Ryukyu Islands); (2) *N.* (*C.*) *cyaneocephala* (Portevin, 1914), endemic to Taiwan; (3) *N.* (*C.*) *cyaniventris* (Motschulsky, 1870), widely distributed from northern India to Vietnam and southern China (east to Hainan Island); and (4) *N.* (*C.*) *ioptera* (Kollar & Redtenbacher, 1844), comb. nov. (ex *Calosilpha*), widely distributed in Pakistan, India (Himachal Pradesh to Assam) and Nepal. *Eusilpha* (*Calosilpha*) *bicolor imasakai* Nishikawa, 1986 and *Eusilpha* (*Calosilpha*) *kurosawai* Nishikawa, 1986 are confirmed as junior subjective synonyms (*sensu* Cho & Lee 1995, Ji 2012) of *Silpha brunnicolis* Kraatz, 1877. Description of important adult taxonomic characters (including male genitalia) and a key to species is included. Georeferenced records for all four species are mapped. First reliable records of *Necrophila* (*Calosilpha*) *brunnicolis* from China: Hong Kong and Anhui, Fujian, Gansu, Hubei, Jiangxi, Jilin, Qinghai and Zhejiang provinces and Guangxi autonomous region; *N.* (*C.*) *cyaniventris* from India: Himachal Pradesh, Uttarakhand, Meghalaya, Arunachal Pradesh, Nagaland and Manipur; and *N.* (*C.*) *ioptera* from Pakistan, India: Uttarakhand, Uttar Pradesh, Bihar, Sikkim, West Bengal and Assam are given (only imprecise records from “Himalaya” had been published for the last two species). First records of *N.* (*C.*) *brunnicolis* from Bhutan, and of *N.* (*C.*) *cyaniventris* from China: Hainan and Yunnan provinces, Myanmar, Laos and Cambodia are given. Parsimony analysis supports the monophyly of *Calosilpha*, with two clades, one formed by *N.* (*C.*) *brunnicolis* and *N.* (*C.*) *cyaneocephala* and the other by *N.* (*C.*) *cyaniventris* and *N.* (*C.*) *ioptera*. Geometric morphometrics discriminated four taxa of *Necrophila* (*Calosilpha*). Results indicated a sexual dimorphism between sexes in all species. Shape variability was concluded between the taxa. Populations of *N.* (*C.*) *brunnicolis* from continental Asia and three regions of Japan (Honshu + Shikoku, Kyushu and Ryukyus) also were examined. MANOVA was significant and supported shape differences in male and female populations. When testing each pair of groups by discriminant analysis, only differences between male populations from Japan (Kyushu) and those from Japan (Honshu + Shikoku) showed insignificance.

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

Introduction

Portevin (1920b) erected *Calosilpha* as a subgenus of *Eusilpha* Semenov, 1890, originally to accommodate seven species: *E.* (*C.*) *ioptera* (Kollar & Redtenbacher, 1844), *E.* (*C.*) *bicolor* (Fairmaire, 1899), *E.* (*C.*) *cyaniventris* (Motschulsky, 1870), *E.* (*C.*) *gilleti* Portevin, 1920, *E.* (*C.*) *formosa* (Laporte, 1832), *E.* (*C.*) *viridis* (Motschulsky, 1861) (Motschulsky 1861a), and *E.* (*C.*) *coelestis* (Dohrn, 1875). Later the same year, Portevin (1920a) described *E.* (*C.*) *renatae*. The next year, Portevin (1921) combined the four later names into his newly constituted genus *Chrysosilpha* and removed them from *Calosilpha* (see Růžička *et al.* (2012) for further nomenclature details on *Chrysosilpha*). Portevin (1926) treated *Calosilpha* as a separate genus with seven species, further accommodating *C.* *brunnicolis* (Kraatz, 1877) (misspelled as *brunneicollis*), *C.* *cyaneocephala* (Portevin, 1920) (described originally in *Eusilpha*) and *C.* *obscuriventris* (Motschulsky, 1870) (treated as species *incertae sedis*). Hatch (1928: