



## Phylogeny and taxonomic revision of the subgenus *Velleius* Leach (Coleoptera: Staphylinidae: Staphylininae)

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### Abstract

The subgenus *Velleius* Leach, 1819 of the genus *Quedius* Stephens, 1829 is a small and very distinctive group in the subtribe Quediina (Staphylinidae: Staphylininae) with pectinate antennal segments and larvae living in nests of *Vespa* species. This paper reviews the taxonomy of all *Velleius* species and analyzes the phylogeny of this group. Two new species, *Quedius (Velleius) sagittalis* **sp. nov.** from Shaanxi, China and *Q. (V.) rectilatus* **sp. nov.** from Guangdong, China, are described. *Q. (V.) simillimus* (Fairmaire, 1891) **syn. nov.** is proposed as a new synonym of *Q. (V.) pectinatus* (Sharp, 1874). Phylogenetic result shows that all nine *Velleius* species can be divided into two clades and both have strong tree supports of Bremer/Bootstrap/Jackknife values.

**Key words:** *Velleius*, new species, phylogeny, geographical distribution, China

### Introduction

The subgenus *Velleius* Leach, 1819 of the genus *Quedius* Stephens, 1829 is a small and very distinctive group in the subtribe Quediina (Staphylinidae: Staphylininae) with pectinate antennal segments and larvae living in nests of *Vespa* species (Watanabe 1991; Naomi 1996). It was established by Leach (1819) and *Staphylinus dilatatus* Fabricius, 1787 was subsequently designed as the type species by Westwood (1838). In two most recent publications, taxonomists debated strongly about the status and the validity of *Velleius* Leach as a genus-level taxon (Solodovnikov, 2011; Smetana, 2013). Solodovnikov (2012) preferred to synonymize *Velleius* Leach with *Quedius* Stephens and emphasized the closeness between *Velleius* Leach and *Microsaurus* Dejean. Smetana (2013) did not support this argument and proposed to treat *Velleius* Leach as a valid subgenus within the genus *Quedius* Stephens. In this study, we followed Smetana (2013) and treated *Velleius* Leach as a subgenus, with the emphasis on the in-group phylogeny of *Velleius* species.

In the taxonomic history of *Velleius* species, Leach (1819) was the author who erected *Velleius* based on two species: *Staphylinus dilatatus* Fabricius (1787) and *S. concolor* Marsham (1802), but the second species, *S. concolor*, was later considered as a synonym of *S. dilatatus* (Germar 1823; Porta 1907; Coiffait 1978). Several decades after its erection, three more species were described: *Velleius pectinatus* Sharp, 1874, *V. setosus* Sharp, 1889, and *V. simillimus* Fairmaire, 1891. Thereafter it was a long pause until the most recent time and then four additional species were described from eastern Asia, namely, *V. elongatus* Naomi, 1986, *V. amamiensis* Watanabe, 1990 and *V. japonicus* Watanabe, 1990 from Japan and *V. circumipectus* Cho, 1996 from Korea. Before our study, the world fauna of *Velleius* contained eight species. Indeed, it was a very small and poorly known group. The special life style of larvae (living with *Vespa* species) and difficult to get new materials made it even more difficult to study from the viewpoint of taxonomy, phylogeny and/or ecology. Moreover, in modern systematics, unraveling phylogenetic relationships among different *Velleius* species was fundamental to understand their evolution and diversification. This paper therefore concentrates on phylogeny and taxonomy of this group.

In this paper, we report our results of phylogenetic study and revise taxonomically all known *Velleius* species.