



The European species of *Chalarus* Walker, 1834 revisited (Diptera: Pipunculidae)

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Abstract

The European representatives of the pipunculid genus *Chalarus* are taxonomically revised. *Chalarus absconditus* Kehlmaier **spec. nov.**, *C. immanis* Kehlmaier **spec. nov.**, *C. marki* Kehlmaier **spec. nov.** and *C. saxonicus* Kehlmaier **spec. nov.** are described as new to science. Males of *C. pughi* Coe, 1966, *C. clarus* Jervis, 1992 and *C. longicaudis* Jervis, 1992 are characterized for the first time, as is the female for *C. griseus* Coe, 1966. A lectotype is designated for *Chalarus velutinus* Macquart, 1834 and the name is proposed for synonymy with *C. spurius* (Fallén, 1816). *Chalarus parmenteri* Coe, 1966 and *C. perplexus* Jervis, 1992 are proposed as junior synonyms of *C. holosericeus* (Meigen, 1824). The assignment of males and females is established through DNA barcodes, using fragments of the mitochondrial coding gene cytochrome oxidase subunit I (coxI) and nuclear Second Internal Transcribed Spacer region (ITS2). An identification key to the European representatives of the genus is provided, including figures of male and female terminalia for most species.

Key words: Diptera, Pipunculidae, *Chalarus*, identification key, DNA barcoding, new species, Palaearctic

Introduction

Pipunculidae or big-headed flies are a family of cyclorrhaphous Diptera, comprising at present almost 1,400 valid species from all biogeographic regions (Skevington 2005). Their larvae are highly specialized endoparasitoids of Auchenorrhyncha (Cercopidae, Cicadellidae, Cixiidae, Delphacidae, Flatidae, Issidae and Membracidae) (Waloff & Jervis 1987) and Diptera (Tipulidae) (Koenig & Young 2007) and play an important role in the natural regulation of their host populations. At present, it is believed that Pipunculidae are monophagous on a generic level, i.e., virtually each genus of Pipunculidae is parasitic on one subfamily of Auchenorrhyncha (Waloff & Jervis 1987), with the exception of *Nephrocerus* Zetterstedt, 1838 which parasitizes *Tipula* Linnaeus, 1758. So far, *Chalarus* Walker, 1834 has been found to be exclusively parasitic on the Auchenorrhyncha subfamily Typhlocybinae.

European *Chalarus* were systematically revised only recently by Jervis (1992), who provides detailed descriptions and figures for all 21 species known then, describing eleven as new to science. The merits of his work lie in the study of available type material plus several important private and institutional collections, as well as collecting and rearing a great deal of the material by himself from its typhlocybinae hosts. That way, he was also able to investigate and compare larval and pupal features for more than half of the European taxa. Nevertheless, the limits of his work must be seen in the introduction of many species based on females only (seven out of eleven) and the rather tentative association of males and females, leaving numerous taxonomic gaps open.

Our recent collecting efforts have revealed a number of unknown morphospecies, especially males with distinct genital features. As many species of *Chalarus* occur in sympatry and are known from one sex only, a study was initiated to investigate the systematics of European *Chalarus* in an integrative approach, combining known morphological and ecological data with newly generated molecular evidence. The assignment of males