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

CHRISTIAN KEHLMAIER1 & THORSTEN ASSMANN2

1State Natural History Collections Dresden, Museum of Zoology, Königsbrücker Landstrasse 159, D–01109 Dresden, Germany. E-mail: kehlmaier@web.de

2Leaphana University Lüneburg, Institute of Ecology and Environmental Chemistry, Scharnhorststrasse 1, D-21314 Lüneburg, Germany. E-mail: assmann@uni-lueneburg.de

Table of contents

Abstract ...................................................................................................................... 2
Introduction ............................................................................................................. 2
Current systematics of *Chalarus* and the problems involved ........................................... 3
Material and methods ............................................................................................ 3
Results .................................................................................................................... 5
  Descriptions of new species .................................................................................. 5
  *Chalarus absconditus* Kehlmaier spec. nov. ......................................................... 3
  *Chalarus immanis* Kehlmaier spec. nov. ................................................................ 3
  *Chalarus marki* Kehlmaier spec. nov. .................................................................. 7
  *Chalarus saxonius* Kehlmaier spec. nov. .............................................................. 9
  *Chalarus spurius*.................................................................................................. 12

Taxonomic synopsis of European *Chalarus* ................................................................ 17
  *Chalarus* Walker, 1834 ...................................................................................... 17
  *Chalarus absconditus* Kehlmaier spec. nov. ......................................................... 18
  *Chalarus argenteus* Coe, 1966 ........................................................................... 18
  *Chalarus basalis* Loew, 1873 ............................................................................. 18
  *Chalarus brevicaudis* Jervis, 1992 ...................................................................... 19
  *Chalarus clarus* Jervis, 1992 ............................................................................. 19
  *Chalarus decorus* Jervis, 1992 .......................................................................... 20
  *Chalarus elegantulus* Jervis, 1992 .................................................................... 20
  *Chalarus exiguis* (Haliday, 1833) .................................................................... 21
  *Chalarus fimбриatus* Coe, 1966 ....................................................................... 21
  *Chalarus griseus* Coe, 1966 ............................................................................ 21
  *Chalarus gynocephalus* Jervis, 1992 .................................................................. 22
  *Chalarus holosericeus* (Meigen, 1824) ................................................................. 23
  *Chalarus immanis* Kehlmaier spec. nov. ............................................................ 23
  *Chalarus indistinctus* Jervis, 1992 .................................................................... 24
  *Chalarus juliae* Jervis, 1992 ............................................................................. 24
  *Chalarus latifrons* Hardy, 1943 ......................................................................... 25
  *Chalarus leticiae* Kehlmaier, 2003 ................................................................... 25
  *Chalarus longicaudis* Jervis, 1992 .................................................................... 25
  *Chalarus marki* Kehlmaier spec. nov. ................................................................ 26
  *Chalarus proprius* Jervis (1992) ...................................................................... 26
  *Chalarus pughii* Coe, 1966 ............................................................................... 26
  *Chalarus saxonius* Kehlmaier spec. nov. ............................................................. 27
  *Chalarus spurius* (Fallén, 1816) ........................................................................ 27

Accepted by D. Bickel: 1 Oct. 2008; published: 19 Nov. 2008
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 monophyletic 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 typhlocybine 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