



## Phylogeny and biogeography of the genus *Piezura* Rondani (Diptera: Fanniidae)

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### Abstract

The Holarctic genus *Piezura* Rondani (Diptera, Fanniidae) is reviewed. Phylogenetic relationships among the species in this group, as well as the biogeography of these species, are discussed on the basis of a cladistic analysis. *Piezura graminicola shanxiensis* Xue, Wang and Wu, 1998 is redescribed and elevated to species rank based on comparison of its morphology and phylogenetic relationships. *Syllegopterula flava* Hsue, 1983 and its replacement name *Thricops flavidus* Xue, 1998 are treated as junior synonyms of *Piezura graminicola* (Zetterstedt, 1846).

**Key words:** *Piezura*, Fanniidae, phylogeny, biogeography, new status, new synonym

### Introduction

Fanniid flies (Diptera: Fanniidae), with 285 species, occur in all zoogeographic regions of the world (Carvalho *et al.* 2003). Four genera are currently recognized in the family: *Fannia* Robineau-Desvoidy, *Euryomma* Stein, *Piezura* Rondani and *Australofannia* Pont (Pont 1986). The small genus *Piezura* is mainly confined to the Holarctic Region and comprises four species and one subspecies (Xue & Wang 1998; Moores & Savage 2005). Moores and Savage (2005) revised the genus *Piezura* worldwide to resolve a series of long standing taxonomic problems. The comprehensive descriptions and keys of all species by Moores and Savage (2005) are useful for taxonomic studies of the group. However, the genus *Piezura* is also an assemblage of species with unclear affinities. The phylogenetic relationships among the species of *Piezura* have not hitherto been studied.

In the present paper, the first phylogenetic analysis of all the *Piezura* species is undertaken using modern taxonomic methods, the distributions of species are updated, and the phylogenetic relationships and biogeography of the species are discussed. *Piezura graminicola shanxiensis* Xue, Wang and Wu, 1998 (treated as *Piezura pardalina shanxiensis* by Moores & Savage 2005) is elevated to species status based on study of its morphology and its phylogenetic relationship with other members of *Piezura*. The species is redescribed from type specimens from Shanxi Province, China. *Thricops flavidus* Xue, 1998 is established as a new junior synonym of *Piezura graminicola* (Zetterstedt, 1846).

### Material and methods

**Taxa and terminology.** The specimens examined for this paper were collected by sweeping from brushwood in mountainous regions of northeast, southeast, and central China. Genitalic structures were detached from the body, cleared by warming in a 10% KOH solution (approximately 100°C) for several minutes, placed in a droplet of glycerol, and observed under a compound light microscope.

No specimens of *Piezura nearctica* Chillcott, *Piezura nigrigenus* Nishida, *Piezura pardalina* Rondani, *Australofannia spiniclunis* Pont, or *Euryomma peregrinum* (Meigen) were available for examination. However, there is no doubt concerning the identity and recognition of these five species because their