



Pseudovidalia Han (Diptera: Tephritidae: Trypetini), a new genus from East Asia proposed based on morphological and molecular data

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ABSTRACT

A new genus, *Pseudovidalia* Han, is proposed for two East Asian tephritid species: *P. rohdendorfi* (Richter) and *P. furialis* (Ito). Morphological and molecular data showed that they do not belong to the genus *Vidalia* Robineau-Desvoidy, in which they have been previously placed. Monophyly of the genus *Pseudovidalia* is also supported by the molecular data as well as the following morphological synapomorphies: 1) frontal setae greatly enlarged with the posterior most pair convergent and distinctly longer than the anterior setae, and 2) female eversible membrane ventrally with numerous short erect setulae between taeniae. Taxonomic confusion involving these two species is clarified based on an examination of many specimens with intra and interspecific variation particularly in the male frontal setae and wing patterns. As a result, *Vidalia furialis* is resurrected from the synonymy of *V. rohdendorfi*. Additionally, a key to the species, descriptions, and photographs are presented.

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Introduction

A new genus, *Pseudovidalia* Han (tribe Trypetini: subtribe Trypetina), is proposed based on *P. rohdendorfi* (Richter, 1963) and *P. furialis* (Ito, 1984). These two species are currently placed in the genus *Vidalia* (Norrbom et al., 1999), but their generic status has been questioned. They both were originally recognized under the genus *Vidalia* Robineau-Desvoidy (Richter, 1963; Ito, 1984), but Han (1992, 1999) did not find any synapomorphy of *Vidalia* in these species, and added them to the unplaced species list of the tribe Trypetini. Han (1999) also assumed their possible relationships to *Acidiella angustifascia* (Hering, 1936) and *A. echinopanacis* (Kandybina, 1966) based on the similar wing pattern and larval host (fruits of Araliaceae). In contrast, Korneyev (1996) proposed it as the sister group of *Hoplandromyia*, and, later, Korneyev (1998) indicated that it might be a sister group of the *Vidalia* group (a clade including *Chenacidiella*, *Hoplandromyia*, and *Vidalia*; sensu Han, 1992, 1999; Han and McPheron, 1994) or at least the latter two. However Han (1999) did not agree with this opinion, based on a comprehensive cladistics analysis of the known genera of the tribe Trypetini (sensu Han, 1999).

The specific statuses of the above two species have also been confused. Ito (1984) described *Vidalia furialis* based on two teneral Japanese males (Korneyev, 1996). This species was later synonymized with *V. rohdendorfi* by Ito and Tamaki (1995) as well as Korneyev (1996). Ito (1985) recognized a third species, *Vidalia brevisalis*, based

on a smaller variant of *V. furialis*, but Ito and Tamaki (1995) correctly synonymized it with *V. furialis* (as *V. rohdendorfi*). However, this synonymy was later questioned by Korneyev (1998), and *Vidalia brevisalis* was erroneously resurrected from the synonymy (Wang, 1998).

Due to the generous help of Masahiro Sueyoshi (FFPRI), I was able to obtain 40 specimens of Japanese *Pseudovidalia furialis* in good condition. I also obtained 19 *P. rohdendorfi* specimens freshly collected from *Acanthopanax chirisanensis* foliage in Korea. An examination of these specimens clearly showed that they were two distinct species with rather extreme variation in the male frontal setae. They also yielded good quality DNA extracts for both species, and a subsequent DNA analysis convincingly indicated their independent generic status. In the present study, the relationships and systematic status of the new genus *Pseudovidalia* are discussed and the generic and specific descriptions as well as a key to the species are provided.

Materials and methods

The terminology and morphological interpretations used in this study follow the glossary of White et al. (1999). The following eight ratios are used: frons-head ratio (narrowest width of frons in dorsal view/width of head); eye ratio (shortest eye diameter/longest eye diameter); gena-eye ratio (genal height/longest eye diameter)—genal height is the distance between ventral eye margin and ventral genal margin anterior to genal seta (gena measured with head tilted slightly dorsally so that gena is at its broadest); vein R_{4+5} ratio (distance along vein R_{4+5} between crossvein R-M and vein R_{4+5} apex/distance

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Table 1

Collection and voucher information of the tephritid flies sequenced. Status of the voucher specimens, voucher specimen numbers, and GenBank accession numbers are indicated in parentheses. Data concerning other flies analyzed in this study are listed in Han (2000) and Han and Norrbom (2008).

Pseudovidalia rohndorfi (Richter). KOREA: Jeollabuk-do, Jangsu-gun, Deoksan-ri, Mt. Jangansan, swept from *Acanthopanax chiisanensis*, 25.VIII.2008, H.-S. Lee et al. N35°37'05.8" E127°34'17.1" (both wings of the sequenced specimen mounted on a rectangular paper; YSUW08100159; GenBank Acc. Nr. JQ412062).

P. furalis (Ito). JAPAN: Ogawa, Kitaibaraki City, Ibaraki Prefecture, Malaise trap, 2002, M. Sueyoshi (same specimens with three right legs detached; FFPRI-Brown-11-2A; GenBank Acc. Nr. JQ412061).

Vidalia armifrons (Portschinsky). JAPAN: Ogawa, Kitaibaraki City, Ibaraki Prefecture, Malaise trap, 2002, M. Sueyoshi (same specimens with three right legs detached; FFPRI-Red-4; GenBank Acc. Nr. JQ412063).

between crossvein R-M and basal node of vein R_{4+5}); vein M ratio (distance along vein M between crossveins R-M and DM-Cu/distance between crossveins R-M and BM-Cu); subcosta-costa ratio (distance along vein C of subcostal cell/costal cell); cell $r_{2+3}-r_1$ ratio (distance along vein C of cell r_{2+3} /cell r_1); wing-thorax ratio (wing length/thorax length).

The depository acronyms cited in this study are as follows: FFPRI, Forestry and Forest Products Research Institute, Tsukuba, Japan; HUS, Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido 060, Japan; UOPJ, Entomological Laboratory, University of Osaka Prefecture, Mosu, Umemachi Sakai, Osaka 593, Japan; YSUW, Division of Biological Science and Technology, Yonsei University, Wonju-si, Gangwon-do 220-710, Korea; and ZISP, Zoological Museum, Academy of Sciences, Russian Academy of Sciences, Universitetskaya-Nabershnyal B-164, St. Petersburg, Russia.

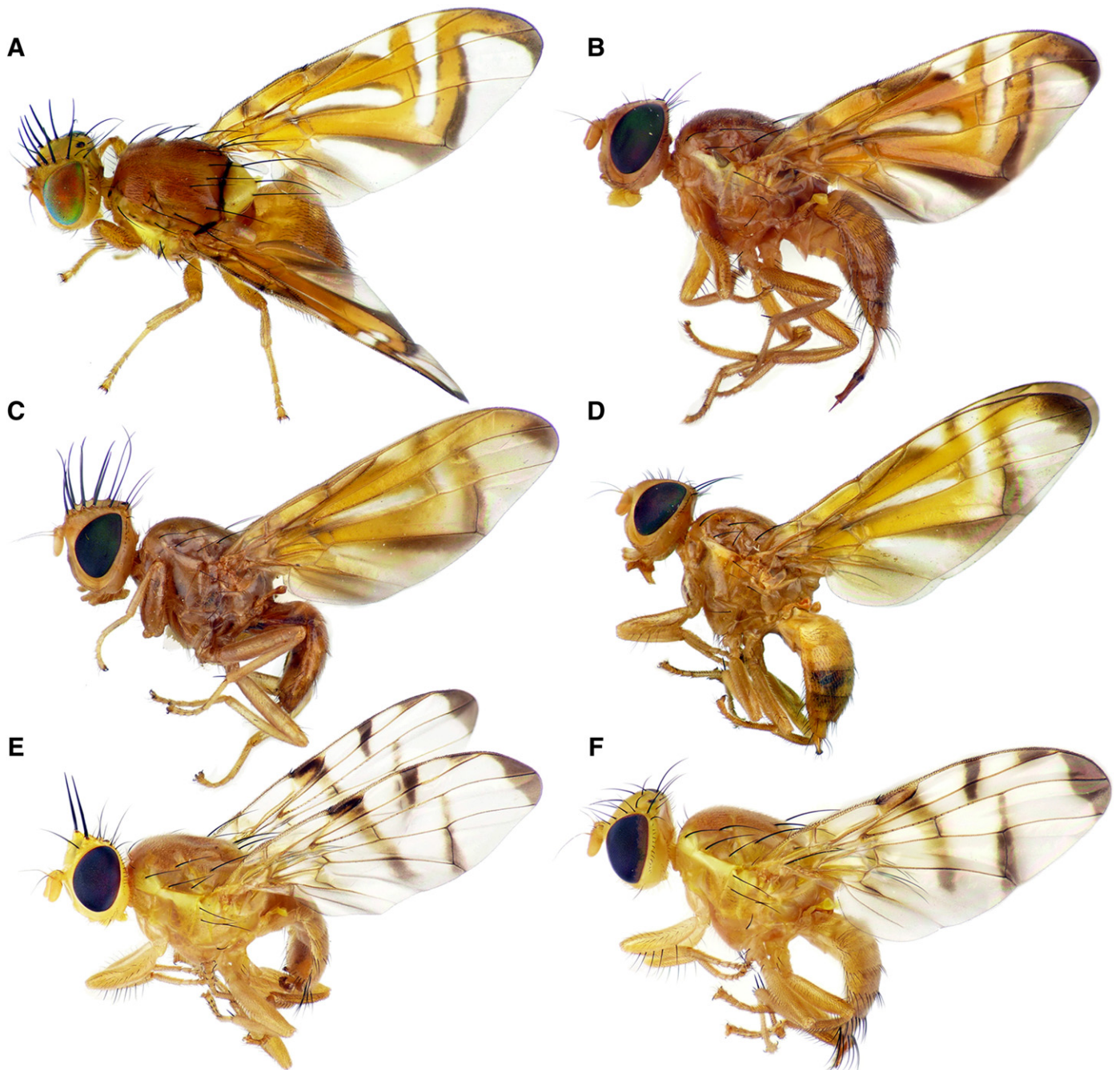


Fig. 1. (A) *Pseudovidalia rohndorfi*, male. (B) *P. rohndorfi*, female. (C) *P. furalis*, male. (D) *P. furalis*, female. (E) *Vidalia accola*, male. (F) *V. accola*, female.

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