

A taxonomic study of the genus *Phasia* (Dip.: Tachinidae) in Iran, with two new records

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Abstract

A review of the genus *Phasia* Latreille in Iran is given. An identification key to the six Iranian species of *Phasia* and illustrations of their male and female terminalia are presented. The species *Phasia obesa* (Fabricius) and *P. pusilla* Meigen are recorded for the first time from Iran.

Key words: *Phasia*, Tachinidae, new records, identification key, Iran

چکیده

مطالعه‌ی تاکسونومیک جنس *Phasia* (Dip.: Tachinidae) در ایران، همراه با دو گزارش جدید

ابراهیم گیلسانی، علی اصغر طالبی، یواخیم زیگلر و شهاب منظری

این مقاله مروری بر جنس *Phasia* Latreille در ایران است. کلید شناسایی شش گونه‌ی جمع‌آوری شده از ایران و ترسیم‌های

مربوط به اندام زادآوری نر و ماده ارایه و دو گونه‌ی *Phasia obesa* (Fabricius) و *P. pusilla* Meigen برای اولین‌بار از ایران

گزارش می‌شوند.

واژگان کلیدی: *Phasia*, Tachinidae، گزارش جدید، کلید شناسایی، ایران

Introduction

The genus *Phasia* Latreille, with 21 described species in the Palaearctic region, is one of the largest genera in the subfamily Phasiinae and in the tribe Phasiini (Herting & Dely-Draskovits, 1993). The *Phasia* species can be considered as one of the most important biological control agents of true bugs (Hem.: Heteroptera) (Sun & Marshall, 2003). Because of their significant role in biological control of some important pests, such as *Eurygaster integriceps* Puton, there has been always high interest to find more data about the fauna, biology and distribution of the *Phasia* species in Iran (Radjabi, 2000).

Draber-Moňko (1965) revised the Palaearctic species of *Phasia* and described 10 new species and studied their biology and biogeography of the species. Tschorsnig (1985) investigated the details of the structure of the male postabdomen of 423 tachinid species and the results showed that subfamilies Phasiinae and Dexiinae should be considered as monophyletic groups based on autapomorphic characters. Tschorsnig & Herting (1994) provided a key to the central and northern European species of *Phasia* with the distribution and some important aspects on the ecology of the central European species.

Ziegler (1994) studied the subgenus *Hyalomya* Robineau-Desvoidy in central Europe and introduced five species-groups according to the structure of the female sheath (sternite 7), and also synonymized *Phasia theodori* (Draber-Moňko) with *P. mesnili* (Draber-Moňko). Sun & Marshall (2003) revised the world species of the genus *Phasia* (excluding the Neotropical species) describing 31 new species and defining six species-groups based on a cladistic analysis of the species, using morphological characters. Richter (2004) prepared a key to the Russian Far East species.

Amirmaafi *et al.* (1991) studied the biology and efficiency of *Phasia subcoleoprata* (Linnaeus) as a natural control agent in Karaj (Alborz, Iran). Radjabi (2000) prepared a key to three species of *Phasia*, viz. *P. subcoleoprata*, *P. aurigera* (Egger) and *P. hemiptera* (Fabricius), using their external morphology. He also listed the host species of *P. subcoleoprata*. Gheibi *et al.* (2008) recorded *P. subcoleoprata* and *P. mesnili* from Fars province, Iran.

Despite the importance of the species of *Phasia* as parasitoids of Sunn pest, *E. integriceps*, its fauna is poorly studied in Iran. This research is intended to improve the current knowledge of the *Phasia* species,

including new records, and to provide a key to its Iranian species.

Materials and methods

The specimens were collected from different habitats of Iran during 2004 to 2011, using standard sweeping nets and Malaise traps. Further specimens from Europe were made available for comparison from the Natural History Museum of Berlin and from the private collection of the third author, Joachim Ziegler.

The specimens were examined using an Olympus SZH microscope for external morphological features and the illustrations were prepared by Olympus BH-2 microscope. For studying the male and female terminalia, the abdomen was entirely removed and boiled in 10% KOH solution for 15 to 20 minutes. After dissection of postabdomen, the preabdomen was dehydrated and stored in microvials containing glycerine and pinned directly underneath the specimens. Illustrations were inked and processed with Adobe Photoshop CS2. Body length was measured in millimeters (mm) from the anterior margin of the head (excluding antenna) to the tip of the abdomen.

The collected specimens were deposited at the Hayk Mirzayans Insect Museum (HMIM), Insect Taxonomy Research Department, Iranian Research Institute of Plant Protection, Tehran, Iran. The materials which were collected by Malaise traps were deposited in the insect collection of Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

Results and discussion

The genus *Phasia* differs from other genera in the subfamily phasiinae by the combination of the following characters: Posteroventral half of head with pale setulae; scutum with 0-1 postsutural intra-alar seta, scutellum with 2 pairs of strong marginal setae; wing cell r_{4+5} with a petiole longer than crossvein $r-m$; postmetacoxal area membranous; abdominal tergites with distinct sutures lacking long marginal setae, tergite 6 of male fused with segment 7+8; sternite 7

(sheath) of female developed, sternite 8 modified into a sclerotized ovipositor.

Key to the species of the genus *Phasia* in Iran

1. Fronto-orbital plate bare outside frontal setae; lateral (outer) vertical setae present 2
- Fronto-orbital plate with at least 1 row of setulae outside frontal setae; lateral (outer) vertical setae absent or present..... 3
2. Genal setae black; halter dark brown or black. Male: Syncercus with a deep notch posteriorly (fig. 11, D); surstylus short and wide (fig. 11, E); sternite 5 as in fig. 11, A-B; pregonite and postgonite as in fig. 11, C, postgonite pointed apically. Female: Sternite 7 (sheath) with a ventroapical bend (fig. 12, B-C); ovipositor as in fig. 12, A; body length 3.5-4.5 mm..... *P. pusilla*
- Genal setae white; halter yellowish. Male: Syncercus without a deep notch posteriorly (fig. 9, D); surstylus longer and narrower (fig. 9, E); sternite 5 as in fig. 9, A-B; pregonite and postgonite as in fig. 9, C, postgonite broad apically. Female: Sternite 7 (sheath) without a ventroapical bend (fig. 10, B-C); ovipositor as in fig. 10, A; body length 3.5-4.5 mm..... *P. mesnili*
3. Fronto-orbital plate with an irregular row of setulae outside frontal setae. Male: Syncercus without a deep notch posteriorly (fig. 7, C); surstylus elongate (at least as long as syncercus) (fig. 7, D); sternite 5 strongly expanded laterally (fig. 7, A); pregonite and postgonite as in fig. 7, B, postgonite narrow, rounded apically. Female: Sternite 7 (sheath) with a ventroapical bend (fig. 8, B-C); ovipositor as in fig. 8, A; body length 7.5-10 mm..... *P. subcoleoprata*
- Fronto-orbital plate with at least 3 to 4 rows of setulae outside of frontal setae; male and female terminalia different..... 4
4. Fronto-orbital plate with 10 to 12 rows of setulae; thorax laterally with dense and long orange to red hair-like setae; katapisternum with 0 to 1 seta; apical 2/3 of scutellum orange; basal third of hind femur orange; basicosta black. Male: Syncercus without a posterior notch (fig. 3, C); surstylus bent downward (fig. 3, D); sternite 5 as in fig. 3, A; pregonite broad apically (fig.

3, B). Female: Sternites 6-7 and ovipositor as in fig. 4, A-C; body length 11-12 mm..... *P. hemiptera*
 - Fronto-orbital plate with at most 8 rows of setulae; thorax laterally with black or white setae; hind femur entirely black; basicosta orange or black; katapisternum with 1 to 2 setae; scutellum entirely black. Male: Syncercus with or without posterior notch; surstylus not bent downward; sternite 5 different; pregonite pointed apically. Female: Sternites 6 to 7 and ovipositor different 5
 5. Lateral (outer) vertical setae absent; ocellar setae absent; fronto-orbital plate with 6 to 7 rows of setae; gena 0.25-0.30 times as long as vertical diameter of eye; thorax with lateral white setae; basicosta orange; katapisternum with 2 setae; abdomen orange and black. Male: Syncercus without a posterior notch or nearly so (fig. 1, C); surstylus hook-like in lateral view (fig. 1, D), sternite 5 laterally wide, as wide as median portion (fig. 1, A); pregonite and postgonite as in fig. 1, B; body length 9 to 11.5 mm..... *P. aurigera*
 - Lateral (outer) vertical setae present; ocellar setae present; fronto-orbital plate with 3 to 4 rows of setae; gena 0.12 to 0.13 times as long as vertical diameter of eye; side of thorax with black setae; basicosta black; katapisternum with 1 seta; abdomen black. Male: Syncercus with a relatively deep posterior notch (fig. 5, C); surstylus almost straight in lateral view (fig. 5, D); sternite 5 laterally narrow, much narrower than median portion (fig. 5, A); pregonite and postgonite as in fig. 5, B; body length 6 mm..... *P. obesa*

- *Phasia (Phasia) aurigera* (Egger, 1860)

(Fig. 1, A-D; Fig. 2, A-C)

Material examined – IRAN, Mazandaran province: Ramsar, Eshkatechal, 36°50'47.8" N, 050°33'28.5" E, 13-14.vii.2008, 1500 m, sweeping net, leg. E. Gilasian (5 ♂♂, 4 ♀♀), Ramsar, Eshkatechal, 27.vii.2005, 1200 m, sweeping net, leg. E. Gilasian (2 ♂♂).

Diagnosis – **Male.** Body length 9 to 11.5 mm; eyes separated by a distance equal to ocellar triangle; antenna, including arista, dark brown; gena 0.25 times as long as vertical diameter of eye in lateral view,

genal setae white; lateral (outer) vertical setae and ocellar setae absent; fronto-orbital plate with 6 to 7 rows of relatively long and black setulae; lower facial margin protruded and visible in lateral view; occiput with white and orange setulae; palpus orange; thorax and scutellum black, mesonotum with golden microtrichosity, postpronotum with 1 long seta, scutum with 0+1 acrostichal, 0+1 dorsocentral, 1+1 intra-alar setae, mesopleuron with long white setae, anepimeron mostly with long black setulae, katapisternum with 2 setae, basicosta orange; wing variously patterned, always with light brown infuscation; halter orange; legs black; abdominal colouration variable, dominantly black with orange spots covered with yellow to orange setae, sternites with long yellow setulae; syncercus without a posterior notch or nearly so; surstylus short, hook-like in lateral view; pregonite pointed apically.

Female. Frons narrower (eyes almost touching); thorax without golden microtrichosity; wing hyaline; terminalia as in fig. 2, A-C.

Hosts – Hemiptera: Pentatomidae: *Palomena prasina* (L.), *Rhaphigaster nebulosa* (Poda); Coreidae: *Coreus marginatus* (L.), *Gonocerus acuteangulatus* (Goeze), *G. juniperi* (Herrich-Schäffer) (Sun & Marshall, 2003).

Distribution – Disjunct-palaeartic species. Eastern area in China (Jilin, Beijing, Sichuan) (O'Hara *et al.*, 2009) and Russian Far East (Draber-Moňko, 1965). Western area in Europe (Spain, France, Italy, Switzerland, Austria, Germany, The Netherlands, Poland, Czech Republic, Slovakia, Hungary, Croatia, Bulgaria, Greece, Ukraine) (Tschorsnig *et al.*, 2012), Denmark, Romania, Turkey and Iran (Radjabi, 2000; Ziegler 2012).

- *Phasia (Phasia) hemiptera* (Fabricius, 1794)

(Fig. 3, A-D; Fig. 4, A-C)

Material examined – IRAN, Mazandaran province: Ramsar, Eshkatechal, 36°50'47.8" N, 050°33'28.5" E, 13-14.vii.2008, 1500 m, sweeping net, leg. E. Gilasian (1 ♂, 1 ♀).

Diagnosis – **Male.** Body length 11-12 mm; eyes separated by a distance equal to ocellar triangle;

antenna, including arista, dark brown, postpedicel with a narrow basal red strip; gena 0.25-0.28 times as long as the vertical diameter of eye in lateral view, genal setae white; lateral (outer) vertical setae absent; ocellar setae very fine; fronto-orbital plate with 10-12 rows of short black setulae; lower facial margin not protruded, invisible in lateral view; occiput with white setulae; palpus brown; thorax and basal third of scutellum black, apical 2/3 of scutellum orange, postpronotum with 0(1) long seta, scutum with 0(1)+1 acrostichal, 0+1 dorsocentral, 1+0 intra-alar setae, mesopleuron with long orange to red hair-like setae, anepimeron without black setulae; katapisternum bare or with 1 yellow seta; basicosta black; wing variously patterned; legs black, basal third of hind femur orange; abdominal colouration variable, tergites with yellow to orange long ventral setae, all sternites with long yellow setulae; syncercus without a posterior notch; surstylus curved downward; pregonite broad apically.

Female. Frons narrower (the distance between eyes equal to ocellar triangle); wing hyaline; hind tibia with anterior spine-like setulae; terminalia as in fig. 4, A-C.

Hosts – Hemiptera: Pentatomidae: *Palomena prasina* (L.), *Pentatoma metalifera* (Motshulsky), *Tropicoris rufipes* (L.) (Sun & Marshall, 2003).

Distribution – Transpalearctic species, recorded from Iran (Radjabi, 2000). Known from Spain and Ireland in the west to China and Japan in the east (Herting & Dely-Draskovits 1993; Sun & Marshall, 2003).

- *Phasia (Phasia) obesa* (Fabricius, 1798)

(Fig. 5, A-D; Fig. 6, A-B)

Material examined – IRAN, Ardabil province: Alvares (Kuhha-ye-Sabalan), N Nir, SW Ardabil, 38°09'31.1" N, 047°56'04.1" E, 07.viii.2005, 2490 m, sweeping net, leg. J. Ziegler (1 ♂).

Diagnosis – **Male.** Body length 6 mm; eyes separated by a distance narrower than ocellar triangle; antenna, including arista, black; gena 0.12-0.13 times as long as vertical diameter of eye in lateral view, genal setae white; lateral (outer) vertical setae present; ocellar setae proclinate; fronto-orbital plate with 3 to 4 rows of

relatively long and black setulae; lower facial margin protruded, visible in lateral view; occiput with white setae; palpus brownish orange; thorax and scutellum black, postpronotum with 1 long setae, scutum with 0+1 acrostichal, 0+1 dorsocentral and 1+1 intra-alar setae, mesopleuron with black setae, only a few white setae on anepisternum and anepimeron; katapisternum with 1 seta; basicosta black; anterior margin and median portion of wing dark brown; halter orange; legs black; abdomen black, tergites with black setulae, sternites with whitish yellow setulae; syncercus with a relatively deep posterior notch; surstylus nearly straight in lateral view; pregonite pointed apically.

Female. Frons narrower (the distance between eyes as wide as one ocellus); wing hyaline; hind tibia with anterior spine-like setulae; terminalia as in fig. 6, A-B.

Hosts – Hemiptera: Lygaeidae: *Beosus maritimus* (Scopoli); Miridae: *Leptopterna dolabrata* (L.), *Lygus pratensis* (L.), *L. rugulipennis* Poppins; Pentatomidae: *Zicrona caerulea* (L.); Rhopalidae: *Myrmus miriformis* (Fallen) (Sun & Marshall, 2003).

Distribution – This species occurs across the palaeartic region, from Spain and England in the west to China and Japan in the east (Herting & Dely-Draskovits, 1993; Sun & Marshall, 2003), and is newly recorded from Iran. The records from "India" by Sun & Marshall (2003) are misinterpretations of the handwritten labels of two specimens collected by H. Loew in 1843 near Posen (Poland) - but not in India.

- *Phasia (Phasia) subcoleoprata* (Linnaeus, 1767)

(Fig. 7, A-D; Fig. 8, A-C)

Material examined – IRAN, Golestan province: Golestan National Park, Koylar, 16.vi.2000, 1250 m, sweeping net, leg. M. Badii (1 ♀); Khorasan-e Razavi province: Ghoochan, Emamgholi, Chovinli, 37°25'44.1" N, 058°31'57.3" E, 30.v.2006, 1746 m, sweeping net, leg. E. Gilasian (1 ♀); Tehran province: Varamin, ii-iii.1969, sweeping net, leg. H. Mirzayans (24 ♂♂, 13 ♀♀), 11.v.1959, ex: *Eurygaster integriceps* (2 ♂♂, 1 ♀).

Diagnosis – **Male.** Body length 7.5 to 10 mm; eyes

separated by a distance at least as wide as ocellar triangle; antenna, including arista, dark brown, postpedicel with a narrow basal red strip; gena about 0.2 times as long as the vertical diameter of eye in lateral view, genal setae white; lateral (outer) vertical setae present; ocellar setae proclinate; fronto-orbital plate with 1 irregular row of setulae outside frontal setae; lower facial margin protruded and visible in lateral view; occiput with white setae; palpus yellowish-orange; thorax including scutellum black, postpronotum with 2 long setae, scutum with 0+1 acrostichal, 0+0(1) dorsocentral, 1+1 intra-alar setae, mesopleuron with long white setae, upper portion of anepimeron with a few long black setae; katepisternum with 1 seta; basicosta orange; wing variously patterned; halter orange; legs black; abdominal colouration variable, yellowish-orange to black, tergites with black longitudinal strip dorsomedial strip (variable in different specimens), tergite 1 black with black setulae, all sternites and ventral portion of tergites with long yellow setulae; syncercus without a posterior deep notch; surstylus elongate; postgonite rounded apically.

Female. Frons usually narrower (the distance between eyes narrower than ocellar triangle); wing hyaline; terminalia as in fig. 8, A-C.

Hosts – Hemiptera: Pentatomidae: *Aelia furcula* Fieber, *A. melanota* Fieber, *A. virgata* (Herrich-Schäffer), *Dolycoris baccarum* (L.), *D. numidicus* (Horvath), *Carpocoris fuscispinus* (Boheman), *Stagonomus amoenus* Brulle; Scutelleridae: *Eurygaster integriceps* Puton, *E. maura* (L.) (Radjabi, 2000; Sun & Marshall, 2003).

Distribution – Palearctic species, distributed from Morocco to Sweden, Central Asia (Sun & Marshall, 2003), and Iran (Herting & Dely-Draskovits, 1993; Radjabi, 2000).

- *Phasia (Hyalomya) mesnili* (Draber-Moňko, 1965)

(Fig. 9, A-E; Fig. 10, A-C)

Material examined – IRAN, Ardabil province: Meshkinshahr, Arbab-Kandi, 36°30'16.4" N, 048°01'59.1" E, 17.viii.2008, 1146 m, sweeping net,

leg. E. Gilasian (2 ♀♀); Khorasan-e Razavi province: Mashhad, Torogh, 14.v.1973, sweeping net, leg. Ayatollahi (1 ♂); Tehran province: Faculty of Agriculture of Tarbiat Modares University, 35°44'56.9" N, 051°09'87.2" E, 21.iv.2010, 1338 m, sweeping net, leg. E. Gilasian (10 ♂♂, 13 ♀♀), Shahryar, 35°40'05.1" N, 050°56'52.1" E, 24-31.viii.2010, 1168 m, Malaise trap, leg. M. Khayrandish, (12 ♂♂, 4 ♀♀), Shahrestanak, 35°58'27.1" N, 051°21'43.0" E, 1-8.x.2010, 2225 m, Malaise trap, leg. M. Khayrandish (1 ♀).

Diagnosis – **Male.** Body length 3.5 to 4.5 mm; eyes separated by a distance as wide as or slightly wider than ocellar triangle; antenna, including arista, black; gena 0.1 times as long as vertical diameter of eye in lateral view, genal setae white; lateral (outer) vertical setae present; ocellar setae small; fronto-orbital plate bare; lower facial margin protruded, visible in lateral view; occiput with black setae; palpus black; thorax including scutellum black, postpronotum with 2 long setae, scutum with 0+1 acrostichal, (0)1+1(2) dorsocentral and 1+0 intra-alar setae, mesopleuron with long black setae; katepisternum with 1 seta; basicosta black; wing hyaline; halter yellow; legs black; abdomen entirely black with black setulae; syncercus without a posterior deep notch; surstylus relatively long and narrow.

Female. Frons narrower (eyes almost touching); hind tibia with anterior spine-like setulae; terminalia as in fig. 10, A-C.

Hosts – Hemiptera: Pentatomidae: *Eysarcoris ventralis* (Westwood), *E. aeneus* (Scopoli) (Sun & Marshall, 2003).

Distribution – Palearctic species, distributed from the Mediterranean to Central Asia (Ziegler, 1994; Sun & Marshall, 2003) and Iran (Gheibi *et al.*, 2008).

- *Phasia (Hyalomya) pusilla* Meigen, 1824

(Fig. 11, A-E; Fig. 12, A-C)

Material examined – IRAN, Ardabil province: Meshkinshahr, Arbab-Kandi, 36°30'16.4" N, 048°01'59.1" E, 17.viii.2008, 1146 m, sweeping net,

leg. E. Gilasian (1 ♂, 1 ♀); East Azarbaijan province: Kaleybar, Asheghlou, 38°57'47.7" N, 046°40'23.4" E, 19.vii.2008, 399 m, sweeping net, leg. E. Gilasian (1 ♂); Alborz province: Karaj, Arangeh, 35°55'12.0" N, 051°05'15.4" E, 21-31.viii.2010, 1891 m, Malaise trap, leg. A. Nadimi (2 ♀♀); Gilan province: Rudsar, Rahimabad, Ghazichak, 36°45'58.1" N, 050°19'58.7" E, 21-28.ix.2010, 1803 m, Malaise trap, leg. M. Khayrandish (4 ♂♂, 8 ♀♀); Mazandaran province: Ramsar, Eshkatechal, 36°50'47.8" N, 050°33'28.5" E, 13-14.vii.2008, 1500 m, sweeping net, leg. E. Gilasian (5 ♂♂, 3 ♀♀).

Diagnosis – Male. Body length 3.5 to 4.5 mm; eyes separated by a distance as wide as ocellar triangle; antenna, including arista, black; gena 0.1 times as long as vertical diameter of eye in lateral view, genal setae black; lateral (outer) vertical setae present; ocellar setae small; fronto-orbital plate bare; lower facial margin protruded, visible in lateral view; occiput with black setae; palpus black; thorax including scutellum black, postpronotum with 1-2 long setae, scutum with 0+1 acrostichal, 0+1(2) dorsocentral and 1+0(1) intralar setae, mesopleuron with long black setae; katepisternum with 1 seta; basicosta black; wing hyaline; halter dark brown or black; legs black; abdomen entirely black with black setulae; syncercus with a posterior deep notch; surstylus short and wide.

Female. Frons narrower (the distance between eyes as wide as one ocellus); hind tibia with spine-like setulae anteriorly; terminalia as in fig. 12, A-C.

Hosts – Hemiptera: Anthocoridae: *Lyctocoris campestris* (F.), *Anthocoris sarothamni* Douglas & Scott, *A. nemoralis* (F.); Cydnidae: *Aethus nigratus* (Fabr.); Lygaeidae: *Chilacis typhae* (Perr.), *Cymus grandicolor* Hahn, *Kleidocerus ericae* (Horv.), *Nysius cymoides* (Spinola), *N. lineatus* (Costa), *N. jacobaeae* (Schill.), *Stygnocoris fuliginus* (Geoffr.), *S. pedestris* (Fall.); Pentatomidae: *Bagrada hilaris* (Burm.) *Stollia inconspicua* (Herrich-Schäffer), *S. aenea* (Scopoli) (Ziegler, 1994; Sun & Marshall, 2003).

Distribution – Known across the Palaearctic region from South Western and Northern Europe to Russian

Far East (Herting & Dely-Draskovits, 1993; Ziegler, 1994; Sun & Marshall, 2003). This species is first recorded from Iran.

About 30 percent of all described species of *Phasia* in the Palaearctic region occur in Iran, of which *P. subcoleoprata* is the most common species that has been reported from different parts of Iran. The biology of *P. subcoleoprata* has been well studied due to its important role as a natural biological control agent of *E. integriceps* in Iran. There is no data on the host range of other *Phasia* species in Iran.

There are some intraspecific variations in the morphology of sternite 5 of males in *P. pusilla* and *P. mesnili* (*P. pusilla* species-group), but other species do not show the same variations. However, we believe that sternite 5 remains as a reliable character for separating the *Phasia* species. The structures of the pregonite and postgonite among six Iranian species are not significantly varied and can be reliably used to identify the closely-related species. According to Tschorsnig & Herting (1994), *P. subcoleoprata* can be considered closer to *P. Pusilla* than *P. hemiptera* based on the bare fronto-orbital plate. However, Sun & Marshall (2003), considering at least 1-2 rows of setulae on fronto-orbital plate, placed this species in *P. subcoleoprata* species-group which is related to *P. hemiptera* species-group. Because of presence of one irregular row of short setulae outside of frontal setae of Iranian specimens, we decided to follow the latest revision and classification of *Phasia* proposed by Sun & Marshall (2003).

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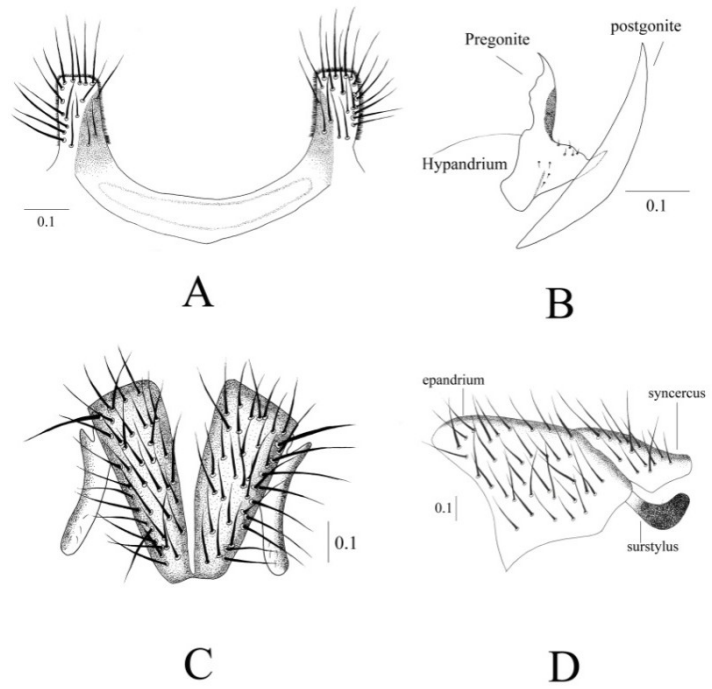


Fig. 1. *Phasia aurigera*, male: A, sternite 5; B, pregonite and postgonite, lateral view; C, syncercus and surstylus, dorsal view; D, same, lateral view.

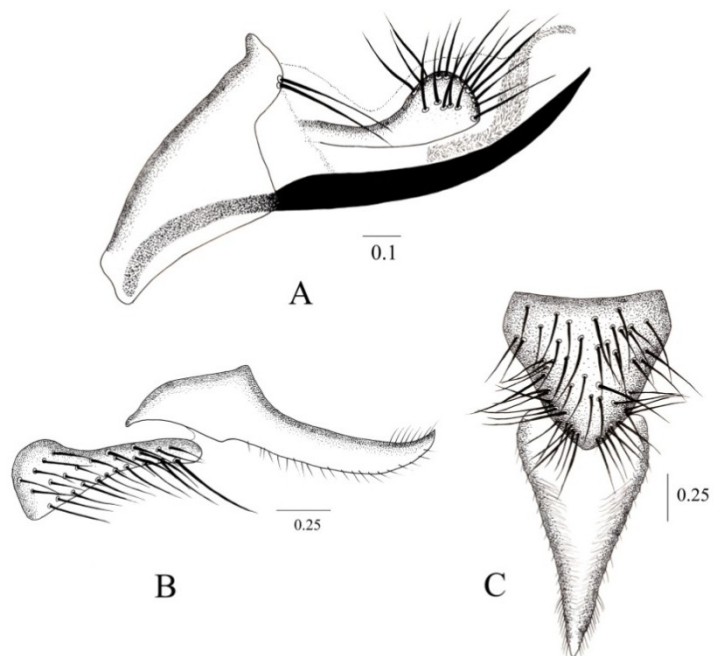


Fig. 2. *Phasia aurigera*, female: A, ovipositor, lateral view; B, sternites 6-7 (sheath), lateral view; C, same, ventral view.

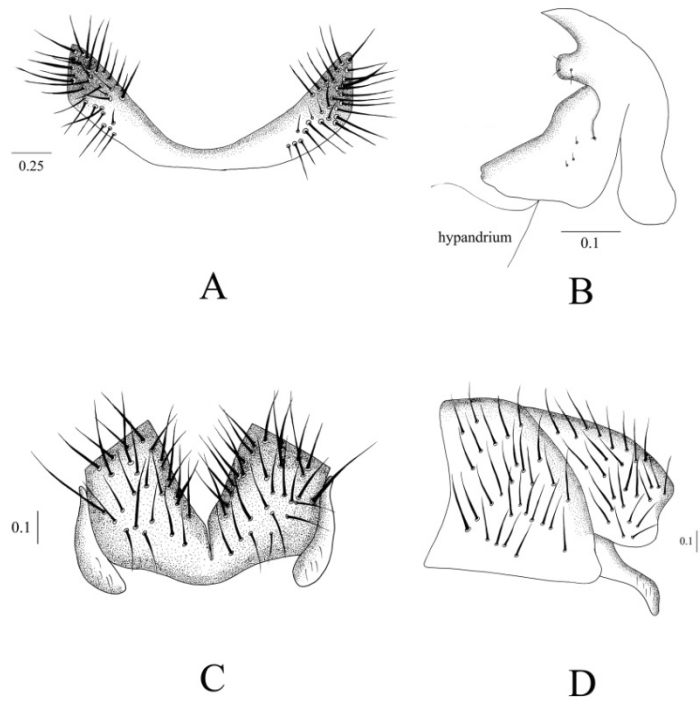


Fig. 3. *Phasia hemiptera*, male: A, sternite 5; B, pregonite and postgonite, lateral view; C, syncercus and surstylus, dorsal view; D, same, lateral view.

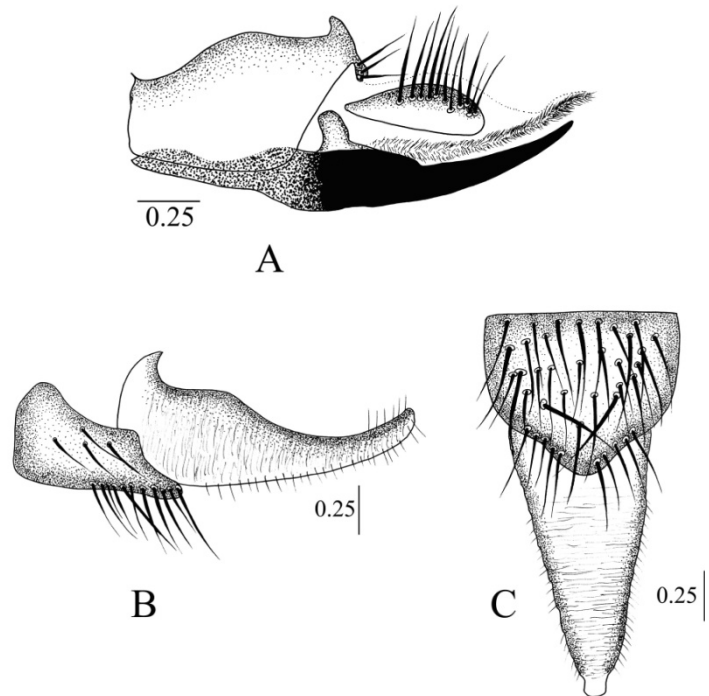


Fig. 4. *Phasia hemiptera*, female: A, ovipositor, lateral view; B, sternites 6-7 (sheath), lateral view; C, same, ventral view.

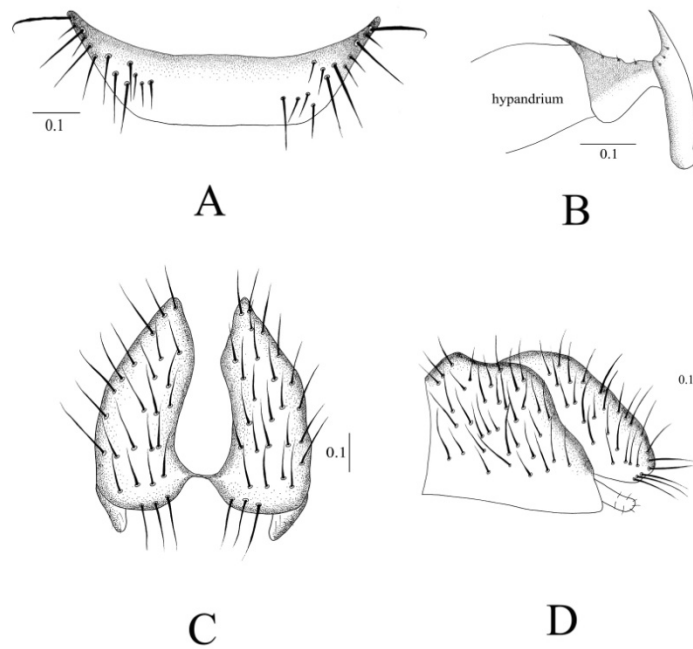


Fig. 5. *Phasia obesa*, male: A, sternite 5; B, pregonite and postgonite, lateral view; C, syncercus and surstylus, dorsal view; D, same, lateral view.

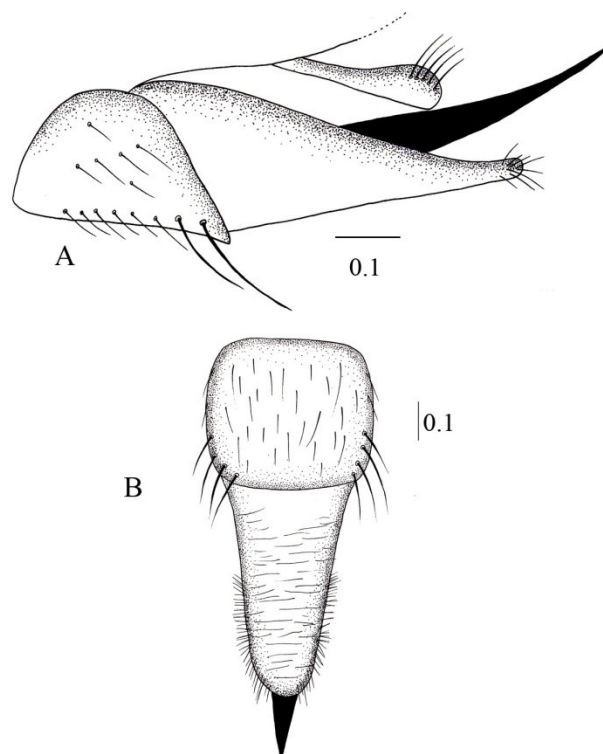


Fig. 6. *Phasia obesa*, female: A, sternites 6-7 (sheath) and ovipositor, lateral view; B, same, ventral view.

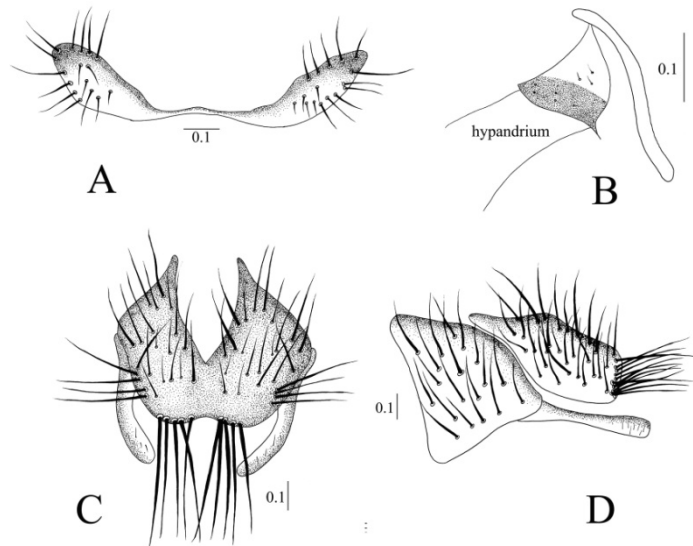


Fig. 7. *Phasia subcoleoprata*, male: A, sternite 5; B, pregonite and postgonite, lateral view; C, syncercus and surstylus, dorsal view; D, same, lateral view.

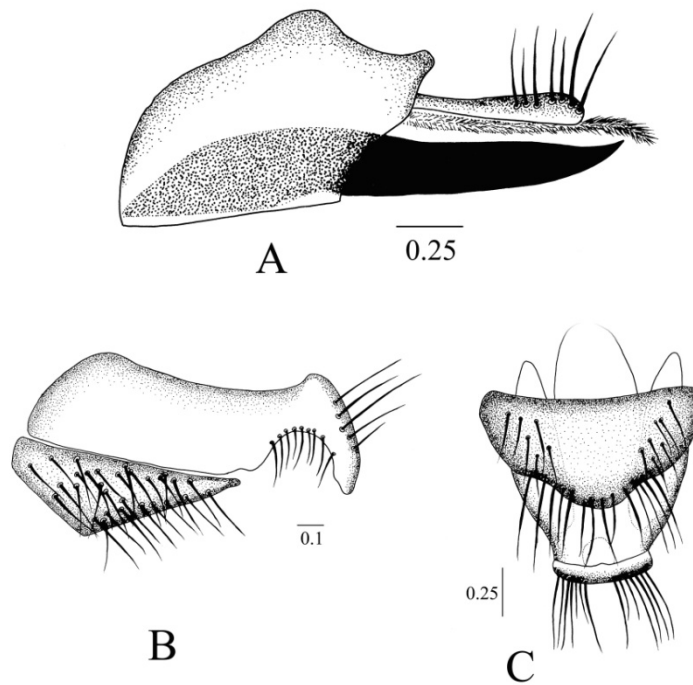


Fig. 8. *Phasia subcoleoprata*, female: A, ovipositor, lateral view; B, sternites 6-7 (sheath), lateral view; C, same, ventral view.

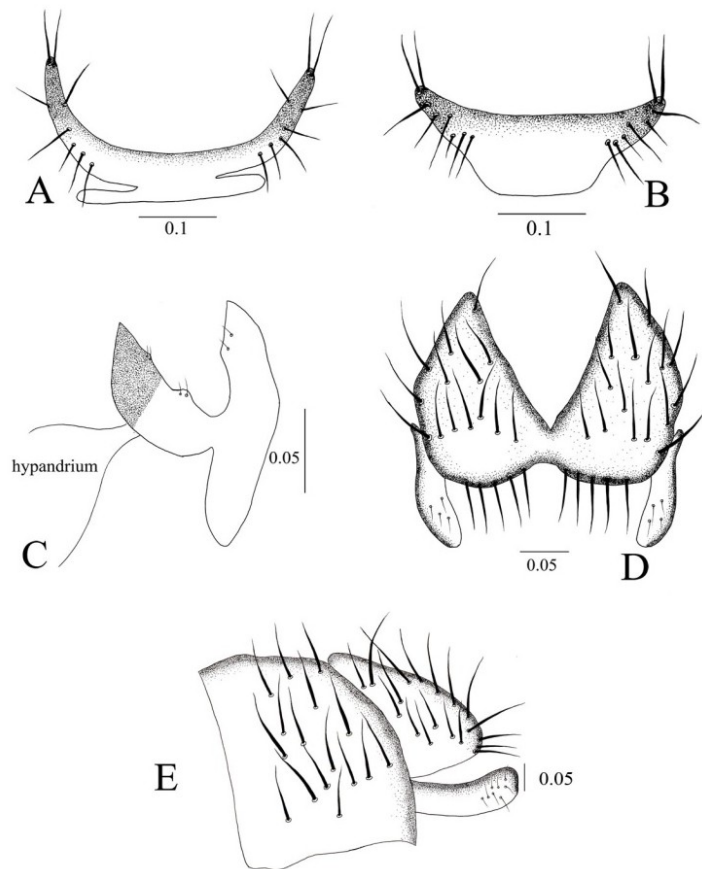


Fig. 9. *Phasia mesnili*, male: A-B, sternite 5; C, pregonite and postgonite, lateral view; D, syncercus and surstylus, dorsal view; E, same, lateral view.

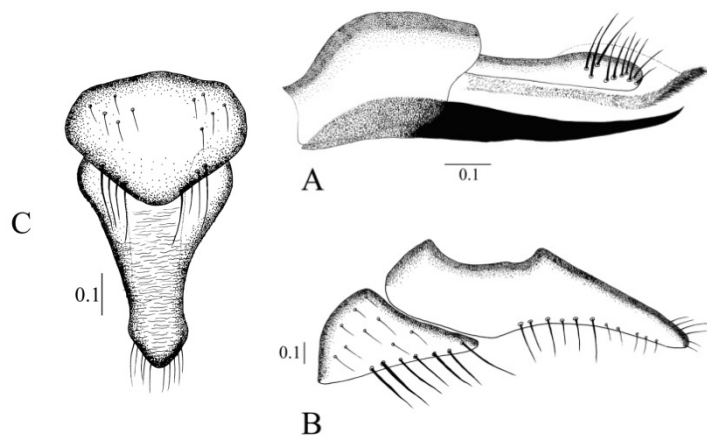


Fig. 10. *Phasia mesnili*, female: A, ovipositor, lateral view; B, sternites 6-7 (sheath), lateral view; C, same, ventral view.

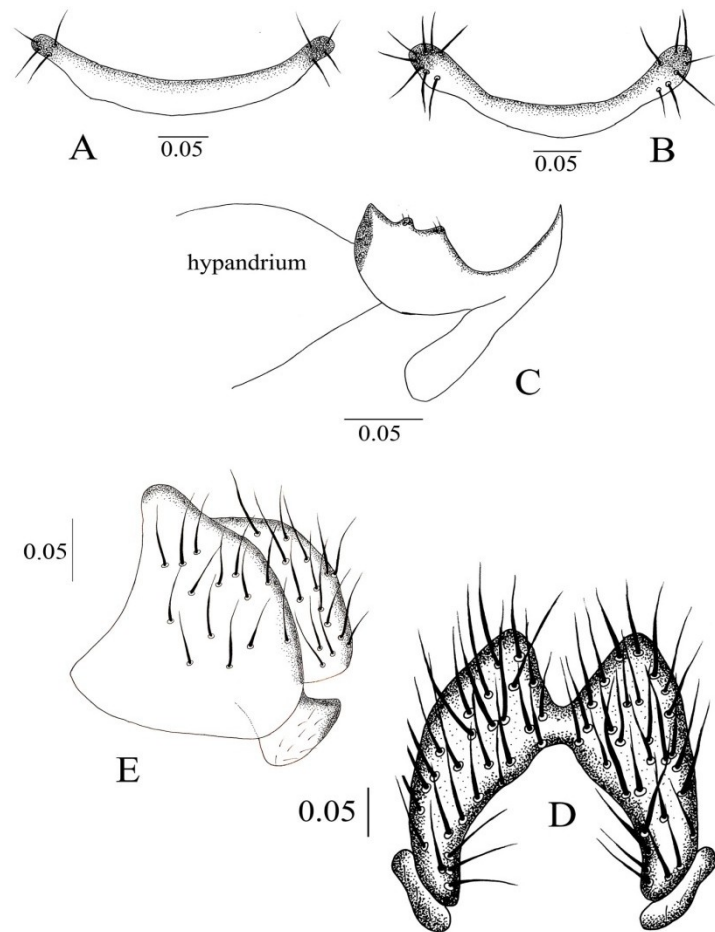


Fig. 11. *Phasia pusilla*, male: A-B, sternite 5; C, pregonite and postgonite, lateral view; D, syncercus and surstylus, dorsal view; E, same, lateral view.

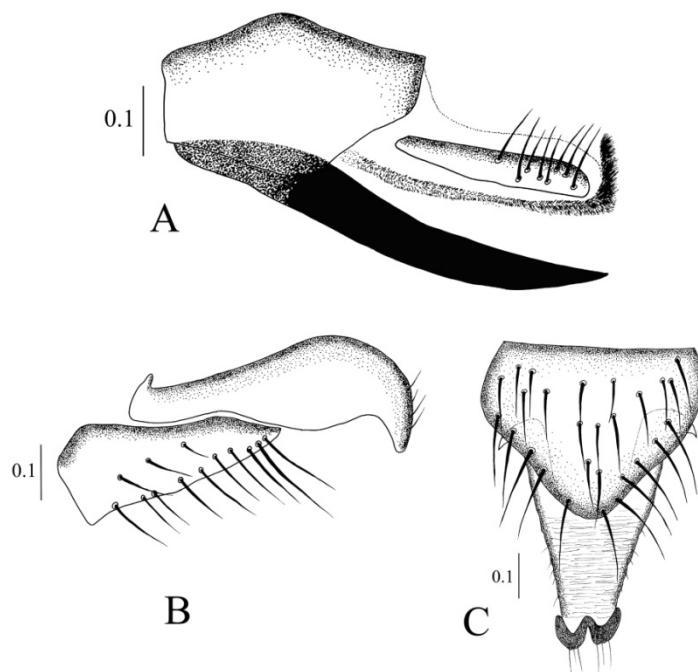


Fig. 12. *Phasia pusilla*, female: A, ovipositor, lateral view; B, sternites 6-7 (sheath), lateral view; C, same, ventral view.

References

- Amirmaafi, M., Kharazi Pakdel, A. & Esmaili, M.** (1991) An investigation on efficiency parasitoid flies of sunn pest. *Proceedings of the 10th Iranian Plant protection Congress*, p. 13.
- Draber-Moňko, A.** (1965) Monographie der paläarktischen Arten der Gattung *Alophora* R. D. (Diptera, Larvaevoridae). *Annales Zoologici* 23(6), 69-194.
- Gheibi, M., Ostovan, H. & Kamali, K.** (2008) Fauna of parasitoid flies belonging to subfamilies Dexiinae and Phasiinae (Diptera: Tachinidae). *Proceedings of the 18th Iranian Plant protection Congress, Vol. I, Pests*, p. 75.
- Herting, B. & Dely-Draskovits, Á.** (1993) Family Tachinidae. pp. 118-458 in Soós, Á. & Papp, L. (Eds) *Catalogue of Palaearctic Diptera, Anthomyiidae – Tachinidae*. Vol. 13, 624 pp. Elsevier, Budapest.
- O'Hara, J. E., Shima, H. & Zhang, C.** (2009) Annotated catalogue of the Tachinidae (Insecta: Diptera) of China. *Zootaxa* 2190, 1-236.
- Radjabi, Gh.** (2000) *Ecology of cereals' sunn pests in Iran*. 343 pp. Agricultural Research, Education and Extension Organization.
- Richter, V. A.** (2004) Family Tachinidae. pp. 148-398 in Sidorenko, V. S. (Ed.) *Key to the insects of Russian Far East, Vol. VI, Diptera and Siphonaptera, Part 3*. 567 pp. Dal'nauka, Vladivostok. [In Russian.]
- Sun, X. & Marshall, S. A.** (2003) Systematics of *Phasia* Latreille (Diptera: Tachinidae). *Zootaxa* 276, 1-320.
- Tschorsnig, H. P.** (1985) Taxonomie forstlich wichtiger Parasiten: Untersuchungen zur Struktur des männlichen Postabdomens der Raupenfliegen (Diptera, Tachinidae). *Stuttgarter Beiträge zur Naturkunde (A)* 383, 1-137.
- Tschorsnig, H. P. & Herting, B.** (1994) Die Raupenfliegen (Diptera: Tachinidae) Mitteleuropas: Bestimmungstabellen und Angaben zur Verbreitung und Ökologie der einzelnen Arten. *Stuttgarter Beiträge zur Naturkunde (A)* 506, 1-170.
- Tschorsnig, H. P., Richter, V. A., Cerretti, P., Zeegers, T., Bergström, C., Vanhara, J., van de Weyer, G., Bystrowsky, C., Raper, C., Ziegler, J. & Hubenov, Z.** (2012) Fauna Europea: Tachinidae. In Pape, T. & Beuk, P. (Hrsg.): *Diptera, Brachycera. Fauna Europaea, Database version 2.4*. Available from: <http://www.faunaeur.org> (accessed 31 August 2012).
- Ziegler, J.** (1994) Die Arten der Gattung *Phasia*, Untergattung *Hyalomya* R. D., in Mitteleuropa (Diptera, Tachinidae). *Studia dipterologica* 1(2), 157-180.
- Ziegler, J.** (2011) Rezente Arealerweiterungen bei Wanzenfliegen (Diptera: Tachinidae, Phasiinae) in Nordostdeutschland und eine Übersicht zur Gesamtverbreitung von fünf Arten. *Studia dipterologica* 18(1/2), 29-54. [In German with English summary].

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