Keys to the Species of Mydaeinae (Diptera: Muscidae) from China, with the Description of Four New Species

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Keys to the species of Mydaeinae (Diptera: Muscidae) from China, with the description of four new species

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Abstract

Four new species of Mydaeinae, \textit{Mydaea franzosternita} \textit{n. sp.}, \textit{Myospila apicaliciliola} \textit{n. sp.}, \textit{Myospila maoershanensis} \textit{n. sp.}, and \textit{Myospila subflavipennis} \textit{n. sp.}, are described and illustrated here for the first time. A key to the genus of Mydaeinae from China and keys to species of genera from Mydaeinae are provided.

Keywords: Chinese species, classification, Mydaea, Myospila,

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Introduction

Mydaeinae is a subfamily of Muscidae in Diptera, with more than 380 species currently known worldwide and represented by 129 species in China. They are distributed all over the world, with the majority distributed in the Oriental and Palaearctic regions. Some scholars have studied the species of the Mydaeinae, such as Hennig (1957), Huckett (1965), Emden (1965), Vockeroth (1972), Pont (1977, 1980, 1986, 1989), Shinonaga (2003), and Carvalho (2005), and since the 1980s, many species have been described from China and summarized by many scholars, such as Ma (1986, 2002), Wei (1991, 1992, 1994, 2010, 2011, 2012), Fan (1992), Xue (1983, 1996, 1998, 2012), Feng (2000, 2001, 2003, 2005, 2007, 2009), and Wang (2013). The species of Mydaeinae can be recognized by the following characters: frontal vitta without interfrontal setae; the lower margin of posterior spiracle without seta; meron bare, with thin and short hair at most, katepisternal setae not situated with triangular; anepimeral bare, vein Sc curved as arc-shaped; post surface of hind coxa without hairs, hind tibia without pd, anterodorsal bristles apically long, longer than its diameter at least.

In the present paper, four new species, namely Mydaea franzosternita n. sp., Myospila apicalicioliola n. sp., Myospila maoershanensis n. sp., and Myospila subflavipennis n. sp., are described. A key to genus of Mydaeinae from China and keys to species of genera from Mydaeinae are provided.

Materials and Methods

The specimens examined for this paper were collected by sweeping from brushwood in the mountainous regions of northeast, southeast, and central China, and were collected with hand nets. Genitalic structures were detached from the body, cleared by warming in a 10% NaOH solution (approximately 100°C) for several minutes, placed in a droplet of glycerol, and observed under a compound light microscope. Terminology of external morphology and of the male terminalia follows McAlpine (1981).

The type specimens studied in this paper are deposited in the Institute of Entomology, Shenyang Normal University, Shenyang, Liaoning Province, China.

Absolute measurements are used for the body length in millimeters (mm). Abbreviations used for characters are: ors = orbital seta; ori = frontal seta; acr = acrostichal seta; prst-acr = anterior-acrostichal seta; post-acr = post-acrostichal seta; dc = dorsocentral seta; prst-dc = anterior dorsocentral seta; post-dc = posterior dorsocentral seta; ial = intra-alar seta; pra = prealar seta; p = posterior bristle; v = ventral bristles; ad = anterodorsal seta; pd = posterodorsal seta; av = anteroventral seta; pv = posteroventral seta; Sc = subcosta; Mt. = mountain.

Nomenclature

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Taxonomy

Key to genus of Mydaeinae from China (Males)

1. Radial node bare……………………………2
   - Radial node with hairs………………………3
2. Sternite 1 with hairs
   ……Gymnodia Robineau-Desvoidy, 1863
   - Sternite 1 bare
     ……Hebecnema Schnabl, 1889

3. Pra present and strong
   ……..Gymnodia Robineau-Desvoidy, 1863
   - Pra absent or trichoid

4. Fore tibia without pv
   ……..Mydaeia Robineau-Desvoidy, 1830
   - Fore tibia with pv

5. Meron bare, sternite 1 bare
   …….Sinopelta Xue et Zhang, 1996
   - Meron with hairs, sternite 1 with hairs
     ……Lasiopelta Malloch, 1928

6. Eye kidney shape in profile
   …….Graphomya Robineau-Desvoidy, 1830
   - Eye ovoid shape in profile

Genus Graphomya Robineau-Desvoidy, 1830

Type species: Musca maculata Scopoli, 1845: 305.

Generic diagnosis: Posterior margin of eye inflexed; meron in the lower of posterior spiracle setosus, the inner of lower calypter with lobe; distal of vein M₁+₂ curving, dorsal and ventral surfaces of radial node all with setulae.

Key to species of Graphomya from China (Males)

1. Species yellow in color; eye narrow, palpus yellow; legs yellow; sternite 1+₂ yellow, both sides of sternite 3 in the middle without patch except median stripe……Gr. paucimaculata Ōuchi, 1938
   - Species brownish black or taupe in color; eye broad, palpus dark brown to brown; legs dark brown to brown; sternite 1+₂ dark, both sides of sternite 3 in the middle with patches

2. Ori with fine hairs; the light stripe of scutum subequal with the black paramedian stripe in width; legs all black except tibiae; sternite 1+₂ mostly brown
   - Ori with dense hairs; the white stripe of scutum shorter than the black paramedian stripe in width; legs all black; sternite 1+₂ mostly dark black

1. Body covered with white pruinosity; distal of vein M₁+₂ curving slightly; the pruinosity and stripe of the abdomen distinctly, both sides of sternite 3 in the middle with big and brown triangular patches
   - Body covered with yellow pruinosity; distal of vein M₁+₂ curving intumescently; the pruinosity of abdomen lightly, the stripes of sternite lightly except the median stripe, both sides of sternite 3 in the middle with small and brown traversed patches

Genus Gymnodia Robineau-Desvoidy, 1863

Type species: Gymnodia pratensis Robineau-Desvoidy, 1863: 635.

Generic diagnosis: Basisternum of prosternum always bare; basal part of vein R₄+₅, dorsal and ventral surfaces of radial node completely bare; sternite 1 broad, the margin of sternite 1 always with setae.

Key to species of Gymnodia from China (Males)

1. End of vein M₁+₂ straight
- End of vein M$_{1+2}$ curving forward...........3

2. Legs all black; prst-acr 2; triangular stripes of tergites 3 and tergites 4 extending to two flanks............................Gy. humilis (Zetterstedt, 1842-1860)

- Basal part of tibia yellow; prst-acr 4; tri- angular stripes of tergites 3 and tergites 4 not extending to two flanks..............Gy. genurufoides Xue et Wang, 1992

3. Dc 2+3.....Gy. polystigma (Meigen, 1826)

- Dc 2+4....................................4

4. Fore tibia with pv 2.........................5

- Fore tibia with pv 1........................8

5. Prst-acr 4–5, the biggest space broader than the space from prst-acr to post-dc rows...........................................6

- Prst-acr 2–4, the space narrower than or subequal with the space from prst-acr to post-dc rows.................................7

6. Eyes with dense ciliae; genal dilation very broad extending to vibrissa angle and facial ridge; vein M$_{1+2}$ curving forward slightly..........Gy. lasiopa (Emden, 1965)

- Eyes bare; genal dilation separates from vibrissa angle and facial ridge; vein M$_{1+2}$ curving forward distinctly....................Gy. yunnanensis Xue et Chen, 1992

7. Hind femur with fringe rows; tergites 5 with a pair of narrow L-shaped stripes......................................................Gy. sichuanensis Xue et Feng, 1992

- Hind femur without pv; tergites 5 without stripe.....Gy. latifronta Xue et Wang, 1992

8. Legs brown partially.............................Gy. tonitru (Wiedemann, 1824)

- Legs all black........................................9

9. Tergites 4 only with a pair of big triangular stripes or a pair of small stripes in the middle........................................10

- Tergites 4 with two pairs of stripes........................................Gy. distincta (Stein, 1909)

10. Parafacial without black pruinosity, abdomen transparent, tergites 4 with a pair of big triangular stripes..............................Gy. ascendens (Stein, 1915)

- Parafacial with gray pruinosity, abdomen dark, tergites 4 with a pair of small stripes..............Gy. nigrogrisea Karl, 1939

**Genus Hebecnema Schnabl, 1887**

**Type species:** Anthomyia umbratica Meigen, 1826: 88.

**Generic diagnosis:** Male frons flat, antennal arista plumose; post-dc 4, pra absent or trichoid, notopleuron bare; vein M$_{1+2}$ straight; hind tibia without pd; abdomen without pair patches.

**Key to species of Hebecnema from China (Males)**

1. Eyes bare........................................2

- Eyes with hairs....................................4

2. Katepisternal setae 2+2; sternite 1 with hairs; cercal plate straight in profile......................H. xishuicum Feng, 2009

- Katepisternal setae 1+2; sternite 1 bare; cercal plate arc-shaped in profile...................3

3. Abdomen yellow, tegula black, calypters brown......................................................H. arcuatiabdomina Feng et Fan, 2001

- Abdomen black, tegula brown, calypters light yellow....H. vespertina (Fallén, 1823)

4. Tibiae yellow to dark yellow..............5
1. Basisternum of prosternum with hairs.............L. longicornis (Stein, 1915)
   - Basisternum of prosternum bare..............2

2. Wing dark brownish, hind tibia with 1 ad. ..........L. maculipennis Wei, 1992
   - Wing hyaline, hind tibia with 2 ad............3

3. Ori 5, hind tibia with 4 av....................L. rufescens Wei et Jiang, 2010
   - Ori 2, hind tibia with 1 av....................L. flava Wei et Cao, 2010

Genus Mydaea Robineau-Desvoidy, 1830

Type species: Mydaea scutellaris Robineau-Desvoidy, 1830: 480.

Generic diagnosis: Basisternum of prosternum bare; vein M_{1+2} always straight.

Key to species to Mydaea from China (Males)

1. Post-dc 3.............................................2
   - Post-dc 4...........................................7

2. Femora black.....................................3
   - Femora yellow....................................4

3. Hind femur with complete and developed pv rows............................................5
   - Hind femur without pv...........................Myd. shuensis Feng, 2003

4. Parafacial about 3/5 of postpedicel in width, antennal arista as long as antennal postpedicel; pra absent; basicosta black; fore tibia without medial pv, hind femur with complete pv rows........................................Myd. bidenserta Xue et Wang, 1992
   - Parafacial about 1/3 of postpedicel in width, antennal arista about 1/3 of antennal postpedicel in length; pra longer than posterior notopleural seta; basicosta yellow; fore tibia with 1 medial pv, hind femur without pv........................................Myd. jubiventera Feng et Deng, 2001

Genus Lasiopelta Malloch, 1928

Type species: Lasiopelta orientalis Malloch, 1928: 309.

Generic diagnosis: Pra long and subequal with posterior notopleural seta at least, reaching to the transverse suture almost, the distance between pra and transverse suture shorter than 1/4 of the distance between pra and supra-alar seta; sternite 1 with hairs.

Key to species of Lasiopelta from China (Males)

1. Basisternum of prosternum with hairs.............L. longicornis (Stein, 1915)
   - Basisternum of prosternum bare..............2

2. Tibiae entirely black.............................6

5. Eyes bare; calypters brown; cercal plate thin strip-shaped in profile..................H. fumosa (Meigen, 1826)
   - Eyes with dense and long hairs; calypters white; cercal plate long cone-shaped in profile........H. dasyopos Feng, 2009

6. Calypters white..................H. alba Xue, 1983
   - Calypters light brown to brown............7

7. Frons with a pair of ors........................H. manasicus Feng, 2009
   - Frons without ors..............................8

8. Eyes with sparse ciliae; ial 0+3..............H. umbratica (Meigen, 1826)
   - Eyes with dense ciliae; ial 0+2...............9

9. Arista short plumose, sternite 1 with hairs......H. coronata Feng et Wang, 2010
   - Arista long plumose, sternite 1 bare........H. invisifacies Feng, 2009

Genus Mydaea Robineau-Desvoidy, 1830

Type species: Mydaea scutellaris Robineau-Desvoidy, 1830: 480.

Generic diagnosis: Basisternum of prosternum bare; vein M_{1+2} always straight.

Key to species to Mydaea from China (Males)

1. Post-dc 3.............................................2
   - Post-dc 4...........................................7

2. Femora black.....................................3
   - Femora yellow....................................4

3. Hind femur with complete and developed pv rows............................................5
   - Hind femur without pv...........................Myd. shuensis Feng, 2003

4. Parafacial about 3/5 of postpedicel in width, antennal arista as long as antennal postpedicel; pra absent; basicosta black; fore tibia without medial pv, hind femur with complete pv rows........................................Myd. bidenserta Xue et Wang, 1992
   - Parafacial about 1/3 of postpedicel in width, antennal arista about 1/3 of antennal postpedicel in length; pra longer than posterior notopleural seta; basicosta yellow; fore tibia with 1 medial pv, hind femur without pv........................................Myd. jubiventera Feng et Deng, 2001
5. Frons about 2.0 times as wide as antennal postpedicel, frontal vitta about 2.0 times as wide as fronto-orbital plate. 
   ..........Myd. laxidetrita Xue et Wang, 1992
- Frons subequal with antennal postpedicel in width, frontal vitta disappeared in the middle part. ..........6

6. Eyes with dense hair, frons with complete ori, parafacial about 2.0 times as wide as antennal postpedicel. 
   ..........Myd. gansuensis (Ma et Wu, 1992)
- Eyes bare, frons with partial ori, parafacial about 2.0 times as wide as antennal postpedicel. ..........6

7. Scutellum yellow or basal part yellow; legs mostly yellow. ..........8
- Scutellum dark black; legs slightly yellow. ..........11

8. Hind femur with complete pv rows. ..........9
- Hind femur without distinct pv. ..........12
   ..........Myd. tinctoscutaris Xue, 1992

9. Anterior spiracle yellow, scutellum and fore femur entirely yellow, prst-acr 2..........10
   ..........Myd. gracilior Xue, 1992
- Anterior spiracle fuscous, neither scutellum nor fore femur yellow, prst-acr 1. ..........10

10. Scutellum yellow mostly; trochanter and coxa of fore leg, basal half of fore femur and all tarsi fuscous; cerci plate broad in profile. ..........Myd. setifemur Ringdahl, 1924
- Basal part of subscutellum fuscous; all legs yellow; cerci plate narrow in profile. ..........Myd. kangdinga Xue et Feng, 1992

11. Hind femur yellow at least. ..........12
- All femora fuscous. ..........22

12. Hind femur without pv. ..........13
- Hind femur with incompletely and trichoid pv row. ..........14

13. Frons subequal with anterior ocellus in width; basicosta yellow; hind tibia with 1 av and 1 ad; abdomen with shifting patches. ..........Myd. discocerca Feng, 2000
- Frons about 2.0 times as wide as anterior ocellus; basicosta fuscous; hind tibia with 2(3) av and 2 ad; abdomen without shifting patch. ..........15

14. Pra about 1/2 of posterior notopleural seta in length; wing brown, basal half of hind femur with pv obviously. ..........19
- Pra longer than posterior notopleural seta; wing yellow, hind femur with sparse and short pv. ..........20

15. Antennal arista ciliated, the longest hair subequal with antennal postpedicel in width. ..........16
- Antennal arista short ciliated, the longest hair longer than antennal postpedicel in width. ..........17

16. Parafacial about 1/2 of postpedicel in width, basicosta brown, pra about 2/3 of posterior notopleural seta in length, hind tibia with 2 av. ..........Myd. brevis Wei, 1994
- Parafacial subequal with postpedicel in width, basicosta dark brown, pra about 1.3 times as long as posterior notopleural seta, hind tibia with 3 av. ..........Myd. fuchaoi Xue et Tian, 2012

17. Frons with 7–8 pairs of ori. ..........18
- Frons with 12–14 pairs of ori. ..........18

18. Basisternum of prosternum yellow, pra subequal with posterior notopleural seta in length, metapleura with hairs; mid tibia with 2–4 p, hind tibia with 2–3 av. ..........22
Myd. flavifemora Feng, 2000
- Basisternum of prosternum black, *pra* longer than posterior notopleural seta in length, metapleura bare; mid tibia with 2 *p*, hind tibia with 2 *av*.................................
.........Myd. nigribasicosta Xue, 1996

19. Frons about 2.0–2.5 times as wide as anterior ocellus; hind tibia with 2 *av*.....................
.........Myd. brunneipennis Wei, 1994

20. Frons with 10 pairs of *ori*; *pra* about 1.5–2.0 times as long as posterior notopleural seta; hind tibia with 3 *av*.............................
........Myd. urbana (Meigen, 1826)
- Frons less than 6 pairs of *ori*; *pra* longer than posterior notopleural seta; hind tibia with 2 *av*..............................
...............Myd. nigra Wei, 1994

21. Frons with 6 pairs of *ori*; tibia dark black, mid tibia with 3–4 *p*.................................
..................Myd. glaucina Wei, 1994
- Frons with 4–5 pairs of *ori*; tibia yellow, mid tibia with 2 *p*.................................
......Myd. minutiglaucina Xue et Tian, 2012

22. Legs all black..............................23
- Legs not all black...............................

23. Antennal arista ciliated, the longest hair subequal with antennal postpedicel in width; *pra* about 3/4 of posterior notopleural seta; fore tibia with 1 medial *p*, hind femur with *pv*; abdomen with shifting patches..............................
.........Myd. sinensis Ma, Wu et Cui, 1986
- Antennal arista plumose, the longest hair about 1.5 times as wide as postpedicel; *pra* about 1.3 times as long as posterior notopleural seta; fore tibia without medial

24. Hind femur with 1 *pv* at least........25
- Hind femur without *pv*......................

25. Only basal half of hind femur with *pv*, tibia fuscous..........Myd. nubila Stein, 1916
- Hind femur with complete *pv* row, tibia yellow.................................

26. Frons distinct narrower than antennal postpedicel; hind tibia with 1 *av* and 2 *ad*...........M. minor Ma et Wu, 1986
- Frons about 2.2 times as wide as antennal postpedicel; hind tibia with 2 *av* and 3 *ad*......Myd. latielecta Xue, 1992

27. Frons wider than the distance between outer margins of posterior ocellus, the longest aristal hair about 2.0 times as wide as antennal postpedicel; tibia yellow, hind tibia with 1 *av*...............................
......Myd. emeishanna Feng et Deng, 2001
- Frons narrower than the distance between outer margins of posterior ocellus, the longest aristal hair subequal with antennal postpedicel in width; tibia dark brown, hind tibia with 2(3) *av*..........................

28. Palpus black, mid femur with strong *a*..................................
.Myd. jiuzhaigouensis Feng et Deng, 2001
- Palpus brown, mid femur without *a*......

29. Abdomen with white pruinosity, the cerci about 1.3 times as long as broad................
.........Myd. subelecta Feng, 2000
- Abdomen with caesious pruinosity, the length of the cerci subequal with the width...........Myd. scolocerca Feng, 2000
**Mydaea franzosternita** Xue & Tian, n. sp. (Figure 1A-D)

**Holotype Male.** Body length 7.5 mm.

**Head.** Eyes bare; frons subequal with antennal postpedicel in width, fronto-orbital plate joint on middle part, basal half of frons with 5 pairs of ori; fronto-orbital plate, parafacial and gena covered with silvery white pruinosity, parafacial about 1/2 of postpedicel in width; antennae dark brown, postpedicel about 2.0 times as long as wide, arista short plumose, the longest hair subequal with antennal postpedicel in width; epistoma not projecting in profile, vibrissal angle situated behind frontal angle in profile, genal height about 1/9 of eye height, genal and postgenal hairs all black, the upper lateral area of the occiput with hairs; proboscis short, prementum about 2.0 times as long as wide, palpi dark brown, longer than haustellum.

**Thorax.** Black in ground color, with light grey pruinosity, presutural area of scutum with 1 black vitta, postsutural area of scutum without distinct vitta; acr 8, dc 2+3, ial 0+2; pra about 3/5 of posterior notopleural seta in length, lateral and ventral surfaces of scutellum, notopleuron, prosternum, meron and katepimeron all bare, katepisternal setae 1+2.

**Wings.** Transparent, veins brownish, basicosta blacknished brown, costal spine shorter than crossvein r-m, radial node with setulae, veins R_{4+5} and M_{1+2} all straight, vein M S-shaped; halteres yellow, calypteres yellowish.

**Legs.** Tibiae yellow, otherwise black; fore tibia without medial p; mid femur with row of 1 pv, becoming short apically, and with 2 apical a and 3 pd, mid tibia with 2 p; hind femur with complete av and pv rows, basal half fine trichoid, and with fine v, hind tibia with 3 av, 2 ad, and 4(5) short p, without apical pv; tarsi longer than tibiae, claws and pulvilli small and short.

**Abdomen.** Black, cone-shape in dorsal view, covered with dense dark yellow pruinosity, without shifting patch; sternite 1 bare, lateral lobes of sternite 5 yellow, with strong 5–6 setae, basal part with long fringe.

**Female.** Unknown.

**Type material.** Holotype: 1 male, Mt. Changbaishan, Jilin Province, 2691 m, 15. v. 2004, collected by Chun-Tian Zhang. Holotype is deposited in IESNU. Paratypes: 1 male, same data as holotype.

**Remarks.** This species resembles *Mydaea laxidetrita* Xue & Wang, 1992, but differs from it by having a frons subequal in width with antennal postpedicel; pra about 3/5 of posterior notopleural seta; lateral lobes of sternite 5 yellow, basal part with long fringe.

**Etymology.** The species name is derived from the Greek words franza meaning fringe and sternita meaning sternite, referring to the male basal part of the lobes of sternite 5 with dense and long fringes.

**Genus Myospila Rondani, 1856**

**Generic diagnosis:** Vein Sc arc-shaped, dorsal and ventral surfaces of radial node with hairs (except *Myo. lenticeps* (Thomson, 1869) just ventral surface with hairs), distal of Vein M1+2 always curving forward, the opening distance of cell 2 R5 about 2.0 times as long as crossvein r-m at least; hind tibia without distinct pd, hind coxa without hair on posterior surface.

**Key to species to *Myospila* from China**

1. Basisternum of prosternum bare..............2
   - Basisternum of prosternum with hairs...14

2. Thorax and abdomen all yellow, apical cerci not divided in posterior view........
   .................*Myo. xanthisma* Shinonaga et Huang, 2007
   - Thorax dark black, abdomen with yellow part at most or black, apical cerci divided in posterior view..........................3

3. Abdomen with yellow part at most.........4
   - Abdomen black..........................5

4. Hind femur blackish brown except for yellowish brown basally, mid femur brownish black at basal 1/2..................
   .................*Myo. basilara* Wei, 2012
   - Hind femur brownish black, mid femur brownish black at basal 2/3...............  
   ..............*Myo. paratrochanterata*, Wei, 2012

5. Postsutural ial short and small; basicosta yellow; tibia yellow; abdomen with yellow part............................6
   - Postsutural ial 2, about 2.0 times as long as body hairs; basicosta dark brown; tibia black; abdomen without yellow part......8

6. Hind tibia with 1 av and 2 ad..............
   .................*Myo. flavipedis* Shinonaga et Huang, 2007
   - Hind tibia with 1 av and 1 ad...............7

7. Dorsal surfaces of radial node with hairs; tarsi black, hind femur without pv on basal half..............*Myo. argentata* (Walker, 1856)
   - Dorsal surface of radial node bare; tarsi yellow, hind femur with fine pv on basal half....................*Myo. boseica* Feng, 2005

8. Frons with 2 pair of ors; distal of vein M1+2 slightly curving forward............9
   - Frons with 1 pair of ors; distal of vein M1+2 distinct curving forward............11

9. Legs black to dark black mostly.............
   .................*Myo. armata* Snyder, 1940 (♀, according to Holotype)
   - Fore femur, fore coxa and tarsi black, other parts yellow.................................10

10. Eyes bare; basicosta balck; tergites with obvious narrow and grayish pruinosity stripes.................................
    .................*Myo. breviscutellata* Xue et Kuang, 1992
    - Eyes with dense ciliae; basicosta yellow; tergites 3–5 with wide and black median stripes.............*Myo. vernata* Feng, 2005

11. Frons with 1 pair of ors at least............
    .................*Myo. mingshanana* Feng, 2000
    - Frons without ors..............................12

12. Eyes almost bare..............................
    .................*Myo. meditabunda* (Fabricius, 1781)
    - Eyes with long ciliae..........................13

13. Eye with dense ciliae, parafacial about 1/3 of antennal postpedicel in width; fore tibia with pv, mid tibia with 1(2) pv, hind tibia with 3(4) av; surstyli straight in profile.....
    .................*Myo. angustifrons* Malloch, 1922
    - Eye with sparse ciliae, parafacial subequal with antennal postpedicel in width; fore
tibia without pv, mid tibia without pv, hind tibia with 2 av; surstyli arc-shaped in profile................Myo. kangdingica Qian, 2005

14. Lower calypter broad, the distal part inflexed........................................15
  - Lower calypter narrow, the distal not inflexed..........................................17

15. Meron with hairs, abdomen with patch vittae................Myo. bina (Wiedemann, 1830)
  - Meron bare, abdomen without patch vittae..............................................16

16. Mid femur dark brown, tergite 3 to 4 without spot, cerci broad and short.........Myo. binoides Feng, 2005
  - Mid femur yellow, tergite 3 to 4 with spot, cerci narrow and long...............Myo. longa Wei, 2011

17. ial 0+2, ventral surface of scutellum bare.. ...........................................18
  - ial 0+1, lateral of scutellum with fine hairs on ventral surface....................43

18. Basicosta black brown or black; coxae black to dark brown.........................19
  - Basicosta yellow; coxae yellowish brown.................................................30

19. Basicosta black.................................20
  - Basicosta dark brown.................................................................22

20. Trochanter brownish black.........................21
  - Trochanter yellow.................................................................Myo. cetera Wei, 2012

21. Cercus narrower and surstylus straight viewed from laterally and posteriorly.....Myo. subflavitibia Wei, 2012
  - Cercus wider and surstylus curved viewed from laterally and posteriorly.......Myo. piliungulisoides Wei, 2012

22. Eyes with dense and long ciliae..............23
  - Eyes bare (few with fine hairs).........................27

23. Anterior spiracle red; hind tibia with 4(ad) on apical half; tergite 3 with a pair of brown patches; tergite 5 without vitta......Myo. apicaliciliola Xue et Tian n. sp.
  - Anterior spiracle yellowish; hind tibia with 2 ad on apical half; tergite 5 with vittae.........................................................24

24. Tergite 3 with patch.........................25
  - Tergite 3 without patch.........................................................26

25. Parafacial reddish brown, frons narrow, about 1.3 times as wide as anterior ocellar-width; wings grey, hyaline.........................Myo. brunneusa Wei, 2012
  - Parafacial black brown, frons wider, about as wide as ocellar triangle-width; wings brownish........Myo. vittata Wei, 2012

26. Mid and hind femora entirely brownish yellow........................................Myo. lasiophthalma (Emden, 1965)
  - Mid and hind femora brownish black.................................Myo. paralasiophthalma Wei, 2012

27. Scutellum often brown; distal part of mid femur and hind femur yellow........Myo. trochanterata (Emden, 1965)
  - Scutellum and femora all black........28

28. Epistoma at the same vertical line with frontal angle in profile, palpus brown......Myo. subtenax Xue, 1998
  - Epistoma placed behind frontal angle in profile, palpus black..................29

29. The front of metapleura with hairs, a pair vittae of scutum not reaching scutoscutellar suture, femur brown.........................Myo. tenax (Stein, 1918)
30. Vein R₁ without seta.........................31
   - At least dorsal surface of vein R₁ with
     rows of setae........................................34

31. Frons ori less than 14; postpronotal lobe
   mostly brown........................................32
   - Frons with 14–16 pairs of ori; postpro-
     notal lobe black....................................33

32. Ori 6, notopleuron bare........................5
    .....................................................Myo. laevis (Stein, 1900)
   - Ori 12, notopleuron with hairs...............
     .....................................................Myo. brunnea Feng, 2005

33. Genal and postgenal hairs all black; the
   inner stripe of scutum black.........................
    .....................................................Myo. maoershanensis Xue et Tian
    n. sp.
   - Genal and postgenal hairs all yellow; the
     inner stripe of scutum black before trans-
     verse suture, other parts yellowish brown........Myo. subbruna Feng, 2003

34. Postpronotal lobe, scutellum and pro-
   pisternum all yellow; apical half of
   scutellum with some black setae on lateral
   surface; dorsal and ventral surfaces of vein
   R₄+₅ with fine rows of setae........................Myo. setipennis (Malloch, 1930)
   - Postpronotal lobe, scutellum and pro-
     pisternum all balck; apical half of
     scutellum without setae on lateral surface;
     dorsal and ventral surfaces of vein R₄+₅
     with fine rows of setae............................35

35. Postpedicel brown yellow.....................36
   - Postpedicel black..................................38

36. Abdomen without patches....................37
   - Abdomen with patches.............................Myo. femorata (Malloch, 1935)

37. Postgena with dark setulae..................52
   - Postgena with yellow setulae....................Myo. ruficornica Wei, 2012

38. All coxae yellow....................................39
   - All coxae blacknish brown.......................

39. Katepisternal setae 2+2; only basal part of
   vein R₁ with 5 setae on dorsal surface........
   .....................................................Myo. fuscicoxoides Xue et Lin, 1998
   - Katepisternal setae 1+2; all dorsal surface
     of vein R₁ with long setae.......................40

40. Distal of cerci in posterior view, surstyli
   longer than cerci in profile......................41
   - Distal of cerci flat, surstyli subequal with
     cerci in length in profile.......................42

41. Vein R₁ bare on dorsal surface; Vein
   R₄+₅ with setulae on dorsal and ventral sur-
   faces................................................Myo. pudica (Stein, 1915)
   - Vein R₁ sparsely setulose on dorsal sur-
     face; Vein R₄+₅ bare..............................Myo. flavilobulusa Wei, 2012

42. Postgena with black setulae; tarsus yellow
   .....................................................Myo. fuscicoxa (Li, 1980)
   - Postgena with yellow setulae; tarsus
     black...............................................Myo. acrula Wei, 2012

43. Ventral and lateral surfaces of scutellum
   bare.................................................61
   - Ventral and lateral surfaces of scutellum
     with some fine hairs.............................61

44. Scutellum brownish yellow except basal
   part.................................................45
   - Scutellum all blacknish brown.............52
45. Only fore femur black; posterior margin of sternite 5 black. 
- Myo. ateptraefemura Feng, 2005
- All femora black; posterior margin of sternite 5 brown. 
46. Frons narrower than anterior ocellus in width, postpedicel always yellow; scutellum brownish yellow mostly. 
- Myo. hainanensis Xue, 1998
- Frons subequal with anterior ocellus in width at least, postpedicel black to dark brown; scutellum yellow apically.
47. Ori not reach to front ocellus, postpronotal lobe yellow, the lateral of scutellum with hair. 
- Myo. flavihumera Feng, 2001
- Ori reach to front ocellus, postpronotal lobe black, the lateral of scutellum without hair.
48. Fore femur yellow, cerci shorter than surstyli in length. 
- Myo. xuthosa Wei, 2011
- Thorax brown. 
- Myo. tianmushanica Feng, 2005
49. Anterior of metanepisternum with light and short hairs; tergite 5 brownish yellow mostly. 
- Myo. rufomarginata (Malloch, 1925)
- Anterior of metanepisternum without hair; tergite 5 black mostly.
50. The anterior margin of gena with 1 row of upcurving setulae; katepisternal setae 1+2; dorsal and ventral surfaces of vein R_{4+5} with hairs; lateral of tergites 4 with a pair of light brown patches respectively. 
- Myo. changzhenga Feng, 2000
- Thorax black. 
- Myo. sublauta Wei, 2011
51. 52. The anterior margin of gena with 3 rows of upcurving setulae; katepisternal setae 2+2; basal of vein R_{4+5} bare on ventral surface; tergite 4 without patch. 
- Myo. emeishanensis Feng, 2005
- Myo. flavihumera Feng, 2001
- The 2/3 base of fore femur black, cerci subequal with surstyli in length. 
53. 54. Myo. sparsiseta (Stein, 1915)
- Myo. lautoides Feng, 2005
- Myo. xuthosa Wei, 2011
- Myo. tianmushanica Feng, 2005
55. 56. Myo. sparsiseta (Stein, 1915)
- Myo. lautoides Feng, 2005
- Myo. xuthosa Wei, 2011
- Myo. tianmushanica Feng, 2005
57. Basal half of vein R_1 with 1 row of setae on dorsal surface. 
- Vein R_1 bare. 
- Myo. guangdonga Xue, 1998
- Myo. frigora Qian et Feng, 2005
- Vein R_1 bare. 
- Myo. guangdonga Xue, 1998
- Myo. frigora Qian et Feng, 2005
58. Scutellum blacknish brown; halteres yellow; coxae and femora dark black. 
- Myo. guangdonga Xue, 1998
- Basal and ventral surface of scutellum yellow; halteres light red brown; coxae and femora dark yellow. 
- Myo. frigora Qian et Feng, 2005
59. Eyes with sporadic hairs, frons with 12–13 pairs of ori...........Myo. bruma Feng, 2003
- Eyes bare, frons with 5–6 pairs of ori....60

60. Pedicel yellow; scutellum with distinct median stripes; only tarsi and tibiae black
......Myo. flavipectus (Malloch, 1928)
- Pedicel black; scutellum without median stripe; legs mostly black except tibiae brownish yellow and tarsi brown
.....Myo. subflavipennis Xue et Tian n. sp.

61. Frons about 1/5 head in width at least, frons with 2 pairs of ors
......Myo. latifrons Wei, 1991
- Frons subequal with the distance between outer margins of posterior ocelli at most, frons with 1 pairs of ors.....62

62. Frontage surface of ommatidium enlarged; abdomen mostly light yellow........63
- Frontage surface of ommatidium not enlarged; abdomen dark brown........64

63. Notopleuron bare, katepisternal seta 1+2...
......Myo. ponti Xue, 1996
- Notopleuron with hairs, katepisternal seta 2+2.............Myo. fengi Wei, 2011

64. Tarsi dark brown, at least fore coxa black..
......Myo. lauta (Stein, 1918)
- Tarsi yellow, coxae slight black........65

65. ial 1+2.....Myo. flavibasis (Malloch, 1925)
- ial 1+1........................................66

66. Abdomen black..........................................
......Myo. flavilata Xue et Li, 1998
- The base of abdomen yellow..............67

67. Frons narrow, frontal vitta disappear, antenna dark brown; posterior spiracle and femur yellow
......Myo. flavibasisoides Wei, 2011
- Frons broad, frontal vitta existence, antenna black; posterior spiracle and femur dark brown
......Myo. subflavibasis Wei, 2011

Myospila apicaliciliola Xue & Tian, n. sp.
(Figure 2A–D)

Holotype Male. Body length 7.5–8.0 mm.

Head. Eyes with short and dense ciliae; frons wider than the distance between outer margins of posterior ocelli, frontal vitta black, about 2.0 times as wide as fronto-orbital plate, frons with 11–13 pairs of ori, becoming shorter apically; both sides of anterior ocellus with a pair of retroverted ors, about 2.0 times as long as the upper one; fronto-orbital plate and parafacial covered with dark gray pruinosity, parafacial about 1/2 of postpedicel in width; antenna black, postpedicel about 4.0 times as long as wide, arista long plumose, the longest hair about 2.5 times as wide as aristal basal diameter; epistoma not projecting in profile, anterior margin of gena with 2 rows of up-curving subvibrissal setulae; vibrissal angle situated behind frontal angle in profile; gena slightly shining, covered with sparse brown pruinosity, genal height about 1/6 of eye height; genal and postgenal hairs entire black, the upper lateral area of the occiput with hairs; proboscis short, prementum shining, covered with sparse grey pruinosity, about 1.5 times as long as wide; palpus black, longer than the length of prementum; labella large, subequal with prementum in length.

Thorax. Black in ground color, scutum covered with grayish pruinosity, postsutural area of scutum covered with grey pruinosity, between dc rows with a black narrow stripe; 6 rows of trichoid prst-acr, post-acr 1, dc 2+4, ial 0+2, pra short, about 1/3 posterior no-
topleural seta in length; notopleuron bare; scutellum brownish yellow apically, lateral and ventral surfaces bare; basisternum of prosternum with hairs, anepimeron, meron and katepimeron all bare; anterior spiracle yellow, posterior spiracle blackish brown; upper pro-pupal setae 2, anterior anepiseral setae 3; katepisternal setae 2+2.

Wings. Transparent; basicosta dark brown, costal spine short and small, ventral surface of vein C with hairs, vein Sc curving, arc-shaped, subcosta sclerite brown; the whole length of vein R\textsubscript{1} bare, basal of vein R\textsubscript{4+5}, dorsal and ventral surfaces of radial node with setulae, distal part of M\textsubscript{1+2} curving forward; upper calypter brownish, lower calypter yellow and tongue-shaped, about 1.5 times as long as the upper one; halteres brownish yellow.

Legs. Apical of femora yellow, other parts blackish brown; fore tibia without median p; mid femur with 1 row of a on basal half, pv strong on basal half, 3(4) pd, short and long 1 av, trichoid apically, without preapical a, mid tibia with 3 p; hind femur with 1 complete and long av row, without pv, hind tibia with 2(1) av and 4(3) ad on distal half, without apical pv; hind tarsi slightly shorter than its tibia, claws and pulvilli normal, slightly shorter than tarsomere 5.

Abdomen. Black, oviform, covered with grayish to brownish grey pruinosity, without glittery patch, body hairs short and dense, tergite 3 with a pair of brown elliptic patches, tergite 4 with a pair of blackish brown triangular patches, tergite 5 with a narrow faint pruinosity vitta, tergites 4 and 5 with distinct posterior marginal and discal setae, with distinct piliferous patches; sternite 1 bare, apical part of sternites 2 and 4 with strong setae.

Female. Unknown.

Type material. Holotype: 1 male, Mt. Mao’er shan, Guangxi Zhuangzu Autonomous Region, 800 m, 16. v. 2004, collected by Ming-fu Wang. Holotype is deposited in IESNU. Paratypes: 2 males, same data as holotype.

Remarks. This species resembles Myospila lasiophthalma (Emden, 1965), but differs from it by in tergite 5 dark brown mostly, without distinct patch; inner margin of male cerci very straight and with many small hairs apically.

Etymology. The species name is derived from the Latin words *cilium* meaning small ciliae, referring to the male apical part of the cerci, which has many small ciliae.

*Myospila maoershanensis* Xue & Tian, n. sp. (Figure 3A–D)

Holotype Male. Body length 7.2–7.5 mm.

Head. Eyes bare; frons about 2.0 times as wide as anterior ocellus; frontal vitta black, the narrowest part wirelike, frons with 13–15 pairs of ori, becoming shorter toward forward, the upper one just subequal with anterior ocel-lus in width, front also with upper orbital seta 1, about 3.5 times as wide as anterior ocellus, fronto-orbital plate and parafacial covered with silvery white pruinosity; parafacial about 2/5 of postpedicel in width; antennae black, postpedicel about 3.5 times as long as wide, arista long plumose, the longest hair about 2.5 times as wide as arival basal diameter; epistoma not projecting, with a row of upcurving subvibrissal setulae; vibrissal angle situated behind frontal angle in profile; gena with dark brown pruinosity, slightly shining, genal height about 1/9 of eye height; beard and postgena setae all black, dorsal area of occiput.
with hairs; proboscis short, prementum shining, covered with few grey pruinosity, about 1.6 times as long as wide; palpus blackish brown, longer than prementum in length.

**Thorax.** Black in ground color, anterior of scutum covered with silvery white pruinosity, posterior of scutum covered with grey pruinosity, inner part of dc row with a black narrow stripe, and the outside one too wide; acr 0+1, dc 2+4, ia 0+2, pra about 2/5 of posterior notopleural seta in length; notopleuron bare; apical half of scutellum brownish yellow, lateral and ventral surfaces bare; basisternum of prosternum with hairs, anepimeron, meron and katepimeron all bare; anterior spiracle yellow, posterior spiracle dark brown; upper proepimeral setae 2, ante-rior anepisernal setae 1; katepisternal setae 1+2.

**Wings.** Transparent; tegula dark brown, basicosta brownish yellow, costal spine short and small, ventral surface of vein C with hairs, vein Sc curving as arc-shaped, subcosta sclerite brownish yellow; vein R₁ bare, base of vein R₄₋₅, dorsal and ventral surfaces of radial node all with setulae, distal of vein M₁₋₂ curving forward; calypters brownish yellow, the lower calypter tongue-shaped, about 1.8 times as long as the upper calypter; halteres yellow.

**Legs.** Femora, tibiae and trochanters yellow, coxae brownish yellow, tarsi blackish brown; fore tibia without median p; mid femur with a short av row 2/5 of distal, 6(7) pv on distal half, preapical with 3 pd, mid tibia with 3(2) p, without other seta; hind femur with a complete and long av row, without pv; hind tibia with 2 av (including a small av), 1 median ad, without pd and apical pv; all tarsi longer than tibiae, claws and pulvilli normal, slightly longer than tarsomere 5.

**Abdomen.** Black, round-shaped, every tergite covered with a grey median pruinosity vitta, both sides of the vitta covered with sparse brownish grey pruinosity, and extended to katepisternum, without glitter patch, body hairs short and dense; posterior of tergite 3 and 4 smoke-color, but without lateral patch; posterior marginal setae on tergite 4 and 5 strong, discal setae on tergite 5 distinct; sternite 1 bare, posterior margin of sternite 2(4) with a pair of strong setae respectively.

**Female.** Unknown.

**Type material.** Holotype: 1 male, Mt. Mao’er shan, Guangxi Zhuangzu Autonomous Region, 800 m, 16. v. 2004, collected by Dong Zhang. Holotype is deposited in IESNU. Paratypes: 1 male, same data as holotype.

**Remarks.** This species resembles *Myospila subbruma* Feng 2003, but differs from it in both beard and postgena setae yellow, inner vitta on presutural area of scutum yellow, and the one on postsutural area of scutum black; frons with 13–15 pairs of or₁, becoming shorter toward the front, the upper one just subequal with anterior ocellus width, front it also with a upper orbital seta, about 3.5 times as wide as anterior ocellus; prementum shining, covered with few grey pruinosity, about 1.6 times as long as wide.

**Etymology.** The species is named after the locality of the holotype, referring to the species found in China: Guangxi Zhuangzu Au-tonomous Region: Mt. Mao’er shan.

**Myospila subflavipennis** Xue et Tian, n. sp. (Figure 4A–D)

**Holotype Male.** Body length 5.8–6.3 mm.
Head. Eyes bare; frons about subequal with the distance between outer margins of posterior ocelli; frontal vitta black, obliterated in the middle; frons with 5–6 pairs of ocelli, distributing over 3/5 lower of frons; fronto-orbital plate and parafacial covered with silvery white pruinosity; parafacial about 1/3 of postpedicel in width; antennae black, postpedicel about 3.5 times as long as wide, arista long plumose, and the longest hair about 2.5 times as wide as its basal diameter; epistoma not projecting in profile, with a row of upward curving subvibrissal setulae; vibrissal angle situated behind frontal angle in profile; gena covered with grey pruinosity, slightly shining, genal height about 1/6 of eye height; beard and postgena setae all black, dorsal area of occiput with hairs; proboscis short, prementum shining and covered with few grey pruinosity, about 2.0 times as long as wide; palpus blackish brown, longer than prementum in length.

Thorax. Black in ground color, anterior of scutum covered with silvery white pruinosity, posterior of scutum covered with grey to brownish grey pruinosity, inner part of dc row with a black narrow stripe, and the outside one too wide; acr 0+1, dc 2+4, ia 0+1, pra trichoid, about 1/3 of posterior notopleural seta in length; notopleuron bare; scutellum the same color as thorax, lateral and ventral surfaces of scutellum bare; basisternum of prosternum with hairs, anepimeron, meron, and katepimeron all bare; spiracles dark brown; just with upper proepimeral setae long and large 1, anterior anepimeral seta 1; katepisternal setae 1+2.

Wings. Transparent; tegula and basicosta black, costal spine short and small, ventral surface of vein C with hairs, vein Sc curved as arc-shaped, and subcosta sclerite brownish yellow; vein R4+5 base, dorsal and ventral surfaces of radial node bare, distal of vein M1+2 curved forward; calypters brown, the lower calypter tongue-shaped, about 1.8 times as long as the upper calypter; haltere yellow.

Legs. Blackish brown except tiabiae brownish yellow, tarsi brown; fore tibia without median p; mid femur with a short av row 2/5 of distal, long 3(4) pv on distal half, preapical with 3 pd, mid tibia with 3 p, without other seta; hind femur with a complete of short av row, and just 4(5) large apically, without distinct pv; hind tibia with 2 av, median with 1 ad, without pd and apical pv; all tarsi longer than tiabiae, claws and pulvilli small, about 1/2 of tarsomere 5 in length.

Abdomen. Black, egg-shaped, covered with dense grey pruinosity, without glittery patch, tergite 3 and 4 with a wide brown trapezia-shaped patch respectively, in the middle of the patch with a brownish grey pruinosity vitta, divided the trapezia-shaped patch into two indistinct parts; posterior marginal setae and discal setae on tergite 4 and 5 thick and large, posterior margin of tergite 5 shining and brown; black median part narrow; sternite 1 bare, posterior margin of sternite 2(4) with a pair of strong setae respectively, sternite 5 lanky.

Female. Unknown.

Type material. Holotype: 1 male, Mt. Jianfeng, Gougu Rain forest, Hainan Province, 500–1000 m, 19.v.2004, collected by Ming-fu Wang. Holotype is deposited in IESNU. Paratypes: 6 males, same data as holotype.

Remarks. This species resembles Myospila flavipennis (Malloch, 1928), but differs from it by the pedicel being black; scutellum with-
out a broad median vitta; legs entirely black except tibiae brownish yellow and tarsi brown.

**Etymology.** The species name is from the Latin words *sub* meaning resemble, referring to the male resemblance to the species *Mycospila flavipennis* (Malloch, 1928).

**Genus Sinopelta Xue et Zhang, 1996**


*Generic diagnosis:* Male frons broad; scutum without *acr*, katepisternal setae 2+2, meron bare; mid tibia with *pv*, hind tibia with 2 *av*; lateral lobe of sternite 5 with strong bunchy setae.

**Key to species of Sinopelta from China (Males)**

1. With *ors*, epistoma projecting; prementum about 6.0 times as long as height; halteres black; fore tibia with 1 medial *pv*, mid tibia with 2 *ad*.......................... 
   ..........*S. latifrons* Xue et Zhang, 1996
- Without *ors*, epistoma not projecting, prementum about 2.5 times as long as height; halteres brown yellow; fore tibia without medial *pv*, mid tibia without *ad*.... 
  ........*S. maculiventra* Xue et Zhang, 1996

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Figure 1. *Mydea franzosternita* Xue et Tian n.sp. Male: A. Sternite 5 in ventral view, scale bar = 0.2 mm; B. Abdomen in dorsal view, scale bar = 1 mm; C. Terminalia in profile, scale bar = 0.2 mm; D. Terminalia in posterior view, scale bar = 0.2 mm. High quality figures are available online.
Figure 2. *Myospila apicaliciliola* Xue et Tian n.sp. Male: A. Sternite 5 in ventral view; B. Terminalia in profile; C. Terminalia in posterior view; D. *Myospila maoerhanensis* Xue et Tian n.sp. Male: Genitalia in profile. All scale bar = 0.2 mm. High quality figures are available online.
Figure 3. *Myospila maoershansensis* Xue et Tian n.sp. Male: A. Sternite 5 in ventral view, scale bar = 0.2 mm; B. Abdomen in dorsal view, scale bar = 1 mm; C. Terminalia in profile, scale bar = 0.2 mm; D. Terminalia in posterior view, scale bar = 0.2 mm. High quality figures are available online.
Figure 4. *Myospila subflavipennis* Xue et Tian n.sp. Male: A. Sternite 5 in ventral view, scale bar = 0.2 mm; B. Abdomen in dorsal view, scale bar = 1 mm; C. Terminalia in profile, scale bar = 0.2 mm; D. Terminalia in posterior view, scale bar = 0.2 mm. High quality figures are available online.