

# A new species of *Pamphilius* Latreille (Hymenoptera: Pamphiliidae: Pamphiliinae) from Mt. Tianmu, Zhejiang Province, China

Mengmeng LIU<sup>1</sup>, Zejian LI<sup>2①</sup>, Meicai WEI<sup>3①</sup>

1. College of Ecology, Lishui University, Lishui, Zhejiang 323000, China

2. Provincial postdoctoral research station, Scientific Research and Management Center of East China Pharmaceutical Botanical Garden, Lishui Ecological Forestry Development Center, Lishui, Zhejiang 323000, China

3. College of Life Sciences, Jiangxi Normal University, Nanchang, Jiangxi 330022, China

**Abstract:** A new species of *Pamphilius*, namely *Pamphilius tianmushanus* Liu, Li & Wei **sp. nov.**, is recorded and illustrated from Mt. Tianmu, Zhejiang Province, China. A key to six species of *Pamphilius* in the Mt. Tianmu region is given.

**Key words:** Pamphilioidea; sawflies; taxonomy; key

中国浙江天目山扁蜂属一新种（膜翅目：扁蜂科：扁蜂亚科）

刘萌萌<sup>1</sup>，李泽建<sup>2①</sup>，魏美才<sup>3①</sup>

1. 丽水学院生态学院，浙江 丽水 323000；2. 丽水市生态林业发展中心，华东药用植物园科研管理中心，省级博士后科研工作站，浙江 丽水 323000；3. 江西师范大学生命科学院，江西 南昌 330022

**摘要：**本文记述中国浙江天目山扁蜂属 1 新种：天目扁蜂 *Pamphilius tianmushanus* Liu, Li & Wei **sp. nov.**。还提供了天目山扁蜂属 6 种分种检索表。

**关键词：**扁蜂总科；叶蜂；分类；检索表

## Introduction

*Pamphilius* Latreille, 1803 is the largest genus in the family Pamphiliidae which is distributed in the Palearctic, Nearctic and Oriental Regions. 121 species have been recorded worldwide (Taeger *et al.* 2010). In China, there are currently 25 recorded species. Mt. Tianmu is located in the Lin'an District of Hangzhou City, Zhejiang Province, in East China. Two species of *Neurotoma*, six species of *Onycholyda* and five species of *Pamphilius* including one new species were recorded on Mt. Tianmu in 2016 (Shinohara & Wei 2016).

As a result of three collecting trips conducted in May and June in 2017 and 2018, we obtained a new species of *Pamphilius*. This paper is the second study on the Pamphiliidae fauna of Mt. Tianmu. But the host plant of this new species remains unknown.

## Material and methods

All specimens of this newly described species were obtained by sweeping in wooded bog and the forest fringe zones in Zhejiang Province (East China) from 2017 to the present. 23 specimens of this new species were examined and studied for this work. The specimens were examined with a Motic-SMZ-171 stereomicroscope. Images of the imagines were taken with a Nikon D700 digital camera and a Leica Z16APO. The genitalia were examined with a Motic BA410E microscope and photographed with a Motic Moticam Pro 285A. Images were focus-stacked using Helicon Focus (HeliconSoft, Kharkiv, Ukraine) and further processed with Adobe Photoshop CS 11.0.

The terminology of genitalia follows Ross (1945) and that of general morphology follows Viitasaari (2002). For a few terms (e. g. middle fovea and lateral fovea), we follow Takeuchi (1952).

The holotype and some paratypes are deposited in the Asian Sawfly Collection, Nanchang, China (ASMN). Some paratypes are deposited in the Scientific Research and Management Center of East China Pharmaceutical Botanical Garden, Lishui, Zhejiang, China (formerly LSAF).

Abbreviations. OOCL — The distance between a lateral ocellus and the occipital carina, or the hind margin of the head where this carina would be if it were developed (Benson 1954); OOL — The shortest distance between an eye and a lateral ocellus; POL — The shortest distance between the mesal margins of the two lateral ocelli.

## Results

### *Pamphilius tianmushanus* Liu, Li & Wei sp. nov. (Figs 1–18)

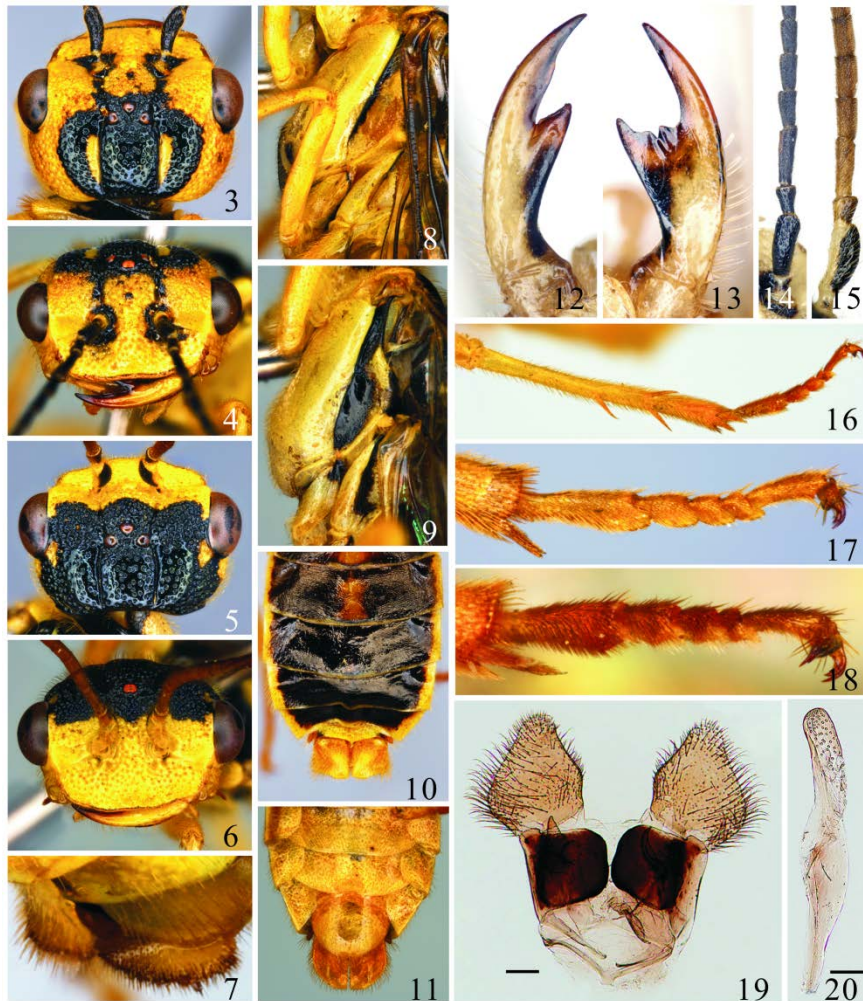
Female. Holotype (Fig. 1). Body length 13 mm. Head pale yellow, with large black mark covering some of dorsal surface (Fig. 3); occiput with black mark dorsally. Mouth parts pale yellow; mandible with inner margin black, apical part brown to black and edge ferruginous (Figs 12, 13). Antennal scape largely black (except for apex pale yellow in ventral side); pedicel and flagellum almost black (except for some brown maculae apically on ventral side, Fig. 14). Thorax black, with following pale yellow: broad posterior margin (medially interrupted) and lateral surface of pronotum, ventral most of cervical sclerite, tegula, posterior most of mesoscutal median lobe, large rectangular spot in posterior part of mesoscutal lateral lobe (adjacent to mesoscutellum), mesoscutellum, almost all of mesepisternum (pectus marked with black), mesepimeron (except for narrow anterior and ventral margins) (Fig. 8), metascutellum (area adjacent to cenchri), cenchri, metepisternum and metepimeron (except for narrow anterior margins) (Fig. 8). Wings faintly stained with blackish brown; veins blackish brown, except for brown vein C and part of veins in basal part of forewing; stigma blackish brown. Legs pale yellow, with very narrow coxal bases black (except for black macula on ventral side of middle coxal base). Abdomen black above and pale yellow beneath; dorsum with narrow lateral margins of all segments, posterior margin of abdominal tergum 8th and more posterior segments pale yellow; abdominal terga 2nd to 5th (except for narrow lateral black parts) orange (Fig. 1).



Figures 1, 2. *Pamphilius tianmushanus* sp. nov., ♀, Holotype. 1. Female adult, dorsal view; 2. Male adult, dorsal view. Scale bars = 2 mm.

Upper frons below ocelli hardly convex, without distinct notch medially; ocellar basin and median fovea indistinct; clypeus with anterior margin weakly and obtusely protruding at middle (Fig. 4); facial crest moderately inflated and bluntly carinate below. Head densely covered with large, deep punctures and golden hairs, transverse area between dorsal parts of eyes, including upper part of frons, ocellar area and upper inner orbits densely and coarsely punctate, almost reticulate; clypeus and lateral area of postocellar area sparsely punctate, with broad weakly coriaceous interspaces (Figs 3, 4). Left mandible (Fig. 12) tridentate, with rather low median tooth; right mandible with distinct and sharp middle tooth, incision between outer and middle tooth broad and slightly shallower than incision between middle and inner tooth, inner tooth with a distinct shoulder (Fig. 13). Antenna with 25 antennomeres, 1st flagellomere about 1.6× length of 2nd and shorter than scape. Cell C of forewing pilose all over. Saw

sheath with appendage short and broad, setose (Fig. 7). Hind tibia and tarsus in lateral view as shown in Fig. 16, hind tarsus and claw of hind tarsus in lateral view as shown in Fig. 17.



Figures 3–20. *Pamphilius tianmushanus* **sp. nov.**, ♀, holotype. 3. Head of female, dorsal view; 4. Head of female, anterior view; 5. Head of male, dorsal view; 6. Head of male, anterior view; 7. Ovipositor sheath, lateral view; 8. Mesopleuron and metapleuron of female; 9. Mesopleuron and metapleuron of male; 10. Apical abdominal 5th–8th segments and apex of gonoforceps of male, dorsal view; 11. Apical abdominal segments and apex of gonoforceps of male, ventral view; 12. Left mandible; 13. Right mandible; 14. Antennomeres 1–6 of female, lateral view; 15. Antennomeres 1–6 of male, lateral view; 16. Hind tibia and tarsus, lateral view; 17. Hind tarsus and claw, lateral view; 18. Hind tarsus and claw, lateral view; 19. Gonoforceps; 20. Penis valve. Scale bars = 200  $\mu$ m (Fig. 19); 100  $\mu$ m (Fig. 20).

Male. Paratype (Fig. 2). Body length 10 mm. Head pale yellow, with large black mark covering most of dorsal surface (Figs 5, 6). Antennal scape largely pale yellow with dorsal surface largely black; pedicel largely brown, with dorsal surface black; flagellum brown and gradually darkened apically, with 24 antennomeres, 1st flagellomere about 1.4 $\times$  length of 2nd



(Fig.15). Thorax black, with following pale yellow: lateral surface of pronotum, ventral most of cervical sclerite, tegula, posterior most of mesoscutal median lobe, small spot in posterior part of mesoscutal lateral lobe (adjacent to mesoscutellum), mesoscutellum, preepisternum, dorsal part of mesepimeron, metascutellum, most of metepisternum, and dorsal part of metepimeron (Fig. 9). Wings and legs as in female (Fig. 2). Abdomen black above and pale yellow beneath; dorsum with narrow lateral margins of all segments pale yellow; 2nd to 5th segments (except for narrow lateral black parts) orange (Fig. 2). Hind tarsus and claw of hind leg in lateral view as shown in Fig. 18. Dorsal surface of abdominal 5th–8th segments and gonoforceps as shown in Fig. 10, and ventral surface of apical abdominal segments and gonoforceps as shown in Fig. 11. Gonoforceps as shown in Fig. 19 and penis valve as shown in Fig. 20.



Figures 21, 22. Habitat of the new species collection site in Mt. Tianmu, Zhejiang, China. 21. Nearby area of Kaishan Laodian; 22. Xianrending.

**Holotype.** ♀, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Kaishanlaodian, N. 30.343°, E. 119.433°, alt. 1106 m, 27-V-2017, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg., ethyl acetate, LSAF17084. **Paratypes.** 1♀8♂, the same data as holotype, LSAF17084; 1♀, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Kaishanlaodian, N. 30.343°, E. 119.433°, alt. 1106 m, 08-VI-2017, Mengmeng LIU, Kaiwen GAO & Tingting JI leg., ethyl acetate, LSAF17090; 2♀, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Kaishanlaodian, N. 30.343°, E. 119.433°, alt. 1106 m, 01–03-VI-2018, Tingting JI leg., ethyl acetate, LSAF18044; 9♂, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Kaishanlaodian, N. 30.343°, E. 119.433°, alt. 1106 m, 28-V-2017, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg., ethyl acetate, LSAF17087; 1♂, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Xianrending, N. 30.349°, E. 119.424°, alt. 1506 m, 28-V-2017, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg., ethyl acetate, LSAF17086.

Variation. Body length 12.5–13 mm in female and 9–10 mm in male.

Host plants. Unknown.

Etymology. The specific epithet “*tianmushanus*” refers to the locality of this new species, Mt. Tianmu of Lin'an District, Hangzhou City, Zhejiang Province.

Remarks. This new species is similar to *P. padus* Shinohara, 2016 (Shinohara & Wei 2016) but differs from it in following: the dorsal black macula in female head smaller and not touching eye laterally, stigma blackish brown; female antenna almost entirely black and with 25 antennomeres, the 1st flagellomere about 1.6× length of 2nd; the left mandible with a low and indistinct middle tooth; the inner apical corner of harpe less protruding, and the valviceps of penis valve very narrow. In *P. padus*, the dorsal black macula in female head larger and touching eye laterally, stigma pale brown with darkened anterior and posterior margins; female antenna brown and with 20 antennomeres, scape yellow with a black macula, the 1st flagellomere about 2.7× length of 2nd; the left mandible with a sharp middle tooth; the inner apical corner of harpe strongly protruding, and the valviceps of penis valve broad and strongly narrowed toward apex.

### Key to the *Pamphilius* species on Mt. Tianmu, Zhejiang Province

1. Wings strongly infuscated blackish except for clear hyaline apical 1/3; left mandible without middle tooth.  
China (Hubei, Hunan, Jiangxi, Zhejiang)..... *P. lizejiani* Shinohara
- . Wings uniformly hyaline, often stained with brown; left mandible with low but distinct middle tooth..... 2
2. Head mostly impunctate, smooth and glabrous except for clypeus; abdomen almost entirely black, without large orange or creamy white areas. China (Henan, Hubei, Zhejiang) ..... *P. shengi* Wei
- . Head punctate and pilose; abdomen with large orange or creamy white areas..... 3
3. Head almost entirely black, densely covered with large deep punctures, without distinct interspaces; thorax entirely black; abdomen black with only segments 2–4 creamy white. China (Gansu, Shaanxi, Zhejiang).....  
..... *P. qinlingicus* Wei
- . Head and thorax with extensive pale yellow marks; head smooth or punctate with distinct interspaces; abdominal color pattern different from above ..... 4
4. Body length 7.5–8.5 mm in female, 7–8 mm in male; vertex smooth with sparse punctures; antennal scape entirely pale yellow; stigma entirely blackish brown. China (Anhui, Zhejiang).....

- ..... *P. palliceps* Shinohara & Xiao
- . Body length 9–13 mm in female, 8.5–10.5 mm in male; vertex with large deep punctures with narrow coriaceous interspaces ..... 5
5. Head pale yellow, with large black mark covering most of dorsal surface; vein Sc in the forewing brown, stigma pale brown, with anterior and posterior margins blackish; antennal scape of female pale yellow, with inner upper surface largely black, pedicel and flagellum brown, becoming blackish apically, with 20 antennomeres, 1st flagellomere about 2.7× length of 2nd (Male: antennal scape pale yellow, with inner upper surface largely black, pedicel brown with blackish spot above, flagellum brown, becoming blackish apically, with 20 antennomeres); the left mandible with a sharp middle tooth; the inner apical corner of harpe strongly protruding, and the valviceps of penis valve broad and strongly narrowed toward apex. China (Zhejiang).....
- ..... *P. padus* Shinohara
- . Head pale yellow, with large black mark covering some of dorsal surface (Fig. 3); vein Sc in the forewing blackish brown, stigma blackish brown (Fig. 1); antennae of female almost entirely black, with 25 antennomeres, 1st flagellomere about 1.6× length of 2nd (Fig. 14). (Male: antennal scape largely pale yellow, with dorsal surface largely black; pedicel and flagellum brown, with dorsal surface blackish brown, becoming blackish apically, with 24 antennomeres (Fig. 15)); the left mandible with a low and indistinct middle tooth (Fig. 12); the inner apical corner of harpe less protruding (Fig. 19), and the valviceps of penis valve very narrow (Fig. 20). China (Zhejiang) ..... *P. tianmushanus* Liu, Li & Wei **sp. nov.**

## Acknowledgements

The authors are deeply grateful to anonymous referees for valuable comments and suggestions. This research was partly supported by the National Natural Science Foundation of China (31970447), starting fund for doctoral research of Lishui University (6004LMM01Z) and special fund for scientific research of postdoctoral research station assessment in Zhejiang Province, China (2021).

## References

- Benson RB. 1954. Some sawflies of the European Alps and the Mediterranean region (Hymenoptera: Symphyta). *Bulletin of the British Museum (Natural History), Entomology*, 3(7): 267–295.
- Ross HH. 1945. Sawfly genitalia: terminology and study techniques. *Entomological News*, 61 (10): 261–268.
- Shinohara A & Wei MC. 2016. Leaf-rolling sawflies (Hymenoptera, Pamphiliidae, Pamphiliinae) of Tianmushan Mountains, Zhejiang Province, China. *Zootaxa*, 4072(3): 301–318.
- Taeger A, Blank SM & Liston AD. 2010. World catalog of Symphyta (Hymenoptera). *Zootaxa*, 2580: 1–1064.
- Takeuchi K. 1952. *A Generic Classification of the Japanese Tenthredinidae (Hymenoptera: Symphyta)*. Kyoto, 90 pp.
- Viitasaari M. 2002. The Suborder Symphyta of the Hymenoptera. In: Viitasaari M (Ed.), *Sawflies (Hymenoptera, Symphyta) I. A Review of the Suborder, the Western Palaearctic Taxa of Xyeloidea and Pamphilioidea. Tremex*, Helsinki, pp. 11–174.