

## Notes on the Subgenus *Polypedilum* (*Uresipedilum*) Oyewo & Sæther (Diptera: Chironomidae) in Zhejiang Province, China

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**Abstract.-** *Polypedilum* (*Uresipedilum*) *bingoparadoxum* Kawai, Inoue & Imabayashi, 1998 is recorded for the first time in China. This species is redescribed and illustrated as its male imago. The other four species in the subgenus *Uresipedilum*, *P. (U.) convictum* (Walker), *P. (U.) cultellatum* Goetghebuer, *P. (U.) lateralum* Zhang & Wang, and *P. (U.) surugense* Niitsuma are newly recorded in Zhejiang Province, China. A key to male species of the subgenus *Uresipedilum* in Zhejiang Province is presented.

**Key words:** *Polypedilum* (*Uresipedilum*); Diptera, Chironomidae.

### INTRODUCTION

*Polypedilum* Kieffer, 1912 is one of the most diverse genera in Chironomidae. To date, about 440 species are recorded in the world (Sæther *et al.*, 2010) including more than 60 species in China (Tang *et al.*, 2014). According to Sæther *et al.* (2010), this genus currently includes eight subgenera: *Polypedilum str.* Kieffer, 1912, *Pentapedilum* Kieffer, 1913, *Kribionympha* Kieffer, 1921, *Tripedilum* Kieffer, 1921, *Tripodura* Townes, 1945, *Uresipedilum* Oyewo & Sæther, 1998, *Cerobregma* Sæther & Sundal, 1999, and *Probolum* Andersen & Sæther, 2010. The subgenus *Uresipedilum* was initially created for *Polypedilum convictum* group *sensu* Niitsuma (1992) (Sasa and Kikuchi, 1995). *P. (U.) convictum* (Walker, 1856) was subsequently designated as the type species by Oyewo and Sæther (1998). The main systematic works on the subgenus of *Uresipedilum* include: records of the *convictum* species group from Japan (Niitsuma, 1992); revision of species for the Afrotropical and Nearctic region (Oyewo and Sæther, 1998; Maschwitz and Cook, 2000); integrative reviews of 14 species from China (Zhang and Wang, 2004); and keys to the males, pupae and larvae worldwide (Sæther and Oyewo, 2008). Recently, the species *P. (U.) bullum* Zhang and

Wang, 2004 was transferred to the new subgenus *Probolum* of *Polypedilum* (Sæther *et al.*, 2010).

Before the present study, only one species (*i.e.*, *P. (U.) minimum* Lin, Qi, Zhang and Wang, 2013) was recorded in Zhejiang Province, China. Based on additional material collected recently, another species of the subgenus *Uresipedilum* is being reported in Zhejiang Province. *P. (U.) bingoparadoxum* Kawai, Inoue & Imabayashi, 1998 is recorded for the first time in China. A key to the males of the subgenus *Uresipedilum* in Zhejiang Province is also provided.

### MATERIALS AND METHODS

The morphological nomenclature and the abbreviations of parts measured have been adopted from Sæther (1980). All specimens were stored in 75% ethanol until laboratory processing. For detailed examination, all specimens were dissected, cleared of musculature, mounted on microscope slides following the procedure outlined by Sæther (1969), and studied using a Nikon 80i microscope. Specimens are deposited in the College of Life Science, Nankai University, China and College of Life Science, Taizhou University, China.

### RESULTS AND DISCUSSION

#### KEY TO THE MALES OF *POLYPEDILUM* (*URESIPEDILUM*) IN ZHEJIANG PROVINCE, CHINA

- |   |                             |   |
|---|-----------------------------|---|
| 1 | Anal point very broad ..... | 2 |
| - | Anal point slender .....    | 3 |

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- 2 AR<0.3.....*P. (U.) minimum* Lin, Qi, Zhang & Wang, 2013  
 - AR>1.0.....*P. (U.) surugense* Niitsuma, 1992  
 3 Superior volsella with 2–5 apical setae.....  
 .....*P. (U.) cultellatum* Goetghbuier, 1931  
 - Superior volsella with 1 apical seta.....4  
 4 Fore tibial scale rounded.....  
 .....*P. (U.) convictum* (Walker, 1856)  
 - Fore tibial scale pointed.....5  
 5 Anal point parallel-sided.....  
 .....*P. (U.) lateralum* Zhang & Wang, 2004  
 - Anal point tapering.....  
 .....*P. (U.) bingoparadoxum* Kawai, Inoue & Imabayashi, 1998

*Polypedilum (Uresipedilum) bingoparadoxum*  
 Kawai, Inoue & Imabayashi, 1998  
 (Fig. 1)

*Diagnostic characters*

*P. (U.) bingoparadoxum* is characterized by the following combination: anal point robust, nearly parallel-sided and abruptly tapered to near pointed apex; superior volsella robust, abruptly narrowed apically to hook-shaped form, with two basal setae and one lateral seta, covered with microtrichia.

*Material examined*

Zhejiang Province: 4 ♂♂, Quzhou City, Kaihua County, 17–IV–2011, light trap, Lin Xiaolong.

*Male imago (n = 4)*

Total length 3.13–3.38 mm. Wing length 1.88–1.98 mm. Total length/wing length 1.67–1.71. Wing length/ length of profemur 2.26–2.37.

*Coloration*

Head yellow, antenna brown. Thorax light yellow, postnotum, preepisternum, median anepisternum II, posterior anepisternum II, epimeron II and scutum with brown spots. Abdomen and legs yellow. Hypopygium brown. Wing transparent without spots.

*Head*

AR 1.33–1.53. Ultimate flagellomere 600–690 µm long. Frontal tubercles absent. Temporal setae 11–13 including 3 inner verticals; 6–9 outer verticals and 1–3 postorbitals. Clypeus with 18–19 setae. Tentorium 140–160 µm long, 30–33 µm wide. Stipes 140–155 µm long, 5 µm wide. Palpomere lengths (in µm): 30–40; 43–45; 90–100; 115–125; 180–200. L: 5<sup>th</sup>/3<sup>rd</sup> 1.95–2.11.

*Thorax (Fig. 1A)*

Acrostichals 9–11, dorsocentrals 14–15, prealars 6–7. Scutellum with 12–16 setae.

*Wing (Fig. 1B)*

VR 1.32–1.36. Brachiolum with 1 seta, R with 23–26 setae, R<sub>1</sub> with 18–19 setae, R<sub>4+5</sub> with 30 setae. Squama with 12–17 setae.

*Legs*

Terminal scale of fore tibia sharply pointed (Fig. 1C). Spur of mid tibia 40–53 µm long including 23–25 µm long comb; unspurred comb 13–15 µm long (Fig. 1D). Spur of hind tibia 50–58 µm long including 13–15 µm long comb; unspurred comb 10–13 µm long (Fig. 1E). Width at apex of fore tibia 50–55 µm, of mid tibia 50–55 µm, of hind tibia 60–63 µm wide. Mid ta<sub>1</sub> without sensilla chaetica. Lengths (in µm) and proportions of legs in Table I.

**Table I.** Lengths and proportions of legs of *Polypedilum (Uresipedilum) bingoparadoxum* Kawai, Inoue & Imabayashi, 1998.

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>
fe	790–860	900–1000	920–1030
ti	550–560	750–830	820–950
ta <sub>1</sub>	950–1030	440–480	630–710
ta <sub>2</sub>	680–750	265–295	360–410
ta <sub>3</sub>	430–520	205–230	325–350
ta <sub>4</sub>	375–400	130–140	190–220
ta <sub>5</sub>	155–170	60–70	80–100
LR	1.73–1.84	0.58–0.59	0.74–0.77
BV	1.33–1.48	3.14–3.18	2.48–2.59
SV	1.38–1.41	3.18–3.75	2.76–2.81
BR	2.81–3.45	4.38–4.75	4.07–5.25

*Hypopygium (Fig. 1F)*

Tergite IX with 4–6 strong median setae. Laterosternite IX with 2–3 setae. Anal point robust, nearly parallel-sided and abruptly tapered to near pointed apex, 60–80 µm long, 5 µm wide in apex, 9–13 wide in base. Phallapodeme 78–100 µm long. Transverse sternapodeme 20–30 µm long. Gonocoxite 160–170 µm long. Superior volsella (Fig. 1G) 68–70 µm long, 30 µm wide, abruptly narrowed apically to hook-shaped form, with two basal setae and one lateral seta, covered with microtrichia. Inferior volsella (Fig. 1H) 95–105 µm long, with 12

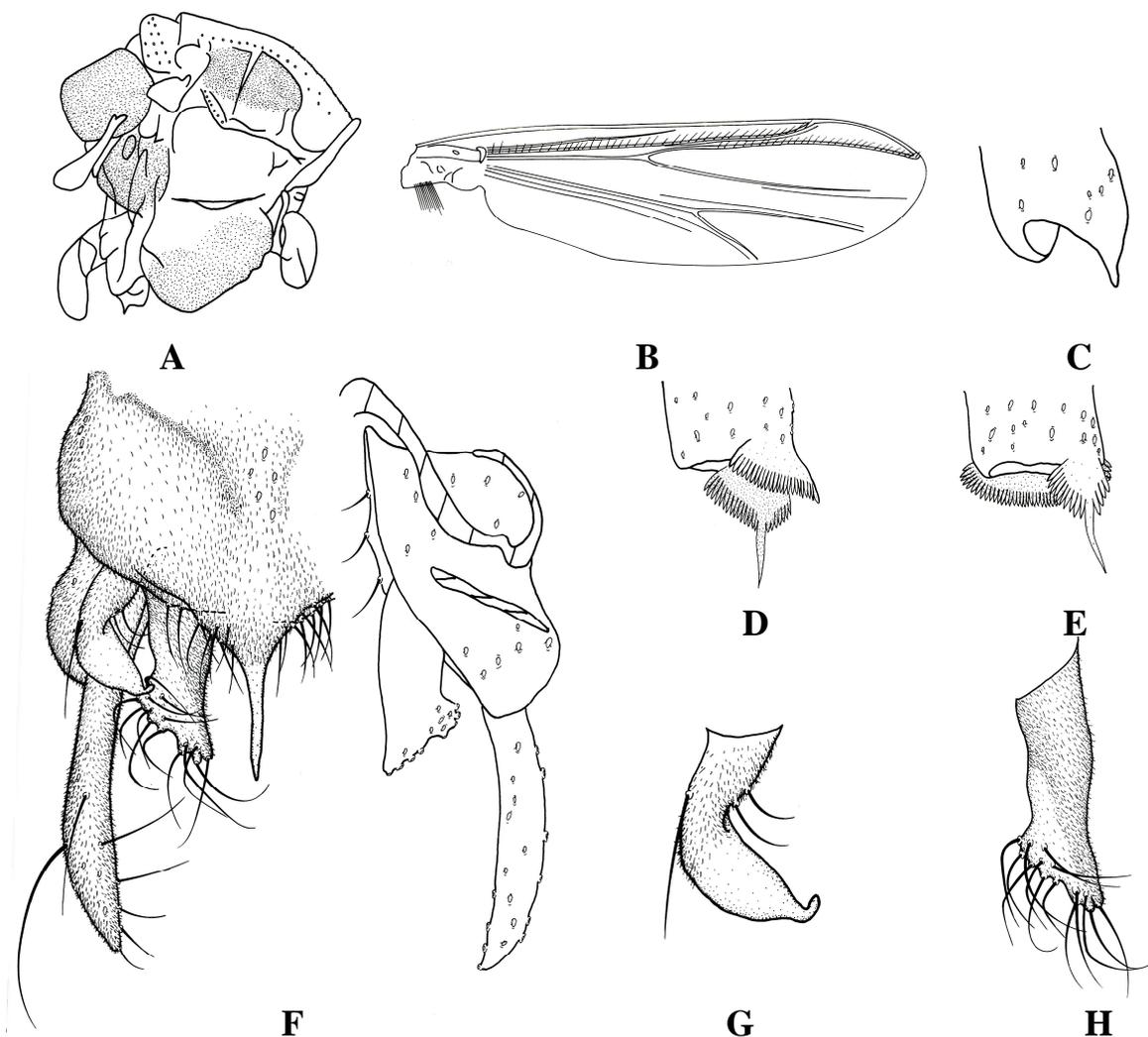


Fig. 1. *Polypedilum* (*Uresipedilum*) *bingoparadoxum* Kawai, Inoue & Imabayashi, 1998, male. A, thorax; B, wing; C, fore tibial apex; D, mid tibial apex; E, hind tibial apex; F, hypopygium; G, superior volsella; H, inferior volsella.

–15 long setae. Gonostylus 120–140  $\mu\text{m}$  long, with 4–5 long setae. HR 1.14–1.42. HV 2.27–2.60.

#### Distribution

Oriental China (Zhejiang Province), Japan.

#### Remarks

The Chinese specimens are mainly accorded with original descriptions by Kawai *et al.* (1998), but all legs of the specimens are yellow, while the coloration of legs of Japanese specimens is as follows: bases of femurs and tibiae brown, front tarsomeres II–V, mid and hind tarsomeres VI and V

slightly brown, other parts of legs yellow. The species resembles *Polypedilum* (*U.*) *nuzesecundum* Sasa, 1996 and *Polypedilum* (*U.*) *pedatum* Townes, 1945 in the shape of superior volsella, but differs from them by having a long and robust anal point. Female and immature stages unknown.

*Polypedilum* (*Uresipedilum*) *convictum* (Walker, 1856)

#### Diagnostic characters

Differs from other species of the subgenus in having superior volsella projected posteriorly.

*Material examined*

Zhejiang Province: 2 ♂♂, Yueqing City, Furong Town, 9–VIII–2010, light trap, Lin Xiao-long; 5 ♂♂, Taizhou City, Dongshan Park, 9–V–2014, sweep net, Zhang Zhe-yi.

*Distribution*

China (Zhejiang, Fujian, Guangdong, Guizhou, Hainan, Henan, Hubei, Shaanxi, Yunnan Province), Palaearctic region.

*Polypedilum (Uresipedilum) cultellatum*  
Goetghbuer, 1931

*Diagnostic characters*

Differs from other species of the subgenus in the presence of 2–5 apical setae on the superior volsella and the short, narrow and tapering anal point.

*Material examined*

Zhejiang Province: 10 ♂♂, Yueqing City, Furong Town, 9–VIII–2010, light trap, Lin Xiao-long; 5 ♂♂, Linhai City, Sanjiang Wetland, 9–VII–2013, sweep net, Bai Yi.

*Distribution*

China (Zhejiang, Fujian, Guangdong, Guizhou, Hainan, Hebei, Sichuan, Taiwan Province, Tianjin City, Xizang Autonomous region), Holarctic region.

*Polypedilum (Uresipedilum) lateralum* Zhang &  
Wang, 2004

*Diagnostic characters*

*P. (U.) lateralum* is easily distinguished from the other species in the subgenus by the anal point with several lateral setae, which is unique in the subgenus. The coloration pattern and the bulging inner margin of the superior volsella are also distinct.

*Material examined*

Zhejiang Province: 8 ♂♂, Hangzhou City, Li'an County, Tianmu Mountain, 29–VII–2011, light trap, Lin Xiao-long.

*Distribution*

China (Zhejiang, Hubei, Shaanxi, Sichuan, Yunnan Province).

*Polypedilum (Uresipedilum) minimum* Lin, Qi,  
Zhang & Wang, 2013

*Diagnostic characters*

Differs from other members of the subgenus by the following combination of characters: low AR (0.27); frontal tubercles present; fore tibial scale rounded; anal point broad; superior volsella strongly projected posteriorly, pointed at apex, without microtrichium; high HV (4.90).

*Material examined*

Zhejiang: 1 ♂, Jinhua City, Pan'an County, 18–VII–2012, Sweep net, Lin Xiao-long.

*Distribution*

Oriental China (Zhejiang).

*Polypedilum (Uresipedilum) surugense* Niitsuma,  
1992

*Diagnostic characters*

Differs from other members of the subgenus in having a broad anal point and a slender, pointed apicomedial projection on superior volsella.

*Material examined*

Zhejiang: 3 ♂♂, Quzhou City, Kaihua County, 17–IV–2011, light trap, Lin Xiao-long.

*Distribution*

Oriental China (Zhejiang, Fujian, Guizhou, Hainan, Yunnan Province), Japan.

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