

## *Polypedilum (Uresipedilum) alixae* sp.n., a new species inhabiting acid peat bogs in north eastern France (Diptera, Chironomidae, Chironominae)

### Новый вид *Polypedilum (Uresipedilum) alixae* sp.n., населяющий кислые торфяники на северо-востоке Франции (Diptera, Chironomidae, Chironominae)

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**Ключевые слова:** Diptera, Chironomidae, *Polypedilum*, подрод *Uresipedilum*, новый вид, северо-восточная Франция.

**Abstract.** *Polypedilum (Uresipedilum) alixae* sp.n., is described based on material recently collected using Malaise traps placed close to cold acidic peat bogs located in the Nature Reserve of Machais (Vosges region, NE-France). Based on some distinctive characters found in the male adult (basal part of segment VIII triangular; shape of tergite IX, anal point, superior volsella and gonostylus), *P. alixae* sp.n. keys to the subgenus *Uresipedilum* Sasa and Kikuchi, 1995 and appears to belong to a local biogeographic element. On the basis of some additional characters for the subgenus, a complemented subgeneric diagnosis of the male adult is given with reference to previous information from the literature. Currently, the subgenus *Uresipedilum* is represented by five species in France: *P. bernardae* Moubayed-Breil, 2020; *P. claudei* Moubayed-Breil, 2020; *P. convictum* (Walker, 1856); *P. cultellatum* Goetghebuer, 1931; *P. tissoti*, Moubayed-Breil and Langton, 2019. Consequently, the description of *P. alixae* sp.n. increases the total number in the genus to six from this country. The new species is known only from its type-locality in NE-France. Discussion, differential diagnosis and comments on the ecology and geographical distribution of the new species are given.

**Резюме.** Приведено описание имаго самца *Polypedilum (Uresipedilum) alixae* sp.n. по материалу, собранному с помощью ловушек Малеза, расположенных вблизи холодных кислых торфяников в природном заповеднике Маше (регион Вогезы, северо-восток Франции). Основываясь на некоторых отличительных признаках, обнаруженных у самцов (треугольной базальной части сегмента VIII, форме тергита IX, анального отростка, верхнего придатка гоноксита и гоностилия), *P. alixae* sp.n. поместили в подрод *Uresipedilum* Sasa and Kikuchi, 1995. На основании некоторых дополнительных признаков дается расширенный подродовой диагноз самца со ссылкой на предшествующую информацию из литературы. В настоящее время во Франции подрод *Uresipedilum* представлен пятью видами: *P. bernardae* Moubayed-Breil, 2020; *P. claudei* Moubayed-Breil, 2020; *P. convictum* (Walker, 1856); *P. cultellatum* Goetghebuer,

1931; *P. tissoti*, Moubayed-Breil et Langton, 2019. Описание нового вида увеличивает общее количество видов в подроде до шести из этой страны. Новый вид известен только по его типовому местонахождению на северо-востоке Франции. Приведены также обсуждение, дифференциальный диагноз и комментарии по экологии и географическому распространению нового вида.

## Introduction

*Polypedilum (Uresipedilum) alixae* sp.n. is diagnosed and described on the basis of male adults collected by Malaise traps placed near some aquatic habitats (acid peat bogs and wet sedge meadows) located in the Nature Reserve of Machais (Vosges region, NE-France). A combination of some characters found in the male adult (basal part of segment VIII triangular; shape of tergite IX, anal point, superior volsella and gonostylus), place *P. alixae* sp.n. in the subgenus *Uresipedilum* Sasa and Kikuchi, 1995. Information on the taxonomy and distribution of known *Polypedilum (Uresipedilum)* species from Europe and neighbouring geographical areas [Lehmann, 1971; Albu, 1980; Rossaro, 1984; Cranston et al., 1989; Sasa, 1989; Niitsuma, 1992; Sasa, Kikuchi, 1995; Oyewo, S ther, 1998; Zhang, Wang, 2004; Langton, Pinder 2007; S ther, Oyewo, 2008; S ther, Spies, 2013; Lin, Wang, 2013; Zhang, Wang, 2004; Zhang et al., 2015; Moubayed-Breil, 2020; Moubayed-Breil, Langton 2020], reveal about 51 species of which only 5 are currently reported from France: *P. bernardae* Moubayed-Breil, 2020, *P. claudei* Moubayed-Breil, 2020, *P. convictum* (Walker, 1856), *P. cultellatum* Goetghebuer, 1931 and *P. tissoti*, Moubayed-Breil et Langton, 2019. Consequently, the description of *P. alixae* sp.n. increases the total number of described species to 6 for this country.

## Material and methods

Material composed of male adults were collected using a sweep net and Malaise traps, and then preserved in 80–85 % ethanol. Information on the methodology of mounting and conservation of the type and paratype material is provided in Moubayed-Breil, Langton [2020]. Morphological terminology and measurements follow those of Sæther [1980] and Langton, Pinder [2007].

## Description

### *Polypedilum (Uresipedilum) alixae*

Moubayed et Langton, **sp.n.**

Figs 1–12.

<http://zoobank.org/NomenclaturalActs/8AF94C06-0A17-4F08-839D-27FC62C33139>

**Material.** *Holotype.* Continental France. 1 male adult, collected by Malaise trap, Acidic peat bogs of Machais Nature Reserve, Vosges region, altitude 980–1000 m (NE-France, Fig. 13); 48°0'24" N, 06°57'34" E; leg. Jocelyn Claude, 22.V.2020. Environmental data of water are: crystalline, conductivity (Cd) 8–28  $\mu$ S/cm; T°C, 1–4 during late winter, 8–12 during late summer; pH acid, 5–6. The male holotype (mounted on 1 slide) is deposited in the collections of the Musée cantonal de Zoologie, Palais de Rumine, 6 place de la Riponne, CH-1014 Lausanne (MZL), Switzerland. *Paratypes.* Continental France. 2 male adults (preserved in ethanol 80%), same locality and same environmental data as for holotype are deposited in collection J.M.

**Description.** *Male adult.* Medium sized: total length 4.15 mm. Wing length 2.87 mm, TL/WL 1.45. General colouration yellowish brown with brownish to dark brown thorax, legs and abdomen. Head with brownish antennae, clypeus and palpomeres. Thorax contrasting brown to dark brown; mesonotal stripes dark brown; humeral area yellowish; wing pale, unmarked. Legs with dark brown tarsomeres. Abdomen uniformly coloured without spots on tergites II–VIII. Anal segment brown to blackish with blackish tergite anal bands.

Head. Eyes bare between ommatidia. Coronal triangle uniformly narrow from base to apex, basal part semi-circular, coronals 4; tubercles digitiform to cylindrical, 1.5  $\mu$ m long, located on median part of frontal area. Temporals 24 including 21 inner and 3 outer verticals; clypeus sub-rectangular, with 22 setae in 4 rows. Palp 5-segmented, first and second segments fused; length ( $\mu$ m) of palpomeres: 50, 70, 235, 240, 275; palpomere 3 with 5 sensilla clavata, sensilla coeloconica absent. Antenna 11-segmented, 1670  $\mu$ m long; ultimate flagellomere 1220  $\mu$ m long, slightly clubbed distally, pre-apical sensilla chaetica weakly-developed, pre-apical seta absent; antennal groove beginning on segment 3; AR 2.71.

Thorax. Lobes of anteprepronotum (Fig. 1) in contact, thinner dorsally, lateral anteprepronotals absent; acrostichals (Fig. 1) 13 in 1 row; dorsocentrals 20 in 1–2 rows; prealars 6; humeral area without granulation, humeral pit absent; scutellars 18 in 2 rows including 12 stout and 6 thinner setae. Wing un-

marked; brachiolum with 2–3 setae; number of setae on veins: R, 35–37; R<sub>1</sub>, 33–35; R<sub>4+5</sub>, 41–43; remaining veins bare; basal part of anal lobe with a characteristic comb of 30–35 curved setae, squama with 25 setae in 1–2 rows.

Legs. Apex of tibia of PI (Figs 2–3) broadly triangular; tibial spur on PII–PIII fused with combs; sensilla chaetica on tibia and tarsomeres ta<sub>1</sub>–ta<sub>5</sub> of PI, only on tarsomeres of PII–PIII; length (in  $\mu$ m) of tibial comb: PII (Fig. 4), 90; PIII (Fig. 5), 125; pseudospurs absent on tarsomeres of PI–PIII. Length (in  $\mu$ m) and proportions of leg segments as in Table 1.

Abdomen. Segment VIII narrowed basally. Hypopygium in dorsal and ventral view as in Figs 6–7, ventral view (Fig. 7) with tergite IX and anal point omitted. Tergite IX 150  $\mu$ m long, 125  $\mu$ m maximally wide, broadly sub-rectangular in basal and median part, narrowing posteriorly; anal tergite bands (ATB) extended from basal angle to median area, thicker at base, tapering and abruptly interrupted medially; dorsal setae 8, including 5 on anteromedian part (between anal tergite bands) and 3 on posteromedian part, anteromedian setae delimited by a heart-shaped figure. Anal point (Fig. 6, dorsal; Fig. 10, lateral) about 85  $\mu$ m long; width at base 80  $\mu$ m, medially 1.5  $\mu$ m, 2.5  $\mu$ m apically; in dorsal view (Fig. 6), spatulate distally and narrowed medially; apex slightly truncate when viewed laterally as in Figs 10–11). Laterosternites VIII (Figs 6–7) with 14 setae (7 on each side). Apodemes (Fig. 7): sternapodeme nearly straight anteriorly; phallapodeme linearly elongated. Superior volsella in dorsal (Figs 6, 9) and lateral view (Figs 8, 12), 90  $\mu$ m long, width at base about 50  $\mu$ m and 75  $\mu$ m in distal part; densely covered with long and short setae inserted on both dorsal and ventral sides; basal part rectangular, posterior part concave dorsally, in lateral view ovoid to ellipsoid; inner process 75  $\mu$ m long, about 2.5  $\mu$ m wide, apical expansion 30  $\mu$ m long, sickle-shaped, arising mid ventrally, bare, outer lateral margin with sclerotization. Inferior volsella (Figs 6, dorsal; 7, ventral; 12, lateral) 155  $\mu$ m long, 80  $\mu$ m maximally wide in its distal part; distal part with 14–16 dorsal stout setae; setiferous ventral lobe well-developed, with 3–4 inwardly curved setae and 1–2 located apically. Gonocoxite 120  $\mu$ m long, bearing about 10 dorsolateral setae; basal inner margin (Fig. 7) with 4 stout ventral setae, caudal one stouter and longer. Gonostylus (Figs 6–7, 12) 220  $\mu$ m long, about 40  $\mu$ m maximally wide medially, slightly swelling outwards medially and parallel-sided distally, inner distal margin with thin needle-like setae located on dorsal and ventral sides.

**Pupa and larva unknown.**

**Diagnosis.** Antenna 11-segmented, last flagellomere 1220  $\mu$ m long, AR 2.71; clypeus sub-rectangular with 22 setae; palpomere 3 with 5 short sensilla clavata, sensilla coeloconica absent. Lobes of anteprepronotum not gaping; acrostichals 13 located at a short distance from anteprepronotum. Tibial spurs well-developed; sensilla chaetica present on: tibia and tarsomeres ta<sub>1</sub>–ta<sub>5</sub> of PI, only on tarsomeres of PII and PIII. Segment VIII distinctly tapered at base; tergites II–VIII without spots. Tergite IX with dorsal setae on anteromedian and posteromedian parts, anteromedian setae delimited by a heart-shaped area, the posterior margin with 8 ventrolateral setae

Table 1. Lengths (in  $\mu$ m) and proportions of leg segments of *Polypedilum (U.) alixae* sp.n., male (n = 1)  
Таблица 1. Длина члеников ног (мкм) и их индексы самца *Polypedilum (U.) alixae* sp.n. (n = 1)

P	f	t	ta <sub>1</sub>	ta <sub>2</sub>	ta <sub>3</sub>	ta <sub>4</sub>	ta <sub>5</sub>	LR	BV	SV	BR
P <sub>1</sub>	1315	955	1585	855	680	535	240	1.66	1.67	1.43	2.80
P <sub>2</sub>	1285	1150	690	395	290	205	150	0.6	3.0	3.53	2.0
P <sub>3</sub>	1445	1480	1040	590	410	255	175	0.70	2.77	2.81	2.65



(4 on each side of anal point) and anal tergite bands extending from base to the median part. Anal point spatulate distally, narrowed medially, basal part with 6 setae (3 on each side). Superior volsella expanded distally, the dorsal surface somewhat concave; dorsal and ventral surfaces densely covered with long and short setae; the apical process sickle-like, bare with sclerotized outer margin arising ventrally. Inferior volsella gradually expanded distally, setiferous ventral lobe well-developed bearing 4 short setae. Gonocoxite well developed, lacking lateral apical expansion. Gonostylus slender, slightly swollen outwards medially, parallel-sided distally with thin needle-like setae present dorsally and ventrally on inner distal margin.

**Диагноз.** Антенна 11-члениковая, длина последнего флагелломера 1220 мкм, AR 2.71; клипеус почти прямоугольный с 22 щетинками; 3 членик максиллярного щупика с 5 короткими булавовидными сенсиллами, sensilla coeloconica отсутствуют. Лопастни антепронотума не сильно разделены; акростихалей 13 и они расположены на небольшом расстоянии от антепронотума. Шпоры голени хорошо развиты; sensilla chaetica присутствуют на: голени и  $ta_1$ – $ta_5$  PI, только на члениках PII и PIII. VIII сегмент заметно сужен к основанию; тергиты II–VIII без пятен. IX тергит с дорсальными щетинками на переднесрединной и заднесрединной частях, переднесрединные щетинки отграничены сердцевидным участком, задний край с 8 вентролатеральными щетинками (по 4 с каждой стороны от анального отростка) и тяжами анального тергита, идущими от основания к срединной части. Анальный отросток дистально лопатообразный, медиально сужен, в базальной части с 6 щетинками (по 3 с каждой стороны). Верхний придаток гонококсита дистально расширена, дорсальная поверхность несколько вогнутая; дорсальная и вентральная поверхности густо покрыты длинными и короткими щетинками; вершинный отросток серповидный, голый, со склеротизованным наружным краем, отходящим вентрально. Нижний придаток гонококсита постепенно расширяется дистально, щетинконосная вентральная лопасть хорошо развита, несет 4 короткие щетинки. Гонококсит хорошо развит, без бокового апикального расширения. Гоностиль тонкий, медиально слегка вздут наружу, дистально параллельносторонний, с тонкими игольчатыми щетинками, расположенными дорсально и вентрально на внутреннем дистальном крае.

**Etymology.** The new species is named «*alixae*» in honour of Alix Greuzat-Badre, who remains active as major curator of the Nature Reserve of Machais (Vosges region, NE-France).

**Taxonomic position.** Though the male adult of *P. alixae* sp.n. shares some characters with *Einfeldia pagana* (Meigen 1838) (similar shape of superior volsella and gonostylus), the new species belongs to *Polypedilum* subgenus *Uresipedilum*, the closest described species being *P. claudei* Moubayed-Breil, 2020. However, some distinguishing characters between these three species are highlighted in the following differential diagnosis: frontal tubercles (occasionally present) are cylindrical and very small, globular in *Einfeldia* species and much bigger in *P. claudei*; squamal area of wing with a comb of

short curved setae, which are replaced by undulation in *P. claudei*, with no trace of this in *Einfeldia*; basal part of segment VIII triangular, anterolaterally rounded in *Einfeldia* species; tergite IX, anal tergite bands and anal point are differently figured for *P. claudei* [Moubayed-Breil, 2020].

**Ecology.** Male adults of *P. alixae* sp.n. were captured near acidic peat bogs of the Nature Reserve of Machais (Vosges region, NE-France).

**Distribution.** The new species is known only from its type-locality (Fig. 13).

## Supplemented subgeneric diagnosis for *Uresipedilum* Sasa et Kikuchi 1995

Information on the subgenus in Cranston et al. [1989], Niitsuma [1992], Sasa, Kikuchi [1995], Oyewo, Sæther [1999], Zhang, Wang [2004], Langton, Pinder [2007], Moubayed-Breil, Langton [2020] and Moubayed-Breil [2020] is complimented as follows.

**Head.** Frontal tubercles digitiform, usually absent but occasionally present; antenna, palpomere 3, clypeus as in Niitsuma [1992], Sasa, Kikuchi [1995] and Oyewo, Sæther [1999], except antenna which consists of 11–13 segments and palpomere 3 with or without sensilla clavata, sensilla coeloconica present sub-apically.

**Thorax.** Anteprenotum reduced or well-developed, lobes gaping or fused, anteprenotals absent; acrostichals present, often beginning close to anterior margin of scutum.

**Wing.** Brachiolum with 1 or 2–3 setae; basal part of squamal area with or without a comb of short curved setae or undulation; membrane of wing with or without coarse punctuation; costa overreaching fork of radius, not extended, crossing point with vein  $R_{4+5}$  distinctly gaping or in contact; subcosta with or without setae.

**Legs.** Tibia and tarsomeres  $ta_1$ – $ta_5$  of PI densely to moderately covered with sensilla chaetica (occasionally absent on PII–PIII); pseudospurs absent or present on tarsomeres  $ta_1$ – $ta_3$  of PII–PIII; pulvilli are *Polypedilum*-type (not pad-like).

**Abdomen.** Segment VIII distinctly tapered basally; tergites II–VIII with or without spots. Tergite IX with or without dorsal setae, anal tergite bands present, simply or distinctly branched at base, parallel-sided or narrowing in distal part. Anal point variable, broadly ellipsoidal, spatulate to parallel-sided, apex with a characteristic papillate point or bare, basal part with median and lateral setae. Superior volsella with well-developed base, mostly bulbous to spherical in outline, concave dorsally; dorsally and ventrally covered with long and short setae; process digitiform to sickle-like, in general bare with sclerotized outer margin. Inferior volsella gradually expanded distally; setiferous ventral lobe well-developed. Gonocoxite with or without short finger-like lateral expansion. Gonostylus slender, slightly swelling outwards medially and parallel-sided distally; thin needle-like setae present on inner distal margin.

Figs 1–12. Male imago of *Polypedilum* (*U.*) *alixae* sp.n. 1 – lobes of anteprenotum and acrostichals of mesonotum; 2–3 – apex of tibia of PI, two aspects; 4–5 – apex of tibia with tibial spurs of PII and PIII; 6 – hypopygium in dorsal view; 7 – hypopygium in ventral view, tergite IX and anal point omitted; 8–9 – superior volsella in lateral and dorsal view. 10 – tergite IX and anal point, lateral; 11 – apex of anal point, lateral; 12 – superior and inferior volsellae and gonocoxite, lateral. The arrows indicate some distinguishing characters.

Рис. 1–12. Имаго самца *Polypedilum* (*U.*) *alixae* sp.n. 1 – лопасти переднеспинки и акростихали среднеспинки; 2–3 – вершина бедра передней ноги в двух аспектах; 4–5 – вершина голени со шпорами средней и задней ног; 6 – гипопигий, вид сверху; 7 – гипопигий без тергита IX и анального отростка, вид сбоку; 8–9 – верхний придаток гонококсита, сбоку и сверху; 10 – тергит IX и анальный отросток, сбоку; 11 – вершина анального отростка, сбоку; 12 – верхний и нижний придатки гонококсита, сбоку. Стрелки указывают на некоторые отличительные признаки.



Fig. 13. Type-locality of *Polypedilum* (*Ur.*) *alixae* sp.n. Acidic peat bogs at the Nature Reserve of Machais (Vosges region, NE-France), where the type-material were collected. Photo G. Jacquemin.

Рис. 13. Типовое место обитания *Polypedilum* (*U.*) *alixae* sp.n. Кислые торфяные болота в заповеднике Маше (регион Вогезы, северо-восток Франции), где был собран типовой материал. Фото Г. Жакемин.

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