

Six new species of *Polypedilum* Kieffer, 1912, from the Yucatán peninsula

(Insecta, Diptera, Chironomidae)

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Six new species of *Polypedilum* Kieffer, 1912 (Diptera, Chironomidae) from Guatemala, Belize and Mexico are described from male imagines. Five of the species could be assigned to the subgenus *Tripodura*: *Polypedilum spiesi* spec. nov., *P. bacalar* spec. nov., *P. rissi* spec. nov., *P. scharfi* spec. nov., and *P. nazarovae* spec. nov. One species, *P. rohneri* spec. nov., owing to the unique shape of the superior volsella and other specific characters, may require erection of a new subgenus. However, definite placement is not attempted, as the immature stages are unknown.

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Introduction

The genus *Polypedilum*, erected by Kieffer in 1912, belongs to the tribe *Chironomini* within the subfamily *Chironominae*. It is nearly cosmopolitan in distribution, having been recorded from all zoogeographical regions except Antarctica, though not at high altitudes and latitudes. The larvae occur in all kinds of standing and flowing waters.

Although *Polypedilum* is widespread and common, only a few descriptions of member species from Central America are available. Watson & Heyn (1992) reported about 10 species from Costa Rica; Sublette & Sasa (1994) documented six new species from Guatemala; Andersen, Contreras-Ramos & Spies (2000) listed one named species for Mexico. Given that taxonomic opinions on how best to define genera are quite heterogeneous among different authors, the classification of *Polypedilum* has been modified several times (Boesel 1985, Sasa & Kikuchi 1995, Oyewo & Sæther 1998, Sæther & Sundal 1999). Currently, *Polypedilum* contains six subgenera (Vårdal et al. 2002, Oyewo 2007).

In the present paper we introduce six new spe-

cies, one of which may justify a new subgenus due to the unique shape of the superior volsella and other specific characters.

Material and methods

The descriptions are based on adult male specimens obtained from lakes on the Yucatán peninsula, collected with a UV-light trap during an expedition through Guatemala, Belize and Mexico in 2005. The material was analyzed at the Institute for Evolution and Biodiversity, University of Münster and the Zoologische Staatssammlung München, Germany. The depository for type specimens is the Zoologische Staatssammlung München, Germany.

The general morphological terminology and abbreviations follow Sæther (1980) and Bidawid & Fittkau (1995). Measurements are given as ranges, followed by means when more than three specimens have been measured and by the number of specimens in parentheses (n). For direct comparison, values for the standard characters are compiled in Table 1.

In figures of the hypopygia, dotting is used to show the shape of the ventral structure (contour) of the anal point stem.

Species newly described here are named in honour of persons who have supported this work and others in the Neotropics, or after type localities.

Polypedilum (Tripodura) spiesi spec. nov.

(Fig. 1)

Type material. **Holotype:** ♂ imagines, Belize, Belmopan, gravel pond (unnamed), 17°30'49"N, 88°48'84"W. – **Paratypes:** 3♂ imagines, MEXICO, Quintana Roo, Lake Ocom, 19°47'42"N, 88°05'42"W. November-December 2005. Specimens mounted on microscope slides in Hydro-Matrix.

Diagnosis. *P. spiesi* spec. nov. is distinguished by the long, narrow, parallel-sided anal point without basal lobes, rather thin and longish gonostylus; and superior volsella nearly covered by tergite IX.

Description

Colour: Thorax and abdominal tergites uniformly brown, postnotum darker, legs stramineous. Halteres pale. Wings immaculate.

Length: Total 2.0-2.17 mm (M=2.11, n=5)

Head: AR 0.63-0.69. Terminal flagellomere 300 µm long. Frontal tubercles not recognizable. 12-14 temporal setae, including two inner verticals, 6 outer verticals and 6 postorbitals. Clypeus with 14-18 setae. Palpomere lengths 1-5 (in µm, n=5): 29 (28-30), 29 (29-30), 78 (77-80), 86 (85-87), 141 (135-150). Dorsomedian eye extension 90-100 µm wide.

Thorax: Acrostichals 12, dorsocentrals 11-12, prealars 4, scutellars 5, humerals absent.

Wing: Length 1.08-1.18 mm (n=6). VR 1.32-1.35 (M=1.33, n=5). Markings absent. Setae: R with 14-17, R₄₊₅ with 19-24. Brachiolium with one seta. Squama with 3 setae. Cells and remaining veins bare.

Legs: Scale of front tibia triangular, without spur.

Tab. 1. Character data for *Polypedilum* species. M, mean; n, number of measurements.

character (♂ imago)	<i>P. spiesi</i>	<i>P. bacalar</i>	<i>P. rissi</i>	<i>P. scharfi</i>
wing length [mm]	1.08-1.18 (1.12, n=4)	1.65	1.05-1.32 (M=1.15, n=8)	1.02-1.13 (M=1.06, n=10)
temporals	14	10	9-11	11-15
eye extension [µm]	80-100	110	80-90	95-110
frontal tubercles [µm]	–	–	–	20
ultimate flagellomere length [µm]	300	640	310-360 (M=332, n=5)	270-355 (M=320, n=8)
AR	0.63-0.69 (M=0.65, n=5)	1.6	0.71-0.78 (M=0.75, n=5)	0.73-0.98 (M=0.85, n=8)
clypeus setae	14-18	11	16-20	19-22
palpomere length 1-5 [µm]	28, 30, 78, 86, 141	30, 35, 110, 110, 80	27, 28, 90, 100, 150	27, 26, 79, 90, 133
acrostichals	12	10	7-13	13-16
dorsocentrals	11-12	14	13-18	8-14
prealars	4	5	5	4-5
scutellars	5	13 in 2 rows	12-15 in two rows	6-7
wing setae	on R, R1, R4+5	on R, R1, R4+5	on R, R1, R4+5	on R, R1, R4+5, M, M1+2, M3+4, Cu, Cu1, PCu; r4+5, m1+2, m3+4, an
VR	1.32-1.35 (n=5)	0.82	1.26-1.32	1.25-1.52
squamals	3	9	5	2-4
LR_1	2.27-2.39 (n=4)	1.91	2.08-2.12 (M=2.12, n=4)	2.28/2.32
LR_2	0.51-0.54 (M=0.52, n=4)	0.50	0.52-0.58 (M=0.55, n=5)	0.56
LR_3	0.53-0.70 (M=0.63, n=4)	0.69	0.66-0.71 (M=0.68, n=5)	0.68-0.71
tibial combs [µm]	12-18	27-28	18-23	18-20
tibial spurs [µm]	46-50	57-58	46-49	48-50
number of setae in tibial comb	25-28	51	36-40	35-37

Spur of middle tibia 40-45 μm long, of hind tibia 46-50 μm long. Width at apex of front tibia 35-40 μm , of middle tibia 37-40 μm , of hind tibia 42-46 μm . Comb of 25-28 teeth of middle tibia 12-17 μm long, of hind tibia 15-18 μm long.

Lengths (in μm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	520/ –	280/ 290	650/ 670	370/ 400	280/ 300	220/ –	110/ –
P2	580/ 640	480/ 530	250/ 290	150/ 170	100/ 120	60/ –	50/ –
P3	590/ 640	510/ 570	280/ 400	170/ 210	120/ 180	100/ 110	50/ 70
	LR		BV		SV		
P1	2.27/2.39		1.47/1.48		1.19/1.23		
P2	0.51/0.54		3.76/3.77		4.03/4.29 (M=4.18, n=4)		
P3	0.53/0.70 (M=0.63, n=4)		2.78/3.20 (M=2.93, n=4)		3.02/4.41 (M=3.43, n=4)		

<i>P. nazarovae</i>	<i>P. rohmeri</i>
1.1	1.08-1.22 (M=1.15, n=4)
7	7-8
65	90
–	17-18
290	355-395 (M=380, n=4)
0.69	0.95-1.06 (M=1.01, n=4)
16	18
22, 30, 65, 82, 125	30, 28, 78, 87, 140
12	13-15
11	11-13
5	4
3	5
on R, R1, R4+5, M3+4	on R, R1, R4+5
1.37	1.24-1.38 (M=1.32, n=4)
3	0
2.0	2.05-2.16 (M=2.12, n=4)
0.6	0.58-0.59
0.71	0.73-0.77
20-22	18-25
52-55	40-47
30	40-44

Hypopygium (Fig. 1): Tergite IX with three median setae. Anal point long narrow, parallel-sided, without basal lobes. Superior volsella nearly covered by tergite IX, stout, about twice as long as wide, covered with microtrichia, with seven setae of the same length directed medially: three inner, two apical, one lateral and one dorsal. Inferior volsella reaching about as far posterior as the anal point, parallel-sided, with seven to eight strong, equal setae: three inner, three apical and two lateral. Gonostylus rather thin and long, slightly medially curved, gradually narrowing to apex, with one apical and three distal-median setae.

Distribution. The species has been collected from two sites on the Yucatán peninsula: (1) from a unnamed eutrophic gravel pond in Belize, a small, shallow water body of artificial origin with a stony littoral, a *Juncus* belt, and a muddy silt bottom; (2) from the Mexican Lake Ocom, a rather large, elongated water body with rather dense vegetation belt in the littoral zone, oligotrophic state and moderate salinity.

Etymology. Named after Mr. Martin Spies, in honour of his outstanding contributions to chironomidology, specifically for the Neotropics.

Polypedilum (Tripodura) bacalar spec. nov.
(Figs 2,3)

Type material. Holotype: ♂ imago, Mexico, Quintana Roo, near Chetumal, Lake Bacalar, 18°66'73"N, 88°39'39"W. December 2005. Specimen mounted on microscope slide in Hydro-Matrix.

Diagnosis. *P. bacalar spec. nov.* is distinguished by the large body size and the characteristic shapes and setation of superior and inferior volsella.

Description

Colour: Dark brown. Thorax, abdominal tergites, and postnotum darker, legs stramineous. Halteres dark. Wings immaculate.

Length: Total 3.6 mm.

Head: AR 1.6. Terminal flagellomere 640 μm long. Frontal tubercles not recognizable. 10 temporal setae, including two inner verticals, six outer verticals and two postorbitals. Clypeus with 11 setae. Palpomere lengths 1-5 (in μm): 1-5: 30, 35, 110, 110, 80 μm . Dorsomedian eye extension 110 μm wide.

Thorax: Acrostichals 10, dorsocentrals 14, prealars 5, scutellars 13, humerals absent.

Wing: Length 1.65 mm. VR 0.82. Markings absent. R with 18, R₁ with 15, R₄₊₅ with 23. Brachiolum with one seta. Squama with 9 setae. Cells and remaining veins bare.

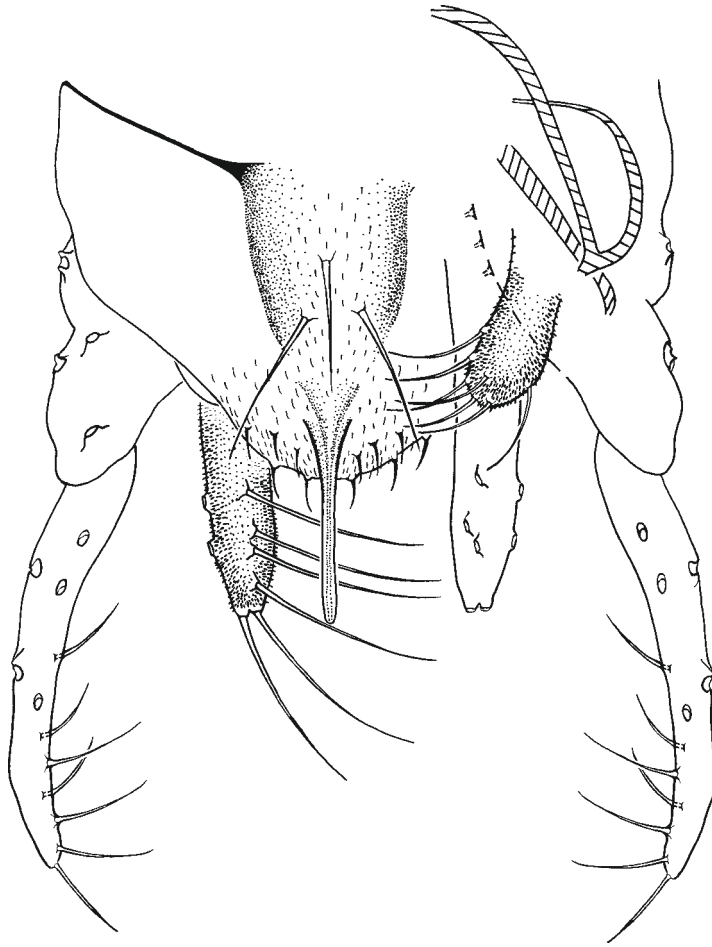


Fig. 1. *Polypedilum (Tripodura) spiesi* spec. nov. Hypopygium, dorsal view.

Legs: Scale of front tibia triangular with pointed tip. Spur of middle tibia 57 μm long, of hind tibia 58 μm long. Width at apex of front tibia 45 μm , of middle tibia 50 μm , of hind tibia 58 μm . Comb of 51 teeth, of middle tibia 27 μm long, of hind tibia 28 μm .

Lengths (in μm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	700	480	920	570	430	330	110
P2	800	690	350	240	190	120	90
P3	850	760	530	310	250	150	100
	LR	BV	SV				
P1	1.91	1.45	1.28				
P2	0.50	2.87	4.25				
P3	0.69	2.64	3.03				

Hypopygium (Figs 2,3): Tergite IX with ten unusually short median setae. Anal point distorted in slide-mounting (Fig. 3), interpreted (Fig. 2) as broadened in mid-section, medially bent, basal lobes narrowly triangular. Superior volsella short, very stout, about twice as long as wide, not reaching end of gonocoxite, completely covered by microtrichia of various lengths, with six to seven setae of different size: one apical, two subapical, three to four inner. Inferior volsella slightly club-shaped, reaches beyond anal point, with nine strong setae mostly along median and posterior margins, increasing in size towards posterior. Gonostylus rather long and slender, with slight bend near the origin, slightly narrowing towards tip, with one strong apical and four distal-median setae.

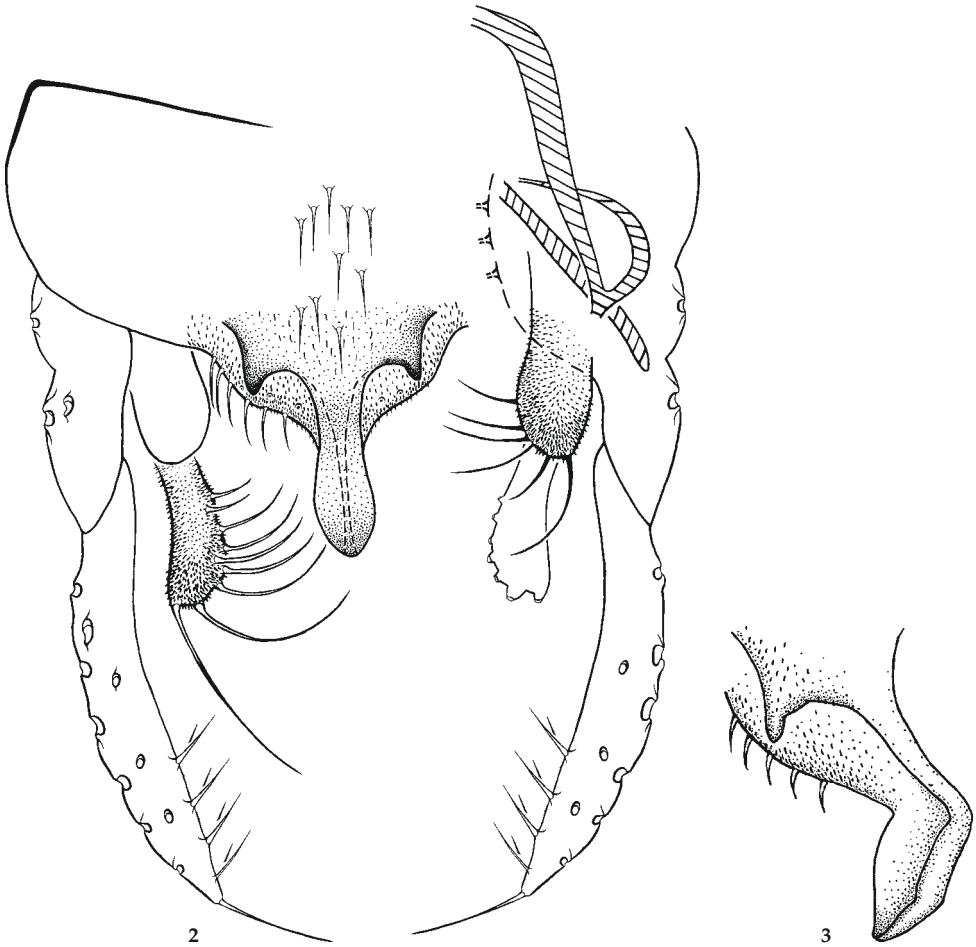


Fig. 2. *Polypedilum (Tripodura) bacalar* spec. nov. Hypopygium, dorsal view.

Fig. 3. *Polypedilum (Tripodura) bacalar* spec. nov. Anal point of holotype.

Remarks. The male can be distinguished from the similar *Polypedilum (Tripodura) albinodus* Townes, 1945 by the distinctive setation of the inferior volsella of *P. bacalar* and by the sizes of superior and inferior volsella relative to the anal point.

Distribution. This species has been recorded only from Lake Bacalar, the second-largest freshwater body in the Mexican part of Yucatán. Due to a former connection with the sea this oligotrophic lake shows comparatively high salinity. The littoral zone, formerly bearing vegetation, now is impacted to a certain extent by tourism.

Etymology. Named for the type locality.

Polypedilum (Tripodura) rissi spec. nov.
(Fig. 4)

Type material. **Holotype:** ♂ imagines, Mexico, Yucatán, Lake Punta Laguna, 20°64'79" N, 87°63'63" W; **Paratypes:** 4♂ imagines, GUATEMALA, Petén region, Lake Petén Itzá, 17°00'68" N, 89°85'37" W and lake Yaxhá 17°07'08" N, 89°40'73" W. – **Paratypes:** ♂ imago, Mexico, Quinto Roo, Lake Bacalar, 18°66'73" N, 88°39'39" W. November-December, 2005. Specimens mounted on microscope slides in Hydro Matrix.

Diagnosis. *P. rissi* spec. nov. is distinguished by an AR lower than 1.0 and by the characteristic configuration of the superior volsella.

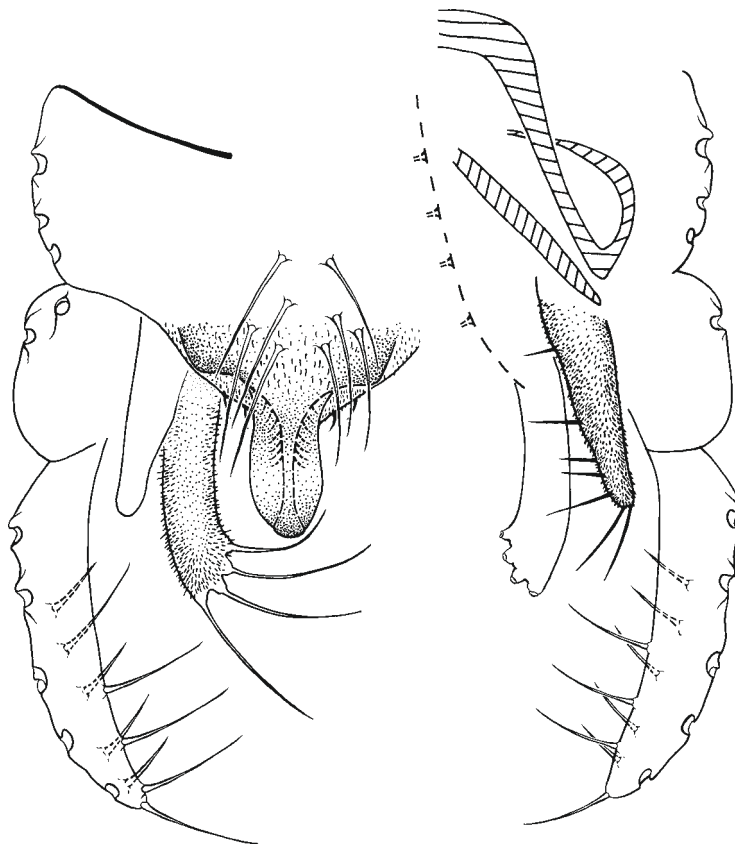


Fig. 4. *Polypedilum (Tripodura) rissi* spec. nov. Hypopygium, dorsal view.

Description

Colour: Thorax mostly evenly brown, somewhat darker at pronotum and postnotum, legs with clear bands at apices of femora, tarsomeres and tibiae. Halteres dark. Wings immaculate.

Length: Total 2.15-2.6 mm ($M=2.4$, $n=7$).

Head: AR 0.71-0.78 ($M=0.75$, $n=5$). Terminal flagellomere 310-360 μm long ($M=332$, $n=5$). Frontal tubercles not recognizable. 9-11 temporal setae, including two to three inner verticals, five to six outer verticals and two postorbitals. Clypeus with 16-20 setae. Palpomere lengths 1-5 (in μm , $n=5$): 25-30, 25-30, 85-100, 90-110, 130-170. Dorsomedian eye extension 80-90 μm wide.

Thorax: Acrostichals 7-13 ($M=8$, $n=5$), dorso-centrals 13-18 ($M=15$, $n=6$), prealars 5, scutellars 12-15 in two rows, anteprenotals 3, supraalars 4-5, humerals absent.

Wing: Length 1.05-1.32 mm ($M=1.15$, $n=8$). VR 1.26-1.32. Markings absent. R with 13-17, R_1 with 12-14, R_{4+5} with 22-27. Brachiolum with one seta. Squama with 5 setae. Cells and remaining veins bare.

Legs: Scale of front tibia triangular with pointed tip. Spur of middle tibia 47-49 μm long, of hind tibia 46-48 μm long. Width at apex of front tibia 48 μm , of middle tibia 49-50 μm , of hind tibia 50 μm . Comb of 36-40 teeth, of middle tibia 18-22 μm long, of hind tibia 20-23 μm long.

Lengths (in μm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	550/ 600	320/ 350	680/ 760	380/ 430	290/ 330	220/ 240	60/ 70
P2	640/ 740	550/ 600	290/ 350	170/ 200	120/ 140	70/ 80	60/ -
P3	650/ 760	600/ 710	420/ 510	220/ 280	190/ 210	100/ 120	70/ 80
	LR		BV		SV		
P1	2.08/2.12 ($M=2.12$, $n=4$)		1.61/1.68 ($M=1.61$, $n=4$)		1.25/1.27 ($M=1.26$, $n=4$)		
P2	0.52/0.58 ($M=0.55$, $n=5$)		3.43/3.6 ($M=3.51$, $n=5$)		3.82/4.1 ($M=3.91$, $n=5$)		
P3	0.66/0.71 ($M=0.68$, $n=5$)		2.62/2.95 ($M=2.74$, $n=5$)		2.88/3.12 ($M=3.02$, $n=5$)		

Hypopygium (Fig. 4): Tergite IX with eight median setae. Anal point with low, shoulder-like basal lobes, subapically broadened and strongly bent to ventral. Superior volsella straight, slender and gradually narrowing, reaching nearly as far posterior as anal point; completely covered by microtrichia, with two or three outer stout setae and one inner seta on apical margin, four medially; inner margin bears some strong microtrichia. Inferior volsella reaches beyond anal point, slightly club-shaped and bent, with four strong setae of equal size situated on apical and inner subapical margin. Gonostylus rather short, slightly narrowing towards tip, with one apical and five ventral strong setae.

Distribution. Specimens have been collected from lakes Bacalar, Punta Laguna (both in Mexico), Petén Itzá and Yaxhá (Guatemala). All these water bodies are relatively large, deep, of oligotrophic character, and surrounded by a narrow vegetation belt. Punta Laguna and Yaxhá are 'cenotes', characteristic karstic water bodies of the Yucatán peninsula.

Etymology. Named in honour of Mr. Hans Wolfgang Riss, my scientific advisor and promoter of ecological research in the Neotropics.

Polypedilum (Tripodura) scharfi spec. nov.
(Fig. 5)

Type material. Holotype: ♂ imago, Belize, Lake Honey Camp, 18°04'07"N, 88°43'42"W. – **Paratypes:** 8♂ imagines, Guatemala, Lake Izabal, 15°45'51"N, 89°10'10"W, Lake Macanché, 16°96'93"N, 89°62'56"W, Lake Yaxhá, 17°07'08"N, 89°40'73"W, Lake Petén Itzá, 17°00'68"N, 89°85'37"W; Paratypes: 5♂ imagines, BELIZE, Lake Almond Hill, 17°46'41"N, 88°31'17"W. November-December 2005. Specimens mounted on microscope slides in Hydro-Matrix.

Diagnosis. *P. scharfi* spec. nov. is distinguished by an AR lower than 1.0, numerous wing setae present on wing membrane and covering most of the veins, and by the apically abruptly bent anal point.

Description

Colour: Thorax yellow-brown to brown, somewhat darker at postnotum and abdominal tergites. Femora brown except for extreme bases and subapical light coloured bands. Halteres pale-brown. Wings immaculate.

Length: Total 2.00-2.25 mm (M=2.15, n=10).

Head: AR 0.73-0.98 (M=0.85, n=8). Terminal flagellomere 270-355 µm long. (M=320, n=8). Frontal tubercles 20 µm long. 11-15 temporal setae, including two inner verticals, six to eight outer verticals, and three to five postorbitals. Clypeus oval,

with weak apico-medial point, bears 19-22 setae. Palpomere lengths 1-5 (in µm, n=8): 25-30, 24-28, 75-87, 85-95, 125-150. Dorsomedian eye extension 95-110 µm wide.

Thorax: Acrostichals 13-16 (M=14, n=7), dorsocentrals 8-14 (M=11, n=7), prealars 4-5, scutellars 6-7, anteprenotals 8, humerals present.

Wing: Length 1.02-1.13 mm (M=1.06, n=10). VR 1.25-1.52. Markings absent. R with 15-16, R₁ with 17-19, R₄₊₅ with 25-33, M with 7-12 setae, M₁₊₂ with 43-69, M₃₊₄ with 21-36, Cu with 34-40, Cu₁ with 21-25, Cu₂ with 18-23. Cell r₄₊₅ with 110-123 setae, m₁₊₂ with 78-103 setae, m₃₊₄ with 35-64 setae, an with 48-77 setae. Brachiolium with one seta. Squama with 2-4 setae. Remaining cells and veins bare.

Legs: Scale of front tibia with distinct spur, 39 µm long. Spur of middle tibia 48-50 µm long, of hind tibia 49-50 µm long. Width at apex of front tibia 37 µm, of middle tibia 38-40 µm, of hind tibia 42-43 µm. Comb of 42-47 teeth, of middle and hind tibia 18-20 µm long.

Lengths (in µm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	450/ 520	250/ 280	580/ 640	340/ 380	250/ 280	190/ 210	100/ 110
P2	540/ 600	440/ 480	250/ 270	150/ 170	100/ 120	50/ 75	45/ 50
P3	540/ 610	490/ 550	340/ 380	190/ 220	155/ 210	90/ 110	60/ 70
	LR		BV		SV		
P1	2.28/2.32		1.44/1.48		1.2/1.27		
P2	0.56		3.25/3.50		3.8/4.07		
P3	0.68/0.71		2.36/2.78		2.94/3.14		
	(M=2.6, n=6)						

Hypopygium (Fig. 5): Tergite IX with nine median setae. Anal point trifid, broadened medially and abruptly bent apically. Basal lobes located far from each other, do not bear setae. Superior volsella of about even width, short, with six setae of different size: three apical and three on outer apical margin; covered with microtrichia. Inferior volsella quite straight, about twice as long as wide, reaches beyond anal point, with four strong setae of equal size situated on apical and inner subapical margin of volsella. Gonostylus rather long, with one strong apical and three distal-median setae.

Remarks. The species is somewhat similar to *Polypedilum (Tripodura) karyana* Bidawid & Fittkau, 1995. However, *P. karyana* lacks setae ventrally on the anal point stem and numerous setae on the wing veins. The species can be separated by differences in AR (for *P. scharfi* spec. nov. 0.73-0.98, for *P. karyana* 0.22), gonostylus length ratio, and configuration of the superior volsella.

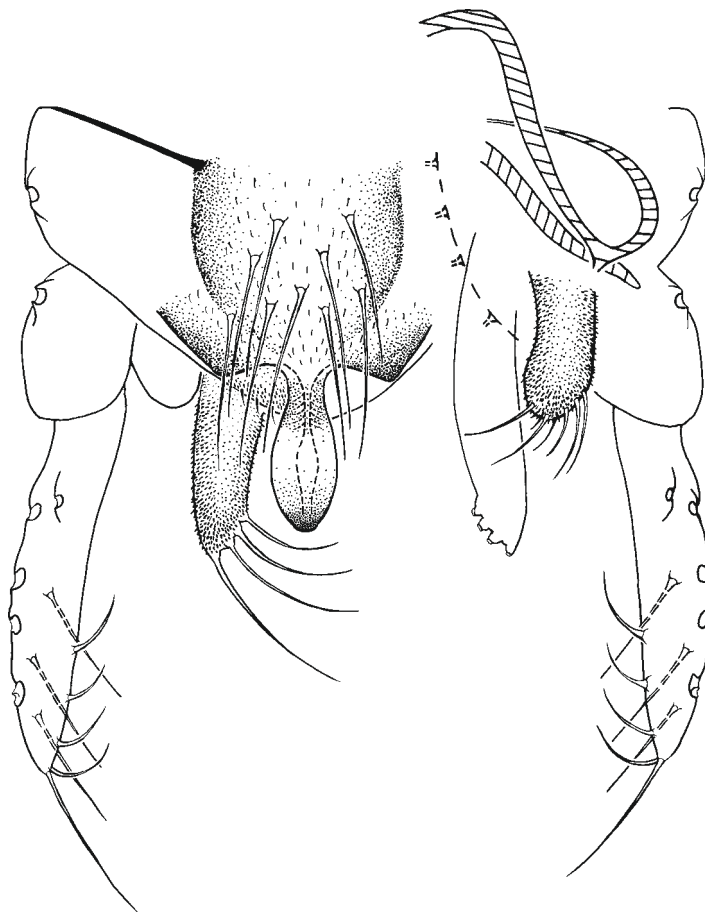


Fig. 5. *Polypedilum (Tripodura) scharfi* spec. nov. Hypopygium, dorsal view.

In the subgenus *Tripodura* only three species have setae on the wing membrane: *P. (T.) chiriguano* Bidawid-Kafka and *P. (T.) guarani* Bidawid-Kafka, both from Brazil, and *P. (T.) kijabense* Freeman from Kenya. Of these, only *P. (T.) kijabense* is lacking spots on the wing (Várdal et al. 2002). Hairy wings otherwise is restricted to the subgenus *Pentapedilum* Kieffer.

Distribution. Judging from the numerous specimens from a series of lakes (Petén Itzá, Izabal, Macanché, Yaxhá, Almond Hill, Honey Camp), *P. scharfi* sp. nov. appears to be rather common in Yucatán, occurring in large oligotrophic lakes, and apparently tolerating strong seawater infiltration.

Etymology. Named for Mr. Burkhard Scharf, for his composure as colleague of mine and his contributions to the limnology of lakes in Germany.

***Polypedilum (Tripodura) nazarovae* spec. nov.**

(Fig. 6)

Type material. Holotype: ♂ imago; BELIZE, Lake Almond Hill, 17°46'41"N, 88°31'17"W. November 2005. Specimen mounted on microscope slide in Hydro-Matrix.

Diagnosis. *P. nazarovae* spec. nov. is distinguished by the AR lower than 1.0; inferior volsella tapering outside; slender, pointed gonostylus; and by the distinctive configuration of the superior volsella.

Description

Colour: Light-brown. Thorax somewhat darker at pronotum and postnotum, legs with clear bands at extreme bases and distal thirds of femora. Wings immaculate.

Length: Total 2.15 mm.

Head: AR 0.69. Terminal flagellomere 290 µm

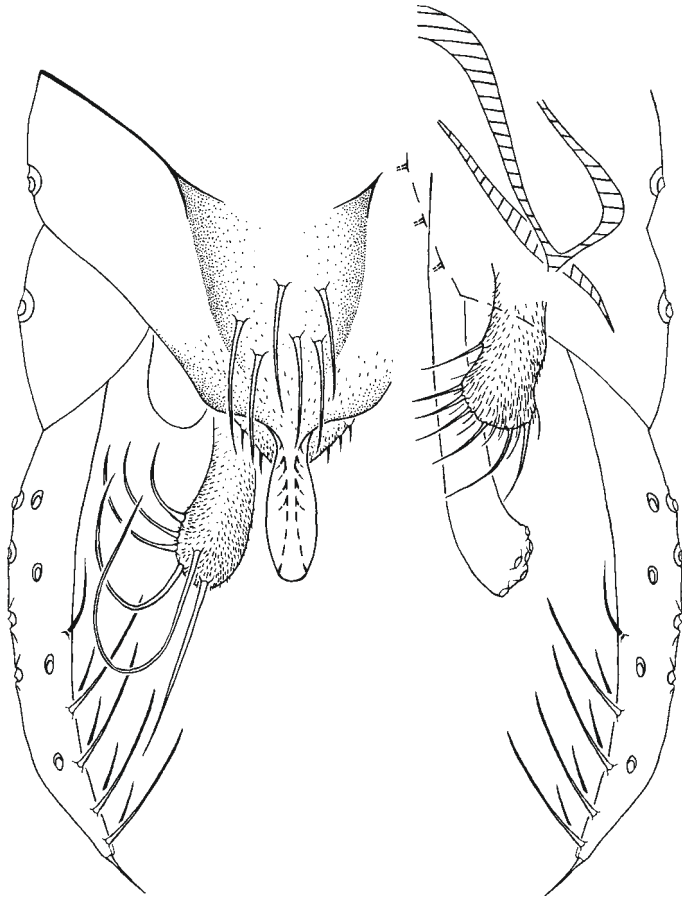


Fig. 6. *Polypedilum (Tripodura) nazarovae* spec. nov. Hypopygium, dorsal view.

long. Frontal tubercles absent. Seven temporal setae. Clypeus rather rounded with weak apico-medial point, bears 16 setae. Palpomere lengths 1-5 (in μm): 22, 30, 65, 82, 125. Dorsomedian eye extension 65 μm wide.

Thorax: Acrostichals 12, dorsocentrals 11, prealars 5, scutellars 3, humerals present.

Wing: Length 1.1 mm. VR 1.37. Markings absent. R with 14, R_1 with 10, R_{4+5} with 20 situated in basal two thirds from crossvein RM; M_{3+4} with 5 setae located close to wing edge. Brachiolum with one seta. Squama with three setae. Cells and remaining veins bare.

Legs: Scale of front tibia triangular with pointed apex but without distinct spur. Spurs of middle tibia 55 μm long, of hind tibia 52 μm long. Width at apex of front tibia 38 μm , of middle tibia 42 μm , of hind tibia 48 μm . Comb of 30 teeth, of middle tibia 22 μm long, of hind tibia 20 μm .

Lengths (in μm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	540	325	650	365	280	205	110
P2	565	450	270	150	105	65	60
P3	570	520	370	200	165	100	70
	LR		BV	SV			
P1	2.0		1.57	1.33			
P2	0.6		3.38	3.75			
P3	0.71		2.72	2.94			

Hypopygium (Fig. 6): Tergite IX with six median setae. Anal point narrowed at the apex, medially slightly bent to ventral. Basal lobes smoothly shoulder-shaped, not very prominent. Superior volsella short, about twice as long as wide; bears seven setae directed medially: two long ones on outer edge of apex, four on inner edge of apex, and one lateral; covered with microtrichia, apical edge

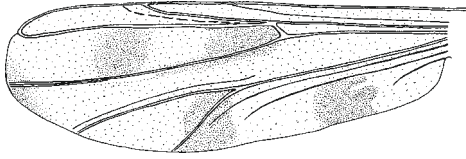


Fig. 7. *Polypedilum rohneri* spec. nov. Wing.

bears strong microtrichia of various sizes. Inferior volsella reaches about as far posterior as anal point, slightly club-shaped, apex slightly bent to lateral; bears six strong setae mostly along median and posterior margins, setae increasing in size towards posterior. Gonostylus rather long, slender, narrowing towards tip, with one short apical and five strong distal-medial setae.

Remarks. The species is similar to *Polypedilum (Tripodura) nahukuwa* Bidawid & Fittkau, 1995 from which it can be separated by lacking the wing pattern, by the different shape of the inferior volsella, different numbers of setae on the inferior and superior volsellae, and the higher number of median setae on tergite IX.

Distribution. *P. nazarovae* spec. nov. has been collected from large and shallow but oligotrophic Lake Almond Hill in Belize, which is subject to varying seawater influence. The lake's littoral is well developed and represented by a dense mangrove belt.

Etymology. Named after Mrs. Larisa Nazarova, chironomidologist at the Kazan State University, Russia, who introduced me to the chironomids.

Polypedilum rohneri spec. nov.
(Figs 7,8)

Type material: **Holotype:** ♂ imago, Belize, Crooked Tree Wildlife Sanctuary, Lake Crooked Tree 17°79'19"N, 88°53'19"W. – **Paratype:** ♂ imagines, Belize, Lake Almond Hill, 17°46'41"N, 88°31'17"W. – **Paratypes:** 2♂ imagines, Guatemala, Lake Perdida, 17°06'93"N, 90°20'81"W; Paratypes: 2♂ imagines, Mexico, Yucatán, Lake Chichancab 19°88'01"N, 88°76'67"W. November-December 2005. Specimens mounted on microscope slides in Hydro-Matrix.

Diagnosis. *P. rohneri* spec. nov. is distinguished by the wing pattern, quite short gonostylus, and unique configuration of the superior volsella. In addition, the squama lacks setae.

Description

Colour: Light-brown, postnotum brownish, posterolateral- and lateral vittae possibly slightly

darker. Femora at bases lighter, distal two-thirds darker. Wings maculate (Fig. 7).

Length: Total 2.3-2.65 mm (M=2.49, n=5).

Head: AR 0.95-1.06 (M=1.01, n=4). Terminal flagellomere 355-395 µm long (M=380, n=4). Frontal tubercles 17-18 µm long. Seven to eight temporal setae, including two inner verticals, four outer verticals, and one to two postorbitals. Clypeus rather rounded, with 18 setae. Palpomere lengths 1-5 (in µm, n=4): 27-32, 23-32, 70-87, 83-90, 130-150. Dorsomedian eye extension 90 µm wide.

Thorax: Acrostichals 13-15, dorsocentrals 11-13, prealars 4, scutellars 5, anteprenotals 4.

Wing (Fig. 7): Length 1.08-1.22 mm (M=1.15, n=4). VR 1.24-1.38 (M=1.32, n=4). With five darkened areas: two in cell r_{4+5} , one small area around tip of M_{1+2} , one around Cu_1 , and one centrally in cell an; along vein M_{1+2} an additional narrow strip fused with the basal area in r_{4+5} . R with 13-17, R_1 with 14-16, R_{4+5} with 22-25. Brachiolum with one seta. Squama without setae. Cells and remaining veins bare.

Legs: Scale of front tibia rounded without spur. Spur of middle tibia 40-42 µm long, of hind tibia 42-47 µm long. Width at apex of front tibia 38-42 µm, of middle tibia 40-47 µm, of hind tibia 45-52 µm. Comb of 40 teeth, on middle tibia 18-25 µm long, on hind tibia 21-25 µm long.

Lengths (in µm) and proportions of leg segments:

	fe	ti	ta1	ta2	ta3	ta4	ta5
P1	520/ 630	310/ 340	670/ 735	320/ 420	280/ 320	220/ 250	120/ 130
P2	580/ 700	475/ 540	280/ 320	160/ 190	110/ 140	70/ 80	60/ 70
P3	595/ 680	540/ 600	400/ 460	220/ 260	180/ 210	110/ 130	70/ 85
	LR		BV		SV		
P1	2.05-2.16 (M=2.12, n=4)		1.49-1.6 (M=1.54, n=4)		1.23-1.3		
P2	0.58-0.59		3.12-3.35 (M=3.24, n=4)		3.78-3.87		
P3	0.73-0.77		2.55-2.69 (M=2.61, n=4)		2.72-2.83		

Hypopygium (Fig. 8): Tergite IX with eight median setae. Anal point subapically broadened and bent ventrally, basal lobes absent. Superior volsella apically bent to median and pointed, narrowed from slightly wider base; bears two strong, antero-medially directed setae on apex and inner margin, and 2-3 weaker setae on outer apical margin; inner margin with row of even-sized stronger microtrichia; microtrichia present on inner surface of volsella only. Inferior volsella long, reaching to mid-gonostylus, narrow, distally clubbed, slightly curved medially;

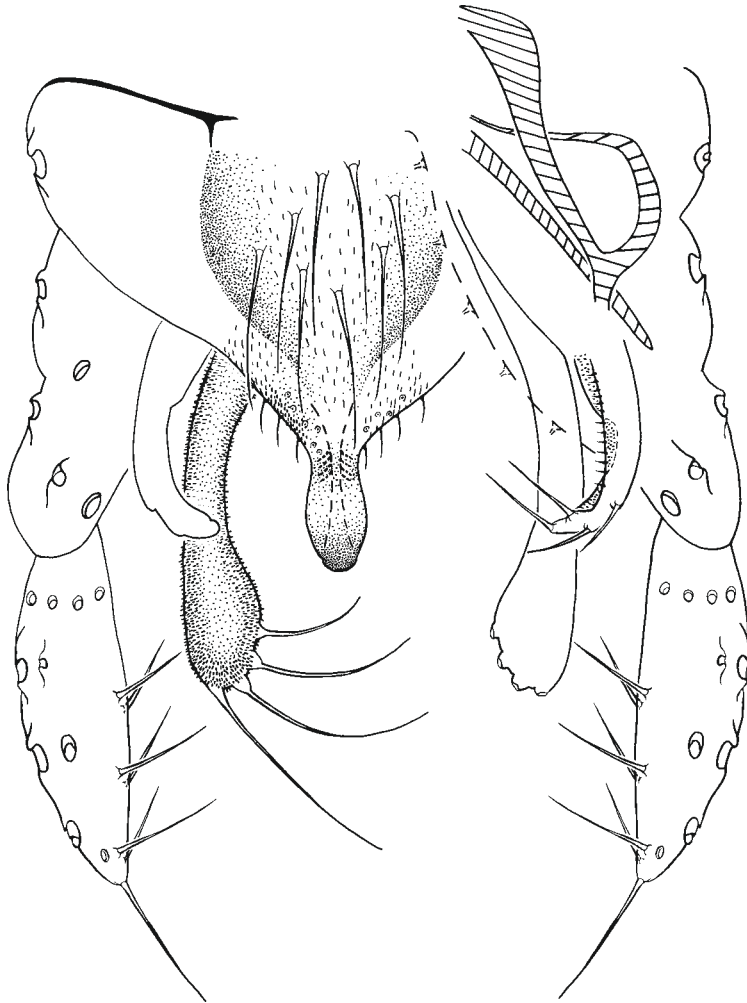


Fig. 8. *Polypedilum rohneri* spec. nov. Hypopygium, dorsal view.

bears 4-5 setae on apical and inner subapical margin. Gonostylus short, with one strong apical and three distal-median setae.

Remarks. The species is distinguished from all others of the subgenus *Tripodura* by its wing pattern, the lack of squamal setae, tergite IX 'shoulders', the shorter gonostylus, and by its characteristic superior volsella. Nevertheless, the species might be confused with *Polypedilum (Tripodura) baniva* Bidawid & Fittkau, 1995, which also has a long (but distally less clubbed) inferior volsella, and similar wing patterns and shape of the anal point.

Distribution. Specimens were collected from the lakes Crooked Tree, Almond Hill (both in Belize), and Chichancanab (Mexico), all of which vary be-

tween high salinity during dry periods and low salinity at high water levels after heavy rainfall. Additionally the species was found in Lake Perdida, a mid-sized water body in Guatemala, which is considerably polluted by human and agricultural impact. In all lakes, the littoral zone is characterized by extensive but variable vegetation belts.

Etymology. Named for Mr. Beat Rohner, in recognition of his kindness and support.

Discussion

At the time of the latest species-level overview of *Polypedilum* (Vårdal et al. 2002) more than 200 validly described species had been listed, whereas at

least 50 more were known to exist but awaiting description. In the unpublished PhD thesis of Oyewo (2007) 433 species are listed. The relatively high diversity of important diagnostic characters, such as the shape of the superior volsella, anal point structure and wing pattern, causes extreme heterogeneity within the genus. Nevertheless, five of the six *Polypedilum* species newly described here are well distinguished by their male hypopygia and can be clearly placed in the subgenus *Tripodura*.

One species, *P. rohneri* spec. nov., does not fit into the subgeneric scheme, most distinctively due to its unique structure of the volsella complex. According to the character matrix given by Oyewo and Sæther (1998), *P. rohneri* spec. nov. can be localized closer to the subgenus *Polypedilum* than to *Tripodura*, and less to all other subgenera. However, various features do not support an explicit placement of *P. rohneri* in the subgenus *Polypedilum*: wing vein R_{2+3} almost in contact with R_1 (not clearly separate); fore tibial scale rounded without apical spur (neither triangular nor bearing a spur); superior volsella with a narrowing projection on the slightly wider setae-free base (not having a usually distinctly broad base bearing up to 3 setae and a well set off projection); anal point slightly spatulate (not parallel-sided or tapering). The remaining character states of *P. rohneri* spec. nov. do not even occur in any of the subgenera (i.e. lack of setae on the squama, lack of setae on the base of superior volsella, and shape of the superior volsella). This diagnosis is of preliminary quality as the phylogenetic weights of the morphological characters were only assumptive or not known. A further observation is that application of the key in Oyewo (2007, modified from Sæther & Sundal 1999) to *P. rohneri* spec. nov. does not lead beyond the subgeneric level. All above-mentioned findings considered, the male of *P. rohneri* spec. nov. most probably justifies erection of a new subgenus. In the absence of evidence on the immature stages, however, such a proposal is considered as premature here.

Several meristic characters were observed to be well correlated with overall body size: height of the tibial comb ($r=0.875$, $p<0.05$), number of teeth in it ($r=0.897$, $p<0.02$), antennal ratio ($r=0.966$, $p<0.01$), and wing length ($r=0.982$, $p<0.001$).

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