Two peculiar species of Oriental Chironomini (Diptera, Chironomidae)

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Abstract

Two strange species are described and illustrated here based on adult males collected from China and Malaysia respectively. The combination of conventional diagnostic character states is unusual in both species, and we cannot allocate either into any currently recognized genera. We propose that these represent two new genera in the tribe Chironomini. Here we adopt 'Chironomini taxon 1' and 'taxon 2' as coded unresolved names for further discussion.

Introduction

Knowledge of species diversity and zoogeographic distribution of chironomid fauna is critical for us to understand their evolutionary diversification (Brundin 1966). However, when we compare chironomid richness between major zoogeographic regions, the Oriental regional fauna, is undoubtedly the most poorly studied (Sublette and Sublette 1973, Ashe 1990, Ferrington 2008). Although recent decades have seen greater activity concerning this fauna, notably a few regional guides (Cranston 2004, Cranston and Tang 2024) and some newly confirmed wide-distribution genera (Tang and Cranston 2025). Nevertheless, there are many new findings together with undescribed taxa needing for revealing highly threatened hotspots for conservation (Sodhi et al. 2010, Hughes 2017).

During recent fieldwork in 2024, two strange midges were sorted from light traps, of which each species is represented by only a single individual. Detail examination indicated neither of them can be assigned confidently into any known genus, but can be narrowed to subfamily Chironominae, tribe Chironomini. Since the material is limited and it is hard to extract DNA or accumulate additional material in the near future, we drawn attention to these peculiar species. Establishment of taxonomic rank without any associated immature materials or evidence from molecular data is unwise. Here, two species with no generic rank are described and illustrated.

Materials and methods

Adults were collected using light traps, sorted, and mounted on slides in Euparal. Photographs were taken under an Olympus BX53 compound microscope through a mounted camera-ToupViewTM. Digital photos of different focal planes were stacked using Helicon Focus version 7. Morphological terminology and abbreviations generally follow Sæther (1980) except the base projection of the gonostylus in the taxon 2. Line drawings were aided using a drawing tube attached to an Olympus BX53. All material is deposited in the Department of Ecology, Research Centre of Hydrobiology, Jinan University, Guangdong, China (EJNU).

Taxonomy

Chironomini taxon 1

Fig. 1

Material examined. 1 male, CHINA: Macao SAR, an artificial ecology park of Alto de Coloane, near South China Herbs Garden, 22°07'N 113°33'E, 160 m, 09.x.2024, light trap, leg. JD Yin.

Diagnostic characters. Taxon 1 can be separated from others by the banded wings and legs; TIX with a pair of posterior tubercles; superior volsella bare, pad-like; inner margin of gonostylus with a field of long setae in apical 2/3.

Male (n = 1)

Total length 2.8 mm. Wing length 1.25 mm.

Generally brown in color. Wing membrane somewhat smoky, with two broad darker bands in basal 1/3 and at mid length (Fig. 1A), lacking macrotrichia. Legs banded: femur with a brown band near apex, tibia almost brown except the apex 1/5 in P_1, all tarsi of P_1 are lost. In P_2 and P_3, femur with two brown rings, one near the middle and another located in the subapex, tibia almost brown except the two terminals (Fig. 1B), all tarsi yellow.

Head. Frontal tubercle absent. Flagellomeres 1–12, 470 μm; flagellomere 13, 410 μm, AR 1.15, apex with 3–4 setae, 30–40 μm long. Lengths (μm) of Pm 1–5: 40; 30; 80; 110; 165, respectively. Temporals 8. Clypeus with 32 setae.

Thorax. Scutal tubercle absent. Ac 16, extending to the mid-scutum. Dc 20, including 2 humerals, robust two rows after middle section. Pa 4. Scutellars consist of two rows, the anterior with three small setae, the posterior with eight strong setae.

Wing (Fig. 1A). Anal lobe obtuse, VR 1.24. R with 20 setae; R_1 with 14 setae; R_{2+3} close to R_1. R_{4+5} with 24 setae, other veins and cells bare. Squama with 3 setae.

Legs. Fore tibia apex tongue-shaped, not pointed. Mid and hind tibia with two separated combs, only outer small comb bearing a curved spur, 25–30 μm long. Pulvilli well-developed, as long as the claws, without further bifurcation. Leg segment length and proportions as Table 1.

Table 1. Lengths (μm) and proportions of legs of Chironomini taxon 1, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV
P_1	680	380	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
P_2	700	560	330	190	130	80	50	0.59	3.53	3.82
P_3	750	630	470	260	200	100	70	0.75	2.94	2.94

Abdomen. Tergite VIII tapered anteriorly, triangular in shape.

Hypopygium (Figs 1C–E). Anal tergite bands well-developed, extending posteriorly to the base of anal point, not fused medially, with 8 anal median setae, distally with two proturbances, apex bearing 6–8 long setae. Anal point 55 μm long, somewhat spatulate, constricted slightly in the middle, each side with 4 setae, and 6–8 small setae ventrally. Superior volsella pediform, microtrichiose, 75 μm long and 50 μm wide in maximum. Inferior volsella rod-shaped, apex with 5–6 strong recurved long setae. Gonocoxite 125 μm long. Gonostylus 130 μm long, with a clump of long setae along the inner margin, more than 35 setae (Fig. 1E). HR 0.96.

Remarks. In the key to the males of the Holarctic Chironominae (Cranston et al. 1989), the species keys to couplet 40, as it has 3 setae on squama, with further to couplet 42 to *Stelechomyia* Reiss (now a junior synonym of *Kribiodorum* Kieffer), but the shape of the fore femur apex and the fore tibial apex are clearly different. If the number of squamals is omitted, the species keys out to couplet 47 where it keys to *Polypedilum* Kieffer. The taxon clearly has similarities with the *Polypedilum* Kieffer generic complex given the tapering abdominal segment VIII, the tibial comb pattern and well-developed gonocoxite lobes, and especially to some species of the subgenus *Tripodura* regarding the pair of caudolateral projections on the anal tergite (Zhang et al. 2016). However, some details differ from the core generic diagnosis of *Polypedilum*: e.g., there are no characteristically bifurcate pulvilli or 6–8 distinct long, even-spaced setae along the inner margin of gonostylus. Although the pulvilli are well developed, each branch with several short twigs, there are no further bifurcate branches. Furthermore, the inner margin seta of the gonostylus of current species are concentrated to the apical 2/3, bearing numerous strong setae, easily observed in lateral view (Fig. 1E). Thus, we cannot make decision on generic placement and adopt “Chironomini taxon 1” here.

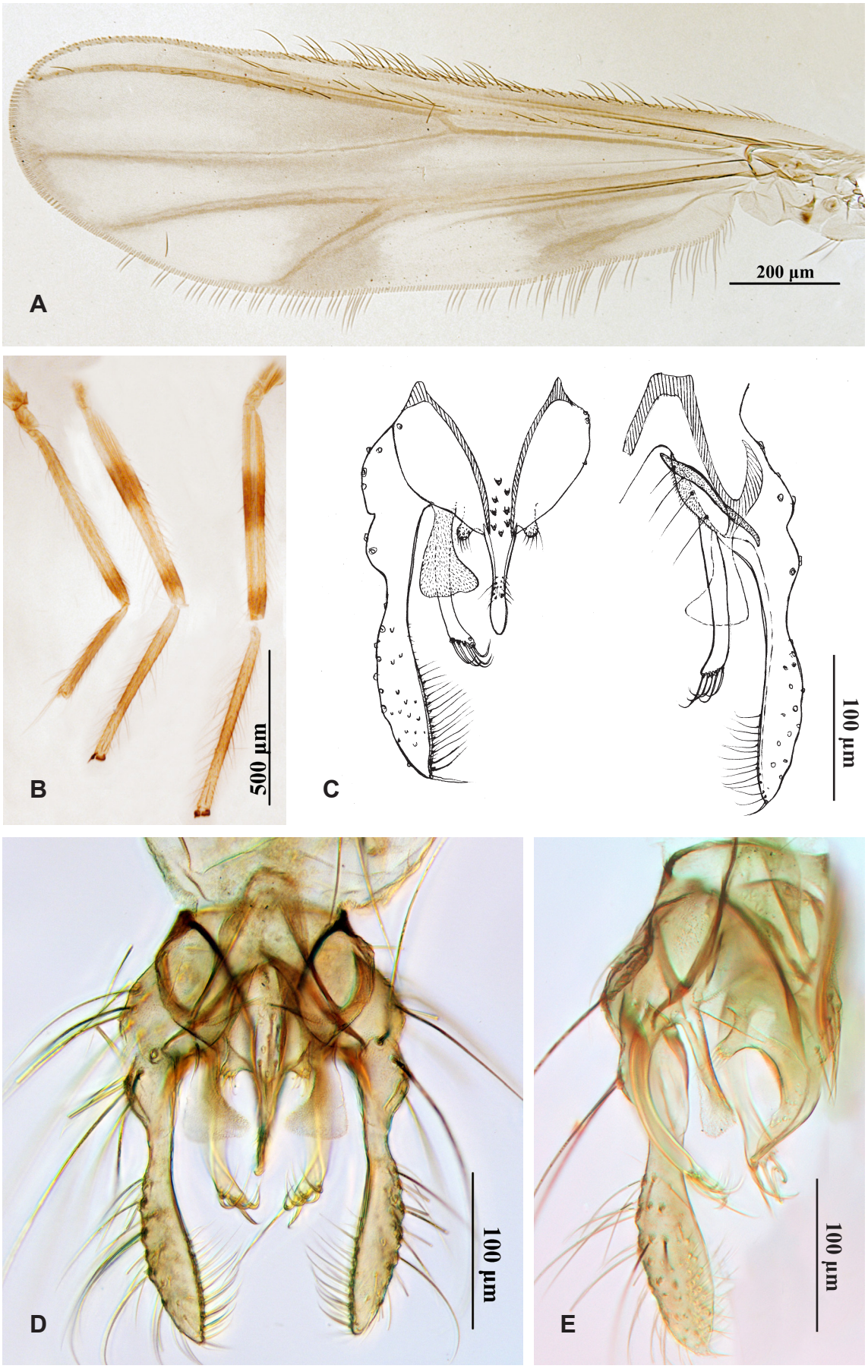

Figure 1. Chironomini taxon 1, male. A, wing; B, legs; C–E, hypopygium: C, line drawing; D, dorsal view; E, lateral view.

Chironomini taxon 2

Fig. 2

Material examined. 1 teneral male, MALAYSIA: Sabah, Kota Kinabalu, Kibunut Stream, 5°54'N 116°13'E, 120 m, 13.vii.2024, light trap, leg. H. Tang.

Diagnostic characters. Taxon 2 can be separated from others by the 11-segmented antenna, the stout gonostylus with a basal microtrichose digitiform projection, both superior volsella and inferior volsella are without microtrichia, but bearing 2 long setae.

Male (n = 1)

Total length 2.3 mm. Wing length 0.96 mm.

Generally yellowish green in color. Thorax with yellowish background, scutal vittae and postnotum brown. Wing surface without macrotrichia.

Head (Fig. 2B). Frontal tubercle absent. Flagellomeres 1–10, 420 μm; flagellomere 11, 530 μm, AR 1.26. Lengths (μm) of Pm 1–5: 20; 25; 25; 75; 95, respectively. Temporals 6. Clypeus with 12 setae.

Thorax. Scutal tubercle absent. Ac 8, starting close to antepronotum. Dc 6. Pa 2. Scutellars 6, uniserial.

Wing (Fig. 2A). Anal lobe nearly obtuse, wing venation indistinct. Wing membrane without macrotrichia, squama bare.

Legs (Fig. 2C). Fore tibia apex with a short extension, not pointed, without comb or spine. Mid and hind tibia with two separated combs, each comb bearing a short straight spur, 20 μm long. Pulvilli present, shorter than the claws. Leg segment length and proportions as Table 2.

Table 2. Lengths (μm) and proportions of legs of Chironomini taxon 2, male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV
P_1	450	280	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
P_2	425	330	170	80	50	25	30	0.52	5.00	4.44
P_3	450	430	270	145	135	70	50	0.63	2.88	3.26

Hypopygium (Fig. 2D–G). Anal tergite bands well-developed, extending posteriorly, not fused and connected with the base of anal point, no median tergite setae, but each side with 4–6 setae above the base of anal point. Anal point 50 μm long, nearly parallel-sided, with inner rim. Superior volsella (Fig. 2F) rod-shaped, about 40 μm long, with two small setae near apex, without microtrichia. Inferior volsella (Fig. 2G) small triangular with two points, about 20 μm by main axle, the basal apex with 2 small setae. Gonocoxite 120 μm long, with a sharp ventrolateral invasion towards the middle of gonostylus, the inner margin of gonocoxite apex slightly expanded, bearing 3–4 long setae. A pubescent digitiform projection is present at the base of gonostylus. Pars ventralis absent. HR 1.60.

Remarks. In the key to the males of the Holarctic Chironominae (Cranston et al. 1989), this taxon keys to couplet 21, but it does not resemble either *Robackia* Sæther or *Parachironomus* Lenz, as it has a reduced and stout gonostylus. If the digitiform projection at the base of gonostylus is regarded as the second branch of the gonostylus, the taxon likely falls into the *Harnischia* generic complex with a bifurcate gonostylus. The general contour of hypopygium also resembles those of some Pseudochironomini, i.e., with bare or digitus-like superior volsella and inferior volsella, plus a pubescent rod-like basal gonostylus projection, yet this taxon shows an 11-segmented antenna, fore tibial apex with no spine or comb, and a hypopygium with distinct long anal point. Those characters contradict the generic diagnosis of the tribe Pseudochironomini. In conclusion, the current taxon cannot be allocated into any known genus, perhaps representing a new genus, here a coded name "Chironomini taxon 2" is adopted here.

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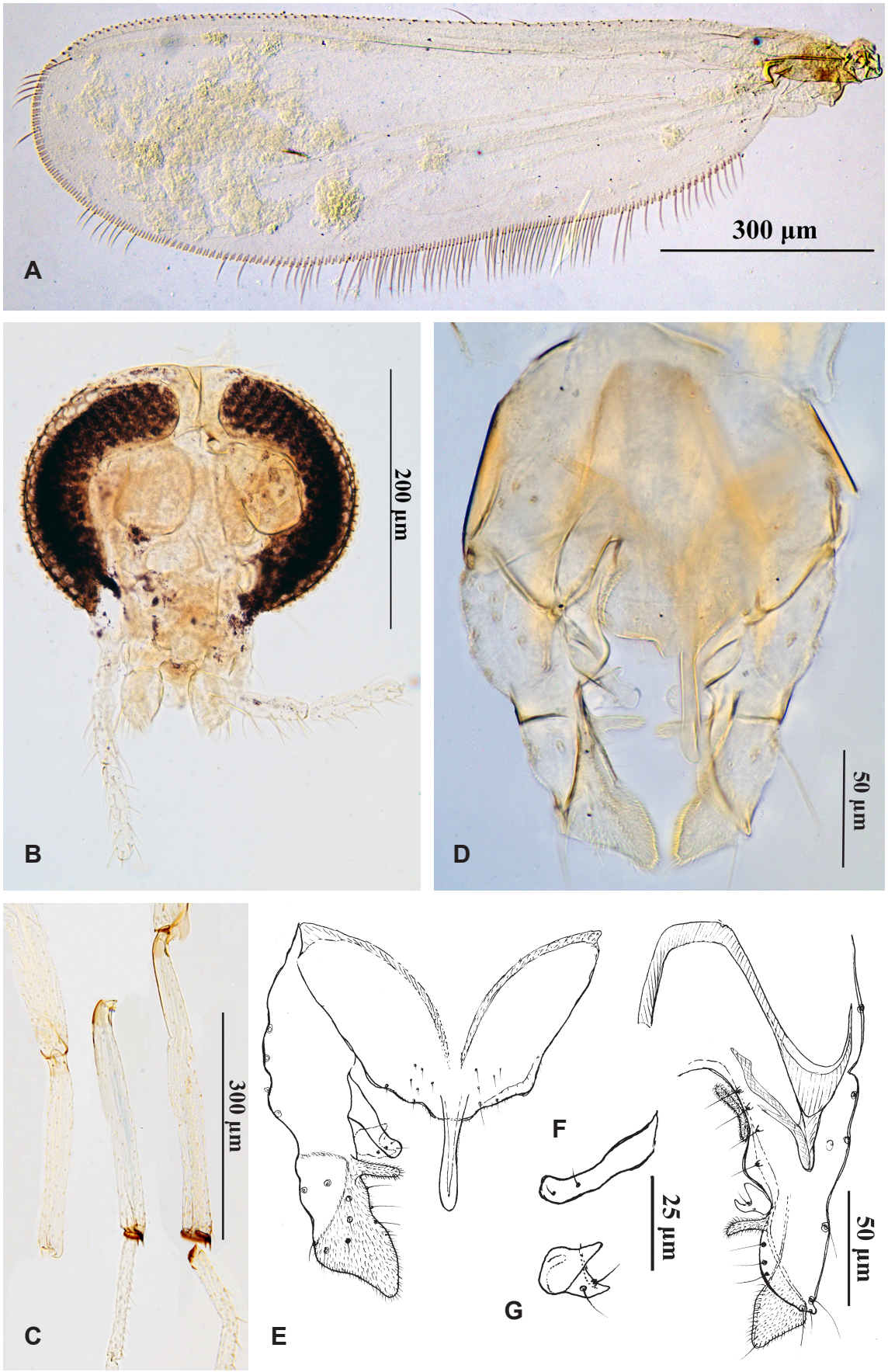

Figure 2. Chironomini taxon 2, A, wing; B, head; C, legs; D–G, male hypopygium: D, color photo; E, line drawing; F, superior volsella; G, inferior volsella.

References

Ashe, P. 1990. Chapter 22. Ecology, zoogeography and diversity of Chironomidae (Diptera) in Sulawesi with some observations of relevance to other aquatic insects. In: Knight W.J. & Holloway J.D. (eds.) *Insects and the Rain Forests of Southeast Asia (Wallacea)*. Royal Entomological Society, London, pp. 261–268.

Brundin L. 1966. Transantarctic relationships and their significance, as evidenced by chironomid midges with monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagyiae. - *Kunglica Svenska Vetenskapsakademiens Handlingar* 11: 1–472.

Cranston, P.S. 2004. Insecta: Diptera: Chironomidae. In: Yule, C.M. & Yong, H.S. (eds.) *Guide to Freshwater Invertebrates of the Malaysian Region*. Academy of Sciences Malaysia, Kuala Lumpur, Malaysia, pp. 711–735.

Cranston, P.S. and Tang, H.Q. 2024. An identification guide to the genera of aquatic larval Chironomidae (Diptera) of south-east Asia. - *Zootaxa* 5497 (2): 151–193. DOI: https://doi.org/10.11646/zootaxa.5497.2.1

Cranston, P.S., Dillon, M.E., Pinder, L.C.V. and Reiss, F. 1989. 10. The adult males of Chironominae (Diptera: Chironomidae) of the Holarctic region – Keys and diagnoses. In: Wiederholm, T. (ed.) *Chironomidae of the Holarctic region. Keys and diagnoses. Part 3. Adult males*. Entomologica scandinavica 34 (Supplement): 353–502.

Ferrington, L.C., Jr. 2008. Global diversity of non-biting midges (Chironomidae; Insecta-Diptera) in freshwater. - *Hydrobiologia* 595: 447–455. DOI: https://doi.org/10.1007/s10750-007-9130-1

Hughes, A.C. 2017. Understanding the drivers of Southeast Asian biodiversity loss. - *Ecosphere* 8 (1): e01624. DOI: https://doi.org/10.1002/ecs2.1624

Sæther, O.A. 1980. Glossary of chironomid morphology terminology (Diptera: Chironomidae). - *Entomologica Scandinavica*, *Supplement* 14: 1–51.

Sodhi, N.S., Posa, M.P.C., Lee, T.M., Bickford, D., Koh, L.P. and Brook, B.W. 2010. The state and conservation of Southeast Asian biodiversity. - *Biodiversity and Conservation* 19: 317–328. DOI: https://doi.org/10.1007/s10531-009-9607-5

Sublette, J.E. and Sublette, M.S. 1973. Family Chironomidae. In: Delfinado, M. & Hardy, E.D. (eds.) *Catalogue of the Diptera of the Oriental Region, Part 1*. University Press, Honolulu, Hawaii, pp. 389–422.

Tang, H.Q. and Cranston, P.S. 2025. *Paraskusella* Cranston, 2018 and *Kribiodosis* Kieffer, 1921 (Diptera: Chironomidae: Chironomini): two new species from Borneo described, allowing incorporation into a multi-gene molecular phylogeny. - *Raffles Bulletin of Zoology* 73: 34–42. DOI: https://doi.org/10.26107/RBZ-2025-0003

Zhang, R.L., Song, C., Qi, X. and Wang, X.H. 2016. Taxonomic review on the subgenus *Tripodura* Townes (Diptera: Chironomidae: *Polypedilum*) from China with eleven new species and a supplementary world checklist. - *Zootaxa* 4136 (1): 1–53. DOI: http://doi.org/10.11646/zootaxa.4136.1.1

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