

***Chaetocladius* Kieffer (Diptera: Chironomidae) in China**

Qian Wang, Fanqing Kong & Xinhua Wang*

Wang, Q., Kong, F. & Wang, X. 2012: *Chaetocladius* Kieffer (Diptera: Chironomidae) in China. — Entomol. Fennica 23: 42–48.

Chaetocladius Kieffer in China is reviewed and a key to the males is provided. There are five Chinese species, of which three are described and illustrated as adult males: *C. absolutus* Wang, Kong & Wang, **sp. n.**, *C. tibetensis* Wang, Kong & Wang, **sp. n.** and *C. triquetrus* Wang, Kong & Wang, **sp. n.** *Chaetocladius oyabevenustus* Sasa, Kawai & Ueno is recorded from China for the first time.

Q. Wang, College of Life Sciences, Nankai University, 300071 Tianjin, China & Tianjin Key Laboratory of Aqua–Ecology & Aquaculture, Department of Fisheries Science, Tianjin Agricultural University, 300384, Tianjin, China; E-mail: wqgt1999@yahoo.com.cn

F. Kong, College of Life Sciences, Nankai University, 300071 Tianjin, China

*X. Wang (*corresponding author), College of Life Sciences, Nankai University, 300071 Tianjin, China; E-mail: xhwang@nankai.edu.cn*

Received 7 June 2011, accepted 2 November 2011

1. Introduction

The genus *Chaetocladius* was established by Kieffer in 1911, with *Dactylocladius setiger* Kieffer as the type species. The immature stages of *Chaetocladius* are found in a wide variety of semiaquatic and truly aquatic habitats, mainly in alpine, arctic or subarctic areas of the Holarctic and Afrotropical regions. However, *Chaetocladius* on the whole as well as a number of species within it have been in dire need of revision for a long time. Based on the double or single gonostylus, with or without crista dorsalis and virga, the genus can be divided into two subgenera, *C. (Amblycladius)* Kieffer and *C. (Chaetocladius)* (Sæther 1986). *C. (Amblycladius)* includes *C. (Amblycladius) subplumosus* Kieffer only, while *C. (Chaetocladius)* can be divided into four species groups based on the immature stages, the *dentiforceps*, *piger*, *vitellinus* and *acuticornus* groups, while this is only partly sustained by the adult males (Cranston *et al.* 1983, Cranston & Martin 1989, Stur & Spies 2011).

Chaetocladius is a species rich genus of the subfamily Orthoclaadiinae with a worldwide distribution. Up to date, the genus comprises 55 recorded species: 49 species in the Palaearctic region, 6 in the Nearctic region, 1 in the Oriental region, 2 in the Afrotropical region (Sublette & Sublette 1973, Cranston & Martin 1989, Ashe & Cranston 1990, Oliver *et al.* 1990, Harrison 1992, Wang 2000, Chaudhuri 2001, Yamamoto 2004, Makarchenko 2004, 2011, Stur & Spies 2011).

Wang (2000) recorded only one species of this genus from China, *C. dentiforceps* Edwards. In this paper an additional three new species are described and illustrated. Five species from China can be included in the subgenus *C. (Chaetocladius)*. A key to the males of *Chaetocladius* from China is presented.

2. Material and methods

The morphological nomenclature used in this paper follows Sæther (1980). Abbreviations used in

Table 1. Abbreviations used in present study.

fe, ti, ta ₁ -ta ₅	Femur, tibia and tarsal segments 1-5
p ₁ - p ₃	Legs 1-3
R	Vein radius of wing, which splits into branches R ₁ , R ₂₊₃ and R ₄₊₅
AR	Antennal ratio: ratio of length of apical elongated flagellomere plus any flagellomeres distal to it divided by combined length of the more basal flagellomeres
VR	Venarum ratio: ratio of length of Cu to length of M; Cu: vein cubitus of wing, often splitting into two branches; M: vein media of wing, usually situating in middle and below vein R
LR	Leg ratio: ratio of metatarsus to tibia
BV	"Beinverhältnisse": combined length of femur, tibia and basitarsus divided by combined length of tarsomeres 2-5
SV	"Schenkel-Schiene-Verhältnis": ratio of femur plus tibia to metatarsus
BR	Bristle ratio: ratio of longest seta of ta ₁ divided by minimum width of ta ₁ measured one third from apex
HR	Hypopygium ratio: ratio of length of gonocoxite to the length of gonostylus
HV	Hypopygium value: ratio of total length to length of gonostylus times 10

this paper are explained in Table 1. The material examined was mounted on slides following the procedure outlined by Sæther (1969). Measurements are given as ranges followed by the arithmetic mean, when there are three or more specimens measured, followed by the number measured (*n*) in parentheses. All types are deposited in the College of Life Sciences, Nankai University, China (BDN).

3. Taxonomy

3.1. *Chaetocladius absolutus*

Wang, Kong & Wang, sp. n. Fig. 1

Type material. Holotype male (BDN No. 012), CHINA: Tibet, Mt. Shergmla, west side (29°39' N, 91°09' E), sweeping net, 1 male, 29.IX.1997, T. Solhøy & J. Skartveit leg.

Diagnostic characters. *C. absolutus* sp. n., by having nearly circular inferior volsella, can be separated from other known species of the genus, except *C. artistylus* Bhattacharyay Chaudhuri, 1993. From the latter it can be separated by its virga composed of tapering spines and well developed anal lobe.

Description. Measurements (*n*=1 male). Total length 4.75 mm. Wing length 3.35 mm. Total length / wing length 1.42. Wing length / length of profemur 2.91.

Coloration. Head and thorax brown, and abdomen yellowish brown. Wing nearly transparent.

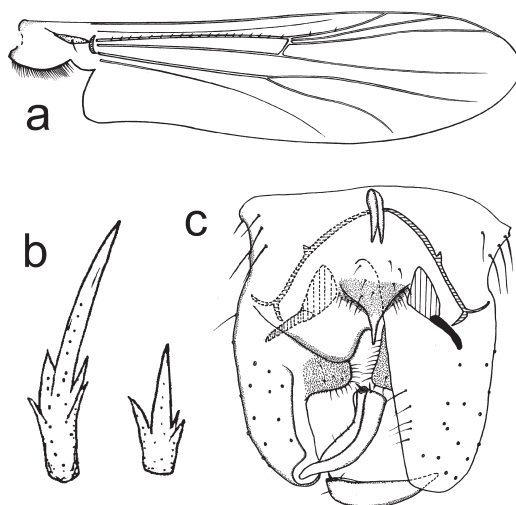


Fig. 1. *Chaetocladius absolutus* Wang, Kong & Wang, sp. n. - a. Wing. - b. Spurs of posterior tibia. - c. Hypopygium.

Head. AR 2.57. Temporal setae 12 including 7 inner verticals, 3 outer verticals and 2 post-orbitals. Clypeus with 14 setae. Tentorium 210 µm long, 50 wide. Palpomere lengths (in µm): 17, 29, 114, 88, 132. Length ratio of palpomeres 5/3 1.16.

Wing (Fig. 1a). Scarcely punctate. Anal lobe well developed. VR 1.0. Costal extension 50 µm long. R with 19 setae, R₁ with 2 setae. Brachiolum with 1 setae. Squama with 32 setae.

Thorax. Dorsocentrals 12, acrostichals 10, prealars 7, scutellars 9.

Legs. Spur of fore tibia 95 µm long, of mid tibia 26 µm and 29 µm long, of hind tibia (Fig. 1b)

Table 2. Lengths (in μm) and proportions of leg segments of male *Chaetocladius absolutus* Wang, Kong & Wang, **sp. n.** For abbreviations, see Table 1.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	1,150	1,450	1,125	575	450	275	150	0.78	2.57	2.31	1.64
p ₂	1,230	1,400	740	410	310	210	140	0.53	3.15	3.55	1.67
p ₃	1,330	1,700	1,010	590	420	260	160	0.59	2.83	3.00	2.38

80 μm and 30 μm long, lateral denticles strong. Tibial comb 48 μm long. Pseudospur of mid ta₁ 30 μm and 31 μm long, of ta₂ 30 μm and 33 μm long, of ta₃ 23 μm long; of hind ta₁ 28 μm and 30 μm long, of ta₂ 29 μm and 31 μm long, of ta₃ 25 μm long. Width at apex of fore tibia 50 μm , of mid tibia 48 μm , of hind tibia 50 μm . Lengths (in μm) and proportions of legs in Table 2.

Hypopygium (Fig. 1c). Anal point slender 50 μm long, 53 μm wide at the base, with 7 setae on it. Laterosternite IX with 6 setae. Phallapodeme 93 μm long; transverse sternapodeme 138 μm long. Virga 60 μm long, composed of tapering spines. Gonocoxite 211 μm long. Inferior volsella single, semicircular, with 14 long setae. Gonostylus 110 μm long, with short crista dorsalis. Megaseta 13 μm long. HR 1.92, HV 4.32.

Distribution. Collected in Tibet Autonomous Region in Oriental China.

Etymology. From Latin, absolute, which means developed and refers to the wing with developed anal lobe.

3.2. *Chaetocladius dentiforceps* (Edwards)

Spaniotoma dentiforceps Edwards, 1929: 346.

Chaetocladius dentiforceps (Edwards), Wang 2000: 635.

Material examined. Inner Mongolia Autonomous Region, Mordaga National Forest Park (51°14' N, 120°46' E), sweeping net, 1 male, 8.VII.1988, W. Bu leg.

Diagnostic characters. The species can be separated from other members of the genus by having small anal point and small inferior volsella, gonostylus nearly right angled at the end, and length ratio of palpomeres $5/3 < 1$.

Description. Measurements ($n=1$ male). Total length 3.37 mm. Wing length 2.18 mm. Total

length / wing length 1.55. Antenna with 13 flagellomeres; AR 1.70. Anal lobe weakly developed, VR 1.05. R with 6 setae, R₁ with 1 seta. Anal point short, about 25 μm long, with 8 setae on it. Laterosternite IX with 8 setae. Phallapodeme 80 μm long; transverse sternapodeme 100 μm long. Virga 40 μm long. Gonocoxite 207 μm long. Inferior volsella small, with 10 setae on it. Gonostylus 92 μm long. Megaseta 11 μm long. HR 2.25, HV 3.67.

Distribution. Recorded in Europe. Occurs in Palaearctic (Inner Mongolia Autonomous Region) China.

3.3. *Chaetocladius oyabevenustus* Sasa, Kawai & Ueno

Chaetocladius oyabevenustus Sasa, Kawai & Ueno 1988: 50; Yamamoto 2004: 13.

Material examined. Zhejiang Province, Tianmushan Natural Conservation area (30°12' N, 119°23' E), light trap, 4 males, 12.XI.1998, H. Wu leg.

Diagnostic characters. This species can be separated from other members of the genus by having broad and roughly rectangular inferior volsella, costa not extending the tip of R₄₊₅.

Description. Measurements ($n=4$ males). Total length 2.13–2.70, 2.38 mm. Wing length 1.70–1.90, 1.83 mm. Total length / wing length 1.12–1.44, 1.31. Antenna with 13 flagellomeres; AR 1.37–1.78, 1.57. VR 1.00–1.07, 1.04. R with 11–14, 12 setae, R₁ with 0–2, 1 setae. Anal point slender, about 50–53, 51 μm long. Laterosternite IX with 5–6, 5 setae. Phallapodeme 66–80, 72 μm long; transverse sternapodeme 88–125, 101 μm long. Anal point slender, tapering. Virga slender, with thin spines, about 30 μm long. Gonocoxite 150–170, 161 μm long. Gonostylus simple, 48–

53, 51 μm long, widest in the middle. Megaseta 10 μm long. HR 3.08–3.40, 3.20; HV 4.01–5.62, 4.76.

Distribution. Recorded in Japan (Sasa, Kawai & Ueno, 1988). Occurs in Oriental (Zhejiang province) China.

Remarks. This species has been described in detail by Sasa, Kawai & Ueno (1988), and this is the first record from China. It should be mentioned that specimen from Japan has no costal extension and an AR of 2.27, while the C extension and the AR of the Chinese specimen are 25 μm and 1.37–1.78, respectively.

3.4. *Chaetocladius tibetensis* Wang, Kong & Wang, sp. n. Fig. 2

Type material. Holotype male (BDN No. 1252), CHINA: Tibet, Naqu Region, Zayu Town (28°38' N, 97°30' E), sweeping net, 28.V.1987, C. Deng leg.

Diagnostic characters. Just as *C. orientalis* Chaudhuri & Ghosh, 1982 and *C. artistylus* Bhattacharyay & Chaudhuri, 1993, the new species also has a very narrow gonostylus. The most obvious characteristic by which the new species can be separated from those two and from other members of this genus is the virga with a symmetrically hooks-shaped end, which is unique in this genus. In addition, the new species has a longer anal point than *C. artistylus* (65 vs. 36 μm), and *C. artistylus* has a broader inferior volsella.

Description. Measurements ($n=1$ male). Total length 3.46 mm. Wing length 2.58 mm. Total length / wing length 1.34. Wing length / length of profemur 2.29.

Coloration. Head black. Thorax and abdomen blackish brown. Wing nearly transparent.

Head. AR 0.49. Temporal setae 14 including 1 inner verticals, 6 outer verticals and 7

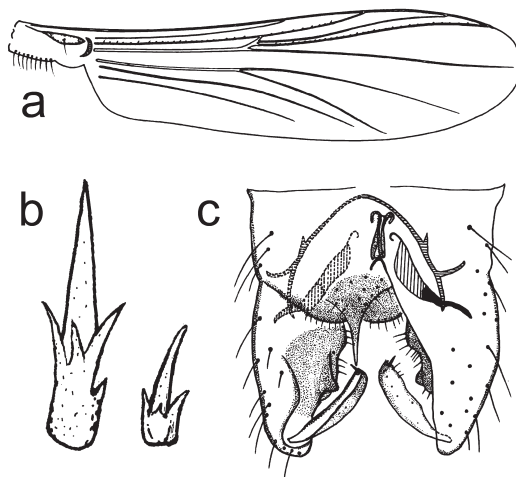


Fig. 2. *Chaetocladius tibetensis* Wang, Kong & Wang, sp. n. – a. Wing. – b. Spurs of posterior tibia. – c. Hypopygium.

postorbitals. Clypeus with 8 setae. Tentorium 141 μm long, 44 wide. Palpomere lengths (in μm): 26, 44, 154, 97, 224. Length ratio of palpomeres 5/3 1.45.

Wing (Fig. 2a). Scarcely punctate. VR 1.05. Costal extension 30 μm long. R with 23 setae, R_1 with 8 setae, R_{4+5} with 29 setae. Brachiolum with 1 setae. Squama with 9 setae.

Thorax. Dorsocentrals 19, acrostichals 5, prealars 4, scutellars 7.

Legs. Spur of fore tibia 70 μm long, of mid tibia 35 μm and 22 μm long, of hind tibia (Fig. 2b) 70 μm and 25 μm long, lateral denticles strong. Tibial comb 75 μm long. Pseudospur of mid ta_1 20 μm and 24 μm long, of ta_2 22 μm and 26 μm long, of hind ta_1 19 μm and 24 μm long, of ta_2 14 μm and 28 μm long. Width at apex of fore tibia 50 μm , of mid tibia 48 μm , of hind tibia 50 μm . Lengths (in μm) and proportions of legs in Table 3.

Hypopygium (Fig. 2c). Anal point slender 65 μm long, 50 μm wide at the base, with 14 setae on

Table 3. Lengths (in μm) and proportions of leg segments of male *Chaetocladius tibetensis* Wang, Kong & Wang, sp. n. For abbreviations, see Table 1.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	550	625	400	200	125	75	50	0.64	2.81	2.47	2.30
p ₂	575	500	225	125	100	50	50	0.45	3.51	4.13	2.27
p ₃	550	600	375	200	125	75	50	0.63	3.27	3.26	2.67

it. Laterosternite IX with 10 setae. Phallapodeme 70 μm long; transverse sternapodeme 130 μm long. Virga 70 μm long, with symmetrically hooks-shaped end. Gonocoxite 176 μm long. Inferior volsella double, with 10 long setae on the big one, and the small one bare. Gonostylus 70 μm long. Megaseta 11 μm long. HR 2.51, HV 4.94.

Distribution. Collected in Tibet Autonomous Region in Oriental China.

Etymology. Named after the type locality (Tibet).

3.5. *Chaetocladius triquetrus*

Wang, Kong & Wang, sp. n. Fig. 3

Type material. Holotype male (BDN No. 07183), CHINA: Liaoning Province, Dandong City, Kuandian Autonomous County (40°43' N, 124°47' E), 22.IV.1992, light trap, J. Wang leg.

Diagnostic characters. Some species also have virga consisting of long spines, such as *C. elegans* Makarchenko & Makarchenko, 2001 and *C. unicus* Makarchenko & Makarchenko, 2001, while the new species can be separated from them by having virga with four long divergent spines, VR lower, squama with 28 setae.

Description. Measurements ($n=1$ male). Total length 3.50 mm. Wing length 2.13 mm. Total length / wing length 1.65. Wing length / length of profemur 2.69.

Coloration. Head, thorax and abdomen black. Legs blackish brown. Wing nearly transparent.

Head. AR 2.00. Temporal setae including 3 inner verticals, others not clear. Clypeus with 10 setae. Tentorium 140 μm long, 25 μm wide. Palpomere lengths (in μm): 25, 75, 140, 100, 150. Length ratio of palpomeres 5/3 1.07.

Wing (Fig. 3a). Scarcely punctate. Anal lobe slightly reduced. VR 0.94. Costal extension 30

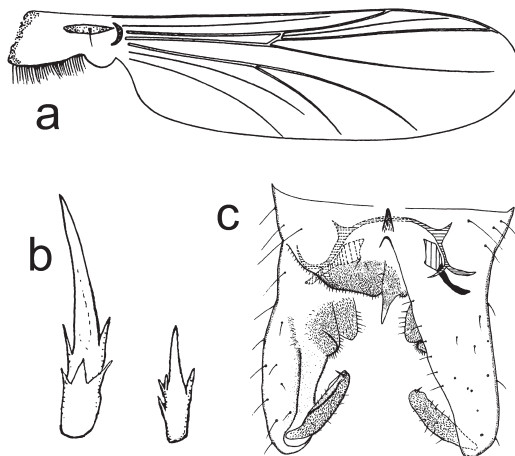


Fig. 3. *Chaetocladius triquetrus* Wang, Kong & Wang, sp. n. – a. Wing. – b. Spurs of posterior tibia. – c. Hypopygium.

μm long. Brachiolum with 1 setae. Squama with 28 setae.

Thorax. Dorsocentrals 12; acrostichals 7; prealars 6; scutellars 4.

Legs. Spur of fore tibia 53 μm long; of mid tibia 18 μm and 23 μm long; of hind tibia (Fig. 3b) 61 μm and 22 μm long, lateral denticles strong. Tibial comb 53 μm long. Pseudospur of mid ta_1 25 mm and 32 mm long, of ta_2 26 mm and 33 mm long, of hind ta_1 30 mm and 37 mm long, of ta_2 20 mm and 30 mm long. Width at apex of fore tibia 50 μm , of mid tibia 44 μm , of hind tibia 66 μm . Lengths (in μm) and proportions of legs in Table 4.

Hypopygium (Fig. 3c). Anal point 92 μm long. Tergite IX with 18 setae. Laterosternite IX with 7 setae. Phallapodeme 105 μm long; transverse sternapodeme 120 μm long. Virga 35 μm long, apparently with 4 long, divergent spines. Gonocoxite 233 μm long. Inferior volsella double, each lobe of nearly the same size, with 16 setae. Gonostylus 88 μm long, with low and short

Table 4. Lengths (in μm) and proportions of leg segments of male *Chaetocladius triquetrus* Wang, Kong & Wang, sp. n. For abbreviations, see Table 1.

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	790	1,075	640	400	260	180	110	0.60	2.64	2.91	3.00
p_2	900	910	440	250	175	120	110	0.48	3.44	4.11	2.60
p_3	950	1,100	600	360	250	140	80	0.55	3.19	3.42	2.83

crista dorsalis. Megaseta 13 µm long. HR 2.65, HV 3.98.

Distribution. Collected in Liaoning province in Palaearctic China.

Etymology. From Latin, triquetrus, triangular, referring to the divergent virgal spines.

4. Key to adult males of Chinese *Chaetocladius*

1. Anal point bare, gonostylus with convex lateral margin 2
- Anal point with short setae, gonostylus without convex lateral margin

C. oyabevenustus Sasa & Okazawa

2. AR < 1.0, gonostylus obviously narrow or slender

C. tibetensis Wang, Kong & Wang, **sp. n.**

- AR > 1.5, gonostylus not narrow or slender 3
3. Anal lobe well developed 4
 - Anal lobe not developed or reduced

C. triquetrus Wang, Kong & Wang, **sp. n.**

4. Inferior volsella semicircular, anal point 50 µm long

C. absolutus Wang, Kong & Wang, **sp. n.**

- Inferior volsella small, not semicircular, anal point less than 50 µm long

C. dentiforceps Edwards

Acknowledgements. Financial support received from the National Natural Science Foundation of China (NSFC) grant No. 30770249, 30870329, J0630963, Fauna of China (FY120100) and Zhejiang Provincial Natural Science Foundation of China (Y3100486) are thankfully acknowledged.

References

- Ashe, P. & Cranston, P. S. 1990: Family Chironomidae. — In: Soós, Á. & Papp, L. (eds.), Catalogue of Palaearctic Diptera, vol. 2: Psychodidae – Chironomidae: 113–355. Akad. Kiadó, Budapest.
- Bhattacharyay, S., Chattopadhyay, S. & Chaudhuri, P. K. 1993: Four new species of *Chaetocladius* (Diptera, Chironomidae) from India. — *European Journal of Entomology* 90: 87–94.
- Brundin, L. 1947: Zur Kenntnis der schwedischen Chironomiden. — *Arkiv för Zoologi* 39A, 3: 1–95.
- Chaudhuri, P. K. & Ghosh, M. 1982: Record of *Chaetocladius* Kieffer (Diptera: Chironomidae) from India. — *Folia Entomologica Hungarica* 63: 5–7.
- Chaudhuri, P. K., Hazra, N. & Alfred, J. R. B. 2001: A checklist of chironomid midges (Diptera: Chironomidae) of the Indian subcontinent. — *Oriental Insects* 35: 335–372.
- Coffman, W. P., Cranston, P. S., Oliver, D. R. & Sæther, O. A. 1986: The pupae of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic region – Keys and diagnoses. — In: Wiederholm, T. (ed.), Chironomidae of the Holarctic region. Keys and diagnoses. Part 2 – Pupae. *Entomologica Scandinavica Supplement* 28: 147–296.
- Cranston, P. S., Oliver, D. R. & Sæther, O. A. 1983: The larvae of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic region – Keys and diagnoses. — In: Wiederholm, T. (ed.), Chironomidae of the Holarctic region. Keys and diagnoses. Part 1 – Larvae. — *Entomologica Scandinavica Supplement* 19: 149–291.
- Cranston, P. S. & Martin, J. 1989: Family Chironomidae. — In: Evenhuis, N. L. (ed.), Catalog of the Diptera of the Australasian and Oceanic Regions: 252–274. Bishop Mus. Pr., Honolulu, and E. J. Brill, Leiden.
- Edwards, F. W. 1929: British non-biting midges (Diptera, Chironomidae). — *Transactions of the Royal Entomological Society of London* 77: 279–430.
- Harrison, A. D. 1992: Chironomidae from Ethiopia, Part 2. Orthoclaudiinae with two new species and a key to *Thienemanniella* Kieffer (Insecta, Diptera). — *Spixiana* 15: 149–195.
- Kieffer, J. J. 1911: Diptera, Chironomidae der Seychellen-Inseln, aus der Sammlung von Mr H. Scott. — *Transactions of the Linnean Society of London. 2nd Series: Zoology* 14: 331–366.
- Makarchenko, E. A. & Makarchenko, M. A. 2000: A Review of the Chironomidae (Diptera) from the Kuril Islands, Kamchatka Peninsula and bordering territories. — *Results of recent research on North East Asian biota. Natural History Research Special Issue* 7: 181–197.
- Makarchenko, E.A. & Makarchenko, M.A. 2001: Fauna chironomid podsemeistva Orthoclaudiinae (Diptera, Chironomidae) ostrova Vrangelya. (Chironomid fauna of the subfamily Orthoclaudiinae (Diptera, Chironomidae) of Wrangel Island.). — In: Chteniya pamyati Vladimira Yakovlevicha Levanidova (V. Y. Levani-dov's Biennial Memorial Meeting) 1: 174–186.
- Makarchenko E.A., Makarchenko M.A. 2004: *Chaetocladius* Kieffer (Diptera, Chironomidae, Orthoclaudiinae) in the Russian Far East. — *Euroasian Entomological Journal* 3: 311–317 [In Russian.]
- Makarchenko E.A. & Makarchenko M.A. 2011: Fauna and distribution of the Orthoclaudiinae of the Russian Far East. — In: Wang, X. and Liu, W. (eds.), Contemporary chironomid studies: 107–125. Proceedings of the 17th International Symposium on Chironomidae (July 6–9, 2009 Nankai University, China). Nankai University Press.
- Oliver, D. R., Dillon, M. E. & Cranston, P. S. 1990: A catalog of Nearctic Chironomidae. — *Research Branch Agriculture Canada Publication* 1857: 1–89.
- Sasa, M., Kawai, K. & Ueno, R. 1988: Studies on the chironomid midges of Oyabe River, Toyama, Japan. In:

- Some Characteristics of Nature Conservation within the Chief Rivers in Toyama Prefecture (The Upper Reach of Oyabe River). — Research Report from Toyama Prefectural Environmental Pollution Research Centre 1988: 26–85.
- Sasa, M. & Okazawa, T. 1992: Studies on the chironomid midges (yusurika) of Toga Mura, Toyama. Part 2. The subfamily Orthoclaadiinae. — Research Report from Toyama Prefectural Environmental Pollution Research Centre 1992: 92–204.
- Sæther, O. A. 1969: Some Nearctic Podonominae, Diamesinae, and Orthoclaadiinae (Diptera: Chironomidae). — Bulletin of the Fisheries Research Board of Canada 170: 1–154.
- Sæther, O. A. 1980: Glossary of chironomid morphology terminology (Diptera: Chironomidae). — Entomologica scandinavica Supplement 14: 51.
- Sæther, O. A. 1986: On the systematic positions of *Dolichoprymna*, *Amblycladius* and *Kloosia* (Diptera: Chironomidae). — Abstracts of First International Congress of Dipterology (ISBN 963 7251 626): 215.
- Stur, E. & Spies, M. 2011: Description of *Chaetocladius longivirgatus* sp. n., with a review of *C. suecicus* (Kieffer) (Diptera: Chironomidae). — Zootaxa 2762: 37–48.
- Sublette, J. E. & Sublette, M. S. 1973: Family Chironomidae. — In: Delfinado, M. & Hardy, E. D. (eds.), Catalogue of the Diptera of the Oriental Region 1: 389–422.
- Thienemann, A. & Kieffer, J. J. 1916: Schwedische Chironomiden. — Archiv für Hydrobiologie, Supplement 2: 483–554.
- Wang, X. 2000: A revised checklist of Chironomidae from China (Diptera). — In: Hoffrichter, O. (ed.), Late 20th Century Research on Chironomidae. An Anthology from the 13th International Symposium on Chironomidae: 629–652. Shaker Verlag, Aachen.
- Yamamoto, M. 2004: A catalog of Japanese Orthoclaadiinae (Diptera: Chironomidae). — Makunagi, Acta dip-terologica 21: 1–121.