Four new species of *Chaetocladius* (Diptera: Chironomidae) from India

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**Taxonomy, Chironomidae, Orthocladiinae, Chaetocladius Kieffer, 4 new species**

**Abstract.** Four new species of the genus *Chaetocladius* Kieffer (Diptera: Chironomidae) are described: *Chaetocladius artystylus*, *C. curvatus*, *C. dilatus* and *C. tenueftexus*. A key is provided to the Indian species of the genus.

**INTRODUCTION**

This is the second account of the Indian species of *Chaetocladius* Kieffer, the first being that of Chaudhuri & Ghosh (1982). This part deals with the description of four new species, based on adults collected during the faunistic survey of Indian orthocladiines at Darjeeling and adjoining areas of West Bengal.

The terminologies and mode of descriptions followed here are based mainly on Saether (1980), Soponis (1977) and Chaudhuri & Ghosh (1982). All measurements (except for ratios) are in millimetres (mm), the numbers before first bracket indicate the value obtained from the holotype and the numbers within the brackets denote minimum and maximum values from paratypes respectively; “n” denotes the number of specimens examined.

Types are deposited in the National Zoological Collections, Calcutta and will also be submitted to the Natural History Museum, London; USNM, Washington D.C.; Zoologische Staatsammlung, München (FRG) and Institut Royal des Sciences Naturelles de Belgique, Brussels.

*Chaetocladius artystylus* Bhattacharyay & Chaudhuri, sp. n.

**Male:** Body length 2.97 (2.95–3.01, n = 5), wing length 1.53 (1.48–1.57, n = 4) and wing width 0.56 (0.53–0.59, n = 4).

Head: Brown in colour. Vertex with 1 outer vertical, 1 inner vertical and postorbital absent. Corona with 2 setae. Clypeus with 10 setae, clypeal ratio 1.36. Maxillary palp brown, ratio of palpmere length I–V 8 : 23 : 30 : 12 : 32, L/W (palpal ratio) 3.75. Eyes without dorsal extension. Antenna brown, ratio of flagellomere length I–XIII 8 : 8 : 6 : 9 : 10 : 12 : 12 : 12 : 13 : 13 : 86, AR (antennal ratio) 0.69. CA (head-antennal ratio) 0.52, CP (head-palpal ratio) 1.05. Cibarial pump and tentorium as in Fig. 1a.

Thorax (Fig. 1b): Dark brown in colour. Antepronotum collar-like, antepronotals absent; acrostichals 2 uniserial, humerals 0, dorsocentrals 6 uniserial, and prealars 4. Scutellum with 6 setae, postscutellum bare.

Wing (Fig. 1c): Transparent or a little smoky. Brachioium with 1 seta and 3–4 sensilla campaniformia; R with 14, R1–3 with 6 and R4+5 with 13 setae; C extended 0.10 long; r-m
Fig. 1 a–d: *Chaetocladus artystylus* Bhattacharyya & Chaudhuri, sp. n. (d): a – cibarial pump and tentorium; b – thorax; c – wing, d – hypopygium.


Legs: Dark brown in colour. Spur of fore tibia 0.04 long, ratio of length of spur to the apical diameter of fore tibia 13 : 4; spur of mid tibia 0.02 long, ratio of length of spur to the apical diameter of mid tibia 8 : 10; spur of hind tibia 0.02 long, ratio of length of spur to the apical diameter of hind tibia 12 : 10. Hind tibial comb with 10 setae 0.018–0.042 long. Empodium 0.01 long. Pulvilli small.

Proportion and ratios of leg segments

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Abdomen: Tergite IX with 8–12 setae. Hypopygium (Fig. 1d) with narrow anal point 0.036 long bearing 2–3 setae at each basal margin. Gonocoxite 0.19 long, narrow, with a
broad dorsal lobe and 17–18 setae; gonostylistus slender 0.072 long with an apical megaseta 0.01 long. Transverse sternapodeme 0.08, lateral sternapodeme 0.03, coxapodem 0.02 and phallapodeme 0.02 long. HR 1.96, HV 3.53.

**Female**: Unknown.

**Material Examined**: Holotype δ (Type No. B.U. Ent. 150), West Bengal, Darjeeling (Lat. 27°03′N, Long. 88°18′E), 8.iv.1984, coll. D.K. Gaha. Paratypes 5 δ, data same as holotype.

**Diagnosis**: The name of the species is derived from the narrow gonostylistus of the male hypopygium. The species resembles *C. grandilobus* Brundin, 1956 and *C. harris* Freeman, 1959 in gonoxite and anal point, but differs from them by the following combination of characters which confirm it as a new member of *Chaetocladius*: i) AR 0.69, ii) scutellum with 6 setae, iii) 3 sensilla campaniformia, iv) rounded anal lobe, v) anal point with 2–3 basal setae and narrow gonostylistus and crista dorsalis.

*Chaetocladius curvatus* Bhattacharyya & Chaudhuri, sp. n.

**Male**: Body length 3.93 (3.91–3.95, n = 4), wing length 2.28 (2.20–2.28, n = 4) and wing width 0.69 (0.67–0.70, n = 4).

Head: Brown in colour. Vertex with 5 outer verticals, 3 inner verticals and 2 postorbitals. Corona with 4 setae. Clypeus with 14 setae, clypeal ratio 1.33. Maxillary palp brown, ratio of palpomere length I–V 6 : 11 : 34 : 40 : 50, L/W 2.27. Eyes with dorsal extension of 0.14 long. Antenna damaged in all specimens. CP 1.13. Cibarial pump and tentorium as in Fig. 2a.

Thorax (Fig. 2b): Dark brown in colour. Antepronotum collar-like, antepronotals absent; acrostichals 10-12 uniserial, humerals 0, dorsocentrals 12–13 uniserial, and prealars 4. Scutellum with 10 setae, postscutellum bare.

Wing (Fig. 2c): Grey with fine microtrichia. Brachioium with 1 seta and 10 sensilla campaniformia; R with 18, and R, with 1 seta; C extended 0.22; r-m little proximal to f-cu. Squama with 8 setae. Haltere brown. VR 1.1, CR 0.94.

Legs: Dark brown in colour. Spur of fore tibia 0.07 long, ratio of length of spur to the apical diameter of fore tibia 23 : 14; spurs of mid tibia equal 0.14 long, ratio of length of spur to the apical diameter of mid tibia 10 : 11; spur of hind tibia 0.07 long, ratio of length of spur to the apical diameter of hind tibia 22 : 17. Hind tibial comb with 17 setae 0.012–0.048 long. Empodium 0.02 long. Pulvilli absent.

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Abdomen: Tergite IX with 29–35 setae. Hypopygium (Fig. 2d) with sharp pointed anal point 0.033 long. Gonoxite 0.16 long with a polliciform and apically-hooked dorsal lobe and 26–27 setae on it; gonostylus 0.084 long, secuiriform, with an apical megaseta 0.01 long. Transverse sternapodeme 0.09, lateral sternapodeme 0.07, coxapodeme 0.02 and phallapodeme 0.05 long. HR 2.52, HV 4.65.
Fig. 2 a–d: *Chaetocladius curvatus* Bhattacharyay & Chaudhuri sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.

**FEMALE:** Unknown.

**Material examined:** Holotype ♂ (Type No. B.U. Ent. 151), West Bengal, Mirik (Lat. 26°25′N, Long. 88°10′E) 28.iii.1988, coll. S. Chattopadhyay. Paratypes 3 ♂, data same as holotype.

**Diagnosis:** *Chaetocladius curvatus* is named after the curved dorsal lobe of gonocoxite. It shares similarities with *C. perennis* (Meigen) and *C. oliveri* Saether in the structure of gonocoxite, gonostylus and anal point, and with *C. melaleucus* (Meigen) and *C. piger* (Goetzheuer) in anal point only. However, the following combination of characters favour for consideration of *curvatus* as a new species of *Chaetocladius*: i) scutellum with 10 setae, ii) squama with 8 setae, iii) bare R_{45}, iv) hind tibial comb with 17 setae, v) thumb-like apically hooked dorsal lobe, and vi) club or chopper shaped gonostylus.

**Chaetocladius dilatus** Bhattacharyay & Chaudhuri, sp. n.

**Male:** Body length 3.92 (3.87–3.97, n = 5), wing length 2.54 (2.51–2.56, n = 5) and wing width 0.74 (0.72–0.82, n = 5).

palp brown, ratio of palpomere length I–V 7 : 14 : 50 : 40 : 56, L/W 4.54. Eyes with a little dorsal extension of 0.033. Antenna dark brown, ratio of flagellomere length I–XIII 11 : 10 : 8 : 8 : 8 : 10 : 9 : 9 : 9 : 11 : 11 : 185, AR 1.57. CA 0.52, CP 0.95. Cibarial pump and tentorium as in Fig. 3a.

Thorax (Fig. 3b): Dark brown in colour. Antepronotum collar-like, antepronotals absent; acrostichals 25 uniserial, humerals 0, dorsocentra 16–17 irregular and prealars 4. Scutellum with 10 setae, postscutellum bare.

Wing (Fig. 3c): White with microtrichia. Brachiolum with 1 seta and 21–22 sensilla campaniformia; R with 17, R1 with 3 and R3-4, with 8 setae; C extended 0.06; r-m little proximal to f-cu. Anal lobe well developed. Squama with 10–11 setae. Haltere light brown. VR 1.07, CR 0.94.

Legs: Dark brown in colour. Spur of fore tibia 0.066 long, ratio of length of spur to the apical diameter of fore tibia 22 : 12; spurs of mid tibia equal 0.03 long, ratio of length of spurs to the apical diameter of mid tibia 10 : 9; spur of hind tibia 0.06 long, ratio of length of spur to the apical diameter of hind tibia 20 : 12. Hind tibial comb with 14 setae 0.027–0.048 long. Empodium 0.018 long. Pulvilli small.

Fig. 3 a–d: *Chaetocladius dilatus* Bhattacharyay & Chaudhuri sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.
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Abdomen: Tergite IX with 42–56 setae. Hypopygium (Fig. 3d) with sharp pointed anal point 0.036 long bearing 20 setae at its base. Gonocoxite 0.165 long with a thumb like setaceous dorsal lobe bearing 13–14 setae; gonostylus short, middle part swollen with an apical megaseta 0.069 long. Transverse sternapodeme 0.12, lateral sternapodeme 0.069, coxapodeme 0.03 and phallapodeme 0.06 long. HR 1.84, HV 4.66.

**FEMALE:** Unknown.

**Material examined:** Holotype ♂ (Type No. B.U. Ent. 152), West Bengal, Darjeeling (Lat. 27°03’N, Long. 88°18’E), 6.ii.1984, coll. D.K. Guha. Paratypes 5 ♂♂, data same as holotype.

**Diagnosis:** The name, *Chaetocladius dilatus*, is used for the expanded gonostylus of male hypopygium. The gonocoxite and gonostylus of the new species appear to be similar to those of *C. perennis* (Meigen). The anal point and gonostylus resemble those of *C. oliveri* Saether. Despite of the above similarities with the above species, the present species may easily be segregated from all other known species of *Chaetocladius* by the following features: i) Scutellum with a single row of 10 setae, ii) 21–22 sensilla campaniformia on brachiolum, iii) squama with 10–11 setae, iv) hind tibial comb with 14 setae, anal point pointed with 20 setae, and v) short gonostylus with swollen middle part.

*Chaetocladius tenusiflexus* Bhattacharyay & Chaudhuri, sp. n.

**Male:** Body length 3.99 (3.95–4.01, n = 3), wing length 2.52 (2.50–2.56, n = 3) and wing width 0.74 (0.72–0.74, n = 3).

Head: Brown in colour. Vertex with 7 outer verticals, 4 inner verticals and 2 postorbitals. Clypeus with 7 setae, clypeal ratio 1.5. Maxillary palp brown, palpomere III with 2 sensilla clavata, ratio of palpomere length I-V 0 : 13 : 47 : 40 : 70, L/W 3.61. Eyes with a dorsal extension of 0.126. Antenna brown, ratio of flagellomere length I-XIII 8 : 10 : 10 : 10 : 10 : 10 : 10 : 10 : 11 : 11 : 185, AR 1.54. CA 0.45, CP 0.78. Cibarial pump and tentorium as in Fig. 4a.

Thorax (Fig. 4b): Dark brown in colour. Antepronotum collar-like, anteponotals absent; acrostichals 20 uniserial, humerals 0, dorsoventrals 17–18 irregular and prealars 4–5. Scutellum with 6 setae, postscutellum bare.

Wing (Fig. 4c): White with microtrichia. Brachiolum with 1 seta and 8 sensilla campaniformia, R with 17, R with 3 and R₄₋₅ with 12 setae; C little extended 0.056; r-m little proximal to f-cu. Anal lobe moderate. Squama with 9 setae. Haltere brown. VR 1.08, CR 0.94.

Legs: Dark brown in colour. Spur of fore tibia 0.075 long, ratio of length of spur to the apical diameter of fore tibia 25 : 14; spurs of mid tibia equal 0.033 long, ratio of length of spurs to the apical diameter of mid tibia 11 : 12; spur of hind tibia 0.018 long, ratio of length of spur to the apical diameter of hind tibia 6 : 13. Hind tibial comb with 12–13 setae 0.012–0.036 long. Empodium 0.021 long.
Fig. 4 a–d: Chaetocladius tenuiflexus Bhattacharyay & Chaudhuri, sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.

Proportion and ratios of leg-segments

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Abdomen: Tergite IX with 57–60 setae. Hypopygium (Fig. 4d) with narrow and slightly bent anal point 0.018 long. Gonocoxite 0.18 long with a digitiform dorsal lobe and 28–29 setae on it; gonostylus short, more or less clavate, with an apical megaseta 0.009 long. Transverse sternapodeme 0.066, lateral sternapodeme 0.051, coxapodeme 0.036 and phal- lapodeme 0.06 long. HR 2.23, HV 4.07.

Female: Unknown.
MATERIAL EXAMINED: Holotype $\delta$ (Type No. B.U. Ent. 153), West Bengal, Darjeeling, 30.iii.1986, coll. S. Chattopadhyay. Paratypes $3 \delta \delta$, data same as holotype; 1 $\delta$, Darjeeling (Lat. 27°03' N, Long. 88°18' E), Bijanbari (Lat. 27°03' N, Long. 88°10' E), 1.iv.1986, coll. P.K. Chaudhuri.

DIAGNOSIS: The name, Chaetocladius tenuiflexus, refers to its slightly bent anal point of male hypopygium. The gonocoxite and anal point of C. perennis and gonocoxite and gonostylist of C. excepsus natalensis Freeman, 1956 appear to be similar to the new species. But the identity of tenuiflexus as a new member of Chaetocladius is due to the following combination of characters: i) palpomere III with 2 sensilla clavata, ii) scutellum with 4 setae, iii) 8 sensilla campaniformia on brachialum, iv) squama with 9 setae, v) narrow and slightly bent anal point, and vi) short and spatulate gonostyle.

Key to the adult males of Indian species of Chaetocladius Kieffer

1 Anal point narrow. Dorsal lobe of gonocoxite present .......................................................... 2
   - Anal point stout. Dorsal lobe of gonocoxite absent ............................................................ orientalis Chaudhuri & Ghosh
2 Scutellum with 10 or more setae. Hind tibial comb with 17 setae. Anal point pointed. Dorsal lobe of gonocoxite thumb like ........................... 3
   - Scutellum with less than 10 setae. Hind tibial comb with 13 setae or less. Anal point narrow and not pointed. Dorsal lobe of gonocoxite triangular or digitiform ........................................ 4
3 Vein $R_4+5$ bare. Squama with 8 setae. Gonostylus chopper like ................................................ curvatus sp. n.
   - Vein $R_4+5$ with setae. Squama with 10–11 setae. Gonostylus short and swollen ................... dilatus sp. n.
4 Squama with 9 setae. Dorsal lobe of gonocoxite digitiform. Gonostylus spatulate ......... tenuiflexus sp. n.
   - Squama with 11 setae. Dorsal lobe of gonocoxite triangular. Gonostylus slender ....... artisylus sp. n.

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REFERENCES


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