

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

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

Abstract. Four new species of the genus *Chaetocladius* Kieffer (Diptera: Chironomidae) are described: *Chaetocladius artistylus*, *C. curvatus*, *C. dilatus* and *C. tenuiflexus*. 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 orthoclaadiines at Darjeeling and adjoining areas of West Bengal.

The terminologies and mode of descriptions followed here are based mainly on Saether (1980), Sponis (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 Staatssammlung, München (FRG) and Institut Royal des Sciences Naturelles de Belgique, Brussels.

Chaetocladius artistylus 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 palpomere 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 : 6 : 9 : 10 : 12 : 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, anteprenotals 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. Brachiolium with 1 seta and 3–4 sensilla campaniformia; R with 14, R₂₊₃ with 6 and R₄₊₅ with 13 setae; C extended 0.10 long; r-m

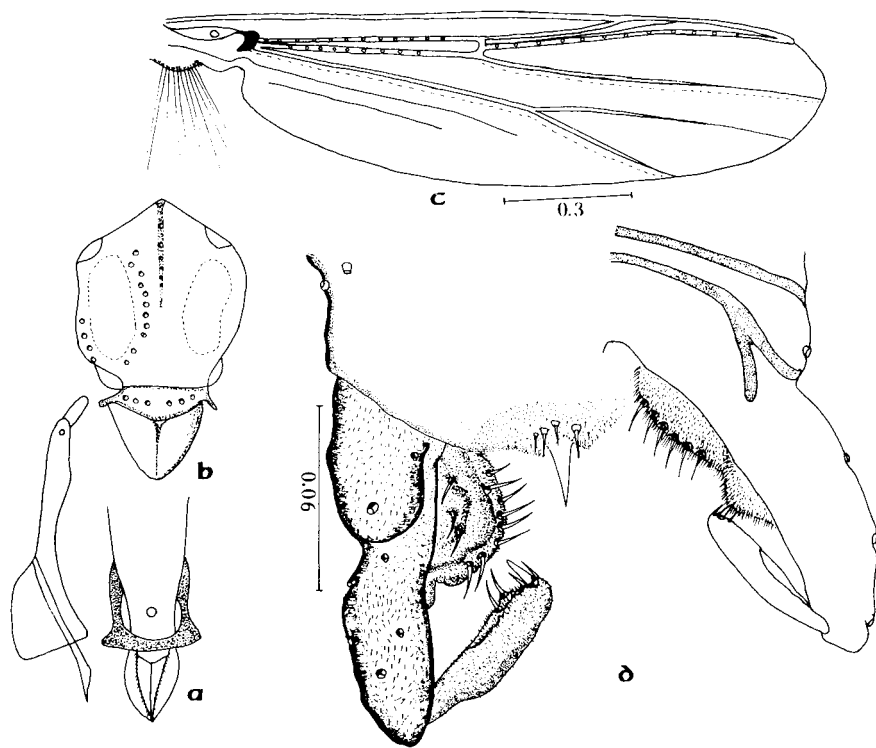


Fig. 1 a-d: *Chaetocladius artistylus* Bhattacharyay & Chaudhuri, sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing, d – hypopygium.

slightly proximal to f-cu. Anal lobe rounded. Squama with 11 setae. Haltere brown. VR 1.30, CR 0.92.

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

	Fe	Ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
Fore	50	43	36	26	21	12	7	0.84	1.95	2.33	3.67
Mid	50	43	23	13	10	7	5	0.53	3.31	4.23	4.57
Hind	51	52	30	16	13	8	7	0.58	3.02	3.68	4.25

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; gonostylus slender 0.072 long with an apical megaseta 0.01 long. Transverse sternapodeme 0.08, lateral sternapodeme 0.03, coxapodeme 0.02 and phallapodeme 0.02 long. HR 1.96, HV 3.53.

FEMALE: Unknown.

MATERIAL EXAMINED: Holotype ♂ (Type No. B.U. Ent. 150), West Bengal, Darjeeling (Lat. 27°03'N, Long. 88°18'E), 8.iv.1984, coll. D.K. Guha. Paratypes 5 ♂♂, data same as holotype.

DIAGNOSIS: The name of the species is derived from the narrow gonostylus of the male hypopygium. The species resembles *C. grandilobus* Brundin, 1956 and *C. harrisi* Freeman, 1959 in gonocoxite 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 gonostylus and crista dorsalis.

Chaetocladius curvatus Bhattacharyay & 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. Brachiolium with 1 seta and 10 sensilla campaniformia; R with 18, and R₁ 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.

Proportion and ratios of leg-segments

	Fe	Ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
Fore	90	90	63	30	23	15	10	0.70	3.12	3.75	3.43
Mid	85	82	40	23	18	12	10	0.49	3.29	4.18	1.25
Hind	92	98	56	34	25	15	11	0.57	2.89	3.73	1.57

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, securiform, 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.

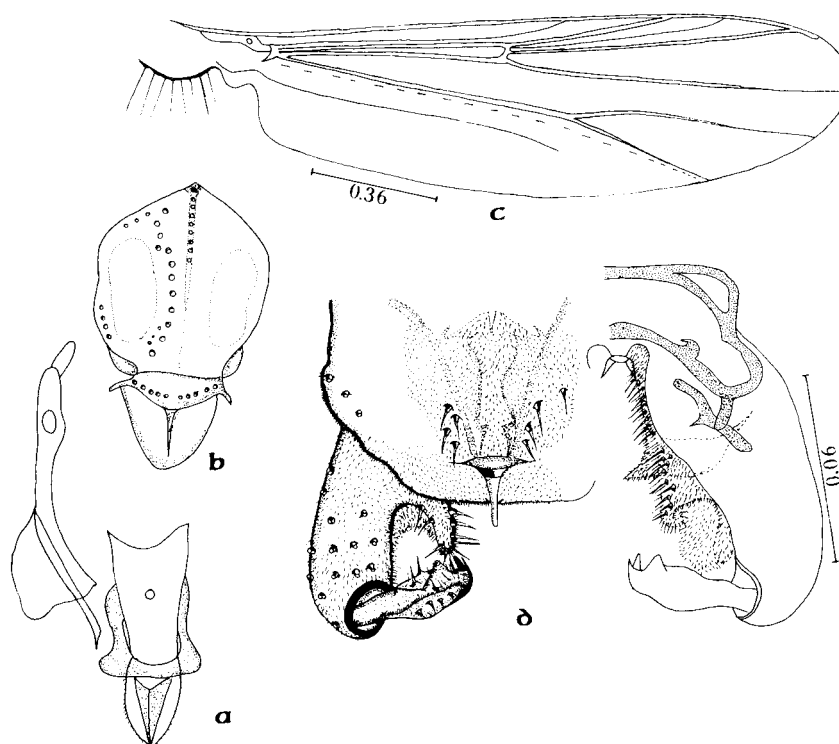


Fig. 2 a–d: *Chaetocladius curvatus* Bhattacharyay & Chaudhuri sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.

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* (Goetghebuer) 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_{4+5} , 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, $n = 5$).

Head: Dark brown in colour. Vertex with 1 outer vertical, 6 inner verticals and 3–4 postorbitals. Corona with 2 setae. Clypeus with 10–11 setae, clypeal ratio 1.17. Maxillary

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 : 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, anteprenotals absent; acrostichals 25 uniserial, humerals 0, dorsocentrals 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, R_1 with 3 and R_{4+5} 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 midtibia 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.

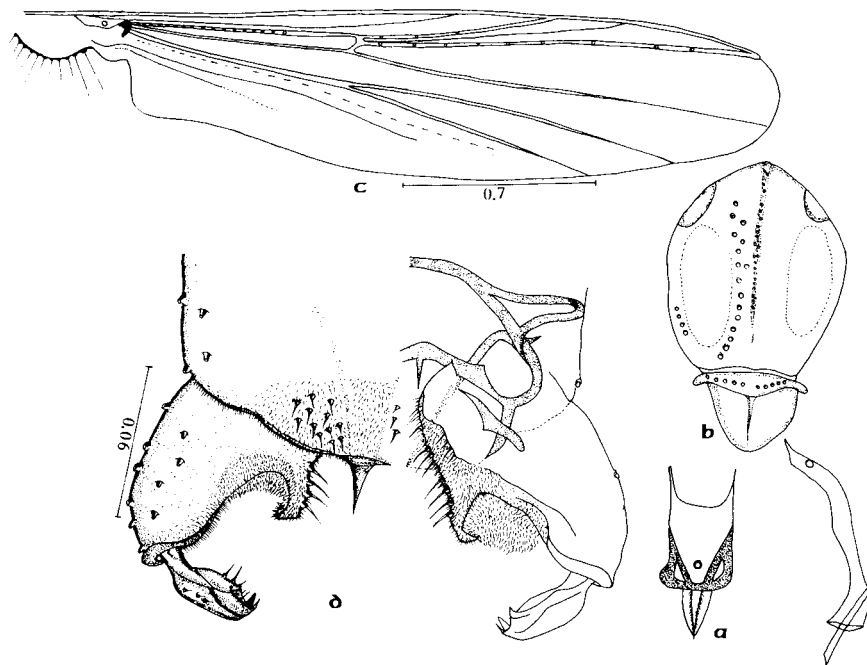


Fig. 3 a–d: *Chaetocladius dilatus* Bhattacharyay & Chaudhuri sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.

Proportion and ratios of leg-segments

	Fe	Ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
Fore	94	95	68	34	22	18	10	0.71	3.05	3.78	2.87
Mid	82	82	40	25	18	11	10	0.48	3.18	4.20	2.62
Hind	95	100	67	34	25	15	12	0.67	3.04	3.75	3.22

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 tenuiflexus 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 postorbital. 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 : 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. Anteprenotum collar-like, anteprenotals absent; acrostichals 20 uniserial, humerals 0, dorsocentrals 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, R₁ 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.

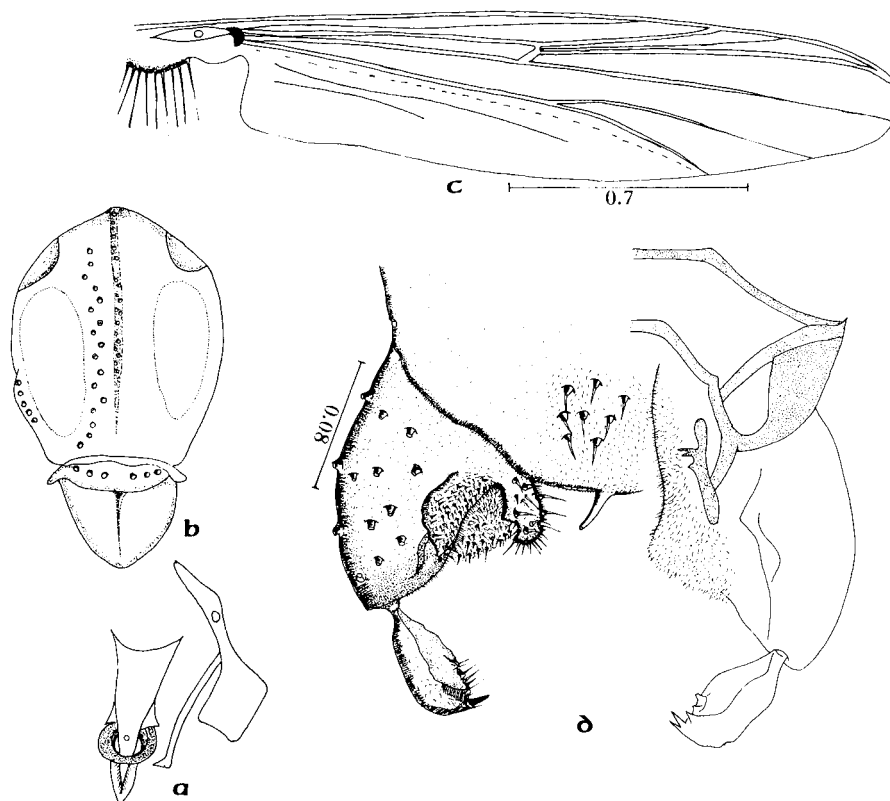


Fig. 4 a–d: *Chaetocladius tenuiflexus* Bhattacharyay & Chaudhuri, sp. n. (♂): a – cibarial pump and tentorium; b – thorax; c – wing; d – hypopygium.

Proportion and ratios of leg-segments

	Fe	Ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
Fore	93	95	67	35	25	18	12	0.70	2.83	3.41	1.75
Mid	88	87	46	25	18	11	10	0.52	3.45	4.48	1.88
Hind	103	105	68	34	27	16	12	0.64	3.10	3.78	2.30

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 ♂ (Type No. B.U. Ent. 153), West Bengal, Darjeeling, 30.iii.1986, coll. S. Chattopadhyay. Paratypes 3 ♂♂, data same as holotype; 1 ♂, 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 gonostylus of *C. exceptus 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 brachiolum, iv) squama with 9 setae, v) narrow and slightly bent anal point, and vi) short and spatulate gonostylus.

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 R₄₊₅ bare. Squama with 8 setae. Gonostylus chopper like *curvatus* sp. n.
- Vein R₄₊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 *artistylus* sp. n.

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