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Chironomid midges of *Harnischia* complex (Diptera: Chironomidae) from the Duars of the Himalayas, India

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Chironomidae, *Harnischia* complex, new species, new records, *Cryptochironomus*, key, Duars, India

Abstract. Adults collected in the Duars of the Himalayas of West Bengal (India) belong to five genera of the *Harnischia* complex. Four species, *Cryptochironomus curryi* Mason, *C. ramus* Mason, *Demicryptochironomus vulneratus* (Zetterstedt), and *Harnischia curtilamellata* (Malloch) are recorded for the first time from India, and four species, *Cryptochironomus acuminatus*, *C. gracilis*, *Harnischia minuta* and *Paracladopelma diutinistyla* are described as new. A key to the Indian species of *Cryptochironomus* Kieffer is presented. The female of *Cryptochironomus subovatus* Freeman, hitherto unknown, is described. One Japanese species, *Demicryptochironomus chuzequartus* Sasa, 1984 is proposed as a synonym of *Demicryptochironomus vulneratus* (Zetterstedt, 1838).

INTRODUCTION

The Duars terai comprises the major northeastern extension of Jalpaiguri district, together with the entire adjoining areas of the district of Coochbehar. The physiography of terai including the Duars (89°0′–90°0′E and 26°0′–27°0′N) is characterised by dense semi-evergreen and moist deciduous forest with various tropical and subtemperate trees underlain with grasslands and marshy places with ponds and pools. The area is interlaced with many perennial, non-perennial and torrential rivers. The climate of the region is determined by the Himalayan mountain range and is moderately cool, but rainy, in summer with a prolonged and torrent monsoon and a fine autumn followed by a dry and frosty winter.

In our studies of the chironomid fauna of the Duars of the Himalayas, midges of *Harnischia* complex (Beck & Beck, 1969; Saether, 1977) were identified as members of five genera: *Cryptochironomus* Kieffer represented by 8 species; *Demicryptochironomus* Lenz by 1 species; *Harnischia* Kieffer by 4 species; *Microchironomus* Kieffer by 1 species; and *Paracladopelma* Harnisch by 1 species. Of these, four species are recorded from India for the first time and four species are considered as new. The following species of the *Harnischia* complex have been recorded from India prior to the present investigation (Chaudhuri & Guha, 1987; Chaudhuri & Chattopadhyay, 1990): *Beckidia nigrotibia* Bhattacharay, Dutta & Chaudhuri; *Cladopelma indica* Bhattacharya, Dutta & Chaudhuri; *Cryptochironomus bulbosus* Guha, Das, Chaudhuri & Choudhuri, *C. calyxus* Guha, Das, Chaudhuri & Choudhuri, *C. fulvus* (Johannsen), *C. judicius* Chaudhuri & Chattopadhyay, *C. polius* (Kieffer), and *C. subovatus* Freeman; *Gillotia frigidia* Bhattacharyay, Dutta & Chaudhuri;

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Harnischia acuta (Goetghebuer), *H. incidata* Townes, *H. orissae* (Kieffer), *H. tenuituberculata* Chaudhuri & Chattopadhyay, and *H. viridula* (L.); *Microchironomus clariatus* Guha & Chaudhuri, *M. fuscitarsis* (Guha & Chaudhuri), *M. tener* (Kieffer); *Paracladopelma aratra* Chaudhuri & Chattopadhyay, *P. bulbosa* Bhattacharyay, Dutta & Chaudhuri, and *P. sacculifera* Chaudhuri & Chattopadhyay.

MATERIAL AND METHODS

The material of the present study is preserved in ethanol (90%). Specimens were mounted following the technique of Das Gupta & Wirth (1968) for examination of external morphology. Measurements and scale in figures of all the structural parts are in milimeters (mm). The mean value of the body length, wing length and wing breadth are followed by standard deviation (S_x). Numbers before the parentheses indicate the value in holotype and those within the parentheses denote the minimum and maximum value in paratypes, while (n) gives the number of specimens measured. The greater part of the morphological descriptions is based upon the holotype with terminology and usage after Saether (1980) and Chaudhuri & Chattopadhyay (1990). Abbreviations in the text are as follows: AR – antennal ratio, BR – bristle ratio, BV – Beinverhältnisse, CA – head-antennal ratio, CP – head-palpal ratio, CR – costal ratio, HR – hypopygium ratio, HV – hypopygium value, IV – inner verticals, LR – leg ratio, L/W – palpal ratio, OV – outer verticals, PO – post orbitals, SV – Schenkel-Schiene-Verhältnis, VR – venarum ratio.

Types and voucher specimens in the collection of insects in the Entomology Laboratory, Department of Zoology, University of Burdwan will be deposited in the National Zoological Collections, Calcutta; The Natural History Museum, London; United States National Museum, Washington, D.C., and Zoologische Staatssammlung, München (Germany).

DESCRIPTION

Cryptochironomus acuminatus Dutta & Chaudhuri, sp. n.

(Figs 1a–c)

Male. Body length 3.04 S_x 0.61 (n = 4). Wing length 6.0 S_x 0.04 (n = 4) and wing breadth 1.0 S_x 0.01 (n = 4).

Head. Brown in colour. Vertex with 9–11 setae (IV 3–4, OV 3–4 and PO 3). Clypeus with 24–26 long curved setae, clypeal ratio 1.90. Maxillary palp light yellow, length ratio of palpomeres I–V: 6 : 10 : 11 : 13 : 21, L/W 2.2. Eyes with an acute dorsal extension of 0.13. Frontal tubercles small. Antenna lost in all the specimens.

Thorax. Brown-yellow. Antepronotum collar-like with a median notch; antepronotals 5–6. Mesonotum with 3 dark bands or stripes and a small tubercle, acrostichals 7–8 uniserial, dorsocentrals 9–10 uniserial, humerals 2 minute, prealars 4 and supraalars 7. Scutellum with 12 irregular setae, postnotum brown and bare.

Wing. Hyaline to light yellow. Brachiolum with 2 setae and 30–32 sensilla campaniformia; R, 19, R_1, 13 and R_{4+5} with 23 setae; R_{2+3} meets C at a distance of 0.12 from R. Squama fringed with 13 setae. Haltere light yellow and bare. CR 1.01 (1.00–1.02); VR 1.14 (1.11–1.15).

Legs. Femora and tibiae of all legs yellow, tarsomere III–V of mid and hind legs brown, others yellow. Fore tibia with a small scale (Fig. 1a) bearing 3 long setae, mid and hind tibial spurs unequal.

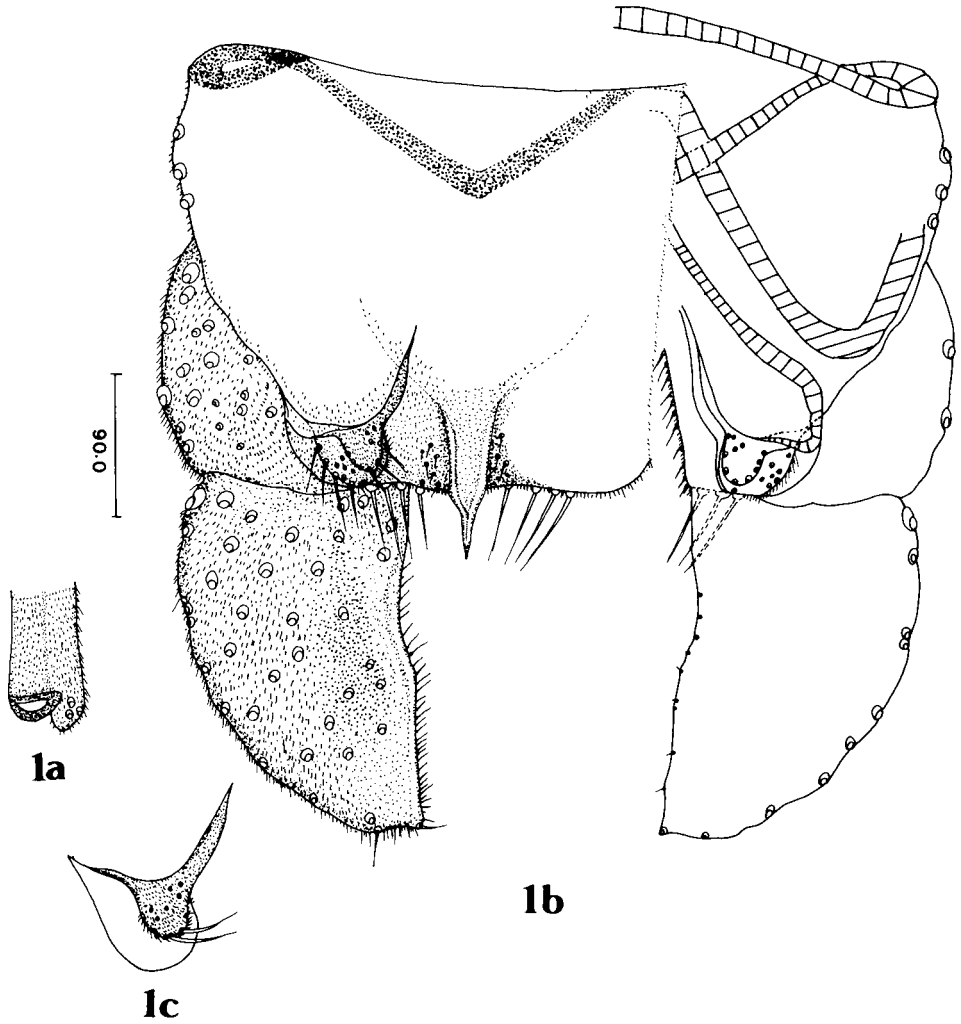


Fig. 1a–c. Male of *Cryptochironomus acuminatus* sp. n.: a – fore tibial apex; b – hypopygium; c – inferior volsella.

Proportion and ratios of leg-segments

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	53	43	30	18	10	11	7	0.69	2.73	3.42	3.16
p_2	50	48	28	15	11	7	6	0.58	3.23	4.08	3.20
p_3	56	68	33	20	12	9	5	0.48	3.41	4.76	3.50

Abdomen. Yellow with profuse setae. Hypopygium (Fig. 1b): Anal point (0.024 long) moderate, acuminiform and bearing 8 basolateral setae. Gonocoxite short, heavy and very broad bearing 17–18 setae at its inner apical margin. Superior volsella broad and lobular

bearing 9–10 setae along the apical margin; inferior volsella (Fig. 1c) small bearing 13–14 setae.

Female unknown.

TYPE MATERIAL: Holotype ♂ (Type no. 205, B.U. Ent.), Hashimara, 18.ix.1984, coll. T.K. Dutta. Paratypes 4♂, data same as holotype; 3♂, Dalsingpara, 10.vi.1986, coll. T.K. Dutta.

The name *acuminatus* applies to the acuminiform anal point. The species appears close to *Cryptochironomus fulvus* (Johannsen) with respect to the shape of volsellae, gonocoxite and structure of wing. It bears affinities with *C. diceras* Kieffer and *C. sorex* Townes in the shape of appendages of the male hypopygium and with *C. albofasciatus* Staeger in the form of the gonocoxite and inferior volsella. However, the following combination of characters separate *acuminatus* from other species of *Cryptochironomus*: 1) scutellum with 12 setae; 2) squama bearing 13 setae; 3) tarsomeres III–V of mid and hind legs brown; 4) hypopygium with acuminated anal point; 5) gonostylus massive; 6) superior volsella broad, lobe-like and setose; and 7) inferior volsella minute, with 13–14 setae.

Cryptochironomus curryi Mason, 1986

Cryptochironomus curryi Mason, 1986: 404.

MATERIAL EXAMINED: 5♂, Gorubathan, 18.x.1984, coll. T.K. Dutta; 3♂, Ambari, 26.v.1986, coll. T.K. Dutta.

This species was first reported by Mason (1986) from Tobin Lake, Saskatchewan, Canada as a member of *Cryptochironomus fulvus* (Johannsen) species complex. A critical appraisal of the adult specimens collected and subsequent comparison with the description of Mason (1986) reveal that they belong to *Cryptochironomus curryi* Mason with some minor differences which seem not sufficient for the description of a new species. The diagnostic features of this species are: 1) the absence of the frontal tubercle; 2) the scutellum with 14 setae; 3) the hypopygium with long, tubular anal point; 4) gonostylus swollen and narrowed toward the apex; 5) superior volsella thumb-like, finely setose with 16–17 long, curved setae; and 6) inferior volsella small, tongue-shaped bearing 2 long apical setae.

DISTRIBUTION. Canada, India (present record).

Cryptochironomus fulvus (Johannsen, 1905)

Chironomus fulvus Johannsen, 1905: 224.
Chironomus (Cryptochironomus) fulvus: Johannsen, 1937: 39.
Cryptochironomus fulvus: Townes, 1945: 98; Darby, 1962: 50; Hashimoto et al., 1981: 16; Sasa & Hasegawa, 1983: 322; Sasa & Kikuchi, 1986: 20; Chaudhuri & Chattopadhyay, 1990: 154.

MATERIAL EXAMINED: 3♂, Birparah, 25.vi.1984, coll. T.K. Dutta; 2♂, Rajabhatkhawa, 20.viii.1984, coll. T.K. Dutta; 1♂, Darjeeling, 15.iv.1984, coll. T.K. Dutta.

DISTRIBUTION. China, India, Japan, Thailand, USA.

Cryptochironomus gracilis Dutta & Chaudhuri, sp. n.
(Figs 2a–b)

Male. Body length 3.18 S_x 0.50 (n = 8), wing length 1.53 S_x 0.08 (n = 8) and wing breadth 0.45 S_x 0.02 (n = 8).

Head. Brown in colour. Vertex with 12–15 setae (IV 3–4, OV 8–10 and PO 1). Clypeus with 12–17 long curved setae, clypeal ratio 1.13 (1.04–1.13). Maxillary palp light yellow, length ratio of palpomeres I–V: 11 : 16 : 36 : 38 : 45, L/W 4.5 (4.1–4.5). Eyes reniform with a pronounced dorsal extension of 0.11 (0.11–0.16). Frontal tubercles small. Antenna light brown, length ratio of flagellomeres I–XI: 6 : 7 : 7 : 5 : 5 : 5 : 5 : 5 : 6 : 6 : 185, AR 3.24 (3.24–3.49). CA 0.62 (0.60–0.62); CP 1.09 (1.09–1.12).

Thorax. Brown-yellow. Antepronotum collar-like with a median notch; antepronotals 2–3. Mesonotum with 3 dark bands or stripes and a small tubercle, acrostichals 8–9 uniserial, dorsocentrals 12–14 uniserial, humerals 2–8 minute, prealars 5–7 and supraalar 0–1. Scutellum with 17–18 setae in two rows, postnotum brown and bare.

Wing. Hyaline. Brachiolum with 2 setae and 42–46 sensilla campaniformia; R, 16–20, R_1, 13–14 and R_{4+5} with 17–19 setae; R_{2+3} meets C at a distance of 0.07 (0.05–0.10) from R_1. Squama fringed with 5–7 setae. Haltere light yellow and bare. CR 1.04 (1.02–1.06); VR 1.17 (1.12–1.20).

Legs. Brown, fore tarsomeres dark brown. Fore tibia with a small blunt scale (Fig. 2a) bearing 3–4 setae, mid and hind tibial spurs unequal.

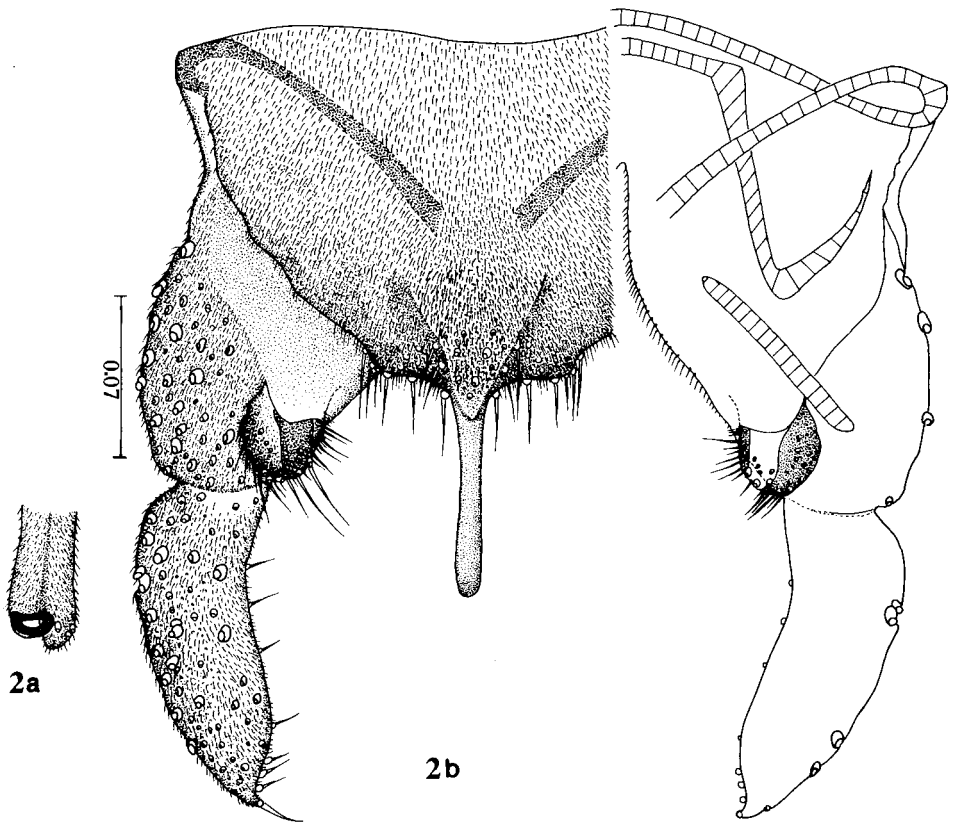


Fig. 2a–b. Male of *Cryptochironomus gracillis* sp. n.: a – fore tibial apex; b – hypopygium.

Proportion and ratios of leg-segments

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	52	40	71	32	27	20	10	1.17	1.83	1.84	1.85
p_2	46	43	27	14	10	5	5	0.62	3.41	4.45	2.25
p_3	48	56	39	21	17	9	6	0.69	2.69	3.25	3.11

Abdomen. Distinctly yellow with numerous setae. Hypopygium (Fig. 2b) with long 0.069 (0.057–0.069), slender parallel-sided or slightly distally expanded anal point, bearing 16–21 basolateral setae. Gonocoxite short with 42–44 setae; gonostylus longer, a little incurved and attenuate, bearing 1 apical seta and 7 setae at the inner margin. Superior volsella pouch-like and strongly setose with 9–10 prominent apical setae; inferior volsella small finger-like with 2–3 long curved apical setae superposed by the superior volsella.

Female unknown.

TYPE MATERIAL: Holotype ♂ (Type no. 206, B.U. Ent.), Rajabhatkhawa, 17.viii.1984, coll. T.K. Dutta. Paratypes 8♂, data same as holotype.

The name *gracilis* is derived from the slender anal point of the male hypopygium. The new species appears to be near to *Cryptochironomus diceras* Kieffer with respect to the gonocoxite, gonostylus, anal point and volsellae of the male hypopygium. The structure of its gonostylus, anal point and inferior volsella resembles *Cryptochironomus fulvus* (Johannsen). It shares similarities with *C. supplicans* (Meigen) with respect to its anal point, gonostylus, superior and inferior volsella.

However, the following combination of characters supports the description of *gracilis*: 1) scutellum with 16–18 setae; 2) squama fringed with 5–7 setae; 3) hypopygium with long, slender anal point; 4) superior volsella pouch-like adorned with many setae; 5) inferior volsella small, finger-like bearing 2–3 long apical setae; and 6) gonostylus not broadened distally.

Cryptochironomus judicius Chaudhuri & Chattopadhyay, 1990

Cryptochironomus judicius Chaudhuri & Chattopadhyay, 1990: 154.

MATERIAL EXAMINED: 5♂, Rajabhatkhawa, 24.viii.1984, coll. T.K. Dutta.
DISTRIBUTION. India.

Cryptochironomus ramus Mason, 1986

Cryptochironomus ramus Mason, 1986: 409.

MATERIAL EXAMINED: 5♂, Mathabhanga, 15.iv.1987, coll. T.K. Dutta; 4♂, Dalgaon, 15.iv.1987, coll. T.K. Dutta. Paratype 1♂, reared from larva, Tobin Lake, Saskatchewan, at Squaw Rapids Dam boat-launch (13 UFK 0545), 25/VII/79, Pres./3/VIII/79, P.G. Mason, Slide No. 79109.1.

This species was described by Mason (1986) from Tobin Lake, Saskatchewan, Canada as a member of *Cryptochironomus fulvus* (Johannsen) species complex. A comparison of the specimens collected during this investigation with the paratype of Mason (1986) suggests that it is identical as far as adults are concerned. It appears to be better to treat the material as specimens of *Cryptochironomus ramus* Mason rather than considering it as a new species. The species may be characterised by the following distinctive

characters: 1) scutellum with 22–25 setae; 2) squama with 10–13 marginal setae; 3) hypopygium with long and tubular anal point; 4) gonocoxite and gonostylus fused; 5) gonostylus moderately curved, beak-shaped; 6) superior volsella clavate, finely setose, bearing 5–8 long apical setae; and 7) inferior volsella small, tongue-shaped with 4 apical setae.

DISTRIBUTION. Canada, India (present record).

Cryptochironomus rostratus (Kieffer, 1911)

Chironomus rostratus Kieffer, 1911: 164.
Chironomus (*Chironomus*) *rostratus*: Edwards, 1929: 390.
Chironomus (*Cryptochironomus*) *rostratus*: Goetghebuer 1928: 84; Kruseman, 1933: 187.
Cryptochironomus rostratus: Pinder, 1978: 116; Ree & Kim, 1981: 143; Chaudhuri & Chattopadhyay 1990: 157.

MATERIAL EXAMINED: 4♂, Phuntsholing, Bhutan, 19.vi.1984, coll. T.K. Dutta; 7♂, Jaigaon, 19.vi.1984, coll. T.K. Dutta.

DISTRIBUTION. Bangladesh, Belgium, Bhutan, England, Germany, Korea, Morocco, Turkey, Netherlands, India.

Cryptochironomus subovatus (Freeman, 1954)
(Figs 3a–b)

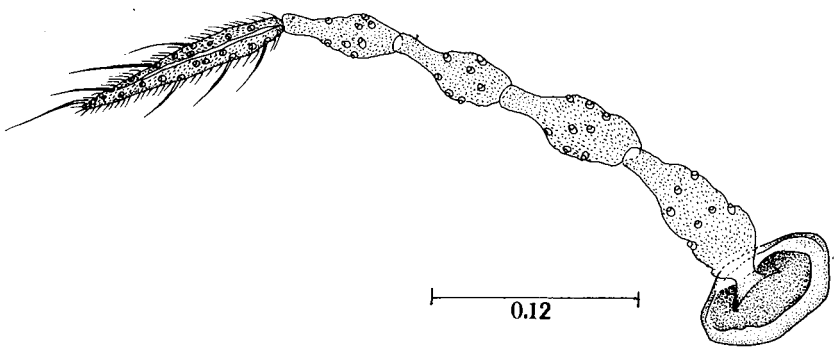
Chironomus (*Cryptochironomus*) *subovatus* Freeman, 1954: 20.
Cryptochironomus subovatus: Freeman, 1955: 375; 1957: 390; Freeman & Cranston, 1980: 189; Chaudhuri & Chattopadhyay, 1990: 157.

Female. Body length 3.54 S_x 0.23 (n = 4). Wing length 1.98 S_x 0.13 (n = 4) and wing breadth 0.73 S_x 0.02 (n = 4).

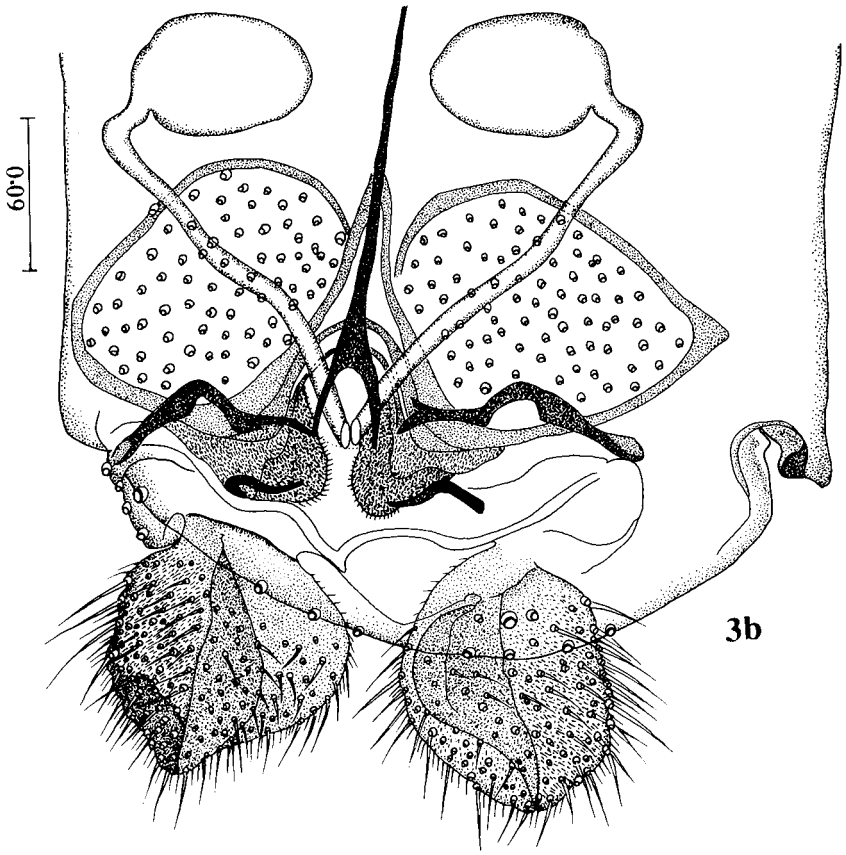
Similar to male with usual sex differences. Antenna (Fig. 3a) dark-brown, flagellomere V darker, flagellomeres II–IV clavate; ratio of flagellomere length I–V: 32:28:23:26:43; AR 0.39. Genitalia (Fig. 3b): Notum 0.17 long. Gonocoxapodeme VIII nearly ovoid, joined medially. Coxosternapodeme stout, bow-shaped. Gonapophysis VIII divided into large broad dorsomedial lobe and a flattened ventrolateral lobe; apodeme lobe prominent. Postgenital plate relatively large and narrow. Seminal capsules equal, oval, 0.072 long by 0.057 wide; ducts of seminal capsules without any loop, opening separately into the vagina. Cerci stout and densely setose.

MATERIAL EXAMINED: 6♀, Gorubathan, 20.x.1984, coll. T.K. Dutta; 4♀, larva, 18.x.1984, coll. T.K. Dutta; 4♀, Gorubathan, 20.x.1984, coll. T.K. Dutta; 1♂ (Chir. 437B), Cape Province, 27.iii.1953, coll. R. Berg.

The species was first described by Freeman (1954) from a male from Cape Province. The specimens collected herein conform with that of Freeman (1954) (chir, 437B, 23.3.53, BMNH) except minor morphometrics. Prior to this study, the male of this species was recorded by Chaudhuri & Chattopadhyay (1990) from the rice fields of Gangetic West Bengal, India. The female, hitherto undiscovered, has been identified and diagnosed by the following characters: 1) frontal tubercles small rounded; 2) supraalar 1; 3) spurs of mid and hind tibia unequal; 4) hypopygium with gonocoxite and gonostylus short and broad; 5) superior volsella digitiform; and 6) female genitalia with bow-shaped



3a



3b

Fig. 3a–b. Female of *Cryptochironomus subovatus* Freeman: a – antenna; b – genitalia.

coxosternapodeme, prominent apodeme lobe and two equal seminal capsules.

DISTRIBUTION. Cape Province, India, Nigeria, South Africa, Sudan, Upper Volta, Zaire.

Key to adult males of Indian species of *Cryptochironomus* Kieffer

1	Frontal tubercle present	2
–	Frontal tubercle absent	9
2	Spurs of hind tibia unequal, superior volsella distinct	3
–	Spurs of hind tibia equal, superior volsella short, indistinct	*polius* (Kieffer)
3	Brachiolum with 3 setae, antepronotal present	*ramus* Mason
–	Brachiolum with 2 setae, antepronotal present or absent	4
4	Scutellum with 8–12 setae	5
–	Scutellum with more than 12 setae	7
5	Frontal tubercle prominent, with an apical knob	*fulvus* (Johannsen)
–	Frontal tubercle small and without apical knob	6
6	Antepronotals 5–6, superior volsella broad and lobular with 9–10 apical setae	*acuminatus* Dutta & Chaudhuri, sp. n.
–	Antepronotal 0, superior volsella digitiform with 2–3 apical setae	*subovatus* (Freeman)
7	Haltere bare	8
–	Haltere setose	*judicius* Chaudhuri & Chattopadhyay
8	Scutellars arranged in two rows	*gracilis* Dutta & Chaudhuri, sp. n.
–	Scutellars arranged irregularly	*rostratus* (Kieffer)
9	Gonostylus long, with broad base and apex attenuated	*calyxus* Guha, Das, Choudhuri & Chaudhuri
–	Gonostylus short, stout with an abrupt apical point	10
10	Superior volsella bulb-like, inferior volsella absent	*bulbosus* Guha, Das, Choudhuri & Chaudhuri
–	Superior volsella expanded, nearly thumb-like, inferior volsella tongue-shaped	*curryi* Mason

Demicryptochironomus vulneratus (Zetterstedt, 1838)

Chironomus vulneratus Zetterstedt, 1838: 838.
Chironomus vulneratus: Edwards, 1929: 390
Demicryptochironomus vulneratus: Lehmann, 1971: 497; Saether, 1977: 131.
Chironomus atriforceps Goetghebuer, 1928: 84.
Chironomus atriforceps: Edwards, 1929: 390.
Demicryptochironomus chuzequartus Sasa, 1984: 47, syn. n.

MATERIAL EXAMINED: 3♂, Coochbehar, 15.iv.1987, coll. T.K. Dutta; 6♂, Dalmani, 17.iv.1987, coll. T.K. Dutta.

This species was described by Zetterstedt (1838) as *Chironomus vulneratus*. Lehmann (1971) made the generic transfer to *Demicryptochironomus*, which was confirmed by Saether (1977). The present specimens conform with the adult male of the species described by Saether (1977) from Canada, except for the body size. The diagnostic features of the species are: 1) mesonotum with 3 dark bands or stripes and with 6 dark spots; 2) scutellum with 30 setae; 3) tarsomeres III, IV and V brown; 4) hypopygium with long anal point and with 6–8 basolateral setae; 5) gonostylus long moderately curved, medially constricted, crescentic with a long terminal seta; and 6) superior volsella digitiform, bilobed apically with 2 apical setae. On the bases of similarities of squamal setae, two spurs in the mid and hind tibiae, long anal point, digitiform and bilobed superior volsella, ankylosed gonocoxite and gonostylus, and medially constricted crescentic gonostylus with 2–3 apical setae, *Demicryptochironomus chuzequartus* Sasa, 1984 is tentatively proposed as a synonym of the present species (we have not seen types).

DISTRIBUTION. England, Canada, China, France, Finland, Germany, Ireland, Japan, Netherlands, India (present record).

Harnischia acuta (Goetghebuer, 1936)

Chironomus (*Harnischia*) *acutus* Goetghebuer, 1936: 470.
Cryptochironomus acutus: Freeman, 1955: 17.
Chironomus (*Cryptochironomus*) *acutus*: Freeman, 1957: 397.
Harnischia acuta: Sasa & Hasegawa, 1983: 323; Chaudhuri & Chattopadhyay, 1990: 158.

MATERIAL EXAMINED: 6♂, Birparah, 14.vi.1984, coll. T.K. Dutta; 3♂, Birparah, 23.vi.1984, coll. T.K. Dutta; 1♂, Birparah, 21.vi.1984, coll. T.K. Dutta; 4♀, Birparah, 14.vi.1984, coll. T.K. Dutta. 1♂ (B.M. 1957–264), Transvaal, Neispruit, coll. F.H. Frank (The Natural History Museum, London).

DISTRIBUTION. Belgian Congo, Cape Province, Chad, Egypt, Ethiopia, India, Israel, Japan, Kenya, Nigeria, South Africa, Turkey, Zaire.

Harnischia curtilamellata (Malloch, 1915)

Chironomus curtilamellatus Malloch, 1915: 474.
Chironomus (*Chironomus*) *curtilamellatus* (*Harnischia* group): Miller, 1941: 20, 61, 62.
Chironomus (*Harnischia*) *pseudosimplex* Goetghebuer, 1928: 20, 61–62.
Chironomus (*Harnischia*) *pseudosimplex*: Edwards, 1929: 390.
Harnischia (*Harnischia*) *curtilamellata*: Townes, 1945: 166; Saether, 1971: 347; Pinder, 1978: 124; Hashimoto et al., 1981: 22; Sasa & Kikuchi, 1986: 20.

MATERIAL EXAMINED: 4♂, Gorubathan, 20.x.1984, coll. T.K. Dutta; 5♂, Jaigaon, 2.x.1984, coll. T.K. Dutta; 1♂, Khartoum, Sudan (The Natural History Museum, London).

Chironomus curtilamellatus was described by Malloch (1915). Townes (1945) redescribed the species and transferred it to *Harnischia* Kieffer and this was supported by the subsequent authors such as Saether (1971), Hashimoto et al. (1981), and Sasa & Kikuchi (1986). Comparison of specimens collected during this study with an identified specimen from the collection of the Natural History Museum shows that the specimens are very similar, with minor morphometric differences which do not warrant description of a new species. The diagnostic features of the species are: 1) vertex with 2 outer verticals; 2) scutellum with 8 irregular setae; 3) wings hyaline, with 6 squamal setae; 4) hypopygium with a characteristic anal point; 5) heavy and fused gonocoxite and gonostylus; 6) gonostylus distally rounded with 3 apical setae; and 7) small pubescent tubercle-like superior volsella.

DISTRIBUTION. Australia, China, England, Finland, Germany, India (present record), Japan, Morocco, North America, Russia, Sudan, Thailand, Turkey.

Harnischia minuta Dutta & Chaudhuri, sp. n.
(Figs 4a–g)

Male. Body length 2.10 S_x 0.11 (n = 7). Wing length 1.04 S_x 0.03 (n = 7) and wing breadth 0.38 S_x 0.01 (n = 7).

Head. Brown in colour. Vertex with 19 setae (IV 4, OV 14 and PO 1). Clypeus with 11–13 long curved setae, clypeal ratio 1.0. Maxillary palp light brown; length ratio of palpomeres I–V: 7 : 22 : 23 : 18 : 5, L/W 4.6. Eyes reniform with a dorsal extension of 0.099.

Antenna light brown, length ratio of flagellomeres I–XI: 7 : 5 : 5 : 6 : 6 : 6 : 6 : 6 : 6 : 6 : 131, AR 2.22 (2.11–2.28). CA 0.50 (0.50–0.52); CP 1.28 (1.27–1.29).

Thorax. Yellow. Antepronotals 2. Mesonotum with 3 dark bands or stripes, acrostichals 10 biserial, dorsocentrals 8 uniserial, humerals 0–1, prealars 3 and prescutellar 1. Scutellum with 10–12 setae arranged in two transverse rows, postnotum brown and bare.

Wing. Hyaline. Brachiolum with 2 setae and 44–46 sensilla campaniformia; R, 18, R_1, 12 and R_{4+5} with 20 setae. Squama fringed with 8 setae. Haltere light yellow and bare, CR 1.09, VR 1.17 (1.15–1.18).

Legs. Femora and tibiae of all legs yellow, apices of fore tibiae darker, tarsomeres yellow. Fore tibia with a scale (Fig. 4a) bearing 2 long setae; mid and hind tibial spurs unequal.

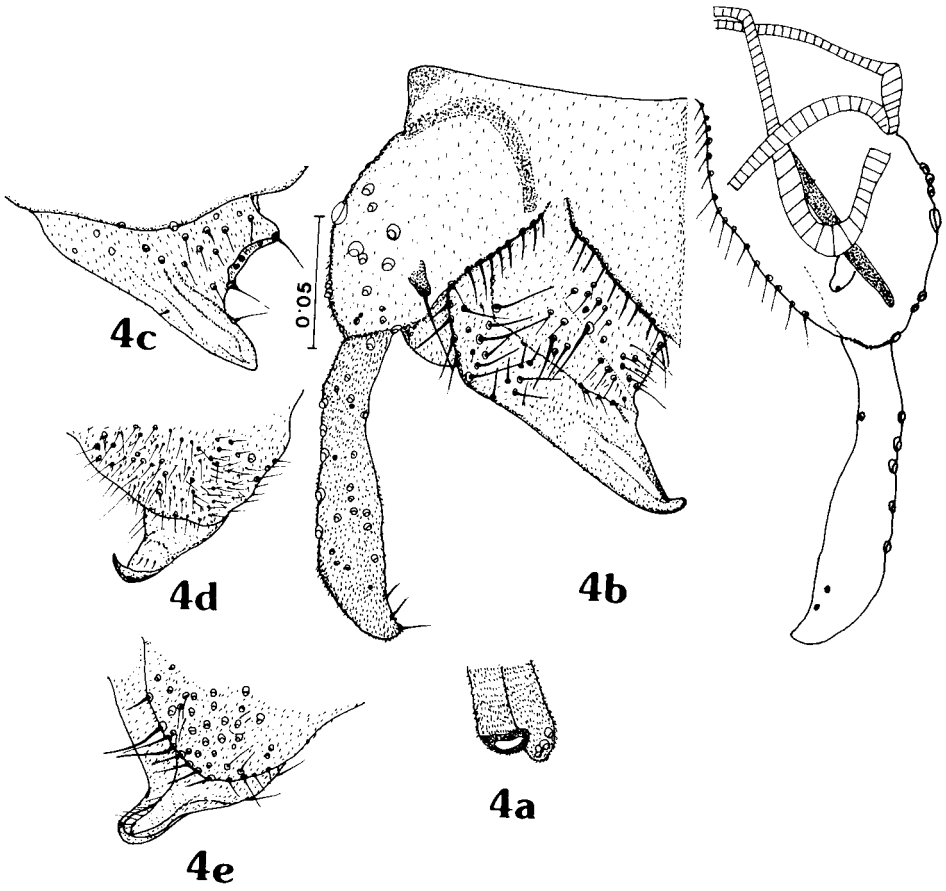


Fig. 4a–e. *Harnischia minuta* sp. n., male: a – fore tibial apex; b – hypopygium; c–e – different shapes of anal point.

Proportion and ratios of leg-segments

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	36	21	42	22	17	13	8	2.0	1.65	1.50	2.35
p_2	30	26	15	8	4	3	3	0.57	3.94	5.60	2.75
p_3	35	35	23	14	13	8	5	0.65	2.32	2.69	4.57

Abdomen. Light yellow with profuse long setae. Hypopygium (Fig. 4b): Tergum IX with small setae at the middle. Anal point (Fig. 4c–e) broad, fleshy, little flexed, more or less triangular and consistently asymmetrical (0.06 long) having a constricted hyaline apex and strongly pubescent base. Gonocoxite short and broad, with about 19–20 setae; gonostylus longer, little curved, forcipate, bearing 1 terminal seta, 2–3 setae at its inner apical margin. Superior volsella very small, with 1 apical seta, inferior volsella absent. Transverse sternapodeme 0.021, lateral sternapodeme 0.06, coxapodeme 0.03, and phallapodeme 0.042 long. HR 0.62 (0.58–0.62), HV 2.10 (2.09–2.11).

Female. Body length 2.02 S_x 0.01 (n = 3). Wing length 1.24 S_x 0.02 (n = 3) and wing breadth 0.47 S_x 0.01 (n = 3).

Similar to male excepting genitalia. Antenna (Fig. 4f) light brown, flagellomere V dark, flagellomeres II–III vase-shaped, length ratio of flagellomeres I–V: 16 : 14 : 17 : 15 : 33, AR 0.53. Genitalia (Fig. 4g): Notum 0.10 long. Gonocoxapodeme VIII in the form of a trough. Coxosternapodeme well represented, bow-shaped. Gonapophysis VIII divided into a broad, fleshy, dorsomedial lobe and a relatively small, flattened, ventrolateral lobe, apodeme lobe weak. Postgenital plate relatively small and narrowed, assuming V-shaped configuration. Seminal capsules almost equal, oval, 0.057 long by 0.036 wide, ducts of seminal capsules without any loop, fused to the terminal and opening into the vagina by a single aperture. Cerci foliiform, densely setose.

TYPE MATERIAL: Holotype ♂ (Type no. 210, B.U. Ent.), Jayanti, 6.vi.1994, coll. T.K. Dutta. Allotype ♀, data same as holotype. Paratypes 4♂ and 3♀, Birparah, 23.vi.1984, coll. T.K. Dutta; 2♂, Buxa duar, 9.vi.1984, coll. T.K. Dutta; 1♂, Jayanti, 7.vi.1984, coll. T.K. Dutta.

The species is named *Harnischia minuta*, due to its superior volsella of the male hypopygium. It resembles *H. tenuitubercula* Chaudhuri & Chattopadhyay with respect to its gonocoxite and the size and shape of the superior volsella. In its gonocoxite and gonostylus, the species appears to be close to *H.* (*Harnischia*) *potamogeti* Townes and it resembles *H.* (*H.*) *carinata* Townes in gonostylus. However, the following combination of characters separate the species from other members of the genus: 1) scutellum with 10 setae, arranged in two rows; 2) wing hyaline with 44–46 sensilla campaniformia, squama fringed with 8 setae; 3) part of fore tibiae is darker; 4) abdomen yellow, profusely setose; 5) hypopygium with short, broad, asymmetrically conical anal point; 6) gonocoxite short and broad; 7) gonostylus long, little curved, tapered toward its apex; 8) superior volsella small with 1 apical seta; and 9) genitalia of female with bow-shaped coxosternapodeme, weak apodeme lobe, V-shaped postgenital plate, almost equal and oval seminal capsules.

Harnischia viridula (L., 1767)

Tipula viridula L., 1767: 975.
Chironomus (*Harnischia*) *viridulus*: Goetghebuer, 1928: 86.

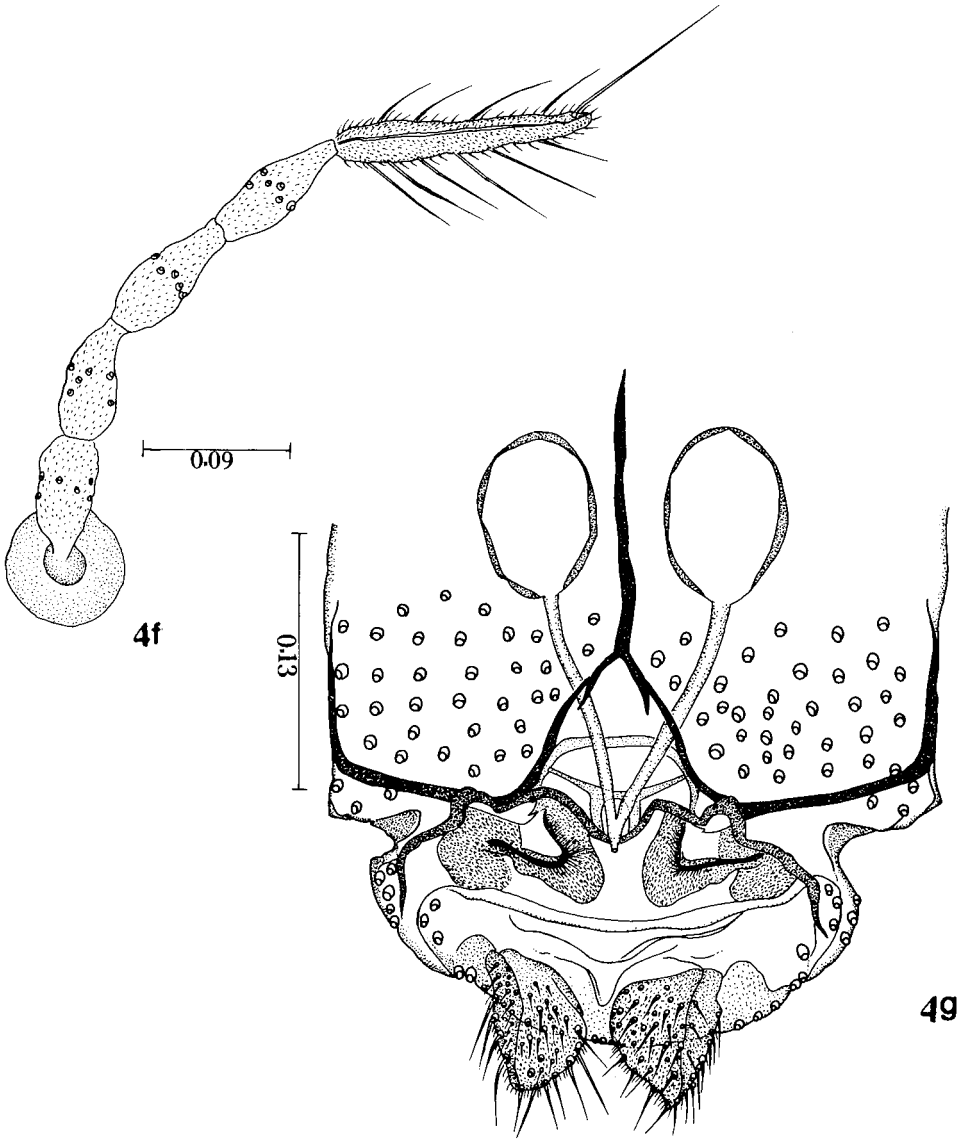


Fig. 4f–g. *Harnischia minuta* sp. n., female: f – antenna; g – genitalia.

Chironomus (*Chironomus*) *viridulus*: Edwards, 1929: 390.
Harnischia (*Harnischia*) *viridulus*: Townes, 1945: 168.
Cryptocladopelma viridula: Pinder, 1978: 18.
Harnischia viridula: Hashimoto et al., 1981: 21; Sasa & Hasegawa, 1983: 324; Sasa, 1985: 35; Sasa & Kikuchi, 1986: 20; Chaudhuri & Chattopadhyay, 1990: 159.

MATERIAL EXAMINED: 3♂, Birparah, 7.x.1984, coll. T.K. Dutta; 2♂, Alipurduar, 8.x.1984, coll. T.K. Dutta.

DISTRIBUTION. England, Finland, India, Japan, North America, Sweden, Thailand.

Microchironomus tener (Kieffer, 1918)

Chironomus tener Kieffer, 1918: 48.
Chironomus (Cryptochironomus) balticus Pagast, 1931: 218.
Cryptochironomus aegyptus Kieffer, 1925: 288.
Tendipes (Parachironomus) tener: Kruseman, 1933: 125.
Leptochironomus tener: Kugler, 1971: 341; Shilova, 1976: 118–119; Pinder, 1978: 126.
Microchironomus tener: Saether, 1977: 101; Freeman & Cranston, 1980: 193; Moller-Pillot, 1984: 244; Chaudhuri & Chattopadhyay, 1988: 177; 1990: 160.

MATERIAL EXAMINED: 9♂, Birparah, 21.–23.vi.1984, 3.x.1984, coll. T.K. Dutta; 5♂, Rajabhatkhawa, 20.viii.1984, coll. T.K. Dutta; 1♂, Hashimara, 7.x.1984, coll. T.K. Dutta; 1♀, Jaigaon, 8.x.1984, coll. T.K. Dutta; 1♀, Phuntsholing, Bhutan, 19.vi.1984, coll. T.K. Dutta.

DISTRIBUTION. Australia, Belgian Congo, Bhutan, Cape Province, Chad, China, Egypt, Ghana, India, Indonesia, Madagascar, Natal, Nigeria, Poland, Rhodesia, South Africa, Spain, Turkey, Uganda, Zaire.

Paracladopelma diutinistyla Dutta & Chaudhuri, sp. n.
(Figs 5a–c)

Male. Body length 2.14 S_x 0.04 (n = 8). Wing length 1.03 S_x 0.01 (n = 8), wing breadth 0.31 S_x 0.007 (n = 8).

Head. Brown. Vertex with 12–15 setae (IV 4, OV 7–9 and PO 1–2). Clypeus with 18–19 long curved setae, clypeal ratio 1.28. Maxillary palp pale brown, length ratio of palpomeres I–V: 7 : 8 : 22 : 28 : 40, L/W 3.66. Eyes reniform with a moderate dorsal extension of 0.075. Frontal tubercles very small. Antenna brown, length ratio of flagellomeres I–XI: 12 : 7 : 6 : 6 : 6 : 6 : 7 : 7 : 7 : 7 : 139, AR 1.95 (1.94–1.96). CA 0.50 (0.49–0.51); CP 1.00 (0.98–1.01).

Thorax. Yellow. Antepronotum narrow with a notch at the middle and without dorsal emargination, antepronotal 0. Mesonotum with 3 brown bands or stripes and a very small tubercle; acrostichals 7–8 biserial, dorsocentrals 10–12 uniserial, prealars 6, and supraalar 1. Scutellum with 10 setae, postnotum dark brown and bare.

Wing. Opaque with microtrichia, veins light brown. Brachiolum with 2 setae and 35–36 sensilla campaniformia; R, 4–5, R_1 without setae and R_{4+5} with 2 setae at the apex; R_{2+3} meets C at a distance of 0.12 from R_1. An ends below FCu. Squama fringed with 6 setae. Haltere light yellow and bare. CR 0.94 (0.92–0.97); VR 1.20 (1.18–1.22).

Legs. Yellow. Apex of fore tibia and basal half of hind tibia light brown, tarsomeres brown. Fore tibia with a rounded scale (Fig. 5a) bearing 2 long setae, mid tibial spurs equal and hind tibial spurs unequal.

Proportion and ratios of leg-segments

	Fe	Ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	37	20	52	22	19	14	7	2.60	1.75	1.42	2.50
p_2	32	26	18	8	6	4	3.5	0.69	3.53	4.29	3.00
p_3	35	35	26	12	12	11.5	6	0.74	2.78	3.11	4.00

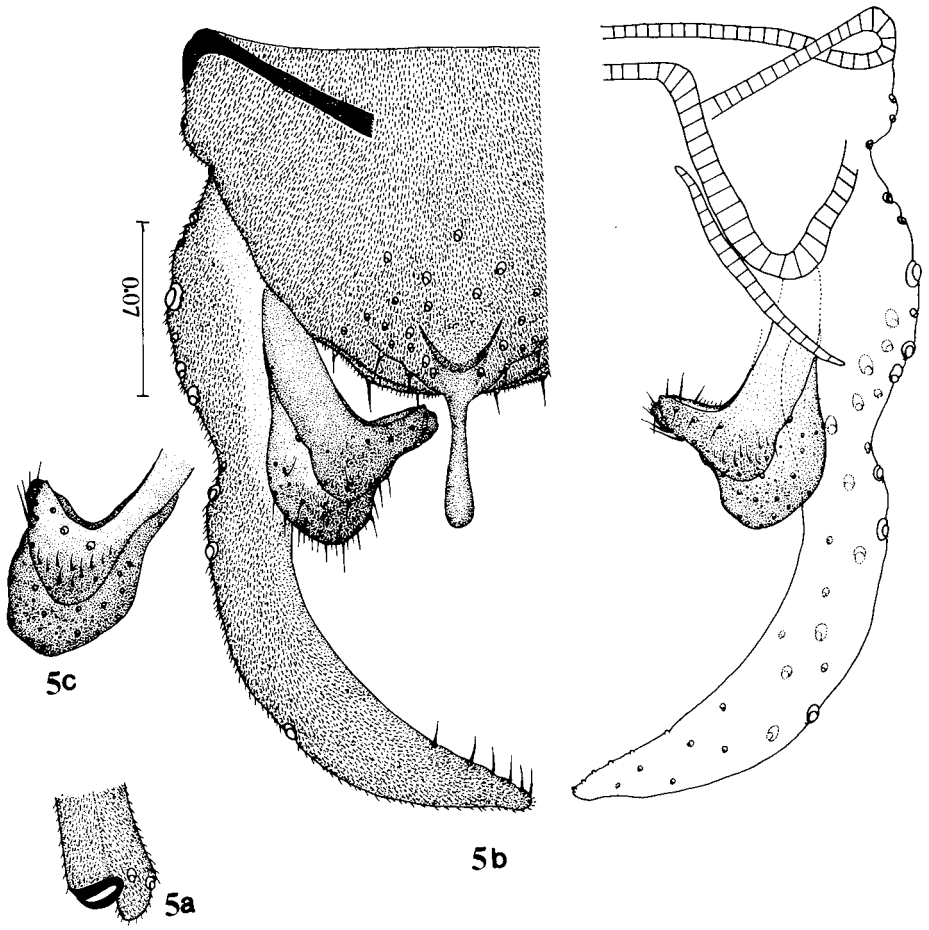


Fig. 5a–c. *Paracladopelma diutinistyla* sp. n., male: a – fore tibial apex; b – hypopygium; c – inferior volsella.

Abdomen. Yellow with setae dorsally. Hypopygium (Fig. 5b): anal point tubular 0.039 long, gradually broadened towards apex and with 6 basolateral setae. Gonocoxite and gonostylus fused; gonocoxite short with 9–10 setae over it; gonostylus elongated, incurved, sickle-shaped, bearing 6 small setae at its inner margin and 19–20 setae over it. Superior volsella pediform with pubescent apex bearing 12–14 prominent and numerous small setae over it; inferior volsella (Fig. 5c) more or less rounded bearing numerous minute setae and 14–16 prominent setae.

TYPE MATERIAL: Holotype ♂ (Type no. 212, B.U. Ent.), Birparah, 14.vi.1984, coll. T.K. Dutta. Paratypes 3♂, Buxa duar, 9.vi.1984, coll. T.K. Dutta; 2♂, Jaldaparah Forest, 15.x.1986, coll. T.K. Dutta.

The species has been named *Paracladopelma diutinistyla* on the basis of its long gonostylus. The gonocoxite, gonostylus and anal point of *P. laminata* Kieffer, *P. orbicus* (Townes) and the same of *P. nais* (Townes) are similar to this new species. *P. camptolabis* (Kieffer), *P. galaptera* (Townes) and *P. nixe* (Townes) resemble the new species in their

anal points. The following combination of characters separates the new species: 1) scutellum with 10 setae; 2) mid tibial spurs equal; 3) squama fringed with 6 setae; 4) hypopygium with distally dilated anal point; 5) gonostylus elongated and sickle-shaped; 6) superior volsella long pediform with pubescent apex; and 7) inferior volsella more or less rounded and densely setose.

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