

New species of predaceous midges of the genus *Alluaudomyia* Kieffer, 1913 (Insecta, Diptera, Ceratopogonidae) from the coastal region of West Bengal, India

Saswati SINHA
Abhijit MAZUMDAR
Prasanta K. CHAUDHURI

Department of Zoology, University of Burdwan,
Burdwan 713 104, West Bengal (India)
abhijitau@rediffmail.com

Sinha S., Mazumdar A. & Chaudhuri P. K. 2005. — New species of predaceous midges of the genus *Alluaudomyia* Kieffer, 1913 (Insecta, Diptera, Ceratopogonidae) from the coastal region of West Bengal, India. *Zoosystema* 27 (1) : 115-122.

ABSTRACT

Three new species of predaceous midges of the genus *Alluaudomyia* Kieffer, 1913: *A. debilipenis* n. sp., *A. finitima* n. sp., and *A. simulata* n. sp., are described from the coastal district of West Bengal, India. *A. debilipenis* n. sp. is distinguished from other species by feeble caudolateral points of aedeagus, colour pattern of legs, nature and distribution of wing spots. *A. finitima* n. sp. is distinguished by the absence of darkish spots in cells M_1 , M_2 and M_4 , colour pattern of thorax, legs and structure of spermatheca. *A. simulata* n. sp. differs by similar small dark wing markings in the cells of the wing, its absence on the medio-cubital fork, unique spotless cell M_4 and features of male genitalia.

KEY WORDS

Insecta,
Diptera,
Ceratopogonidae,
Alluaudomyia,
coastal region,
West Bengal,
new species.

RÉSUMÉ

Nouvelles espèces de moucheron prédateurs du genre Alluaudomyia Kieffer, 1913 (Insecta, Diptera, Ceratopogonidae) de la région côtière du Bengale occidental, Inde.

Trois nouvelles espèces de moucheron prédateurs du genre *Alluaudomyia* Kieffer, 1913, *A. debilipenis* n. sp., *A. finitima* n. sp., et *A. simulata* n. sp., sont décrites du district côtier du Bengale occidental, Inde. *A. debilipenis* n. sp. se distingue des autres espèces par ses points caudolatéraux de l'édéage faibles, le pattern de couleurs des pattes, la nature et la distribution des taches alaires. *A. finitima* n. sp. est caractérisé par l'absence de points noirâtres dans les M_1 , M_2 et M_4 , le pattern de couleurs du thorax et des pattes et la structure de la spermathèque. *A. simulata* n. sp. diffère par de petites marques alaires sombres similaires dans les cellules des ailes, leur absence sur la fourche médio-cubital, une cellule M_4 sans tache unique et les traits du genitalia mâle.

MOTS CLÉS

Insecta,
Diptera,
Ceratopogonidae,
Alluaudomyia,
région côtière,
Bengale occidental,
nouvelles espèces.

INTRODUCTION

The small, pale, but conspicuously marked predaceous midges of the genus *Alluaudomyia* Kieffer, 1913 are well distributed in all major biogeographical regions of the world except for Antarctica. The study of the genus in India began in 1913 when Kieffer described *A. xanthocoma* (Kieffer 1913). Nearly 60 years later, Chaudhuri *et al.* (1972, 1974, 1981) and Chaudhuri & Ghosh (1980) began investigation of these predaceous midges describing several new species and many species previously recorded from other countries. At present there are 19 species known from the Indian subcontinent (Borkent & Wirth 1997). The present paper deals with the description of three new species from the coastal district of West Bengal.

MATERIAL AND METHODS

The adults of the biting midges were obtained by light-trap from several sites in the coastal district of Midnapur of West Bengal and some of which contained the breeding substrates of the midges. The preparation of specimens for taxonomic study followed procedures of Wirth & Hubert (1989) by treating specimens with a saturated solution of phenol in absolute alcohol. The phenol-alcohol mixture was warmed for a few hours to ensure relaxation and clearing of specimens before they were mounted on microscope slides in a 50/50 mixture of phenol-balsam. All slide-mounted specimens were baked in oven at low heat (*c.* 50°C) until hardened.

Morphological terms and the descriptive procedures of Chaudhuri *et al.* (1981) and Giles & Wirth (1982) were followed in this paper. Measurements of structures were made on a series of three to six specimens and presented as follows: mean (minimum-maximum values, *n* = number of individuals measured).

ABBREVIATIONS

MNHN Muséum national d'Histoire naturelle, Paris;
NZC National Zoological Collection, Calcutta;

AR antennal ratio;

CR costal ratio;

PR palpal ratio;

TR tarsal ratio;

Wing morphology (M_1 , M_3 , M_4 ; R_5 ; r-m): see Chaudhuri *et al.* (1981) and Giles & Wirth (1982).

SYSTEMATICS

Family CERATOPOGONIDAE Grassi, 1901

Genus *Alluaudomyia* Kieffer, 1913

Alluaudomyia debilipenis n. sp.

(Fig. 1)

TYPE MATERIAL. — Holotype: West Bengal, Haldia, 10.VI.1990, S. Sinha coll., ♂ (NZC). Paratypes: West Bengal, Nandigram, 18.VI.1993, S. Das coll., 1 spec. (MNHN); 6 specs (data same as paratype) are retained with the junior authors.

ETYMOLOGY. — “*Debilipenis*” means feeble penis.

DESCRIPTION

Male

Wing length 0.81 (0.81-0.82, *n* = 5) mm, breadth 0.32 (*n* = 5) mm.

Head. Dark brown. Vertex with six setae. Eyes bare, narrowly separated. Antennal plume brown. Maxillary palpus (Fig. 1A) dark brown, pubescent and five-segmented, segment III elongated with small sub-apical sensory pits having three sensilla; segment V equal in length to segment III; length ratio of palpomeres I-V 3: 7: 9: 7: 9; PR 2.3.

Thorax. Brown to dark brown. Scutum medially and laterally brown with submedian dark brown vitae; prescutellar area and humeral area large and pale; scutellum pale brown; post scutellum dark brown.

Legs (Fig. 1B). Pale with brown bands; coxae and trochanters brown; fore and hind femora pale yellowish with subapical, median dark bands; mid femora with apical and median bands; all tibiae with apical, median and sub-basal bands; fore and mid basitarsi pale but hind tarsomere I dark brown, rest of tarsomeres whitish; length ratio of tarsomeres I-V

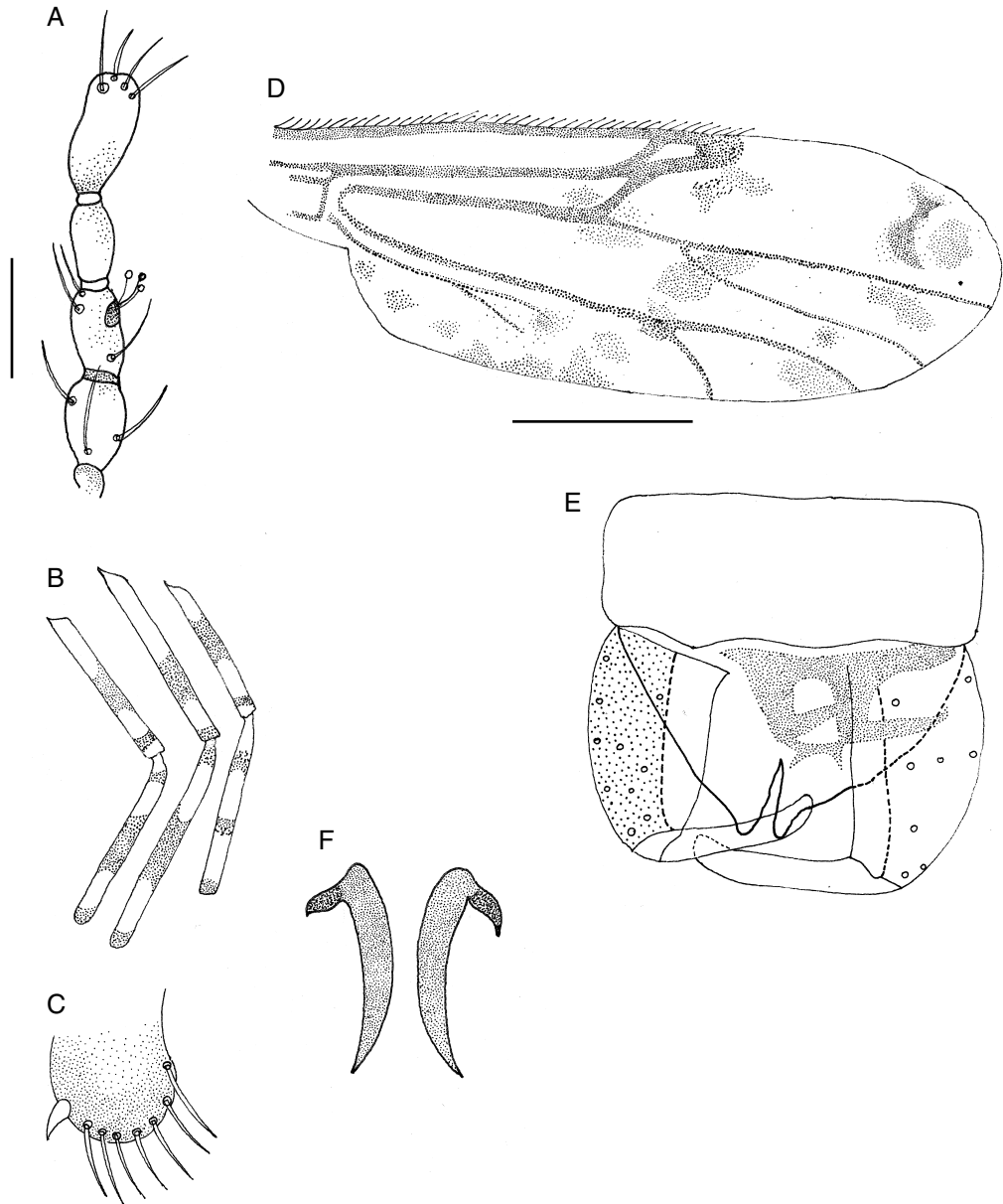


FIG. 1. — *Alluaudomyia debilipenis* n. sp., ♂; **A**, maxillary palpus; **B**, legs; **C**, hind tibial comb; **D**, wing; **E**, genitalia; **F**, parameres. Scale bars: A, 0.05 mm; D, 0.4 mm; E, 0.1 mm.

and TR 8: 3: 5: 2: 2: 2 and 2.2 in fore leg; 13: 5: 5: 2: 2 and 2.3 in mid leg; 7.5: 3: 2: 1.5: 3 and 2.5 in hind leg; claws on all legs small equal sized. Hind tibial comb (Fig. 1C) with seven spines.

Wings (Fig. 1D). Whitish with macrotrichiae only along the margin; four dark black/brown spots covering/touching veins R, M_{2+3} and f-cu and smaller spots in cells R_5 , M_1 , M_2 , Cu and An. Costal length 0.48 mm, CR 0.59. Haltere pale yellow.

Abdomen. Yellowish brown. Genitalia (Fig. 1E): sternite IX moderately long with moderate caudomedian excavation (caudal base nearly straight); tergite IX tapering abruptly to rounded margin without prominent apicolateral processes. Basistyle long, slender, distal part narrowed; dististyle long and elongated, gently bent inward; aedeagus with a high basal arch of gothic shape with one median and two caudolateral points; parameres (Fig. 1F) divided each with long, slender basal arm, distal part slender, slightly curved blade near the base with sharply pointed tip.

Female

Unknown.

REMARKS

In view of feeble caudolateral points of aedeagus, the species is named *Alluaudomyia debilipennis* n. sp. The new species appears close to *A. magna* Wirth & Delfinado, 1964 (see Wirth & Delfinado 1964; Chaudhuri *et al.* 1972) in respect to wing spots and haltere but differs from the above species in the number, nature and position of spots on wing. The species also shows affinity with *A. marginalis* Wirth & Delfinado, 1964 (see Wirth & Delfinado 1964; Chaudhuri *et al.* 1972) in wing spots and in the genitalic features especially the aedeagus, but its paleness, the distribution of wing spots and the structures of the aedeagus and parameres in particular suggest to treat the species as a new one in *Alluaudomyia*.

Alluaudomyia finitima n. sp.

(Fig. 2)

TYPE MATERIAL. — Holotype: West Bengal, Haldia, 11.III.1990, S. Sinha coll., ♀ (NZC). Paratypes: West Bengal, Nandigram, 12.VIII.1990, A. K. Sinha coll., 1 spec. (MNHN); West Bengal, Juneput, 18.VIII.1993, S. Das coll., 25 specs are retained with the junior authors.

ETYMOLOGY. — “*Finitima*” means nearer to *A. typica*.

DESCRIPTION

Female

Wing length 0.87 (0.86-0.89, n = 10) mm, wing breadth 0.37 (0.36-0.37, n = 10) mm.

Head. Dark brown. Vertex with three setae. Eyes narrowly separated. Antenna brown; flagellomeres II-VII pale at base; distal five flagellomeres more elongated, uniformly brown; length ratio of flagellomeres I-XIII 8: 6: 6: 6: 6: 6: 8: 8: 10: 10: 10: 12, AR 1.70. Maxillary palpus (Fig. 2A) brown, palpomere III longer, segment V dark with four apical setae segment III with sub-apical sensory pit bearing sensilla; length ratio of palpomeres I-V 4: 6: 6: 6: 6; PR 2.26. Mandible (Fig. 2B): with 12-15 subequal in size small coarse teeth.

Thorax. Brown to black with yellowish mottling along dorsolateral position of scutum.

Legs (Fig. 2C). Brown. Fore femur brown with a median dark brown band and a narrow subapical dark brown small bands, mid femur pale with a small apical dark brown; hind femur with median dark brown band; fore tibia with a median dark brown, mid tibiae with dark brown basal and median bands; hind tibiae with dark brown median and apical bands; fore, mid tarsomere I pale yellow, and hind tarsomere I dark brown, tarsomeres II-V pale yellow; length ratio and TR 5: 3: 2: 2: 3, and 1.67 in fore; 10: 4: 2: 1: 4, and 2.5 in mid leg and 9: 4: 2: 1: 3.5 and 2.57 in hind legs; claws of fore legs subequal, mid and hind claws unequal; hind tibial comb (Fig. 2D) with five to seven spines.

Wings (Fig. 2E). With costal length 0.5 mm; CR 0.57; dark conspicuous spots in wings as: one proximal to r-m crossvein and a broader spot at the end of costa, others in cells R₅, M₁, M₃ and M₄. Haltere yellow.

Abdomen. Yellow in colour. Segment X light brown; spermatheca (Fig. 2F) elongated oval, heavily sclerotized, measuring 0.073 × 0.058 mm with broad neck.

Male

Unknown.

REMARKS

The new species is close to *Alluaudomyia typica* Chaudhuri, Das Gupta & Choudhuri, 1972 in respect to the wing spots but differs in the absence of darkish spots in cells M₁, M₂ and M₄.

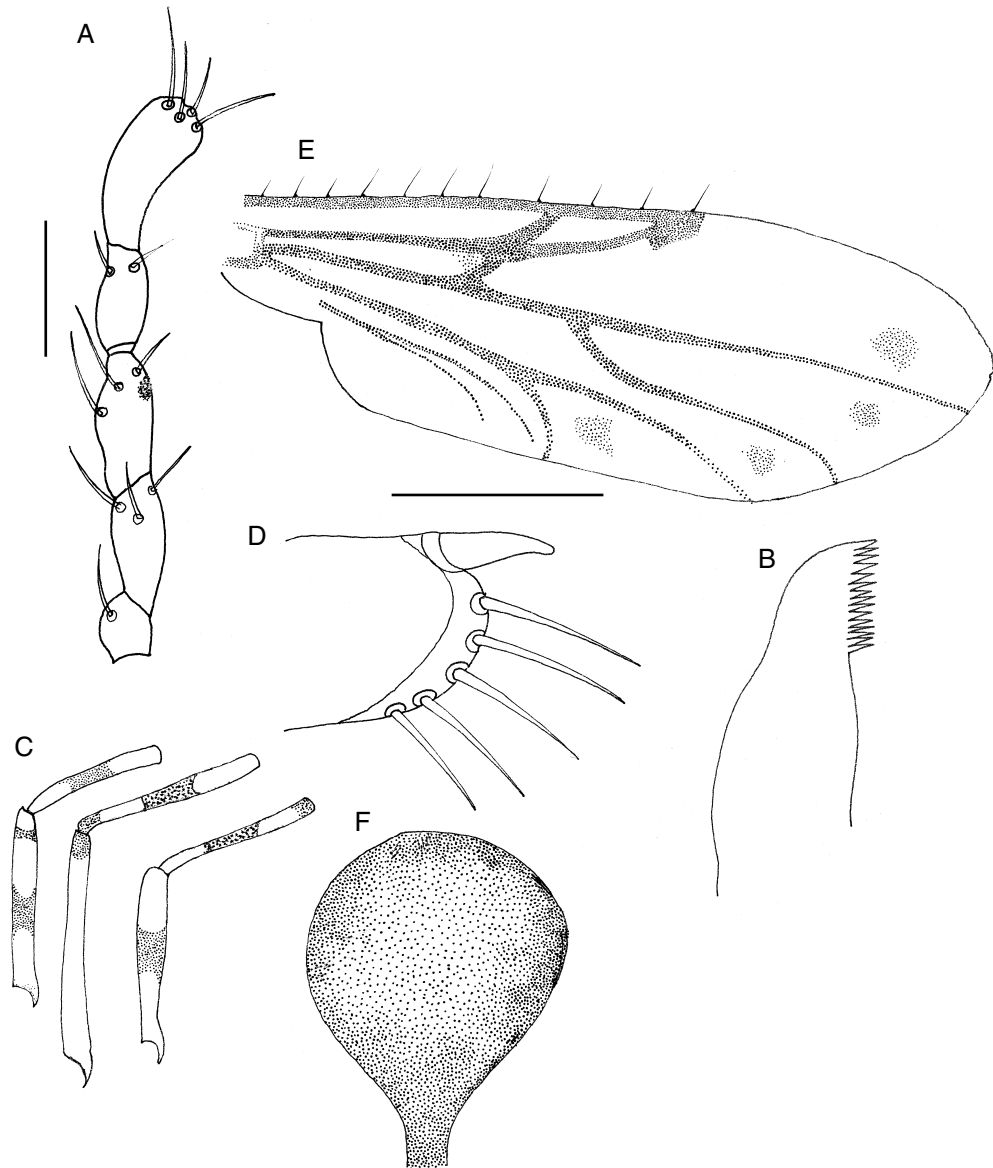


FIG. 2. — *Alluaudomyia finitima* n. sp., ♀; **A**, maxillary palpus; **B**, mandible; **C**, legs; **D**, hind tibial comb; **E**, wing; **F**, spermatheca. Scale bars: A, 0.05 mm; E, 0.4 mm.

The distribution of wing spots, their absence in three cells, colour pattern of thorax, legs and structure of spermatheca indicate that this should be considered as a new species of *Alluaudomyia* but in absence of male, determination of group of this species has not been made.

Alluaudomyia simulata n. sp.
(Fig. 3)

TYPE MATERIAL. — Holotype: West Bengal, Nandigram, 12.VIII.1990, S. Sinha coll., ♂ (NZC). Paratypes: same data as holotype, 3 specs (MNHN); same data as holotype, 3 specs are retained with the junior authors.

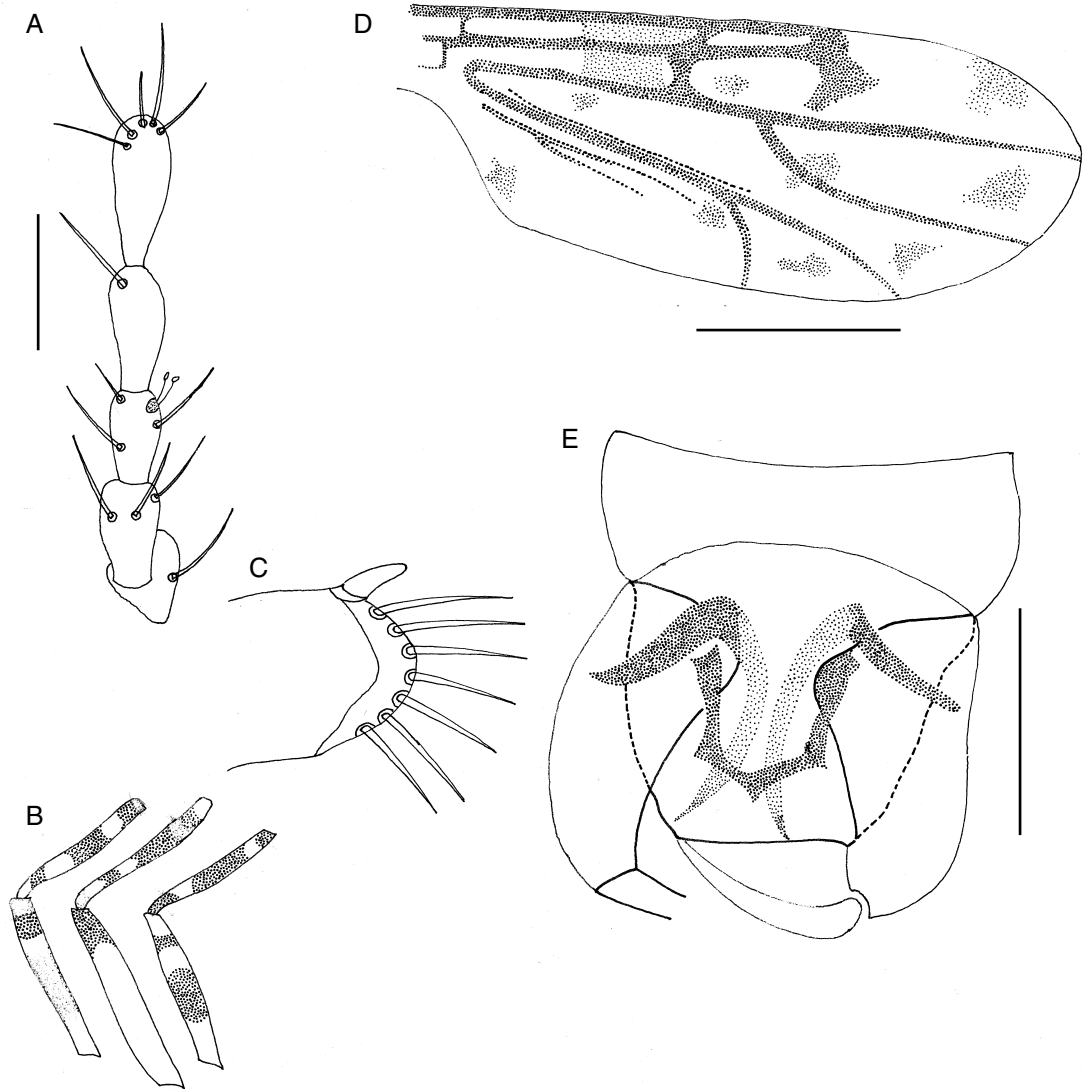


FIG. 3. — *Alluaudomyia simulata* n. sp., ♂; **A**, maxillary palpus; **B**, legs; **C**, hind tibial comb; **D**, wing; **E**, genitalia. Scale bars: A, 0.05 mm; D, 0.4 mm; E, 0.1 mm.

ETYMOLOGY. — “*Simulatus*” means similar wing spots.

DESCRIPTION

Male

Wing length 0.76 (0.76-0.78, n = 3) mm, breadth 0.32 (n = 3) mm.

Head brown. Vertex with 13 setae. Eyes contiguous. Antennal brown plume well developed.

Maxillary palpus (Fig. 3A). Dark brown, seg-

ment III with median sensory pit bearing two sensillae, segment V longest segment, bearing three to five apical setae. Length ratio of palpomeres I-V 3: 6: 7: 6: 9; PR 1.65.

Thorax. Yellowish brown. Scutum with numerous dark brown punctures and prominent pair of sublateral dark brown vittae; scutellum and postscutellum dark brown bearing irregular setae.

Legs (Fig. 3B). Yellow mid and hind coxae and trochanters. Fore femur with subapical dark brown bands; mid femur with a dark brown apical and hind femur with broad median and subapical dark brown bands; fore tibia with broad median and narrow subbasal and subapical bands, mid tibia with similar bands except pale at the apex; hind tibia with a narrow basal, broad median and apical dark brown bands; fore, mid tarsomere I apically brown, hind tarsomere I brown; tarsomeres II-V yellow; Length ratio and TR 6: 3: 2: 1: 2, 2 in fore leg; 12: 3.5: 2.5: 1: 3 and 3.71 in mid leg; 8: 4: 2: 2: 2 and 2 in hind leg; claws of all legs equal sized. Hind tibial comb (Fig. 3C) of seven spines of equal length and a stout spur.

Wings (Fig. 3D). With many irregular dark brown patches as: a broad patch on vein M extending to the base of r-m, one below cell R_{4+5} , two in cell R_5 , one hanging from the apical margin and another near the base and one each on the vein M_{2+3} near the base and cell M_1 ; near the apex, distad of cell M_4 , in cells M_3 and M_5 , and in An near the basal margin. Costa extending to 0.415 mm, CR 0.53. Haltere whitish.

Abdomen. Yellow. Genitalia (Fig. 3E): sternite IX moderately elongated with very shallow convex caudal margin; tergite IX tapering distally to broad truncate caudal margin with distinct, well separated apicolateral processes; basistyle broader at basal two-third, dististyle nearly straight ending at rounded, pointed tip; aedeagus massive, bearing well developed, heavily sclerotized basal arches, midportion broad, bearing two laterally directed processes of equal length having, a biramous heavily chitinised body at distal margin; parameres each with stout basal arm, the distal portion little curved, the blade slender with simple and sharp tip.

Female

Unknown.

REMARKS

Because of the presence of many similar small dark spots in the cells of the wing, the present

species has been named as *Alluaudomyia simulata* n. sp. and assigned to the *maculipennis* group (Wirth & Delfinado 1964; Chaudhuri *et al.* 1972) having unequal claws, one spermatheca and with either one or two dark spots over medio-cubital fork. The proposed new species apparently satisfies the general criteria for the *maculipennis* group, but differs from the above species in possession of dark spot on the medio-cubital fork as found in the Indian species, *A. maculosipennis* Tokunaga, 1940, *A. fuscitarsis* Chaudhuri, Das Gupta & Chatterjee, 1981 but differs from the above species in possession of lesser number of spots. The combination of characters like, the nature of the wing spots, their absence on the medio-cubital fork, the unique clear, spotless cell M_4 , as well as the differences in male genitalia features indicate that this species should be considered as a new species belonging to the *maculipennis* group of *Alluaudomyia*.

Acknowledgements

The authors are grateful to Dr Art Borkent, Biosystematic Research Institute, Canada, for providing information and to the esteemed reviewers for making important suggestions for improvement of the paper. We are thankful to the heads of the Department of Zoology, University of Burdwan, and Presidency College, Calcutta, for laboratory facilities.

REFERENCES

- BORKENT A. & WIRTH W. W. 1997. — World species of biting midges (Diptera: Ceratopogonidae). *Bulletin of the American Museum of Natural History* 233: 1-257.
- CHAUDHURI P. K., DAS GUPTA S. K. & CHATTERJEE A. K. 1981. — *Alluaudomyia fuscitarsis* n. sp. and *Stilobezzia ensistyla* n. sp. from India (Diptera: Ceratopogonidae). *Entomologia Scandinavica* 12: 147-150.
- CHAUDHURI P. K., DAS GUPTA S. K. & CHAUDHURI D. K. 1972. — Biting midges of the genus *Alluaudomyia* Kieffer (Diptera: Ceratopogonidae). *Entomologia Scandinavica* 6: 83-110.

- CHAUDHURI P. K., DAS GUPTA S. K. & SINHARAY D. C. 1974. — Three new species of *Stilobezzia* Kieffer (Diptera: Ceratopogonidae) from India. *Entomologia Scandinavica* 8: 47-50.
- CHAUDHURI P. K. & GHOSH M. 1980. — Addition to the studies of genus *Alluaudomyia* Kieffer (Diptera: Ceratopogonidae) of India. *Entomologia Scandinavica* 14: 421-424.
- GILES F. E. & WIRTH W. W. 1982. — New species and new collection record of Ceratopogonidae (Diptera) from Sri Lanka. *Proceedings of the Entomological Society of Washington* 84 (4): 822-827.
- KIEFFER J.-J. 1913. — Nouvelle étude sur les chironomides de l'Indian Museum de Calcutta. *Records of the Indian Museum* 9: 119-197, pls 11, 12.
- TOKUNAGA M. 1940. — Biting midges from the Micronesian Islands (Diptera, Ceratopogonidae) with biological notes by Teiso Esaki. *Tenthredo* 3: 166-186.
- WIRTH W. W. & DELFINADO M. D. 1964. — Revision of the oriental species of *Alluaudomyia* Kieffer (Diptera, Ceratopogonidae). *Pacific Insects* 6: 599-648.
- WIRTH W. W. & HUBERT A. A. 1989. — The *Culicoides* of South East Asia (Diptera: Ceratopogonidae). *Memoirs of the American Entomological Institute* 44: 1-508.

*Submitted on 17 January 2003;
accepted on 7 January 2004.*