SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

First Record of the Genus *Colosmittia* Andersen & Sæther (Chironomidae: Orthocladiinae) from the Neotropical Region

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Primeiro Registro do Gênero *Colosmittia* Andersen & Sæther (Chironomidae: Orthocladiinae) para a Região Neotropical

RESUMO - *Colosmittia brasileira* sp. n., proveniente do estado de São Paulo, é descrita e ilustrada com base no macho. O gênero *Colosmittia* Andersen & Sæther foi descrito com base em uma única espécie, *C. clavata* Andersen & Sæther, de "West Usambara Mountains" na Tanzânia, leste da África. A descoberta de *C. brasileira* sp. n. indica que o gênero *Colosmittia* possui padrão de distribuição geográfica do tipo afro-brasileira.

PALAVRAS-CHAVE: Espécie nova, Brasil, Diptera, biogeografia, padrão Inabreziano

ABSTRACT - *Colosmittia brasileira* sp. n. from São Paulo state, Brazil, is described and illustrated based on a male imago. The genus *Colosmittia* Andersen & Sæther was described based on a single species, *C. clavata* Andersen & Sæther, from the West Usambara Mountains, Tanzania, East Africa. The discovery of the new species shows that *Colosmittia* has an Afro-Brazilian distribution pattern.

KEY WORDS: New species, Brazil, Diptera, biogeography, Inabrezian pattern

The genus *Colosmittia* Andersen & Sæther was erected for *C. clavata* Andersen & Sæther, from the West Usambara Mountains in Tanzania, East Africa by Andersen & Sæther (1994). The genus differs from other known orthoclads by the combination of a strongly reduced 4-segmented palp, absence of anal point, and lack of squamal setae. The genus was tentatively placed in the *Pseudosmittia* group of genera, but does not appear to resemble any other described genus (Andersen & Sæther 1994).

Material and Methods

The species was taken in a Malaise trap in a primary Atlantic forest. The specimen was slide-mounted in Canada balsam following the procedures outlined by Sæther (1969). The general terminology follows Sæther (1980).

The holotype is deposited in the Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil.

Colosmittia brasileira sp. n. (Figs 1-6)

Type material. Holotype male: **Brazil,** São Paulo state, Parque Estadual Intervales, Ribeirão Grande, Barra Grande, 10-13.xii.2000, Malaise trap (Bosque 4), M T Tavares *et al* (MZUSP).

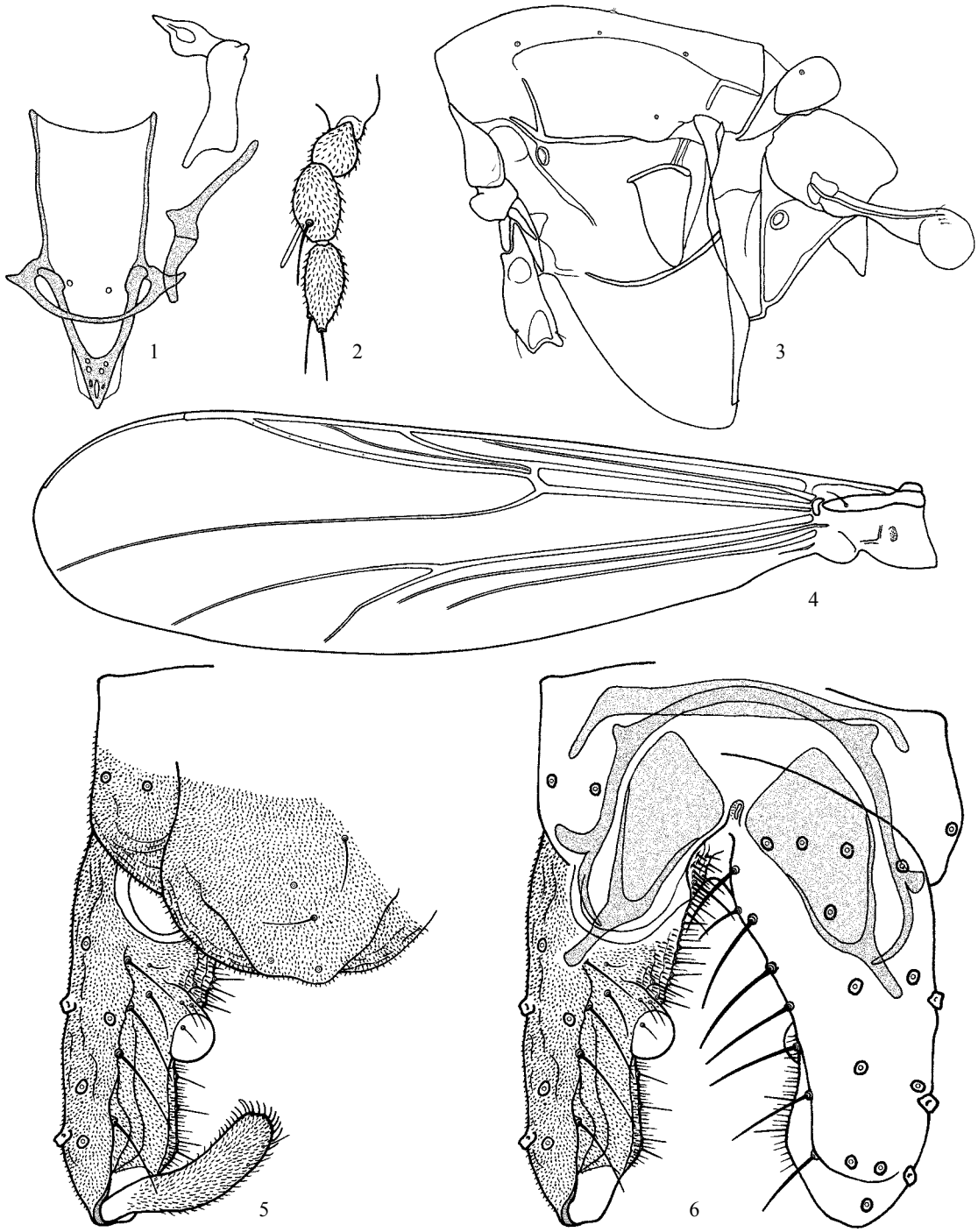
Diagnostic characters. The new species can be separated from *C. clavata* as it has antennae with 13 flagellomeres, AR of about 0.30, and three strong postorbitals.

Etymology. From Portuguese, *brasileira*, meaning Brazilian in the feminine gender. The name should be regarded as noun in apposition.

Description. Male (n = 1). Total length 1.54 mm. Wing length 962 µm. Total length / wing length 1.61. Wing length / length of profemur 4.02. Coloration dark brown with lighter legs and antennae.

Head. Antenna with 13 flagellomeres, AR 0.30, ultimate flagellomere 119 µm long. Temporal setae reduced to three postorbitals. Clypeus with four setae. Tentorium, stipes and cibarial pump as in Fig 1. Tentorium 54 µm long, 10 µm wide at sieve pore. Stipes 57 µm long, 11 µm wide. Palp segment lengths / widths (in µm): 7 / 8; 16 / 10; 20 / 11; 23 / 9. Third palpomere with one sensilla subapically, 11 µm long (Fig 2).

Thorax (Fig 3). Antepronotum with single, very weak



Figs 1-6 *Colosmittia brasileira* sp. n., male. 1, tentorium, stipes and cibarial pump; 2, palp; 3, thorax; 4, wing; 5, hypopygium, dorsal view; 6, hypopygium with tergite IX removed, left dorsal aspect, right ventral aspect.

seta. Dorsocentrals 3; acrostichals 2 very weak in midscutum; prealar 1. Scutellum with two setae.

Wing (Fig 4). VR 1.39. Costal extension 95 µm long, false vein extending to 244 µm. Cu_1 weakly sinuate. Brachiolum with one seta; R_{4+5} with five weak setae, other veins bare. Squama bare.

Legs. Spur of foretibia 32 µm long; midleg lost; longest spur of hind tibia 29 µm long, shortest spur broken. Width at apex of foretibia 18 µm, of hind tibia 19 µm. Comb with six setae, longest 20 µm, shortest 14 µm long. Lengths (in µm) and proportions of legs as in Table 1.

Hypopygium (Figs 5-6). Tergite IX with five setae; laterosternite IX with two setae. Phallapodeme 59 µm long; transverse sternapodeme 66 µm long. Virga very weak, 3 µm

Table 1 Length (in µm) and proportions of legs of *Colosmittia brasileira* sp. n., male (n = 1).

	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	BV	SV	BR
p_1	241	302	130	60	40	27	22	0.43	4.56	4.19	2.8
p_2	--	--	--	--	--	--	--	--	--	--	--
p_3	328	360	169	86	90	32	29	0.47	3.61	4.06	3.0

long, apparently surrounded by tiny spines. Gonocoxite 116 µm long; superior volsella low, densely covered with setae basally; inferior volsella rounded, 21 µm long, reaching 0.65 of gonocoxite length. Gonostylus 50 µm long; megaseta 5 µm long. HR 2.32, HV 3.09.

Notes on the habitat. The new species was collected in a Malaise trap in a primary Atlantic forest in the Parque Estadual Intervales, São Paulo State. The park is situated in the Serra de Paranapiacaba, inside the nature reserve of the Serra do Mar mountain range. The park covers an area of 417 km^2 and includes parts of the municipalities of Ribeirão Grande, Eldorado, Guapiara, Iporanga and Sete Barras (Campos 2001). The main vegetation type is tropical Atlantic rain forest. The climate is tropical and super humid, with a dry season. The annual precipitation ranges from 1000 mm to 2000 mm and the mean annual temperature is about 20°C (Nimmer 1989). Recently, several other orthoclad species collected in the park have been described, among them the so far endemic *Antillocladius biota* Mendes, Andersen & Sæther, and *Gynocladius scalpellosus* Mendes, Sæther & Andrade-Morraye (Mendes *et al* 2004, 2005).

Discussion

The African and the South American continents became completely separated at the end of middle Cretaceous, 98 to 93 million years ago. The formation of the Serra do Mar mountain range along the southeast coast of Brazil is complex; it evolved in response to tectonic forces like uplifting and volcanism (see e.g. Ribeiro 2006). These mountains are today covered with humid Atlantic forest. However, during glacial periods when a cooler and dryer climate prevailed, the humid forest shrunk to small refugia in sheltered places.

The West Usambara Mountains, where *C. clavata* was collected, belongs to the Eastern Arc, a chain of mountains stretching along the east coast of Tanzania. The Eastern Arc was formed by uplifting in connection with the formation of the Rift Valley (Windley 1995). It has been believed that these mountains are Neogene in age (40 Myr), but according to Griffiths (1993), studies have indicated that at least the Uluguru Mountain fault-block started to form as a distinct unit as far back as the Karoo period (290 Myr). At the end of Cretaceous, Africa was 15-18° south of its present position and humid forest covered the present North Africa in the Palaeocene (60 Myr). When Africa moved northwards, the pan-African forest fragmented. In eastern Africa, tropical rain forest has grown continuously during the last 30 million years (Wasser & Lovett 1993). The mountain forests in the Eastern Arc have thus been isolated and comparatively stable for a long period of time, and the mountains are considered to be among Africa's most important centers of endemism.

Banarescu (1990, 1995) discussed main biogeographical categories of freshwater animals. The northern Gondwanian or Inabrezian lineages include warm-eurythermic animals distributed in tropical South America, Africa, Australia and Southeast Asia; animals shared only by South America and Africa have an Afro-Brazilian distribution pattern. Sæther (2000) gave an overview of general distribution patterns of different chironomid genera or subgenera based on geographic co-evolutionary analyses using Brooks' Parsimony Analysis (see e.g. Brooks *et al* 2001, 2004 for a review of the method).

Sæther & Ekrem (2003) studied the Afrotropical chironomids in more detail and lists three non-cosmopolitan chironomid genera which are taken both in Africa and South America; two of these apparently exhibit an Inabrezian vicariance pattern. The Tanypodinae genus *Djalmabatista* Fittkau has its main distribution in South America, but is also present in Africa, Arabian Peninsula, East Asia and Australia. The single Afrotropical species, *D. reidi* (Freeman) was redescribed in detail by Sæther & Andersen (2000). The Pseudochironomini genus *Manoa* Fittkau, first described from the Amazon, Brazil, also exhibit Inabrezian vicariance following the discovery of one species from the West Usambara Mountains in Tanzania (Andersen & Sæther 1997) and one from the Everglades in Florida (Jacobsen & Perry 2002). Recently, the discovery of several new species of the chironomini genus *Nilothauma* Kieffer in South America also indicates Inabrezian vicariance (Adam & Sæther 1999, Mendes & Andersen 2009).

With the discovery of *Colosmittia brasileira* sp. n. in southeast Brazil, *Colosmittia* might thus be the first Orthocladiinae genus to show an Afro-Brazilian vicariance pattern. However, true vicariance is difficult to establish and might be rare within chironomids as many species apparently disperse easily.

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References

Adam J I, Sæther O A (1999) Revision of the genus *Nilothauma* Kieffer, 1921 (Diptera: Chironomidae). Entomol Scand Suppl 56: 1-107.

Andersen T, Sæther O A (1994) *Colosmittia clavata* gen. n., sp. n., a new orthoclad from the West Usambara Mountains, Tanzania (Diptera: Chironomidae). J Kans Entomol Soc 66: 439-443.

Andersen T, Sæther O A (1997) First record of *Manoa* Fittkau and tribe Pseudochironomini Sæther from the Afrotropical region (Diptera: Chironomidae: Chironominae). Entomol Scand 28: 311-317.

Banarescu P (1990) Zoogeography of fresh waters. General distribution and dispersal of freshwater animals. Wiesbaden, AULA, 1-512p.

Banarescu P (1995) Zoogeography of Fresh Waters. Distribution and dispersal of freshwater animals in Africa, Pacific areas and South America. Wiesbaden, AULA, 1093-1617p.

Brooks D R, van Veller M G P, McLennan D A (2001) How to do BPA, really. J Biogeogr 28: 345-358.

Brooks D R, Dowling A P G, van Veller M G P, Hoberg E P (2004) Ending a decade of deception: a valiant failure, a not-so valiant failure, and a success story. Cladistics 20: 32-46.

Campos F P (2001) Parque Estadual Intervales e o serviço de áreas naturais protegidas, p.11-19. In Leonel C (ed) Intervales: Fundação para conservação e a produção florestal do estado de São Paulo. São Paulo, Secretaria de Estado do Meio Ambiente de São Paulo, Fundação Forestal, 240p.

Griffiths C J (1993) The geological evolution of East Africa, p.9-21. In Lovett J C, Wasser S K (eds) Biogeography and ecology of the rain forests of eastern Africa. Cambridge, Cambridge University Press, 351p.

Jacobsen R E, Perry S A (2002) A new species of *Manoa* (Diptera: Chironomidae) from Everglades National Park. J North Am Benthol Soc 21: 314-325.

Mendes H F, Andersen T (2009) Neotropical *Nilothauma* Kieffer, 1921, with the description of thirteen new species (Diptera: Chironomidae). Zootaxa 2063: 1-45.

Mendes H F, Andersen T, Sæther O A (2004) A review of *Antillocladius* Sæther, 1981; *Compterosmittia* Sæther, 1981 and *Litocladius* new genus (Chironomidae, Orthocladiinae). Zootaxa 594: 1-82.

Mendes H F, Sæther O A, Andrade-Morraye M (2005) *Gynocladius scalpellosus* n. gen., n. sp. from Brazil (Diptera: Chironomidae: Orthocladiinae). Zootaxa 979: 1-12.

Nimmer E (1989) Climatologia do Brasil, IBGE. Rio de Janeiro, Departamento de Recursos Naturais e Estudos Ambientais, 422p.

Ribeiro A C (2006) Tectonic history and the biogeography of the freshwater fishes from the coastal drainages of eastern Brazil: an example of faunal evolution associated with a divergent continental margin. Neotrop Ichthyol 4: 225-246.

Sæther O A (1969) Some Nearctic Podonominae, Diamesinae and Orthocladiinae (Diptera: Chironomidae). Bull Fish Res Bd Canada 107: 1-154.

Sæther O A (1980) Glossary of Chironomid morphology terminology (Diptera: Chironomidae). Entomol Scand Suppl 14: 1-51.

Sæther O A (2000) Zoogeographical patterns in Chironomidae (Diptera). Int Ver Theor Angew Limnol Verh 27: 290-302.

Sæther O A, Andersen T (2000) *Djalmabatista reidi* (Freeman) comb. n. and *Lepidopelopia annulator* (Goetghebuer), two interesting macropelopine tanypods from Ghana (Diptera: Chironomidae), p.209-220. In Hoffrichter O (ed) Late 20th century research on Chironomidae. An anthology from 13th international symposium on Chironomidae. Aachen, Shaker Verlag, 661p.

Sæther O A, Ekrem T (2003) Biogeography of Afrotropical Chironomidae (Diptera), with special reference to Gondwanaland. Cimbebasia 19: 175-191.

Wasser S K, Lovett J C (1993) Introduction to the biogeography and ecology of the rain forests of eastern Africa, p.3-7. In Lovett J C, Wasser S K (eds) Biogeography and ecology of the rain forests of eastern Africa. Cambridge, Cambridge University Press, 351p.

Windley B F (1995) The evolving continents. 3rd ed. Chisester, John Wiley & Sons, 544p.

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