

SHORT COMMUNICATION

Description of the female and larval stage of *Denopelopia amicitia* Dantas, Hamada & Mendes (Diptera: Chironomidae)

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Denopelopia amicitia Dantas, Hamada & Mendes was described based on the male and pupae collected in the Brazilian Amazon. Here we describe and illustrate the female and larva of this species. At both stages, *D. amicitia* is similar to *Denopelopia atria* Roback & Rutter, which is the only species in the genus with all life stages known until now.

KEYWORDS: aquatic insects, Tanypodinae, Pentaneurini, Amazonia, Brazil

Descrição da fêmea e do estágio larval de *Denopelopia amicitia* Dantas, Hamada & Mendes (Diptera: Chironomidae)

RESUMO

Denopelopia amicitia Dantas, Hamada & Mendes foi descrita com base no macho e na pupa coletados na Amazônia brasileira. Aqui descrevemos e ilustramos a fêmea e a larva desta espécie. Em ambos os estágios, *D. amicitia* é similar à *Denopelopia atria* Roback & Rutter, que é a única espécie do gênero com todos os estágios de vida conhecidos até agora.

PALAVRAS-CHAVE: insetos aquáticos, Tanypodinae, Pentaneurini, Amazônia, Brasil

Denopelopia Roback & Rutter is a small chironomid genus with six valid species, of which only *D. atria* Roback & Rutter, 1988 has all life stages known. *D. amicitia* Dantas, Hamada & Mendes, 2016 is known as male and pupa, and all other species are known as adult male only. Based on adult morphology, *Denopelopia* seems to be most related to *Telmatopelopia* and *Zavrelimyia* (Roback and Rutter 1988). However, the wing C of *Telmatopelopia* and *Zavrelimyia* is slightly produced beyond R_{4+5} and ends above or slightly beyond M_{1+2} , contrasting with *Denopelopia*, in which C is not produced and ends clearly before M_{1+2} (Murray and Fittkau 1989). According to Roback and Rutter (1988), the female of *Denopelopia* differs from that of *Zavrelimyia* in having the anterior end of notum slightly expanded and the ramus broader. Furthermore, the female of *Denopelopia* has three seminal capsules, differing from that of *Telmatopelopia*, which possess only two (Rodova 1971; Saether 1977). The genus has a discontinuous distribution around the world, with one Nearctic, two Neotropical, two Oriental and one Palearctic/Oriental species (Cheng and Wang 2005; Ashe and O'Connor 2009; Dantas *et al.* 2016).

Recently, a Pentaneurini larva collected near the type locality of *D. amicitia* was reared and associated with the pupa and female, which was subsequently identified as *D. amicitia*. In the present study, female and larva of *D. amicitia* are described and illustrated.

Larvae were collected associated with aquatic vegetation using an aquatic hand net. In the laboratory, they were individually reared in a 20-mL plastic vial. Chironominae larvae were provided as food every two days. For further details on rearing techniques, see Mendes (2002). Emerged adults were kept alive for at least 24 hours before being fixed in 80% ethanol to adequately preserve the coloration. The material examined was slide-mounted in Euparal[®], following the procedures outlined by Pinder (1983, 1986, 1989). The general terminology follows Sæther (1980). The holotype of *D. amicitia* was examined to certify the identification of the reared specimen. The material is housed in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas, Brazil.

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Taxonomic treatment

Family: Chironomidae Newman, 1834
 Subfamily: Tanypodinae Kieffer, 1906
 Tribe: Pentaneurini Fittkau, 1962
 Genus: *Denopelopia* Roback & Rutter, 1988

***Denopelopia amicitia* Dantas, Hamada & Mendes, 2016**

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http://zoobank.org/References/47E3D9BC-9227-4003-B3E8-D9081D4DFA7D

Material examined. Holotype male with pupal exuvia, Brazil, Amazonas State, Presidente Figueiredo, pisciculture pond, BR 174-Km 121, 01°55'50.2" S, 60°03'02.0" W, 10/xii/2012, G.P.S. Dantas, (INPA); 1 female with pupal and larval exuviae, Presidente Figueiredo, tributary of the Igarapé da Onça, 02°02'22"S, 59°51'03"W, 11.iii.2019, G.P.S. Dantas (INPA).

Diagnostic characters. *Female:* tibial spurs with three teeth, tibial comb on hind leg with six bristles. *Larva:* VP antero-lateral to SSm; tips of the internal teeth of the ligula directed outwards.

Female (n = 1). Total length 1.46 mm; wing length 1.09 mm; total length/wing length 1.33; wing length/length of profemur 1.89.

Coloration. Head brown. Thorax almost completely brown, as in Figure 1b. Wing darker at the basal 1/3, membrane covered with macrotrichia, as in Figure 1c. Legs: femurs and tibiae light-brown, ta₁₋₅ pale. Abdomen brown.

Head (Figure 1a). AR 0.24. Antenna with 11 flagellomeres; apical flagellomere 124 µm long; 25 µm wide, with one apical seta 92 µm long; pedicel with seven setae; scape with five setae. Eyes bare; dorsomedial extension well developed, 78 µm long, 72 µm wide, medially separated by 77 µm. Temporal setae 11, uniserial. Clypeus 110 µm long, 80 µm wide, with 21 setae. Cibarial pump with anterior margin concave, 217 µm long and with orifice 87 from apex. Tentorium 132 µm long. Palpomere lengths (1–5): 34, 64, 126, 147 and 265 µm.

Thorax (Figure 1b). Scutal tubercle absent. Acrostichals 30; dorsocentrals 17, biserial anteriorly, uniserial posteriorly; prealars 7–8; one supraalar. Anteprepronotum with one lateral seta, small tubercle present. Scutellum with 15 setae, biserial. Posnotum without setae.

Wing (Figure 1c). Width 0.49 mm. Membrane covered with macrotrichia. Costa not produced beyond apex of R₄₊₅. MCu proximal to the RM. Brachiolum with three setae. Squama with 10 setae. Anal lobe moderately developed. VR 0.92; WW 0.45.

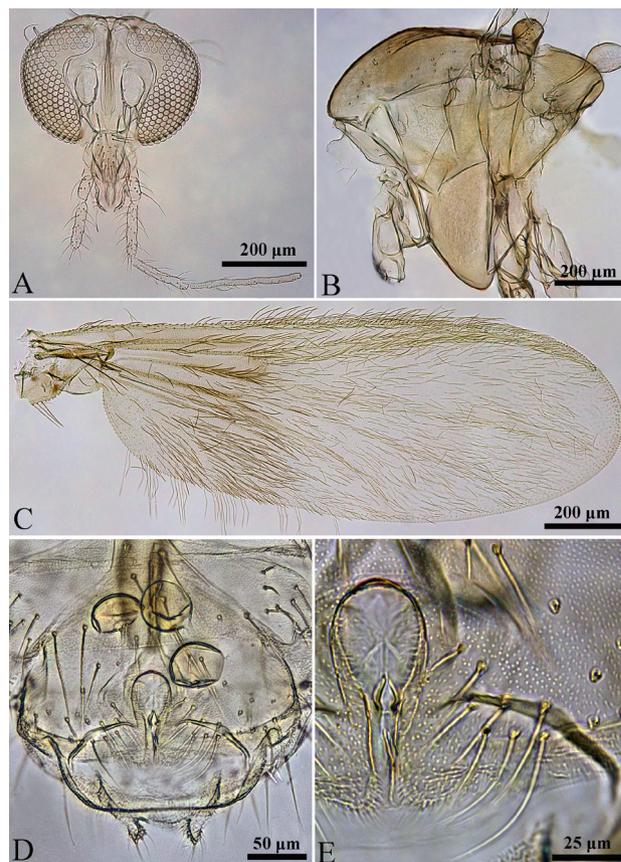


Figure 1. *Denopelopia amicitia*, female. A – Head, dorsal view; B – Thorax, lateral view; C – Wing; D – Genitalia, ventral view; E – Gonapophysis VIII and coxosternapodeme, ventral view. This figure is in color in the electronic version.

Legs. Foretibia 38 µm wide at apex, with one apical spur, 61 µm long, bearing three teeth. Mid tibia 38 µm wide at apex, with two apical spurs, 25 and 50 µm long, each bearing three teeth. Hind tibia 40 µm wide at apex, with two apical spurs, 30 and 65 µm long, each bearing three teeth; tibial comb with six bristles. Claws slender and distally pointed. Lengths (in µm) and proportions of leg segments as in Table 1.

Genitalia (Figure 1d–e). Tergite IX without setae. Three spherical seminal capsules, with 48 µm in diameter; spermathecal ducts separate for all their length, special secretory cells present. Gonapophysis VIII rounded at apex. Coxosternapodeme curved at the ends, slightly swollen at the mid-length, 96 µm long. Tergite X with about 14 setae on each side. Notum 102 µm long; ramus 65 µm long. Cercus 21 µm long.

Table 1. Lengths (in µm) and proportions of the female legs of *Denopelopia amicitia* (n = 1).

	Fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
P ₁	572	702	506	258	210	137	82	0.72	2.59	2.52
P ₂	650	720	435	225	155	100	76	0.60	3.25	3.15
P ₃	611	827	557	290	226	137	87	0.67	2.70	2.58

Larva (n = 1).

Coloration. Head brownish yellow; postoccipital margin brown; apex of mandible dark-brown; ligula brown, darker at apex. Procercus pale brown, anal setae brown. All posterior parapod claws pale yellow.

Head (Figure 2a). Head capsule elongated; cephalic index 0.59. Chaetotaxy as in Figure 2b-c. Dorsally S5, S8 and S7 in a triangular arrangement, DP absent. Ventrally SSm, S9 and S10 nearly aligned diagonally, VP larger than the setal pits, posterior to S10, slightly antero-lateral to SSm. SSm bifid, S9 simple, S10 simple.

Antenna. Length 397 μm , A₁ 290 μm long, 22 μm wide, with ring organ placed 174 μm from base, A₂ 99 μm long, A₃ 5 μm long, A₄ 4 μm long, blade 104 μm long, accessory blade 95 μm long. AR 2.71.

Maxilla. Basal palp segment 45 μm long and 11 μm wide, arising from a prominent tubercle, with ring organ placed 27 μm from the base. A1/P1 6.44, A2/P1 2.20.

Mandible. Gradually curved, 115 μm long, with three lateral setae and one sensilla. Mola distally expanded to a protruding tooth apically directed and conical; inner tooth easily visible, immediately distal to mola. A1/MD 2.52.

Mentum and M appendage. Dorsosomal teeth reduced, labial vesicles well-developed, egg-shaped. M appendage bluntly rounded apically; pseudoradula 76 μm long, 33 μm wide at base, uniformly granulated.

Hypopharyngeal complex (Figure 2d). Ligula with five teeth, anterior row of teeth straight; 73 μm long, 47, 27 and 43 μm wide at apex, middle and base respectively; tips of inner teeth strongly directed outwards. Paraligula trifold, two inner teeth shorter than apical tooth; 40 μm long, 7 μm wide. Pecten hypopharyngis with about 12 teeth.

Body. Without swim hairs. Anterior parapods with simple claws. Posterior parapod (Figure 2e) apex with hooklets, numerous simple claws and two smaller forked claws, with a small spine on the outer margin (Figure 2f); the claws can be completely retracted into the parapods. Subbasal seta of posterior parapod simple, 210 μm long. Procercus 164 μm long, 35 μm wide at base, with eight anal setae each, about 620 μm long. L/W 4.68. Supraanal seta 275 μm long. Anal tubules 207 μm long.

Taxonomic comments

A better knowledge on immature stages and the female, and a higher taxonomic resolution can support the use of non-biting midges in a wider range of fields such as ecology, biogeography and phylogenetic (Ekrem *et al.* 2010). However, in many Chironomidae groups, females and larvae of different species of the same genus, and even of closely related genera, are difficult to be characterized and distinguished due to their morphological homogeneity. Indeed, in many cases

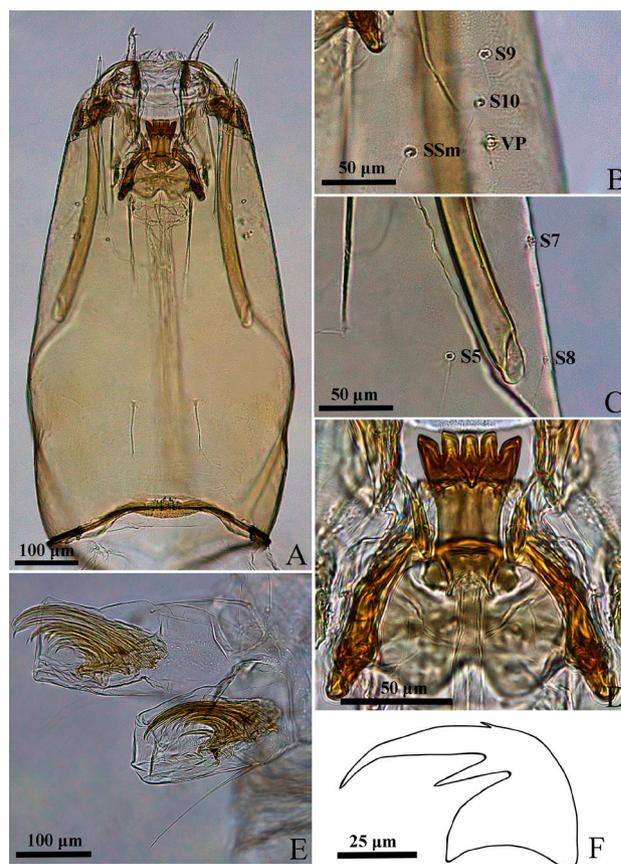


Figure 2. *Denopelopia amicitia*, larva. A – Head capsule, ventral view; B – Chaetotaxy of the head, ventrally; C – Chaetotaxy of the head, dorsally; D – Ligula and paraligula, ventral view; E – Posterior parapods, lateral view; F – Bifid claw of posterior parapod, lateral view. This figure is in color in the electronic version.

species-level identification of larvae and females is only possible in association with the male adult. Of the six known species in *Denopelopia*, *D. atria* was the only one with female and larva described so far, which limits the understanding of interspecific morphological differences. Females of *D. amicitia* and *D. atria* are quite similar, therefore it is difficult to distinguish them. The only observed differences were the number of teeth in tibial spurs (four teeth in *D. atria* and three in *D. amicitia*) and the number of bristles of the tibial comb (six in *D. amicitia* and seven in *D. atria*). The larva of *D. amicitia* is also very similar to that of *D. atria*, but it can be distinguished by having VP antero-lateral to SSm and the tips of internal teeth of the ligula directed outwards, contrasting with the larva of *D. atria*, with VP lateral or postero-lateral to SSm, and the tips of the internal teeth of the ligula anteriorly directed. It is worth mentioning, however, that the two larval features of *D. atria* referred above, were determined with base on illustrations and description provided by Roback and Rutter (1988) and on photos available in Cranston (2010).



Figure 3. Second-order stream, in Presidente Figueiredo, Amazonas state, Brazil, where the larva of *Denopelopia amicitia* was collected. This figure is in color in the electronic version.

Distribution and notes on biology

Denopelopia amicitia is known only from two localities in the Brazilian Amazon. The larva was collected in a preserved second-order stream (*sensu* Strahler 1957), with sandy bottom at the sampling site (Figure 3). Although immatures of *D. amicitia* have been collected both in artificial (Dantas *et al.* 2016) and natural environments (Figure 3), they seem to be highly associated with aquatic vegetation.

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