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Three new species of Diadocidiidae (Diptera) from Papua New Guinea

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Ševčík, J. 2003. Three new species of Diadocidiidae (Diptera) from Papua New Guinea. *Entomol. Probl.* **33(1–2): 63–68.** – *Diadocidia (Adidocidia) papua* sp.nov., *Diadocidia (Diadocidia* s. str.) *cizeki* sp.nov. and *Diadocidia (D.) halopensis* sp.nov. are described from Madang Province in Papua New Guinea. It is the first record of the family Diadocidiidae from this country and confirmation of the occurrence of this family in the Australasian region.

Key words: Diadocidiidae, Sciaroidea, *Diadocidia*, fungus gnats, new species, taxonomy, zoogeography, Papua New Guinea, Australasian region.

Introduction

The family Diadocidiidae currently comprises only one genus *Diadocidia* Ruthe, 1831, with 9 described Holarctic species (Laštovka & Matile 1972, Chandler 1994, Zaitzev 1994, Polevoi 1996) and one little known Neotropical species (Edwards 1940). No species of *Diadocidia* has been described from the other zoogeographical regions up to the present, although this genus was preliminary reported from Australia by Tonnoir (1929).

Laštovka & Matile (1972) divided the genus *Diadocidia* into two subgenera, *Adidocidia* Laštovka & Matile, 1972 and *Diadocidia* s. str. The former subgenus has the first flagellomere at least four times as long as broad and anepisternum haired.

In this paper, three new species of *Diadocidia* are described from the northeastern part of Papua New Guinea. It is the first record of the family Diadocidiidae from this country and confirmation of the occurrence of this family in the Australasian region.

Material and methods

Collections examined:

BMH	Bishop Museum, Honolulu, Hawaii, USA.
JŠ	Collection of Jan Ševčík, Ostrava, Czech Republic
SMO	Silesian Museum, Opava, Czech Republic.

The terminalia of most specimens have been cleared in KOH and placed in a microvial with glycerol. The morphological terminology used here principally follows Søli (1997). M-ratio is given as length of M-petiole to the length of M1 and M2 respectively, Cu-ratio as length of Cu-petiole to the length of CuA1 and CuA2 respectively.

Subgenus *Adidocidia*

Diadocidia (Adidocidia) papua sp.nov.

Type material. Holotype: PAPUA NEW GUINEA, Morobe District, Mt. Missim, 2350 m, 20.–31.10.1966, 1 ♂, G. A. Samuelson leg., coll. BMH.

Diagnostic characters. A large brownish species. Vein R1 ending beyond base of median fork. First flagellomere 4.5 times as long as wide. Gonostylus apically bifid, between its branches a comb-like structure. Tergite 9 semicircular, densely covered with setae.

Etymology. The specific name, a noun in the nominative singular standing in apposition to the generic name, refers to the occurrence of this species in Papua New Guinea.

Description. Male. Body length 4.3 mm. General coloration dark brown, legs yellowish.

Head. Yellowish brown. Antennae brown. Length of antenna 3.2 mm, length of flagellum 3.1 mm. Scape and pedicel short, as long as wide, covered with setae. Flagellum cylindrical, densely covered with fine setulae, tapering towards apex, with 14 flagellomeres. Ratio of length to width for first flagellomere is 4.5, that for the flagellomeres 2 to 8 is 2.3. Clypeus rounded and setose. Mouthparts and palpi yellowish brown. Palpus with 4 palpomeres, covered with dark setae. Palpomere 4 (apical) narrow and somewhat darkened. Relative lengths of palpomeres 1 to 4: 1:2:3.2:3.6.

Thorax. Mesonotum yellowish brown, with three longitudinal dark stripes, which are covered with dark setae. Lateral margins of mesonotum also darker and setose. Scutellum brown, with several long dark apical bristles, about three times as long as scutellum. Mediotergite, laterotergite and preepisternum 2 bare, yellowish brown. Anepisternum with about 10 black setae near upper margin. Antepronotum with 4 black setae. Halteres yellowish, covered with dark setulae.

Wings. Hyaline, both membrane and veins covered with macrotrichia. Wing length 4.6 mm. Ratio of length to width 2.6. Costa produced beyond R5. Sc ending in C before base of Cu-fork. Sc2 absent. R1 ending in C well beyond base of M-fork. The ratio of the length of R1 to the total wing length is 0.67. Veins R-M and bM-Cu in one line. M ratios: 0.54 and 0.71, Cu ratios: 0.63 and 1.38. A1 distinct and setose, reaching wing margin. Calypter well developed, bearing long setae along its margin.

Legs. Yellowish, covered with dark trichia and setae.

All coxae with a longitudinal row of long black setae, c1 anterolaterally, c2 laterally and c3 posterolaterally. All trochanters with a black spot ventrally. Femora laterally compressed and thickened medially, clothed with numerous trichia and with a row of longer setae ventrally. Fore and mid femora somewhat longer than coxae, hind femur almost twice as long as hind coxa. Ratio of the spur length to the length of the first tarsomere for particular legs: 0.23; 0.26; 0.31. All spurs on mid and hind tibiae subequal in length. Ratio of femur (including trochanter) to tibia for particular legs: 0.83; 0.86; 0.75. Ratio of tibia to tarsus: 0.62; 0.87; 1.17. Ratio of first tarsomere to tarsus: 0.50; 0.52; 0.52.

Abdomen. Brown, all tergites and sternites covered with dark setae.

Terminalia. (Figs 1–3). Brown, apical parts of gonostyli and aedeagus black. Length of terminalia 0.5 mm. Caudal margin of gonocoxites ventrally with wide V-shaped depression. Aedeagal complex pear-shaped and rounded caudally (Fig. 1). Tergite 9 (Fig. 2) semicircular, almost as long as wide, densely covered with long setae. Gonostylus long and narrow, with two black apical branches. Between the branches is a comb-like structure (Fig. 3).

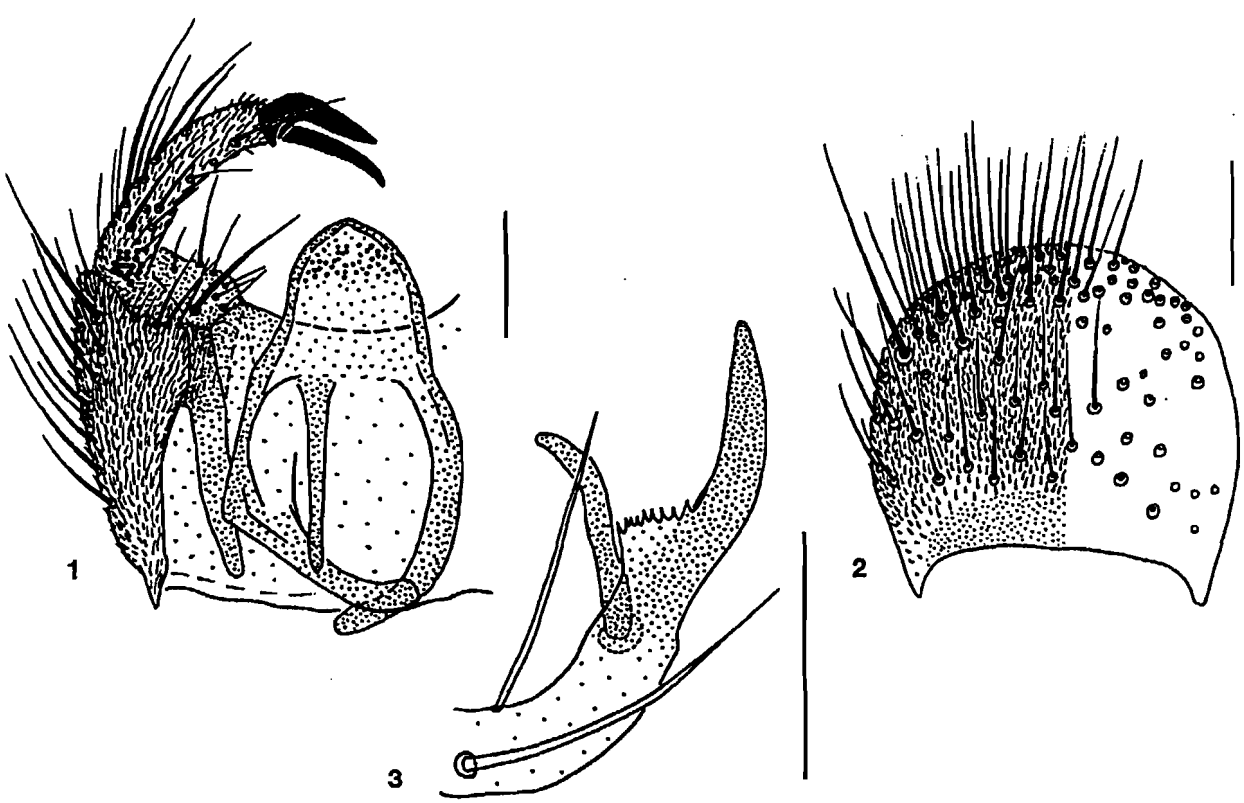
Female unknown.

Discussion. The identification of the species in the genus *Diadocidia* is based mainly on the morphology of the male terminalia. Six species of the subgenus *Adidocidia* has been described up to the present (cf. LAŠTOVKA & MATILE 1972, ZAITZEV 1994), and several species undoubtedly still await description. They differ mainly in the shape of tergite 9, aedaegal complex and gonostyli. The new species is similar to the Holarctic species *Diadocidia borealis* COQUILLET, 1900 and recently described *Diadocidia fissa* ZAITZEV, 1994.

Subgenus *Diadocidia* s. str.

***Diadocidia (Diadocidia* s. str.) *cizeki* sp.nov.**

Type material. Holotype: PAPUA NEW GUINEA, NE, May River, 100 m, 8.6.1963, 1 ♂, R. Straatman leg., coll. BMH. **Paratypes:** PAPUA NEW GUINEA (= PNG), SE, Koroba, 40 km W of Tari, 1650 m, 17.–19.9.1963, 3 ♂♂, R. Straatman leg. (BMH); PNG, SE, Milne Bay, 10 m, III. 1965, 1 ♂ (BMH), 1 ♀ (SMO), R. Straatman leg., light trap; PNG, SE, Central District, 3.2 km S Vanapa R., Brown Rd., 20.–22.5.1965, 1 ♀, W. A. Steffan et Y. M. Huang leg. (BMH); PNG, Mt. Lawson (Papua border S Wan), 800 m, 11.–17.3.1974, 2 ♀♀, J. L. Gressit leg., Malaise trap (BMH); PNG, NE, Wau, 1200 m, I. 1965, 1 ♀, J. Sedlacek leg. (BMH); PNG, SE, Mamai pltn., E of Port Glasgow, 150 m, 10.2.1965, 1 ♀, R. Straatman leg., light trap (BMH); PNG, Madang Province, Baitabag village, Kau Wildlife Area, 50 m, S 5° 08′, E 145° 46′, primary forest, L. Čížek leg., Malaise trap, 10.10.–8.11.1999, 1 ♂ (JŠ), 8.11.–21.11.1999, 2 ♂♂ (JŠ), 1 ♂ (SMO), 21.11.–22.12.1999, 3 ♂♂, 2.2.–19.2.2000, 1 ♂ (all JŠ); PNG, Madang Province, Halopa village, 600 m, primary rain forest, October 2000, 1 ♂, November 2000, 2 MM, December 2000, 3 ♂♂, 2 ♀♀, L. Čížek leg. (Malaise trap); PNG, Madang Province, Hapurpi village, near Halopa mission, 700 m, S 5°05 , E 145°41, primary rain forest, February 2001, 23 ♂♂, 2 ♀♀, Chris Amari & V. Novotný leg., Malaise trap (all JŠ).



Figs 1–3 *Diadocidia* (*A.*) *papua* sp.nov., male terminalia, holotype: 1) dorsal view, tergite 9 removed; 2) tergite 9; 3) detail of gonostylus. Scales: 0.1 mm.

Diagnostic characters. A small brownish species. Vein R1 ending at the level of the base of median fork. First flagellomere almost as long as broad. Gonocoxites and gonostyli long and narrow, each gonostylus directed anterodorsally, bearing a strong black subapical seta with blunt apex. Tergite 9 small, moon-shaped, with long setae along its caudal margin.

Etymology. Named after Lukáš Čížek, a Czech entomologist participating in the Insect Ecology Project in Madang Province (PNG), who provided me with a major part of the type material.

Description. Male. Body length 1.9 mm. General coloration dark brown, legs yellowish brown.

Head. Dark brown. Three ocelli. Lateral ocelli about twice as large as median, and separated from the eye margin for a distance of about 1.5 times their diameter. Frons and clypeus setose. Length of antenna 0.9 mm, length of flagellum 0.8 mm. Scape and pedicel yellowish, as long as wide, with dark setae. Flagellum brown, cylindrical, densely covered with fine setulae, tapering towards apex, with 14 flagellomeres. Base of first flagellomere yellowish. Ratio of length to width for flagellomeres 1 to 7 is 1.3, that for the flagellomeres 8 to 13 is 1.9 and for the apical flagellomere 2.9. Mouthparts and palpi brownish yellow. Palpus with 4 palpomeres, covered with dark setae. Palpomere 4 (apical) long and narrow. Relative lengths of palpomeres 1 to 4: 1:2:3:7.

Thorax. Mesonotum brown, with indistinct longitudinal stripes bearing dark setae. Lateral margins of mesonotum with long setae. Scutellum brown, with several long dark apical bristles, about twice as long as scutellum. Mediotergite, laterotergite, anepisternum and preepisternum 2 bare, brown. Antepronotum with several long setae. Halteres brown.

Wings. Hyaline, both membrane and veins covered with macrotrichia. Wing length 1.8 mm. Ratio of length to width 2.2. Costa produced beyond R5. Sc ending in C well before base of Cu-fork. Sc2 absent. R1 ending in C at the level of base of M-fork. The length of R1 to the total wing length is 0.56. Veins R-M and bM-Cu in one line. M ratios: 0.49 and 0.60, Cu ratios: 0.63 and 1.09. Both CuP and A1 distinct and setose, the latter reaching wing margin. Calypter with several long setae along its margin.

Legs. Yellowish, covered with dark trichia and setae. All coxae with a longitudinal row of long black setae, c1 and c2 anterolaterally and c3 posterolaterally, the longest setae almost as long as the width of coxa. All trochanters with a black spot ventrally. Femora laterally compressed and thickened medially, clothed with numerous trichia and with a row of longer setae along ventral edge. Ratio of coxa to femur for particular legs: 0.70; 0.60; 0.58. Ratio of femur (including trochanter) to tibia for particular legs: 1.00; 0.89; 0.77. Mid tibia with 2–3 weak ventral setae. Hind tibia with 4–5 dorsal setae. All spurs on mid and hind tibiae subequal in length. Ratio of the spur length to the length of the first tarsomere for particular legs: 0.28; 0.29; 0.37. Ratio of tibia to tarsus: 0.71; 0.79; 1.13. Ratio of first tarsomere to tarsus: 0.41; 0.47; 0.43.

Abdomen. Brown, all tergites and sternites covered with long dark setae.

Terminalia. (Figs 4–7). Brownish yellow. Length of terminalia 0.3 mm. Gonocoxite relatively long and narrow (Fig. 4). Gonostylus narrow, directed anterodorsally, bearing a strong subapical seta with blunt apex. The apex of gonostylus black and bifid (Fig. 5). Gonocoxites almost separated, joined by narrow ventral bridge. Aedeagus consists of two parts, Y-shaped and T-shaped, see Fig. 6. Tergite 9 (Fig. 7) small, moon-shaped, with long setae along its caudal margin.

Female. Similar to male. Body length 2.5 mm. Length of wing 2.0 mm. Fore leg with tarsomeres 2 to 4 swollen. The ratio of length to the maximum width for the fore tarsomere 2 is 1.77. Terminalia as in Fig. 8 and 9.

Discussion. The structure of the male terminalia of the new species is very characteristic and different from all hitherto known species of *Diadocidia*. This is also the smallest species of *Diadocidia* currently known (together with the following species), with wing length in male less than 2 mm. The new species appears to be rather common and widely distributed, at least within rain forests of Papua New Guinea.

Diadocidia (Diadocidia s. str.*) halopensis* sp.nov.

Type material. Holotype ♂: PAPUA NEW GUINEA, Madang Province, Halopa village, 600 m, primary rain forest, November 2000, L. Čížek leg., Malaise trap, coll. BMH. **Paratype** ♂: PNG, Madang Province, Hapurpi village, near Halopa mission, 700 m, S 5°05 , E 145°41, primary rain forest, February 2001, Ch. Amari & V. Novotný leg., Malaise trap (JŠ).

Diagnostic characters. A small brownish species. Vein R1 ending at the level of the base of median fork. First flagellomere almost as long as broad. Terminalia peculiar. Gonocoxites swolen, gonostylus narrow, setose, with two subapical projections and bearing a strange fan-like appendage. Tergite 9 long, folded, with two long setae on its caudal margin.

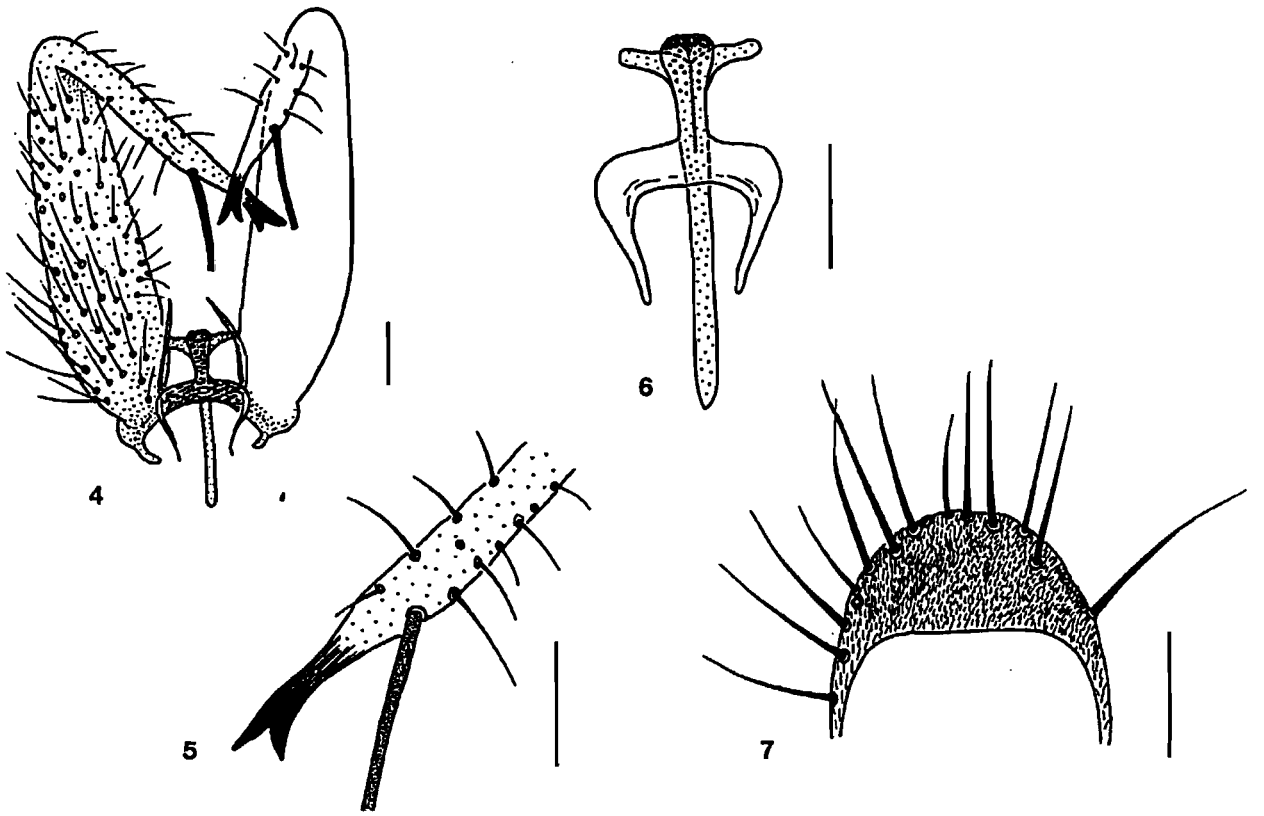
Etymology. Named after Halopa village, where the holotype has been collected.

Description. Male. Body length 2.4 mm. General coloration brown, legs yellowish brown.

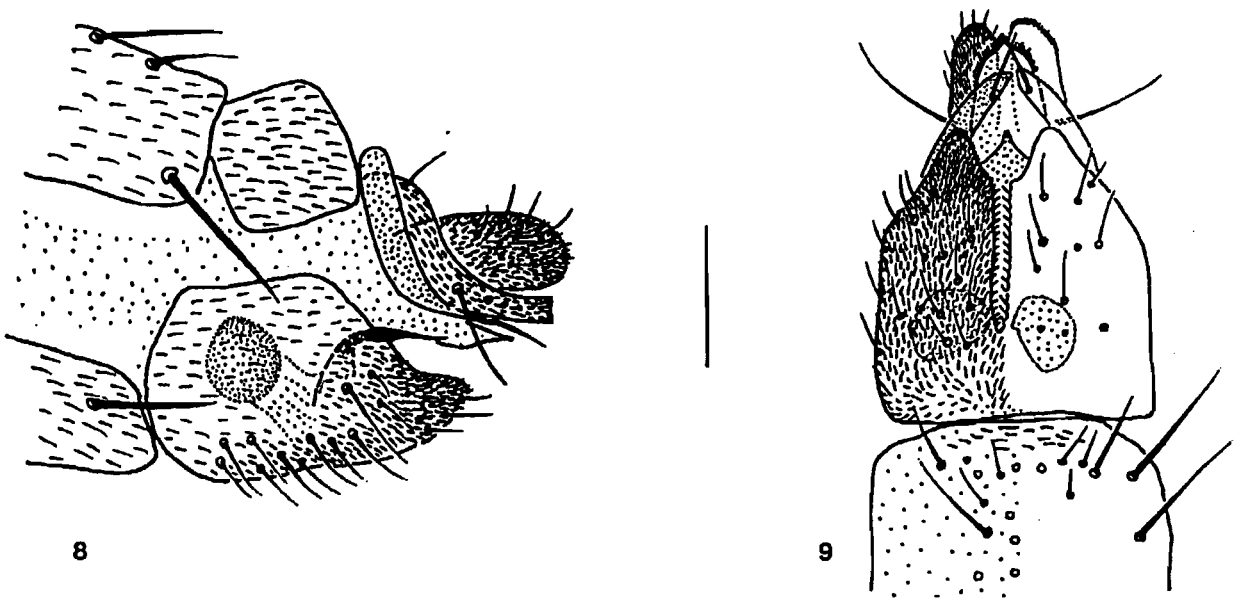
Head. Dark brown. Three ocelli. Lateral ocelli about twice as large as median, and separated from the eye margin for a distance of about 1.5 times their diameter. Frons and clypeus setose. Length of antenna 1.2 mm, length of flagellum 1.0 mm. Scape and pedicel yellowish, about as long as wide, with dark setae. Flagellum dark brown, cylindrical, densely covered with fine setulae, tapering towards apex, with 14 flagellomeres. Base of first flagellomere yellowish. Ratio of length to width for flagellomeres 1 to 7 is 1.7, that for the flagellomeres 8 to 13 is 2.2 and for the apical flagellomere 2.6. Mouthparts and palpi brownish yellow. Palpus with 4 palpomeres, covered with dark setae. Palpomere 4 (apical) long and narrow. Relative lengths of palpomeres 1 to 4: 1:2:4:8.

Thorax. Mesonotum brown, with indistinct longitudinal stripes bearing dark setae. Lateral margins of mesonotum with long setae. Scutellum brown, with several long dark apical bristles, about twice as long as scutellum. Mediotergite, laterotergite, anepisternum and preepisternum 2 bare, brown. Antepronotum with several long setae. Halteres brown.

Wings. Hyaline, both membrane and veins covered with macrotrichia. Wing length 2.0 mm. Ratio of length to width 2.3. Costa produced beyond R5. Sc ending in C well



Figs 4–7 *Diadocidia* (*D.*) *cizeki* sp.nov., male terminalia, holotype: 4) dorsal view, tergite 9 removed; 5) detail of gonostylus; 6) aedeagus; 7) tergite 9. Scales: 0.1 mm.



Figs 8, 9 *Diadocidia* (*D.*) *cizeki* sp.nov., female terminalia, paratype: 8) lateral view; 9) ventral view. Scales: 0.1 mm.

before base of Cu-fork. Sc2 absent. R1 ending in C slightly beyond the base of M-fork. The length of R1 to the total wing length is 0.64. Veins R-M and M-Cu in one line. M ratios: 0.58 and 0.70, Cu ratios: 0.66 and 1.10. Both CuP and A1 distinct and setose, the latter reaching wing margin. Calypter with several long setae along its margin.

Legs. Yellowish, covered with dark trichia and setae. All coxae with a longitudinal row of long black setae, c1 and c2 anterolaterally and c3 posterolaterally, the longest setae almost as long as the width of coxa. All trochanters with a black spot ventrally. Femora laterally compressed and thickened medially, clothed with numerous trichia and with a row of longer setae along ventral edge. Ratio of coxa to femur for particular legs: 0.80; 0.58; 0.47. Ratio of femur (including trochanter) to tibia for particular legs: 0.89; 0.76; 0.79. Mid tibia with 2 weak ventral setae. Hind tibia with 8 dorsal setae.

Abdomen. Brown, all tergites and sternites covered with long dark setae.

Terminalia. (Figs 10–13). Brownish yellow. Length of terminalia 0.3 mm. Gonocoxite swolen (Fig. 13). Gonostylus narrow, setose, with two subapical projections and bearing a strange fan-like appendage (Fig. 10). Gonocoxites almost separated, joined by narrow ventral bridge. Aedeagus consists of two parts, Y-shaped and T-shaped, see Fig. 12. Tergite 9 (Fig. 11) long, folded, with two long setae on its caudal margin.

Female. Unknown.

Discussion. The male terminalia of this species is very peculiar and different from the previous species, which is otherwise rather similar. *D. halopensis* is also apparently rarer than *D. cizeki*.

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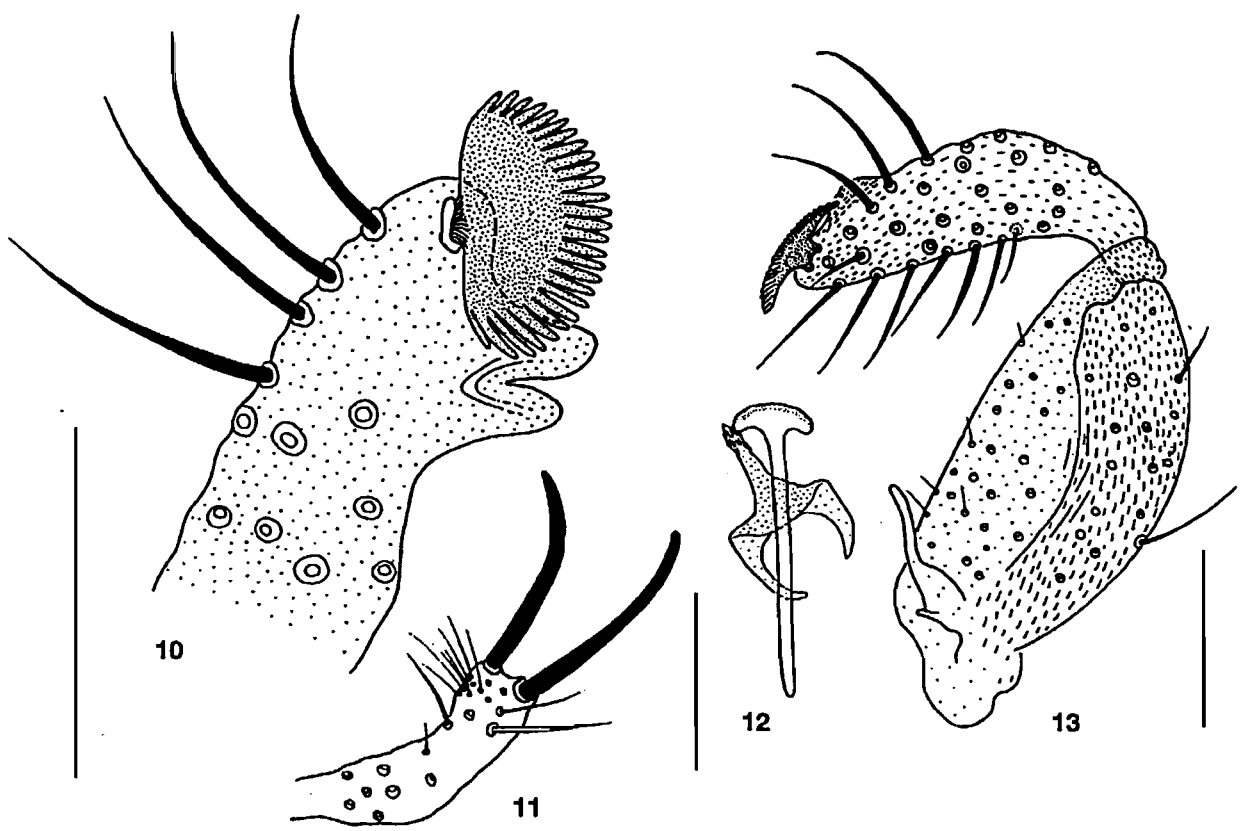

Figs. 10–13 *Diadocidia (D.) halopensis* sp.nov., male terminalia, holotype: 10) detail of gonostylus; 11) tergite 9; 12) aedeagus; 13) dorsal view, tergite 9 removed. Scales: 0.1 mm.

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