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NEW TAXA OF DIADOCIDIIDAE (DIPTERA) FROM THE ORIENTAL REGION

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The first records of the family Diadocidiidae are given for Taiwan and for the whole Oriental region. A new subgenus of *Diadocidia*, *Taidocidia* L. PAPP et ŠEVČÍK, subgen. n. (type species *D. globosa* L. PAPP et ŠEVČÍK, sp. n., Taiwan and Thailand) and three other new species, *D. sevciki* L. PAPP , sp. n. (Taiwan), *D. bruneicola* ŠEVČÍK, sp. n. (Brunei) and *D. sulawesiana* ŠEVČÍK, sp. n. (Sulawesi) are described. With 16 figures.

Key words: Diadocidiidae, *Taidocidia*, new taxa, Taiwan, Thailand, Brunei, Sulawesi, Oriental region

In the course of collecting trips of the Department of Zoology, HNHM to Taiwan in 2000 and 2003, we found representatives of 15 dipterous families, which have not formerly been found on that island, among them also specimens of Diadocidiidae (cf. LIN & CHEN 1999). Those specimens were either captured during our collecting and minuten-pinned on the site, or they were selected under a stereomicroscope from a large quantity of unnamed specimens in the National Museum of Natural Science, Taichung (Taiwan). In addition, the junior author found two further undescribed species of *Diadocidia* RUTHE, 1831 in unsorted ethanol materials in the Natural History Museum, London.

Diadocidiidae, a small family of Sciaroidea, has with certainty only been recorded from the Holarctic region (LAŠTOVKA & MATILE 1972) for a long period of time; their Neotropical record(s) (e.g. EDWARDS 1940) are uncertain, and a species recorded from Australia are still undescribed (cf. BECHEV 2000). Most recently ŠEVČÍK (2003) described 3 species from Papua New Guinea. Below we give the first records of Diadocidiidae from the Oriental region. There are no species listed in the Oriental Catalog of Diptera; OOSTERBROEK (1998) did not include it among the dipterous families of the Malay Archipelago, not even as a family expected to occur.

LAŠTOVKA and MATILE (1972) revised the Holarctic species; that work served as a solid base for any further studies in Diadocidiidae. Following them, modern descriptions of new species (CHANDLER 1994, POLEVOI 1996, ŠEVČÍK

2003, PAPP 2003) are mainly based on details of male genitalia, which has made studies and new descriptions reliable in this family.

The family Diadocidiidae, as presently understood, comprises only one genus with two subgenera. *Freemanomyia* JASCHHOF, 2004 (*Pterogymnus* FREEMAN, 1951, not *Pterogymnus* SMITH, 1938) does not belong to this family (JASCHHOF 2004, cf. BECHEV 2000). Below we describe a peculiar species in a third subgenus.

We may note here that among the Sciaroidea, Bolitophilidae was published for the first time from Taiwan and also from the entire Oriental region, based on the description of a known and two new species, by ŠEVČÍK and PAPP (2004). Two new species and a new genus have established the family Lygistorrhinidae in Taiwan (PAPP 2002).

The specimens are preserved in the collection of the Hungarian Natural History Museum (HNHM), in the Natural History Museum, London (BMNH) and in the National Museum of Natural Science, Taichung, Taiwan (NMNS).

Taidocidia L. PAPP et ŠEVČÍK, subgen. n.
(Figs 1–6)

Type species: *Diadocidia (Taidocidia) globosa* L. PAPP et ŠEVČÍK, sp. n.
Gender: feminine.
Etymology. A combination of *Tai*[wan] and [Dia]*docidia*.

Rather small, dark bodied diadocidiids (Fig. 6).

First flagellomere relatively short, about as long as wide. No microtrichia on anepisternum, i.e. anepisternum with other pleural parts bare. Vein Sc short, its apical part thickened, ending in/at R_1. Apical section of R_1 colourless, consequently R_1 seemingly not reaching costal vein, but terminating distally to base of M fork. Costa only slightly produced beyond R_5. Vein A_2 discernible. (In naming veins we follow KRZEMIŃSKI & EVENHUIS 2000).

Male tergite 9 (Fig. 5) quadrate, broader than long, with long setae. Gonocoxite (Fig. 1) extremely short, male hypopygium globular. Mediocaudal edge of gonocoxite (Fig. 2) with 1 very thick straight thorn-like seta with 2 very long setae above. Gonostylus (Fig. 3) rather short, broadened apically, with 11–13 dentiform black thorns. Genital complex (Fig. 4) weakly sclerotized.

The only included species is its type species, *D. globosa*.

A TENTATIVE KEY TO SUBGENERA OF DIADOCIDIA RUTHE

1 Anepisternum haired, first flagellomere long, more than 4 times as long as wide *Adidocidia* LAŠTOVKA et MATILE, 1974

– Anepisternum bare, first flagellomere at most 3.2 times as long as wide 2

2 R_1 ending in C above or before base of M-fork *Diadocidia* RUTHE, 1831 s. str.

– R_1 ending in C behind base of M-fork 3

3 Sc ending in R, C only slightly produced beyond R_5. Gonostylus rather short, broadened apically, with numerous dentiform black thorns *Taidocidia* PAPP et ŠEVČÍK, 2005

– Sc ending in C or free. Apex of gonostylus comparatively thick, black and not bifid *D. setistylus* and *D. sevciki*

Diadocidia (Taidocidia) globosa L. PAPP et ŠEVČÍK, sp. n.
(Figs 1–6)

Holotype male (HNHM): TAIWAN: Taipei, Nanshih Chiao, Han-Lo-Da, S of Taipei, 450 m, rocky forest undergrowth, September 23, 2000, leg. L. PAPP, No. 1.

Paratypes: TAIWAN (HNHM): 1 male: Ilan Hsien, Fu-Shan LTER Site, lake shore vegetation + along a brook bed, September 26, 2000, No. 7, leg. L. PAPP; 1 male: Kaohsiung Hsien, Liukuei, Shan-Ping LTER Site, over/along a creek, April 2–3, 2003, L. PAPP, No. 15. THAILAND (HNHM): 1 male: Khao Pu – Khao Ya N. P., 21.11.2004, No. 42, forest brook at waterfall, leg. PAPP & FÖLDVÁRI.

Etymology. This species is named after its globular male hypopygium.

Measurements in mm: body length 1.60 (holotype), 1.76, 2.09 (Taiwan paratypes), 1.85 (Thailand paratype), wing length 2.31 (holotype), 2.38, 2.51; 2.38 (paratypes), wing breadth 1.04 (holotype), 1.05, 1.27; 1.06 (paratypes).

Whole body, i.e. head, thorax and abdomen dark brown (Fig. 6), mesoscutum without lighter stripes. Both body and wing macrotrichia are longer than usual in this genus.

Three ocelli, lateral ocelli about as large as median one and separated from the eye margin by a distance of their diameter. Palpomeres comparatively thin, ultimate palpomere about twice longer than penultimate. Flagellomeres with long cilia, longer than 0.02 mm. First flagellomere short, about as long as wide, 0.06×0.055 mm (paratype); apical flagellomere 3 times longer than broad, 0.095×0.033 mm (holotype), 0.10×0.035 mm (paratype).

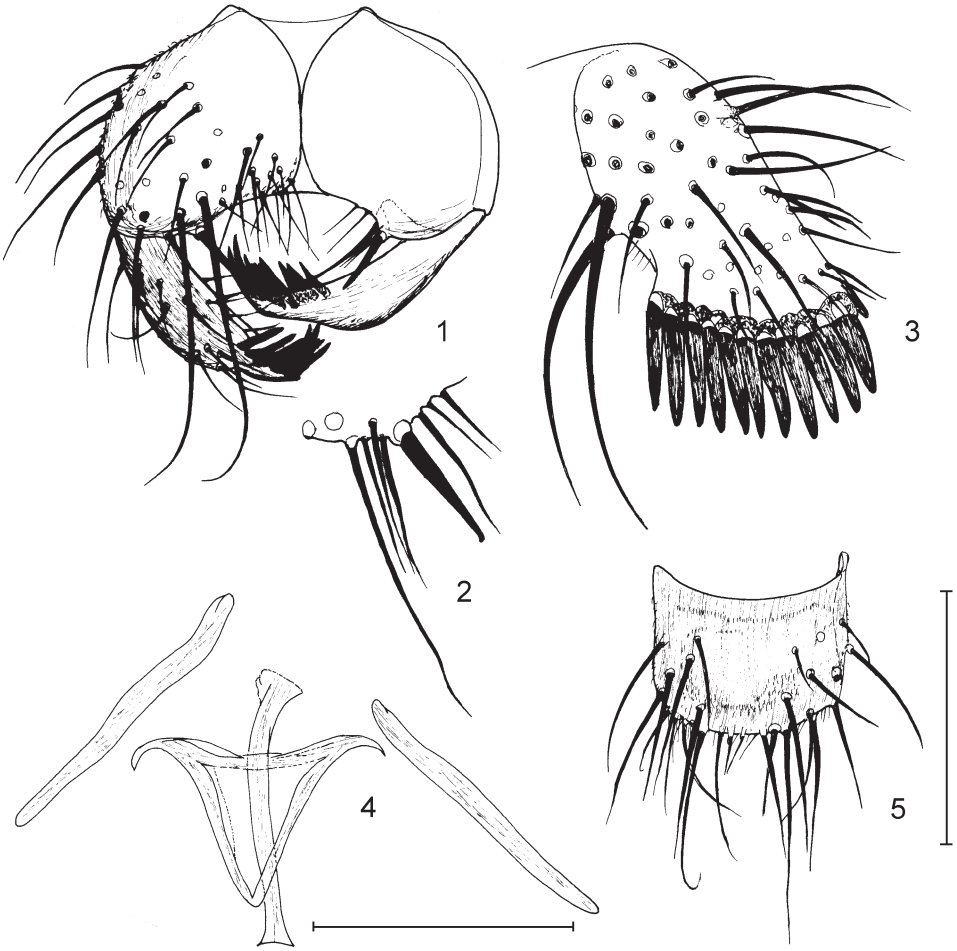
No microtrichia on anepisternum, other meso- and metathoracic pleura bare and shiny.

Wing brownish, veins darker brown. Veins and wing membrane with long macrotrichia, longest ones 0.08 mm (!). Vein Sc short (0.32 mm on holotype, 0.30 mm on a paratype), its apical part thickened, ending in (holotype) or at R_1 (paratypes). Costa produced only slightly beyond R_5 (0.04

mm). Apical section of R_1 colourless, consequently R_1 seemingly not reaching costal vein, but terminating distal to base of M fork. R_s abruptly broken proximal to crossvein, at a distance equal to R-M crossvein. R_5 slightly recurved. Vein M_1 slightly downcurved. M indexes 2.14, 1.76 (holotype), 1.94, 1.51 (Thailand paratype). Vein Cu_2 dark, strong with macrochaetae, reaching far distally to cross-veins. Vein A_1 reaching three quarters distance from its base to wing margin. Vein A_2 discernible. Calypter with setae as long as 0.26 mm (!). Halteres all dark brown.

Legs light brown, tarsi black.

Abdomen dark brown, tergites without any lighter margin.



Figs 1–5. *D. (Taidocidia) globosa* sp. n., paratype male (Taiwan), genitalia. 1 = gonocoxites and gonostyli, caudal view, 2 = mediocaudal edge of gonocoxite and its armature, same view, 3 = gonostylus, in the broadest view of gonostylar apex, most of the setae omitted, 4 = inner genitalia, inner (actually anterior) view, 5 = tergite 9 ventrally. Scales: 0.2 mm for Figs 1, 5, 0.1 mm for Figs 2–4

Male tergite 9 (Fig. 5) quadrate, broader than long, with long setae mostly on caudal edge. Male hypopygium globular (Fig. 6), as a consequence of its extremely short gonocoxites (Fig. 1). Mediocaudal edge of gonocoxite (Fig. 2) with 1 extremely thick straight thorn-like seta with 2 very long (0.22 mm) setae above. Cerci perpendicular to the plane of tergite 9. Gonostylus (Fig. 3) rather short, broadened apically, with 11 (Taiwan) to 13 (Thailand) dentiform black thorns (plus one thinner thorn laterally). Gonostylus slightly spoon-shaped, bases of the apical thorns largely in the axis of the body (at rest). Lateral surface of gonostyli covered by long setae. Genital complex (Fig. 4) weakly sclerotized, aedeagal apodeme blunt ended, other parts incompletely fused.

Female unknown.

Diagnostic characters are largely given in the description of the subgenus. However, long cilia on flagellomeres, evenly dark brown colour of abdomen, long setae on calypter and details of male genitalia may be additional specific characters.

Diadocidia sevciki L. PAPP, sp. n.
(Figs 7, 8)

Holotype male (HNHM): TAIWAN, Ilan Hsien, Fu-Shan LTER Site, over a rocky brook, September 26, 2000, leg. L. PAPP.

Measurements (in mm): body length 2.56, wing length 2.88, wing breadth 1.13.

Fig. 6. *D. (Taidocidia) globosa* sp. n., paratype male (Taiwan), habitus photo

Head and body brown, legs yellow, incl. tarsi, only apical tarsomeres brownish yellow.

Three ocelli, lateral ocelli more than twice larger than median one and separated from the eye margin by a distance of less than 1/3 of their diameter. Scape and pedicel light brown, about as long as wide. Flagellum of 14 flagellomeres (right flagellomeres 9–14 lost), darker brown, cylindrical, densely covered with fine pale cilia. Also base of first flagellomere brown. Ratio of length of flagellomeres 1 to 2 and 3 are 14.5 : 9 : 8.5, i.e. 0.16, 0.10 and 0.094 mm, width of flagellomere 1 0.05 mm, that of flagellomeres 2–3 almost the same. That is, first flagellomere only slightly more than 3 times longer than broad. Mouthparts and palpi all dark. Four palpomeres, covered with lighter setae. Apical palpomere thin and long, only 0.182 mm long on holotype (dry).

Mesoscutum uniformly dark brown, shiny, with some greyish microtomentum but without any longitudinal stripes. Lateral margins of mesoscutum with long setae. All setae black. Scutellar setae broken off, but bases of 3 pairs of long setae detectable. Anepisternum, preepisternum 2 and metepisternum lighter brown, mediotergite and laterotergite as dark as mesoscutum. Antepronotum with several long setae, longest ones broken off. No anepisternal setae or setulae.

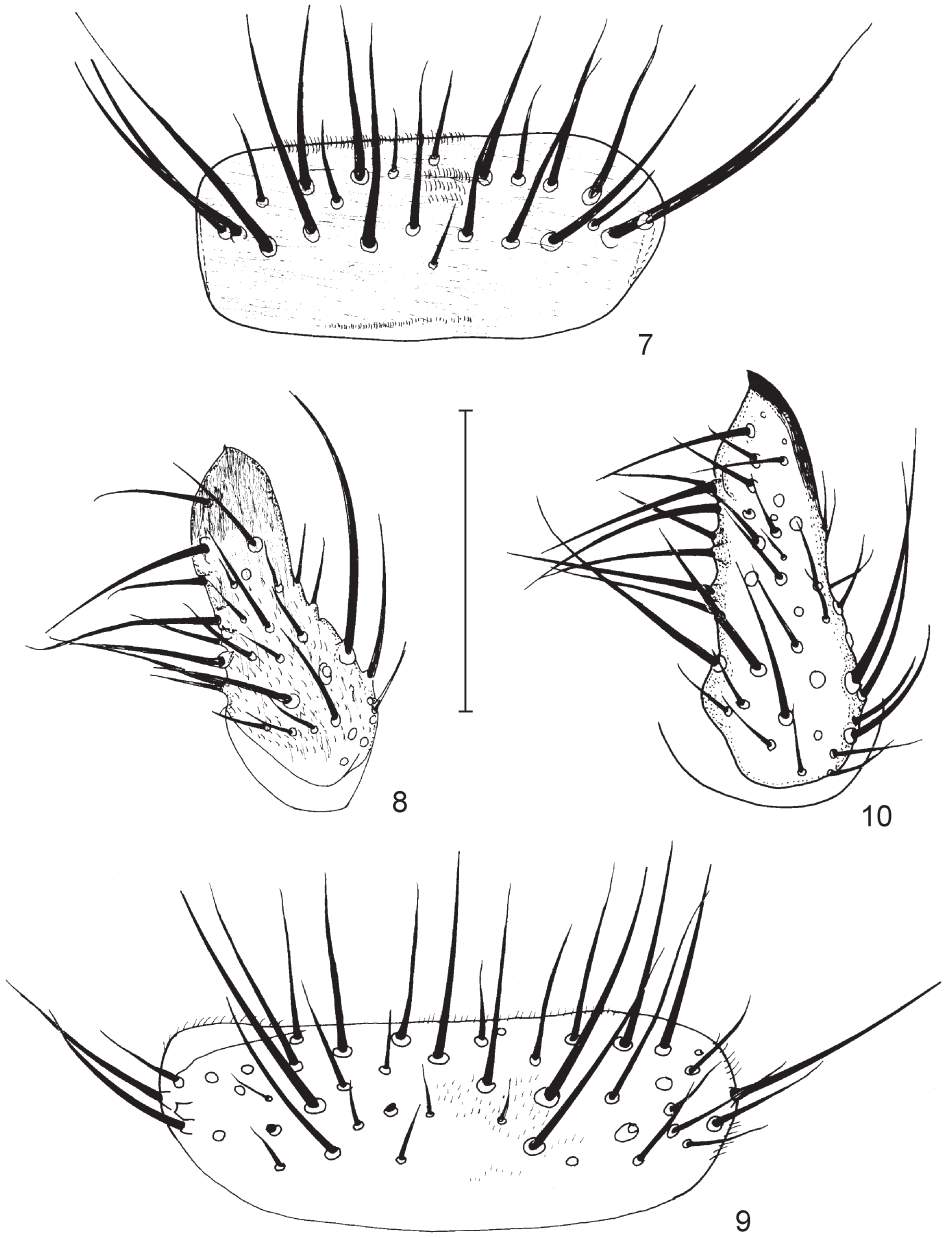
Wings light brownish, veins ochre, both membrane and veins evenly covered with macrotrichia. Costa produced beyond R_5 by a distance of 0.15 mm and ends abruptly. Sc strong, complete, ending in C; ratio of distance on costa from H to Sc and Sc to R_1 0.75. R_1 terminating in C distally to level of base of M-fork. R_{4+5} apically downcurved, while slightly S-shaped in *D. setistylus* PAPP, 2003. Cross-veins R-M and M-M in one line. M fork with a short stalk, M ratios 0.62, 0.80, i.e. M_2 slightly longer than stalk. In *D. setistylus* M fork much longer, i.e. M_2 much longer than stalk (54 vs 95). Cu_1 ratio 1.25. M_3 thick to wing margin, Cu_2 distinct to level of M_3-Cu. A_1 well developed and setose, reaching wing margin. Vein A_2 not discernible. Calypter with several long setae along its margin, up to 0.21 mm. Knob of halteres brown, stalk yellowish.

Legs yellow, covered with evenly set dark trichia and several setae. Male hind coxa in middle third with 4 black setae of 0.2 mm postero-laterally (there is another, more dorsal seta in *D. setistylus*). All trochanters with a black spot ventrally. Femora laterally slightly compressed and thickened medially. Ratios of coxae to femora (without trochanter) and to tibia: 48/70/92; 43/86/108; 41/101/144. Mid tibia with 1 anterodorsal, 1 posterodorsal and 1 subventral setae. Hind tibia with 3 long dorsal setae. All spurs on mid and hind tibiae subequal in length, hind ones 0.21 mm, 0.19 mm (measurements taken on holotype). Empodia very small.

Abdomen dark brown, tergites and sternites covered with long dark setae. Male terminalia 0.24 mm long. Tergite 9 (Fig. 7) comparatively small and extremely short, more than twice broader than long (2.33×), edges rounded, with thick long setae, which are more or less ordered in 2 rows (2 lateral setae being the longest). Gonocoxites not large but not slender, meeting on a longer section ventrally. Gonostylus broad at base, horizontally medially curved, with high number of strong setae. The apex of gonostylus is comparatively thick, black and not bifid (Fig. 8); gonostylus in broadest extension (largely in a caudal view), subtriangular. Aedeagal complex rather simple, ventrally curved.

Etymology. I name this new species to the honour of my friend Dr JAN ŠEVČÍK (Silesian Museum, Opava), who has already published numerous and high quality papers on families of Sciaroidea.

Diagnostic characters. This is a peculiar species with its uniapical and strongly setose gonostylus and transverse male tergite 9. Its unicolorous (not striped) dark thoracic scutum is also characteristic. We think, there is no closely related described species in the Oriental region but a similar species, *Diadocidia setistylus* L. PAPP, was found in Hungary (Mecsek Mts) and described recently



Figs 7–10. *Diadocidia* species, male genitalia. 7–8 = *D. sevciki* sp. n., holotype: 7 = tergite 9 ventrally, 8 = gonostylus in broadest (i.e. not the longest) extension (subcaudal view); 9–10 = *D. setistylus* L. PAPP, paratype (Mecsek Mts, Hungary): 9 = tergite 9 ventrally, 10 = gonostylus in broadest extension (subcaudal view). Scale: 0.1 mm for all

(PAPP 2003), whose gonostylus and tergite 9 are given for comparison (Figs 9–10). The two species differ also in a number of body and wing characteristics, as given above. E.g. M fork of D. *sevciki* is much longer, i.e. M_2 much longer than stalk (0.594 vs 1.045, ratio 0.568), its male hind coxa in middle third with 4 black setae of 0.2 mm postero-laterally (there is another, more dorsal seta in *D. setistylus*).

First we thought to place these two species in the subgenus *Adidocidia* tentatively. They are not closely related to any other species of *Adidocidia* but only to each other. This is why we took no notice of subgeneric relegation finally (see the key above).

Diadocidia sp.

A female specimen of *Diadocidia* is also preserved in the HNHM: TAIWAN, Taichung Hsien, Piluchi, TFRI Site, 2200 m – Dec 26–28, 2001, leg. L. RONKAY & A. KUN. That was thought to be the female of the above species by the senior author, but now we think, that may belong to another, undescribed species (the fourth Diadocidiidae species of Taiwan).

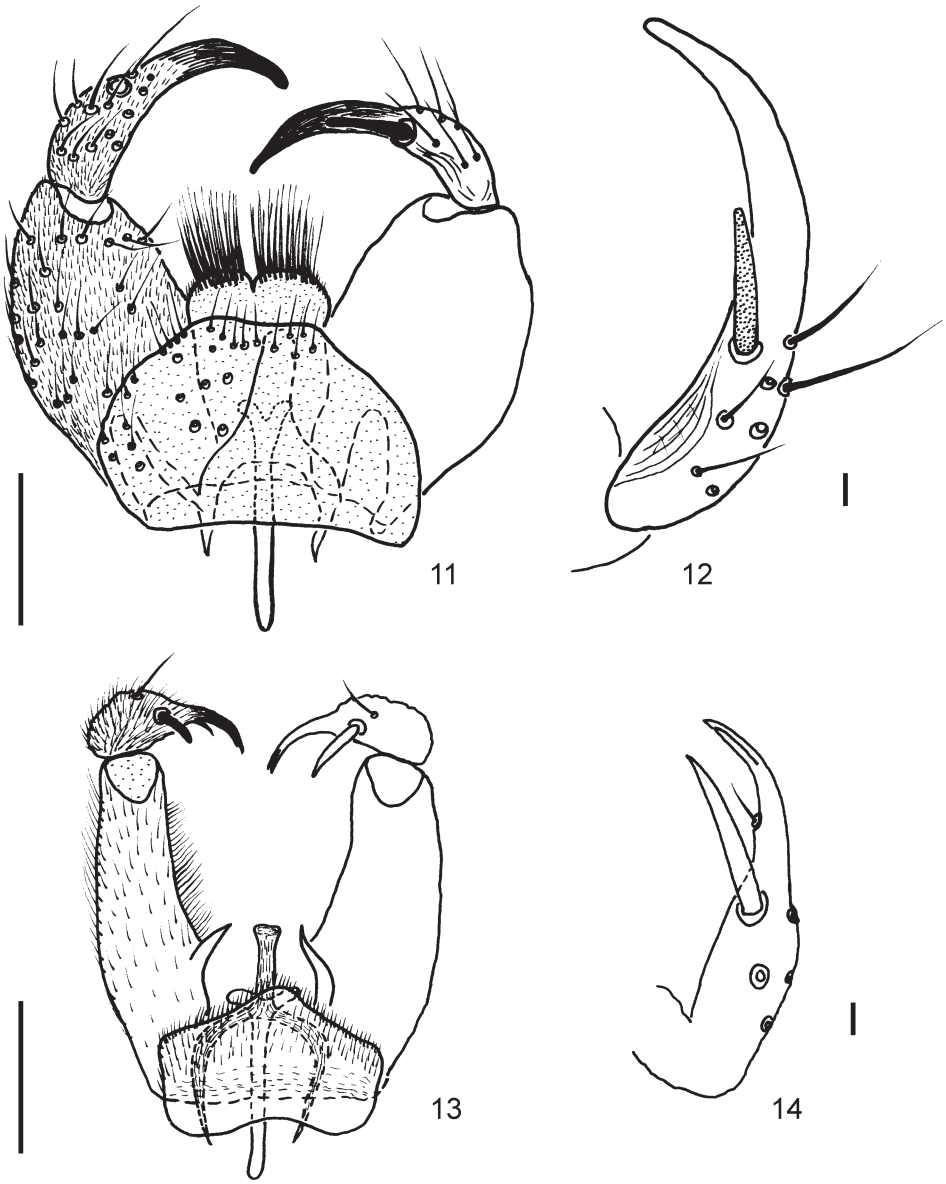
Female (body length 2.86 mm, wing length 4.58 mm) similar to the male of *D. sevciki* with the same dark scutum, also its palpi black, cerci black (ochre with brown apex in *D. setistylus*). Contrary to the holotype of *D. sevciki*, mesoscutal and abdominal setae very long and light (not black), costal vein runs to more than ½ of section between R_5 and M, legs yellow, but tarsi black, vein R_1 ends just at level of M fork base. M ratios 0.49, 0.625; this again contradicts conspecificity with *D. sevciki*. Fore leg with tarsomeres 2 to 4 slighly swollen, tarsomere 1 being the thickest, tarsomere 2 0.065 mm thick, tarsomere 3 0.055 mm thick. Length ratio of fore tarsomeres 75:23:20:16:12.5. Cx_3 posteroventrally with 9 long setae.

Diadocidia (Diadocidia) bruneicola ŠEVČÍK, sp. n.
(Figs 11–12)

Holotype male (BMNH): Brunei, Ulu Temburonge Ridge, 14.2.–9.3.1982, leg. M. C. Day (Malaise trap). (Placed in a pinned microvial filled with glycerol. Flagellum of both antennae and all legs missing.)

Etymology. The specific name refers to the type locality.

Measurements (in mm): body length 2.45, wing length 2.14, wing breadth 0.91.
Head and thorax orange brown, legs and abdomen brownish yellow.



Figs 11–14. 11–12 = *D. (Diadocidia) bruneicola* sp. n., male genitalia: 11 = dorsal view, 12 = detail of gonostylus. 13–14 = *D. (Diadocidia) sulawesiana* sp. n., male genitalia: 13 = dorsal view, 14 = detail of gonostylus. Scales: 0.1 mm for Figs 11, 13, 0.01 mm for Figs 12, 14

Head. Three ocelli. Lateral ocelli about as large as median, and separated from the eye margin by a distance of about 1.2 times their diameter. Frons and clypeus setose. Scape and pedicel yellowish, about as long as wide, with dark setae. 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 are 1:2:3:6.

Thorax. Mesoscutum brownish, with indistinct longitudinal stripes bearing dark setae. Lateral margins of mesoscutum with long setae. Scutellum with four apical bristles. Mediotergite, laterotergite, anepisternum and preepisternum 2 bare. Antepronotum with several setae. Halteres yellowish brown.

Wings. Hyaline, both membrane and veins covered with macrotrichia. Ratio of length to width 2.3. Costa well produced beyond R_5, reaching to about a third of the distance to M1 Sc ending in C well before base of Cu-fork, but its apical part weak. Sc_2 absent. R_1 ending in C slightly before base of M-fork. The ratio of the length of R_1 to the total wing length is 0.55. Veins R-M and M-Cu in one line. M ratios: 0.55 and 0.69, Cu ratios: 0.47 and 0.81. Both Cu_2 and A_1 distinct and setose, the latter reaching wing margin. Calypter with several long setae along its margin.

Legs. Coxae yellowish brown, with a longitudinal row of black setae, c1 and c2 anterolaterally and c3 posterolaterally, the longest setae almost as long as the width of coxa. Apical part of c2 and c3 with black spots.

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

Terminalia (Figs 11–12). Brownish yellow. Length of terminalia 0.28 mm. Width 0.32 mm. Gonocoxite swollen. Gonostylus narrow, curved, apically darkened, basally setose, with a relatively strong thorn in the middle (Fig. 12). Gonocoxites almost separated, joined by narrow ventral bridge. Aedeagal complex consists of two parts, Y-shaped aedeagal apodemeand T-shaped fused parameres, the latter rather narrow. Tergite 9 semicircular, cerci remarkable, each bearing a patch of long setae.

Female unknown.

Diagnostic characters. A small species of *Diadocidia* s. str., similar to *D. cizeki* ŠEVČÍK, 2003 and *D. halopensis* ŠEVČÍK, 2003. Terminalia are very characteristic, especially those long setae on cerci.

Diadocidia (Diadocidia) sulawesiana ŠEVČÍK, sp. n.
(Figs 13–14)

Holotype male (BMNH): Sulawesi, Suunny Mogogonipa, 20.10.1985, leg. J. S. Noyes (Malaise trap). (Placed in a pinned microvial filled with glycerol.)

Etymology. The specific name refers to the type locality.

Measurements (in mm): body length 2.62, wing length 2.45, wing breadth 1.05.

Head and thorax orange brown, legs and abdomen brownish yellow.

Head. Three ocelli. Lateral ocelli slightly larger than median, and separated from the eye margin for a distance of about their diameter. Frons and clypeus setose. Scape and pedicel yellowish, about as long as wide, with dark setae. Length of antenna 1.3 mm, length of flagellum 1.1 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 13 is 1.7 and for the apical flagellomere 2.4. 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 are 1:2:4:8.

Thorax. Mesoscutum brown, with indistinct longitudinal stripes bearing dark setae. Lateral margins of mesoscutum 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.

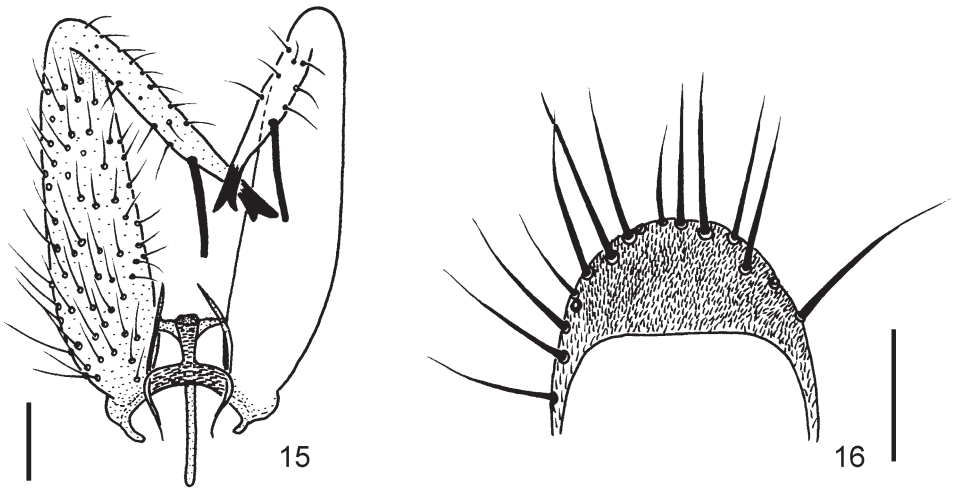
Wings. Hyaline, both membrane and veins covered with macrotrichia. Ratio of length to width is 2.3. Costa well produced beyond R_5, reaching to about a third of the distance to M_1 Sc ending in C well before base of Cu-fork. Sc_2 absent. R_1 ending in C slightly beyond the base of M-fork. The ratio of the length of R_1 to the total wing length is 0.59. Veins R-M and M-Cu in one line. M ratios: 0.63 and 0.77, Cu ratios: 0.47 and 0.88. Both Cu_2 and A_1 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 and tips of coxae 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. Mid tibia with 2 weak ventral setae. Hind tibia with 6–8 dorsal setae.

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

Terminalia (Figs 13–14). Brownish yellow. Length of terminalia 0.25 mm. Gonocoxites relatively long and narrow. Gonostylus about a half the length of gonocoxite, tapering, directed anterodorsally, apically slightly bifid and bearing a strong pointed thorn and a small subapical seta. Gonocoxites almost separated, joined by narrow ventral bridge. Aedeagal complex consists of two parts, Y-shaped aedeagal apodeme and T-shaped fused parameres. Tergite 9 small, tranverse, subtriangular.

Female unknown.



Figs 15–16. *D. (Diadocidia) cizeki* ŠEVČÍK, 2003, male genitalia. 15 = dorsal view, 16 = detail of tergite 9. Scales: 0.1 mm

Diagnostic characters. This species is very similar to *D. cizeki*. It has, however, shorter gonostyli with pointed thorn and a more triangular tergite 9 than the latter species.

Diadocidia (Diadocidia) cizeki ŠEVČÍK, 2003
(Fig 15–16)

Material studied: TAIWAN: 1 male (HNHM). Ilan Hsien, Fu-Shan Botanical Garden, along a forest path, September 25, 2000, leg. L. PAPP, No. 3; 1 male (HNHM): Taipei Hsien, Han-Lo-Dé, 450 m, No. 12, forest undergrowth, March 29–30, 2003, leg. L. PAPP; 1 male (HNHM): Taipei Hsien, Pinling, 319 m, No. 27, over/along Jinggua-liao river, April 17, 2003, leg. L. PAPP. 1 male (NMNS): Taiwan Nantou, Sanlinchi, 19/V/1991, C. C. Chiang, Sweeping & Sucking – NMNS ENT 1128–269.

This species was described from Papua New Guinea. New to Taiwan and for the entire Oriental region. The most characteristic feature of this species is its very long, apically bifid gonostylus with a strong blunt thorn. In addition, vein Sc free and no vein A_2 discernible.

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