The genus *Adicella* McLachlan (Trichoptera, Leptoceridae) in Japan

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Abstract

The Japanese species of the genus *Adicella* McLachlan (Trichoptera, Leptoceridae) are reviewed and confirmed, including a described species and 3 new species: *A. makaria* Malicky & Chantaramongkol 2002, originally described from Taiwan, *A. trichotoma* Ito & Kuhara sp. nov., *A. paludicola* Ito & Kuhara sp. nov., and *A. strigillata* Katsuma & Ito sp. nov. For clear comparisons, adults of all species are redescribed or described.

Key words: male, female, variation, East Asia

Introduction

About 150 named species of the genus *Adicella* McLachlan 1877 (Trichoptera, Leptoceridae) are known from the Oriental (113 species), West Palaearctic (18 species), Afrotropical (9 species), and East Palaearctic (2 species) regions (Morse 2012; Morse personal communication). The larvae live in various sizes of flowing waters, from springs to rivers, often among dense vegetation (Lepneva 1971; Wallace *et al.* 2003; Graf *et al.* 2008).

Japanese *Adicella* was first recorded with three unnamed 'species' by Uenishi (1993), but the 'species' have not been described. Recently, *A. makaria* Malicky & Chantaramongkol 2002 (in Malicky *et al.* 2002), originally described from Taiwan, has been recorded from Yonaguni-jima Island, in the southwestern-most part of Japan (Shimura 2010). In this paper, we redescribe or describe the adults of 4 species of *Adicella* including 3 new species.

Material and methods

Association of the male and female of each species was based on similar general body characteristics from among specimens collected together. Genitalic segments were figured after treatment in hot dilute KOH solution. Morphological terms mainly follow Yang & Morse (2000). The type series and other materials are deposited in the collections of the Natural History Museum and Institute, Chiba (CBM) and persons or museum shown in parentheses, respectively. All specimens are preserved in 70–80% ethyl alcohol. Collecting methods, collectors and depositories (depositories are in parentheses) are abbreviated as follows: L, light trap; M, Malaise trap; S, sweep netting; NKA, N. Katsuma; NKU, N. Kuhara; TI, T. Ito; MKNM, Minakuchi Kodomo-no-kuni Nature Museum (Shiga-ken).

*Adicella makaria* Malicky & Chantaramongkol 2002

(Figs. 1, 6)

*Adicella makaria* Malicky & Chantaramongkol 2002 in Malicky *et al.* 2002: 27, fig. 27, male, “Thailand”; Malicky 2006: 1514, correction: the type locality is not Thailand but is Taiwan; Shimura 2010: 50, 54, photo of adult, Japan (Ryûkyû Islands, Yonaguni-jima).
Adult (Fig. 1). Light brown, body length (from front of head to end of abdomen) 4.5–6.0 mm in male (n=7) and 4.5–6.0 mm in female (n=9). Antennae 4.0–4.5 times as long as body in male (n=3) and 3.5–4.0 times in female (n=2); scape thick, long, each about 4 times as long as its pedicel. Maxillary palpi each 5-segmented, total length about 2.2 mm in male (n=2) and 2.0 mm in female (n=2); labial palpi each 3-segmented, total length 0.5–0.8 mm in male (n=4) and 0.55–0.60 mm in female (n=2); all segments of both palpi cylindrical and covered with fine setae.

Head with large anterodorsal setal wart (ad; anteromesal setal wart in Wiggins & Currie 1996; vertexal ocellar compact setal wart in Oláh & Johanson 2007) and 4 pairs of warts posterior from it, including dorsal (small, d; anterior setal warts in Wiggins & Currie 1996: vertexal ocellar compact setal warts in Oláh & Johanson 2007), postero-dorsal (large, pd; posterior setal warts in Wiggins & Currie 1996; occipital setal warts in Oláh & Johanson 2007), postero-lateral (small, pl; posterolateral setal warts in Wiggins & Currie 1996; postgenal setal warts in Oláh & Johanson 2007) and postocciptal (small, p; unnamed in Wiggins & Currie 1996 and Oláh & Johanson 2007) setal warts (Fig. 1A). Pronotum with 1–2 pairs of warts, mesoscutum with pair of longitudinal setal lines, and mesoscutellum sometimes with pair of very small setal warts (Fig. 1A).

Wings narrow (Fig. 1B). Forewings mostly covered with brown hairs. Hind wings subacute apically, covered with brown hairs, with long fringes at posterior margins. Venation similar in both sexes. Forewings with apical forks I, II and V, fork I with stalk, fork II sub-rectangular, fork V sessil; discoidal cell narrow and long, about 1/3 as long as wing, thyridial cell narrow and very long, about 1/2 as long as wing; r–s crossvein present in some specimens; Cu2 and P connected by cu–p crossvein, then P fused with E+1A+2A to form single curved vein ending at arculus. Hind wings with apical forks I and II, fork II sub-rectangular; discoidal and thyridial cells absent; R fine (often invisible without staining) and fused to Sc near midlength of wings. Lengths of forewings and hind wings each 5.0–7.0 mm and 4.0–5.0 mm respectively in males (n=7), 4.5–6.0 mm and 3.5–4.5 mm respectively in females (n=9).

Male genitalia (Figs. 1C–G). Segment IX (IX) rectangular, posterolateral margins slightly convex in lateral view (Fig. 1C); in dorsal view posterodorsal margin produced with two triangular lobes (Fig. 1D, pd IX). Lower part of tergum X (up X) trifurcate, setose apically, middle process longer than lateral processes (Figs. 1C, D). Lower part of tergum X (lo X) tall, hood-like, composed of two large vertical lobes fused dorsally in basal half, directed ventrocaudad in basal half then gently curved and directed caudad (Fig. 1C), apex of each lobe subacute in dorsal view (Fig. 1D). Preanal appendages (pr ap) oval, subacute apically in lateral view, round apically in dorsal view (Figs. 1C, D). Inferior appendages each with three branches (Figs. 1C, E, F): Upper branch (up in ap) club-like with many short setae mesally; middle branch (mi in ap) longest, bar-like, gently curved mesally, acute apically with few short setae on apical outer surfaces; lower branch (lo in ap) thick at base, gradually tapered with many long and short setae on ventral surface, subacute apically. Phallobase (phb) tubular, curved 90°; phallicata (phc) tubular, almost straight, about 2/3 as long as phallobase (Fig. 1G), with U- or V-shaped phalotremal sclerite.

Female genitalia (Figs. 1H–J). Segment IX (IX) short, tergum IX produced into subtriangular lobe posteromedially and fused with tergum X and preanal appendages (Figs. 1H, I). Preanal appendages (pr ap) represented as broad setose mounds (Figs. 1H, I). Segment X (X) forming longitudinally short tube with semimembranous ventral surface (Figs. 1H, J). Lamellae irregularly shaped, vertical, setose lobes, each with small round flap on dorsolateral margin (Fig. 1H). Gonopod plate (go pl) rugose, broadly semicircular or subquadrate; pair of small, round, vertical lobes (vl go pl) emerging from postgenal lobes, about 1/4 as large as lamellae in lateral view (Fig. 1H), triangular in ventral view (Fig. 1J). Apicomesal process of internal part of gonopod (ap go pl) slightly convex (Fig. 1J), sometimes trapezoidal. Spermathecal sclerite (sp sc) subcircular in ventral view (Fig. 1J), trapezoidal in lateral view (Fig. 1H).

FIGURE 1. Adicella makaria. Male (A–G, Yonaguni-jima): A, head, and pro- and meso-thorax, dorsal; B, left wings, ventral; C, genitalia, left lateral; D, same, dorsal; E, same, ventral; F, right inferior appendage, ventromesal; G, phallus, left lateral. Female (H–J, Yonaguni-jima): H, genitalia, left lateral; I, same, dorsal; J, same, ventral. Abbreviations. Head: ad=anterodorsal wart; d=dorsal wart; p=postoccipital wart; pd=posterodorsal wart; pl=posterolateral wart. Wings: I, II and V=fork I, fork II and fork V; dc=discoidal cell; tc=thyridial cell. Male: IX and X=9th and 10th abdominal segments; lo X=lower part of tergum X; lo in ap=lower branch of an inferior appendage; mi in ap=middle branch of an inferior appendage; up in ap=upper branch of inferior appendage; pdp IX=posterodorsal projection of segment IX; phb=phallobase; phc=phallicata; pr ap=a preanal appendage; up X=upper part of tergum X. Female: VIII–X=8th to 10th abdominal segments; ap go pl=apicomesal process of internal gonopod plate; go pl=gonopod plate; pr ap=a preanal appendage; sp sc=spermathecal sclerite; vl go pl=a vertical lobe of gonopod plate.
Remarks. Malicky & Chantaramongkol (2002, in Malicky et al. 2002) did not recognize any species similar to Adicella makaria. However, it apparently belongs to the A. biramosa Group (Kimmins 1963, Schmid 1994) and its male most closely resembles that of A. trigitata Yang & Morse 2000 in the shape of the inferior appendages; the male of A. makaria differs from that of A. trigitata, however, by the absence of paramere spines. The female of this species is described here for the first time. In this species group, only the females of A. starmuehlneri Malicky 1979 (Malicky 1979), A. biramosa Martynov 1936 (Schmid 1958) and A. capitata Yang & Morse 2000 (Yang & Morse 2000) have been described previously. Among these, tergum X is much shorter in A. makaria and apically rounded in dorsal and ventral view, versus truncate (A. starmuehlneri, A. capitata) or with an acute dorsomesal projection (A. biramosa).

Habitat. Most adults were collected near small streams in forests.

Distribution (Fig. 6). Taiwan: Nantou County, and Japan: Ryûkyû Islands (Ishigaki-jima, Iriomote-jima, Yonaguni-jima).

Japanese name. Taiwan-ko-higenaga-tobikera.

Adicella trichotoma Ito & Kuhara sp. nov.
(Figs. 2, 3, 6)

Adicella sp.: Kuhara 1997: 62, Japan (Hokkaidô); Kuhara 2001: 20, Japan (Hokkaidô); Ito et al. 2010: 64, Japan (Hokkaidô).

Diagnosis. Also a species of the Adicella biramosa Group (Kimmins 1963, Schmid 1994), the male of this species resembles that of Adicella mita Yang & Morse, 2000, described from southeastern China, in having a trifurcate upper part of tergum X with shortest middle process and phallus without paramere spines. However, it clearly differs from A. mita as follows. Adicella trichotoma has (1) preanal appendages oval with no acute posterior margin in dorsal and lateral aspects, and (2) inferior appendages tribranched. On the other hand, A. mita has (1) preanal appendages orbicular with subacute posterior margin in dorsal and lateral aspects, and (2) inferior appendages mitten-like, with broad, short lower branch.

Among the A. biramosa Group for which the female is known, the female of this species resembles that of A. makaria in its short tergum X, but is distinguishable from the latter as follows: In A. trichotoma, vertical lobes of the gonopod plate are rather large, about 4/5 as large as lamellae in lateral view; in A. makaria, they are small, 1/4 as large as lamellae in lateral view.

Adult (Figs. 2, 3). Light brown, body length 5.0–6.5 mm in male (n=6) and 4.0–6.5 mm in female (n=8). Antennae 3.1–3.6 times as long as body in male (n=4), 2.8–3.1 times in female (n=4); scapes thick, long, each about 4 times as long as its pedicel. Maxillary palpi each 5-segmented, total length 1.5–1.7 mm in male (n=2), 1.8–2.0 mm in female (n=5); labial palpi each 3-segmented, total length 0.5 mm in male (n=2), 0.5–0.8 mm in female (n=5); all segments of both palpi cylindrical and covered with fine setae. Warts on head and thorax as in A. makaria.

Wings: Color and venation as in A. makaria. Lengths of forewings and hind wings each 6.0–7.0 mm and 5.0–5.5 mm respectively in males (n=7), 4.5–6.5 mm and 3.5–5.0 mm respectively in females (n=5).

Male genitalia (Fig. 2). Segment IX rectangular in lateral view with posterolateral margins slightly convex (Fig. 2A), in dorsal view posterodorsal margin produced triangularly often with two lobes variable in size and shape individually (Figs. 2B, D1–9), mostly asymmetrical (Figs. 2D1–4, 8, 9), sometimes absent (Figs. 2D7, 8). Preanal appendages oval in dorsal and lateral views (Figs. 2A, B). Upper part of tergum X trifurcate, setose apically, middle process shorter than lateral processes (Figs. 2A, B). Lower part of tergum X tall, hood-like, composed of two large vertical lobes fused dorsally in basal half, directed ventrocaudad (Figs. 2A, B), apex of each lobe broad in lateral view (Fig. 2A), subacute in dorsal view (Fig. 2B). Inferior appendages each with three branches and variable in shape among sites and also individually in each site, with numerous short thick setae mesally and long slender setae ventrally and laterally (Figs. 2A, C, F, G1–8): Upper branch finger-like, slightly bent ventrad (Figs. 2A, G1–8); in lateral view, gently tapered with subacute apices in most specimens (Figs. 2A, G2, G4, G5, G7), but parallel-sided with round apices in few specimens (Figs. 2G1, G6, G8); middle branch thick, bar-like (Figs. 2A, F, G), strongly curled mesad apically with subacute apex in ventral view (Fig. 2C), in lateral view, thickest among three branches (Figs. 2A, G), longest among three branches in most specimens (Figs. 2A, G1–G4, G7), but slightly shorter than upper branch in few specimens (Fig. 2G6), almost parallel sided with round
or subquadrate apex in most specimens (Figs. 2G1, G2, G5, G6, G7, G8), but apex slightly tapered (Fig. 2G4) or broadened (Figs. 2A, G3) in few specimens. Ratio of widths of middle part of middle branch to widths of middle part of upper branch 1.8–2.0 in Hokkaido (n=7) (Figs. 2A, G1), 2.0–2.5 in Iwate (n=2) (Fig. 2G2), about 3 in Ibaraki (n=4) (Fig. 2G3), 1.8–2.3 in Mie (n=5) (Fig. 2G4), 1.1–2.9 in Shikoku (n=9) (Figs. 2D5, 7), 1.1 in Shimane (n=1) (Fig. 2G6) and 1.5 in Okinawa (n=2) (Fig. 2G8), with geographical cline not found in ratio; lower branch (Figs. 2A, F, G) shortest, variable in size even at each site, often only protuberance (Figs. 2G1, 3G7). Phallobase tube curved 90˚; paramere spines absent; phallicatia tubular, almost straight, about 2/3 as long as phallobase, with U- or V-shaped phallicatia sclerite (Figs. 2C, E).

Female genitalia (Fig. 3). Segment IX short, fused with tergum X and preanal appendages (Fig. 3A); terga IXa (IXa) and IXb (IXb) conspicuous in dorsal view (Fig. 3B); IXb variable in size and shape individually even at each site (Fig. 3D1–8), round (Fig. 3D1) or subtrapezoidal (Fig. 3D2), with (Figs. 3B, D3–5, D7, D8) or without (Figs. 3D1, 2) middle notch, asymmetrical in some specimens (Figs. 3D5, 6), very short in few specimens (Fig. 3D8). Preanal appendages (pr ap) represented as round, setose mounds (Fig. 3A), semicircular in dorsal and ventral views (Figs. 3B, C). Segment X (X) membranous, short, tube-like (Fig. 3C), mesoventral slit present in few specimens. Lamellae round, vertical, setose lobe, each with rugose flap basolaterally (Figs. 3A, C). Gonopod plate (go pl) broad, rugose laterally, with round vertical lobes (vl go pl) posterolaterally (Figs. 3A, C); vertical lobes large, about 4/5 as large as lamellae in lateral view (Fig. 3A), triangular in ventral view (Fig. 3C). Apicomesal process of internal part of gonopod (ap go pl) semimembranous, subquadrate in ventral view (Fig. 3C), acute in lateral view (Fig. 3A). Spermathecal sclerite (sp sc) large sub-pentalgonal in ventral view (Fig. 3C), trapezoidal in lateral view (Fig. 3A).


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FIGURE 2. *Adicella trichotoma* sp. nov. Male (A–D1, E, F, type locality; D2–D9, G, other localities): A, left genitalia, lateral; B, same, dorsal; C, same, ventral; D, posterodorsal projection of segment IX, dorsal, variation: 1, Hokkaidô, Otaru-shi; 2, Iwate, Iwaizumi-chô; 3–5, Ibaraki, Hitachi-ôta-shi; 6–8, Mie, Daian-chô; 9, Köchi, Kami-shi; E, phallus, left lateral; F, left inferior appendage, ventromesal; G, left inferior appendage, left lateral, variation: 1, Hokkaidô, Shimamaki-mura; 2, Iwate, Iwaizumi-chô; 3, Ibaraki, Hitachi-ôta-shi; 4, Mie, Daian-chô; 5, Shimane, Oku-izumo-shi; 6, Köchi, Monobe-mura; 7, Köchi, Kami-shi; 8, Okinawa, Genka-kawa.
The specific epithet is a Latinized version of the Greek adverb "τρίχα" (=in 3 parts) and a variant of the Greek adjective "τομαϊος, -α, -ον" (=cut), referring to the shape of the three-branched upper part of tergum X.

Habitat. Most adults were collected near streams in mountain area.

Distribution (Fig. 6). Japan: Hokkaidô, Honshû, Shikoku, Ryûkyû Islands (Amami-ôshima, Okinawa-jima).


Adicella paludicola Ito & Kuhara sp. nov.
(Figs. 4, 6)

Adicella sp. 1: Ito et al. 2007: 153, Japan (Hokkaidô); Ito & Kosugi 2007: 55, Japan (Hokkaidô).

Diagnosis. A species of the Adicella pulcherrima Group (Schmid 1994), the male of this species resembles that of A. papillosa Yang & Morse 2000, distributed in southwestern China, in having the upper part of tergum X with seta-bearing papillae, a large lower part of tergum X and inferior appendages without branches. However, it clearly differs from the latter as follows: This species has (1) the upper part of tergum X is without a deep and wide dorsomesal slit and is never longer than the preanal appendages, (2) the lower part of tergum X is not extending beneath the phallus, and (3) the phallicata is without a phallotremal sclerite. On the other hand, A. papillosa has (1) the upper part of tergum X with a deep and wide dorsomesal slit and is much longer than the preanal appendages

FIGURE 3. Adicella trichotoma sp. nov. Female (A–C, D1–3, type locality; D4–8, other localities): A, genitalia, left lateral; B, same, dorsal; C, same, ventral; D, terga IXa and IXb, dorsal, variation: 4, Iwate, Iwaizumi-chô; 5, Ibaraki, Hitachi-ota-shi, 6, Mie, Daian-chô; 7, 8, Ehime, Oda-chô. Abbreviations: IXa=tergum IXa; IXb=tergum IXb; ap go pl=apicomesal process of internal gonopod plate; go pl=gonopod plate; pr ap=a preanal appendage; sp sc=spermathecal sclerite; vl go pl=a vertical lobe of gonopod plate.

Etymology. The specific epithet is a Latinized version of the Greek adverb “τρίχα” (=in 3 parts) and a variant of the Greek adjective “τομαϊος, -α, -ον” (=cut), referring to the shape of the three-branched upper part of tergum X.

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(2) the lower part of tergum X is extending mesad beneath the phallus, and (3) the phallicata has a U-shaped phallotremal sclerite.

The female of this species resembles that of *A. trichotoma* but is distinguishable from the latter as follows: In *A. trichotoma*, the vertical lobes of the gonopod plate are relatively large, about 4/5 times as large as the lamellae in lateral view; in *A. paludicola*, the vertical lobes of the gonopod plate are rather small, about 2/3 as large as the lamellae and each is largely fused to its lamella along its dorsal edge in lateral view.

**Adult** (Fig. 4). Light brown, body length 4.1–5.9 mm in male (n=11) and 4.0–5.5 mm in female (n=11). Antennae 3.0–4.6 times as long as body in male (n=8), 2.8–3.5 times in female (n=5); scapes thick, long, each 2.0 times as long as its pedicel. Maxillary palpi each 5-segmented, total length 1.8–2.0 mm in male (n=3), 1.8 mm in female (n=2); labial palpi each 3-segmented, total length 0.5–0.6 mm in male (n=2), 0.7 mm in female (n=2); all segments of both palpi cylindrical and covered with fine setae. Warts on head and thorax as in *A. makaria*.

Wings: Shape, color and venation as in *A. makaria*, long hair pencil of hind wing absent. Lengths of forewings and hind wings each 6.0–7.1 mm and 4.5–5.4 mm respectively in males (n=11), 5.3–6.2 mm and 4.3–5.1 mm respectively in females (n=11).

**Male genitalia** (Figs. 4A–G). Segment IX rectangular, posterior margins almost straight or very slightly convex in lateral view (Fig. 4A), small excision present near base of inferior appendages in some specimens (Fig. 4A); in dorsal view posterodorsal margin produced backward at center in broad triangular process, with small lobes beneath; lobes variable in size individually and sometimes asymmetrical (Fig. 4B). Preanal appendages oval (Figs. 4A, B). Upper part of tergum X forming broad plate extending to, but never exceeding, tips of preanal appendages, with 10 seta-bearing papillae apically and with very narrow dorsomesal slit in few specimens (Figs. 4B, D). Lower part of tergum X tall, hood-like composed of two large vertical lobes fused dorsally in basal half, each lobe directed ventrocaudad (Figs. 4A, B), apices broad in lateral view (Fig. 4A) and subacute in dorsal view (Fig. 4B). Inferior appendages upcurved, each about 3 times as long as wide, without branches (Figs. 4A, C, E, F); in lateral view, almost parallel-sided, truncate apically (Fig. 4A) or truncate with protruding ventrocaudal corner (Fig. 4F); at 3/5 from base small dorso-mesal protuberance present with numerous spines (Figs. 4C, E). Phallobase slender tube curved 90°; paramere spines absent; phallicata tubular, sinuate, about 4/5 times as long as phallobase, without phallotremal sclerite (Fig. 4G).

**Female genitalia** (Figs. 4H–K). Segment IX short; tergum IXa (a) produced into triangular or subtriangular lobe posteromedially (Figs. 4H, I, K1–5), sometimes asymmetrical (Figs. 4K1, K2); tergum IXb (b) round (Figs. 4K2, K4), subtriangular (Figs. 4K1) or subtrapezoidal (Figs. 4I, K3, K5) in dorsal view, often with pair of small lobes (Figs. 4K1, K2, K4), sometimes asymmetrical (Fig. 4K3). Preanal appendages represented as broad setose mounds fused with tergum X (Figs. 4H, I). Segment X forming longitudinally short tube with semimembranous ventral surface (Fig. 4J). Lamellae round lobes, flattened laterally, each with oblique ridge on outer surface, posterior 2/5 covered with setae (Figs. 4H, J). Gonopod plate broad, subquadrate, lateral regions rugose with vertical lobes on posterolateral margins (Figs. 4H, J); vertical lobes round, rather small, about 2/3 as large as lamellae and each fused to its lamella along its dorsal edge in lateral view (Fig. 4H), thin and triangular in ventral view (Fig. 4J). Apicomical process of internal part of gonopod subquadrate or semicircular (Fig. 4J). Spermathecal sclerite pentagonal in ventral view (Fig. 4J), trapezoidal in lateral view (Fig. 4H).


**Paratypes**: Same data as holotype, 2 males, 2 females (CBM-ZI 146712–146715).

**Other specimens**: JAPAN: Hokkaidô. Same data as holotype, 5 males, 16 females (TI); same data except 22.vii.2003, TI, L, 1 male (TI); same data except 7.viii.2006, TI, L, 1 male, 1 female (NKU); same data except 28.vii.2012, TI, L, 5 males, 7 females (TI); Kushiro Shitsugen, Shibe-chô, Kayanuma, Shirarutoro-etoro-gawa, Tômi-bashi, 4.xi.2003, TI, L, 2 males, 2 females (TI); same data except 25.vii.2008, TI, L, 1 female (TI); Kushiro Shitsugen, Kushiro-shi, Kirakoton-misaki, 16.vii.2005, T. Kosugi, L, 1 male (TI); Yûfutsu Shitsugen, Tomakomai-shi, Uenae, Bibi-gawa, 4 m, 16.vii.2010, TI, L, 1 female (TI). Honshû. Ibaraki ET AL.: Hitachi-ôta-shi, Okami, small marsh, 24.vi.2006, NKA, 13 males, 3 females (11 males, 2 females, TI; 2 males, 1 female, NKU); same data except 8.viii.2009, NKA, 1 male, 17 females (NKA); same data except 16.vii.2012, NKA, 2 males, 3 females (NKA).

FIGURE 4. *Adicella paludicola* sp. nov. Male (A–G: A–E, G–I, type locality; F, Ibaraki, Hitachi-ôta-shi): A, genitalia, left lateral, upper part of X hidden by preanal appendage; B, same, dorsal; C, same, ventral; D, upper part of tergum X, left lateral; E, inferior appendages, left oblique ventrolateral and ventromesal; F, inferior appendage, left lateral, variation; G, phallus, left lateral. Female (H–K: H–K2, type locality; K3-5, Ibaraki, Hitachi-ôta-shi): H, left genitalia, lateral; I, same, dorsal; J, same, ventral; K, terga IXa and IXb, dorsal (upper) and left lateral (lower), variation. Abbreviations: a=tergum IXa; b=tergum IXb.
Etymology. The specific epithet is from the Latin noun “palus, -udis” (=marsh) and Latin suffix “-colus, -a, -um” (=living in), indicating that this species is a dweller of marshes.

Habitat. Most adults were collected in marshes.

Distribution (Fig. 6). Japan: Hokkaidô, Honshû.


Adicella strigillata Katsuma & Ito sp. nov.
(Figs. 5–6)

Adicella sp. 1: Katsuma 2011: 68, Japan (Honshû).
Adicella sp. 3: Katsuma 2012: 67, Japan (Honshû).

Diagnosis. Also a species of the Adicella pulcherrima Group (Schmid 1994), the male of this species resembles that of A. penicillaris Yang & Morse 2000, described from southeastern China, in having short inferior appendages and long hair-brushes of the hind wings. However, it differs from A. penicillaris by (1) the upper part of tergum X having only a single process in A. penicillaris, but with three processes in A. strigillata and (2) the lower part of tergum X being strongly sclerotized on its ventral margins and with its apices each produced into an acute dorsolateral projection and not bearing setae in A. penicillaris, but the lower part of tergum X is not sclerotized on its ventral margins and has rounded apices bearing apical setae in lateral view in A. strigillata.

Adult male (Fig. 5). Pale brown, body 4.2–5.0 mm long in male (n=3). Male antennae 3.6 times as long as body (n=1); scapes thick, long, each 2.0 times as long as its pedicel. Maxillary palpi each 5-segmented, 2.6 mm in total (n=2); labial palpi each 3-segmented, 0.8 mm in total (n=3); all segments of both palpi cylindrical and covered with fine setae. Warts on head and thorax as in A. makaria.

Wings (Fig. 5A). Forewings broader than those of other Japanese Adicella species with round apical margin, mostly covered with brown hairs. Hind wings broader than other Japanese Adicella species, each with slightly acute apical margin, covered with brown hairs, with long fringes at posterior margins; dark brown or black hair-brushes conspicuous, long, 2/3 as long as hind wings, arising from jugal lobe. Forewings each with apical forks I, II and V, fork I broad with long (as long as fork I) stalk, fork II sub-rectangular, fork V sessil; discoidal cell long, 1/3 as long as wing; thrydial cell very long, about 1/2 as long as wings; presence of cross vein sc-r variable individually even in opposite sides of single specimen; Cu2 and P connected by cu-p crossvein, then P fused with E+1A+2A to form single curved vein ending at arculus; 1A often not reaching 2A. Hind wings each with apical forks I and II, fork I short and broad, with very long stalk (about 2.5 times as long as fork I), fork II sub-rectangular; discoidal and thrydial cells absent; Sc and R fine, fused into single vein at midlength of wing, Sc+R slightly sinuate apically. Lengths of forewings and hind wings each 6.2–6.6 mm and 4.7–5.0 mm respectively in male (n=3).

Male genitalia (Fig. 5). Segment IX (IX) rectangular, anterior margins slightly convex and posterior margins widely concave in lateral view (Fig. 5B); in dorsal view posterodorsal margin produced backward at center in triangular process (Fig. 5C). Preanal appendages (pr ap) oval (Figs. 5B, C). Upper part of tergum X (up X) trifurcate, setose apically, middle process longer than lateral processes (Figs. 5B, C). Lower part of segment X (lo X) tall, hood-like, composed of two large vertical lobes fused dorsally at base, each lobe broad in basal half and narrow in apical half, round apically in lateral view, bar-like in dorsal view (Figs. 5B, C). Inferior appendages thick and short, each about 2 times as long as basal width, with humplike ventral branch (Fig. 5B); basal half broad and setose, apical half narrower, round, with many spines along subapicomesal margin in ventral and dorsal views (Figs. 5D, E). Phallobase (phb) thick almost straight, with about 10 short setae arranged in circle on inner surface of apical half; paramere spines absent; phallicata (phc) tubular, with phalotremal sclerite; phalotremal sclerite U-shaped in ventral view and subquadrate in lateral view (Figs. 5D, F).

Female. Unknown.


Paratypes: Same data as holotype, 1 male (CBM-ZI 146717).

Other specimens. Honshû, Ibaraki: Same data as holotype, 1 male (TI); Hitachi-ôta-shi, Okami-shitsugen, 19.viii.2006, NKA, 2 males (NKA).
**Etymology.** The specific epithet is from the Latin noun "*strigil*" (=scraper) and the Latin suffix "*-atus, -a, -um*" (=possessing), referring to the long hair-brushes of the hind wings.

**Habitat.** Specimens were collected near small marshes.

**Distribution** (Fig. 6). Japan: Honshû.

**Japanese name.** Chômô-ko-higenaga-tobikera.
FIGURE 6. Distribution of the 4 Japanese species of *Adicella* in East Asia.

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References


