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Three New Species of the Genus *Antocha* from Japan, with a Note on the Subgenera *Antocha* and *Proantocha* (Diptera, Tipulidae)

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Abstract Three new species of the genus *Antocha*, *latistilus*, *mitosanensis* and *tuberculata*, are described from Japan, all belonging to the subgenus *Antocha*. They differ from one another and from the other congeners in the structure of the male terminalia. A short discussion on the division between the subgenera *Antocha* and *Proantocha* is also given.

Key words: *Antocha*; Tipulidae; new species; Japan; subgeneric division.

Antocha OSTEN SACKEN, 1860 is a relatively large genus of small- to medium-sized crane flies, being found in all the zoogeographical regions. It belongs to the tribe Limoniini of the subfamily Limoniinae and is divided into three subgenera, *Antocha* OSTEN SACKEN, 1860, *Proantocha* ALEXANDER, 1919 and *Orimargula* MIK, 1883. Numerous species occur in eastern and southeastern Asia, but fewer representatives elsewhere. The genus *Antocha* is characterized by the following features of the wing: anal angle prominent; Sc close to R, Sc_2 not evident; basal section of Rs usually straight, diverging from R_1.

Up to the present time, 15 species of the genus *Antocha* have been recorded from Japan. Thirteen species of them belong to the subgenus *Antocha* and two species to *Proantocha*. In this paper, three new species of the subgenus *Antocha* are added to the tipulid fauna of Japan.

ALEXANDER (1924) and ISHIDA (1957) pointed out the following morphological differences between the two subgenera: [male] the subgenus *Proantocha* has opposable tubercles at the tip of hind femur and the base of hind tibia, but the subgenus *Antocha* has none of them; [female] ventral margin of cercus serrated in the subgenus *Proantocha*, but smooth in the subgenus *Antocha*. However, *Antocha* (*Antocha*) *latistilus*, which will be described in this paper, has serrated cerci in the female, but no opposabe tubercles on the hindleg in the male. Therefore, the subgeneric definition given by ALEXANDER (1924) and ISHIDA (1957) seems not to be applied to such species. The reason why I placed *latistilus* in the subgenus *Antocha* will be mentioned later.

Male and female terminalia were treated with hot 10% KOH, and observed in small dishes or as temporary glycerol slides, and preserved in glycerol in glass or polyethylene microtubes or glued to paper mounts pinned with the specimens. The

morphological terminology follows that of Alexander and Byers (1981), McAlpine (1981), Snodgrass (1903, 1904) and Torii (1988).

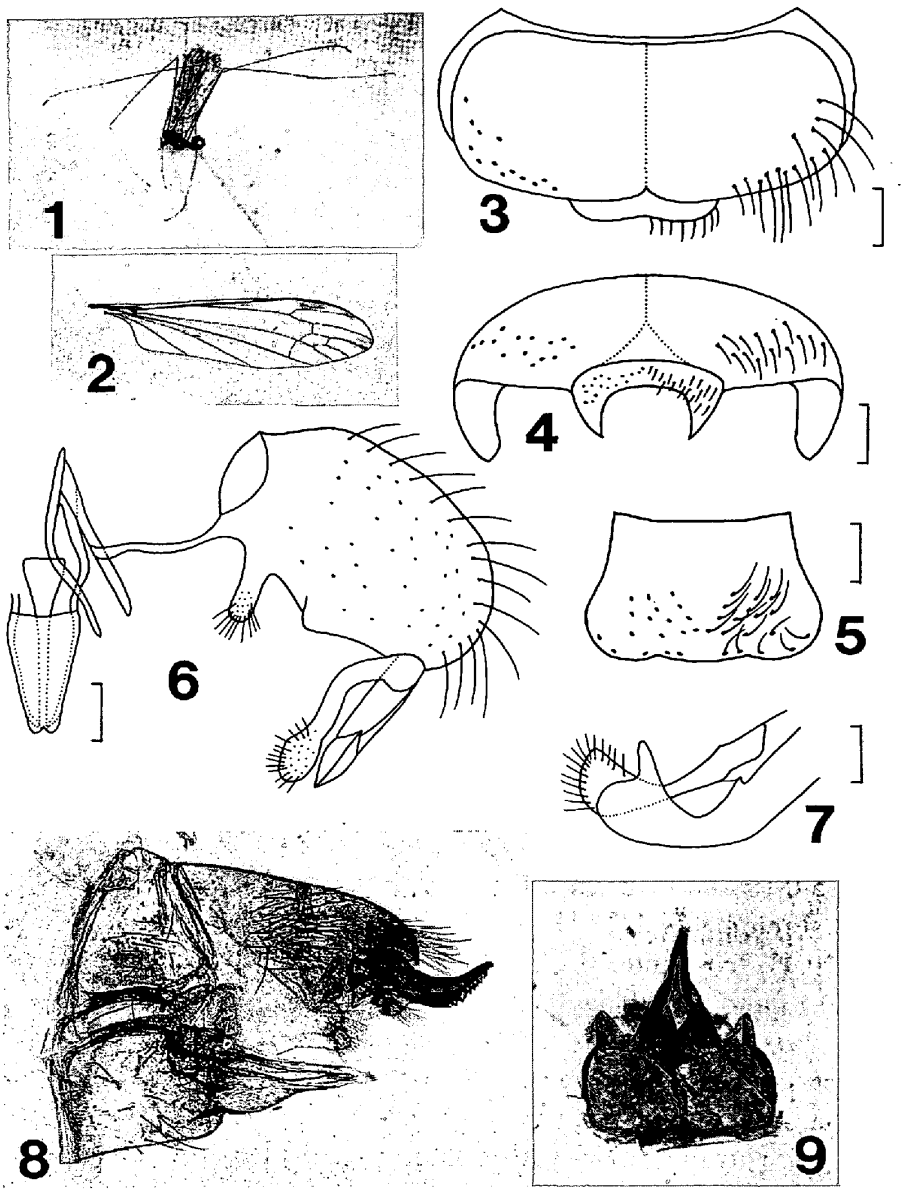
Antocha (*Antocha*) *latistilus* sp. nov.

(Figs. 1–9)

Male (Figs. 1–7). Length (in mm): wing (from tegula) 5.0–6.7; body (from frons to distal margin of abdominal tergite 9) 4.0–5.7; head (excluding rostrum) 0.40–0.53; thorax 1.3–1.8; antenna 1.2–1.5; halter 0.70–0.93; foreleg, coxa 0.48, trochanter 0.28, femur 4.7–6.1, tibia 5.6–6.9, tarsomeres 1/2/3/4 and 5, 3.0–3.5/0.81/0.37/0.19 and 0.17, claw 0.13; midleg, coxa 0.55, trochanter 0.23, femur 5.0–6.4, tibia 4.6–5.6, tarsomeres 1/2/3/4 and 5, 2.2–2.4/0.63/0.32/0.18 and 0.19, claw 0.13; hindleg, coxa 0.48, trochanter 0.28, femur 5.4–6.6, tibia 5.7–7.0, tarsomeres 1/2/3/4 and 5, 2.9–3.2/0.85/0.40/0.19 and 0.18, claw 0.12; aedeagus 0.23–0.28.

Head brown or brownish grey, pruinose; postgena pale; postgena and area around compound eye margin with a few setae; rostrum yellow, with setae; compound eye black. Antenna: scape yellow, about twice as long as wide, with a few setae; pedicel brown, oval or long oval, with 12–13 setae; flagellomeres brown, 14 in number, basal six or seven segments oval to long oval, distal segments longer, basal four or five and terminal two segments with a few setae; flagellomeres except terminal one or two with weaker setae densely. Labellum yellow, with setae; palpus brown, with setae.

Thorax brown to yellowish brown, pruinose; antepronotum yellowish brown, darker medially, with setae; postpronotum yellowish brown or brown; propleuron brown or yellowish brown; mesoprescutum darker brown medially, brown to yellowish brown laterally; presutural area of mesoscutum brown to yellowish brown, usually with three, broad darker stripes; median stripe joining the stripe on mesoprescutum in the same color, posteriorly ending before the transeverse suture; lateral stripe joining that on postsutural area of mesoscutum; postsutural area of mesoscutum brown to yellowish brown medially, darker laterally; scutellum yellowish brown; mediotergite, laterotergite and lateral process under prescutal suture brown to yellowish brown; episternum brown to yellowish brown; katepisternum with a few setae, darkened ventrally; epimeron yellowish brown; pleurite basal to hindcoxa with a few setae. Legs: coxae brown to yellowish brown; anterior side of fore and mid coxae usually dark; each coxa with setae mainly on distal part; trochanters yellowish brown, with setae mainly on distal part; femora brown, yellowish basally; remaining segments of legs brown; terminal tarsomeres dark; claws dark brown; each claw with a long tooth at about basal third; all legs with short setae; midleg shorter than the others. Wing (Fig. 2) subhyaline, faintly tinged with grey; basal part of wing white; stigma indistinct. Venation: veins pale brown; C, R_1 and R_{1+2} yellowish near the stigmal area; Sc_1 ending at about five-sixths the length of basal section of Rs; R_2 about or slightly basal to a position opposite to r–m, indistinct



Figs. 1–9. *Antocha* (*Antocha*) *latistilus* sp. nov. (1–7, male, 8–9, female). —— 1, Male; 2, wing; 3, tergite 9, dorsal; 4, same, posterior; 5, sternite 9, ventral; 6, aedeagus, aedeagal sheath, paramere and gonopod, dorsal; 7, gonostyli, posterior; 8, terminalia, left lateral; 9, sternite 8 and hypogynial valves, ventral. Scales for Figs. 3–7, 0.1 mm.

in stigmal area; r–m at two-fifths to half the length of cell dm distal to fork of M; cell dm long, 2.3–2.5 times as long as wide; basal section of CuA_1 joining M at 0.18–0.36 its own length basal to fork of M. Macrotrichia present on C, R_1, R_{1+2}, distal 0.65–0.71 of distal section of R_{4+5}, distal three-fifths to three-fourths of distal section of M_{1+2}, and on wing margin; a few macrotrichia present on distal section of M_3, usually near the tip. Halter with a stem pale yellow and setose; knob slightly dark,

with setae on basal part.

Abdominal tergites brown to yellowish brown, with setae; tergite 1 usually darker medially, with more numerous setae; tergite 7 usually darker. Abdominal sternites yellowish brown, with setae more densely than tergites; each sternite darker along caudal margin; sternite 7 usually uniformly dark brown, but yellowish brown along caudal margin; sternite 8 dark brown on anterior and median portions. Male terminalia (Figs. 3–7): tergite 9 (Figs. 3–4) faintly yellowish brown, with setae on latero-caudal portions, bearing two setiferous processes medially at caudal margin, and covered with minute setulae, but sparsely on setiferous processes; sternite 9 (Fig. 5) faintly yellowish brown, darker latero-caudally, convex medially, weakly trilobed caudally, with setae on caudal half, and covered with minute setulae; aedeagus (Fig. 6) simple in shape; aedeagal sheath well sclerotized dorsally, somewhat membranous ventrally; parameres with two pairs of branches; inner branch of paramere curved at its middle, reaching near the level of middle of aedeagus; outer branch of paramere straight, a little shorter than inner one; gonocoxite faintly yellowish brown, somewhat pointed dorso-mesally and ventro-mesally, with setae and minute setulae, and produced into a setiferous lobe mesally at base; outer gonostylus (Figs. 6–7) brown, glabrous, curved upward; distal part of outer gonostylus paddle-like, with a tooth near the tip; inner gonostylus faintly yellowish brown, curved; distal part of inner gonostylus somewhat flattened, densely setiferous.

Female (Figs. 8–9). Length (in mm): wing 6.2; body (from frons to distal margin of abdominal tergite 10) 4.4; head 0.43; thorax 1.3; antenna 1.1; halter 0.70; foreleg, coxa 0.40, trochanter 0.25, femur 4.5, tibia 5.2, tarsomeres 1/2/3/4 and 5, 2.7/0.63/0.35/0.18 and 0.18, claw 0.10; midleg, coxa 0.45, trochanter 0.20, femur 4.3, tibia 4.2, tarsomeres 1/2/3/4 and 5, 1.9/0.55/0.30/0.16 and 0.20, claw 0.10; hindleg, coxa 0.43, trochanter 0.23, femur 4.7, tibia 5.4, tarsomeres 1/2/3/4 and 5, 2.4/0.63/0.38/0.18 and 0.18, claw 0.088; cercus 0.33.

Female differs from male as follows: generally smaller, especially legs shorter; presutural area of mesoscutum with only one median stripe; postsutural area of mesoscutum entirely brown to yellowish brown; darker area of katepisternum restricted antero-ventrally; claws with a shorter tooth; length of cell dm 2.27 times as long as wide; basal section of CuA_1 joining M at 0.44 its own length basal to fork of M; abdomen brown, with its terminal segments yellowish.

Female terminalia (Figs. 8–9): cercus strongly sclerotized, short and stout; ventral margin of cercus serrated, with about a dozen teeth, distal ones of which are smaller; hypogynial valve moderately sclerotized; tip of hypogynial valve reaching the level of base of cercus; dense pencil of long yellow setae present on either side of tergite 10, directed caudad; sternite 8 (Fig. 9) convex mediocaudally, with a pair of laterocaudal processes.

Holotype: ♂, Ikusabata, ca. 200 m alt., Ôme, Tokyo Pref., Honshu, VI. 2, 1982, T. Torii leg. Paratypes: 1 ♂ 1 ♀, same locality as above, VI. 2, 1982, T. Torii leg.; 1 ♂, Taimagura – Kagura, ca. 400 m alt., Kawai-mura, Shimohei-gun,

Iwate Pref., Honshu, VIII. 15, 1983, T. TORII leg.; 6 ♂♂, Mt. Kohinokiyama (Riv. Yakushigawa), 400 m alt., Kawai-mura, Shimohei-gun, Iwate Pref., Honshu, VIII. 17, 1983, T. TORII leg.; 1 ♂, Matsukusa, 580 m alt., Kawai-mura, Shimohei-gun, Iwate Pref., Honshu, VIII. 19, 1983, T. TORII leg. The type series is deposited in the collection of the Department of Natural History, Tokyo Metropolitan University.

Distribution. Japan (Honshu).

Remarks. This species is readily distinguishable from *Antocha* (*Antocha*) *sagana* ALEXANDER, 1932 (Honshu) and *Antocha* (*Antocha*) *integra* ALEXANDER, 1940 (Soviet Far East, North Korea) by having a tooth near the tip of the outer gonostylus of the male terminalia. The specimens from Iwate Prefecture are smaller (male wing length 5.0–5.6 mm) than those from Tokyo Prefecture (male wing length 6.4–6.7 mm).

The male of this species has no opposable tubercles at the tip of hind femur and the base of hind tibia which are characteristic of the subgenus *Proantocha*, while the female has serrated cerci which are the diagnostic feature of *Proantocha*. To avoid confusion, this species is temporarily placed in the subgenus *Antocha* based on the male characteristics, because most species of the genus *Antocha* are known only from males, including two other new species to be described in the present paper. Further studies are necessary to clarify the subgeneric relation between *Antocha* and *Proantocha* when female specimens of most species are available for comparison.

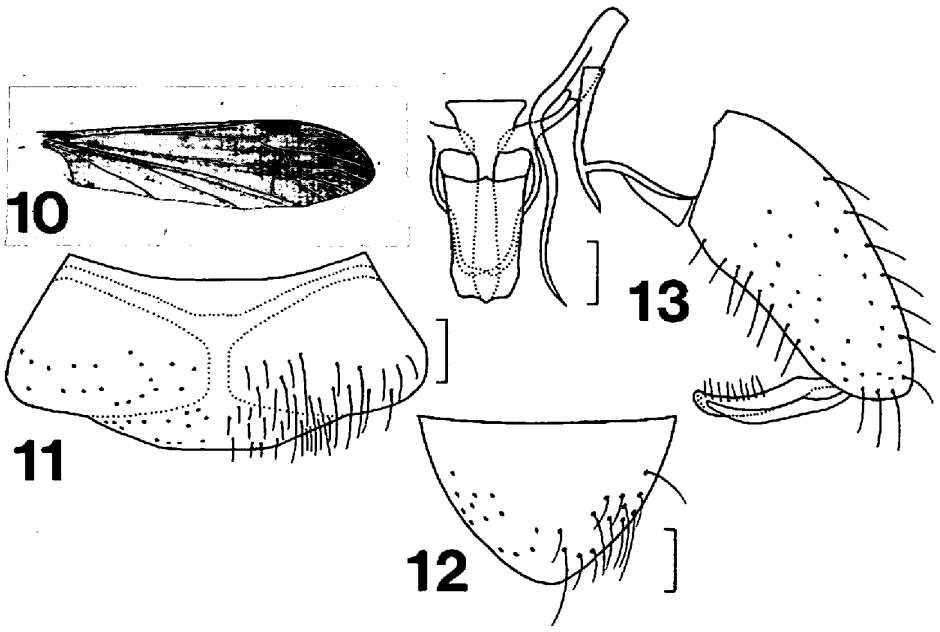
Antocha (*Antocha*) *mitosanensis* sp. nov.

(Figs. 10–13)

Male. Length (in mm): wing 8.5; body about 6.5; thorax 1.9; antenna 1.2; halter 1.0; foreleg, coxa 0.54, trochanter 0.39, femur 7.1, tibia 8.5, tarsomeres 1/2/3/4 and 5, 6.5/1.4/0.48/0.24 and 0.19, claw 0.13; midleg, coxa 0.56, trochanter 0.26, femur 8.0, tibia 7.8, tarsomeres 1/2/3/4 and 5, 5.1/1.3/0.43/0.23 and 0.20, claw 0.14; hindleg, coxa 0.49, trochanter 0.30, femur 8.3, tibia 8.6, tarsomeres 1/2/3/4 and 5, 5.5/1.4/0.45/0.21 and 0.19, claw 0.13; aedeagus 0.29.

Head blackish brown, pruinose; rostrum brown, with more setae on more distal part; compound eye black, with brownish parts. Antenna blackish brown; scape with setae; pedicel oval, with sparse setae; flagellomeres 14 in number, basal ten segments oval or long oval, with numerous setae, terminal four segments elongate, with sparser setae, terminal segment about 1.5 times as long as penultimate one. Labellum brown, with setae on distal half; palpus blackish brown, with sparse setae.

Thorax blackish brown, pruinose; lateral process under prescutal suture yellowish brown; border between mediotergite and laterotergite pale; pronotum with setae. Legs: coxae brown; fore coxa yellow distally; fore trochanter yellow; mid and hind trochanters brown, a little yellowish; fore femur dark brown, with a yellowish base; mid and hind femora brown, each with yellowish base; remaining seg-



Figs. 10–13. *Antocha (Antocha) mitosanensis* sp. nov., male. —— 10, Wing; 11, tergite 9, dorsal; 12, sternite 9, ventral; 13, aedeagus, aedeagal sheath, paramere and gonopod, dorsal. Scales for Figs. 11–13, 0.1 mm.

ments of the legs brown; distal tarsomeres darkened; claws dark brown; all legs covered with short seate. Wing (Fig. 10) tinged with grey; basal portion of wing tinged with yellowish white; stigma distinct, pale brown. Venation: C brown, thickened at apical third of wing; R_1 and CuA brown, relatively thickened; the other veins pale and indistinct; Sc_1 ending slightly before the level of fork of Rs; R_2 about opposite to r–m, indistinct in stigma; r–m slightly basal to one-third the length of cell dm; length of cell dm slightly less than twice as long as wide; basal section of CuA_1 joining M at three- to four-tenths its own length basal to fork of M. Macrotrichia present on C, R_1, R_{1+2}, distal three-fourths to four-fifths of distal section of R_{4+5}, distal section of M_{1+2} (sparsely on basal part in left wing, and lacking on basal one-third of right wing of the holotype), distal section of M_3 sparsely, and on wing margin; macrotrichia present on distal section of CuA_1 very sparsely. Halter with a stem pale and setose, yellowish basally; knob slightly darkened.

Abdomen uniformly blackish brown, with setae; tergite 1 with more numerous setae mainly on latero-caudal portions than several following tergites. Male terminalia (Figs. 11–13) dark brown; tergite 9 (Fig. 11) convex at caudal margin, weakly concave and somewhat membranous at anterior margin, with setae on caudal half; sternite 9 (Fig. 12) simple in shape, inverted triangular, rounded at caudal apex, pale latero-caudally, with setae mainly on caudal half; gonocoxite (Fig. 13) slightly long for a member of the genus, with setae except on basal part; aedeagus simple in shape; aedeagal sheath well developed; inner branch of paramere long and sinuous, acute

apically, reaching the level of apex of aedeagus; outer branch of paramere clearly shorter than inner one, acute apically; gonocoxal apodeme with a flange; both of gonostyli simple in shape, yellowish brown; outer gonostylus glabrous, acute apically; inner gonostylus setiferous, somewhat stouter than outer one, with an obtuse tip.

Female. Unknown.

Holotype: ♂, Mt. Mitôsan, ca. 1,000 m alt., Hinohara-mura, Nishitama-gun, Tokyo Pref., Honshu, V. 18, 1984, T. TORII leg. (deposited in the collection of the Department of Natural History, Tokyo Metropolitan University).

Distribution. Japan (Honshu).

Remarks. This species is readily distinguishable from *Antocha* (*Antocha*) *dilatata* ALEXANDER, 1924 (Soviet Far East, Hokkaido, Shikoku), *Antocha* (*Antocha*) *platyphallus* ALEXANDER, 1935 (Honshu) and *Antocha* (*Antocha*) *satsuma* ALEXANDER, 1919 (Hokkaido, Honshu, Shikoku) by having the following characters in the male terminalia: tergite 9 convex at caudal margin; outer gonostylus not blackened; gonocoxal apodeme with a flange.

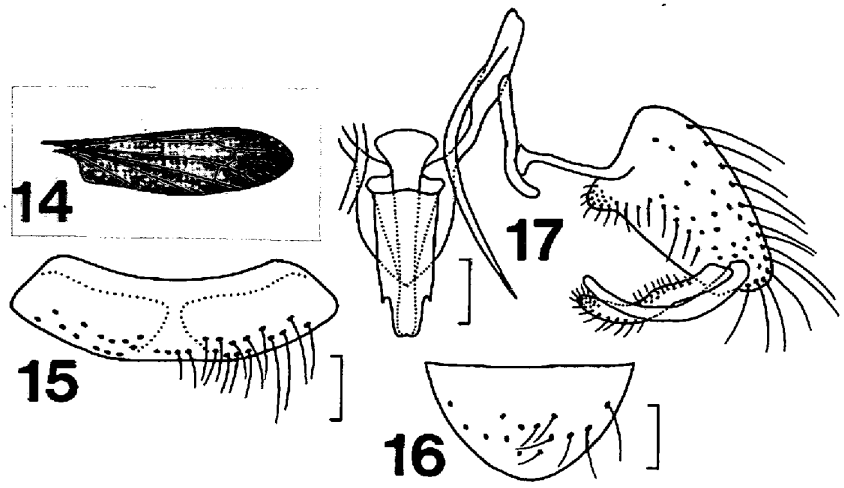
Antocha (*Antocha*) *tuberculata* sp. nov.

(Figs. 14–17)

Male. Length (in mm): wing 4.5; body about 4; thorax 1.1; antenna 0.75; halter 0.60; foreleg, coxa 0.30, trochanter 0.18, femur 4.0, tibia 4.6, tarsomeres 1/2/3/4 and 5, 2.7/0.68/0.33/0.15 and 0.13, claw 0.10; midleg, coxa 0.35, trochanter 0.18; hindleg, coxa 0.35, trochanter 0.16; aedeagus 0.33.

Head greyish brown, pruinose; rostrum pale yellowish brown, with setae sparsely; compound eye black. Antenna: scape brown; pedicel brown, oval; flagellomeres brown, 14 in number, each segment oval or long oval, with numerous setae, terminal segments slightly elongate, with a few setae. Labellum yellowish brown, with setae sparsely; palpus brown, with setae sparsely.

Thorax greyish brown or brown, pruinose; pronotum greyish brown; mesoprescutum greyish brown, pale laterally; presutural area of mesoscutum greyish brown, clearly brown laterally; postsutural area of mesoscutum brown; lateral process under prescutal suture yellowish brown; scutellum, mediotergite and laterotergite brown; pleuron uniformly brown. Legs lost with the exception of right foreleg in the holotype; foreleg with coxa pale brown, its distal part pale yellowish brown; trochanter pale yellowish brown; femur brown, except for basal part pale yellowish brown; remaining segments brown; claws dark brown. Wing (Fig. 14) subhyaline, whitish at basal portion; stigma indistinct; veins brown. Venation: Sc_1 short, ending at three-fourths to four-fifths the length of basal section of Rs; R_2 about opposite to r–m, indistinct in stigmal area; R_{2+3} and R_3 paler than R_{4+5}; r–m slightly basal to one-third the length of cell dm; basal section of CuA_1 joining M at about half its own length basal to fork of M; cell dm present, about twice as long as wide. Macrotrichia present on C, R_1, R_{1+2}, distal two-thirds of distal section of R_{4+5},



Figs. 14–17. *Antocha* (*Antocha*) *tuberculata* sp. nov., male. —— 14, Wing; 15, tergite 9, dorsal; 16, sternite 9, ventral; 17, aedeagus, aedeagal sheath, paramere and gonopod, dorsal. Scales for Figs. 15–17, 0.1 mm.

distal two-thirds to three-fourths of distal section of M_{1+2}, distal one-third to two-fifths of distal section of M_3, and on wing margin. Halter with a stem pale yellowish brown and setose; knob darkened.

Abdomen brown, with setae; caudal segments with more numerous setae; tergite 1 with more numerous setae than several following tergites. Male terminalia (Figs. 15–17) brown; tergite 9 (Fig. 15) with setae on caudal area; sternite 9 (Fig. 16) simple in shape, with setae except on cephalic portion; gonocoxite (Fig. 17) with long setae and minute setulae, bearing a setiferous lobe mesally at basal part; aedeagus simple in shape; aedeagal sheath well developed; inner branch of paramere arcuate, long and slender; tip of the branch acute, reaching near the level of apex of aedeagus; outer branch of paramere clearly shorter than inner one, weakly curved on distal half; tip of the branch obtuse; both of gonostyli simple in shape; outer gonostylus glabrous, with an obtuse tip; inner gonostylus setiferous, stouter than outer one.

Female. Unknown.

Holotype: ♂, Omogo, Iyo (=Ehime Pref.), Shikoku, VII. 14, 1952, S. MIYAMOTO leg. (in the collection of the Entomological Laboratory, Kyushu University, holotype No. 2720).

Distribution. Japan (Shikoku).

Remarks. This species is readily distinguishable from *Antocha* (*Antocha*) *brevinervis* ALEXANDER, 1924 (Hokkaido) and *Antocha* (*Antocha*) *spicata* ALEXANDER, 1936 (Hokkaido, Honshu, Shikoku, Kyushu) by having the following characters in the male terminalia: tip of outer gonostylus obtuse; inner branch of paramere long; tip of the branch reaching near the level of apex of aedeagus.

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References

ALEXANDER, C. P., 1919. Undescribed species of Japanese crane-flies (Tipulidae, Diptera). *Ann. ent. Soc. Am.*, **12**: 327–348.

———— 1924. New or little-known crane-flies from northern Japan (Tipulidae, Diptera). *Philipp. J. Sci.*, **24**: 531–611, pls. 1–2 (22 figs.).

———— 1932. New or little-known Tipulidae from eastern Asia (Diptera). X. *Ibid.*, **49**: 105–136, pls. 1–3 (48 figs.).

———— 1935. New or little-known Tipulidae from eastern Asia (Diptera). XXVII. *Ibid.*, **58**: 213–252, pls. 1–4 (48 figs.).

———— 1936. New or little-known Tipulidae from eastern Asia (Diptera). XXIX. *Ibid.*, **59**: 225–257, pls. 1–2 (38 figs.).

———— 1940. New or little-known Tipulidae from eastern Asia (Diptera). XLI. *Ibid.*, **71**: 39–76, pls. 1–4 (50 figs.).

———— & G. W. BYERS, 1981. Tipulidae. *In* MCALPINE, J. F., B. V. PETERSON, G. E. SHEWELL, H. J. TESKEY, J. R. VOCKEROTH & D. M. WOOD (eds.), *Manual of Nearctic Diptera*, **1**: 153–190, 89 figs. Agriculture Canada, Hull, Quebec.

ISHIDA, H., 1957. The catalogue of the Japanese Tipulidae, with the keys to the genera and subgenera. III. Limoniinae, Tribe Limoniini. *Annual Rep. Hyogo agric. Coll.*, **6** [for 1956]: 122–149.

MCALPINE, J. F., 1981. Morphology and terminology—adults. *In* MCALPINE, J. F., B. V. PETERSON, G. E. SHEWELL, H. J. TESKEY, J. R. VOCKEROTH & D. M. WOOD (eds.), *Manual of Nearctic Diptera*, **1**: 9–63, 146 figs. Agriculture Canada, Hull, Quebec.

MIK, J., 1883. Zur Kenntniss der "*Limnobina anomala*" O. S. Ein dipterologischer Beitrag. *Wien. ent. Ztg.*, **2**: 198–202, 2 figs.

OSTEN SACKEN, C. R., 1860. New genera and species of North American Tipulidae with short palpi, with an attempt at a new classification of the tribe. *Proc. Acad. nat. Sci. Philad.*, **1859** [for 1859]: 197–256.

SNODGRASS, R. E., 1903. The terminal abdominal segments of female Tipulidae. *J. N. Y. ent. Soc.*, **11**: 177–183, pls. 10–11 (20 figs.).

———— 1904. The hypopygium of the Tipulidae. *Trans. Am. ent. Soc.*, **30**: 179–236, pls. 8–18 (161 figs.).

TORII, T., 1988. Redescription of *Antocha* (*Proantocha*) *spinifer* (Diptera, Tipulidae). *Kontyû, Tokyo*, **56**: 354–364, 10 figs.

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