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NEW SPECIES OF MOSQUITOES FROM THE SOUTHERN RYUKYU ISLANDS

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During a survey of the mosquito fauna of Ishigaki and Iriomote Islands in the southern Ryukyus, two species were discovered which are apparently undescribed. They are given names here to facilitate the writing of a general paper on mosquitoes of the area. The collections were made while the writer was a participant in the SIRI Program of the Pacific Science Board, National Research Council, supported by contract funds from the Department of the Army. The types of the new species will be placed in the U. S. National Museum.

Relationships of the following species were worked out in part with the help of Dr. Alan Stone and Dr. K. L. Knight. Their assistance is gratefully acknowledged.

***Toxorhynchites yaeyamae* n. sp.**

Male: Length of wing 6.0 mm. Head scales brownish purple with a narrow silvery anterior border widening laterally. Proboscis purple on basal one-half, greenish to blue on distal one-half; palpus about as long as proboscis, last segment nearly twice as long as penultimate, purple except for yellowish scales toward apex of II, broad medioventral spot on III and base of IV beneath; apu and ppn silvery, latter coppery above; scutum iridescent green tinted with copper behind head and with purple at wing base, some dark hairlike scales intermixed; scutellum brownish gold with a lateral silvery spot, bristles here and over wing base purplish; pleuron dark brown with heavy patches of silvery scales; wing membrane slightly darkened in crossvein area, crossveins close together; halter pale, knob silvery; legs mostly purple, femora yellowish toward

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base and extensively beneath; tibiae all dark; fore tarsus all dark above, pale beneath toward base of I, a few scales on II, most of III and IV; mid tarsus dark outwardly, inner surface pale toward base of I, and whole length of II–IV; hind tarsus with inner surface of V and I toward base pale; abdominal tergites deep blue with some purplish lights, with laterobasal silvery spots on II–VIII; sternites pale golden except for an irregular median purplish line which is broadened into a band on VII. Dististyle very slender.

Female: Palpus purple, reaching middle of fourth flagellar segment; pale-scaled areas of tarsi more nearly encircling, broken mainly beneath; mid tarsus with II dark except for a few apical scales; laterobasal silvery spots on tergites I–III tending to form incomplete basal bands; sternites pale golden except for a few mediobasal dark scales on IV and a narrow purple line on VIII.

Pupa: Float hair of abdominal tergite I with about 4 main branches and many branchlets. On tergites II–VIII (numbering system of Belkin, 1953) hair 1 moderate and 3 to 5 branched on I and III, strong and single on IV and V, slender and inconspicuous on VI–VIII; hair 2 single, and strong only on IV–VI; hairs 3–6 inconspicuous; hair 7 usually single and small except on V and VI where it is stout and about a tergite in length. Paddle ovoid, distinctly emarginate near apex, an irregular dark line across basal one-seventh.

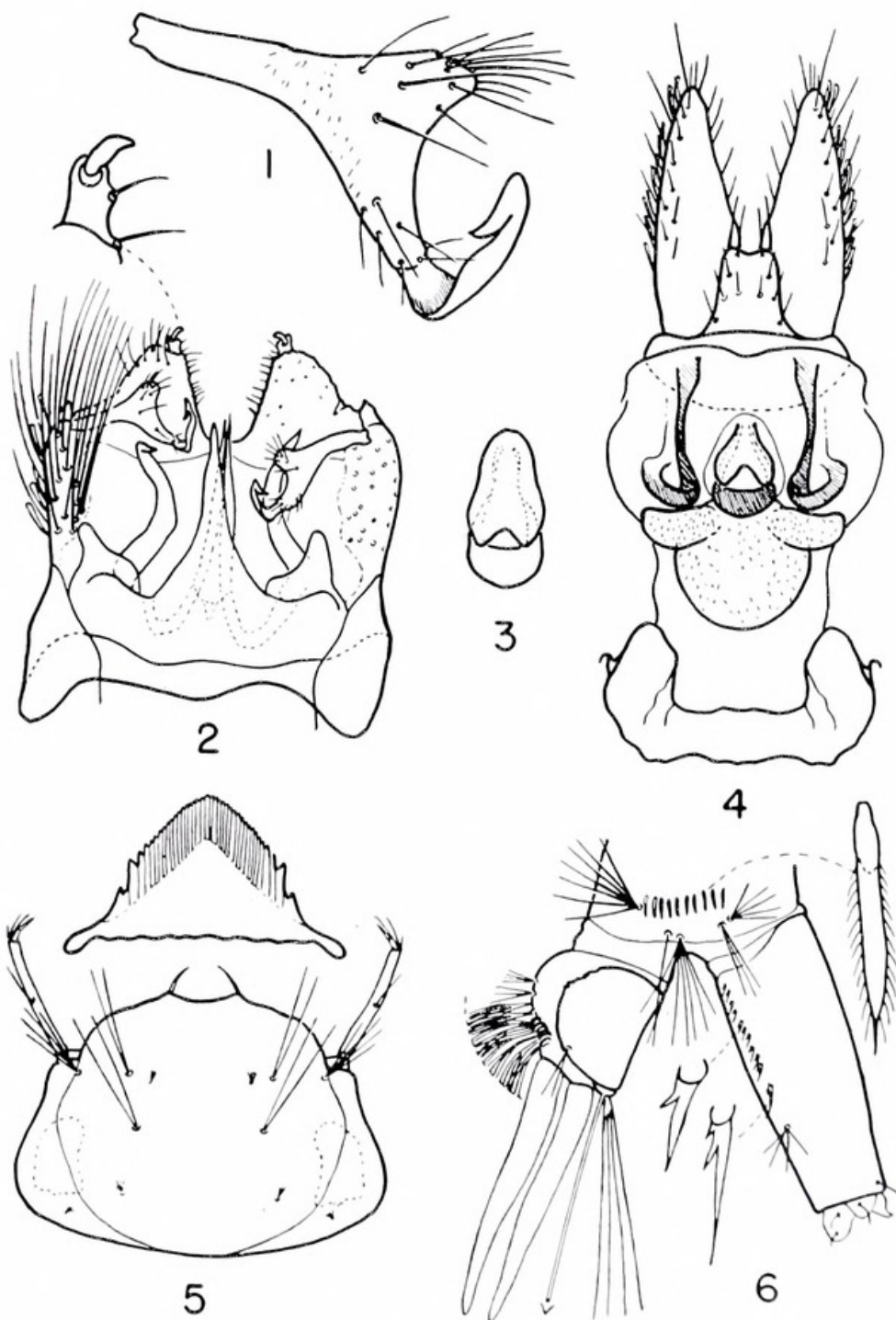
Larva: Head hairs 5 and 6 (or C and B) simple. Pronotal hairs 5 and 7 single and very stout, 5 about three-fourths as long as 7; mesonotal hairs 2 and 3 on separate small plate or plates; dorso-lateral plate of tergites VI–VII with hairs, 1, 3 and 4 weak but 2 stout, nearly as long as siphon, and about equal to longer seta of plate on VIII; siphon tuft with 4 or 5 branches; siphon smaller than saddle but about as long; saddle margined distally with a row of alternating short and long setae on both sides of the lateral hair; isc with about 10 branches, osc with about 6.

Holotype: Male with associated larval and pupal skins, east fork of Nakara River, Iriomote I., Ryukyus, November 17, 1951, tree hole (R. M. Bohart). One female paratype and associated pupal skin, Shirahama, Iriomote Island, November 17, 1951, tree hole (R. M. Bohart); one paratype larva, same data but collected November 19, 1951; one female paratype, Yarabu Peninsula, Ishigaki I., November 4, 1951, tree hole (R. M. Bohart).

Systematics: The short female palpi place this species with the rest of the Oriental fauna in Edward's group C. Also, it belongs in the subgroup containing *kempi* (Edw.), *gravelyi* (Edw.), *metal-*

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PLATE II



Anatomical details of *Culex ishigakiensis* n. sp. Fig. 1. Dististyle of holotype male. Fig. 2. Genitalia of holotype male from camera lucida drawing uncorrected for asymmetry due to mounting. Fig. 3. Atrial area of female genitalia from paratype. Fig. 4. Female genitalia from another paratype. Fig. 5. Head and mentum of fourth stage larval paratype. Fig. 6. Terminal segments of larval paratype.

licus (Leic.), *yamadai* (Ôuchi), *klossi* (Edw.), and *manicatus* (Edw.) in which there are no lateral scale tufts on the abdomen. From all of these *yaeyamae* differs in the tarsal markings. A particularly close relationship is seen with *yamadai* (northern Ryukyus and *manicatus* (Formosa) which occur on either side of it geographically. It differs from both by the silvery lateral scutellar spot and by having the tarsi more extensively white, with II–IV all white within but broken outwardly by a dark line. It is further distinguished from *yamadai* by the silvery halter knob, and from *manicatus* by the narrowly divided gold areas of sternites IV and VII.

***Aedes (Aedes) ishigakiensis* n. sp.**

Male: Wing 2.3 mm. Antenna with about 10 verticillate bristles on most segments, torus light brown, darker within. Vertex with broad scales, dark except for a row along eye, a few between eyes and a lateral patch of pale ones; apn well covered with broad pale scales; ppn with 4 bristles posteriorly; scutum and scutellum with narrow brownish scales on a dark brown integument; pleuron with 4 patches of pale scales, 1 on propleuron, 2 on sternopleuron, 1 on upper mesepimeron; meteusternum bare, sternopleuron without hairs on anterior margin, no lower mesepimeral bristles; claws of fore and mid legs unequal, larger ones toothed; claws on hind legs small, equal, toothed. Abdominal tergites I–VII with laterobasal white spots, that on VII visible from above; sternites with basal pale bands. Genitalia (figs. 1, 2).

Female: Wing 2.8 mm. Posterior corner of ppn with 3 or 4 pale broad scales associated with bristles. Claws of all legs equal, toothed. Genitalia (figs. 3, 4).

Pupa (based on 22 skins): Trumpet with a sharp point at middle of outer edge. Abdominal hair 1 (C) moderate and with 3–6 fine branches on II–VII; hair 3 (B) stout, single and twice as long as hair 1 on II–III; hair 5 moderate and usually double on III, long and single (longest hair of abdomen) on IV–V; hair 7 (A) of VIII small, slender, double or triple. Paddle ovoid, apical and lateral margin finely serrate, paddle hair about one-sixth as long as rib, rather slender.

Larva (based on 36 paratypes): Head (fig 5): antenna sparsely spiculate, hair stout, single or double, located just before middle; clypeal spine slender, brownish; hair 4 (d) small, with 3 or 4 branches; lower head hair (5) double, stout and nearly as long as antenna, upper head hair (6) similar but rarely single; hair 7 with about 6 branches; mentum with about 33 fine teeth. Pronotal hairs

1-4 rather small and slender, 5-7 long and stout. Lateral abdominal hairs (6) single on II-VI; terminal abdominal segments as in fig. 6; comb of 9-12 scales; first pentad hair with 4 or 5 branches which are one-half as long as those of fifth; second triple, third with 5-9 branches, fifth with 6-8; pecten in a row of 11-14 gradually enlarging teeth with 1 or rarely 2 stout basal subteeth and 1 or more fine secondary teeth, pecten row on basal one-half of siphon, followed at distal two-fifths by 3-5 branched tuft; lh nearly twice as long as last pecten tooth, double; ventral brush of 10 large, branched hairs and 2 smaller ones before barred area; isc with 2-4 branches; gills equal, slender, tapering, nearly as long as siphon.

Holotype: Male, Mt. Banna, Ishigaki Island, Ryukyus, October 27, 1951, reared from a pure culture of larvae taken from a "fox-hole" in pine woods (R. M. Bohart).

Paratypes: 18 males, 56 females, 22 pupal skins, and 43 larvae and larval skins, same data as holotype.

Systematics: As pointed out by K. L. Knight (personal discussion, December, 1952), this species belongs in a group of the genus which includes *abditus* Barraud (India), *fragilis* (Leic.) (Malay Peninsula), *hamistylus* Laffoon (Philippines), *indecorabilis* (Leic.) (Malay Peninsula), *robertsi* Laffoon (Philippines), *uniformis* (Theo.) (India), and *yusafi* Barraud (India). The presence of white markings on the abdominal tergites differentiate it from *abditus*, *hamistylus*, *robertsi* and *uniformis*. From all of the species insofar as they have been described it differs by the spine-like median projection of male tergite IX, the shape of the dististyle and of the apical prolongation of the basistyle in the male, and the unusual bilobed shape of the bristly preatrial plate in the female.

Very few species of the subgenus *Aedes* have been described in the pupal stage. From the description and figure of *lineatus* (Taylor) by Penn (1949) *ishigakiensis* seems to differ chiefly in having hair 5 of abdominal tergites IV and V single rather than double, and hair 7-VIII fine and double or triple instead of medium coarse and 4-8 branched. In specimens of *cinereus* (Meigen) in my collection from Wyoming, hair 7-VIII is stout and single, and the longer oval paddles are more minutely serrate on the margin. Neither of the other species has the sharp, tooth-like projection on the trumpet rim that is found in *ishigakiensis*.

The larva differs from the 15 other species of the subgenus *Aedes* which I have seen figured in having the head hairs (5 and 6) almost invariably double whereas the other species have these hairs with 3 or more branches. According to the figures of Laffoon (1946) the



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