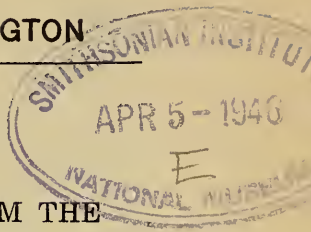


PROCEEDINGS  
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NEW SPECIES OF MOSQUITOES FROM THE  
MARIANAS AND OKINAWA (DIPTERA,  
CULICIDAE).<sup>1</sup>

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Four new species are described in this paper so that they can be included in a forthcoming general treatise on mosquitoes of the Marianas Islands and Okinawa.

*Aedes* (Finlaya) *okinawanus*, n. sp.

*Male*.—Length of body 4.0 mm., wing 3.0 mm. Median area of vertex with pale lemon yellow, narrow curved and upright forked scales, flanked by a large spot of black broad appressed scales and a lateral spot of broad appressed creamy ones; eyes bordered with yellow narrow curved scales along inner half; palpus and proboscis black, palpus about two-thirds as long as proboscis, last segment about as long as its apical bristles. Scutum with distinct lines of pale lemon yellow consisting of a median line forking posteriorly, a submedian line on anterior half of scutum, a line around anterior margin of scutum which bows inward along fossal area and continues to posterior margin as a sublateral line, a few pale scales over wing base; scutellum with black broad appressed scales on mid lobe and with black and yellow narrow curved scales on all lobes; anterior pronotal lobe with whitish broad appressed scales; proepimeron with whitish broadly crescent-shaped scales; pleuron dark brown with several large patches of whitish broad appressed scales. Fore and mid femora with a broad pale line on hind surface, hind femur dark along whole length dorsally but with basal two-thirds pale in front and basal one-half pale on hind surface, a restricted knee spot present on hind femur, very indistinct on other femora; tibiae dark except for a few scales at base beneath and scattered along hind surface; fore tarsus dark, mid and hind tarsi with pale mark at base of first segment, hind tarsus also with pale joint marks over first 3 joints. Wing scales dark, halter

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knob with dark and dull pale scales. Abdominal tergites I-VII with lateral basal silvery spots, sternites with broad pale basal bands. Genitalia as in figures 1-3; basal lobe attached to claspette and with about 7 leaf-like blades, more basally with setiform bristles which extend up harpaginal fold, gradually becoming thicker and flatter; inner margin of basistyle with a group of twisted bristles toward base; basistyle ventrally with a tight clump of about 13 long and rather pale bristles near apex.

*Female*.—About as in male except for hind tarsi. Palpus all dark and about one-fifth as long as proboscis. Lateral pale spot on vertex enclosing a small dark spot. Scutal lines slightly deeper in color than in male, approaching pale golden. Five-fifths of hind femur pale on posterior surface; tarsal marks more distinct than in male, first fore tarsal sometimes with a few basal pale scales; last hind tarsal with dull white scaling above.

*Larva*.—About 7 mm. long. Antenna (fig. 5) very slender, about one-half as long as head, a single hair inserted before middle and reaching to apex of shaft, shaft sparsely spiculate; clypeal spines very slender, brown; median hairs of mouth brush with small teeth; head hair A with 8 to 10 plumose branches; B single and very long, one and one-half times as long as head; C slightly posterior and close to B, with 4 or 5 plumose branches which are about half as long as B; d on a line with B, small and with 5 to 7 branches; mentum (fig. 4) subtriangular with about 19 sharp teeth. Shoulder hairs well developed; hair 0 short and bushy, about 25-branched; hairs 1 to 3 moderate in length, hair 1 with 2 or 3 branches, 2 single, 3 with 4 or 5 branches; hair 4 with 3 or 4 moderately long branches; hairs 5 and 7 very long, plumose and triple; hair 6 long and single. Lateral abdominal bristles double on I and II, single and long on III to VII. Comb of about 60 apically fringed teeth in a patch; lateral hair of segment VIII with 3 to 5 plumose branches. Siphon (fig. 6) about 3.5 times its basal diameter, gradually tapering toward apex, acus small, pecten of 22 to 26 teeth of which last 10 are about equal in size, pecten occupying basal half of tube; tuft at apical two-fifths, with 5 to 7 plumose branches, about as long as basal diameter of tube. Anal segment (fig. 6) with a two-thirds complete sclerotized ring which is spiculate along posterior margin, lateral single hair shorter than ring and divided into 3 or more branches at about middle; gills unequal and pointed, longer pair about as long as ring, shorter pair half as long; fan of 10 hair brushes, all in barred area; outer apical bristle (osc) single, inner apical bristle (isc) triple.

*Type*.—Male (U. S. National Museum No. 57758), Okuma, Okinawa, September, 1945, reared from a treehole (C. L. Harnage).

*Paratypes*.—Four males and 3 females, same data as type; 1 male and 32 females, Chizuka,<sup>3</sup> Okinawa, August to September, 1945, taken

<sup>3</sup> Also known as Chijuka and Kizyoka.

biting, resting on vegetation, and reared from treeholes; 1 male, Nago, Okinawa, May 14, 1945, reared from an earthenware jug; 8 larval paratypes on slides, Okuma, Okinawa, from treehole (C. L. Harnage). Other

specimens were collected at Kochiya, Shana Wan, Hentona and Euka. The females bite readily in deep shade during the day.

This species is closely related to *aureostriatus* (Doleschall) of which I have examined New Guinea specimens in the U. S. National Museum. Points of difference are the presence in *okinawanus* of all yellow upright vertex scales and the dark last hind tarsal in the male. The male genitalia have a row of setae on the harpaginal fold which are stouter than in *aureostriatus*, there is a group of twisted bristles at the base of the inner basistyle margin and there is a tight clump of about 13 long bristles near the apex of the basistyle ventrally. The larvae have a somewhat shorter siphon than those of *aureostriatus* but otherwise appear identical.

*Culex* (*Culiciomyia*) *ryukyensis*, n. sp.

*Male*.—Length of body 3.0 mm., wing 2.5 mm. Vertex with broad median area covered with yellowish white narrow curved scales and brown upright forked ones, vertex laterally with a spot of dull whitish, broad appressed scales continued inward along eye margin; mouthparts dark-scaled, palpus longer than proboscis by one-fourth to one-third of last segment, last two segments sparsely haired (as compared with *pallidothorax* Theobald), first long segment with 3 or 4 short translucent scales projecting downwards. Scutum brown-scaled; pleuron without scales, pale green or pale brown, with a faint dark stripe from anterior pronotal lobe to upper part of mesepimeron, a small dark spot at anterior corner of sternopleuron; 1 lower mesepimeral bristle; legs dark-scaled except for undersurfaces of femora; plume scales of veins 2.1 and 2.2 about 6 times their greatest width. Abdomen with dull pale straight-margined basal bands on tergites II to VII; venter mainly pale-scaled. Genitalia (figs. 7-9) with the 2 black rods of subapical lobe plainly visible in dried specimen (also in all paratypes); lateral arm of paraproct elongate but not enlarged.

*Female*.—About as in male. Palpus about 3 times as long as clypeus and one-fifth proboscis length. Plume scales of veins 2.1 and 2.2 from 6 to 10 times as long as broad; fork cells one and one-half to twice as long as their stems.

*Larva*.—About 8.0 mm. long. Antenna (fig. 10) about five-sixths as long as head, tufted at middle, tuft not quite reaching to apex, shaft sparsely spiculate, not much darkened apically, insertions of apical and subapical bristles well separated; clypeal spines very slender and curved; head hair A about 7-branched, B and C with 3 branches reaching a short distance beyond clypeus, d simple; mentum (fig. 11) subpyramidal with about 20 small teeth and 7 larger ones. Shoulder hairs moderate reaching about to middle of head; hairs 1 to 3 on a sclerotized plate, 1 double, 2 single, 3 single or double, 4, 7 and 8 double, 5 and 6 single. Lateral abdominal bristles double on I and II, single or rarely double on III to VI. Comb of about 55 slender and apically fringed teeth without a distinct apical spine, lateral hair of segment VIII with about 7 plumose branches. Siphon (fig. 12) about 6 times its basal diameter, tapering



gradually to a narrow and somewhat upturned apex, with 3 pairs of small sublateral double hairs along apical two-fifths, pecten of 14 to 20 teeth along basal one-fourth of tube. Anal segment (fig. 12) with a complete sclerotized ring which is strongly spiculate along its posterior edge, lateral single hair about as long as ring; gills unequal, shorter pair twice as long as anal ring, fan of 8-hair brushes, all in barred area; outer and inner apical bristles (osc and isc) single.

*Type*.—Male (U. S. National Museum No. 57759), Chizuka, Okinawa, September, 1945, collected resting on a damp rock (R. Bohart and R. Ingram).

*Paratypes*.—30 males and 15 females, Chizuka; Okinawa, August and September 1945, collected from damp rocks and reared from rock holes; 9 males, 6 females and 4 larvae (on slides), Koehiya, Okinawa, June 15, 1945, from an earthenware crock in the woods; 1 male, Hedo, Okinawa, September 23, 1945; 6 larvae (on slides), Yaba, Motabu Peninsula, Okinawa, May 1945, from an earthenware crock by the roadside. All paratypes collected by R. Bohart and R. Ingram. Females of *ryukyensis* were not observed to bite.

This species appears to be most closely related to the Indian *bailyi* Barraud which also has an uncrested male basistyle, and reduced pleural markings. It differs from *bailyi*, however, in having the male palpi, extending beyond the proboscis by less than half of the length of the last segment (the whole last segment in *bailyi*), in the darkened anterior corner of the sternopleuron, and in details of the male genitalia (figs. 7-9). The larva (figs. 10-12) checks closely with the description of *viridiventer* Giles given by Barraud (Barraud, P. J., 1934, Fauna, British India, Diptera, vol. 5, Culicidae, p. 379) but differs in having the siphon tufts almost invariably double, in having only 3 or 4 denticles on the pecten teeth instead of 5 to 7, and in the pointed anal gills.

#### *Culex (Lophoceraomyia) tuberis*, n. sp.

*Male*.—Length of body 3 mm., wing 2.5 mm. Vertex covered with pale narrow curved and dark upright forked scales in broad median area, laterally with a large spot of pale broad appressed scales continued inward along eye margin; torus with a pronounced knob at upper inner angle; flagellum with specialized setae on segments VI to X (torus considered as first segment); VI with 7 or 8 yellowish setae of varying lengths, the longest about like those on X; VII to IX with matted and twisted tufts, shortest on VIII; X with 6 slender setae; mouthparts dark, palpus longer than proboscis by about length of last segment, last 2 segments not very hairy, no row of stiff hairs at base of palpus. Scutal integument pale brown with indistinct submedian dark lines and with hair-like brown scales; pleuron almost uniformly pale brown with a few scattered scales, most evident along lower hind margin of sternopleuron, no lower mesepimeral bristle; femora with a line of pale scales beneath, tibiae and tarsi dark. Abdominal tergites dark-scaled, venter with some paler scales. Genitalia (figs. 13-16) with distal division of subapical lobe of basistyle

greatly elongated and hairy, bearing at its base a long blade and at its apex 2 short curved setae and a short blade of distinctive shape; inner margin of basistyle with a row of 6 (7 in one paratype) long curved bristles.

*Larva*.—A single specimen which is probably this species was found in a seepage pool at Ginka, Okinawa (R. Ingram) in company with *C. (Neoculex) hayashii* Yamada. It appears to be very similar to that of *mammilifer* Leicester according to the characters given by P. J. Barraud (1934, Fauna British India, Diptera vol. V, Culicidae). It has the following salient characters: Antenna tufted at apical two-thirds, only slightly darkened at base and beyond tuft; head hairs B and C fairly long and double; comb about 50 scales in a patch; siphon distinctly but gently curved upwards, about 10 times its basal diameter, with 4 pairs of double hairs which are about as long as diameter of tube subapically, 17 pecten teeth, each with about 7 denticles; anal gills pointed and subequal, longer pair a little longer than anal ring.

*Type*.—Male (U. S. National Museum No. 57760), Chizuka, Okinawa, September, 1945, reared from larvae collected in a rockhole along a stream (R. Bohart and R. Ingram).

*Paratypes*.—Two males, same data as holotype.

This species is related to *minor* Leicester, *mammilifer* Leicester, *uniformis* Theobald, *plantaginis* Barraud, *mindinaoensis* Baisas and *nolledoi* Baisas, all of which in the male have a knob on the torus, specialized setae on antennal segments VI to IX or X and an unbanded abdomen. It differs from all of these by the elongate hairy distal division of the subapical lobe of the basistyle. In addition to the length of the distal division, the terminal processes are distinctive (fig. 13). Except in this last character it closely resembles *nolledoi*, of which I have seen paratypes. The scutal integument of *tuberis* is pale brown instead of dark brown as in *nolledoi*, however.

#### *Culex (Culex) literalis*, n. sp.

*Male*.—Length of body 3.5 mm., wing 2.9 mm. Vertex with median area covered with pale yellowish narrow curved and upright forked scales, a few submedian dark upright scales, vertex laterally with a large spot of dull white, broad appressed scales. Palpus longer than proboscis by the last segment; first long segment (actual II and III) as seen laterally with five bands of about equal length, those of base, middle and apex black, the other two pale yellow; subterminal segment with a narrow basal pale band; terminal segment with narrow basal and apical pale bands; first long segment with a row of short ventral hairs on apical one-half and a lateral row of long hairs on apical one-fourth. Proboscis with a pale ring just beyond middle, taking up one-fifth of proboscis. Scales of anterior pronotal lobe, proepimeron, scutum and scutellum narrow curved and pale yellowish; scutum also with dark curved scales forming a spot in fossal area and a fringe around antescutellar area; scutal scales mostly scimitar-like and imparting a shaggy appearance; pleuron with 3 small spots of pale broad appressed scales, integument

mottled, darkest in postspiracular area and on sternopleuron except in scaled portions. Wing dark-scaled; halter knob entirely pale. Posterior surface of femora mostly pale, anterior surface of fore and mid femora dark and unspeckled, that of hind femur pale on most of basal two-thirds; tibiae dark-scaled; tarsi with narrow pale joint bands. Dorsum of abdomen with broad whitish yellow basal bands on II-VII, the bands occupying one-half or more of each segment, all more or less produced backwards at mid line of body, segment VIII with a lateral spot; venter of abdomen mostly pale-scaled. Genitalia (figs. 17-19) with basal arm of paraproct very small.

*Female*.—About as in male. Palpus about one-fourth proboscis length, pale at tip; pale ring of proboscis one-fourth to nearly one-third proboscis length; dark scutal areas more distinct than in male. Costa with a line of basal pale scales on its posterior margin above. Pale tergal bands most often produced on II to V, rarely occupying less than half of segment.

*Larva*.—Head broad; antenna (fig. 20) relatively short and slightly bowed, constricted and tufted at apical third, tuft surpassing antennal apex, basal two-thirds of shaft spiculate; apical third smooth but darkened, apical and subapical bristles arising close together and about equal in length; clypeal spines (fig. 22) very stout and spatulate, light brown in color; head hair A 6-branched, B double, C triple, d simple, e triple, hairs B and C hardly reaching past middle of antenna; mentum (fig. 21) subtriangular with about 15 teeth. Pronotal hairs fine and moderate in length, shoulder hairs (from left to right): 8 small and single, 7 double, 6 to 4 single, 3 to 1 single on a sclerotized plate. Lateral abdominal bristles triple on I and II, double on III to VI. Comb of about 30 apically fringed teeth without a distinct apical spine, lateral hair of segment VIII of about 10 plumose branches, siphon (fig. 23) tapering gradually toward apex, about 3.5 times as long as broad at base, with 8 to 11 long multiple hair tufts arranged in an irregular ventral row along apical three-fourths of tube, 2 pairs of short sublateral posterior tufts, acus well developed, pecten of 12-16 often irregularly placed stout teeth with 2 or 3 large denticles along anterior edge, pecten extending along entire basal third of tube. Anal segment (fig. 23) with a partial sclerotized ring which is apically spiculate, lateral single hair inserted just outside sclerotized area; gills short, rounded bud-like, slightly unequal; fan of 12 hair brushes, all in barred area; outer apical bristle (osc) single, inner apical bristle (isc) double or triple.

*Type*.—Male, Rota Island (north shore), Marianas Islands, October 26, 1945, reared from brackish coral rockhole (R. Bohart and R. Ingram).

*Paratypes*.—21 males, 25 females, 10 larvae and 1 pupa (larvae and pupa on slides), same data as type. I have also studied specimens from the islands of Tinian and Guam.

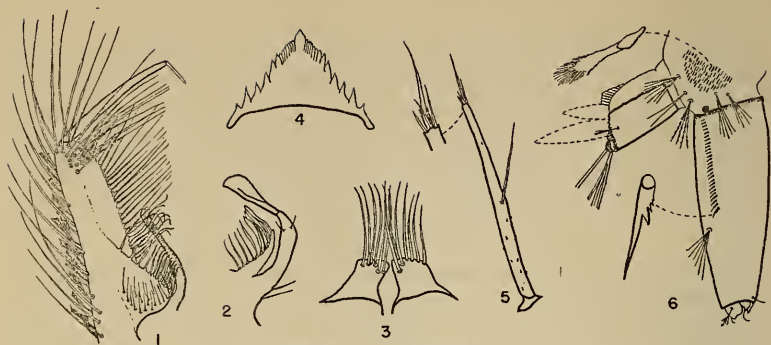
This species was first collected by Dr. S. F. Bailey in the fall of 1945 during the invasion of the island of Tinian. It has since been found on Guam and Rota. It is abundant during rainy spells following periods of unusually high tides, the larvae breeding in brackish water of coral

rockholes and artificial containers along the shore. The species is related to *jepsoni* Theobald and *annulirostris* Skuse. From the former it differs by its much paler vertex and scutum, its unspeckled mid femora, and the broader and often produced abdominal bands. From *annulirostris* it differs particularly by the much broader abdominal bands. The larva (figs. 20–23) has bud-like gills as in *jepsoni*, but the pecten teeth are much stouter and with fewer denticles, and the anal ring is incomplete.

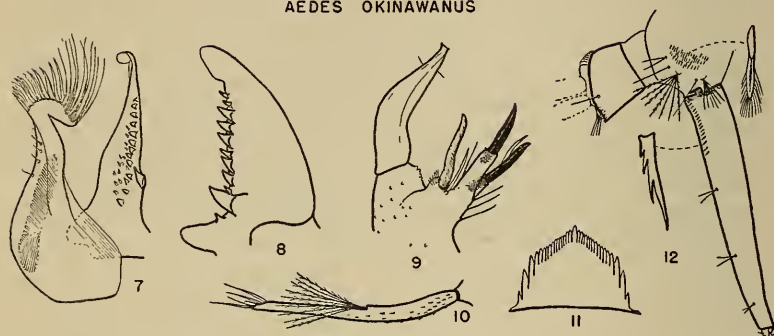
#### EXPLANATION OF PLATE VII.

Figures 1–6, *Aedes okinawanus*: 1, basistyle and dististyle (ventral); 2, claspette and basal lobe (lateral); 3, lobes of ninth male tergite; 4, larval mentum; 5, larval antenna; 6, caudal segments of larva. Figs. 7–12, *Culex ryukyensis*: 7, mesosome lobe and paraproct (left, ventral); 8, mesosome lobe (left, inner, lateral); 9, subapical lobe of basistyle and dististyle (inner, lateral); 10, larval antenna; 11, larval mentum; 12, caudal segments of larva. Figs. 13–16, *Culex tuberis*: 13, subapical lobe of basistyle; 14, basistyle and dististyle, showing subapical lobe in slightly different view (inner lateral); 15, paraproct (left, ventral); 16, mesosome (dorsal), Figs. 17–23, *Culex litoralis*: 17, subapical lobe of basistyle; 18, mesosome lobe and part of paraproct (left, ventral); 19, mesosome lobe (left, inner, lateral); 20, larval antenna; 21, larval mentum; 22, larval clypeus; 23, caudal segments of larva.

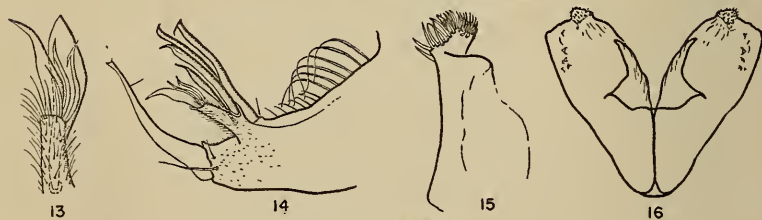




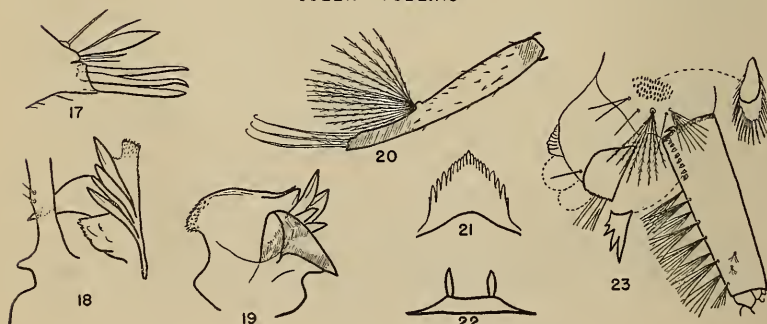
AEDES OKINAWANUS



CULEX RYUKYENSIS



CULEX TUBERIS



CULEX LITORALIS