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*CULEX (CULICIOMYIA) KYOTOENSIS* N. SP.  
(CULICIDAE, DIPTERA) from JAPAN

*With 2 Plates*

by

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In 1948 and 1950 we designated a Japanese mosquito as *Culex (Culiciomyia) ryukyensis* Bohart, 1946, without material from Okinawa to compare with at our disposal. Recently one of us (Lt. Col. LaCasse) had an opportunity to collect mosquitoes from Okinawa and to compare the Japanese species with *C. ryukyensis* from the type locality. After careful comparison we found distinct differences between the two, and so propose a new name *Culex (Culiciomyia) kyotoensis* for the Japanese species previously referred to *C. ryukyensis* Bohart.

We take this opportunity to redescribe the species in question with emendations.

*Adult female. Head:* Broad median area of vertex covered with yellowish pale narrow curved scales and dark upright forked scales. Lateral region with pale broad appressed scales. Eye margin fringed with pale appressed scales. Torus brownish dark, with fine dark hairs medially. Palpus and proboscis dark, former about one-fifth as long as latter. *Thorax:* Scutal integument dark brown, covered all over with ochraceous to brownish pale scales and numerous dark bristles above and in front of wing base. Scutellum greenish to greyish brown, with brownish pale narrow curved scales on each lobe. Anterior pronotal lobe with similar scales. Pleuron without scales, greenish pale, with a dark stripe from posterior pronotal lobe to beneath base of halter, and another from propleuron to sternopleuron as in *C. ryukyensis* Bohart. One lower mesepimeral bristle present. Wing 4.1 to 4.8mm. long, dark scaled. *Legs:* Femora dark dorsally and pale ventrally. Tibiae with sometimes indistinct pale stripe ventrally, dark elsewhere. Tarsi dark throughout. Tarsal claws equal, similar, untoothed. *Abdomen:* First tergite with median patch of dark scales. Second to seventh tergites with narrow basal bands of yellowish pale scales, which widen progressively posteriorly. Eighth tergite almost entirely pale scaled. Venter greenish, covered with pale transparent scales.

*Female terminalia*: Eighth sternite truncate, eighth tergite broadly rounded apically. Ninth tergite band-like, with several minute setae submedianly. Tenth tergite absent. Insula with median group of about 10 small setae. Sigma indistinct. Cowl with arcuate chitinous margin. Atrial plates and V-shaped chitinous median structure present. Postgenital lobe rounded apically, with one dorsal, one apical and seven ventral setae in each submedian field. Cerci plump, reaching a little beyond postgenital lobe. Spermathecae three, oval, nearly of same size.

*Adult male*: Palpus longer than proboscis by its own terminal segment or a little more; long segment with a row of 5 to 7, evenly spaced, somewhat curved, lanceolate, upright scales along ventral margin of distal portion. Wing 3.2 to 4.1 mm. long. Tarsal claws of fore and mid legs unequal, dissimilar; larger claw with a branch just proximal to middle, smaller claw with accessory denticle at base. Hind tarsal claws equal, similar, untoothed.

*Male terminalia*: Basistyle subcylindrical, about two and one half times as long as wide, with prominent subapical lobe, on the ventral side of which is a group of spines and setae. The four strong spines are, however, not pedunculate and not so heavily sclerotized as in *Culex ryukyensis*. Dististyle sigmoid, recurved at tip, swollen at base, usually with frilled margin on the convex side of attenuated distal portion. Each lateral half of mesosome with a nodular ventrolateral protuberance, by which it is articulated with the ventral apical corner of the basal plate. The attenuated apical portion of the mesosome is provided on the outer side with oblique ridges and along the ventral margin with a double row of about 10 denticles and a stout separate tooth, and on the mediodorsal side with a triangular lobe, whose apex does not overlap the corresponding part of its fellow of the other side unless strongly flattened; the basal portion of the mesosome is provided on each side dorsally with a longitudinal chitinous fold supported by the paramere at its base. Paraproct with a moderately long, dorsally directed, lateral peg and a trapezoidal medial lobe covering nodular ventrolateral protuberance of mesosome. The antero-medial margin of this lobe is conspicuously thickened in contrast with that of *C. ryukyensis* and *C. pallidothorax*. Apical spines and setae as well as basal ventral arm of paraproct similar to those of the other species mentioned above. Paramere attenuated apically, articulated with basal plate beyond its middle. Ninth sternite lobe nearly triangular, bearing a zigzag marginal row of 5 to 10 small setae.

*Larva. Head*: Preclypeal setiform, moderately long. Inner clypeal lacking, outer fine. Postclypeal 1 to 3 forked. Inner and middle frontals 2 to 5

forked, outer 3 to 10 forked. Inner sutural single or double, outer 3 to 8 forked. Orbital 2 to 5 forked. Ventrolateral 2 to 6 forked. Ventrally anteromedial to the eye is a moderately long 2 to 9 forked hair, and medial to the eye is another much smaller 2 to 5 forked hair. Postmental 3 to 7 forked; inner postmaxillary 1 to 3 forked, outer single or double. *Antenna*: Spined except at distal end, with spines and setae as usual; antennal 15 to 30 forked, inserted just before middle of shaft. *Mouth parts*: Cutting organ consisting of a pectinate ventral blade with a pointed anterodorsal spine, a four-toothed main saw and two single dorsal teeth with a simple and an apically bifid accessory denticle behind. Behind the ventral pectinate blade is a longitudinal row of 12 or 13 plumose setae. Ventral plate of labium with 27 to 37 denticles, most of which are minute but the basal are distinctly larger; dorsal plate finely denticulate anteromedianly, with a median group of spines ventrobasally. *Prothorax*: Medioposterior shoulder hair double, middle single, anterolateral usually double, occasionally single or triple; all not reaching beyond anterior head end. Inner dorsolateral double, middle and outer single. Lateral 2 or 3 forked, sublateral double, occasionally single. Ventrolateral consisting of a long single bristle, two small hairs and a minute 3 or 4 forked tuft. Ventral single. *Mesothorax*: Dorsal principal 2 to 4 forked. Of the three dorsal accessories the smallest inner is 2 to 4 forked, the middle is single, and the outer double, occasionally single. Three dorsolaterals single, outer two very close together. Lateral 4 to 8 forked, with accessory tuft anteroventrally. Sublateral consisting of two single bristles and a 3 to 8 forked tuft. Ventral tuft. *Metathorax*: Of the six dorsals the outer two are single and the others 2 to 6 forked. Lateral 4 to 8 forked, with accessory tuft anterolaterally. Sublateral consisting of a single bristle, a 4 to 7 forked tuft and a minute simple hair. Ventral 4 to 7 forked. *Abdomen*: Lateral principal bristles are as follows: Segment I, 2 bristled, both double; segment II, 1 bristled, 2 or 3 forked; segment III, 1 bristled, single or double; segment IV, 1 bristled, 1 to 4 forked; segment V, 1 bristled, 1 to 3 forked; segment VI, 1 bristled, single. *Eighth segment*: Comb scales 30 to 50 in number, fringed apically and laterally, forming a patch. First pentad hair 3 to 9 forked, second single, third 5 to 11 forked, fourth single, fifth 1 to 4 forked. Siphon gradually tapered from base to apex,  $1.45-2.0 \times 0.25-0.35$  mm., apical portion somewhat recurved; siphonal index 5-7:1. Pecten of 12 to 22, progressively more widely spaced, spiniform teeth, inserted on basal fourth of siphon; individual tooth with up to 5 denticles; one or two basal teeth may be simple and very small. Siphonal hairs of four pairs, occasionally three or five on one side, all subventral; in-

Individual hair 2 to 4 forked, shorter than basal diameter of siphon. *Anal segment*: longer than wide. Saddle 0.2 to 0.35 mm. long, completely ringed, spined on posterior subdorsal margin; saddle hair single. Dorsal tuft consisting of two pairs of single bristles. Ventral brush usually of eight tufts, with delicate grid; individual tuft 1 to 9 forked. Gills elongate, claviform,  $0.6-1.7 \times 0.05-0.2$  mm.

This species closely resembles *Culex pallidothorax* Theobald, 1905 on the one hand and *Culex ryukyensis* Bohart, 1946 on the other, and this is believed to be a possible explanation for the fact that Yamada, whose work on adult mosquitoes in Japan was very extensive, failed to recognize its existence as a distinct species despite its fairly widespread occurrence. We originally regarded the species as identical with *C. ryukyensis* but after careful comparison of Okinawan material with specimens from Japan we regard this species as distinct. The most outstanding differences between this and other related species are given in the table which follows.

**Biology:** This mosquito was found breeding in a wide variety of situations ranging from clear, clean water to environments in which the degree of pollution with organic matter including feces and urine was very high. Perhaps the best index of variation in breeding habitat is reflected by the wide range of other species with which larvae were found in multiple collections. In this connection it is pointed out that larvae were taken with *Anopheles lindesayi japonicus*, *Anopheles sinensis*, and *Culex infantulus* which are quite strictly fresh water breeders, and with *Culex tritaeniorhynchus*, *Aedes albopictus*, *Aedes togoi*, and *Aedes japonicus*, species favoring environments offering some degree of pollution with organic matter. It was also taken in multiple collections with *Culex vorax*, *Culex pallidothorax*, *Culex pipiens*, and *Armigeres subalbatus*, all of the latter preponderantly favoring situations in which pollution with organic matter, particularly human and animal waste is present. Among *Culex* mosquitoes in Japan the only other species exhibiting a somewhat comparable variation in breeding sources is *Culex tritaeniorhynchus*, although the latter species displays a far lesser degree of variation than the one under consideration. Further evidence of wide variation in breeding habitat is indicated by the fact that of the total of 124 collections recorded, 19% were from movable artificial containers, 42% from immovable containers, 33% from stagnant ground water, and 6% from ground water which may be moving or stagnant. Very recently this species was also taken on several occasions from the stumps of cut bamboo in densely shaded groves. We have also taken larvae in situations varying from complete shade in submerged tanks (below ground level) protected with overhead roofs, to habitats exposed to full sun. Adults were never taken in

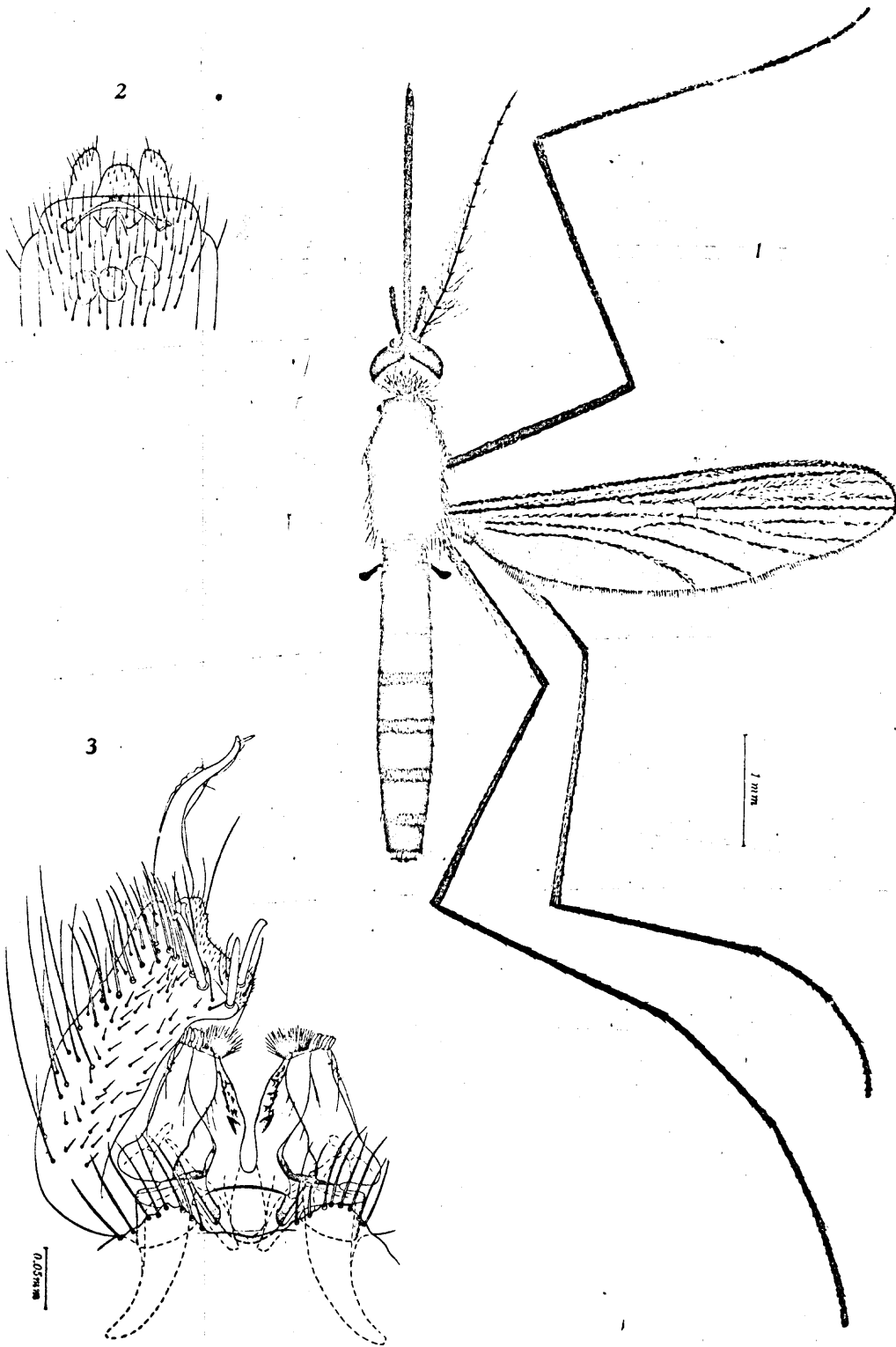
	Species	<i>pallidothorax</i>	<i>ryukyensis</i>	<i>kyotoensis</i>
ADULT	Wing length $\left\{ \begin{array}{l} \text{male} \\ \text{female} \end{array} \right.$	3.3-4.2 mm 4.0-4.8 mm	2.5-3.0 2.5-3.8	3.2-4.1 4.1-4.8
	Lanceolate upright scales on male palpus	6-8	3-4	5-7
	Subapical spines of basistyle	all sessile, none black	two black, distinctly pedunculate, others sessile	all sessile, none black
	Distal convex margin of dististyle	with pectinate crest	no distinct crest	with frilled crest
	Mediodorsal lobes on apical half of dististyle	small, rounded apically, not overlapping each other	large, trapezoidal, approximating or overlapping each other	small, triangular apically, not overlapping each other
	Additional denticles basal to separate ventral tooth of mesosome	absent	present	absent
	Inner lobe of paraproct	linguiform, only slightly thickened apically	linguiform, thickened apically very little if at all	trapezoidal, greatly thickened at anteromedial margin
LARVA	Siphon	somewhat fusiform	gradually tapered from base to apex	gradually tapered from base to apex
	Siphonal hairs	usually 4 pairs, 3-6 forked	3 pairs, usually 2 forked	4 pairs, 2-4 forked
	Penultimate siphonal hair	a little above subventral line or practically lateral	only slightly above subventral line	subventral
	Gills	not distinctly subequal	distinctly subequal	not distinctly subequal

biting collections and no evidence obtained in our studies indicates this species may be of any particular importance.

*continued 5 pairs,*

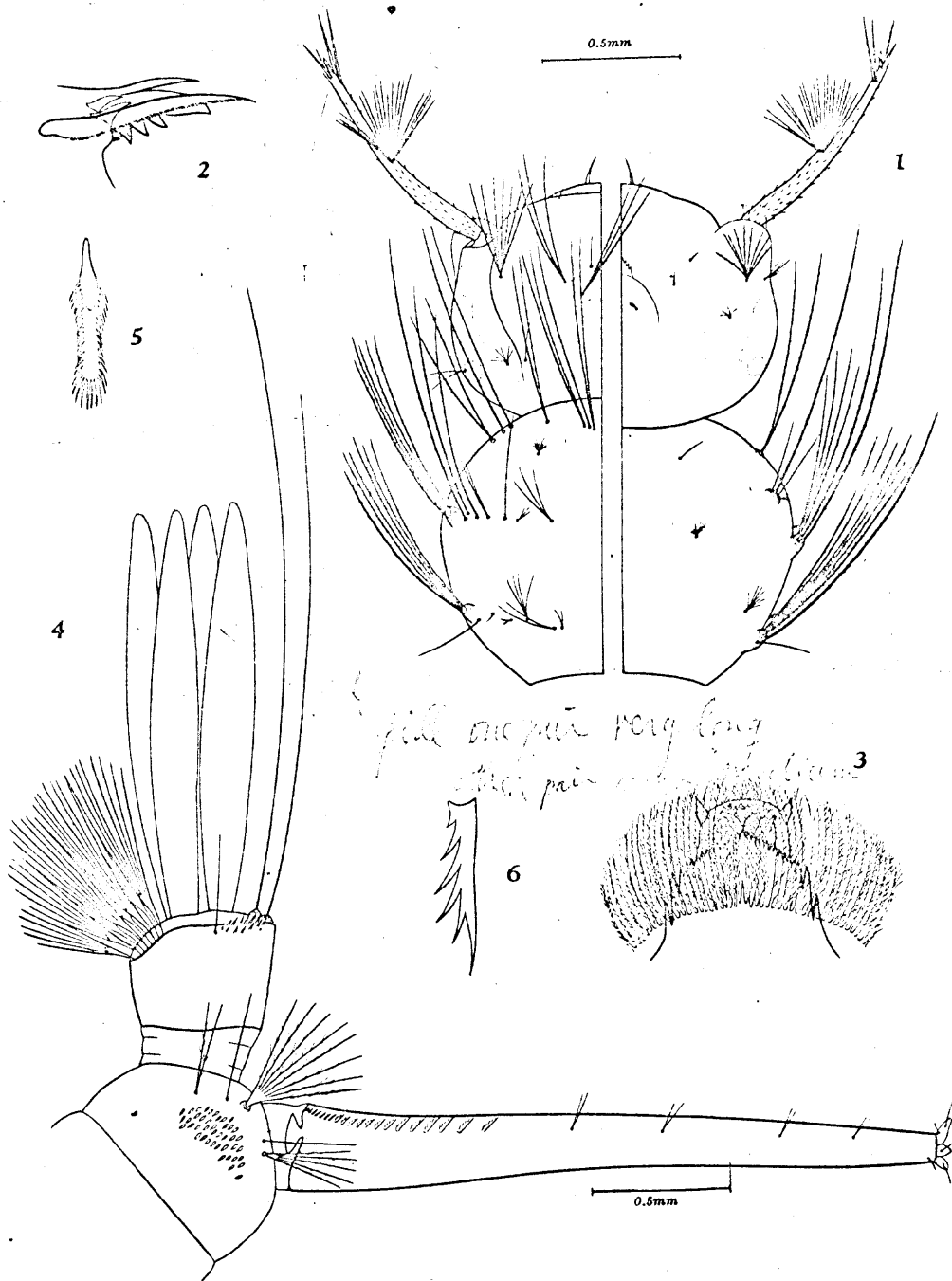
#### Literature

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*Culex (Culiciomyia) kyotoensis* n. sp. :

1. adult female, 2. female terminalia, ventral view, 3. male terminalia, ventral view.



*Culex (Culiciomyia) kyotoensis* n. sp. :

1. head and thorax, 2. cutting organ of mandible, 3. labium, 4. posterior extremity, 5. comb scale, 6. pecten tooth.