

SOME JAVANESE BITING MIDGES
(CERATOPOGONIDAE, DIPTERA) *

By

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This report deals with a collection of the genus *Culicoides*, which was found by myself during a trip of the western part of Java in the winter of 1944.

I am greatly indebted to Prof. Dr. Teiso Esaki, with whose kind help this study was made possible.

- *Culicoides punctigerus* sp. nov.

This species is very much characteristic having with many pale spots in the wing cell R_5 and closely resembles *C. maculithorax* Williston and *C. oxystoma* Kieffer.

Female. Body 1.5—1.7mm. long. Head dark brown. Eyes bare. Antennae pale brown, somewhat moniliform without terminal stylet; antennal ratio about 0.94; relative lengths of distal seven segments about 4.5 : 4.5 : 6 : 6 : 6.3 : 6.8 : 9. Maxillary palpi pale brown, with sensory organs of *obsoletus* subtype; relative lengths of distal four segments about 7 : 8 : 4 : 5. Thorax mat and brown in ground color; notum with pale brown markings, scutum with a pair of pale brown irregular stripes median brown part with a very fine pale brown stripe on anterior half, lateral brown part with three pale obscure oval spots, anterior margin of scutum pale brown, with two small brown spots on each lateral part; scutellum pale brown, with a brown cloud on each lateral corner and on middle part. Wings (Plate I, Fig. 1) with adornment closely similar to those of *C. maculithorax* and *C. oxystoma*, with macrotrichia very sparse being found on marginal zone of distal half; first radial cell slit-like second large, entirely dark; second pale costal spot consisting of three small round spots, third pale costal spot large situated before distal corner of cell R_5 and constricted; a pale small spot situated immediately anterior to fork between M_{3+4} and

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No. 2.

Cu₁; distal half of vein M₁ and M₂ bordered with pale zones on both sides. Halteres white. Legs pale brown, with dark and white bands; femur with a large brown band at middle; knee-joint dark, with a white ring before and beyond this joint, but hind femur without pre-apical white ring; tibia with a large middle brown ring and a dark ring just beyond sub-basal white ring; tarsus yellowish white. Relative lengths of seven distal segments of legs as follows: 41: 40: 22: 8.5: 6.5: 5: 6 in fore leg. 54: 53: 31: 9.5: 7: 5: 6 in middle and 50: 51: 24: 11: 7: 4.5: 6 in hind. Abdomen almost pale, rarely dusted in dark; sclerites very much atrophied, tergal sclerite remained as a small round brown plate. Spermathecae two, brown, oval equal in size without chitinised duct.

Male. Coloration as in female; wing adornment somewhat ill defined. Hypopygium (Fig. 1) somewhat similar to that of *C. oxystoma*, but styles not pointed but slightly spatulate; anal points well developed, caudal margin of ultimate tergite thickly chitinised and with a median V-shaped incision; gonapophyses curved irregularly, needle-like, simple. Ninth sternite with excavation deep; membrane between ninth sternite with excavation deep; membrane between ninth sternite and aedeagus spinulate uniformly.

This species closely resembles to two tropical species, *C. oxystoma* and *C. maculithorax*. But the first allied species differs chiefly in the following characters: the macrotrichia of the wing are more densely distributed, a pale spot under the second radial cell is far smaller and the spermathecae are provided with chitinised necks. The second allied species also differs in the following characters: a pale spot situated immediately anterior to the fork between M₃₊₄ and Cu₁ is absent, a pale spot situated just below the second radial cell is smallest of three spots of the second costal pale spot-group, the thoracic scutum is distinctly spotted, the spermathecae are provided with rather long chitinised necks.

Specimen. Alcoholic males and females; collected at window of a cottage

of natives; Java, Batavia; December, 1944; deposited in the entomological laboratory Saikyo University.

Culicoides javae sp. nov.

This species is related to *C. erairai* Kono et Takahashi and *C. shortti* Smith et Swarminath.

Female Body 1—1.5 mm. long yellowish pale brown in ground color. Head brown; eyes bare; frontoclypeus with four setae. Antennae whitish pale brown somewhat moniliform; proportional lengths of distal seven segments about 4.5: 4.5: 5.5: 6: 6: 6.5: 10; ultimate segment without terminal stylet; antennal ratio about 0.91—0.92. Maxillary palpi rather short with sensory organs of *obsoletus* subtype; distal four segments about 7: 8: 3.5: 4.2 in relative length. Thorax brown not shiny but moderately mat; scutum with fuscous clouds on brown lateral and cephalic areas and with a brown mid-dorsal stripe on yellowish pale brown median area; caudoscuteal area with a small rhombic fuscous cloud. Wings (Plate I Fig. 2) with macrotrichia numerous, but bare on basal area; adornment faint but sometimes distinct. Second radial cell entirely dark. cell R_5 with three pale spots besides first costal white spot. Wing markings closely similar to those of *C. shortti* and very closely similar to those of *C. erairai*. Legs brown, with knee-joints and distal ends of tibiae dark with white rings before and beyond knee-joints; basal half of femur and distal quarter of tibia pale brownish yellow; tarsi yellowish brown. Relative lengths of distal seven segments of fore leg about 39: 38: 19.5: 8: 5.5: 4: 5.5; those of middle 50: 48: 27: 8: 6: 5: 5.5; those of hind 45: 48: 19: 10: 6: 4: 6. Abdomen white with sclerites yellowish pale brown; abdominal tip brown. Spermathecae two, yellow, spherical equal in size and shape, without chitinised neck parts and ducts.

Of the two allied species *C. shortti* differs from the present species in the following points: the hind femur is entirely dark brown the hind tibia is pale

brown and provided with a dark band before the apical end, the abdomen is blackish, and the spermathecae are oval and provided with chitinised ducts. The other allied species, *C. erairai*, differs in the following points: the antennal ratio is about 1, the proportional lengths of the distal seven antennal segments are 14: 14: 15: 16: 18: 19: 20, the abdominal sclerites are brown and membranous areas are fuscous, the spermathecae are three and one of them is vestigial and tubular, and the other two are provided with distinctly chitinised ducts.

Specimen. Alcoholic females; male unknown; collected at window of a hotel; Java Bandoeng; November to December, 1944; deposited in the entomological laboratory, Saikyo University, Kyoto, Japan.

Culicoides bifasciatus sp. nov.

This species is somewhat related to *C. duodenarius* Kieffer and *C. similis* Cater, Ingram et Macfie in the adornment of the wings.

Female. Body length about 2 mm. Head dark brown, with antennae pale brown. Antennal ratio about 1.1—1.2; relative lengths of distal seven segments about 4.5: 4.5: 6: 7.5: 8: 8: 10; last segment without terminal stylet. Maxillary palpus with sensory organ of *obsoletus* subtype; relative lengths of four distal segments about 6: 7.5: 3.5: 4. Thorax not shiny but rather mat; scutum brown with a pair of yellowish pale brown stripes, median vitta not subdivided; scutellum yellowish brown. Legs brown but femora pale brown on basal half and tibiae somewhat whitish on sub-basal area; relative lengths of distal seven segments of legs as follows: 46: 42: 23: 9: 7: 5: 6 in fore 58: 57: 29: 10: 7: 6: 7 in middle and 55: 53: 26: 12: 8: 5.5: 6.5 in hind leg. Wings (Plate I Fig. 3) rather paler with two pale cross-bands at position of first and second costal white spot; macrotrichia fairly numerous, almost covering distal half of wing. Both radial cells well formed; second radial cell larger than first. Adornment of wing generally similar to that in *C. duodenarius* and *C. similis* but with

following notable differences : in the first allied species, first costal white spot and three marginal white spots far smaller, second costal white spot enveloping distal tip of second radial cell and basal angle of cell M_4 paler, and in the second allied species two costal white spots not forming so distinct cross-bands as in present new species. Halteres brown. Abdomen with tergal plates distinctly developed and pale brown, sternal plates subdivided longitudinally at middle into paired sclerites and pale brown, membranous areas white but sometimes dusky. Spermathecae two, brown, slightly unequal, one oval and one more globular and somewhat pyriform; both without chitinised ducts but each with a very short neck part.

Male. Coloration and general structure similar to those of female. Hypopygium (Fig. 2) closely related to that of *C. duodenarius*, but gonapophyses and anal points longer; ultimate tergite with caudal margin convex and anal points rather long; ultimate sternite with caudal margin slightly concave; membrane between sternite and base of aedeagus spinulate on anterior half.

Specimen. Alcoholic males and females; collected at window of a hotel; Java, Batavia; December, 1944; deposited in the entomological laboratory, Saikyo University, Kyoto Japan.

Culicoides micropunctatus sp. nov.

This species is closely allied to *C. guttifer* de Meijere and *C. arakawae* Arakawa.

Female. Body 2—2.5mm. long, dark brown in ground color. Head dark brown with antennae pale brown, mouth parts brownish black, eyes bare. Antennae slender, without apical stylets; antennal ratio 1.3—1.4; proportional lengths of distal seven segments about 5.5 : 5.5 : 10.5 : 10.5 : 12 : 13 : 16. Maxillary palpi slender with sensory organs of *obsoletus* subtype; relative lengths of distal four segments about 10 : 11.5 : 5 : 5. Thorax dark brown not shiny but slightly

mat, without dot-like punctures; scutum with brown median vitta, cephalic margin dark brown, lateral parts dark brown and each with two large brown spots, mid-dorsal stripe dark brown and extending over caudoscuteal area; scutellum with black spots on lateral corners and middle part and a pair of brown spots on lateral parts; postscutellum dark brown or black. Legs brown; femora whitish pre-apically; tibiae narrowly pale brown sub-basally; tarsi paler; relative lengths of distal seven segments of legs about 55: 54: 28: 12.5: 8: 5: 7 in fore, 70: 71: 38: 13: 8.5: 6: 7.5 in middle and 64: 70: 31: 15: 9: 6: 6.5 in hind. Wings (Plate I. Fig. 4) very much closely similar to those of *C. guttifer* and *C. arakawae* in adornment and venation; but specific in development of a pale spot just below vein R_{4+5} . Halteres brown. Abdomen brown; sclerites well developed; membranous areas brownish. Spermatheca only one, brown, elongated and bottle-like.

Of the two allied species, in *C. arakawae*, the pale spot below the radial cells is very much obliterate and the antennal ratio is far larger being 1.5(1.4—1.5). In the other allied species *C. guttifer*, the basal area of the wing, proximad to the level of the cross-vein r-m, is almost bare without macrotrichiae, and the pale spot below the vein R_{4+5} is very large and round extending caudad and touching the vein M_{1+2} .

Specimen. Alcoholic female; male unknown; collected at window of a cottage in a cinchona field; Java, Tjinjirean; November, 1944; deposited in the entomological laboratory, Saikyo University, Kyoto, Japan.

Culicoides suborientalis sp. nov.

This species is rather large, being about 2—2.5 mm. in body length and closely allied to *C. orientalis* Macfie.

Female. Head, thorax and abdominal tergites brown. Eyes bare. Antennae slender, with antennal ratio 1—1.1, ultimate segment without terminal stylet; relative lengths of distal seven segments 4: 4.5: 6: 5.5: 6: 6.8: 9.8.

Maxillary palpus slender, relative lengths of distal four segments 8.3: 6.3: 4: 3.5. Thorax shiny. Halteres white. Legs brown, knee-joints dark brown or black; fore leg with white narrow rings before and beyond knee-joint; middle leg with white large rings before and beyond knee-joint; in fore and middle leg base of femur and distal three tarsal segments pale brown; hind leg with a white ring beyond knee-joint and distal three tarsal segments pale brown. Relative lengths of distal seven segments of fore leg about 37: 37: 20: 8: 5: 3: 4.5; those of middle 45: 45: 26: 9.5: 5.5: 4: 5; those of hind 46: 47: 22: 11: 5.5: 3.5: 4.5. Wings (Plate I, Fig. 5) broad, comparatively short, with macrotrichia scanty being found only on marginal zone of cell R_5 , M_1 and M_2 , with very large pale spots on dark ground color. Abdominal sclerites brown; sternites subdivided broadly into paired linear sclerites at middle. Spermathecae brown two, equal in size and shape, oval, with very short chitinised neck regions.

Male. Ultimate tergite with a pair of caudal p pilliform erection and a very shallow semicircular caudal incision, where is spinulate. Distal part of gonapophyses very slender, and each with a few spinules at tip (Fig. 3).

This species is very closely allied to *C. orientalis*, but the allied species may be distinguished by the following characters: The second costal pale spot covers the second radial cell less than the distal half, the pale stripes along the vein M_1 are very much obscure and the macrotrichia on the wing margin are rather numerous than in the present species. The gonapophyses are simple and not spinulate at tip and the ultimate abdominal tergite is provided with more obscure low caudal erection.

Specimen. Alcoholic males and females; collected in a coco forest; Java, Tjinjiroean; November, 1944; deposited in the entomological laboratory, Saikyo University, Kyoto, Japan.

Culicoides quadratus sp. nov.

This species is rather large. The wings are dark and provided with rather clear pale punctures. The adornment of the wings is somewhat similar to that of *C. peregrinus* var. *assamensis* Smith et Swarminath, *C. amamiensis* Tokunaga or *C. kagiensis* Tokunaga.

Female. Body about 2.5—3 mm. long; dark brown in ground color. Head dark brown; eyes bare; antennae slender, yellowish brown on basal half, gradually changing into brown towards the tip; ultimate segment with a slender stylet; antennal ratio about 1.1—1.2; relative lengths of distal seven segments about 4.5: 4.5: 7: 7: 8: 9: 11. Maxillary palpi with small sensory organs of *obsoletus* subtype; relative lengths of distal four segments about 7.5: 7.5: 3.5: 4. Thorax dark brown; scutum mat. Legs dark brown in ground color, with knee-joints yellow; in fore leg, trochanter, femur, base of tibia and tarsus pale yellow; in middle leg, trochanter, both ends of femur, base of tibia and tarsus pale brown or yellowish brown; in hind leg, trochanter, base of femur, both ends of tibia and tarsus pale yellow. Relative lengths of distal seven segments about 43: 43: 23: 10: 6.5: 5: 6 in fore, 56: 60: 28: 11: 7.5: 5: 6 in middle and 50: 52: 27: 12: 7.5: 5.5: 7 in hind leg. Halteres dark brown. Wings (Plate I, Fig. 6) dark with rather clear adornment; macrotrichia distributed only on marginal zone; dark spot between second and third costal white spots square in shape and very dark; base of cell M_4 pale; a small round spot present just anterior to fork between M_{3+4} and Cu_1 ; M_1 and M_2 ending into a small semicircular pale spot respectively; a very small pale spot rarely present at end of M_{3+4} . Abdomen dark brown with lateral membranes dark; spermathecae two, similar in shape and size, brown with very short chitinised neck parts oval.

This species may be distinguished from the allied species in the following points: In *C. peregrinus* var. *assamensis* the dark spot of the wing between the second and third pale costal spots is always distinctly constricted at middle. In

C. amamiensis and *C. kagiensis*, there is no pale spot on the basal area of cell M_4 .

Specimen. Alcoholic females; male unknown; collected in the botanical garden; Java Buitenzorg; November, 1944; deposited in the entomological laboratory, Saikyo University, Kyoto Japan.

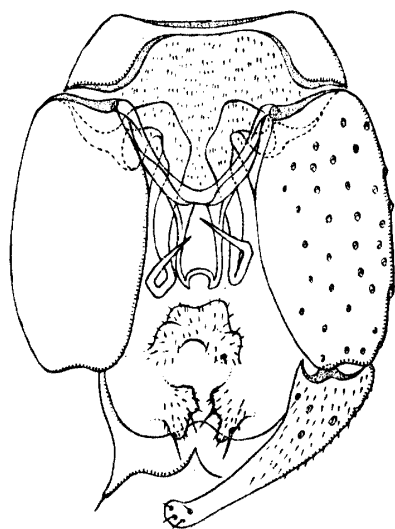


Fig. 1. Male hypopygium of *C. punctigerus* sp. nov.

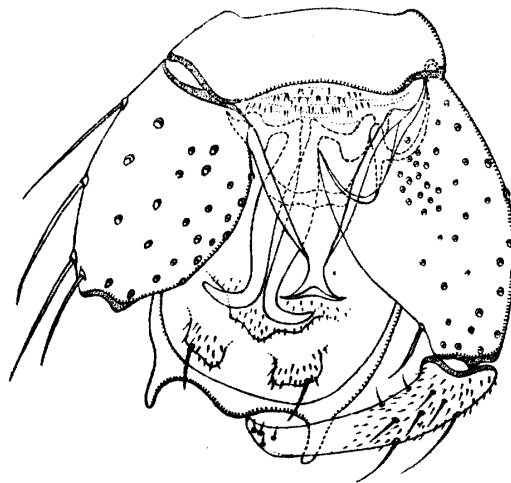


Fig. 2. Male hypopygium of *C. bifasciatus* sp. nov.

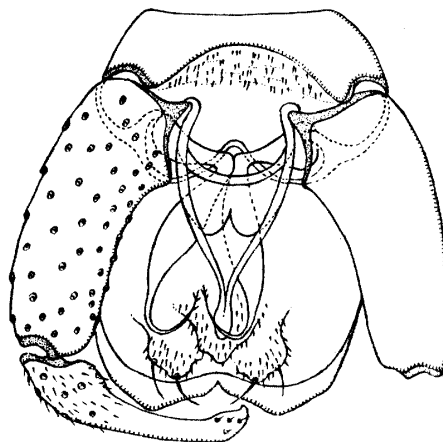
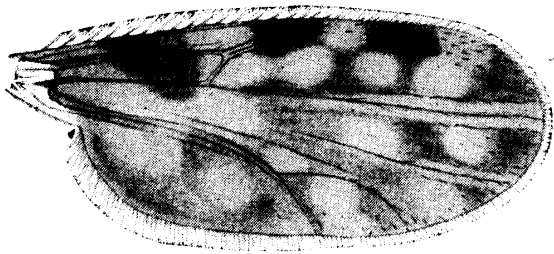


Fig. 3. Male hypopygium of *C. suborientalis* sp. nov.

Expalnation of Plate I

Female wings

- Fig. 1. *Culicoides punctigerus* sp. nov. Fig. 4. *Culicoides micropunctatus* sp. nov.
Fig. 2. *Culicoides javae* sp. nov. Fig. 5. *Culicoides suborientalis* sp. nov.
Fig. 3. *Culicoides bifasciatus* sp. nov. Fig. 6. *Culicoides quadratus* sp. nov.



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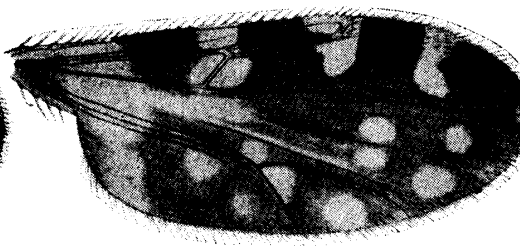
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