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**THE BITING MIDGE GENUS *MONOHELEA* KIEFFER
IN THE ORIENTAL REGION¹
(Diptera: Ceratopogonidae)**

By Niphan Chanthawanich Ratanaworabhan² and Willis W. Wirth³

Abstract: The Oriental species of the genus *Monohelea* Kieffer are classified and characterized into 4 groups: *hieroglyphica*, *multilineata*, *tessellata*, and *inflativena* Groups. A key is presented for the identification of the 22 known Oriental species, of which the following 18 are described as new: *ampligonata*, *arcuata*, *basilobata*, *brinchangensis*, *campostyla*, *capitata*, *chelagonata*, *digitata*, *macclurei*, *nigripes*, *orientalis*, *pahangensis*, *parafurcata*, *quatei*, *scanloni*, *superlobata*, *tenuilobata*, and *whartoni*. Descriptions and figures are given for all 22 Oriental species.

This paper is the fourth in a series of revisions of Oriental Ceratopogonidae, the previous ones being a revision of the Oriental *Alluaudomyia* by Wirth and Delfinado (1964), revision of the Oriental species of *Stilobezzia* by Das Gupta and Wirth (1968), and a new genus of Sphaeromiini from the Oriental Region by Das Gupta and Wirth (1970). The light trap collections of ceratopogonids which were sent to the U. S. National Museum for a study of the *Culicoides* of Southeast Asia by Wirth and Hubert (in preparation) provide a rich source which we hope will facilitate much needed revisions of other genera of biting midges.

We are especially indebted to the following persons and organizations for their generous cooperation in collecting and sending us material for this study: A. A. Hubert, H. E. McClure, R. Traub, and R. H. Wharton, associated with the Walter Reed Army Institute of Research and the Medical Research Institute at Kuala Lumpur, Malaya; J. L. Gressitt and L. W. Quate of the B. P. Bishop Museum, Honolulu, Hawaii; J. E. Scanlon of the SEATO Medical Research Laboratory, Bangkok, Thailand; and D. H. Colless, Commonwealth Scientific and Industrial Research Organization, Canberra, Australia.

The types of our new species are deposited in the U. S. National Museum in Washington and the B. P. Bishop Museum in Honolulu. Paratypes, when available, will be deposited in: USNM; Bishop Museum; British Museum (Natural History), London;

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School of Public Health, University of Sydney, Australia ; the Commonwealth Scientific and Industrial Research Organization, Canberra, Australia ; and the Applied Scientific Research Corporation of Thailand, Bangkok, Thailand.

In the genus *Monohelea* Kieffer the best and most reliable characters for separation of species are found in the male genitalia. Usually the females have little variation between species in wing and leg markings or other external characters, and we often been unable to associate females of closely related species with their males, except sometimes by collection data. Wing markings are of little use except for group separation, but leg markings are frequently more useful. We were only partially successful in trying to set up a key for both sexes. Wing and leg characters of both sexes could be used for separation of groups, but for species separation we were forced to rely on male genitalia. Many of our new species are necessarily based on male specimens only.

For a detailed account of ceratopogonid morphology and for an explanation of our terminology, the reader is referred to the comprehensive accounts by Carter, Ingram, and Macfie (1920-1921), Edwards (1926), Lee (1948), Wirth (1952), Tokunaga and Murachi (1959), and Das Gupta and Wirth (1968). Special terminology we are using in *Monohelea* is as follows: Tarsi—ventral spines are borne at the apices of some or all of the first 4 tarsomeres and at the base of tarsomere 1 on the hind leg ; their number is stated as formulae in our descriptions. Spermathecae—the neck is the sclerotized slender portion at the base of the opening into the duct.

The illustrations were made by the senior author using a microprojector, and the measurements were made with an ocular micrometer.

Genus *Monohelea* Kieffer

Monohelea Kieffer, 1917, *Ann. Hist. Nat. Mus. Hungarici* **15**: 295. Type-species, *Monohelea hieroglyphica* Kieffer (original designation).

Diagnosis. Moderately small, compact midges ; not very hairy. Eyes meeting above antennae ; bare. Antenna variable in length ; ♂ with plume. Palpus 5-segmented ; segment 3 slender to moderately stout, usually with round sensory pit. ♀ mandible with strong teeth. Thorax moderately broad and convex ; humeral pits present but usually small. Fore and mid legs slender ; hind legs often with femur and tibia more or less thickened, but without spines ; femora without ventral spinose armature. Tarsi with ventral spines on some of proximal segments ; tarsomere 4 cylindrical, 5 without ventral armature. Fore and mid legs of ♀ with claws equal, small to moderately large ; hind leg with 1 very long claw, the other absent or reduced to a short basal barb ; ♂ claws small and equal except in *tessellata* and *inflativena* groups, in which the hind claw resembles that of ♀. Wing with fine microtrichia, often with prominent color pattern ; macrotrichia restricted to a few at wing tip ; 2 radial cells, 2nd longer than 1st ; costa extending well over halfway to wing tip ; intercalary fork fairly distinct ; crossvein r-m vertical ; medial fork with short stem, vein M2 sometimes interrupted at base ; anal vein thickened in middle but without fold at thickening. ♀ abdomen blunt distally, without modification of genital segments ; two large sclerotized spermathecae present. ♂ genitalia with 9th tergum tapered, caudal margin truncate or broadly bilobed ; 9th sternum usually filling space anterior to aedeagus, rarely emarginate ; aedeagus with a sclerotized basal loop, a pair of sharp-pointed, tapered, lateral sclerites, and an accessory dorsomedian posterior lobe, or bipartite, with more or less separated, basal and distal sclerites ; parameres consisting of paired

submedian sclerites of various shapes.

KEY TO THE ORIENTAL SPECIES OF MONOHELEA

1. Wing with 2 small dark spots or 4 dark areas on anterior margin; hind femur slender or slightly swollen; ♀ claws large and equal on first 4 legs, a single hind claw little larger than anterior claws 2
 Wing with 3 large dark areas on anterior margin; hind femur greatly swollen; ♀ claws small and equal on first 4 legs, a single large hind claw with distinct basal barb7
2. Wing with 4 dark areas on anterior margin and with characteristic irregular hieroglyphic markings; ♀ spermathecae very unequal (smaller one with long threadlike sclerotization of duct); ♂ aedeagus usually with sclerotized basal loop joining a pair of strong, sharp-pointed, tapering, lateral sclerites (*hieroglyphica* Group).....3
 Wing with 2 dark areas on anterior margin, caudally without characteristic irregular hieroglyphic markings; ♀ spermathecae subequal; ♂ aedeagus without sclerotized basal loop (*multilineata* Group) 5
3. ♂ parameres each with apex not divided into 2 blades 1. **pahangensis** n. sp.
 ♂ parameres each with apex divided into 2 blades..... 4
4. ♂ parameres each with large blade of the apex very long and slender ... 2. **orientalis** n. sp.
 ♂ parameres each with large blade of the apex short and stout 3. **palauensis** Tokunaga
5. Legs dark brown, especially on hind pair, bands on each side of hind knee poorly contrasting; ♂ aedeagus with pair of short distolateral processes, on shoulders
 4. **macclurei** n. sp.
 Legs yellow with contrasting narrow dark brown bands on each side of hind knee; ♂ aedeagus without sclerotized processes on shoulders. 6
6. ♂ parameres joined at bases, each massive distally with broad, recurved, bilobed apex 5. **scanloni** n. sp.
 ♂ parameres not joined at bases, each tapering distally to slender, slightly outcurved, simple, apical point..... 6. **whartoni** n. sp.
7. Base of media without prominent blisterlike swelling (*tessellata* Group)..... 8
 Base of media with prominent blisterlike swelling (*inflativena* Group) 9
8. Hind femur with subapical pale band; ♂ parameres fused subbasally, midportion without mesal process; aedeagus with apical portion tapered..... 7. **brinchangensis** n. sp.
 Hind femur entirely black; ♂ parameres separated, midportion with mesal process; aedeagus with apical portion stout. 8. **chelagonata** n. sp.
9. Hind femur entirely black..... 10
 Hind femur with subapical pale band 14
10. ♂ parameres each split into 2 long slender processes 11
 ♂ parameres each with simple tip..... 13
11. ♂ parameres each bifurcate near base, the mesal process arising near basal bridge.....12
 ♂ parameres bifurcate at approximately midlength or beyond, and abruptly curved ventrolaterad at the fork; (aedeagus with short, broad, basal portion bearing distolateral lobes, with distal main portion parallel-sided to tip) 9. **tenuilobata** n. sp.
12. ♂ dististyle bent at base, broad to tip; parameres stout, the lateral process distinctly curved, the mesal process arising submedially from basal bridge 10. **quatei** n. sp.
 ♂ dististyle gradually curved to slender tip; parameres slender, the mesal process filiform and arising from stout base of lateral process 11. **parafurcata** n. sp.
13. Aedeagus with distal portion detached, broad with pair of strong distolateral processes each terminating in a capitate lobe; basistyle with long fingerlike dorsomedian process at base 12. **capitata** n. sp.
 Aedeagus with distal portion not detached, gradually tapering to slender tip bearing a

- pair of inconspicuous subapical points; basistyle without basal lobe.....13. **nigripes** n. sp.
14. ♂ parameres each with longitudinal, more or less elongate, main body..... 15
 ♂ parameres without longitudinal main body, each reduced to a pair of distinct lobes extending caudad from basal bridge, the mesal lobe slender and pointed twice as long as the short, rounded, lateral lobe 14. **camptostyla** n. sp.
15. ♂ parameres distally with distinct subapical lobe or bifid tip 16
 ♂ parameres each with simple tip, not bifid or lobed distally 18
16. ♂ parameres each with stout round lateral lobe about midway to tip, distal portion a strong, curving blade 15. **superlobata** n. sp.
 ♂ parameres without lobelike lateral swelling..... 17
17. ♂ parameres long and slender, lobes straight and of approximately same thickness.....
16. **basilobata** n. sp.
 ♂ parameres short and stout, lateral lobe stout, the mesal lobe slender and contorted 17. **papuae** Tokunaga
18. Basistyle with long, fingerlike basal lobe at base 18. **digitata** n. sp.
 Basistyle without long fingerlike basal lobe 19
19. Dististyle strongly curving, hooklike, or abruptly bent in midportion.....20
 Dististyle slender and nearly straight 21
20. Dististyle strongly curving, hooklike, with slender, pointed tip; aedeagus short and broad, with pair of low, rounded, distolateral lobes; parameres each moderately slender, simple, slightly hooked tip..... 19. **bellula** Macfie
 Dististyle bent in midportion and broad to tip; aedeagus with broad basal portion short, gradually narrowed to slender, subcylindrical distal channel with slender bifid tip; parameres each with rather heavy, abruptly bent, sharp pointed tip.....
20. **ampligonata** n. sp.
21. Aedeagus abruptly narrowed in midportion with long distolateral process on each side at end of broad basal portion; parameres each with main body scarcely swollen at base, gradually tapered to gently curved, arcuate, sharp-pointed, bladelike tip.
 21. **arcuata** n. sp.
- Aedeagus gradually tapering distally, without distolateral processes; parameres each with main body stout at base, abruptly constricted near tip and ending in a slender, distally bent filament 22. **inflativena** Tokunaga

Hieroglyphica Group

Diagnosis. Wing with characteristic irregular hieroglyphic markings, these usually grayish, sometimes also with whitish or yellowish borders; 4 dark areas at anterior margin of wing, 1 at r-m crossvein, 1 at end of radius, and 2 in basal cell. Hind legs and sometimes all legs conspicuously banded, usually legs yellow with narrow dark bands. ♀ antenna elongate, segment 11 usually at least 4 times as long as broad. ♀ palpus with small, indistinct, sensory pit. ♀ spermathecae very unequal, the larger one ovoid and often with oblique sclerotized neck, the smaller one usually subspherical with long, threadlike sclerotization of the duct. Legs slender, hind tarsus with ventral spines inconspicuous. ♀ claws large and equal on first 4 legs, a single long claw without basal barb on hind leg; ♂ claws small and equal on all legs. ♂ aedeagus usually with sclerotized basal loop joining a pair of strong, sharp-pointed, tapering lateral sclerites; a poorly sclerotized, accessory dorsomedian posterior lobe also present, often bifid and pointed caudally. ♂ parameres of various shapes.

1. *Monohelea pahangensis* Ratanaworabhan and Wirth, new species Fig. 1.

♀. Wing length 0.86 mm.

Head: Yellow, antenna and palpus pale brown. Antenna (fig. 1a) with proximal flagellar segments cylindrical, distal 5 elongated; flagellar segments with lengths in proportion of 22-16-17-18-18-18-19-19-23-23-27-28-34; antennal ratio 0.92. Palpal segments (fig. 1b) with lengths in proportion of 5-11-11-9-15; segment 3 short and slender with small round sensory pit. Mandible with 10 teeth.

Thorax: Yellow with dark pattern and few hairs. First 4 legs (fig. 1e) yellow, tibiae slightly dark at distal ends; hind legs yellow, femur with dark pattern and middle pale ring, tibia with apical dark band and sub-basal dark spot; tibial comb with 5 spines. Tarsi light brown; ventral spines of tarsomeres 1-4, 2-1-0-0 on fore leg, 2-1-1-1 on mid leg, and 2-1-1-2 on hind leg (fig. 1h). Wing (fig. 1c) pattern as figured, with large irregular dark band in middle and

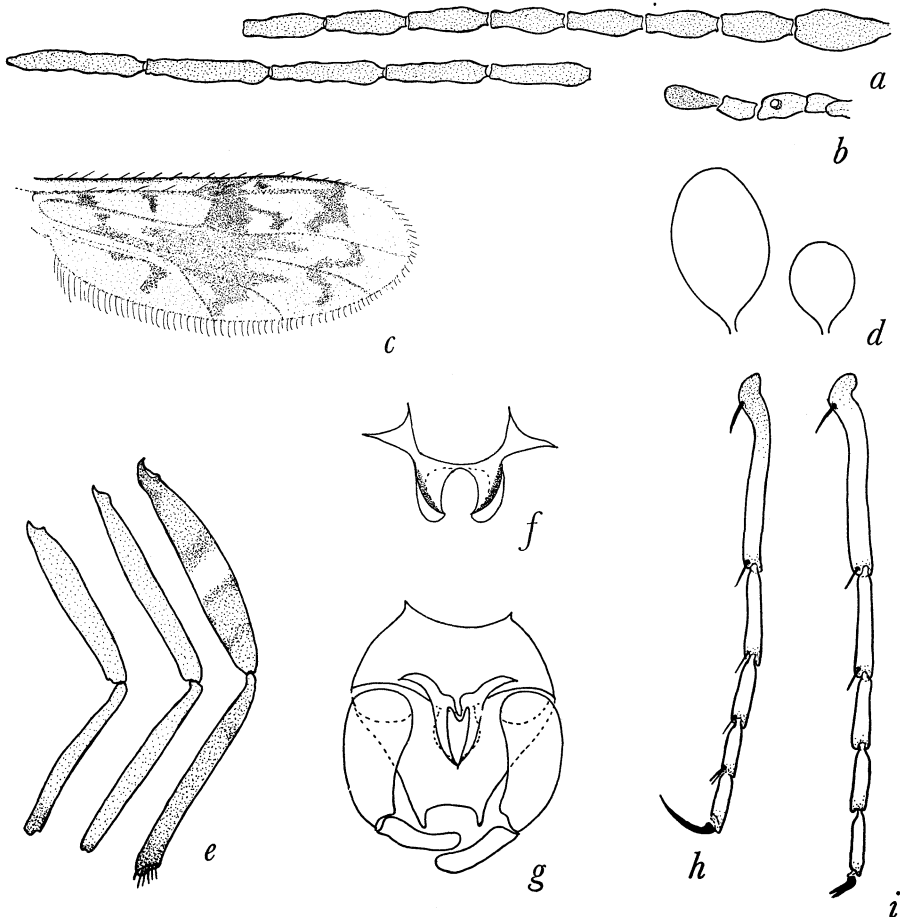


Fig. 1. *Monohelea pahangensis*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

dark spots in hieroglyphic pattern; costal ratio 0.81. Halter pale.

Abdomen: Yellow. Spermathecae (fig. 1d) oval, very unequal, measuring 0.075 by 0.050 mm and 0.038 by 0.025 mm (necks 0.008 mm); the smaller one with long, threadlike sclerotization of duct.

♂. Antennal plume brown; antennal segments 3-13 fused, lengths of 13-15 proportion of 25-25-28. Ventral spines of tarsomeres 1-4, 1-0-0-0 on fore leg, 1-1-1-0 on mid leg, and 2-1-0-0 on hind leg (fig. 1i). Genitalia (fig. 1g): Dististyle extremely short and stout. Aedeagus small, with sclerotized basal loop joining a pair of strong, sharp-pointed, tapering, lateral sclerites. Parameres (fig. 1f) joined in midportion; each with apex not divided into 2 blades, but forming a short, rounded distal lobe and shorter, sharper process just ventral to the latter.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71179), allotype ♀, 1 ♂ and 1 ♀ paratypes, Pahang, Malaya, Kuantan-Pekan Road, swamp forest, XI.1959, R. H. Wharton, light trap.

Discussion. *Monohelea pahangensis* can easily be distinguished by the ♂ genitalia, in which the dististyles are extremely short and stout, and the parameres each have 2 very short distal lobes, the one rounded, the other pointed.

2. *Monohelea orientalis* Ratanaworabhan and Wirth, new species Fig. 2.

♀. Wing length 1.16 mm.

Head: Brown, antenna and palpus light brown. Antenna (fig. 2a) with proximal segments cylindrical, distal 5 elongated; flagellar segments with lengths in proportion of 23-19-20-20-21-22-22-22-28-28-32-32-41; antennal ratio 0.95. Palpal segments (fig. 2b) with lengths in proportion of 7-14-17-10-18; segment 3 slender and similar to other segments, with small, round, sensory pit, length to breadth ratio 2.4. Mandible with 9 teeth.

Thorax: Yellowish brown with dark punctate pattern and moderate number of hairs. First 4 legs (fig. 2e) yellow; hind legs yellow with 3 dark bands on both femur and tibia; tibial comb with 7 spines. Tarsi yellow, basitarsi of all legs slightly dark at bases; ventral spines of tarsomeres 1-4, 2-1-1-1 on fore leg, 3-2-2-1 on mid leg, and 2-1-1-2 on hind leg (fig. 2h). Wing (fig. 2c) pattern as figured, with large, irregular dark area in middle and dark spots in hieroglyphic pattern; costal ratio 0.73. Halter pale, knob brownish.

Abdomen: Pale brown, cerci yellow. Spermathecae (fig. 2d) very unequal, measuring 0.085 by 0.065 mm and 0.038 by 0.035 mm, the larger one ovoid and the smaller one round with long threadlike sclerotization of the duct.

♂. Antennal plume pale brown; antennal segments 13-15 with lengths in proportion of 37-41-42. Ventral spines of tarsomeres 1-4, 2-1-1-0 on fore leg, 2-2-2-1 on mid leg, and 2-1-1-0 on hind leg (fig. 2i). Genitalia (fig. 2g): Dististyle moderately short and stout. Aedeagus small, triangular in shape with sclerotized basal loop joining a pair of strong, sharp-pointed, tapering lateral sclerites. Parameres (fig. 2f) separated; each with distal portion elongated and giving rise ventrally to a much more slender, anteroventrally directed blade, tapering and curving to slender distal point.

DISTRIBUTION. Cambodia, Laos, Malaya, Philippines, Thailand.

Holotype ♂ (USNM 71180), allotype ♀, Chiangmai, Thailand, IV-V.1958, V. Notananda, light trap. Paratypes, 43 ♂♂, 32 ♀♀, as follows:

CAMBODIA: Phnom Penh, 25.V.1967, M. Delfinado, light trap, 1 ♀.

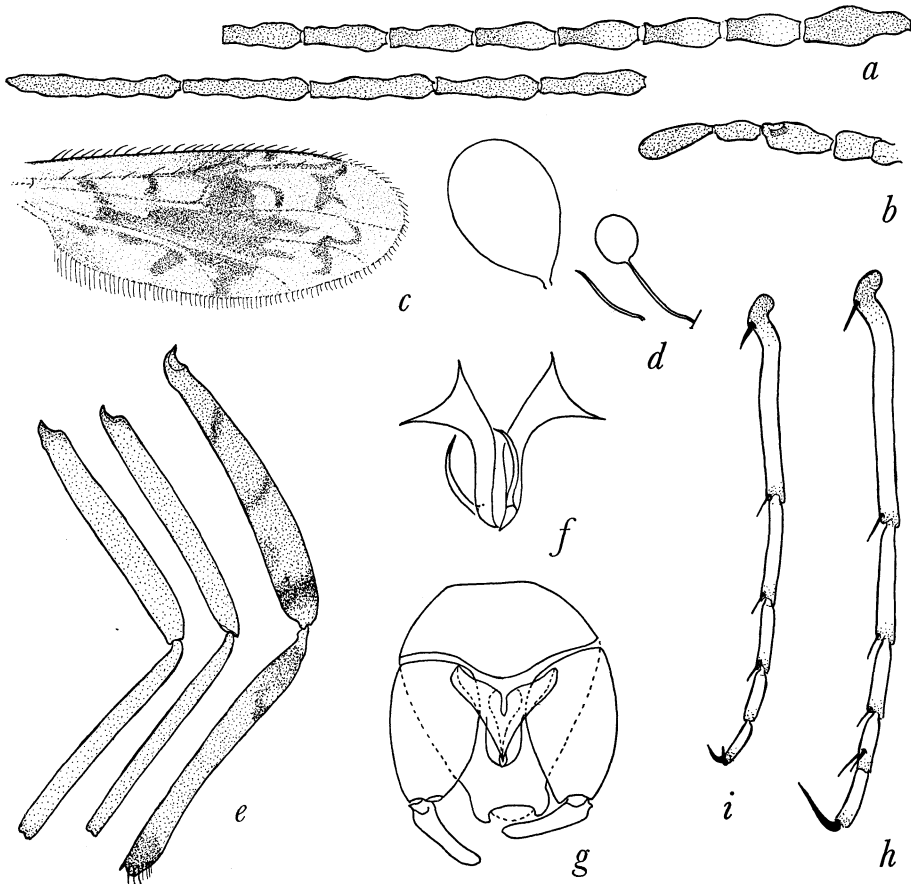


Fig. 2. *Monohalea orientalis*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

LAOS: Vientiane, 3.VI.1960, L. & S. Quate, light trap, 1 ♂.

MALAYA: Pahang, Kuala Singgora, 17.VII.1958, 2 ♂♂; Pahang, Kuala Singgora, Maran, 6.III.1959, 1 ♀; Pahang, Kuantan, Paya Bungor, 6.VII.1959, 1 ♀; all collected by R. H. Wharton in light traps. Selangor, Kuala Lumpur, VIII.1958, 2 ♂♂, 3 ♀♀; Selangor, Rantau Panjag, Klang, III.1958, 2 ♂♂; collected by R. Traub in light traps. Trengganu, Bukit Besi, Dungun, 26.II.1961, A. A. Hubert, light trap, 1 ♀.

PHILIPPINES: Mindanao, Pikit, Cotabato Prov., 16.XII.1946, F. G. Werner, light trap, 1 ♂. Sulu, Siasi, Siasi Island, 25.VIII.1958, H. E. Milliron, 1 ♂.

THAILAND: Ayudhaya, 2.I.1959, Manop R., light trap, 3 ♂♂, 1 ♀. Bangkok, Thonglo Dist., X.1962, J. E. Scanlon, light trap, 25 ♂♂, 14 ♀♀. Khon Kaen, Choom Pae Dist., 25.V.1959, Manop, light trap, 1 ♀. Loey, Meung Dist., 1-5.VI.1959, Manop, light trap, 1 ♂. Nakornprathom, 18.XII.1958, Manop, light trap, 1 ♀. Pechaburi, 27.XII.1958,

Manop, light trap, 3 ♀♀. Rachaburi, Banpong Dist., 26.XII.1958, Manop, light trap, 3 ♂♂. Samuthprakan, 22.XII.1958, Manop, light trap, 1 ♂, 2 ♀♀. Thonburi, 23.XII.1958, Manop, light trap, 2 ♂♂, 3 ♀♀.

Discussion. This species can be readily separated from others in the *hieroglyphica* group by the slender separated parameres, each with distal portion elongated in a slender blade, tapering and curving to slender distal point.

3. *Monohelea palauensis* Tokunaga Fig. 3.

Monohelea palauensis Tokunaga, in Tokunaga and Murachi, 1959, *Ins. Micronesia* 12 (3): 408 (♂, ♀; Palau Islands; figures).
♀. Wing length 0.91 mm.

Head: Yellow, antenna and palpus yellow. Antenna (fig. 3a) with lengths of flagellar segments in proportion of 20-15-17-17-17-18-19-19-22-22-25-27-31; antennal ratio 0.89. Palpal segments (fig. 3b) with lengths in proportion of 4-10-12-9-15; segment 3 similar to 2 but with

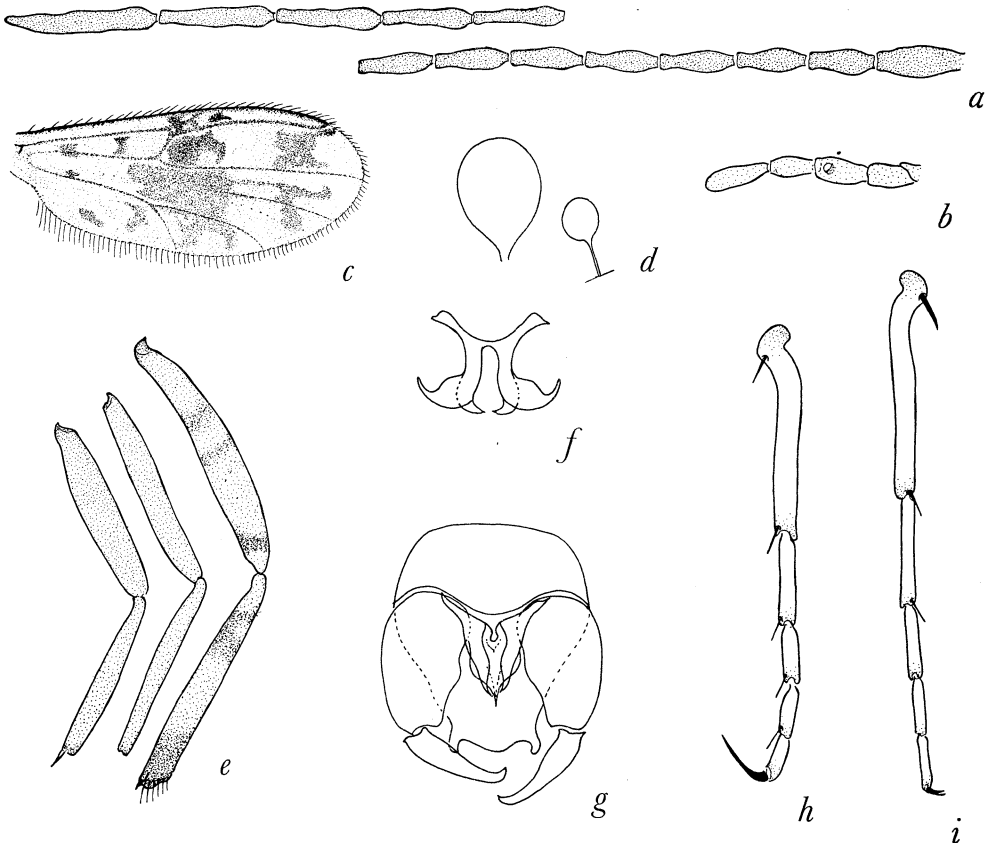


Fig. 3. *Monohelea palauensis*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

small sensory pit, length to breadth ratio 2.0. Mandible with 8 teeth.

Thorax: Yellowish brown with few hairs. First 4 legs (fig. 3e) yellow; hind leg yellow with 3 dark areas on femur and tibia; tibial comb with 6 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-0-0 on fore leg, 4-2-2-1 on mid leg, and 2-1-1-1 on hind leg (fig. 3h). Wing (fig. 3c) pattern as figured, with characteristic irregular hieroglyphic markings, 4 dark spots at anterior margin, 1 at r-m crossvein, 1 at end of radius, and 2 in basal cell; costal ratio 0.79. Halter pale, dark on outer margin.

Abdomen: Yellowish brown. Spermathecae (fig. 3d) very unequal, measuring 0.070 by 0.063 mm and 0.040 by 0.038 mm (necks 0.008 and 0.003 mm); larger spermatheca ovoid, smaller one round with long threadlike sclerotization of the duct.

♂. Antennal plume yellow; antennal segments 13-15 with lengths in proportion of 31-33-35. Ventral spines of tarsomeres 1-4, 2-1-0-0 on fore leg, 3-1-1-1 on mid leg, and 2-1-0-0 on hind leg (fig. 3i). Genitalia (fig. 3g): Aedeagus with sclerotized basal loop joining a pair of strong, sharp-pointed, tapering lateral sclerites, dorsomedian posterior lobe also present, bifid caudally. Parameres (fig. 3f) joined at bases; each with distal portion large, bifid apically with inner blade stout and short, the ventrolateral blade longer and slender distally.

DISTRIBUTION. Caroline Islands, Malaya, North Borneo, Philippines Thailand.

Holotype ♂ (USNM 64620), Ngiwal, Babelthuap I., Palau Is., 21.V.1957, C. W. Sabrosky, light trap.

SPECIMENS EXAMINED.

MALAYA: Johore, Kahang Kluang, 7-9.I.1961, A. A. Hubert, light trap, 2 ♂♂. Pahang, Kuala Singgora, 18.VII.1958, R. H. Wharton, light trap, 1 ♂, 1 ♀; Pahang, Kuantan-Pekan Road, swamp forest, XI.1959, Wharton, light trap, 2 ♂♂, 4 ♀♀. Perak, Kuala Kengrong, Girik, 14.IV.1958, R. Traub, light trap, 1 ♀. Selangor, Gombak, III.1958, Traub, light trap, 1 ♂; Selangor, Kuala Lumpur, VII. 1958, Traub, light trap, 1 ♂.

NORTH BORNEO: Labuan Island, IX-X.1948, D. H. Colless, light trap, 1 ♂, 1 ♀.

PHILIPPINES: Luzon, Clark Air Base, Angeles, Pampanga Prov., 17.IX.1957, I. Balatbat, light trap, 1 ♂, 1 ♀. Mindanao, E. slope Mt. McKinley, Davao Prov., 28.VI.1946, F. G. Werner, 2 ♂♂, 2 ♀♀.

THAILAND: Bangkok, Pratoomvan Dist., 9.V.1959, 1 ♂; Nakronrajasrma, Pakchong Dist., 10.VII.1959, 1 ♂; Pechaburi, 27.XII.1958, 2 ♂♂; Rachaburi, Banpong Dist., 26.XII.1958, 1 ♂; all collected by Manop in light traps.

Discussion. *M. palauensis* differs from *orientalis* and *pahangensis* by the ♂ genitalia, with the dististyle slender, and parameres each with distal portion stout, bifid apically with short inner blade, ventrolateral blade longer with distal portion slender.

Multilineata Group

Diagnosis. Wing with 2 large anterior blackish patches, 1 over r-m crossvein and other behind tip of radius; other fainter, irregular markings along the veins posteriorly. Scutellum dark in middle. ♀ antenna elongate, segment 11 usually about 3 times as long as broad. Legs usually dark brown with yellow knee spots; hind legs not swollen, the tarsi long and at most with slender distal spines. ♀ claws large and equal on 4 anterior legs, 1 long claw on hind leg without basal barb; ♂ claws small and equal on all legs. ♀ spermathecae small, ovoid, subequal. ♂ aedeagus long and narrow, without sclerotized basal loop; parameres of various shapes.

4. *Monohelea macclurei* Ratanaworabhan and Wirth, new species Fig. 4.

♀. Wing length 1.01 mm.

Head: Brown; antenna and palpus pale brown. Antenna (fig. 4a) with proximal flagellar segments cylindrical, distal 5 elongated; flagellar segments with lengths in proportion of 21-14-14-15-15-15-16-16-26-26-26-26-36; antennal ratio 1.12. Palpal segments (fig. 4b) with lengths in proportion of 7-12-20-10-18; segment 3 slightly swollen, with round, shallow sensory pit, length to breadth ratio 2.2. Mandible with 9 teeth.

Thorax: Brown with few short hairs; scutellum dark in midportion. First 4 legs (fig. 4e) brown with pale knees; hind leg brown with subapical dark band on femur, knee pale; tibial comb with 7 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-1-0 on fore leg, 4-2-2-0 on mid leg, and 3-2-2- on hind leg (fig. 4h). Wing (fig. 4c) with 2 large, prominent, anterior blackish patches, 1 over r-m crossvein and other behind tip of radius, posterior markings faint; costal ratio 0.79. Halter dark.

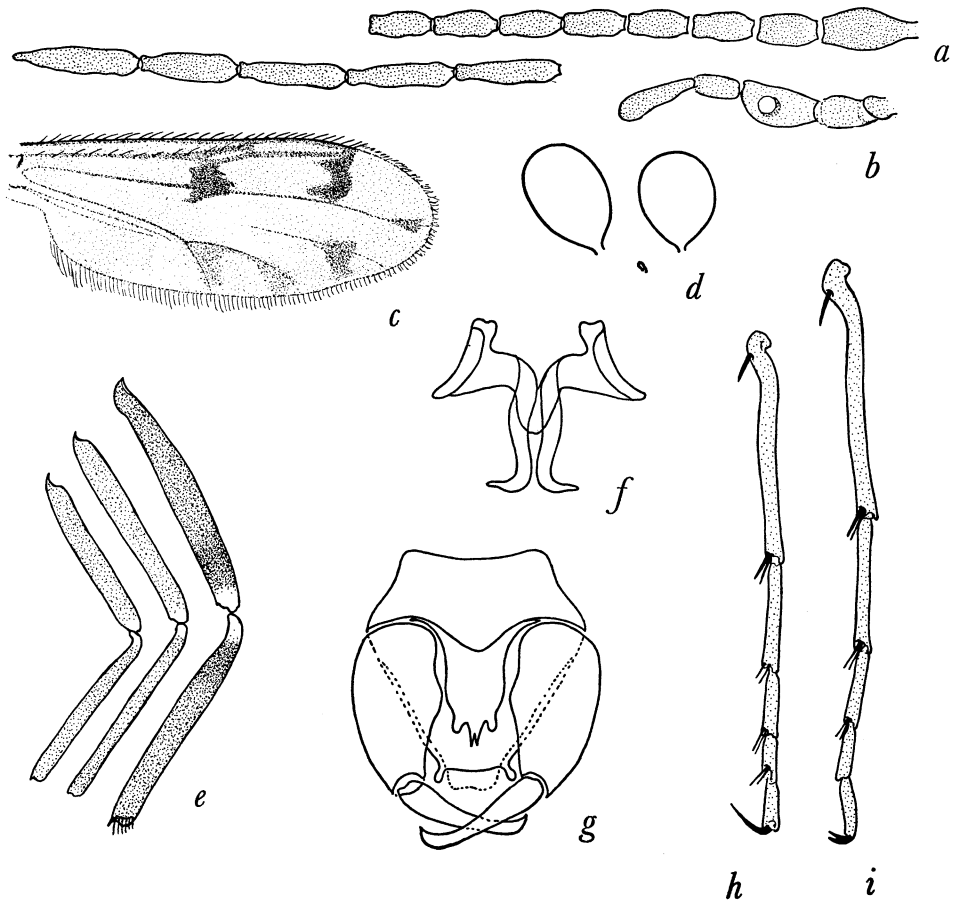


Fig. 4. *Monohelea macclurei*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

Abdomen: Brown; cerci yellow. Spermathecae (fig. 4d) oval, subequal, measuring 0.050 by 0.038 mm and 0.045 by 0.038 mm (necks 0.005 mm); small rudimentary spermatheca present.

♂. Antennal plume yellow; lengths of segments 13-15 in proportion of 44-38-39. Ventral spines of tarsomeres 1-4, 2-1-1-1 on fore leg, 3-2-2-0 on mid leg, and 3-2-2-0 on hind leg (fig. 4i). Genitalia (fig. 4g): Aedeagus long, with slender base and bifid tip, a pair of short distolateral processes on shoulders. Parameres (fig. 4f) joined at bases, each with columnar midportion and relatively short, stout, laterally bent distal point.

DISTRIBUTION. Malaya, North Borneo.

Holotype ♂ (USNM 71181), allotype ♀, 5 mi N. Klang, Rantau Panjang, Selangor, Malaya, IX-XII.1959, H. E. McClure, light trap. Paratypes, 5 ♂♂, 6 ♀♀, as follows:

MALAYA: Same data as types, 3 ♂♂, 1 ♀; same data but 30.XII.1958, L. W. Quate, 2 ♂♂. Kuantan, Telok Sisek, Pahang, 14.VI.1958, R. H. Wharton, light trap, 4 ♀♀.

NORTH BORNEO: Tawau, II.1960, D. H. Colless, 1 ♀.

Discussion. This species is named in honor of Dr. H. Elliott McClure of the Migratory Animal Pathological Survey, Bangkok, Thailand, in appreciation of his constant help and guidance and for his important collections of ceratopogonids while working at the Institute for Medical Research in Kuala Lumpur, Malaya.

Monohelea macclurei differs from *M. scanloni* and *M. whartoni* by its darker legs and more extensive dark wing markings, and by the more slender ♂ parameres and distinct distolateral processes on the shoulders of the ♂ aedeagus.

5. *Monohelea scanloni* Ratanaworabhan and Wirth, new species Fig. 5.

♀. Wing length 1.50 mm.

Head: Yellow; palpus brown. Eyes bare. Antenna missing. Palpal segments (fig. 5a) with lengths in proportion of 11-16-35-17-23; segment 3 slender, with small, round, distal sensory pit, length to breadth ratio 3.7. Mandible with 15 teeth.

Thorax: Yellowish brown. Legs (fig. 5d) yellow; hind femur with subapical dark band, hind tibia with sub-basal and apical dark band; tibial comb with 6 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-1-1 on fore leg, 4-2-2-1 on mid leg, and 3-2-2-2 on hind leg (fig. 5g). Wing (fig. 5b) pattern with 2 distinct dark spots on anterior portion; costal ratio 0.82. Halter pale.

Abdomen: Yellowish; cerci pale. Spermathecae (fig. 5c) small, oval, subequal, measuring 0.068 by 0.053 mm and 0.083 by 0.050 mm (necks 0.005 mm), a 3rd rudimentary spermatheca present.

♂. Antennal plume brown; lengths of segments 13-15 in proportion of 40-45-43. Ventral spines of tarsomeres 1-4, 2-1-1-1 on fore leg, 4-2-2-1 on mid leg, and 3-1-1-0 on hind leg (fig. 5h). Genitalia (fig. 5f): Dististyle stout with blunt tip. Aedeagus broad without distolateral points. Parameres (fig. 5e) joined at bases, each massive with broad apex divided into 2 unequal, recurved, distal processes.

DISTRIBUTION. Thailand.

Holotype ♂ (USNM 71182), Nonthaburi, 20.XII.1958, Manop., light trap. Allotype ♀, Nakornprathom, 18.XII.1958, Manop, light trap. Paratypes, 3 ♀♀. THAILAND: Chiangmai,

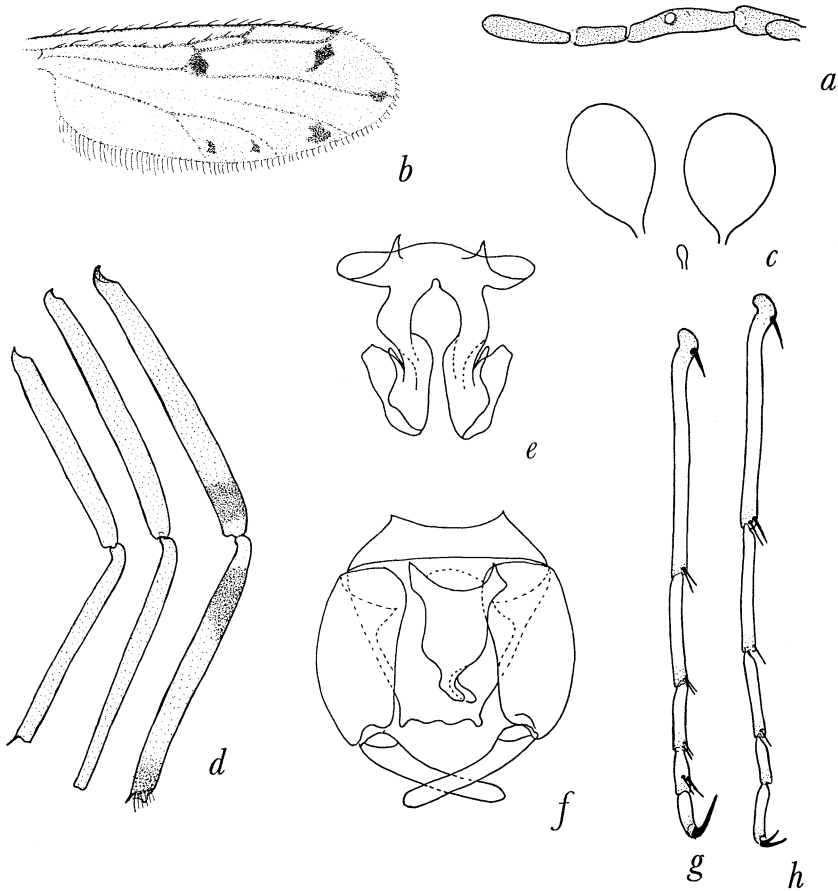


Fig. 5. *Monohelea scanloni*. a, palpus; b, wing; c, spermathecae; d, femora and tibiae; e, ♂ parameres; f, ♂ genitalia; g, ♀ hind tarsus; h, ♂ hind tarsus.

Ampur Muang, VII.1962, J. E. Scanlon, light trap, 2 ♀♀. Udon Thani, Ampur Muang, IX.1962, Scanlon, light trap, 1 ♀.

Discussion. This species is named for Dr. John E. Scanlon, formerly entomologist with the SEATO Medical Research Laboratory in Bangkok, in appreciation of his interest and assistance, and the collection of much valuable material during his work in Thailand.

Monohelea scanloni is closely related to *M. whartoni*, with the ♀♀ almost impossible to distinguish, but the ♂ genitalia are quite different. The parameres of *M. whartoni* are separated, each stout at the base, tapering distally to slender, slightly outcurved, simple apical point.

6. *Monohelea whartoni* Ratanaworabhan and Wirth, new species Fig. 6.

♀. Wing length 1.2 mm.

Head: Brown; antenna and palpus brown. Antenna (fig. 6a) with proximal flagellar segments oval to cylindrical, distal 5 elongated; lengths of flagellar segments in proportion of 21-15-15-15-16-16-17-18-28-31-31-33-43; antennal ratio 1.25. Palpal segments (fig. 6b) with lengths in proportion of 8-16-26-11-23; segment 3 slightly swollen, with shallow, round, sensory pit, length to breadth ratio 2.2. Mandible with 10 teeth.

Thorax: Yellowish brown with few hairs. First 4 legs (fig. 6e) yellowish, tibiae slightly dark apically; hind leg yellowish, slender, femur with subapical dark band, tibia with subbasal and apical dark bands; tibial comb with 4 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-1-1 on fore leg, 4-2-2-1 on mid leg, and 3-2-2-2 on hind leg (fig. 6h). Wing (fig. 6c) pattern with 2 small anterior dark patches, 1 over r-m crossvein and other behind tip of radius, other faint markings posteriorly; costal ratio 0.81. Halter pale.

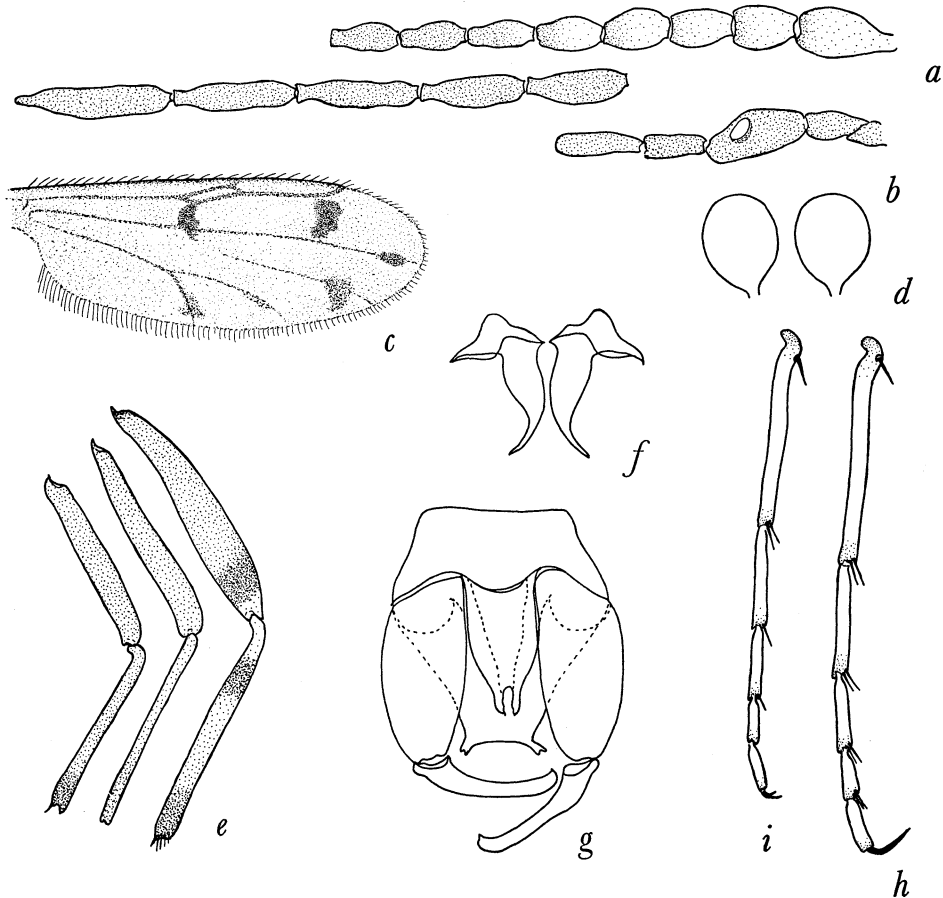


Fig. 6. *Monohelea whartoni*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♂ hind tarsus; i, ♀ hind tarsus.

Abdomen: Brown; cerci yellow. Spermathecae 9 (fig. 6d) small, subequal.

♂. Antennal plume yellow; lengths of segments 13-15 in proportion of 47-43-38. Ventral spines of tarsomeres 1-4, 2-1-0-0 on fore leg, 3-1-2-1 on mid leg, and 3-1-1-0 on hind leg (fig. 6i). Genitalia (fig. 6g): Dististyle slender and pointed distally. Aedeagus without distolateral processes on shoulders, tip slender, bifid. Parameres (fig. 6f) separated; each stout at base, tapering distally to slender, slightly outcurved, simple apical point.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71183), allotype ♀, Kuantan-Pekan Road, swamp forest, Pahang, Malaya, 16.VI.1959, R. H. Wharton, at light. Paratype, 1 ♀, same data.

Discussion. This species is named in honor of Dr. R. H. Wharton of the Institute of Medical Research in Kuala Lumpur, Malaya, who collected many specimens for us on the eastern coast of Malaya where he was investigating filariasis transmission.

Monohelea scanloni resembles *M. whartoni* in its yellowish leg color with contrasting dark brown narrow bands on hind femur and tibia, but *whartoni* differs in the ♂ genitalia by the shape of the parameres, which are not joined, and are narrowed distally to slender, laterally curved, apical points.

Tessellata Group

Diagnosis. Wing with 3 large dark anterior spots and irregular posterior infuscated areas usually of same intensity. Scutellum often with midportion yellow. Hind legs swollen and shining black, with somewhat yellow knees; hind tarsus short and with very strong ventral spines at apices of proximal 2-4 tarsomeres; claw of hind leg of ♂ long and single with basal barb as in the ♀. Spermathecae oval, subequal. ♂ aedeagus without sclerotized basal loop, the slender, pointed, posterior sclerite borne in a notch in the quadrate basal sclerite; parameres of various shapes.

7. *Monohelea brinchangensis* Ratanaworabhan and Wirth, new species Fig. 7.

♀. Wing length 1.60 mm.

Head: Dark brown; antenna and segment 5 of palpus dark brown; first 4 segments of palpus yellow. Antenna (fig. 7a) with proximal flagellar segments cylindrical, the distal 5 elongated with last segment slightly swollen; lengths of flagellar segments in proportion of 22-17-17-17-18-20-20-20-30-30-30-30-38; antennal ratio 1.04. Palpal segments (fig. 7b) with lengths in proportion of 8-15-27-15-27; segment 3 swollen distally, with round, shallow, sensory pit, length to breadth ratio 1.7. Mandible with 8 teeth.

Thorax: Dark brown with scattered long hairs; scutellum yellow in midportion. First 4 legs (fig. 7e) brown with pale knees; dark bands subapically on femur and tibia; hind legs dark brown, swollen with pale knee, femur with subapical pale band; tibial comb with 10 spines. Tarsi yellow; hind tarsus with strong ventral spines; ventral spines of tarsomeres 1-4, 3-1-1-0 on fore leg, 5-2-1-0 on mid leg, and 2-1-1-2 on hind leg (fig. 7h). Wing (fig. 7c) with 3 large dark bands on anterior portion, continued posteriorly to wing margin; costal ratio 0.81. Halter pale.

Abdomen: Dark brown; cerci yellow. Spermathecae (fig. 7d) oval, subequal, measuring 0.073 by 0.050 mm and 0.070 by 0.055 mm (necks 0.008 and 0.005 mm), small rudimentary 3rd spermatheca present.

♂. Antennal plume brown; segments 3-13 yellow, 13-15 dark brown; lengths of 13-15 in

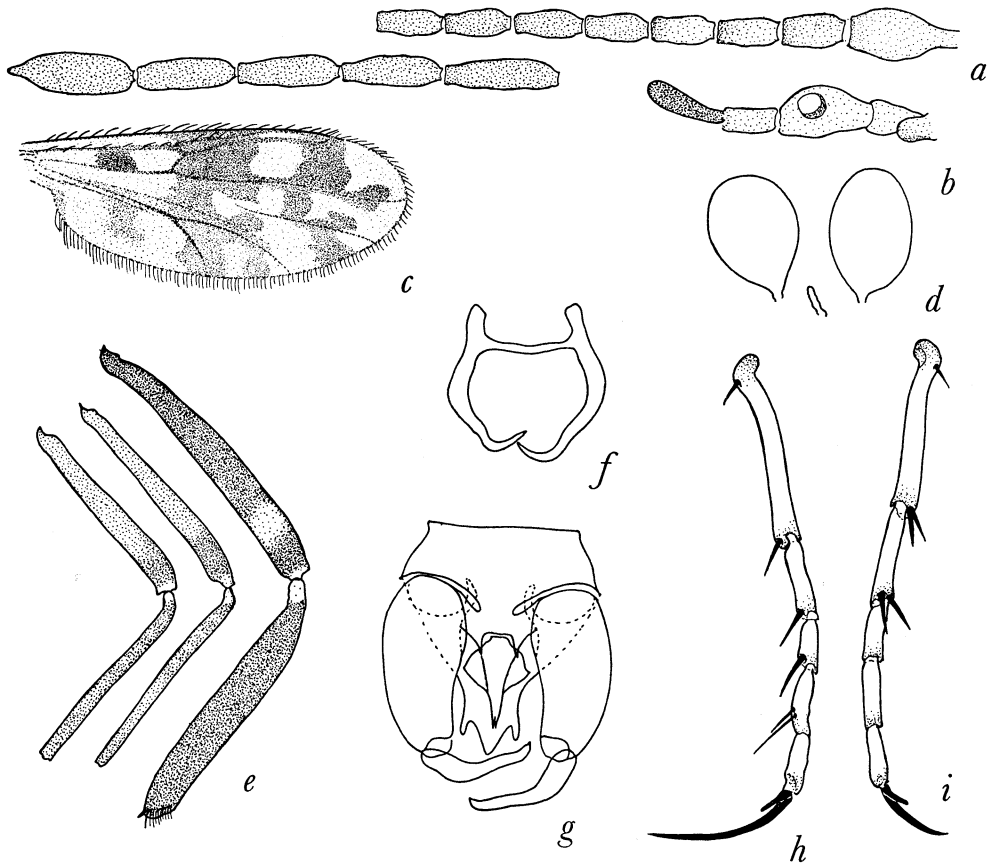


Fig. 7. *Monohelea brinchangensis*, a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

proportion of 48-38-41. Ventral spines of tarsomeres 1-4, 3-1-1-0 on fore leg, 4-2-2-0 on mid leg, and 3-2-0-0 on hind leg (fig. 7i). Genitalia (fig. 7g): Aedeagus in 2 portions; a slender, pointed, distal sclerite borne in a notch in a quadrate basal sclerite; distal portion swollen at base with tapered, pointed tip. Parameres (fig. 7f) joined at bases; each slender with simple recurved tip; mesal process absent.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71184), allotype ♀, Mt. Brinchang, 5000-6000 ft (1520-1825 m), Pahang, Malaya, III.1963, H. E. McClure, light trap. Paratype, 1 ♂, same data.

Discussion. This species is readily separated from *M. chelagonata* by the distinct subapical pale band on the hind femur, the femur more slender than in *chelagonata*, and by the proximally joined, distally slender, simple ♂ parameres, which lack the characteristic mesal process found in *chelagonata*.

8. *Monohelea chelagonata* Ratanaworabhan and Wirth, new species Fig. 8.

♀. Wing length 1.10 mm.

Head: Dark brown; antenna and palpus brown. Antenna (fig. 8a) with proximal flagellar segments cylindrical, distal 5 distinctly elongated; lengths of flagellar segments in proportion of 18-15-14-14-14-16-16-16-27-27-23-23-33; antennal ratio 1.0. Palpal segments (fig. 8b) with lengths in proportion of 6-14-19-15-26; segment 3 slightly swollen, with small round sensory pit, length to breadth ratio 2.4. Mandible with 8 small teeth.

Thorax: Dark brown with few short hairs. Scutellum dark brown. First 4 legs (fig. 8e) brown; hind leg dark brown, slightly swollen; tibial comb with 6 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 3-1-2-1 on fore leg, 5-2-2-0 on mid leg, 3-2-1-0 on hind leg (fig. 8h). Wing (fig. 8c) with 3 large anterior areas and smaller posterior spots infuscated; costal ratio 0.84. Halter pale.

Abdomen: Dark brown, cerci yellow. Spermathecae (fig. 8d) oval, subequal, measuring 0.070 by 0.055 mm and 0.063 by 0.053 mm (neck 0.005 mm); small rudimentary spermatheca present.

♂. Antennal plume brown; lengths of segments 13-15 in proportion of 29-26-30. Ventral

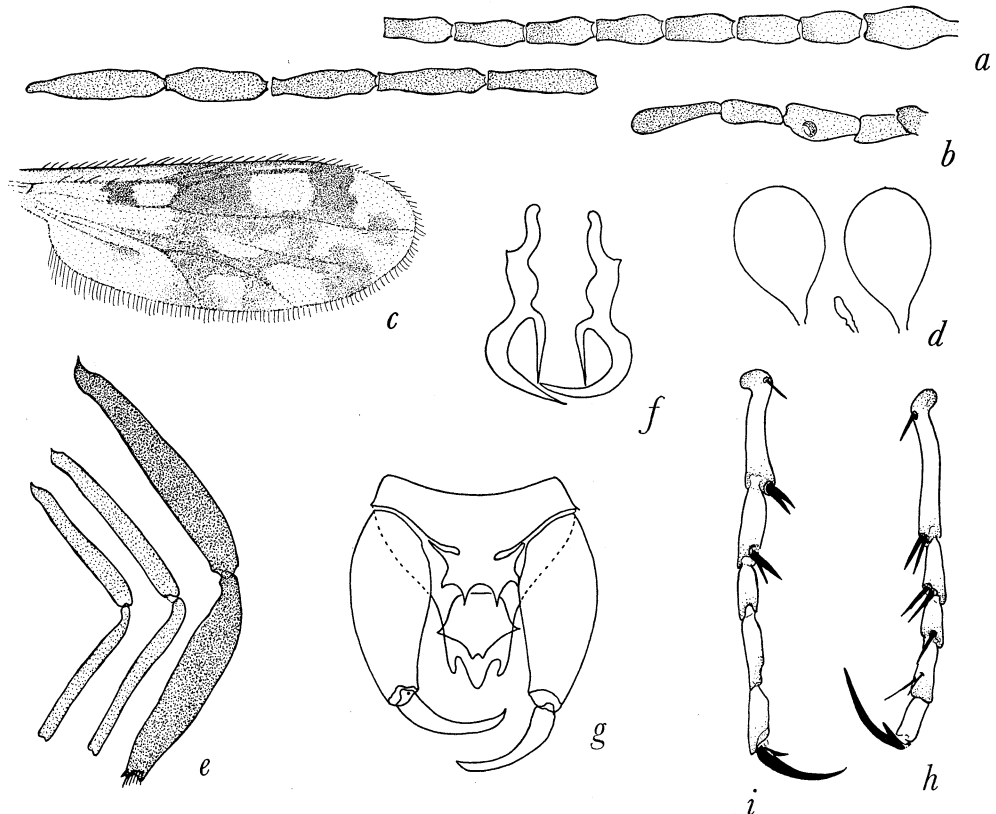


Fig. 8. *Monohelea chelagonata*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

spines of tarsomeres 1-4, 3-1-0-0 on fore leg, 4-2-1-0 on mid leg, and 3-2-0-0 on hind leg (fig. 8i). Genitalia (fig. 8g): Dististyle evenly curved to slender pointed tip. Aedeagus with broad, laterally pointed, distally slender and bifid, posterior sclerite borne in a notch in a quadrate basal sclerite. Parameres (fig. 8f) not joined by basal bridge; each slender and curved distally to pointed tip, provided mesally at midlength with slender, pointed, caudally directed process.

DISTRIBUTION. Malaya, Thailand.

Holotype ♂ (USNM 71185), Gombak, Selangor, Malaya, III.1958, R. Traub, light trap. Allotype ♀, Ampur Muang, Chiangmai, Thailand, VII.1962, J. E. Scanlon, light trap. Paratypes, 2 ♂♂, 1 ♀, as follows:

MALAYA: Kuala Kengrong, Girik, Perak, 14.IV.1958, R. Traub, light trap, 2 ♂♂.

THAILAND: Minburi, 24.XII.1958, Manop R., light trap, 1 ♀.

Discussion. One ♂ from the Pilippines, Mindanao Island, Buenoswerte, near Salvacion, 3.III.1958, H. E. Milliron, is provisionally referred here, having similar wing and leg pattern, but differing in having a more slender hind femur, dististyle similar in shape to that of *M. brinchangensis*, and the proximal portion of the paramere before the mesal process much stouter and partially separated from the distal hook. This specimen, probably a distinct species, could possibly be the ♂ of *M. solidipedalis* Tokunaga from New Guinea, but the condition of the specimen is scarcely good enough to warrant further description.

Inflativena Group

Diagnosis. Closely resembling species of the *tessellata* Group, but the base of the media with a prominent blisterlike swelling. Wing with 3 large dark anterior spots, and irregular posterior infuscated areas usually of same intensity. Hind legs swollen and usually with subapical pale band. Hind tarsus short and with very strong ventral spines at apices of the proximal 1-4 tarsomeres; claw of hind leg of ♂ long and single as in the ♀, bearing a short basal barb. Spermathecae oval, subequal. ♂ genitalia of various shapes; aedeagus without sclerotized basal loop, but usually with distal sclerite at least partially detached and borne in a distal notch in the more or less quadrate basal sclerite.

9. *Monohelea tenuilobata* Ratanaworabhan and Wirth, new species Fig. 9.

♀. Unknown.

♂. Wing length 1.08 mm.

Head: Dark brown; palpus brown; antenna yellowish basally, brown distally. Antennal segments 13-15 with lengths in proportion of 29-24-26. Palpal segments (fig. 9b) with lengths in proportion of 5-6-17-12-20; segment 3 slender, with small round sensory pit, length to breadth ratio 4.0.

Thorax: Dark brown, with pattern of punctiform brown dots at seta bases and of irregular blackish patches. Legs (fig. 9d) dark brown, especially hind pair; fore and mid knees with yellowish spots; hind leg moderately swollen: tibial comb with 6 spines. Ventral spines of tarsomeres 1-4, 1-1-1-0 on fore leg, 2-2-2-0 on mid leg, and 2-2-0-0 on hind leg (fig. 9c). Wing (fig. 9a) with pattern as figured; costal ratio 0.72.

Abdomen: Dark brown, pale area over proximal terga. Genitalia (fig. 9e, g): Dististyle moderately slender and curved. Aedeagus with distal portion slender, columnar. Parameres (fig.

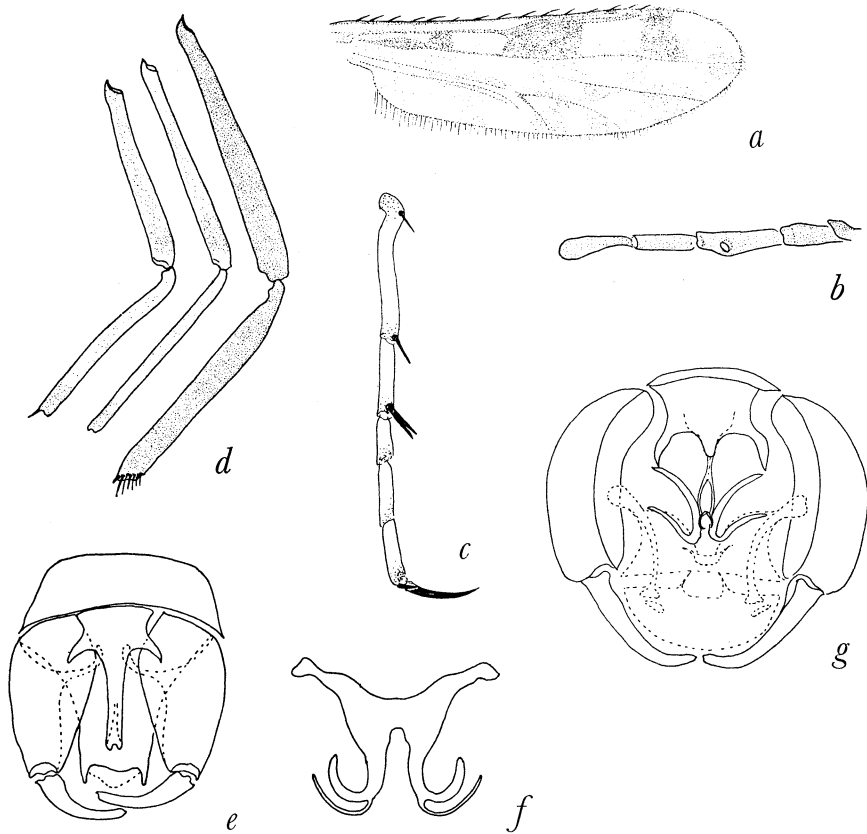


Fig. 9. *Monohelea tenuilobata*. a, wing; b, palpus; c, ♂ hind tarsus; d, femora and tibiae; e, ♂ genitalia; f, ♂ parameres; g, end view of ♂ genitalia.

9f) joined near bases; each with short, swollen basal portion; main body moderately slender, tapering distally, distal portion divided in 2 processes of nearly equal lengths at the point where paramere bends abruptly ventrolaterad, the dorsal process slender and filiform, the ventral process much stronger and tapering bladelike to slender tip.

DISTRIBUTION. Malaya, Thailand.

Holotype ♂ (BISHOP 9747), Chiangmai, Ban-tin-doi, Thailand, 12.XII.1958, J. L. Gressitt, light trap. Paratype, 1 ♂, Subang Forest Reserve, Kuala Lumpur, Malaya, 1959-60, H. E. McClure, light trap.

Discussion. *Monohelea tenuilobata* can be distinguished by the deeply bifid apices of the ♂ parameres, forming 2 long processes of subequal lengths, one nearly filiform, the other forming a curving blade. An unusual end view of the genitalia, in which the dorsoventral spacing of the internal parts can be seen, is shown in fig. 9g.

10. *Monohelea quatei* Ratanaworabhan and Wirth, new species Fig. 10.

♀. Unknown.

♂. Wing length 1.00 mm.

Head: Dark brown. Palpus and antenna broken.

Thorax: Dark brown; mesonotum with pattern of prominent blackish patches. Legs (fig. 10b) dark brown; hind femur and tibia relatively slender; tibial comb with 7 spines. Fore and mid tarsi broken; ventral spines of tarsomeres 1-4, 3-2-0-0 on hind leg (fig. 10c). Wing (fig. 10a) with pattern as figured; costal ratio 0.72. Halter slightly infuscated.

Abdomen: Dark brown. Genitalia (fig. 10e): Dististyle abruptly bent near base, stout to tip, latter with sharp point. Aedeagus bipartite; basal sclerite short and broad with deep disto-median notch; distal sclerite broad at base, moderately short, tapering distally. Parameres (fig. 10d) with bases massively fused in a broad sclerite; main bodies sessile, each completely separated into two unequal processes; a shorter, more slender, submesal pair with apices directed caudoventrad; and a strong lateral pair curving bladlike ventromesad with apices nearly touching each other.

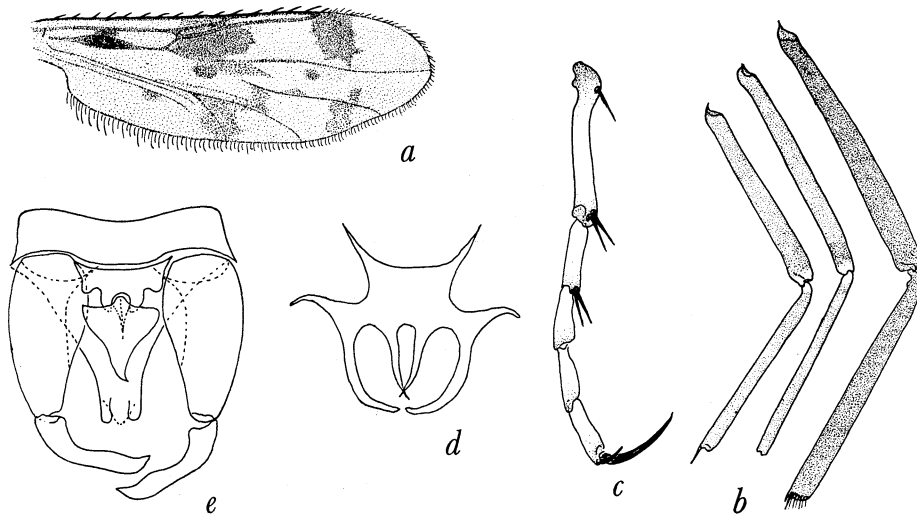


Fig. 10. *Monohelea quatei*. a, wing; b, femora and tibiae; c, ♂ hind tarsus; d, ♂ parameres; e ♂ genitalia.

DISTRIBUTION. North Borneo.

Holotype ♂ (BISHOP 9748), Tenompok, 1460 m, North Borneo, 30 mi E of Jesselton, 17.X.1958, L. W. Quate.

Discussion. This species is dedicated to Dr. Larry W. Quate, prominent Dipterist and authority on Psychodidae, who collected much valuable ceratopogonid material in Southeast Asia while associated with the B. P. Bishop Museum. The ♂ genitalia of *M. quatei* are very similar to those of *M. camptostyla* n. sp., but the latter species has prominent pale bands on the hind femur, and the lateral processes of the ♂ parameres are much shorter and rounded, not bladlike.

11. *Monohalea parafurcata* Ratanaworabhan and Wirth, new species

Fig. 11.

♀. Unknown.

♂. Wing length 0.90 mm.

Head: Brown; antenna and palpus pale brown. Antennal plume pale brown; lengths of segments 13-15 in proportion of 30-25-30. Palpal segments with lengths in proportion of 3-4-6-4-6; segment 3 swollen, with shallow, round, sensory pit, length to breadth ratio 1.5.

Thorax: Brown with few short hairs. Fore leg (fig. 11b) pale brown, mid leg missing in type; hind leg dark brown, moderately swollen; tibial comb with 7 spines. Ventral spines of tarsomeres 1-4, 2-1-1-0 on fore leg, 2-2-0-0 on hind leg (fig. 11c). Wing (fig. 11a) pattern as figured; costal ratio 0.78. Halter pale.

Abdomen: Pale brown. Genitalia (fig. 11e): Dististyle slender, distinctly curved to pointed tip. Aedeagus more or less triangular in ventral view, bipartite, the basal sclerite very short and broad, bearing the slender, tapering distal sclerite in a caudomesal notch, distal sclerite divided on ventral side in 2 slender valves, each bearing fine setae on mesal margin. Parameres (fig. 11d) joined near bases; each divided near base into 2 unequal processes, the inner process shorter and filamentous, the outer one a strongly sclerotized, caudally directed rod with slightly tapered tip.

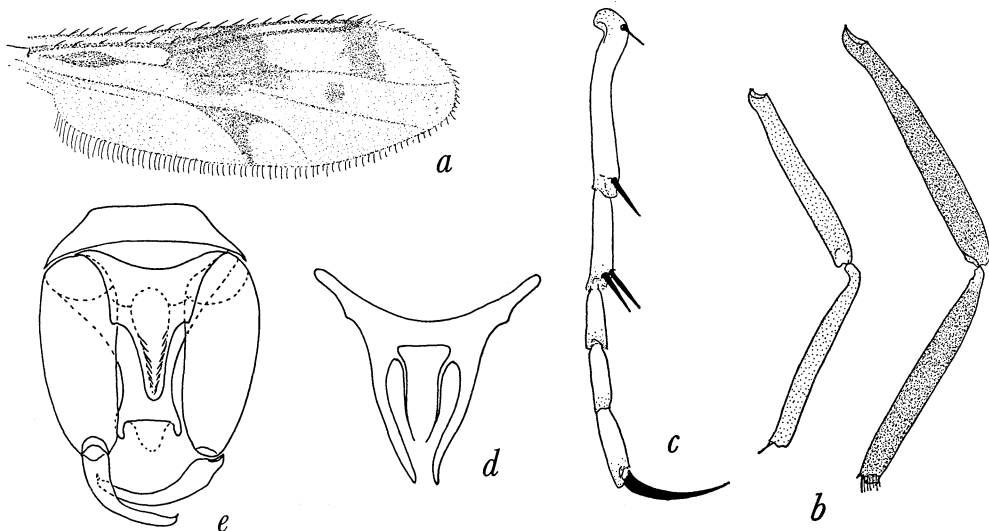


Fig. 11. *Monohalea parafurcata*. a, wing; b, femora and tibiae; c, ♂ hind tarsus; d, ♂ parameres; e, ♂ genitalia.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71186), Tampin, Negri Sembilan, Malaya, 20.XII.1949, R. H. Wharton, light trap.

Discussion. This species can be distinguished only by the genitalia in which the dististyle is slender and curved, the aedeagus is divided distally in a pair of slender, mesally setose valves, and the parameres are each deeply divided in 2 unequal slender processes.

12. *Monohalea capitata* Ratanaworabhan and Wirth, new species Fig. 12.

♀. Unknown.

♂. Wing length 0.84 mm.

Head: Dark brown; antenna and palpus pale brown. Antenna with pale brown plume; segments 13-15 with lengths in proportion of 26-20-25. Palpal segments with lengths in proportion of 5-7-12-10-16; segment 3 relatively stout with small round pit, length to breadth ratio 1.7.

Thorax: Dark brown. Fore and mid legs (fig. 12b) brownish, with narrow knee spots yellowish; hind femur and tibia dark brown, slightly swollen; hind tibial comb with 6 spines. Tarsi yellowish; ventral spines on tarsomeres 1-4, 0-0-0-0 on fore and mid legs, 2-2-0-0 on hind leg (fig. 12c). Wing (fig. 12a) with pattern as figured; costal ratio 0.77.

Abdomen: Dark brown; proximal terga with bases yellowish. Genitalia (fig. 12e): Basistyle with prominent, fingerlike, dorsomesal lobe at base; dististyle nearly straight, slender and tapered to tip. Aedeagus bipartite; proximal sclerite small with deep mesal notch; distal portion broad, with rounded distomedian lobe, and a pair of lateral expansions each terminating in a rounded lobe. Parameres (fig. 12d) joined near bases; each with main body moderately stout proximally, tapering distally to slender blade with simple tip abruptly bent ventrolaterad distally.

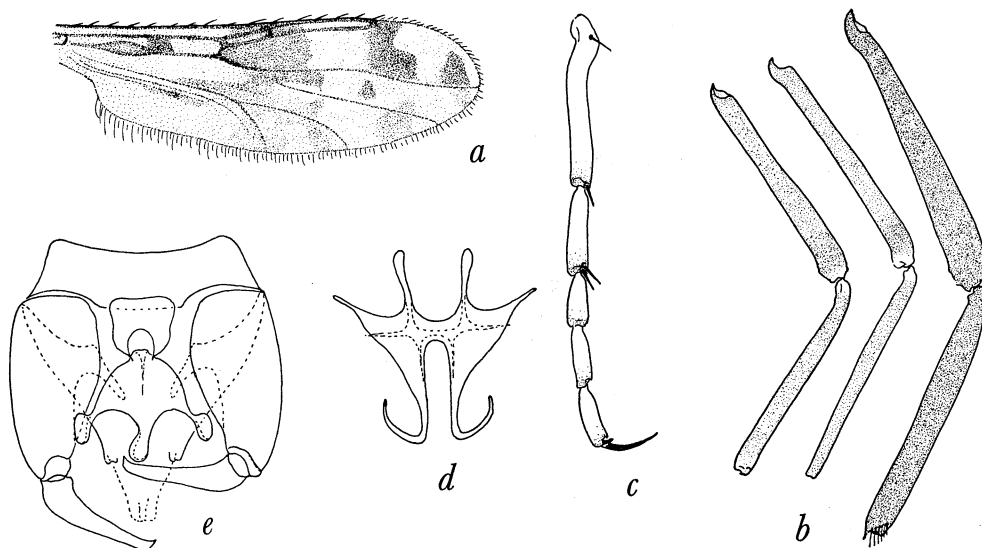


Fig. 12. *Monohalea capitata*. a, wing; b, femora and tibiae; c, ♂ hind tarsus; d, ♂ parameres; e, ♂ genitalia.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71187), Subang Forest Reserve, Kuala Lumpur, Malaya, 12.VI. 1958, R. Traub, light trap.

Discussion. *Monohalea capitata* can be distinguished from the others of the *inflativena* Group with totally dark hind femora, by the basal lobe on the basistyle, and by the broadly expanded aedeagus with 3 capitate lobes. The parameres are of a simple type with bladelike apices.

13. *Monohelea nigripes* Ratanaworabhan and wirth, new species Fig. 13.

♀. Wing length 0.99 mm.

Head: Brown, palpus pale brown. Antenna broken. Palpal segments (fig. 13b) with lengths in proportion of 8-15-20-17-25; segment 3 slender, with small round sensory pit, length to breadth ratio 2.5. Mandible with 7 teeth.

Thorax: Dark brown with few hairs. First 4 legs (fig. 13d) brown with pale knees, dark band apically on femora; hind leg dark brown, slightly swollen; tibial comb with 7 spines. Tarsi yellow, ventral spines of tarsomeres 1-4, 0-0-0-0 on fore leg, 2-2-2-0 on mid leg, and 2-1-1-0 on hind leg (fig. 13g). Wing (fig. 13a) with pattern as figured; costal ratio 0.84. Halter pale.

Abdomen: Dark brown. Spermathecae (fig. 13c) subequal, measuring 0.058 by 0.048 mm and 0.050 by 0.045 mm (necks 0.005 mm), small rudimentary spermatheca present.

♂. Ventral spines of tarsomeres 1-4, 0-0-0-0 on fore leg, 2-2-0-0 on mid leg, and 2-2-0-0 on hind leg (fig. 13h). Genitalia (fig. 13f): Dististyle bent at base and nearly straight toward the pointed tip. Aedeagus with moderately large, simple, basal sclerite, the distal sclerite long and slender, columnar. Parameres (fig. 13e) joined near bases, each swollen

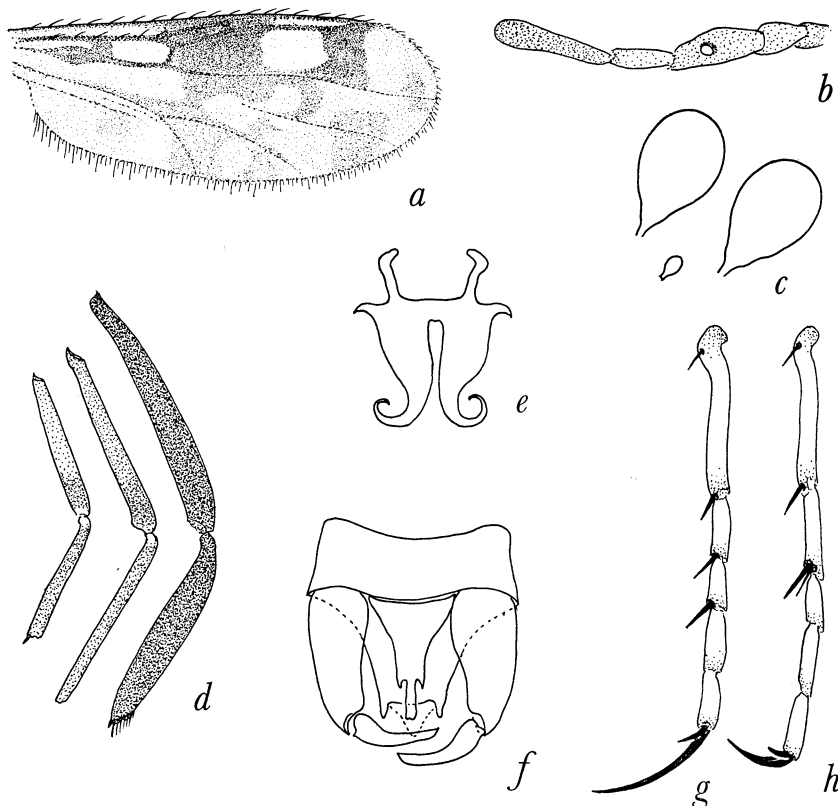


Fig. 13. *Monohelea nigripes*. a, wing; b, palpus; c, spermathecae; d, femora and tibiae; e, ♂ parameres; f, ♂ genitalia; g, ♀ hind tarsus; h, ♂ hind tarsus.

on proximal portion, short, tapering distally to moderately slender, lateroventrally curving, simple tip.

DISTRIBUTION. Thailand.

Holotype ♂ (USNM 71188), allotype ♀, Cholburi, Bangphra, Thailand, X.1962, J. E. Scanlon, light trap.

Discussion. This black-legged species of the *inflativa* Group is distinguished by the slender, columnar ♂ aedeagus, and the short, relatively stout parameres, each with simple, ventrolaterally curved, slender tip.

14. *Monohelea camptostyla* Ratanaworabhan and Wirth, new species Fig. 14.

♀. Unknown.

♂. Wing length 1.04 mm.

Head: Dark brown, antenna and palpus brown. Antenna with yellowish plume; segments 13-15 with lengths in proportion of 30-25-38. Palpal segments (fig. 14b) with lengths in proportion of 4-10-14-7-18; segment 3 moderately short and swollen, with small round sensory pit, length to breadth ratio 1.7.

Thorax: Dark brown without prominent pattern. First 4 legs (fig. 14c) brown with pale knees, dark band apically on femora; hind leg dark brown, moderately swollen, femur with subapical pale band; tibial comb with 9 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-1-0 on fore leg, 3-1-1-0 on mid leg, and 2-2-0-0 on hind leg (fig. 14d). Wing (fig. 14a) with pattern as figured; costal ratio 0.75. Halter pale.

Abdomen: Dark brown. Genitalia (fig. 14f): Dististyle bent at base and nearly straight toward the blunt apex. Aedeagus bipartite, basal sclerite broad, distal sclerite a large conical structure with simple tip. Parameres (fig. 14e) forming a transverse bridge; each with main body not developed, instead consisting of a pair of short, simple, straight processes, the

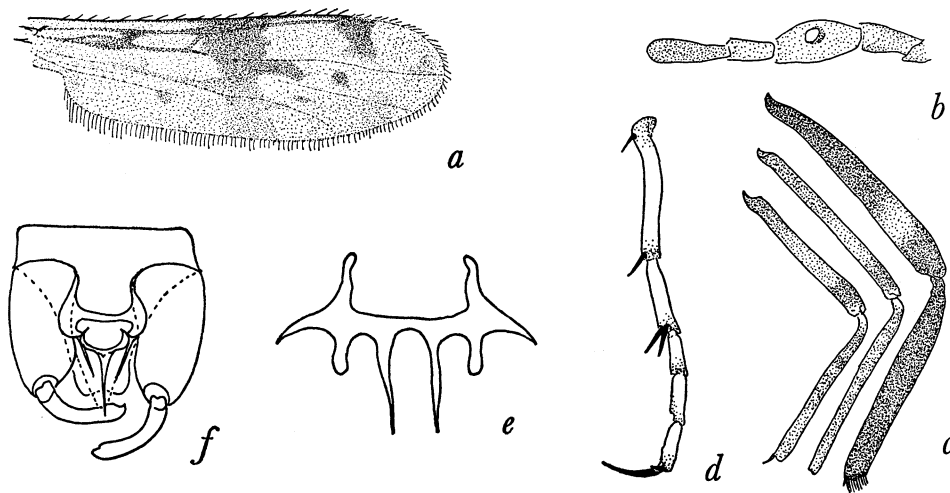


Fig. 14. *Monohelea camptostyla*. a, wing; b, palpus; c, femora and tibiae; d, ♂ hind tarsus; e, ♂ parameres; f, ♂ genitalia.

submedian pair longer and pointed, the lateral pair about half as long and stouter with rounded tips.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71189), Rantau Panjang, 5 mi N Klang, Selangor, Malaya, IX-XII.1959, H. E. McClure, light trap.

Discussion. This species can readily be distinguished by the basally bent, distally stout dististyles and the extreme reduction of the parameres to a transverse bridge bearing 2 pairs of short, straight, caudal processes, the submedian pair slender with sharp point, and the lateral pair shorter with rounded tip.

15. *Monohalea superlobata* Ratanaworabhan and Wirth, new species Fig. 15.

♀. Wing length 1.20 mm.

Head: Brown, antenna and palpus light brown. Antenna (fig. 15a) with proximal flagellar

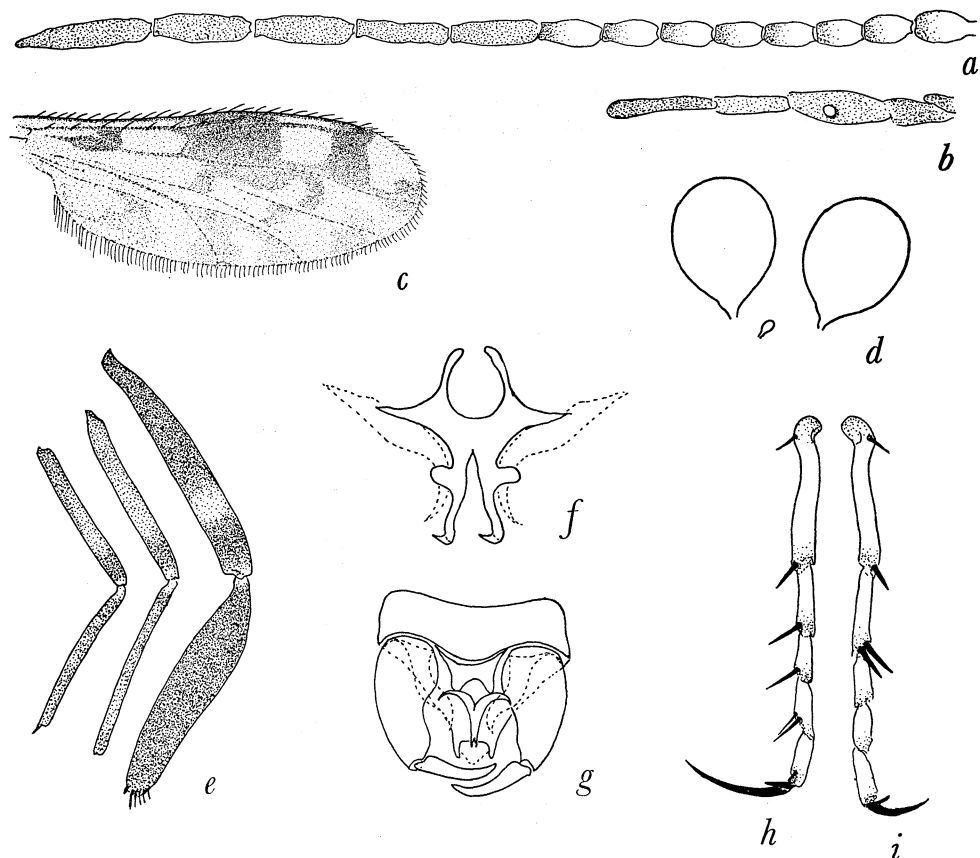


Fig. 15. *Monohalea superlobata*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

segments cylindrical, distal 5 distinctly elongated; flagellar segments with lengths in proportion of 16-14-15-15-16-16-17-17-30-30-30-30-39; antennal ratio 1.27. Palpal segments (fig. 15b) with lengths in proportion of 6-22-32-24-34; segment 3 long, slightly swollen in midportion, with small round sensory pit, length to breadth ratio 2.9. Mandible with 8 teeth.

Thorax: Dark brown; mesonotum with punctiform blackish dots at the bases of the long hairs. First 4 legs (fig. 15e) brown with pale knees, dark band apically on femora; hind leg dark brown, swollen, femur with subapical pale band, tibia greatly swollen; tibial comb with 5 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-1-1-0 on fore leg, 3-2-2-0 on mid leg, and 2-1-1-2 on hind leg (fig. 15h). Wing (fig. 15c) with pattern as figured; costal ratio 0.84. Halter pale.

Abdomen: Dark brown; sterna spiny. Spermathecae (fig. 15d) subequal, measuring 0.068 by 0.050 mm and 0.060 by 0.045 mm (necks 0.005 mm).

♂. Antennal plume yellow; antennal segments 13-15 with lengths in proportion of 44-35-39. Ventral spines of tarsomeres 1-4, 2-0-0-0 on fore leg, 3-2-2-0 on mid leg, and 2-2-0-0 on hind leg, (fig. 15i). Genitalia (fig. 15g): Dististyle moderately slender and curved; basistyle with long, fingerlike process from base of dorsomesal margin at juncture with 9th tergum. Aedeagus bipartite, basal sclerite small, with deep caudomesal notch, distal sclerite with basolateral sclerotization joining mesal margin of basistyle, tapering distally to slender bifid tip. Parameres (fig. 15f) joined on proximal portion; each with stout, triangular base, distal portion tapering to long, slender blade curving ventrolaterad and finely serrate on dorsal margin, with a well developed, rounded, ventral lobe in midportion.

DISTRIBUTION. Thailand.

Holotype ♂ (USNM 71190), allotype ♀, 2 ♂♂ and 3 ♀♀ paratypes, Ampur Muang, Chiangmai, Thailand, VII.1962, J. E. Scanlon, light trap. One ♀ paratype, Udon Thani, Thailand, IX.1962, J. E. Scanlon, light trap.

Discussion. This species is readily distinguished from the species of the *inflativena* Group with subapical pale band on the hind femur by the slender dististyle, slender fingerlike lobe on the basistyle, and the well developed rounded ventral lobe on the midportion of the paramere.

16. *Monohelea basilobata* Rantanaworabhan and Wirth, new species Fig. 16.

♀. Unknown.

♂. Wing length 1.33 mm.

Head: Brown, including antenna and palpus; antennal plume brownish. Antenna with lengths of segments 13-15 in proportion of 51-50-50. Palpus (fig. 16b) with lengths of segments in proportion of 6-10-20-14-22; segment 3 moderately swollen with small round sensory pit, length to breadth ratio 2.0.

Thorax: Dark brown; mesonotum with pattern of punctiform blackish dots. Legs (fig. 16f) dark brown; fore femur paler with dark brown apical ring; hind leg darker and distinctly swollen, femur with subapical pale ring; tibial comb with 7 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 3-1-1-0 on fore leg, 4-2-2-0 on mid leg, and 3-2-0-0 and very strong on hind leg (fig. 16c). Wing (fig. 15a) with pattern as figured; costal ratio 0.80. Halter pale.

Abdomen: Dark brown, proximal terga yellowish. Genitalia (fig. 16d): Basistyle with slender, fingerlike, dorsomesal lobe at basal articulation with parameres; dististyle long and slender, slightly curved. Aedeagus simple with small, distally notched, basal sclerite, and proximally broad, distally slender, distal sclerite ending in a pair of contiguous caudal points. Para-

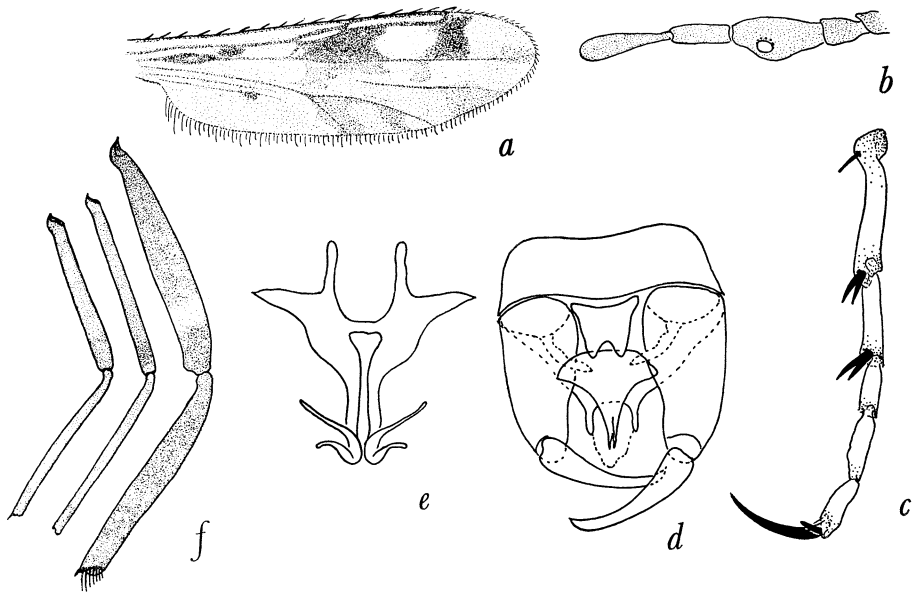


Fig. 16. *Monohelea basilobata*. a, wing; b, palpus; c, ♂ hind tarsus; d, ♂ genitalia; e, ♂ parameres; f, femora and tibiae.

meres (fig. 16e) joined near bases by a slender bridge; each with moderately stout base, midportion somewhat columnar and moderately slender, distally divided in 2 unequal slender processes recurved ventrolaterally.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71469), Telok Pelandok, Port Dickson, Negri Sembilan, Malaya, 18.VII.1958, R. Traub, light trap. Paratypes: MALAYA: Carey Island, Klang, Selangor, 10.IX.1969, A. Rudnick, 70 ft tree platform, 1 ♂. Kuala Langat, Tg. Rabok, Selangor, freshwater peat swamp forest, 30.VII.1969, A. Rudnick, 1 ♂. Ulu Gombak Forest Reserve, Selangor, I-V.1960, H. E. McClure, light trap, 1 ♂.

Discussion. *Monohelea basilobata* can be distinguished by the presence of the slender fingerlike lobe on the basistyle and the nearly straight, columnar parameres with apices each divided into 2 unequal slender processes.

17. *Monohelea papuae* Tokunaga Fig. 17.

Monohelea papuae Tokunaga, 1963, *Pacif. Ins.* 5: 245 (♂, ♀; New Ireland; fig. wing, ♂ genitalia).

♀. Wing length 1.10 mm.

Head: Yellowish brown, antenna and palpus pale brown. Antenna (fig. 17a) with proximal flagellar segments cylindrical, distal 5 elongated and darker in color; flagellar segments with lengths in proportion of 19-14-14-15-16-16-16-17-28-29-29-26-32; antennal ratio 1.30. Palpal segments (fig. 17b) with lengths in proportion of 5-12-22-15-25; segment 3 slender, with small round sensory pit, length to breadth ratio 2.4. Mandible with 7 teeth.

Thorax: Brown with short hairs. First 4 legs (fig. 17e) yellowish brown, dark band apically on femora; hind leg dark brown and swollen, femur with subapical pale ring; tibial comb with 8 spines. Tarsi yellow, ventral spines of tarsomeres 1-4, 3-1-1-0 on fore leg, 3-2-2-0 on mid leg, and 2-1-1-0 on hind leg (fig. 17h). Wing (fig. 17c) with pattern as figured, 3 dark bands on anterior portion; costal ratio 0.83. Halter pale.

Abdomen: Brown, cerci yellowish. Spermathecae (fig. 17d) oval, subequal, each measuring 0.055 by 0.045 mm (necks 0.005 mm); small rudimentary spermatheca present.

♂. Similar to ♀, with usual sexual differences; antennal plume yellow; lengths of antennal segments 13-15 in proportion of 48-41-43. Ventral spines of tarsomeres 1-4, 3-1-1-0 on fore leg, 3-2-2-0 on mid leg, and 3-2-0-0 on hind leg (fig. 17i). Genitalia (fig. 17g): Dististyle slender, slightly curved. Aedeagus with basal sclerite notched distomesad; distal sclerite with slender median lobe and a pair of long, thumblike lateral lobes connecting laterad to mesal margin of basistyle. Parameres (fig. 17f) joined mesad in midportions; each stout

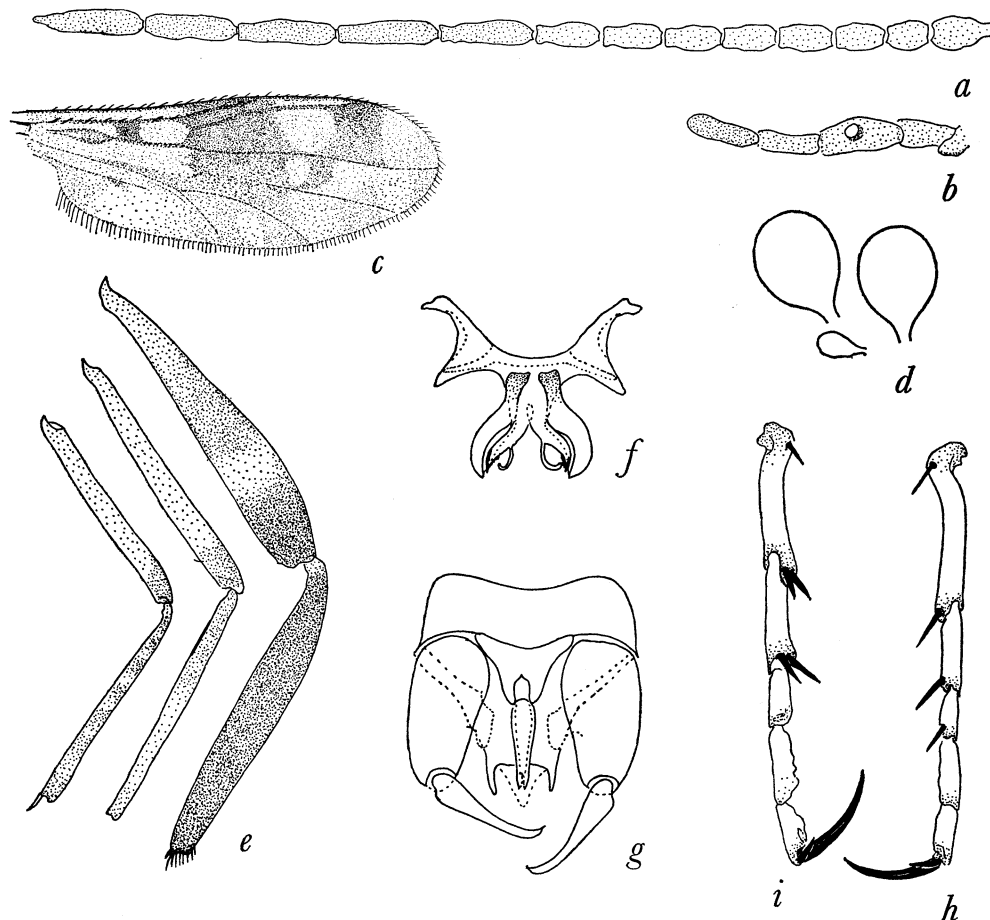


Fig. 17. *Monohelea papuae*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

subapically with apex divided into a stout recurved lateral lobe bearing a small, slender, hooked, appendixlike, dorsomesal process.

DISTRIBUTION. Malaya, New Ireland, North Borneo.

Holotype ♀ (BISHOP 6762), Kavieng, New Ireland, 3-4.VI.1959, Peters coll.

SPECIMENS EXAMINED.

MALAYA: Selangor, Rantau Panjang, 5 mi N Klang, IX-XII.1959, H. E. McClure, light trap, 1 ♂; Selangor, Subang Forest Reserve, 1959, McClure, light trap, 1 ♂, 4 ♀♀.

NORTH BORNEO: Labuan Island, XII.1951, D. H. Colless, at light, 1 ♂, 1 ♀; Tawau, II.1960, D. H. Colless, 2 ♂♂, 1 ♀.

Discussion. *Monohelea papuae* is readily distinguished by the long, thumblike, lateral lobes connecting the edge of the aedeagus to the mesal margin of the basistyles, and by the small, slender, hooked, appendix-like dorsomesal process near the tip of the aedeagus.

18. *Monohelea digitata* Ratanaworabhan and Wirth, new species Fig. 18.

♀. Unknown.

♂. Wing length 1.20 mm.

Head: Pale brown; antennal plume brownish. Antenna with lengths of segments 13-15 in proportion of 39-34-38. Palpal segments with lengths in proportion of 5-10-20-12-22; segment 3 slender with small round sensory pit; length to breadth ratio 2.9.

Thorax: Dark brown; mesonotum with pattern of large dark patches and punctiform dots at bases of the strong setae. Fore and mid legs (fig. 18b) brown, knee spots yellowish, slightly darker bands at apices of femora; hind leg swollen, femur with subapical pale band; tibial comb with 9 spines. Tarsi yellowish; ventral spines of tarsomeres 1-4, 2-2-2-0 on fore leg, 1-

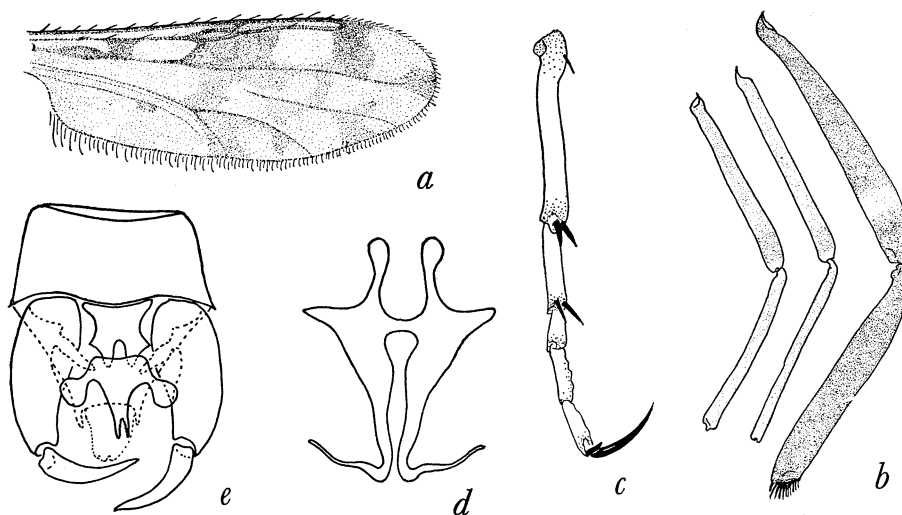


Fig. 18. *Monohelea digitata*. a, wing; b, femora and tibiae; c, ♂ hind tarsus; d, ♂ parameres; e, ♂ genitalia.

0-0-0 on mid leg, and 3-2-0-0 on hind leg (fig. 18c). Wing (fig. 8a) with pattern as figured; costal ratio 0.76. Hatler pale.

Abdomen: Dark brown, prodimal terga yellowish. Genitalia (fig. 18e): Basistyle with long, fingerlike, ventromesal lobe; dististyle slightly hook-shaped, slender and pointed distally. Aedeagus with moderately broad, dististally notched basal sclerite; distal sclerite broad at base with slender, distally tapered median lobe divided apically in 2 sharp points, also bearing a pair of knoblike lateral lobes. Parameres (fig. 18d) joined narrowly near bases; each with main body moderately stout at base, tapering and slightly sinuate in midportion; distal portion abruptly bent ventrolaterad in a slender, heavily sclerotized blade.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71470), Bukit Besi, Dungun, Trengganu, Malaya, 6.VIII.1958, R. Traub, light trap.

Discussion. *Monohalea capitata* n. sp. has very similar ♂ genitalia, but with dististyle nearly straight, and not so curved hooklike. It also differs in its entirely dark brown hind femur.

19. *Monohalea bellula* Macfie Fig. 19.

Monohalea bellula Macfie, 1934, *Ann. Trop. Med. Parasit.*, **28**: 282 (♂, ♀ Malaya; fig. ♂ genitalia).

♀. **Head:** Dark brown, with gray or silvery pruinescence; antenna dark brown, segments 3-10 paler at bases; palpus dark brown distally, pale at base. Antenna with flagellar segments sub-cylindrical; lengths in proportion of 17-13-13-13-13-13-13-13-20-20-20-20-24; antennal ratio 0.97.

Thorax: Dark brown, mottled with gray or silvery markings and provided with dark brown punctate spots at the origin of hairs. First 4 legs dark brown with pale yellowish knees, femora and tibiae paler in middle than at ends; hind leg very dark brown, femur with subapical pale band. Tarsi pale, tarsomeres slightly infuscated at apices, the first also darker at base; ventral spines of tarsomeres 1-4, 2-1-1-1 on hind leg. Wing with color pattern resembling *M. tessellata*; costal ratio about 0.75. Halter pale.

Abdomen: Dark brown distally, paler at base. (after Macfie, 1934).

♂. Antenna with plume brown; lengths of segments 13-15 in proportion of 34-26-26. Palpal segments 3-5 with lengths in proportion of 17-12-16. Ventral spines of tarsomeres 1-4, 2-2-0-0 on hind leg. Genitalia (fig. 19a): Basistyle without dorsomesal lobe at base; dististyle strongly curving, hooklike, with slender, pointed tip. Aedeagus exceptionally broad and short, distal sclerite with low, rounded, distolateral lobe on each shoulder. Parameres (fig. 19b) joined by a basal bridge; each with moderately long and slender, simple, sinuate, slightly hooked tip. (after Macfie, 1934).

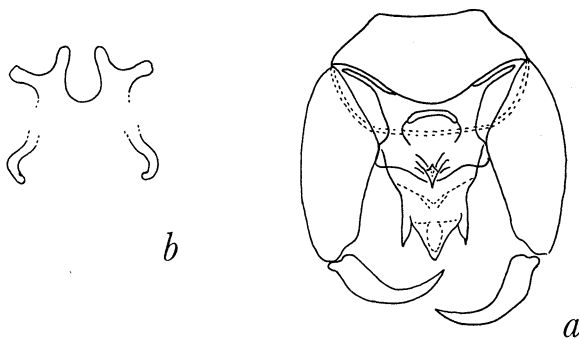


Fig. 19. *Monohalea bellula*. a, ♂ genitalia; b, ♂ parameres (after Macfie, 1934).

DISTRIBUTION. Malaya.

Syntypes, 2 ♂♂, 1 ♀, Gunong Tahan Padang, Pahang, Malaya, 5500 ft (1670 m), 20, 22.I.1923, H. M. Pendlebury, at light, and Bukit Kutu, Selangor, Malaya, 3500 ft (1065 m), IV.1926, H. M. Pendlebury (in British Museum (Nat. Hist.), London).

Discussion. *Monohelea arcuata* n. sp. is closely related but differs markedly in the ♂ genitalia by its nearly straight dististyle, slender, columnar distal sclerite of the aedeagus, and by its straighter, arcuate parameres.

20. *Monohelea ampligonata* Ratanaworabhan and Wirth, new species Fig. 20.

♀. Wing length 1.00 mm.

Head: Brown, antenna and palpus pale brown. Antenna (fig. 20a) with proximal segments cylindrical, distal 5 distinctly elongated; flagellar segments with lengths in proportion of 17-

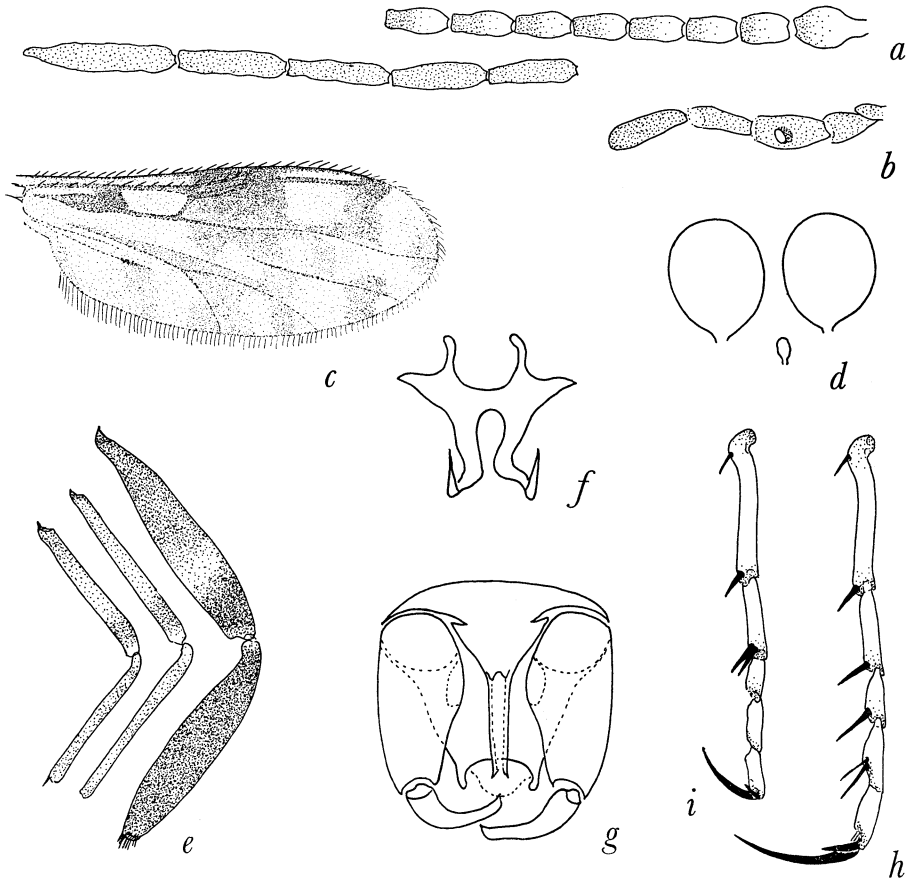


Fig. 20. *Monohelea ampligonata*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

16-16-16-16-17-17-17-26-27-28-27-31; antennal ratio 1.05. Palpal segments (fig. 20b) with lengths in proportion of 6-17-21-15-22; segment 3 moderately slender with small round sensory pit, length to breadth ratio 2.6. Mandible with 8 teeth.

Thorax: Dark brown with moderate number of hairs. First 4 legs (fig. 20e) pale brown with pale knees, femora with subapical dark band; hind leg dark brown and swollen, femur with subapical pale ring; tibial comb with 7 spines. Tarsi yellow; ventral spines of tarsomeres 1-4, 2-0-0-0 on fore leg, 2-2-2-0 on mid leg, and 2-1-1-2 on hind leg (fig. 20h). Wing (fig. 20c) pattern as figured; costal ratio 0.82. Halter pale.

Abdomen: Brown. Spermathecae (fig. 20d) unequal in size, oval with short neck; measuring 0; 0.65 by 0.060 mm and 0.058 by 0.053 mm (necks 0.005 and 0.003 mm).

♂. Antennal plume yellow; lengths of segments 13-15 in proportion of 34-29-32. Ventral spines of tarsomeres 1-4, 1-0-0-0 on fore leg, 3-2-2-0 on mid leg, and 2-2-0-0 on hind leg (fig. 20i). Genitalia (fig. 20g): Basistyle with low vanelike lobe from dorsomesal juncture with 9th tergum; dististyle moderately stout, somewhat bent in midportion. Aedeagus bipartite, basal sclerite short, distal notch small; distal sclerite columnar with truncate tip. Parameres (fig. 20f) with broad basal union, each with main body slender, with pointed tip abruptly bent laterad and then ventrocephalad.

DISTRIBUTION. Malaya.

Holotype ♂ (USNM 71471), allotype ♀, Negri Sembilan, Port Dickson, Telok Pelandok, Malaya, 18.VII.1958, R. Traub, light trap. Paratypes, 5 ♂♂, 5 ♀♀, Carey Island, Klang, Selangor, Malaya, 22.IX and 18.XI.1969, A. Rudnick, light trap 21 m tree platform.

Discussion. *Monohalea ampligonata* is similar to *M. bellula* Macfie but in *bellula* the dististyle appears hooklike with slender, pointed tip, the distal sclerite of the aedeagus is reduced to a small median point, without columnar elongation, and the parameres have slender, rounded apices.

21. *Monohalea arcuata* Ratanaworabhan and Wirth, new species Fig. 21.

♀. Wing 1.00 mm long.

Head: Brown, antenna and palpus brown. Antenna (fig. 21a) with proximal flagellar segments oval to cylindrical, distal 5 elongated; flagellar segments with lengths in proportion of 19-13-14-15-15-15-15-16-25-26-28-27-33; antennal ratio 1.14. Palpal segments (fig. 21b) with lengths in proportion of 6-12-19-16-23; segment 3 slightly swollen, with shallow round sensory pit, length to breadth ratio 2.1. Mandible with 8 teeth.

Thorax: Dark brown, mesonotum with pattern of small punctate dots. First 4 legs (fig. 21e) brown with pale knees, femora pale in midportions, a darker band subapically, tibiae somewhat pale mottled; hind leg dark brown, slightly swollen, femur with subapical pale ring; tibial comb with 8 spines. Tarsi yellow, ventral spines of tarsomeres 1-4, 1-0-0-0 on fore leg, 4-2-2-0 on mid leg, and 2-1-1-1 on hind leg (fig. 21h). Wing (fig. 21c) with pattern as figured; costal ratio 0.84. Halter whitish, knob opaque.

Abdomen: Dark brown, cerci yellow. Spermathecae (fig. 21d) ovoid, slightly unequal, measuring 0.058 by 0.058 mm and 0.053 by 0.045 mm (necks 0.005 mm); rudimentary spermatheca present.

♂. Antennal plume yellow; length of segments 13-15 in proportion of 33-30-31. Ventral spines of tarsomeres 1-4, 3-2-0-0 on hind leg (fig. 21i). Genitalia (fig. 21g): Dististyle slightly curving, slender to tip. Aedeagus with short, broad basal sclerite; distal sclerite slender, slightly tapering distally to bifid tip; a pair of small rounded lateral lobes arising from dorsal side

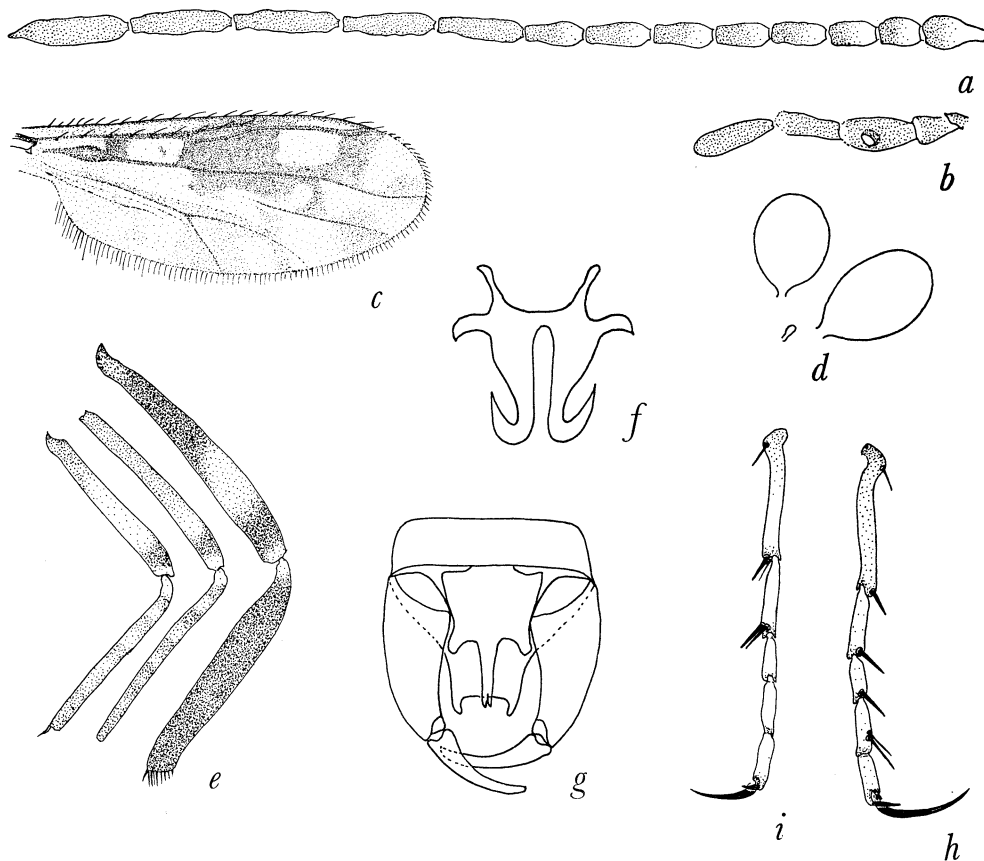


Fig. 21. *Monohelea arcuata*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

of posterior shoulders of basal sclerite. Parameres (fig. 21f) joined near bases; each with main body slightly swollen proximally, tapering distally to moderately slender simple tip which is more or less arcuately bent or abruptly recurved ventrad.

DISTRIBUTION. Malaya, North Borneo.

Holotype ♂ (USNM 71472), allotype ♀, Kuala Singgora, Pahang, Malaya, 17.VII.1958, R. H. Wharton, light trap at edge of padi field. Paratypes, 3 ♂♂, 1 ♀, as follows:

MALAYA: Pahang, Kuantan, Paya Bungor, IX-XI.1959, R. H. Wharton, light trap, 1 ♂, 1 ♀. Selangor, Kuala Lumpur, VII.1958, R. Traub, light trap, 1 ♂.

NORTH BORNEO: Tawau, 19.XI.1958, L. W. Quate, on beach at dusk, 1 ♂.

Discussion. The ♂ genitalia of *M. papuae* Tokunaga are quite similar to those of *M. arcuata*, but in *papuae* the dorsolateral lobes of the aedeagus are stronger and the parameres each bears a slender, dorsal, appendix-like process at the point where the blade turns ventrally.

22. *Monohelea inflativena* Tokunaga Fig. 22.

Monohelea inflativena Tokunaga, 1962 *Pacif. Ins.* 4: 214 (♂, ♀: Ryukyu Islands; fig. wing, spermathecae, ♂ genitalia).

♀. Wing length 1.20 mm.

Head: Brown, antenna and palpus pale brown. Antenna (fig. 22a) with proximal flagellar segments oval to cylindrical, distal 5 elongated with last segment slightly swollen; flagellar segments with lengths in proportion of 20-13-13-15-15-15-15-16-25-26-29-28-33; antennal ratio 1.16. Palpal segments (fig. 22b) with lengths in proportion of 8-11-20-14-21; segment 3 swollen distally with round, shallow, sensory pit, length to breadth ratio 2.0. Mandible with 10 teeth.

Thorax: Dark brown with few long hairs. First 4 legs (fig. 22e) brown with pale knees, dark band subapically on femora; hind leg dark brown, swollen, femur with subapical pale ring; tibial comb with 10 spines. Tarsi yellow; hind tarsus with strong ventral spines; ventral spines of tarsomeres 1-4, 2-0-0-0 on fore leg, 4-2-2-0 on mid leg, and 2-1-1-2 on hind leg (fig. 22h). Wing (fig. 22c) pattern as figured, 3 dark bands on anterior portion; costal ratio 0.82. Halter pale.

Abdomen: Dark brown; cerci yellow. Spermathecae (fig. 22d) round, subequal, each measuring 0.055 by 0.048 mm; small rudimentary spermatheca present.

♂. Antennal plume yellowish at base; segments 13-15 with lengths in proportion of 33-27-

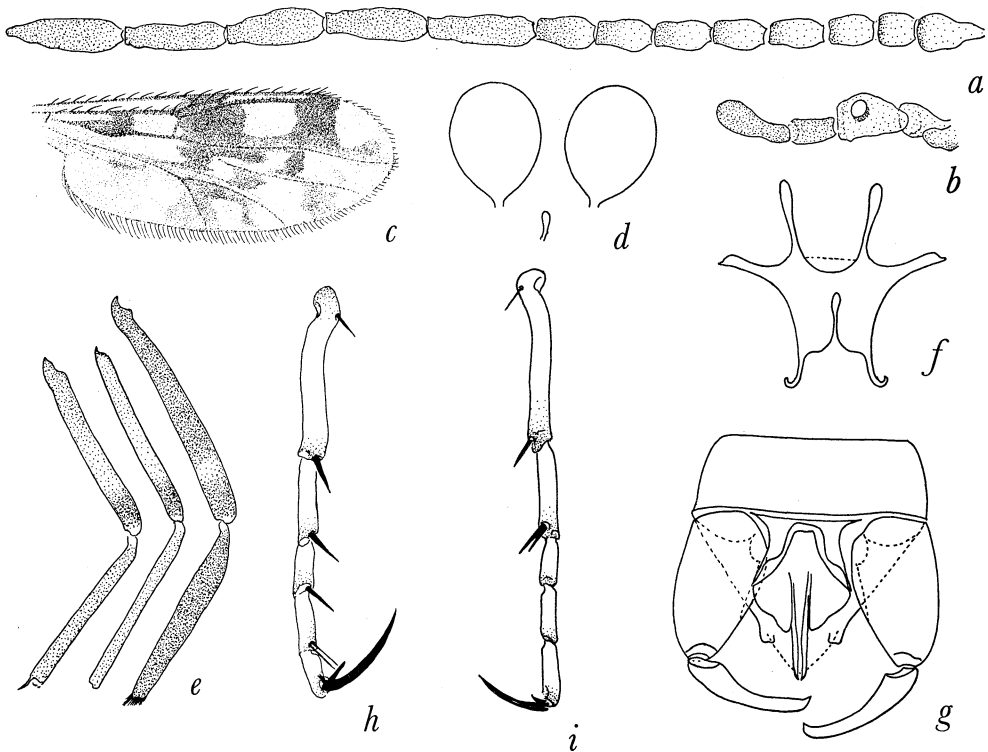


Fig. 22. *Monohelea inflativena*. a, antenna; b, palpus; c, wing; d, spermathecae; e, femora and tibiae; f, ♂ parameres; g, ♂ genitalia; h, ♀ hind tarsus; i, ♂ hind tarsus.

30. Ventral spines of tarsomeres 1-4, 1-1-0-0 on fore leg, 2-2-2-0 on mid leg, and 2-2-0-0 on hind leg (fig. 22i). Genitalia (fig. 22g): Dististyle nearly straight, tip moderately slender. Aedeagus bipartite; basal sclerite short, cleft to base; distal sclerite with broad, round, lateral expansions, distomedian process slender and columnar with distomedian flaplike valves. Parameres (fig. 22f) broadly fused in midportion; each with main body short and greatly swollen, bearing distally a slender, distally recurved, appendix-like process from distolateral corner.

DISTRIBUTION. Japan, Korea, Ryukyu Islands.

Holotype ♂ (USNM 71474), Chibana, Okinawa, Ryukyu Islands, VII.1959, C. Nibley, light trap.

SPECIMENS EXAMINED.

JAPAN: Kyoto, Midoro Pond, 9.VIII.1954, P. Arnaud, A. Fulmer and Y. Shogaki, light trap, 1 ♀.

KOREA: Seoul, 11.VIII.1959, light trap, 1 ♀.

RYUKYU ISLANDS: Chibana, Okinawa, VII-VIII.1959, C. Nibley, light trap, 1 ♂, 5 ♀♀ (type series); Sonabi, Okinawa, IX.1959, C. Nibley, light trap, 1 ♂ (paratype); Yaka, Okinawa, V.1959, C. Nibley, light trap, 5 ♀♀; same but III.1962, W. F. Pippin, 4 ♀♀.

Discussion. This species is readily distinguished by the peculiar shape of the ♂ parameres, in which the distolateral corner of the swollen main body bears a small, simple, appendixlike, recurved process.

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