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NEW SPECIES AND RECORDS OF PREDACEOUS MIDGES (DIPTERA: CERATOPOGONIDAE) FROM RICE PADDIES IN THAILAND

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Abstract. Records are given for 26 species of predaceous ceratopogonids collected by Dr Keizo Yasumatsu in rice paddies in Thailand in connection with his research on natural enemies of rice pests. Predaceous ceratopogonids give indirect benefit in biological control by reducing the numbers of aquatic midges (Chironomidae), which are often preferred as alternate hosts by some non-host-specific parasites and predators. The following are described as new species: *Mackerrasomyia wongsirii, Nilobezzia yasumatsui, Xenohelea nuansriae, Bezzia collessi, B. lewvanichae, B. lutea, B. tirawati, B. yasumatsui,* and *Phaenobezzia mellipes.* New combinations are as follows: *Sphaeromias brevispina* (Kieffer), *S. cinerea* (Kieffer), *S. discolor* (de Meijere), *Homohelea insons* (Johannsen), *Phaenobezzia assimilis* (Johannsen), *P. conspersa* (Johannsen), *P. eucera* (Kieffer), and *P. javana* (Kieffer). New synonymy is given as follows: *Homohelea insons* (syn.: *obscuripes*), *Nilobezzia acanthopus* (syn. *raphaelis* var. *conspicua*), *Sphaeromias discolor* (syn.: *javanensis*), *Bezzia micronyx* (syn. *crassistyla*). Diagnoses and keys or checklists are given for SE Asian and/or Oriental species of the genera *Homohelea, Jenkinshelea, Leehelea, Nilobezzia, Xenohelea, Bezzia,* and *Phaenobezzia.*

This study reports on the predaceous midges taken by Dr Keizo Yasumatsu while working under a Colombo Plan project with the Entomology and Zoology Division, Department of Agriculture, Bangkhen, Bangkok, Thailand, during the years 1972 to 1980 (Yasumatsu et al. 1980). Dr Yasumatsu needs the names of the new species to report further on the natural enemies of the insects affecting rice culture in Thailand. Localities and dates of collection are detailed in Yasumatsu et al. (1980). Identifications entailed considerable revision of the literature and of the extensive collection of Oriental Ceratopogonidae in the U.S. National Museum of Natural History in Washington, D.C. For this reason considerable non-rice-paddy material is also reported.

Most of the rice-paddy ceratopogonids submitted by Dr Yasumatsu were the large predaceous midges of the subfamily Ceratopogoninae, although the numbers of *Dasyhelea* (subfamily Dasyheleinae) and *Culicoides* (subfamily Ceratopogoninae, tribe Culicoidini) were significant. Most of the *Culicoides* belonged to the common species *C. schultzei* (Enderlein), *C. arakawai* (Arakawa), *C. peregrinus* Kieffer, and *C. actoni* Smith, whose adult females are blood feeders on vertebrates, including man and domestic animals. *Culicoides* larvae in the rice paddies feed on detritus or prey on protozoa and other microscopic invertebrates in the water or mud around the paddy margins. *Dasyhelea* larvae are herbivores feeding on algae in or at the margins of the paddies,

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and the adults feed only on the nectar of the plants growing nearby. Because Dr Yasumatsu's survey was intended to investigate the predators and parasites of the dominant insect pests of the rice plants, we confined our intensive study to the ceratopogonid tribes Stilobezziini, Sphaeromiini, and Palpomyiini. In these tribes adult females prey on chironomid midges and other small soft-bodied insects occurring in the paddies; the larvae prey upon small aquatic insects and other invertebrates found in the bottom mud, algal mats, or the muddy margins of the paddies.

There has been no comprehensive study on Thai ceratopogonids, although Causey (1938) reported on the Siamese *Culicoides*. Most of Causey's material was obtained by light traps and he did not mention species breeding in rice fields. Other authors reporting on ceratopogonids obtained in light traps sited near or at rice fields include Ratanaworabhan (1975, *Culicoides* of Chiang Mai Valley, northern Thailand); Promsaka (1975, ceratopogonids of Chiang Mai, Chiang Rai and Phrae, northern Thailand); Pakarnseree (1976, *Culicoides* of Phuket and Songkhla, southern Thailand); and Prayoonhong (1976, *Culicoides* of Nakon Prathom, central Thailand).

It has long been known that rice paddies are an excellent habitat for biting midges, along with countless other aquatic insects that can readily colonize in the temporary sites formed when cultivated fields are flooded for rice culture. In the past, researchers have provided only scattered and more or less isolated accounts of ceratopogonids from rice fields in Asia. Johannsen (1931) described a number of rice-paddy ceratopogonids from collections made by Dr August Thienemann and his associates in Java, Sumatra, and Bali in 1928 and 1929: *Culicoides peregrinus* Kieffer and *Bezzia (Probezzia) suavis* Johannsen reared from larvae found in a rice field at Ranau, South Sumatra; *Stilobezzia notata* (de Meijere) var. *perspicua* Johannsen from the same rice field; *Bezzia (Nilobezzia) ochriventris* Edwards var. *diffidens* Johannsen reared from larvae in a rice field near Singkarak, Middle Sumatra; and *Bezzia mollis* Johannsen reared from a larva found in a rice field near Balige, Toba Lake region, Sumatra.

After a long search for the larval habitat of the common pest species *Culicoides arakawai* (Arakawa) in Japan, Tokunaga et al. (1961) finally reported finding larvae abundantly in rice paddies, although paddies were not presumed to be the exclusive breeding sites. Kitaoka & Morii (1963) and Tokunaga (1963) reported that the following ceratopogonid species were closely associated with rice fields in Japan: a) blood feeders: *Culicoides arakawai, C. schultzei, C. odibilis* Austen, *C.* sp. nr *nipponensis* Tokunaga; b) non-bloodsucking species: *Dasyhelea arcuiforceps* Tokunaga, *D. kyotoensis* Tokunaga, *D. flaviventris* Goetghebuer, *D. centridorsalis* Tokunaga, and *D. densipilosa* Tokunaga; and c) predaceous species: *Alluaudomyia sagaensis* Tokunaga, *A. shogakii* Tokunaga, *Stilobezzia zonata* Tokunaga, *Palpomyia ferruginea* (Meigen), *P. tibialis* (Meigen), *Bezzia kitaokai* Tokunaga, *B. spinosa* Tokunaga, and *B. japonica* Tokunaga. We are not aware of any other published records of predaceous ceratopogonids from rice paddies in Thailand or elsewhere in SE Asia.

Yasumatsui et al. (1980) have given a detailed report on studies over an 8-year period on the natural enemies of rice pest insects in Thailand and the development

of an integrated control program. Predaceous ceratopogonids play an important part in rice-field ecology, with applications to integrated pest control. Rice culture has been a basic human activity in Thailand for centuries, and the system has maintained a high population of parasites and predators, which usually keep the rice pests at tolerable levels. Rice crops are seasonal in most Thailand agricultural areas, with 1 crop a year through the wet season; the paddies lie fallow when rainfall is light. During the time that rice is not grown, the rice pests and their parasites and predators either go into diapause or shift to alternate hosts growing elsewhere, namely volunteer rice or wild rice. When the rice fields are flooded and rice is abundant, the pest populations build up; this is closely followed by increases in populations of their natural enemies, which quickly bring the pest populations into some sort of balance.

Populations of chironomid midges, which become extremely abundant in the paddies at certain times after flooding, are also a factor in the rice-field equilibrium. Many of the parasites and predators of the rice pests also attack these chironomid midges; if the chironomid population is too high, they focus on the chironomids and fail to control the rice pests. However, there is an important and abundant fauna of predaceous ceratopogonids in and near the paddies that depends on the chironomids for prey. Yasumatsu and his co-workers (1980) studied many rice fields in detail and showed an inverse correlation between numbers of ceratopogonids and chironomids, indicating effective biological control of the chironomids. Thus, the predaceous ceratopogonids are of indirect benefit in the biological control of rice pests.

Heckman (1979) recently reported on an excellent ecological study of the rice-field biota in northeastern Thailand; he listed many insects, but ceratopogonids were not reported in detail. Heckman's report dealt primarily with physico-chemical studies and the structure of the food chains of the vertebrates and larger invertebrates that man uses as food. He recorded larvae of several species of chironomids, which occasionally build up massive populations, and unidentified ceratopogonid larvae; however, probably because of identification problems, not much attention was given to these flies. In his summary Heckman points out that the habits of most rice-field invertebrates are poorly known. He says, "The ecosystem may be looked upon as a multiculture of flora and fauna. Great caution should be exercised in applying agricultural chemicals to improve the yield of rice or to control the intermediate hosts of trematodes. Any distortions in the microbiotic community structure may break important food chain links and reduce or eliminate the habitat's capacity for protein production."

MATERIALS AND METHODS

Midge specimens were collected by sweeping rice fields with an insect net; specimens were killed in a cyanide jar and preserved in 70% alcohol. For critical study the ceratopogonids were dissected and mounted on slides in phenol-balsam according to the method of Wirth & Marston (1968).

Types of the new species are deposited in the U.S. National Museum of Natural

History in Washington, D.C. (USNM). Paratypes, when available, will be deposited in the Bishop Museum, Honolulu (BISHOP); the British Museum (Natural History), London; the Museum National d'Histoire Naturelle, Paris; the Australian National Insect Collection, Canberra; the National Science Museum, Shinjuku, Tokyo, Japan; and the Thailand Institute of Scientific and Technological Research, Bangkok. A voucher collection of all the rice-paddy species has been deposited in the entomological collection of the Thailand Department of Agriculture, Bangkok (BANGKOK).

For an explanation of general terminology of Ceratopogonidae see Wirth (1952), Tokunaga & Murachi (1959), or Wirth et al. (1977). Our systematic arrangement follows Wirth (1973).

In the locality lists the word "Amphoe" is the Thai word for the geographic division of the second order, smaller than "Changwat," or province, the division of the first order. "Muang" is the Thai word for central; thus "Amphoe Muang" or "A. Muang" means central district. Locality names in general follow the U.S. Board of Geographic Names Gazeteer for Thailand, 1966 edition; occasionally they follow those published in Yasumatsu et al. (1980).

Tribe CERATOPOGONINI

Genus **Alluaudomyia** Kieffer

Alluaudomyia marginalis Wirth & Delfinado

Alluaudomyia marginalis Wirth & Delfinado, 1964: 625 (♂, ♀; Malaysia; figs.).

Diagnosis. A small brownish species; wing whitish with 13–15 prominent black spots and narrow dark streaks along margin; legs brownish with broad pale bands at bases of fore- and hindfemora, near tips of all femora, near bases and tips of all tibiae, and in midportion of midtibia. Wing length 1.2 mm.

Distribution. Sri Lanka, Malaysia to Java, and the Philippines.

Thailand rice paddy records. Chachoengsao Prov., Amphoe Bangkanag, 12.VII.1978, K. Yasumatsu, wild rice, 4♂,2♀. Khon Kaen Prov, Rice Exp. Stn., 30.IX.1977, 1♀. Prachin Buri Prov, A. Aranyaprathet, Ban Khao Noi, 9.XI.1976, 1♂; A. Sa Kaeo, Ban Nong Ka Poa, 8.XI.1976, 1♀; A. Watthana Nakhon, Ban Huai Dua, 8.XI.1976, 1♀. Si Sa Ket Prov, A. Khun Han, Ban Ta Muan, 30.X.1976, 2♀; A. Muang, Ban Kra Sang, 30.X.1976, 2♂. Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.IX.1978, 1♂. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 3♂,9♀.

Alluaudomyia xanthocoma (Kieffer)

Culicoides xanthocoma Kieffer, 1913a: 182 (♂; India).
Alluaudomyia xanthocoma (Kieffer): Kieffer, 1925: 422 (combination).—Wirth & Delfinado, 1964: 616 (♂, ♀ redescribed; figs.; distribution).

Diagnosis. A small dark brown species; wing whitish with 2 prominent black spots on anterior portion and a 3rd at base of vein M2; legs dark brown, narrow pale rings at bases and near apices of femora, near bases and apices of tibiae. Wing length 1.0 mm.

Distribution. India, Java, Malaysia, Sri Lanka, Taiwan, Thailand.

Thailand rice paddy records. Chachoengsao Prov, Amphoe Ban Pho, 16.XI.1976, K. Yasumatsu, 4♂. Chiang Mai Prov, Doi Par-Morn, Doi Inthanon, 5.IX.1978, 1♂. Chiang Rai Prov, A. Muang, Ban Kua Tae,

28.III.1979, 5♂; Ban Pa Bong, 22.II.1979, 1♂. Kamphaeng Phet Prov, A. Khlong Khlung, 3.V.1978, 1♂. Prachin Buri Prov, A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 1♀. Ubon Ratchathani Prov, A. Phibun Mangsahan, 6.IX.1977, 1♂; A. Amnat Charoen, Ban None Nam Tang, 10.VIII.1978, 1♂; Rice Exp. Stn., 29.X.1976, 1♂,3♀. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 1♀.

Other material examined. INDONESIA: JAVA: Kalasan, Yogyakarta, 9.IV.1977, K. Yasumatsu, 1♀.

Tribe STILOBEZZIINI

Genus **Stilobezzia** Kieffer

Stilobezzia Kieffer, 1911: 118. Type-species, *Stilobezzia festiva* Kieffer (orig. desig.).

Reference. Das Gupta & Wirth 1968: 1 (revision Oriental species; synonymy; keys; classification).

Stilobezzia festiva Kieffer

Stilobezzia festiva Kieffer, 1911: 118 (♂, ♀; India; figs.).—Das Gupta & Wirth, 1968: 82 (♂, ♀ redescribed; figs.; distribution).

Diagnosis. A medium-sized yellowish species. Mesonotum with prominent pattern of dark brown vittae; abdomen with terga prominently marked with dark brown pattern; legs with broad subapical dark brown bands on mid- and hindfemora, broad paler brown infuscation at bases of mid- and hindtibiae, narrow apices of tibiae dark brown; ♀ 5th tarsomeres with a pair of stout blackish batonnets on fore- and midlegs, the claws very unequal on all legs. Wing brownish, especially along veins; 2 anterior pale areas and 2 large prominent dark brown anterior spots, 1 over r-m crossvein and other at end of costa. Halter brown. Wing length 1.39 mm.

Distribution. Common and widespread from Pakistan to Japan, Indonesia and Sri Lanka.

Thailand rice paddy records. Chiang Mai Prov, Amphoe Hang Dong, 20.IX.1976, K. Yasumatsu, 1♂; A. San Pa Tong, Ban Thau Sieo, 19.II.1979, 1♀. Chiang Rai Prov, A. Muang, Ban Teen Doi, 22.II.1979, 1♂. Prachin Buri Prov, A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 1♂.

Tribe SPHAEROMIINI

Genus **Calyptopogon** Kieffer

Calyptopogon Kieffer, 1910: 209. Type-species, *Calyptopogon albitarsis* Kieffer (monotypy) [=*Calyptopogon gibbosus* (Wiedemann)].

Reference. Wirth & Ratanaworabhan 1980: 707 (revision; key to species).

Calyptopogon brevitarsis Macfie

Calyptopogon brevitarsis Macfie, 1939: 8 (♀; Thailand; fig. wing).—Wirth & Ratanaworabhan, 1980: 711 (redescription; figs.; synonymy; distribution).

Diagnosis. Female, wing length 4.7 mm. Dark brown, almost black; thorax with some grayish pollen; legs with all femora and tibiae entirely very dark brown; tarsi pale brown, tarsomeres 5 and 5 of fore- and midlegs and tarsomere 1 of hindlegs very dark brown. Wing hyaline, infuscated at base and tip; anterior veins brown. Tarsomere 5 fusiform on foreleg, armed on all legs in ♀; in ♂ with 1 pair of batonnets on foreleg. Male genitalia with high basal arch and slender tip on aedeagus.

Distribution. Indonesia, Thailand.

Thailand rice paddy records. Chiang Mai Prov, Amphoe San Pa Tong, Ban Thau Sieo, 19.II.1979, K. Yasumatsu, 1♂. Khon Kaen Prov, Ban Nong Bua, Ban Kud Khae, 23.VI.1977, 1♂. Nakhon Phanom Prov,

A. Renunakorn, Ban Pone Thong, 10.VIII.1978, 2♂,5♀. Ubon Ratchathani Prov, A. Phibun Mangsahan, 6.IX.1977, 8♂.

Calyptopogon gibbosus (Wiedemann)

Macropeza gibbosa Wiedemann, 1824: 10 (India Orient.).—Wiedemann, 1828: 20 (descriptive notes; type in Univ. Zool. Mus., Copenhagen).—Edwards, 1913: 202 (Ceylon record; syn. *albitarsis*).

Calyptopogon gibbosus (Wiedemann): Kieffer, 1910: 210 (combination; notes).—Wirth & Ratanaworabhan, 1980: 710 (redescribed; figs.; synonymy).

Calyptopogon albitarsis Kieffer, 1910: 209 (♀; Calcutta; figs.).—Kieffer, 1911: 124 (♂ described; India).—Brunetti, 1913: 150 (descriptive and synonymical notes; recorded from India).—Brunetti, 1920: 45 (erroneous notes on synonymy; India records).—Macfie, 1934a: 292 (descriptive notes; recorded Malaya, Thailand).—Macfie, 1939: 4 (in key; fig. wing; syn. *kiefferi*).—Wirth, 1973: 378 (catalog reference; syns.: *kiefferi, similis*).

Macropeza kiefferi Johannsen, 1927: 423 (unnecessary n. n. for *Calyptopogon albitarsis* because of preoccupation in *Macropeza* by *M. albitarsis* Meigen).—Johannsen, 1931: 439 (proposed again).

Macropeza similis Johannsen, 1927: 424 (♀; Formosa).

Diagnosis. Wing 4–5 mm long in ♀, 1.8 mm long in ♂. Thorax shining black. Legs blackish; trochanters and bases of femora pale brown; tarsi whitish, tip of tarsomere IV brownish, tarsomere V dark brown. Female hindbasitarsus 1.5 as long as tibia; ♂ hind tarsomere V without batonnets. Wing hyaline, a faint dark cloud sometimes in anal cell. Halter brownish.

Distribution. India, Malaysia, Taiwan, Thailand, Vietnam.

Thailand rice paddy records. Chiang Mai Prov, Amphoe Chom Thong, Ban Wang Nam Yard, 7.V.1978, K. Yasumatsu, 1♂; Doi Pa-Morn, Doi Inthanon, 5.IX.1977, 5♂. Prachin Buri Prov, A. Aranyaprathet, Ban Khao Noi, 9.XI.1976, 1♀. Si Sa Ket Prov, A. Muang, Ban Kra Sang, 30.X.1976, 2♀. Ubon Ratchathani Prov, A. Phibun Mangsahan, 29.X.1976, 4♂,1♀.

Calyptopogon javanensis (Kieffer)

Macropeza javanensis Kieffer, 1910: 210 (n. sp. for *gibbosa* of de Meijere 1907, not Wiedemann).—Edwards, 1913: 202 (descriptive notes; Ceylon).—Johannsen, 1927: 423 (in key).

Calyptopogon javanensis (Kieffer): Wirth & Ratanaworabhan, 1980: 712 (combination; synonymy; descriptive notes).

Calyptopogon gibbosus (Wiedemann), of authors, misident.

Macropeza edwardsi Macfie, 1939: 9 (♀; Ceylon; syn. *M. javanensis* Kieffer of Edwards (1913) and Johannsen (1927)).

♀ *diagnosis.* Wing 4.6 mm long. Thorax dull brownish black. Legs yellow, narrow knee spot, tips of tibiae and tarsomere V dark brown or black; hindbasitarsus 1.7–2.0× as long as tibia. Otherwise as in *C. gibbosus.* ♂. Undescribed.

Distribution. Indonesia, Malaysia, Sri Lanka, Thailand.

Thailand rice paddy records. Si Sa Ket Prov, Amphoe Khun Han, Ban Ta Muan, 30.X.1976, K. Yasumatsu, 2♀ [15 males in this collection are indistinguishable from those of *C. gibbosus* (Wied.)]. Ubon Ratchathani Prov, A. Phibun Mangsahan, 29.X.1976, 1♀.

Genus **Homohelea** Kieffer

Homohelea Kieffer, 1917: 364. Type-species, *Palpomyia abjuncta* Kieffer (designated by Macfie, 1940: 26).

Diagnosis. Moderately large, grayish pollinose, stout-bodied species with whitish hyaline wings. Eyes contiguous or nearly so. Femora armed ventrally with stout spines; tarsomeres with ventral palisade setae, fore none, mid 1 row, and hind 2 rows; tarsomere V with 1–2 pairs of batonnets; claws equal on all legs;

on foreleg each with slender, internal, subbasal barb, the 2 barbs unequal in length. Wing with 2 large radial cells, 2nd extending almost to wing tip. Two spermathecae present.

Checklist of Oriental species of Homohelea.

abjuncta (Kieffer), 1913a: 189 (*Palpomyia*). India.

barkudensis Edwards, 1932: 179. India.

insons (Johannsen), 1931: 436 (*Sphaeromias*). Sumatra. **New combination.**

Note. Some errors were made in generic placement in Wirth's (1973) catalog that should be corrected, in addition to the new combination listed above. *Palpomyia atriclava* Kieffer is a true *Palpomyia* and not a species of *Homohelea. Palpomyia brevispina* Kieffer, *P. cinerea* Kieffer, and *P. inermithorax* Kieffer should be transferred to the genus *Sphaeromias* Curtis (**new combinations**) rather than placed in *Homohelea.*

Homohelea insons (Johannsen), **new combination**

Sphaeromias insons Johannsen, 1931: 436 (♀; Sumatra).—Macfie, 1934b: 226 (compared with *obscuripes*).—Wirth, 1973: 384 (catalog reference).

Sphaeromias obscuripes Macfie, 1934b: 225 (♀; Sumatra). **New synonymy.**

Homohelea obscuripes (Macfie): Wirth, 1973: 380 (catalog reference; combination).

Note on synonymy. A close comparison of Johannsen's and Macfie's original descriptions reveals no significant differences that are not evident as variation in a series of about 100 females in the USNM collection from Cambodia, the Philippines, and Thailand. Edwards' (1932) description of *H. barkudensis* from Chilka Lake, India, also fits this species, except for the statement "all claws equal and simple (without basal barbs)," which would be exceptional in *Homohelea,* leading us to believe that Edwards may have erred in his observation of the foreclaws in *barkudensis.* Examination of the type is necessary to determine the possible synonymy.

Diagnosis. Wing length 2–2.5 mm. A moderately large, stout-bodied species, distinguished by its dark femora and tibiae. Mesonotum with 3 broad dark brown vittae. Legs blackish, fore- and midtibiae paler brownish, first 4 tarsomeres pale yellowish, tips narrowly darkened. Femora each with 4–8 strong ventral spines on distal ½. Wing whitish, veins pale; halter pale. Abdomen blackish, posterior margins of last few segments narrowly pale.

Distribution. Cambodia, Indonesia, Malaysia, Philippines, Thailand.

Thailand rice paddy records. Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, K. Yasumatsu, 1♀. Chiang Mai Prov, A. Chom Thong, Ban Wang Nam Yard, 7.V.1978, 5♂,5♀; Ban Huai Nam Dib, 7.V.1978, 1♀; Doi Pa-Morn, Doi Inthanon, 5.IX.1978, 1♂; A. Hang Dong, Ban Rong Ku, 27.III.1979, 5♀; Mae Jo, 6.IX.1978, 5♀. Chiang Rai Prov, A. Muang, Ban Teen Doi, 22.II.1979, 1♀. Khon Kaen Prov, Ban Nong Bua, 23.VI.1977, 4♀; Rice Exp. Stn., 30.IX.1977, 1♀. Nakhon Phanom Prov, A. Renunakorn, Ban Pone Thong, 10.IX.1978, 12♀. Lamphun Prov, A. Muang, 4.V.1978, 30♂,♀. Phrae Prov, Rice Exp. Stn., 5.X.1977, 2♀. Prachin Buri Prov, A. Aranyaprathet, Ban Khao Noi, 9.XI.1976, 1♀; A. Kabin Buri, Ban Hong Hua Chang, 8.XI.1976, 1♂,3♀; A. Sa Kaeo, Ban Nong Ka Poa, 8.XI.1976, 8♂,10♀; A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 1♀. Si Sa Ket Prov, A. Khanthararom, Ban Nong Bua, 30.IX.1976, 4♀; A. Khun Han, Ban Ta Muan, 30.X.1976, 2♂,5♀; A. Muang, Ban Kra Sang, 30.X.1976, 3♀. Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.VIII.1978, 7♀; A. Phibun

Mangsahan, 29.X.1976, 6.IX.1977, 1♂,6♀; Rice Exp. Stn., 29.X.1976, 1♀. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 10♂,10♀.

Genus **Jenkinshelea** Macfie

Jenkinsia Kieffer, 1913a: 161. Type-species, *Jenkinsia setosipennis* Kieffer (orig. desig.). Preoccupied by *Jenkinsia* Jordan & Evermann, 1896.

Jenkinshelea Macfie, 1934a: 177 (n. n. for *Jenkinsia* Kieffer). Type-species, *Jenkinsia setosipennis* Kieffer (automatic).

Reference. Grogan & Wirth, 1981: 45 (review and key to Oriental species).

Diagnosis. A genus of large, usually grayish pollinose midges. Anal angle of ♀ wing greatly expanded; wing with 1 or 2 radial cells, in ♀ distal cell greatly elongated with costa nearly reaching wing tip, in ♂ radial cell extending to 0.75 of wing length. Legs slender, femora unarmed; 4 tarsomeres cordiform; 5th tarsomeres of ♀ with stout ventral batonnets, inflated on foreleg; ♀ claws of all legs rather short, equal, each with small blunt external basal tooth.

Jenkinshelea niphanae Grogan & Wirth

Jenkinshelea niphanae Grogan & Wirth, 1981: 45 (♀; Thailand; figs.).

Diagnosis. Wing with 2 radial cells; legs yellow, narrow tip of hindtibia and all of tarsomeres 3–5 dark brown; hindbasitarsus elongate, tarsal ratio 3.5; 5th tarsomeres each with 4–8 batonnets; antenna uniformly dark brown. Wing length 2.32 mm.

Distribution. China, Malaysia, Philippines, Thailand.

Thailand rice paddy records. Chiang Mai Prov, Amphoe San Pa Tong, Ban Thau Sieo, 19.II.1979, K. Yasumatsu, 1♀; Ban Yu Wha, 19.II.1979, 1♀. Chiang Rai Prov, A. Muang, Ban Kua Tae, 28.III.1979, 1♀.

Jenkinshelea tokunagai Grogan & Wirth

Jenkinshelea tokunagai Grogan & Wirth, 1981: 49 (♂, ♀; Thailand; figs.).

Diagnosis. Wing with 1 radial cell. Thorax of ♀ golden brown, of ♂ dark brown; legs yellow, only narrow apex of hindtibia and all of tarsomeres 3–5 dark brown; hindtarsal ratio of ♀ 2.3. Female wing length 1.96 mm.

Distribution. Thailand.

Thailand rice paddy records. Chiang Mai Prov, Amphoe San Pa Thong, Ban Thau Sieo, 19.II.1979, 13♂.

Genus **Leehelea** Debenham

Leehelea Debenham, 1974: 54. Type-species, *Homohelea hollandiensis* Tokunaga (orig. desig.).

Diagnosis. Very large (wing 3.5 mm long) predaceous midges with long, slender, spinose legs usually with prominent bands or spotting. Tarsomere V with numerous black ventral batonnets; ♀ claws equal, long and curved, without basal external or internal tooth.

The structure of the 5th tarsomeres and claws and the long costa extending nearly to the wing tip ally this genus closely with *Sphaeromias* Curtis, but in that genus the claws are shorter than the 5th tarsomeres and each has a slender internal basal tooth. There are 5 described species of *Leehelea,* of which 3 occur in Australia, and 2 in SE Asia and New Guinea.

KEY TO ORIENTAL SPECIES OF *Leehelea*

1. Legs yellow with narrow knee spots, intense subapical blackish bands present on femora; narrow base of foretibia dark ..... **hollandiensis** (Tokunaga)
   Legs yellow with prominent punctiform brown spotting on femora and tibiae; only hindfemur with distinct subapical brown band ..... **punctipes** (Macfie)

Leehelea hollandiensis (Tokunaga)

Homohelea hollandiensis Tokunaga, 1966: 123 (♀; W Irian; figs.).
Leehelea hollandiensis (Tokunaga): Debenham, 1974: 59 (combination; ♂, ♀ redescribed; figs.; New Guinea).

Distribution. New Guinea, Thailand.

Thailand rice paddy records. Chachoengsao Prov, Amphoe Ban Pho, 16.XI.1976, K. Yasumatsu, 1♀. Khon Kaen Prov, Ban Nong Bua, Ban Kud Khae, 23.VI.1977, 1♀. Si Sa Ket Prov, A. Muang, Payoo, 27.V.1977, rice paddy, Nipha Patarakulpong coll., 3♀.

Discussion. The present specimens are the first known for this species from outside New Guinea. *Leehelea punctipes* (Macfie), which was described from Malaysia, also occurs in Thailand, where it is represented in the USNM collection by 9 males and 22 females from Bangkok, Chiang Mai, Chon Buri, Loei, Nong Khai and Udon Thani provinces.

Genus **Mackerrasomyia** Debenham

Mackerrasomyia Debenham, 1970: 140. Type-species, *Heteromyia brevibarba* Kieffer (orig. desig.).

Diagnosis. Eyes bare, widely separated. Antenna long and slender, last 5 segments greatly elongated. Palpus 5-segmented, 3rd segment more slender than 2nd. Thorax with strong anterior tubercle. Forefemur greatly swollen, with numerous short stout spines, hindfemur weakly clubbed distally, mid- and hindfemora with 1 or 2 ventral preapical spines; foretibia arcuate, with blunt apical projection, mid- and hindtibiae normal. All 4th tarsomeres cordiform; 5th tarsomeres of ♀ armed with several pairs of stout ventral batonnets along length of segment, distal pair separated from other pairs. Female claws paired and equal on all legs, each with large internal basal tooth. Wing narrow, 2 radial cells present; costal ratio about 0.75. Female abdomen without gland rods; a single spermatheca present.

This genus is closely related to *Neosphaeromias* Das Gupta & Wirth (1971), differing mainly in the presence of a short stout external basal tooth on the tarsal claws of *Neosphaeromias*. There are 4 previously described species: *M. brevibarba* (Kieffer) and *M. marginata* Debenham from Queensland, *M. caesia* (Macfie) from Malaysia, and *M. zumpti* de Meillon & Wirth from Rhodesia. De Meillon & Wirth (1979) gave a key for their separation.

Mackerrasomyia wongsirii Wirth & Ratanaworabhan, **new species** Fig. 1

Holotype ♀. Wing length 3.12 mm; breadth 0.85 mm.

Head. Dark brown, narrow bases of antennal flagellar segments yellowish. Eyes broadly separated. Antenna (Fig. 1A) with lengths of flagellar segments in proportion of 17-14-12-12-12-12-12-14-32-30-40-44-50; antennal ratio 1.92. Palpus (Fig. 1B) short and slender; lengths of segments in proportion of 5-7-13-

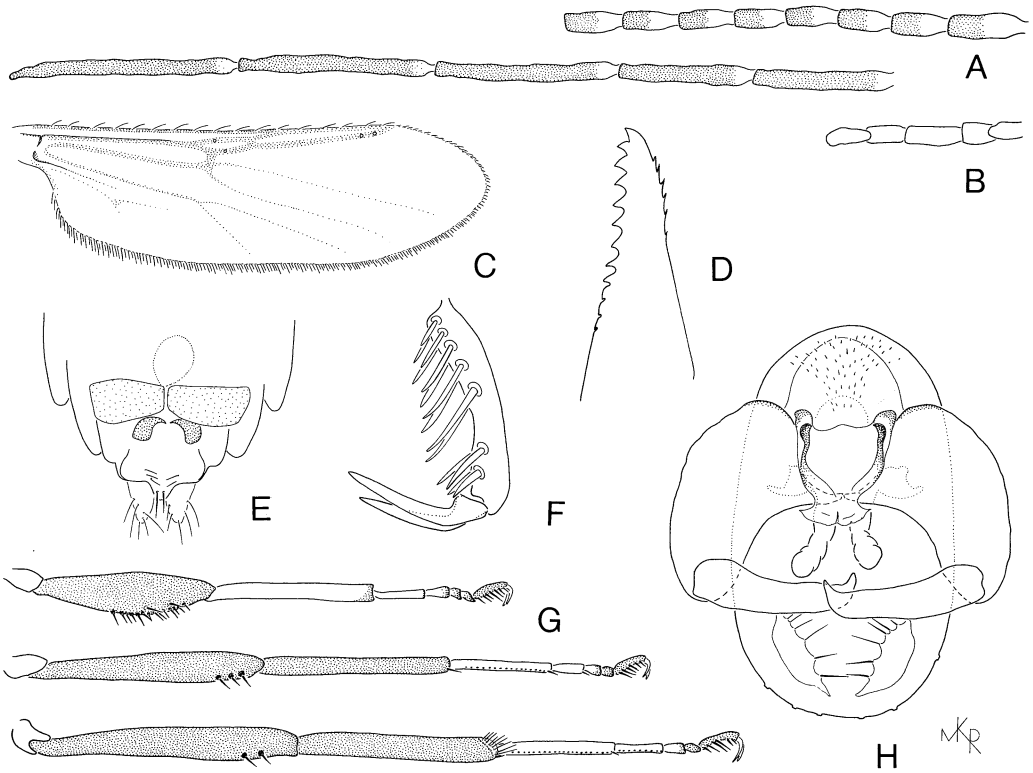

FIG. 1. *Mackerrasomyia wongsirii*: **A–G,** ♀; **H,** ♂: **A,** antenna; **B,** palpus; **C,** wing; **D,** mandible; **E,** genital sclerotization and spermatheca; **F,** 5th tarsomere and claws of hindleg; **G,** fore-, mid- and hindlegs (top to bottom); **H,** genitalia, ventral view.

7-10; 3rd segment with a few stalked sensilla scattered on surface. Mandible (Fig. 1D) with 10 coarse teeth. *Thorax.* Dark brown to blackish; integument of mesonotum with reticulate pattern of micro-rugosity, setae minute; scutellum with about 15 small bristles borne on small tubercles. Legs (Fig. 1G) dark brown, first 2 tarsomeres pale yellowish with narrow tips dark; foretibia yellowish except at extreme tip; forefemur greatly swollen with 18 stout black ventral spines borne on distinct basal tubercles on ventral side; midfemur with 3 long, stout black ventral spines at apex, hindfemur with 2 such spines; tibiae with sparse, fine, long, erect hairs. Foretarsus without palisade setae; midleg with 1 row on basitarsus; hindleg with 2 rows on basitarsus, 1 row on 2nd tarsomere. Fifth tarsomere (Fig. 1F) with 12–14 long, stout, black batonnets in pairs, the 2 distal pairs slightly set off from the others, those in midsegment much longer than those at each end. Claws (Fig. 1F) long and curved, stout at base, each bearing a slender basal barb on inner side. Wing (Fig. 1C) grayish infuscated due to coarse microtrichia, the veins brownish; 2 radial cells present; costal ratio 0.79. Halter dark brown. *Abdomen.* Dark brown, slightly paler at base; cerci yellowish brown. Spermatheca (Fig. 1E) 1, dark brown; ovoid with short slender neck; measuring 0.130 by 0.087 mm including neck.

Allotype ♂. Wing length 2.08 mm; breadth 0.65 mm.

Similar to ♀ with the usual sexual differences. Antenna with sparse plume of long brown verticils; 5 distal segments with lengths in proportion of 13-13-27-43-52. Wing venation as in ♀; costal ratio 0.81. Genitalia (Fig. 1H): Similar to those of *M. zumpti* described by de Meillon & Wirth (1979). 9th sternum a narrow ribbon, ventral membrane to base of aedeagus spiculate; 9th tergum remarkably expanded and rounded caudad, the whole 9th segment forming an oval bowllike plate greatly exceeding tips of basistyles

and bearing on mesal surface a pair of broad flaplike cerci. Basistyles narrowly joined mesally dorsad of aedeagus; much swollen proximally and tapering distally, greatly curved appearing arcuate in ventral view and together forming a rigid semicircular structure; dististyle long and broad, nearly straight, with small distomesal point. Aedeagus small, forming a shield-shaped sclerite tucked between mesal bases of basistyles, its stout, slightly bilobed, caplike tip only slightly protruding ventromesally past bases of basistyles. Parameres separate, small, each forming a stout, ventrally curved process with stout tip and winglike, slightly expanded, laterally bent basal process.

Distribution. Thailand.

Types. Holotype ♀, allotype ♂, THAILAND: Mae Hong Son Prov, Amphoe Mae Sariang, 5.V.1978, K. Yasumatsu (Type no. 76565, USNM).

Discussion. M. wongsirii can be separated from the other known species by the tibial coloration: all tibiae are dark brown in *brevibarba,* the fore- and midtibiae have extensive pale markings in *caesia, marginata,* and *zumpti,* while only the foretibia is pale in *wongsirii.*

This species is named for Tanongchit Wongsiri in appreciation of his aid in this study.

Genus **Nilobezzia** Kieffer

Nilobezzia Kieffer, 1921b: 24. Type-species, *Nilobezzia armata* Kieffer (monotypy).

Reference. Debenham 1974: 62 (diagnosis, revision Australia and New Guinea species).

Diagnosis. Robust, usually large species, usually dull or pollinose. Eyes nearly contiguous. Legs slender; femora moderately stout, not especially swollen at knees, femora with ventral, and tibiae with dorsal, widely spaced stout bristles or slender spines. Fourth tarsomeres not cordiform; 5th tarsomeres of ♀ armed ventrally with numerous long, black, blunt spines or batonnets. Female claws large, equal, bent at base and nearly straight distally; each with short, stout, basal tooth on external side. Wing with 1 or 2 radial cells; costa moderately long, usually extending to about 0.8 of wing length. Female abdomen without gland rods; 8th segment with sclerotization and a pair of ventral hair tufts. Two spermathecae present. Male genitalia rotated and bent ventrad so that sternal surface is oriented caudad, with very poorly developed basistyle and dististyle, the latter thumblike and not movable; aedeagus with short basal arch and caplike distal portion; parameres fused in an H-shaped structure, the distal lobes contiguous mesad and abruptly curved or bent dorsad distally.

Checklist of Nilobezzia species of SE Asia

acanthopus (de Meijere), 1907: 215 (*Ceratopogon*). Java. Synonym: *conspicua* (Johannsen), 1931: 441 (*Bezzia raphaelis* var.). Java.

badia (Johannsen), 1931: 442 (*Bezzia flaviventris* var.). Sumatra.

bakeri (Kieffer), 1921c: 570 (*Probezzia*). Philippines.

brevipalpis (Kieffer), 1923: 141 (*Crespinia*) (♂ only). Java.

diffidens (Johannsen), 1931: 441 (*Bezzia ochriventris* var.). Java, Sumatra.

kiefferi Wirth, 1973: 383, n. n. for *Parrotia flaviventris* Kieffer, 1923. Synonym: *flaviventris* (Kieffer), 1923: 140 (*Parrotia*), preoccupied in *Nilobezzia* by *Bezzia flaviventris* Kieffer, 1910. Java.

ochriventris Edwards, 1929: 12. Philippines.

raphaelis (Salm), 1918: 134 (*Ceratopogon*), n. n. for *Ceratopogon blanchardi* Salm. Synonyms: *blanchardi* (Salm), 1917: 106 (*Ceratopogon*), preoccupied by *Cerato-*

pogon blanchardi Iches, 1906; *nigriventris* (Kieffer), 1923: 141 (*Parrotia*). Java.
yasumatsui Wirth & Ratanaworabhan, n. sp. Thailand.

Note. Ceratopogon discolor de Meijere (1907: 214) from Java, which was placed in *Nilobezzia* by Wirth (1973), belongs in the genus *Sphaeromias*. *Nilobezzia brevipalpis* (Kieffer), known only from the male, is omitted from the key.

KEY TO *Nilobezzia* SPECIES OF SE ASIA

1. Femora with spines in series before apex; large species, wing 3.5 mm long 2
   Femora with apical spines only; wing less than 3 mm long 3
2. Abdomen dark; fore- and midlegs yellowish except narrow dark bands on tibiae; forefemur without subapical bands; antennal segments 3–10 much shorter than 10–15, antennal ratio 1.75 ..... **acanthopus** (de Meijere)
   Abdomen pale; hindfemur and tibia entirely dark brown, broad dark bands at tips of fore- and midfemora and base of midtibia; forefemur with 3–4 subapical spines; antennal segments 3–10 not much shorter than 11–15 ..... **ochriventris** Edwards
3. Femora and tibiae with extensive yellowish or pale brown markings 4
   Femora and tibiae entirely dark brown 5
4. Scutellum dark brown ..... **kiefferi** Wirth
   Scutellum yellow ..... **diffidens** (Johannsen)
5. Palpus yellowish to pale brownish; scutellum dark ..... **raphaelis** (Salm)
   Palpus dark brown 6
6. Palpus 4-segmented, 4th and 5th segments fused; abdomen dark brown; scutellum pale ..... **yasumatsui, n. sp.**
   Palpus 5-segmented as usual 7
7. Abdomen dark; scutellum yellow ..... **bakeri** (Kieffer)
   Abdomen pale; scutellum reddish ..... **badia** (Johannsen)

Nilobezzia acanthopus (de Meijere)

Ceratopogon (*Bezzia*) *acanthopus* de Meijere, 1907: 215 (♀; Java; fig. wing).
Bezzia (*Nilobezzia*) *acanthopus* (de Meijere): Johannsen, 1931: 439 (in key; combination).
Bezzia (*Nilobezzia*) *raphaelis* var. *conspicua* Johannsen, 1931: 441 (♀; Java). **New synonymy.**
Nilobezzia conspicua (Johannsen): Macfie, 1934b: 228 (♀ redescribed; combination; Sumatra).—Wirth, 1973, 382 (catalog reference).

Diagnosis. Wing 3.5 mm long, 0.9 mm broad. Antenna brown, antennal ratio 1.75. Palpus brown; 5-segmented. Wing whitish, slightly dusky at tip. Halter with white knob. Legs yellowish; base of midtibia with narrow brown band; hindfemur and tibia brown, each with subapical pale band, that on femur variable, sometimes absent; series of long sharp spines present on anterior side of mid- and hindfemora, dorsal side of tibiae and on anterior side of midtibia; all femora also with stronger apical spines. Hindtarsal ratio 2.6. Abdomen brown; spermathecae equal, each 0.115 by 0.075 mm; gonopore on each side with anteroposterior row of 4–5 short bristles and laterad of these a group of 5 long strong bristles.

Note on synonymy. The generic position of *N. acanthopus* and the species synonymy were confirmed by examination of the holotype in the Zool. Mus. Univ. Amsterdam. Apparently de Meijere misinterpreted the claw character when he stated: "Krallen an Vorder- und Hinterbeinen ungleich gross, die längeren Krallen mit einem Zahn in der Nähe der Basis." This led Johannsen (1931) to key *acanthopus* out separately in couplet 7 and to describe his species as *raphaelis* var. *conspicua.* Macfie (1934b) made no mention of *acanthopus* when he gave his excellent redescription of Sumatra specimens of this species under the name *Nilobezzia conspicua* (Johannsen).

Distribution. Java, Sumatra, Thailand.

Thailand rice paddy records. Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, K. Yasumatsu, 1♀. Chachoengsao Prov, A. Bankanang, 12.VII.1978, wild rice, 8♀; A. Ban Pho, 16.XI.1976, 2♀. Chiang Mai Prov, A. Chiang Dao, Ban Sob Kab, 6.IX.1978, 5♀; Ban Thung Ka La, 6.IX.1978, 15♀; A. Chom Thong, Ban Huai Nam Dib, 7.V.1978, 6♀; Doi Pa-Morn, Doi Inthanon, 5.IX.1978, 1♀; A. San Pa Tong, Ban Thau Sieo, 19.II.1979, 5♀; Mae Jo, 6.IX.1978, 10♀. Chiang Rai Prov, A. Muang, Ban Mae Khao Tom, 22.II.1979, 1♂; A. Muang, Ban Teen Doi, 22.II.1979, 1♂,1♀; Ban Pa Bong, 22.II.1979, 2♂, 3♀. Khon Kaen Prov, Ban Nong Bua, Ban Kud Khae, 23.VI.1977, 6♂,3♀; Rice Exp. Stn., 12.VIII.1977, 7♂,2♀. Nakhon Phanom Prov, A. Renunakorn, Ban Pone Thong, 10.IX.1978, 3♀. Phrae Prov, Rice Exp. Stn., 5.X.1977, 20♀. Si Sa Ket Prov, Boo Soong, 21.XI.1977, 5♀; A. Kanthararom, Ban Nong Bua, 30.IX.1976, 2♀; A. Khun Han, Ban Ta Muan, 30.X.1976, 1♀. Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.IX.1978, 12♂,10♀; A. Phibun Mangsahan, 6.IX.1977, 2♂,2♀. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 3♀.

Other material examined. INDONESIA: JAVA: Indranayu, 6.IV.1977, K. Yasumatsu, rice paddy, 3♀.

Nilobezzia raphaelis (Salm)

Ceratopogon blanchardi Salm, 1917: 106 (♀; Java; figs.). Preoccupied by *Ceratopogon blanchardi* Iches, 1906.
Ceratopogon raphaelis Salm, 1918: 135 (n. n. for *C. blanchardi* Salm).
Bezzia (Nilobezzia) raphaelis (Salm): Johannsen, 1931: 440 (combination; in key; syn.: *nigriventris*).
Nilobezzia raphaelis (Salm): Macfie, 1934a: 290 (combination; Java record).—Macfie, 1934b: 229 (♀ redescribed; Sumatra; synonymy discussion).
Parrotia nigriventris Kieffer, 1923: 141 (♀; Java).
Bezzia (Parrotia) nigriventris (Kieffer): Johannsen, 1931: 442 (combination; in key; Java record).

Diagnosis. Wing length 2.5 mm; breadth 0.7 mm. Antenna brown; proximal segments short. Palpus yellowish; 5-segmented. Wing milky white, not dusky at tip. Legs dark brown, fore- and midtibiae sometimes paler in midportions; tarsomeres 1–4 whitish; femora without long sharp spines except 1–2 near apices; hindtarsal ratio 2.7. Abdomen brown; only 2–3 bristles on each side of gonopore. Spermathecae small and unequal, measuring 0.092 by 0.070 mm and 0.074 by 0.060 mm, each with neck sclerotized about 0.005 mm.

Distribution. Widespread from Pakistan to Sri Lanka, east to the Philippines and Indonesia.

Thailand rice paddy records. Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, K. Yasumatsu, 15♀. Chachoengsao Prov, A. Ban Pho, 16.XI.1976, 5♀; Bankanang, 12.VII.1978, wild rice, 1♂,2♀. Chai Nat Prov, Rice Exp. Stn., 25.III.1977, 1♂. Chiang Mai Prov, A. Chiang Dao, Ban Sob Kab, 6.IX.1978, 30♀; Ban Thung Ka La, 6.IX.1978, 100♀; A. Chom Thong, Ban Huai Dib, 7.V.1978, 1♂,20♀; Ban Wang Nam Yard, 7.V.1978, 5♂,5♀; Doi Pa-Morn, Doi Inthanon, 5.IX, 19.XI.1978, 40♀; A. Hang Dong, 19.II.1979, 1♂,3♀; A. San Pa Tong, Ban Thau Sieo, 19.II.1979, 150♂,♀; Rice Exp. Stn., 8.V.1978, 20♂,20♀; A. San Sai, Ban Mae Yoi, 24.VI.1979, 2♂,6♀; A. Saraphi, Ban Sab Kab Tong Nua, 4.V.1978, 5♂,10♀; Mae Jo, 6.IX.1978, 50♀. Chiang Rai Prov, A. Muang, Ban Kua Tae, 28.III.1979, 2♂,30♀; Ban

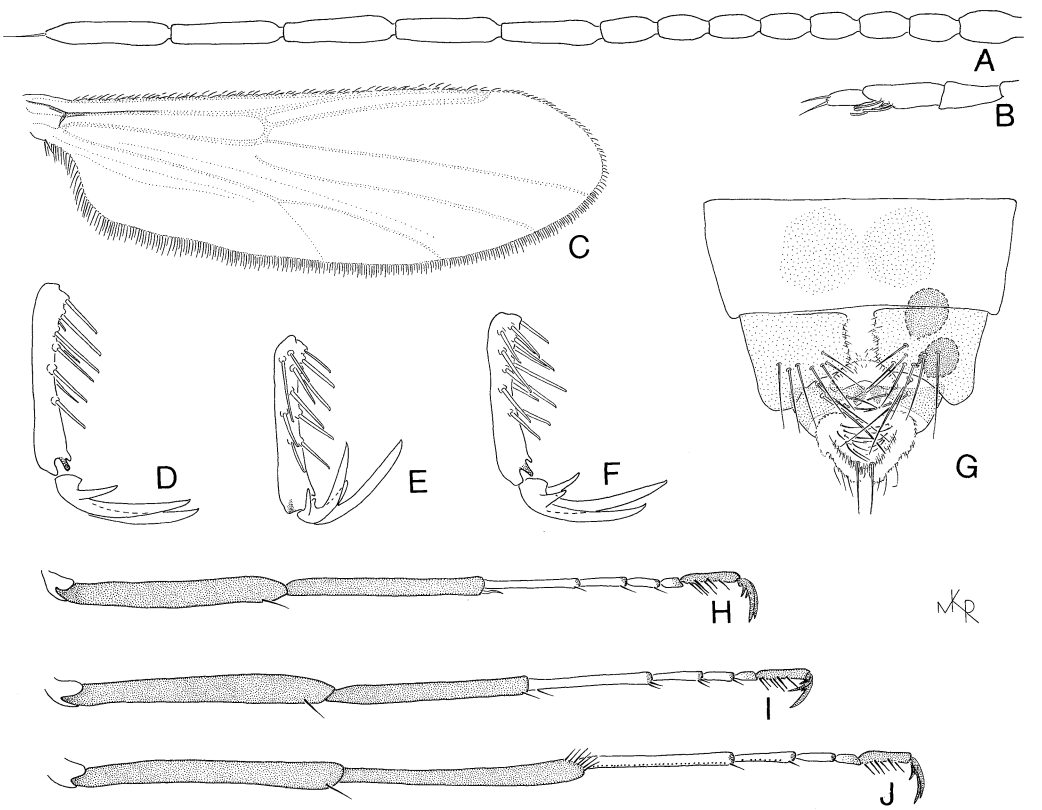

FIG. 2. *Nilobezzia yasumatsui*, ♀: **A,** antenna; **B,** palpus; **C,** wing; **D,** 5th tarsomere and claws of foreleg; **E,** same, midleg; **F,** same, hindleg; **G,** genital sclerotization; **H,** foreleg; **I,** midleg; **J,** hindleg.

Teen Doi, 22.II.1979, 20♂,30♀; A. Wiang Pa Pao, Ban Mae Kachiang, 21.II.1979, 1♀; A. Muang, Ban Mae Khao Tom, 22.II.1979, 14♀. Khon Kaen Prov, Ban Nong Bua, Ban Kud Khae, 23.VI.1977, 8♀; Rice Exp. Stn., 30.IX.1977, 10♀. Kamphaeng Phet Prov, A. Khlong Khlung, 3.V.1978, 10♀. Lamphun Prov, A. Muang, 4.V.1978, 50♀. Mae Hong Son Prov, A. Muang, Ban Pa Bong, 6.V.1978, 20♀; Ban Pang Mu, 6.V.1978, 2♂,40♀; A. Mae Sariang, 5.V.1978, 5♂,15♀. Nakhon Phanom Prov, A. Renunakorn, Ban Pone Thong, 10.IX.1978, 4♂,9♀. Nakhon Ratchasima Prov, A. Muang, Ban Bu, 1.XI.1976, 1♂,2♀. Nakhon Sawan Prov, A Phayuha Khiri, 3.V.1978, 2♂,30♀. Phrae Prov, Rice Exp. Stn., 5.X.1977, 20♀. Prachin Buri Prov, A. Aranyaprathet, Ban Khao Noi, 9.XI.1976, 4♂,6♀; A. Kabin Buri, Ban Hong Hua Chang, 8.XI.1976, 3♂,6♀; A. Sa Kaeo, Ban Nong Ka Poa, 8.XI.1976, 5♂,15♀; A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 3♀. Si Sa Ket Prov, A. Kanthararom, Ban Nong Bua, 30.IX.1976, 20♀; A. Khun Han, Ban Ta Muan, 30.X.1976, 5♂,10♀; A. Muang, Ban Kra Sang, 30.XI.1976, 2♀; Boo Soong, 21.XI.1977, 2♂,10♀. Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.IX.1978, 5♂,12♀; A. Phibun Mangsahan, 6.IX.1977, 1♂,30♀; Rice Exp. Stn., 29.X.1976, 30♀. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 30♀.

Other specimens examined. INDONESIA: JAVA: Kalasan, Yogyakarta, 9.V.1977, K. Yasumatsu, 1♀.

Nilobezzia yasumatsui Wirth & Ratanaworabhan, **new species** Fig. 2

Holotype ♀. Wing length 2.21 mm; breadth 0.72 mm.

Head. Dark brown including antenna and palpus. Eyes broadly contiguous. Antenna (Fig. 2A) with

lengths of flagellar segments in proportion of 15-12-10-10-11-12-13-15-25-30-30-30-32; antennal ratio 1.45. Palpus (Fig. 2B) apparently 4-segmented; lengths of segments in proportion of 3-15-18-10; 2nd and 3rd segments subequal in breadth, 3rd with a few scattered long hyaline sensilla near tip. Mandible with 7 coarse teeth. *Thorax.* Dark brown, almost black, pollinosity not visible on slide-mounted specimen; vestiture of short, fine, decumbent hairs only; scutellum paler brown. Legs (Fig. 2H–J) dark brown, tarsomeres 1–3 except extreme tips and proximal ½ of tarsomere 4 yellowish white; femora unarmed except for a weak apical spine on ventral side; hindleg with lengths of femur, tibia, and tarsomeres 1–5 in proportion of 130-125-80-30-20-10-27; tarsal ratio 2.7. Fifth tarsomeres (Fig. 2D–F) each with 6 pairs of stout, black, ventral batonnets; claw 0.75 as long as 5th tarsomere; outer tooth ⅓ as long as claw. Wing (Fig. 2C) milky white, anterior veins pale yellowish; costal ratio 0.78. Halter brownish. *Abdomen.* Brown. Female genital sclerotization dark brown, as in Fig. 2G; spermathecae 2, oval without sclerotized necks; unequal, measuring 0.075 by 0.062 mm and 0.058 by 0.048.

♂. Unknown.

Distribution. Thailand.

Types. Holotype ♀, 1♀ paratype, THAILAND: Chiang Mai Prov, Doi Inthanon, Doi Pa-Morn, 3.IV.1979, K. Yasumatsu, in rice paddy (Type no. 76557, USNM).

Discussion. This species is named in honor of the collector, Dr Keizo Yasumatsu, in recognition of his important contributions to the study of rice-field insects and his keen interest in the predaceous midges of the paddies.

Nilobezzia yasumatsui can be separated from the other known species of SE Asia by the characters given in the preceding key. It is immediately recognizable by its dark femora and tibiae without spines except for a weak one at the apex of the femora, the brownish 4-segmented palpus, and the dark halteres.

Genus **Sphaeromias** Curtis

Sphaeromias Curtis, 1829: plate 285. Type-species, *Sphaeromias albomarginatus* Curtis (orig. desig.) [=*S. fasciatus* (Meigen)].

Diagnosis. Large, stout, grayish pollinose species of Sphaeromiini. Legs slender, femora with ventral, and tibiae with dorsal, numerous small sharp spines. Fourth tarsomeres cylindrical; 5th tarsomeres of ♀ armed ventrally with numerous long black batonnets along their entire length. Female claws large, equal, and curved, each with slender sharp tooth at base on inner side. Wing with 2 radial cells; costa extending nearly to wing tip.

Sphaeromias discolor (de Meijere), **new combination**

Ceratopogon discolor de Meijere, 1907: 214 (♀; Java).
?*Palpomyia discolor* (de Meijere): Johannsen, 1931: 437 (in key; generic position not clearly stated).
Nilobezzia discolor (de Meijere): Wirth, 1973: 382 (combination).
Sphaeromias (*Xylocrypta*) *javanensis* Macfie, 1934a: 285 (♀; Java). **New synonymy.**

Note on synonymy. Wirth (1973) erroneously placed *discolor* in *Nilobezzia* from reading the original description. After examining de Meijere's type in the Zool. Mus. Univ. Amsterdam we can transfer the species correctly to *Sphaeromias.* A careful comparison of the descriptions reveals that *discolor* is conspecific with *S. javanensis* Macfie (1934a). Macfie compared his species with *Homohelea insons* (Johannsen) but not with *discolor,* although Johannsen (1931) keyed the 2 species out in the same couplet in his key to the related species of the Malayan Subregion.

Distribution. Pakistan, India and Sri Lanka east to the Ryukyu Is, the Philippines and Indonesia.

Thailand rice paddy records. Chiang Mai Prov, Amphoe Chom Thong, Ban Nam Dib, 7.V.1978, K. Yasumatsu, 1♂,4♀; A. Hang Dong, Ban Rong Ku, 27.III.1979, 2♂,1♀; A. San Pa Tong, Ban Thau Sieo, 19.II.1979, 2♂,4♀; Ban Yu Wha, 8.V.1978, 1♂,1♀; Rice Exp. Stn., 8.V.1978, 1♂,1♀. Chiang Rai Prov, A. Muang, Ban Teen Doi, 22.II.1979, 1♂. Mae Hong Son Prov, A. Muang, Ban Pa Bong, 6.V.1978, 1♂. Nakhon Si Thammarat Prov, Rice Exp. Stn., 26.III.1978, 1♂. Si Sa Ket Prov, Boo Soong, 21.XI.1977, 1♀; A. Kanthararom, Ban Nong Bua, 30.IX.1976, 1♀. Ubon Ratchathani Prov, Ban Thang Sai, 19.XI.1977, 1♀.

Genus **Xenohelea** Kieffer

Xenohelea Kieffer, 1917: 295. Type-species, *Xenohelea pruinosa* Kieffer (orig. desig.).
Mixohelea Kieffer, 1917: 364. Type-species, *Palpomyia pulchripes* Kieffer (desig. Wirth 1973: 384).

Diagnosis. Large, slender, grayish pollinose species of Sphaeromiini; 2 radial cells, rarely 1 radial cell due to obsolescence of radial crossvein; costa extending to 0.8 of wing length. Femora armed ventrally with numerous spines; 5th tarsomeres of ♀ with 4 or more pairs of ventral batonnets along entire length; tarsal claws of ♀ unequal, simple on all legs (could be interpreted as a single long claw with slender basal barb). Mesonotum with setae arising from distinct tubercles forming dark punctations.

Key to *Xenohelea* species of SE Asia (females)

1. Femora and tibiae entirely brown or reddish brown, except at bases of femora 2
   Femora and tibiae with yellowish bands 3
2. Thorax dull yellowish brown; halter pale; 2 radial cells; femoral spines 6-5-6 on fore-, mid- and hindlegs; 5th tarsomeres each with 3 rows of 5–6 batonnets . . . (Taiwan) ..... **ciliaticrus** (Kieffer)
   Thorax blackish; halter brown; 1 radial cell; femoral spines 10-5-5; 5th tarsomeres each with 10–12 batonnets . . . (Cambodia, Laos, Philippines, Thailand) ..... **nuansriae, n. sp.**
3. Tibiae yellow, on foreleg with base and apex narrowly dark brown . . . (Java) ..... **luteinervis** (de Meijere)
   Tibiae dark brown, yellowish on distal ½ on midleg and distal ⅔ on hindleg . . . (Malaya, Sumatra, Thailand) ..... **polydora** Macfie

Xenohelea nuansriae Wirth & Ratanaworabhan, **new species** Fig. 3

Holotype ♀. Wing length 2.40 mm; breadth 0.78 mm.

Head. Dark brown including antenna and palpus. Eyes (Fig. 3F) broadly contiguous. Antenna (Fig. 3A) with lengths of flagellar segments in proportion of 23-17-17-16-17-18-20-21-40-40-40-40-57; antennal ratio 1.32. Palpus (Fig. 3B) with lengths of segments in proportion of 5-15-20-17-15; 3rd segment slender, with a small circular sensory area near tip bearing a compact clump of 6–7 sensilla. Mandible (Fig. 3D) with 6 coarse teeth. *Thorax.* Blackish; mesonotum with series of strong, bristly, erect hairs; scutellum with 10–12 long, fine bristly hairs. Legs (Fig. 3H) long and slender, femora somewhat arcuate; femora and tibiae dark brown, femora with bases variably yellowish on proximal ¼; tarsi dirty whitish, apices of tarsomeres I–IV and all of V brownish. Femora with stout black ventral spines arising from distinct blackish tubercles; 10 on foreleg extending nearly to base, 5 each on mid- and hindleg on distal ⅓ to ¼; hind tarsal ratio 2.1 (Fig. 3I). Fifth tarsomeres (Fig. 3J) each with 12 stout black ventral batonnets on foreleg, 10 on midleg and

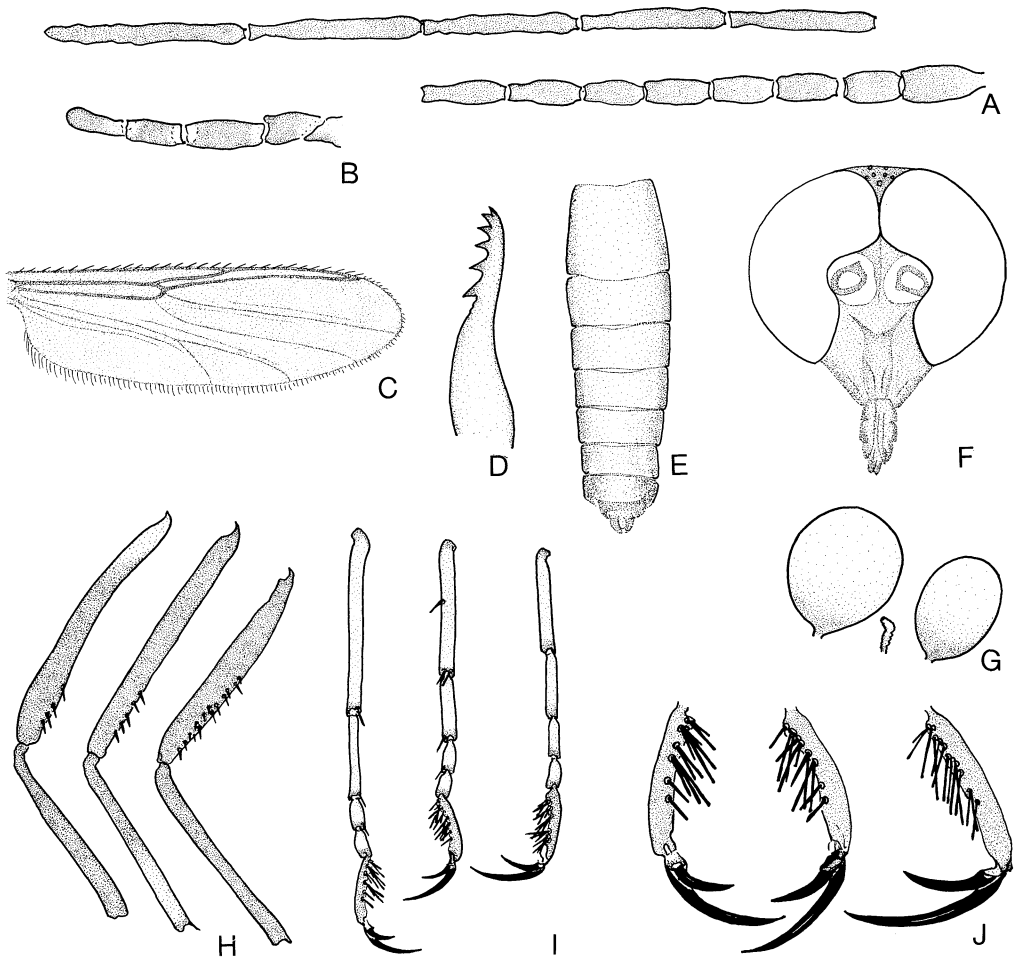

FIG. 3. *Xenohelea nuansriae,* ♀: **A,** antenna; **B,** palpus; **C,** wing; **D,** mandible; **E,** abdomen; **F,** head, anterior view showing eye separation; **G,** spermathecae; **H,** femora and tibiae of (left to right) hind-, mid-, and forelegs; **I,** tarsi of (left to right) hind-, mid-, and forelegs; **J,** 5th tarsomeres and claws of (left to right) hind-, mid-, and forelegs. (Drawn by Niphan Ratanaworabhan.)

12 on hindleg; claws long and slender, unequal, the longer nearly as long as 5th tarsomere, the shorter about ½ to ⅔ as long. Wing (Fig. 3C) grayish to milky white, anterior veins yellow to pale brown; rather slender; 1 radial cell present; costal ratio 0.90. Halter brownish. *Abdomen* (Fig. 3E). Dark brown. Spermathecae (Fig. 3G) 2 plus rudimentary 3rd; functional spermathecae deeply pigmented, oval to subspherical with very short neck; unequal, measuring 0.046 by 0.040 mm and 0.040 by 0.029 mm including necks.

♂. Unknown.

Types. Holotype ♀, CAMBODIA: Phnom Penh, 25.V.1967, M. Delfinado, light trap (Type no. 76558, USNM). Paratypes, 10♀, as follows. LAOS: Vientiane, 31.V–3.VII.1960, S. & L. Quate, light trap, 1♀ (BISHOP). PHILIPPINES: Leyte I: Mahaplag,

9.VII.1964, M. Delfinado, light trap, 1♀ (BISHOP); Luzon I: Pampanga Prov, Angeles, Clark Air Base, I–XI.1957, I. Balatbat, light trap. 7♀ (USNM). THAILAND: Si Sa Ket Prov, Amphoe Muang, Payoo, 27.V.1977, Nipha Patarkulpong, rice paddy. 1♀ (BANGKOK).

Discussion. This species is named for Mrs Nuansri Wongsiri in recognition of her contributions to this study. Of the Oriental species, *Xenohelea nuansriae* comes closest to *X. ciliaticrus* (Kieffer) from Taiwan, but it differs, as shown in the key, in the color of the thorax and halteres and in the number of femoral spines and tarsal batonnets. *X. nuansriae* also differs in the presence of only 1 radial cell, unusual for the genus.

Xenohelea polydora Macfie

Xenohelea polydora Macfie, 1934b: 226 (♀; Sumatra).

Diagnosis. Female wing length 3.2 mm. A dark brown species; mesonotum with gray pubescence, showing 3 indistinct broad longitudinal bands, and numerous dark spots at the bases of hairs; scutellum dark yellowish brown. Wing pale; 2 radial cells (sometimes vein R2+3 absent forming 1 cell). Halter pale with brownish knob. Legs dark brown; proximal halves of mid- and hindfemora, distal ½ of midtibia and distal ⅔ of hindtibia yellowish; tarsi pale with apices of tarsomeres I–IV and all of V brown. Femora slender, all armed ventrally with stout black spines, 18 on foreleg, 9 on midleg and 6 on hindleg. Fifth tarsomeres of ♀ each with about 12 black ventral batonnets; claws on all legs strong and unequal, 1 nearly as long as 5th tarsomere, the other ⅔ as long. Abdomen shining dark brown; spermathecae 2, oval, unequal, measuring 0.150 by 0.110 mm and 0.110 by 0.090 mm, ducts sclerotized for 0.005 mm.

Distribution. Malaysia, Sumatra, Thailand.

Thailand rice paddy records. Chiang Mai Prov, Amphoe San Pa Tong, Ban Tung Theo, 19.II.1979, K. Yasumatsu, 1♀.

Tribe PALPOMYIINI

Genus **Bezzia** Kieffer

Bezzia Kieffer, 1899: 69. Type-species, *Ceratopogon ornatus* Meigen (orig. desig.).

Diagnosis. Moderately large and stout predaceous midges with sparse bristles. Mesonotum rarely with anterior spine or tubercle. Eyes contiguous to broadly separated. Antenna moderately slender; palpus 5-segmented, 3rd segment slender; ♀ mandible with coarse teeth. Legs usually slender; forefemur rarely swollen, usually with ventral armature of stout black spines; 4th tarsomeres more or less cordiform; 5th unarmed ventrally; 5th claws simple and equal, usually with an internal basal tooth or barb. Wing without macrotrichia; 1 radial cell present; costa extending to 0.7–0.8 of wing length; medial fork usually broadly sessile, rarely with short petiole. Female abdomen with paired eversible glands and internal sclerotized gland rods. Male genitalia inverted; 9th tergum small with setose submedian lobes; basistyle stout, usually simple, dististyle short and articulated; aedeagus triangular in outline; parameres fused, forming an elongate process, bases usually expanded butterfly-like.

KEY TO THE *Bezzia* SPECIES OF SE ASIA

1. Anterior femur unarmed; legs yellow with or without dark bands 2
   Anterior femur with 1–4 stout ventral spines; legs various 3
2. Legs yellow, knee spots and extreme tips of tibiae and tarsomeres darkened; all femora with distinct brownish subapical ring, and all tibiae with median brown band ..... **suavis** Johannsen

Only knee spots and tips of tibiae darkened; tarsomeres pale; femora not ringed, and only foretibia with faint median brown band ..... **lutea, n. sp.**

3. Legs pale yellow or whitish, usually with some brown banding 4
Legs brown to black, at most with narrow pale rings (foreleg may be paler brownish than others 10

4. Legs pale yellowish or reddish without any dark rings except at apex of hindtibia 5
Legs with dark rings or bands 6

5. Forefemur with 3 spines . . . (Taiwan) ..... **murina** Kieffer
Forefemur with 1 spine . . . (Thailand) ..... **yasumatsui, n. sp.**

6. Wing with a large rounded to quadrate dark brown spot in cell R5 below tip of costa; all femora with broad brown bands; forefemur with 1–2 ventral spines; legs stout, hindfemur often swollen on distal ¼ ..... **collessi, n. sp.**
Wing uniformly hyaline without dark spot in cell R5 7

7. All tibiae with median dark bands and narrow apex dark; all femora with broad brown subapical ring; forefemur with 1 spine; legs stout, with coarse setae; large species, 3 mm long ..... **serena** Johannsen
Tibiae unbanded or with median dark band only on foreleg 8

8. Tibiae pale except narrow apex of hindpair; femora pale except faint brown ring before tips of mid- and hindpairs; forefemur with 2 spines . . . (Taiwan) ..... **nigriclava** Kieffer
Foretibia with median brown band; all femora with apical or subapical brown bands; knee spots and tips of tibiae brown 9

9. Femora with subapical brown band; forefemur with 1 spine (sometimes absent); spermathecae with long sclerotized necks and round apices ..... **lewvanichae, n. sp.**
Femora with apical brown band; forefemur with 3 spines; apex of abdomen contrasting blackish; spermathecae with pointed apices and filiform necks ..... **tirawati, n. sp.**

10. Subapical pale rings present on at least forefemur; forefemur with 2–3 spines 11
Femora without subapical pale rings; forefemur with 1–3 spines 13

11. Hindleg entirely dark; forefemur with 3–4 spines 12
All femora with apical, and all tibiae with basal and apical, broad pale bands, knee spots dark; forefemur with 2 spines . . . (Java, Sumatra, rice fields) ..... **mollis** Johannsen

12. Foretibia with subbasal and subapical pale rings; midfemur entirely dark; forefemur with 3–4 spines; ventral palisade setae on tarsomeres 1–3 on hindleg . . . (widespread) ..... **micronyx** Kieffer
Foretibia entirely dark; midfemur with subapical pale ring; forefemur with 4 spines . . . (Taiwan) ..... **insularis** Kieffer

13. Foreleg paler than others, brownish yellow; forefemur with 1 spine; (wing

whitish; all tarsi white; antenna yellow with golden plume; forefemur stouter; hindtarsomeres 1–3 with palisade setae) ... (♂; Taiwan) ..... **chrysolopha** Kieffer

Foreleg concolorous with others; forefemur with 2–3 spines 14

14. Legs blackish, bases of femora and both ends of tibiae paler brown; forefemur with 2 spines; tarsomeres 1–3 with palisade setae ... (♂; Sri Lanka) ..... **indecora** Kieffer

Legs light brown without paler markings; forefemur with 3 spines ... (Taiwan) ..... **separata** Kieffer

Bezzia collessi Wirth & Ratanaworabhan, **new species** Fig. 4

A large brown species; wing brownish, a prominent dark spot behind tip of costa; legs stout, banded, forefemur with 1 ventral spine, hindfemur abruptly swollen on distal 4th.

Holotype ♀. Wing length 1.72 mm; breadth 0.71 mm.

Head. Brown, bases of antennal segments pale. Eyes (Fig. 4D) well separated, vertex with numerous small setae. Antenna (Fig. 4A) with lengths of flagellar segments in proportion of 23-13-12-12-12-13-14-15-21-23-23-23-25; antennal ratio 1.00. Palpus (Fig. 4B) with lengths of segments in proportion of 8-12-17-8-9; 3rd segment scarcely swollen. Mandible (Fig. 4E) with 8 coarse teeth. *Thorax.* Brown, scutellum not paler; mesonotum with vestiture of fine microsetae, no large bristles except 2–3 above wing bases; a well-developed pointed anterior tubercle present. Legs (Fig. 4H–J) moderately stout, hindfemur distinctly swollen on distal ¼; femora and tibiae with distinct brown-banded color pattern as figured, distal band on hindfemur more intense; forefemur with 1 stout black ventral spine; a few moderately long extensor bristles on hindtibia; a strong apical spine on midtibia, 2 strong apical spines on each of first 3 tarsomeres on midleg; 1 row of ventral palisade setae on first 3 tarsomeres of midleg, 2 such rows on first 3 tarsomeres on hindleg. Fourth tarsomeres slightly cordiform; 5th tarsomeres unarmed (Fig. 4F); claws moderately long, each with small basal barb on inner side. Wing (Fig. 4C) infuscated, smoky brownish, more intensely anteriorly in region of r-m crossvein and base of radial cell; a prominent quadrate to irregularly rounded dark brown spot in cell R5 extending from tip of radial cell halfway to vein M1; costal ratio 0.84. Halter moderately infuscated. *Abdomen.* Pale brownish, vestiture of moderately long and dense bristly hairs; genital sclerotization as in Fig. 4G; 1 pair of dark brown gland rods on 7th tergum. Spermathecae 2 plus rudimentary 3rd; functional spermathecae globular to slightly oval with distinct sclerotized neck, measuring 0.058 by 0.052 mm and 0.046 by 0.041 mm plus necks about 0.012 mm long.

Allotype ♂. Wing length 1.03 mm; breadth 0.47 mm.

Head. Antenna short, flagellar segments with lengths in proportion of 22-10-10-10-10-10-10-10-10-12-20-20-20; plume short and sparse, lengths of verticils decreasing up to segment 12. Palpus extremely reduced, nearly vestigial, length of entire palpus 20 units compared with 54 in ♀. *Thorax.* Brownish as in ♀. Legs with femora and tibiae brown, unbanded, slender, forefemur with 1 ventral spine; fore- and midtarsi without palisade setae, 2 rows on tarsomeres I and II of hindleg. Wing brownish infuscated with prominent dark brown spot in cell R5 as in ♀; relatively shorter and broader than in ♀; costal ratio 0.76. Halter brown. *Abdomen.* Pale brown, genitalia dark brown. Genitalia (Fig. 4K) of usual structure for the subgenus *Bezzia,* 9th sternum short with broad, shallow caudomedian excavation; basistyle about 2× as long as broad, without mesal lobe or swelling, dististyle nearly as long as basistyle, tapering to bluntly pointed tip; aedeagus short and triangular in outline, about as long as basal breadth, with basal arch to about ¼ total length, ventral surface spiculate distally, tapering to slender simple rounded tip; parameres fused as usual in an elongate rodlike caudal process about 2× as long as aedeagus, with simple rounded tip.

Pupa. Length 4.5 mm. Color dark amber brown, abdominal segments except last 2 with lateral margins dark brown, leaving a large quadrate area on dorsal and ventral surfaces pale yellowish brown and poorly sclerotized. Respiratory horn (Fig. 4L) long and slender, with bell-shaped apical expansion bearing a row of 30–35 spiracular openings, the row not extending more than 1/5 the distance to base of horn. Operculum (Fig. 4M) broader than long, surface without prominent tubercles, a pair of moderately long sub-

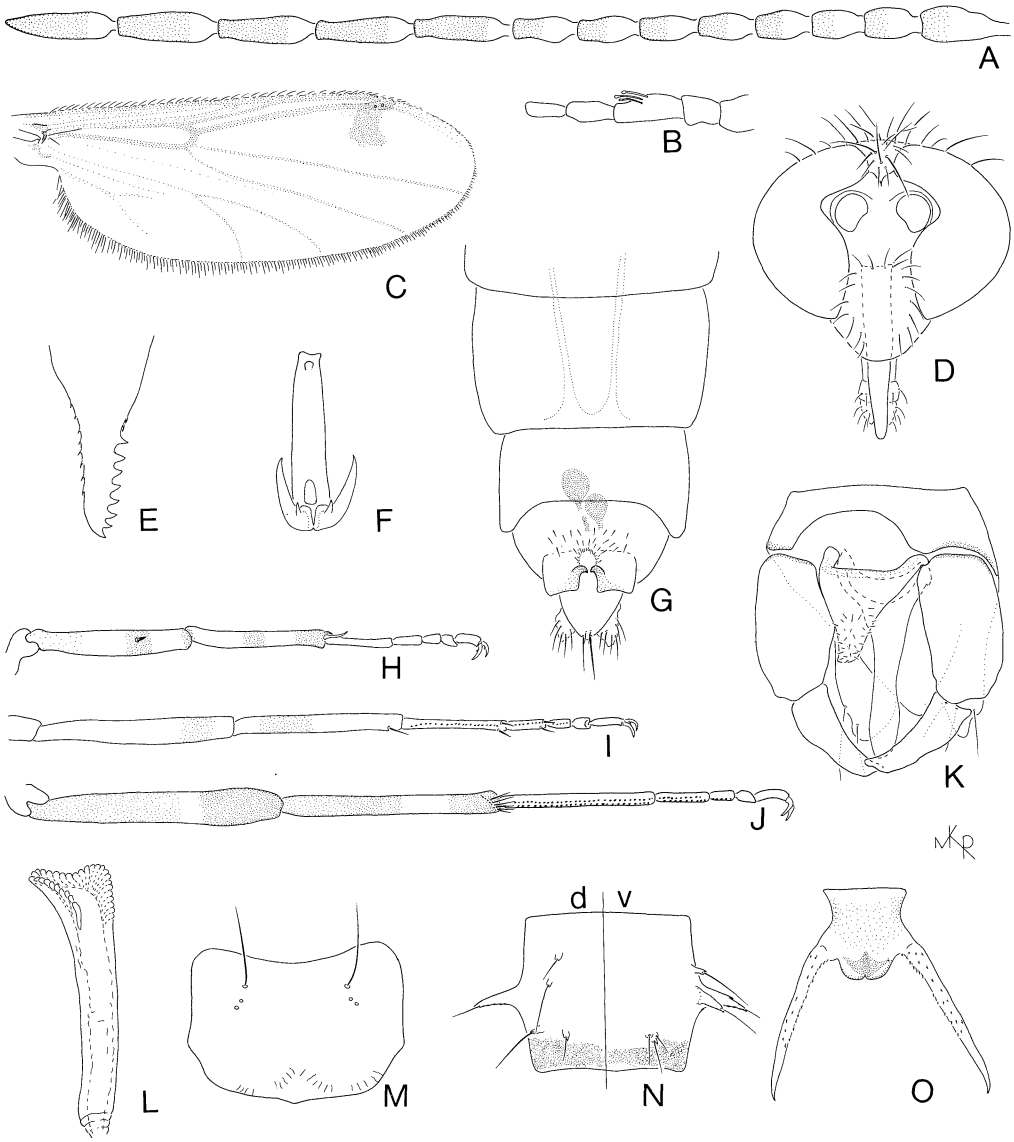

FIG. 4. *Bezzia collessi*: **A–J,** ♀; **K,** ♂; **L–O,** pupa: **A,** antenna; **B,** palpus; **C,** wing; **D,** anterior view of head showing eye separation; **E,** mandible; **F,** 5th tarsomere and claws of foreleg; **G,** genital sclerotization; **H,** foreleg; **I,** midleg; **J,** hindleg; **K,** genitalia; **L,** respiratory horn; **M,** operculum; **N,** 4th abdominal segment; **O,** last abdominal segment.

lateral setae present. Abdominal segments as in Fig 4N, the lateral spines prominent, long and pointed, their surface spiculose, each bearing a long apical seta. Terminal segment (Fig. 4O) bearing a pair of long slender, slightly diverging processes about 2× as long as main body of segment, their tips pointed and surfaces spiculose.

Distribution. Widespread and common in SE Asia.

Types. Holotype ♀, allotype ♂, SINGAPORE: 28.VII.1952, D.H. Colless, reared from surface of weedy pond (Type no. 76559, USNM). Paratypes, 10♂,91♀, as follows. CAMBODIA: Phnom Penh, 25.V.1967, M. Delfinado, light trap, 1♀. INDONESIA: JAVA: Djakarta [Jakarta], V–VI.1955, D.M. Rees, light trap, 3♀. SINGAPORE: same data as types, 4♂,4♀, 5 pupae; same data except 10.IX.1952, open grassy pool, 3♀, 2 pupae. MALAYSIA: Pahang, Kuantan, Gudang Rasan, I–II.1959, R. Traub, light trap, 4♀; SABAH (Borneo): Labuan I, IX–X.1948, D.H. Colless, at light, 1♀; SARAWAK (Borneo): Akah Riv, Lg. Tebangan, VII.1953, Colless, reared from swamp, 1♀. THAILAND: Bangkok, Bangpo, VIII–IX.1962, J. Scanlon, light trap, 7♀; Huaykwang, IX.1962, J. Scanlon, light trap, 3♂,16♀; Pratoomvan, 9–10.V.1959, Manop Ratanarithikul, light trap, 2♀; Plukchit, VIII–IX.1962, J. Scanlon, light trap, 2♀; Thonglo, VIII–IX.1962, J. Scanlon, light trap, 11♀. Chachoengsao Prov, 29.VI.1978, K. Yasumatsu, rice paddy, 1♂. Chiang Mai Prov, IV–V.1958, V. Notananda, light trap, 1♀; Amphoe Sai, Ban Mae Yoi, 24.VI.1979, K. Yasumatsu, rice paddy, 1♂. Loei Prov, A. Dan Sai, 6–7.VI.1959, Manop, light trap, 4♀; A. Muang, 1–5.V.1959, Manop, light trap, 25♀. Nakhon Pathom Prov, 18.XII.1958, Manop, light trap, 1♀. Phetchaburi Prov, 27.XII.1958, Manop, light trap, 1♀. Samut Prakan Prov, 22.XII.1958, Manop, 1♂. Ratchaburi Prov, A. Ban Pong, 26.XII.1958, Manop, light trap, 1♀. Thon Buri Prov, 23.XII.1958, Manop, light trap, 1♀; A. Muang, 7.V.1959, Manop, light trap, 1♀. Udon Thani Prov, A. Muang, IX.1962, J. Scanlon, light trap, 1♀.

Discussion. This species is named for the collector of the type series, Dr Donald H. Colless, in recognition of his long and continued interest in Oriental Ceratopogonidae and his important contributions to the study of Asian and Australian Diptera. *Bezzia collessi* can immediately be recognized by the presence of the prominent dark brown spot on the brownish wing; characters to separate it from the other SE Asian species are given in the key. The poorly developed male palpi are unusual.

Bezzia lutea Wirth & Ratanaworabhan, **new species** Fig. 5

A large pale brown species with slender yellowish hyaline wing and pale halter; legs pale with narrow dark spots at apices of femora and tibiae and a broad median brown band on foretibia; forefemur unarmed.

Holotype ♀. Wing length 1.75 mm; breadth 0.58 mm.

Head. Eyes (Fig. 5D) separated by width of 2 ommatidial facets, vertex with small yellowish setae. Antenna (Fig. 5A) brown, bases of segments whitish; elongate; lengths of flagellar segments in proportion of 23-12-12-12-13-13-14-15-28-20-32-32-33; antennal ratio 1.36. Palpus (Fig. 5B) pale, slender; lengths of segments in proportion of 6-10-15-7-12. Mandible (Fig. 5E) with 14 teeth, proximal teeth much smaller. *Thorax.* Yellowish brown; mesonotum with obscure pattern of darker brown patches. Legs (Fig. 5H–J) yellowish, narrow apices of femora and tibiae, and a broad median band (sometimes reduced to a shorter dark area on extensor side) on foretibia dark brown. Forefemur unarmed, a pale brown apical spine on midtibia; tarsomeres 1–3 on midleg each with a pair of brownish apical spines; tarsomeres 1 and 2 on midleg and tarsomere 3 on hindleg with single row of ventral palisade setae, tarsomeres 1 and 2 on hindleg with double row; 4th tarsomeres slightly cordiform; 5th tarsomeres (Fig. 5F) brownish, without ventral spines; claws relatively stout, each with small basal barb on inner side. Wing (Fig. 5C) slender, yellowish hyaline,

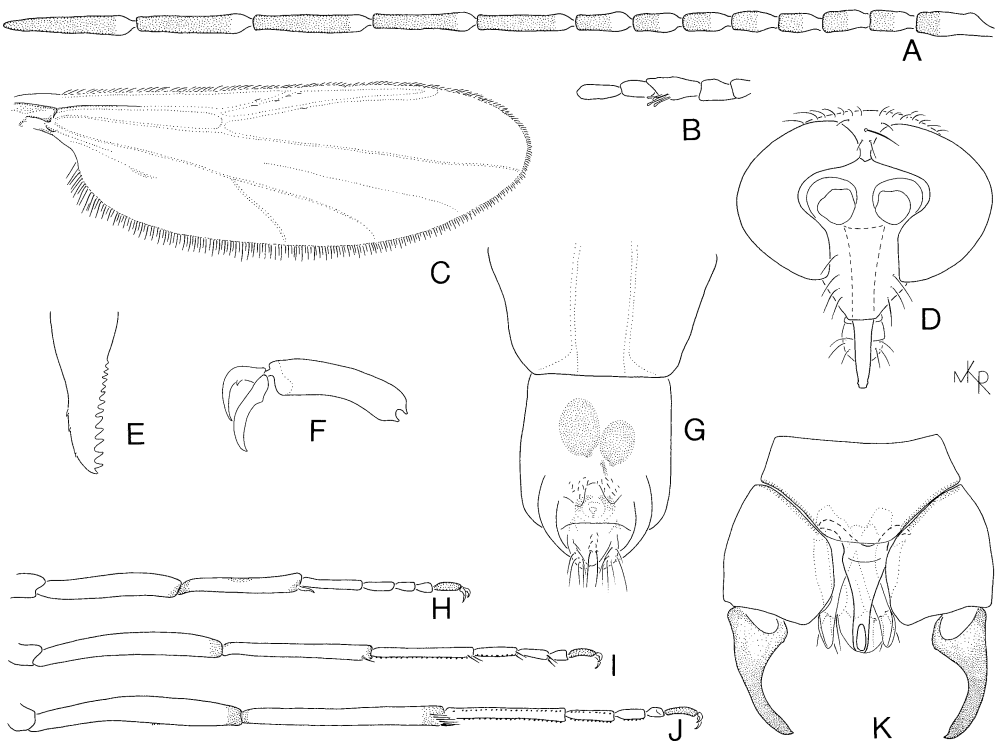

FIG. 5. *Bezzia lutea*: **A–J,** ♀; **K,** ♂: **A,** antenna; **B,** palpus; **C,** wing; **D,** head, anterior view; **E,** mandible; **F,** 5th tarsomere and claws of foreleg; **G,** genital sclerotization; **H,** foreleg; **I,** midleg; **J,** hindleg; **K,** genitalia.

anterior veins yellowish; costal ratio 0.80. Halter pale. *Abdomen.* Yellowish brown, faint segmental brownish crossbands in middle of terga; genital sclerotization as in Fig. 5G. One pair of long yellowish to pale brown gland rods extending anteriorad nearly to base of abdomen. Spermathecae 2; dark brown, oval with short necks; unequal, measuring 0.099 by 0.072 mm and 0.075 by 0.058 mm including necks.

Allotype ♂. Wing length 1.27 mm; breadth 0.43 mm.

Head. Antenna elongate, flagellar segments with lengths in proportion of 25-15-15-15-15-16-16-18-20-35-25-30-40; plume pale brown, moderately long and dense. Palpus with lengths of segments in proportion of 4-6-12-9-10. *Thorax.* As in ♀, including leg markings, dark brown markings on mesonotum more extensive. Palisade setae absent on fore- and midlegs; hindbasitarsus with 2 rows, tarsomeres 2 and 3 with 1 row. Wing as in ♀ but costa shorter, costal ratio 0.72. *Abdomen.* Brownish. Genitalia (Fig. 5K) pale brown, dististyles blackish distally; 9th sternum moderately long; basistyle short and stout, about as broad as long; dististyle swollen basally, heavily sclerotized, tapering and curved distally to slender pointed tip. Aedeagus heavily sclerotized, unusually long and slender with narrow basal arch, tapering distally to pointed tip curving ventrad in a dark brown process. Parameres fused at base only, separating in a pair of posteriorly diverging clavate brownish processes curved ventrad with apices laterally flattened and expanded somewhat spoonlike.

Distribution. Cambodia, Malaysia, Thailand.

Types. Holotype ♀, allotype ♂, MALAYSIA: Selangor, Kuala Lumpur, Inst. Med. Res. grazing ground, VII.1958, R. Traub, light trap (Type no. 76560, USNM). Para-

types, 26♂,53♀, as follows. CAMBODIA: Phnom Penh, 25.V.1967, M. Delfinado, light trap, 1♀. MALAYSIA: Selangor, same data as types, 3♂,7♀. THAILAND: Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, K. Yasumatsu, 1♀. Chiang Mai Prov, IV–V.1958, V. Notananda, light trap, 1♂,2♀; A. Hang Dong, Ban Rong Ku, 27.III.1979, K. Yasumatsu, 2♂, 2♀; Chiang Rai Prov, Ban Pa Bong, 22.II.1979, 2♂; A. Muang, Ban Kua Tae, 28.III.1979, 7♀; Ban Teen Doi, 22.II.1979, 8♂,3♀. Chon Buri Prov, A. Ban Phra, X.1962, J. Scanlon, light trap, 1♀. Kamphaeng Phet Prov, A. Khlong Khlung, 3.V.1978, 1♀. Khon Kaen Prov, A. Ban Phai, 28–30.V.1959, Manop Ratanarithikul, light trap, 7♀; A. Chum Phae, 25–27.V.1959, Manop, light trap, 9♀. Loei Prov, A. Dan Sai, 6–7.VI.1959, Manop, light trap, 1♀; A. Muang, 1–5.VI.1959, Manop, light trap, 1♀; A. Ta Lee, 8–9.VI.1959, Manop, light trap, 1♂,1♀. Nakhon Phanom, A. Muang, 28–30.VI.1959, Manop, light trap, 1♀. Nakhon Ratchasima Prov, A. Muang, 5–7.VII.1959, Manop, 2♀. Nong Khai Prov, A. Muang, 10–14.VI.1959, Manop, light trap, 2♀. Sakon Nakhon Prov, A. Muang, 25–27.VI.1959, Manop, light trap, 1♀. Si Sa Ket Prov, A. Kanthararom, Ban Nong Bua, 30.IX.1976, K. Yasumatsu, 3♂,2♀; A. Khun Han, Ban Ta Muan, 30.X.1976, 1♂,1♀. Ubon Ratchathani Prov, A. Phibun Mangsahan, 29.X.1976, 4♂; Rice Exp. Stn., 29.X.1976, 1♂.

Discussion. The species takes its name from its predominantly yellow legs and yellowish hyaline wings. *B. suavis* Johannsen also has unarmed femora and yellowish legs but has brownish bands on all femora and tibiae. The male genitalia of *B. lutea* are quite distinctive.

Bezzia micronyx Kieffer

Bezzia micronyx Kieffer, 1921a: 162 (♂, ♀; Taiwan).—Tokunaga, 1939: 276 (descriptive notes); 1940: 162 (redescribed; Japan).
Bezzia crassistyla Tokunaga, 1966: 143 (♂, ♀; New Guinea; figs.). **New synonymy.**

Diagnosis. Moderately large black species, dull to slightly shining; wing length 1.8 mm. Eyes contiguous. Antenna dark with pale rings; ♂ plume yellow, brown at tip. Legs brownish black, forefemur with subapical pale band; foretibia with 2 pale bands; forefemur with 3–4 ventral spines. Wing grayish hyaline, anterior veins brown; radial cell short; media forks at r-m crossvein. Halter dark brown, stem pale. Abdomen dark brown; 1 pair of short, poorly pigmented gland rods. Spermathecae 2, equal, ends blunt-pointed; necks long, slender to filiform. Male genitalia as figured by Tokunaga for *crassistyla*: 9th segment short, sternum with caudomedian excavation and spiculate membrane; basistyle bulbous, with large triangular lobe on mesal side near apex; dististyle short and stout, abruptly tapering distally to pointed tip; aedeagus with quadrate basal sclerite and a pair of slender distal blades; parameres massive, fused, main portion with sides parallel in ventral view, and tip abruptly expanded in a truncate plate, a slender pubescent internal posterior process also present.

Distribution. We have examined about 300 specimens in the USNM collection from Java, Malaysia, Nepal, Sabah (Borneo), Philippines, Ryukyu Is, Taiwan, Thailand and Vietnam.

Thailand rice paddy records. Chiang Mai Prov, Amphoe Chom Thong, Ban Huai Nam Dib, 7.V.1978, 3♂; A. Hang Dong, Ban Rong Ku, 27.III.1979, 20♂,20♀. A. Hang Dong, 19.II.1979, 20.IX.1976, 1♂,1♀; A. San Pa Tong, Ban Yu Wha, 8.V.1978, 6♂; A. San Pa Tong, Rice Exp. Stn., 20♂,10♀; A. San Sai, Ban

Mae Yoi, 24.VI.1979, 1♀; A. Saraphi, Ban San Kab Tong Nua, 4.V.1978, 5♂,5♀. Chiang Rai Prov, Ban Pa Bong, 22.II.1979, 1♂; A. Muang, Ban Kua Tae, 28.III.1979, 4♂,15♀; A. Muang, Ban Teen Doi, 22.II.1979, 1♂. Khon Kaen Prov, Rice Exp. Stn., 12.VIII, 30.IX.1977, 1♀. Lamphun Prov, A. Muang, 4.V.1978, 3♂,1♀. Nakhon Phanom Prov, A. Renunakorn, Ban Pone Thong, 10.VIII.1978, 1♀. Nakhon Sawan Prov, A. Phayuha Khiri, 3.V.1978, 4♂,2♀. Nakhon Si Thamarat Prov, 26.III.1978, Rice Exp. Stn., 2♂,1♀. Si Sa Ket Prov, Boo Soong, 21.XI.1977, 1♀; A. Muang, Ban Kra Sang, 30.X.1976, 1♂,2♀. Ubon Ratchathani Prov, A. Amnarcharoen, Ban None Nam Tang, 10.VIII.1978, 1♂; Rice Exp. Stn., 29.X.1976, 20.XI.1977, 1♂. Udon Thani Prov, A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 2♂,1♀.

Note on synonymy. Tokunaga (1966) compared *B. crassistyla* with Taiwanese *B. murina* but not with *micronyx*; he compared the latter elsewhere with his species *inflatifemora,* indicating a different concept of Kieffer's species. Our synonymy is based on a comparison of males and females in the USNM collection from Taiwan (Chao-Chow, Kaoh-siung, VIII.1959, S. M. K. Hu, light trap) with Kieffer's original description and with Tokunaga's (1966) excellent and detailed description and figures. *Bezzia ornatipes* Kieffer (1910) from India (Puri) differs from *B. micronyx* in the pale distal ½ of the hind femur and in 2 pale rings on all the tibiae, wing with pale veins, and length 1.8 mm. *Bezzia trispinosa* Kieffer (1911) from India (Calcutta) differs from *B. micronyx* in its shining black color; otherwise it is like *micronyx* with length 1.5 mm.

Bezzia tirawati Wirth & Ratanaworabhan, **new species** Fig. 6

A rather small, stout, bicolored species; thorax blackish with a few stout black spines; legs yellow with narrow apices of femora and tibiae and broad median bands on forefemur and tibia dark brown, forefemur with 2–3 stout spines; wing unmarked; abdomen yellowish with apex dark brown.

Holotype ♀. Wing length 1.23 mm; breadth 0.45 mm.

Head. Dark brown, bases of antennal segments whitish. Eyes (Fig. 6E) meeting at a point; vertex with several long stout black setae. Antenna (Fig. 6A) with lengths of flagellar segments in proportion of 15-10-10-10-10-10-11-12-20-23-23-25-26; antennal ratio 1.20. Palpus (Fig. 6B) slender, lengths of segments in proportion of 4-8-15-12-10. Mandible (Fig. 6D) with 10 moderately large teeth. *Thorax.* Dark brown; mesonotum blackish, with numerous long black spinelike hairs. Legs (Fig. 6H–J) yellowish, narrow apices of femora and tibiae dark brown, forefemur and tibia with rather faint, broad, median brown bands and femur with base brownish; forefemur with 3 long stout black ventral spines; midtibia with long black apical spine; midtarsus with a pair of black apical spines on tarsomeres 1–3; tarsomeres 1 and 2 on midleg and tarsomere 3 on hindleg with 1 row of palisade setae, tarsomeres 1 and 2 on hindleg with 2 such rows; tarsomeres 4–5 brownish, 4th short and cordiform; 5th unarmed; claws (Fig. 6G) short and stout, basal inner barbs absent. Wing (Fig. 6C) grayish hyaline, veins pale brownish; costal ratio 0.71. Halter pale. *Abdomen.* Yellowish, faint segmental crossbands on terga 5–7, and last 2 segments dark brown; sparse vestiture of short stout setae becoming more prominent toward caudal segments. Genital sclerotization as in Fig. 6K; 1 pair of long dark brown gland rods; spermathecae 2, elongate ovoid to subconical in shape with long, slender, dark brown, tapering necks; subequal, each measuring 0.104 by 0.058 mm, plus necks 0.050 mm long.

Allotype ♂. Wing length 1.08 mm; breadth 0.36 mm.

Similar to ♀ with usual sexual differences. Antenna with lengths of flagellar segments in proportion of 20-12-12-12-12-13-15-15-20-40-20-28-35; brownish, segments 4–11 and proximal ½ of 12 yellowish, plume long and dense, yellowish brown. Palpus with lengths of segments in proportion of 4-8-16-13-10. Wing with costa shorter than in ♀, costal ratio 0.63. A sparse row of palisade setae on midbasitarsus; hindleg with 2 dense rows on tarsomeres 1–2, a single row on 3rd tarsomere. Abdomen brown except first 2 segments yellow. *Genitalia* as in Fig. 6F; heavily sclerotized, dark brown, much broader than long. Ninth sternum narrow and trapezoidal, sandwiched between bases of basistyles, its caudal margin with rounded excavation. Basistyle short and stout, almost globular, broadest at midlength where on mesal margin it articulates with bases of aedeagus and parameres; dististyle nearly as long as basistyle, slightly sinuate and

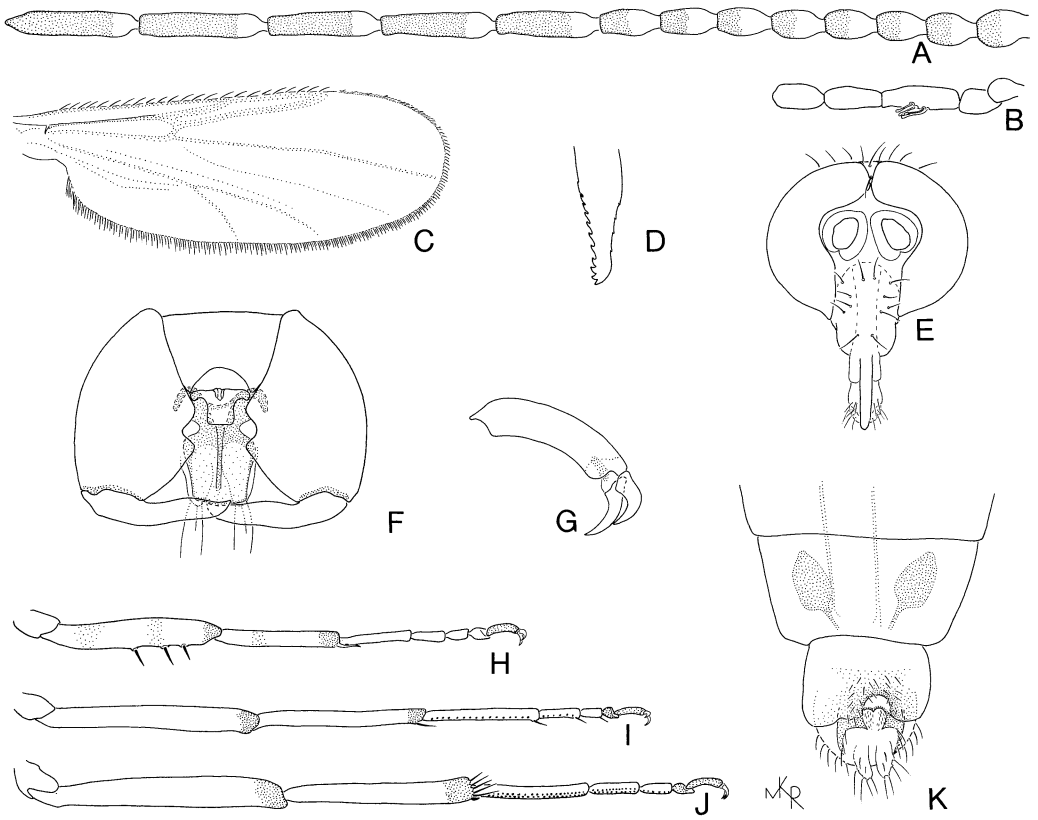

FIG. 6. *Bezzia tirawati*: **A–E, G–K,** ♀; **F,** ♂: **A,** antenna; **B,** palpus; **C,** wing; **D,** mandible; **E,** anterior view of head; **F,** genitalia; **G,** 5th tarsomere and claws of foreleg; **H,** foreleg; **I,** midleg; **J,** hindleg; **K,** genital sclerotization.

rather stout, slightly tapering to bluntly pointed tip. Aedeagus a small transverse sclerite with slender basal arms meeting mesal margin of basistyle, and a rather quadrate caudomedian process. Parameres fused in a single urn-shaped structure with slender, winglike basal arms and a broad, heavily sclerotized caudomedian plate with distally truncate margin extending to tips of cerci, and a darker vanelike internal thickening extending dorsally toward 9th tergum.

Distribution. Indonesia, Malaysia, Thailand.

Types. Holotype ♀, MALAYSIA: Selangor, Kuala Lumpur, Inst. Med. Res. grazing ground, III.1960, light trap (Type no. 76561, USNM). Allotype ♂ (USNM), same data except VIII.1958, R. Traub, light trap. Paratypes, 9♂,7♀, as follows. INDONESIA: JAVA: Indramayu, 6.IV.1977, K. Yasumatsu, rice paddy, 1♀. MALAYSIA: Kuala Lumpur, same data as types but dates VII.1958 to IX.1959, 5♂,3♀; Pahang, Kuala Singgora, 25.I.1959, R.H. Wharton, light trap, 1♂; Pahang, Kuantan, Gudang Rasan, I–II.1959, R. Traub, light trap, 1♀; Telok Sisek, 14.VI.1958, Wharton, light trap, 1♀; Perak, Pulau Pangkor, 1.IV.1959, R. Traub, light trap, 3♂. THAILAND: Udon Thani Prov, Amphoe Muang, IX.1962, J. Scanlon, light trap, 1♀.

Discussion. This species is named for Mr Chalermwong Tirawat in appreciation of his aid in this study. *B. tirawati* belongs to the same group of species as *B. micronyx,* as shown by the structure of the male genitalia and the female spermathecae. It can be separated from the other Oriental species of that group by the predominantly yellow legs with 3 femoral spines and by the distinct yellowish color of the base of the abdomen. The shape of the male parameres is also diagnostic.

Bezzia serena Johannsen

Bezzia serena Johannsen, 1931: 443 (♂, ♀; Java).—Mayer, 1934: 191 (pupa; Java; figs.).

Diagnosis. A large stout-bodied species; entire body with coarse black setae; ♀ 3 mm long, ♂ 2.5 mm long. Thorax brown, mesonotum with indications of 3 darker vittae, with minute sharp tubercle anteriorly; scutellum yellow with 4 black setae. Antenna moderately long, segments dark with narrow pale bases; palpus pale, slender. Mandible slender with 8 coarse teeth. Eyes broadly separated; frons between them with numerous long coarse dark setae. Wing hyaline, veins pale; media forks at r-m crossvein. Halter pale. Legs stout, pale; coxae brown; femora with broad brown preapical band, tibiae with broad brown median band; knee spots, tips of tibiae and tips of tarsomeres brown; leg bands not contrasting, especially in ♂; forefemur with 1 ventral spine. Abdomen yellowish white; gland rods not pigmented; spermathecae 2, ovoid with moderately long tapering necks; slightly unequal, measuring 0.073 by 0.047 mm and 0.061 by 0.039 mm including necks. Male genitalia typical of subgenus *Bezzia*; basistyle short and stout, broader than long, dististyle longer than basistyle; aedeagus with low, broad, basal arch and moderately long distal process with parallel margins; parameres with midportion of fused distal process slightly spindle-shaped, slightly broader than straight distal portion.

Distribution. Indonesia, Thailand.

Thailand rice paddy records. Chiang Mai Prov, Doi Pa-Morn, Doi Inthanon, 5.IX.1978, 19.XII.1978, K. Yasumatsu, 6♀. Khon Kaen Prov, Rice Exp. Stn., 12.VIII.1977, 1♂. Ubon Ratchathani Prov, Amphoe Phibun Mangsahan, 6.IX.1977, 1♂,1♀.

Bezzia lewvanichae Wirth & Ratanaworabhan, **new species** Fig. 7

A small yellowish brown species with yellow and brown banded legs and wing with costa extending practically to apex; spermathecae globular with extremely long necks.

Holotype ♀. Wing length 1.47 mm; breadth 0.55 mm.

Head. Brown, antenna with bases of segments somewhat paler. Eyes (Fig. 7E) separated by about diameter of 1 facet; vertex with only short, weak setae. Antenna (Fig. 7A) elongate; lengths of flagellar segments in proportion of 15-10-10-10-10-10-10-12-26-28-28-30-35; antennal ratio 1.52. Palpus (Fig. 7B) short and slender; lengths of segments in proportion of 5-7-10-10-9. Mandible (Fig. 7D) with 9 coarse teeth. *Thorax.* Brown; mesonotum with inconspicuous vestiture of short, fine, pale setae. Legs (Fig. 7H–J) pale yellow, apices of femora and tibiae with brownish spots; all femora with narrow brownish subapical bands and foretibia with narrow brown band at proximal ⅓; forefemur with 1 rather slender, long black ventral spine; midtibia with long brown apical spine; tarsomeres 1–3 of midleg each with a pair of long black spines; palisade setae in 1 row on tarsomeres 1–2 of midleg and 2 rows on tarsomeres 1–2 of hindleg; 4th tarsomeres subcylindrical, 5th unarmed; claws (Fig. 7G) long and slender with small basal barb on inner side. Wing (Fig. 7C) hyaline, anterior veins yellowish brown; costa fused with radius on distal ¼ of vein R4+5 and extending practically to wing tip; costal ratio 0.99. Halter brownish. *Abdomen.* Brownish; vestiture of short, sparse, fine, pale setae; genital sclerotization as in Fig. 7K; 1 pair of long brown gland rods. Spermathecae 2, dark brown, globular with extremely long necks; slightly unequal, measuring 0.043 by 0.036 mm plus neck 0.043 mm long, and 0.036 by 0.032 mm with neck 0.036 mm long.

Allotype ♂. Wing length 0.95 mm; breadth 0.36 mm; costal ratio 0.95.

Similar to ♀ with usual sexual differences; costa also unusually elongate although costal ratio not as

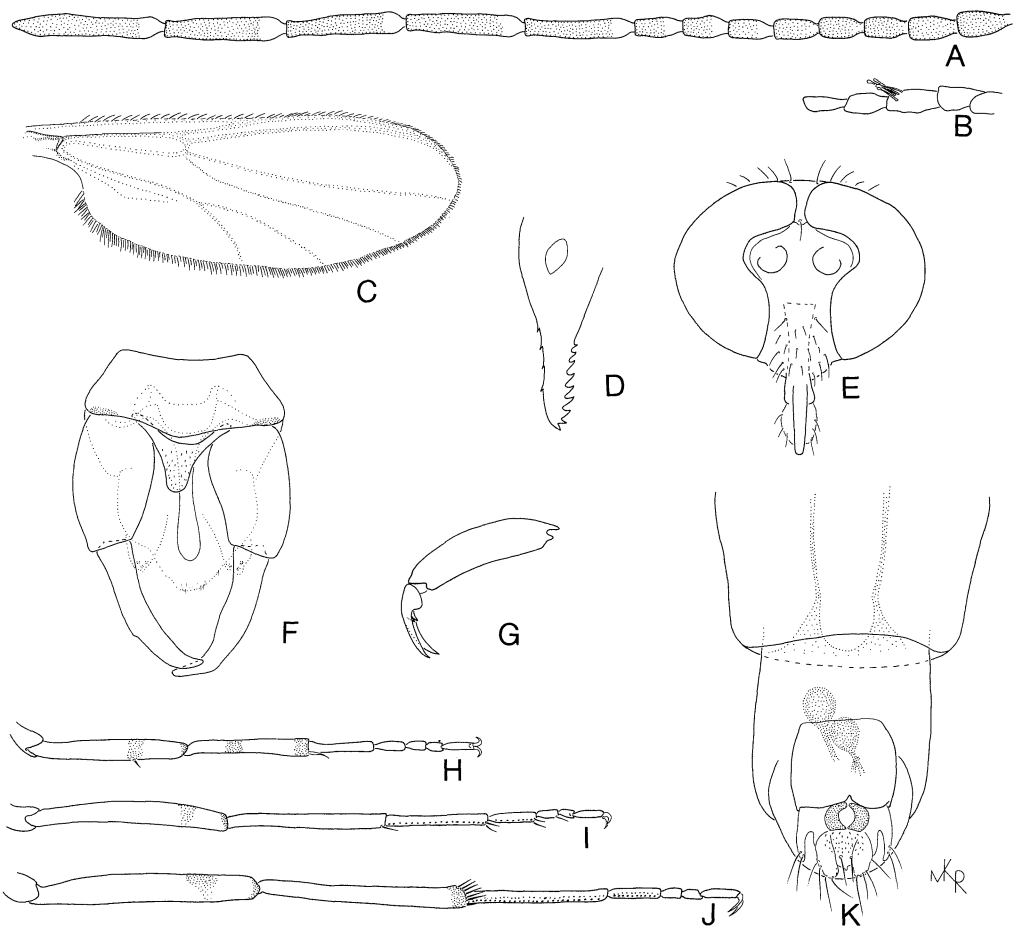

FIG. 7. *Bezzia lewvanichae*: **A–E, G–K,** ♀; **F,** male: **A,** antenna; **B,** palpus; **C,** wing; **D,** mandible; **E,** head, anterior view; **F,** genitalia; **G,** 5th tarsomere and claws of foreleg; **H,** foreleg; **I,** midleg; **J,** hindleg; **K,** genital sclerotization.

great as in ♀. Antenna missing. Palpus very short, almost vestigial. Legs with dark markings more diffuse and fainter than in ♀, but subapical pale rings still distinct on femora; no trace of ventral spine on forefemur; palisade setae absent on fore- and midtarsi, 2 rows on tarsomeres 1 and 2 of hindleg. Genitalia (Fig. 7F) typical of subgenus *Bezzia* with short 9th sternum, but dististyle unusually long, 1.2 as long as basistyle; aedeagus small and triangular with spiculate ventral surface and bluntly rounded distal process as usual; parameres with fused rodlike caudal process long and slender with rounded tip.

Distribution. Thailand.

Types. Holotype ♀, allotype ♂, THAILAND: Loei Prov, Amphoe Muang, 1–5.VI.1959, Manop Ratanarithikul, light trap (Type no. 76562, USNM). Paratypes, 11♂,40♀, as follows. THAILAND: same data as types, 1♂,25♀; Bangkok, Plukchit, VIII–IX.1962, J. Scanlon, light trap, 2♀; Thonglo, VIII–IX.1962, J. Scanlon, light

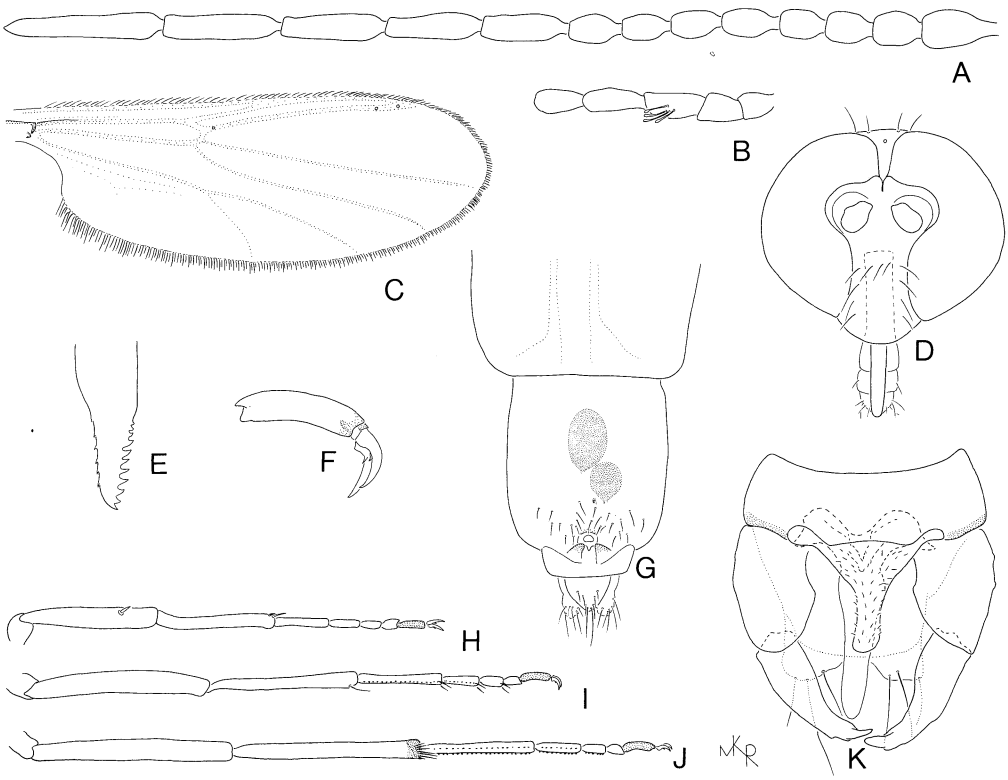

FIG. 8. *Bezzia yasumatsui*: **A–J,** ♀; **K,** ♂: **A,** antenna; **B,** palpus; **C,** wing; **D,** head, anterior view; **E,** mandible; **F,** 5th tarsomere and claws of foreleg; **G,** genital sclerotization; **H,** foreleg; **I,** midleg; **J,** hindleg; **K,** genitalia.

trap, 7♂,6♀; Loei Prov, A. Dan Sai, 6–7.VI.1959, Manop, light trap, 2♂,6♀; Nakhon Phanom Prov, A. Renunakorn, Ban Pone Thong, 10.IX.1978, K. Yasumatsu, 1♀; Ubol Ratchathani Prov, A. Phibun Mangsahan, 6.IX.1977, K. Yasumatsu, 1♂.

Discussion. This species is named for Dr Angoon Lewvanich in appreciation of her assistance in this study. *Bezzia lewvanichae* can be recognized in both sexes by the extremely long costa, which in the female reaches nearly to the wing tip; the globular spermathecae with unusually long necks are also distinctive.

Bezzia yasumatsui Wirth & Ratanaworabhan, **new species** Fig. 8

A large slender species with brownish thorax and yellowish abdomen; wing pale, veins yellow, radial cell long; halter pale brownish; legs yellowish, only apex of hindtibia and 5th tarsomeres brown; forefemur with 1 spine; gland rods unpigmented; spermathecae unequal with short necks.

Holotype ♀. Wing length 1.64 mm; breadth 0.65 mm.

Head. Yellowish brown, antenna and palpus brownish. Eyes (Fig. 8D) separated by a wedge-shaped space equal to diameter of 1 ommatidial facet; vertex with fine setae only. Antenna (Fig. 8A) with lengths of flagellar segments in proportion of 18-9-9-9-10-10-10-10-16-20-20-22-30; antennal ratio 1.27. Palpus (Fig. 8B) slender, lengths of segments in proportion of 6-10-12-10-10. Mandible (Fig. 8E) with 11 teeth, proximal

teeth smaller. *Thorax.* Brown, scutellum yellow; mesonotum with minute anterior tubercle, vestiture of short, very fine, brownish setae. Legs (Fig. 8H–J) pale yellow, only narrow apex of hind tibia and all of 5th tarsomeres brown; forefemur with 1 dark brown stout spine; palisade setae in 1 row on tarsomeres 1 and 2 of midleg and tarsomere 3 of hindleg, in 2 rows on tarsomeres 1 and 2 of hindleg; 4th tarsomeres slightly cordiform; 5th tarsomeres unarmed; claws (Fig. 8F) short and curved, each with basal barb on inner side. Wing (Fig. 8C) hyaline, veins pale yellowish; costal ratio 0.81. Halter pale brownish. *Abdomen.* Yellowish, only genital sclerotization (Fig. 8G) brownish; 1 pair of long transparent gland rods. Spermathecae 2, dark brown, oval with short slender neck; unequal, measuring 0.101 by 0.070 mm and 0.065 by 0.061 mm including the necks.

Allotype ♂. Wing length 1.10 mm; breadth 0.70 mm.

Similar to ♀ with the usual sexual differences. Antenna with segments in midportion of flagellum shorter and more slender than in ♀; lengths of segments in proportion of 22-10-10-10-10-9-9-9-10-15-23-25-28. Wing hyaline; costal ratio 0.80. Palisade setae absent on fore- and midtarsi; in 2 rows on basitarsus and in 1 row on 2nd tarsomere of hindleg. Genitalia (Fig. 8K) typical of subgenus *Bezzia*; posterior margin of 9th sternum not emarginate but abutting anterior arch of aedeagus, latter coarsely spiculate with distomedian process well developed with rather broad apex; basistyle short, somewhat broader on basal portion, dististyle slightly longer than basistyle, curved to pointed tip; parameres with proximal portion of distal process slightly swollen, slender and straight distally with rounded tip.

Distribution. Philippines, Thailand.

Types. Holotype ♀, allotype ♂, THAILAND: Nakhon Phanom Prov, Amphoe Renunakorn, Ban Pone Thong, 10.IX.1978, K. Yasumatsu (Type no. 76563, USNM). Paratypes, 45♂,179♀, as follows. PHILIPPINES: Luzon I, Pampanga Prov, Angeles, Clark Air Base, 17.IX.1957, I. Balatbat, light trap, 2♀. THAILAND: same data as type, 12♂,12♀; Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, 1♂,4♀; Chachoengsao Prov, A. Bangkanang, 12.VII.1978, wild rice, 1♀; Chiang Mai Prov, A. Chiang Dao, Ban Thung Ka La, 6.IX.1978, 2♀; A. Chom Thong, Ban Huai Nam Dib, 7.V.1978, 1♂,40♀; Doi Pa-Morn, Doi Inthanon, 5.IX.1978, 3♂,6♀; A. Hang Dong, Ban Rong Ku, 27.III.1979, 7♂,11♀; A. San Pa Tong, Ban Tung Theo, 19.II.1979, 8♂,8♀; Chiang Rai Prov, Ban Pa Bong, 22.II.1979, 1♂; A. Muang, Ban Teen Doi, 22.II.1979, 1♂,1♀; A. Wiang Pa Pao, Ban Mae Kachiang, 21.II.1979, 3♂; Khon Kaen Prov, Ban Nong Bua, Ban Kud Khae, 23.VI.1977, 5♀; A. Ban Phai, 28–30.V.1959, Manop, light trap, 2♀; A. Chum Phae, 25–27.V.1959, Manop, light trap, 2♀; Rice Exp. Stn., 12.VIII.1977, 1♂,28♀; Lampang Prov, A. Muang, Ban Suk Sawadee, 20.II.1979, 1♂,2♀; Nakhon Ratchasima Prov, A. Muang, Ban Bu, 1.XI.1976, 1♂; Nakhon Sawan Prov, A. Phayuha Khiri, 3.V.1978, 2♂,5♀; Phrae Prov, Rice Exp. Stn., 5.X.1977, 1♀; Prachin Buri Prov, A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 2♀; Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.IX.1978, 2♂,15♀; Rice Exp. Stn., 29.X.1976, 1♂,2♀; Udon Thani Prov, A. Muang, IX.1972, J. Scanlon, light trap, 1♀; A. Phen, Ban Nong Nok Kiang, 8.VIII.1978, 2♀; Ubon Ratchathani Prov, A. Phibun Mangsahan, 6.IX.1977, 25♀.

Discussion. We are pleased to name this species in honor of Dr Keizo Yasumatsu in recognition of his extensive contributions to Asian Entomology and his important studies of the insects of Thai rice paddies. *B. yasumatsui* is one of the commonest and most widespread of the predaceous midges of the paddies; in addition to the paratypes listed above we have examined about 500 specimens from the same collections that have not been mounted or marked as paratypes.

Bezzia yasumatsui resembles *B. murina* Kieffer from Taiwan with respect to its dull brownish thorax and unmarked pale legs, but, according to the original description, *murina* differs from *yasumatsui* in the lack of a dark band at the tip of the hindtibia and the presence of 2–3 ventral spines on the foretibia.

Genus **Phaenobezzia** Haeselbarth

Phaenobezzia Haeselbarth, 1965: 297. Type-species, *Probezzia pistiae* Ingram & Macfie (orig. desig.).

Diagnosis. Closely resembling *Bezzia* Kieffer. Large, usually yellowish or brownish, poorly marked, predaceous midges. Antenna long, slender, distal segments cylindrical; ♂ with sparse plume. Palpus slender, 5-segmented; 3rd segment without sensory pit. Eyes broadly separated, bare, 1 strong seta on frons between them. Mandible with 7–8 coarse teeth. Mesonotum with or without anterior spine. Wing with coarse microtrichia, macrotrichia absent; costa rather long, extending to 0.87 of wing length. Legs slender, without distinct bands; femora without spines; 4th tarsomere slightly cordiform; ♀ 5th tarsomere ventrally with more or less strong, sharp, spinelike bristles with bent tips; ♀ claws evenly curved or bent at base, equal, each with small basal barb on inner side. Female abdomen with 1–5 pairs of dorsal gland rods; 2 large spermathecae present. Male genitalia with short 9th tergum; basistyle short and bulbous; dististyle absent or very small and nonarticulated; aedeagus triangular, ventral membrane spiculate; parameres fused, rodlike, with butterfly-shaped bases.

Most of the *Bezzia* species described by earlier authors in the genus or subgenus *Probezzia* Kieffer belong in *Phaenobezzia.* Females of *Phaenobezzia* and some *Bezzia* species are difficult to separate when the latter have unmarked brownish legs and a long radial cell or when the strong sharp spines on the 5th tarsomeres of the former are poorly developed. However, the unique male genitalia of all *Phaenobezzia* species, with short bulbous basistyle and the absent or vestigial buttonlike dististyle, leave no doubt of the generic position of any species.

Key to *Phaenobezzia* species of SE Asia

1. Legs yellow including knees and tarsi; antenna short 2
   Legs with at least knees and apices of hind tarsi brownish; antenna longer, segments 3–10 each at least 2× as long as broad 3
2. Male dististyle absent; (♀ antenna with segments 3–10 short oval, IV scarcely longer than broad; XI 2.7 as long as X; ♀ 5th tarsomere with 5–7 black ventral spines; ♀ abdomen with 4 pairs of black gland rods; wing not brownish) ..... **mellipes, n. sp.**
   Male dististyle present and ½ as long as basistyle; only ♂ known .... **assimilis** (Johannsen), **n. comb.**
3. Legs yellow, knees, tips of tibiae and tarsomeres III–V brownish; hind basitarsus pale; gland rods not blackish; antennal segment XI 1.85 as long as X; tarsomere V with 1–2 pairs of strong spines ... **javana** (Kieffer), **n. comb.**
   Legs darker, hind basitarsus entirely brownish; at least 1 pair of gland rods blackish 4
4. Only posterior pair of gland rods strong and blackish; spermathecae subequal; antennal segment XI 1.60 as long as X; no strong spines on tar-

somere V or 1 weak pair; only tip of wing dark brown .....
..... **conspersa** (Johannsen), **n. comb.**

Four pairs of strong black gland rods; spermathecae unequal; antennal segment XI 2.0 as long as X; 1–2 pairs of strong spines on tarsomere V; wing mostly brownish ..... **eucera** (Kieffer), **n. comb.**

Phaenobezzia eucera (Kieffer), **new combination**

Bezzia eucera Kieffer, 1911: 123 (♀; India; fig. antenna).

Diagnosis. Length 3 mm. Brown; thorax slightly pruinose; antenna reddish; legs yellow, tarsi gradually infuscated distad; wing mostly brownish, the strong veins brown; halter brown. Eyes separated by a line on the vertex, frons broader than high. Antenna with segments 3–9 gradually elongated, the proximal 2×, the others 3× as long as broad, their midportions a little swollen, verticils very long, 2–3× as long as a segment; last 5 segments gradually elongated, each 2–3× as long as 10th. Fifth tarsomeres each with 1–2 pairs of strong spines. Female abdomen with 4 pairs of strong black gland rods; spermathecae unequal, strongly sclerotized. Male genitalia with dististyle present but small.

Distribution. India, Malaysia, Sri Lanka, Thailand.

Specimens examined. MALAYSIA: Pahang, Kuala Singgora, 18.VII.1958, R.H. Wharton, light trap, 1♀; SABAH (Borneo): Tambunan, Maran, 6.III.1959, IV.1952, D.H. Colless, swept, 1♀. SRI LANKA: Uggalkaltota, 5.II.1970, D. Davis & W. Rowe, light trap, 2♀. THAILAND: Chiang Mai Prov, Amphoe Muang, VII.1962, J. Scanlon, light trap, 1♀; IV–V.1958, V. Notananda, light trap, 1♀. Chon Buri Prov, A. Banphra, X.1962, J. Scanlon, light trap, 1♀. Udon Thani Prov, A. Muang, IX.1962, Scanlon, light trap, 1♀.

Thailand rice paddy records. Mae Hong Son Prov, A. Muang, Ban Pang Mu, 6.V.1978, K. Yasumatsu, 4♂,5♀.

Phaenobezzia javana (Kieffer), **new combination**

Probezzia javana Kieffer, 1923: 142 (♀; Java).

Diagnosis. Length 3 mm. Brownish black. Palpi yellow; antennae pale, scape orange; 11–15 and tips of 3–10 brownish black. Wing hyaline, gradually becoming brownish toward apex. Legs yellow; knees, tips of tibiae, and 2–3 distal tarsomeres brownish black; tarsomere 5 with 1–2 black, pointed spinules. Antenna moderately long, segment 11 1.8× as long as 10. Female abdomen with strong blackish setose vestiture; gland rods not blackish.

Distribution. Indonesia, Malaysia, Philippines, Ryukyu Is, Thailand.

Specimens examined. MALAYSIA: Pahang, Kuantan, Gudang Rasan, I–II.1959, R. Traub, light trap, 1♀. PHILIPPINES: Luzon I: Pampanga Prov, Angeles, Clark Air Base, 15.XI.1957, I. Balatbat, light trap, 1♀. RYUKYU IS: Okinawa: Yaha, III.1962, W.F. Pippin, light, 1♀. THAILAND: Bangkok, Thonglo, I–III.1963, J. Scanlon, light trap, 1♂. Nong Khai Prov, Amphoe Muang, 10–14.VI.1959, Manop, light trap, 1♂,1♀. Sakon Nakhon Prov, A. Muang, 25–27.VI.1959, Manop, light, 1♀.

Thailand rice paddy records. Chiang Mai Prov, Amphoe Chom Thong, Ban Huai Nam Dib, 7.V.1978, K. Yasumatsu, 2♀; Doi Pa-Morn, Doi Inthanon, 19.XI.1978, 17♂,9♀; A. Hang Dong, Ban Rong Ku, 27.III.1979, 2♂,1♀. Chiang Rai Prov, A. Muang, Ban Kua Tae, 28.III.1979, 5♂; Ban Teen Doi, 22.II.1979, 4♂, 1♀. Si Sa Ket Prov, A. Khun Han, Ban Ta Muan, 30.X.1976, 2♂,3♀.

Phaenobezzia mellipes Wirth & Ratanaworabhan, **new species** Fig. 9

Holotype ♀. Wing length 1.69 mm; breadth 0.65 mm.

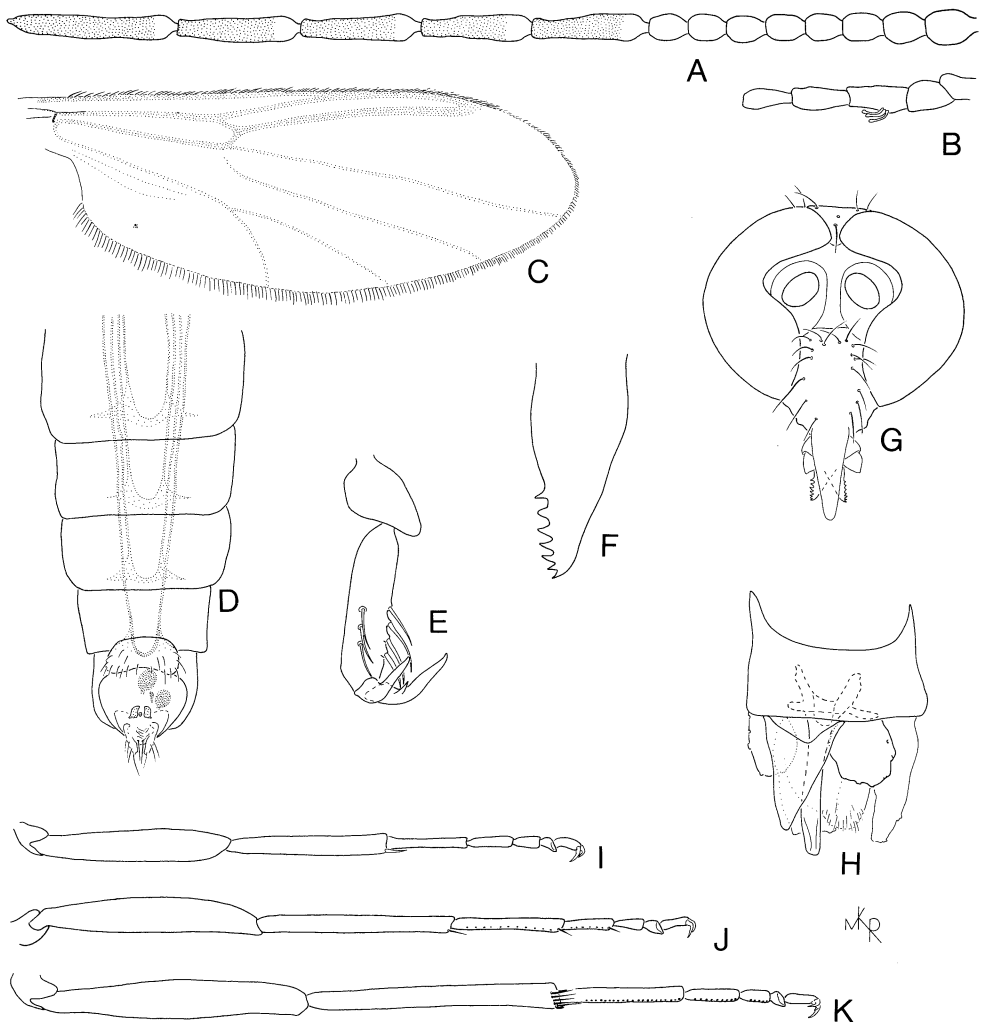

FIG. 9. *Phaenobezzia mellipes*: **A–G, I–K,** ♀; **H,** ♂: **A,** antenna; **B,** palpus; **C,** wing; **D,** genital sclerotization; **E,** 4th and 5th tarsomeres and claws; **F,** mandible; **G,** head, anterior view; **H,** genitalia; **I,** foreleg; **J,** midleg; **K,** hindleg.

Head. Amber yellowish brown; antenna brownish, narrow bases of segments whitish; palpus whitish. Eyes (Fig. 9G) separated by distance equal to diameter of 1 ommatidial facet. Antenna (Fig. 9A) with lengths of flagellar segments in proportion of 13-10-9-9-9-9-9-9-26-26-26-28-37; antennal ratio 1.86. Palpus (Fig. 9B) with lengths of segments in proportion of 5-9-12-11-9; first 3 segments moderately stout, last 2 slender. Mandible (Fig. 9F) with 8 coarse teeth. *Thorax.* Brownish amber, pleuron brownish; scutellum with 6 short blackish bristles; mesonotum without anterior spine or tubercle. Legs (Fig. 9I–K) yellowish; 5th tarsomeres pale brown, with 3–4 long sharp blackish ventral spines distally on posterior side, 2–3 more slender spines on anterior side (Fig. 9E); claws moderately stout, nearly straight on distal portion; hind tarsal ratio 2.40. Wing (Fig. 9C) pale brownish, veins brownish, anterior veins strong; 1 radial cell, costal ratio 0.78. Halter

dark brown. *Abdomen.* Brownish; 4 pairs of prominent blackish gland rods; genital sclerotization as in Fig. 9D. Spermathecae 2 plus rudimentary 3rd; functional spermathecae unequal, well sclerotized, ovoid with short sclerotized neck; measuring 0.052 by 0.041 mm with neck 0.015 mm, and 0.044 by 0.036 mm with neck 0.006 mm long.

Allotype ♂. Wing length 0.97 mm, breadth 0.43 mm.

Color pale brownish, darker than ♀. Antenna with short, very sparse plume; flagellar segments with lengths in proportion of 12-10-9-9-9-9-9-10-16-21-25-25. Genitalia (Fig. 9H) small, 9th segment only 0.08 mm wide; lobes of 9th tergum (cercus) about as long as breadth of 9th sternum; aedeagus more or less triangular in profile with short basal arch, tip bluntly rounded; apices of aedeagus and parameres extending nearly to apices of cerci; parameres fused in a slender rodlike process with bilobed basal wings as figured; basistyle poorly developed, a small globular structure about ½ as long as 9th tergum; dististyle absent.

Distribution. Malaysia, Philippines, Thailand.

Types. Holotype ♀, THAILAND: Samut Prakan Prov, 22.XII.1958, Manop (Type no. 76564, USNM). Allotype ♂ (USNM), THAILAND: Loei Prov, Amphoe Muang, 1–5.VI.1959, Manop, light trap. Paratypes, 8♂,58♀, as follows. MALAYSIA: Negri Sembilan, Tampin, 20.XII.1949, R.H. Wharton, light trap, 1♀; Pahang, Kuala Singgora, VII.1958, Wharton, light trap, 5♀; Selangor, Kuala Lumpur, VIII.1958, I.1959, R. Traub, light trap, 1♂,1♀. PHILIPPINES: Leyte: Mahaplag, 7.VII.1964, M. Delfinado, light trap, 1♀. THAILAND: Buri Ram Prov, Amphoe Muang, Ban Hua Woa, 31.X.1976, K. Yasumatsu, 3♀; Chiang Mai Prov, A. Chom Thong, Ban Huai Nam Dib, 7.V.1978, 3♀; A. San Pa Tong, Ban Tung Theo, 19.II.1979, 1♂; Chiang Rai Prov, A. Muang, Ban Teen Doi, 27.III.1979, 1♀; Khon Kaen Prov, Rice Exp. Stn., 30.IX.1977, 2♀; A. Chum Phae, 25–27.V.1959, Manop, light trap, 1♀; Loei Prov, A. Dan Sai, 6–7.VI.1959, Manop, light trap, 2♀; A. Muang, 1–5.VI.1959, Manop, 1♂,1♀; Nong Khai Prov, A. Muang, 14–19.VI.1959, Manop, light trap, 2♀; Phrae Prov, Rice Exp. Stn., 5.X.1977, 1♀; Prachin Buri Prov, A. Watthana Nakhon, Ban Huai Dyua, 8.XI.1976, 1♂,3♀; Saraburi Prov, A. Phra Phutthabat, 9.XII.1958, Manop, light trap, 1♀; Si Sa Ket Prov, A. Kanthararom, Ban Nong Bua, 30.IX.1976, 1♂,25♀; A. Khun Han, Ban Ta Muan, 30.X.1976, 3♂,2♀; A. Muang, Ban Kra Sang, 30.X.1976, 1♀; Ubon Ratchathani Prov, A. Amnat Charoen, Ban None Nam Tang, 10.IX.1978, 1♀; Udon Thani Prov, A. Muang, 17–20.VI.1959, Manop, light trap, 1♀.

Discussion. The species is distinguished from most other known Oriental species of *Phaenobezzia* by its uniform yellowish amber color with unmarked yellowish legs, from which it takes its name. *Phaenobezzia assimilis* (Johannsen), known only from the male from Sumatra, is similarly colored; but in that species a well-developed dististyle is present.

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