

Psychodidae (Diptera) at the Zoological Survey of India*

LAURENCE W. QUATE

B. P. BISHOP MUSEUM
HONOLULU, HAWAII

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This paper is based upon the specimens of Psychodidae at the Zoological Survey of India (Z.S.I.). The main purpose is to redescribe the species described by Brunetti and assign them to their proper genera. Type data have been cited for all psychodid types at the Survey and lectotypes selected when necessary. A number of generic reassignments have been made, keys constructed for most species of genera other than *Phlebotomus*, two new species described from the Survey material, and additions made to the psychodid fauna of India.

One month was spent at the Zoological Survey in 1960. Through the courtesy of Dr. A. P. Kapur, Deputy Director and Dr. M. L. Roonwaal, Director of the Zoological Survey, specimens were made available and working space and equipment provided. Assisted by Mrs. S. M. Quate, who has executed the illustrations, all the type specimens of the Psychodidae at the Zoological Survey were examined, slides made, and drawings and redescrptions made where possible and desirable.

Near the beginning of the century, the first serious work on the Psychodidae of India was done by E. Brunetti (1908-12) and N. Annandale (1908-11) at the Zoological Survey of India (then the Natural History Section), Indian Museum, Calcutta. Brunetti, a musician by profession and entomologist by interest, devoted much of his free time to the study of Indian Diptera. As funds permitted he was salaried by the Zoological Survey, but continued his studies whether reimbursed or not. In 1921 the government of India sent him to London to revise his work on Indian Diptera. Brunetti died in England six years later and his personal collections were bequeathed to the British Museum (Natural History). However, most of his psychodid types remain in Calcutta.

Dr. N. Annandale, founder and first director of the Zoological Survey, was a man of exceptionally wide interests whose studies ranged from invertebrates to anthropology. For a short time he worked on the Psychodidae, describing the genus *Brunettia* and a few species of *Phlebotomus*.

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The psychodid species described by both men are difficult to recognize from their publications, as important anatomical structures were left untouched. Brunetti, who "loathed a dissected specimen," gave good descriptions of pinned specimens, but this is of little value in the psychodids unless accompanied by details of slide mounts. Annandale mounted most of his specimens on slides, but, as was generally true of dipterists at that time, failed to appreciate all the structures revealed. While both men had high taxonomic standards for their period, increased knowledge of structures necessary for the discernment of species and refinements of taxonomic techniques in the past forty years have outdated their works and left their species for others to clarify more fully.

The specimens of Brunetti have remained virtually unstudied since he left them in 1921. Many of the pinned specimens have been broken and have deteriorated, pins have rusted and apparently the high humidity of Calcutta has had a deleterious effect on the sclerotized parts. Both factors made it difficult to obtain good slides from the pinned material in Calcutta and Honolulu. Nevertheless, all available, unmounted types were slide-mounted and from these, redescriptions and illustrations are given insofar as possible. The *Phlebotomus* specimens have not suffered as badly as the Psychodinae, since they were largely slide-mounts by Annandale and Sinton and, other than the usual darkening of the balsam, are in quite good condition.

SUBFAMILY PHLEBOTOMINAE

Genus *Phlebotomus* (Rondani)

Types of *Phlebotomus* species at the Zoological Survey of India described by Annandale were studied, redescribed, and illustrated by Sinton (1922-1933) in his lengthy studies of Indian *Phlebotomus*. On the basis of the material at my disposal there is little to add to that which Sinton has published, other than the formal selection of lectotypes. In nearly all the type series at the Survey, there is one specimen which has been labelled "type" (apparently by Annandale) and often one of each sex. These have been cited by Sinton and are clearly recognizable by the Survey serial numbers. Lectotypes have been selected from these specimens which apparently were regarded by both Annandale and Sinton as primary types.

In the following section, only references giving the original description, redescriptions, illustrations, classification, and synonymy have been cited.

The classification of Theodor (1948) is followed in principle, but the taxa are not recognized at the same levels as Theodor places them. Thus, *Phlebotomus*, s.s., and *Sergentomyia* are placed as subgenera within the genus *Phlebotomus*, s.l. This appears to me to be more consistent with the classification generally used in the other subfamilies of the Psychodidae.

Phlebotomus (Phlebotomus) argentipes Annandale and Brunetti.

Phlebotomus argentipes Annandale and Brunetti, in Annandale, 1908a:101.—Annandale, 1910b:44, 59; 1911a:203 (*marginatus* reduced to a variation of *argentipes*).—Sinton, 1925:789 (*annandalei* a synonym, ♂, ♀ descr., illus.); 1927a:24 (♀ spermatheca); 1928:301 (*zeylanicus* ♂ a synonym); Sinton and Barraud, 1928:329 (♀ pharynx, spermatheca); Sinton, 1932:59 (key to ♀, illus.); 1933a:226 (key to ♀, illus.); 1933b:419 (key to ♂, illus.).

Phlebotomus (Euphlebotomus) argentipes, Theodor, 1948:98.

Phlebotomus (Phlebotomus) argentipes, Lewis, 1957, PROC. ROY. ENT. SOC. LONDON, ser. B, 26:165 (Malaya).

Phlebotomus marginatus Annandale, 1910a:62.

Phlebotomus argentipes var. *marginatus*, Annandale, 1911b:319.

Phlebotomus annandalei Sinton, 1922:742.

Type data (*argentipes*): Calcutta, India. Lectotype ♂ selected (1960), Calcutta, 28-XII-07; Z.S.I. No. 5708/19, labelled (by Annandale?) "type male."

Type data (*marginatus*): Holotype ♀, Peradeniya, Ceylon. Type apparently lost, not located at Z.S.I.

Phlebotomus (Phlebotomus) major Annandale.

Phlebotomus major Annandale, 1910b:46.—Sinton, 1927a:24 (♀ spermatheca); 1928:303 (synonymy); 1928b:329 (♀ pharynx, spermatheca); 1932:59 (key to ♀ illus.); 1933b:419 (key to ♂, illus.).

Phlebotomus (Larrousius) major, Theodor, 1948:97.

Phlebotomus major var. *grisea* Annandale, 1911b:320.

Type data (*major*): Naini Tal and Bowali, Kumaon; Kurseong, Darjeeling Dist.; Nepal Terai; and Paresnath Hill, Chota Nagpur; all India. Lectotype ♂ selected (1960), Naini Tal, U.P.; Z.S.I. 7106/16. Only other type remaining at Z.S.I. is ♀ (abdomen only), Nepal Terai, the specimen Sinton (1928) regarded as the ♀ type, but did not designate as the lectotype.

Type data (*grisea*): Kurseong, Darjeeling Dist., India, 4700 ft., VI-1910. Types apparently lost, none located at Z.S.I. Described as a dark form of *major* and apparently only individual variation; in view of lost type and uncertain status it is best regarded as outright synonym of *major*.

Phlebotomus (Sergentomyia) babu Annandale.

Phlebotomus babu Annandale, 1910b:49; 1911a:203 (as a synonym of *minutus*).—Sinton, 1928:314 (type ♂, distinct sp.); 1932:60 (key to ♀, illus.); 1933b:422 (key to ♂, illus.).

Sergentomyia (Sergentomyia) babu, Theodor, 1948:110.

Phlebotomus babu var. *niger* Annandale, 1911b:320.—Sinton, 1928a:315.

Phlebotomus minutus var. *niger*, Sinton, 1927a:25 (♀ spermatheca); 1927b:31 (♀ cibarium).—Adler and Theodor, 1929, ANN. TROP. MED. PARASIT. 23:281.

Type data (*babu*): Rawalpindi, Allahabad; Rajmahal on the Ganges; Asansol; Purneah, Pusa, Calcutta and Port Canning, Bengal; Puri, Orissa; Rambha, Madras; Trivandrum, Pallode and Maddathorai, Travancore; Igatpuri, W. Ghats; all India. Lectotype ♂ selected (1960), Calcutta, VI-08; Z.S.I. No. 7121/16, labelled (by Annandale ?) "male type."

Type data (var. *niger*): Bihar, India. Type apparently lost, not located at Z.S.I.

Phlebotomus (Sergentomyia) himalayensis Annandale.

Phlebotomus himalayensis Annandale, 1910b:50.—Sinton, 1924a:817 (♂, ♀ descr., illus.); 1928:321; 1932:62 (key to ♀ illus.); 1933b:421 (key to ♂, illus.).

Sergentomyia (Sergentomyia) himalayensis, Theodor, 1948:111.

Type data: Naini Tal and Bowali, Kumaon; Kurseong, Darjeeling Dist.; India. Lectotype ♀ selected (1960), Kurseong, 3-VII-08, 5000 ft.; Z.S.I. No. 8024/15, labelled (by Annandale ?) "type."

Phlebotomus (Sergentomyia) malabaricus Annandale.

Phlebotomus malabaricus Annandale, 1910b:48.—Sinton, 1924b:1007 (♂ descr., illus.); 1928:321, 1933b:420 (key to ♂, illus.).

Phlebotomus malabaricus (?), Sinton, 1927a:25 (♀ spermatheca); 1927b:30 (♀ cibarium); 1928:321; 1932:61 (key to ♀, illus.).

Sergentomyia (Sergentomyia) malabarica, Theodor, 1948:111.

Type data: Nedumangad, Pallode, Maddathorai; all Travancore, S. India. Lectotype ♂ selected (1960), Maddathorai, 16-XI-08; Z.S.I. No. 5750/19, labelled (by Annandale ?) "type."

Phlebotomus (Sergentomyia) zeylanicus Annandale. (Figure 1, k.)

Phlebotomus zeylanicus Annandale, 1910a:60.—Sinton, 1924c:1029 (sexes misassociated, ♀ valid sp., descr.; ♂ is *argentipes*); 1928:319 (*chalami* a synonym); 1932:61 (key to ♀, illus.); 1933b:420 (key to ♂, illus.).

Sergentomyia (Sergentomyia) zeylanica, Theodor, 1948:101.

Phlebotomus chalami Young and Chalam, 1927, INDIAN JOUR. MED. RES. 14:849 (India, Ceylon).

Type data (*zeylanicus*): Peradeniya, Ceylon, May to Aug. Lectotype ♀ selected (1960), Peradeniya, 17-V-1910; Z.S.I. No. 5753/19.

From Ceylon specimens I am able to give an illustration of the spermathecae which were drawn from temporary phenol mounts and seem a little less distorted than Sinton's (1932) figure.

SUBFAMILY PSYCHODINAE

Genus *Pericoma* Walker

Pericoma Walker, 1856, Ins. Brit., Dipt. 3:256.—Quate, 1955, Univ. Calif. Publ. Ent. 10:121 (key, descr.).—Jung, 1956, Deutsche Ent. Zeitschr., n.f. 3:134, 192 (key, descr.).

KEY TO SOME INDIAN SPECIES OF PERICOMA

1. Radial and medial forks nearly on same level as or basad of level of Cu apex. 2
 Radial and medial forks basad of level of Cu apex; medial fork with well defined spur; ♂ flagellar segment 1 about $4 \times$ length of other flagellar segments and bearing straight row of 6 or 7 large bristles . . . **spinicornis**
2. Scape about $2 \times$ length of pedicel; ♀ subgenital plate uniformly brown over plate proper and darker brown only on apical lobes. 3
 Scape and pedicel subequal in length; ♀ subgenital plate with dark brown, quadrangular area on inner face of plate proper at base of apical lobes; ♂ unknown. **metatarsalis**
3. Eye bridge with 5 rows of facets; ♂ with first flagellar segment more than $2 \times$ length of following segments, bearing straight row of 6 or 7 large bristles. 4
 Eye bridge with 4 rows of facets; ♂ with first 3 flagellar segments partly fused, each a little larger than following segments and each bearing 4 to 6 bristles arranged in patch, but not in straight row . . . **margininotata**
4. Eye bridge with 5 or 6 rows of facets; median band of hairs on frons not triangular; ♂ surstyle with bulbous base and long, sinuate apical part about $4 \times$ length of base. **mixta**
 Eye bridge with 7 rows of facets; frons with triangular band of hairs on midline; ♂ aedeagus spear-like, simple; dististyle slender, blade-like, with several teeth near center of outer margin; ♀ unknown . . . **singularis**

Pericoma spinicornis Brunetti, 1908:378; 1911:304 (synonymizes *appendiculata*); 1912:238. (Figure 1, a-j.)

Pericoma appendiculata Brunetti, 1908:379 (♀).

Pericoma unicolor Brunetti, 1911:309 (♀); 1912:247. *New synonymy.*

Pericoma formosana Tokunaga, 1957, Saikyo Univ. Agric., Sci. Rpt. 9:73. *New synonymy.*

Vestiture chiefly brown with black and white markings; frons, palpus and antenna with white hair; wing brown with base before fold white, white band before forks and narrower white band on distal one-fourth, adjacent white and dark brown spots over forks with white spot basad, vein tips (except Cu) with white spots at base of fringe, Cu with larger, subapical white patch; leg vestiture brown with white apical annuli on tibiae and white basal rings on first 2 tarsal segments.

Male: Eyes separated by distance equal to 2 facets, eye bridge usually with 5 rows of facets, interocular suture concave; frons with band of hairs extending posteriorly on midline to upper eye margin; ratio of palpal segments 6:14:14:22. Antenna 15-segmented; scape very large, $3 \times$ length of pedicel; flagellar segment

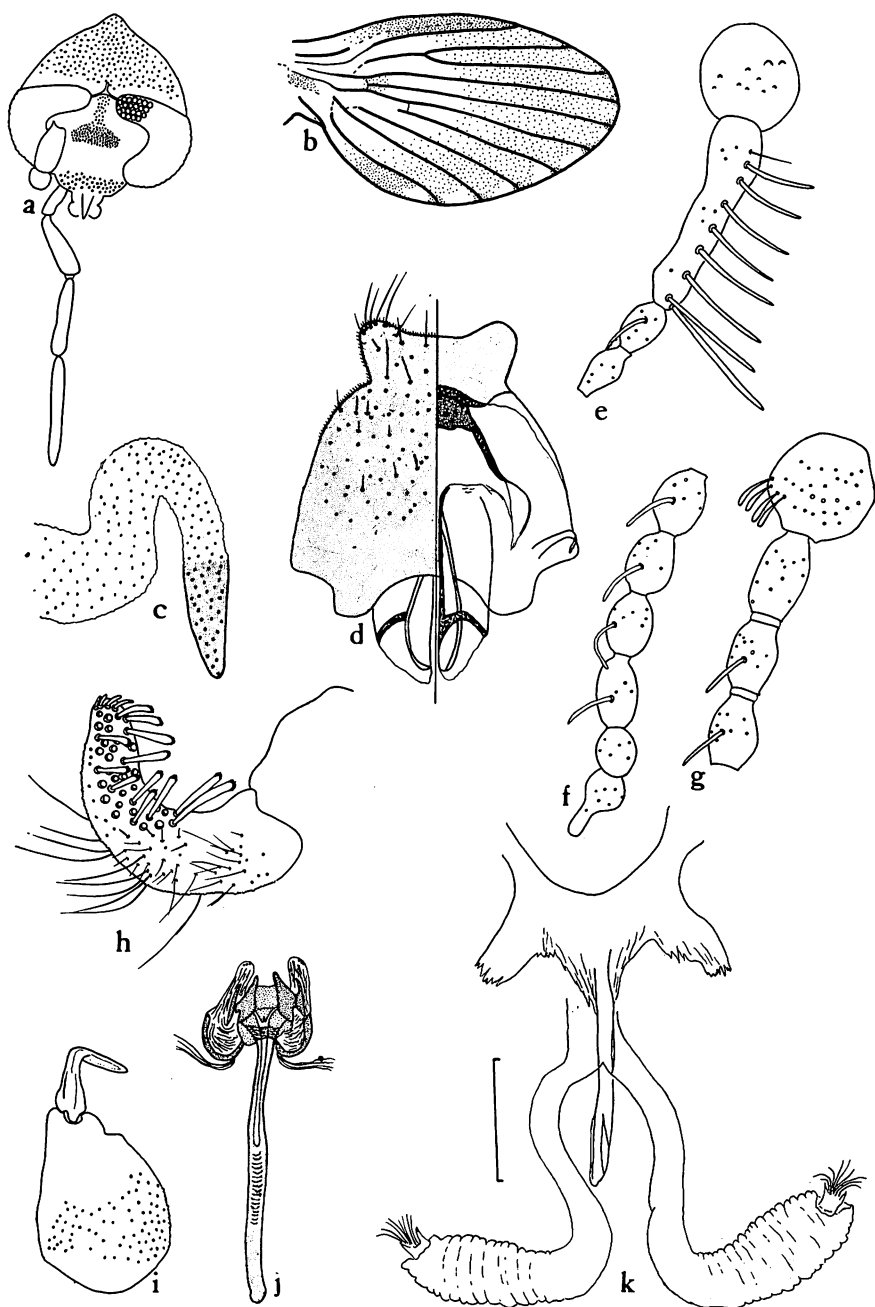


FIG. 1. a-j, *Pericoma spinicornis*: a, ♀ head; b, ♂ wing; c, ♂ patagium on prothorax; d, ♀ genitalia; e, ♂ antenna base; f, ♀ antenna tip; g, ♀ antenna base; h, ♂ surstyle; i, ♂ coxite; j, ♂ aedeagus. k, *Phebotomus zeylanicus*, ♀ spermathecae and furca. (scale line = 0.05 mm.).

1 (actually fused 1 and 2 with faint indication of segmentation) elongate, two-thirds length of pedicel, bearing row of 6 or 7 large, erect bristles; following flagellar segments much smaller and barrel-shaped; terminal segment with apiculus nearly as long as node; ascoids simple, rod-like, about as long as segments.

Thorax with long, tubular patagia, about as long as palpus, largely membranous and covered with microtrichia and pits, tip bullet-shaped, smooth, sclerotized. Wing membrane brown with clear spots on hind margin between tips of veins and darker brown in costal and anal cells; radial fork distad of medial, medial basad of level of Cu apex, with strong spur. Genitalia with large, globose basistyle and small dististyle sharply recurved near center; surstyle short, about as long as coxites, with tenacula distributed over distal one-half of upper surface, tenacula short, clavate with small apical fringe.

Wing length 2.4–2.8 mm.; wing width 1.2–1.4 mm.

Female: Similar to male. Eye bridge with 4 rows of facets, eyes separated by 4 facets; antenna 16-segmented, scape $2 \times$ length of pedicel, flagellum without spines, first segment similar to following; thorax without patagia; genitalia as figured.

Wing length 2.8–3.3 mm.; wing width 1.4–1.7 mm.

Type data (*spiniornis*): 8 ♂, Kurseong, E. Himalayas, India, 5-VII-08, 5000 ft. Lectotype ♂ selected (1960); Z.S.I. No. 7108/16. Six paratypes now at Z.S.I.

Type data (*appendiculata*): 10 ♀, Kurseong, India, 5-VII-08; no types remaining at Z.S.I., but 2 at British Museum (Natural History); lectotype not selected.

Type data (*unicolor*): Holotype ♀, Kurseong, E. Himalayas, India, XI-10, 6000 ft.; Z.S.I. No. 5972/19; only specimen in type series.

Other specimens. India: Darjeeling District, Darjeeling, VI-30, 6000–7000 ft.; Kurseong, 24-III-10, 4700 ft.; Simla, 18-VII-11, 7000 ft.; near Ghoom, 11-VI-14, 6000–7000 ft.; Soom, 14-VI-14, 4000–5000 ft.; United Provinces, Dehra Dun District, below Landour, Bazar, Mussoorie, 18-VI-30; Dhoobie Khud, below Sunny View about 3 miles from Mussoorie, 21 to 27-VI-30; 5 ♂, 8 ♀.

Distribution: India, Taiwan.

There is no question of the synonymy of *spiniornis* and *appendiculata*, as Brunetti (1911:309) realized after proposing the latter species. The synonymy of *unicolor* is not as definite, for the only type is broken and the wings are lacking. However, the female genitalia, head, and coloration appear the same as *spiniornis* and on this basis I am synonymizing *unicolor*.

The excellent illustrations of *formosana* provided by Tokunaga leave no doubt that it is the same species as *spiniornis*, but Tokunaga can hardly be criticized for creating this synonym since no one really knew what *spiniornis* was prior to the examination of the types.

Pericoma metatarsalis Brunetti, 1911:305; 1912:243. (Figure 2, a-d.)

Body vestiture chiefly white, especially on head and thorax. Wing vestiture brown with white and dark brown markings; concave white band at about basal one-third paralleled on distal side by irregular dark brown band and zig-zag

white band at about distal one-third; margin with dark brown spots at vein tips and white spots between vein tips basad of fringe between veins R_2 and Cu ; fringe brown with apical white patch between R_3 and M_1 . Leg vestiture brown and white; femora brown; tibiae white on basal three-fifths and brown distally with apical white annuli; long, sparse, white hairs in addition to those described

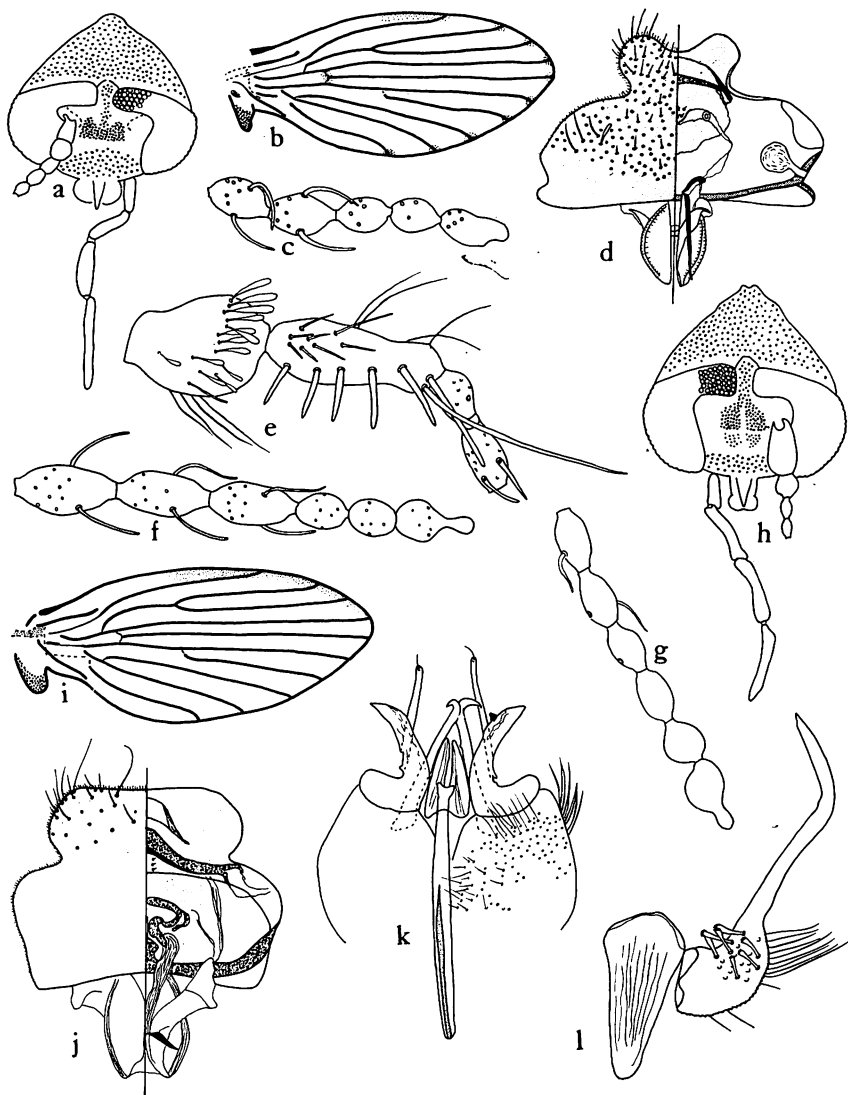


FIG. 2. a-d, *Pericoma metatarsalis*: a, ♀ head; b, ♀ wing; c, ♀ antenna tip; d, ♀ genitalia. e-l, *P. mixta*: e, ♂ antenna base; f, ♀ antenna tip; g, ♂ antenna tip; h, ♀ head; i, ♀ wing; j, ♀ genitalia; k, ♂ coxites and aedeagus; l, ♂ surstyle and lobe of tergite 9.

above; basitarsi white with apical, brown annuli, remaining tarsal segments brown.

Male: Unknown.

Female: Eyes separated by distance equal to 3 facets, eye bridge with 5 rows of facets, but lower row just at median margin and composed of only 2 to 4 facets, interocular suture inverted V-shaped with faint median projection; frons with sparse band of hairs extending posteriorly on midline to nearly upper eye margin; ratio of palpal segments 7:10:12:20. Antenna 16-segmented; scape and pedicel subequal in size; flagellar segments barrel-shaped; terminal with stout apiculis as long as nodes; ascoids rod-like and about as long as segments.

Wing moderately narrow; membrane lightly tinged with brown with little darker areas at vein tips; R_{2+3} weakened at fork, R_2 and R_3 also often weakened, medial fork little distad of radial and close to level of Cu apex, M_2 weakened at fork. Genitalia as figured.

Antenna 0.7–0.9 mm.; wing length 2.3–2.6 mm.; wing width 1.0–1.1 mm.

Type data: Holotype ♀, Simla, Simla District, India, 9-V-09 (regarded as type selection by Brunetti's reference to specimen as "type," 1911:306). Paratypes, 2 ♀, Phagu, Simla District, 11, 12-V-09. (Erroneously stated by Brunetti to be 2 ♀ from Simla and 1 ♀ from Phagu.)

Other specimens. India: Phagu, Simla District, 18 to 21-V-16, 9000 ft.; Barogh, Simla Hills, 10-V-10, 5000 ft.; Mundali, Dehra Den District, Jaunsa Div., 10-V-10, 9000 ft.; Naini Tal, Kumaon, 5-VI-09, 6000 ft.

***Pericoma mixta* Brunetti, 1911:306; 1912:244. (Figure 2, e-l.)**

Vestiture chiefly brown; male with dark, spatulate hairs on head, thorax, and basal one-third of wing; antenna apparently white. Wing vestiture brown with white and dark brown (or black) marking; hairs erect except appressed hairs on distal one-fourth; white concave band at basal one-third and another at distal one-third; dark brown spots over forks; margin (before fringe) with dark brown spots at tips of veins and white between tips; fringe apparently all brown except small, white, apical patch. Leg vestiture brown with white apical annuli on tibiae, basitarsi and tarsal segments 2; some scattered, long, white hairs on tibiae.

Male: Eyes narrowly separated by distance equal to little less than 1 facet, bridge with 5 rows of facets; (interocular suture and frons not visible, probably like female; see below) ratio of palpal segments 6:14:16:22. Antenna 15-segmented; scape very large, 2 × length of pedicel; flagellar segment 1 (actually fused 1 and 2 with faint indication of segmentation) elongate, little longer than pedicel, bearing straight row of 6 strong, erect bristles; other flagellar segments smaller than 1, barrel-shaped; terminal 2 little larger and more nearly globular than preceding, terminal with short apiculis; ascoids rod-like, a little curved, little shorter than segments.

Thorax apparently without patagia (but damaged). Wing membrane light brown, darker brown basally, in costal cell and around vein tips; radial and medial

forks on same level little basad of level of Cu apex, medial fork weakened but without spur. Leg ratio (femur: tibia: basitarsus: remaining tarsal segments), fore leg 11:14:6:7, mid leg 12:14:7:7, hind leg 13:20:8:7. Genitalia with heavily sclerotized aedeagus; dististyle heavily sclerotized, with long slender appendage arising from basal one-third and extending beyond tip of main part; surstyle inflated basally, suddenly tapering to long, slender, heavily sclerotized, apically curved distal part, which is nearly $4 \times$ length of base, about 20 short, apically fringed tenacula on basal enlargement.

Antenna 0.9 mm.; wing length 3.0 mm.; wing width 1.3 mm.

Female: Similar to male; lacking spatulate hairs on head, thorax and wing; eyes separated by distance equal to 4 or 5 facets, bridge with 5 or 6 rows of facets, lower row may be short and composed of only 3 or 4 facets, interocular suture broad and curved; frons with wide, moderately dense band of hairs extending posteriorly on midline to upper eye margin, sometimes nearly divided into 2 bands; antenna 16-segmented, scape nearly $2 \times$ length of pedicel; flagellar segments barrel-shaped, 1 not elongate and without bristles, terminal 3 globular and smaller than preceding, except terminal with clavate apiculus; genitalia as figured.

Antenna 0.9 mm.; wing length 2.5 mm.; wing width 1.3 mm.

Type data: Holotype ♀, Simla, India, 9-V-09, 7000 ft.; Z.S.I. No. 5971/19, only specimen in type series (Brunetti, *l.c.*, cites date as "6-V-09", a typographical error). Allotype ♂ (by present designation), Simla, 10-V-09, 7000 ft., Annandale; Z.S.I. No. 5936/19, srl. no. 28, 1960.

Other specimens. India: Darjeeling, 11-VI-14, 6000–7000 ft.; Lebong, Darjeeling District, 13-VI-14, 6000–6600 ft.; 2 ♀.

Pericoma margininotata Brunetti, 1908:381; 1911:304 (synonymizes *bella*); 1912:240. (Figure 3.)

Pericoma bella Brunetti, 1908:383.

Pericoma margininotata var. *bella*, Brunetti, 1912:241.

Vestiture of head, antenna, palpus, thorax and abdomen chiefly white, white hairs on lateral and posterior scutum with brown tips. Wing vestiture brown with white and dark brown (or black) markings; hairs erect except appressed hairs on distal one-third; white patch at base on and before fold, V-shaped white band at distal one-third paralleled medially by dark-brown band; very dark-brown or black spots over forks; margin (before fringe) with dark-brown spots at tips of veins and small white spots between tips; fringe brown with white spots continuous with V-shaped white band and between tips of R_4 and R_5 . Femora white; tibiae white basally and brown distally with apical white annuli; basitarsi white basally and brown distally with narrow, apical white annuli; tarsal segments 2 white, remaining segments brown.

Male: Eyes separated by distance equal to 4 facets, bridge rather narrow with 4 rows of facets, interocular suture thick, broadly V-shaped with small median

projection; frons with small band of hairs extending posteriorly on midline to middle of eye bridge; ratio of palpal segments 6:6:8:16. Antenna 16-segmented; scape $2 \times$ length of pedicel; first 3 flagellar segments partly fused, each bearing patch of 4 to 6 large setae; following segments separated and only with usual hairs; terminal segment with stout, short apiculis; ascoids rod-like, shorter than segments.

Thorax without patagia. Wing rather narrow, membrane lightly tinged with brown with brown spots in apex of costal cell, at tips of veins and at base of R_5 ; base of R_2 (not R_3) sometimes weakened at base, M_2 weakened at base and sometimes with short spur, radial and medial forks on about same level as Cu apex. Genitalia with symmetrical aedeagus, surstyle short, with 4 apical tenacula.

Antenna 0.7 mm.; wing length 1.9 mm.; wing width 0.8 mm.

Female: Nearly identical to male; flagellum without large bristles on basal flagellar segments, those segments not fused; genitalia as figured.

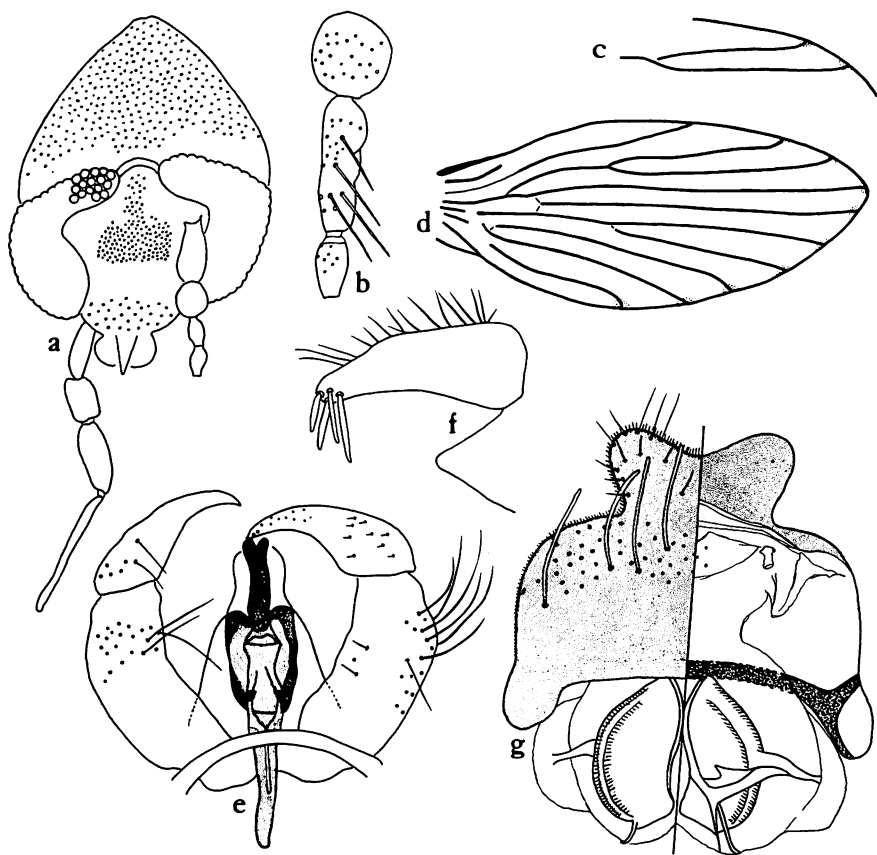


FIG. 3. *Pericoma margininotata*: a, ♀ head; b, ♂ antenna base; c, ♂ wing, radial fork; d, ♀ wing; e, ♂ coxites and aedeagus; f, ♂ surstyle and lobe of tergite 9; g, ♀ genitalia.

Antenna 0.8 mm.; wing length 2.1 mm.; wing width 0.9 mm.

Type data (*margininotata*): ♂, 2 ♀, Simla, India, May, 1907, 1908 "7000 ft." Lectotype ♂ selected (1960), Simla, 12-V-08, 5000 ft. (Brunetti's citation of elevation apparently in error); Z.S.I. No. 7150/16.

Type data (*bella*): 6 ♀, Darjeeling, India, Sept. and Oct. 1908. Lectotype ♀ selected (1960), I-X-08, 6000 ft.; Z.S.I. No. 5950/19; only remaining specimen at Z.S.I., damaged; 1 ♀ at British Museum (Natural History).

Other specimens. India: Darjeeling, 5, 6-VIII-09, 1-X-08; Kurseong, 25, 27-VI-10; 5 ♂, 6 ♀.

Although the one remaining type of *bella* is badly damaged, the eyes, wing venation, and female genitalia are recognizable enough to confirm Brunetti's synonymizing *bella* with *margininotata*.

The structure of the male flagellum is an interesting intermediate stage between an unmodified antenna and one with an elongate first flagellar segment bearing a row of bristles. It might be an annectant stage between the two types, but not necessarily since the bristled flagellum has arisen in several lines of *Pericoma* at different times (see Quate, 1955).

Pericoma singularis Quate, new species (Figure 4).

Male: Eyes separated by distance equal to 2 facets, interocular suture highly arched, without median projection; bridge with 7 rows of facets; frons with

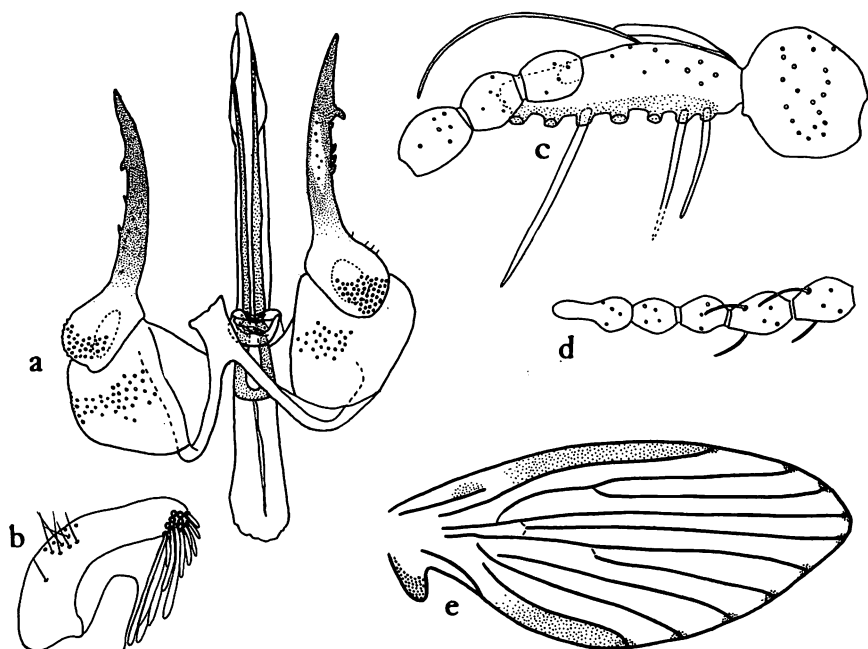


FIG. 4. *Pericoma singularis*, ♂: a, coxites and aedeagus; b, surstyle and lobe of tergite 9; c, antenna base; d, antenna tip; e, wing.

triangular band of hairs extending to upper eye margin; ratio of palpal segments 8:15:16:20. Antenna 16-segmented; scape very large, $4 \times$ length of pedicel; flagellar segment 1 elongate, nearly $2 \times$ length of pedicel, bearing row of 6 strong, erect bristles, without apical constriction; following flagellar segments barrel-shaped; flagellar segment 2 attached subapically to 1; terminal 3 little smaller and more globular than preceding, except terminal with slender apiculus; ascoids rod-like, little shorter than segments.

Thorax with large, saccular patagia about same size as scape, covered with microtrichia, except apical surface pitted. Wing membrane light brown, darker in costal cell and brown spots around vein tips; radial and medial forks on same level little basad of level of Cu apex; bases of R_3 and M_2 weakened, but without spurs. Genitalia with long, spear-like aedeagus; dististyle slender, blade-like, outer margin with 3 small teeth near center, another similar one separated from central ones, and much larger tooth beyond at about distal one-fourth.

Antenna 1.1 mm.; wing length 3.2 mm.; wing width 1.4 mm.

Female: Unknown.

Holotype ♂ (Z.S.I. 2385/H6, srl. no. 7, 1960), near Ghoom, Darjeeling District, India, 11-VI-14, 6000–7000 ft., Gravely.

SPECIES INQUIRENDAE

Pericoma impunctata Brunetti, 1911:309; 1912:247.

Type data: Holotype (♀ ?), Tenmalai, Travancore, India, 22-XI-08, Z.S.I. No. 5978/19; only specimen in type series.

The type is badly damaged and unrecognizable and the generic assignment is uncertain. Only parts of the thorax and head are left on the original specimen.

Pericoma gilvipes Brunetti, 1911:308; 1912:246.

Pericoma margininotata var. *gilvipes* Brunetti, 1908:382.

Type data: 3 ♀, Calcutta, 28-VII-08 (designated as type), 2-VIII-08, and 17, 18-VIII-07; only a pin with the type data and no specimen at Z.S.I., other types not found.

One specimen from Travancore of *Telmatoscopus* determined as *gilvipes* by Brunetti is present, but it is not certain that this is a correct identification and the identity of this species is still unknown.

Genus *Brunettia* Annandale

Brunettia Annandale, 1910c:141 (type species, *superstes* Annandale).—Quate, 1959, B. P. BISHOP MUS., INS. MICRONESIA 12(4):443 (key, descr.).

Parabrunettia Brunetti, 1911:310; 1912:251. (type species, *squamipennis* Brun.).

Specimens of *Brunettia* at the Zoological Survey are largely in poor condition, so it is not possible to give redescriptions or even to recognize all the species. A key is provided and illustrations given of as many taxonomically important structures as possible, but other than that only the type data are cited. Only additional specimens of this genus will make it possible to adequately redescribe the species now recorded in India.

KEY TO SOME SPECIES OF INDIAN BRUNETTIA

1. Radial fork distad of medial.....2
 Radial fork basad of medial.....3
2. Base of R_5 at about same level as base of R_1 ; medial fork complete.....
 *squamipennis*
 Base of R_5 considerably basad of base of R_1 ; medial fork incomplete,
 i.e., base of M_5 lacking.....*flavicollis*
3. Eyes contiguous or separated only by 1 or 2 facets.....4
 Eyes widely separated by 3 or 4 facets.....
 *albohumeralis*, *albonotata*, *annandalei*
4. Eyes separated by 1 or 2 facets; R_5 ending beyond wing apex...*superestes*
 Eyes contiguous; R_5 ending in acute apex.....*atrisquamis*

***Brunettia superestes* (Annandale). (Figure 5, a-b.)**

Diplonema superestes Annandale, 1908a:353.

Brunettia superestes, Annandale, 1910c:142.—Brunetti, 1911:310; 1912:249.

Type data: 3 ♂ (not 1 ♂ and 2 ♀ as stated by Annandale), Kurseong, Darjeeling Dist., India, 6-VII-08, and 3-VII-08. Lectotype ♂ selected (1960), 6-VII-08; Z.S.I. No's. 7131/16, 7115/16 (on 2 slides).

While Annandale's descriptions and illustrations are generally adequate, the figure of the male genitalia (1910) is not correct and he overlooked the patagia on the male thorax. Illustrations of these structures are given here.

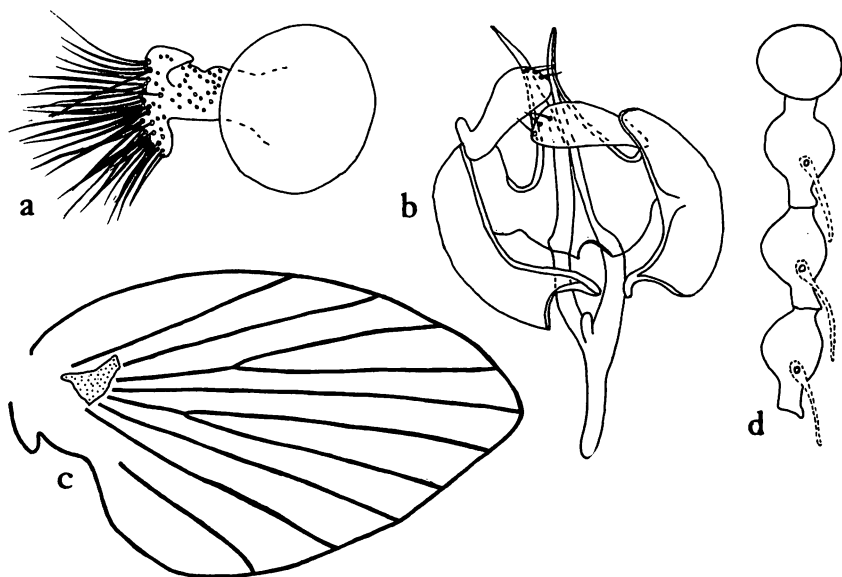


FIG. 5. a-b, *Brunettia superestes*, ♂: a, patagium on prothorax; b, coxites and aedeagus. c-d, *B. squamipennis*, ♀: c, wing; d, antenna base.

Brunettia squamipennis (Brunetti), new combination (Figure 5, c-d.)

Psychoda squamipennis Brunetti, 1908:375.

Parabrunettia squamipennis, Brunetti, 1911:311; 1912:252.

Type data: Holotype (sex ?, probably ♂), Calcutta, India, 5-VIII-07; Z.S.I. No. 8045/15; only specimen in type series, damaged and abdomen lacking.

It is unfortunate that this species, the type of *Parabrunettia*, is known only from a damaged type. However, the wing venation is close to that of other species of *Brunettia*, particularly *superstes*, and there is no reason to question the synonymy of *Brunettia* and *Parabrunettia*. Even though *Brunettia* may be further subdivided, the two type species seem similar enough that it is doubtful *Parabrunettia* would be suitable for any of the segregates.

Brunettia atrisquamis (Brunetti). (Figure 6, a-d.)

Psychoda atrisquamis Brunetti, 1908:376.

Parabrunettia atrisquamis, Brunetti, 1911:312 (*travancorica* a synonym); 1912:253.

Brunettia travancorica Annandale, 1910c:144.

Type data (*atrisquamis*): Holotype ♂ (not ♀ as stated by Brunetti), Calcutta, India, 22-VII-08; Z.S.I. No. 8046/15; only specimen in type series, damaged.

Type data (*travancorica*): Holotype ♂ (not ♀ as stated by Annandale), base of W. Ghats, Travancore, India, XI-09; Z.S.I. No. 3787/H2 and slide No. 7093/16.

The type of *atrisquamis* has the male genitalia broken, but enough remains to indicate the synonymy of *atrisquamis* and *travancorica* is correct. The illustrations given here were made from the type of *travancorica*.

Brunettia albobumeralis (Brunetti), new combination (Figure 6, e-g).

Parabrunettia albobumeralis Brunetti, 1911:312; 1912:254.

Type data: 3 ♀, Peradeniya, Ceylon, IX & X-10. Lectotype ♀ selected (1960), IX-10; Z.S.I. No. 5987/19.

Brunettia albonotata (Brunetti). (Figure 7, a-c.)

Psychoda albonotata Brunetti, 1908:373; 1911:298; 1912:224.

Brunettia albonotata, Edwards, 1928, ENT. 61:32 (cites *B. indica* (Eaton), *Parabrunettia 9-punctata* Brunetti, and *Psychoda duripunctata* Curran as synonyms).

Type data: Holotype ♀, Calcutta, India, 5, 6-I-08; Z.S.I. No. 5901/18, only specimen in type series.

Edwards' synonymy of *indica* and *duripunctata* with *albonotata* is probably incorrect. Superficially these species look alike, as do many *Brunettia*, but there seem to be specific differences in the genitalia. *Parabrunettia novempunctata* might be synonymous with *albonotata*, but the female genitalia also appear distinct, although the type of the former is damaged and it is not possible to fully identify that species.

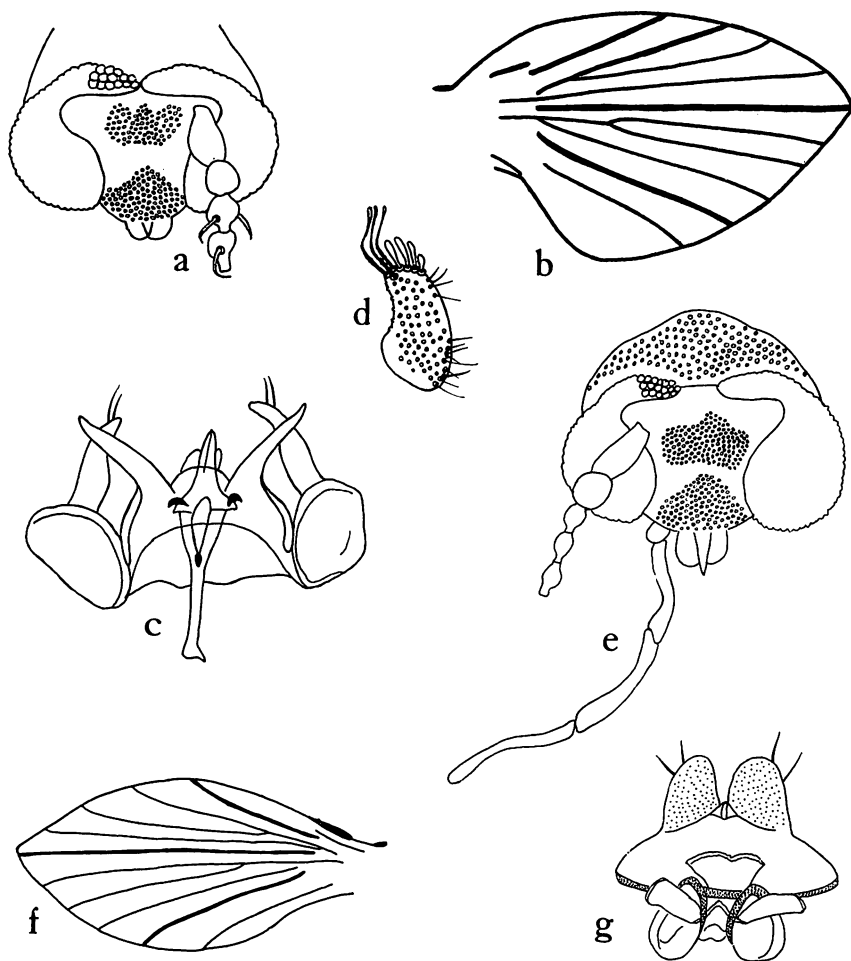


FIG. 6. a-d, *Brunettia atrisquamis*, ♂: a, head; b, wing; c, coxites and aedeagus; d, surstyle. e-g, *B. albobumeralis*, ♀: e, head; f, wing; g, genitalia.

***Brunettia annandalei* (Brunetti), new combination (Figure 7, d-g).**

Pericoma annandalei Brunetti, 1908:380; 1911:304; 1912:237.

Type data: Holotype ♀, Kurseong, E. Himalayas, India, 5-VII-08, 5000 ft.; Z.S.I. No. 5976/19, only specimen in type series.

***Brunettia novemnotata* (Brunetti), new combination (Figure 8, a).**

Parabrunettia 9-notata Brunetti, 1911:313; 1912:255.

Parabrunettia novemnotata, Enderlein, 1937, DEUTSCHE ENT. ZEITSCHR. 1936:106.

Type data: Holotype ♀, Puri, Orissa, India, 12-XI-10; Z.S.I.; only specimen in type series, damaged.

Possibly a synonym of *albonotata*, but additional specimens needed to fully identify this species.

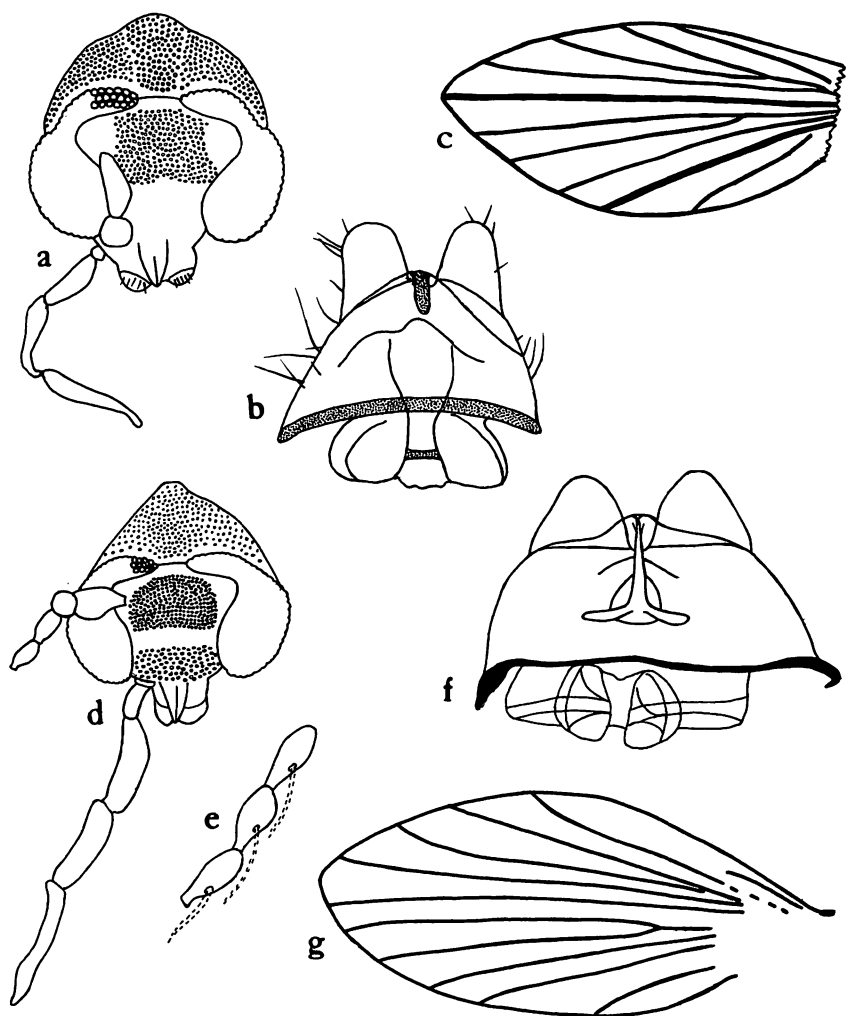


FIG. 7. a-c, *Brunettia albonotata*, ♀: a, head; b, genitalia; c, wing. d-g, *B. annandalei*, ♀: d, head; e, antenna segments 8-10; f, genitalia; g, wing.

***Brunettia argenteopunctata* (Brunetti), new combination (Figure 8, b-e).**

Psychoda argenteopunctata Brunetti, 1908:375.

Parabrunettia argenteopunctata, Brunetti, 1911:311; 1912:254.

Type data: Holotype ♀, Calcutta, India, 27-VIII-08; Z.S.I. No. 8030, wing on slide No. 5985/15; only specimen in type series.

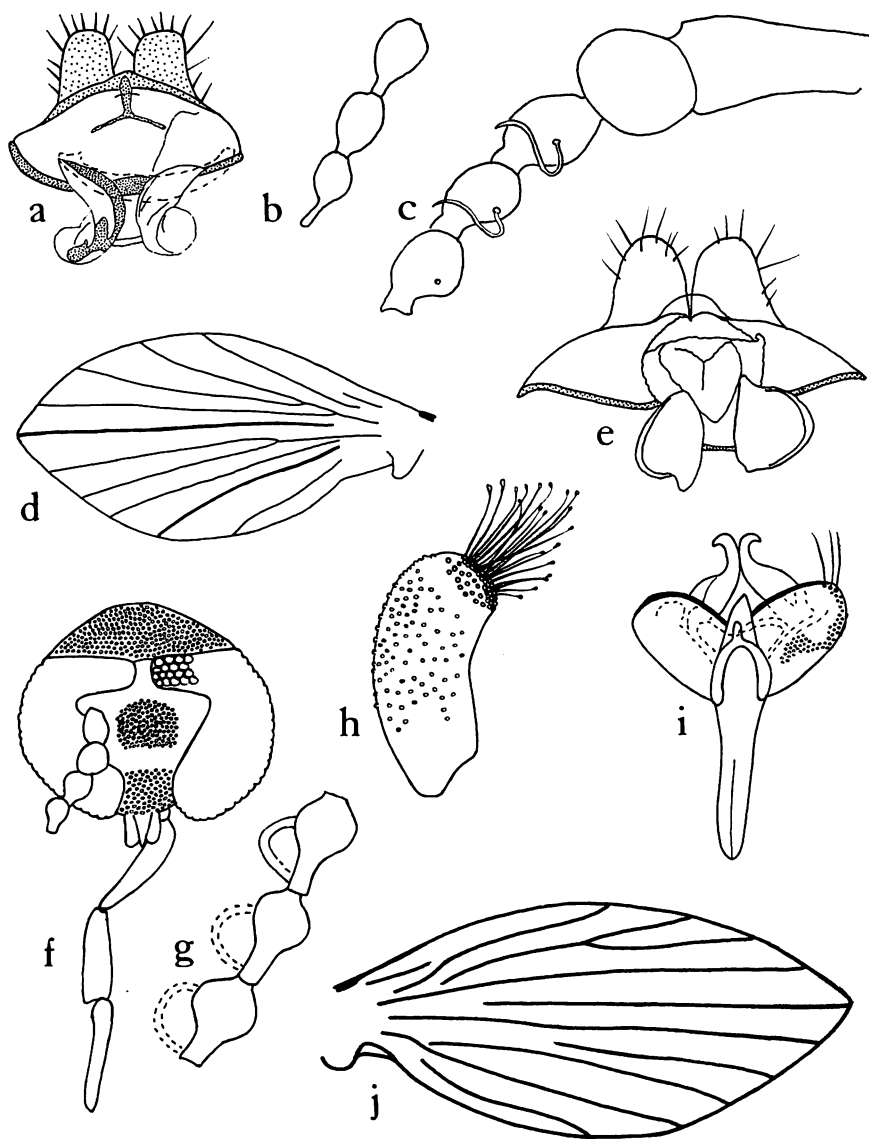


FIG. 8. a, *Brunettia novemnotata*, ♀ genitalia. b-e, *B. argenteopunctata*, ♀: b, antenna tip; c, antenna base; d, wing; e, genitalia. f-j, *B. flavicollis*, ♂: f, head; g, antenna segments 7-9; h, surstyle; i, coxites and aedeagus; j, wing.

Brunettia flavicollis (Brunetti), new combination (Figure 8, f-j).

Parabrunettia flavicollis Brunetti, 1911:314; 1912:256.

Vestiture brown, very long and dense on abdomen, cream-colored on frons and scutum (partly rubbed). Wing vestiture brown, hairs on veins only (partly rubbed); white tufts on R_1 and R_5 at level of base of R_4 , row of white spots across wing at level of center of R_2 and another at level of tip of R_3 , white spots at tips of veins, color of fringe beyond center of wing apparently white. Leg vestiture brown with white bands on femora and tibiae at joints and on distal one-third of tibiae, white apical rings on tibiae and basitarsi.

Wing length 2.4 mm.; wing width 1.1 mm.

Holotype ♂, Peradeniya, Ceylon, VIII-10; Z.S.I. No. 5993/19; only specimen in type series.

Genus *Telmatoscopus* Eaton

Telmatoscopus Eaton, 1904, ENT. MO. MAG., ser. 2, 15:58.—Quate, 1955, UNIV. CALIF. PUBL. ENT. 10:157 (key, descr.).—Jung, 1956, DEUTSCHE ENT. ZEITSCHR., n.f., 3:172, 192 (key, descr.).

KEY TO KNOWN SPECIES OF INDIAN TELMATOSCOPIUS

1. Eyes clearly separated by at least 1 facet. 2
 Eyes contiguous on midline; wing rather slender; radial fork little distad of medial; frons without median band of hairs. **lacteitarsis**
2. Eyes separated by no more than 4 or 5 facets, connected by interocular suture; forks beyond basal $\frac{1}{4}$; wing $2\frac{1}{2} \times$ or more as long as wide. 3
 Eyes widely separated by 8 or more facets and with very short eye bridge, interocular suture absent; forks close to wing base, at basal $\frac{1}{4}$; wing slender, about $3 \times$ as long as wide. **distinctus**
3. R_{2+3} shorter than R_2 ; ♂ dististyle simple, surstyle with simple tenacula. 4
 R_{2+3} longer than R_2 ; ♂ dististyle with lateral, recurved hook near center, surstyle with long slender tenacula with clavate tips. **longichaetus**
4. Eyes separated by 1 to $1\frac{1}{2}$ facets; frons with triangular patch of hairs, exclusive of posterior band; ♂ aedeagus racquet-shaped. . **albipunctatus**
 Eyes separated by about 2 facets; frons with quadrangular patch of hairs, exclusive of median band; ♂ aedeagus tubular. **proximus**

Telmatoscopus lacteitarsis (Brunetti), new combination (Figure 9, a-c).

Pericoma margininotata var. *lacteitarsis* Brunetti, 1908:382.

Pericoma lacteitarsis, Brunetti, 1911:307; 1912:245.

Pericoma squaminervis Brunetti, 1911:303; 1912:237. *New synonymy.*

Vestiture chiefly brown; antenna white; wing brown with dark brown (or black) spots over forks and at vein tips; legs brown with all of tarsi white.

Male: Eyes broadly contiguous on midline, bridge with 4 rows of facets; frons with hairs confined to quadrangular patch on anterior two-thirds, vertex with denser hairs centrally and apically; ratio of palpal segments 9:20:19:20

(last segment may be shrunken). Antenna with scape about 1–1.5 times length of pedicel; flagellar segments with internodes shorter than nodes; apical part broken.

Wing rather slender, radial fork little distad of level of medial, both basad of level of Cu apex, base of M_2 weakened, but not forming spur. Structure of genitalia unknown.

Wing length 2.1 mm.; wing width 0.9 mm.

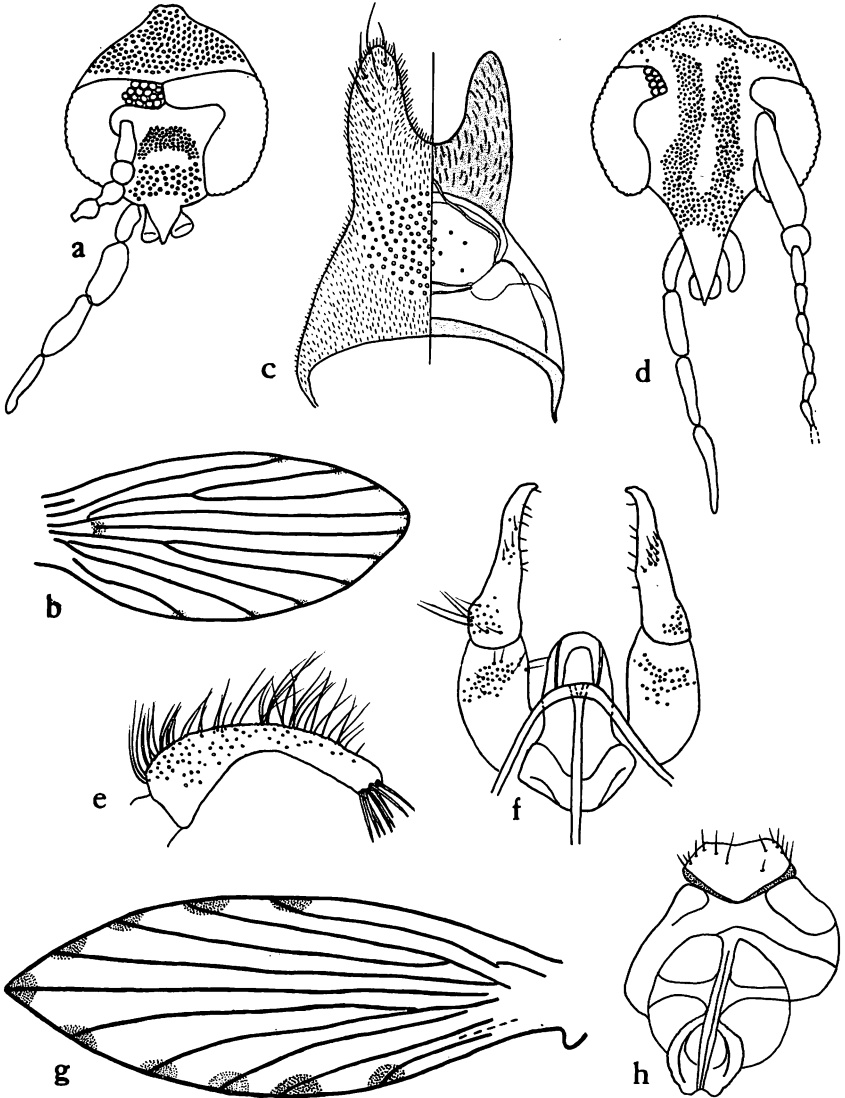


FIG. 9. a–c, *Telmatoscopus lacteitaris*, ♀: a, head; b, wing; c, subgenital p.ate. d–h, *T. distinctus*: d, ♂ head; e, ♂ surstyle; f, ♂ coxites and aedeagus; g, ♀ wing; h, ♀ genitalia.

Female: Similar to male; genitalia as figured.

Wing length 2.2 mm.; wing width 0.9 mm.

Type data (*lacteitarsis*): 3 ♀, Kurseong, Darjeeling Dist., India, "4-VII-08." Only 2 ♀ remain, 1 labelled "5-VII-08" and may not be type. Lectotype selected (1960), Kurseong, 4-VII-08, 5000 ft.; Z.S.I. No. 5969/19.

Type data (*squaminervis*): Holotype ♂, Kurseong, 4-VII-08; Z.S.I. No. 1979/19; only specimen in type series. (Brunetti erroneously cites date as "4-VIII-08.")

Other specimen: Chumti, Darjeeling Dist., VII-11, 4000 ft.; ♀.

The type of *squaminervis* is damaged and the abdomen is missing, but the remaining characters of the head, wing venation, coloration and size agree well with *lacteitarsis* and types of the two were collected at the same place on the same day. Brunetti (*l.c.*) noted a similarity between the two, but stated *squaminervis* is distinguished by the scaled veins. Scales are often present on the veins of male *Telmatoscopus* and absent on females and I believe *squaminervis* is simply the male of *lacteitarsis*.

Telmatoscopus distinctus (Brunetti), new combination (Figure 9, d-h).

Psychoda distincta Brunetti, 1908:372; 1911:298; 1912:225.

Vestiture chiefly yellowish brown; wing vestiture yellowish brown with black spots on margin (before fringe) at tips of veins and white spots between tips, fringe light brown; legs with pale yellowish scales on tarsi.

Male: Eyes widely separated by distance equal to about 8 facets, bridge very short, without interocular suture; frons with 2 bands of hair over entire length extending to above upper eye margin, but not joining vertex hairs; ratio of palpal segments 6:7:8:10. Antenna 16-segmented; scape very long, 4 × length of pedicel; flagellar segments weakly nodiform.

Thorax apparently without patagia. Wings slender, forks close to base of wing at about basal one-fourth, radial little basad of medial; dark spots on membrane at tips of veins. Genitalia as figured.

Female: Similar to male; genitalia as figured.

Type data: 2 ♀, Sylhet, Assam, India, 1-I-05 and 30-I-05. First specimen destroyed and second regarded as designated lectotype (see Brunetti, 1911:298).

Other specimens: Sylhet, Assam, 7-I-05 and no data; 2 ♂.

With its widely separated eyes, weakly nodiform flagellum, and wing venation, this is a distinctive species and quite divergent from other species of *Telmatoscopus*. Undoubtedly, it eventually will be given subgeneric recognition.

Telmatoscopus longichaetus (Brunetti), new combination (Figure 10).

Parabrunettia longichaeta Brunetti, 1911:314; 1912:256.

Vestiture brown; thorax with black spot at base of each wing. Wing vestiture brown with white markings; base before fold white; tuft on each fork composed of basal white patch and adjacent, distal black patch; fringe pattern faded and indistinct, but apparently tips of veins with dark brown and white spots, dark

brown inside of wing margin and white outside. Leg vestiture brown with white annuli on apices of tibiae and tarsal segments.

Male: Eyes separated by distance equal to 1 facet, bridge with 4 rows of facets, interocular suture present, slightly arcuate; frons with sparse band of hairs extending posteriorly on midline to upper eye margin, strong suture from antero-medial eye margin to center of median margin of antennal socket; ratio of palpal

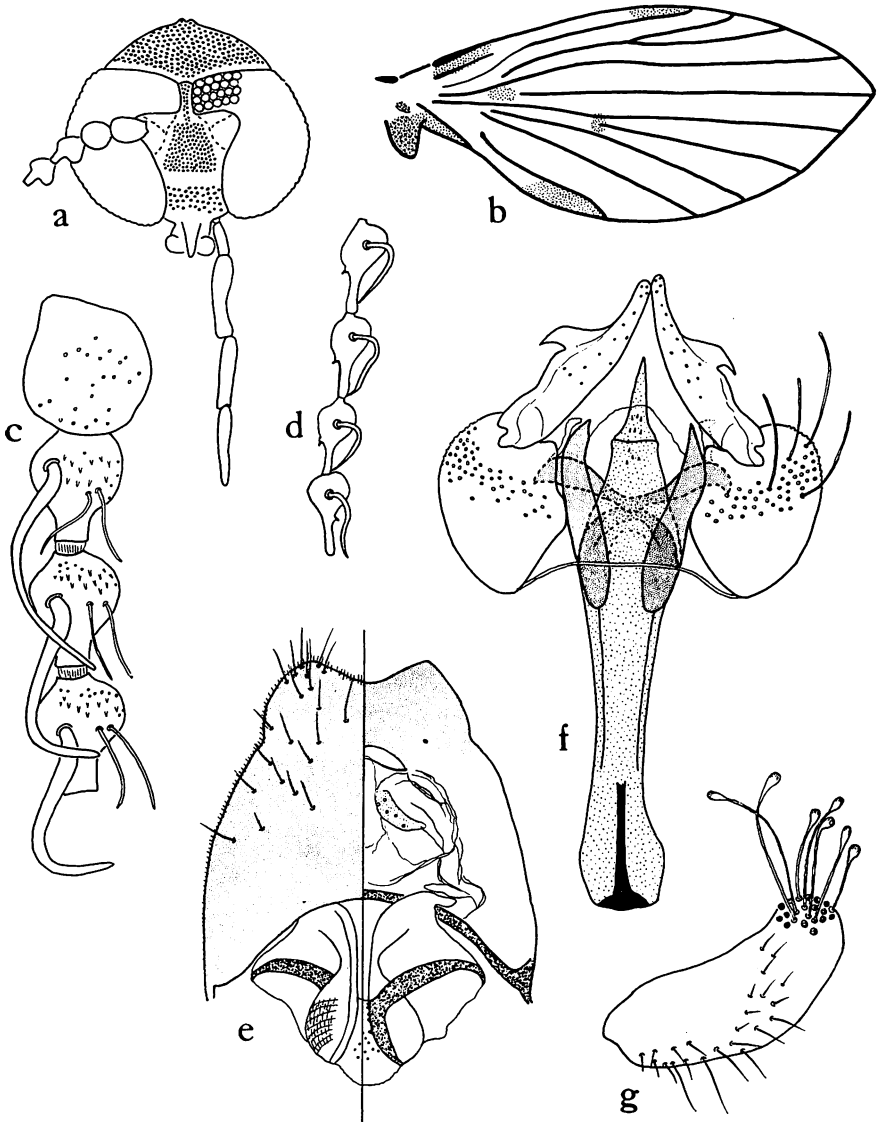


FIG. 10. *Telmatoscopus longichaetus*: a, ♂ head; b, ♂ wing; c, ♂ antenna base; d, ♂ antenna tip (not at same enlargement as base); e, ♀ genitalia; f, ♂ coxites and aedeagus; g, ♂ surstyle.

segments 6:14:12:14. Antenna 16-segmented; scape and pedicel subequal in length; flagellum strongly nodiform, nodes eccentric; ascoids composed of single long, sinuate rod.

Thorax without patagia. Wing moderately broad, apex acute; membrane without vestiture; radial fork beyond center of wing and level of Cu apex, medial basad of radial. Genitalia with dististyle expanded at center into outer, recurved hook; surstyle with long, slender tenacula clavate at tips.

Wing length 1.4–1.9 mm.; wing width 0.6–0.8 mm.

Female: Similar to male, flagellar segments and ascoids smaller; genitalia as figured.

Wing length 1.5–1.7 mm.; wing width 0.6–0.7 mm.

Type data: Holotype ♂, Maddathorai, Travancore, India, 17-XI-08; Z.S.I. No. 5990/19; only specimen in type series.

Other specimens. India: Calcutta, Feb., March, Sept., Oct., Nov., breeding in hollow of decayed tree trunk; Pallode, 20 mi NE of Trivandrum, Travancore, 15-XI-08; 12 ♂, 7 ♀.

This is an anomalous species with characters of both *Telmatoscopus* and *Brunettia*. Until this time male genitalia with long slender tenacula with clavate tips had been exclusively a character of *Brunettia* and on this basis *longichaetus* should be assigned to that genus. However, other generic characters indicate assignment to *Telmatoscopus* and in spite of its striking resemblance to *Brunettia*, I feel it properly belongs to the former genus.

***Telmatoscopus albipunctatus* (Williston).**

Psychoda albipunctata Williston, 1893, ENT. NEWS, 4:113.

Telmatoscopus albipunctatus, Tonnoir; Quate, 1959, B. P. BISHOP MUS., INS.

MICRONESIA 12(4):452 (descr., illus., ♂, ♀).

Psychoda albonigra Brunetti, 1908:374; 1911:295; 1912:228. *New synonymy*.

Type data (*albonigra*): Holotype ♀, Calcutta, India, 30-VII-08, in museum; Z.S.I. No. 8047/15; only specimen in type series, damaged and abdomen lacking.

Other specimens. India: Calcutta, Apr., Aug., Sept., Dec.; Benaras; Chasma Shaha, Srinagar, Kashmir, 5-IX-28; 9 ♂, 14 ♀.

***Telmatoscopus proximus* (Brunetti), new combination (Figure 11).**

Pericoma proxima Brunetti, 1911:308; 1912:245.

Vestiture chiefly brown; frons, apex of scape and pedicel with white hairs; patch of white hairs on side of scutum behind head. Wing vestiture brown with snow-white margins; white spots on margin (before fringe) at tips of R₁, R₂, R₄, and M₄ and subapically on M₁ and M₂, on R₃ little beyond fork and on median fork; fringe white at apex of Sc, between R₃ and R₅ and between M₁ and M₃, cream colored between M₄ and Cu. Leg vestiture brown with white hairs on apical half of posterior border of mid tibia, apical white annuli on tibiae and basitarsi, white on basal three-fourths of fore basitarsus. (Specimen faded, black spots mentioned by Brunetti not seen.)

Male: Eyes separated by distance equal to about 2.5 facets, bridge with 4 rows of facets, interocular suture broadly inverted V-shaped; frons with band of hairs extending posteriorly on midline to upper eye margin beyond anterior, quadrangular patch; ratio of palpal segments 6:18:18:20. Antenna 16-segmented; scape little longer than pedicel; flagellar segments strongly nodiform, internodes slender, longer than nodes; terminal 2 segments little smaller than preceding.

Wing with forks on nearly same level basad of level of Cu apex. Genitalia with aedeagus simple, tubular; dististyle simple, slender beyond basal expansion.

Wing length 2.0 mm.; wing width 0.9 mm.

Female: Unknown.

Type data: Holotype ♂, Peradeniya, Ceylon, VIII-10; Z.S.I. No. 5980/19; only specimen in type series.

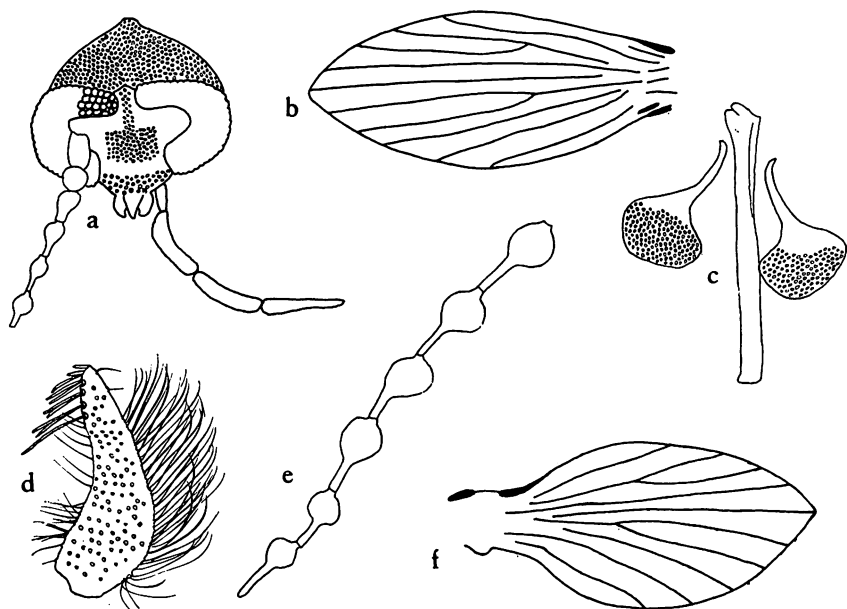


FIG. 11. *Telmatoscopus proximus*, ♂: a, head; b, wing; c, dististyli and aedeagus; d, surstyle; e, antenna tip.

SPECIES INQUIRENDAE

Telmatoscopus (?) *maculipennis* (Brunetti). (Figure 11,f.)

Psychoda maculipennis Brunetti, 1911:299; 1912:223.

Male: Wing unusually colored and marked; vestiture brown with many small, white spots, several rows of spots across wing and series along margin; R_5 with alternating, equal patches of white and brown hairs, brown hairs erect, dense and longer than others and forming a broken ridge down center of upper surface of wing.

Wing length 1.6 mm.; wing width 0.8.

Type data: Holotype ♂, Peradeniya, Ceylon, 17-VI-10; Z.S.I. No. 1468/H6; only specimen in type series.

The type is badly broken and only the wing remains. It surely does not belong to *Psychoda*; as the wing coloration and pattern resemble that of *Telmatoscopus* it is tentatively assigned to that genus.

Genus *Trichopsychoda* Tonnoir

Trichopsychoda Tonnoir, 1922, ANN. SOC. ENT. BELG., 62:59.—Satchell, 1955, PROC. ROY. ENT. SOC. LONDON, ser B, 24:50 (descr.).—Quate, 1959, ANN. ENT. SOC. AMER., 52:446 (descr., key).

KEY TO KNOWN SPECIES OF INDIAN TRICHOPSYCHODA

- Base of M_2 at about level of Cu tip; antenna 15-segmented; ♀ subgenital plate with small apical lobes and wide basal part *hirtipennis*
 Base of M_2 a considerable distance basad of Cu apex; antenna 16-segmented; ♀ subgenital plate with large apical lobes and no basal part *indiensis*

Trichopsychoda hirtipennis (Brunetti), new combination (Figure 12, a-c).

Psychoda hirtipennis Brunetti, 1911:300; 1912:227.

Female: Eyes contiguous; frons apparently without median band of hairs behind anterior patch; ratio of palpal segments 6:10:(9?):14. Antenna 15-segmented, terminal 3 segments reduced, subequal, separated. Wing with dense covering of hair on membrane as well as veins; radial and medial forks incomplete. Wing length 1.7 mm.; wing width 0.6 mm.

Male: Unknown.

Type data: "several specimens," Kurseong, Bengal, India, 5-IX-09; Bangalore, S. India, 15-X-10; Maddathurai, S. India, 18-XI-08; Trivandrum, S. India, 12, 13-XI-08. Lectotype ♀ selected by Brunetti (1912), Kurseong. Only ♀ paratype from Bangalore, Z.S.I. No. 5923/19, recognizable; other types damaged or lost.

The hairy wing membrane, incomplete wing forks, general structure of the head and antenna strongly indicate that this species belongs to *Trichopsychoda*; however, confirmation of this assignment must await discovery of the males.

Trichopsychoda indiensis Quate, new species (Figure 12, d-i).

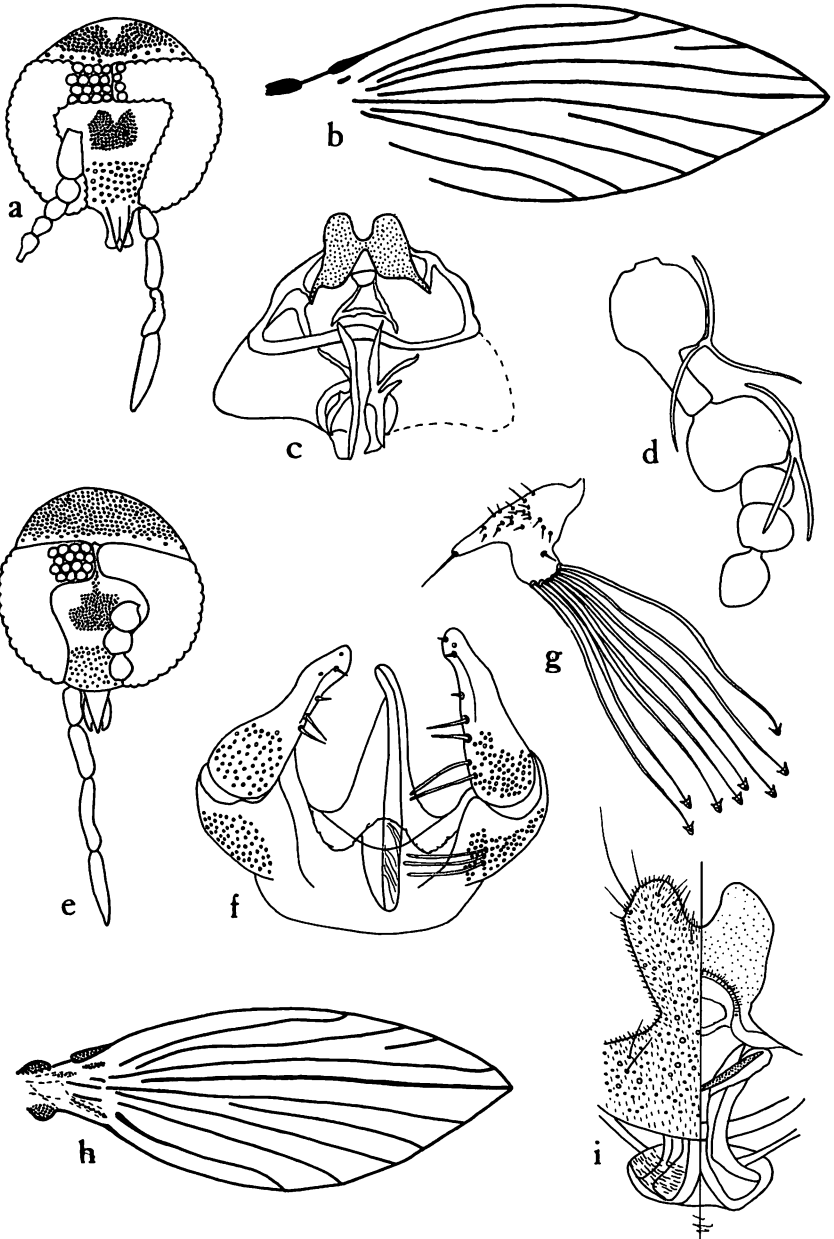
Male: Vestiture uniformly light brown. Eyes contiguous; eye bridge wide, with 4 rows of facets; frons with band of scattered hairs extending posteriorly on midline from concentration of hairs on anterior two-thirds ending in acute apex; (palpus lacking, see female). Antenna 16-segmented, terminal 3 segments reduced, subequal in size, separated; ascoids Y-shaped.

Wing with dense covering of hair on membrane as well as veins; R_3 very short, base at or just before R_2 apex; M_2 base well before Cu apex. Aedeagus simple; surstyle with about 8 long, bell-tipped tenacula, ventral lobe elongate, slender, with single apical seta.

Antenna 1.1 mm.; wing length 1.7 mm.; wing width 0.7 mm.

Female: Similar to male; eyes narrowly separated by distance equal to less than one-half facet; ratio of palpal segments 6:8:11:12. Subgenital plate with large lobes constricted basally, without basal part.

Antenna 1.0 mm.; wing length 2.0 mm.; wing width 0.8 mm.



Holotype ♂, allotype ♀, paratype ♀ (Z.S.I. No. 165), Garo Hills above Tura, Assam, India, 15-VII to 30-VIII-17, 3500-3900 ft.

Genus *Philosepedon* Eaton

Philosepedon Eaton, 1904, ENT. MO. MAG., ser 2, 15:57.—Quate, 1959, ANN. ENT. SOC. AMER., 52:448 (key, descr.).

KEY TO KNOWN INDIAN SPECIES OF PHILOSEPEDON

- Eye bridge with 4 rows of facets; radial fork incomplete, medial complete; wing vestiture without spots at vein tips. ***decora***
 Eye bridge with 3 rows of facets; radial and medial forks complete; wing vestiture with dark brown (or black) spots at tip of each vein. ***distans***

Philosepedon decora (Brunetti), new combination (Figure 13, a-c).

Psychoda decora, 1911:299; 1912:226.

Female: Eyes separated by distance equal to 2 facets; ratio of palpal segments 5:12:17:20; antenna 16-segmented, terminal 3 segments reduced, subequal in size, separated. Wing with dense covering of hairs on membrane as well as veins, radial fork incomplete, medial complete. Abdomen lacking from type.

Wing length 2.1 mm.; wing width 0.9 mm.

Male: Unknown.

Type data: Holotype ♀, Tenmalai, W. Ghats, Travancore, India, 22-XI-08; Z.S.I. 5915/19, only specimen in type series.

The two inconspicuous, narrow, brown bands across the wing and two black spots near the base of the wing mentioned by Brunetti (*l.c.*) were not observed in the type, but probably have been lost through fading.

This species is assigned to *Philosepedon* on the basis of the bulbous labellum without teeth, the 16-segmented antenna, and complete medial fork. It might be a member of *Trichopsychoda* with its hairy membrane, but all species of that genus known to me have both forks incomplete. However, the male genitalia is definitive for separating these two genera in doubtful cases and until males of *decora* are known, its assignment to *Philosepedon* must be tentative.

Philosepedon distans (Brunetti), new combination (Figure 13, d-g).

Psychoda distans Brunetti, 1911:296; 1912:230.

Male: Eyes contiguous, eye bridge with 3 rows of facets; ratio of first 3 palpal segments 3:10:12 (segment 4 lacking); antenna 16-segmented, terminal 3 reduced, subequal in size, separated (a little shrivelled in type), covered with white vestiture. Wing with dense covering of hair on membrane as well as veins; radial and medial forks complete, radial a little distad of medial; vestiture with dark brown spots at tip of each vein, fringe brown with basal part and between

tips of M_4 and Cu white (tip perhaps also white, but rubbed), faint indication of white band across wing at basal one-third. Male genitalia as figured.

Wing length 1.5 mm.; wing width 0.5 mm.

Female: Unknown.

Type data: Holotype ♂ (erroneously stated to be ♀), Maddathorai, West base of Ghats, Travancore, India, 16-XI-08; Z.S.I. 5916/19, only specimen in type series.

The black spots at the base of R_{2+3} and the radial fork mentioned by Brunetti (*l.c.*) were not observed in the type, but perhaps were lost by fading.

This species is clearly assignable to *Philosepedon* on the basis of the bulbous labellum without teeth, 16-segmented antenna, complete wing forks, symmetrical aedeagus and multiple tenacula of the male surstyle. It should not be confused

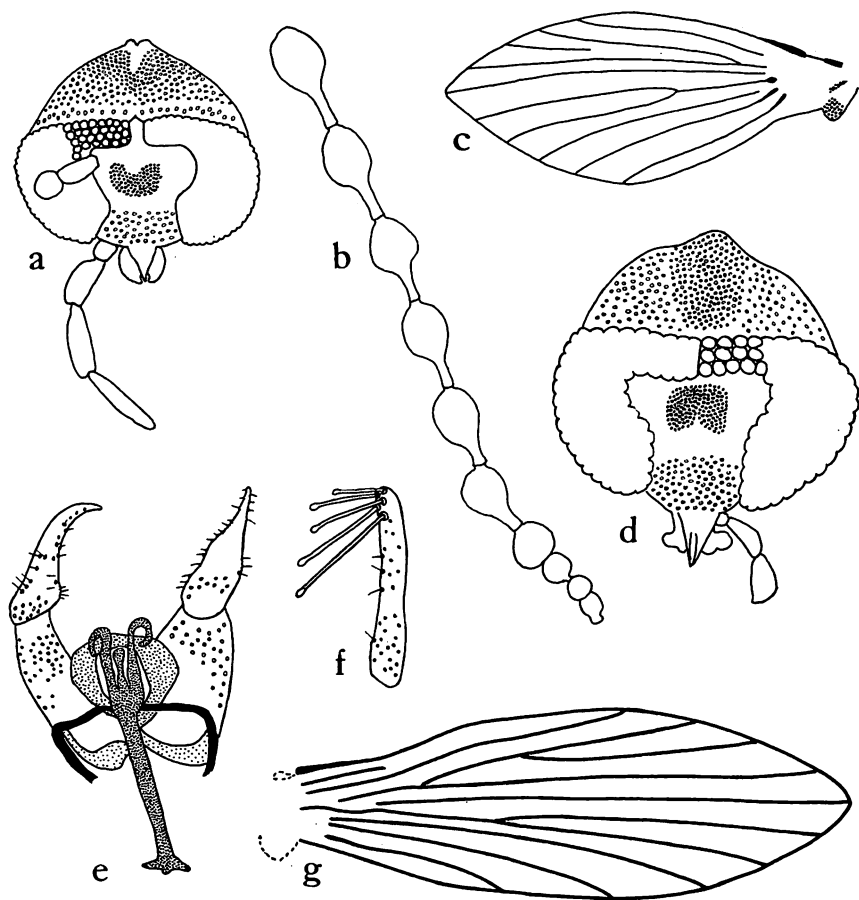


FIG. 13. a-c, *Philosepedon decora*, ♀: a, head; b, antenna; c, wing. d-g, *P. distans*, ♂: d, head; e, coxites and aedeagus; f, surstyle; g, wing.

with *Trichopsychoda* in spite of the similarity to members of that genus in the hairy wing membrane.

Genus *Psychoda* Latreille

Psychoda Latreille, 1796, PRECIS. CARACT. GEN. INS. p. 152.—Quate, 1959, ANN. ENT. SOC. AMER., 52:450 (key, descr.).

KEY TO KNOWN INDIAN SPECIES OF PSYCHODA

1. Radial and medial forks incomplete, R_3 and M_2 lacking over noticeable distance before usual junction.....2
- Radial and medial forks complete, at most only weakened at junction...5
- 2(1). Antenna 16-segmented.....3
- Antenna 15-segmented.....4
- 3(2). Antennal segments 14 and 15 separated; ♀ subgenital plate heart-shaped.....**makati**
- Segments 14 and 15 fused together; ♀ subgenital plate quadrangular.....**formosana**
- 4(2). Female subgenital plate with deep apical concavity, about one-third length of plate; ♀ ascoids dimorphic, spindle-shaped on segments 3 and 4, Y-shaped on remaining segments; ♂ genitalia without striated paramere.....**alabangensis**
- Female subgenital plate with shallow apical concavity; all ♀ ascoids Y-shaped; ♂ with striated paramere below aedeagus.....**mediocris**
- 5(1). Wing without brown band near center, may be brown spots at vein tips but no band.....6
- Wing with brown band near center; female subgenital plate with small apical lobes.....**vittata**
- 6(5). Wing with brown spots at tips of veins on margin (visible in pinned and slide-mounted specimens).....7
- Wing without brown spots on margin.....9
- 7(6). Radial fork clearly distad of medial by distance equal to several times width of cell R_3 at point of bifurcation.....8
- Radial fork on same level as or only little distad of medial fork.....**acanthostyla**
- 8(7). Female subgenital plate V-shaped, sides clearly divergent; aedeagus of ♂ genitalia with 2 shafts ending on same level.....**alternata**
- Sides of subgenital plate parallel or subparallel; ♂ unknown.....**vagabunda**
- 9(6). Antenna 16-segmented.....10
- Antenna 14- or 15-segmented.....12
- 10(9). Female subgenital plate composed of central quadrate or Y-shaped piece and wide flap on either side, thus appearing tripartite.....11
- Subgenital plate consisting of central quadrate piece resting on

- narrow base and essentially unipartite; ♂ dististyle with long seta beyond center..... **aponesos**
- 11(10). Central part of ♀ subgenital plate quadrate with sides nearly parallel, except just at base where structure is constricted; ♂ unknown.....
..... **nigripennis**
- Central part of subgenital plate roughly Y-shaped with sides clearly divergent; ♂ with eyes nearly touching and aedeagus ending in recurved, hooklike process..... **harrisi**
- 12(9). Antenna 15-segmented, 14 small and may appear as only a swelling between 13 and 15; ♀ subgenital plate weakly bilobed with only a slight apical concavity; ♂ antennal ascoids 4-branched, ♀ Y-shaped.....
..... **savaiiensis**
- Antenna 14-segmented; subgenital plate strongly bilobed with moderately deep apical concavity; ascoids of both sexes Y-shaped.....
..... **severini**

Psychoda makati del Rosario, 1936, PHIL. JOUR. SCI. 59:568 (♀, ♂, types destroyed; illus.).—Tokunaga, 1957, SAIKYO UNIV. AGRIC., SCI. RPTS. 9:58 (♀ descr., illus.).—Quate, 1962, PAC. INS. 4:68 (♀ illus.).

Psychoda infurcis Satchell, 1950, PROC. ROY. ENT. SOC. LOND., ser. B, 19:180 (♀, ♂, illus.).

DISTRIBUTION: Cook Is., Samoa, Fiji, Australia, Borneo, Philippines, Taiwan, India.

India. Calcutta, 27-VI-60, 22-VIII-07, 5-XI-06, at light; 8 ♀.

Psychoda formosana Tokunaga, 1957, SAIKYO UNIV. AGRIC., SCI. RPTS. 9:61 (♀, ♂, illus.).

DISTRIBUTION: Taiwan, Ceylon.

Ceylon. Peradeniya, 26-V-10; 1 ♀.

Psychoda alabangensis del Rosario, 1936, PHILIP. JOUR. SCI. 59:566 (♂, type destroyed, illus.).—Tokunaga, 1957, SAIKYO UNIV. AGRIC., SCI. RPTS. 9:63 (♀, ♂, illus.).

DISTRIBUTION: Philippine Is., Taiwan, Ceylon.

Ceylon. Peradeniya, 20-V-10; 1 ♀.

Psychoda mediocris Quate, 1959, B. P. BISHOP MUS., INS. MICRONESIA 12(4): 468 (♀, ♂, illus.).

DISTRIBUTION: Caroline Is., Borneo, Ceylon.

Ceylon. 20, 29-VI-10; 2 ♀.

Psychoda vittata Brunetti, 1908:377; 1911:298; 1912:233. (Figure 14, a–b.)

Small, yellowish species; wing with brown band of hairs little beyond center (color in vestiture only); wing forks complete; ♀ subgenital plate with unusually small apical lobes. Wing length 1.9 mm.; wing width 0.7 mm.

Type data: 5 ♀, Calcutta, 11-VII to 2-VIII-08. Lectotype ♀ selected (1960), Calcutta, 11-VII-08, Museum compound, Z.S.I. No. 5914/19; 1 other type now remains, badly damaged with only part of thorax present. (♂ mentioned by Brunetti, 1912, not considered a type, since it was not part of the original series.)

DISTRIBUTION: India.

Psychoda alternata Say, 1824, NARRATIVE EXPED. SOURCE ST. PETER'S RIVER 2:358.—Tonnoir, 1921, BULL. PARIS NAT. HIST. MUS., 27:296 (synonymy).—Quate, 1959, B. P. BISHOP MUS., INS. MICRONESIA 12(4):469 (♀, ♂, illus., key).

Psychoda bengalensis Brunetti, 1908:371; 1911:295; 1912:229.

Type data (*bengalensis*): "about 50 females," Calcutta, I-08; Simla, V-08. Lectotype ♀ selected (1960), Calcutta, 28-I-08, at light; Z.S.I. No. 5817/19. Remaining paratypes: ♀, Calcutta, 13-I-08; ♀, ♂, Simla, 10-V-08, ca. 7000 ft. As Tonnoir (1921) observed, this is the same as the ubiquitous *alternata*.

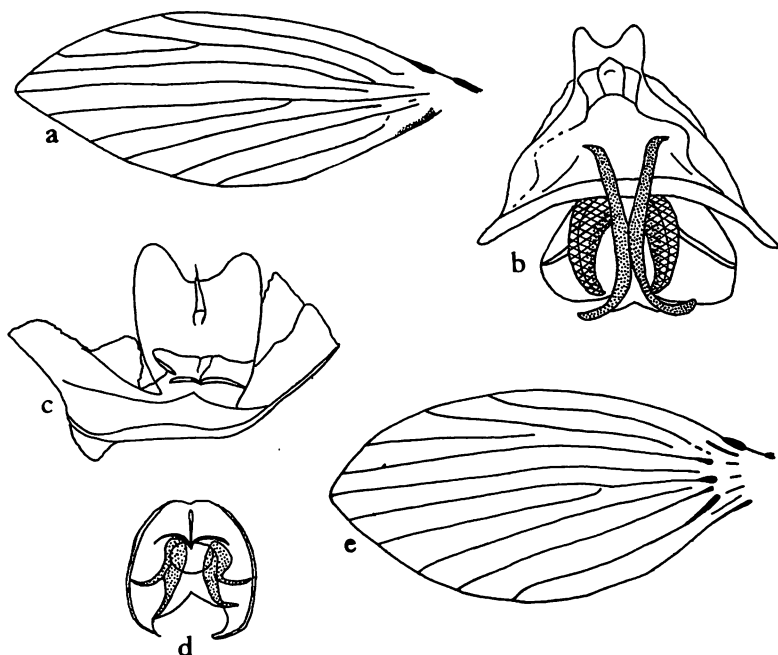


FIG. 14. a-b, *Psychoda vittata*, ♀: a, wing; b, genitalia. c-e, *P. nigripennis*, ♀: c, subgenital plate; d, spermatheca; e, wing.

DISTRIBUTION: Cosmopolitan.

India. Calcutta, V-33, 28-VIII-58, 7-IX-14, XI-14; 1 ♂, 5 ♀. Hamirpur Road, United Prov., 16, 17-X-11; 3 ♀. Cawnpore Dist., U.P., 14, 15-X-11; 1 ♂. Kanauj, U.P., 13-X-11; 1 ♀. Dinapore, Bihar, 16-XII to 23-I-15; 2 ♀. Naduvatum, Nilgiri Hills, 25-X-50, 6000 ft.; ♂.

Psychoda acanthostyla Tokunaga, 1957, SAIKYO UNIV. AGRIC., SCI. RPT. 9: 53.—Quate, 1959, B. P. BISHOP MUS., INS. MICRONESIA 12(4):471 (♀, ♂, illus., key).

DISTRIBUTION: Mariana Is., Caroline Is., Borneo, India, Ceylon.

India. Calcutta, 19, 24, 25-VI-60, 30-VII-08, 16, 21, 24-VIII-07; 12 ♀, 2 ♂.

Ceylon. Peradeniya, 29-VI-10; 1 ♀.

Psychoda vagabunda Quate, 1962, PAC. INS. 4:61. (♀, Z.S.I.; illus.)

DISTRIBUTION: Borneo, Ceylon.

Ceylon. Perideniya, 23-VII-10 (types).

Psychoda nigripennis Brunetti, 1908:376; 1911:297; 1912:232. (Figure 14, c-e.)

Gray species without apparent markings. Antenna 16-segmented, terminal 3 segments reduced and of subequal size, separated; eyes separated by distance equal to 3 facets; wing forks complete, but radial weakened. Wing length 2.4 mm.

Type data: Described from 4 ♂ and 12 ♀, Kasauli, Simla Dist., India, 15-V-08; Simla, Simla Dist., 10-V-08; and Kurseong, Darjeeling Dist., 4-VII-08. Lectotype ♀ selected (1960), Kasauli, Simla Hills, V-08, ca. 6300 ft., "common in bungalow"; Z.S.I. No. 80(?)2/15. 3 other ♀ at Z.S.I. are only remaining types.

P. nigripennis and *trilobata* Tokunaga (1957:389; Japan) are similar and I suspect the two are synonymous. However, the lectotype of *nigripennis* is damaged and critical features of the female genitalia are not visible. Furthermore, Brunetti (*l.c.*) mentioned that *nigripennis* has snow-white hairs on the tibia and white hairs and scales on the tarsi (which were not observed on the lectotype) and apparently are not present on *trilobata*. Further study of additional *nigripennis* specimens will be necessary to confirm this suspected synonymy.

DISTRIBUTION: India.

Psychoda aponesos Quate, 1959, B. P. BISHOP MUS., INS. MICRONESIA 12(4): 465 (♀, ♂, illus.).

DISTRIBUTION: Caroline Is., Samoa, Ceylon.

Ceylon. Peradeniya, 24, 25, 29-VI-10; 1 ♂, 3 ♀.

Psychoda harrisi Satchell, 1950. TRANS. ROY. ENT. SOC. LONDON, 101:171 (♂, ♀, illus.).—Quate, 1954, PROC. HAW. ENT. SOC. 15:354 (♂, ♀, descr., illus.).

Psychoda bifurcata Tokunaga, 1958, PHIL. JOUR. SCI. 86:378 (♀ only; descr., illus.).

Psychoda hamatifera Tokunaga, 1958, *Ibid.*, 86:385 (♂ only; descr., illus.).

DISTRIBUTION: Hawaii, Caroline Is., New Zealand, Australia, Borneo, Ryukyu Is., India.

India. Calcutta, 17-VII-56; 1 ♀.

Psychoda savaiiensis Edwards, 1928, INS. SAMOA (BRIT. MUS., N.H.), 6(2):74 (♂, illus.).

Psychoda rarotongensis Satchell, 1953, PROC. ROY. ENT. SOC. LONDON, ser. B, 22:183 (♂, ♀, illus.).

Psychoda lucia Quate, 1954, PROC. HAW. ENT. SOC., 15:349 (♂, ♀, illus.).

DISTRIBUTION: Tropics from Caribbean to India.

Ceylon. Peradeniya, 24, 25-VI-10; 1 ♂, 2 ♀.

India. Calcutta, 22-VIII-07; 1 ♀. Tenmalai, W. Ghats, Travancore, 22-XI-03; 1 ♂, 1 ♀.

Psychoda severini Tonnoir, 1922, ANN. SOC. ENT. BELG., 62:78 (♂, ♀, illus.); 1940, TRANS. SOC. BRIT. ENT., 7:53 (♂, illus.).

DISTRIBUTION: Europe, India, Korea, Japan, Australia.

India. Kichha, Naini Tal Dist., United Prov., 4-IV-09; 1 ♀.

SPECIES INQUIRENDAE

Psychoda albopicta Brunetti, 1911:296; 1912:231.

Type data: Holotype ♀, Pusa, Bengal, India, 8-I-08; type in Pusa Collection, not seen.

Psychoda apicalis Brunetti, 1911:301; 1912:223.

Wing densely covered with scales. Wing length 2.1 mm.; wing width 0.8 mm.

Type data: Holotype ♀, Maddathorai, Travancore, India, 16-XI-08; Z.S.I. No. 8370/16; only specimen in type series, badly damaged with head mashed, thorax and abdomen lacking. This is not a species of *Psychoda*, but I am unable to assign it to another genus, although I would guess it belongs to *Telmatoscopus* or *Brunettia*.

Psychoda fulvohirta Brunetti, 1911:297; 1912:233.

Type data: 2 ♀. Darjeeling ("type") and ♀, Kurseong. First specimen, regarded as holotype by Brunetti's clear reference to it as the type, has been lost. Paratype (Z.S.I. 5918/19) badly damaged.

With only a wing left of the remaining type, recognition of this species is impossible. Color characters and position of wing forks mentioned by Brunetti for this species are not helpful, for they apply to a number of species of *Psychoda*.

Psychoda geniculata Brunetti, 1911:294; 1912:227.

Type data: Holotype ♀, Peradeniya, Ceylon, X-10; type lost, at Z.S.I. a pin with relevant data, but no specimen.

Psychoda notatipennis Brunetti, 1913:151.

Type data: Rotung, NE Frontier, India, 24-XII-11, 1400 ft.; no specimen found at Z.S.I.

Psychoda orbicularis Brunetti, 1911:298; 1912:231.

Type data: Holotype ♀, Pusa, India, 21-XII-08; type in Pusa Collection, not seen.

Psychoda transversa Brunetti, 1911:300, 1912:226.

Type data: Holotype ♀, Kurseong, E. Himalayas, India, 20-VI-10, 4700–5000 ft.; Z.S.I. No. 5919/19; only specimen in type series, badly damaged with head and antenna shrivelled and genitalia lacking. This is not a species of *Psychoda* and may belong to *Brunettia*.

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