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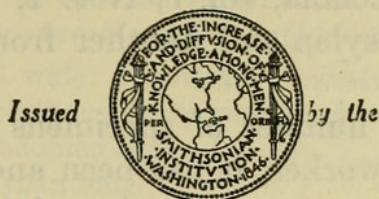
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SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 103

Washington: 1954

No. 3331

STUDIES IN NEOTROPICAL MALLOPHAGA, XI:
BIRD LICE OF THE SUBORDER AMBLYCERA, GENUS
DENNYUS NEUMANN

By M. A. CARRIKER, Jr.

Dennyus Neumann, a genus of Amblycera found only on the swifts (Apodidae), is a relatively small group, 13 valid species being listed by Hopkins and Clay in "A Checklist of the Genera and Species of Mallophaga," 1952. Very little concerning the genus has appeared in literature. Apparently few specimens have been collected, owing, I suspect, to the difficulty of securing their hosts.

Of the 13 recognized species, 3 are from North American hosts, 2 from Central America, 1 from South America, 1 from Jamaica, 1 from Europe, and 5 from Asia and the East Indies.

Harrison (Genera and Species of Mallophaga, 1916) listed six valid species, of which one, *latifrons* Carriker and Shull, is a *Myrsidea*.

Ewing reviewed the genus in 1930 (Proc. U. S. Nat. Mus., vol. 77, art. 20) and listed eight valid species, of which two are *Myrsidea* (*femoralis* Kistiakowsky and *piageti* Kistiakowsky). He placed *bruneri* Carriker under the synonymy of *dubius* Kellogg, stating that Ferris had examined a cotype of it and pronounced it to be the same as *dubius*, in which he agreed; but this statement is clearly an error, as will be shown later in this paper. He also described three new species (*richmondi*, *spiniger*, and *australis*). On page 2 he says, "*latifrons* Carriker and Shull . . . is a true *Dennyus*," but he does not include it in his list of species of the genus. He redescribed and figured *dubius* Kellogg and, on the whole, left a much clearer picture of the genus than we previously had.

In 1941 Thompson (Ann. Mag. Nat. Hist., ser. 11, vol. 7, p. 530, 1941) described a species (*francicus*) from the Solomon Islands and in 1948 (Bol. Ent. Venezolana, vol. 7, Nos. 1, 2, June 1948) he described a species from Ceylon and another from Jamaica (*cypsiurus* and *gossei*).

Because of the small number of specimens and species available for study to any single worker, it has been and still is impossible to prepare a thoroughly comprehensive review of the genus. I have been fortunate in securing a considerable number of species of this interesting group. In my collection are the types of *bruneri* (Carriker) and *meridionalis* (Carriker), several specimens of *australis* Ewing from the type host, and a male of *distinctus* Ferris.

In addition, there are specimens of seven forms which appear to be undescribed, all from various countries of South America. Some of these species are very distinct and may be easily recognized, but others form a closely related group, some of which may be conspecific but may be separated from each other by the shape of the head and thoracic segments, chaetotaxy, etc. I have examined males of seven species (four described species and three new ones) and found very little difference in the genitalia (see figures). Even the genitalia of *distinctus* Ferris, one of the most aberrant species of the genus, are very similar to the others. Apparently, the only very different genitalia are those of *major* (Uchida), for which Uchida erected a new genus not recognized by Hopkins and Clay. The males, insofar as I can determine, differ but little from the females except in size and in the terminal segments of the abdomen.

The best characters for the separation of the species are the gular plate and its chaetotaxy, the shape and proportions of the thoracic segments, the prosternal plate and its chaetotaxy, the mesosternal and metasternal plates, and a median sternal sclerite usually present in abdominal segments I and II (sometimes wanting).

The following key contains the new species described in this paper as well as all of the known species except *cypsiurus* Thompson, *francicus* Thompson, and *hirundinidis* (Linnaeus), the European species for which I lack sufficient data for their inclusion. I have followed Peters in the nomenclature of the hosts. All hosts whose identities were uncertain have been verified by Dr. A. Wetmore except that of *D. similis*, which was furnished by Mr. Phelps. To both of these my thanks are due. All measurements are in millimeters and all drawings were prepared by the author.

Key to the species of *Dennyus*

(Data are insufficient for the inclusion of *cypsiurus* Thompson, *francicus* Thompson, and *hirundinidis* (Linnaeus).)

- 1a. Head very short and wide; prothorax quadrilateral, without lateral lobes; mesothorax and metathorax very short and very wide (more than 3 times wider than long); abdomen oval-----**brevicapitis**, new species
- 1b. Head but little wider than long.
 - 2a. Pre-antennary portion of head with sides almost parallel and front transverse (head, .49 by .51); temples more or less angular--**distinctus** Ferris
 - 2b. Pre-antennary area circular; temples small, narrow and rounded, but little expanded (head, .47 by .59)-----**minor** (Kellogg)
- 1c. Head, thorax, and abdomen of shape normally found in the genus.
 - 3a. Fringe of setae along anterior edge of temples double, one pointing outward, the other backward; double rows of long hairs on posterior margins of temples, occiput, prothorax, and metathorax; patches of 4 to 6 exceedingly long hairs in median portion at each side of tergites II to VII (nearly as long as abdomen)-----**intonsus**, new species
 - 3b. Chaetotaxy normal, not as above.
 - 4a. Posterolateral margins of temples clearly convex from lateral to posterior angle, not straight or concave.
 - 5a. Abdominal segment VIII in both sexes deeply concave on posterior margin, with all (♂) or most (♀) of segment IX within this concavity; Male genitalia very different from all other species of the genus-----**major** (Uchida)
 - 5b. Abdominal segments VIII and IX normal, not as in 5a.
 - 6a. Numerous peglike spines on dorsal surface of head and prothorax.
spiniger Ewing
 - 6b. No peglike spines on head or thorax.
 - 7a. Prosternal plate with numerous short, thickened spines (10 to 12), with or without longer setae.
 - 8a. Pre-antennary margin of head uniformly rounded and posterior margin of temples strongly convex; 10 short spines on prosternal plate, without any longer setae.
rotundocapitis, new species
 - 8b. Pre-antennary margin of head not uniformly rounded, but with sides slightly concave.
 - 9a. Twelve short, straight spines and 2 long setae on prosternal plate; plate with straight sides converging sharply posteriorly; temples strongly convex posteriorly.
brunneitorques, new species
 - 9b. Twelve short, curving spines on central area of prosternal plate, and a long, curving seta at anterior angle of same area; plate with sides subparallel and concave--**richmondi** Ewing
 - 7b. Prosternal plate with 3 to 6 longish setae on anterior portion.
 - 10a. Prosternal plate long, and narrow posteriorly, with narrow lateral bands, and with 5 (or 6) longish setae; temples strongly rounded and pre-antennary margin uniformly circular.
 - 11a. Setae along posterior margin of abdominal tergites consist of short, thickened hairs, alternating with hairs nearly length of segments; sides of thorax straight.
similis, new species

- 11b. Setae along posterior margin of abdominal tergites consist of slender hairs, sparsely set, and mostly longer than the succeeding segments-----**australis** Ewing
- 10b. Three longish setae on prosternal plate, one on each side on anterior border and one in anterior center of inner, clear area; temples very slightly convex and pre-antennary margin with slight concavity on each side---**gossei** Thompson
- 4b. Posterolateral margins of temples straight or concave (never convex).
- 12a. Posterolateral margin of temples straight; occiput transverse; prosternal plate large, with slightly concave, converging sides and wide marginal bands; 11 or 12 short spines set on inner portion of plate and a long hair at anterior, lateral angles of inner portion.
spininotus, new species
- 12b. Posterolateral margins of temples decidedly concave just forward of the posterior angle.
- 13a. Metathorax normal, with posterolateral angles simple and connected by a submarginal band to abdominal segment I (see fig. 68).
- 14a. Prosternal plate with 3 to 5 setae; when only 3, all are long; when 5, one is very small and 2 medium.
- 15a. Prosternal plate with 2 long and 2 rather short setae, all set in anterior marginal band of plate, with the 2 short ones set medially (often a very short spine at one side).
limbus, new species
- 15b. Prosternal plate with 3 long setae, set in anterior portion of medial clear area; temples small; head narrow.
dubius (Kellogg)
- 14b. Prosternal plate with about 8 longish setae, all set within the median clear space-----**bruneri** (Carriker)
- 13b. Metathorax with posterior margin much wider than abdominal segment I, with the posterolateral angle bifurcated; the spines along the posterior margin of segment beginning at the inner point of the bifurcation, also connecting band across to the abdomen-----**meridionalis** (Carriker)

***Dennyus australis* Ewing**

FIGURE 63,i

Dennyus australis Ewing, Proc. U. S. Nat. Mus., vol. 77, art. 20, p. 5, 1930.
(Host, *Apus a. andecolus* (d'Orbigny and La Fresnaye).)

I have in my collection one adult male and two immature females from *Apus andecolus parvulus* (Berlepsch and Stolzmann) collected at Huarmey, Perú, and one adult female from the type host collected at Oploca, Bolivia. The type of *australis* is a female, and my female from Oploca agrees closely with Ewing's description and figure of the species, although the measurements differ slightly, those given for the type being 2.75 by 1.30, while my female measures 2.86 by 1.19.

The male from *A. andecolus parvulus* has exactly the same shape, structure, and chaetotaxy of the head as the female, as well as the

shape and chaetotaxy of the prosternal plate as given by Ewing. It measures 2.36 by .90.

This species is close to *bruneri* (Carriker), having the same style of head bands and exactly the same gular plate and chaetotaxy. It differs, however, in the shape of the head, *australis* having the temples convex, while in *bruneri* they are concave. In *australis* the sides of the mesothorax and metathorax are straight, while in *bruneri* the sides of the mesothorax are convex and the sides of the metathorax are concave. *D. australis* is also much larger than *bruneri*, the male of the latter measuring only 2.13 by .80. The dorsal aspect of the paratergals is different, as well as the shape and chaetotaxy of the prosternal plate, that of *bruneri* being shorter, and broader anteriorly, and with the eight longish hairs all set inside the clear area, while in *australis* there are four setae in the clear area and two in the lateral band (male). Ewing shows three setae in the lateral band and three in the clear area (female), but in my female the setae are arranged in the same manner as in the male.

Measurements of adult male and female in collection of author:

	Male		Female	
	Length	Width	Length	Width
Body.....	2.39	-----	2.88	-----
Head.....	-----	-----	-----	-----
ant. fossae.....	-----	.49	-----	.51
temples.....	.49	.65	.542	.76
occiput.....	.434	-----	.51	-----
Prothorax.....	.288	.40	.314	.465
Meso-metathorax.....	.358	.655	.37	.803
Abdomen.....	1.44	.90	1.86	1.19
Basal plate.....	.41	.13	-----	-----
Parameres.....	.24	.14	-----	-----
Endomeral sac.....	.217	.14	-----	-----

Dennysus dubius (Kellogg)

Nitzschia dubius Kellogg, Proc. California Acad. Sci., ser. 2, vol. 6, p. 540, 1896.

(Host, *Chaetura pelagica* (Linnaeus).)

I have no specimens of this species and have used, with some misgivings, Ewing's description and figures as a basis for my conclusions regarding it. Ewing says his description is based "upon many adult specimens *chiefly from the type host*" (*italics mine*), and lists under *dubius* specimens not only from *Aeronautes melanoleucus* (*A. s. saxatilis*), type host for *D. bruneri* (Carriker), but from *Chaetura richmondi*, from Eden, Nicaragua; yet, in the same paper, he describes *Dennysus richmondi* whose host is *Chaetura richmondi*, also from Eden, Nicaragua.

I have in my collection two males (paratypes) of *D. bruneri*, from *Aeronautes s. saxatilis*, and they certainly are not what Ewing describes as *dubius* (see key). Although the two are undoubtedly closely related, and may possibly be conspecific along with the new species (*limbus*) described on page 542, until more is known about this group I prefer to leave them as separate species.

***Dennyus bruneri* (Carriker)**

FIGURE 63,c

Nitzschia pulicaris var. *tibialis* Carriker, Journ. New York Ent. Soc., vol. 10, p. 225, pl. 22, figs. 4, 5, 1902. (Host, *Aeronautes melanoleucus* (= *A. s. saxatilis* (Woodhouse)).)

Nitzschia bruneri Carriker, Univ. Nebraska Stud., vol. 3, No. 2, p. 55, 1903 (new name for *N. tibialis*, preoccupied by *N. tibialis* Piaget, 1880).

I have in my collection two males (labeled as types) of this species. The original type series contained three males and one female. I imagine that one male and the female remained in the collection of the University of Nebraska, and if they still exist they should be considered as the male holotype and female allotype of the species.

This species may be distinguished from its closely related forms by the detailed characters as given in the key. From *dubius* it may easily be distinguished by the chaetotaxy of the prosternal plate, *dubius* having three longish setae set in a row along the edge of the clear area, while in *bruneri* there are eight longish setae irregularly placed within the clear area. Ewing's figure shows the posterior margin of the prothorax with sides angulated and median portion strongly concave, while in *bruneri* the posterolateral angles are rounded and the posterior margin is almost transverse. In *dubius* the metathorax has the sides straight and is "over twice as broad as long," while in *bruneri* the sides of metathorax are concave and its width is three times the length. Ewing's description of the abdominal chaetotaxy is very vague but I suspect that it is different from that of *bruneri*, which has one spine in lateral angle of segment I and one slender, submarginal hair; in segment II there are one spine and one slender hair in the angle and a longer, coarser, submarginal dorsal hair. In segments III to VII there are two short hairs in the angle and one long submarginal hair, with two very long hairs at angles of segments VIII and IX. These long dorsal hairs become progressively longer posteriorly.

In *dubius* the parameres are incurved apically, their tips touching, while in *bruneri* they are almost straight in one specimen and slightly incurved apically in the other.

Measurements of the male paratype:

	Length	Width
Body.....	2. 13	-----
Head.....	-----	-----
ant. fossae.....	-----	. 456
temples.....	. 48	. 63
occiput.....	. 44	-----
Prothorax.....	. 26	. 38
Meso-metathorax.....	. 326	. 615
Abdomen.....	1. 26	. 80
Parameres.....	. 23	. 14

Dennyus meridionalis (Carriker)

FIGURE 63,b,h

Nitzschia bruneri [var. *meridionalis* Carriker, Univ. Nebraska Stud., vol. 3, No. 2, p. 56, 1903. (Host, *Chaetura griseiventris* (= *C. spinicauda fumosa* Salvin).)¹

I have in my collection a slide containing a male and a female of this species, labeled as "types," and another slide, also containing a pair of adults and several nymphs, labeled merely "Pozo Azul, Costa Rica, June, 1902."

Eight skins of the host swift were collected by me at Pozo Azul, and all are in the Carnegie Museum. It is probable that the various specimens of *Dennyus* came from more than one of these birds. This fact is mentioned because of the presence of two apparently distinct species in this series, including specimens from *Chaetura spinicauda aetherodroma* Wetmore, from Colombia. The whole series seems to be practically the same in every way except in the structure of the metathorax, of which there are two very distinct types (see figs.). It does not seem possible that this can be a case of individual variation, since the difference is very great and clear-cut.

The male and female labeled as the types of *meridionalis* are of one class, while the male and female "paratypes" are of the other. A female from Cartagena, from *C. s. aetherodroma* Wetmore, has the metathorax as in the "paratype" of *meridionalis*, as have also a female taken at El Real, Colombia, from the same host and a female taken at Las Vegas, Colombia; but a male from El Real is like the types of *meridionalis*.

All the above specimens have the chaetotaxy of the prosternal plate the same except the female from Las Vegas, which has only three rather short, spinelike setae in a straight row across the anterior marginal band, while the plate itself is longer and narrower than in

¹ Hopkins and Clay (A Checklist of the Genera and Species of Mallophaga, 1952) have given the host of this species as *Chaetura griseiventris phaeopygus* Hellmayr, a bird found on the Caribbean side of Costa Rica. The birds from Pozo Azul (Pacific side) were identified by Todd as well as by Wetmore as *Chaetura spinicauda fumosa* Salvin.

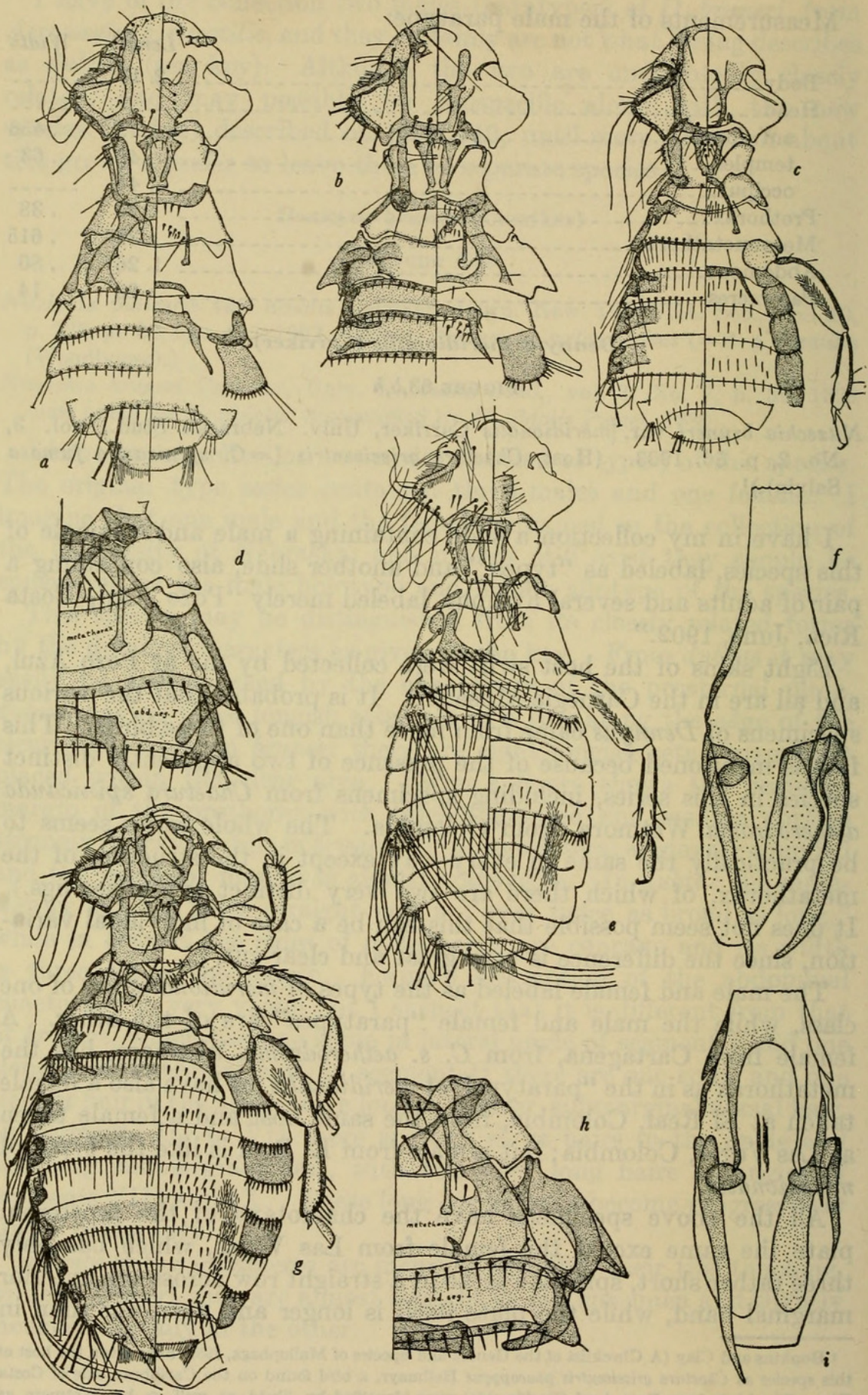


FIGURE 63.—For explanation see facing page.

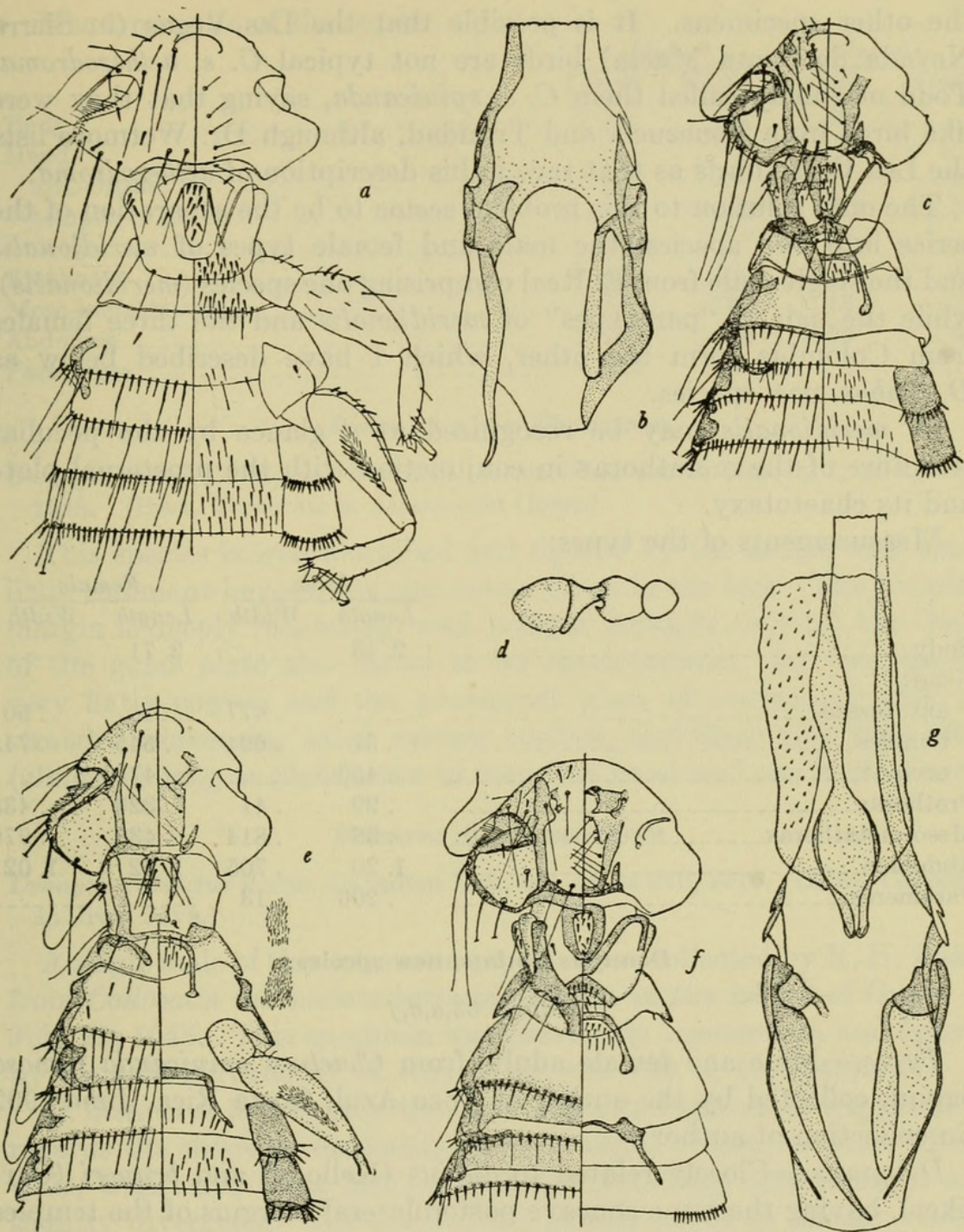


FIGURE 64.—*a*, *Dennyus spininotus*, new species, female; *b*, female genitalia of *D. rotundocapitis*, new species; *c*, *D. brunneitorques*, new species, female; *d*, antennae of *D. rotundocapitis*, male; *e*, *D. similis*, new species, female (patches of sternal setae to right of figure); *f*, *D. rotundocapitis*, female; *g*, male genitalia of *D. similis*.

FIGURE 63.—*a*, *Dennyus limbus*, new species, female; *b*, type, female, of *D. meridionalis* (Carriker); *c*, paratype, male, of *D. bruneri* (Carriker); *d*, thorax and abdominal segment I of female *D. limbus*; *e*, *D. intonsus*, new species, female; *f*, male genitalia of *D. limbus*; *g*, *D. brevicapitis*, new species, female; *h*, thorax and abdominal segment I of *D. meridionalis*; *i*, male genitalia of *D. australis* Ewing.

the other specimens. It is possible that the Las Vegas (in Sierra Nevada de Santa Marta) birds are not typical *C. s. aetherodroma*. Todd originally called them *C. s. spinicauda*, saying that they were like birds from Venezuela and Trinidad, although Dr. Wetmore lists the Las Vegas birds as that race in his description of *aetherodroma*.

The only solution to this problem seems to be the separation of the series into two species, the male and female types of *meridionalis* and the single male from El Real comprising one species (*meridionalis*), while the pair of "paratypes" of *meridionalis* and the three females from Colombia form the other, which I have described below as *D. limbus*, new species.

D. meridionalis may be recognized at a glance by the peculiar structure of the metathorax in conjunction with the prosternal plate and its chaetotaxy.

Measurements of the types:

	Male		Female	
	Length	Width	Length	Width
Body-----	2. 13	-----	2. 71	-----
Head:				
ant. fossae-----	-----	. 477	-----	. 50
temples-----	. 51	. 694	. 545	. 745
occiput-----	. 456	-----	. 475	-----
Prothorax-----	. 29	. 41	. 326	. 435
Meso-metathorax-----	. 38	. 814	. 435	. 976
Abdomen-----	1. 20	. 705	1. 62	1. 02
Parameres-----	. 206	. 13	-----	-----

***Dennyus limbus*, new species**

FIGURE 63,a,d,f

Types.—Male and female adults from *Chaetura spinicauda fumosa* Salvin, collected by the author at Pozo Azul, Costa Rica, June 1902 (in collection of author).

Diagnosis.—Closely related to *dubius* (Kellogg) and *bruneri* (Carriger), having the same concave posterolateral margins of the temples and the same thoracic structure.

D. limbus differs from *bruneri* in the wider head (.49 by .684 against .48 by .63) and much wider thorax (.76 against .615); the abdomen (females) is smaller (1.20 by .716 against 1.26 by .80). It differs from both *dubius* and *bruneri* in the shape and chaetotaxy of the prosternal plate. The plate is much larger than that of *bruneri*, having four setae (two long and two short) set in the marginal band, while *bruneri* has eight shorter setae, all within the clear median area. *D. dubius* has but three long setae, set at head of median clear area. A discussion of the metathoracic characters is given under remarks on *meridionalis* and in the key.

Measurements of the types:

	Male		Female	
	Length	Width	Length	Width
Body.....	2. 10	-----	2. 84	-----
Head:				
ant. fossae.....	-----	. 46	-----	. 51
temples.....	. 49	. 684	. 542	. 755
occiput.....	. 445	-----	. 48	-----
Prothorax.....	. 28	. 40	. 325	. 467
Meso-metathorax.....	. 355	. 76	. 42	. 74
Abdomen.....	1. 20	. 716	1. 73	1. 04
Parameres.....	. 225	. 14	-----	-----

Dennysus gossei Thompson

Dennysus gossei Thompson, Bol. Ent. Venezolana, vol. 3, Nos. 1, 2, p. 1, June 1948. (Host, *Tachornis p. phoenicobia* Gosse.)

This species is well described and figured by the author and needs little comment beyond the characters given in the key. The occipital margin is deeply reentering, with occiput strongly convex; the shape of the gular plate also seems to be characteristic; the temples are very flatly convex and the prosternal plate characteristic with its straight, converging sides, narrow borders, and three very long setae (almost as long as plate), two in marginal band and one in clear area.

Dennysus distinctus Ferris

Dennysus distinctus Ferris, Canadian Ent., vol. 48, p. 310, 1916. (Host, *Callocalia* sp. from Java.)

A single male of this interesting species was collected by R. H. Baker from *Callocalia inexpectata bartschi* Mearns on the Island of Guam on July 29, 1945. This specimen was previously reported on and figured by the author (Proc. U. S. Nat. Mus., vol. 100, p. 16, 1949).

D. distinctus is probably the most abnormal species of the genus as regards the shape of the head, which is about as long as wide, with a wide, transverse frons and sides of pre-antennary area straight and slightly divergent. The meso-metathoracic suture is faintly visible, but the two segments are very closely united (this detail omitted in my figure in paper cited above).

Dennysus major (Uchida)

Takamatsuia major Uchida, Journ. Coll. Agric. Tokyo, vol. 9, p. 32, 1926. (Host, *Hirundapis c. caudacutus* (Latham).)

A new genus was erected by Uchida for this species on the strength of the shape of abdominal segments VIII and IX in both sexes and the male genitalia. Segment IX is very small (especially in the male) and enclosed within a deep emargination of the posterior margin of

Segment VIII. The male genitalia is also quite different from all others of the genus which I have seen, the remainder being unusually uniform. I have carefully examined Uchida's description and figures and am of the opinion that this species may be entitled to subgeneric rank, but without actual examination of specimens I hesitate to do this.

Dennyus minor (Kellogg and Paine)

Nitzschia minor Kellogg and Paine, Rec. Indian Mus., vol. 10, p. 243, pl. 15, fig. 10, 1914. (Host, *Apis a. affinis* (J. E. Gray).)

Like most of Kellogg's descriptions, this one is very inadequate and the figure not particularly illuminating. The species seems to be characterized by its small size, circular frontal margin of head, and small, rounded temples. He gives the following measurements:

	Male		Female	
	Length	Width	Length	Width
Body.....	1. 75	-----	1. 92	-----
Head.....	. 39	. 52	. 47	. 59
Prothorax.....	. 22	. 32	. 23	. 36
Metathorax.....	. 27	. 48	. 32	. 58
Abdomen.....	. 87	. 71	. 90	. 71

Dennyus brevicapitis, new species

FIGURE 63, *g*

Type.—Female adult from *Chaetura b. brachyura* (Jardine), collected by the author at Carenage, Trinidad, B. W. I., August 14, 1909 (in collection of author).

I have been undecided as to the generic position of this species, whether it belongs in *Eureum* or *Dennyus*. Certainly it presents characters common to both, resembling the former genus in its wide, short head, rectangular prothorax, and oval abdomen. It might be classed as the connecting link between *Dennyus* and *Eureum*, but on the whole it seems best to place it under *Dennyus*.

Diagnosis.—The species is so different from all other known species of the genus that, in addition to the figure given, very little description seems necessary.

The head is nearly twice as wide as long, with pre-antennary area flatly conical, and sides flatly convex; temples short and expanded laterally; prothorax quadrilateral in shape, encircled by a wide, deeply chitinized band, with three spines on anterior angles, two long hairs on the rounded posterior angles and two on posterior margin. The prosternum is of the usual type for the genus, with four short spines and two longer, thickened setae, all set in the marginal band.

The mesothorax is very short and wide, with acute lateral angles and strongly convex posterior margin. The metathorax is nearly four times as wide as long, with posterior margin flatly pointed medially. The greater portion of the paratergal plates lies on the ventral side; they are wide, heavily chitinized, and deeply colored, with 6 to 12 spines on posterior margin; the dorsal portion of pleurites II to VIII contains heavily chitinized incrassations of varying shapes, no two being exactly the same.

The legs are normal for the genus, but the third pair of femora are unusually short, scarcely longer than the second pair. The chaetotaxy of the head and mesosternum is typical of the genus. The long hairs at the lateral angles of tergites II to VIII are thick and long, there being one or two in each angle which are thicker and longer than the others. The dorsal chaetotaxy of tergites II, III, and V is not shown in the figure, but is approximately equal to that of IV and VI, the hairs becoming progressively longer posteriorly, with one or two shorter hairs between the longer ones which reach across the succeeding segment. The female holotype is the only specimen of the species.

Measurements of the type:

	Length	Width
Body.....	2. 21	-----
Head.....	-----	-----
ant. fossae.....	-----	. 52
temples.....	. 456	. 80
occiput.....	. 38	-----
Prothorax.....	. 303	. 467
Meso-metathorax.....	. 38	. 88
Abdomen.....	1. 36	1. 10

Dennysus intonsus, new species

FIGURE 63,e

Type.—Adult female from *Chaetura chapmani viridipennis* Cherrie, collected by the author at El Real, Río Cauca, Colombia, March 8, 1948 (in USNM).

Diagnosis.—*D. intonsus* is a very distinct species and may be recognized at a glance by the abnormal chaetotaxy of the whole body. There is a double fringe of setae along the anterior margin of the temples; one fringe is along the edge, pointing outward, and the other is submarginal, parallel to the first, and pointing inward and backward. There are two rows of very long hairs along the posterior margin of the temples, the usual four along the edge and an additional row of five submarginal; also four long, dorsal hairs on the occiput, two near the margin and two others, longer, inside the marginal pair;

There are three spines on the anterolateral angle of the prothorax, and two more posterior to them; the three long marginal hairs on posterior edge of prothorax are also duplicated by three longer ones just inside them. There are eight hairs (four long, four short) on each side of the posterior margin of the metathorax with an additional submarginal row of nine much longer ones.

The chaetotaxy of the abdomen is exceedingly complex, but may be understood from a careful study of the figure. However, it was not possible to put in the figure all of the hairs on all of the segments. The most striking feature of the abdominal chaetotaxy is the groups of six extremely long hairs set in the median portion of tergites II to VI, just within the lateral margins. These hairs are almost as long as the abdomen. In the same position on tergite I there are three long hairs and a spine, while on tergites VII to IX there are two long submarginal hairs in addition to the other long ones at the angle.

The first and second pairs of legs are normal, but the third femur is short and slender, scarcely longer than the tibia. The setae forming the patches on the third femora and abdominal sternites are very fine and closely set, those on the abdomen forming a continuous patch from middle of sternite V to near end of sternite VII.

The structure of abdominal pleurites and sternites is unusual and not clearly determined, the posterior margin of the sternites not reaching to the lateral edges of the abdomen. The head is unusually small and the thorax narrow. The type apparently is an adult female recently moulted so that all of the chitinized bands are not clearly outlined. The characteristic sternal plate on segments I and II is apparently absent. The prosternal plate is normal and contains four long and two short, slender setae.

In addition to the type there is a nymph which has a quite different chaetotaxy, having not yet acquired the duplicated temporal fringe and the patches of long hairs on the tergites (only one long hair and a spine on tergites II to V, and two long hairs on VI to IX). It is impossible to determine with certainty the sex of this nymph, but it seems, from the structure of abdominal segments VIII and IX, to be a female.

Measurements of the type:

	Length	Width
Body.....	2. 20	-----
Head.....		-----
ant. fossae.....		. 456
temples.....	. 47	. 655
occiput.....	. 434	-----
Prothorax.....	. 267	. 282
Meso-metathorax.....	. 355	. 654
Abdomen.....	1. 24	. 846

Dennyus spininotus, new species

FIGURE 64,a

Type.—Female adult from *Cypseloides fumigatus* (Streubel) collected by the author on Río Esmeralda, Department of Córdoba, Colombia, May 19, 1949 (in USNM).

Diagnosis.—The general shape of the head resembles very much that of *D. gossei* Thompson, although the temples are perfectly straight on posterior margin, but the measurements of the body are very different, 2.80 by 1.02 against 2.30 by .81 for *gossei*.

Unfortunately the type, and only specimen, is in poor condition, having been cleared too much and having collected within the head and thorax a quantity of food particles which obscure the few visible details of internal structure.

The whole thorax and abdomen are of normal shape and structure, presenting no outstanding characters. The chaetotaxy of the head is also normal, except for the three dorsal spines which are present in but few species. The prosternal plate is unusually large, very broad anteriorly, and with wide marginal band. There is a long, slender seta at each anterior corner of the clear area and 11 heavy, short spines irregularly set within it. There are numerous heavy spines on the mesosternum, those beneath the posterior portion of the prothorax being thicker than the patch on the posterior margin of the mesosternum.

The spines along posterior margin of the tergites are thick and closely set, interspaced irregularly with long setae, usually 2 to 3 spines between the long hairs; there is but one longish hair at the posterolateral angle of tergites II to VII. Short, thick setae are scattered irregularly over the sternites, while the patches of setae on sternites V and VI are sparse and coarse, as well as those on the third femora; there are an unusual number of short, thick spines along the outer edge of the second and third femora, and the spines along posterior edge of ventral pleurites are unusually numerous and thickened. The peculiar median sternal plate usually present on segment I of abdomen seems to be absent, at least it is not visible.

Measurements of type:

	Length	Width
Body.....	2. 80	-----
Head.....	-----	-----
ant. fossae.....	-----	. 586
temples.....	. 521	. 836
occiput.....	. 456	-----
Prothorax.....	. 37	. 471
Meso-metathorax.....	. 51	. 91
Abdomen.....	1. 65	1. 02

Dennysus rotundocapitis, new species

FIGURE 64,b,d,f

Types.—Male holotype from *Streptoprocne zonaris albicincta* (Cabanis) collected by the author near Cali, Colombia, December 16, 1950 (in USNM), and female allotype from same host collected by the author at Huancano, Perú, March 9, 1931 (in collection of author).

Diagnosis.—This species may be recognized by the narrow, broadly rounded temples, without angles, the flatly rounded pre-antennary margin, the prosternal plate and setae, the sparse, coarse setae of femoral and abdominal patches, and by the shape of the sternal plate on segments I and II.

The bands of chitin which connect the prothorax with the mesothorax and the metathorax with the abdomen are unusually heavy, as are the dorsal incrassations of the paratergal plates. The prosternum contains 10 short, thick spines, all within the clear area. The species is represented only by the male holotype and the female allotype.

Measurements of the types:

	Male		Female	
	Length	Width	Length	Width
Body.....	2. 04	-----	2. 63	-----
Head.....	-----	-----	-----	-----
ant. fossae.....	-----	. 49	-----	. 564
temples.....	. 46	. 673	. 55	. 77
occiput.....	. 434	-----	. 488	-----
Prothorax.....	. 303	. 39	. 35	. 48
Meso-metathorax.....	. 325	. 62	. 445	. 835
Abdomen.....	1. 16	. 78	1. 67	1. 11
Parameres.....	. 228	. 13	-----	-----

Dennysus brunneitorques, new species

FIGURE 64,c

Type.—Female adult from *Chaetura rutila brunneitorques* La Fresnaye, collected by the author at San Juan, Chanchamayo, Perú, June 6, 1930 (in collection of author).

Diagnosis.—Somewhat similar to *rotundocapitis*, new species, but considerably smaller (head, .467 by .694 against .55 by .77), with temples less rounded and more angulated both front and rear; pre-antennary margin with pronounced concavities on each side; occipital bands and gular plate very similar to those of *rotundocapitis*, as well as entire thoracic structure. The prosternal plate is of decidedly different shape and chaetotaxy, having three spines and two long setae along the border of the anterior band, and with nine spines set within the clear area. The shape and chaetotaxy of the terminal abdominal segments are also somewhat different. The median sternal plate on



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<https://doi.org/10.5479/si.00963801.103-3331.533>.

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