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THE MENOPONIDAE (MALLOPHAGA) FOUND ON NORTH AMERICAN SWIFTS

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Biting lice in the genera *Dennyus* and *Eureum* are found only on the swifts. The genus *Dennyus* was reviewed recently by Mr. M. A. Carriker. Notes on those forms of the North American species which were not available to Mr. Carriker for his review are presented here; as well as a description of one new species. The genus *Eureum* is extremely rare; illustrations of the one North American species previously known are presented, and one new species is described.

Genus *Dennyus* Neumann

Nitzschia Denny, 1842 (*nec* Baer, 1827). Mon. Anopl. Brit.; p. 230.
Dennyus Neumann, 1906. Bull. Soc. Zool. Fr., *20*: p. 60. *Nomen novum* for *Nitzschia* Denny, 1842 (*nec* Baer, 1827).
Dennyus Neumann. Ferris, 1916. Canad. Ent. *48*: p. 309.
Takamatsuia Uchida, 1926. J. Coll. Agri. Tokyo, *9*: p. 32.
Dennyus Neumann. Ewing, 1930. Proc. U. S. Nat. Museum, *77*, no. 2843: p. 2.
Ctenodennyus Ewing, 1930, Ibid: p. 9.
Dennyus Neumann. Buttiker, 1954. Acta Tropica, *11*: p. 159.
Dennyus Neumann. Carriker, 1954. Proc. U. S. Nat. Museum, *103*, no. 3331: p. 533.

Genotype: *Dennyus hirundinis* (Linnaeus), found on the European Swift, *Apus apus apus* (Linnaeus).

The genus is distinguished by its slender form. Antennae relatively small; antennal fossae partly roofed by an expansion of the head; no preocular notch or slit; eyes double, the two corneas on one side being partly fused; temples slightly expanded, angular; the occiput slightly concave.

Prothorax rather narrow, pronotum expanded laterally; prosternal plate well developed with heavy chitinous margin bearing more than two setae. Mesothorax small but distinct and separated from the metathorax by a distinct dorsal suture. First pair of legs short, second and third pairs longer; first femur very short, frequently as broad as long; hind femur very long, with a patch of setae on ventral surface.

Abdomen long; paratergites each with a marginal row of spines and a tuft of long hair-like setae; tergites bare except for a single transverse row of setae on the posterior margin. Abdominal sternites V and VI each with a

patch of fine setae in the posterior lateral angles. Abdominal sternite VII may have extra setae in the posterior lateral angles, but not a distinct patch as found on V and VI.

Genital armature of the male symmetrical, with long, narrow basal plate; parameres free, clasper-like, extending beyond preputial sac. Female genital region with sternites VIII and IX fused into a single large plate; the margin of the vulva smoothly convex with a corona of fine setae.

Previous authors have noted that the male genitalia are of little value in the separation of species in this genus. The chaetotaxy and the shape of the gular plate and thoracic sternal plates offer the best means for separation, especially for the forms found in North America. The thoracic prosternal plate of the male of each species has been illustrated, the figures being of the same scale, to show these differences. The gular plate is described for each species.

KEY TO THE NORTH AMERICAN SPECIES OF *DENNYUS*

1. Some of the setae on head and body short and peglike; each abdominal tergite bearing a posterior marginal row of normal setae alternating with short peglike spines (on *Nephoecetes niger borealis*) ..... *Dennyus spiniger* Ewing.
   Setae of head and body normal, none peglike 2
2. Gular plate with four medium length setae in clear portion of each lateral margin (on *Aeronautes saxatilis saxatilis*) ..... *Dennyus bruneri* (Carriker).
   Gular plate with two long setae in clear portion of each lateral margin 3
3. Fourth paratergites each with seven short spines (on *Chaetura vauxi*) ..... *Dennyus vauxi* n. sp.
   Fourth paratergites each with nine short spines (on *Chaetura pelagica*) ..... *Dennyus dubius* (Kellogg).

Dennyus bruneri (Carriker)

(Figure 7)

Nitzschia pulicaris var. *tibialis* Carriker, 1902. J. New York Ent. Soc. *10*: p. 225, pl. 22, figs. 4 and 5.

Nitzschia bruneri Carriker, 1903. Univ. Stud. Nebraska, *3*: p. 177.
Nomen novum for *N. tibialis* Carriker, 1902 (*nec* Piaget, 1880).

Type host: *Aeronautes saxatilis saxatilis* (Woodhouse), Whitethroated Swift.

Carriker has in his collection two males of the type series of this species. He did not know the location of the remaining male and female of this series, but stated: "If they still exist they should be considered as the male holotype and female allotype of the species." These two specimens are in the collection of Stanford University. As has been noted by Carriker, in his review, the gular plate is long oval-shaped and contains four medium-length setae inside the clear portion of each lateral margin. The prosternal plate may possess eight, nine or ten setae (Figure 7). There is some variation in location of the median setae, but apparently no variation in the size or shape of the plate. Figure 7 is from a specimen collected in Arizona.

In addition to the types, specimens were examined which had been col-

lected from the type host in Tucson, Arizona; Yosemite National Park, San Benito County, San Bernardino County and Coachella, California; and Golden, Colorado. The material from San Bernardino County, California, was determined by Ewing (1930, p. 8) as *D. dubius*.

Dennyus dubius (Kellogg)
(Figures 1, 2, 2A, 6)

Nitzschia dubius Kellogg, 1896. Proc. California Acad. Sci., 6: p. 540, pl. 73, fig. 6.

Type host: *Chaetura pelagica* (Linnaeus), Chimney Swift.

Material of this species was not available to Carriker for his study. The types are in the collection of Stanford University. The gular plate is short oval-shaped and contains two long setae just inside the clear portion of each lateral margin, and has two long setae outside of each posterior lateral and one outside of each anterior lateral angle. The prosternal plate may possess four or five setae, but six appears to be more normal. The prosternal plate illustrated in figure 6 is from a specimen collected in Georgia. Illustrations of both sexes have been furnished by Mrs. Chester J. Stojanovich and are shown in Plate I.

In addition to the types, specimens were examined which had been collected from the type host in State College, Mississippi; Lincoln, Nebraska; Rome, Georgia; New Platz, New York; Doroville, Oregon; Kansas City, Missouri; Urbana, Illinois; Massachusetts; Maryland; North Dakota; New Jersey; Pennsylvania; South Carolina; Virginia; Tennessee; and Indiana.

Dennyus spiniger Ewing
(Figure 8)

Dennyus (Ctenodennyus) spiniger Ewing, 1930. Proc. U. S. Nat. Museum, 77, no. 2843: p. 9, figs. 4 and 7d.

Type host: *Nephoecetes niger borealis* (Kennerly), Northern Black Swift.

Material of this species was not available to Carriker for his study. Ewing's description was based on a single female, which is now in the U. S. National Museum (no. 42762). Dr. G. J. Spencer, University of British Columbia, recently collected a series of this species which was loaned to the authors for this study.

The male is similar in shape and chaetotaxy, except for the terminal abdominal segments, to the female. The male ganitalia is not distinctive. The gular plate is short oval-shaped and contains three long setae just inside the clear portion of each lateral margin, two long setae outside each posterior lateral angle, and two short spines on the anterior margin. The prosternal plate may possess ten to fourteen stout spines and two or four long setae. There is considerable variation in the location of these setae and spines. The prosternal plate illustrated in figure 8 is from a specimen collected in British Columbia.

In addition to the type, from Seattle, Washington, specimens collected in British Columbia were examined.

Dennyus vauxi n. sp.
(Figures 3, 4, 5)

Male. As illustrated in figures 3, 4 and 5. Gular plate short, oval-shaped

and contains two long setae inside each anterior lateral angle, and two long setae outside each posterior lateral angle. Prosternal plate with eight setae (only one specimen was examined that possessed seven).

Female. Much larger than the male, total length being 2.82 mm. General shape and chaetotaxy, except for the terminal abdominal segments, same as for the male. Tergite VIII with four long and six short setae on the posterior margin. Vulva broadly rounded with twenty small setae on the posterior margin. Posterior margins, both dorsal and ventral, of anal corona with a thick fringe of small setae.

Type host: *Chaetura vauxi* (Townsend), Vaux's Swift.

Type material: Holotype male and allotype female were collected at Ft. Lowell, Arizona, on August 10, 1938, by Dr. Allan R. Phillips and will be deposited in the U. S. National Museum. Paratypes of the same series are in the collection of the University of Arizona. Nine paratypes collected at Santa Barbara, California, from the same host, are in the collection of Stanford University.

This species is closest to *D. dubius,* but differs in having a great number of setae on the prosternal plate and fewer spines on the paratergal plates.

Genus *Eureum* Nitzsch

Eureum Nitzsch, 1818. Germar's Mag. Ent., *3*: p. 301.
Eureum Nitzsch. Ewing, 1930. Proc. U. S. Nat. Museum, 77, no. 2843: p. 10.
Arndtiella Eichler. 1948. Naturwissenshaftlichen Rundschau, *2*: p. 81. *Nomen novum* for "*Eureum* Ewing, 1930" (*nec Eurem* Nitzsch, 1818).

Genotype: *Eureum cimicoides* Burmeister, 1838, found on the European Swift, *Apus apus apus* (Linnaeus).

The genus is distinguished by its large, short, robust form. Antennae relatively small; antennal fossae partly roofed by an expansion of the head; no preocular notch or slit; eyes double, the two corneas on one side being partly fused; temples greatly expanded, angular; the occiput deeply concave.

Prothorax enlarged, emarginate laterally and posteriorly; prosternal plate well developed with heavy chitinous margin and bearing numerous setae. Mesothorax short, separated from the metathorax by a distinct dorsal suture, but seldom visible dorsally. Metathorax large, lateral margins expanded posteriorly. First pair of legs short, second and third pairs longer; first femur very short; hind femur has a patch of fine setae on the ventral surface.

Abdomen short and broad; paratergal plates each with a marginal row of spines and setae and a small tuft of long hair-like setae; tergites bare except for a single transverse marginal row of closely set setae. Abdominal sternites V, VI and VII have a patch of fine setae in each posterior lateral angle.

Genital armature of the male symmetrical, with short, wide basal plate; parameres short, clasper-like and free, extending beyond preputial sac. Female genital region with sternites VIII and IX fused into a single short plate; the margin of the vulva convex with a corona of fine setae.

Eureum ewingi Eichler

(Figure 9, 9A)

"*Ereum cimicoides* Nitzsch." Ewing, 1930. Proc. U. S. Nat. Museum, 77, no. 2843: p. 10, figs. 5 and 7e.
Eureum ewingi Eichler, 1942. Zool. Anz., 138: p. 179. *Nomen novum* for "*Eureum cimicoides* Nitzsch," Ewing, 1930 (*nec* Burmeister, 1838).

Type host: *Chaetura pelagica* (Linnaeus), Chimney Swift.

Ewing gave a complete description of a female collected at Columbus, Ohio, which he determined to be "*Eureum cimicoides* Nitzsch." Later Eichler noticed that Ewing's description did not agree with *Eureum cimicoides* Burmeister found on the type host. The specimen described by Ewing, which becomes the holotype, is still in the collection of Mr. H. S. Peters. Dr. Eichler did not see the specimen and based his action entirely on the information contained in Ewing's paper.

Mr. H. S. Peters has kindly loaned his specimen to the authors for this study. No additions need be made to Ewing's description, but the original illustrations are inadequate. Figure 5 (in Ewing, 1930) shows twelve setae on the posterior margins of the pronotum. There are only eight, four on each posterior lateral angle. The middle four setae of the drawing are not evident in the cleared, remounted type, nor are any sockets for these setae. The prosternal plate was incorrectly illustrated in figure 7e (Ewing 1930) and has been drawn as figure 9A. Mr. Chester J. Stojanovich has kindly illustrated the holotype as figure 9 and 9A.

Dr. G. J. Spencer, in 1947 (Proc. Ent. Soc. Br. Columbia, 44: p. 4) recorded "*Eureum cimicoides* Nitzsch" from *Nephoecetes niger borealis* (Kennerly, the Northern Black Swift, collected at Vancouver, British Columbia. This is the second and latest published record of a collection of this genus in North America. As noted by Dr. Spencer, the determination was made by Professor A. W. Baker. The material could not be secured for this study, so the identity of this series could not be established. In all probability, Spencer's (1947) material is not "*cimicoides*" but *E. spenceri* n. sp. described in this paper.

Eureum spenceri n. sp.
(Figures 10, 10A)

Male: Head twice is wide as long. Dorsal chaetotaxy of head as in *E. ewingi,* except for six long setae on each temple. Gular plate long and narrow, open posteriorly with nine long setae on each lateral margin. Pronotum with six long setae in each posterior lateral angle. Twenty-four or twenty-six short seta and six long setae on the prosternal plate. A patch of eight small stout setae on the first femora. Twenty-two short stout setae on the middle femora. A thick patch of short, fine setae on the last femora. One row of short and medium length setae on the posterior margin of each tergite. A row of medium-length setae on the posterior margin and a row of short setae on the anterior margin of the abdominal sternites. A patch of fine setae in the posterior lateral angles of abdominal sternites V, VI and VII. A patch of long setae in the posterior lateral angles of abdominal sternite VIII. Six short stout spines in the posterior lateral angles of abdominal sternites II, III and IV. Paratergal plates as in *E. ewingi,* except twice the number of spines and setae on each. Genital opening with a row of medium-length setae on the posterior margin. Anal opening with a sparse row of fine setae. Male genitalia as illustrated in figure 10A.

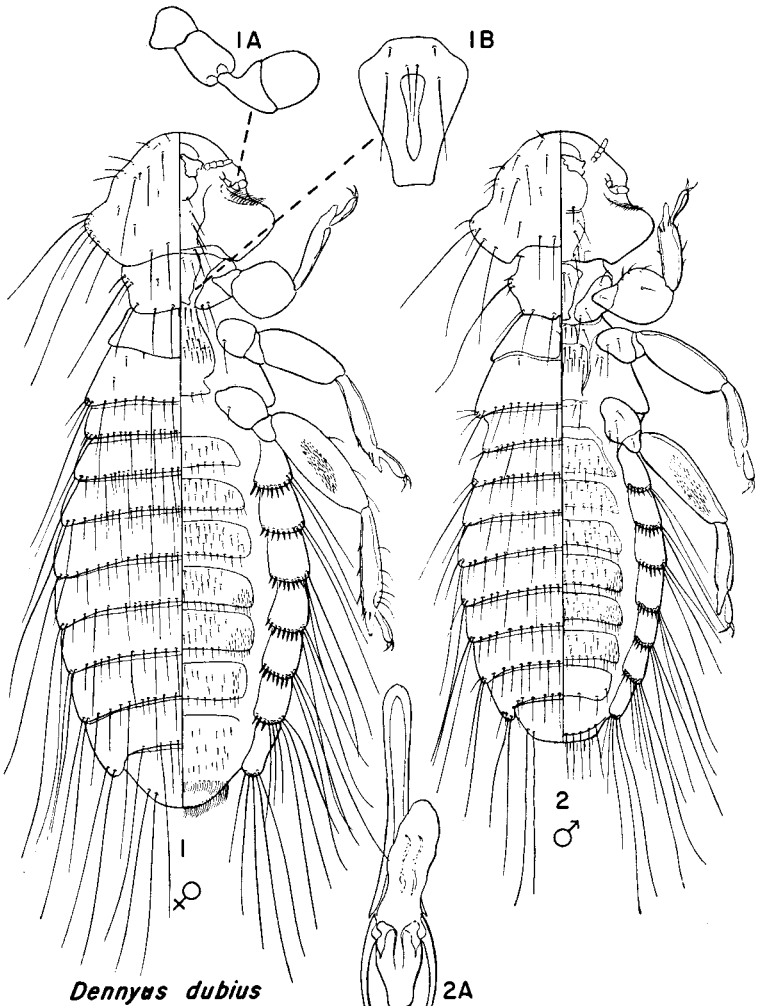
Female: General shape, size, and chaetotaxy, except for the terminal abdominal segments, same as in the male. Vulva broadly rounded, with six long setae in each posterior lateral angle. Posterior margins of anal corona with a

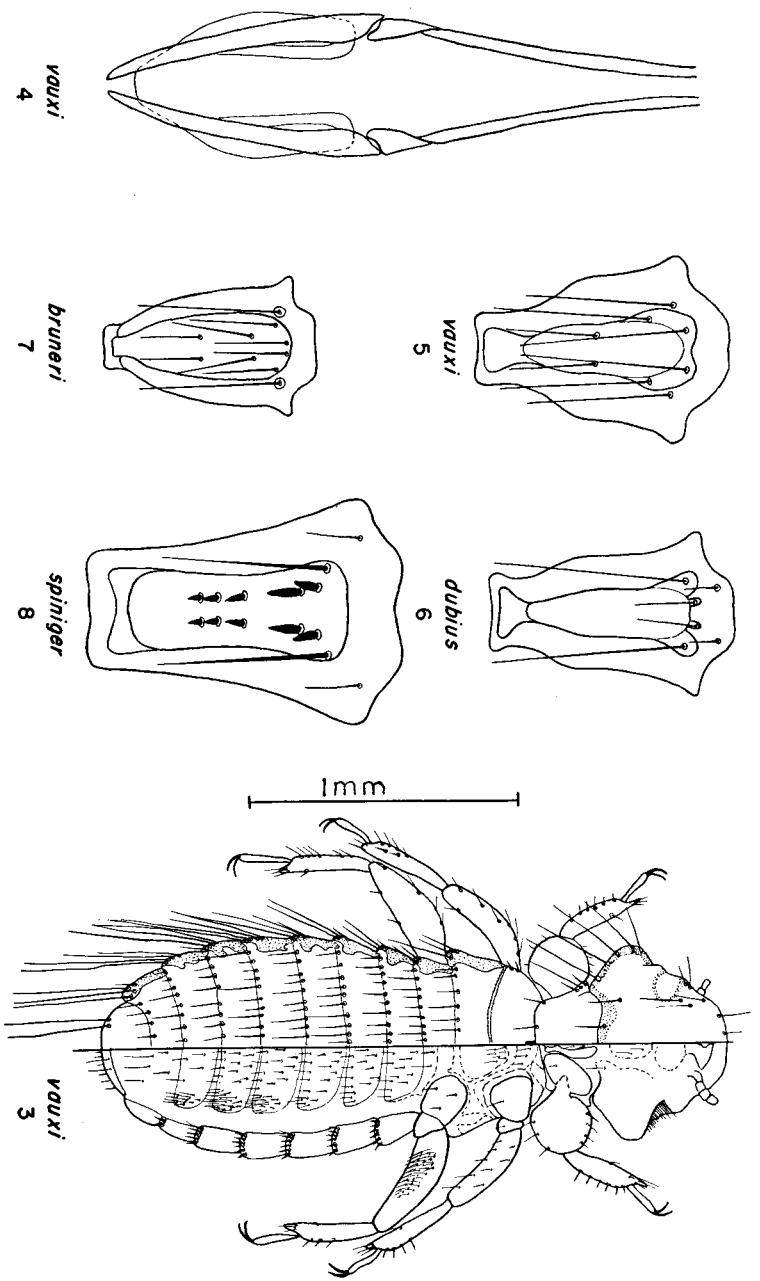
thick fringe of fine setae. Length of female and male is 4.4 mm. and greatest width in both sexes is 2.7 mm.

Type host: *Nephoecetes niger borealis* (Kennerly), Northern Black Swift.

Type material: Holotype male and two paratype males collected at New Denver, British Columbia, in May or June 1941 by Mr. J. Hatter. Allotype female collected at Vancouver, British Columbia, in November 1931 by Dr. G. J. Spencer. All types are in the collection of Dr. G. J. Spencer.

This species is closest to *E. ewingi,* but differs in being much larger and possessing a greater number of setae on the temples, pronotum, and paratergal plates.

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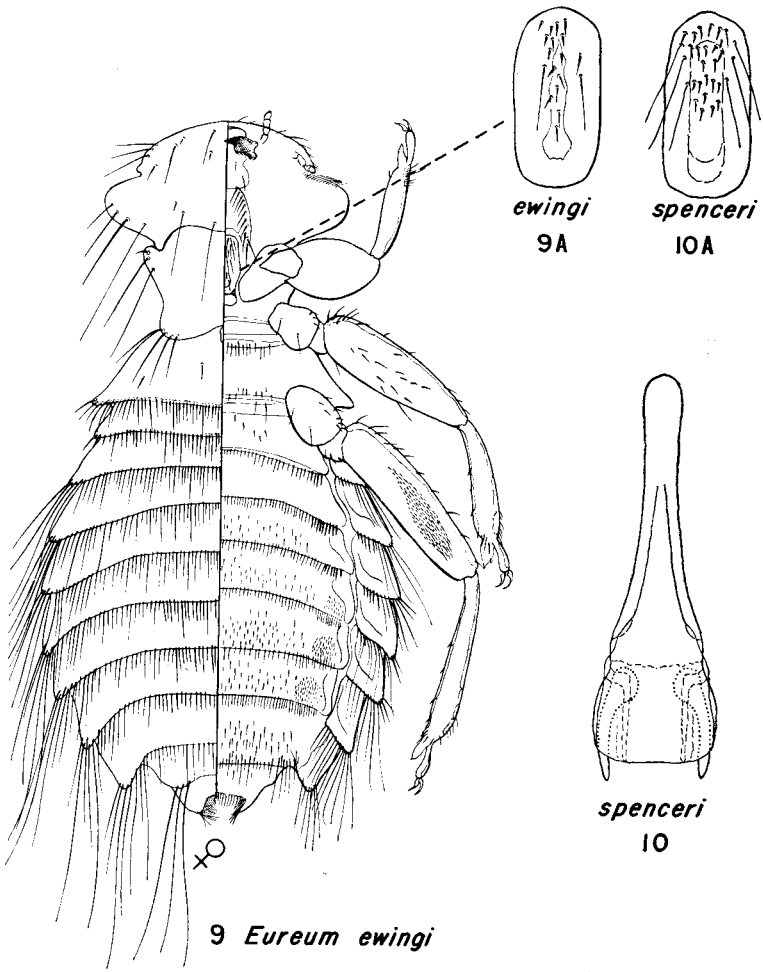

9 *Eureum ewingi*

EXPLANATION OF FIGURES

PLATE I

Dennyus dubius (Kellogg). 1. Dorsal-ventral view of female; 1A. antenna; 1B. prosternal plate; 2. dorsal-ventral view of male; 2A. male genitalia.

PLATE II.

Dennyus vauxi n. sp. 3. Dorsal-ventral view of male; 4. male genitalia; 5. prosternal plate.
Dennyus dubius (Kellogg). 6. Prosternal plate.
Dennyus bruneri (Carriker). 7. Prosternal plate.
Dennyus spiniger Ewing. 8. Prosternal plate.

PLATE III.

Eureum ewingi Eichler. 9. Dorsal-ventral view of female; 9A. prosternal plate.
Eureum spenceri n. sp. 10. Prosternal plate; 10A. male genitalia.