

**Two New Species of *Dennyus* (*Ctenodennyus*) Lice
(Phthiraptera: Menoponidae) from Swiftlets
(Apodiformes: Apodidae)**

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ABSTRACT: The single previously-described species of *Dennyus* (*Ctenodennyus*), *D. (C.) spiniger* Ewing (type host—*Cypseloides niger*), is redescribed. Two new species of this subgenus are also described and illustrated: *D. (C.) southwoodi* (type host—*Aerodramus franciscus*; other hosts—*A. brevirostris*, *A. fuciphagus*, *A. maximus*, *A. spodiopygius*, *A. whiteheadi*) and *D. (C.) elbeli* (type host—*Collocalia esculenta*; other host—*C. linchi*).

To date, only a single species of *Dennyus* (*Ctenodennyus*) has been described, this being *D. (C.) spiniger* Ewing from *Cypseloides niger borealis* (Kennerly), the northern black swift in North America. Through extensive collecting of lice by the junior author from swiftlets and through a loan of Bishop Museum material, we have obtained a small number of lice representing 2 new species of this subgenus. Here we redescribe *D. spiniger* and describe and illustrate these 2 new species.

Subgenus *Ctenodennyus* Ewing

Subgenus *Ctenodennyus* Ewing, 1930:9. Type species: *Dennyus (Ctenodennyus) spiniger* Ewing, 1930.

This subgenus is characterized by the following combination of characters: Both sexes with dorsal head setae 14, 17, 19, 23, and 28 stout, thick (see Ledger, 1970, Fig. 3 for numbering system); anterior head margin evenly rounded; ventral truncate-ovoid excavation of head anterior to eye without thickened anterior rim; 6 stout setae on pronotum along with 8 very long marginal setae; 10 stout setae on metanotum; meso- and metasternum with only long fine setae; first femur quite broad; third femur with ventral brush of setae; at least first 3 abdominal terga with stout setae intermixed in marginal row of normal setae; each tergum I–VIII with very long seta at lateroposterior corner; each side of terminal tergum with 2 very long setae; sternum II lacking conspicuous pigmented area laterally and anteriorly typical of many other *Dennyus*; sterna II–V with elongate slender pigmented strip adjacent to each lateroposterior corner; lateral setal brush on each side of sterna V–VII. Male with genitalia of relatively simple structure, similar to Fig. 3. Female ventral terminalia with subgenital plate margin straight, bearing row of setae; anus oval, with ventral and dorsal row of shorter among longer setae.

The members of *Ctenodennyus* are apparently uncommon on the swifts and swiftlets. Clayton et al. (1996) recently reviewed 23 taxa of *Dennyus* (*Collodennyus*)

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occurring on swiftlets. *Collodennyus* was far more common on swiftlets than *Ctenodennyus*; the latter represented less than 5% of a total of several hundred *Dennyus* collected. The grossly different head shape, the presence of stout spiniform setae on at least some abdominal terga, the presence of sternal brushes on VII, and other features readily distinguish *Ctenodennyus* from *Collodennyus*.

In the following descriptions, measurements are in millimeters. Host nomenclature follows Chantler and Driessens (1995). For sake of brevity, subgeneric features are not repeated in the species descriptions.

Dennyus (Ctenodennyus) spiniger Ewing

Dennyus (Ctenodennyus) spiniger Ewing, 1930: 9. Type host: *Cypseloides niger borealis* (Kennerly).

DESCRIPTION: Female with shape and chaetotaxy of head and thorax near to Fig. 1, abdomen near to Fig. 2; prosternal plate of type in Fig. 4, with 4–10 stout, thick setae in addition to 4–6 longer, slender setae; mesosternum with 5 setae, metasternum with 16; margin of metanotum with 14 fine setae in addition to 4 stout setae; all tarsi with pair of small claws. Fine setae on abdominal terga: I, 8; II, 15–17; III–VII, 19–22; VIII, 14–15. Stout thick setae on terga: I, 22–23; II, 13–15; III, 15–17; IV, 18–20; V, 17–18; VI, 15–17; VII, 9–14; VIII, 8–10. Marginal sternal setae (exclusive of brushes): I, 2; II, 16–21; III–IV, 20–23; V–VI, 11–14; VII, 4–5. Anterior sternal setae (exclusive of brushes and lateroanterior pair of short setae each side of II): I, 5–6; II–III, 11–13; IV–VI, 10–15; VII, 5–6. Setae in each brush on V, 21–29; on VI, 24–33; on VII, 15–20. Subgenital plate with 21–29 marginal, 10–12 anterior setae. Anus with 47–48 ventral, 57–58 dorsal fringe setae.

Male unknown.

DIMENSIONS: Female: preocular width (POW), 0.61; temple width (TW), 0.79–0.82; head length (HL), 0.46–0.48; TW/HL, 1.7; prothorax width (PW), 0.49; metathorax width (MW), 0.86–0.92; abdomen width at segment IV (AWIV), 1.11–1.13; abdomen length (AL), 1.74–1.79; AL/AWIV, 1.6; anus width (AnW), 0.36–0.38; total length (TL), 3.01–3.05.

REMARKS: Ewing (1930) based his description of the species and subgenus on only a single female specimen collected off the type host at Seattle, Washington. We have studied the female holotype as well as an additional female taken off the same host taxon in British Columbia and found that these are morphologically close to females of the new species we are describing from *Aerodramus*. They differ, however, in being consistently much larger in all dimensions, as well as by having quantitative differences in certain chaetotaxy details.

In addition to this material, we have seen a single male from *Schoutedenapus myoptilus* (Salvadori) in Kenya, whose size and chaetotaxy are consistent with what we anticipate the male of *D. spiniger* could be like, were it known. However, the wide separation of localities and hosts, coupled with absence of males for *D. spiniger* and absence of females for the Kenya material, leaves us no choice but to relegate the Kenya louse to unknown status awaiting collection of additional material.

MATERIAL EXAMINED: Female holotype of *D. (C.) spiniger*, ex *C. n. borealis*, USA: Washington: Seattle; 1 female, ex *C. niger* (Gmelin), CANADA: British Columbia: Vancouver.

Dennyus (Ctenodennyus) southwoodi n. sp.
(Figs. 1-4)

TYPE HOST: *Aerodramus francicus* (Gmelin).

DESCRIPTION: Male as in Fig. 1. Prosternal plate (Fig. 4) with total of 7-13 slender and stout thick setae; mesosternum with 2-4 setae, metasternum with 7-12; margin of metanotum with 13-16 fine setae in addition to 4 stout setae; all tarsi with pair of small claws. Fine setae on abdominal terga: I, 8; II, 17-18; III, 17-20; IV-VI, 19-27; VII, 14-23; VIII, 15-20. Stout thick setae on terga: I, 15-25; II, 9-14; III-V, 12-16; VI, 8-13; VII, 5-12; VIII, 0-3. Marginal sternal setae (exclusive of brushes): I, 2; II-IV, 10-15; V-VI, 4-8; VII, 4; VIII, 6. Anterior sternal setae (exclusive of brushes and lateroanterior pair of short setae each side of II): I, 2-5; II-IV, 4-12; V-VI, 3-7; VII, 0-1; VIII, 1-4. Setae in each brush on V, 11-24; on VI, 17-27; on VII, 9-19. Male genitalia as in Fig. 3.

Female head and thorax close to that of male (Fig. 1); prosternal plate with total of 9-11 slender and stout thick setae; mesosternum with 3-6 setae, metasternum with 11-12; margin of metanotum with 13-14 fine setae in addition to 4 stout setae. Abdomen as in Fig. 2. Fine setae on terga: I, 7-8; II, 15-17; III-IV, 16-22; V-VI, 19-24; VII, 16-22; VIII, 11-15. Stout thick setae on terga: I, 21-27; II-IV, 14-21; V, 15-17; VI, 13-16; VII, 8-13; VIII, 5-6. Marginal sternal setae (exclusive of brushes): I, 2; II, 15-17; III-IV, 17-23; V-VI, 9-12; VII, 3-5. Anterior sternal setae (exclusive of brushes and lateroanterior pair of setae each side of II): I, 5-7; II-VI, 10-23; VII, 4-8. Setae in each brush on V, 18-24; on VI, 20-31; on VII, 11-17. Subgenital plate with 19-25 marginal, 11-14 anterior setae. Anus with 47-54 ventral, 39-44 dorsal fringe setae.

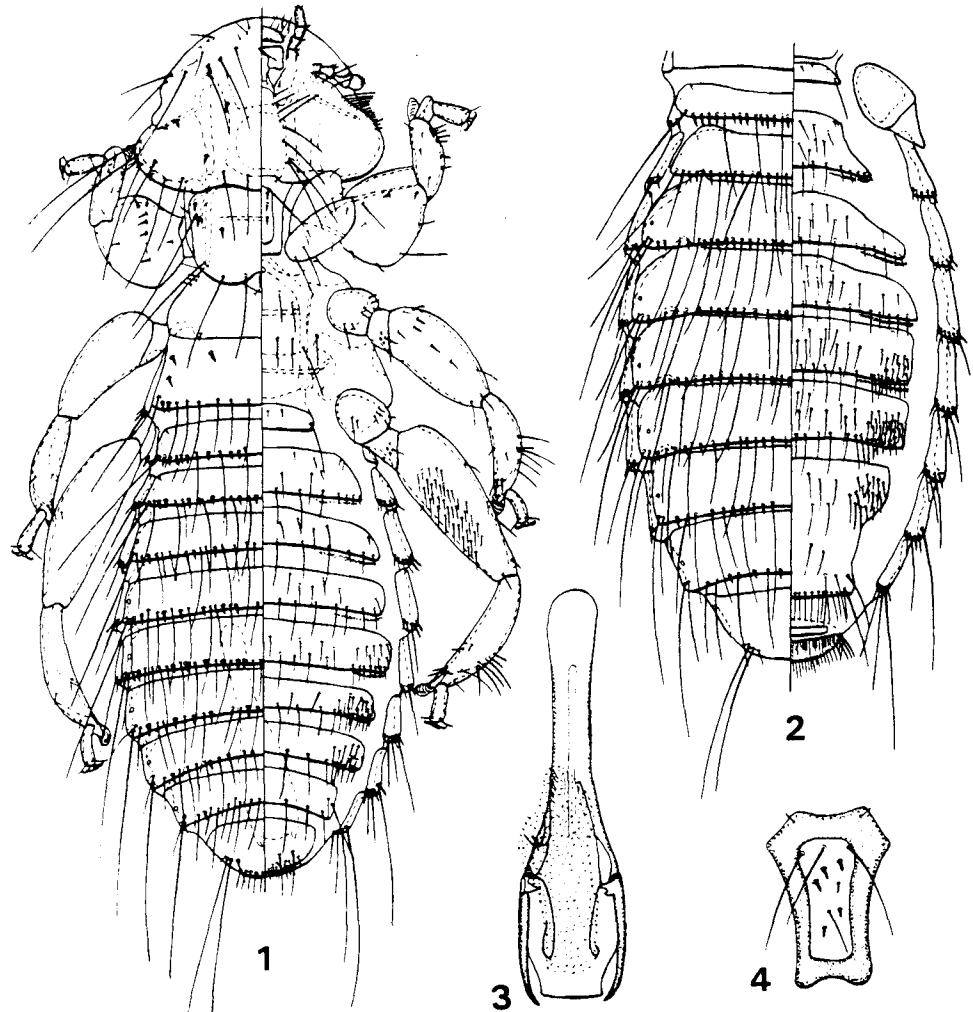
DIMENSIONS: Male: POW, 0.51-0.52; TW, 0.62-0.65; HL, 0.40-0.42; TW/HL, 1.5-1.6; PW, 0.37-0.42; MW, 0.63-0.66; AWIV, 0.71-0.79; AL, 1.16-1.33; AL/AW, 1.6-1.7; TL, 2.07-2.33; genitalia length (GL), 0.55-0.60; genitalia paramere length (GPL), 0.17-0.18; genitalia width (GW), 0.12-0.14. Female: POW, 0.55-0.56; TW, 0.67-0.71; HL, 0.41-0.43; TW/HL, 1.6-1.7; PW, 0.41-0.43; MW, 0.74-0.80; AWIV, 0.94-1.02; AL, 1.46-1.77; AL/AW, 1.6-1.7; AnW, 0.27-0.29; TL, 2.48-2.86.

REMARKS: As stated previously, this new species shows many similarities to *D. spiniger* in spite of their disparate localities and hosts. The female of *D. southwoodi* is much smaller in virtually all dimensions, has fewer metasternal setae, fewer thick stout setae on tergum VIII, and fewer dorsal anal setae. Since the male of *D. spiniger* is unknown, comparisons for that sex cannot be made.

Judging from the occurrence of *D. southwoodi* on at least 6 species of *Aerodramus* distributed over a fairly wide geographic area, we suggest that this louse taxon may eventually be found on many species of this genus.

TYPE MATERIAL: Female holotype, ex *A. francicus*, MAURITIUS, 4-5 January 1995, D. H. Clayton; in The Natural History Museum, London.

OTHER MATERIAL: 1 female, ex *A. brevirostris vulcanorum* (Stresemann), INDONESIA: West Java. 1 female, ex *A. fuciphagus* (Thunberg), MALAYSIA: Sabah: Gomantong Caves. 1 female, 1 male, ex *A. maximus* (Hume), MALAYSIA: N Sabah: Balembangen Is. 1 male, ex *A. spodiopygius assimilis* (Stresemann), FIJI: 9 mi from Suva: Nasinu Cave. 1 male, ex *A. whiteheadi* (Ogilvie-Grant), PHILIPPINE IS: N Vizcaya, Dalton; 1 male, same, except NEW GUINEA: Chimbu Dist.: Chauve. 1



Figs. 1-4. *Dennyus (Ctenodennyus) southwoodi* n. sp. 1. Male. 2. Female abdomen. 3. Male genitalia. 4. Prosternal plate.

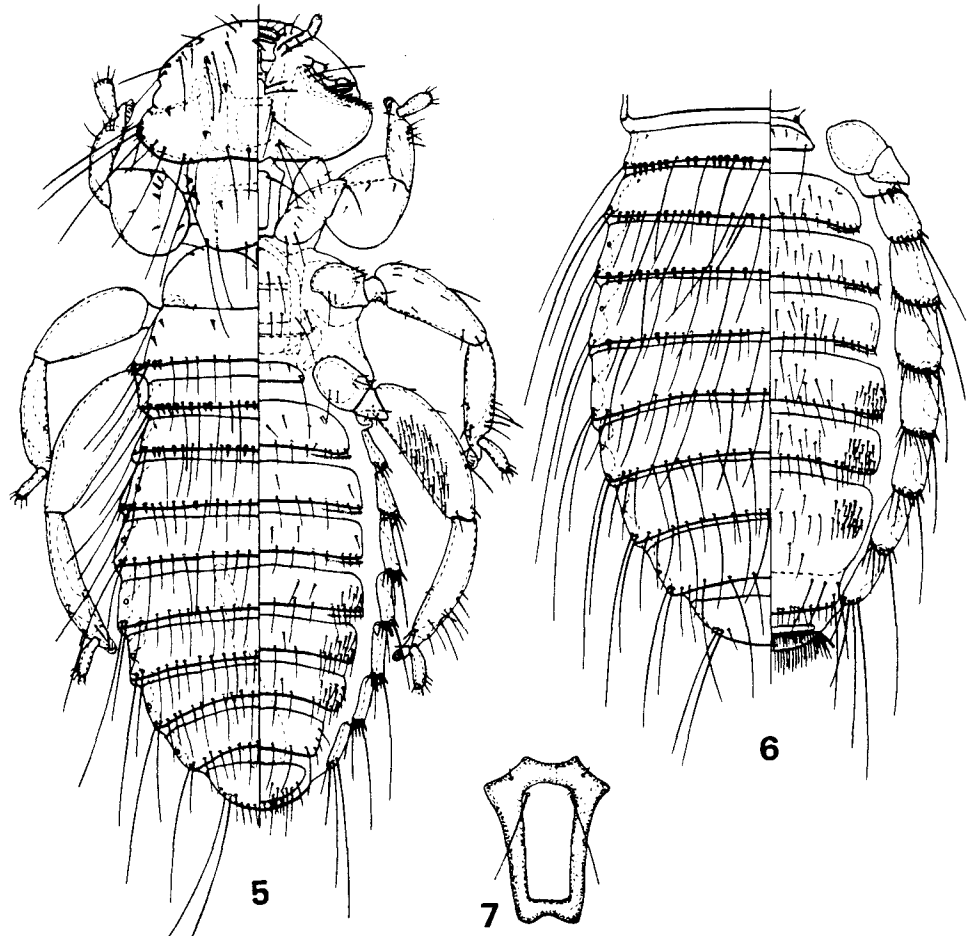
male, *Collocalia* (= *Aerodramus*) sp., NEW GUINEA: Papua: Central Dist.: Javarere Cave #2.

ETYMOLOGY: This species is named for T. R. E. Southwood, University of Oxford, in recognition of his widespread contributions to ecology and his friendship and enthusiastic support for the junior author's work.

Dennyus (Ctenodennyus) elbeli n. sp.
(Figs. 5-7)

TYPE HOST: *Collocalia esculenta* (Linnaeus).

DESCRIPTION: Male as in Fig. 5, differing from *D. southwoodi* as follows. Prosternal plate (Fig. 7) with total of 2 long, 2 short slender setae; mesosternum with 2-5



Figs. 5-7. *Dennyus (Ctenodennyus) elbeli* n. sp. 5. Male. 6. Female abdomen. 7. Prosternal plate.

setae, metasternum with 5-12; margin of metanotum with 12-18 fine setae in addition to 2-4 stout setae; first tarsi without apparent claws, second and third tarsi each with single weak claw. Fine setae on abdominal terga: I, 8-10; II, 16-22; III-VI, 21-28; VII, 19-26; VIII, 16-19. Stout thick setae on terga: I, 14-19; II, 3-13; III, 0-4; IV, 0-1; V, 0-2; VI, 0; VII, 0-3; VIII, 0. Marginal sternal setae (exclusive of brushes): II-IV, 5-14; V-VI, 4-7; VII, 3-4; VIII, 4-8. Anterior sternal setae (exclusive of brushes and lateroanterior pair of short setae each side of II): I, 0-3; II-IV, 5-13; V-VI, 3-9; VII-VIII, 0-4. Setae in each brush on V, 6-13; on VI, 12-23; on VII, 11-18.

Female head and thorax close to those of male (Figs. 5, 7). Abdomen (Fig. 6) differing as follows. Fine setae on abdominal terga: II, 12-18; VIII, 12-16. Stout thick setae on terga: I, 22-24; II, 12-17; III, 4-12; IV, 0-4; V-VIII, 0. Marginal sternal setae (exclusive of brushes): II, 15-18; III-IV, 16-22; V-VI, 6-11; VII, 4-6. Anterior sternal setae (exclusive of brushes and lateroanterior pair of short setae each side of II): I, 2-5; II, 9-14; III, 12-18; IV, 20-24; V-VI, 7-16; VII, 4-11. Setae in each

brush on V, 16–25; on VI, 17–30; on VII, 13–21. Subgenital plate with 20–26 marginal, 12–19 anterior setae. Anus with 42–51 ventral, 38–53 dorsal fringe setae.

DIMENSIONS: Male: POW, 0.44–0.50; TW, 0.53–0.60; HL, 0.32–0.36; TW/HL, 1.5–1.7; PW, 0.31–0.39; MW, 0.53–0.64; AWIV, 0.68–0.77; AL, 1.05–1.20; AL/AW, 1.5–1.6; TL, 1.88–2.07; GL, 0.53–0.57; GPL, 0.13–0.15; GW, 0.11–0.13. Female: POW, 0.47–0.50; TW, 0.58–0.62; HL, 0.33–0.36; TW/HL, 1.7–1.8; PW, 0.31–0.39; MW, 0.62–0.71; AWIV, 0.78–0.95; AL, 1.32–1.52; AL/AW, 1.5–1.7; AnW, 0.24–0.28; TL, 2.13–2.42.

REMARKS: This species, the second member of the subgenus *Ctenodennyus* to be described from swiftlets, differs from the other 2 members of the subgenus in a number of important ways: prosternal plate with only fine setae (Fig. 7); no tarsi with a full pair of claws; and generally without stout thick setae on terga V–VIII, with fewer of these setae on terga III–IV. Other more minor differences in dimensions and chaetotaxy further support this separation.

Dennyus elbeli is recorded from 2 species of *Collocalia* and may be the only species of *Ctenodennyus* found on this genus of host. The prosternal plate chaetotaxy and absence of claws on the first tarsi are characters shared by the subgenus *Collo-dennyus*, whose members also occur throughout the swiftlets.

TYPE MATERIAL: Female holotype, ex *C. esculenta*, NEW GUINEA: Morobe: Bulldog Rd.: 12 mi. S. Edie Cr., 2405 m, 5 July 1966, R. M. Mitchell, BBM-NG 52291; in collection of the Bishop Museum, Honolulu. Paratypes: 1 male, same except 6 mi. from Edie Cr., 2200 m, 13 December 1970, A. B. Mirza, BBM-NG 99597; 1 male, same except Edie Cr., 2040 m, 22 July 1966, N. Wilson & R. M. Mitchell, BBM-NG 52588; 1 male, same except Mt. Kaindi, 2300 m, 24 June 1967, A. C. Ziegler, BBM-NG 53291; 1 female, same except West Sepik Dist., Telefomin, 5000 ft., 15 August 1963, P. Temple, BBM-NG 22834; 2 females, 2 males, "No specimens, prob. *Collocalia esculenta*", NEW GUINEA: Bougainville: Mutahi, 700 m, 18 km SW Tinputz, 12 March 1968, A. B. Mirza, BBM-NG 61207; 1 male, *C. esculenta*, SOLOMON IS: Florida Is.: Haleta, 10 m, 7 October 1964, P. J. Shanahan, BBM-SI 24394; 1 male, *C. esculenta*, MALAYSIA: Kuala Lumpur: Ampang Reservoir, January 1994, D. M. Tompkins.

OTHER MATERIAL: 1 female, *Collocalia linchi* Horsfield and Moore, INDONESIA: West Java: Bogor.

ETYMOLOGY: This species is named for Robert E. Elbel, University of Utah, in recognition of his contributions to chewing louse taxonomy.

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Literature Cited

- Chantler, P., and G. Driessens. 1995. *Swifts: A Guide to the Swifts and Treeswifts of the World*. Pica Press, The Banks, East Sussex.
- Clayton, D. H., R. D. Price, and R. D. M. Page. 1996. Revision of *Dennyus* (*Collodennyus*) lice (Phthiraptera: Menoponidae) from swiftlets, with descriptions of new taxa and a comparison of louse and host relationships. *Syst. Entomol.* 21:179-204.
- Ewing, H. E. 1930. The taxonomy and host relationships of the biting lice of the genera *Dennyus* and *Eureum*, including the descriptions of a new genus, subgenus, and four new species. *Proc. U.S. Nat. Mus.* 77 (Art. 20):1-16.
- Ledger, J. A. 1970. A preliminary review of *Dennyus* (Mallophaga: Menoponidae) parasitic on swiftlets. *J. Entomol. Soc. So. Afr.* 33:239-260.