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TWO NEW SPECIES OF *PHANETA* (TORTRICIDAE) FROM SOUTHERN CALIFORNIA, WITH REVIEWS OF TEN SIMILAR SPECIES

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ABSTRACT. *Phaneta kramerana* and *Phaneta donahuei*, new species, are described from southern California. Ten congeners that might be confused with the new taxa based on forewing appearance are reviewed: *Phaneta tenuiana* (Walsingham), *Phaneta nepotinana* (Heinrich), *Phaneta fertoriana* (Heinrich), *Phaneta subminimana* (Heinrich), *Phaneta complicana* (McDunnough), *Phaneta migratana* (Heinrich), *Phaneta alatana* (McDunnough), *Phaneta cinereolineana* (Heinrich), *Phaneta crassana* (McDunnough), and *Phaneta spectana* (McDunnough). Adults and genitalia are illustrated for each species.

Additional key words: Olethreutinae, Eucosmini, western North America

The primary purpose of this paper is to make names available for two new species of *Phaneta* Stephens from southern California. The new taxa are small nondescript brownish-gray moths that might be mistaken for several named western *Phaneta* based on forewing appearance but which are readily distinguished by genitalic characters. The similar looking congeners can themselves be difficult to identify due to a scarcity of diagnostic forewing markings, a fair amount of intraspecific variation, and a lack of information on the female genitalia. Ten species are reviewed here: *Phaneta tenuiana* (Walsingham), *Phaneta nepotinana* (Heinrich), *Phaneta fertoriana* (Heinrich), *Phaneta subminimana* (Heinrich), *Phaneta complicana* (McDunnough), *Phaneta migratana* (Heinrich), *Phaneta alatana* (McDunnough), *Phaneta cinereolineana* (Heinrich), *Phaneta crassana* (McDunnough), and *Phaneta spectana* (McDunnough). Three others, *Phaneta indagatricana* (Heinrich), *Phaneta misturana* (Heinrich), and *Phaneta latens* (Heinrich), were recently reviewed by Wright (2010). The new species are placed in *Phaneta* for lack of a costal fold on the male forewing.

MATERIALS AND METHODS

I examined 376 adult specimens and 121 associated genitalia preparations from the following institutional and private collections: V. Albu, Friant, California; American Museum of Natural History, New York (AMNH); George J. Balogh, Portage, Michigan; Canadian National Collection, Ottawa (CNC); Lawrence L. Crabtree, Bieber, California; Essig Museum of Entomology, UC Berkeley (EME); The Natural History Museum of Los Angeles County, Los Angeles (LACM); John S. Nordin, Laramie, Wyoming; Strickland Museum, University of Alberta, Edmonton (UASM); United States Museum of Natural History, Washington D.C. (USNM); and Donald J. Wright (DJW).

Adults were examined with a Leica MZ95 stereomicroscope equipped with an ocular micrometer, genitalia with a Leica DME compound microscope. Images of adults were edited in Adobe Photoshop CS5, and line and stipple drawings were made with the aid of a Ken-A-Vision X1000-1 microprojector. Morphological terminology follows Gilligan et al. (2008). Aspect ratio (AR) is defined as forewing length (FWL) divided by medial forewing width, valval neck ratio (NR) as minimum neck width divided by valval width near the saccular corner, and saccular angle (SA) as the angle-like projection on the ventral margin of the valva where the sacculus meets the neck (see Wright 2011). These statistics are reported as the average of several such measurements. The term clasper refers here to a small portion of the medial surface of the valva located at the distal margin of the basal excavation. In *Phaneta* its form varies from an elongate tongue-like projection (sometimes called a pulvinus) to a variably raised tab-like projection, and its surface is usually covered with stiff setae. An estimate of the number of cornuti in the male vesica was obtained by counting sockets. The symbol "≈" stands for "approximately equal to," and n signifies the number of observations supporting a particular statement.

I examined the primary types of the species treated here except for that of *P. tenuiana*. In that case my determinations are based on photographs taken by Obraztsov sixty years ago of the adult and genitalia of a specimen he chose as the lectotype. His selection was never published, so for the sake of nomenclatorial stability that designation is made below.

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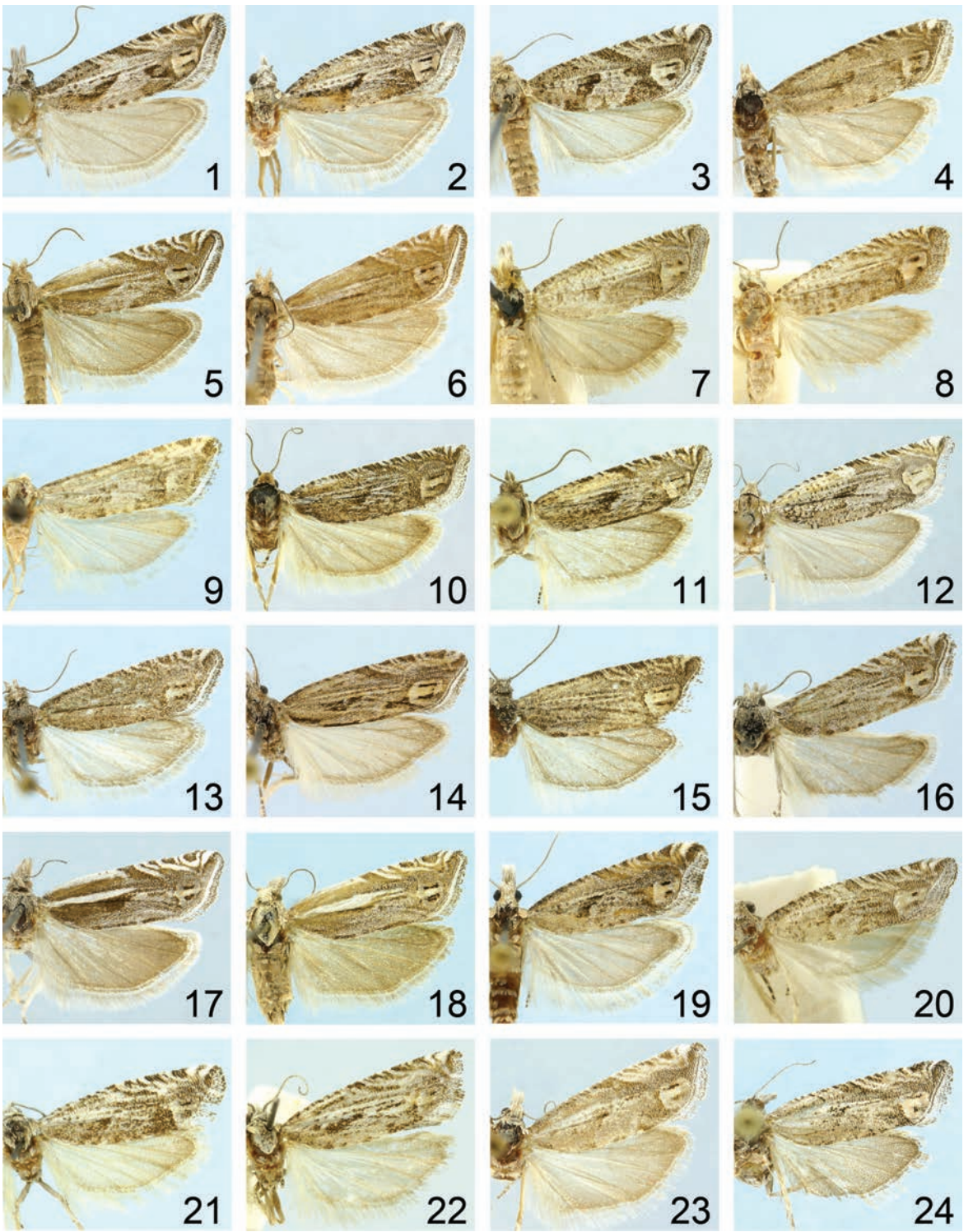

FIGS. 1–24. **1–2,** *P. tenuiana*. **1.** ♂ Grand Co., Colorado. **2.** ♂ Esmeralda Co., Nevada. **3–4,** *P. nepotinana*. **3.** ♂ Summerland, British Columbia. **4.** ♂ Routt Co., Colorado. **5–6,** *P. fertoriana*. **5.** ♂ Peachland, British Columbia. **6.** ♂ Hardy W.C., South Dakota. **7–8,** *P. subminimana*, ♀, ♀ San Diego Co., California. **9,** *P. complicana*, ♂ holotype. **10–12,** *P. migratana*. **10.** ♂ Deschutes Co., Oregon. **11.** ♂ Albany Co., Wyoming. **12.** ♀ Alamosa Co., Colorado. **13–14,** *P. alatana*. **13.** ♂ holotype. **14.** ♂ San Diego Co., California. **15–16,** *P. cinereolineana*. **15.** ♂ holotype. **16.** ♂ Lost River Bandlands, Alberta. **17–18,** *P. crassana*. **17.** ♂ Osoyoos, British Columbia. **18.** ♀ Lethbridge, Alberta. **19–20,** *P. spectana*. **19.** ♂ Slope Co., North Dakota. **20.** ♂ White Pine Co., Nevada. **21–22,** *P. kramerana*. **21.** ♀ holotype. **22.** ♀, San Bernardino Co., California. **23–24,** *P. donahuei*. **23.** ♂ Kern Co., California. **24.** ♂ Inyo Co., California.

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SPECIES ACCOUNTS

Phaneta tenuiana (Walsingham)
(Figs. 1–2, 25, 37, 45)

Semasia tenuiana Walsingham 1879:59.
Thiodia tenuiana: Fernald [1903]:462; Heinrich 1923:54; McDunnough 1939:44.
Eucosma tenuiana: Barnes and McDunnough 1917:172.
Phaneta tenuiana: Powell 1983:33; Brown 2005:496.

Lectotype (here designated): ♂, California, Siskiyou County, Sheep Rock, Walsingham, 3 September 1871, slide 11584, BMNH(E) #819942, BMNH.

Syntype: ♀, same data as lectotype, slide 11548, BMNH.

Description. *Head.* Frons white; vertex with medial scales white, lateral scales mostly gray with white apices; labial palpus elongate, with medial surface grayish white, lateral surface gray, long scales on second segment concealing third segment; antenna concolorous with vertex. *Thorax.* Dorsal surface grayish; fore- and mid-legs with anterior surfaces blackish gray to brownish gray, posterior surfaces grayish; hind-legs pale brownish gray; tarsi with conspicuous white annulations. Forewing (Figs. 1, 2): ♂ FWL 7.0–9.4 mm (mean = 8.3, n = 78), AR = 3.42; ♀ FWL 7.4–8.4 mm (mean = 7.8, n = 14), AR = 3.23; costa straight to weakly arched; apex acute; termen straight to weakly concave; dorsal surface with blackish-brown markings and grayish-white interfascial areas; subbasal fascia represented by small costal dash and outwardly oblique dash from A_{1+2} to cubitus, the latter adjoined by an irregular orange-brown to grayish-brown patch extending along inner margin to base of wing; median fascia consisting of a blackish-brown bar from mid-costa to radius and a semi-rectangular mark on inner margin bordering proximal edge of ocellus; subbasal and median fasciae interrupted in cell by whitish diffuse longitudinal streak from base to ocellus; ocellus with whitish central field crossed by two prominent blackish-brown dashes and bordered proximally and distally by fawn to grayish-white lustrous bars; costal strigulae from median fascia to apex white, divided, and sharply separated by blackish-brown costal marks; termen with thin white line from tornus to apex; fringe scales white with black to gray cross-marks. Hindwing pale gray brown. *Abdomen.* Male genitalia (Fig. 25) (n = 13): Uncus moderately developed, clearly differentiated from dorsolateral shoulders of tegumen; socii fingerlike; phallus moderately tapering distally; vesica with 14–24 deciduous cornuti; valva with costal margin concave, NR = 0.51, SA obtuse (mean = 107°), clasper tablike and weakly raised; cucullus with apex somewhat angular, anal angle well developed; distal margin of cucullus with bend at two-thirds distance from anal angle to apex and 8–10 moderately stout setae evenly distributed from anal angle to bend. Female genitalia (Figs. 37, 45) (n = 4): Papillae anales laterally facing and moderately setose; lamella postvaginalis rectangular, width ≈ 2 × length, with microspinulate central trough weakly depressed; lamella antevaginalis ringlike; sternum 7 with lateral projections pointed and posterior edge emarginated to length of sterigma; anterolateral corners of sterigma fused with sternum 7; ductus bursae with sclerotized ring at juncture with ductus seminalis; corpus bursae with two signa of distinctly different size.

Distribution and biology. I examined 114 specimens (100 ♂, 14 ♀) from Arizona, California, Colorado, Nevada, Oregon, Utah, Washington, and Wyoming. Capture dates range from 25 August to 17 October. Several of the California specimens were collected in association with *Haplopappus* (Asteraceae).

Phaneta nepotinana (Heinrich)
(Figs. 3, 4, 26, 38, 46)

Thiodia nepotinana Heinrich 1923:263; McDunnough 1939:44.
Phaneta nepotinana: Powell 1983:33; Brown 2005:494.

Holotype: ♂, Utah, [Juab Co.], Eureka, T. Spalding, 30 May 1911, slide 72771, USNM.

Paratypes: UTAH. [Juab Co.], Eureka, T. Spalding, 30 May 1911, (5 ♂, slide 70034; 1 ♀, slide DJW 2611) USNM; [Tooele Co.], Stockton, T. Spalding, 24 May 1904, (1 ♂, slide CH 13 June 1922) AMNH. NEVADA. [Washoe Co.], Verdi, A. H. Vachell, 1–10 June, (2 ♂, slide 70036) USNM, (3 ♂; 1 ♀, slide DJW 2671) AMNH; CALIFORNIA. Inva [Inyo] Co., Olancha, 16–23 June, (1 ♂, slide 70035) USNM. This accounts for 14 of the 15 paratypes mentioned by Heinrich (1923). He reported two females from Eureka, Utah; I found only one. However, the AMNH has a ♂ from Eureka, Utah dated 2 June 1911 that was not mentioned by Heinrich but does bear his handwritten paratype label.

Description. *Head.* Frons white to brownish gray; vertex with medial scales white, lateral scales mostly gray brown with white apices; labial palpus with medial surface grayish white, lateral surface white toward base, with long gray-brown scales on second segment concealing third segment; antenna gray brown dorsally, white laterally; scape with ventral surface white, dorsal surface brownish gray. *Thorax.* Dorsal surface brownish gray to blackish gray; legs with anterior surfaces brownish gray to blackish gray, posterior surfaces pale tan; mid-leg with white mark at mid-tibia; tarsi with white annulations. Forewing (Figs. 3, 4): ♂ FWL 4.3–7.8 mm (mean = 6.7, n = 42), AR = 3.24; ♀ FWL 4.5–6.4 mm (mean = 5.8, n = 7), AR = 3.17; costa nearly straight; apex acute; termen straight to weakly concave; dorsal surface with fascial markings blackish brown, interfascial areas usually grayish white, sometimes suffused with gray brown; subbasal fascia chevron shaped, usually interrupted by thin whitish streak on radius; median fascia complete (Fig. 3) to barely discernible (Fig. 4), always represented by blackish-brown bar at mid-costa and variably expressed blackish-brown patch on inner margin adjacent to proximal edge of ocellus; ocellus edged proximally and distally by fawn to grayish-white lustrous bars, with proximal margin thinly edged with black; central field of ocellus whitish, crossed by two blackish dashes; costal strigulae from median fascia to apex white, divided, and sharply delimited by blackish-brown marks; scales along termen white with black cross-marks that form a thin black line from tornus to apex, the line flanked proximally and distally by thin and broader white lines, respectively; outer fringe scales gray brown with white apices. Hindwing pale gray brown. *Abdomen.* Male genitalia (Fig. 26) (n = 15): Uncus semi-circular, weakly divided medially, clearly differentiated from dorsolateral shoulders of tegumen; socii short and stubby; phallus cylindrical; vesica with 23–41 deciduous cornuti; valva with costal margin weakly concave, NR = 0.54, saccular corner broadly rounded, SA obtuse but ill defined; clasper consisting of two ridges lined with stiff setae, one bending parallel to costal edge of valva from margin of basal excavation to base of neck, the second parallel to first and displaced slightly toward ventral margin of neck; cucullus with apex evenly rounded, distal margin nearly straight, occasionally with shallow concave inflection or weak convex protrusion, ventral angle developed into long narrow finger-like projection; setae on medial surface of cucullus hairlike toward apex, course and less densely distributed toward base of ventral projection, sparse and stubby on ventral projection. Female genitalia (Figs. 38, 46) (n = 5): Papillae anales laterally facing and moderately setose; sterigma (Fig. 46)

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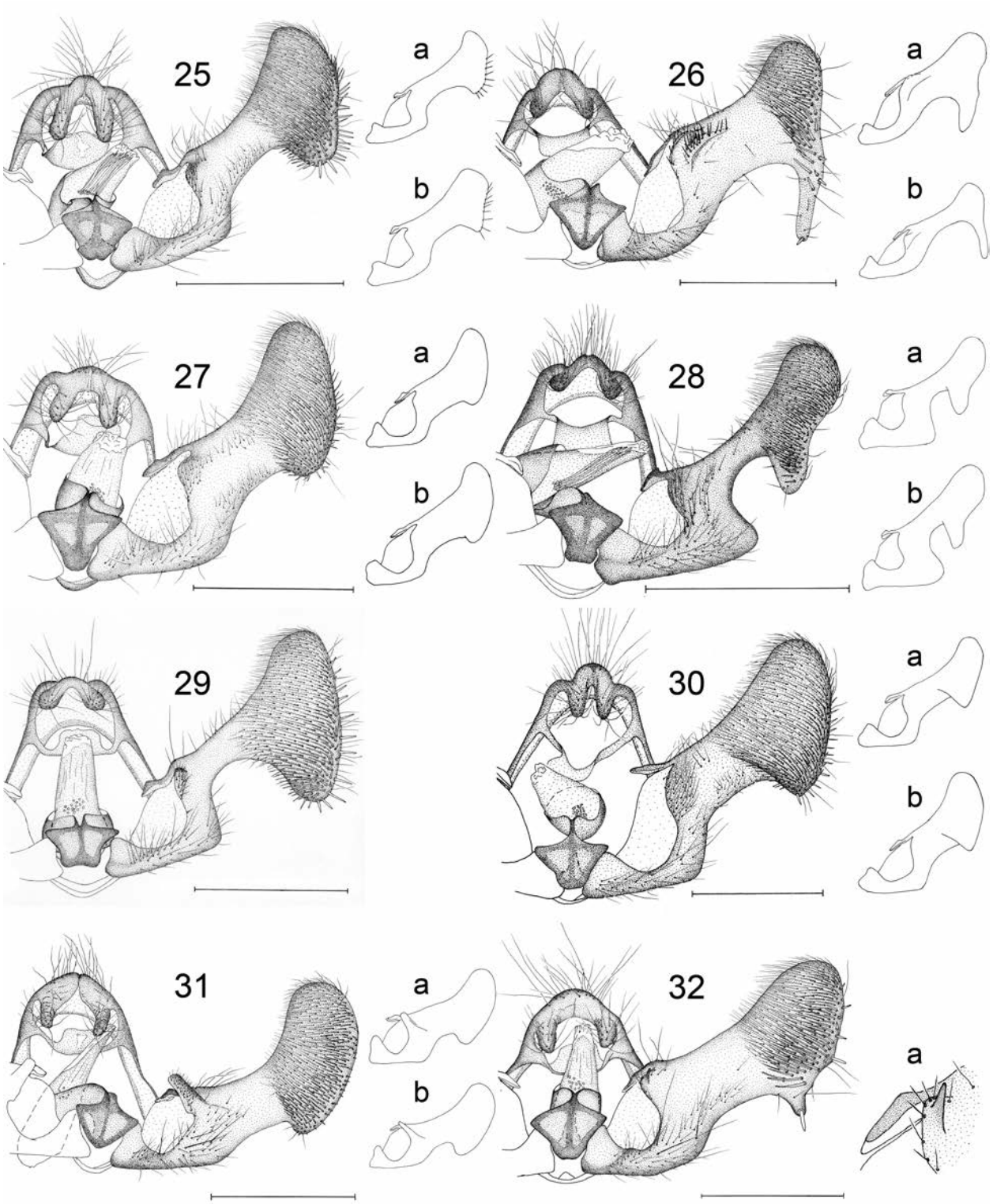

FIGS. 25–32. Male genitalia. **25.** *P. tenuiana*, slides DJW1009, USNM70040, 70039. **26.** *P. nepotinana*, slides DJW2165, 2610, USNM70032. **27.** *P. fertoriana*, slides DJW882, 2217, 2216. **28.** *P. subminimana*, slides DJW2635, 2637, USNM70080. **29.** *P. complicana*, slide TOR981 (holotype). **30.** *P. migratana*, slides USNM72770 (holotype), DJW2146, 281. **31.** *P. alatana*, slides DJW2115, 2618, USNM87883. **32.** *P. cinereolineana*, slide DJW2266. Scale bar = 0.5 mm.

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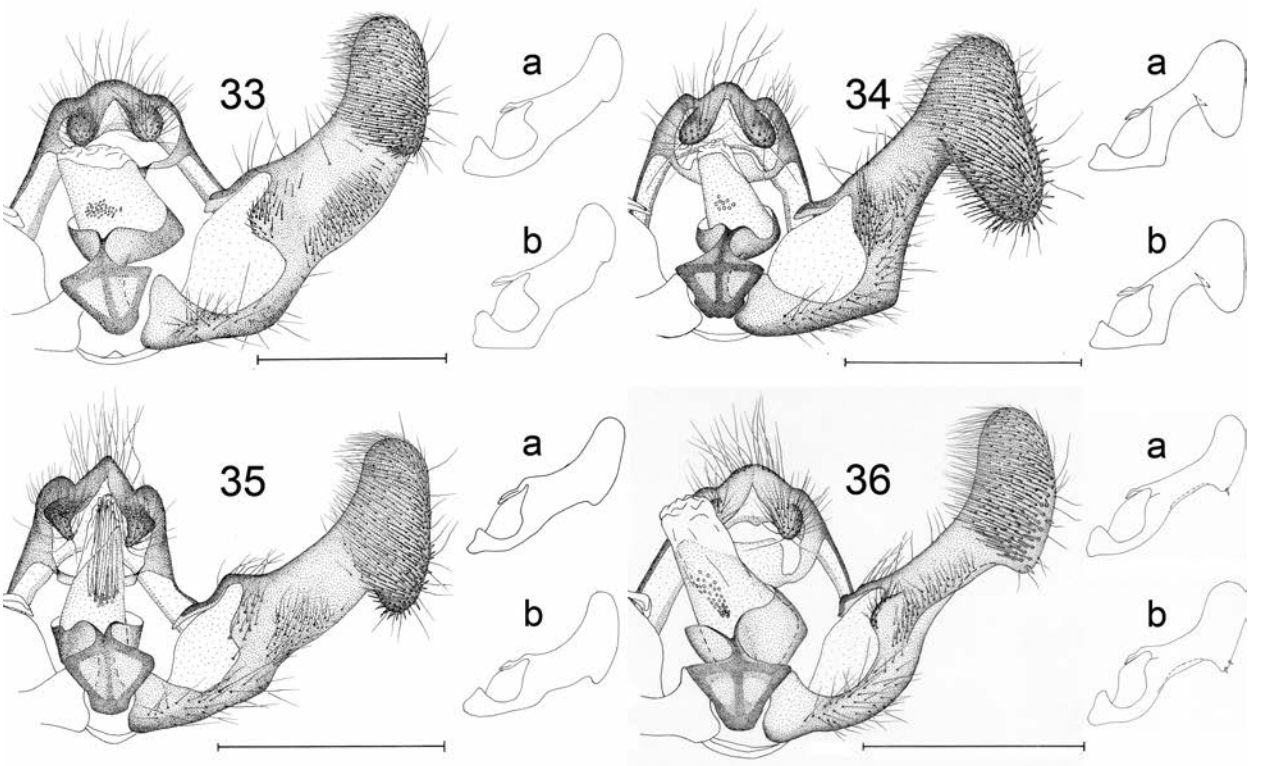

FIGS. 33–36. Male genitalia. **33.** *P. crassana*, slides USNM70041, DJW2651, USNM70042. **34.** *P. spectana*, slides DJW2619, 2213, 1092. **35.** *P. kramerana*, slides DJW2108, JAP234, DJW2632. **36.** *P. donahuei*, slides DJW3062, 3063, 2796. Scale bar = 0.5 mm.

ovately ringlike, microspinulate on posterior margin, fused with sternum 7 along lateral and anterior margins; sternum 7 with posterior edge emarginated beyond length of sterigma and with pair of outwardly projecting crescent shaped flaps, one on each lateral section, the two aligned with anterior margin of ostium; ductus bursae with irregularly shaped sclerotized ring at juncture with ductus seminalis, the latter located near ostium; corpus bursae with two signa of nearly equal size.

Distribution and biology. I examined 66 specimens (59 ♂, 7 ♀) from California, Colorado, Idaho, Nevada, Utah, Washington, and Wyoming collected between mid-February and mid-July. Six specimens in the USNM (5 from Asotin, Co., Washington, 1 from Jerome Co., Idaho) were reared by O. O. Filmore from *Artemisia tridentata* (Asteraceae).

Remarks. At the USNM there are a few male specimens from southern California with an unusually narrow valval neck (Fig. 26b). I tentatively determined them as *P. nepotinana* but did not include them in the statistics reported above.

Phaneta fertoriana (Heinrich)
(Figs. 5, 6, 27, 39, 47)

Thiodia fertoriana Heinrich 1923:264; McDunnough 1939:44.

Phaneta fertoriana: Powell 1983:33; Brown 2005:493.

Holotype: ♂, Canada, British Columbia, Goldstream, 24 May 1903, slide 72767, USNM.

Paratypes: same location as holotype, 10 May 1903 (1 ♀, slide DJW 2214) USNM, (1 ♀) AMNH. Heinrich (1923) reported 10/5/03 as the collection date for all three type specimens, but the pin label on the holotype reads 24/5/03, which admits only one interpretation (24 May 1903). Both paratypes are labeled 10/5/03, which I presume is to be interpreted as 10 May 1903.

Description. *Head.* Frons white; vertex gray brown, sometimes with obscure whitish medial line; labial palpus with first segment white, medial surface of second segment white shading to gray brown at margins, lateral surface mostly gray brown; antenna gray brown dorsally, whitish laterally. *Thorax.* Dorsal surface gray brown; legs with anterior surfaces brown, posterior surfaces tan; tarsi with pale

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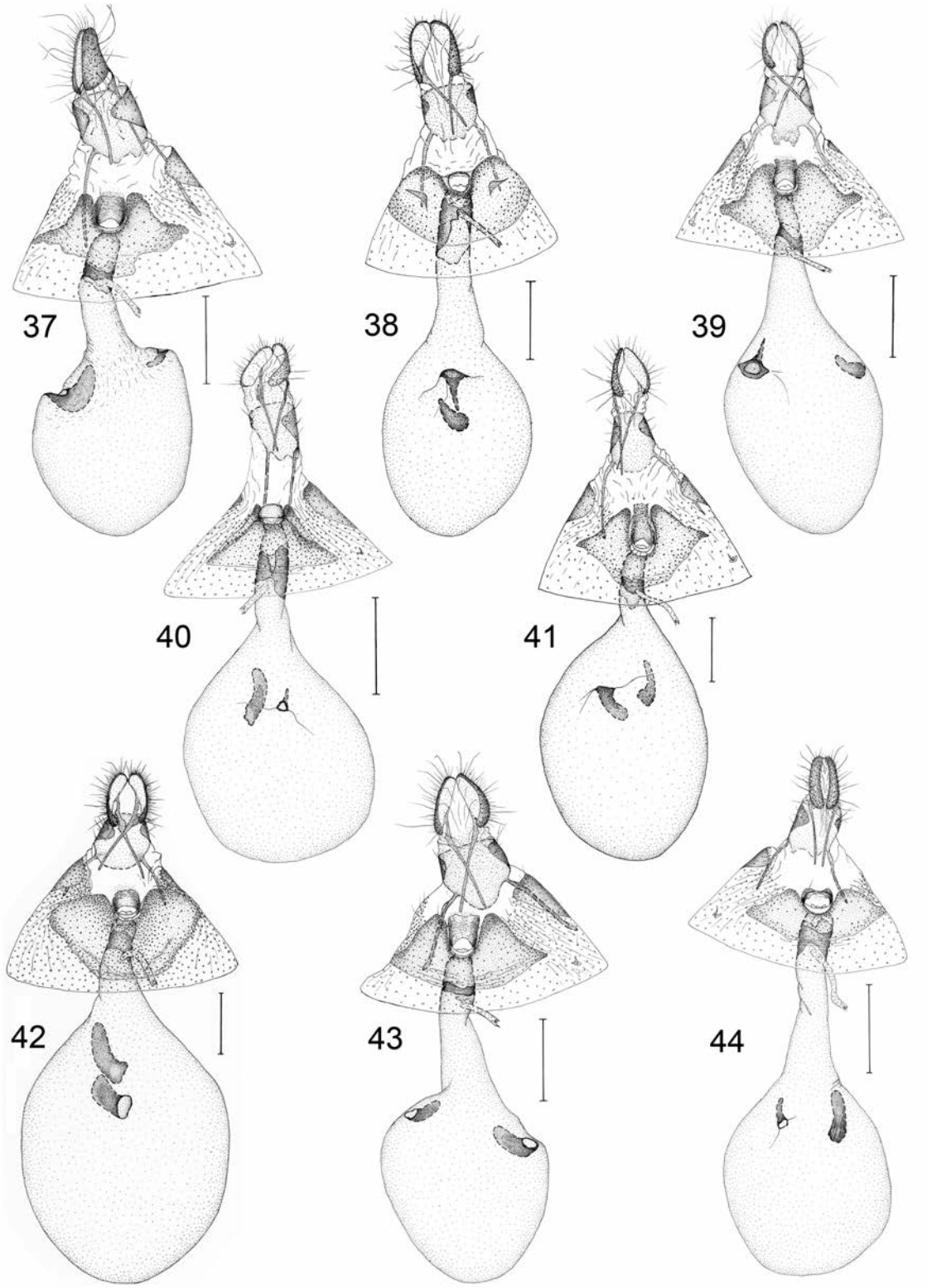

FIGS. 37–44. Female genitalia. **37.** *P. tenuiana*, slide DJW1937. **38.** *P. nepotinana*, slide DJW2611. **39.** *P. fetoriana*, slide DJW2215. **40.** *P. subminimana*, slide DJW2636. **41.** *P. migratana*, slide DJW2253. **42.** *P. crassana*, slide DJW3071. **43.** *P. spectana*, slide DJW2628. **44.** *P. kramerana*, slide DJW2145. Scale bar = 0.5 mm.

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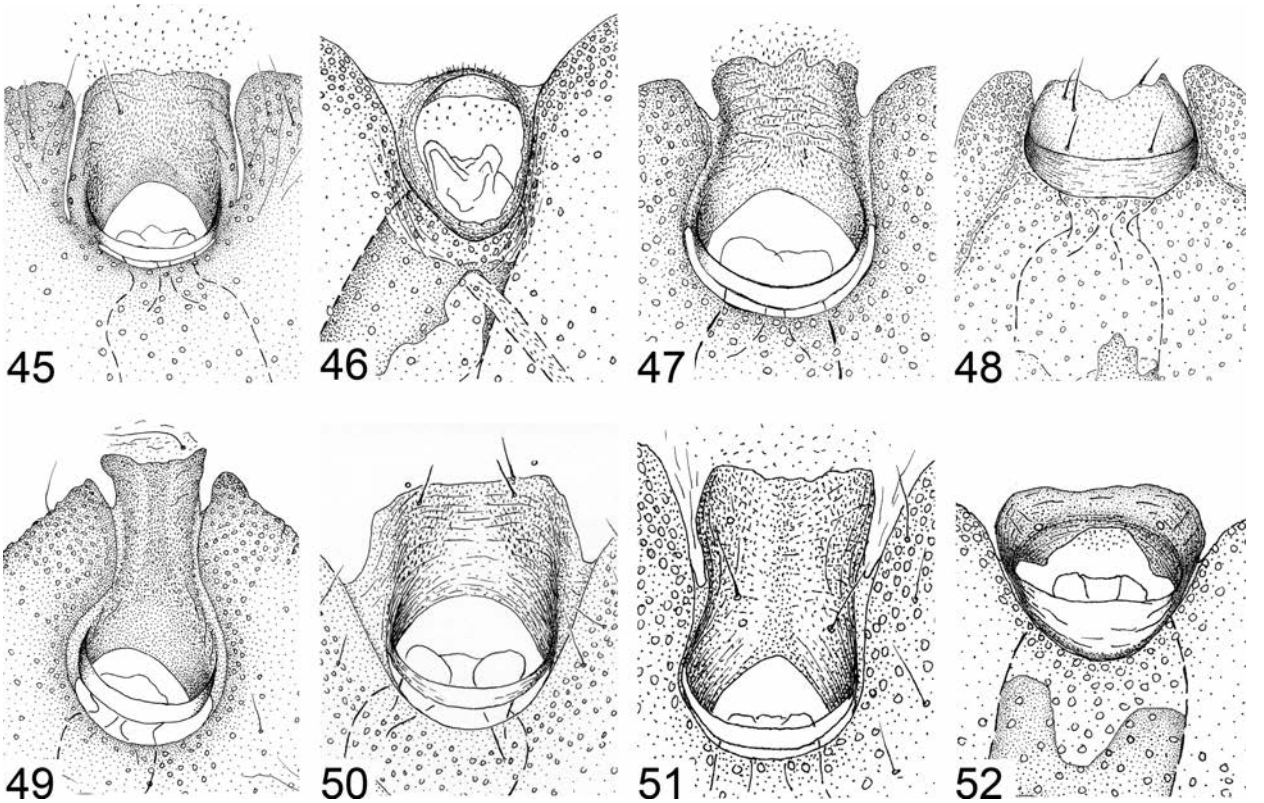

FIGS. 45–52. Sterigmata. **45.** *P. tenuiana*, slide DJW2211. **46.** *P. nepotinana*, slide DJW2157. **47.** *P. fetoriana*, slide DJW2215. **48.** *P. subminimana*, slide DJW2634. **49.** *P. migratana*, slide DJW2202. **50.** *P. crassana*, slide DJW3076. **51.** *P. spectana*, slide DJW2018. **52.** *P. kramerana*, slide DJW2167.

annulations. Forewing (Figs. 5, 6): ♂ FWL 6.3–8.3 mm (mean = 7.5, n = 22), AR = 3.28; ♀ FWL 5.4–8.0 mm (mean = 6.8, n = 9), AR = 3.20; costa nearly straight; apex acute; termen straight; dorsal surface brownish, with dark brown markings, a diffuse whitish streak along costa from base to median fascia, and sometimes an indistinct whitish streak along cubitus from base to mid-wing; cubital streak usually edged posteriorly with blackish-brown line and sometimes anteriorly by yellow-brown band from base to median fascia; subbasal fascia obscure to undetectable; median fascia complete but often fading toward inner margin; ocellus bordered proximally and distally by lustrous gray bars, with white to pale brown central field crossed by two prominent black dashes; costal strigulae from median fascia to apex white, divided, and delimited by brown marks; termen with thin black line from tornus to apex, followed distally by prominent white line; fringe scales brown to blackish brown with white apices. Hindwing gray brown. *Abdomen.* Male genitalia (Fig. 27) (n = 16): Uncus convex, weakly developed, weakly differentiated from dorsolateral shoulders of tegumen; socii short and fingerlike; phallus moderately tapering distally; vesica with 18–31 deciduous cornuti; valva with costal margin concave, NR = 0.65, SA obtuse (mean = 109°), clasper tablike and weakly raised; cucullus with apex evenly rounded, distal margin convex, ventral angle weakly developed, medial surface densely setose, margins lacking spiniform setae. Female genitalia (Figs. 39, 47) (n = 4): Papillae anales laterally facing and moderately setose; lamella postvaginalis rectangular, width ≈ length, with microspinulate central trough weakly depressed; lamella antevaginalis ringlike; sternum 7 with posterior edge emarginated nearly to length of sterigma and fused with lateral margins of lamella postvaginalis, lateral projections pointed; ductus bursae with sclerotized ring at juncture with ductus seminalis; corpus bursae with two signa, one somewhat larger than the other.

Distribution and biology. I examined 54 specimens (38 ♂, 16 ♀) from British Columbia, Manitoba, Arizona, California, New Mexico, South Dakota, Oregon, and Wyoming. Adults fly from late March to mid-July.

Phaneta subminimana (Heinrich)
(Figs. 7, 8, 28, 40, 48)

Thiodia subminimana Heinrich 1923:61; McDunnough 1939:45.
Phaneta subminimana: Powell 1983:34; Brown 2005:496.

Holotype: ♂, California, [San Diego Co.], San Diego, 1–7 August, slide 72776, USNM.

Paratypes: California, [San Diego Co.], San Diego, (5 ♂, slides 70080, DJW 2635) USNM, (2 ♂) AMNH, 1–7 August (1 ♂) USNM, 16–23 August (3 ♂, slide DJW 2637) USNM; W. S. Wright, 22 July 1908 (1 ♂) AMNH, 8 August 1908 (2 ♂) USNM, AMNH.

Description. *Head.* Frons whitish; vertex whitish shading to pale brown laterally; labial palpus largely whitish; second segment with brown mark on lateral surface and long brownish scales concealing third segment; antenna whitish with thin brown line along dorsal surface. *Thorax.* Dorsal surface pale brown; legs with anterior surfaces tan, posterior surfaces whitish; tarsi with white annulations. Forewing

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(Figs. 7, 8): ♂ FWL 5.0–7.0 mm (mean = 5.9, n = 11), AR = 3.14; ♀ FWL 5.4–7.1 mm (mean = 6.2, n = 15), AR = 3.03; costa weakly arched; apex acute; termen straight; interfascial areas of dorsal surface whitish with pale brown suffusion and brown transverse reticulations; fascial markings brown; subbasal fascia reduced to small mark on CuP; median fascia represented by short bar at mid-costa and diffuse mark on inner margin adjacent to proximal edge of ocellus; cell with diffuse whitish band interrupting subbasal and median fasciae; ocellus edged proximally and distally by white to pale gray lustrous bars; central field of ocellus white to pale brown, crossed by two blackish streaks, the latter sometimes reduced to two small dots; costal strigulae whitish, delimited by short brown dashes; fringe scales whitish with brown cross-marks. Hindwing gray brown. *Abdomen.* Male genitalia (Fig. 28) (n = 4): Uncus moderately developed, weakly divided medially by shallow indentation, clearly differentiated from dorsolateral shoulders of tegumen; socii short and stubby; phallus strongly tapering distally; vesica with 8–12 deciduous cornuti; valva with costal margin concave, NR = 0.32, SA acute (mean = 64°) with rounded vertex, clasper reduced to band of moderately stiff setae along margin of basal excavation; cucullus elongate, tapering from broadly rounded apex to narrowly rounded anal angle, with distal margin concavely indented, basoventral margin weakly overlapping ventral margin of neck, medial surface densely setose, margins lacking spiniform setae. Female genitalia (Figs. 40, 48) (n = 4): Papillae anales laterally facing and moderately setose; tergum 8 densely covered with minute hairlike setae; sterigma ovate, with lamella postvaginalis very weakly developed, lamella antevaginalis ringlike; sternum 7 semi-triangular, with a pair of ridges extending more or less parallel to lateral margins from anterolateral corners of sterigma to anterolateral vertices; posterior "vertex" of sternum 7 emarginated to length of sterigma and fused with lamella antevaginalis; ductus bursae with sclerotized ring at juncture with ductus seminalis; corpus bursae with two signa of distinctly different size.

Distribution and biology. I examined 26 specimens (11 ♂, 15 ♀) from San Diego and Monterey Counties, California with capture dates ranging from mid-July to mid-September.

Phaneta complicana (McDunnough)
(Figs. 9, 29)

Thiodia complicana McDunnough 1925:16; McDunnough 1939:44.
Phaneta complicana: Powell 1983:33; Brown 2005:493.

Holotype: ♂, British Columbia, Osoyoos, C. B. Garrett, 19 May 1923, slide TOR-981, CNC.

Description. *Head.* Missing. *Thorax.* Dorsal surface tan; legs tan, with anterior surfaces darker; tarsi with whitish annulations. Forewing (Fig. 9): ♂ FWL 7.4 mm, AR =3.36, n = 1; costa nearly straight; apex acute; termen straight; dorsal surface with brown markings and whitish interfascial areas, the latter somewhat suffused with pale brown; subbasal fascia indicated by outwardly oblique dark shade from inner margin to mid-cell; median fascia complete, outwardly oblique from mid-costa to ocellus, continuing to inner margin along proximal edge of ocellus; ocellus obscure, with broad white bar on proximal margin and narrow lustrous white bar on distal margin; central field of ocellus brownish with a few blackish scales; veins anterior to ocellus accentuated by pale brownish lines; costal strigulae from median fascia to apex whitish, well defined; fringe scales white with gray-brown cross-marks, the latter aligned to produce prominent white band along termen from tornus to apex followed distally by a narrow blackish line. Hindwing pale gray brown. *Abdomen.* Male genitalia (Fig. 29) (n = 1): Uncus reduced, rounded, weakly differentiated from dorsolateral shoulders of tegumen; socii short and stubby; phallus moderately tapering distally; vesica with 16 deciduous cornuti; valva with costal margin weakly concave, NR = 0.31, SA = 95°, clasper raised, moundlike; cucullus nearly symmetric about horizontal center line, with apex and anal angle strongly developed and evenly rounded, distal margin weakly convex, medial surface densely setose; distal margin of cucullus with series of spiniform setae evenly distributed from anal angle nearly to apex. Female genitalia unknown.

Distribution and biology. This species is known only from the holotype.

Phaneta migratana (Heinrich)
(Figs. 10–12, 30, 41, 49)

Thiodia migratana Heinrich 1923:53; McDunnough 1939:44.
Phaneta migratana: Powell 1983:33; Brown 2005:494

Holotype: ♂, California, Inyo Co., Olancha, 24–30 April, slide 72770, USNM.

Paratype: ♀, same data as holotype, slide DJW 2253, USNM.

Description. *Head.* Frons grayish white to pale brown; vertex scales white to pale yellow, shading to gray brown at apices; labial palpus with first segment white, second segment white, shading to gray distally, with gray mark on lateral surface, third segment gray; antenna concolorous with vertex. *Thorax.* Dorsal surface brown to gray, often with some yellow-brown suffusion; legs white to gray brown; tarsi blackish brown with white annulations. Forewing: ♂ FWL 6.4–9.9 mm (mean = 8.3, n = 35), AR = 3.35; ♀ FWL 8.0–9.8 mm (mean = 8.3, n = 7), AR = 3.14; costa nearly straight; apex acute; termen straight to weakly concave; dorsal surface with blackish-brown markings and grayish interfascial areas, the latter usually suffused with pale brown; most specimens with yellowish-brown to orange-brown subcostal band from base to median fascia; subbasal fascia reduced to irregularly shaped mark on cubitus; median fascia represented by outwardly oblique bar at mid-costa; ocellus with proximal and distal margins edged by lustrous fawn to pearl-gray bars, whitish central field crossed by two blackish dashes; costal margin white with numerous interruptions by blackish dashes associated with costal strigulae; fringe scales white with blackish cross-bars. Hindwing gray brown. *Abdomen.* Male genitalia (Fig. 30) (n = 14): Uncus well developed, clearly differentiated from dorsolateral shoulders of tegumen, sometimes with distal margin medially indented; socii short, fingerlike; phallus moderately tapering distally, usually with protuberance on ventral surface (not shown in illustration); vesica with 17–31 deciduous cornuti; valva with costal margin weakly concave, dorsal and ventral margins of neck nearly parallel, NR = 0.56, SA obtuse (mean = 118°), clasper represented by patch of stiff setae; cucullus with apex rounded, distal margin straight to weakly convex, anal angle moderately developed, basoventral margin overlapping ventral one-half of neck. Female genitalia (Figs. 41, 49) (n = 3): Papillae anales laterally facing and moderately setose; lamella postvaginalis elongate, length ≈ 2 × width, with lateral margins weakly concave, shallow central trough microspinulate; lamella antevaginalis ringlike; posterior edge of sternum 7 emarginated to full length of sterigma and fused with lateral margins of lamella postvaginalis; sternum 7 with strongly produced, sharply pointed, lateral projections; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size.

Distribution and biology. I examined 42 specimens (35 m, 7 f) from California, Colorado, Nevada, Oregon, Utah, and Wyoming. Capture dates range from late March in southern California to late June in Colorado.

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Phaneta alatana (McDunnough)
(Figs. 13, 14, 31)

Thiodia alatana McDunnough 1938:100; McDunnough 1939:44.
Phaneta alatana: Powell 1983:33; Brown 2005:492.

Discussion. Until recently this species was known only from the holotype (Fig. 13), which was collected in desert-like habitat along the Okanogan River in southern British Columbia. Its most distinctive feature is a long tongue-like clasper on the margin of the basal emargination of the valva (Fig. 31). In the late 1990's a series of moths with similar genitalia was collected by N. Bloomfield during a survey of the Lepidoptera of Marine Corps Air Station Miramar, San Diego County, California (Brown and Bash 2000). I am tentatively determining these San Diego specimens as *P. alatana*. McDunnough's (1938, fig. 4) illustration of the male genitalia of *P. alatana* shows a narrower neck and a more weakly produced anal angle than is depicted in Fig. 31, but these differences are due largely to the genitalia being excessively tilted on the slide. The cucullus in Fig. 31 is a little less elongate than in the holotype. Figures 13 & 14 illustrate differences in forewing appearance, the San Diego specimens having more strongly expressed markings. Lacking additional material with which to evaluate these characters, I am attributing the differences to intraspecific variation. The description below of the forewing maculation relies heavily on the San Diego specimens.

Holotype: (Fig. 13) ♂, British Columbia, Osoyoos, Kreuger Mt., A. N. Gartrell, 9 May 1936, slide TOR-948, CNC.

Description. *Head.* Frons whitish; vertex gray brown with diffuse whitish medial line; labial palpus with medial surface and ventral edge whitish, lateral surface and dorsal edge gray brown; antenna gray brown with whitish scaling on lateral surfaces. *Thorax.* Dorsal surface gray brown; fore- and mid-legs gray brown with white mark at mid-tibia; hind-legs pale brown; tarsi with white annulations. Forewing (Figs. 13, 14): ♂ FWL 6.6–8.1 mm (mean = 7.4, n = 13), AR = 3.50; costal margin weakly arched; apex acute, termen straight to weakly concave; dorsal surface grayish brown with brown to blackish-brown markings; subbasal fascia reduced to dark mark between A_{1+2} and cubitus; median fascia represented by outwardly oblique bar arising at mid-costa; basal two-thirds of wing with fine longitudinal streaking, including a pale line along cubitus from base nearly to ocellus, a black line on CuP, and a pale line along A_{1+2} from base to tornus; inner margin with thin black edging that expands into a wider blackish mark near base; ocellus bordered proximally and distally with lustrous pale gray bars; central field of ocellus white to pale orange, crossed by two prominent black dashes; anterior margin of ocellus bordered by longitudinal brown band connecting median fascia to apex; costal strigulae gray brown to whitish; termen with thin white line from tornus to apex followed distally by thin black line and wider white line; outer fringe scales white with black to gray-brown cross-marks. Hindwing grayish white basally, shading to gray brown at margins. *Abdomen.* Male genitalia (Fig. 31) (n = 4): Uncus broad, not differentiated from dorsolateral shoulders of tegumen, with medial line of division on ventral surface; socii short, fingerlike, somewhat wider toward base; phallus elongate, tapering distally; vesica with 8–14 deciduous cornuti; valva with costal margin concave, NR = 0.62, SA obtuse (mean = 123°), clasper long, tonguelike, projecting obliquely outward from medial surface of valva; cucullus with apex rounded, distal margin convex of nearly uniform curvature, anal angle acute and weakly developed, medial surface densely setose. Female genitalia unknown.

Distribution and biology. This species is known from Osoyoos, British Columbia and San Diego, California. Adults fly in early May at the former locality, from mid-January to early March at the latter.

Phaneta cinereolineana (Heinrich)
(Figs. 15, 16, 32)

Thiodia cinereolineana Heinrich 1923:52; McDunnough 1939:44.
Phaneta cinereolineana: Powell 1983:33; Brown 2005:492.

Holotype: (Fig. 15) ♂, Utah, [Juab County], Eureka, T. Spalding, 21 April 1910, slide 72762, USNM.

Description. *Head.* Frons whitish; vertex scales pale brown basally, grading to white distally; labial palpus with medial surface whitish, lateral surface largely pale brown; antenna with thin brown line along dorsal surface and whitish lateral surfaces. *Thorax.* Dorsal surface gray brown; fore- and mid-legs with anterior surfaces brown, posterior surfaces whitish; hind-legs whitish; tarsi with alternating brown and whitish annulations. Forewing (Figs. 15, 16): ♂ FWL 6.5–6.7 mm (mean = 6.5, n = 3), AR = 3.29; costa straight to weakly arched; apex acute; termen weakly concave; dorsal surface grayish brown with dark brown markings; subbasal fascia not expressed; median fascia represented by indistinct outwardly oblique bar at mid-costa; proximal two-thirds of wing with fine longitudinal streaking, including thin brown line from base to tornus along CuP; ocellus edged proximally and distally by lustrous gray to beige bars, with whitish central field crossed by two blackish dashes; costal strigulae pale brown to whitish, more clearly defined from median fascia to apex; termen with thin white line from tornus to apex, followed distally by thin brown line and wider white line; fringe scales whitish with gray-brown cross-marks. Hindwing gray brown. *Abdomen.* Male genitalia (Fig. 32) (n = 3): Uncus broad, uniformly rounded, and barely differentiated from dorsolateral shoulders of tegumen; socii short and fingerlike; phallus moderately tapering distally; vesica with 11–13 deciduous cornuti (n = 3); valva with costal margin concave, NR = 0.62 (n = 3), SA obtuse (mean = 116°) (n = 3), clasper tablike with variably developed bladelike projection perpendicular to surface (Fig. 32a); cucullus with apex rounded, distal margin convex, anal angle developed into narrow projection with one spiniform seta at apex, medial surface densely setose; distal margin of cucullus with three to five spiniform setae that are noticeably stouter than adjacent setae on medial surface. Female genitalia unknown.

Distribution and biology. In addition to the holotype I examined two males in the CNC from Lost River badlands, 10 km south of Onefour, in the southeast corner of Alberta, collected by J.-F. Landry on 22 May 1982, and one male in the LACM from Scodie Meadow, Tulare Co., California, collected by J. *P.* Donahue on 25 May 1976.

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Phaneta crassana (McDunnough)
(Figs. 17, 18, 33, 42, 50)

Thiodia crassana McDunnough 1938:99, Fig. 6; McDunnough 1939:44.
Phaneta crassana: Powell 1983:33; Brown 2005:493.

Holotype: ♂, British Columbia, Kreuger Mt., Osoyoos, A. N. Gartrell, 9 May 1936, slide TOR-989, CNC.

Paratypes: BRITISH COLUMBIA: Kreuger Mt., Osoyoos, A. N. Gartrell, 9 May 1936 (1 ♂, slide 70041; 1 ♀, abdomen missing) USNM, (2 ♀, slide DJW 3071, abdomen missing) CNC, 12 May 1936 (1 ♂) CNC; Shingle Creek Road, Keremeos, A. N. Gartrell, 12 May 1936 (1 ♂) CNC; Shingle Creek, Penticton, A. N. Gartrell, 16 May 1936 (1 ♂) CNC; Brent's Lake, Penticton, A. N. Gartrell, 30 May 1935 (1 ♀) CNC. The paratype data are taken from pin labels and does not always agree in date/sex with that reported by McDunnough.

Description. *Head.* Frons whitish; vertex gray brown; labial palpus gray brown with white scaling on ventral margins of first and second segments; antenna with lateral surfaces white, dorsal surface brown. *Thorax.* Dorsal surface gray brown; legs whitish with anterior surfaces shading to pale gray brown; tarsi darker with whitish annulations. Forewing (Figs. 17, 18): ♂ FWL 7.1–8.4 mm (mean = 7.7, n = 4), AR =3.44; ♀ FWL 7.1–8.9 mm (mean = 7.7, n = 5), AR = 3.23; costa nearly straight; apex acute; termen straight; dorsal surface gray brown with two prominent white streaks, one along costa, the other along cubitus, both extending from base to median fascia; subbasal fascia not expressed; median fascia represented by prominent dark bar at mid-costa; area between costal and cubital streaks usually with orange-brown tint; posterior margin of cubital streak edged with blackish brown; ocellus bordered proximally and distally by lustrous gray bars, with white central field crossed by two black dashes; ocellus bordered anteriorly by band of white-tipped gray-brown scales extending from median fascia to termen; costal strigulae from median fascia to apex white and sharply defined; termen with conspicuous white line from tornus to apex; fringe scales white with brown to blackish-brown cross-marks. Hindwing gray brown. *Abdomen.* Male genitalia (Fig. 33) (n = 6): Uncus moderately developed, clearly differentiated from dorsolateral shoulders of tegumen; socii short and stubby; phallus short, cylindrical; vesica with 34–43 deciduous cornuti; valva with costal margin concave, neck elongate with ventral margin weakly convex, NR = 0.56, SA obtuse (mean = 137°), clasper tablike; cucullus with apex rounded, distal margin convex, anal angle weakly produced; valval neck with elongate patch of setae on ventral one-half of medial surface; medial surface of cucullus densely setose. Female genitalia (Figs. 42, 50) (n = 2): Papillae anales laterally facing and moderately setose; lamella postvaginalis semi-rectangular, width ≈ 2 × length, with central trough weakly depressed and lateral ridges microspinulate; lamella antevaginalis ringlike, separated from sternum 7 by narrow band of membrane; posterior edge of sternum 7 emarginated to length of sterigma and fused with lateral margins of lamella postvaginalis; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size.

Distribution and biology. I examined 15 specimens (9 ♂, 6 ♀) from southern British Columbia, southern Alberta, and central Nevada. Capture dates range from 9 May to 30 May.

Phaneta spectana (McDunnough)
(Figs. 19, 20, 34, 43, 51)

Thiodia spectana McDunnough 1938:100; McDunnough 1939:44.
Phaneta spectana: Powell 1983:33; Brown 2005:496.

Holotype: ♂, Alberta, Edmonton, K. Bowman, 31 August 1930, slide TOR-1062, CNC.

Paratypes: same location & collector as holotype, 1 September 1936, (1 ♂) CNC, (1 ♂) USNM, (1 ♂) UASM.

Description. *Head.* Frons whitish; vertex pale gray brown; labial palpus with medial surface whitish, lateral surface pale gray brown; antenna whitish laterally, with dorsal surface gray brown. *Thorax.* Dorsal surface gray brown; legs gray brown anteriorly, whitish posteriorly, with whitish tarsal annulations. Forewing (Figs. 19, 20): costa weakly arched; apex acute; termen weakly concave; ♂ FWL 5.5–7.4 mm (mean = 6.6, n =18), AR = 3.33; ♀ FWL 5.9–6.5 (mean = 6.1, n = 3), AR = 3.05; dorsal surface gray brown with pale orange-brown highlights and a thin white line on cubitus from base to subbasal fascia; subbasal fascia reduced to dark brown mark on cubitus and associated dark marks on costa and inner margin; median fascia represented by outwardly oblique bar from mid-costa to ocellus, connecting along proximal edge of ocellus to weakly expressed dark mark on inner margin; ocellus edged proximally and distally by lustrous gray bars, with orange-brown central field crossed by two black dashes; costal strigulae from median fascia to apex white, delimited by brown triangular marks, divided by orange-brown striae; fringe scales white with blackish-gray cross-marks. Hindwing brownish gray. *Abdomen.* Male genitalia (Fig. 34) (n = 6): Uncus moderately developed, apex rounded; dorsolateral shoulders of tegumen somewhat hunched; socii short, fingerlike; phallus moderately tapering distally; vesica with 6–12 deciduous cornuti; valva with costal margin very weakly concave, neck long, tapering distally, emargination of ventral margin semi-triangular, NR = 0.46, saccular corner sharply angulate, SA obtuse (mean = 112°), clasper represented by patch of stiff setae; cucullus with apex and anal angle rounded of nearly equal radius, distal margin nearly straight, basoventral margin overlapping ventral one-third of neck, medial surface densely setose. Female genitalia (Figs. 43, 51) (n = 2): Papillae anales laterally facing, moderately setose; lamella postvaginalis semi-rectangular, length ≈ width, microspinulate, with central trough weakly depressed; lamella antevaginalis ringlike; sternum 7 with posterior edge emarginated to length of sterigma, separated from lamella antevaginalis by narrow strip of membrane, but fused with anterior one-half of lateral margins of sterigma; lateral projections of sternum 7 sharply acute; ductus bursae with narrow sclerotized band posterior to juncture with ductus seminalis; corpus bursae with two signa of slightly different size.

Distribution and biology. I examined 30 specimens (27 ♂, 3 ♀) from Alberta, Iowa, Montana, Nevada, North Dakota, and South Dakota. Adults fly from the end of August to late September.

***Phaneta kramerana*, new species**
(Figs. 21, 22, 35, 44, 52)

Diagnosis. The only other gray-brown Nearctic *Phaneta* with convex curvature of the ventral margin of the valval neck is *P. crassana*, which differs from *P. kramerana* in the shapes of the cucullus, uncus, and socii (Figs. 35 & 33) and in forewing appearance (Figs.

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17, 18, 21, 22). The male genitalia of *P. kramerana* are most similar to those of *Phaneta mayelisana* Blanchard, a much larger whitish species with distinctly different forewing maculation (Blanchard 1979, figs. 1, 6). The female genitalia somewhat resemble those of *P. nepotinana* in that the sterigma is greatly reduced and the ductus seminalis arises relatively close to the ostium, but the flap-like structures on sternum 7 in *P. nepotinana* are not present in *P. kramerana*.

Description. *Head.* Frons and vertex white; labial palpus white with brownish-gray shading on lateral surface of second segment; antenna white with gray-brown dorsal streak. *Thorax.* Dorsal surface whitish, variably suffused with pale brown; legs pale brownish gray to whitish; tarsi with white annulations. Forewing (Figs. 21, 22): ♂ FWL 5.8–6.5 mm (mean = 6.1, n = 4), AR = 3.25; ♀ FWL 5.3–5.6 mm (mean = 5.5, n = 4), AR = 3.11; costal margin weakly arched; apex acute; termen weakly convex; dorsal surface white from cubitus to costa, with gray-brown to blackish-brown markings and some longitudinal brown streaking; region from CuA_2 to inner margin strongly suffused with gray brown; subbasal fascia variably expressed as dark mark between A_{1+2} and cubitus; median fascia a thin dash at mid-costa; ocellus with lustrous pale gray bars marking proximal and distal margins and two blackish longitudinal dashes on white to pale brown central field; fringe with patch of white scales (terminal strigula) at M_1, otherwise white with black to gray-brown cross-marks. Hindwing whitish to pale gray brown. *Abdomen.* Male genitalia (Fig. 35) (n = 4): Uncus semi-triangular; dorsolateral shoulders of tegumen hunched; socii fingerlike, with distal one-half angling medially and tapering to apex; phallus moderately tapering distally; vesica with 16–23 deciduous cornuti; valva with costal margin concave, neck elongate, of uniform width, with convex ventral margin nearly parallel to costal margin, NR = 0.72, SA obtuse (mean = 141°), clasper represented by patch of stiff setae; cucullus with apex rounded, distal margin convex to nearly straight, anal angle weakly developed with rounded vertex, medial surface densely setose. Female genitalia (Figs. 44, 52) (n = 3): Papillae anales ventrolaterally facing, moderately setose; lamella postvaginalis weakly developed, bandlike, with posterior margin sometimes indented medially; lamella antevaginalis ringlike, rather wide at anterior margin of ostium; posterior edge of sternum 7 emarginated to length of sterigma and fused with lamella antevaginalis; ductus bursae with sclerotized band posterior to juncture with ductus seminalis, the latter located relatively near ostium; corpus bursae with two signa, one considerably larger than the other.

Holotype: (Fig. 21) ♀, California, San Bernardino County, Kramer Hills, J. A. Powell, 19 April 1958, slide DJW 2109, EME.

Paratypes: CALIFORNIA, same data as holotype (3 ♂, slides JAP 234, DJW 2108, 2632; 2 ♀, slide DJW 2145) EME; Inyo Co., Olancha, 1–7 May (1 ♀, slide DJW 2167) USNM; Los Angeles Co., April (1 ♂, slide DJW 3098) USNM.

Etymology. The specific epithet refers to the name of the type locality, Kramer Hills.

Distribution and biology. Seven of the eight types were collected in May and June at two sites along US Highway 395 in southern California: the Kramer Hills, located approximately 14 miles west of Hinkley, and Olancha, some 100 miles farther north.

Phaneta donahuei, new species
(Figs. 23, 24, 36)

Diagnosis. This moth was illustrated but not described by Wright (2011, fig. 33). It is distinguished from the other brownish-gray *Phaneta* considered here by valval shape (Figs. 25–36). There is some similarity in male genitalia among *P. donahuei*, *Phaneta labiata* Wright, and *Phaneta latens* (Heinrich), but in the latter two species the cucullus has a much more strongly developed anal angle and a basoventral margin that overlaps the ventral margin of the neck (Fig. 36, Wright 2010: figs. 55 & 57). Moreover, *P. donahuei* has a ridgelike clasper and a ridge along the ventral margin of the medial surface of the neck, neither of which occurs in the other two species.

Description. *Head.* Frons white; vertex whitish, tinted with tan; labial palpus white with tan suffusion on lateral surface of second segment; antenna concolorous with vertex. *Thorax.* Scales on dorsal surface pale brownish gray with white apices; fore- and mid-legs with anterior surfaces pale brown, posterior surfaces whitish, obscure white mark at mid-tibia; hind-legs mostly whitish; tarsi with whitish annulations. Forewing (Figs. 23, 24): ♂ FWL 6.8–7.9 mm (mean = 7.3, n = 12), AR = 3.17; costal margin weakly arched near base; apex acute; termen straight; dorsal surface pale brown with dark brown markings, the interfascial areas usually suffused with white; subbasal fascia reduced to diffuse mark on cubitus; median fascia consisting of outwardly oblique bar from mid-costa to ocellus and a variably expressed semi-triangular mark extending along proximal edge of ocellus from inner margin to cubitus; cell with diffuse whitish streak from base to median fascia; ocellus with lustrous gray to fawn bars along proximal and distal margins, white central field crossed by two blackish dashes; anterior margin of ocellus bordered by brown band connecting median fascia to mid-termen, extending from there to apex; costal strigulae white, particularly well-defined from median fascia to apex; fringe scales white with blackish-brown cross-marks, the marks aligned to form a thin white terminal line followed distally in turn by a thinner black line and a wider white line. Hindwing pale grayish brown. *Abdomen.* Male genitalia (Fig. 36) (n = 8): Uncus broad-based, distally rounded, clearly differentiated from dorsolateral shoulders of tegumen; socii short and stubby; phallus somewhat cylindrical; vesica with 31–41 deciduous cornuti; valva with costal margin concave, neck elongate with ventral margin of medial surface ridgelike, NR = 0.41, saccular corner broadly rounded, SA obtuse but ill-defined, clasper ridgelike; cucullus with apex evenly rounded, distal margin convex to nearly straight, anal angle acute and moderately produced, setation of medial surface coarse; anal angle with one stout stubby seta at vertex; medial surface of neck with elongate patch of setae along ventral margin. Female genitalia unknown.

Holotype: ♂, California, Kern County, Piute Mountains, Rancheria Creek, T29S R33E Sec. 23, 4350 ft., J. P. & K. E. Donahue, 1–3 June 1973, slide DJW 2796, LACM.

Paratypes: CALIFORNIA. Same data as holotype (4 ♂, slides DJW 2794, 3062, 3063) LACM; Kern County, Walker Pass, V. & M. Albu, 18 May 2006 (2 ♂, slides DJW 2615, 3087) DJW; Inyo County, Lone Pine, V. & M. Albu, 15 May 2009 (1 ♂, slide DJW 3086) DJW, Olancha, 8–15 June (1 ♂, slide 70079) USNM; San Bernardino County, Grace Vy. Ranch near Onyx

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Summit, 2475m, Powell & Sperling, 26–27 June 1998 (1 ♂, slide 6519) EME, 2 km S. Wildhorse Spring, San Bernardino Mountains, 2450m, J. A. Powell, 26 June 1998 (1 ♂, slide 6518) EME; San Bernardino Mountains, 6200 ft., J. Grinnell, 19 June 1907 (1 ♂, slide DJW 3107), USNM.

Etymology. This species is named after Julian P. Donahue, one of the collectors of the series of five specimens from which the holotype was selected.

Distribution and biology. *Phaneta donahuei* is known from three California counties: Inyo, Kern, and San Bernardino. Adults were collected between mid-May and late June. The type locality is approximately thirty miles east of Bakersfield, California.

Remark. The paratype from Olancha, California is the specimen that was incorrectly illustrated by Heinrich (1923, fig. 131) as *Phaneta minimana* (see Wright 2010).

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