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Author: Wright, Donald J.

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## NINE NEW SPECIES OF *PHANETA* STEPHENS (TORTRICIDAE) FROM WESTERN NORTH AMERICA, WITH REVIEWS OF TEN RELATED SPECIES

DONALD J. WRIGHT

3349 Morrison Ave., Cincinnati, Ohio 45220-1430, USA; email: wrightdj@fuse.netz

**ABSTRACT.** Nine previously unrecognized species of *Phaneta* Stephens (Tortricidae) are described from western North America: *P. browni*, *P. arenana*, *P. labiata*, *P. goblinana*, *P. cibolana*, *P. parvula*, *P. clementeana*, *P. baloghi*, and *P. vogelana*. Reviewed are: *Phaneta corculana* (Zeller) and *Phaneta mormonensis* (Heinrich), which have male genitalia similar to those of *P. browni* and *P. arenana*; *Phaneta indagatricana* (Heinrich) and *Phaneta misturana* (Heinrich), due to similarity in forewing pattern with *P. labiata* and *P. goblinana*; *Phaneta stramineana* (Walsingham), *Phaneta parvana* (Walsingham), and *Phaneta grindeliana* (Busck), close relatives of *P. clementeana*; *P. minimana* (Walsingham), a species misidentified in North American collections for more than eighty years; and *Phaneta latens* (Heinrich), which is similar in male genitalia to *P. labiata*. *Phaneta verecundana* Blanchard is recognized as a synonym of *P. indagatricana*. Adults and genitalia are illustrated for each species.

**Additional key words:** Olethreutinae, Eucosmini, *verecundana*, *minimana*, *parvana*, *grindeliana*, *stramineana*

Over the past several decades, specimens representing numerous unnamed species of *Phaneta* Stephens, *Eucosma* Hübner, and *Pelochrista* Lederer have been accumulating in North American institutional and private collections. For the most part these insects are from western United States and have received little or no attention, probably due to similarities with currently recognized taxa and uncertainty in the application of available names. This paper proposes names for nine such species and reviews the current taxa with which they are most likely to be confused. Following prevailing practice, the new species are placed in *Phaneta* based on the absence of a costal fold on the dorsal surface of the male forewing.

Two of the new species, *Phaneta browni* and *Phaneta arenana*, appear to be closely related to *Phaneta corculana* (Zeller) and *Phaneta mormonensis* (Heinrich), based on male genitalia.

*Phaneta goblinana*, new species, is superficially similar to *Phaneta indagatricana* (Heinrich). Review of *P. indagatricana* led to consideration of *Phaneta misturana* (Heinrich) and *Phaneta verecundana* Blanchard and, in turn, to the discovery that the type series for the latter taxon includes two distinct species. The holotype of *P. verecundana* is treated here as a

whitish phenotype of *P. indagatricana*; six of the paratypes are recognized as *Phaneta labiata*, new species. Also reviewed are *Phaneta latens* (Heinrich), which has male genitalia that can be confused with those of *P. labiata*, and *Phaneta minimana* (Walsingham), because the genitalia illustrated under that name by Heinrich (1923) are not those of *P. minimana* but do resemble those of *P. labiata*.

*Phaneta clementeana* and *Phaneta baloghi*, new species, are superficially similar to *Phaneta stramineana* (Walsingham), a taxon that has been misidentified in North American collections since Heinrich (1923) confused it with *Phaneta grindeliana* (Busck). Reviews are included of *P. stramineana*, *P. grindeliana*, and *Phaneta parvana* (Walsingham), the last species being very closely related to *P. stramineana*.

Finally, descriptions are provided for *Phaneta cibolana*, *Phaneta parvula*, and *Phaneta vogelana*, new species with similarities to one or more of the aforementioned taxa.

### MATERIALS AND METHODS

I examined 788 specimens and 224 associated genitalia preparations from the following institutional and private collections: Canadian National Collection,

Ottawa (CNC); George J. Balogh, Portage, Michigan (GJB); Colorado State University, Fort Collins, Colorado (CSU); Essig Museum of Entomology, UC Berkeley (EME); Todd M. Gilligan, Loveland, Colorado (TMG); Mississippi Entomological Museum, Mississippi State, Mississippi (MEM); John S. Nordin, Laramie, Wyoming (JSN); The Natural History Museum, London (BMNH); United States Museum of Natural History, Washington D.C. (USNM); and Donald J. Wright (DJW).

Forewing length (FWL) is defined as the distance from base to apex including fringe, aspect ratio (AR) as FWL divided by medial forewing width. Saccular angle (SA) refers to the angle-like projection on the ventral margin of the valva formed where the ventral margin of the sacculus meets that of the adjacent part of the neck. Its size was estimated by drawing lines approximating the two margins on a projected image of the valva and measuring the resulting angle with a protractor. The number of cornuti in the male vesica was determined by counting sockets. That count is subject to considerable intraspecific variation in the species treated here. The symbol “≈” stands for “approximately equal to,” and the letter n signifies the number of observations supporting a particular statement. Images of adults were edited in Adobe Photoshop CS and sized to fit a standard cell in the plates, so the illustrations do not show the relative sizes of the taxa. The latter information is contained in the forewing data in the species accounts. Morphological nomenclature follows Gilligan *et al.* (2008).

With the exception of *P. corculana* (Zeller), I examined the holotype/lectotype of each species treated below as well as any paratypes residing in the USNM. Reports of paratypes in other institutions are based on literature records. In particular, references to specimens at the American Museum of Natural History (AMNH) are based on Heinrich (1923) and Klots (1942); I did not examine those specimens. For stability of nomenclature, I am designating lectotypes for *P. grindeliana* (Busck), *P. minimana* (Walsingham), *P. parvana* (Walsingham), and *P. stramineana* (Walsingham), the selections for the Walsingham species being those previously made by Obratzov but never published.

#### SPECIES ACCOUNTS

##### *Phaneta corculana* (Zeller) (Figs. 1–4, 49, 67–69, 101)

*Semasia corculana* Zeller 1874:433; Walsingham 1884:141.

*Thiodia corculana*: Fernald [1903]:461; Heinrich 1923:41; McDunnough 1939:44.

*Eucosma corculana*: Barnes and McDunnough 1917:171.

*Phaneta corculana*: Powell 1983:33; Brown 2005:493.

**Discussion.** Zeller (1874) described *Semasia corculana* from a single female captured on Vancouver Island, British Columbia. There are several references in the literature to possible confusion regarding this species and the European *Eucosma aspidiscana* (Hübner): Walsingham (1879:77), Walsingham (1884:141), Kearfott (1907:38), and Heinrich (1923:41). Walsingham (1879:77) reported collecting *E. aspidiscana* in April, 1872 at Fort Dalles, Oregon, and subsequent authors seem to have viewed this record as a misidentification of *P. corculana*. I examined one *Phaneta* specimen with this data from the BMNH. It is a female, and dissection revealed that it is neither *P. corculana* nor *E. aspidiscana*, but I am unable to assign it to any of the available names. The genitalia of *P. corculana* are distinct from *E. aspidiscana* (Figs. 49, 67; Razowski 2003, species 272). To my knowledge there are no valid records of *E. aspidiscana* from North America.

To confirm the identity of *P. corculana*, I relied on photographs made by Obratzov of the holotype and its genitalia. The holotype resembles the specimen in Fig. 1. The male-female association presented here is based on a pair of specimens I collected on 12 July 1993 near Mishawaka in Larimer Co., Colorado, the female agreeing with the holotype, the male with the female in forewing color and maculation. Specimens of like genitalia exhibited the variation in forewing appearance illustrated in Figs. 1–4.

**Type.** Holotype: ♀, [British Columbia], Vancouver, Mathis, 74, genitalia slide 11547, BMNH.

**Descriptive notes.** In typical *P. corculana* (Figs. 1–3) the forewing is yellowish-brown basally, shading to reddish-brown or brown distally, with darker but weakly defined subbasal and median fasciae. Frequently there is a patch of whitish scales at mid-dorsum (Figs. 1, 3), but occasionally the region posterior to CuA2 is suffused with black (Fig. 2). In some instances (Fig. 4) the basal two-thirds of the forewing is blackish brown. Most specimens have at least a few red-brown to orange-brown scales in the apical portion of the wing. The costal strigulae are white and conspicuous from mid-costa to apex but muted and weakly expressed from base to mid-costa. The pale yellowish-brown central field of the ocellus is crossed by up to three thin black dashes and is bordered basally and distally by narrow transverse silvery-gray bars. Forewing statistics: ♂ FWL: 5.5–8.1 mm (mean = 7.3, n = 39), AR = 3.14; ♀ FWL: 6.8–9.0 mm (mean = 7.6, n = 19), AR = 3.11.

**Male genitalia** (Fig. 49) (n = 21): Valva with costal margin concave, distal margin convex, of nearly uniform curvature, but occasionally (Fig. 49a) with shallow concave inflection near anal angle, SA ≈ 110°; cucullus roughly symmetrical about horizontal center-line, tapering dorsally to rounded apex, ventrally to acute anal angle, with basoventral margin overlapping ventral margin of neck; vesica with 17–35 deciduous cornuti (n = 19). **Female genitalia** (Figs. 67–69) (n = 7): Lamella postvaginalis a shallow trough; sternum 7 with posterior margin invaginated to length of sterigma and fused with lateral margins of lamella postvaginalis and with outer rim of ringlike lamella antevaginalis; portions of sternum 7 flanking ostium sometimes mildly raised; 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 99 specimens

(71 ♂, 28 ♀) from Alberta, British Columbia, Saskatchewan, California, Colorado, Montana, Nevada, Oregon, Washington and Wyoming (Fig. 101) as well as a male in poor condition from Nain, Newfoundland which I take to be *P. corculana* based on similarity of genitalia. Collection sites range in elevation from near sea level at Comox, British Columbia to 14,000 ft. on Mt. Evans, Colorado. Collection dates range from April to late August, but most records are from July and August. There appears to be some geographical influence on the distribution of color forms: most specimens from Colorado and Wyoming are red brown (Figs. 1, 2); those from California, Nevada, Oregon and Washington are dark brown (Fig. 3); and the Canadian material comes in both forms. The darkest phenotype (Fig. 4) was collected on Mt. Evans at elevations above 11,700 feet.

*Phaneta mormonensis* (Heinrich)

(Figs. 5–8, 51, 72, 73, 101)

*Thiodia mormonensis* Heinrich 1923:44; McDunnough 1939:44.

*Phaneta mormonensis*: Powell 1983:33; Brown 2005:494.

**Types.** Holotype: ♂, Utah, Salt Lake City, C. N. Ainslie, genitalia slide 72772, USNM. Paratypes. COLORADO: Denver, Oslar (3 ♂, genitalia slides 69983, 69984), USNM. Klots (1942) reported two paratypes in the AMNH.

**Descriptive notes.** Head, thorax, and forewing (Figs. 5–8) are yellow brown to yellow gray; forewing markings are brown, similar in pattern to those of *corculana*. The yellowish central field of the ocellus is crossed by three dark dashes and bordered basally and distally by lustrous gray bars. Forewing statistics: ♂ FWL: 6.3–8.7 mm (mean = 7.4, n = 23), AR = 3.16; ♀ FWL: 7.0–8.3 mm (mean = 7.6, n = 8), AR = 3.12.

**Male genitalia** (Fig. 51) (n = 17): Valva with costal margin strongly concave near apex, neck tapering evenly, SA ≈ 140°; cucullus asymmetrical with respect to horizontal center-line, with anal angle broadly rounded, distal margin convex except for occasional weakly concave inflection near apex, and basoventral margin weakly sinuate and broadly overlapping neck; vesica with 15–38 deciduous cornuti (n = 15). **Female genitalia** (Figs. 72, 73) (n = 3): Lamella postvaginalis elongate, narrowing posteriorly but weakly flared at posterolateral corners, length ca. 3 × medial width; posterior margin of sternum 7 invaginated nearly to length of sterigma and fused with lateral margins of lamella postvaginalis and with inner rim of ringlike lamella antevaginalis; ductus bursae with sclerotized ring posterior to juncture with the ductus seminalis; corpus bursae with two signa of nearly equal size.

**Distribution and biology.** I examined 28 specimens (23 ♂, 5 ♀) from California, Idaho, Montana, New Mexico, North Dakota, and Utah (Fig. 101). Most collections are from July and August, but records in California range from May to early September. Two specimens collected diurnally in Contra Costa Co., California were flushed from *Grindelia camporum* Greene (Asteraceae) (J. A. Powell, personal communication).

*Phaneta browni*, new species

(Figs. 9–11, 52, 74, 75, 101)

**Diagnosis.** This species differs from *P. corculana* and *P. mormonensis*, its closest congeners, in maculation and genitalia. The forewing is noticeably narrower (AR ≈ 3.43 vs. 3.13 and 3.15 in *P. corculana* and *P. mormonensis*, respectively). It is pale brown with dark brown surrounding the ocellus, the latter color extending basally in thin streaks through the median area (Figs. 9–11). It lacks well defined transverse markings and red-brown/orange-brown apical scaling. In genitalia, *P. browni* is most similar to *P. mormonensis* (Figs. 51, 52 & 72–75). Males differ in the shape and armature of the anal angle: triangular with two or three spiniform setae in *P. browni* vs. semicircular and lacking spiniform setae in *P. mormonensis*. Females of *P. browni* have the posterolateral corners of the lamella postvaginalis more strongly flared and the lamella antevaginalis separated from sternum 7 by a narrow strip of membrane.

**Description.** **Head:** Frons white; vertex beige medially, a shade darker laterally; labial palpus with first segment white, second segment white medially, brownish-gray laterally, with long brownish-gray scales concealing brownish-gray third segment; antenna with dorsal scaling concolorous with vertex, ventral scaling paler. **Thorax:** Dorsal surface pale brown, ventral surface white; legs white to pale brown with brown annular markings on tarsi. **Forewing** (Figs. 9–11): ♂ FWL 6.1–8.2 mm (mean = 7.3, n = 36), AR = 3.46; ♀ FWL 6.5–8.0 (mean = 7.2, n = 9), AR = 3.36; costal margin nearly straight, apex acute, termen straight to weakly concave; dorsal surface pale brown, lacking well defined fascial markings, with dark brown scaling along anterior and proximal margins of ocellus and with thin dark brown longitudinal streaking from base to ocellus; costal strigulae obscure from base to mid-costa, more strongly expressed from mid-costa to apex; central field of ocellus white to beige, crossed by two or three thin black dashes, and bordered basally and distally by lustrous gray transverse bars; fringe scales brown with white apices, becoming paler toward tornus. **Hindwing:** Uniformly grayish brown, fringe a shade lighter. **Male genitalia** (Fig. 52) (n = 10): Uncus a dorsally setose lobe with rounded apex; dorsolateral shoulders of tegumen well developed; socii short and fingerlike; vesica with 17–26 deciduous cornuti (n = 8); valva with costal margin concave, apex rounded, distal margin convex medially but often with shallow concave inflection near apex and/or anal angle, anal angle acute, neck evenly tapered, SA ≈ 125°; cucullus with weakly sinuate basoventral margin broadly overlapping ventral margin of neck, with moderately stout setae evenly distributed along ventral two-thirds of distal margin, and with two or three larger setae at anal angle. **Female genitalia** (Figs. 74, 75) (n = 4): Papillae anales laterally facing and sparsely setose; lamella postvaginalis elongate, length ca. 3 × width, narrowing medially but flaring posteriorly, width of posterior margin nearly equal to ostium diameter; posterior margin of sternum 7 invaginated nearly to length of sterigma, fused with lateral margins of lamella postvaginalis, but separated from ringlike lamella antevaginalis by narrow strip of membrane; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of similar size.

**Holotype.** ♂, Colorado, Chaffee Co., 4 mi N. Buena Vista, Co. Rd. 375, 8800 ft., 38° 54' N, 106° 7.8' W, D. J. Wright, 15 August 1999, USNM.

**Paratypes.** ARIZONA: Coconino Co., Walnut Canyon, 6-1/3 mi EESE Flagstaff, 6500 ft., J. G. Franclemont, 16 August 1964 (1 ♀); Fort Valley, 7-1/2 mi NW Flagstaff, 7350 ft., R. W. Hodges, 19 August



1961 (1 ♂, genitalia slide USNM 69990). COLORADO: same data as holotype (7 ♂, genitalia slide DJW 537); Fremont Co., 4.6 mi. SE of Salida on W side of US 50, 7100 ft., D. J. Wright, 22 August 1997 (2 ♀, genitalia slide DJW 400); Mesa Co., 10.3 mi. E of US 50 along Land's End Rd., D. J. Wright, 2 September 2000 (1 ♂, genitalia slide DJW 1999; 1 ♀, genitalia slide DJW 2000); Denver, Osler (1 ♂, genitalia slide USNM 69985; 1 ♀). NEW MEXICO: Sandoval Co., Valles Caldera, VC03 @ gate to Redondo Meadow, 7900 ft., 35° 52.38' N, 106° 37.30' W, J. Brown, 16 August 2007 (3 ♂, genitalia slide USNM 126416); Socorro Co., Hwy 60 mile 91–93, vic. VLA site, G. J. Balogh, 25 September 2003 (1 ♂, genitalia slide DJW 1126); Taos Co., S side US 64, 10 mi. SE Tres Piedras, 7550 ft., D. J. Wright, 11 August 1999 (1 ♂, genitalia slide DJW 1998; 1 ♀, genitalia slide DJW 852). UTAH: Uintah Co., 3 mi N of Vernal on 2500 W, 6184 ft., D. J. Wright, 4 September 2000 (2 ♂); WYOMING: Albany Co., T15N R73W Sec 1, 2217 Sky View Lane, 7480 ft., J. S. Nordin, 30 July 2001 (1 ♂, genitalia slide DJW 848), 30 July 2006 (1 ♂), 31 July 2003 (1 ♀), 12 August 2003 (1 ♂), 13 August 2001 (1 ♂, genitalia slide DJW 826), 15 August 2002 (1 ♂), 19 August 2001 (1 ♀); Albany Co., T15N R73W Sec 1, C. D. Ferris, 8 August 2002 (1 ♂), 13 August 2002 (1 ♂), 15 August 2002 (1 ♀, genitalia slide DJW 2001). Paratype depositories: BMNH, CNC, CSU, EME, JSN, MEM, USNM, DJW.

**Etymology.** This species is named in honor of Richard L. Brown in appreciation of the guidance and encouragement generously provided to the author over the past dozen years.

**Distribution and biology.** I examined 50 adults (40 ♂, 10 ♀) from Arizona, Colorado, New Mexico, Utah, and Wyoming (Fig. 101) collected between 4 June and 25 September at elevations of 6000 to 9000 feet. In my experience, *P. browni* is associated with sagebrush habitat.

***Phaneta arenana*, new species**

(Figs. 12, 50, 70, 71, 101)

**Diagnosis.** Though similar in male genitalia to *P. corculana*, *P. mormonensis* and *P. browni*, *P. arenana* is separated from those taxa by forewing color (Fig. 12 vs. Figs. 1–11). It is also the largest species in this group, with mean FWL exceeding that of *P. corculana* (next in size) by 1.8 mm. The male genitalia are distinguished by the weakly falcate condition of the anal angle of the cucullus. The female genitalia are nearly identical to those of *P. corculana*, but sternum 7 is more strongly sculptured near the lateral margins of the ostium.

**Description.** *Head:* Frons and vertex creamy white, with black dot anterior to eye; labial palpus white, second segment with dark gray patch on lateral surface and pale brownish scales concealing brownish-gray third segment; antenna concolorous with vertex, base of scape with ring of black scales. *Thorax:* Dorsal surface creamy white to pale brownish yellow, ventral surface creamy white; legs whitish, sometimes with pale brown shading; tarsi with brown annular markings; foreleg tibiae with two brown transverse marks. *Forewing* (Fig. 12): ♂ FWL 7.9–10.0 mm (mean = 9.2, n = 14), AR = 3.44; ♀ FWL 8.3–9.6 (mean = 9.1, n = 7), AR = 3.15; costal margin straight, apex acute, termen straight to weakly concave; dorsal surface brownish yellow, lacking fascial markings; costa with short, thin, closely spaced, blackish-brown dashes from base to apex; ocellus inconspicuous but well expressed, defined basally and distally by lustrous beige transverse bars, with white central field crossed by up to three blackish-brown dashes; proximal margin of ocellus often edged with white scales, the latter preceded basally by thin blackish-brown line; a thin brownish line sometimes present on CuA2 from

cubitus to tornus. *Hindwing:* Uniformly grayish brown, fringe lighter. *Male genitalia* (Fig. 50) (n = 3): Uncus a dorsally setose lobe with rounded apex; dorsolateral shoulders of tegumen well developed; socii fingerlike; vesica with 12–33 deciduous cornuti (n = 3); valva with costal margin concave, apex rounded, distal margin convex except near anal angle, anal angle weakly falcate, SA ≈ 90°. *Female genitalia* (Figs. 70, 71) (n = 3): Papillae anales laterally facing and sparsely setose; lamella postvaginalis a shallow trough; posterior margin of sternum 7 invaginated to length of sterigma and fused with lateral margins of lamella postvaginalis and with outer rim of ringlike lamella antevaginalis; sternum 7 with raised ridge on either side of ostium; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size.

**Holotype** (Fig. 12). ♂, Utah, Emery Co., Goblin Valley Rd., 5010 ft., J. S. Nordin, 9 May 2007, genitalia slide DJW 1961, USNM.

**Paratypes.** UTAH: same data as holotype (8 ♂, genitalia slide DJW 1960; 2 ♀, genitalia slide DJW 1963); Emery Co., Hwy 24 & Goblin Valley Rd., T25S R21E Sec 22, 5010 ft., J. S. Nordin, 17 May 1998 (1 ♂, genitalia slide DJW 692; 1 ♀), 17 May 2002 (2 ♀, genitalia slides DJW 930, 951). Paratype depositories: BMNH, CNC, CSU, EME, JSN, MEM, USNM, DJW.

**Etymology.** The specific epithet derives from the Latin noun *arena*, meaning sand, and refers to the desert-like habitat at the type locality.

**Distribution and biology.** This species is known only from the vicinity of Goblin Valley Road in Emery Co., Utah (Fig. 101). The 21 specimens examined (14 ♂, 7 ♀) were collected on 9 May and 17 May.

***Phaneta indagatricana* (Heinrich)**

(Figs. 13–17, 53, 76–78, 102)

*Thiodia indagatricana* Heinrich 1923:56; McDunnough 1939:44.

*Phaneta indagatricana*: Powell 1983:33; Brown 2005:493.

*Phaneta verecundana* Blanchard 1979:210; Brown 2005:496, **new synonymy**.

**Discussion.** *Phaneta indagatricana* is widespread in western North America. I examined 230 specimens (171 ♂, 59 ♀) with varying forewing coloration as depicted in Figs. 13–17. The holotype resembles the specimen in Fig. 15. Thirty-one associated genitalia preparations (21 ♂, 10 ♀) provided no support for interpreting these specimens as more than one taxon. Blanchard (1979) proposed the name *P. verecundana* for what he considered to be a distinct species represented by specimens at the white end (Fig. 13) of the color range. In examining the types of *P. verecundana* (7 ♂, 4 ♀) I found that Blanchard's conclusions were based on a mixed series. The holotype and four of the male paratypes agree with the specimen in Fig. 13. One of these five had been dissected by Blanchard, and the genitalia are typical of *P. indagatricana*. The remaining six paratypes (2 ♂, 4 ♀) are distinguishable from the holotype in forewing appearance and genitalia and represent a new species described below as *Phaneta labiata*. Blanchard had dissected one of the females but

neither of these two males. John F. G. Clarke examined the two dissected paratypes (1 ♂, 1 ♀) and suggested (see Blanchard 1979) the following characters as possibly diagnostic for *P. verecundana*: basal one-half of costa lacking thin dark dashes, ventral margin of valva more deeply excavated than in *P. indagatricana*, and lamella postvaginalis not sclerotized. The first comment is descriptive of *P. labiata* (Figs. 21–23) but not entirely accurate for the white phenotype of *P. indagatricana*. The dark dashes on the basal one-half of the costa are reduced in *P. indagatricana*, particularly in specimens at the light end of the color range. Nevertheless, faint indications of these marks can usually be detected, even in the whitest specimens. I tested Clarke's second comment by calculating the ratio of neck width to valval width, the latter measurement taken at the saccular angle, and obtained values varying from 0.41 to 0.48 in both white and brownish-gray specimens ( $n = 12$ ). Clarke's third comment, being based on a specimen of *P. labiata*, has no bearing on the taxonomic status of *P. verecundana*. These observations are the grounds for the synonymy proposed here.

**Types.** *Thiodia indagatricana*. Holotype: ♂, Utah, [Utah Co.], Provo, Tom Spalding, 26 August 1908, genitalia slide 72766, USNM. Paratypes. COLORADO: [Garfield Co.], Glenwood Springs, W. Barnes, August 1892 (1 ♀), USNM; Denver, Collection Wm. Schaus (2 ♂, genitalia slide 70059; 2 ♀), USNM. SOUTH DAKOTA: [Union Co.], Elk Point, C. N. Ainslie, August 1913 (1 ♀), USNM. UTAH: [Utah Co.], Provo, Tom Spalding, 26 August 1908 (2 ♂; 2 ♀, genitalia slide 70060), USNM; [Juab Co.], Eureka, Tom Spalding, 6 August 1910 (1 ♂), USNM, 9 August 1911 (3 ♂), USNM. Klots (1942) reported 8 paratypes in the AMNH. This accounts for 23 of the 25 specimens mentioned by Heinrich (1923). *Phaneta verecundana*. Holotype: ♂, Texas, Hemphill Co., Canadian, A. & M. E. Blanchard, 15 August 1971, USNM. Paratypes: same location and collectors as holotype, 13 August 1971 (4 ♂, genitalia slide 90504), USNM.

**Descriptive notes.** The forewing of *P. indagatricana* (Figs. 13–17) features a white streak on the cubitus flanked by conspicuous brown bars extending from base to mid-wing. The costa is white, with brown striae from mid-wing to apex. Except for the ocellus, the rest of the wing varies from white to brownish gray. Forewing statistics: ♂ FWL 5.8–8.3 mm (mean = 7.2,  $n = 106$ ), AR = 3.37; ♀ FWL 5.4–8.0 mm (mean = 7.1,  $n = 40$ ), AR = 3.33.

**Male genitalia** (Fig. 53) ( $n = 21$ ): Uncus triangular and dorsally setose; dorsolateral shoulders of tegumen well developed; socii fingerlike, with distal one-third tapering abruptly to narrowly rounded apex; vesica with 18–37 deciduous cornuti ( $n = 19$ ); valva with costal margin concave, apex rounded, distal margin weakly convex, anal angle broadly rounded, ventral margin strongly emarginated, SA  $\approx 90^\circ$ ; cucullus of nearly uniform width; medial surface of valva with patch of moderately stout setae on raised area at base of neck. **Female genitalia** (Figs. 76–78) ( $n = 10$ ): Lamella postvaginalis rectangular, width nearly equal to length, with medial trough microspinulate and weakly depressed; sternum 7 with posterior margin invaginated 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 similar size.

**Distribution and biology.** Figure 102 shows the geographic range based on 230 specimens examined. Adults fly from July through early October, but the vast majority of capture dates are in July and August. This species is commonly encountered in sagebrush habitat.

### *Phaneta misturana* (Heinrich)

(Figs. 18, 19, 54, 79, 80, 102)

*Thiodia misturana* Heinrich 1923:54; McDunnough 1939:44.

*Phaneta misturana*: Powell 1983:33; Brown 2005:494.

**Types.** Holotype: ♂, Saskatchewan, Oxbow, Fred K. Knab, 9 June 1907, genitalia slide 72773, USNM. Paratypes: same location and collector as holotype, 5 June 1907, (1 ♀, genitalia slide DJW 2151), USNM. Klots (1942) reported one paratype in the AMNH.

**Descriptive notes.** The forewing (Figs. 18, 19) is brownish-gray to blackish-gray, with white highlights. It is similar in pattern to that of *P. indagatricana*, but the overall appearance is darker, the proximal one-half of the costa is brownish gray instead of white, and the distal end of the white cubital streak is well separated from the ocellus by a patch of blackish-gray scales. The posterior margin of the cubital streak is marked with a thin black line that expands at mid-wing into a dark mark that nearly interrupts the streak. Usually the two species can be separated by head color: brownish gray in *P. misturana*; white in *P. indagatricana*, with gray to pale brown suffusion in darker phenotypes. Forewing statistics: ♂ FWL 6.3–8.3 mm (mean = 7.2,  $n = 18$ ), AR = 3.30; ♀ FWL 5.7–7.5 mm (mean = 6.7,  $n = 6$ ), AR = 3.17.

The genitalia of *P. misturana* are virtually indistinguishable from those of *P. indagatricana*. The uncus tends to be a little less strongly developed, the socii a little more rounded distally, and the cucullus a little more abruptly tapered at the anal angle, but these differences are subtle and do not appear to be diagnostic.

**Distribution and biology.** Figure 102 shows the geographic range of *P. misturana* based on 29 specimens (22 ♂, 7 ♀). Powell & Opler (2009:133) reported *Artemisia californica* Less. (Asteraceae) as a larval host in coastal California, and there is one reported rearing from southern Idaho on *Artemisia tridentata* Nutt. (Asteraceae) (Brown *et al.*, 1983). The flight period of *P. misturana* (mid-March to late June) is disjunct from that of *P. indagatricana* (July through early October).

**Remarks.** Figure 20 is representative of four specimens collected on 21 June and 18 July at Ebbetts Pass, Alpine Co., California (8350 ft.) which are similar in genitalia, forewing pattern, and coloration to *P. misturana* and *P. indagatricana*. One female exhibited sculpturing of the sterigma that is slightly different than typical *P. indagatricana* and *P. misturana*. These specimens may represent a distinct species, but I think that decision is best deferred until more material is available.

### *Phaneta labiata*, new species

(Figs. 21–23, 55, 81, 82, 102)

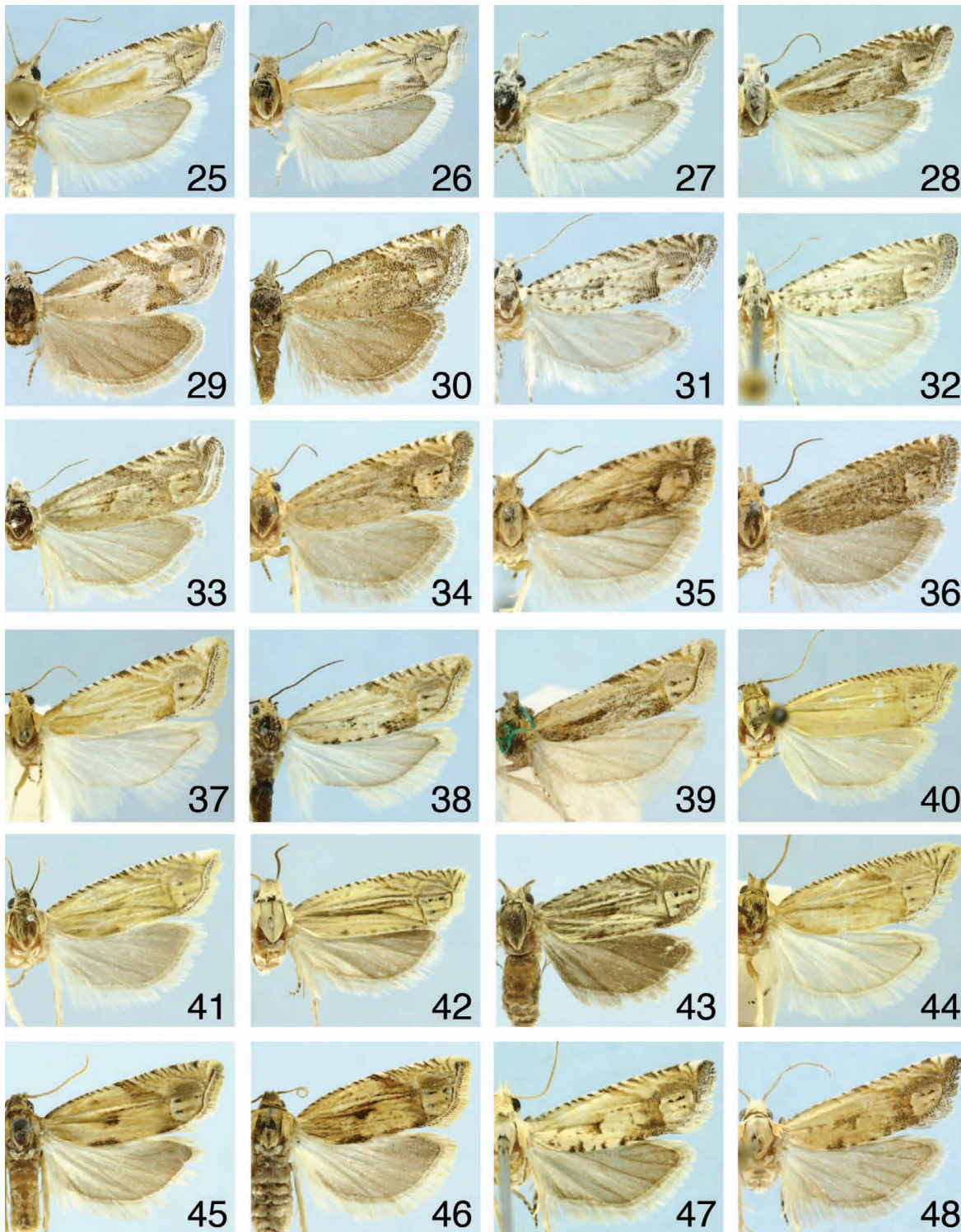
**Diagnosis.** This species is superficially similar to many Nearctic *Phaneta* but is readily diagnosed by genitalic characters: males (Fig. 55) have a prominent liplike flange on the ventral margin of the basal excavation of the valva; females (Figs. 81, 82) have a membranous lamella antevaginalis and a patch of microspinules on the inner surface of the sclerotized ring in the ductus bursae. *Phaneta labiata* resembles *Phaneta latens* (Fig. 57) in valval profile but is easily





Figs. 1–24. **1–4**, *P. corculana*. **1**, ♂ Larimer Co., Colorado. **2**, ♀ Chaffee Co., Colorado. **3**, ♀ Whitman Co., Washington. **4**, ♀ Clear Creek Co., Colorado. **5–8**, *P. mormonensis*. **5**, ♂ Sanpete Co., Utah. **6**, ♀ Grant Co., New Mexico. **7**, ♀ Lincoln Co., New Mexico. **8**, ♂ Contra Costa Co., California. **9–11**, *P. browni*. **9**, ♀ Taos Co., New Mexico. **10**, ♂ Chaffee Co., Colorado. **11**, ♂ Albany Co., Wyoming. **12**, *P. arenana*, ♂ holotype, Emery Co., Utah. **13–17**, *P. indagatricana*. **13**, ♂ Baca Co., Colorado. **14**, ♂ Weld Co., Colorado. **15**, ♂ Taos Co., New Mexico. **16**, ♂ Carter Co., Montana. **17**, ♂ Sanpete Co., Utah. **18–19**, *P. misturana*. **18**, ♂ Los Angeles Co., California. **19**, ♂ Twin Falls Co., Idaho. **20**, *Phaneta* sp., ♀ Alpine Co., California. **21–23**, *P. labiata*. **21**, ♀ Hemphill Co., Texas. **22**, ♂ Albany Co., Wyoming. **23**, ♂ Oneida Co., Idaho. **24**, *P. goblinana*, Emery Co., Utah.





Figs. 25–48. 25–26, *P. cibolana*, ♂, ♀ holotype, Cibola Co., New Mexico. 27–28, *P. parvula*. 27, ♂ holotype, Oneida Co., Idaho. 28, ♂ Uintah Co., Utah. 29–30, *P. latens*, ♂, ♂ Kern Co., California. 31–32, *P. minimana*, ♂, ♀ Washington Co., Utah. 33, *Phaneta* sp., ♂ San Bernardino Co., California. 34–36, *P. vogelana*, ♀, holotype, ♀, Otero Co., Colorado. 37–38, *P. stramineana*. 37, ♂ Fremont Co., Wyoming. 38, ♂, Albany Co., Wyoming. 39, ♂, *P. parvana* lectotype. 40–44, *P. grindeliana*. 40, ♂ paratype, Donley Co., Texas. 41, ♀, Morton Co., Kansas. 42, ♂, Marion Co., Florida. 43, ♂, Suwannee Co., Florida. 44, ♂, San Diego Co., California. 45–46, *P. clementeana*, ♂ holotype, ♀, Los Angeles Co., California. 47–48, *P. baloghi*. 47, ♂ holotype, Otero Co., New Mexico. 48, ♂ Gove Co., Kansas.



separated from the latter species by forewing appearance (Figs. 21–23 vs. 29, 30).

**Description.** *Head:* Frons and vertex white; labial palpus white with long yellowish-white scales on second segment concealing third segment; antenna white with yellowish tints. *Thorax:* Dorsal and ventral surfaces white to pale yellowish white; legs yellowish white with darker tarsal annulations. *Forewing* (Figs. 21–23): ♂ FWL 5.4–8.0 mm (mean = 6.9, n = 8), AR = 3.26; ♀ FWL 5.8–7.5 mm (mean = 6.8, n = 6), AR = 3.02; costal margin weakly convex, apex acute, termen weakly concave; dorsal surface grayish brown to yellowish brown with prominent white cubital streak from base to ocellus; costa white with thin dark dashes from mid-wing to apex; ocellus with white central field crossed by one or two weakly defined brown dashes and bordered basally and distally by lustrous pearly white transverse bars; fringe scales white with brown cross-bars, the latter forming several thin lines parallel to termen. *Hindwing:* Pale grayish brown, fringe white. *Male genitalia* (Fig. 55) (n = 7): Uncus and dorsolateral shoulders of tegumen moderately developed; socii fingerlike; vesica with 21–29 deciduous cornuti (n = 7); valva with costal margin concave, apex rounded, distal margin nearly straight, anal angle acute, neck long and narrowing distally, saccular corner broadly rounded, SA ≈ 145°; cucullus with basoventral margin overlapping ventral margin of neck; basal excavation with ventral margin thickened and developed into liplike projection. *Female genitalia* (Figs. 81, 82) (n = 5): Papillae anales laterally facing and sparsely setose; lamella postvaginalis rectangular, width ca. 2 × length, microspinulate throughout, with anterolateral corners joined to sternum 7, and with two fingerlike projections forming posterior margin of ostium; lamella antevaginalis membranous; posterior margin of sternum 7 invaginated to length of sterigma; ductus bursae short, with sclerotized ring posterior to juncture with ductus seminalis; inner surface of ring microspinulate near ductus seminalis; corpus bursae with two signa of nearly equal size; anterior one-third of inner surface of corpus bursae strongly microspinulate.

**Holotype.** ♂, Texas, Cottle Co., Paducah, A. & M. E. Blanchard, 4 June 1970, genitalia slide DJW 2149, USNM.

**Paratypes.** CALIFORNIA: Inyo Co., Westguard [misspelling of Westgard] Pass, White Mts., P. Opler, J. Powell, & J. A. Scott, 19 July 1968 (1 ♂, genitalia slide DJW 2113; 1 ♀, genitalia slide DJW 2114). COLORADO: Grand Co., Beaver Creek at US 40, 7800 ft., D. J. Wright, 25 August 1997 (1 ♀, genitalia slide DJW 409); Summit Co., Co. Rd. 950, 5.3 mi S. of Frisco off St. Rt. 9, 9100 ft., D. J. Wright, 30 July 2008 (2 ♂, genitalia slides DJW 2066, 2068). IDAHO: Oneida Co., Curlew NG, 5 mi ENE of Holbrook, D. J. Wright, 15 July 2006 (1 ♂, genitalia slide DJW 2144). NEW MEXICO: Taos Co., S. side US 64, 10 mi. SE Tres Piedras, 7550 ft., D. J. Wright, 11 August 1999 (1 ♂, genitalia slide DJW 547). TEXAS: Hemphill Co., Canadian, A. & M. E. Blanchard, 28 May 1970 (1 ♂; 4 ♀, genitalia slides USNM 90503, DJW 2150, 2153). WYOMING, Albany Co., T15N R73W Sec. 1, 2217 Sky View Lane, 7480 ft., J. S. Nordin, 21 June 2002, (1 ♂, genitalia slide DJW 931). Paratype depositories: CSU, EME, USNM, DJW.

**Etymology.** The specific epithet comes from the Latin adjective labiatus, meaning lipped, and refers to the flangelike projection on the margin of the basal excavation of the valva.

**Distribution and biology.** Figure 102 shows the distribution of the 14 specimens (8 ♂, 6 ♀) in the type series. Capture dates range from 28 May to 25 August. The specimens from Inyo Co., California are smaller than the rest (mean FWL = 5.6 mm) and more yellowish in forewing appearance; those from Colorado and Idaho have grayish forewings.

**Remarks.** The holotype and the five paratypes from Texas were designated by Blanchard (1979) as paratypes of *P. verecundana*. Clarke's comment (Blanchard 1979)

regarding the lack of sclerotization of the lamella postvaginalis in *P. verecundana* was based on a specimen of *P. labiata*. The lamella postvaginalis is not very strongly developed, but it is sclerotized.

### *Phaneta goblinana*, new species

(Figs. 24, 56, 83, 84, 102)

**Diagnosis.** *Phaneta goblinana* is similar in forewing appearance to some phenotypes of *indagatricana* (Figs. 24, 14, 15), but the white cubital streak is flanked by larger yellow-brown patches, the basal one-half of the costa is unmarked, and the dorsum is suffused with white. Mean FWL in *P. goblinana* exceeds that in *P. indagatricana* by 1.5 mm. Differences in male genitalia include: ventral emargination of neck broad and shallow, SA ≈ 130°, and anal angle narrowly rounded in *P. goblinana*, vs. U-shaped, 90°, and broadly rounded, respectively, in *P. indagatricana*. The lamella postvaginalis is separated from sternum 7 in *P. goblinana* but fused with sternum 7 in *P. indagatricana*.

**Description.** *Head:* Frons and vertex white; labial palpus white with grayish-brown shading on lateral surface of second segment; antenna white with grayish-brown streak along dorsal surface. *Thorax:* Dorsal surface white, with yellow-brown tegulae; ventral surface white; legs white with varying shades of grayish brown, tarsal segments gray brown with white annulations. *Forewing* (Fig. 24): ♂ FWL 7.6–9.9 mm (mean = 8.8, n = 20), AR = 3.53; ♀ FWL 7.4–8.7 mm (mean = 8.0, n = 9), AR = 3.34; costa straight, apex acute, termen straight to weakly convex; dorsal surface with three longitudinal white streaks: one on costa from base to apex, interrupted beyond mid-wing by brown striae; a second anterior to cubitus, extending from base to distal end of cell; and a third along dorsum from base to mid-wing; cubital streak flanked by yellowish-brown coloration, the later shading to gray from mid-wing to termen; central field of ocellus white, bordered basally and distally by lustrous, transverse, pearly white to pale gray bars, crossed longitudinally by three variably expressed black dashes; fringe scales white with blackish subapical cross-bars. *Hindwing:* Grayish brown with concolorous fringe. *Male genitalia* (Fig. 56) (n = 3): Uncus a prominent lobe with rounded apex and setose dorsal surface; dorsolateral shoulders of tegumen well developed; socii fingerlike, broad basally, with distal one-third tapering to narrowly rounded apex; vesica with 13–22 deciduous cornuti (n = 3); valva with costal margin concave, apex blunt to rounded, ventral one-half of distal margin nearly straight, anal angle weakly developed and narrowly rounded, ventral emargination broad and shallow, neck long, SA ≈ 130°. *Female genitalia* (Figs. 83, 84) (n = 2): Papillae anales laterally facing and moderately setose; lamella postvaginalis rectangular, flaring slightly posteriorly, length nearly equal to width, lateral margins not fused with sternum 7; sternum 7 with posterior margin invaginated nearly to length of sterigma and with lateral extremities triangular and broadly developed; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa, one noticeably larger than the other.

**Holotype.** ♂, Utah, Emery Co., Rt. 24 & Goblin Valley Rd., 5010 ft., J. S. Nordin, 11 May 2001, genitalia slide DJW 1939, USNM.

**Paratypes.** UTAH: Emery Co., Goblin Valley Rd., J. S. Nordin, 9 May 2007 (1 ♂, 1 ♀); same data as holotype (5 ♂, genitalia slides DJW 858, 1938); Emery Co., T24S R13E Sec 2, HWY 24, mi. 146.8, 4880 ft., J. S. Nordin, 19 May 2003 (10 ♂, 2 ♀), 21 May 2003 (4 ♂; 4 ♀, genitalia slides DJW 1940, 1941); Emery Co., T24S R13E Sec 4, HWY 24, mi. 154.8, 4880 ft., J. S. Nordin, 21 May 2003 (1 ♂). Paratype depositories: CNC, CSU, EME, JSN, USNM, DJW.

**Etymology.** This species is named after the type locality.

**Distribution and biology.** The type series consists of 29 specimens (20 ♂, 9 ♀) collected between 9 May and 21 May in sandy habitat at or near the type locality. Capture sites range in elevation from 4250 to 5010 feet.

*Phaneta latens* Heinrich  
(Figs. 29, 30, 57, 89, 90, 103)

*Thiodia latens* Heinrich 1929:2; McDunnough 1939:44.  
*Phaneta latens*: Powell 1983:33; Brown 2005:494.

**Types.** *Holotype*: ♂, California, Tulare County, Monache Meadows, 8,000 ft., 8–14 July, genitalia slide 72769, USNM. *Paratypes*: same locality as holotype, 1–7 July (2 ♂), USNM, 8–14 July (2 ♂), USNM. [Heinrich (1929) mentioned 7 ♂ paratypes dated 8–14 July, but pin labels on two USNM specimens read 1–7 July.] Klots (1942) reported 2 paratypes in the AMNH.

**Descriptive notes.** *Phaneta latens* is a brownish-gray moth with two somewhat different looking phenotypes (Figs. 29, 30). The holotype resembles the specimen in Fig. 30, with fascial markings obscured by extensive brownish-gray suffusion from base to median fascia. The second form (Fig. 29) has an outwardly oblique brown mark on the cubitus representing the subbasal fascia, a prominent chevron-shaped median fascia extending from mid-costa to dorsum, and a white streak through the cell from base to mid-wing. Both forms have bright white strigulae on the distal one-half of the costa. Forewing statistics: ♂ FWL 6.4–7.6 mm (mean = 7.2 n = 16), AR = 2.99; ♀ FWL 6.8–7.5 mm (mean = 7.1, n = 3), AR = 2.99.

**Male genitalia** (Fig. 57) (n = 5): Uncus a dorsally setose bulge, basal width ca. 4 × height, weakly differentiated from rounded dorsolateral shoulders of tegumen; socii short; vesica with 26–37 deciduous cornuti (n = 3); valva with costal margin weakly concave, apex rounded, distal margin straight to convex, neck elongate and narrowing distally, SA ≈ 140°; cucullus with length (apex to anal angle) ca. 3 × medial width and with basoventral margin overlapping ventral margin of neck. **Female genitalia** (Fig. 89, 90) (n = 2): Lamella postvaginalis rectangular, narrowing slightly posteriorly, with shallow microspinulate medial trough; posterior margin of sternum 7 invaginated 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 equal size.

**Distribution and biology.** I examined the holotype, four paratypes at the USNM, one male from Lander Co., Nevada, and 18 specimens (15 ♂, 3 ♀) from two localities in the Los Padres National Forest in Kern Co., California. This material was collected between 8 June and 21 July at elevations ranging from about 7500 to 8300 feet. Specimens from Cerro Noroeste, Kern Co., California have pin labels with the notation *Artemisia* (Asteraceae).

**Remarks.** Figure 33 illustrates an unnamed species that appears to be very closely related to *P. latens*. I have seen three specimens of this taxon, all males, two from San Bernardino Co., and one from Inyo Co., California. The Inyo Co. specimen was incorrectly determined and illustrated by Heinrich (1923, Fig. 131) as *Phaneta minimana* (Walsingham). Its genitalia are similar to those of *latens*, but the basoventral margin of the cucullus does not overlap the ventral margin of the neck. Description of this species is deferred for lack of material.

*Phaneta minimana* (Walsingham)  
(Figs. 31, 32, 58, 91, 92, 103)

*Semasia minimana* Walsingham 1879:60.

*Eucosma minimana*: Barnes & McDunnough 1917:172.

*Thiodia minimana*: Fernald [1903]:462; Heinrich 1923:61; McDunnough 1939:45.

*Phaneta minimana*: Powell 1983:34; Brown 2005:494.

**Discussion.** Lacking an opportunity to examine the syntypes, Heinrich (1923, Fig. 131) illustrated as *P. minimana* a specimen from Inyo Co., California that resembles in forewing appearance and genitalia the specimen in Fig. 33 but does not resemble in either respect the lectotype of *P. minimana* (designated below). The species illustrated by Heinrich does not appear to have a valid name (see Remarks under *P. latens*).

**Types.** Lectotype here designated: ♂, California, Siskiyou Co., Sheep Rock, 3 September 1871, Walsingham, genitalia slide 5740, BMNH. Paralectotype: 1 ♀, same data as lectotype, genitalia slide 5751, BMNH.

**Descriptive notes.** *Phaneta minimana* is a small whitish insect with black markings as follows: a dot on lateral surface of labial palpus, a mark on dorsal surface of scape, a spot at base of tegula, a dash at mid-costa of forewing, and irrorations on basal one-half of forewing. The white central field of the ocellus is crossed by two blackish-gray dashes and is edged basally and distally by lustrous gray bars. Patches of white-tipped grayish scales are located along the proximal and anterior margins of the ocellus, the latter patch often infiltrating the central field of the ocellus. Fringe scales are white with blackish cross-bars. Forewing statistics: ♂ FWL 5.0–5.4 mm (mean = 5.2 n = 4), AR = 3.29; ♀ FWL 5.4–7.2 mm (mean = 6.5, n = 4), AR = 3.05.

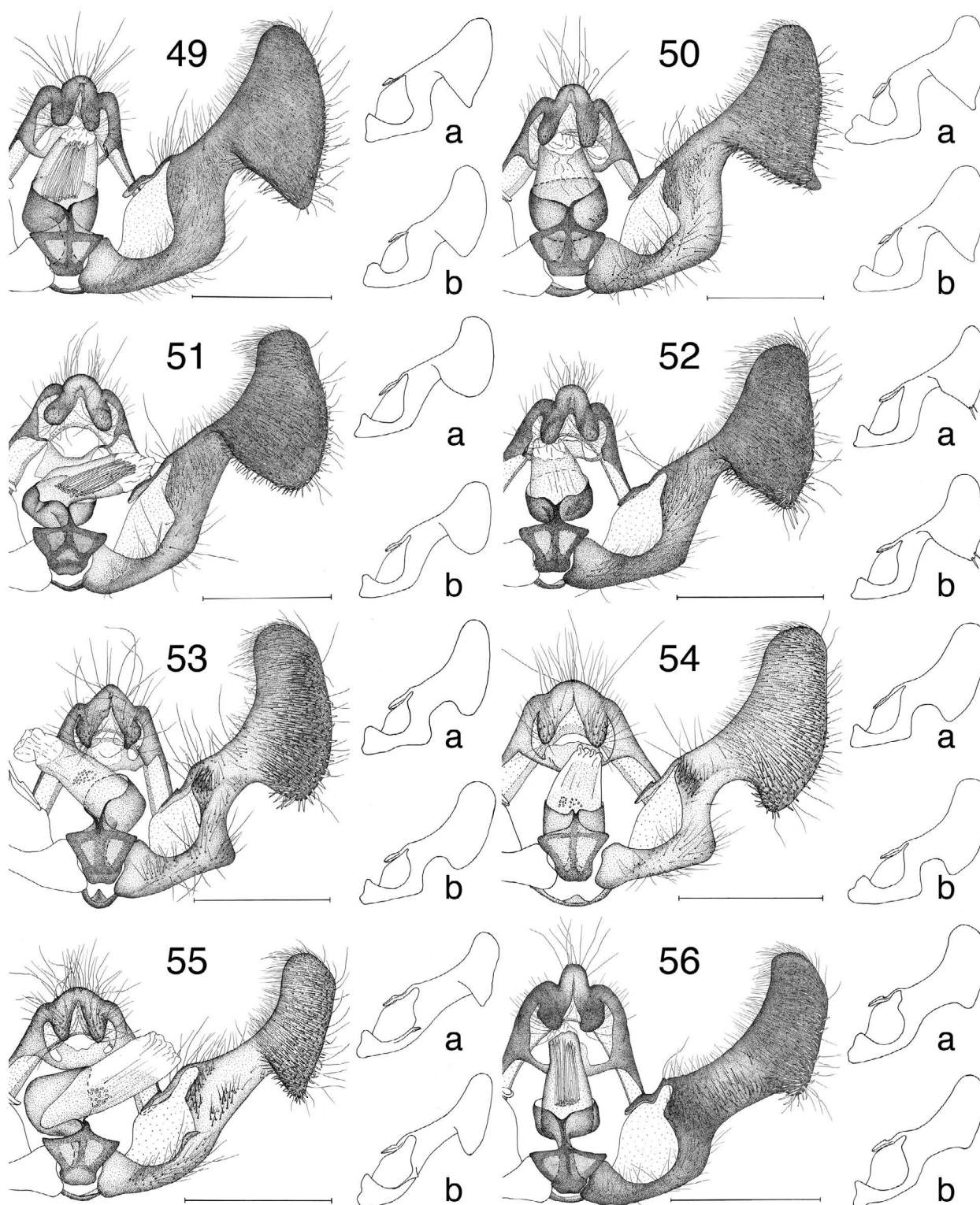
**Male genitalia** (Fig. 58) (n = 4): Uncus a weakly developed convex bulge; dorsolateral shoulders of tegumen well defined; socii fingerlike; vesica with 29–38 deciduous cornuti (n = 4); valva with costal margin concave, apex rounded, distal margin convex and of uniform curvature, anal angle a weakly developed, narrowly rounded lobe, ventral emargination broad and shallow, neck widening distally, saccular angle obtuse; medial surface of valva with broad band of moderately stout setae on ventral one-half of neck and with prominent line of similar setae parallel to costal margin and arising on weakly developed ridge at margin of basal excavation. **Female genitalia** (Figs. 91, 92) (n = 3): Papillae anales weakly sclerotized and laterally facing; sterigma ringlike; lamella postvaginalis weakly developed, width ca. 4 × length; lamella antevaginalis with sclerotized inner edge and membranous outer rim; sternum 7 weakly sclerotized, with posterior margin invaginated beyond length of sterigma and fused with lamella antevaginalis; ductus bursae long, with sclerotized ring near ostium; corpus bursae with two signa of nearly equal size.

**Distribution and biology.** The syntypes were collected in early September in northern California. I examined the lectotype, 3 ♀ from San Diego County, California dated 4 September, and 4 specimens (3 ♂, 1 ♀) from Washington County, Utah dated 25 September.

*Phaneta cibolana*, new species  
(Figs. 25, 26, 61, 85, 86, 103)

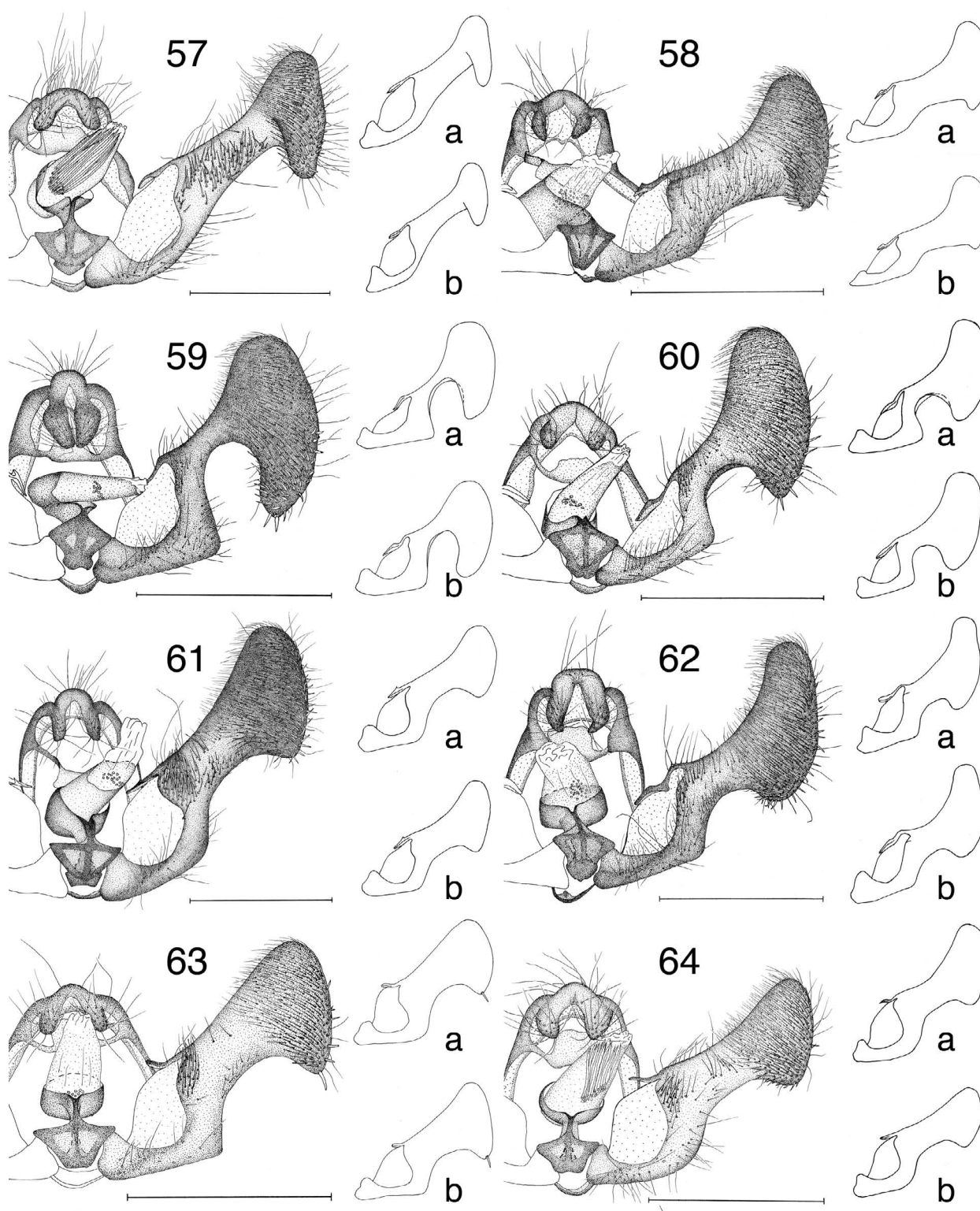
**Diagnosis.** In forewing appearance, *Phaneta cibolana* (Figs. 25, 26) resembles certain phenotypes of *P. indagatricana* (Fig. 14) and *P. parvula* (Fig. 27) (described below), but the three species differ in





Figs. 49–56. Male genitalia. **49**, *P. corculana*, slides DJW853, USNM69953, DJW2127. **50**, *P. arenana*, slides DJW1961, 692, 1960. **51**, *P. mormonensis*, slides DJW1977, 934, 2137. **52**, *P. browni*, slides DJW1999, 826, 1998. **53**, *P. indagatricana*, slides DJW1953, 395, 746. **54**, *P. misturana*, USNM70050, 70053, DJW2155. **55**, *P. labiata*, slides DJW2149, 2113, 931. **56**, *P. goblinana*, slides DJW858, 1938, 1939. Scale bar = 0.5 mm.





Figs. 57–64. Male genitalia. **57**, *P. latens*, slides DJW2089, 2134, 2133. **58**, *P. minimana*, slides DJW2023, 2170, 936. **59**, *P. vogelana*, slides DJW1935, 554, 376. **60**, *P. parvula*, slides DJW932, 745, TOR1046. **61**, *P. cibolana*, slides DJW1395, 2159, 1942. **62**, *P. baloghi*, slides DJW651, 702, 2141. **63**, *P. stramineana*, slides BMNH11601, DJW2016, 929. **64**, *P. clementeana*, slides DJW2091, 2178, 2177. Scale bar = 0.5 mm.

genitalia (Figs. 61, 53, 60 & 85, 76, 87) and size (mean FWL  $\approx$  6.7, 7.2, and 5.2 mm in *P. cibolana*, *P. indagatricana*, and *P. parvula*, respectively). The male genitalia are somewhat similar to those of *Phaneta clementeana* (described below) and *Phaneta grindeliana* (Figs. 61, 64, 66), but *P. cibolana* is separated from the latter two taxa by forewing color and maculation (Figs. 25–26 vs. 40–46).

**Description.** *Head:* Frons white; vertex pale grayish brown; labial palpus with first segment white, second segment white with brownish-gray mark on lateral surface and long brownish-gray scales at distal extremity, third segment brownish-gray; antenna brownish gray. *Thorax:* Dorsal surface straw yellow, ventral surface white; legs white, tinted with brown, with blackish-brown tarsal annulations. *Forewing* (Figs. 25, 26): ♂ FWL 6.0–7.9 mm (mean = 6.6,  $n = 8$ ), AR = 3.25; ♀ FWL 6.1–8.0 mm (mean = 6.9,  $n = 4$ ), AR = 3.17; costal margin weakly convex, apex weakly falcate, termen concave from apex to M3; dorsal surface straw yellow from base to mid-wing, with longitudinal white streak on cubitus; costa white, marked with thin black dashes, those from base to mid-costa greatly reduced; dorsum suffused with white; median fascia represented by blackish mark at mid-costa; proximal and anterior margins of ocellus bordered by patches of white scales with blackish cross-bars; central field of ocellus pale yellow, crossed by two dark dashes, and edged basally and distally by lustrous gray transverse bars; termen with thin blackish line from apex to tornus; fringe scales white with blackish cross-bars. *Hindwing:* Grayish brown, fringe white. *Male genitalia* (Fig. 61) ( $n = 3$ ): Uncus semicircular and dorsally setose; dorsolateral shoulders of tegumen well developed; socii fingerlike; vesica with 21–24 deciduous cornuti ( $n = 3$ ); valva with costal margin weakly concave, apex rounded, distal margin convex of nearly uniform curvature, anal angle moderately developed, ventral emargination broad; medial surface of valva with patch of stout setae at base of neck. *Female genitalia* (Figs. 85, 86) ( $n = 3$ ): Papillae anales weakly sclerotized and laterally facing; lamella postvaginalis with length ca. 2  $\times$  ostium diameter, width of posterior margin ca. 0.5  $\times$  ostium diameter; sternum 7 with strongly produced and sharply pointed lateral extremities; posterior margin of sternum 7 invaginated to length of sterigma, fused with lateral margins of lamella postvaginalis, but separated from lamella antevaginalis by narrow strip of membrane; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of similar size.

**Holotype** (Fig. 26). ♀, New Mexico, Cibola Co., Cibola NF, Lobo Canyon Picnic Area, 7300 ft., 35° 12.77' N, 107° 43.21' W, D. J. Wright, 9 August 2005, genitalia slide DJW 1943, USNM.

**Paratypes.** COLORADO: Zapata Ranch, 7900 ft., R. W. Hodges, 26 June 1982 (1 ♂, genitalia slide DJW 2159); Alamosa Co., Great Sand Dunes, Mosca Creek, 8200 ft., R. W. Hodges, 28 June 1982 (1 ♀, genitalia slide DJW 2160). IDAHO: Oneida Co., Curlew National Grassland, 5 mi. ENE of Holbrook, D. J. Wright, 15 July 2006 (1 ♀, genitalia slide DJW 1959); Oneida Co., Curlew National Grassland, 5 mi. SSE of Holbrook, 4800 ft., D. J. Wright, 18 July 2001 (1 ♂, genitalia slide DJW 1942). NEW MEXICO: Cibola Co., Cibola NF, 11 mi. NE of Grants, 8300 ft., D. J. Wright, 8 August 2005 (1 ♂); same data as holotype (2 ♂); Cibola Co., Cibola NF, Coal Mine Canyon Campground, 7200 ft., D. J. Wright, 9 August 2005 (3 ♂, genitalia slide DJW 1395; 1 ♀). Paratype depositories: CSU, EME, USNM, DJW.

**Etymology.** The specific epithet refers to the type locality in Cibola National Forest, Cibola Co., New Mexico.

**Distribution and biology.** The type material (8 ♂, 4 ♀) was collected in southern Idaho, south central Colorado, and northwestern New Mexico between 26 June and 9 August (Fig. 103). The Idaho localities are

dominated by sagebrush; those in New Mexico are forested.

### *Phaneta parvula*, new species

(Figs. 27, 28, 60, 87, 88, 103)

**Diagnosis.** Some *Phaneta parvula* specimens (Fig. 27) are superficially similar to *P. cibolana* (Fig. 26), but the latter species is larger (see *P. cibolana* diagnosis) and more yellowish. The two taxa are easily separated by genitalia: males have different valval shapes (Figs. 60, 61); females differ in the shape of sternum 7 (Figs. 85, 87) and the structure of the sterigma (Figs. 86, 88).

**Description.** *Head:* Frons and vertex white; labial palpus white, second segment with black spot on lateral surface and long yellowish-gray scales concealing dark gray third segment; antenna white. *Thorax:* Dorsal surface white; tegulae with pale yellow suffusion; ventral surface white; legs white with blackish-brown tarsal annulations. *Forewing* (Figs. 27, 28): ♂ FWL 4.9–5.6 mm (mean = 5.2,  $n = 11$ ), AR = 3.15; ♀ FWL 5.3–5.5 mm (mean = 5.4,  $n = 2$ ), AR = 3.14; costal margin weakly convex, apex acute, termen weakly concave; dorsal surface whitish gray, with pale white cubital streak and brownish-yellow to brownish-gray suffusion from base to subbasal fascia; subbasal fascia represented by dark mark on cubitus, median fascia by dark outwardly oblique bar at mid-costa; costa white with thin black dashes from base to apex; proximal and anterior margins of ocellus with adjacent patches of white-tipped grayish-brown scales; central field of ocellus white, crossed by two brownish dashes, and bordered basally and distally by lustrous grayish-white bars; termen with thin white line from tornus to apex; fringe scales white with blackish-gray cross bars. *Hindwing:* Brownish gray on margins, shading to grayish white at base. *Male genitalia* (Fig. 60) ( $n = 5$ ): Uncus a rounded bulge, basal width ca. 2  $\times$  height, weakly differentiated from dorsolateral shoulders of tegumen; socii short; vesica with 10–15 deciduous cornuti ( $n = 5$ ); valva with costal margin concave, apex rounded, distal margin convex of nearly uniform curvature, anal angle acute, ventral emargination U-shaped, neck narrow, SA  $\approx$  90°. *Female genitalia* (Figs. 87, 88) ( $n = 2$ ): Papillae anales laterally facing, weakly sclerotized, and sparsely setose; lamella postvaginalis rectangular, length ca. 2  $\times$  width, medial trough shallow and microspinulate, anterior margin with two fingerlike projections forming posterior margin of ostium; posterior margin of sternum 7 invaginated to length of sterigma, fused with lateral margins of lamella postvaginalis, but well separated from ringlike lamella antevaginalis; ductus bursae long, with sclerotized ring near ostium; corpus bursae with two large signa of similar size.

**Holotype** (Fig. 27). ♂, Idaho, Oneida Co., Curlew National Grassland, T14S R32E Sec 30, D. J. Wright, 28 July 2003, genitalia slide DJW 1958, USNM.

**Paratypes.** COLORADO: Mesa Co., 10.3 mi. E. of US 50 along Land's End Road, D. J. Wright, 2 September 2000 (1 ♂, genitalia slide DJW 932). MONTANA: [Phillips Co.], Malta, J. McDunnough, 8 August 1928 (1 ♂; 1 ♀, genitalia slide DJW 2096), 12 August 1928 (2 ♂, genitalia slide TOR-1046). UTAH: Uintah Co., 3 mi. N. of Vernal on 2500 W, 6184 ft., D. J. Wright, 4 September 2000 (2 ♂, genitalia slides DJW 745, 2025); Green River Cpgd., Dinosaur Nat. Mon., J. Powell, 12 August 1973 (1 ♂; 1 ♀, genitalia slide DJW 2095); Spanish River, 4–8 September (1 ♂, genitalia slide TOR-1047). Paratype depositories: CNC, EME, USNM, DJW.

**Etymology.** The specific name derives from the Latin *parvulus*, meaning very small.

**Distribution and biology.** The type series consists of 13 specimens (11 ♂, 2 ♀) from Colorado, Idaho, Montana, and Utah (Fig. 103) captured between 28 July and 4 September.



*Phaneta stramineana* (Walsingham)

(Figs. 37, 38, 63, 104)

*Semasia stramineana* Walsingham 1879:60.*Thiodia stramineana*: Fernald [1903]:462; Heinrich 1923:69; McDunnough 1939:45.*Eucosma stramineana*: Barnes and McDunnough 1917:172.*Phaneta stramineana*: Powell 1983:34; Brown 2005:496.

**Discussion.** Walsingham (1879) described *stramineana* from two specimens (1 ♂, 1 ♀) collected at Denver, Colorado in July, 1872. I examined both specimens. The male, which resembles the specimen in Fig. 37, was chosen as lectotype by Obratzov and is so designated below. The female does not seem to be conspecific with the male. The abdomen is missing, but forewing color and maculation suggest that it is *Phaneta pallidarcis* (Heinrich).

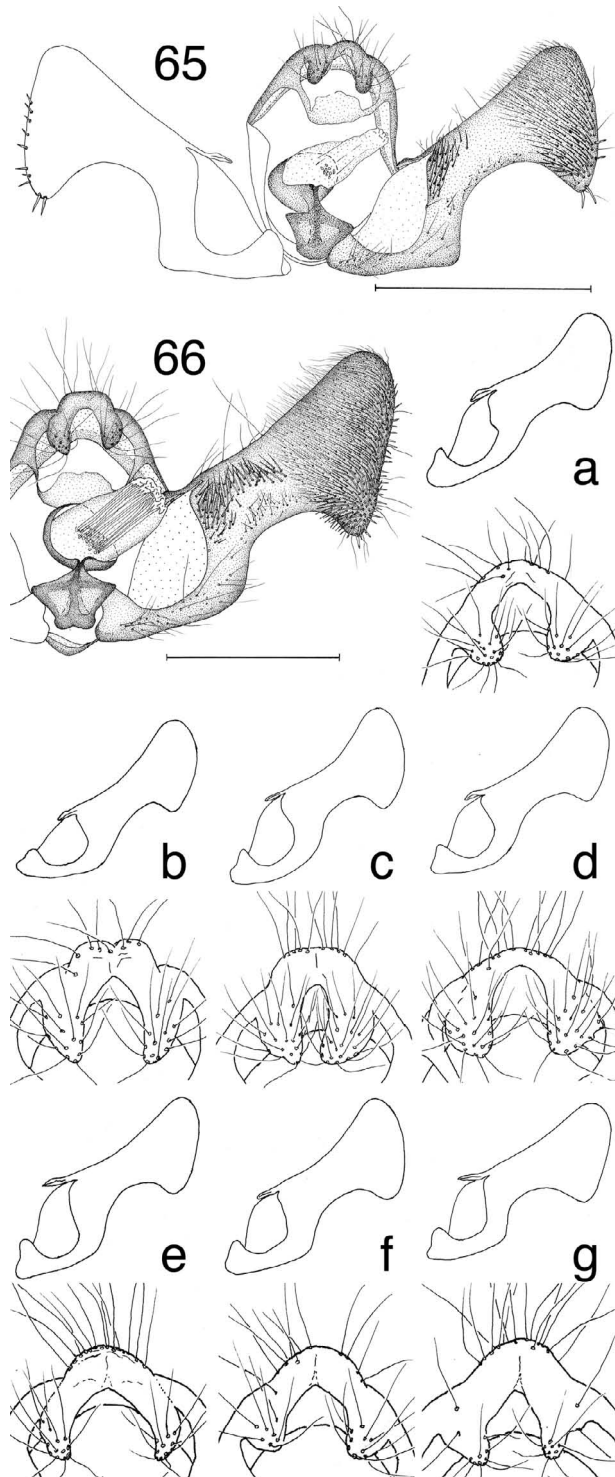
Heinrich (1923) mistakenly interpreted as *P. stramineana* several specimens treated here as members of a species complex associated with *Phaneta grindeliana* (Busck). He illustrated the genitalia (Fig. 118) of one of the latter specimens under the former name. Since then, most *grindeliana*-like specimens in North American collections have been referred to *P. stramineana*. The two taxa are readily separated by male genitalia (Figs. 63, 66): in *P. stramineana* the saccular angle has a well defined vertex, and there are one or two spines at the anal angle of the cucullus; *P. grindeliana* has a broadly rounded saccular corner and lacks spines at the anal angle.

**Types.** *Semasia stramineana*. Lectotype here designated: ♂, Colorado, Denver, Walsingham, July 1872, genitalia slide 11601, BMNH.

**Descriptive notes.** This small yellowish moth (Figs. 37, 38) has little in the way of fascial markings. Fragments of a subbasal fascia are sometimes present in the form of blackish-brown marks on the cubitus and/or dorsum. The median fascia is reduced to a blackish-brown mark at mid-costa, which infrequently is joined to the dorsum by a brown band along the proximal margin of the ocellus. The yellowish-white central field of the ocellus is crossed by two blackish-brown dashes and defined basally and distally by inconspicuous pearly white bars. There is a thin dark line along the termen, followed distally by a thin yellow line. Fringe scales are yellowish-white with black cross-bars that align parallel to the termen. Forewing statistics: ♂ FWL: 5.6–6.6 mm (mean = 6.1, n = 26), AR = 3.43; ♀ unknown.

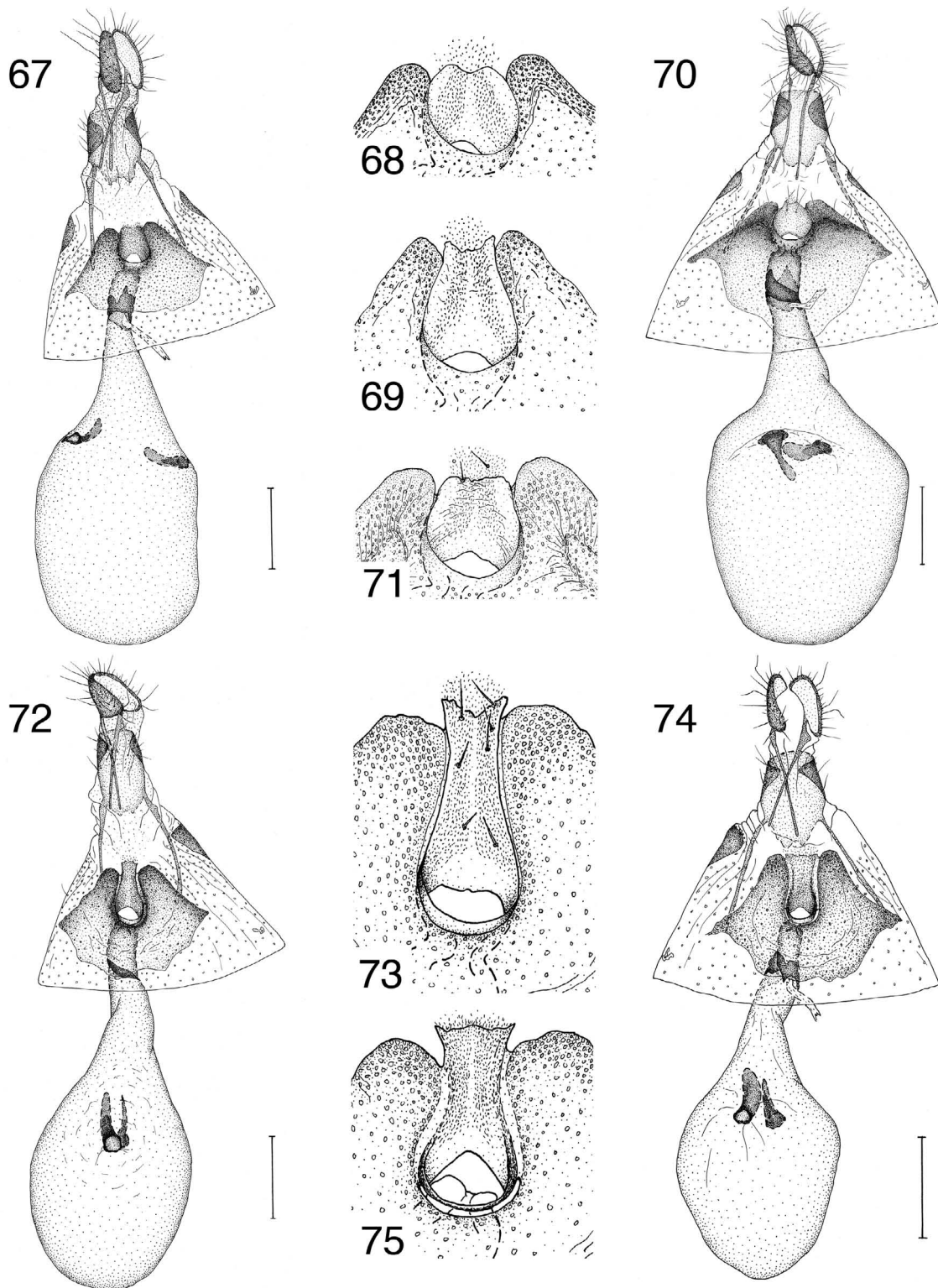
**Male genitalia** (Fig. 63) (n = 5): Uncus a convex bulge, weakly differentiated from rounded dorsolateral shoulders of tegumen; socii short; vesica with 9–14 deciduous cornuti (n = 5); valva with costal margin nearly straight, apex rounded, distal margin weakly convex, anal angle with one or two spiniform setae, ventral emargination broad, neck widening distally. **Female genitalia:** unknown.

**Distribution and biology.** I examined 27 males from Colorado, Oregon, Nevada, and Wyoming (Fig. 104). Capture dates range from 16 June to 22 July.

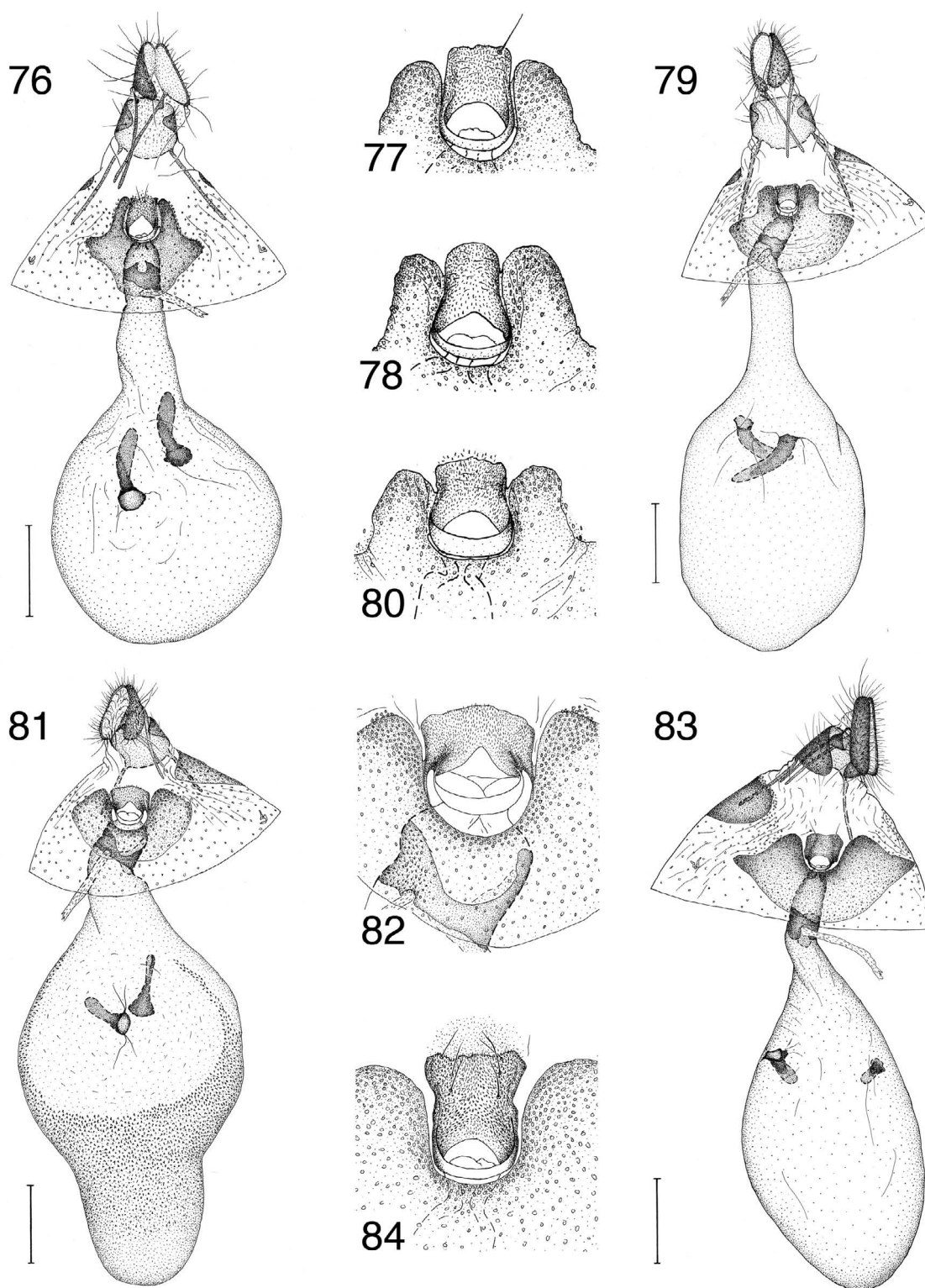


Figs. 65–66. Male genitalia. **65**, *P. parvana* lectotype, slide BMNH11600. **66**, *P. grindeliana* paratype, slide DJW2206. **66a–g**, *P. grindeliana* complex, slides DJW2027, 536, 2209, 2208, 2220, 2219, 2198. Scale bar = 0.5 mm.



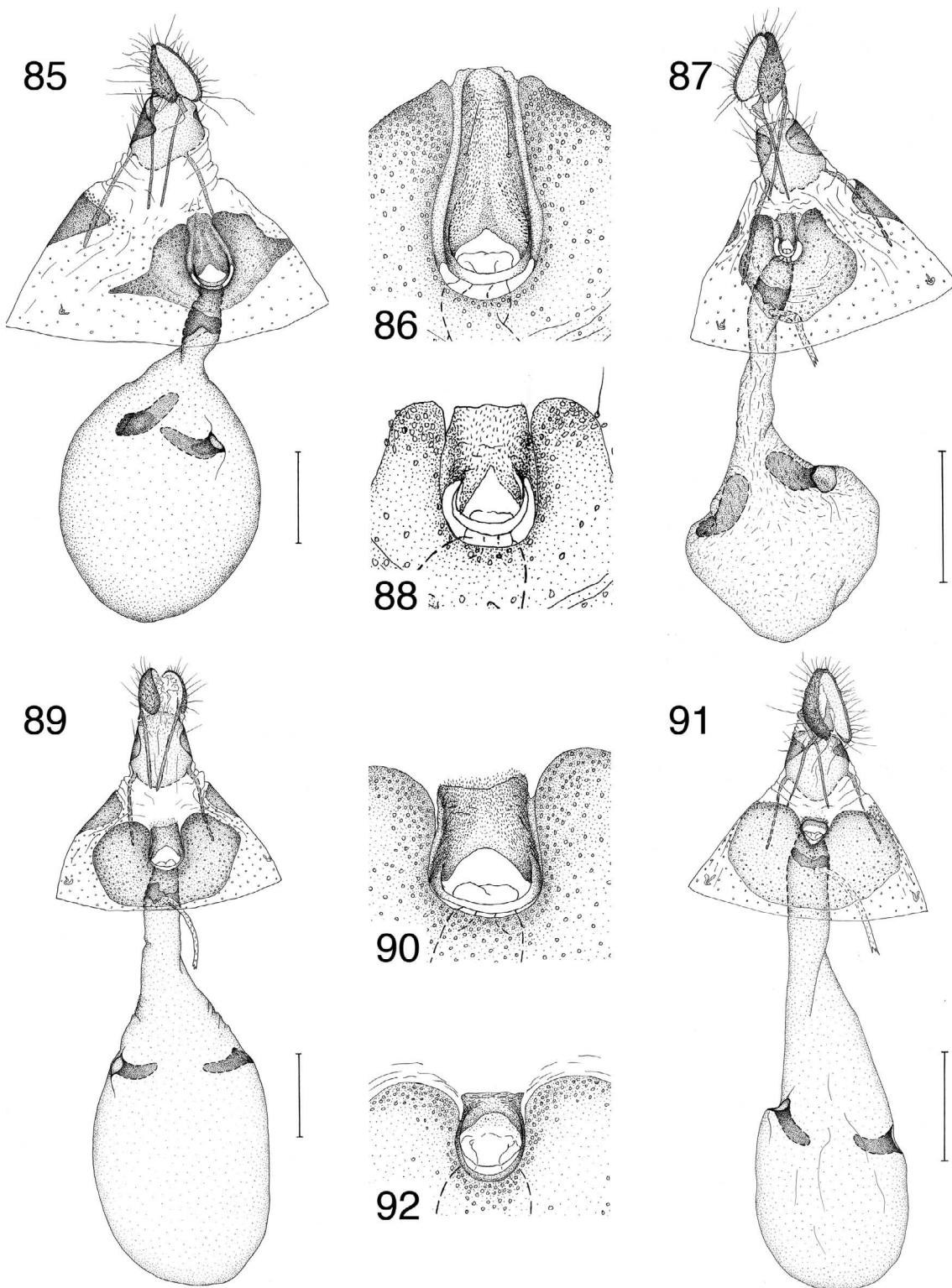


Figs. 67–75. Female genitalia. **67–69**, *P. corculana*, slides DJW1965, 851, 2128. **70–71**, *P. arenana*, slides DJW1963, 951. **72–73**, *P. mormonensis*, slide DJW1966. **74–75**, *P. browni*, slides DJW2001, 852. Scale bar = 0.5 mm.



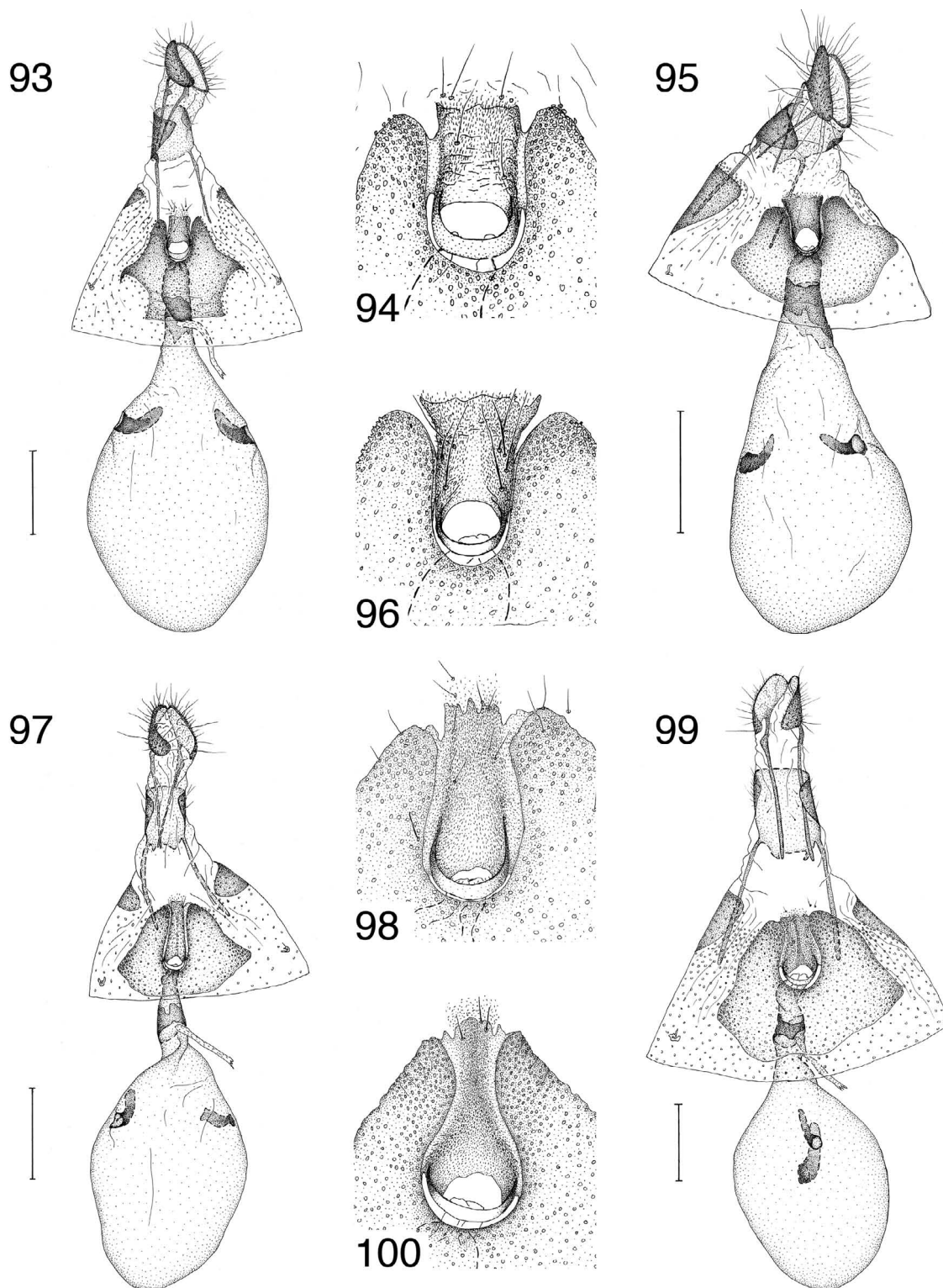
Figs. 76–84. Female genitalia. **76–78**, *P. indagatricana*, slides DJW1945, 1944, 2022. **79–80**, *P. misturana*, slides DJW2158, 2151. **81–82**, *P. labiata*, slide DJW2153. **83–84**, *P. goblinana*, slides DJW1940, 1941. Scale bar = 0.5 mm.





Figs. 85–92. Female genitalia. **85–86**, *P. cibolana*, slides DJW1943, 2160. **87–88**, *P. parvula*, slides DJW2095, 2096. **89–90**, *P. latens*, slide DJW2090. **91–92**, *P. minimana*, slides DJW2024, 2107. Scale bar = 0.5 mm.





Figs. 93–100. Female genitalia. 93–94, *P. baloghi*, slides DJW1948, 1403. 95–96, *P. vogelana*, slides DJW1936, 427. 97–98, *P. clementeana*, slides DJW2094, 2179. 99–100, *P. grindeliana* paratypes, slides DJW2207, 2221. Scale bar = 0.5 mm.

*Phaneta parvana* (Walsingham)  
(Figs. 39, 65)

*Semasia parvana* Walsingham 1879:60.

*Thiodia parvana*: Fernald [1903]:462; Heinrich 1923:55; Heinrich 1929:6; McDunnough 1939:44.

*Eucosma parvana*: Barnes and McDunnough 1917:172.

*Phaneta parvana*: Powell 1983:33; Brown 2005:495.

**Discussion.** The description of *P. parvana* mentions two male syntypes collected by Walsingham in April, 1872 in Grant County, Oregon. The BMNH has a third male, also collected by Walsingham, with data identical to that of the two syntypes except for the date of capture, which reads March–April 1872. I examined these three specimens but was unable to locate any additional representatives of this species. Figure 39 shows the syntype that was selected as lectotype by Obratsov and which is designated below as such. It is representative of all three specimens. Heinrich (1923) was unable to review *P. parvana* for lack of authoritatively determined material but later (1929) illustrated the genitalia of a male from Yellowstone National Park that he misidentified as this species. I examined the specimen he illustrated and cannot associate it with any of the available names.

*Phaneta parvana* is very similar to *P. stramineana*. It is darker (Fig. 39 vs. Figs. 37, 38) and a little smaller (mean FWL = 5.3 mm vs. 6.1 mm), but there are only three *P. parvana* specimens supporting these comparisons. The lectotypes of the two species are essentially indistinguishable in genitalia (Figs. 65, 63): the former has two spines at the anal angle of each valva; the latter has one on the right valva and two on the left (not illustrated). I think it is likely that the types of *P. parvana*, being collected in April, represent a dark spring form of *P. stramineana*. I have collected typical *P. stramineana* in July near Hines, Oregon, which is located some 60 to 70 miles south of the *P. parvana* type locality. Further resolution of this situation will probably have to await the availability of additional *parvana*-like material and females of both taxa.

**Types.** Lectotype here designated: ♂, Oregon, Grant Co., Camp Watson, Walsingham, April 1872, genitalia slide 11600, BMNH. Paralectotype: same data as lectotype (1 ♂), BMNH.

*Phaneta grindeliana* (Busck)  
(Figs. 40–44, 66, 99, 100)

*Cydia grindeliana* Busck 1906:211.

*Thiodia grindeliana*: Heinrich 1923:69; McDunnough 1939:45.

*Thiodia stramineana*: (not Walsingham 1879) Heinrich 1923:69.

*Phaneta grindeliana*: Powell 1983:34; Brown 2005:493.

*Phaneta stramineana*: (not Walsingham 1879) Gilligan *et al.* 2008:100.

**Discussion.** Heinrich (1923) noted that the syntypes of *P. grindeliana* (FWL ≈ 8.2 mm) are similar in forewing appearance and male genitalia to a few smaller specimens (FWL ≈ 6.5 mm) from Arizona, California, and New Mexico that he misidentified as *P. stramineana* (see discussion under *stramineana*). Since then the *grindeliana*-like specimens that have accumulated in North American collections have for most part been determined as *P. stramineana*. This material comes from southern United States (North Carolina to California) and is variable in forewing appearance (Figs. 40–44) as well as size. The male genitalia exhibit considerable variation in the shape of the uncus and socii but only subtle differences in valval shape (Fig. 66); the female genitalia are essentially uniform. Recorded larval hosts include *Grindelia* (Asteraceae) in Texas (Busck, 1906) and *Haplopappus* (Asteraceae) in Texas, Arizona, and California (Brown *et al.* 1983, under *P. stramineana*; J. A. Powell, personal communication). These specimens likely represent a complex of sibling species, but I am treating them all as *P. grindeliana* for lack of reliably diagnostic morphological characters. Under these circumstances, the species presented in Gilligan *et al.* (2008) as *P. stramineana* is *P. grindeliana*.

**Types.** Lectotype here designated: ♂, Texas, [Donley Co.], Clarendon, W. D. Pierce, 19 September 1905 [immature collected], 28 September 1905 [adult emergence], genitalia slide DJW 2206, USNM. Paralectotypes: same data as lectotype, with emergence dates varying from 22 September to 10 October, 1905 (3 ♂, genitalia slides 70119; 5 ♀, genitalia slides DJW 2207, 2221), USNM. Busck (1906) did not specify the number of syntypes but named the USNM and the AMNH as depositories. Klots (1942) reported one syntype in the AMNH.

**Descriptive notes.** Busck (1906) observed that in the syntypes of *P. grindeliana* the antennae and tips of the labial palpi are darker than the forewing. This contrast is conspicuous in *grindeliana*-like specimens from Kansas and Texas, in which there is blackish-gray to olive-gray scaling on the vertex, the third segment of the labial palpus, the scape, and the dorsal surface of the antenna. In specimens from California, Arizona, and Baja California the head and forewing are concolorous; those from Florida are mixed in this respect. The forewing is yellow and often longitudinally streaked with olive-gray (Fig. 41) or blackish-brown (Figs. 42, 43). Both streaked and uniformly yellow specimens are found in the *P. grindeliana* type series. Thin, closely-spaced blackish-brown dashes are present on the costa from base to apex. Some specimens show faint traces of a subbasal and/or median fascia (Figs. 41, 43, 44), but many lack transverse markings entirely. The proximal margin of the ocellus is marked by a thin, sometimes obscure, dark line. The termen is marked by a dark line from tornus to apex, followed distally by a thin white line. Dark cross-bars on the fringe scales produce a second diffuse dark line parallel to the termen. Size is variable, but forewing geometry, as measured by AR, is nearly constant. Forewing statistics: ♂ FWL 4.4–8.9 mm (mean = 6.1, n = 103), AR = 2.98; ♀ FWL 5.4–9.0 mm (mean = 6.5, n = 26), AR = 3.02. The largest specimens are the *P. grindeliana* syntypes (from north central Texas), with mean FWL = 8.2 mm (n = 7). In *grindeliana*-like specimens from California, Baja California and Arizona, mean FWL = 7.2 (n = 25); in those from Kansas, the Gulf Coast of Texas, Alabama, and Florida, mean FWL = 5.8 (n = 97).

**Male genitalia** (Fig. 66) (n = 28): Uncus and socii variable, as illustrated in Fig. 66; aedeagus with 17–48 deciduous cornuti (n = 24);

valva with costal margin weakly concave, apex rounded, distal margin convex to nearly straight, anal angle acute, saccular corner well rounded. *Female genitalia* (Figs. 99, 100) ( $n = 14$ ): Lamella postvaginalis elongate, length ca.  $1.5 \times$  ostium diameter, narrowing posteriorly; posterior margin of sternum 7 invaginated to length of sterigma, fused with lateral margins of lamella postvaginalis, but separated by narrow strip of membrane from ringlike lamella antevaginalis; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of nearly equal size. In some specimens the surface of the corpus bursae is weakly distorted by a band of densely spaced microspinulae near the ductus bursae (not illustrated).

**Distribution and biology.** I examined 156 specimens (123 ♂, 33 ♀) from Alabama, Arizona, California, Florida, Kansas, New Mexico, North Carolina, Oklahoma, Texas, and Baja California, Mexico. Florida adults have been captured in March, May, July, September, and November; Kansas records are from August in Morton County; collections along the Gulf Coast of Texas range from February to November; and southern California records are from March to June and again in October. The type series for *P. grindeliana* was reared from *Grindelia squarrosa* (Pursh) Dunal (Asteraceae) by W. D. Pierce, an employee of the U.S. Department of Agriculture (Busck 1906). The larvae feed in flower heads, and pupation occurs in a loose cocoon at the feeding site.

***Phaneta clementeana*, new species**

(Figs. 45, 46, 64, 97, 98, 104)

*Phaneta stramineana*: (in part, not Walsingham 1879) Powell & Opler, 2009.

**Diagnosis.** This species is similar to *P. stramineana*, *P. grindeliana*, and *P. parvana*. It is separated from the first two by its brownish forewing color and strongly expressed median fascia. The male genitalia differ from those of *P. stramineana* and *P. parvana* in the lack of spiniform setae at the anal angle of the cucullus but are virtually indistinguishable from those of *P. grindeliana* (Figs. 63–66). The lamella postvaginalis is slightly more elongate in *P. clementeana* than *P. grindeliana* (Figs. 97, 99).

**Description.** *Head*: Frons yellowish white; vertex brownish yellow to dark brown; labial palpus with medial surface yellowish white, lateral surface brown, sometimes shading to black at apex; antenna brownish yellow with brown dorsal streak. *Thorax*: Dorsal surface concolorous with head, ventral surface a shade lighter; legs brownish yellow to brown, with yellow tarsal annulations. *Forewing* (Figs. 45, 46): ♂ FWL 5.1–8.0 mm (mean = 6.3,  $n = 27$ ), AR = 3.05; ♀ FWL 5.4–7.5 mm (mean = 6.2,  $n = 13$ ), AR = 3.01; costal margin weakly convex, apex acute, termen straight to weakly concave; dorsal surface yellowish brown with brown markings, often with some longitudinal streaking from base to median fascia; subbasal fascia represented by dark marks on cubitus and dorsum; median fascia an outwardly oblique bar at mid-costa, usually joined to dorsum by dark band along proximal margin of ocellus; ocellus bordered basally and distally by lustrous gray transverse bars, anteriorly by patch of dark brown scales; yellowish central field of ocellus crossed by two dark longitudinal dashes which are often reduced to one or two black dots; costa marked from base to apex with thin dark dashes; termen with thin black line

from apex to tornus, followed distally by yellowish-white line; fringe scales pale brownish yellow, with black cross-bars aligned parallel to termen. *Hindwing*: Pale grayish brown, fringe a shade lighter. *Male genitalia* (Fig. 64) ( $n = 4$ ): Uncus a convex dorsally setose lobe; dorsolateral shoulders of tegumen rounded; socii short; vesica with 23–37 deciduous cornuti ( $n = 4$ ); valva with costal margin weakly concave, apex rounded, distal margin convex of nearly uniform curvature, ventral emargination broad and shallow, saccular corner rounded, SA  $\approx 115^\circ$ . *Female genitalia* (Figs. 97, 98) ( $n = 3$ ): Papillae anales laterally facing and sparsely setose; lamella postvaginalis rectangular, length ca.  $2.5 \times$  width; sternum 7 with posterior margin invaginated 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 similar size.

**Holotype** (Fig. 45). ♂, California, Los Angeles Co., San Clemente Island, Wilson Cove, Powell & De Benedictis, 1 October 2002, EME.

**Paratypes.** CALIFORNIA: same data as holotype (17 ♂, genitalia slides DJW 2091, 2178; 10 ♀, genitalia slides DJW 2092, 2179); San Diego Co., Cardiff, J. A. Powell, 2 October 1964 (1 ♂, genitalia slide DJW 2177; 1 ♀, genitalia slide DJW 2094); San Luis Obispo Co., San Simeon Beach State Park, J. A. Powell, 28 August 1961 (1 ♂); Santa Barbara Co., Jalama Beach, J. A. Powell, 23 April 1966 (4 ♂). Paratype depositories: EME, USNM, DJW.

**Etymology.** The specific epithet refers to the type locality, San Clemente Island.

**Distribution and biology.** The type series consists of 35 adults (24 ♂; 11 ♀) from Los Angeles, San Diego, San Luis Obispo, and Santa Barbara counties in southern California (Fig. 104). Spring, summer and autumn capture dates suggest the likelihood of two or three generations per year. The specimens from San Clemente Island were collected as immatures on *Isocoma menziesii* (Hook. & Arn.) (Asteraceae). The larva creates a gall-like shelter causing the twig to curl just below the flower, and pupation occurs in the “gall” (J. A. Powell, personal communication). Adults emerged in the laboratory between 9 October and 9 November 2002.

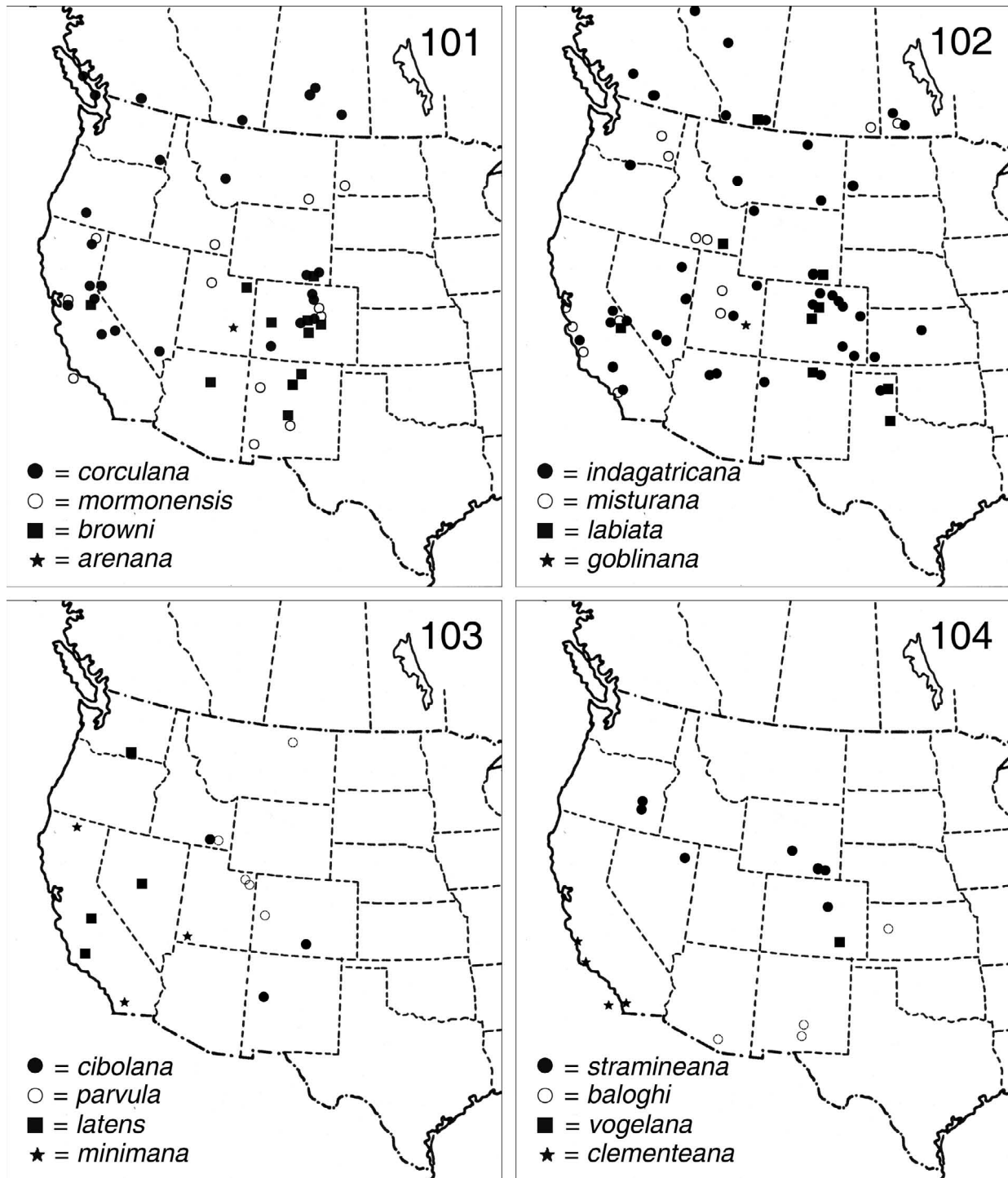
***Phaneta baloghi*, new species**

(Figs. 47, 48, 62, 93, 94, 104)

**Diagnosis.** The yellowish phenotype of *P. baloghi* (Fig. 47) is similar in size, forewing color, and maculation to *P. stramineana* (Fig. 38) but lacks the thin black line on the termen of the forewing; the browner phenotype (Fig. 48) resembles some specimens of *Phaneta vogelana* (Fig. 34) (described below), which is a considerably smaller insect. The three species have distinctly different male genitalia (Figs. 59, 62, 63).

**Description.** *Head*: Frons creamy white; vertex creamy white with yellowish-brown tints; labial palpus creamy white, second segment with yellowish-brown patch on lateral surface and long yellowish-brown scales concealing brownish third segment; antenna concolorous with vertex. *Thorax*: Dorsal and ventral surfaces concolorous with head; legs creamy white to pale brown, with brown tarsal annulations and brown marks on the fore and mid tibiae. *Forewing* (Figs. 47, 48): ♂ FWL 5.8–6.5 mm (mean = 6.2,  $n = 7$ ), AR = 3.33; ♀ FWL 5.3–6.3 mm (mean = 5.9,  $n = 4$ ), AR = 3.18; costal margin straight, apex acute, termen straight to weakly concave; dorsal surface yellow to pale brown; subbasal fascia represented by brown marks on cubitus and dorsum, median fascia by narrow brown dash at mid-costa; ocellus





Figs. 101–104. Geographic distribution of species.

defined basally and distally by pale, lustrous gray bars and bordered on proximal and anterior margins by bands of brown scales; central field of ocellus creamy white to pale yellowish brown, with up to three dark longitudinal dashes; costa marked from base to apex with thin dark dashes, those from base to median fascia sometimes greatly reduced; fringe scales white with blackish-brown cross-bars. *Hindwing*: Grayish brown, fringe a shade lighter. *Male genitalia* (Fig. 62) ( $n = 6$ ): Uncus a broad, convex, dorsally setose lobe, basal width ca.  $2 \times$  height; dorsolateral shoulders of tegumen well developed; socii fingerlike, with distal one-third tapering to narrowly rounded apex; vesica with 22–35 deciduous cornuti ( $n = 5$ ); valva with costal margin concave, apex rounded, dorsal one-half of distal margin nearly straight, anal angle broadly rounded, ventral emargination moderate,  $SA \approx 120^\circ$ . *Female genitalia* (Figs. 93, 94) ( $n = 3$ ): Papillae anales laterally facing and sparsely setose; lamella postvaginalis rectangular, length ca.  $1.5 \times$  width; posterior margin of sternum 7 invaginated to length of sterigma and fused with lateral margins of lamella postvaginalis; lateral extremities of sternum 7 triangular with acute vertices; ductus bursae with sclerotized ring posterior to juncture with ductus seminalis; corpus bursae with two signa of similar size.

**Holotype** (Fig. 47). ♂, New Mexico, Otero Co., vic. [vicinity] Holloman Lakes, G. J. Balogh, 14 September 2004, genitalia slide DJW 1667, USNM.

**Paratypes**. ARIZONA: Pima Co., Baboquivari Mts., O. C. Poling, 1–15 September 1924 (1 ♂, genitalia slide DJW 2171). KANSAS: Gove Co., Monument Rocks, G. J. Balogh, 24 September 1999 (3 ♂, genitalia slides DJW 651, 702, 2140). NEW MEXICO: same data as holotype (2 ♂, genitalia slide DJW 2141; 3 ♀, genitalia slide DJW 1948); Lincoln Co., Valley of Fires RA [Recreation Area], 4 mi. NW Carrizozo, 5350 ft., D. J. Wright, 19 August 2005 (1 ♀, genitalia slide DJW 1403). Paratype depositories: EME, GJB, USNM, DJW.

**Etymology**. This species is named after George J. Balogh, who collected most of the specimens in the type series.

**Distribution and biology**. The type series consists of 11 specimens (7 ♂, 4 ♀) from western Kansas, southwestern Arizona, and south central New Mexico (Fig. 104). Collection dates range from mid-August to late September.

***Phaneta vogelana*, new species**  
(Figs. 34–36, 59, 95, 96, 104)

**Diagnosis**. This small brown insect is similar in forewing appearance to many western Eucosmini but is distinguished by genitalia: males (Fig. 59) with ventral margin of valva deeply emarginated, neck short and narrow, cucullus elongate with anal angle inclined slightly toward sacculus corner; females (Figs. 95, 96) with posterior one-third of the lamella postvaginalis flared and not fused with sternum 7.

**Description**. *Head*: Frons white, scales of vertex white to tan basally, yellowish brown to brownish gray distally; labial palpus with medial surface white, lateral surface white to tan, shading to brownish gray ventrally, with bushy scaling of second segment nearly concealing dark third segment; antenna brown. *Thorax*: Dorsal surface concolorous with head, ventral surface paler, legs tan with brownish annular markings on tarsi. *Forewing* (Figs. 34–36): ♂ FWL 4.8–5.8 mm (mean = 5.2,  $n = 14$ ), AR = 3.16; ♀ FWL 5.0–6.0 (mean = 5.3,  $n = 10$ ), AR = 3.21; costal margin weakly convex, apex acute, termen straight to weakly concave; dorsal surface pale brown; median fascia reduced to mark at mid-costa; ocellus edged with dark brown scaling and bounded basally and distally by lustrous white transverse bars, with yellowish-brown central field crossed by one to three black dashes; fringe from apex to M3 brown, paler toward tornus.

Infrequently the entire wing is suffused with brown (Fig. 36). *Hindwing*: Uniformly pale grayish brown, fringe lighter. *Male genitalia* (Fig. 59) ( $n = 3$ ): Uncus rounded and dorsally setose; dorsolateral shoulders of tegumen well developed; socii broad medially, narrowing toward base and apex; vesica with 16–21 deciduous cornuti ( $n = 2$ ); valva with costal margin concave, apex rounded, distal margin convex of uniform curvature, ventral margin deeply emarginated, neck short and narrow (width ca.  $0.25 \times$  valval width at sacculus corner),  $SA \approx 90^\circ$ . *Female genitalia* (Fig. 95, 96) ( $n = 2$ ): Papillae anales laterally facing and sparsely setose; lamella postvaginalis with posterolateral corners flared, medial trough shallow and microspinulate, length ca.  $1.5 \times$  ostium diameter; posterior margin of sternum 7 invaginated nearly to length of sterigma and fused with anterior one-half of lamella postvaginalis; lamella antevaginalis ringlike and separated from sternum 7 by narrow strip of membrane; ductus bursae widening anteriorly, with sclerotized ring posterior to junction with ductus seminalis; corpus bursae with two signa of similar size.

**Holotype** (Fig. 35). ♂, Colorado, Otero Co., Vogel Canyon Picnic Area, 15 mi. S. of La Junta, 4340 ft.,  $37^\circ 46' 13''$  N,  $103^\circ 30' 46''$  W, 18 August 1997, D. J. Wright, genitalia slide DJW 554, USNM.

**Paratypes**. COLORADO: same data as holotype (13 ♂, genitalia slides DJW 376, 1935; 10 ♀, genitalia slides DJW 427, 1936). Paratype depositories: BMNH, CNC, CSU, EME, USNM, DJW.

**Etymology**. This species is named after the type locality, Vogel Canyon Picnic Area, Comanche National Grassland, west of state route 109, 15 miles south of La Junta, Colorado.

**Distribution and biology**. All 24 specimens in the type series were all collected on the same night in mid-August. The type locality is predominantly short grass prairie.

#### ACKNOWLEDGEMENTS

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