

A review of the Nearctic species of *Hadena* Schrank, 1802 (Lepidoptera: Noctuidae) with descriptions of six new species¹

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Abstract. The Nearctic members of the genus *Hadena* Schrank, 1802 are revised to include 15 species. *Hadena caelestis*, *H. gabrieli*, *H. paulula*, *H. lafontainei*, *H. siskiyou*, and *H. maccabei* are **described as new**. *Hadena jola* (Barnes and Benjamin, 1924) is **synonymised** with *Hadena ectrapela* (Smith, 1898). *Hadena mimula* (Grote, 1883) is transferred to the genus *Lacinipolia* McDunnough, 1937 (**new combination**). *Hadena sutrina* (Grote, 1881) is transferred to the genus *Hada* Billberg, 1920 (**revised combination**). A neotype is designated for *Mamestra ectypa* Morrison, 1875. An identification key to species is provided, and the adults as well as male and female genitalia are illustrated. A French version of the introduction, the identification key, and species group and species diagnoses is included after the English text of the paper.

Résumé. Les auteurs présentent une révision des 15 espèces néarctiques du genre *Hadena* Schrank, 1802. *Hadena caelestis*, *H. gabrieli*, *H. paulula*, *H. lafontainei*, *H. siskiyou* et *H. maccabei* sont **nouvellement décrites**. *Hadena jola* (Barnes et Benjamin, 1924) est désigné comme **synonyme récent** d'*Hadena ectrapela* (Smith, 1898). *Hadena mimula* (Grote, 1883) est transféré dans le genre *Lacinipolia* McDunnough, 1937 (**nouvelle combinaison**). *Hadena sutrina* (Grote, 1881) est transféré dans le genre *Hada* Billberg, 1920 (**combinaison révisée**). Un néotype est désigné pour *Mamestra ectypa* Morrison, 1875. Un tableau d'identification des espèces est fourni et les adultes ainsi que les génitalia des deux sexes sont illustrés. L'introduction, le tableau d'identification et les diagnoses des groupes d'espèces et des espèces sont traduits en français à la suite du texte anglais de l'article.

¹ This article with colour illustrations is available in pdf format for download at www.biology.ualberta.ca/old_site/uasm/troubridgehadena.pdf. — Cet article avec les illustrations en couleurs est disponible en format pdf pour téléchargement à l'adresse Internet suivante : www.biology.ualberta.ca/old_site/uasm/troubridgehadena.pdf.

Introduction

Hadena Schrank, 1802 is Holarctic in distribution with 15 Nearctic and about 134 Palaearctic species. A combination of individual variation, geographic variation, and similar wing markings makes many *Hadena* species difficult to identify, and genitalia must often be examined. Many of the species are infrequently collected or local and the genus is typically poorly represented in collections. Larvae feed nocturnally on flowers and seed capsules of Caryophyllaceae (the Pink family), and hide in the lower leaves during the day (Hacker 1996).

The characteristic features of *Hadena* were described by Hacker (1996). Members of this genus are medium sized moths with hairy eyes. Male valvae have a heavily sclerotized digitus, terminating in a flattened or thorn-like process on the costa at the base of the cucullus. The cucullus has a well developed corona, is separated from and bent at least 45° from the digitus. A dorso-apical process of the sacculus (not to be confused with the saccular extension found in *Euxoa* Hübner, 1821) is present. The clasper is much reduced and forms a low ridge or plate on the surface of the valve. The vesica bends ventrally and anteriorly, usually has three diverticula, one thorn-like, bulbous cornutus and a band of cornuti of varying lengths. The corpus bursae is rounded and sack-like with a single elongate signum. The posterior corpus bursae is narrow and the appendix bursae sclerotized to various degrees. The long, telescopic ovipositor is guided by modified lobes on the seventh abdominal sternite.

Recent authors (Poole 1989; Hacker 1996) treated *Anepia* Hampson, 1918 as a subgenus within *Hadena*. Of the Nearctic species, only *H. variolata* (Smith, 1888), *H. capsularis* (Guenée, 1852), and *H. lafontainei* sp. n. are included in subgenus *Hadena*. We place the rest of the Nearctic species in the Holarctic subgenus *Anepia*.

In the present work we review the Nearctic *Hadena* species and describe *H. caelestis*, *H. gabrieli*, *H. paulula*, *H. lafontainei*, *H. siskiyou*, and *H. maccabei* as new.

Materials and Methods

Specimens were examined from the following collections:

- AMNH American Museum of Natural History, New York, United States.
- CNC Canadian National Collection of Insects, Arachnids, and Nematods, Ottawa, Ontario, Canada.
- CSUC C. P. Gillette Arthropod Biodiversity Museum, Colorado State University, Fort Collins, Colorado, United States.
- JTT Personal collection of James T. Troubridge, Stittsville, Ontario, Canada.
- LACM Los Angeles County Museum of Natural History, Los Angeles, California, United States.

- LGC Personal collection of Lars G. Crabo, Bellingham, Washington, United States.
- TLM Personal collection of Timothy L. McCabe, Albany, New York, United States.
- UCD University of California at Davis, Davis, California, United States.
- USNM National Museum of Natural History, Washington, D.C., United States.
- Dissection of genitalia and terms for genital structures and wing markings follow Lafontaine (1987).

Key to the Nearctic species of *Hadena*

1. Cucullus bent at least 90° to costa; juxta spinose, Y-shaped (Fig. 18); 7th abdominal sternite of female with deep anterior pits 1. *variolata* (p. 113)
- Cucullus bent at 30–45° to costa; juxta a bifid plate with numerous minute spines (Fig. 17); 7th abdominal sternite of female without anterior pits. 2
2. Forewing white subterminal line deeply excised on medial veins, touching the wing margin or nearly so; orbicular spot very large and round, crossing radial vein to reach costal margin or nearly so (Fig. 4) 2. *capsularis* (p. 114)
- Forewing white subterminal line only slightly excised on medial veins, not usually reaching margin; orbicular spot medium to small, not usually crossing radial vein (Fig. 6) — if crossing radial vein, orbicular spot oval rather than circular (Fig. 14b) 3
3. Forewing colour dark brownish, ordinary spots and lines obscure (Fig. 5); occurs east of Great Plains 4. *ectypa* (p. 117)
- Forewing colour greyish, or olive, ordinary spots and lines distinct; occurs on or west of Great Plains 4
4. Forewing ground colour olive brown 5
- Forewing ground colour grey, white, or grey brown 6
5. Uncus wide, densely setose, resembling a bottle brush (Fig. 17); ductus bursae less than half as wide as ostium bursae (Fig. 33); Wyoming to Mexico . . 3. *lafontainei* (p. 114)
- Uncus narrow with few setae near tip (Fig. 28); ductus bursae and ostium bursae about equal in width (Fig. 41); mountains of SE Arizona to Mexico 6. *glaciata* (p. 119)
6. Cucullus bluntly rounded (Fig. 26); anterior corpus bursae pear-shaped (Fig. 37) 7
- Cucullus tapered to a distal point (Fig. 25); anterior corpus bursae distinctly orbicular, not tapered towards anterior end (Fig. 36) 10
7. Scales through the fold of the forewing above vein 2A and within the mesial band black or much darker than ground colour of remainder of wing — black scales abruptly stopping at vein 2A (Fig. 8); cucullus reduced to form a finger-like process (longer than wide); digitus terminated in broad, rounded process at costal angle (Fig.

- 30) 5. *minorata* (p. 118)
- Scales through the fold of the forewing above vein 2A and within the mesial band not appreciably darker than ground colour of remainder of wing — if dark, dark scales also occurring below vein 2A (Figs. 9, 11, 12); cucullus of normal size; digitus terminated in a pointed process (Fig. 29) 8
8. Occurring in the Transverse Ranges of southern California 9. *gabrieli* (p. 122)
- Occurring outside of the Transverse Ranges of southern California 9
9. Occurring at high elevation in the Cascade Mountains, Blue Mountains, and Sierra Nevada; subbasal diverticulum absent from male vesica — bulbous cornutus directed vertically (Fig. 26a) 8. *caelestis* (p. 120)
- Occurring from the northern Great Plains, along Rocky Mountains to White Mountains of Arizona; subbasal diverticulum present on male vesica — bulbous cornutus directed posteriorly (Fig. 29a) 7. *circumvadis* (p. 120)
10. Orbicular spot white with some darker scales in centre, strongly contrasting with dark colour of remainder of forewing; ordinary lines of forewing crisp and bright (Figs. 11, 13) 11
- Orbicular spot whitish or gray with darker scales in centre, not markedly contrasting with the remainder of forewing; ordinary lines of forewing obscure or not strongly contrasting with forewing ground colour (Figs. 6, 12, 14a-c, 15a-c) 12
11. Occurring in Klamath and Siskiyou Mountains of southwestern Oregon and (probably) northwestern California 15. *siskiyou* (p. 130)
- Occurring from southern Utah to central Arizona 14. *paulula* (p. 129)
12. Occurring in or west of the Sierra Nevada, California 13
- Occurring east and north of Sierra Nevada, California 10. *ectrapela* (p. 124)
13. Median diverticulum of vesica about 2× as long as vesica is wide, points to left (Fig. 22b); occurs in various mountain ranges of California 14
- Median diverticulum of vesica shorter than or about as long as vesica is wide, points posteriorly (Fig. 20b); occurs in deserts of southwestern California 11. *amabilis* (p. 125)
14. Forewing dark charcoal gray; claviform spot obscured within a cloud of black scales (Fig. 12); occurs in dry mid-elevation forests on east slope of northern Sierra Nevada 12. *plumasata* (p. 126)
- Forewing light to medium gray; claviform spot well-demarcated (Figs. 15a-c); occurs at high elevation on Mt. Shasta, Transverse Ranges, and Sierra Nevada 13. *maccabei* (p. 126)

Subgenus *Hadena* Schrank, 1802

Subgenus *Hadena* is separated from subgenus *Anepia* by the presence of a large tooth on the left side of the aedeagus and by the absence of a small thorn-like process extending from the digitus near the apex of the clasper. The dorso-apical process of the sacculus is normally wider in the species of subgenus *Hadena* than in the species of subgenus *Anepia*. The ostium bursae is wider and more heavily sclerotized ventrally and the ductus bursae is shorter and more heavily sclerotized in subgenus *Hadena* than in subgenus *Anepia*.

1. *Hadena (Hadena) variolata* (Smith, 1888)

(Figs. 1, 18, 31)

Mamestra variolata Smith, 1888: 467; Smith, 1893: 122; Dyar, 1902: 153. Lectotype male in USNM type number 33806, designated by Todd, 1982: 223 [examined].

Miselia variolata (Smith); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena variolata (Smith); Poole, 1989: 481.

Dianthoecia nana var. *dealbata* Staudinger, 1892: 365; Hacker, 1996: 125. Holotype in Museum für Naturkunde der Humboldt Universität, Berlin, Germany (Poole 1989) [not examined].

Diagnosis. Males and females with similar wing markings. Forewing length 14–16 mm; mean 15.2 mm (n=20). *Hadena variolata*, *H. glaciata*, and *H. lafontainei* are the only Nearctic species with an olive-brown forewing ground colour. Females of *H. variolata* are most easily separated from those of *H. lafontainei* and *H. glaciata* by the seventh abdominal sternite, which has two deep anterior pits, whereas the other species have only slight depressions. Males can be distinguished by brushing the valves and examining the cucullus, which is directed ventrally and bent at least 90° from the digitus in *H. variolata* but bent at about 45° from the digitus in the other species.

Type localities. Washington Territory (*variolata*); Transcaucasus (*dealbata*).

Remarks. In examining specimens of *H. variolata* from Colorado and Wyoming, Hacker (1996) determined the Palearctic *H. dealbata* to be a conspecific with *H. variolata*, listing Palearctic populations as subspecies of *H. variolata*. We did not find characters to separate Palearctic *dealbata* from most Nearctic populations of *H. variolata*. *Hadena variolata* was described from “Washington Territory”, but the lectotype matches specimens (Fig. 1a) from the Garry Oak prairie near Olympia, Washington. This nominate subspecies is characterized by the olive-brown forewing colour and the presence of a white patch on the forewing, which runs from the costa through the immaculate white orbicular spot, terminating in a yellow spot below the reniform spot. Populations

on southeastern Vancouver Island retain the olive-brown forewing colour and yellow spot below the reniform spot (Fig. 1b) but the white patch on the forewing is reduced and dark scales occur within the orbicular spot. Elsewhere, the yellow spot is lost, the white patch on the forewing is reduced and dark scales occur within the orbicular spot, and the forewing ground colour is a darker blackish brown (Fig. 1c). We place these latter darker populations, which encompass most of the species' Nearctic range, as *Hadena variolata dealbata*. Although the nominate subspecies in the Puget Trough and southeastern Vancouver Island is abundantly distinct from nearby high elevation populations in the Cascades or high or low elevation populations elsewhere, we see no structural characters to separate them as distinct species.

Distribution and habitat. Southern British Columbia and western Alberta to Arizona and southern California. It is often common near treeline but also occurs in xeric habitats at lower elevations.

2. *Hadena (Hadena) capsularis* (Guenée, 1852)

(Figs. 4, 19, 32)

Dianthoecia capsularis Guenée, 1852: 22. Holotype male in The Natural History Museum, London, United Kingdom (BMNH) (Poole 1989) [not examined].

Raphia propulsa Walker 1857: 529; Hodges *et al.*, 1983: 149. Holotype in BMNH (Poole 1989) [not examined].

Mamestra capsularis (Guenée); Smith, 1893: 117; Dyar, 1902: 152.

Anepia capsularis (Guenée); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena capsularis (Guenée); Poole, 1989: 476.

Diagnosis. Males and females with similar wing markings. Forewing length 12-17 mm; mean 15.8 mm (n=20). This species is easily recognizable by the large, circular orbicular spot, blue-grey forewing colour, relatively smooth postmedial line, and very jagged subterminal line, which often reaches the wing margin.

Type localities. Florida (*capsularis*); Florida, St. John's Bluff (*propulsa*).

Distribution and habitat. *Hadena capsularis* occurs from the Atlantic coast, west to south-central British Columbia, eastern Oregon, and at least as far as Texas, Arizona, and Florida in the south. Western specimens have been found at low elevation in xeric habitats.

3. *Hadena (Hadena) lafontainei* Troubridge and Crabo, *sp. nov.*

(Figs. 3, 17, 33)

Hadena glaciata (Grote); Hacker, 1996: 516 [misidentification].

Diagnosis. Externally, *H. lafontainei* is almost inseparable from *H. glaciata*; however, the area between the orbicular and reniform spots usually has white scales in *H. glaciata* but is olive-brown in *H. lafontainei*. Internally, the male uncus is wide and resembles a bottle brush in *H. lafontainei* (a feature shared with *H. capsularis*), but slender with a few apical setae in that of *H. glaciata*.

Description. Males and females with similar wing markings. Forewing length 13-15 mm; mean 14.5 mm (n=10). Male antenna serrate, ciliate, female antenna filiform; head and palpi with a mixture of off-white, black, and grey-brown scales; prothoracic collar edged with white scales; thorax, tegulae, and dorsal tuft adjacent to abdomen with a mixture of white, black, and black-tipped brownish scales; abdomen light grey brown. Dorsal forewing ground colour olive brown; orbicular spot circular, white with olive-brown centre, edged thinly with black and contained within discal cell; reniform spot similar in colouration to orbicular spot but more completely filled with olive-brown scales; claviform spot almost square, olive brown, edged with black scales; basal line broken; antemedial line black, excurved between veins, edged proximally with white scales; mesial band olive brown with scattered white scales and a square white spot adjacent and distal to claviform spot; median line black, deeply scalloped; postmedial line a series of double crescents incurved between veins, black proximally, dark olive brown distally, the area between these rows filled with white scales; white subterminal line forms distinct chevrons edged proximally with black; margin with black chevrons between veins thinly edged proximally with white scales; fringe grey brown, checkered with cream scales at veins. Dorsal hindwing with dark grey-brown postmedial band and discal lunule with slightly lighter base; fringe grey brown basally, white terminally.

Male genitalia (Fig. 17). Digitus lies on costa of valve, terminating in thorn-like process at base of cucullus; cucullus bluntly rounded with well developed corona, bent at about 30° to costa; dorso-apical process of sacculus about 2× as long as wide with rounded tip. Uncus swollen medially with numerous long bristles on distal half. Vesica bends down and backwards with one globular, subbasal diverticulum on right; a band of small cornuti extends ventrally along medial 1/4 of vesica; a sclerotized, pointed diverticulum occurs on left side of vesica, and a small tooth is directed vertically from left side of tip of aedeagus.

Female genitalia (Fig. 33). Ovipositor lobes bluntly pointed with sparse setae. Ductus bursae relatively short, about as long as ostium bursae is wide, sclerotized. Ostium bursae very wide, encircled, heavily sclerotized. Corpus bursae orbicular, with one elongate, ventral signum. Posterior corpus bursae broad, heavily sclerotized; sclerotized appendix bursae widely attached to left posterior corpus bursae.

Type material. Holotype ♂: USA, Wyoming, Albany Co., T15N R71W S18S, 8,200 ft [2,500 m], FR 712H, 6-7.VII.2000, CDF [C.D. Ferris] (CNC). Paratypes: 60 ♂♂, 25 ♀♀: **Arizona:** 1 ♂, Greer, White Mountains, Apache Co., 11.VII.1953, C.W. Kirkwood; 3 ♂♂, Greer, White Mountains, Apache Co., 8,500 ft [2,600 m], 2.VIII.1962, E. & I. Munroe; 1 ♂, 1 ♀, 4.VIII.1962, same locality and

collectors; 1 ♂, 5.VIII.1962, same locality and collectors; 1 ♂, 6.VIII.1962, same locality and collectors; 1 ♂, Ashfork, 20.VII.1930; 1 ♂, 2 ♀♀, White Mountains; 2 ♂♂, White Mountains, 20-27.VII.1930; 1 ♂, Chiricahua Mountains, 8-9,000 ft [2,500-2,800 m], Turkey Flat, Cochise Co., 22.VII.1927; 1 ♂, Chiricahua Mountains, 9,000 ft [2,800 m], Rustler Park, Cochise Co., 15.VII.1927, J.A. Kusche; 1 ♀, Chiricahua Mountains, 8,500 ft [2,600 m], Bar Foot Park, Cochise Co., 6.VIII.1927, J.A. Kusche; 1 ♀, Apache Co., Double Bar K Ranch on Home Creek, Near Buffalo Crossing, 7,500 ft [2,300 m], 25.VII.1986, R.S. Wielgus; 5 ♂♂, 2 ♀♀, Kaibab Plateau, nr. Jacob Lk., 8,300 ft [2,550 m], 18.VII.1980, D.C. Ferguson; **New Mexico:** 3 ♀♀, Grant Co., Cherry Crk. CG., Gila NF, 6,800 ft [2,100 m], 8.VIII.1979, C.D. Ferris; 1 ♀, Grant Co., Gallinas Cyn. CG., Gila NF, 6,700 ft [2,100 m], 19.VIII.1981, C.D. Ferris; 1 ♂, Grant Co., Gallinas Cyn. CG., Gila NF, 6,600 ft [2,100 m], 7.VIII.1979, C.D. Ferris; 8 ♂♂, 4 ♀♀, Socorro Co., Springtime CG., San Mateo Mountains, 7,700 ft [2,400 m], 8.VIII.1981; 1 ♂, 5 mi W Ute Park, Colfax Co., 13.VII.1974, E.L. Todd; 1 ♂, Cimarron Cyn., 7,900 ft [2,400 m], Sangre de Cristo Mountains, Colfax Co., 11.VII.1962, E. & I. Munroe; 1 ♀, Cedar Creek Campground, Ruidoso, Lincoln Co., 7,000 ft [2,100 m], 28.VII.1962, E. & I. Munroe; **Colorado:** 2 ♂♂, 1 ♀, Big Spring Ranch, Florissant, Teller Co., 8,640 ft [2,650 m], 9.VII.1962, T.C. Emmel; 1 ♂, 2 ♀♀, 8.VII.1962, same locality and collector; 1 ♂, 1 ♀, 26.VII.1960, same locality and collector; 1 ♂, 29.VII.1962, same locality and collector; 1 ♂, 2.VIII.1960, same locality and collector; 1 ♂, 23.VII.1962, same locality and collector; 1 ♂, 23.VII.1960, same locality and collector; 1 ♂, 20.VII.1960, same locality and collector; 1 ♂, 22.VII.1960, same locality and collector; 1 ♂, 1 ♀, 21.VII.1960, same locality and collector; 2 ♀♀, 4 mi SW Buena Vista, Chaffee Co., 8,700 ft [2,700 m], 10.VII.1982, D.C. Ferguson; 1 ♂, 15.VII.1982, same locality and collector; 1 ♂, Plainview, Jeff. Co., 7-8,000 ft [2,100-2,500 m], 9-14.VII.1923; 1 ♂, Estes Park, Larimer Co., 7,800 ft [2,400 m], 27.VII.1967, A. & M.E. Blanchard; 1 ♂, 21.VII.1967, same locality and collectors; **Wyoming:** 1 ♂, Albany Co., T12N R72W Sect. 24, W of Hwy 287, just N of Colorado, 7,570 ft [2,300 m], 4.VII.1998, J.S. Nordin; 1 ♂, Albany Co., T14N R71W Sect. 7, N of Rd. 705, just N of Colorado, 8,200 ft [2,500 m], 16.VII.1997, J.S. Nordin; 5 ♂♂, Albany Co., T15N R71W S18S, FR 712H, 8,200 ft [2,500 m], 4-5.VII.2000, CDF [C.D. Ferris]; 8 ♂♂, 1 ♀, Albany Co., T15N R71W S18S, 8,200 ft [2,500 m], FR 712H, 6-7.VII.2000, CDF [C.D. Ferris]; **Mexico, Chihuahua:** 1 ♀, Creel, 29.VII.1968. Paratypes deposited in the CNC, LACM, UCD, USNM, and JTT.

Type locality. Albany County, Wyoming.

Derivation of the name. The name honours Dr. J. Donald Lafontaine, for his work on the Nearctic Noctuidae.

Remarks. This species has been misidentified as *H. glaciata* in many of the major North American collections. *Hadena glaciata*, discussed below, has been found only in the mountains of southeastern Arizona and northern Mexico.

Distribution and habitat. *Hadena lafontainei* occurs from southwestern Wyoming, south through Colorado, New Mexico and Arizona to southwestern Chihuahua, Mexico.

Subgenus *Anepia* Hampson, 1918

Subgenus *Anepia* is characterized by the valvae, which have a heavily sclerotized digitus, terminating in a flattened or thorn-like process on the costa at the base of the cucullus with a smaller thorn-like process extending from the digitus near the apex of the clasper, this thorn-like process is absent in subgenus *Hadena*. The dorso-apical process of the sacculus is normally narrower in the species of subgenus *Anepia* than in the species of subgenus *Hadena*. The ductus bursae is longer in subgenus *Anepia*, but short and heavily sclerotized in subgenus *Hadena*.

The *ectypa* group

The *ectypa* group contains a single species, the Nearctic *H. ectypa* (Morrison, 1875).

4. *Hadena (Anepia) ectypa* (Morrison, 1875)

(Figs. 5, 16, 34)

Mamestra ectypa Morrison, 1875: 118; Smith, 1893: 124; Dyar, 1902: 154. The type has not been found with the other Morrison types at Michigan State University or in other major collections and is presumed to be lost. Neotype male bearing labels: “ex UV light trap, So. Charleston, Kanawha Co., WV, 25 V 1980, P.H. Adler”, and “Neotype *Mamestra ectypa* Morrison, des. Troubridge & Crabo” [red] is here designated in order to clarify the taxonomic status of the species. The neotype has been deposited in the USNM. This specimen matches Morrison’s (1875) description for *Mamestra ectypa* and is from West Virginia, the original type locality.

Mamestra bella Grote, 1883a: 30; Dyar, 1902: 154. Holotype female Type No. 33808 in USNM [examined].

Hadena ectypa (Morrison); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Diagnosis. Males and females with similar wing markings. Forewing length 12-15 mm; mean 14.2 mm (n=5). The dark brown forewing colour and obscure pattern separates this species from all other Nearctic *Hadena* species. In the male, a large, setose, editum-like process is present between the digitus and cucullus (absent in the other species), and the lateral spine of the digitus is elongate and projects from the base of the cucullus rather than from mid-way along the digitus as in the other species. In the female, the ostium bursae is wide and sclerotized ventrally, much narrower and more membranous in the other species of the sub-

genus.

Type localities. South Charleston, Kanawha Co., West Virginia (*ectypa*); New Jersey (*bella*).

Distribution and habitat. *Hadena ectypa* occurs from the eastern U. S. seaboard, west at least to Illinois. In Ohio it occurs in small openings in mature second growth forest, close to riparian settings (Eric Metzler, pers. comm.).

The *minorata* group

The *minorata* group is characterized by the presence of a spine on the ventral surface at the apex of the aedeagus combined with the reduced size and rounded tip of the cucullus. The digitus is broader than in the other members of the subgenus and rounded rather than pointed apically. The female characters are typical of the *ectrapela* group. The only Nearctic member is *H. minorata*.

5. *Hadena (Anepia) minorata* (Smith, 1888)

(Figs. 8, 30, 39)

Mamestra minorata Smith, 1888: 467; Smith, 1893: 122; Dyar, 1902: 153. Lectotype male in AMNH, designated by Todd, 1982: 141 [examined].

Anepia minorata (Smith); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena minorata (Smith); Poole, 1989: 479.

Diagnosis. Males and females with similar wing markings. Forewing length 13-15 mm; mean 14 mm (n=3). *Hadena minorata* is characterized by the distinct pale orbicular spot contrasting with the long, black claviform spot, which runs through the fold from the antemedial to the postmedial line, and the relatively smooth postmedial line. In addition, black scales fill the mesial band from the claviform spot to the costa, proximal to the orbicular spot. Internally, the cucullus is rounded and reduced in size compared to the other species and the apex of the digitus is very wide and rounded. The female genitalia are more or less similar to those of *E. ectrapela*.

Type locality. Havilah, Kern Co. California.

Distribution and habitat. *Hadena minorata* has been collected on the west side of the Sierra Nevada and in the Coast Range of California from Mendocino County in the north, south to Kern County in oak/manzanita chaparral and grassland.

The *glaciata* group

The *glaciata* group is characterized by the lack of the spine on the ventral surface at the apex of the aedeagus and the rounded tip of the cucullus on the

valve. Its Nearctic members include *H. glaciata*, *H. circumvadis*, *H. caelestis*, and *H. gabrieli*.

6. *Hadena (Anepia) glaciata* (Grote, 1882)

(Figs. 2, 28, 41)

Mamestra glaciata Grote, 1882: 170; Smith, 1893: 122; Dyar, 1902: 153. Holotype male in USNM [examined].

Miselia glaciata (Grote); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena glaciata (Grote); Poole, 1989: 478.

Hadena sutrina (Grote); Hacker, 1996: 512 [misidentification].

Diagnosis. Males and females with similar wing markings. Forewing length 13-16 mm; mean 15.2 mm (n=5). *Hadena glaciata* superficially resembles *H. lafontainei* (Fig. 3): each has a pale olive-brown forewing ground colour with more or less similar maculation. *Hadena lafontainei*, which is placed in a different subgenus based on genital features, is distinguished by the wide uncus that resembles a bottle brush, whereas *H. glaciata* has a narrow uncus with fine setae. Specimens of the much more common and widespread *H. lafontainei* have been placed under *H. glaciata* in most of the museum collections we examined. In genital characters, *H. glaciata* is most similar to *H. circumvadis* and closely related on that basis, even though they are differently coloured.

Type locality. Arizona.

Distribution and habitat. *Hadena glaciata* has been found at mid elevations (1,600 m) in Graham and Cochise Counties, Arizona and in the vicinity of Creel, Chihuahua, Mexico. It flies in August in oak/manzanita chaparral and grassland.

Remarks. The length of the median diverticulum on the vesica of *H. circumvadis* (particularly in specimens from New Mexico and Arizona) is variable and outside the normal variation we expect to see within a species. A parallel situation occurs in *H. glaciata*, where most specimens examined from Chihuahua, Mexico have a very long median diverticulum and most specimens examined from the Chiricahua Mountains of southern Arizona have this diverticulum reduced. We find no other characters to separate these individuals. Because *H. glaciata* and *H. circumvadis* are closely related, we prefer to believe that a gene controlling this variation in the shape of the vesica arose once rather than evolving twice to produce identical variability in two sets of sister species. Although we treat the length of the median diverticulum as unusually variable within the *glaciata* group, molecular techniques may prove otherwise as additional material becomes available for study.

7. *Hadena (Anepia) circumvadis* (Smith, 1902)

(Figs. 7, 29, 42)

Mamestra circumvadis Smith, 1902: 42; Dyar, 1902: 156. Holotype female in AMNH [examined].

Anepia circumvadis (Smith); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena circumvadis (Smith); Poole, 1989: 476.

Hadena capsularis (Guenée); Hacker, 1996: 511 [misidentification].

Diagnosis. Males and females with similar wing markings. Forewing length 13-16 mm; mean 15.3 mm (n=20). *Hadena circumvadis* cannot be confused with any other species. On the Great Plains, the forewing is light grey with white patches in the apex, tornus, and postbasal areas. The claviform spot is very small with very few black scales. The orbicular and reniform spots are filled with white scales. In the mountains, the ground colour of the forewing is much darker. Internally, the cucullus is rounded apically, the median diverticulum is reduced to form a small bump capped with a thorn-like cornutus, and the posterior corpus bursae is relatively narrow like that of *H. ectrapela*.

Type locality. Head of Pine Creek, [west of] Calgary, Alberta.

Distribution and habitat. *Hadena circumvadis* occurs on the northwestern Great Plains, from southwestern Manitoba to the foothills of the Rocky Mountains in Alberta, south through North Dakota and Wyoming to the White Mountains of Arizona.

Variation. The variation in *H. circumvadis* is pronounced. Specimens from the northern Great Plains occur at low elevation in prairie and badland habitats and are pale (Fig. 7b); populations in Colorado, New Mexico, and Arizona occur at much higher elevation and are much darker (Fig. 7a). Specimens from Wyoming are dark like the Colorado populations but more brightly patterned and appear intermediate. In New Mexico and Arizona, the median diverticulum of the vesica can be short (Fig. 29c) or long and narrow (Fig. 29a), matching specimens from farther north. The specimens with a shorter median diverticulum are otherwise identical to other specimens from Arizona, New Mexico, Colorado, and Wyoming. We treat the shorter median diverticulum of some of the more southern specimens as variation.

8. *Hadena (Anepia) caelestis* Troubridge and Crabo, *sp. nov.*

(Figs. 10, 26, 38)

Diagnosis. This species flies with *H. ectrapela*, *H. siskiyou* and *H. maccabei* and can be easily confused with these species. They can be separated by the cucullus, which is rounded in *H. caelestis*, but pointed in *H. siskiyou*, *H. maccabei*, and

H. ectrapela. Externally, *H. caelestis* is almost inseparable from *H. ectrapela*, but the orbicular spot is larger, whiter, and more circular in *H. caelestis*.

Description. Males and females similarly marked. Forewing length 13-15 mm ; mean 14.6 mm (n=20). Male antenna serrate, ciliate, female antenna filiform; scape, head, and palpi with a mixture of white and grey scales; prothoracic collar with five transverse bands: black anteriorly followed by a thin white line, a narrow black band, a thin white line, and finally a light grey-brown band posteriorly; thorax, tegulae, and dorsal tuft adjacent to abdomen with a mixture of grey, white, and black scales; abdomen light grey brown. Dorsal forewing ground colour light grey, orbicular spot circular, mostly white with a few grey scales in the centre, edged thinly with black and contained within discal cell; reniform spot edged with black scales except towards costa, filled with grey scales and white scales along proximal edge; claviform spot black; white basal line diffuse, edged proximally with black; antemedial line black, deeply excurved between veins, edged proximally with white scales within cell 1A+2A and light brown elsewhere; mesial band light grey with white scales scattered in costa above orbicular spot and forming a white patch below orbicular spot; postmedial line a series of double crescents incurved between the veins, thicker and black proximally, thin, dark grey, and less deeply curved distally, the area between these rows filled with white scales within cells CuA_1 , CuA_2 , and 1A+2A, and light grey brown elsewhere — this line lacks indentation on vein CuA_2 , forming a single crescent between veins CuA_1 and 1A+2A; white subterminal line undulates through cells R_3-M_1 then forms indistinct chevrons edged proximally with black in cells M_2-CuA_1 before bending to outer margin at vein 1A+2A; margin with black chevrons edged proximally with white scales between veins; fringe beige basally, dark grey distally, checkered with lighter scales at veins. Dorsal hindwing with dark grey-brown postmedial band, median line and discal lunule with lighter base and white scales on vein CuA_2 in submargin; fringe beige basally, then a grey line and white terminally.

Male genitalia (Fig. 26). Digitus parallel to costa and tapered to a distal point, lateral extension of digitus elongate, triangular; cucullus bluntly rounded with well developed corona, well separated from and bent at about 45° to costa; dorso-apical process of sacculus more than $2\times$ as long as wide, narrowing towards apex and bluntly rounded. Juxta with numerous minute spines. Uncus narrow, pointed apically, and slightly swollen in mid-section. Spines absent from ventral side of aedeagus. Vesica bent down and around, pointing anteriorly with one small, dorsal, subbasal bulbous cornutus; a band of smaller cornuti extended ventrally along the apical half of vesica; a smaller subapical diverticulum on left side of vesica.

Female genitalia (Fig. 38). Ovipositor telescopic; lobes bluntly pointed, with sparse setae. Ductus bursae sclerotized dorsally. Ostium bursae with lateral patches of spinules. Corpus bursae shaped like a tear-drop, with one elongate, ventral signum. Sclerotized appendix bursae widely attached to left corpus bursae.

Type material. Holotype ♂: Canada, British Columbia, Mt. Kobau, 49°05'N 119°37'W, 4,000-5800 ft [1,200-1,800 m], 17.VII.1998, J. Troubridge, in the CNC. Paratypes: 73 ♂♂, 33 ♀♀: **British Columbia:** 18 ♂♂, 7 ♀♀, same data as holotype; 6 ♂♂, 1 ♀, same locality and collector, 1.VIII.1997; 25 ♂♂, 3 ♀♀, same locality and collector, 4.VIII.1999; 1 ♀, same locality and collector, 20.VIII.1999; 1 ♂, Mt. Kobau, 16.VII.1999, L.G. Crabo & J. Troubridge; **Washington:** 1 ♂, Yakima Co., Bethel Ridge, 6,000 ft [1,850 m], 1.VIII.1993, J. Troubridge; 1 ♂, 2 ♀♀, Chelan Co., Junior Pt. Campground, 6,900 ft [2,100 m], 6.VIII.1997; 1 ♂, 1 ♀, same locality and collector, 18.VII.1998; 7 ♂♂, 4 ♀♀, same locality and collector, 5.VIII.1999; **Oregon:** 7 ♂♂, 9 ♀♀, Mt. Ashland, Jackson Co., 42°04'N 122°42'W, 6,400 ft [2,000 m], 2.VIII.1998, J. Troubridge; 1 ♂, Jackson Co., Saddle W of Mt. Ashland summit, 42°08'N 122°72'W, 2,163m, 30.VII.1991, L.G. Crabo; 2 ♂♂, Wallowa Co., Chief Joseph Mt., nr. Joseph, 10.VII.1950, J.L. Sperry; 1 ♂, 2 ♀♀, same locality and collector, 14.VII.1950; **California:** 1 ♂, Convict Cr., Mono Co., 14.VIII.1963; 1 ♂, 1 ♀, E. side Tioga Pass, Mono Co., 8,520-9,640 ft [2,600 - 3,000 m], 1.VIII.1996, J. Troubridge & L.G. Crabo; 1 ♀, Wohens Cr., Tioga Pass, Mono Co., 22.VII.1941; 1 ♀, Mono Lk., 11.VII.1937. Paratypes deposited in the CNC, USNM, LACM, JTT and LGC.

Type locality. Mt. Kobau, British Columbia.

Derivation of the name. The name is derived from the Latin *caelestis*, which means “heavenly”, and refers to the high elevation at which this species lives.

Distribution and habitat. *Hadena caelestis* has been collected at treeline (1,800-3,000 m) from southern British Columbia to central California in the North Cascade Mountains, Siskiyou Mountains, and Sierra Nevada. It flies in mid-summer.

9. *Hadena (Anepia) gabrieli* Troubridge and Crabo, *sp. nov.*

(Figs. 9, 27, 37)

Diagnosis. *Hadena gabrieli*, *H. maccabei*, and *H. amabilis* all occur in southwestern California and look more or less similar externally; however, the cucullus of the valve is more rounded in *H. gabrieli*, pointed in *H. maccabei* and *H. amabilis*. The closest relative to *H. gabrieli* is *H. caelestis*, from which it is most easily separated by range. Internally, *H. gabrieli* is separated from *H. caelestis* by the much wider vinculum, the larger, more elongate cucullus, and the much longer dorso-apical process of the sacculus.

Description. Forewing length 15 mm ; mean 15 mm (n=3). Male antenna serrate, ciliate; female antenna filiform; scape, head, and palpi with grey-brown scales; prothoracic collar with five transverse bands: white anteriorly followed by a thin black line, a narrow white band, a thin black line, and finally a wide white band posteriorly; thorax, tegulae, and dorsal tuft adjacent to abdomen with mixture of

grey, white, and black scales; abdomen light grey brown. Dorsal forewing ground colour light grey, orbicular spot circular, mostly white with a few grey scales in centre, edged thinly with black; reniform spot grey, edged with black scales except towards costa and white scales along proximal edge; claviform spot black; white basal line diffuse, edged proximally with black; antemedial line black, excurved between veins, edged proximally with white scales within cell 1A+2A and light brown elsewhere; mesial band light grey with white scales scattered on costa above orbicular spot and forming a white patch between orbicular and reniform spots; postmedial line a series of black crescents incurved between veins, edged distally with white scales in cells CuA_1 , CuA_2 , and 1A+2A, and light grey-brown elsewhere — this line lacks indentation on vein CuA_2 , forming a single crescent between veins CuA_1 and 1A+2A; white subterminal line undulates through cells R_3-M_1 then forms indistinct chevrons edged proximally with black in cells M_2-CuA_1 before bending to outer margin at vein 1A+2A; margin with thin black chevrons between veins; fringe beige basally, dark grey distally, checkered with lighter scales at veins. Dorsal hindwing with dark grey-brown postmedial band, median line and discal lunule with lighter base and white scales on vein CuA_2 in submargin; fringe beige basally, with a grey line and white terminally.

Male genitalia (Fig. 27). Digitus tapered and turned medially at apex to form distal point, lateral process of digitus short, triangular; cucullus narrowed towards apex but bluntly rounded with well developed corona, bent at about 40° to costa; dorso-apical process of sacculus more than $2\times$ as long as wide, squared off towards apex. Juxta with numerous minute spines. Uncus long, narrow, and pointed, slightly swollen in mid-section. Spine(s) absent from ventral side of aedeagus. Vesica bent down and anteriorly with dorsal, subbasal bulbous cornutus; a band of smaller cornuti extended ventrally along apical $2/3$ of vesica; a smaller subapical diverticulum on left side of vesica. Vinculum wide ventrally, expanded to form flaps at junction with saccus.

Female genitalia (Fig. 37). Ovipositor telescopic; lobes bluntly pointed, with sparse setae. Ductus bursae membranous ventrally, sclerotized dorsally. Ostium bursae with lateral patches of spinules. Corpus bursae pear-shaped with one elongate, ventral signum. Sclerotized appendix bursae widely attached to left posterior corpus bursae.

Type material. Holotype ♂: USA, California, Ventura Co., Alamo Mt., Dutchman Campsite, 6,710 ft [2,050 m], 29.VI.2000, [34.675°N, 118.977°W], UV Light and traps, Thomas E. Dimock; in the CNC. Paratypes: 3 ♂♂, 1 ♀: **California:** 1 ♂, Ventura Co., Pine Mountain Rd. at 6320 ft [1,900 m], 7.VII.1999, Thomas E. Dimock; 1 ♂, Mt. Lowe, [San Gabriel Range, L.A. Co.], 3.VI.[19]24; 1 ♂, Table Mt., San Gabriel Range, L.A. Co., 7,000 ft [2150 m], 16.V. 1940; 1 ♀, Buckhorn Flats, 6,400 ft [1,950 m], on Angeles Crest Highway, Los Angeles Co., 20.VI.1958, R.H. Leuschner. Paratypes deposited in the LACM and JTT.

Type locality. Alamo Mountain, California.

Derivation of the name. The initial specimens we examined were collected in the San Gabriel Mountains. Like the mountains, the name honours Archangel Gabriel.

Distribution and habitat. *Hadena gabrieli* occurs at high elevation in the Transverse Ranges of Los Angeles and Ventura Counties, California. The holotype was collected in an area of transition between chaparral-oak woodland and pine forest at 1,900 m elevation.

The *ectrapela* group

The *ectrapela* group is characterized by the presence of 1-3 spines on the ventral surface at the apex of the aedeagus, the modified tip of the cucullus on the valve, which is drawn to a point, and the elongation of the band of short cornuti on the vesica. Its members include *H. ectrapela*, *H. amabilis*, *H. plumasata*, *H. maccabei*, *H. paulula*, and *H. siskiyou*.

10. *Hadena (Anepia) ectrapela* (Smith, 1898)

(Figs. 14, 24, 43)

Mamestra ectrapela Smith, 1898: 249; Dyar, 1902: 156. Lectotype female designated by Todd, 1983: 71, in AMNH [examined].

Anepia ectrapela (Smith); Hodges *et al.*, 1983: 149.

Hadena ectrapela (Smith); Poole, 1989: 477.

Epia jola Barnes and Benjamin, 1924: 12. Holotype male in USNM [examined],

new synonymy.

Anepia jola (Barnes and Benjamin); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena jola (Barnes and Benjamin); Poole, 1989: 478.

Diagnosis. Males and females with similar wing markings. Forewing length 13-15 mm; mean 14.1 mm (n=20). *Hadena ectrapela* is characterized by a medium grey forewing, oval orbicular spot filled with light grey scales, and darker grey claviform spot. Internally, the cucullus of the valve is pointed apically, the elongate median diverticulum extends distally, and the posterior corpus bursae is slender, terminating in a bulbous anterior corpus bursae. There is slightly more individual and geographic variation present in *H. ectrapela* than in most other Nearctic species. Specimens from Utah, (*jola*), are slightly paler with more pronounced white markings than in other areas of its range and specimens from northern Idaho can be dark and have been confused with *H. minorata* in museum collections. We see no structural differences to separate *ectrapela* from *jola* and place *jola* as a synonym of *H. ectrapela*.

South and west from Alberta, *H. ectrapela* gradually gets larger and the

median diverticulum of the vesica more often is bent towards or extends from the left side of the vesica rather than from the posterior end. In all specimens that we examined from the White Mountains of southwestern California, the median diverticulum extends from the left side of the vesica and we were at first tempted to describe this population as distinct. However, occasional specimens from north-central Washington exhibit this character, as do many specimens that we examined from south-central Oregon and northeastern California. Intermediate vesicas also occur in Washington, Oregon, and northeastern California. Because these specimens cannot otherwise be separated, we treat this as variation.

Type localities. Agnes Lake, British Columbia, [Agnes Lake, Alberta, here restricted] (*ectrapela*); Eureka, Utah (*jola*). The type locality of *Mamestra ectrapela* is Agnes Lake, British Columbia; however, early specimens collected in Alberta were often labelled “British Columbia” or “Northwest Territories”, and Smith named other species from Laggan, British Columbia, which is in Alberta, near Lake Louise, in Banff National Park. Agnes Lake, British Columbia is in a remote area on the mainland, north of Port McNeill (51°40'N 127°39'W). It is more likely that the lectotype was collected at Agnes Lake, Alberta (51°25'N 116°15'W), in Banff National Park, thus we believe the type locality is Agnes Lake, Banff National Park, Alberta.

Distribution and habitat. Southwestern Alberta and southern British Columbia, south to Wyoming, Utah, and south-central Oregon. Like *H. variolata*, it is found most often near treeline but also occurs in xeric habitats at lower elevations.

11. *Hadena (Anepia) amabilis* (Barnes and McDunnough, 1918)

(Figs. 6, 20, 36)

Epia amabilis Barnes and McDunnough, 1918: 96. Holotype male in USNM [examined].

Anepia amabilis (Barnes and McDunnough); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena amabilis (Barnes and McDunnough); Poole, 1989: 475.

Diagnosis. Males and females with similar wing markings. Forewing length 12-14 mm; mean 13.5 mm (n=10). *Hadena amabilis* occurs in southwestern California. *Hadena gabrieli* and *H. maccabei* also occur in southwestern California, have light gray forewing colouration, and could be confused with *H. amabilis*. Externally, the pale grey forewing of *H. amabilis* is not hoary or grizzled as in *H. gabrieli* and *H. maccabei*, the claviform spot is crisper and shorter, and the subterminal line is less distinct than in these other species. Internally, the tip of the cucullus is pointed as in *H. maccabei*, but rounded in *H. gabrieli*. The dorso-apical

process of the sacculus of *H. amabilis* is equal to or greater than 2× as long as wide, whereas it is about as long as it is wide in *H. maccabei*. *Hadena amabilis* occurs in deserts at lower elevation than *H. gabrieli* and *H. maccabei*, which occur at high elevation in the mountains.

Type locality. Loma Linda, San Bernardino Co., California.

Distribution and habitat. *Hadena amabilis* occurs in the deserts of southern California, from Tulare and Santa Barbara Counties, south to San Diego County.

12. *Hadena (Anepia) plumasata* (Buckett and Bauer, 1967)

(Figs. 12, 22, 45)

Anepia plumasata Buckett and Bauer, 1967: 235; Hodges *et al.*, 1983: 149. Holotype male in UCD [examined].

Hadena plumasata (Buckett and Bauer); Hacker, 1996: 514.

Diagnosis. Males and females with similar wing markings. Forewing length 15-17 mm; mean 16.3 mm (n=20). *Hadena plumasata* is the only *Hadena* with a dark, charcoal grey forewing and no basal dash. The sagittate subterminal line is less dentate than in the other species with the “W” mark absent or nearly so. The claviform spot is surrounded with black scales, giving it an indistinct appearance. The orbicular and reniform spots are edged with light grey scales and filled with dark charcoal grey. Internally, the cucullus of the valve is pointed apically, the elongate median diverticulum of the vesica extends to the left at about 45°, the sacculus is more massive than in the other species of the *ectrapela* group, and the posterior corpus bursae is wider than that of *H. ectrapela*.

Type locality. Johnsville, Plumas Co., California.

Distribution and habitat. *Hadena plumasata* occurs on the east slope of the Sierra Nevada of California, from Plumas County in the north to Mariposa County in the south. It is most common in mixed oak/douglas fir/incense cedar/manzanita forests at mid-elevations.

13. *Hadena (Anepia) maccabei* Troubridge and Crabo, *sp. nov.*

(Figs. 15, 23, 40)

Diagnosis. In California, this species occurs sympatrically with *H. caelestis* at higher elevations in the Sierra Nevada, and with *H. gabrieli* in the Transverse Ranges. The duller, more oval orbicular spot of *H. maccabei* helps to distinguish this species from *H. caelestis* and *H. gabrieli*. In *H. maccabei*, the cucullus of the valve is distinctly pointed, whereas it is rounded in *H. caelestis* and *H. gabrieli*. In the northern Sierra Nevada, *H. maccabei* may occur with *H. plumasata* but the latter is separated from it by the much darker forewing and less dentate subtermi-

nal line. Internally, the posterior corpus bursae of *H. maccabei*, *H. plumasata*, and *H. siskiyou* is thicker than that of *H. ectrapela*. The median diverticulum of the vesica extends distally and slightly to the left in most *H. ectrapela*, but sharply to the left in *H. maccabei*, *H. siskiyou*, and *H. plumasata*.

Description. Males and females similarly coloured. Forewing length 13-15 mm ; mean 14.2 mm (n=10). Male antenna serrate, ciliate, female antenna filiform; scape, head, and palpi light grey brown; prothoracic collar light grey brown with two fine black lines and a white band towards the thorax; thorax, tegulae, and dorsal tuft adjacent to abdomen with a mixture of light grey, white, and black-tipped scales; abdomen light grey brown. Dorsal forewing ground colour light grey, orbicular spot circular to oval, whitish with grey scales in the centre, often thinly edged with black; reniform spot edged with black scales except towards costa, filled with grey scales and white scales along proximal and distal edges; claviform spot medium grey to black; white basal line diffuse, edged proximally with black; antemedial line white within cell 1A+2A and light brown elsewhere, slightly excurved between veins, edged proximally with a thin dark grey line, distally with black; mesial band grey, often darker below claviform spot; postmedial line a series of crescents incurved between the veins, thicker and black proximally, thin, dark grey, and less deeply curved distally, the area between these rows filled with white scales within cells CuA_1 , CuA_2 , and 1A+2A, and light grey brown elsewhere — this line lacks indentation on vein CuA_2 , forming a single crescent between veins CuA_1 and 1A+2A; white subterminal line undulates through cells R_3-M_1 then forms indistinct chevrons edged proximally with black chevrons in cells M_2-CuA_1 before bending to outer margin at vein 1A+2A; margin with black chevrons edged proximally with white scales between veins; fringe dark grey basally, dark grey distally, checkered with lighter scales at veins. Dorsal hindwing with dark grey-brown postmedial band, median line and discal lunule with lighter base and white scales on vein CuA_2 in submargin; fringe light grey basally, then a grey line and light grey terminally.

Male genitalia (Fig. 23). Digitus parallel to costa, terminated in a raised distal point, lateral process of digitus elongate, triangular; cucullus with elongate, upturned point and well-developed corona, well separated from and bent at about 80° to costa; dorso-apical process of sacculus more than $2\times$ as long as wide with rounded tip. Juxta with numerous minute spines. Uncus narrow and pointed, slightly swollen in mid-section. Aedeagus with ventral sclerotized bifid or trifid spike at base of vesica. Vesica bent down and forward with one very small lateral, subbasal diverticulum on right; relatively long median diverticulum (about $2\times$ length of cap and thorn) extended to left and downward, capped with bulbous cornutus; a band of smaller cornuti extended ventrally along apical $\frac{3}{4}$ of vesica; a small sub-apical diverticulum on left.

Female genitalia (Fig. 40). Ovipositor telescopic; lobes bluntly pointed, with sparse setae. Ductus bursae sclerotized, dorso-ventrally flattened. Ostium

bursae with lateral sclerotized plates very narrow distally, widened and rounded proximally, with many spinules on lateral edge, fewer on wider proximal portion. Corpus bursae bulb-like, with one elongate ventral signum. Posterior corpus bursae about half as wide as anterior corpus bursae; appendix bursae sclerotized, widely attached to postero-ventral corpus bursae.

Type material. Holotype ♂: USA, California, Mt. Shasta, Siskiyou Co., 41°21'N 122°13'W, 7,300 ft [2,200 m], 15.IX.1998, J. Troubridge, in the CNC. Paratypes: 21 ♂♂, 3 ♀♀: **California:** 9 ♂♂, 1 ♀, same data as holotype; 4 ♂♂, 1 ♀, Mt. Shasta, Siskiyou Co., 41°21'N 122°12'W, 7,680 ft [2,300 m], 27.VIII.2000, J. Troubridge; 5 ♂♂, 1 ♀, Mt. Shasta, 6 mi ENE, 7400 ft [2,250 m], 25.VIII.1967, D.F. Hardwick; 1 ♂, Panther Meadows, 7,500 ft [2,300 m], Mt. Shasta, Siskiyou Co., 23.VII.1965; 2 ♂♂, Mt. Shasta, Siskiyou Co., 17.VIII.1998, L.G. Crabo & G. Morrell. Paratypes deposited in the CNC, JTT, and LGC.

Type locality. Mount Shasta, California.

Derivation of the name. The name honours Dr. Tim McCabe for his work on the Nearctic Hadeninae.

Distribution and habitat. *Hadena maccabei* has been collected at treeline on Mt. Shasta, in Sierra Nevada (1,800-3,000 m), and in chaparral-oak woodland/pine forest at 1,900 m elevation in the Transverse Ranges of California.

Variation. We separate *H. maccabei* from *H. ectrapela* on the basis of the direction in which the median diverticulum of the vesica is pointed, of the more circular orbicular spot, and of size. Specimens examined from Mt. Shasta, and Nevada Co. (northern Sierra Nevada), California, match material from the southern Sierra Nevada in genital characters but the forewing markings are darker in the more northern populations. The lighter colouration of the more southern populations may be an adaptation to the white granite substrate where they occur. Although we believe these populations to be conspecific, we have found that the characters separating the species of the *ectrapela* group are often subtle at best, so we restrict the type series to specimens from Mt. Shasta, California. Specimens from the Transverse Ranges (Ventura and Los Angeles Counties) are more boldly patterned (Fig. 15c) and may be confused with *H. amabilis*.

Hadena ectrapela is a widespread species that flies at treeline as well as in xeric valley bottoms and thus the populations appear to be more or less genetically continuous. Its apparent absence from the mid-elevation forests may be due to lack of suitable foodplants. There are several foodplant choices in the Caryophyllaceae in the steppe and sagebrush habitats on the valley floors as well as in the alpine and subalpine meadows but fewer species in the forest. *Hadena maccabei*, by contrast, flies at high elevation in California and does not occur in the valley bottoms. These populations are not genetically continuous and populations from the northern Sierra Nevada (including Mt. Shasta), the southern Sierra Nevada, and the Transverse Ranges are geographically isolated from one another, look a little different from one another, but have similar genitalia — particularly the

shape of the vesica.

14. *Hadena (Anepia) paulula* Troubridge and Crabo, *sp. nov.*

(Figs. 13, 25, 35)

Diagnosis. This is the smallest Nearctic *Hadena*. Externally, the wing markings are crisp and distinct. The distal and proximal margins of the reniform spot are more or less parallel and similar in colouration. The distal margin of the reniform spot is more straight and more heavily marked with white in *H. paulula* than in other Nearctic species. Internally, the ribbon of small cornuti on the venter of the vesica is much longer in *H. paulula* than in the other species, and the tip of the cucullus less pointed than in other members of the *ectrapela* group.

Description. Males and females similarly coloured. Forewing length 12-13 mm; mean 12.3 mm (n=5). Male antenna serrate, ciliate, female antenna filiform; head and palpi with a mixture of off-white and dark grey-brown scales; prothoracic collar with five bands: white basally followed by black, then white, then a broad black band, and finally white; thorax, tegulae, and dorsal tuft adjacent to abdomen with a mixture of white, dark grey-brown, and black scales; abdomen light grey brown. Dorsal forewing ground colour grey brown, orbicular spot slightly oval, white with grey-brown centre, edged thinly with black and contained within discal cell; reniform spot thinly edged with black on outside, white on inside, and filled with grey scales; claviform spot black; basal line broken; antemedial line black, excurved between veins, edged proximally with white scales in cell 1A+2A and on costa, light brown elsewhere; mesial band a mix of light brown and grey-brown patches, darkest between orbicular and reniform spots, distal to reniform spot, and trailing from claviform spot; postmedial line a series of double crescents incurved between the veins, thick and black proximally, thin, grey brown, and less deeply curved distally, area between rows filled with white scales within cells CuA₁, CuA₂, and 1A+2A, and light grey brown elsewhere; distinct white subterminal line undulates through cells R₅-M₁ then forms distinct chevrons edged proximally with black in cells M₂-CuA₁ before bending to outer margin at vein 1A+2A; margin with black chevrons between veins; fringe dark grey brown, checkered with lighter grey-brown scales at veins. Dorsal hindwing with dark grey brown postmedial band, median line and discal lunule with lighter base and white scales on vein CuA₂ in submargin; fringe grey brown basally, white terminally.

Male genitalia (Fig. 25). Digitus parallel to costa, terminated in raised distal point, lateral process of digitus elongate, triangular; cucullus bluntly pointed and upturned with well developed corona, cucullus bent at about 40° to costa; dorso-apical process of sacculus more than 2× as long as wide with rounded tip. Juxta with numerous minute spines. Uncus narrow, pointed, and slightly swollen in mid-section. Aedeagus with ventral sclerotized bifid or trifid spike-like process at

base of vesica. Vesica bent down and forward with one small, dorso-lateral, sub-basal diverticulum on right; elongate median diverticulum extended distally then bent to left, capped with bulbous cornutus; a band of smaller cornuti extended ventrally along the apical 4/5 of vesica.

Female genitalia (Fig. 35). Ovipositor telescopic; lobes bluntly pointed, with sparse setae. Ductus bursae sclerotized, dorso-ventrally flattened. Ostium bursae with lateral sclerotized plates covered with numerous spinules. Corpus bursae anterioris bulb-like, with one elongate, ventral signum. Corpus bursae posterioris narrow, tube-like; appendix bursae sclerotized ventrally, widely attached to postero-ventral corpus bursae.

Type material. Holotype ♂: USA, Arizona, Granite Dells, 4 mi N of Prescott, Yavapai Co., 13.V.1970, Lloyd Martin, in the CNC. Paratypes: 6 ♂♂, 5 ♀♀: **Arizona:** 2 ♂♂, same locality and collector, 18.V.1970; 1 ♀, same locality and collector, 17.V.1970; 1 ♂, same locality and collector, 22.V.1970; 1 ♀, same locality and collector, 23.V.1970; 1 ♂, 5 mi. N Prescott, Yavapai Co., 5,450 ft [1,650 m], 16.V.1971, Lloyd Martin; 1 ♀, same locality and collector, 11.V.1974; 1 ♂, Prescott, Yavapai Co., 16.V.1974, Lloyd Martin; 1 ♂, same locality and collector, 3.V.1970; 1 ♀, 4 mi. N Prescott, Yavapai Co., 15.V.1972, Lloyd Martin; **Utah:** 1 ♀, Zion Nat. Park, Washington Co., 8.VI.1937, Wm. N Burdick. Paratypes deposited in the CNC and LACM.

Type locality. Prescott, Yavapai Co., Arizona.

Derivation of the name. The name is from Latin and refers to the small size of this species.

Distribution and habitat. *Hadena paulula* was found at Prescott, Arizona and in southern Utah in open Ponderosa Pine forests.

15. *Hadena (Anepia) siskiyou* Troubridge and Crabo, *sp. nov.*

(Figs. 11, 21, 44)

Diagnosis. This species occurs sympatrically with *H. caelestis* at higher elevations in the Siskiyou Mountains, Oregon. *Hadena siskiyou* is distinguished by the bright, black and white wing markings and bright white orbicular spot, which is usually brighter and less circular than in *H. caelestis*; the cucullus of the valve is distinctly pointed, whereas it is rounded in *H. caelestis*. Internally, the tubular posterior corpus bursae of *H. siskiyou*, *H. plumasata*, and *H. maccabei* is thicker than in *H. ectrapela*; the median diverticulum of the vesica extends sharply to the left in *H. siskiyou*, *H. maccabei* and *H. plumasata*, but distally and slightly to the left in *H. ectrapela*; the median diverticulum of *H. siskiyou* is about half as long as that of *H. plumasata* and *H. maccabei* in most specimens.

Description. Males and females similarly coloured. Forewing length 13-15 mm ; mean 14.3 mm (n=10). Male antenna serrate, ciliate, female antenna

filiform; scape, head, and palpi with a mixture of white and dark grey scales; prothoracic collar with four bands: black basally followed by a thin white line, a narrow black band, and finally a white band towards thorax; thorax, tegulae, and dorsal tuft adjacent to abdomen with a mixture of white and black scales; abdomen grey brown. Dorsal forewing ground colour light grey, orbicular spot circular or slightly oval, mostly white with a few grey scales in centre, edged thinly with black; reniform spot edged with black scales except towards costa, filled with grey scales and white scales along proximal edge; claviform spot black; white basal line diffuse, edged proximally with black; basal dash short, black; antemedial line white, deeply excurved between veins, edged proximally with dark grey and black distally; mesial band light grey with white scales scattered in costa above orbicular spot and forming a white patch below orbicular spot; postmedial line a series of crescents incurved between veins, thicker and black proximally, thin, dark grey, and less deeply curved distally, area between rows filled with white scales within cells CuA_1 , CuA_2 , and $1A+2A$, and light grey brown elsewhere — this line lacks indentation on vein CuA_2 , forming a single crescent between veins CuA_1 and $1A+2A$; white subterminal line undulated through cells R_3-M_1 then forming indistinct chevrons edged proximally with black in cells M_2-CuA_1 before bending to outer margin at vein $1A+2A$; margin with black chevrons between veins; fringe grey, checkered with black scales between veins. Dorsal hindwing with dark grey-brown postmedial band, obscure median line and discal lunule with lighter base and white scales on vein CuA_2 in submargin; fringe dark grey brown basally, lighter grey terminally.

Male genitalia (Fig. 21). Digitus parallel to costa, terminated in raised distal point, lateral process of digitus elongate, triangular; cucullus bent at about 80° to costa with elongate, upturned point and well-developed corona; dorso-apical process of sacculus more than $2\times$ as long as wide with rounded tip. Juxta with numerous minute spines. Uncus narrow and pointed, slightly swollen in mid-section. Aedeagus with ventral sclerotized bifid or trifid spike at base of vesica. Vesica bent down and back at 180° with one very small lateral, subbasal diverticulum on right; relatively short median diverticulum (about same length as cap and thorn) extended distally then bent to left, capped with bulbous cornutus; a band of smaller cornuti extended ventrally along apical $3/4$ of vesica; a small sub-apical diverticulum present on left.

Female genitalia (Fig. 44). Ovipositor telescopic; lobes bluntly pointed, with sparse setae. Ductus bursae sclerotized, dorso-ventrally flattened with raised bump located midway down ventral surface. Ostium bursae with lateral sclerotized plates reduced, covered with spinules. Corpus bursae anterioris bulb-like, with one elongate, ventral signum. Posterior corpus bursae is almost as wide as anterior corpus bursae; appendix bursae sclerotized, widely attached to posterior corpus bursae.

Type material. Holotype σ^7 : U.S.A., Oregon, Josephine Co., Eight Dollar

Mtn. Rd., 42°14'N 123°14' W, 1,600' [500 m], 15.VI.1999, J. Troubridge, in the CNC. Paratypes: 20 ♂♂, 15 ♀♀: **Oregon:** 6 ♂♂, 1 ♀ same data as holotype; 9 ♂♂, 12 ♀♀, Eight Dollar Mtn. Rd., Josephine Co., 42°14'N 123°41' W, 1,125 ft [340 m], 23.V.2001, J. Troubridge; 1 ♂, Jackson Co., Saddle W of Mt. Ashland summit, 42°08'N 122°72'W, 2,163m, 30.VII.1991, L.G. Crabo; 1 ♀, Grants Pass, 25.V.1963, K. Goeden; 1 ♂, Eugene, 25.V.1963, K. Goeden; 3 ♂♂, 1 ♀, Josephine Co., Illinois R. Valley, 0.3 mi NE of Little Illinois R. Falls on Eight Dollar Mtn. Rd., 42°24'N 123°67' W, 1,400 ft [450 m], 6-7.VI.1993, L.G. Crabo. Paratypes deposited in the CNC, JTT, and LGC.

Type locality. Eight Dollar Mountain Road, Illinois River Valley, Josephine Co. Oregon.

Derivation of the name. The name refers to the Siskiyou Mountains, where this species occurs. It is a noun in apposition.

Distribution and habitat. *Hadena siskiyou* has been collected in dry, open forests from 500 m to treeline in the Siskiyou Mountains of southwestern Oregon and at Eugene, Oregon. It flies from late April until mid June at lower elevations and in mid-summer at higher elevations.

Checklist of the Nearctic *Hadena* species

Hadena Schrank, 1802

Subgenus *Hadena*

1. *variolata* (Smith, 1888)
 - a. *dealbata* (Staudinger, 1892)
2. *capsularis* (Guenée, 1852)

Raphia propulsa Walker, 1857
3. *lafontainei* sp. nov.

Subgenus *Anepia* Hampson, 1918

4. *ectypa* (Morrison, 1875)

Mamestra bella Grote, 1883
5. *minorata* (Smith, 1888)
6. *glaciata* (Grote, 1882)
7. *circumvadis* (Smith, 1902)
8. *caelestis* sp. nov.
9. *gabrieli* sp. nov.
10. *ectrapela* (Smith, 1898)

Epia jola Barnes and Benjamin, 1924 (**new synonymy**)
11. *amabilis* (Barnes and McDunnough, 1918)
12. *plumasata* (Buckett and Bauer, 1967)
13. *maccabei* sp. nov.
14. *paulula* sp. nov.
15. *siskiyou* sp. nov.

Excluded Taxa

1. *Lacinipolia mimula* (Grote, 1883b), new combination.

Mamestra mimula Grote, 1883b: 48.

Anarta mimula (Grote); Smith, 1893: 295; Dyar, 1902: 160.

Lasiestra mimula (Grote); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena mimula (Grote); Lafontaine *et al.*, 1986: 265.

The habitus and genitalia of *mimula* are more similar to some lineages of *Lacinipolia* McDunnough, 1937 than to *Hadena*. *Lacinipolia* is currently a “catch-all” hadenine genus in need of revision, and we feel that *mimula* should be dealt with in that context.

2. *Hada sutrina* (Grote, 1881), revised combination.

Mamestra sutrina Grote, 1881: 5; Smith, 1893: 295; Dyar, 1902: 155.

Astrapetis sutrina (Grote); McDunnough, 1938: 72.

Hecatera sutrina (Grote); Hodges *et al.*, 1983: 149.

Hada sutrina (Grote); Lafontaine *et al.*, 1986: 256.

Hadena sutrina (Grote); Poole, 1989: 481; Hacker, 1996: 512.

Lafontaine *et al.* (1986) correctly placed *sutrina* in the genus *Hada* Billberg, 1820 [type-species *Hada nana* (Hufnagel, 1766)]. Subsequently, it was unjustifiably placed in the genus *Hadena* (Poole 1989; Hacker 1996). The genitalia of *sutrina* do not resemble any of the *Hadena* subgenera but closely approach those of *Hada nana*. Thus, we follow Lafontaine *et al.* and place *sutrina* in the genus *Hada*.

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SECTION EN FRANÇAIS

Introduction

Hadena Schrank, 1802, est un genre holarctique comprenant 15 espèces néarctiques et environ 134 espèces paléarctiques. D'importantes variations individuelles et géographiques de même que des dessins alaires similaires font que plusieurs espèces d'*Hadena* sont difficiles à déterminer et souvent leur génitalia doivent être examinés. Plusieurs *Hadena* sont peu fréquemment récoltées ou localisées et on n'en trouve habituellement pas beaucoup dans les collections. Les chenilles se nourrissent de nuit des fleurs et des capsules de graines des Caryophyllacées; elles se cachent parmi les feuilles situées au bas des tiges durant le jour (Hacker 1996).

Les caractéristiques morphologiques du genre ont été décrites par Hacker (1996). Les espèces d'*Hadena* sont de taille moyenne et leurs yeux sont velus. Les valves des mâles ont un digitus fortement sclérifié qui se termine par une projection aplatie ou en forme d'épine sur la costa, à la base du cucullus. Le cucullus possède une corona bien développée et il est séparé du digitus et courbé à 45° par rapport à lui. On trouve aussi une projection dorsoapicale sur le sacculus (à ne pas confondre avec la projection sacculaire qu'on rencontre chez *Euxoa* Hübner, 1821). La harpe est très réduite et prend la forme d'une petite crête ou d'une plaque sur la surface de la valve. La vesica est courbée ventralement et antérieurement; elle est ornée de trois diverticules, dont un en forme d'épine, d'un cornutus bulbeux et d'une bande de cornuti de tailles variées. Le corpus bursae est arrondi et en forme de sac; il porte un signum allongé. Le corpus bursae postérieur est étroit et l'appendix bursae est sclérifié à divers degrés. Le long ovipositeur télescopique est guidé par des lobes modifiés du 7^e sternite abdominal.

Les auteurs récents (Poole 1989; Hacker 1996) considèrent qu'*Anepia* Hamp-

son, 1918 est un sous-genre d'*Hadena*. Parmi les espèces néarctiques, seules *H. variolata* (Smith, 1888), *H. capsularis* (Guenée, 1852) et *H. lafontainei* sp. nov. font partie du sous-genre *Hadena*. Nous classifions le reste des espèces néarctiques dans le sous-genre *Anepia*.

Dans les pages qui suivent nous présentons une revue des *Hadena* néarctiques et nous décrivons les six espèces nouvelles suivantes : *H. caelestis*, *H. gabrieli*, *H. paulula*, *H. lafontainei*, *H. siskiyou* et *H. maccabei*.

Tableau d'identification des espèces néarctiques d'*Hadena*

1. Cucullus courbé à au moins 90° par rapport à la costa; juxta épineuse, en forme de Y (Fig. 18); 7^e sternite abdominal de la femelle orné de profondes cavités antérieures 1. *variolata* (p. 138)
- Cucullus courbé à 30-45° par rapport à la costa; juxta en forme de plaque bifide ornée de multiple épines minuscules (Fig. 17); 7^e sternite abdominal de la femelle orné de profondes cavités antérieures 2
2. Ligne subterminale blanche de l'aile antérieure fortement incurvée sur les nervures médianes, touchant ou frôlant la marge de l'aile; tache orbiculaire très grande et arrondie, traversant la nervure radiale pour joindre ou frôler la marge costale (Fig. 4) 2. *capsularis* (p. 138)
- Ligne subterminale blanche de l'aile antérieure incurvée faiblement sur les nervures médianes, ne rejoignant habituellement pas la marge; tache orbiculaire de taille moyenne à petite, ne traversant habituellement pas la nervure radiale (Fig. 6) — si traversant la veine radiale, la tache orbiculaire ovale plutôt que circulaire (Fig. 14b) 3
3. Couleur de l'aile antérieure brunâtre foncé, taches et lignes ordinaires peu contrastées (Fig. 5); se rencontre à l'est des Prairies 4. *ectypa* (p. 139)
- Couleur de l'aile antérieure grisâtre ou olive, taches et lignes ordinaires distinctes; se rencontre à l'ouest ou dans les Prairies 4
4. Couleur de fond de l'aile antérieure brun olive 5
- Couleur de fond de l'aile antérieure grise, blanche ou brun gris 6
5. Uncus élargi, densément sétigère, semblable à une brosse à bouteilles (Fig. 17); ductus bursae de largeur moindre que la moitié de celle de l'ostium bursae (Fig. 33); du Wyoming jusqu'au Mexique 3. *lafontainei* (p. 139)
- Uncus étroit et faiblement sétigère à l'extrémité (Fig. 28); ductus bursae et ostium bursae à peu près d'égales largeurs (Fig. 41); montagnes du SE de l'Arizona jusqu'au Mexique 6. *glaciata* (p. 140)

6. Cucullus arrondi (Fig. 26); corpus bursae antérieur en forme de poire (Fig. 37) . . . 7
- Cucullus effilé en pointe (Fig. 25); corpus bursae antérieur distinctement orbiculaire, ne se rétrécissant pas vers l'extrémité antérieure (Fig. 36) 10
7. Écailles du pli de l'aile antérieure au-dessus de la nervure 2A et dans la bande médiane noires ou nettement plus foncées que la couleur de fond du reste de l'aile — écailles noires absentes sous la nervure 2A (Fig. 8); cucullus réduit et en forme de doigt, plus long que large; extrémité du digitus en forme de processus large et arrondi à l'angle costal (Fig. 30) 5. *minorata* (p. 140)
- Écailles du pli de l'aile antérieure au-dessus de la nervure 2A et dans la bande médiane pas visiblement plus foncées que la couleur de fond du reste de l'aile — si foncées, des écailles foncées se trouvant aussi en dessous de la nervure 2A (Figs. 9, 11, 12); cucullus de taille normale; digitus se terminant en pointe (Fig. 29) 8
8. Dans les Transverse Ranges du sud de la Californie 9. *gabrieli* (p. 142)
- À l'extérieur des Transverse Ranges du sud de la Californie 9
9. À haute altitude dans la chaîne des Cascades, les Blue Mountains et la Sierra Nevada; vesica du mâle sans diverticulum subbasal — cornutus bulbeux dirigé verticalement (Fig. 26a) 8. *caelestis* (p. 141)
- À partir du nord des Prairies, le long des Rocheuses jusque dans les Montagnes Blanches de l'Arizona; vesica du mâle présentant un diverticulum subbasal — cornutus bulbeux dirigé postérieurement (Fig. 29a) 7. *circumvadis* (p. 141)
10. Tache orbiculaire blanche présentant des écailles plus foncées en son centre, contrastant fortement avec la couleur foncée du reste de l'aile antérieure; lignes ordinaires de l'aile antérieure nettes, presque luisantes (Figs. 11, 13) 11
- Tache orbiculaire blanchâtre ou grise, présentant des écailles plus foncées en son centre, ne contrastant pas particulièrement avec le reste de l'aile antérieure; lignes ordinaires de l'aile antérieure peu fortement contrastées par rapport à la couleur de fond de l'aile (Figs. 6, 12, 14a-c, 15a-c) 12
11. Dans les Monts Klamath et Siskiyou du sud-ouest de l'Orégon et, probablement, du nord-ouest de la Californie 15. *siskiyou* (p. 144)
- Du sud de l'Utah au centre de l'Arizona 14. *paulula* (p. 144)
12. Dans la Sierra Nevada ou à l'ouest de celle-ci, en Californie 13
- À l'est et au nord de la Sierra Nevada, en Californie 10. *ectrapela* (p. 142)
13. Diverticulum médian de la vesica environ 2× plus long que la largeur de celle-ci et dirigé vers la gauche (Fig. 22b); sur plusieurs chaînes de montagnes en Californie 14
- Diverticulum médian de la vesica plus court ou presque aussi long que la largeur de la vesica et dirigé postérieurement (Fig. 20b); dans les déserts du Sud-ouest californien 11. *amabilis* (p. 143)
14. Aile antérieure gris charbon foncé; tache claviforme peu contrastée dans un nuage d'écailles noires (Fig. 12); dans les forêts sèches d'altitude médiane sur les pentes est

- du nord de la Sierra Nevada 12. *plumasata* (p. 143)
- Aile antérieure gris clair à gris moyen; tache claviforme bien contrastée (Figs. 15a-c); à haute altitude sur le Mont Shasta, les Transverse Ranges et la Sierra Nevada
- 13. *maccabei* (p. 144)

Sous-genre *Hadena* Schrank, 1802

Le sous-genre *Hadena* diffère du sous-genre *Anepia* par la présence d'une grosse dent sur le côté gauche de l'édéage et par l'absence d'une petite projection en forme d'épine habituellement présente sur le digitus près de l'extrémité du clasper. La projection dorso-apicale du sacculus est habituellement plus large chez les espèces du sous-genre *Hadena* que chez celles du sous-genre *Anepia*. L'ostium bursae est plus large et plus fortement sclérifié ventralement et le ductus bursae est plus court et plus fortement sclérifié dans le sous-genre *Hadena* que dans le sous-genre *Anepia*.

1. *Hadena (Hadena) variolata* (Smith, 1888)

(Figures 1, 18, 31)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 14-16 mm; moyenne 15,2 mm (n=20). *Hadena variolata*, *H. glaciata* (Grote, 1882), et *H. lafontainei* sont les seules espèces néarctiques dont la couleur de fond de l'aile antérieure est brun olive. Les femelles de *H. variolata* se distinguent plus facilement de celles de *H. lafontainei* et *H. glaciata* par la présence sur le 7^e sternite abdominal de deux cavités antérieures profondes, tandis que les autres espèces possèdent seulement de légères dépressions. Les mâles peuvent être séparés en brochant les valves et en examinant le cucullus; celui-ci est pointé ventralement et courbé à au moins 90° par rapport au digitus chez *H. variolata* alors que chez les autres espèces il est courbé à environ 45° par rapport au digitus.

2. *Hadena (Hadena) capsularis* (Guenée, 1852)

(Figures 4, 19, 32)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure: 12-17 mm; moyenne 15,8 mm (n=20). On peut facilement reconnaître cette espèce par la tache orbiculaire, qui est grande et circulaire, la couleur bleu-gris de l'aile antérieure, la ligne postmédiane assez régulière, et la ligne subterminale très dentelée et rejoignant souvent la marge de l'aile.

3. *Hadena (Hadena) lafontainei* Troubridge et Crabo, *sp. nov.*

(Figures 3, 17, 33)

Diagnose. *Hadena lafontainei* est presque impossible à séparer de *H. glaciata* par des caractères externes; toutefois, la région située entre les taches orbiculaire et réniforme s'orne habituellement d'écaillés blanches chez *H. glaciata* alors qu'elle est brun olive chez *H. lafontainei*. L'uncus du mâle de *H. lafontainei* est élargi et ressemble à une brosse à bouteilles (comme chez *H. capsularis*), alors qu'il est étroit et orné seulement de quelques soies à l'extrémité chez *H. glaciata*.

Remarques. Cette espèce a souvent été confondue avec *H. glaciata* dans les collections nord-américaines. *Hadena glaciata*, voir ci-après, ne se rencontre que dans les montagnes du sud-est de l'Arizona et du nord du Mexique.

Le sous-genre *Anepia* Hampson, 1918

Le sous-genre *Anepia* se caractérise par la présence sur les valves d'un digitus fortement sclérifié qui se termine par une projection aplatie ou en forme d'épine sur la costa à la base du cucullus et par la présence d'une plus petite projection en forme d'épine sur le digitus, près de l'extrémité de la harpe; cette dernière est absente dans le sous-genre *Hadena*. La projection dorso-apicale du sacculus est habituellement plus large chez les espèces du sous-genre *Hadena* que chez celles du sous-genre *Anepia*. Le ductus bursae est court et fortement sclérifié dans le sous-genre *Hadena*; il est plus long dans le sous-genre *Anepia*.

Le groupe *ectypa*

Ce groupe n'inclut qu'*Hadena ectypa* (Morrison, 1875) dans la région néarctique.

4. *Hadena (Anepia) ectypa* (Morrison, 1875)

(Figures 5, 16, 34)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 12-15 mm ; moyenne 14,2 mm (n=5). L'aile antérieure brun foncé et les dessins alaires indistincts permettent de séparer cette espèce de toutes les autres *Hadena* néarctiques. Chez le mâle, la présence d'une grosse projection sétigère entre le digitus et le cucullus est unique à cette espèce et l'épine latérale du digitus est allongée et prend naissance à la base du cucullus plutôt qu'au milieu de la longueur du digitus comme chez les autres espèces. Chez la femelle l'ostium bursae est plus large et plus fortement sclérifié ventralement que chez les autres espèces du sous-genre.

Le groupe *minorata*

Le groupe *minorata*, représenté seulement par *H. minorata* dans la région néarctique, se caractérise par la combinaison de deux caractères, soient la présence d'une épine sur la surface ventrale de l'édéage à son extrémité et l'extrémité réduite et arrondie du cucullus. Le digitus est plus large que chez les autres espèces du sous-genre et arrondi plutôt que pointu à son extrémité. Les caractères de la femelle sont les mêmes que pour le groupe *ectrapela*.

5. *Hadena (Anepia) minorata* (Smith, 1888)

(Figures 8, 30, 39)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 13-15 mm ; moyenne 14,0 mm (n=3). *Hadena minorata* se caractérise par sa tache orbiculaire pâle et distincte contrastant avec la longue tache claviforme noire qui s'étend des deux côtés du pli entre les lignes antémédiane et postmédiane, ainsi que par la ligne postmédiane assez régulière. De plus, des écailles noires emplissent la bande médiane à partir de la tache claviforme jusqu'à la costa, près de la tache orbiculaire. Le cucullus est arrondi et de taille réduite en comparaison avec celui des autres espèces et le bout du digitus est très large et arrondi. Les génitalia femelle sont semblables à ceux d'*E. ectrapela*.

Le groupe *glaciata*

Le groupe *glaciata* se caractérise par l'absence d'une épine au bout de l'édéage ventralement et par le bout arrondi du cucullus. Dans la région néarctique ce groupe comprend *H. glaciata*, *H. circumvadis*, *H. caelestis* et *H. gabrieli*.

6. *Hadena (Anepia) glaciata* (Grote, 1882)

(Figures 2, 28, 41)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 13-16 mm ; moyenne 15,2 mm (n=5). *Hadena glaciata* ressemble superficiellement à *H. lafontainei* (Figure 3) : elles ont chacune le fond de l'aile antérieure brun olive avec plus ou moins de maculation. *Hadena lafontainei*, placée dans un autre sous-genre à cause des caractéristiques de ses génitalia, se distingue par son large uncus ressemblant une brosse à bouteilles, alors qu'*H. glaciata* a un uncus étroit orné de fines soies. *H. lafontainei* est beaucoup plus commune et largement répartie qu'*H. glaciata* et les deux taxons ont souvent été confondus dans les collections que nous avons examinées. Des caractéristiques des pièces génitales indiquent qu'*H. glaciata* est plus proche parente d'*H. circumvadis* même si elles sont colorées différemment.

Remarques. La longueur du diverticulum médian de la vesica d'*H. circumvadis* (surtout chez les spécimens du Nouveau-Mexique et de l'Arizona) est variable d'une façon plus importante que ce que l'on considère comme la norme. Une situation similaire se rencontre chez *H. glaciata* alors que la plupart des spécimens examinés de Chihuahua, Mexique, possèdent un très long diverticulum médian et la plupart des spécimens des Monts Chiricahua, au sud de l'Arizona, ont un diverticulum plus court. Nous n'avons trouvé aucun autre caractère permettant de séparer ces spécimens. Étant donné qu'*H. glaciata* et *H. circumvadis* sont proches parentes, nous croyons qu'un gène contrôlant cette variation dans la forme de la vesica a évolué une seule fois plutôt que deux, produisant une variabilité identique chez ces deux espèces-soeurs. Même si nous traitons cette variation de la longueur du diverticulum médian comme étant inhabituelle dans le groupe *glaciata*, des techniques moléculaires pourraient mener à une autre conclusion avec l'apport de nouveau matériel.

7. *Hadena (Anepia) circumvadis* (Smith, 1902)

(Figures 7, 29, 42)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 13-16 mm ; moyenne 15,3 mm (n=20). *Hadena circumvadis* ne peut être prise pour aucune autre espèce. Dans les Prairies, l'aile antérieure est gris pâle avec des taches blanches à l'apex, au tornus et à la région subbasale. La tache claviforme est très petite et presque sans écailles noires. Les taches orbiculaire et réniforme sont remplies d'écailles blanches. Dans les montagnes, la couleur de fond de l'aile antérieure est beaucoup plus foncée. Le bout du cucullus est arrondi, le diverticulum médian est réduit, formant une petite bosse couronnée d'un cornutus en forme d'épine et le ductus bursae postérieur est plutôt étroit, comme celui d'*H. ectrapela*.

8. *Hadena (Anepia) caelestis* Troubridge et Crabo, *sp. nov.*

(Figures 10, 26, 38)

Diagnose. Cette espèce se rencontre avec *H. ectrapela*, *H. siskiyou* et *H. maccabei* et peut être confondue avec elles. Elles peuvent être séparées par le cucullus, qui est arrondi chez *H. caelestis*, alors qu'il est pointu chez *H. siskiyou*, *H. maccabei* et *H. ectrapela*. Les caractères externes d'*H. caelestis* sont presque pareils à ceux d'*H. ectrapela*, mais la tache orbiculaire est plus grande, plus blanche et plus circulaire chez *H. caelestis*.

9. *Hadena (Anepia) gabrieli* Troubridge et Crabo, *sp. nov.*

(Figures 9, 27, 37)

Diagnose. *Hadena gabrieli*, *H. maccabei* et *H. amabilis* se rencontrent toutes dans le sud-ouest de la Californie et se ressemblent plus ou moins. Toutefois, le cucullus est pointu chez *H. maccabei* et *H. amabilis*, alors qu'il est plus arrondi chez *H. gabrieli*. L'espèce la plus proche d'*H. gabrieli* est *H. caelestis*, mais elles ne partagent pas la même répartition géographique. On peut également séparer *H. gabrieli* d'*H. caelestis* par le vinculum plus large, le cucullus plus gros et plus allongé et la projection dorso-apicale du sacculus beaucoup plus longue.

Le groupe *ectrapela*

Le groupe *ectrapela* se caractérise par la présence d'une à trois épines sur la surface ventrale de l'édéage à son extrémité, par le bout modifié en pointe du cucullus et par la longue bande de petits cornuti sur la vesica. Ce groupe comprend *H. ectrapela*, *H. amabilis*, *H. plumasata*, *H. maccabei*, *H. paulula* et *H. siskiyou*.

10. *Hadena (Anepia) ectrapela* (Smith, 1898)

(Figures 14, 24, 43)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 13-15 mm ; moyenne 14,1mm (n=20). Les caractéristiques externes d'*Hadena ectrapela* sont l'aile antérieure gris neutre, la tache orbiculaire ovale remplie d'écailles gris pâle et la tache claviforme plus foncée. Le cucullus se termine en pointe, le diverticulum médian est allongé et se prolonge distalement et le corpus bursae postérieur mince se termine en un corpus bursae antérieur bulbeux. Il y a légèrement plus de variations individuelle et géographique chez *H. ectrapela* que chez la plupart des autres espèces néarctiques. Les spécimens de l'Utah (*jola*) sont légèrement plus pâles et leurs taches blanches sont plus prononcées que ceux des autres régions. Ceux du nord de l'Idaho peuvent être foncés et on les a parfois mépris pour des *H. minorata* dans les musées. Nous n'avons trouvé aucune différence structurale entre *ectrapela* et *jola* et plaçons *jola* en synonymie avec *H. ectrapela*.

Au sud et à l'ouest de l'Alberta, *H. ectrapela* acquiert graduellement une plus grande taille et le diverticulum médian de la vesica est plus souvent courbé vers le côté gauche de la vesica plutôt que postérieurement. Chez tous les spécimens que nous avons examinés des Montagnes Blanches du Sud-ouest californien, le diverticulum médian est courbé vers le côté gauche de la vesica et nous avons été tentés de décrire cette population comme étant distincte. Toutefois, quelques spécimens du centre nord de l'État de Washington de même que plusieurs autres du

centre sud de l'Orégon et du nord-est de la Californie possèdent aussi cette caractéristique. Des formes intermédiaires du caractère se rencontrent dans les états de Washington, de l'Orégon et dans le nord-est de la Californie. Étant donné qu'on ne peut séparer ces spécimens autrement, nous concluons qu'il s'agit de variation intraspécifique.

11. *Hadena (Anepia) amabilis* (Barnes and McDunnough, 1918)

(Figures 6, 20, 36)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 12-14 mm ; moyenne 13,5 mm (n=10). *Hadena amabilis* se rencontre dans le sud-ouest de la Californie. *Hadena gabrieli* et *H. maccabei* se rencontrent aussi dans cette région, ont les ailes antérieures gris pâle et pourraient être confondues avec *H. amabilis*. Toutefois, l'aile antérieure, quoique gris pâle, ne montre pas de tons aussi pâles que chez *H. gabrieli* et *H. maccabei*, la tache claviforme est plus nette et plus courte et la ligne subterminale est moins distincte que chez ces deux autres espèces. Le bout du cucullus est pointu, comme chez *H. maccabei*, mais il est arrondi chez *H. gabrieli*. La longueur de la projection dorso-apicale du sacculus d'*H. amabilis* est égale ou plus grande que 2× sa largeur alors qu'elle est à peu près aussi longue que large chez *H. maccabei*. *Hadena amabilis* se rencontre dans les déserts à plus basse altitude que *H. gabrieli* et *H. maccabei*, qui se rencontrent dans les montagnes, à haute altitude.

12. *Hadena (Anepia) plumasata* (Buckett and Bauer, 1967)

(Figures 12, 22, 45)

Diagnose. Dessins alaires similaires chez les mâles et les femelles. Longueur de l'aile antérieure : 15-17 mm ; moyenne 16,3 mm (n=20). *Hadena plumasata* est la seule espèce du genre à avoir l'aile antérieure gris foncé et sans trait basal. La ligne subterminale sagittée est moins dentée que chez les autres espèces et le « W » est absent ou presque. La tache claviforme est entourée d'écailles noires, ce qui lui donne une apparence indistincte. Les taches orbiculaire et réniforme sont bordées d'écailles gris pâle et remplies de gris foncé. Le cucullus de la valve est pointé vers l'apex, le diverticulum médian de la vesica est allongé et courbé vers la gauche à 45° environ, le sacculus est plus massif que chez les autres espèces du groupe *ectrapela*, et le corpus bursae postérieur est plus large que chez *H. ectrapela*.

13. *Hadena (Anepia) maccabei* Troubridge et Crabo, *sp. nov.*

(Figures 15, 23, 40)

Diagnose. En Californie, on rencontre cette espèce aux mêmes localités qu'*H. caelestis* en haute altitude dans la Sierra Nevada, et qu'*H. gabrieli* dans les Transverse Ranges. La tache orbiculaire plus brillante et plus circulaire d'*H. caelestis* et *H. gabrieli* permet d'aider à séparer ces espèces d'*H. maccabei*. Chez *H. maccabei*, le cucullus de la valve est distinctement pointu, alors qu'il est arrondi chez *H. caelestis* et *H. gabrieli*. Dans le nord de la Sierra Nevada, *H. maccabei* peut se rencontrer aux mêmes endroits qu'*H. plumasata*, mais cette dernière a l'aile antérieure beaucoup plus foncée et la ligne subterminale moins dentée que chez *H. maccabei*. Chez la femelle, le corpus bursae postérieur est plus large chez *H. maccabei*, *H. plumasata* et *H. siskiyou* que chez *H. ectrapela*. Chez le mâle, le diverticulum médian de la vesica pointe distalement et légèrement vers la gauche chez la plupart des *H. ectrapela* examinés alors qu'il est fortement courbé vers la gauche chez *H. maccabei*, *H. siskiyou* et *H. plumasata*.

14. *Hadena (Anepia) paulula* Troubridge et Crabo, *sp. nov.*

(Figures 13, 25, 35)

Diagnose. Cette espèce est la plus petite *Hadena* néarctique. Les dessins alaires sont nets et distincts. Les marges distale et proximale de la tache réniforme sont plus ou moins parallèles et de couleurs semblables. La marge distale de la tache réniforme chez les autres espèces néarctiques est plus fortement courbée et moins fortement marquée de blanc que chez *H. paulula*. Chez les mâles, la bande de petits cornuti sur la vesica du côté ventral est beaucoup plus longue chez *H. paulula* que chez les autres espèces et le bout du cucullus est moins pointu que chez les autres membres du groupe *ectrapela*.

15. *Hadena (Anepia) siskiyou* Troubridge et Crabo, *sp. nov.*

(Figures 11, 21, 44)

Diagnose. Cette espèce se rencontre aux mêmes localités qu'*H. caelestis* dans les Monts Siskiyou, Orégon, en haute altitude. *Hadena siskiyou* se caractérise par ses dessins alaires noir et blanc lumineux, dont la tache orbiculaire blanche qui est habituellement plus lumineuse et moins circulaire que chez *H. caelestis*, et par le cucullus de la valve distinctement pointu alors qu'il est arrondi chez *H. caelestis*. Le corpus bursae postérieur est tubulaire et plus épais chez *H. plumasata*, *H. maccabei*

et *H. siskiyou* que chez *H. ectrapela*; le diverticulum médian de la vesica pointe distalement et légèrement à gauche chez *H. ectrapela*, alors qu'il est fortement courbé vers la gauche chez *H. siskiyou*, *H. maccabei* et *H. plumasata*; et le diverticulum médian d'*H. plumasata* et *H. maccabei* est environ 2× plus long que celui d'*H. siskiyou* chez la plupart des spécimens.

Taxons exclus

1. *Lacinipolia mimula* (Grote), 1883, nouvelle combinaison.

Mamestra mimula Grote, 1883b: 48.

Anarta mimula (Grote); Smith, 1893: 295; Dyar, 1902: 160.

Lasiestra mimula (Grote); McDunnough, 1938: 72; Hodges *et al.*, 1983: 149.

Hadena mimula (Grote); Lafontaine *et al.*, 1986: 265.

L'habitus et les génitalia de *mimula* sont plus proches de ceux de certaines lignées de *Lacinipolia* McDunnough, 1937 que de ceux d'*Hadena*. *Lacinipolia* est présentement un genre « poubelle » ayant besoin d'être révisé et nous pensons que *mimula* devrait être traitée dans ce contexte.

2. *Hada sutrina* (Grote), 1881, combinaison révisée.

Mamestra sutrina Grote, 1881: 5; Smith, 1893: 295; Dyar, 1902: 155.

Astrapetis sutrina (Grote); McDunnough, 1938: 72.

Hecatera sutrina (Grote); Hodges *et al.*, 1983: 149.

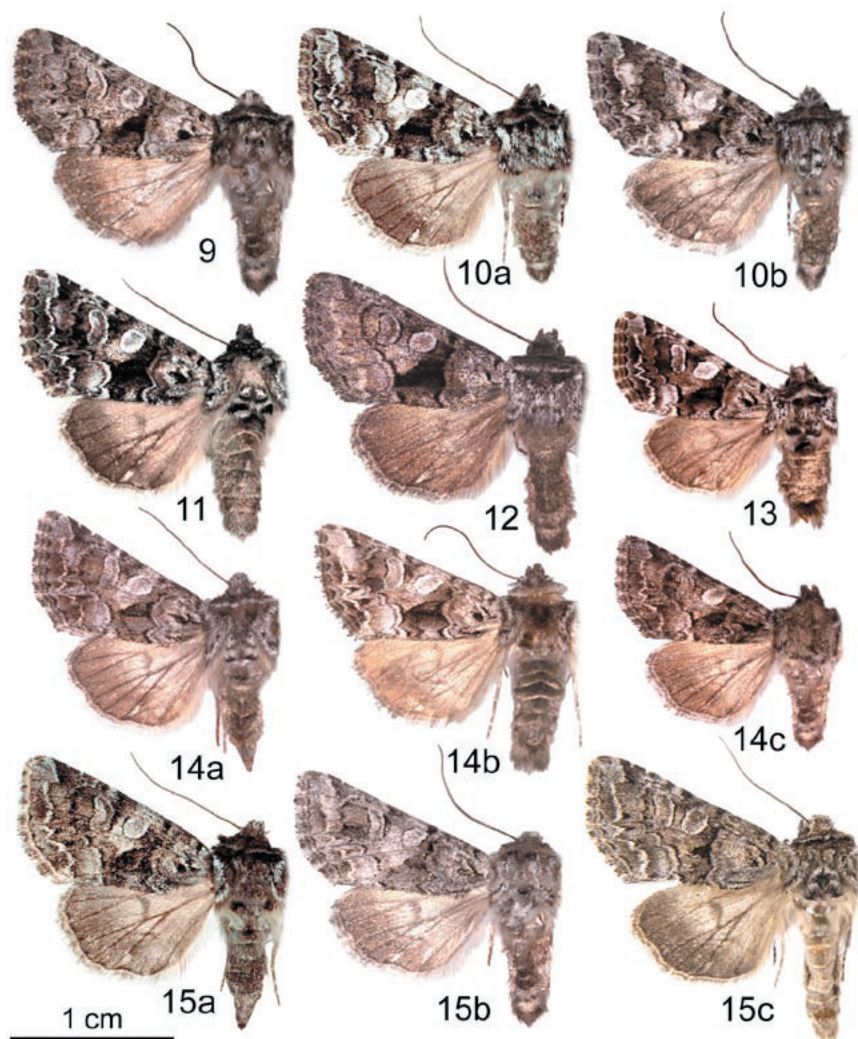
Hada sutrina (Grote); Lafontaine *et al.*, 1986: 256.

Hadena sutrina (Grote); Poole, 1989: 481; Hacker, 1996: 512.

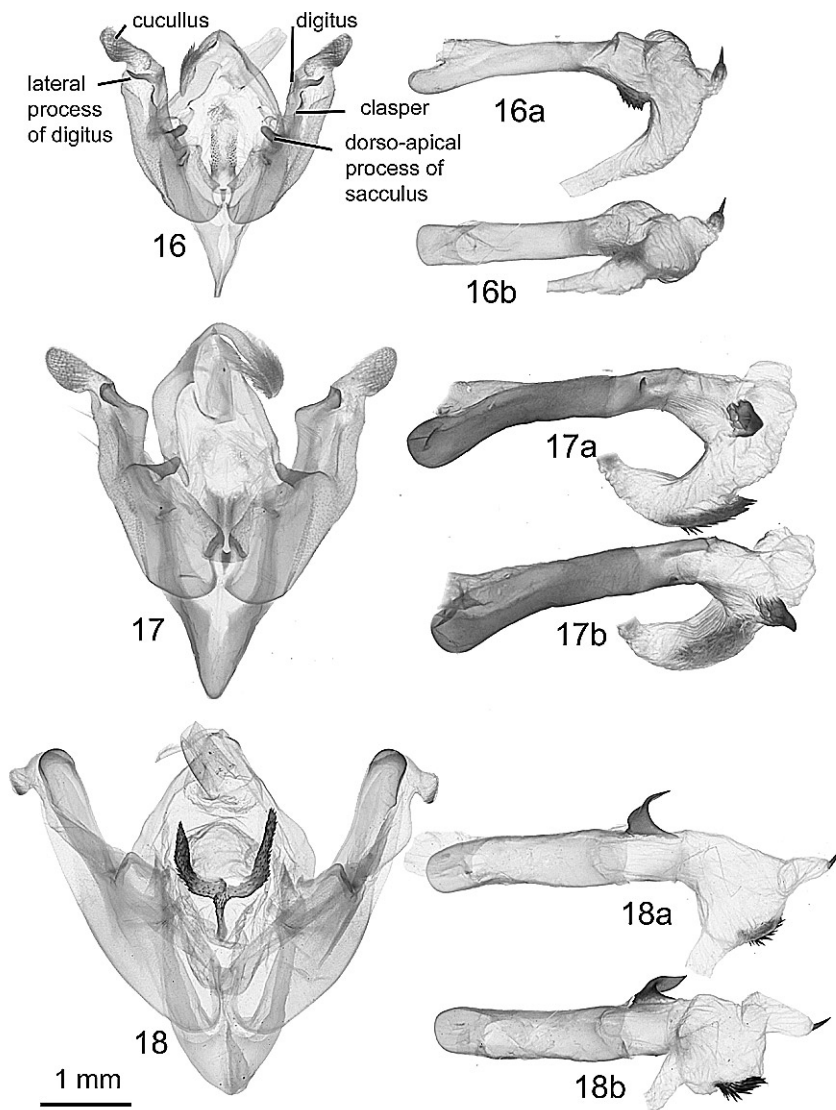
Lafontaine *et al.* (1986) ont correctement placé *sutrina* dans le genre *Hada* Billberg, 1820 [espèce type : *Hada nana* (Hufnagel, 1766)]. Subséquemment, on l'a placée de manière injustifiée dans le genre *Hadena* (Poole 1989; Hacker 1996). Les génitalia de *sutrina* ne ressemblent pas à ceux des *Hadena* mais plutôt à ceux d'*Hada nana*. Conséquemment, nous sommes d'accord avec Lafontaine *et al.* et plaçons *sutrina* dans le genre *Hada*.



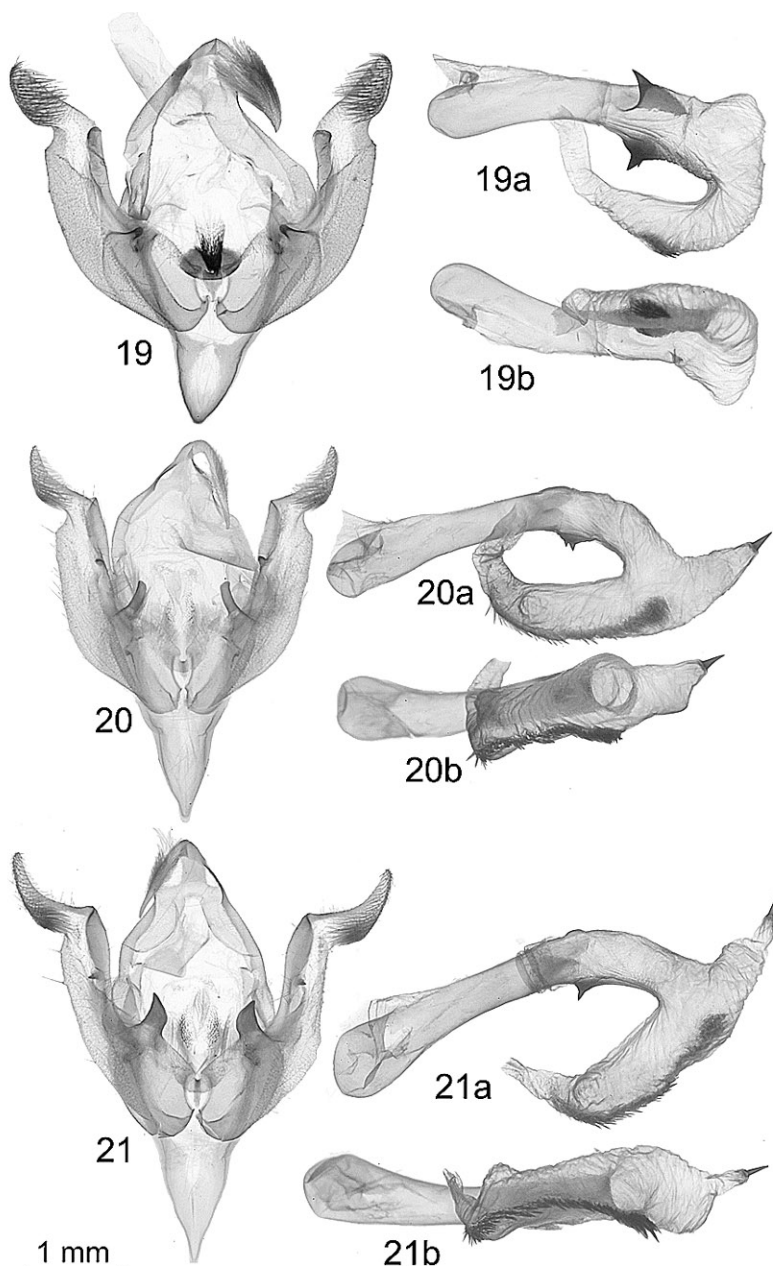
FIGURES 1-8. Adults of the genus *Hadena*: **1a)** *H. variolata variolata*, Rocky Prairie, WA; **1b)** *H. variolata variolata*, Victoria, BC; **1c)** *H. variolata dealbata*, H. J. Andrews Exp. Forest, Lane Co., OR; **2a)** *H. glaciata*, Creel, Chihuahua, Mexico; **2b)** *H. glaciata*, Chiricahua Mountains, Cochise Co., AZ; **3)** *H. lafontainei*, Greer, White Mountains, AZ; **4)** *H. capsularis*, Okanagan Falls, BC; **5)** *H. ectypa*, Chicago, IL; **6)** *H. amabilis*, Juniper Hills, Mojave Desert, CA; **7a)** *H. circumvadis*, Greer, White Mountains, AZ; **7b)** *H. circumvadis*, Burstall, SK; **8)** *H. minorata*, Anderson Springs, CA.



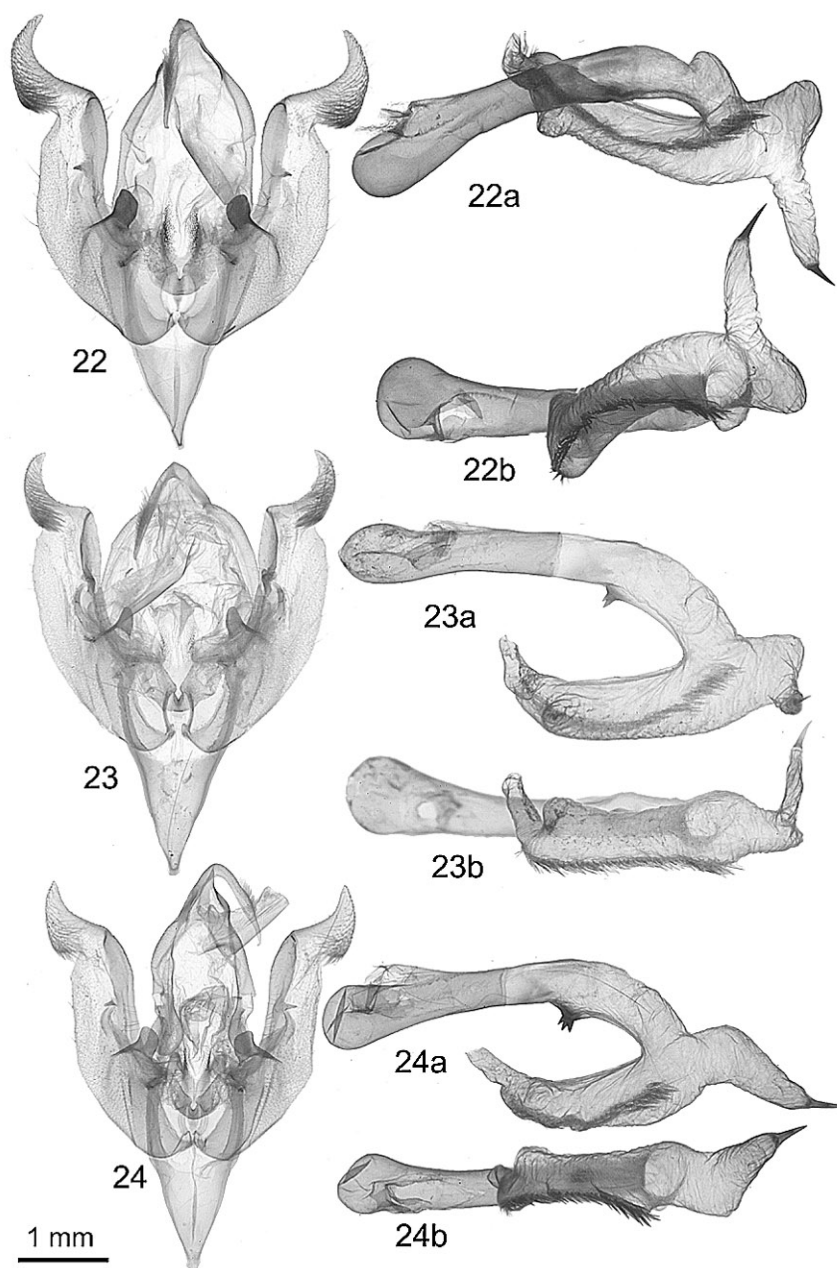
FIGURES 10-16. Adults of the genus *Hadena*: **9)** *H. gabrieli*, Table Mt., San Gabriel Mountains, CA; **10a)** *H. caelestis*, Mt. Kobau, BC; **10b)** *H. caelestis*, Tioga Pass, CA; **11)** *H. siskiyou*, Illinois R. Valley, Josephine Co., OR; **12)** *H. plumasata*, Mohawk, Plumas Co., CA; **13)** *H. paulula*, Prescott, AZ; **14a)** *H. ectrapela*, Mission Ridge, BC; **14b)** *H. ectrapela*, Eureka, UT (paratype of *H. jola*); **14c)** *H. ectrapela*, Laggan, AB; **15a)** *H. maccabei*, Mt. Shasta, CA; **15b)** *H. maccabei*, Tioga Pass, CA; **15c)** *H. maccabei*, Pine Mt., Ventura Co., CA.



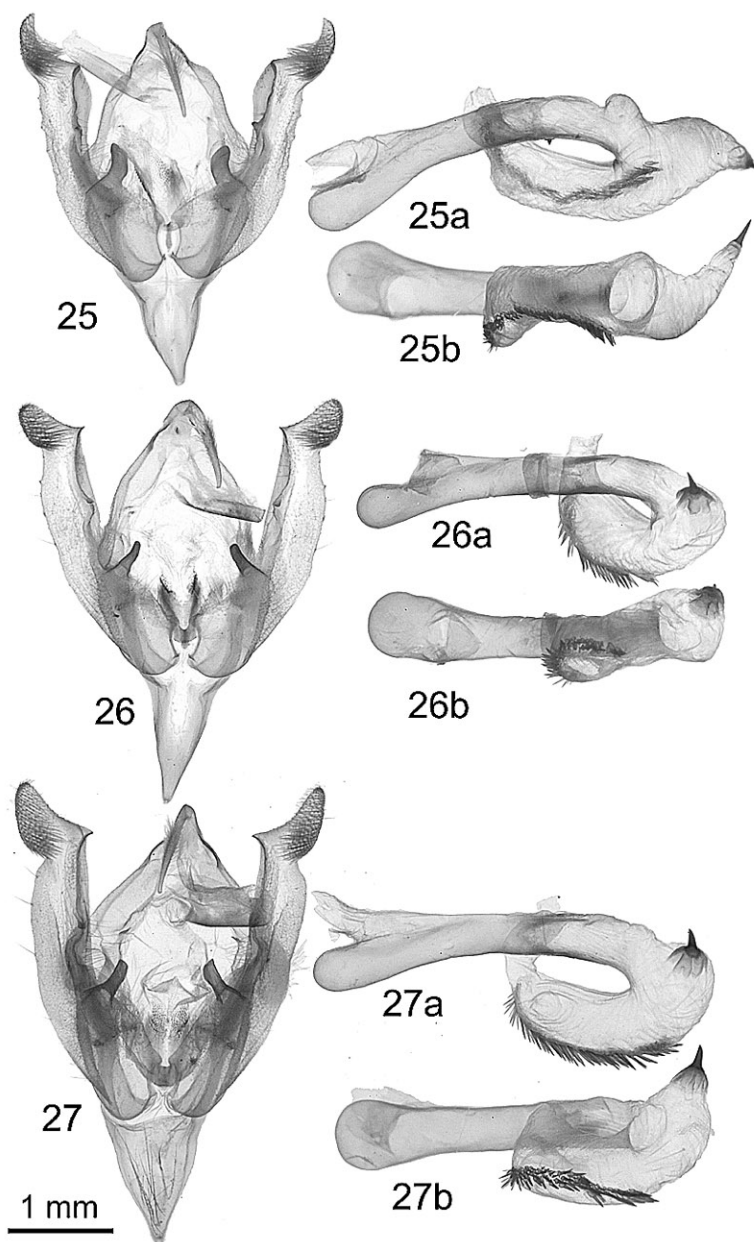
FIGURES 16-18. Male genitalia of *Hadena* species. Aedeagi with everted vesicae are shown from lateral (**a**) and ventral (**b**) aspects: **16**) *H. ectypa* (neotype), South Charleston, WV; **17**) *H. lafontainei*, Greer, AZ; **18**) *H. variolata variolata*, Victoria, BC.



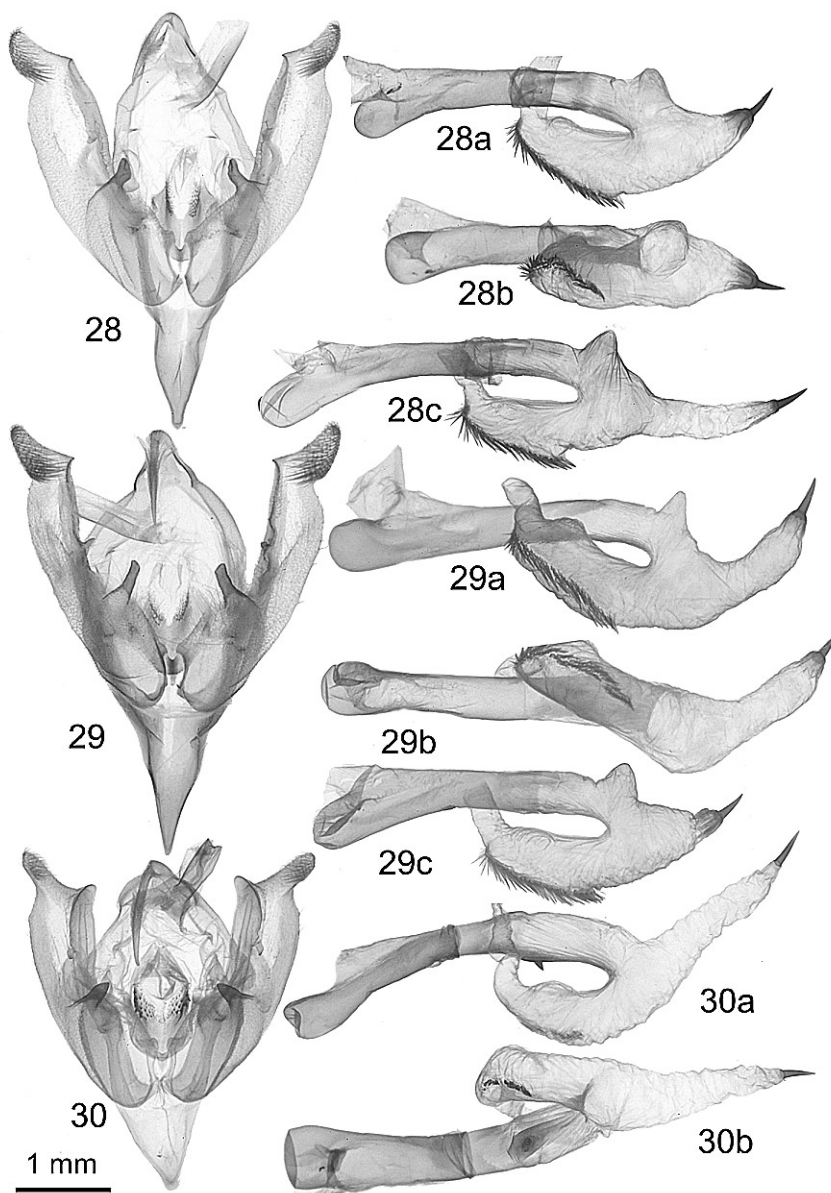
FIGURES 19-21. Male genitalia of *Hadena* species. Aedeagi with everted vesicae are shown from lateral (**a**) and ventral (**b**) aspects: **19**) *H. capsularis*, Okanagan Falls, BC; **20**) *H. amabilis*, Valyermo, CA; **21**) *H. siskiyou*, Selma, OR.



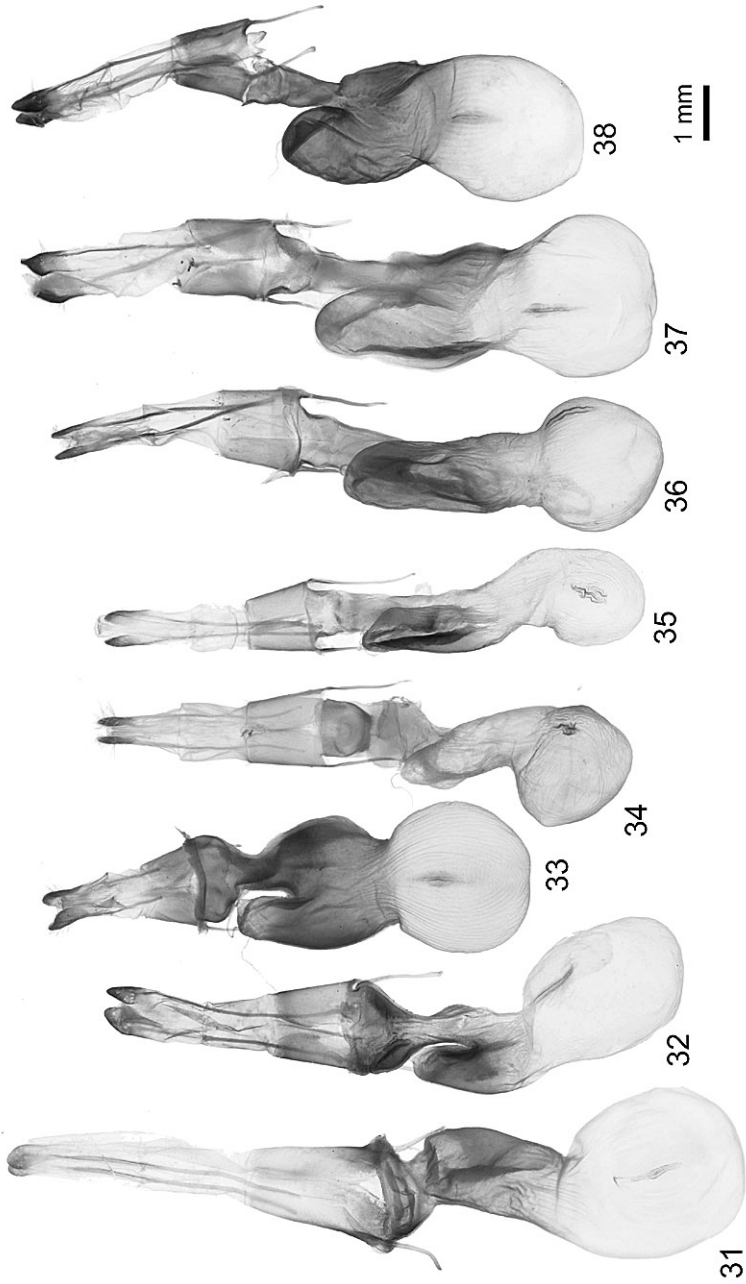
FIGURES 22-24. Male genitalia of *Hadena* species. Aedeagi with everted vesicae are shown from lateral (a) and ventral (b) aspects: **22)** *H. plumasata*, Mohawk, CA; **23)** *H. maccabei*, Mt. Shasta, CA; **24)** *H. ectrapela*, Mt. Kobau, BC.



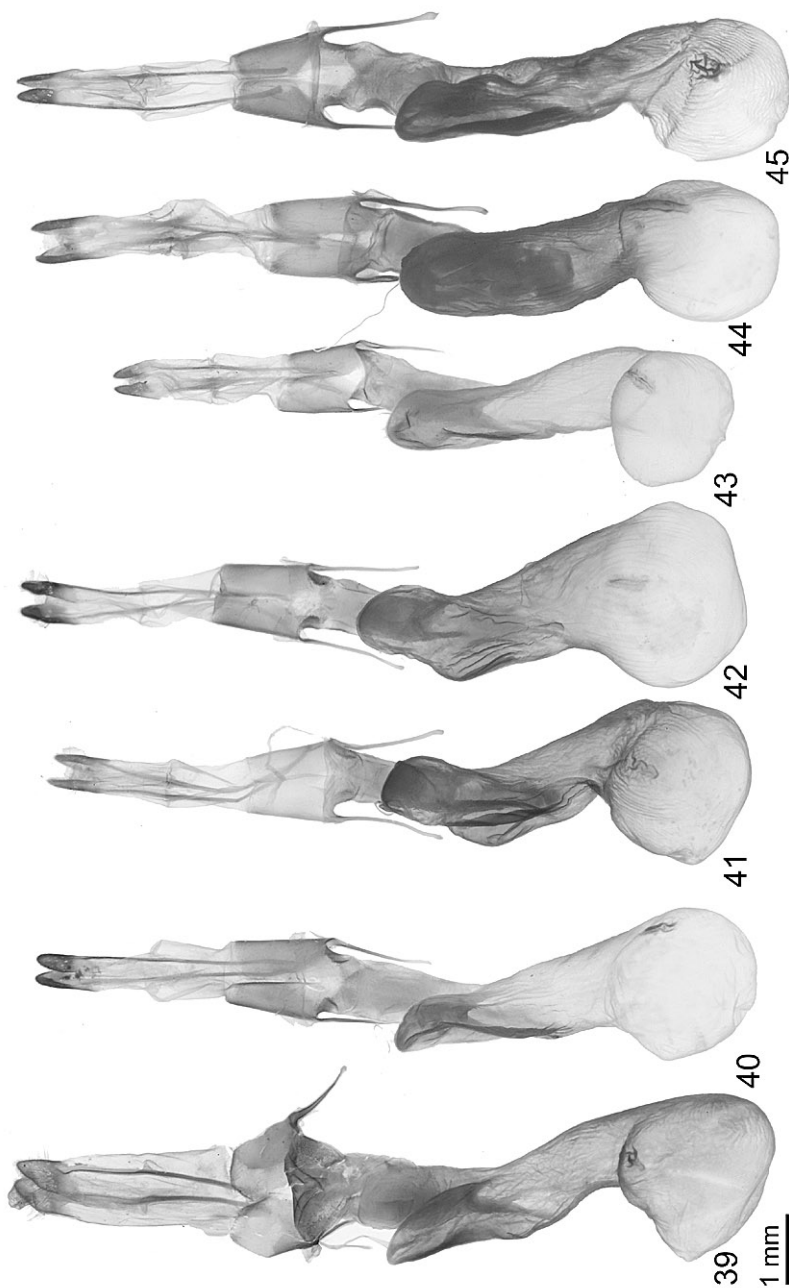
FIGURES 25-27. Male genitalia of *Hadena* species. Aedeagi with everted vesicae are shown from lateral (a) and ventral (b) aspects: **25**) *H. paulula* Prescott, AZ; **26**) *H. caelestis*, Mt Kobau, BC; **27**) *H. gabrieli*, Mt Lowe, CA.



FIGURES 28-30. Male genitalia of *Hadena* species. Aedeagi with everted vesicae are shown from lateral (a) and ventral (b) aspects: **28** *H. glaciata*, Chiricahua Mountains, AZ: (a) with short median diverticulum; (c) with long median; **29** *H. circumvadis*, Burstall, SK: (a) with long median diverticulum; (c) Greer, AZ, with short median diverticulum; **30** *H. minorata*, Mendocino, CA.



FIGURES 31-38. Female genitalia of *Hadena* species in ventral aspect: **31)** *H. variolata*, Victoria, BC; **32)** *H. capsularis*, Okanagan Falls, BC; **33)** *H. lafontainei*, Greer, AZ; **34)** *H. erypa*, Staten Island, NY; **35)** *H. paulula*, Prescott, AZ; **36)** *H. amabilis*, Juniper Hills, Mojave Desert, CA; **37)** *H. gabrieli*, Buckhorn Flats, CA; **38)** *H. caelestis*, Mt. Kobau, BC.



FIGURES 39-45. Female genitalia of *Hadena* species in ventral aspect: **39)** *H. minorata*, Georgetown, CA; **40)** *H. maccabei*, Mt. Shasta, CA; **41)** *H. glaciata*, Chiricahua Mountains, AZ; **42)** *H. circumvadis*, Florissant, CO; **43)** *H. ectrapela*, Mt. Kobau, BC; **44)** *H. siskiyoui*, Selma, OR; **45)** *H. plumasata*, Mohawk, CA.