

## TWO NEW SPECIES OF *BAILEYA* GROTE (NOLIDAE: RISOBINAE) FROM THE SOUTHEASTERN UNITED STATES

VERNON ANTOINE BROU JR.

74320 Jack Loyd Road, Abita Springs, Louisiana 70420, USA, email: vabrou@bellsouth.net

**ABSTRACT.** Records for seven species of the genus *Baileya* Grote in Louisiana are discussed. All five described North American species are known for the state, though only one, *Baileya ophthalmica* (Guenée) was previously recorded. Two new species are described: *Baileya acadiana*, new species and *Baileya ellessyoo*, new species. A key to *Baileya* species and images of adults for all seven species are provided.

**Additional key words:** Louisiana, Mississippi, Sarrothripinae, Texas, voltinism.

The genus *Baileya* is a member of the Nolidae subfamily Risobinae. Kitching and Rawlins (1999) removed the subfamilies Nolinae and Sarrothripinae from the Noctuidae and placed them in the family Nolidae, recognizing that these two subfamilies are more closely related to the Arctiidae than to the Noctuidae, and as a result combined them as the reinstated family Nolidae and placed it next to the Arctiidae. Following this action, I treat the genus *Baileya* as belonging to the family Nolidae while recognizing that prior literature has *Baileya* placed in the Noctuidae.

Forbes (1954), Hodges (1983), and Covell (1984) list five species of *Baileya* Grote as occurring in North America north of Mexico, but no records were specifically mentioned for Louisiana. In the most recent list of Noctuidae for Louisiana, Chapin and Callahan (1967) include only one species, *Baileya ophthalmica* (Guenée). The purpose of this paper is to review the status of the genus *Baileya* in Louisiana, and provide descriptions for two new species

To date, seven species have been collected in Louisiana using mercury vapor/ultraviolet light traps. Two of these are new, and are described below. Among the other five species, *Baileya doubledayi* (Guenée) has been taken March through August in Natchitoches and St. Tammany Parishes, representing at least three broods. *Baileya ophthalmica* (Guenée) has been taken March through August in Ascension, Bossier, Calcasieu, East Baton Rouge, St. Tammany, Tangipahoa, Vernon, and West Feliciana Parishes, representing at least three broods. *Baileya dormitans* (Guenée) has been taken March, June, and August in West Feliciana Parish, representing at least three broods. *Baileya levitans* (Smith) has been taken March, April, and May in Bossier, St. John the Baptist, and West Feliciana Parishes, representing one brood. *Baileya australis* (Grote) has been taken March through November in West Feliciana Parish, representing at least four broods. Forbes (1954) and Covell (1984) reported three broods for *australis*.

### *Baileya acadiana* Brou, new species

(Figs. 1a, b, 2)

**Male. Head:** Color gray to dark gray, frontal tuft rounded; palpi color similar gray; antennae similar gray, simple, slender, and acuminate. **Thorax:** Entire dorsal color similar to head, appearing light gray or dark gray, due to light refraction from shiny scales; frontal area scales form raised collar on dried specimens; scales of tegula elevated well above mesothorax; ventral color gray, including legs. **Abdomen:** Dorsal color as described for thorax; ventral color light gray. **Forewing:** Dorsal ground color shiny gray, black basal line demarcates basal area, of which frontal portion is light gray, caudally light brown; area distal to basal line dark gray approaching a narrow, often obscure line of light gray scales proximally bordering antemedial line, becoming more obscure or nonexistent caudally; area between antemedial and medial lines shiny gray; medial line usually evident near costal margin, occasionally obscure, but more often indistinguishable caudally; distinct median area of shiny white scales, most prominent between medial and postmedial lines and extending beyond postmedial line as small triangular area intersecting costal edge, and at inner margin as a minute spot or short transverse line; postmedial line poorly defined mesially; front-distal edge of white area defined by short, black, transverse bar obliquely intersecting costal edge, caudal half of bar forms acute or right angle as it abruptly changes direction towards outer margin, forming a v-shape; three short longitudinal apical dashes acutely approach, but do not intersect distal edge of frontal portion of v-shaped bar; pseudo anal dashes usually tiny or obscure, sometimes forming black zigzag near inner margin; subterminal line obscure or indistinguishable, represented midway by two or three minute groupings of black scales, distally bordered by similar minute groupings of whitish scales; light dusting of shiny whitish scales over frontal half of wing between postmedial line and outer margin, including fringe of most specimens; terminal line represented by series of sometimes less contrasting gray to darker gray, well-defined, crescent-shaped spots between veins; caudal portion of fringe uncontrastingly shiny gray; ventral ground color shiny gray, appearing very light gray or very dark gray, depending upon angle viewed; same light refraction effects responsible for presence or absence of well marked dark vein lines over entire surface depending on angle viewed; light gray scales along entire inner margin and continuing along outer margin as antimarginal shade band to dark apical spot; crescent-shaped apical patch at outer margin, either well marked with whitish scales or obscure with gray scales; small crescent-shaped patch of whitish scales proximal to dark apical spot along costal margin to dark postmedial spot; on some specimens a black costal spot or short bar evident at center of crescent-shaped whitish patch; on some specimens to varying degrees, second rectangular-shaped patch of whitish scales along costal edge between dark postmedial and midcostal spots, viewed from different angles, both white patches can appear

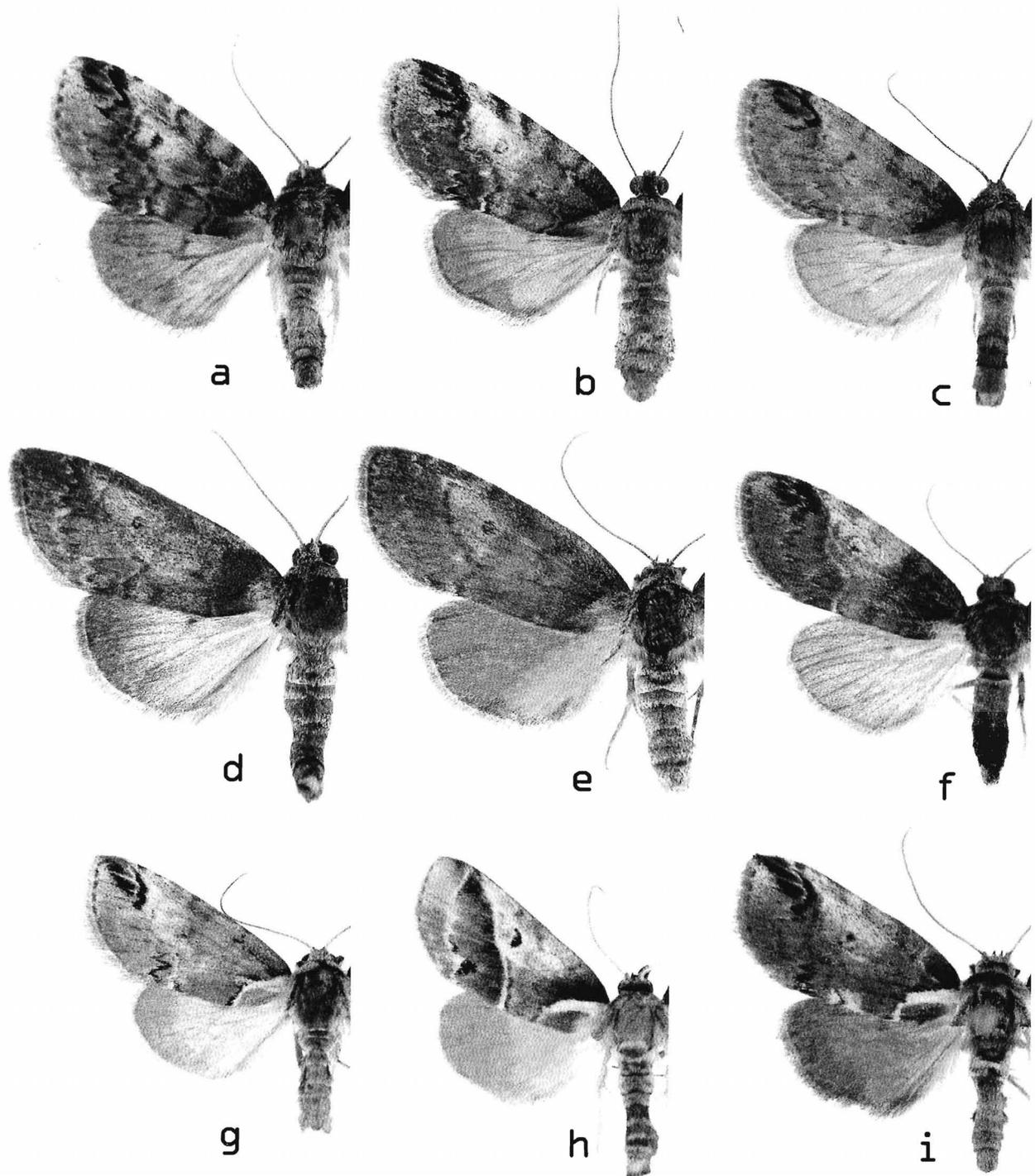


FIG. 1. *Baileya* species. **a**, *B. acadiana* Type male; **b**, *B. acadiana* Allotype female; **c**, *B. dormitans* male; **d**, *B. ellessyoo* Type male; **e**, *B. ellessyoo* Allotype female; **f**, *B. levitans* male; **g**, *B. australis* male; **h**, *B. doubledayi* male; **i**, *B. ophthalmica* male.

bordered by fully encompassing crescent-shaped dark borders, rather than just dark spots at ends; terminal line and fringe as described for dorsal surface; length  $\bar{x}$  = 12.2 mm (11.0–13.2; n = 32).

**Hindwing:** Dorsal color uniform shiny light to dark gray, fringe contrastingly lighter gray, ventral ground color light or dark gray; crescent-shaped dark gray discal spot; proximal of postmedial line, light

gray, except near base and along costal margin, dark gray; distal of postmedial line usually dark gray without markings, or light gray antimarginal shade band proximally along outer margin; narrow outer marginal band or line of whitish scales, increasing in width apically as a whitish patch bounded distally by dark gray terminal line, band, or distal edge of dark gray area; fine white line along entire costal

edge. **Genitalia:** ( $n = 8$ ) (Fig. 2) Valves bilaterally symmetric, ventral margins often slightly more convex than dorsal margins, homogeneous, broad bases, apically obtuse; oblong spatulate distal lobes, dorsal margins slightly more convex; basal portion of right process of sacculus stout, distal portion arcuate, ensiform, acuminate. **Female. Head, Thorax, and Abdomen:** As described for male. **Forewing:** Dorsal and ventral colors as described for male, except white scales often more pronounced and numerous; length  $\bar{x} = 13.3$  mm (12.5–13.9;  $n = 22$ ). **Hindwing:** Dorsal and ventral colors as described for male. **Genitalia:** ( $n = 5$ ) (Fig. 2) Appendix bursa nearly half the size of the corpus bursa, a single signum in the form of an elongated rasp-like band on side surface of corpus bursa.

**Types. Holotype** ♂ (Fig. 1a), USA, Louisiana, St. Tammany Parish, 4.2 miles (6.8 km) NE Abita Springs, sec.24, T6S, R12E, 5 June 1989. **Allotype** ♀ (Fig. 1b), same locality, 20 April 1992. **Paratypes: Alabama,** 2 ♂ and 2 ♀, DeKalb and Munroe Counties, 4 April to 19 May 1990–95, **Arkansas,** Arkansas County, 1 ♀ 20 Aug 1970, Madison County, Blue Springs State Park, 2 ♂ and 3 ♀ 27–31 May 1966–71, Washington County, 2 ♂ 30 May 1979, **Louisiana,** 597 ♂ and 404 ♀, Ascension, Bossier, Iberville, Natchitoches, St. John the Baptist, St. Tammany, Tangipahoa, and West Feliciana Parishes, 20 February–22 October 1961–2003; **Mississippi,** 114 ♂ and 130 ♀, Adams, Amite, Forest, Franklin, George, Grenada, Hancock, Harrison, Hinds, Holmes, Issaquena, Lafayette, Lauderdale, Lowndes, Madison, Oktibbeha, Pearl River, Pike, Lee, Rankin, Smith, Tishomingo, Warren and Winston Counties, February–December 1959–2001, **Texas,** San Jacinto County, 1 ♀ 12 May 1985. Holotype, allotype, and paratypes deposited in Florida State Collection of Arthropods, Gainesville. Additional paratypes deposited in Canadian National Collection of Insects and Arachnids, Ontario; Louisiana State Arthropod Museum, Baton Rouge; Mississippi Entomological Museum; and the private collections of E. Metzler, R. Kergosien, E. C. Knudson, and the author. Primary types are designated with the words Holotype and Allotype on white labels outlined with red color, secondary types designated with the word Paratype on white labels outlined with blue color.

**Distribution.** *Baileya acadiana* has been confirmed from the states of Alabama, Arkansas, Louisiana, Mississippi, and Texas. In Louisiana it is the most commonly encountered species of *Baileya*.

**Flight period.** In Louisiana, *Baileya acadiana* has three annual broods, first brood peaking around April 8, subsequent broods peaking at 60-day intervals (Fig. 3).

**Etymology.** The epithet is derived from the colloquial term for the region as well as the endemic human populations, early settlers in the southern rural regions of Louisiana, the Acadians (Cajuns), French settlers who traveled to Louisiana from (Acadia) Nova Scotia. *Baileya acadiana* is the only common *Baileya* species known to occur in these southern areas of the state.

**Diagnosis.** *Baileya acadiana* appears to be most closely related to *B. dormitans* on the basis of vesica characteristics, though the spatulate lobes of *acadiana* are shorter in length and less curved than in *dormitans*. *B. acadiana* and *dormitans* also share a distinct black forewing basal line, though *dormitans* lacks the distinct forewing median area of whitish scales found on *acadiana*.

### *Baileya ellessyoo* Brou, new species (Figs. 1d, e, 2)

**Male.** Head: Color gray, frontal tuft rounded; palpi color similar or contrastingly lighter gray. **Antennae:** Simple, similar gray color. **Thorax:** Dorsal color similar to head, appearing gray or very dark gray, due to light refraction from shiny scales; scales on frontal area form a raised collar on dried specimens; scales of tegula elevated well above mesothorax; ventral color gray or light gray, including legs. **Abdomen:** Dorsal color same as described for thorax; ventral color light gray. **Forewing:** Dorsal ground color monochrome lead gray, entirely overlaid with medium intensity sheen; basal line obscure or nonexistent, small amount of whitish or light gray scales at base, on some barely evident; area distal to basal line lead gray approaching obscure antemedial line, which on some is indiscernible; fine, delicate line of shiny whitish scales proximally bordering antemedial line extending from costal to inner margins; area between antemedial and medial lines uniformly blanketed with same delicate, light dusting of shiny whitish scales; median line obscure, more often indiscernible; reniform spot nearly indistinguishable to distinct tiny, nearly black dot, on some, few white scales in center appearing as minute eyespot; blanket of shiny whitish scales distal of gray median line, to gray, often obscure or sometimes indistinguishable postmedial line; postmedial line distally bordered by fine obscure line of shiny whitish scales, sometimes barely evident; this fine whitish line bordered by dark gray, sometimes broad and diffuse line, extending from costal to inner margins where it meets the ends of crescent-shaped obscure zigzag subterminal line; subterminal line dark gray, distally bordered by irregular, often unconnected groupings of white scales; area between subterminal line and outer margin lead gray, more often with obscure dusting of whitish scales; delicate and thin terminal line occurring as a series of contrasting dark gray spots between veins; fringe uncontrastingly gray; ventral ground color shiny light gray or dark gray, depending upon angle viewed; light gray scales along entire inner margin, and continuing along outer margin as obscure antemarginal shade band intersecting costal margin subterminally; maculation limited to faintly dark reniform spot and obscure subterminal line; this line sometimes evident simply as a shade change proximal to antemarginal shade band, small crescent-shaped subterminal patch of whitish scales along costal margin; on some specimens, a dark costal spot at center of crescent-shaped patch, and sparse whitish scales evident medially along costal margin; terminal line and fringe as described for dorsal surface; length  $\bar{x} = 15.1$  mm (14.3–16.3;  $n = 28$ ). **Hindwing:** Dorsal color uniformly gray, shiny or dull depending upon angle viewed; on some specimens color becomes lighter gray basally; terminal line often represented only by distinct change from gray to lighter gray fringe color; fringe longitudinally bisected by bold dark line; ventral ground color very light gray to whitish, generously peppered with varying amounts of dark gray scales. **Genitalia:** ( $n = 8$ ) (Fig. 2) Valves bilaterally symmetric, homogeneous, broad bases, dorsal margins markedly convex, ventral margins gently curving approaching nearly obtuse apex; elongated, spatulate, distal lobes, dorsal margins markedly convex; distal portion of right process of sacculus curvilinear, acuminate. **Female. Head, Thorax, and Abdomen:** as described for male. **Forewing:** Dorsal and ventral colors as described for male, except white scales occasionally more pronounced and numerous; length  $\bar{x} = 15.2$  mm (13.9–16.7;  $n = 20$ ). **Hindwing:** Dorsal and ventral colors as described for male. **Genitalia:** ( $n = 5$ ) (Fig. 2) Appendix bursa one-fourth of the size of the somewhat elongated corpus bursa, single signum in the form of a rasp-like elongated band on surface of the corpus bursa.

**Types. holotype** ♂ (Fig. 1d), USA, Louisiana, Natchitoches Parish, Kisatchie National Forest, near Gorum, 10 March 1986. **allotype** ♀ (Fig. 1e), same locality and date. **paratypes: Alabama,** Barbour

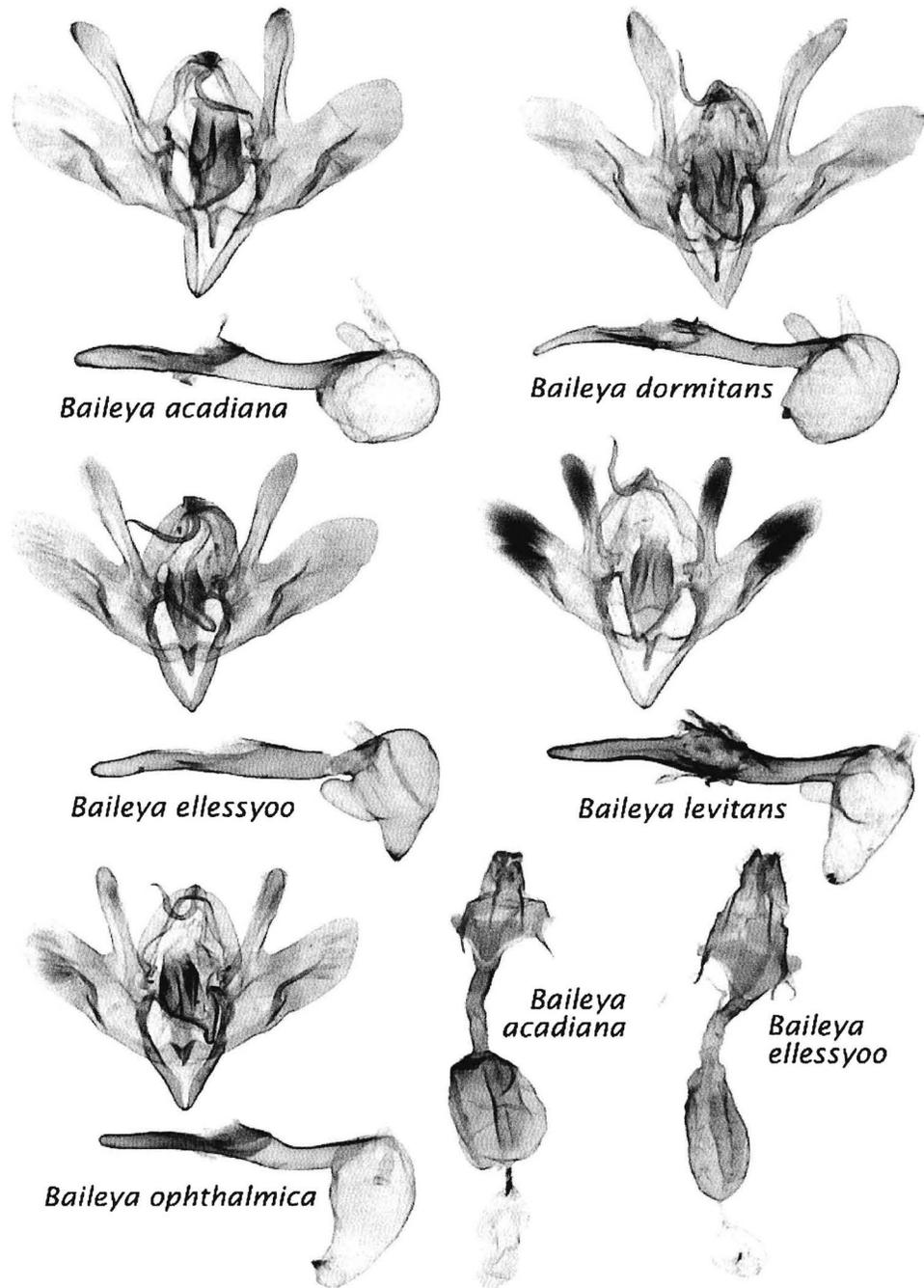


FIG. 2. Genitalia of *Baileya* species.

County, Blue Springs St. Pk. 1 ♀ 17 April 1976, Monroe County, 2 ♀ (4–5) April 1995, **Florida**, Liberty County, Torreya State Park, 2 ♂ and 1 ♀ March 1979–95, **Georgia**, Gilmer County, 1 ♂ 9 April 1992, Gordon County, 1 ♂ and 2 ♀ 13–19 2001–02, Morgan County, Hard Labor Cr. S. P. 7 ♂ and 3 ♀ 18 April 1988, Whitfield County, 18 March 1995, **Louisiana**, same locality as type, 10 ♂ and 1 ♀, March and April 1986, **Mississippi**, Tishomingo, Lee, and Winston Counties, 115 ♂ and 42 ♀, March–May, 1986–99, **Missouri**, Barry County, 1 ♀ 16 April 1967, Franklin County, 1 ♂ 9 April 1976, **Texas**, Polk County, Big Sandy

Creek Unit, 1 ♀ 8 April 1995, Sabine County, Sixmile, 2 ♂ 13–14 March, 1989, San Jacinto County, Double Lake Rec. Area, Coldspring, 3 ♀ 18 March 1990. Holotype, allotype, and paratypes deposited in Florida State Collection of Arthropods, Gainesville. Additional paratypes deposited in Canadian National Collection of Insects and Arachnids, Ontario; Florida State Collection of Arthropods; Louisiana State Arthropod Museum Baton Rouge; Mississippi Entomological Museum; and the private collections of E. Metzler, R. Kergosien, E. C. Knudson, and the author. Primary types are designated with the words Holotype and

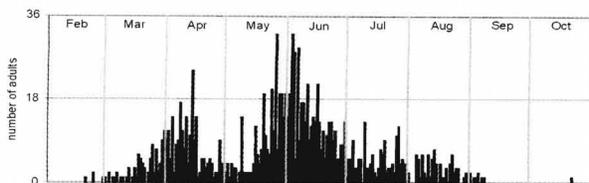


FIG. 3. *Baileya acadiana* adults captured at sec.24, T6S, R12E, 4.2 mi. NE Abita Springs, Louisiana, n = 1200

Allotype on white labels outlined with red color, secondary types designated with word Paratype on white labels outlined with blue color.

**Distribution.** *Baileya ellessyoo* has been confirmed from the states of Alabama, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, and Texas.

**Flight Period.** In Louisiana, *Baileya ellessyoo* has a single annual spring brood peaking in March and April.

**Etymology.** The epithet is a rhyme of the acronym for Louisiana State University (LSU).

**Diagnosis.** *Baileya ellessyoo* appears to be most closely related to *B. levitans* on the basis of vesica characteristics, though it differs from *B. levitans* in lacking a black ring around the reniform spot and in having a more even forewing ground color, without white medial shading and without a dark line proximal to the subterminal line characteristic of *levitans*. The two species also differ in male genitalia with *ellessyoo* exhibiting a broader valvae with longer and less curved spatulate lobes than that of *levitans*.

DISCUSSION

Three species of *Baileya* have a conspicuous white forewing basal patch: *B. australis*, *B. doubledayi*, and *B. ophthalmica* (Fig. 1g-i). The two new species, *B. dormitans* (Fig. 1c), and *B. levitans* (Fig. 1f) all lack the prominent white forewing basal patch. *Baileya*

*acadiana* is the most widespread and commonly encountered member of the genus in Louisiana and Mississippi, and its wing pattern is most similar to *B. dormitans* and *B. levitans*. Males of *B. acadiana* may sometimes be confused with males of *B. dormitans*, while some females of *B. acadiana* appear similar to females of both *B. dormitans* and *B. levitans*. Similarly, *B. ellessyoo* is nearest in appearance to *B. levitans*. *Baileya ellessyoo* is the largest in size and most inconspicuously marked of known *Baileya* species.

The right valvae of all five previously described *Baileya* species were illustrated by Forbes (1954). All male species of *Baileya* exhibit a short to long bilaterally symmetrical distal lobe extending from the base at the dorsal edge of each valvae. A comparison of the male genitalia of *B. dormitans*, *B. levitans*, *B. acadiana*, and *B. ellessyoo* from Louisiana indicates that each species is separable (Fig. 2), with the valves, distal lobes, and saccular processes differing significantly in size and shape among these four species. In Louisiana, the genitalia of male *B. dormitans* (Fig. 2) exhibit a long, lanceolate right valvae, end tapering somewhat symmetrically to a blunt point; process of sacculus barely sinuous and acuminate; elongated, spatulate distal lobes; all characteristics illustrated in Forbes (1954). In Louisiana, the genitalia of male *B. levitans* (Fig. 2) exhibit a short asymmetrical right valvae, the ventral edge arciform, gently curving to a blunt end, dorsal edge straight, curving near blunt end; process of sacculus nearly straight and acuminate; short, straight-edged, non-spatulate, obtuse, distal lobes; all characteristics illustrated in Forbes (1954). The male genitalia of *B. ophthalmica* is also illustrated here for comparison (Fig. 2).

KEY TO BAILEYA SPECIES

1. Basal area of forewing with white shading (occasionally white absent in some *ophthalmica*, but in these the black basal line extends down to the posterior margin of the wing) ..... **2**  
 Basal area of forewing gray: basal line if present, extending to anal vein ..... **4**
2. Forewing with postmedial line white, oblique, almost straight ..... *doubledayi*  
 Forewing with postmedial line black, usually obscure, wavy and scalloped ..... **3**
3. Forewing with black bar adjacent to costa, on inner margin of subterminal line straight; reniform spot obscure (a dark smudge) ..... *australis*  
 Black bar adjacent to costa curved, C-shaped: reniform spot distinct, a black dot surrounded by a line forming a circle ..... *ophthalmica*
4. Forewing with prominent black bar adjacent to subterminal line near costa and several black streaks near apex ..... **5**  
 Forewing without contrasting black marks towards costa or with diffuse darker shading in area ..... **6**
5. Larger species, forewing 13 to 15 mm; median area similar in color to subterminal and basal areas or slightly paler; reniform spot a dark spot ..... *dormitans*  
 Smaller species, forewing 11 to 13 mm; extensive silvery-gray shading in upper portion of median area; reniform spot distinct, a black dot surrounded by a black line forming a circle ..... *acadiana*
6. Forewing generally contrasting with pale shading in median area and darker shading adjacent to subterminal line; reniform spot distinct, a black dot surrounded by a black line forming a circle ..... *levitans*  
 Forewing an even gray color with only slightly paler shading in median area; reniform spot a darker blackish-gray dot ..... *ellessyoo*

## ACKNOWLEDGEMENTS

I thank the following individuals who supplied specimens, records, or aided in this project: James K. Adams, Charles Bordelon, Richard Brown, Tom Fair, Lawrence Gall, John B. Heppner, Rick Kergosien, Edward C. Knudson, Bryant Mather, and Eric Metzler, with special thanks to Don Lafontaine for the excellent genitalia images and helpful critique in this investigation.

## LITERATURE CITED

- CHAPIN, J. B. & PHILIP S. CALLAHAN. 1967. A list of the Noctuidae (Lepidoptera, Insecta) collected in the vicinity of Baton Rouge, Louisiana. *Proc. La. Acad. Sci.* 30:39–48.
- COVELL JR., C. V. 1984. A field guide to moths eastern North America. The Peterson Field Guide Series No. 30. Houghton Mifflin Co., Boston. xv + 469 pp., 64 plates.
- FORBES, W. T. M. 1954. Lepidoptera of New York and neighboring states. Noctuidae, Part III. Cornell Univ. Agr. Exp. St. Mem. 329. Ithaca, New York, 433 pp.
- HODGES, R. W. ET AL. 1983. Checklist of the Lepidoptera of America north of Mexico. E. W. Classey Ltd. and The Wedge Entomol. Res. Found., Cambridge: Univ. Press. xxiv + 284 pp.
- KITCHING, I. J. & J. E. RAWLINS. 1999. The Noctuidae. Pp. 355–401. *In* Kristensen, N. P. (ed.), *Lepidoptera: moths and butterflies*. Vol. 1: evolution, systematics and biogeography. *Handbook of Zoology/Handbuch der Zoologie*. 491 pp. Walter de Gruyter, Berlin/NewYork.

*Received for publication 11 March 2003; revised and accepted 20 December 2003.*