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A NEW SPECIES OF *EPIBLEMA* (TORTRICIDAE) FORMERLY MISIDENTIFIED AS *E. WALSINGHAMI* (KEARFOTT) AND *E. INFELIX* HEINRICH

DONALD J. WRIGHT
3349 Morrison Avenue, Cincinnati, Ohio 45220-1430, USA

AND

CHARLES V. COVELL JR.
Department of Biology, University of Louisville, Louisville, Kentucky 40292-0001, USA

ABSTRACT. ***Epiblema gibsoni*, new species**, is described from 84 adult specimens (69 ♂, 15 ♀). This moth is commonly encountered at black light in Ohio and Kentucky during July, especially in habitat supporting prairie vegetation. Its range extends from northwest Arkansas to central Mississippi and western South Carolina, and north to southern Michigan. *Epiblema gibsoni* is distinguishable from other members of the genus on the basis of forewing maculation, but its similarity to *E. walsinghami* (Kearfott) and *E. infelix* Heinrich has caused it to be misidentified in the past. Genitalic characters suggest that its closest congener is *E. infelix*.

Additional key words: Olethreutinae, Eucosmini, prairie.

Changes since publication of the most recent check list (Powell 1983) bring the current number of North American species of the genus *Epiblema* (Hübner) to 41 (Blanchard 1979, 1984, Brown & Powell 1991, Miller 1983, 1985, 1995, Miller & Pogue 1984, Wright 2002). For about half of these species the larvae are known to be late instar stem and root borers in Asteraceae, usually inducing a conspicuous gall.

Recent survey activity in Kentucky (Covell 1999), Ohio, and Illinois generated numerous specimens of a previously unrecognized species of *Epiblema*, described below as *E. gibsoni*, new species. Efforts to identify these specimens led to the discovery of a rather extensive history of misidentification involving *E. gibsoni*, *E. walsinghami* (Kearfott), and *E. infelix* Heinrich. The purpose of this paper is to eliminate the confusion surrounding these taxa and make a name available for the new species.

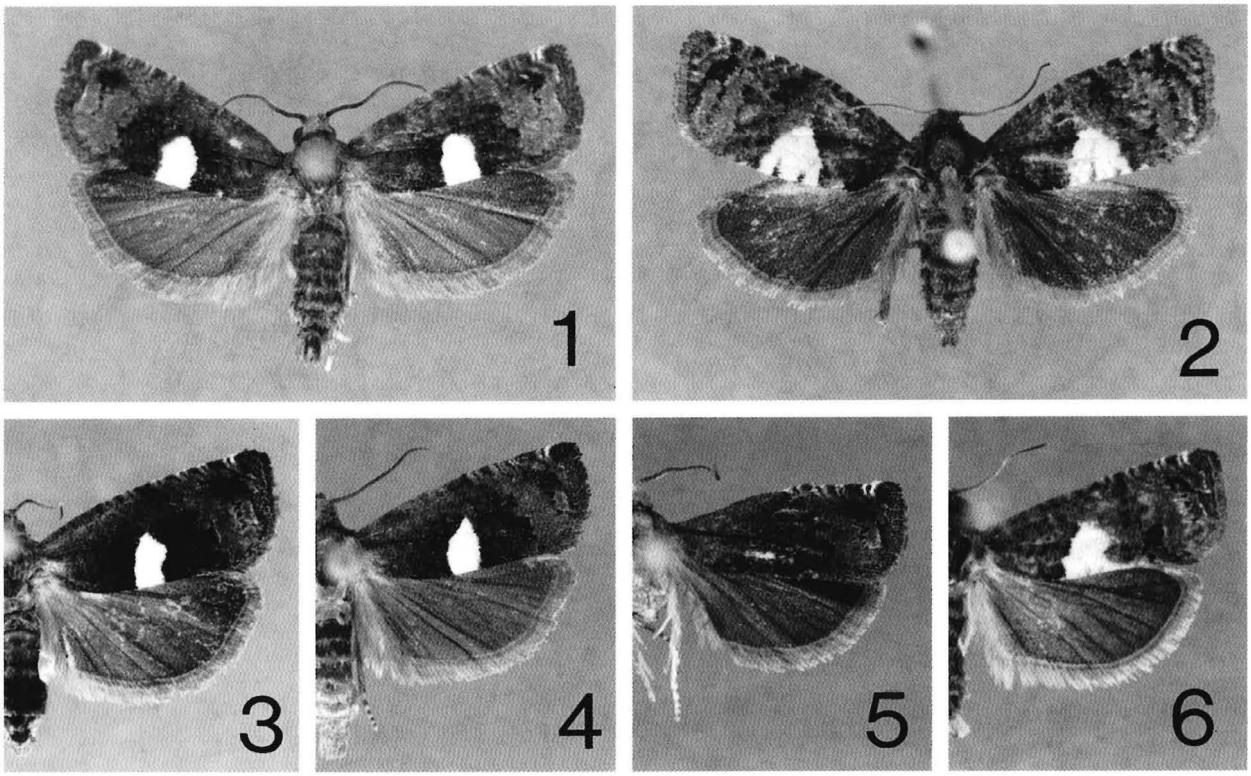
To our knowledge, the earliest literature reference to a specimen of *E. gibsoni* occurs in the description of *Enarmonia walsinghami* Kearfott. Kearfott (1907:57) mentioned a series of seven syntypes. Heinrich (1923:150) pointed out that two of those specimens, a male and female from Tryon, North Carolina, were not conspecific with the other five. He designated the female as a paratype of his new species, *E. infelix* (Heinrich 1923:151). He also identified the male as *infelix* but considered it somewhat aberrant and declined to include it among his paratypes. Our examination of the latter specimen revealed it to be *E. gibsoni*.

For reasons explained by Klots (1942:392), it can be difficult to locate Kearfott's syntypes. Klots (1942:412) listed four specimens in the American Museum of Natural History (AMNH) as belonging to the type series for *walsinghami*, including a specimen labeled LECTOTYPE, which Klots interpreted as having been designated by Heinrich (1923:151). We examined the *walsinghami* material at AMNH and the United States National Museum of Natural History (USNM). Based on Klots' (1942) remarks and the scant data provided by Kearfott (1907), we believe we found six of the seven syntypes. As mentioned above, one is *infelix*, and one is *gibsoni*. The other four are listed below under lectotype and paralectotypes for *walsinghami*. Five of the six specimens bear Kearfott's handwritten cotype labels. We were unable to locate a syntype mentioned by Kearfott (1907:58) from Essex Co., N. J., dated 4 May. Kearfott is known to have published incorrect dates for some of his syntypes (Klots 1942:392), and this could be one such instance. Otherwise, that specimen is probably lost. We also examined the holotype and both paratypes of *E. infelix*.

During this study we frequently encountered specimens of *infelix* and *gibsoni* that had been misidentified as *walsinghami*. In particular, the photograph and genitalia drawings in Miller (1987:58) of *walsinghami* are actually illustrations of *gibsoni*.

MATERIALS AND METHODS

We examined material from the following institutional and private collections: AMNH, Canadian National Collection (CNC), Field Museum of Natural History (FMNH), Loran D. Gibson (LDG), Todd M. Gilligan (TMG), Illinois Natural History Survey (INHS), University of Louisville (UL), Mississippi Entomological Museum (MEM), Mogens C. Nielsen (MCN), Ohio Lepidopterists (OL), Ron Panzer (RP), USNM, and Donald J. Wright (DJW). Other cited collectors are abbreviated as follows: Richard L. Brown (RLB), C. V. Covell Jr. (CVC), John G. Franclemont



FIGS. 1–6. **1,** *E. gibsoni*, holotype male, Rowan Co., Kentucky. **2,** *E. walsinghami*, lectotype female, Essex Co., New Jersey. **3,** *E. gibsoni*, female, Adams Co., Ohio. **4,** *E. gibsoni*, male, Adams Co., Ohio. **5,** *E. gibsoni*, male, Cook Co., Illinois. **6,** *E. infelix*, male, Laurel Co., Kentucky.

(JGF), J. Richard Heitzman (JRH), Ronald W. Hodges (RWH), Eric H. Metzler (EHM), and Alex K. Wyatt (AKW). Line drawings were made with the aid of a Ken-A-Vision microprojector (Model X1000-1). Forewing length indicates the distance from base to apex, including fringe, and the number of specimens supporting a particular statistic is denoted by (n). Wing pattern terminology follows Brown and Powell (1991).

SYSTEMATICS

Epiblema walsinghami (Kearfott) (Figs. 2, 7, 8)

Enarmonia walsinghami Kearfott 1907:57.

Laspeyresia walsinghami; Barnes & McDunnough 1917:174.

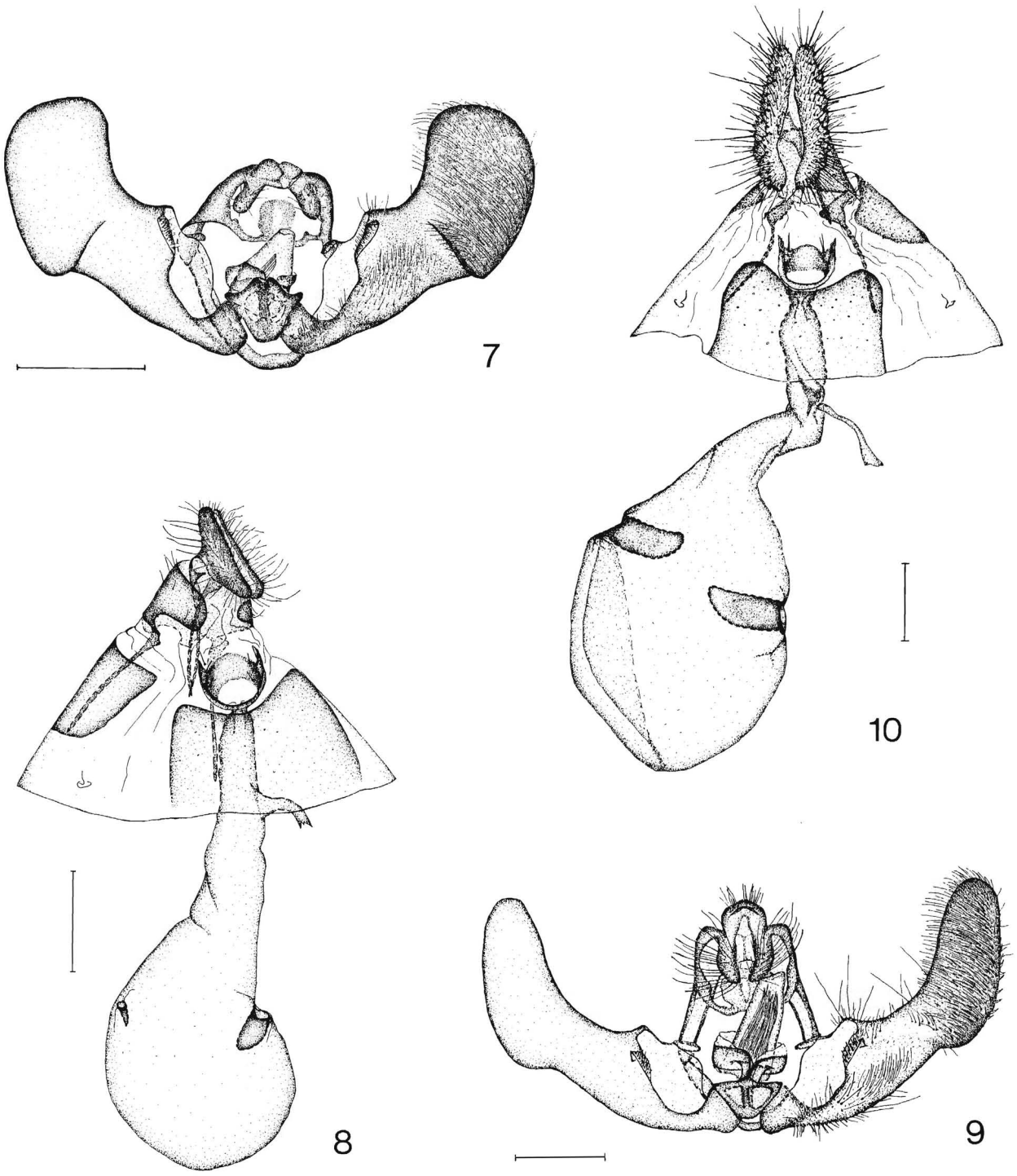
Epiblema walsinghami; Heinrich 1923:150; McDunnough 1939:48; Powell 1983:35.

Lectotype. ♀: Essex Co., New Jersey, 30 April 1899, W. D. Kearfott, AMNH, designated by Heinrich (1923:151).

Paralectotypes. NEW JERSEY: Watchung Mts., G. N. [Great Notch], 4 May 1902, W. D. Kearfott (1 ♂), AMNH; Hmlck Fls [Hemlock Falls], 29 April (1 ♂, genitalia slide RLB 98), USNM; Hmlck Fls, 29 April (1 ♀), AMNH. [These three specimens and the lectotype bear Kearfott's handwritten label "*Enarmonia walsinghami* Cotype Kearf." and his red printed label "TYPE, Collection of W. D. Kearfott".]

Additional material examined. CANADA: Ottawa, 11 June 1907, Arthur Gibson (1 ♀), CNC. ILLINOIS: Putnam Co., 5 May 1965, M. O. Glenn (1 ♂), USNM. KENTUCKY: Bullitt Co., 13–17 April 1976, C. V. Covell (1 ♀; genitalia slide LDG 192), UL. NEW JERSEY: Gt. Notch, 10 May 1914 (1 ♀, genitalia slide DJW 869), USNM; Hmlck Fls, 29 April (1 ♀), USNM; Hmlck Fls, 29 April (1 ♂, genitalia slide DJW 750), FMNH; Hemlock Falls, So. Orange, 19 April 1903, F. E. Watson (1 ♂), AMNH; Newfndland, 17 May, G. P. Engelhardt (1 ♀), USNM; Palisades, 25 April 1915 (1 ♀; genitalia slide RLB 68), USNM; Plainfield, 9 May (1 ♀, genitalia slide CH 14), USNM. OHIO: Clermont Co., 13 May 1931, Annette Braun (1 ♀), CNC; Montgomery Co., 21 April 1987, Val Albu (1 ♀; genitalia slide LDG 184), LDG. PENNSYLVANIA: Oak Station, Alleg. Co., 13 May 1916 (1 ♂, genitalia slide USNM 70798), USNM.

Remarks. Judging from these 17 specimens, forewing maculation of *E. walsinghami* exhibits very little variation. We found the following features most useful for diagnostic purposes: white interfascial spot on forewing roughly triangular, its base occupying middle third of dorsum and marked by three to five small, variably expressed, black dashes, its anterior vertex extending toward costa to two-thirds distance from dorsum to costa; basal and subbasal fasciae confluent, forming blackish basal patch, sometimes tinted with dull gray; median fascia represented at costa by blackish transverse bar extending to middle of discal cell and disintegrating into various blackish spots from there to pretornal portion of dorsum; postmedian fascia represented by black mark on costa and three to four longitudinal black marks in ocellus; subterminal fascia a narrow black line arising on costa and following terminal margin of ocellus, sometimes broken below costa, often joined to postmedian fascia by variously expressed black mark anterior to ocellus; terminal fascia a short black apical streak; lateral margins of ocellus formed by dull gray transverse bars; another gray bar arising on costa between subbasal and median fasciae, extending through discal cell along distal margin of interfascial spot. Forewing length: ♂ 6.7–7 mm (mean = 6.9, n = 6), ♀ 6–7.8 mm (mean = 7.3, n = 11). Male costal fold ex-



FIGS. 7–10. Genitalia. **7,** Male, *E. walsinghami*, slide DJW 750 (FMNH). **8,** Female, *E. walsinghami*, slide DJW 869 (USNM). **9,** Male, *E. gibsoni*, slide DJW 636 (DJW). **10,** Female, *E. gibsoni*, right apophysis posterioris omitted for clarity, slide DJW 635 (DJW). Scale bars 0.5 mm.

tending from base to 0.5 × length of forewing. Hindwing uniformly blackish brown.

Male genitalia (Fig. 7): Uncus a rounded lobe, supported by moderately developed shoulders; socii short and mildly setose; costal margin of valve strongly concave basally, becoming nearly straight distally, ventral margin weakly convex with only slight invagination at neck, apex of cucullus rectangular with rounded corners, ventral angle V-shaped, basal margin of cucullus narrowly overlapping neck; clasper situated on upper third of inner margin of saccular opening.

Female genitalia (Fig. 8): Papillae annales laterally facing and moderately setose; anterior margin of sterigma circular and collar-like; posterior margin of lamella postvaginalis convex and circular,

with posteriorly directed lateral projections; posterior margin of sternum VII concavely invaginated to 0.3 × length of sterigma, approximate to sterigma medially; ductus bursae constricted below ostium, widening gradually toward corpus bursae; corpus bursae with two signa arising opposite one another posterior to mid-bursa, one narrow and awlshaped, the other much larger and spadelike.

Distribution and biology. The study specimens indicate a geographic distribution from central Illinois east to New Jersey and north to southern Canada. The specimen from Bullitt Co., Kentucky, was taken in a malaise trap; the one from Montgomery Co., Ohio, was captured during the day. The mode of collection of the remaining specimens is not known to us. However, the scarcity of specimens in major collections and the fact that no specimens taken at black light have come to our attention in more than twenty years of field work in Ohio and Kentucky lead us to suspect that *walsinghami* is either diurnal or not attracted to ultraviolet light. No larval host has been reported.

Epiblema infelix Heinrich
(Fig. 6)

Epiblema infelix Heinrich 1923:151, Fig. 276 (genitalia of ♂ holotype); McDunnough 1939:48; Powell 1983:35.

Remarks. This species recently was reviewed by Wright (2002). A photograph of the adult is included here for comparison; illustrations of the genitalia can be found in Wright (2002: Figs. 13, 17) and Heinrich (1923: Fig. 276).

***Epiblema gibsoni* Wright and Covell, new species**
(Figs. 1, 3, 4, 5, 9, 10)

Epiblema walsinghami (not Kearfott) Miller 1987:58.

Diagnosis. The three species under consideration here differ in forewing pattern and coloration. Moderately fresh specimens of *gibsoni* have a lavender cast, whereas *infelix* and *walsinghami* have a dull gray to blackish gray appearance. Of the latter two, *walsinghami* is the more mottled, and its median fascia is more strongly expressed, particularly at the costa where it is represented by a distinct blackish mark. The shape of the interfascial spot in *gibsoni* (Figs. 1, 3, 4) is usually diagnostic (see description below). However, our *gibsoni* sample did include four specimens from the Chicago area in which this feature was greatly reduced (Fig. 5). With regard to genitalic characters, *gibsoni* is distinct from *walsinghami* in the shape of the valva (Figs. 7, 9), and there are subtle but consistent differences in the shape of the cucullus between *gibsoni* and *infelix*. In *infelix* (Wright 2002: Fig. 13) the inner and outer margins are nearly "parallel", being concave and convex, respectively, producing a cucullus of roughly constant width. In *gibsoni* the outer margin is nearly straight and the inner margin is weakly convex toward the apex, causing a gentle tapering of the cucullus from the ventral angle to the rounded apex. The female genitalia of *gibsoni* and *infelix* are similar, but the papillae anales of *gibsoni* tend to be larger and more nodulous than those of *infelix* (Wright 2002: Fig. 17). The marked difference in size between the two signa in *walsinghami* easily distinguishes that species from the other two. The flight periods of *walsinghami* and *gibsoni* are essentially nonoverlapping: adults of the former species emerge in April and May, those of the latter largely in July. *Epiblema infelix* flies from late April to early July.

Description. Head: Scales of lower frons white, short and closely appressed, those of upper frons and vertex moderately long, yellowish brown basally, darker brown distally, often with pale lavender hues; outer surface of labial palpus brown, inner surface cream white to light tan, third segment light tan to brown, often with tan apex; dorsal surface of antenna concolorous with head or slightly darker, ventral surface tan; ventral surface of scape tan. Thorax: Dorsal surface concolorous with head, ventral surface light tan; legs brown outwardly, light tan inwardly, with light tarsal annulations. Forewing (Figs. 1, 3, 4, 5): ♂ length 6–9 mm (mean = 7.5, n = 77), ♀ length 7–9.5 mm (mean = 8.7, n = 13); costa weakly convex, termen straight to weakly concave and perpendicular to costa, tornus gently rounded, male costal fold extending from base to 0.5 × length of forewing. Dorsal surface lavender brown with brown to black markings and an immaculate white dorsal spot between subbasal and median fasciae; basal and subbasal fasciae confluent, forming brown to lavender brown basal patch; median fascia brown, weakly contrasting with adjacent lavender brown scaling, narrow and sometimes incomplete near costa, broader and more sharply defined toward dorsal margin, overlaid with varying amounts of black scaling between interfascial spot and ocellus; postmedian fascia reduced to two to four longitudinal black dashes in ocellus and a brown spot, variably overlaid with black scaling, anterior to ocellus; subterminal and terminal fasciae expressed as a narrow brown dash and brown apical spot, respectively; interfascial spot bright white, extending from dorsal margin to two-thirds distance to costa, sharply defined but variable in shape, width increasing gently from dorsum to fold and narrowing anteriorly to form a rounded nipple-shaped apex (Fig. 4), or lateral margins parallel and apex rounded (Figs. 1, 3), or, in a few instances, spot weakly expressed to nearly obsolescent (Fig. 5); central field of ocellus brown, bordered on lateral and tornal margins with lavender gray; distal half of costa with four, white, paired strigulae; ocellus separated from termen by narrow band of brown scales; scales along terminal edge of membrane gray with pale white apices; fringe gray to lavender brown. Hindwing: Uniformly gray brown, fringe scales with pale white apices. Male genitalia (Fig. 9): Uncus a well developed, dorsally setose lobe, supported laterally by well developed shoulders; socii long, fingerlike, and densely setose; gnathos narrow and bandlike laterally, considerably expanded medially; juxta triangular, caulis short; costal margin of valva strongly concave basally, weakly convex toward apex, distal margin weakly convex, ventral invagination narrow and shallow, ventral angle gently rounded, apex evenly rounded; cucullus narrowing gradually toward apex, its inner surface densely setose; clasper centrally located on inner margin of saccular opening, its basal surfaces supporting numerous, short, stout setae; sacculus moderately setose on ventral half of inner surface. Female genitalia (Fig. 10): Papillae anales ventro-laterally facing, nodulous, and strongly setose; anterior margin of sterigma rounded and collarlike; posterior margin of lamella postvaginalis convexly rounded medially and flaring into posteriorly

directed projections at the lateral margins; posterior margin of sternum VII concavely invaginated to 0.5 × length of sterigma, closely approximate to sterigma medially, diverging therefrom laterally; ductus bursae long, constricted below ostium, and mildly sclerotized at juncture with ductus seminalis; corpus bursae with two finlike signa of nearly equal size arising roughly opposite one another and slightly posterior to mid-bursa.

Holotype. ♂: KY: Rowan Co., Rt. 1274, 2 mi. W. Rt. 519, 16 July 1994, leg. L. Gibson; deposited in USNM. Type Locality: 38°06′47″N, 83°25′15″W.

Paratypes (n = 83). ARKANSAS: Washington Co., Devil's Den St. Pk., 29 June 1966, RWH (1 ♂). ILLINOIS: Cook Co., Gens. Markham Pr., 7 June 1999, RP (1 ♂, genitalia slide DJW 606). INDIANA: Hessville, 4 July 1914, AKW (2 ♂); Lake Co., Du Pont Sav., 30 July 2000, RP (1 ♀), Ivanhoe D & S, 17 June 2000, RP (1 ♂, 1 ♀; ♂ genitalia DJW 738, ♀ genitalia DJW 740). KENTUCKY: Barren Co., Mammoth Cave N. P., Wondering Woods, 26 June 1998, CVC (3 ♂); Bullitt Co., Pine Creek Forest, 0.5 mi. N of Rt. 480, 4.5 mi. E of I65, 22 July 1989, CVC (1 ♂), DJW (1 ♂), LDG (3 ♂, 1 ♀, ♂ genitalia slides LDG 91, 185, ♀ genitalia slide LDG 183); Menifee Co., Leatherwood Fork, Indian Creek Rd. 9A, 6 July 1991, LDG (1 ♂, genitalia slide LDG 194); Owsley Co., 3 mi. NE of Booneville, 20 July 1991, LDG (1 ♀), 24 July 1982, LDG (2 ♂, genitalia slide CVC 1197); Rowan Co., E side Rt. 1274, 2 mi. W Rt. 519, 1 July 1995, LDG (2 ♂, 1 ♀), 16 July 1994, LDG (1 ♂, genitalia slide LDG 195). MICHIGAN: Monroe Co., T7S R6E Sec 15, 22 July 1988, MCN (1 ♂). MISSISSIPPI: Oktibbeha Co., 6 mi. SW Starkville, 15 August 1985, RLB (1 ♀); Winston Co., Noxubee N. W. Refuge, 14 June 1992, T. L. Schiefer (1 ♂). MISSOURI: Randolf Co., Rudolf Bennitt Wildlife Area, 24 July 1971, JRH (2 ♂). NORTH CAROLINA: Macon Co., Highlands, 3865′, 19 July 1958, RWH (1 ♂), 22 July 1958, JGF (1 ♂, genitalia slide CVC 1196), 23 August 1958, JGF (1 ♂). OHIO: Adams Co., Lynx Prairie Pr., 8 June 1989, DJW (2 ♂), 1 mi. S.E. of Lynx, 18 June 2002, DJW (5 ♂), 5 July 1996, DJW (2 ♂, genitalia slide DJW 636), 5 July 2002, DJW (7 ♂), 16 July 1990, DJW (1 ♂, 1 ♀), 25 July 1997, DJW (4 ♂), 29 July 1989, DJW (1 ♀), 3 August 1998, DJW (2 ♂), 3 August 2000, DJW (4 ♂, 2 ♀; ♂ genitalia slide DJW 810, ♀ genitalia slide DJW 811), 19 August 1998, DJW (1 ♀, genitalia slide DJW 635); Erie Co., Resthaven Wildlife Area, 13 July 1991, LDG (2 ♂, 2 ♀, ♂ genitalia slide LDG 186), 16 July 1996, DJW (5 ♂, 2 ♀), 20 July 1990, DJW (2 ♂), 21 July 1990, TMG (2 ♂); Lucas Co., Kitty Todd Preserve, 8 June 1996, EHM (2 ♂). SOUTH CAROLINA: Oconee Co., Cherry Hill Recreation Area, Rte. 107, 2000′, 7 August 1958, JGF (2 ♂). Paratype depositories: AMNH, CNC, FMNH, LDG, TMG, INHS, UL, MEM, MCN, OL, USNM, DJW.

Etymology. We are pleased to name this species after Loran D. Gibson in recognition of his many contributions to the knowledge of Kentucky Lepidoptera.

Distribution and biology. Our study sample consisted of 151 specimens from Arkansas, Illinois, Indiana, Kentucky, Michigan, Mississippi, Missouri, Ohio, North Carolina, and South Carolina. They document a flight period extending from the first week of June to the third week of August, but 70% of the records are from July. No larval host has been recorded.

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