

TWO NEW SPECIES OF MOTHS
(NOCTUIDAE: ACRONICTINAE, CUCULLIINAE)
FROM MIDLAND UNITED STATES

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ABSTRACT. Two new species of noctuid moths are described and illustrated. *Acronicta heitzmani*, new species, in the subfamily Acronictinae, is known from Missouri, Arkansas, Illinois and Ohio. *Lithophane joannis*, new species, in the subfamily Cuculliinae, is known from Ohio, Kentucky, and Michigan. Both species are compared with morphologically similar congeners.

Additional key words: *Acronicta heitzmani*, *Lithophane joannis*, faunal survey.

Since their origins, the Ohio Lepidopterists and the Society of Kentucky Lepidopterists have promoted regional surveys of the Lepidoptera fauna of midland United States. These efforts have resulted in numerous new records and range extensions and in the discovery of several new taxa. The purpose of this paper is to describe and illustrate two recently discovered species of the family Noctuidae. Both apparently are restricted to midland United States. *Acronicta heitzmani*, new species, is known from Missouri, Arkansas, Illinois and Ohio. *Lithophane joannis*, new species, is known from Ohio, Kentucky, and Michigan. Both species are morphologically distinct from, and sympatric with, congeners.

In 1964, J. R. Heitzman collected a series of an unusual *Acronicta* species in Missouri. The specimens superficially resembled *A. fragilis* (Guenée) which was not recorded from Missouri. In 1967, the first author collected a specimen of the same species in Kentucky; the second author took the first Ohio specimen in 1975. The specimens were determined as a possibly undescribed species near *A. fragilis* by the late E. L. Todd of the Systematic Entomology Laboratory, U.S. Department of Agriculture. In 1986 J. D. Hooper collected typical *A. fragilis* together with the new species in Shawnee State Forest, Scioto Co., Ohio; more recently, both were collected together at Tunnel Ridge, Red River Gorge, Powell Co., Kentucky, by L. D. Gibson. Over the years, collections of this species have resulted in a study series of 92 specimens from 5 states. Characteristics that distinguish this species are remarkably constant throughout its range. We therefore describe this insect as a new species.

The new species of *Lithophane* was collected in Ohio in 1975 by the second author, who recognized it as an undescribed species on the basis of male genitalic characters. More specimens were recorded from Ohio and Kentucky in the 1980's. In 1990 M. C. Nielsen took two specimens in Lenawee Co., Michigan. We initially assumed that this species had remained undescribed because of its close resemblance to "ferralis" phases of *Lithophane petulca* Grote and *L. hemina* Grote; however, only two specimens that predate 1975 were located in any collection.

No specimens of either of the new species were found in the American Museum of Natural History, Carnegie Museum of Natural History, Canadian National Collection, Field Museum of Natural History, Illinois Natural History Survey, Ohio State University collection of insects, Michigan State University Department of Entomology, or University of Michigan.

***Acronicta heitzmani* Covell and Metzler,**

new species

(Figs. 1, 2, 7, 8, 9)

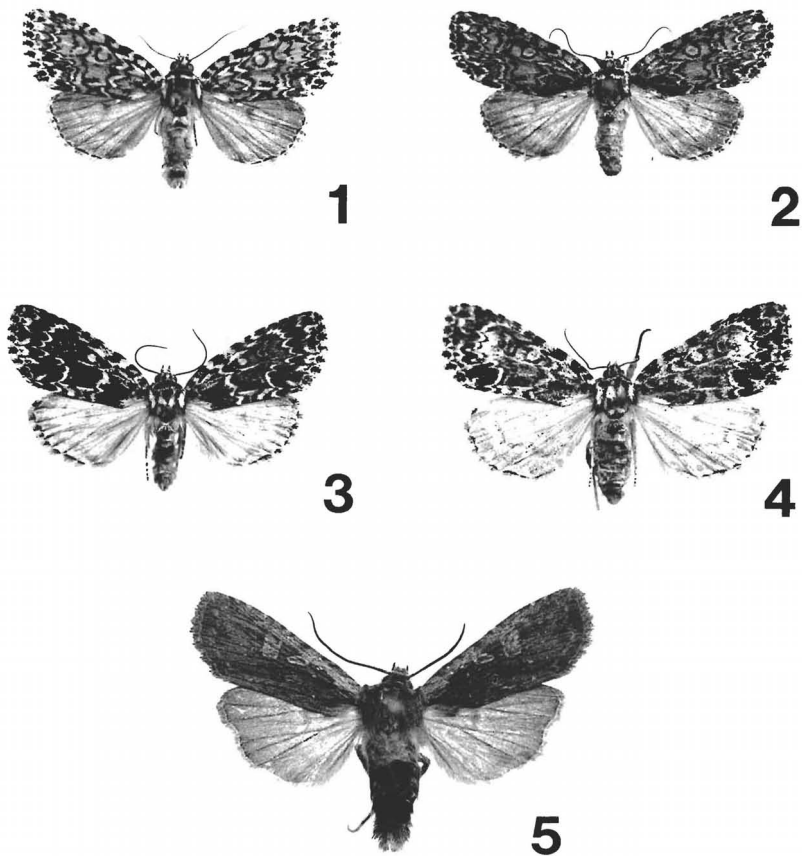
Diagnosis. *Acronicta heitzmani* is similar to *A. fragilis* in forewing pattern (see Figs. 1–4), but it is slightly smaller—individuals range 1.0–1.5 mm shorter in forewing length. Black areas of the forewing in *A. fragilis* are replaced by olive gray in *A. heitzmani*, giving it a more uniform olive gray ground color. The scaling between the double antemedial and postmedial lines and in the suborbicular spot are gray in *A. heitzmani* rather than white as in *A. fragilis*. The hindwing is gray in *A. heitzmani*, not white with gray shading as in *A. fragilis*. The male valvae are slightly longer in relation to their width in *A. heitzmani* (see Figs. 6 and 7).

Description (Figs. 1 and 2). Head with frons usually more outwardly bulging than in *A. fragilis*. Vestiture of body similar to *A. fragilis*, but abdomen darker grayish. Forewing length 12.0–14.5 mm ($n = 67$) in males, 12.5–15.0 mm ($n = 25$) in females. Forewing above olive gray with black lines and spots contrasting less than in *A. fragilis*, which is black and whitish; lower half of postmedial line less deeply incurved than in *A. fragilis*. Filling of postmedial line, subterminal shade, and terminal line whitish. Fringe checkered olive-gray and white. Hindwing above dull gray; discal dot and median line faintly expressed. Terminal line broken, thin, blackish, with fringe as in forewing. Both wings shiny gray below, forewing darker. Lines of upperside faintly repeated beneath, darkest at costa; terminal lines of fine black dots. Color and pattern similar in both sexes and uniform among specimens studied.

Male genitalia (Fig. 7). Similar to that of *A. fragilis* (Fig. 6), but valva longer in relation to width, and not narrowing noticeably beyond valvula. Ampulla wider and shorter than that of *A. fragilis*. Aedeagus much smaller—nearly half the size of that in *A. fragilis*.

Female genitalia (Fig. 8). No consistent differences between those of *A. heitzmani* and *A. fragilis* are apparent. As with adults in general, the genitalia of *A. heitzmani* are smaller than those of *A. fragilis*.

Types. Holotype, male: Missouri, Benton County, Harry S. Truman State Park, near Warsaw, 24 July 1965, at blacklight, J. R. Heitzman. Paratypes, 66 ♂♂ and 25 ♀♀, as follows:



FIGS. 1-5. *Acronicta* and *Lithophane* species. 1, *Acronicta heitzmani*, holotype male. 2, *Acronicta heitzmani*, paratype female, Boone Co., Kentucky, 18 May 1980, L. D. Gibson. 3, *Acronicta fragilis*, male, Harlan Co., Kentucky, 14 July 1979, C. V. Covell Jr. 4, *Acronicta fragilis*, female, Powell Co., Kentucky, 21 May 1988, C. V. Covell Jr. 5, *Lithophane joannis*, holotype male.

ARKANSAS: Madison Co.: Blue Springs State Park, east of Springdale, 15 April 1967 (1 ♂), R. L. Heitzman. Washington Co.: Devil's Den State Park, 22 July 1967 (1 ♂, 1 ♀), R. W. Hodges. MISSOURI: Benton Co.: same locality as holotype, 26 July 1964 (3 ♂♂), 7 May 1965 (1 ♀), 24 July 1965 (1 ♂), 8 August 1965 (1 ♂), 7 August 1966 (2 ♂♂), 27 July 1967 (2 ♂♂, 1 ♀), 15 May 1969 (1 ♂), 7 May 1970 (1 ♂, 3 ♀♀), 5 August 1971 (1 ♂), all R. L. Heitzman. Boone Co.: Ashland Wildlife Area, deciduous forest, 12 April 1977 (1 ♂), 14 April 1977 (1 ♂), 21 April 1977 (2 ♂♂), all R. L. Heitzman. Grundy Co.: Crowder State Park, marsh and deciduous forest, near Trenton, 21 July 1979 (1 ♂), 24 May 1980 (1 ♀), R. L. Heitzman. Jefferson Co.: Victoria Glade, 4 km (2.5 miles) SE Hillsboro, 24 April 1982 (4 ♂♂), George Balogh. Laclede Co.: 3 km (2 miles) SE Stoutville, 2 August 1975 (4

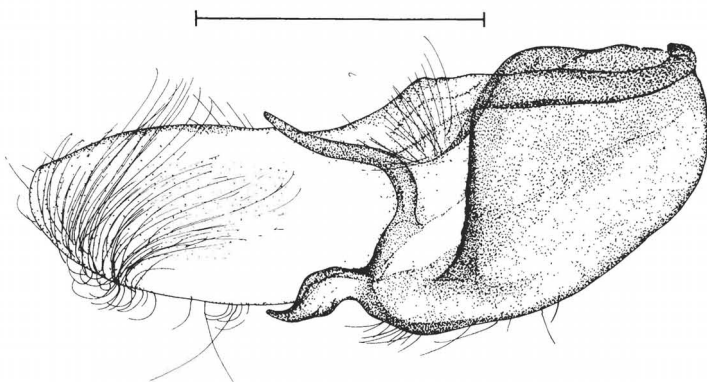


FIG. 6. *Acronicta fragilis*. Male genitalia left valve. Slide C.V.C.Jr. 1186. Bell Co., Kentucky, 3 May 1974, Carl C. Cornett. Scale bar = 1 mm.

♂♂, 1 ♀, 10 April 1976 (2 ♂♂), 31 July 1976 (6 ♂♂, 2 ♀♀), R. L. Heitzman. Ste. Genevieve Co.: Hawn State Park, 10 April 1981 (1 ♂), 27 July 1984 (1 ♂), T. C. Macrae. ILLINOIS: McDunnough Co.: Macomb, 22 April 1985 (1 ♂), Y. Sedman. KENTUCKY: Boone Co.: Big Bone Lick State Park, 2 May 1979 (3 ♂♂, 3 ♀♀), 19 May 1979 (1 ♀), 5 May 1980 (1 ♂, 1 ♀), 18 May 1980 (1 ♂, 5 ♀♀), L. D. Gibson; Camp Earnst, 17 August 1979 (1 ♂), L. D. Gibson. Jefferson Co.: Valley Station, 3 May 1987 (1 ♂), B. S. Nichols. Meade Co.: Fort Knox, 9 August 1975 (1 ♂), S. Sholz; Otter Creek Park, 10 May 1987 (1 ♀), B. S. Nichols. Oldham Co.: Horner Wildlife Sanctuary, 14 August 1967 (1 ♀), C. V. Covell Jr. Powell Co.: Tunnel Ridge, 14 May 1988 (1 ♂), 3 May 1991 (1 ♂), L. D. Gibson. OHIO: Adams Co.: Green Township, Waggoner Riffle Rd. at Black Run Rd., 1 August 1981 (2 ♂♂), E. H. Metzler. Scioto Co.: Shawnee State Forest, clearcut on state forest Rt. 2, ca. 0.6 mile east of state forest road 13, 16 July 1986 (4 ♂♂); clearcut 1 mile south of Pond Run Tower, 18 July 1986 (8 ♂♂), 20 August 1986 (1 ♂), J. D. Hooper. Vinton Co.: Richland Township, Section 24, 1 August 1975 (1 ♂), 30 July 1976 (1 ♂), 28 May 1978 (1 ♀), 24 May 1981 (1 ♂, 1 ♀), and 15 May 1982 (1 ♀), E. H. Metzler.

Disposition of types. Holotype and paratypes in the National Museum of Natural History, Washington, D.C.; paratypes at American Museum of Natural History, New York; California Academy of Sciences, San Francisco, California; Canadian National Collection, Ottawa, Ontario; Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; Field Museum of Natural History, Chicago, Illinois; Florida State Collection of Arthropods, Gainesville, Florida; Los Angeles County Museum of Natural History, Los Angeles, California; Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; The Natural History Museum, London, England; University of Louisville, Louisville, Kentucky; and private collections of George J. Balogh, Portage, Michigan; Loran D. Gibson, Florence, Kentucky; J. Richard Heitzman, Independence, Missouri; Jeffrey D. Hooper, Uniontown, Ohio; Eric H. Metzler, Columbus, Ohio; Barry S. Nichols, Louisville, Kentucky; and Yale Sedman, Macomb, Illinois.

Type locality. Described by J. R. Heitzman (pers. comm.) as oak-hickory forest interspersed with cedar glades. Understory trees, shrubs, and vines include *Bumelia* (Sapotaceae), *Celtis* (Ulmaceae), *Cercis* (Fabaceae), *Crataegus* (Rosaceae), *Gleditsia* (Fabaceae), *Gymnocladus* (Fabaceae), *Prunus* (Rosaceae), *Viburnum* (Caprifoliaceae), *Sassafras* (Lauraceae), *Zanthoxylum* (Rutaceae), *Ceanothus* (Rhamnaceae), *Ribes* (Saxifragaceae), *Rhus* (Anacardiaceae), *Vaccinium* (Ericaceae), *Aristolochia* (Aristolochiaceae), *Smilax* (Liliaceae), and *Vitis* (Vitaceae). Elevation is approximately 260 meters.

Immature stages. Unknown. One female produced 3 ova in captivity but the larvae refused to eat alder, *Alnus serrulata* (Ait.) Willd. (Betulaceae), and river birch, *Betula nigra* L. (Betulaceae).

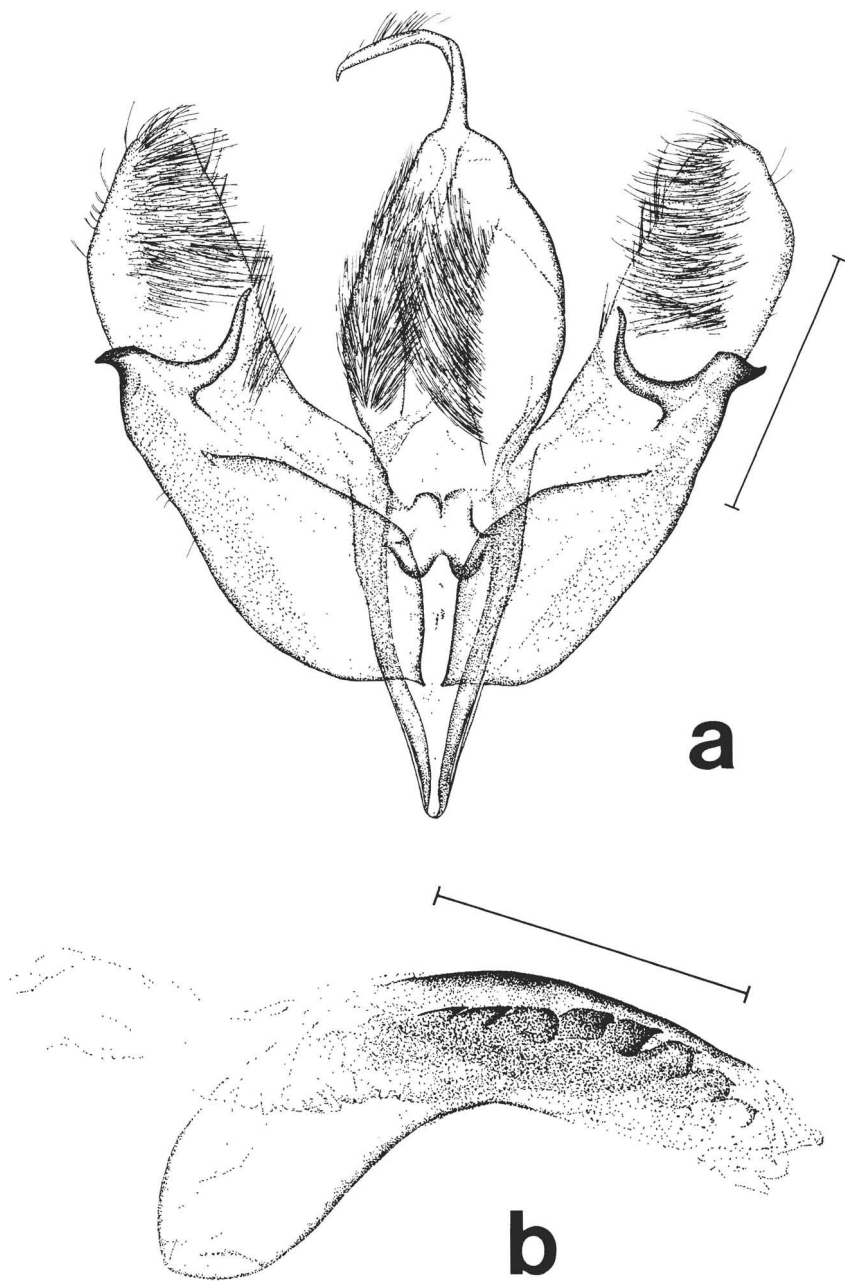


FIG. 7. Male genitalia of *Acronicta heitzmani*. a) Genitalia with aedeagus removed; b) Aedeagus. Slide C.V.C.Jr. 1172. Paratype, Adams Co., Ohio, 1 August 1981, E. H. Metzler. Scale bar = 1 mm.



FIG. 8. Female genitalia of *Acronicta heitzmani*. Slide C.V.C.Jr. 1185. Paratype, Oldham Co., Kentucky, 14 August 1967, C. V. Covell Jr. Scale bar = 1 mm.

Geographical distribution. Southeastern Ohio to Illinois, Missouri, and northern Arkansas (Fig. 9).

Flight period. Two broods, April through early June, and mid-July to late August.

Discussion. The known range of *Acronicta fragilis* extends from Newfoundland to Florida, west across Canada, and south to Kentucky (Covell 1984:85). The known range of *A. heitzmani* lies within the

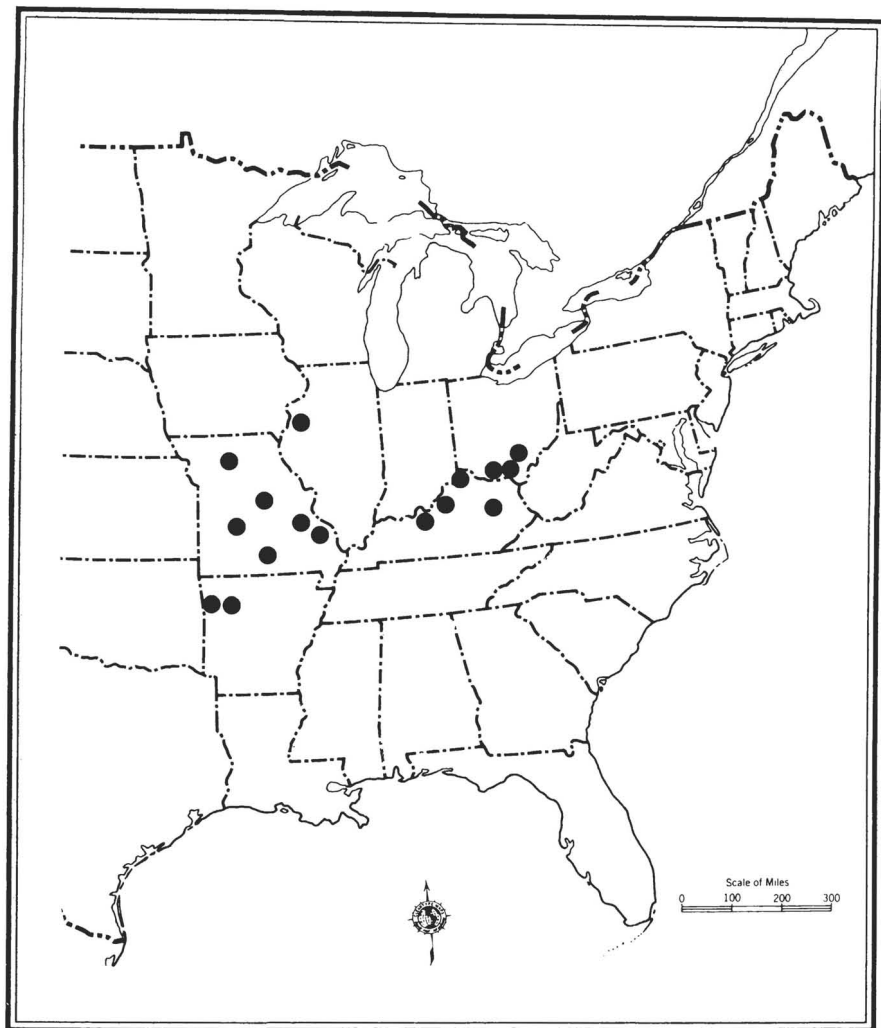


FIG. 9. Geographical range of *Acronicta heitzmani* in the United States.

southern part of the range of *A. fragilis*, west of the Appalachian Mountains. It also extends farther to the southwest than *A. fragilis*, reaching northern Arkansas. Heitzman (pers. comm.) has not found *A. fragilis* in Missouri or Arkansas.

Etymology. The authors take pleasure in naming this species in honor of J. Richard Heitzman, who collected the first known specimens and who has made many significant contributions to North American lepidopterology.

***Lithophane joannis* Metzler and Covell,
new species**

(Figs. 5, 10, 11, 12)

Diagnosis. *Lithophane joannis* is similar to “ferrealis” phases of *L. hemina* and *L. petulca*, and the typical form of *L. oriunda* Grote (Noctuidae). It can be separated from *L. oriunda* by its darker black-brown color and less contrasting pale outlines of the orbicular and reniform spots, and from *L. hemina* and *L. petulca* by the more evenly excurved terminal line. The costal area is not as pale as the “lignicosta” form of *L. hemina*, and lacks the bluish cast of the “ferrealis” form of *L. petulca* (Franclemont 1942). The forewing has neither contrastingly pale scales outlining the claviform spot nor very dark scales in medial area of the fold often found on *L. hemina* form “lignicosta.”

Description (Fig. 5). Dorsal thorax dark brown with pale mid-thoracic crest between collar and abdomen. Legs, palpi, head, and collar pale. Front crossed laterally by a black line. Abdomen brown with five obscure dorsal tufts. Forewing length 15.0–17.0 ($n = 82$) in males and females. Forewing above umber and black-brown. Pale reddish brown costa continues to basal dash; the latter defined by pale. Orbicular spot pale, flattened laterally. Reniform spot dark with pale outline, often smudged with pale scales. Orbicular and reniform spots with filling slightly paler than dark ground color. Antemedial line obscure, single, deeply zigzagged basally on veins and distally between veins, doubled through the pale costa; marked with three pale dots at the radial, medial, cubital, and anal veins. Similar postmedial line zigzags distally on veins, basally between veins; marked by six obscure pale dots at the radial, medial, cubital, and anal veins. Medial line marked only by a dark shade at the costa. Two terminal lines: one pale, excurved, nearly parallel to the outer margin; the other fine, black; base of fringes pale. Subterminal area darker on paler specimens. Hindwing above dark fuscous with darker veins; a dark discal lunule and dark terminal line. Fringe tips pale. Forewing below uniformly dark fuscous with costa and terminal area slightly paler. Costa just before terminal area marked with four dark and three pale shades; reniform spot of dark shade. Hindwing below paler than forewing, dusted with dark scales; marked by dark postmedial line, dark discal spot, and dark terminal line. Fringes pale. Males and females similar in color and pattern. Spring specimens range from black-brown to faded umber brown, never pale.

Male genitalia (Fig. 10). Similar to *L. oriunda*, *L. hemina*, and *L. petulca*, but the base of the valve with a prominent dorsal lobe not found in those species. At the narrowest point, the central ridge of the juxta is at least $\frac{1}{4}$ wider than in the other three species.

Female genitalia (Fig. 11). The ductus bursae is 45% shorter than that in *L. hemina* and *L. petulca*.

Types. Holotype male: Ohio, Greene County, John Bryan State Park, 30 October 1989, E. H. Metzler. Paratypes, 40 ♂♂ and 39 ♀♀, as follows: KENTUCKY: Boone Co: Big Bone Lick State Park, 20 February 1986 (1 ♂, 2 ♀♀), 25 March 1986 (1 ♂, 1 ♀), both D. J. Wright, 20 March 1979 (1 ♂, 2 ♀♀), 23 March 1980 (1 ♀), 25 March 1986 (2 ♀♀), all L. D. Gibson; Boone Cliffs Nature Preserve, 17 March 1982 (3 ♂♂, 2 ♀♀), 24 March 1982 (1 ♀), both L. D. Gibson. Carroll Co: General Butler State Park, 29 March 1980 (2 ♂♂, 3 ♀♀), L. D. Gibson. Jefferson Co: Camp Cedar Ridge, 15 February 1981 (1 ♀), R. A. Henderson; Louisville, 9 March 1977 (1 ♂, 2 ♀♀), C. V. Covell Jr. Menifee Co: north of Slade Road, vicinity Red River, Edward Branch, elev. 900 ft, 3–8 March 1980 (1 ♂), J. S. Nordin. Meade Co: Otter Creek Park, 17 March 1979 (1 ♀), R. A. Henderson. MICHIGAN: Lenawee Co: T8S, R2E, Section 31, 21 March 1990 (1 ♂, 1 ♀), M. C. Nielsen. OHIO: Adams Co: 1 mi [1.3 km] SE Lynx, P. Knoop Property, 20 March 1991 (1 ♀), L. D. Gibson. Delaware Co: Alum Creek State Park, 15 March 1977 (1 ♂), E. H. Metzler. Fairfield Co: Wahkeena Nature Preserve, Berne Township, Section 4, 11 March 1977 (1 ♂), E. H. Metzler (EHM slide no. 100). Franklin

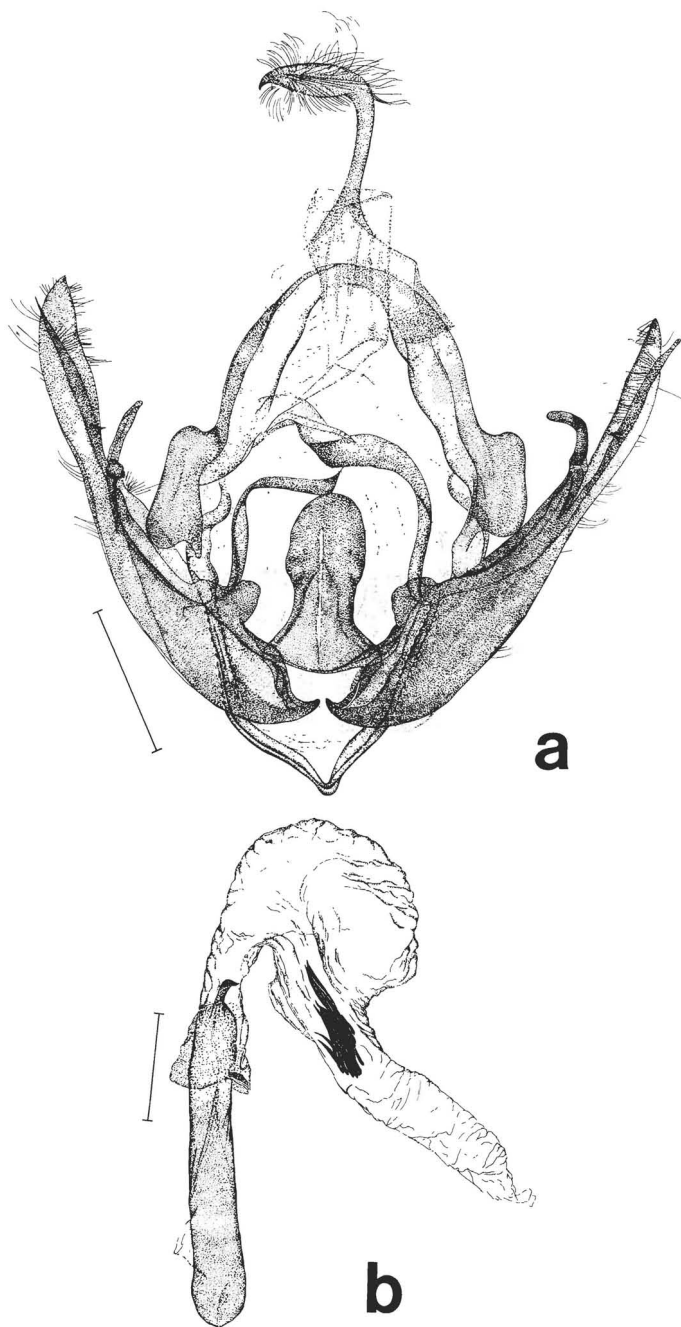


FIG. 10. Male genitalia of *Lithophane joannis*. a) Genitalia with aedeagus removed; b) Aedeagus. Slide E.H.M. 110. Paratype, Greene Co., Ohio, 10 March 1990, E. H. Metzler. Scale bar = 1 mm.

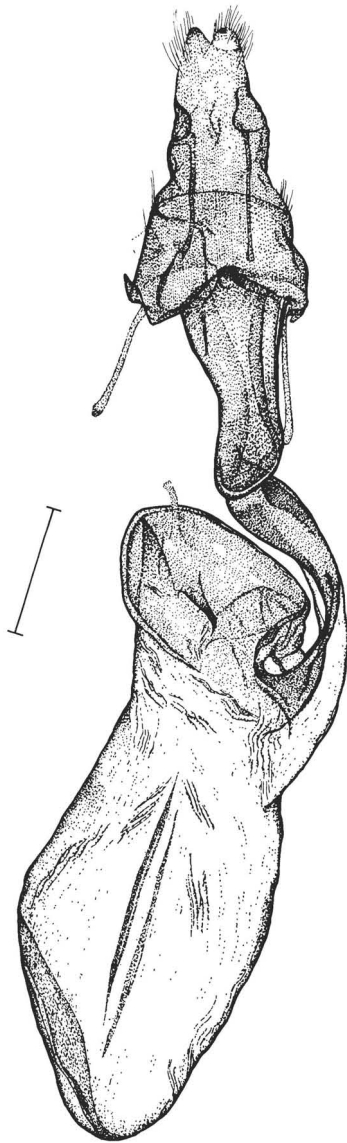


FIG. 11. Female genitalia of *Lithophane joannis*. Slide E.H.M. 111. Paratype, Fulton Co., Ohio, 10 March 1989, R. W. Rings. Scale bar = 1 mm.

Co: Blendon Township, Hoover Dam, 22 February 1975 (1 ♀), E. H. Metzler; Jefferson Township, Gahanna Woods Nature Preserve, 19 March 1976 (1 ♂), E. H. Metzler. Fulton Co: German Township, Goll Woods, 11 March 1989 (1 ♀), R. W. Rings (EHM slide no. 111). Greene Co: John Bryan State Park, 14 March 1989 (3 ♂♂) (EHM slide nos. 112, 113), 16 April 1989 (2 ♀♀) (EHM slide nos. 114, 115), R. W. Rings, 30 October 1989 (2 ♀♀), 10

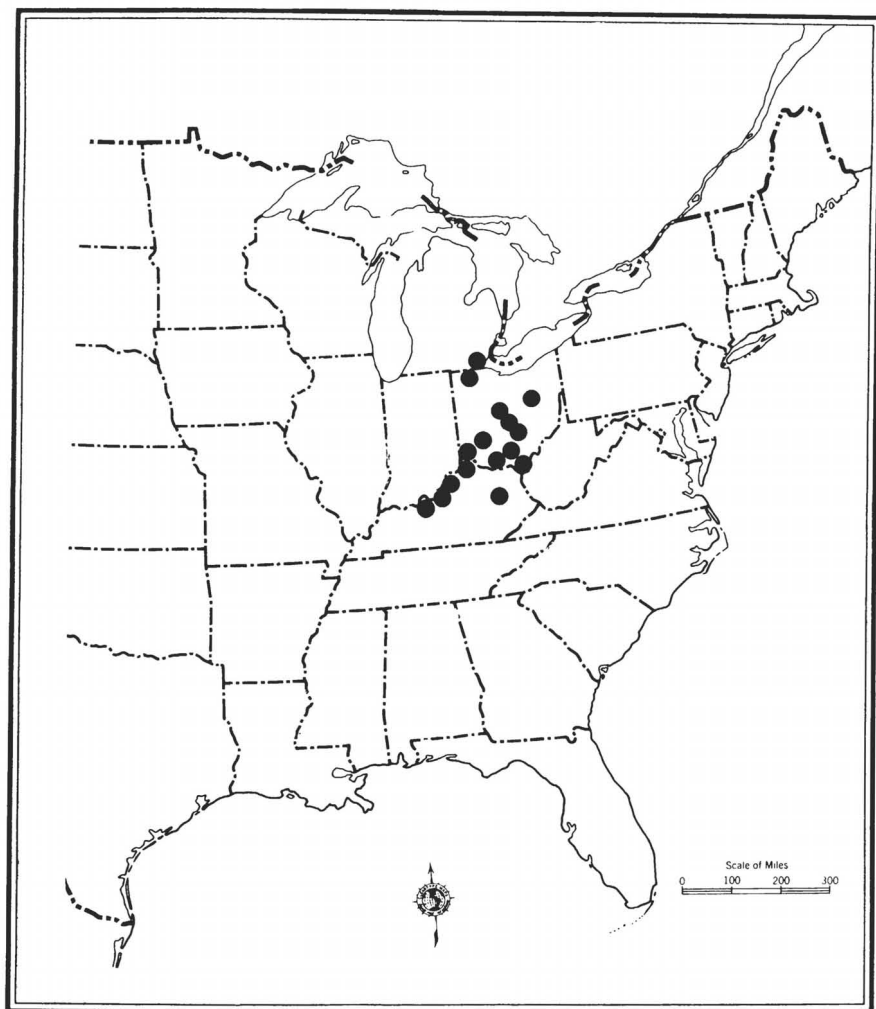


FIG. 12. Geographical range of *Lithophane joannis* in the United States.

March 1990 (12 ♂♂, 5 ♀♀) EHM slide nos. 110, 116), 16 April 1990 (1 ♀), 3 March 1992 (5 ♂♂, 7 ♀♀), E. H. Metzler. Hamilton Co: Cincinnati, 9 March 1986 (1 ♀), 13 March 1986 (2 ♂♂, 1 ♀), D. J. Wright. Lawrence Co: Lake Vesuvius, 10 October 1984 (1 ♂), R. W. Rings. Vinton Co: Richland Township, Section 24, 3 March 1979 (1 ♂), E. H. Metzler. Wayne Co: Wooster, 4 March 1970 (1 ♂), R. W. Rings. No county: Skinner collection [no date] (1 ♂).

Disposition of types. Holotype and paratypes in the National Museum of Natural History, Washington, D.C.; paratypes in Academy of Natural Sciences, Philadelphia, Pennsylvania; American Museum of Natural History, New York; Canadian National Collection, Ottawa, Ontario; Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; Florida State Collection of Arthropods, Gainesville, Florida; Los Angeles County Museum of Natural History, Los Angeles, California; Michigan State University, De-

partment of Entomology, East Lansing, Michigan; Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; The Natural History Museum, London, England; Ohio State University, Ohio Agricultural Research and Development Center, Wooster, Ohio; University of Louisville, Louisville, Kentucky; Ohio Lepidopterists' collection, Ohio State University, Columbus, Ohio; and private collections of John G. Franclemont, Department of Entomology, Cornell University, Ithaca, New York; Loran D. Gibson, Florence, Kentucky; Eric. H. Metzler, Columbus, Ohio; Mogens C. Nielsen, Lansing, Michigan; and Donald J. Wright, Cincinnati, Ohio.

Type locality. The type locality is a mature, second growth, mixed mesophytic hardwood forest along a ridge trail overlooking the Little Miami River at the campground in John Bryan State Park. The exact location where the holotype was collected is 39°47'04"N, 83°51'57"W.

Immature stages. Unknown. One female produced 17 ova in captivity but the larvae refused to eat a variety of woody plants that were offered.

Geographical distribution. Southeast Michigan, Ohio, and north-central Kentucky (Fig. 12).

Flight period. October through April.

Discussion. *Lithophane joannis* probably has gone undetected because of its limited geographic range coupled with a dearth of collecting efforts for "winter moths" as described by Newman (1945). Only two specimens that predate 1975 were located in any collection; most collections have no specimens. This species is abundant in the type locality, where, in March, the number of specimens collected at bait exceeds all other species of *Lithophane* combined.

Etymology. The specific epithet *joannis* is the genitive case of the Latin word for John. John H. Newman, who introduced the second author to the study of Noctuidae, declined to be recognized with a patronym. Therefore, this species is named for the first word of the type locality—John Bryan State Park—which is also by intentional coincidence the first name of Mr. Newman.

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Collection, Ottawa, Ontario, Canada; Mark F. O'Brien, University of Michigan, Ann Arbor, Michigan; Robert W. Poole, National Museum of Natural History, Washington, D.C.; Eric L. Quinter, American Museum of Natural History, New York; John E. Rawlins, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; Roy W. Rings, Ohio State University, Ohio Agricultural Research and Development Center, Wooster, Ohio; Frederick W. Stehr, Michigan State University, East Lansing, Michigan; Yale Sedman; Barry S. Nichols; Mogens C. Nielsen; J. Richard Heitzman; Roger L. Heitzman; Jeffrey D. Hooper; Loran D. Gibson; William F. Babcock; George J. Balogh; and Donald J. Wright. We thank Douglas C. Ferguson and Robert W. Poole for reviewing the manuscript.

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