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A REVISION OF THE GEOMETRID GENUS *EXELIS* (LEPIDOPTERA)

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The genus *Exelis* Guenée forms a small homogeneous group in the subfamily Ennominae. Up to the present time, only one species has been recognized as belonging to this genus in the United States; however, careful study shows that there are three species. This confusion is readily understandable, as the three species are very similar in color and maculation. The genitalia of both sexes have good characters that can be used to separate the species, and genitalic preparations should be relied upon as the most accurate means of species determination. Much work needs to be done with this obscure group of moths, with a particular need for life history work.

MATERIALS STUDIED: Eighty-five specimens have been studied, as well as the type specimens. This material has been made available to the author through the kindness of the authorities in some of the major eastern and western museums, and the cooperation of several private collectors; these are referred to specifically in the following paragraph. A number of genitalic slides have been prepared by the author, mainly from specimens in the collection of the American Museum of Natural History, and additional slides have been studied from the collections of the United States National Museum, the Museum of Comparative Zoölogy, Harvard College, the Canadian National Collection, Ottawa, and John L. Sperry, Riverside, California. These slides have served as the basis for the genitalic descriptions and drawings.

ACKNOWLEDGMENTS: The author wishes to acknowledge with thanks the cooperation and aid of the following men who have

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GENUS **EXELIS** GUENÉE

Exelis GUENÉE, 1857, Histoire naturelle des insectes, vol. 9, p. 323. WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 21, p. 477. HULST, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 351. DYAR, "1902" [1903], Bull. U. S. Natl. Mus., vol. 52, p. 323. GROSSBECK, 1912, Bull. Amer. Mus. Nat. Hist., vol. 31, p. 405. BARNES AND McDUNNOUGH, 1918, Check list, p. 116. McDUNNOUGH, 1938, Check list, p. 162. FORBES, 1948, Cornell Univ. Agr. Exp. Sta., Mem. 274, p. 52.

Patridava WALKER, 1862, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 26, p. 1688. HULST, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 351 (synonymy).

Head, front flat, weakly tufted ventrally; eyes large, round, wider than front; antennae of both sexes pectinate, the pectinations arising in terminal portion of segments in basal half of antenna, becoming mediad in origin distally, apex of antenna serrate; tongue present; labial palpi strongly developed, heavily scaled, rising to middle of eyes, middle segment extending beyond front, terminal segment small, slightly longer than high. Thorax without tufts; legs without hair pencils, fore tibia with moderate process, hind tibia not dilated, with two pairs of spurs. Abdomen without tufts; ventral surface of third abdominal segment without row of bristles and eighth abdominal segment without plate. Forewings elongate, apex somewhat produced, 11 veins, usually no areoles; R_{1+2} from top of cell, sometimes with weak cross vein

to R_{3+5} , R_3 to R_5 stalked, from top near R_{1+2} , R_5 from stalk before R_3 ; M_1 from upper angle, M_2 from middle of dc; Cu_2 from well before outer angle; fovea absent. Hind wings elongate, apex produced, frenulum strong in both sexes; Sc approximate to R near base for one-half of length of cell; R and M_1 approximate, from cell, the latter from just before upper angle; M_3 from angle, approximate with Cu_1 at base; Cu_2 from well before outer angle. Forewings and hind wings concolorous gray or brown, with obscure maculation; primaries above unicolorous, with t. a., median, and t. p. lines usually weakly indicated, discal dot present; secondaries with intradiscal and extradiscal lines weakly represented. Beneath similar to upper surfaces, with maculation repeated or obsolescent.

MALE GENITALIA: Uncus simple, long, tapering to apex from broad base, terminal portion strongly curved; socius not differentiated; gnathos strongly developed, heavily sclerotized, widened medioventrally; valves large, rounded, only slightly sclerotized, valvula present in the form of an elongated sclerotized arm with apical group of short spines or as small sclerotized process at base of valve, sacculus present as prominent sclerotized plate or arm with an apical group of short or long spines; transtilla absent; cristae present; juxta elongate, membranous; furca absent; saccus projecting short distance beyond base of valves, broadly rounded or bluntly pointed, longer than length of uncus; aedeagus elongate, subequal to, or longer than, combined length of tegumen and saccus, tapering to apex or with terminal portion extending as elongate, narrow, sclerotized arm; vesica unarmed.

FEMALE GENITALIA: Ostium with lateral sclerotized plates; operculum absent; ductus bursae sclerotized, in length ranging from shorter than length of ovipositor lobes to longer than combined lengths of lobes and apophyses; ductus seminalis arising ventrally at junction of ductus bursae and bursa copulatrix, as small swollen sac with ductus coming off mid-section of sac; bursa copulatrix membranous, longer than apophyses of ovipositor lobes, with transverse indented signum. Segment VIII with dorsal surface more heavily sclerotized than ventral surface.

EARLY STAGES: Undescribed, except for a few brief notes by Guenée and Forbes. The caterpillar of the type species is described more fully below. A few eggs have been found protruding from the tip of the abdomen of one specimen from Texas; these furnish the basis of the following description.

EGGS: Elongate, one end rounded, the other truncate; the sides with approximately 18 longitudinal ridges, these being quite high and prominent at the truncate end, and becoming lower and sometimes splitting into two medially, the surface between these ridges with numerous low, transverse ridges, forming rectangular cells.

LARVA: No material available.

PUPA: Undescribed.

TYPE SPECIES: *Exelis pyrolaria* Guenée (monobasic), for both *Exelis* and *Patridava* (Walker's sole included species was *tensaria*, a synonym of *pyrolaria*).

This genus has been placed in association with *Tornos* Morrison for many years. *Exelis* can be separated immediately from that group by the presence of pectinate antennae in both sexes. In addition, *Tornos* has the discal dot of the forewings above represented by a prominent scale tuft which is lacking in *Exelis*.

The genus *Exelis* is found in the eastern and southern parts of the United States, from the middle Atlantic states south to Florida, west to Texas, and north as far as Illinois. Several other species have been described in this genus from Mexico and South America (*mundaria* Dyar, *quadripuncta* Warren); these are better placed in the genus *Tornos*.

The following key to the adults should be used with considerable caution, as the species are very similar to one another in color and maculation. To be certain of the identifications, the genitalia should be mounted and studied.

KEY TO ADULTS

1. Wings above dark gray or gray-brown, with cross lines on primaries tending to be incompletely indicated or obsolescent.....2
- Wings above ochreous, with cross lines on primaries usually complete and well defined.....*ophiurus*
2. Vertex, front, and palpi concolorous, without dark band between antennal bases; forewings above with t. a., median, and t. p. lines usually indicated.....*pyrolaria*
- Vertex lighter in color than front and palpi, with dark band between antennal bases; forewings above with t. a. line complete, with median line absent, and with t. p. line partially obsolescent.....*dicolus*

KEY TO MALE GENITALIA

1. Aedeagus subequal in length to combined lengths of tegumen and saccus; apical portion of aedeagus in form of long, narrow, sclerotized arm.....2

- Aedeagus slightly longer than combined lengths of uncus, tegumen, and saccus; apical portion of aedeagus without sclerotized arm. . . . *ophiurus*
- 2. Valves with arm of valvula reaching almost to apex of valves, and being much longer than arm of sacculus. *pyrolaria*
- Valves with arm of valvula extending approximately three-fourths of length of valve, and with arm of sacculus extending farther posteriad. . . . *dicolus*

KEY TO FEMALE GENITALIA¹

- 1. Ductus bursae shorter than ovipositor lobes. *pyrolaria*
- Ductus bursae longer than combined lengths of lobes and apophyses of ovipositor. *ophiurus*

Exelis pyrolaria Guenée

Figures 1, 4

Exelis pyrolaria GUENÉE, 1857, Histoire naturelle des insectes, vol. 9, p. 324. WALKER, 1860, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 21, p. 477. PACKARD, 1876, A monograph of the geometrid moths . . . of the United States, p. 565. HULST, 1895, Ent. News, vol. 6, p. 103. GROSSBECK, 1912, Bull. Amer. Mus. Nat. Hist., vol. 31, p. 405 (*partim*); 1917, *ibid.*, vol. 37, p. 96 (*partim*). OBERTHÜR, 1913, Études de lépidoptérologie comparée, vol. 7, p. 330, pl. 184, fig. 1813. FORBES, 1948, Cornell Univ. Agr. Exp. Sta., Mem. 274, p. 52 (*partim*).

Patridava tensaria WALKER, 1862, List of the specimens of lepidopterous insects in the collection of the British Museum, pt. 26, p. 1689. HULST, 1895, Ent. News, vol. 6, p. 103 (synonymy). GROSSBECK, 1912, Bull. Amer. Mus. Nat. Hist., vol. 31, p. 405.

Exelis teusaria (*sic*), DYAR, "1902" [1903], Bull. U. S. Natl. Mus., vol. 52, p. 323.

Tornos approximaria PACKARD, 1876, A monograph of the geometrid moths . . . of the United States, p. 215, pl. 9, fig. 40. HULST, 1895, Ent. News, vol. 6, p. 103. GROSSBECK, 1912, Bull. Amer. Mus. Nat. Hist., vol. 31, p. 405.

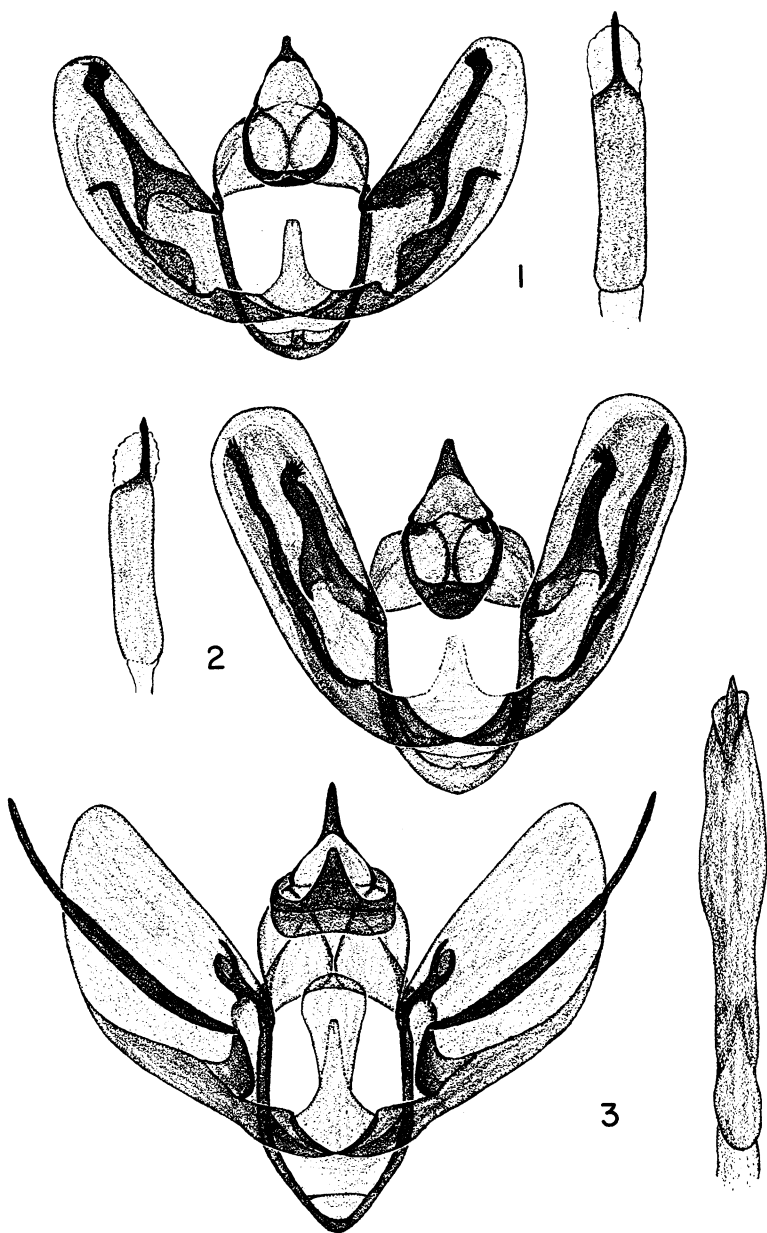
Lepiodes (Tornos) approximaria, HULST, 1888, Ent. News, vol. 4, p. 50 (synonymy).

Lepiodes approximaria, J. B. SMITH, 1891, List of the Lepidoptera of boreal America, p. 71.

MALE: Head, vertex, front, and palpi dark gray-brown. Thorax, legs and abdomen dark gray-brown above and below.

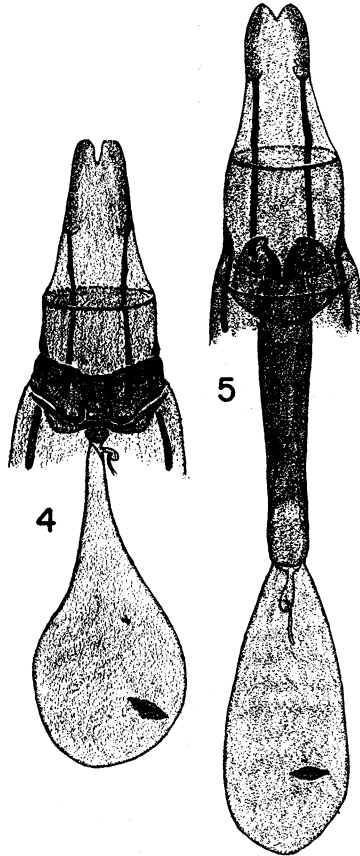
UPPER SURFACE OF WINGS: Forewings, ground color a unicolorous dark gray-brown; costa with slightly darker bands or spots, these usually only weakly indicated or obsolete except when marking origin of cross lines; basal line usually absent, rarely indicated by a few black-brown scales; t. a. line narrow, black-brown, complete or partially obsolescent, arising on costa one-fourth of distance from base at a right angle, running across

¹ The female of *dicolus* is unknown.



FIGS. 1-3. Male genitalia of *Exelis*. 1. *E. pyrolaria* Guenée, Maxton, North Carolina, June 20, 1944 (A. B. Klots). 2. *E. dicolus*, new species, holotype, Sulphur City, Arkansas, August 16-23. 3. *E. ophiurus*, new species, paratype, Burnet County, Texas.

wing to below cubital vein, then curving gently basad to inner margin; median line weakly indicated, usually incompletely represented by black-brown scaling, arising on costa one-half of distance from base, curving outwardly in cell and on anal vein, with strong basal bend in middle of cubital cell; discal dot black-



FIGS. 4-5. Female genitalia of *Exelis*. 4. *E. pyrolaria* Guenée, Lakeland, Florida, March 28, 1912. 5. *E. ophiurus*, new species, paratype, Bexar County, Texas, 1907.

brown, elongate, prominent; t. p. line narrow, black-brown, usually completely indicated, arising on costa two-thirds of distance from base, going slightly basad of radial vein, then swinging outward to vein M_1 , then sharply indented opposite discal dot, swinging outward again to vein M_3 , subparalleling outer margin

to vein Cu_2 , with a strong basal bend in middle of cubital cell, and then going outwardly to anal vein, paralleling median line; subterminal and terminal areas usually not differentiated, without lines, rarely with faint gray shading; terminal line faintly represented between veins; fringe concolorous with wings, the scales tipped with gray. Hind wings concolorous with forewings; antemedian line usually represented on anal margin three-fifths of distance from base as a few black-brown scales, rarely extending as far as middle of wing; discal dot absent; postmedian line slightly stronger than antemedian line, sometimes extending completely across wing, black-brown at anal margin and becoming paler anteriorly, sinuate, with strong outward curves at veins M_1 , M_3 , and 2A, being bent rather sharply basad between these points, meeting inner margin at four-fifths of distance from base; terminal line faintly represented between veins, or absent; fringe as on primaries.

UNDER SURFACE OF WINGS: Forewings, ground color a unicolorous dark gray-brown, as above; costa lightly marked with gray; cross lines absent or very weakly indicated near costa; discal dot weakly represented, dark gray-brown, diffuse; fringe as above. Hind wings concolorous with forewings, with some scattered, black-brown scales; antemedian and postmedian lines sometimes weakly indicated; fringe as above. Expanse: 19 to 24 mm.

FEMALE: Like male. Expanse: 22 to 25 mm.

MALE GENITALIA: Uncus subtriangular, dorsal surface with approximately 25 setae; gnathos with lateral portions narrow, increasing in width medially, the ventral margin extending as bluntly pointed, spoon-like lip; valves rounded, outer surface lightly sclerotized in central portion of valve; valvula elongate, almost reaching apex of valve, with wide bifurcate base, the ventrodistal portion of base extending as a narrow curving arm, the medial part of base being larger and broader, narrowing and extending apically as a straight arm, the terminal portion widened and turning medially, thickly beset with many short, heavy spines; sacculus extending one-half of length of valve, being a broad, semiquadrate, sclerotized plate basally, extending posteroventrally as a narrow arm, then turning at a right angle and extending ventrally, terminating in two elongate, heavy spines; juxta membranous, tapering to a blunt point; saccus broadly rounded; aedeagus subequal in length to combined lengths of

tegumen and saccus, of equal width or very slightly constricted medially, extending apically as elongate, narrow, heavily sclerotized arm.

FEMALE GENITALIA: Ostium with a small sclerotized plate ventrally, somewhat tapering towards ductus bursae, with a median lobe, and with large lateral plates, tapering posterolaterally, being longer than ostial plate and extending to lateral margins of segments, and with a less clearly defined sclerotized band, just anterior to lateral sclerotized plates, widest medially and extending width of segment; ductus bursae very short, in length subequal to length of ostial plate, narrower than long; ductus seminalis arising medially or on right side; bursa copulatrix elongate, pear shaped, with several very finely scobinate lines near junction with ductus bursae, signum one-half as long as ovipositor lobes.

EARLY STAGES: Briefly described by Guenée in the original description. This species has also been reared by Mr. Theodore Pergande from larvae collected in Washington, D. C. Under No. 4311, Pergande made the following notes: "The larvae are deep, dull black. Face flat; head sprinkled with rather few, minute whitish spots; labrum whitish anteriorly, pale brownish posteriorly; first antennal joint white; thoracic segments with about 13 rows of minute white spots, and the abdomen subdorsally with three or four rather indistinct rows of still smaller whitish spots; there is also a transverse row of six larger and rather conspicuous yellow spots across abdominal segments 2-4, and behind them some smaller yellow spots and a bright yellow, somewhat interrupted substigmatal line on segments 2-5." The length of the full-grown larva was about 17 mm. The caterpillars were collected July 1; on July 9 they began to pupate, and they emerged July 23-26, 1888.

TYPES: *Pyrolaria*, in United States National Museum; *tensaria*, in British Museum (Natural History); *approximaria*, in Museum of Comparative Zoölogy, Harvard College.

TYPE LOCALITIES: "Amérique septentrionale" (*pyrolaria*); "—" (*tensaria*); Kentucky (*approximaria*).

RANGE: United States, east of the Mississippi River and south of Illinois and the District of Columbia; one specimen seen from New York (Adirondack Mountains). (See fig. 6.) On the wing from March through August.

FOOD PLANTS: *Chimaphila umbellata* (Linnaeus) Nuttall (*Py-*

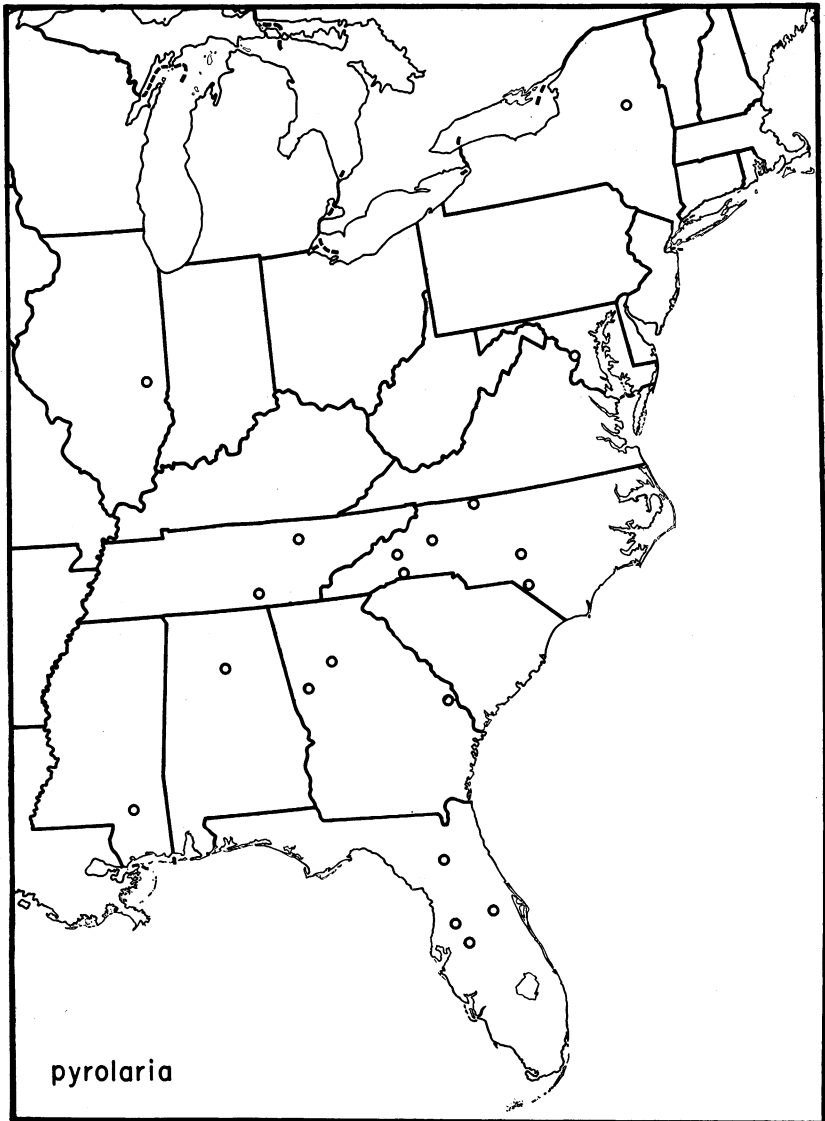


FIG. 6. Distribution of *Exelis pyrolaria* Guenée. This species is also known from Kentucky, but without further data.

rola) and two other plants (Guenée); persimmon (reared by Pergande).

REMARKS: Forty-two specimens examined. This species can

be recognized by the dark gray color of the wings, although in old or worn specimens this fades to a grayish brown. In fresh specimens, the three cross lines and discal spot of the upper surface of the forewings are usually fairly clearly defined; in worn specimens, the maculation may become partially or wholly obsolete. Particularly in this latter case, confusion may result with the following species. The genitalia are very distinct, however, and offer the most accurate means of separating the species.

Exelis dicolus, new species

Figure 2

Exelis pyrolaria FORBES (*nec* Guenée), 1948, Cornell Univ. Agr. Exp. Sta., Mem. 274, p. 52 (*partim*).

MALE: Head, vertex gray-brown, with a row of brownish scales between antennal bases; front and palpi brown. Thorax and abdomen gray-brown above, slightly shaded with brown beneath and on legs.

UPPER SURFACE OF WINGS: Forewings, ground color a unicolorous gray-brown, with a few scattered brown scales; costa with slightly darker bands or spots, these usually only weakly indicated or obsolete except when marking origin of cross lines; basal line absent; t. a. line narrow, dark brown or black-brown, usually rather weakly indicated or partially obsolescent, arising on costa one-fourth of distance from base at a right angle, running across wing to below cubital vein, then curving evenly basad to inner margin; median line usually absent, sometimes weakly represented by a faint clouding on costa and by a few dark scales across the wing; discal dot dark brown, elongate, somewhat diffuse; t. p. line dark brown or black-brown, partially obsolescent, its course being indicated by scattered dark scales, arising on costa two-thirds of distance from base, going across radial vein with slight basal bend, then swinging outward to vein M_1 , more or less obsolescent in middle of wing but apparently subparalleling outer margin with basal bend opposite discal dot, with stronger basal bend in cubital cell, swinging outward again to anal vein; subterminal and terminal areas not differentiated, usually with faint gray line between; terminal line faintly represented between veins; fringe concolorous with wings. Hind wings concolorous with forewings, with a few scattered brown scales, especially along anal margin; antemedian line represented by a few black-brown

scales three-fifths of distance from base on anal margin, sometimes extending to center of wing; discal dot absent; postmedian line slightly stronger than antemedian line, sometimes extending completely across wing, black-brown at anal margin and becoming paler anteriorly, sinuate, with outward bends on veins M_1 , M_2 , and 2A, being bent basad between these points, meeting inner margin at four-fifths of distance from base; terminal line faintly represented or absent; fringe as on primaries.

UNDER SURFACE OF WINGS: Forewings, ground color a unicolorous gray-brown or ochreous, with scattered brownish scales; costa lightly marked; cross lines absent or very weakly indicated near costa; discal dot brown, diffuse; fringe as above. Hind wings concolorous with forewings, with some scattered brown scales; antemedian and postmedian lines absent or weakly indicated; discal dot faintly represented; fringe as above. Expanse: 18 to 21 mm., holotype 18 mm.

FEMALE: Unknown.

MALE GENITALIA: Uncus subtriangular, dorsal surface with approximately 50 setae; gnathos with lateral portions narrow, increasing in width medially, the ventral margin extending as bluntly pointed lip; valves rounded, outer surface lightly sclerotized in central portion of valve; valvula elongate, extending approximately three-fourths of length of valve, with wide bifurcate base, the ventrodiscal portion of base extending as short curving arm, the medial part of base being much larger and broader, gradually narrowing and extending apically as a gently curving arm, the terminal portion recurved and with 10 to 15 short heavy spines; sacculus extending farther distally than valvula, being widened at base, gradually narrowing, extending as slightly sinuate arm, narrower than arm of valvula, the apex with two stout spines; juxta membranous, tapering to blunt point; saccus broadly rounded; aedeagus subequal in length to combined lengths of tegumen and saccus, of equal width or very slightly constricted medially, extending apically as elongate, narrow, heavily sclerotized arm.

EARLY STAGES: Unknown.

TYPES: Holotype, male, Sulphur City, Washington County, Arkansas, August 16-23; in the collection of the United States National Museum. Paratypes, five males, all from Arkansas: same data as holotype; Hope, June 26, 1926 (L. Knobel); Benton, July 1, 1950 (H. Ramstadt). Paratypes to be distributed as

follows: United States National Museum; the American Museum of Natural History; Canadian National Collection; Museum of Comparative Zoölogy, Harvard College; and collection of Alex K. Wyatt of Chicago.

RANGE: Known only from Arkansas. (See fig. 7.) On the wing in June, July, and August.

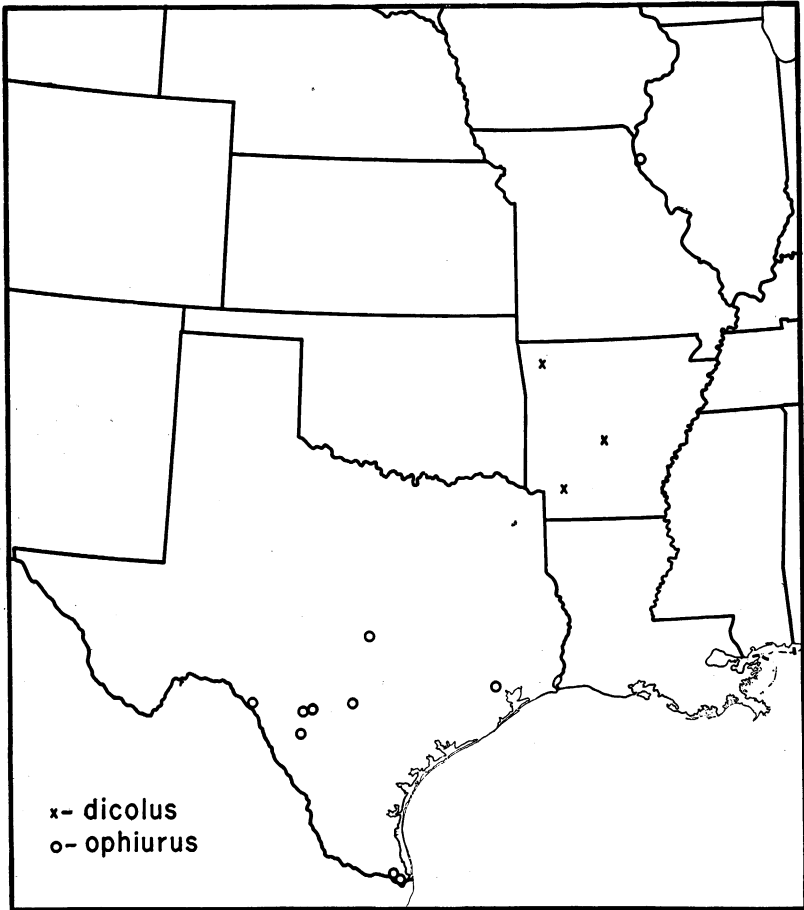


FIG. 7. Distribution of *Exelis dicolus* Rindge and *E. ophiurus* Rindge.

FOOD PLANT: Unknown.

REMARKS: Six specimens examined. The color of the wings above varies from that found in *pyrolaria* to a slightly more brownish gray, so these two species might be confused. However,

dicolus has the maculation much more weakly represented on the forewings above, with the median line usually absent and the t. p. line partially obsolescent. In addition, the vertex of this species tends to be lighter in color than the front and palpi, while in *pyrolaria* the three tend to be concolorous.

The best way to distinguish this species is by the genitalia. The males can be separated immediately from *pyrolaria* by the structure of the valves; in this species the arm of the valvula extends three-fourths of the length of the valve, with the arm of the sacculus extending farther posteriad.

Exelis ophiurus, new species

Figures 3, 5

Tornos approximaria PACKARD, 1876, A monograph of the geometrid moths . . . of the United States, p. 216 (*partim*).

Exelis pyrolaria AUCT. (*nec* Guenée). GROSSBECK, 1912, Bull. Amer. Mus. Nat. Hist., vol. 31, p. 405 (*partim*); 1917, *ibid.*, vol. 37, p. 96 (*partim*). FORBES, 1948, Cornell Univ. Agr. Exp. Sta., Mem. 274, p. 52 (*partim*).

MALE: Head, vertex ochreous, with a row of dark brown scales between antennal bases; front and palpi brown. Thorax ochreous above, slightly shaded with brown beneath and on legs. Abdomen gray-brown above and below, ends of segments on dorsal surface tending to be narrowly marked with black-brown.

UPPER SURFACE OF WINGS: Forewings, ground color a unicolorous ochreous, with scattered reddish brown or dark brown scales; costa gray-brown, with obscure, lighter bands or spots, and with three darker brown spots marking origin of cross lines; basal line absent; t. a. line narrow, black-brown, complete, arising on costa one-fifth of distance from base, going slightly outwardly oblique through cell, with small basal bend on or just posterior to cubital vein, swinging with broad outward curve to meet inner margin one-fourth of distance from base; median line narrow, black-brown, complete, arising on costa approximately two-fifths of distance from base, swinging outward on radial vein, vein Cu_1 , and on anal vein, with strong basal bend below cubital vein; discal dot absent, or weakly indicated by a few brown scales; t. p. line narrow, black-brown, complete, arising on costa two-thirds of distance from base in dark brown spot, going sharply outward to vein M_1 , then angled sharply and sub-parallelizing outer margin, with small basal bend opposite discal dot, to about vein Cu_2 , with strong basal bend in middle of cubital

cell, and then going outward to anal vein, paralleling median line; subterminal and terminal areas not differentiated, usually with faint gray line between; terminal line brown, faint, sometimes incomplete; fringe concolorous with wing. Hind wings concolorous with forewings, with scattered reddish brown or dark brown scales, especially along anal margin; antemedian line black-brown at anal margin, becoming dark brown medially, and usually fading out in anterior portion of wing, in course running fairly straight across wing from two-fifths of distance from base on costa to five-eighths of distance from base on anal margin; discal dot absent; postmedian line black-brown at anal margin, becoming dark brown medially, and usually fading out before reaching costa, arising one-half of distance from base on costa, swinging outward, then curving basally, with basal bend on vein M_1 , subparalleling outer margin to cell Cu_2 , then turning and subparalleling antemedian line to anal margin near anal angle; terminal line brown, faint, sometimes incomplete or lacking; fringe as on primaries.

UNDER SURFACE OF WINGS: Forewings a unicolorous ochreous, as above; costa slightly darkened; cross lines absent or very weakly indicated near costa; discal dot absent or barely indicated; fringe as above. Hind wings concolorous with forewings, with some scattered dark brown scales; antemedian and postmedian lines usually weakly indicated; fringe as above. Expanse: 20 to 24 mm., holotype 24 mm.

FEMALE: Like male. Expanse: 19 to 26 mm., allotype 25 mm.

MALE GENITALIA: Uncus subtriangular, terminal half narrowed and tapering, dorsal surface with approximately 20 to 25 setae; gnathos large, with lateral portions fairly wide, increasing in width medially, the ventral portion quite wide and extending posteriorly as large, heavily sclerotized, subtriangular lip; valves bluntly pointed; valvula small, inconspicuous, extending as bifurcate projection, the apical arm narrow, the basal arm broad and curved; sacculus extending as a very long and narrow arm, arising from a roughly triangular, sclerotized plate near base of valve, then extending as a freely moving arm, in length longer than length of valves, the arm with constriction at two-thirds of its length, then continued as several very long, tapering spines; juxta membranous, enlarged distally; saccus bluntly pointed; aedeagus slightly longer than combined lengths of uncus, tegumen, and saccus, slightly swollen medially, apex with short, lightly sclerotized arm.

FEMALE GENITALIA: Ostium elongate, the dorsal surface extending approximately the length of the ovipositor lobes beyond the ventral margin, the former with a median indentation, heavily sclerotized, extending laterally as large, less heavily sclerotized lateral plates, widest medially, and tapering to both dorsal and ventral lips of ostium; ductus bursae very long, longer than combined lengths of lobes and apophyses of ovipositor, maximum width approximately two-thirds of length of ovipositor lobes, being widest below ostium, then slightly narrowing anteriorly; ductus seminalis arising medioventrally; bursa copulatrix elongate, rounded, signum approximately two-thirds as long as ovipositor lobes.

EARLY STAGES: Unknown except for the egg (see generic description).

TYPES: Holotype, male, and allotype, female, Burnet County, Texas; in the collection of the American Museum of Natural History. Paratypes, 14 males and 20 females, all from Texas: same data as holotype; Bexar County, 1907; San Antonio, July, 1899 (O. C. Poling); San Benito, March 16–23, September 8–15; Nueces River, Zavalla County, April 26–27, 1910 (F. C. Pratt); Shovel Mountain, April 8–15, July 16–23; Sabinal, May (F. C. Pratt); Houston, February 13; Del Rio, May 22; Uvalde, March 7–19, 1923; Brownsville; "Texas," without date and May. Paratypes to be distributed as follows: United States National Museum; the American Museum of Natural History; Museum of Comparative Zoölogy, Harvard College; California Academy of Sciences; Rutgers University; Department of Entomology, Cornell University; and collection of Otto Buchholz of Roselle Park, New Jersey.

RANGE: Texas, with a single specimen from Illinois. (See fig. 7.) On the wing from February through May, July, and September.

FOOD PLANT: Unknown.

REMARKS: Thirty-seven specimens examined. This species can usually be recognized by the ochreous color of the wings, and by the usually complete and well-defined cross lines on the upper surface of the forewings. In this species, the cross lines tend to be more completely represented than in *pyrolaria* and are more contrasting, owing to the lighter wing color in *ophiurus*. However, the discal dot is weaker in this species, as it is represented

by relatively few scales, whereas in *pyrolaria* the discal dot is often quite prominent and tends to be elongate.

The genitalia are quite distinctive. The male of this species can be distinguished by the very long aedeagus, which does not have the elongate, narrow, sclerotized arm at the apex, and by the fact that the valvula is small and inconspicuous, while the sacculus is in the form of a very long, freely moving arm. The female genitalia can be separated from those of *pyrolaria* by the presence, in this species, of the elongate ductus bursae.

