

Investigating Rowan County Lepidoptera biodiversity, part five: Nymphalidae and Riodinidae

Rachel Brown and Sean O'Keefe, Mentor

ABSTRACT

According to Charles Covell's 1999 work *The Butterflies and Moths (Lepidoptera) of Kentucky: An Annotated Checklist* and its three supplements, there are 2493 species of Lepidoptera (butterflies, moths, and skippers) known from Kentucky, with 563 of these occurring in Rowan County (RC). Our project updates Covell's records from RC via data from The Society of Kentucky Lepidopterists and the current Lepidoptera collections of Morehead State University (MSU) and Jonathan Smith. This poster concludes our research updating the superfamily Papilionoidea, which contains the families Papilionidae, Pieridae, Lycaenidae, Nymphalidae, and Riodinidae. Previous posters have shown the results of the first three families, where we identified numerous new county records (NCRs) (one in Papilionidae, four in Pieridae, and eleven in Lycaenidae, bringing RC's total to six, eight, and eighteen species respectively). Here we update the Nymphalidae and Riodinidae found in RC and provide members' common and scientific names, Hodge number, phenotype, seasonality, and host plants. Covell records eighteen species of Nymphalidae and no species of Riodinidae in RC. We identify eleven NCRs in Nymphalidae and none in Riodinidae.

INTRODUCTION

The superfamily Papilionoidea contains the approximately 20,000 "true butterflies" and its members are subdivided into five families: Papilionidae, Pieridae, Lycaenidae, Nymphalidae, and Riodinidae (Allen, 1997). Of these, around 800 can be found in North America with 95 in Kentucky (Covell, 1999). In previous posters, we updated Rowan County (RC) records for Papilionidae (swallowtails), Pieridae (whites and sulfurs), and Lycaenidae (harvesters, hairstreaks, coppers, and blues), finding one, four, and eleven new county records (NCRs) respectively. Here, we show updated records for the families Riodinidae (Metalmarks) and Nymphalidae (Brushfoots).

Riodinidae: Most metalmarks inhabit tropical localities and there is considerable confusion taxonomically as well as high similarity between some members. Around 1,400 species are recognized with 20 in North America and two in KY (Bugguide, 2013; Covell, 1999). They come in a myriad of colors and have small to medium wings displaying intricate patterns. No metalmarks are known from RC.

Nymphalidae: Brushfoots are the largest family in Papilionoidea and contain many iconic species, including the famous migrating monarch (Fig.26). With around 6,000 members (Bugguide, 2016), they vary widely in wingspan, wing-shape, color, and diet. About 209 brushfoots inhabit North America (Bugguide, 2016) and Covell (1999) records 42 in Kentucky with 18 from RC. This numerous group is divided into several subfamilies: Nymphalinae (Brushfoots), Satyrinae (Satyrs & Wood Nymphs), Heliconiinae (Longwings), Limenitidinae (Admirals), Danaeinae (Milkweed Butterflies), Lybytheinae (Snouts), Apaturinae (Hackberry Butterflies), and Charaxinae (Leaf Butterflies). Most members do not use their prolegs for walking and often have comb-like hairs on them, hence this family's common name (Opler, 1998).

KEY: V=ventral, D=dorsal, FW=forewing, HW=hindwing, WS=wingspan, S=seasonality, HP=host plants, M=male, & F=female.

Limenitidinae: Admirals



***4522 Limenitis arthemis (Red-spotted Purple)** (Fig. 24A): Iridescent blue with orange basal & submarginal spots and two rows of pale dashes. D (Fig. 24B): Iridescent navy fading to pale blue (HW) or black (FW) with rows of light bands. WS: 3.4-in. S: April-Oct. HP: Wild cherry, poplar, aspens, & black oaks. Note: White Admiral is same species, but its phenotype is not recorded from RC.

***4523 Limenitis archippus (Viceroy)** (Figs. 25A-B): Famous monarch mimicker. V (Fig. 25A): Peach with black veins, HW with black postmedian vein, which the monarch (Fig. 26) lacks. D (Fig. 25B): Orange with black stripes & margins with one row of white spots. WS: 2.6-3.3in. S: May-Sept. HP: Willows.

Danaeinae: Milkweed Butterflies



***4614 Danaus plexippus (Monarch)** (Figs. 26A-C): Likely the best known butterfly and renowned for the fall brood's migration to Mexico. All wings with prominent black veins and black margin with two rows of white spots. HW lacks Viceroy's (Fig. 25) postmedian black vein. Males (Fig. 26C) with scent patch on HW, which females (Fig. 26B) lack. V (Fig. 26A): HW peach, FW orange with golden apex. D (Figs. 26B-C): Golden-orange. WS: 3.4-4.9in. S: Migrates north and resides here June-Aug. HP: Milkweed (makes species toxic to predators).

Lybytheinae: Snouts



***4411 Lybytheana carinenta (American Snout)** (Figs. 27A-B): Distinctive wing margins and snout. V (Fig. 27A): Mottled grey HW, bright orange, white, & black on FW. D (Fig. 27B): Deep brown with orange & white patches. WS: 1.6-2in. S: May-Aug. HP: Hackberries & sugarberry.

Apaturinae: Hackberry Butterflies



***4457 Asterocampa celtis (Hackberry Emperor)** (Figs. 28A-B): Cream with tan swirls, HW with seven postmedian eyes, FW with single eye. D (Fig. 28B): Brown & tan, HW with six postmedian dark spots, FW with one dark spot & several white patches. WS: 1.9-2.5in. S: May-Oct. HP: Sugarberry & hackberry.

***4462.1 Asterocampa clyton (Tawny Emperor)** (Figs. 29A-C): Some polymorphism. V (Fig. 29A): pale red with dark postmedian red (HW) or cream (FW) patches. D (Figs. 29B-C): HW with five submarginal eyes, FW with prominent black discal bars. Golden brown color variable. WS: 1.9-2.75in. S: June-Aug. HP: Sugarberry & hackberry.

Nymphalinae: Brushfoots



***4420 Polytonia interrogationis (Question Mark)** (Figs. 1A-D): Seasonally dimorphic. Both with white "question mark" on V HW (Fig. 1C). D (Fig. 1B): FW orange with 4th black dot not seen in *P. comma* (Fig. 2). Winter: V (Fig. 1A) grey-red, D (Fig. 1B) with more orange. Summer: V (Fig. 1C) brown bark pattern with marginal black dots, D (Fig. 1D) mainly black HW. WS: 2.25-3in. S: fall-spring or spring-summer. HP: Nettle, false nettle, elms, & hackberry.

***4421 Polytonia comma (Eastern Comma)** (Figs. 2A-D): Seasonally dimorphic. Both with "comma" white mark on V HW (Fig. 2C), D (Fig. 2B) FW orange with black spots, lacking 4th dot of *P. interrogationis* (Fig. 1). Winter: V (Fig. 2A) dull grey, D (Fig. 2B) HW with more orange. Summer: V (Fig. 2C) brown bark pattern, D (Fig. 2D) HW mostly black. WS: 2-2.4in. S: Sept.-May and May-Aug. HP: Nettle, false nettle, elms, & hops.

***4432 Nymphalis antiopa (Mourning Cloak)** (Figs. 3A-B): V (Fig. 3A): Rippled grey with light margin. D (Fig. 3B): Deep burgundy with submarginal blue dots and marginal yellow band. WS: 3-4in. S: June-May (estivate then hibernate). HP: Willow, birch, cottonwood, elm, & hackberry.

***4434 Vanessa virginiensis (American Painted Lady)** (Figs. 4A-B): V (Fig. 4A): FW salmon with brown & white, HW with white cobweb & two large eyes. D (Fig. 4B): brown, yellow, & gold with four submarginal black dots. WS: 2-2.6in. S: Summer. HP: Everlasting & pussy toes.



***4435 Vanessa cardui (Painted Lady)** (Figs. 5A-B): V (Fig. 5A): FW orange with brown & white, HW with white cobweb & five eyes. D (Fig. 5B): HW brown-orange with five submarginal black dots. WS: 2.2-2.8in. S: Colonizes May-Oct. HP: Thistles, mallows, legumes, & many others.

***4437 Vanessa atalanta (Red Admiral)** (Figs. 6A-B): V (Fig. 6A): HW brown bark-like, FW with red on black and brown apex. D (Fig. 6B): Brown basally then rust margin (HW) or median rust band with black white-spotted apex (FW). WS: 2.25-3in. S: April-Oct. HP: Nettles, false nettle, wood nettle, & pellitory.

***4440 Junonia coenia (Common Buckeye)** (Figs. 7A-B): V (Fig. 7A): HW tan with red postmedian band. FW with orange & white stripes and black eye. D (Fig. 7B): Brown with three prominent gold-ringed eyes. WS: 1.6-2.7in. S: May-Oct. HP: Snapdragon, false foxglove, toadflax, & ruellia.

***4481 Phyciodes tharos (Pearl Crescent)** (Figs. 8A-B): V (Fig. 8A): FW blurry calico coloring, HW with rows of yellow, tan, & brown. D (Fig. 8B): Orange-gold with black margins, HW with submarginal black spots. WS: 1.25-1.6in. S: April-Oct. HP: Asters.

***4490 Chlosyne nycteis (Silvery Checkerspot)** (Figs. 9A-B): V (Fig. 9A): Mosaic of tan, brown, & gold with submarginal spots. D (Fig. 9B): Dark basally turning to gold with dark margins. FW with light submarginal spots & HW with dark ones. WS: 1.5-1.9in. S: May-Sept. HP: Asters, Black-eyed Susans, & wingstem.

Satyrinae: Satyrs & Wood-Nymphs



***4516 Euphydryas phaeton (Baltimore Checkerspot)** (Figs. 10A-B): V (Fig. 10A): Black with several rows of white and orange patches. D (Fig. 10B): Basal black with two submarginal rows of white dots and an orange margin. WS: 1.75-2.75in. S: June-Aug. HP: Turtlehead, beardtongue, & false foxglove.

***4568 Enodia portlandia (Southern Pearly-eye)** (Figs. 11A-B): V (Fig. 11A): Light grey with median caramel lines & several gold-ringed eyes. D (Fig. 11B): Russet, HW with five solid spots, FW submarginal spot line slightly curved. Gold antennae clubs (Fig. 11A). WP: 2.2-2.75in. S: March-Oct. HP: Giant cane & switch cane.

***4573 Cyllopsis gemma (Gemma Satyr)** (Figs. 12A-B): V (Fig. 12A): Grainy tan, HW with grey apex enclosing four dark reflective spots. D (Fig. 12B): Brown, HW with four dark brown marginal spots. WS: 1.9-2.25in. S: April-Sept. HP: Bermuda grass.

***4587 Ceryonis pegala alope (Common Wood Nymph)** (Figs. 13A-C): Polymorphic. Size of prominent yellow band and presence of dual eyes on both sides of FW variable. V (Fig. 13A): Wrinkled brown with variable numbers of HW submarginal eyespots. D (Figs. 13B-C): Brown with single spot. WS: 1.9-3in. S: June-Oct. HP: Purple top & other grasses.

Heliconiinae: Longwings



***4452 Speyeria idalia (Regal Fritillary)** (Figs. 14A-C): Slightly sexually dimorphic. V (Fig. 14A): FW orange with black/white margins, HW white spots on black. F D (Fig. 14B): FW orange with costal black & white dots, HW rust to dark with two rows of light patches. M D (Fig. 14C): FW orange & black, lacking marginal white spots, HW rust to dark with median row of light patches then marginal row of orange patches. WS: 3-4in. S: June-Oct. HP: Birdsfoot & violets.

***4569 Satyroides appalachia (Appalachian Brown)** (Figs. 16A-B): V (Fig. 16A): Tan with median caramel lines & gold-ringed eyes. D (Fig. 16B): Tan with four nearby eyes, HW eyes larger. D (Fig. 16B): Tan with small submarginal eyes. WS: 1.4-1.7in. S: July-Sept. HP: Sedge & giant sedge.

***4575 Hermeuptychia sosybius (Carolina Satyr)** (Figs. 17A-B): V (Fig. 17A): Grey-brown with two brown median lines & distinct submarginal eyes. D (Fig. 17B): Brown with two faint spots. WS: 1.25-1.5in. S: April-Oct. HP: Carpet grass, centipede grass, & other grasses.

***4578 Megisto cymela (Little Wood Satyr)** (Figs. 18A-B): V (Fig. 18A): tan with two straight caramel lines & two prominent gold-ringed eyes on both FW & HW. D (Fig. 18B): Brown, also with sets of two spots. WS: 1.6-1.9in. S: June-July. HP: Grasses.



***4447 Euptoieta claudia (Variegated Fritillary)** (Figs. 19A-B): V (Fig. 19A): Cascade of brown, orange, & tan lacking light spots. D (Fig. 19B): Brown to light gold with marginal black spots. WS: 1.8-3in. S: April-Oct. HP: Violets, maypops, & others.

***4449 Speyeria diana (Diana Fritillary)** (Figs. 20A-D): Sexually dimorphic with similar underlying patterns. F V (Fig. 20A): Navy with postmedian & marginal white lines, FW with white & sky blue patches. F D (Fig. 20B): Navy, FW with three rows of light spots & HW with two marginal rows of sky blue patches. M V (Fig. 20C): Gold & brown, HW with same white lines & FW dark basal to median. M D (Fig. 20D): Dark brown till postmedian, then gold with marginal dots. WS: 3.5-4.5in. S: June-Sept. HP: Violets.

***4450 Speyeria cybele (Great Spangled Fritillary)** (Figs. 21A-B): V (Fig. 21A): FW gold with black stripes & dots, HW brown to tan with large white patches. D (Fig. 21B): Dark brown to gold with black lines & dots. WS: 3-4in. S: June-Aug. HP: Violets.

***4451 Speyeria aphrodite (Aphrodite Fritillary)** (Figs. 22A-B): V (Fig. 22A): FW like *S. cybele* (Fig. 21), but HW lacks tan submarginal band. D (Fig. 22B): FW like *S. cybele*, but HW has unique median black pattern. WS: 2.6-3.3in. S: June-Sept. HP: Violets.

***4465 Boloria bellona (Meadow Fritillary)** (Figs. 23A-B): Flat FW apex (Fig. 23B). V (Fig. 23A): FW gold with black patterns, including black ring basally, HW autumn mixture with two rows of marginal dark dots. D (Fig. 23B): both wings gold with black patterns & two rows of submarginal dark dots. WS: 1.3-2in. S: April-Oct. HP: Violets.

Limenitidinae: Admirals



***4522 Limenitis arthemis (Red-spotted Purple)** (Fig. 24A): Iridescent blue with orange basal & submarginal spots and two rows of pale dashes. D (Fig. 24B): Iridescent navy fading to pale blue (HW) or black (FW) with rows of light bands. WS: 3.4-in. S: April-Oct. HP: Wild cherry, poplar, aspens, & black oaks. Note: White Admiral is same species, but its phenotype is not recorded from RC.

***4523 Limenitis archippus (Viceroy)** (Figs. 25A-B): Famous monarch mimicker. V (Fig. 25A): Peach with black veins, HW with black postmedian vein, which the monarch (Fig. 26) lacks. D (Fig. 25B): Orange with black stripes & margins with one row of white spots. WS: 2.6-3.3in. S: May-Sept. HP: Willows.

Danaeinae: Milkweed Butterflies



***4614 Danaus plexippus (Monarch)** (Figs. 26A-C): Likely the best known butterfly and renowned for the fall brood's migration to Mexico. All wings with prominent black veins and black margin with two rows of white spots. HW lacks Viceroy's (Fig. 25) postmedian black vein. Males (Fig. 26C) with scent patch on HW, which females (Fig. 26B) lack. V (Fig. 26A): HW peach, FW orange with golden apex. D (Figs. 26B-C): Golden-orange. WS: 3.4-4.9in. S: Migrates north and resides here June-Aug. HP: Milkweed (makes species toxic to predators).

Lybytheinae: Snouts



***4411 Lybytheana carinenta (American Snout)** (Figs. 27A-B): Distinctive wing margins and snout. V (Fig. 27A): Mottled grey HW, bright orange, white, & black on FW. D (Fig. 27B): Deep brown with orange & white patches. WS: 1.6-2in. S: May-Aug. HP: Hackberries & sugarberry.

Apaturinae: Hackberry Butterflies



***4457 Asterocampa celtis (Hackberry Emperor)** (Figs. 28A-B): Cream with tan swirls, HW with seven postmedian eyes, FW with single eye. D (Fig. 28B): Brown & tan, HW with six postmedian dark spots, FW with one dark spot & several white patches. WS: 1.9-2.5in. S: May-Oct. HP: Sugarberry & hackberry.

***4462.1 Asterocampa clyton (Tawny Emperor)** (Figs. 29A-C): Some polymorphism. V (Fig. 29A): pale red with dark postmedian red (HW) or cream (FW) patches. D (Figs. 29B-C): HW with five submarginal eyes, FW with prominent black discal bars. Golden brown color variable. WS: 1.9-2.75in. S: June-Aug. HP: Sugarberry & hackberry.

MATERIALS & METHODS

Previous RC biodiversity records were derived from Covell's 1999 *The Butterflies and Moths (Lepidoptera) of Kentucky: An Annotated Checklist* and its three supplements (Covell et al. 2000, Gibson & Covell 2006, Covell & Gibson 2008). Updated records were assembled from the collections of MSU (MSU), A. Jonathan Smith (JS), and The Society of Kentucky Lepidopterists's database (SKL). The field guide *Eastern Butterflies* by Paul Opler (1998) was used to determine phenotype, seasonality, & host plants. Photographs were taken of A. Jonathan Smith's (JS) specimens or downloaded from websites.

RESULTS

We found eleven NCRs* in Nymphalidae and none in Riodinidae.

- *Nymphalis antiopa*^{SKL, JS, MSU}-Mourning Cloak (Fig. 3)
- *Vanessa cardui*^{JS}-Painted Lady (Fig. 5)
- *Junonia coenia*^{JS, MSU}-Common Buckeye (Fig. 7)
- *Enodia portlandia*^{SKL, MSU}-Southern Pearly-eye (Fig. 11)
- *Ceryonis pegala alope*^{KL, MSU}-Common Wood Nymph (Fig. 13)
- *Speyeria idalia*^{MSU}-Regal Fritillary (Fig. 14)
- *Satyroides appalachia*^{JS}-Appalachian Brown (Fig. 16)
- *Euptoieta claudia*^{JS}-Variegated Fritillary (Fig. 19)
- *Speyeria diana*^{SKL, JS, MSU}-Diana Fritillary (Fig. 20)
- *Lybytheana carinenta*^{JS}-American Snout (Fig. 27)
- *Asterocampa clyton*^{JS}-Tawny Emperor (Fig. 29)

This brings RC's total Nymphalids to 29, while Riodinids remain at zero.

* Denotes a NCR. Superscripts signify specimen's origin.

DISCUSSION

Butterflies have been well cataloged in terms of described species and general ranges, but Covell's work is significant since it provides more precise ranges. Covell (1999) recorded several of our NCRs from nearby KY counties. The NCRs may have been recent migrants, but most likely represent insufficient collecting prior to Covell's catalog. Covell (1999) noted just two Riodinidae species in KY and both are said to be uncommon. Of the 42 Nymphalids known from KY, we now know at least 29 occur in RC. This correlates well with RC's large size and diverse ecology. All major brushfoot subfamilies are represented in RC except for Charaxinae, a largely tropical group (Opler, 1998), which has one uncommon species recorded in KY.

Overall, our Lepidoptera biodiversity project has found 25 NCRs of Papilionoidea for RC, increasing our species list to 61. While certainly more butterflies remain to be recorded, we hope this work will interest local lepidopterists and provide a resource for species identification.

ACKNOWLEDGEMENTS

We thank the MSU Department of Biology and Chemistry for partial funding and Jonathan Smith for providing specimens to photograph.