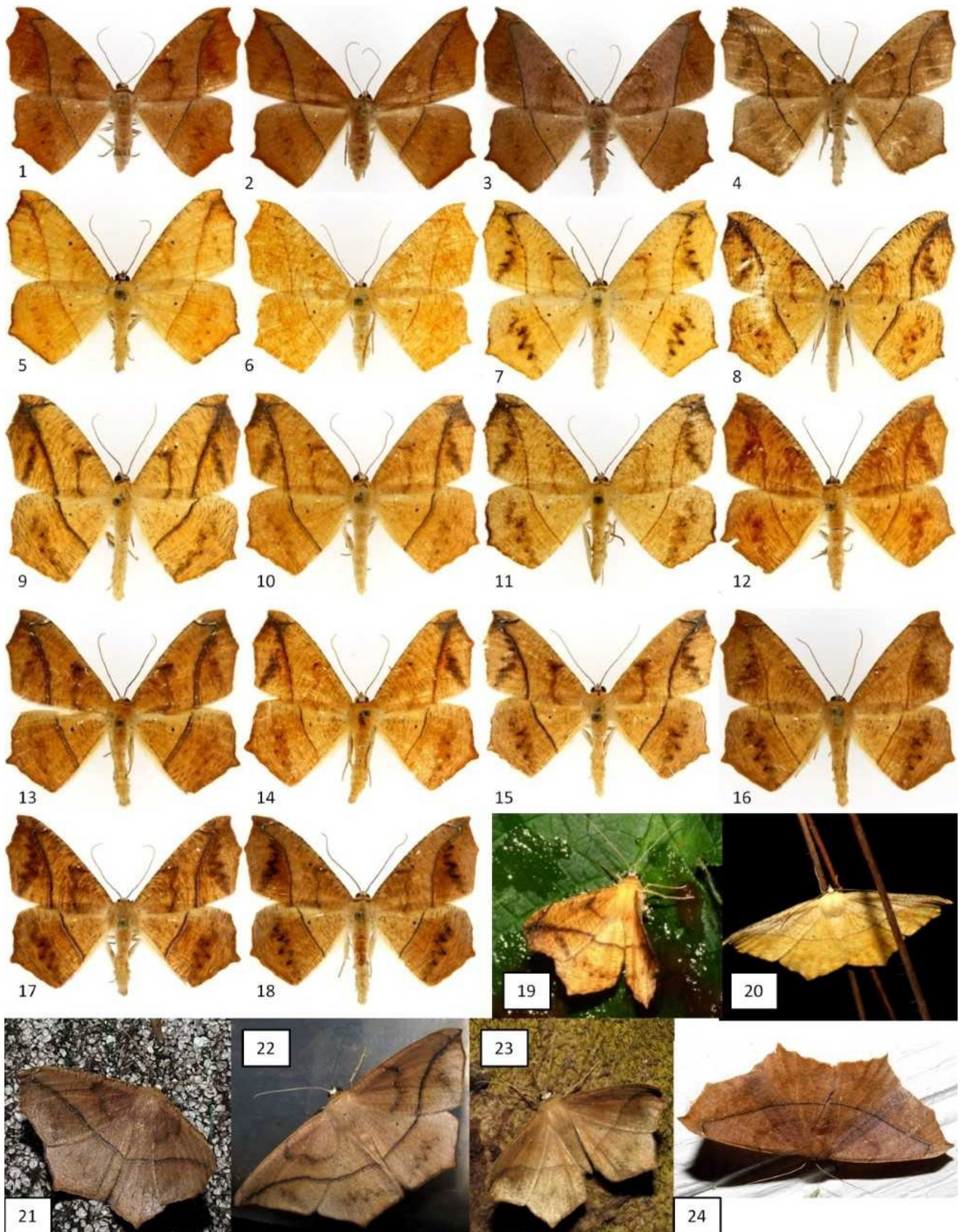


**FIGURE 118: Two species going under the name *Prochoerodes lineola* from the Outagamie County Area (Geometridae: Ennominae).**

**Species 1:** Multivoltine, migratory, widespread in Wisconsin and the eastern United States. Plain brown with little infraspecific variation, other than minor sexual dimorphism (females have a slight violet cast). Recorded from late May through early November in Outagamie County.

**Species 2:** Univoltine resident of the Northern Transition and Canadian Zones. Highly variable, with yellow and brown forms. Brown forms are lighter than species 1. The peak flight is late July and early August, with worn individuals sometimes present up to late August.

1. *Prochoerodes lineola* complex species 1 (6982) ♀: WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 6 September 2020.
2. *Prochoerodes lineola* complex species 1 (6982) ♀: WI Outagamie County: Fallen Timbers: hydric hardwood forest, UV trap 24, 20 September 2021.
3. *Prochoerodes lineola* complex species 1 (6982) ♀: WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 21 September 2021.
4. *Prochoerodes lineola* complex species 1 (6982) ♂: WI Outagamie County: Appleton: MV trap, 2 July 2017.
5. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 26 July 2023.
6. *Prochoerodes lineola* complex species 2 (6982) ♀: WI Shawano County: Navarino Wildlife Area: sandy mesic-xeric oak-pine-hardwood forest/grassland, bait trail, 5 August 2022.
7. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, bait trail, 5 August 2022.
8. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV trap 15, 5 August 2022.
9. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 26 July 2023.
10. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: bog boardwalk near hardwood swamp with sedges and ferns, UV sheet 14, 5 August 2022.
11. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 2 August 2022.
12. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, bait trail, 5 August 2022.
13. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, bait trail, 2 August 2022.
14. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV trap 15, 5 August 2022.
15. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 26 July 2023.
16. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 26 July 2023.
17. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 26 July 2023.
18. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 2 August 2022.
19. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, bait trail, 5 August 2022.
20. *Prochoerodes lineola* complex species 2 (6982) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, bait trail, 5 August 2022.
21. *Prochoerodes lineola* complex species 1 (6982) ♂: WI Outagamie County: Appleton: UV lights, 11 July 2017.
22. *Prochoerodes lineola* complex species 1 (6982) ♂: WI Outagamie County: Appleton: UV lights, 14 September 2017.
23. *Prochoerodes lineola* complex species 1 (6982) ♂: WI Outagamie County: Appleton: bait trail, 4 September 2017.
24. *Prochoerodes lineola* complex species 1 (6982) ♀: WI Outagamie County: Appleton: UV lights, 6 July 2017.

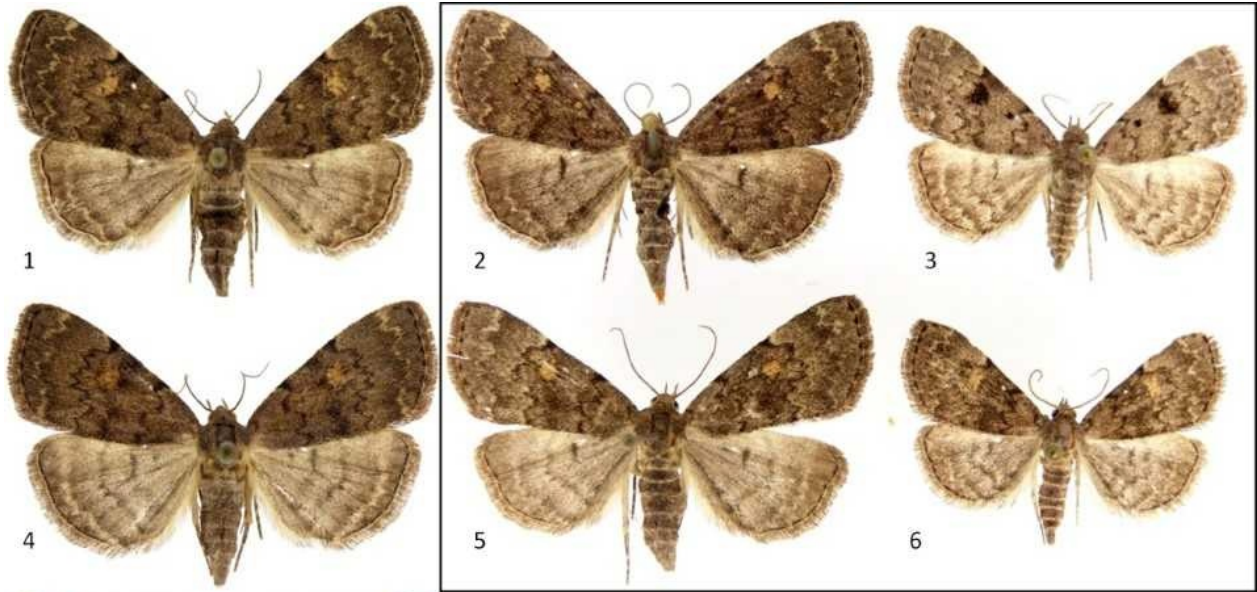


**FIGURE 119: The *Idia aemula* complex in the Outagamie County Area (Noctuidae: Herminiinae).**

Based on pattern, size, and distribution I think there are three *aemula* complex species in Outagamie County. *Idia concisa* has the lightest hindwing coloration, and richer forewing coloration. I apply the name *herminoides* based on the Smithsonian collection, which has a specimen with black reniform and orbicular spots identified under this name (pers. obsv., 1998). *Idia herminoides* is polymorphic for the reniform and orbicular spots being black or orange, whereas they are always orange in the other two species. Orange-spotted *herminoides* may be difficult to separate from *aemula*, but they generally comprise the smaller of two size classes where they are sympatric, and tend to have a lighter more contrasting hindwing. *Idia herminoides* occurs primarily in the Southern Transition and Upper Austral Zones, but is apparently absent from the Canadian and Lower Austral Zones. *Idia aemula* and *Idia concisa* occur throughout eastern Wisconsin.

**Note:** Numbers 2-3 & 5-6 were photographed together in the same frame

1. *Idia aemula* (8323): WI Outagamie County: Appleton: MV trap, 17 June 2019.
2. *Idia aemula* (8323): WI Outagamie County: Appleton: MV trap, 23 June 2019.
3. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: bait trail, 23 June 2019.
4. *Idia aemula* (8323): WI Outagamie County: Appleton: MV trap, 26 August 2017.
5. *Idia aemula* (8323): WI Outagamie County: Appleton: MV trap, 17 June 2019.
6. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: bait trail, 22 June 2019.
7. *Idia aemula* (8323): WI Outagamie County: Appleton: bait trail, 30 June 2017.
8. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: MV trap, 22 June 2019.
9. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: bait trail, 23 June 2019.
10. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: MV trap, 13 July 2019.
11. *Idia herminoides* (8323.2): WI Outagamie County: North Bluemound Drive Power Line Cut: UV trap, 4 September 2018.
12. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: bait trail, 13 July 2018.
13. *Idia herminoides* (8323.2): WI Outagamie County: Appleton: bait trail, 13 July 2019.
14. *Idia concisa* (8323.1): WI Outagamie County: Appleton: MV trap, 18 June 2017.
15. *Idia concisa* (8323.1): WI Outagamie County: Appleton: bait trail, 10 August 2017.
16. *Idia aemula* (8323): WI Outagamie County: Appleton: bait trail, 30 June 2017 (=Number 7).
17. *Idia herminoides* (8323.2): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 11 July 2020.
18. *Idia concisa* (8323.1): WI Outagamie County: Appleton: bait trail, 8 July 2017.



## FIGURE 120: *Zanclognatha* Species Recorded from the Outagamie County Area and Wisconsin (part) (Noctuidae: Herminiinae).

*Zanclognatha* near *lituralis* is smaller and more brownish than *Z. lituralis*, which is greyer. Unlike most *Zanclognatha* species, each of these species forms a divergent clade with COI 5' sequences. *Zanclognatha lituralis* is widespread in eastern North America and occurs throughout Wisconsin, whereas near *lituralis* is an Austral Zone species that rarely strays into Wisconsin, as suggested by isolated captures of worn specimens.

*Zanclognatha deceptricalis* is a larger (21-24 mm wingspan), darker grey species than sympatric *Zanclognatha inconspicualis*, which is a light greyish tan species with a wingspan of 17-20 mm. In *Zanclognatha deceptricalis*, there is a long straight area in the forewing postmedial (pm) line where it angles distally below the costa, forming a sharp obtuse angle with the costal portion of the line. These sections of the postmedial line tend to form a smoother concave arc in *Z. inconspicualis*, as in a photo of a syntype that I examined. The holotype of *deceptricalis* is drooped but has a wingspan of about 24 mm and the pm line forms an obtuse angle. However, a photo of this type suggests the color is brownish, which can be explained by the 1884 date of the specimen. I have examined many *Catocala* collected in the late 1800s and compared them with recently collected specimens of the same species, revealing that there is a dramatic color shift from grey to brown in specimens this old. In specimens from northwestern Wisconsin the anterior part of the pm line is straighter, forming a slighter concave arc, consistent with the holotype of *Zanclognatha theralis*. In other respects *theralis* and *inconspicualis* phenotypes are similar, and they may be variants of the same species. *Zanclognatha gypsalis* has contrasting darker shading between the postmedial line and outer margin, and is sympatric with *inconspicualis* in the Canadian Zone of the WV Appalachians. I have not found *gypsalis* in Wisconsin but include it for comparison.

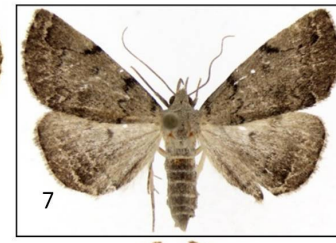
*Zanclognatha cruralis* species A is a univoltine, pale tan species. Species B is multivoltine and is smaller than species A. Species B has two color phenotypes of uncertain taxonomic status, including a darker brownish tan phenotype (No. 22) and a reddish brown phenotype (No. 23). Outagamie County specimens are the brownish tan phenotype, but I have found the reddish brown phenotype in southern Wisconsin (Dane County).

*Zanclognatha pedipilalis* species A is a univoltine, pale tan to brownish tan species, whereas species B is a multivoltine, smaller, and darker species.

WINGSPAN (mm) OF SPREAD WI SPECIMENS: *lituralis* (22-24), near *lituralis* (21), *deceptricalis* (21-24), *inconspicualis* (17-20), *theralis* (18-20), *pedipilalis* species A (27-31), *pedipilalis* species B (22-23), *laevigata* (27-32), *cruralis* species A (28-31), *cruralis* species B (24-26).

NOTE: Numbers 7 and 8 were photographed together in the same frame, so relative differences in size and color are not influenced by photographic variables.

1. *Zanclognatha lituralis* (8340): WI Shawano County: Navarino Wildlife Area: hardwood swamp by mesic hardwood/pine/hemlock forest, UV trap 13, 22 June 2022.
2. *Zanclognatha lituralis* (8340): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
3. *Zanclognatha lituralis* (8340): WI Outagamie County: power line cut N of Allean Road: UV trap, sedge meadow: 18 June 2020.
4. *Zanclognatha near lituralis* (8340.1): WI Dane County: Swamplovers Preserve: upland mesic hardwood forest/upland prairie restoration overlooking wet-mesic prairie planting/wetlands, MV trap, 24 August 2021.
5. *Zanclognatha deceptricalis* (8341.1): WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements/oak-pine forest edge, UV trap 18, 26 July 2023.
6. *Zanclognatha deceptricalis* (8341.1): WI Door County: Sunset Drive near Baileys Harbor: boreal forest, UV trap 1, 18 August 2017.
7. *Zanclognatha deceptricalis* (8341.1): WI Door County: Sunset Drive near Baileys Harbor: boreal forest/open-shrubby wetlands, MV sheet, 18 August 2017.
8. *Zanclognatha inconspicualis* (8344): WI Door County: Sunset Drive near Baileys Harbor: boreal forest/open-shrubby wetlands, MV sheet, 19 August 2017.
9. *Zanclognatha gypsalis* (8342): WV Pochahontas County: Monangahela National Forest Road 102: boggy spruce forest/mesic hardwoods, MV sheet, 7 July 2002, Kons & Borth.
10. *Zanclognatha theralis* (8341): WI Burnett County, Namekogan Barrens, oak-pine barrens, UV sheet, 5 August 1995.
11. *Zanclognatha inconspicualis* (8344): WI Door County: Sunset Drive near Baileys Harbor: boreal forest/open-shrubby wetlands, MV sheet, 19 August 2017.
12. *Zanclognatha inconspicualis* (8344): WI Outagamie County: Appleton: MV trap, 6 July 2018.
13. *Zanclognatha inconspicualis* (8344): WI Door County: Sunset Drive near Baileys Harbor: boreal forest/open-shrubby wetlands, MV sheet, 18 August 2017.
14. *Zanclognatha pedipilalis* complex species A (8348a): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
15. *Zanclognatha pedipilalis* complex species A (8348a): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 8 June 2020.
16. *Zanclognatha pedipilalis* complex species A (8348a): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 8 June 2020.
17. *Zanclognatha pedipilalis* complex species B (8348b): WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, MV sheet 10, 5 August 2023.
18. *Zanclognatha pedipilalis* complex species B (8348b): IN Posey County: Hovey Lake Wildlife Management Area: field/hydric hardwood forest, MV sheet 2, 2 September 2015, Kons & Borth.
19. *Zanclognatha laevigata* (8345): WI Outagamie County: Mosquito Hill: mesic hardwood forest, bait trail on hill, 10 July 2020.
20. *Zanclognatha laevigata* (8345): WI Outagamie County: Mosquito Hill: hillside mesic hardwood forest/grassland, 24 July 2020.
21. *Zanclognatha cruralis* complex species A (8351a): WI Outagamie County: Mosquito Hill: hillside mesic hardwood forest, bait trail, 3 June 2020.
22. *Zanclognatha cruralis* complex species B (8351b): WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, bait trail, 5 August 2023.
23. *Zanclognatha cruralis* complex species B (8351b): WI Dane County: Swamplovers Preserve: upland mesic hardwood forest/upland prairie restoration overlooking wet-mesic prairie planting/wetlands, MV trap, 24 August 2021.



**FIGURE 121: *Zanclognatha* Species Recorded from the Outagamie County Area (part)  
(Noctuidae: Herminiinae).**

Nominotypical *Zanclognatha protummalis* is a light tan to brownish tan species with the forewing lines diffuse, especially in females. *Zanclognatha protummalis* species 2 is darker grey and the postmedial and antemedial lines are accented with black, and it usually has a black reniform spot. Species 2 looks like a miniature *Z. dentata* (No. 6 & 9) or an intermediate between *dentata* and *protummalis* (No. 12); in corresponding genders the black accents of the lines tend to be less pronounced, but size is the most reliable means of separation without DNA (COI 5' sequences separated the two species where they were collected together in Door County). *Zanclognatha dentata* sometimes has a prominent blackish patch on the basal side of the postmedial line posterior of the reniform (No. 5 & 7), whereas this patch is faint or absent in species 2. *Zanclognatha martha* is larger and more brownish than species 2, and has less black accents on the postmedial and antemedial lines posterior of the costa than *dentata*. *Zanclognatha protummalis* species 3 differs from the aforementioned by having a contrasting cream colored subterminal line, like *marcidilinea*. Compared with *marcidilinea*, species 3 is smaller, has a darker brownish tan forewing, and a darker hindwing.

*Zanclognatha dentata*, *Z. protummalis*, and *Z. protummalis* species 2 are sympatric in Outagamie County and northeastern Wisconsin. *Zanclognatha dentata* and *Z. protummalis* range south into the Upper Austral Zone, whereas *Z. protummalis* species 2 occurs primarily in the Canadian Zone, with scattered records in the Transition Zone. *Zanclognatha marcidilinea* and *Z. protummalis* species 3 are sympatric in the Austral Zone. Unlike *marcidilinea*, species 3 ranges south into peninsular Florida, and unlike species 3, *marcidilinea* ranges north into the Canadian Zone. Species 3 appears to be a rare stray in the Transition Zone, where *marcidilinea* is common and widespread.

WINGSPAN (mm) OF SPREAD WI SPECIMENS: *martha* (25-30); *dentata* (25-29); *protummalis* sp. 2 (20-23); *protummalis* (20-23); *ochreipennis* (27-30); *marcidilinea* (27-31); *protummalis* sp. 3 (26).

NOTE: Numbers 11-12 were photographed together in the same frame, so relative differences in size and color are not influenced by photographic variables. Number 12 is my largest specimen of *protummalis* species 2.

1. *Zanclognatha martha* (8350) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 23 June 2023, common.
  2. *Zanclognatha martha* (8350) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 23 June 2023.
  3. *Zanclognatha martha* (8350) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV trap 15, 23 June 2022.
  4. *Zanclognatha martha* (8350) ♀: WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, MV sheet 10, 18 July 2023.
  5. *Zanclognatha dentata* (8349.1) ♂: WI Outagamie County: Mosquito Hill: hillside mesic hardwood forest/grassland, 1 July 2020.
  6. *Zanclognatha protummalis* complex species 2 (8349.2) ♀: WI Door County: Sunset Drive: boreal forest/wetland, MV sheet, 18 August 2017.
  7. *Zanclognatha dentata* (8349.1) ♂: WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, UV trap 10, 26 July 2023.
  8. *Zanclognatha dentata* (8349.1) ♀: WI Door County: Lake Michigan shore, grass/sedge wetland, UV trap 3, 18 August 2017.
  9. *Zanclognatha protummalis* complex species 2 (8349.2) ♂: WI Outagamie County: Fallen Timbers: hydric hardwood forest, UV trap 9, 10 August 2019.
  10. *Zanclognatha ochreipennis* (8353) ♂: WI Outagamie County: Mosquito Hill: MV sheet 10, 18 July 2023.
- Note: I refer to this species by its junior synonym, *ochreipennis*, as the oldest name, *jacchusalis*, has been extensively applied to the species now known as *marcidilinea*.
11. *Zanclognatha dentata* (8349.1) ♀: WI Door County: Sunset Drive: boreal forest, UV Trap 1, 18 August 2017.
  12. *Zanclognatha protummalis* complex species 2 (8349.2) ♀: WI Door County: Sunset Drive: boreal forest, UV Trap 1, 18 August 2017.
  13. *Zanclognatha ochreipennis* (8353) ♀: WI Outagamie County: Appleton: bait trail, 23 July 2019.
  14. *Zanclognatha protummalis* (8349) ♂: WI Outagamie County: Appleton: MV trap, 16 June 2017.
  15. *Zanclognatha protummalis* (8349) ♀: WI Outagamie County: Mosquito Hill: hillside mesic hardwood forest/grassland, 1 July 2020.
  16. *Zanclognatha marcidilinea* (8352) ♀: WI Outagamie County: Mosquito Hill: bait trail on hill, 24 July 2020.
  17. *Zanclognatha marcidilinea* (8352) ♂: WI Outagamie County: Old Stone Bridge Trail: bait trail, 16 June 2020.
  18. *Zanclognatha protummalis* complex species 3 (8348.3) ♂: WI Outagamie County: Old Stone Bridge Trail: mesic to hydric hardwood forest/fields, bait trail, 16 June 2020.



1



2



3



4



5



6



7



8



9



10



11

12



13



14



15



16



17



18



**FIGURE 122: *Chytolita morbidalis* and *Chytolita petrealis* (Noctuidae: Herminiinae).**

*Chytolita* specimens have two size classes with differences in phenology and distribution, thus I consider them to comprise two species. With specimens spread as shown on the plate, in Wisconsin *Chytolita morbidalis* has a wing span of 31-34mm, whereas *C. petrealis* has a wing span of 23-26mm, typically 24-25mm. There are no consistent wing pattern differences, but *C. petrealis* has a form with a solid black reniform (numbers 7-8), whereas *C. morbidalis* does not. On the average *C. morbidalis* is paler, but there is lots of overlap.

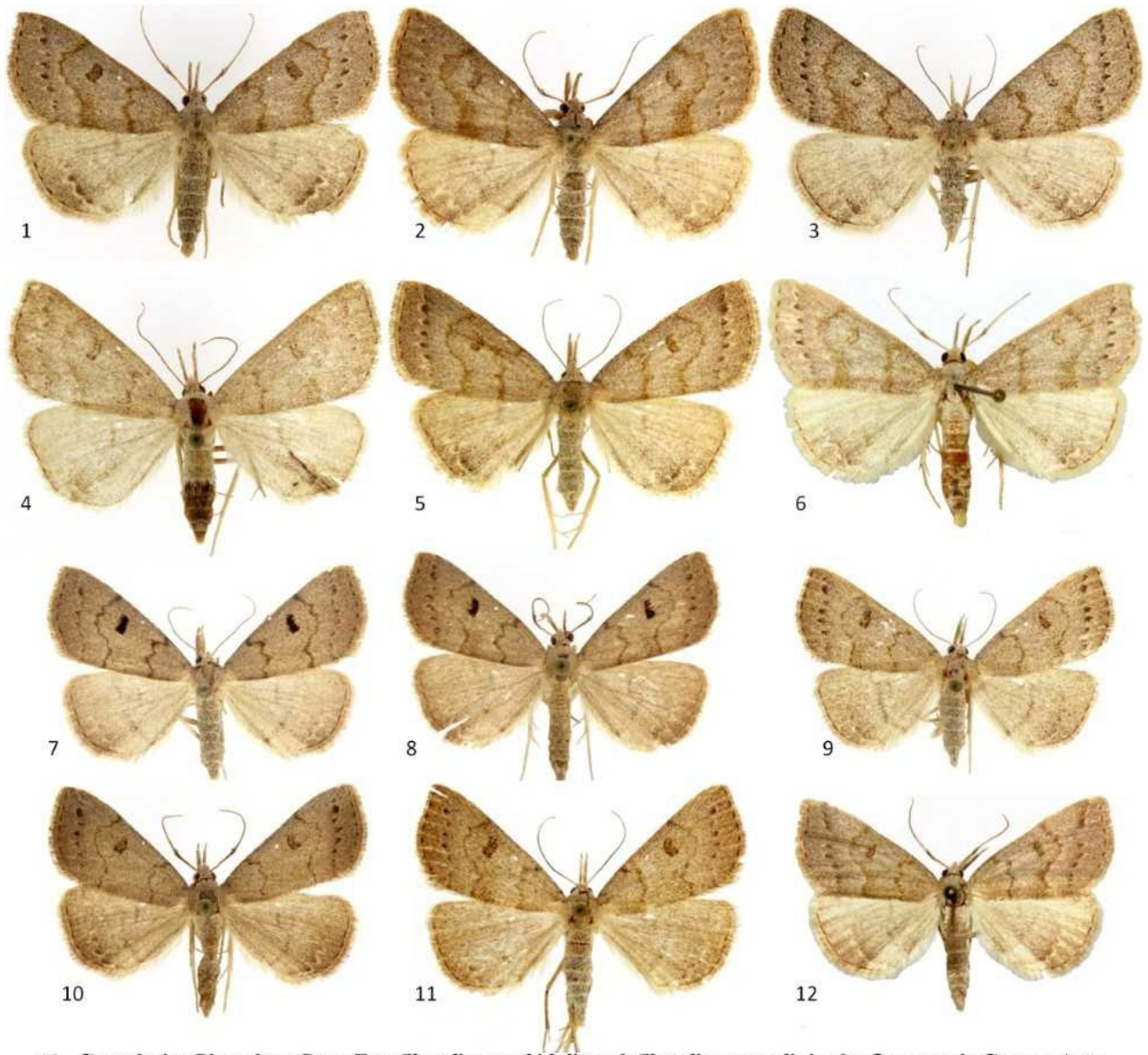
In Wisconsin both species are univoltine, with *C. morbidalis* emerging first. The flight seasons overlap, but *C. morbidalis* are worn when *C. petrealis* are fresh. The cumulative phenology for the Outagamie County area is shown in Figure 122: 13.

The relative abundances of both species differ markedly between Mosquito Hill and Fallen Timbers. As of 2022, I have 237 individuals of *morbidalis* databased for Mosquito Hill, versus 32 for *petrealis*. For Fallen Timbers there are 201 individuals of *petrealis* versus 4 individuals of *morbidalis*.

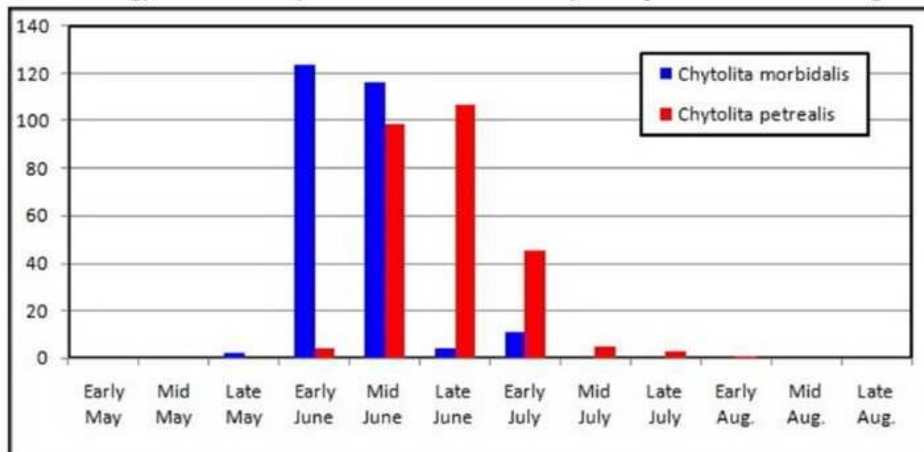
Both species occur throughout Wisconsin, but *C. petrealis* ranges farther south, and is a resident species as far south as the central Florida panhandle, as reported in Kons and Borth (2006). I have seen only one worn specimen of *C. morbidalis* from Florida, which is probably a stray. The farthest south I have found *C. morbidalis* in numbers /fresh condition is Atlanta State Park in Cass County, northeast Texas (Kons & Borth surveys).

Note: Numbers 6 and 12 were photographed with a flash, while the remainder were not.

1. *Chytolita morbidalis* (8355): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 3 June 2020.
2. *Chytolita morbidalis* (8355): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 3 June 2020.
3. *Chytolita morbidalis* (8355): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 3 June 2020.
4. *Chytolita morbidalis* (8355): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 3 June 2020.
5. *Chytolita morbidalis* (8355): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
6. *Chytolita morbidalis* (8355): WI Outagamie County: Mosquito Hill: 11 June 1993.
7. *Chytolita petrealis* (8356): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
8. *Chytolita petrealis* (8356): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
9. *Chytolita petrealis* (8356): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
10. *Chytolita petrealis* (8356): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
11. *Chytolita petrealis* (8356): WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 18 June 2021.
12. *Chytolita petrealis* (8356): WI Douglas County: spruce-tamarack bog, T43N R 12W Sec 36, UV trap, 21 June 1996, Kons & Borth.
13. **Cumulative Phenology Data for *Chytolita morbidalis* and *Chytolita petrealis* (8356) in the Outagamie County Area.**



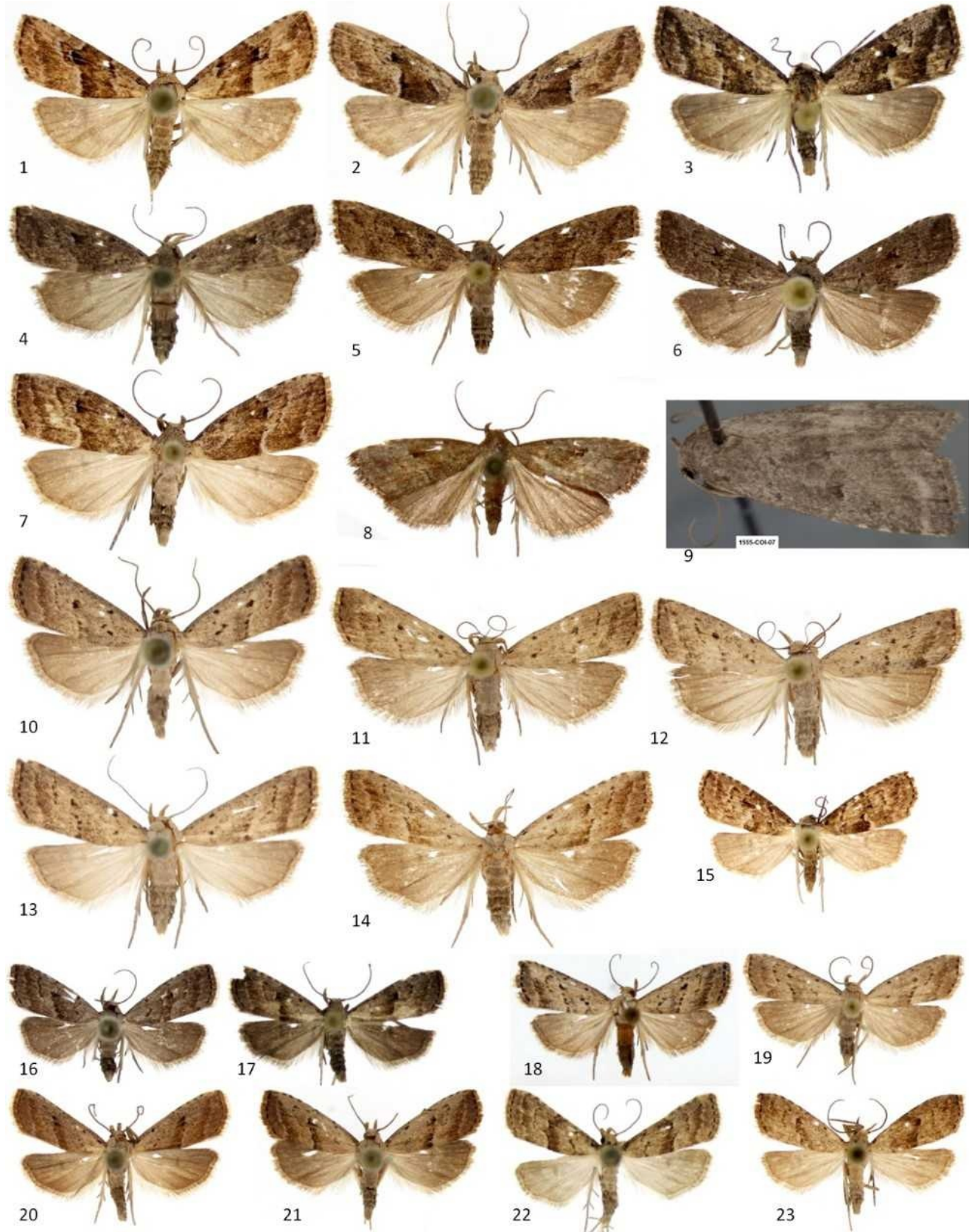
13. Cumulative Phenology Data For *Chytolita morbidalis* and *Chytolita petrealis* in the Outagamie County Area.



**FIGURE 123: *Hyphenodes* Species Recorded from Outagamie County (Noctuidae: Hyphenodinae).**

There are two size classes of *Hyphenodes*. The larger size class includes *caducus*, *sombrus*, and species 1, whereas the smaller size class includes *fractilinea*, near *fractilinea*, *palustris*, and *franclemonti*. *Caducus* is polymorphic as confirmed with COI 5' sequences, with a typical contrasting form (Numbers 1-3, 7) and a plainer, dark form (Numbers 4-6) which is very similar to *sombrus*. *Sombrus* has a subtle smoother appearance than the dark forms of *caducus*. Species 1 is patterned similar to *fractilinea* but is the size of *caducus*; unfortunately, this phenotype has not been successfully sequenced to my knowledge. *Franclemonti* has a notch in the postmedial line across from the reniform, a sinusoidal shaped postmedial line posterior to the reniform (angled in the other species), and a dark patch between the postmedial and antimedial lines along the lower forewing margin. *Fractilinea* is light grey with little contrast basal to the postmedial line. Near *fractilinea* is more brownish with a contrasting dark bar on the basal side of the postmedial line posterior to the reniform. *Palustris* is a darker grey than the other species in the smaller size class, and also has the contrasting dark bar present in near *fractilinea*.

1. *Hyphenodes caducus* (8420): WI Outagamie County: Fallen Timbers: open hydric hardwood forest, MV trap 10, 31 July 2020.
2. *Hyphenodes caducus* (8420): WI Outagamie County: Fallen Timbers: open hydric hardwood forest, MV trap 10, 31 July 2020.
3. *Hyphenodes caducus* (8420): WI Outagamie County: Appleton: MV trap, 23 June 2019.
4. *Hyphenodes caducus* (8420): WI Outagamie County: Appleton: MV trap, 26 July 2017.
5. *Hyphenodes caducus* (8420): WI Outagamie County: Appleton: MV trap, 25 June 2019; Sequence Voucher Sample ID Number: 25004-COI-2020.
6. *Hyphenodes caducus* (8420): WI Outagamie County: Appleton: bait trail, 1 August 2022.
7. *Hyphenodes caducus* (8420): WI Outagamie County: sedge meadow north of Allcan Road, UV trap, 18 June 2020; Sequence Voucher Sample ID Number: 25005-COI-2020. Photographed with a flash.
8. *Hyphenodes sombrus* (8423): WI Outagamie County: Mosquito Hill: sedge meadow in floodplain forest, UV trap, 13 August 1994.
9. *Hyphenodes sombrus* (8423): WI Forest County: Armstrong Creek Bog: UV trap, 28 August 1995. This is a GT Vision image.
10. *Hyphenodes species 1* (8420.1): WI Outagamie County: Appleton: MV trap, 11 August 2017.
11. *Hyphenodes species 1* (8420.1): WI Outagamie County: Appleton: MV trap, 25 June 2019.
12. *Hyphenodes species 1* (8420.1): WI Outagamie County: Appleton: MV trap, 20 June 2019.
13. *Hyphenodes species 1* (8420.1): WI Outagamie County: Appleton: MV trap, 27 July 2017.
14. *Hyphenodes species 1* (8420.1): WI Outagamie County: Appleton: MV trap, 1 July 2017.
15. *Hyphenodes franclemonti* (8424): WI Outagamie County: Fallen Timbers: open hydric hardwood forest, UV trap 9, 10 August 2019.
16. *Hyphenodes palustris* (8422): WI Outagamie County: Appleton: MV trap, 18 June 2017.
17. *Hyphenodes palustris* (8422): WI Outagamie County: Appleton: MV trap, 30 July 2019; Sequence Voucher Sample ID Number: 25003-COI-2020.
18. *Hyphenodes fractilinea* (8421): WI Dane County: Swamplovers Preserve: upland mesic hardwood forest/upland prairie restoration overlooking wet-mesic prairie planting/wetlands, MV trap, 19 August 2021.
19. *Hyphenodes fractilinea* (8421): WI Outagamie County: Appleton: MV trap, 6 July 2019.
20. *Hyphenodes species near fractilinea* (8421.1): WI Outagamie County: Appleton: MV trap, 11 August 2017.
21. *Hyphenodes species near fractilinea* (8421.1): WI Shawano County: Navarino Wildlife Area: boardwalk through bog adjacent to hardwood swamp and sedge meadow, UV sheet 14, 5 August 2022.
22. *Hyphenodes species near fractilinea* (8421.1): WI Outagamie County: Appleton: MV trap, 11.VIII. 2017.
23. *Hyphenodes species near fractilinea* (8421.1): WI Outagamie County: Appleton: MV trap, 12 July 2020; Sequence Voucher Sample ID Number: 25006-COI-2020.



### FIGURE 124: Pine Specialist *Zale* Species Recorded from Outagamie County and Adjacent Areas (part) (Noctuidae: Erebiniae).

Two species match McDunnough's (1943) male genitalia drawings for both *Zale helata* and *Zale duplicata*. The species in each of these pairs are indistinguishable in male genitalia (including the three dimensional structure of the everted vesica), in contrast to most pine specialist *Zale* species, which have species specific genitalia. The second species with *duplicata*-like genitalia resembles *submediana* in size and pattern and is covered on the next plate.

*Zale duplicata* and *Zale helata* species 1 occur in habitats with white pine, red pine, or jack pine, including in areas where white pine or red pine are the only pines present. *Zale helata* species 2 occurs exclusively in jack pine habitats.

The two species with *helata*-like genitalia are readily separatable by pattern. Species 1 is predominately brownish whereas species 2 is blackish grey, and is actually more similar in pattern to some variants of *duplicata* than to *helata* species 1. *Zale duplicata* typically has distinct bluish grey scaling in contrast to the blackish appearance of *helata* species 2. *Zale duplicata* sometimes has brown scaling between the median band and postmedial line, and sometimes also in the basal area (Numbers 12-13), whereas this brown scaling is sparse or absent in *Zale helata* species 2. Some variants of *Zale duplicata* lack the typical amount of bluish grey scaling as well as the brown scaling, and these might only be reliably separated from *helata* species 2 by genitalia or DNA. Forbes' (1954) description of the pattern of *franclemonti* is in good agreement with *helata* species 2.

1. *Zale helata* species 1 (8704): WI Outagamie County: Mosquito Hill: hill top mesic hardwood forest/grassland, MV trap 4, 22 May 2020.
2. *Zale helata* species 1 (8704): I Shawano Co: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, bait trail, 11 May 2022.
3. *Zale helata* species 1 (8704): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 22 May 2020.
4. *Zale helata* species 1 (8704): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 31 May 2023.
5. *Zale helata* species 1 (8704): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 22 May 2020.
6. *Zale helata* species 1 (8704): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 22 May 2020.
7. *Zale helata* species 2 (8704.1): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest west of Highway K, south of Pike's Peak Flowage, bait trail 4, 11 May 2022.
8. *Zale helata* species 2 (8704.1): WI Marinette County: intermediate succession oak-jack pine barrens mosaic adjacent to the Dunbar Barrens, T 37N R 18E Sec 21, UV light, 4 June 1995. Dissection Number 2016HLK: 2390.
9. *Zale helata* species 2 (8704.1): WI Marinette County: intermediate succession oak-jack pine barrens mosaic adjacent to the Dunbar Barrens, T 37N R 18E Sec 21, UV light, 4 June 1995.
10. *Zale duplicata* (8703): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 22 May 2020.
11. *Zale duplicata* (8703): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 21 May 2020.
12. *Zale duplicata* (8703): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 22 May 2020.
13. *Zale duplicata* (8703): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest west of Highway K, south of Pike's Peak Flowage, bait trail 4, 11 May 2022.
14. *Zale duplicata* (8703): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 21 May 2020.
15. *Zale duplicata* (8703): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 21 May 2020.



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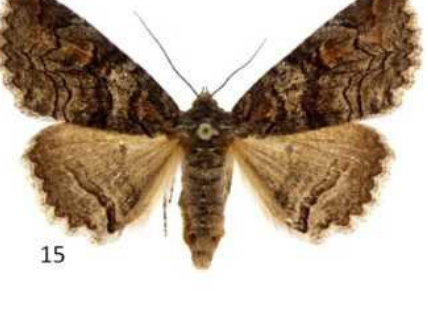
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**FIGURE 125: Pine Specialist *Zale* Species Recorded from Outagamie County and Adjacent Areas (part) (Noctuidae: Erebinae).**

These four species are similar in wing pattern and all can be differentiated by male and female genitalia, although the genitalia of *Zale* near *duplicata* are indistinguishable from *Z. duplicata*, which it does not resemble in pattern. The basal side of the median band is always basal to the reniform in *Z. near duplicata*, and never basal to the reniform in *Z. obliqua*. Either condition may occur in the other two species. *Zale metatoides* is smaller than the other three species. *Zale submediana* emerges first (between early April and early May, depending on how warm the spring is), and if the flight overlaps with the other species it is worn when they are fresh. *Zale* near *duplicata* emerges second, *Z. metatoides* third, and *Z. obliqua* last (typically late May). In fresh specimens, *Zale obliqua* has the most extensive reddish brown scaling in the median band, and usually has darker reddish brown scales in the reniform relative to the other species, which are orange.

1. *Zale submediana* (8702): WI Shawano County: Navarino Wildlife Area: oak-pine hardwood forest west of McDonald Road, south of Pike's Peak Flowage, bait trail, 11 May 2022.
2. *Zale submediana* (8702): WI Shawano Co: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, east of McDonald Road, south of Pike's Peak Flowage, bait trail, 11 May 2022.
3. *Zale submediana* (8702): WI Shawano Co: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, east of McDonald Road, south of Pike's Peak Flowage, bait trail, 11 May 2022.
4. *Zale submediana* (8702): WI Shawano Co: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, east of McDonald Road, south of Pike's Peak Flowage, bait trail, 11 May 2022.
5. *Zale submediana* (8702): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, UV trap 8, 14 May 2022.
6. *Zale submediana* (8702): WI Shawano Co: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, east of McDonald Road, south of Pike's Peak Flowage, bait trail, 14 May 2022.
7. *Zale submediana* (8702): WI Shawano County: Navarino Wildlife Area: hardwood swamp by mesic hardwood/pine/hemlock forest, UV trap 13, 13 April 2023.
8. *Zale near duplicata* (8703.1): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, bait trail, 23 May 2023.
9. *Zale near duplicata* (8703.1): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 23 May 2023.
10. *Zale metatoides* (8707): WI Shawano County: Navarino Wildlife Area: sandy mesic to xeric oak-pine hardwood forest, UV trap 11, 30 May 2022.
11. *Zale metatoides* (8707): WI Shawano County: Navarino Wildlife Area: sandy mesic to xeric oak-pine hardwood forest, UV trap 11, 30 May 2022.
12. *Zale metatoides* (8707): WI Shawano County: Navarino Wildlife Area: sandy mesic to xeric oak-pine hardwood forest, UV trap 11, 30 May 2022.
13. *Zale metatoides* (8707): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, bait trail, 31 May 2023.
14. *Zale obliqua* (8699): WI Oconto County: Boulder Lake Campground: hardwood-conifer forest, bait trail, 5 June 2017.
15. *Zale obliqua* (8699): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 31 May 2023.



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**FIGURE 126: *Catocala neogama* and *Catocala communis* (Noctuidae: Erebiniae).**

*Catocala neogama* and *C. communis* are separate diagnosable phenotypes with different ranges and distributions within their range, thus I think they represent separate species. In Outagamie County, both species are regular at Mosquito Hill. However, only *C. neogama* is regular in suburban Appleton, with just a few records of *C. communis* despite a massive baiting effort over many years. The two species do not differ in genitalia and there is some overlap in COI 5' haplotypes, but this is true of most Juglandaceae specialist *Catocala* species.

Both species are sexually dimorphic and *C. neogama* is geographically variable. Males and females of *C. communis* have contrasting rich, light brown scaling between the postmedial and subterminal lines, whereas midwestern *C. neogama* have gray or dull grayish brown scaling. In males, the basal dash of *C. neogama* always reaches the antemedial line. In many *C. communis* males it is shorter (as in Number 3), and when it does reach the antemedial line (as in Number 1) it is usually thinner than in *C. neogama*. Also, *C. communis* males are bluish grey, whereas midwestern *C. neogama* are plain grey. Farther south in the Austral Zone, *C. neogama* may have more bluish and brown scaling than midwestern populations, but they still have distinctly less so than sympatric *C. communis*.

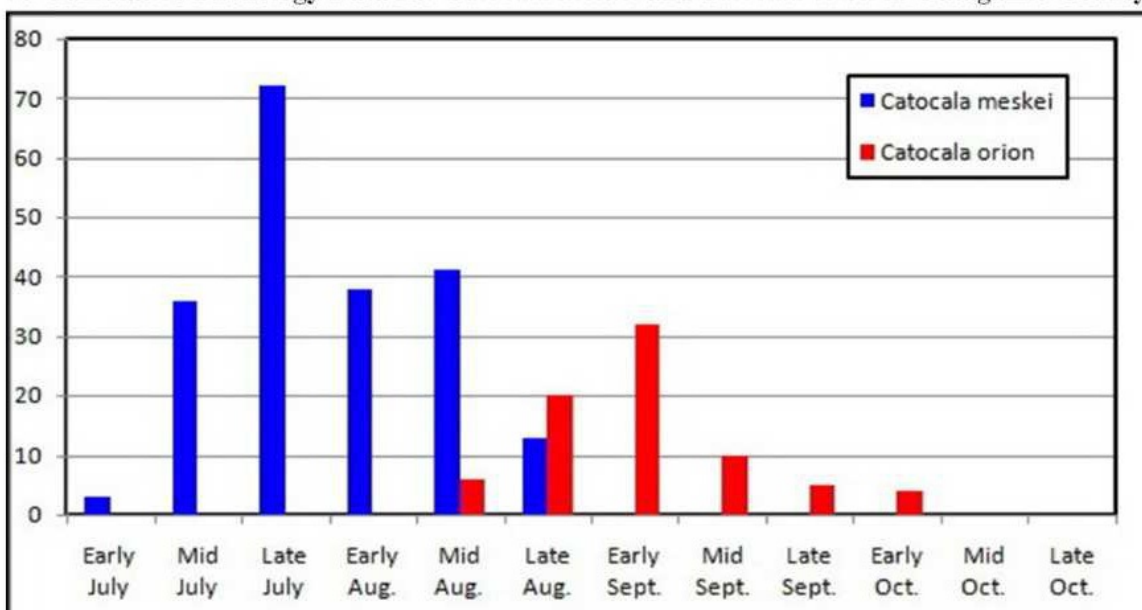
1. *Catocala communis* (8798.1) ♂: WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 25 July 2020.
  2. *Catocala communis* (8798.1) ♂: WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 24 July 2020.
  3. *Catocala neogama* (8798) ♂: WI Outagamie County: Appleton: bait trail, 8 August 2017.
  4. *Catocala neogama* (8798) ♂: WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 25 July 2020.
  5. *Catocala communis* (8798.1) ♀: WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 24 July 2020.
  6. *Catocala communis* (8798.1) ♀: WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 24 July 2020.
  7. *Catocala neogama* (8798) ♀: WI Outagamie County: Appleton: bait trail, 25 July 2017.
  8. *Catocala neogama* (8798) ♀: WI Outagamie County: Appleton: bait trail, 15 September 2017.
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**FIGURE 127: *Catocala meskei* and *Catocala orion* (Noctuidae: Erebiniae).**

The three dimensional structure of the everted vesica provides clear evidence that *C. meskei* and *C. orion* are separate species; this will be documented in a future taxonomic paper. However, wing pattern and flight season will usually enable reliable separation of these species. In Outagamie County I have not documented any overlap in the flights of *C. meskei* and *C. orion* during the same season, although there is some overlap in cumulative phenology data. If the two species were to fly together I expect *C. meskei* would be worn when *C. orion* is freshly emerged. The most consistent pattern difference is on the basal side of the hindwing medial band where it crosses vein M2 (black arrows). The band is fairly straight across vein M2 in *C. meskei* (it may be constricted) whereas it is distinctly angled in *C. orion*.

1. *Catocala meskei* (8822) ♂: WI Outagamie County: Appleton: bait trail, 30 July 2018.
2. *Catocala meskei* (8822) ♂: WI Outagamie County: Appleton: bait trail, 24 July 2017.
3. *Catocala orion* (8822.1) ♂: WI Outagamie County: Appleton: bait trail, 16 August 2018.
4. *Catocala orion* (8822.1) ♂: WI Outagamie County: Appleton: bait trail, 17 August 2018.
5. *Catocala meskei* (8822) ♀: WI Outagamie County: Appleton: bait trail, 23 July 2017.
6. *Catocala meskei* (8822) ♀: WI Outagamie County: Appleton: bait trail, 29 July 2017.
7. *Catocala orion* (8822.1) ♀: WI Outagamie County: Appleton: bait trail, 15 September 2017.
8. *Catocala orion* (8822.1) ♀: WI Outagamie County: Appleton: bait trail, 1 September 2017.
9. Cumulative Phenology Data For *Catocala meskei* and *Catocala orion* in Outagamie County.





**FIGURE 128: *Bellura* Species Recorded from eastern Wisconsin (Noctuidae: Noctuinae).**

1. *Bellura obliqua* (9525) ♀: WI Shawano County: Navarino Wildlife Area: sedge meadow along stream, UV trap 23, 23 June 2023.
  2. *Bellura obliqua* (9525) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine upland clearing near hardwood forest/wetlands, UV sheet 17, 22 June 2022.
  3. *Bellura obliqua* (9525) ♂: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 23 June 2023.
  4. *Bellura brehmei* (9524) ♀: WI Shawano County: Navarino Wildlife Area: mesic hardwood/pine/hemlock forest, near hardwood swamp and open wetlands, UV trap 12, 31 May 2023.
  5. *Bellura brehmei* (9524) ♂: WI Shawano County: Navarino Wildlife Area: mesic hardwood/pine/hemlock forest, near hardwood swamp and open wetlands, UV trap 12, 31 May 2023.
  6. *Bellura densa complex species 1* (9526) ♂: WI Outagamie County: Appleton: MV trap, 16 August 2020. [41mm wing span, versus 27-31mm in *densa* phenotype 2]
  7. *Bellura species (anoa?)* (9525.1) ♂: WI Waukesha County: Ottawa Lake Fen: fen and sedge meadow along lake margin, UV trap, 9 August 1992.
  8. *Bellura species (anoa?)* (9525.1) ♂: WI Waukesha County: Ottawa Lake Fen: fen and sedge meadow along lake margin, UV trap, 9 August 1992.
  9. *Bellura densa complex phenotype 2* (9526.1) ♂: WI Shawano County: Navarino Wildlife Area: mesic hardwood/pine/hemlock forest, near hardwood swamp and open wetlands, UV trap 12, 31 May 2023.
  10. *Bellura densa complex phenotype 2* (9526.1) ♂: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 2 August 2022.
  11. *Bellura densa complex phenotype 2* (9526.1) ♀: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 2 August 2022.
  12. *Bellura densa complex phenotype 2* (9526.1) ♀: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 2 August 2022.
  13. *Bellura densa complex phenotype 2* (9526.1) ♀: WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements, UV trap 18, 2 August 2022.
  14. *Bellura gortynoides* (9523) ♀: WI Waukesha County: Ottawa Lake Fen: fen and sedge meadow along lake margin, UV trap, 9 August 1992.
  15. *Bellura gortynoides* (9523) ♀: IL DuPage County: prairie planting near ponds, MV Trap, 22 September 2023.
  16. *Bellura vulnifica* (9523.1) ♀: WI Outagamie County: Fallen Timbers: swamp forest edge/prairie planting, UV Trap 19, 16 July 2020.
  17. *Bellura vulnifica* (9523.1) ♀: WI Shawano County: Navarino Wildlife Area: oak-pine uplands south of low sedge meadow with bog elements, MV sheet 6, 26 July 2023.
  18. *Bellura vulnifica* (9523.1) ♀: WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, MV sheet 10, 5 August 2023.
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**FIGURE 129: The *Papaipema pterisii* species complex in the Outagamie County Area (Noctuidae: Noctuinae: *Papaipema*).**

*Papaipema pterisii* phenotypes form two haplotype groups with COI 5' mtDNA sequences. On BOLDSystems (2022) they are called *pterisii* and "nr. *pterisii*." I have confirmed the presence of near *pterisii* in Outagamie County with two sequenced specimens (Numbers 3 & 6). See the species account on near *pterisii* for habitat differences in the Outagamie County area.

COI 5' mtDNA is the most reliable way to separate these species, followed by habitat. They would be difficult to separate without DNA if a site contained suitable habitat for both species. My series suggest near *pterisii* has more dark reddish orange scales than *pterisii* on average, at least in the coverage area, but there is overlap. I did not find differences in male genitalia.

1. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: sedge meadow opening in hydric hardwood forest with ostrich fern, UV trap 2, 6 September 2020.
2. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: open hydric hardwood forest with ostrich fern, UV trap 21, 6 September 2020.
3. *Papaipema near pterisii* (9480.1): WI Outagamie County: Appleton: MV trap, ostrich fern present in neighboring yard, 31 August 2020. DNA Sample ID Number: 25015-COI-2020.
4. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: sedge meadow opening in hydric hardwood forest with ostrich fern, UV trap 2, 17 September 2018.
5. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: open hydric hardwood forest with ostrich fern, UV trap 21, 5 September 2021.
6. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: sedge meadow opening in hydric hardwood forest with ostrich fern, UV trap 2, 17 September 2018. DNA Sample ID Number: 25013-COI-2020.
7. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fox River Walk by Riverside Cemetery: mesic to hydric hardwood forest along Fox River, UV trap, 13 September 2020.
8. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: field with prairie planting/hydric hardwood forest edge, 18 September 2022.
9. *Papaipema near pterisii* (9480.1): WI Outagamie County: Fallen Timbers: open hydric hardwood forest with ostrich fern, UV trap 21, 19 September 2021.
10. *Papaipema pterisii* (9480): WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements/oak-pine forest edge with bracken fern, UV trap 18, 28 August 2022.
11. *Papaipema pterisii* (9480): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, near xeric woodland with bracken fern, MV sheet, 28 August 2022.
12. *Papaipema pterisii* (9480): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, near xeric woodland with bracken fern, MV sheet, 28 August 2022.
13. *Papaipema pterisii* (9480): WI Portage County: Schmeeckle Reserve: bracken fern habitat, UV light, 21 September 1994.
14. *Papaipema pterisii* ? (9480): WI Outagamie County: Appleton: lighted sheet, 1 September 1991. Note: At this time there was bracken fern growing in an adjacent yard, but since 2016 I have not seen this plant anywhere in the neighborhood.
15. *Papaipema pterisii* (9480): WI Marinette County: oak-pine forest/barrens interface adjacent to the Dunbar Barrens, bracken grassland, T 37N R 18E Sec 21, UV trap, 28 August 1995.



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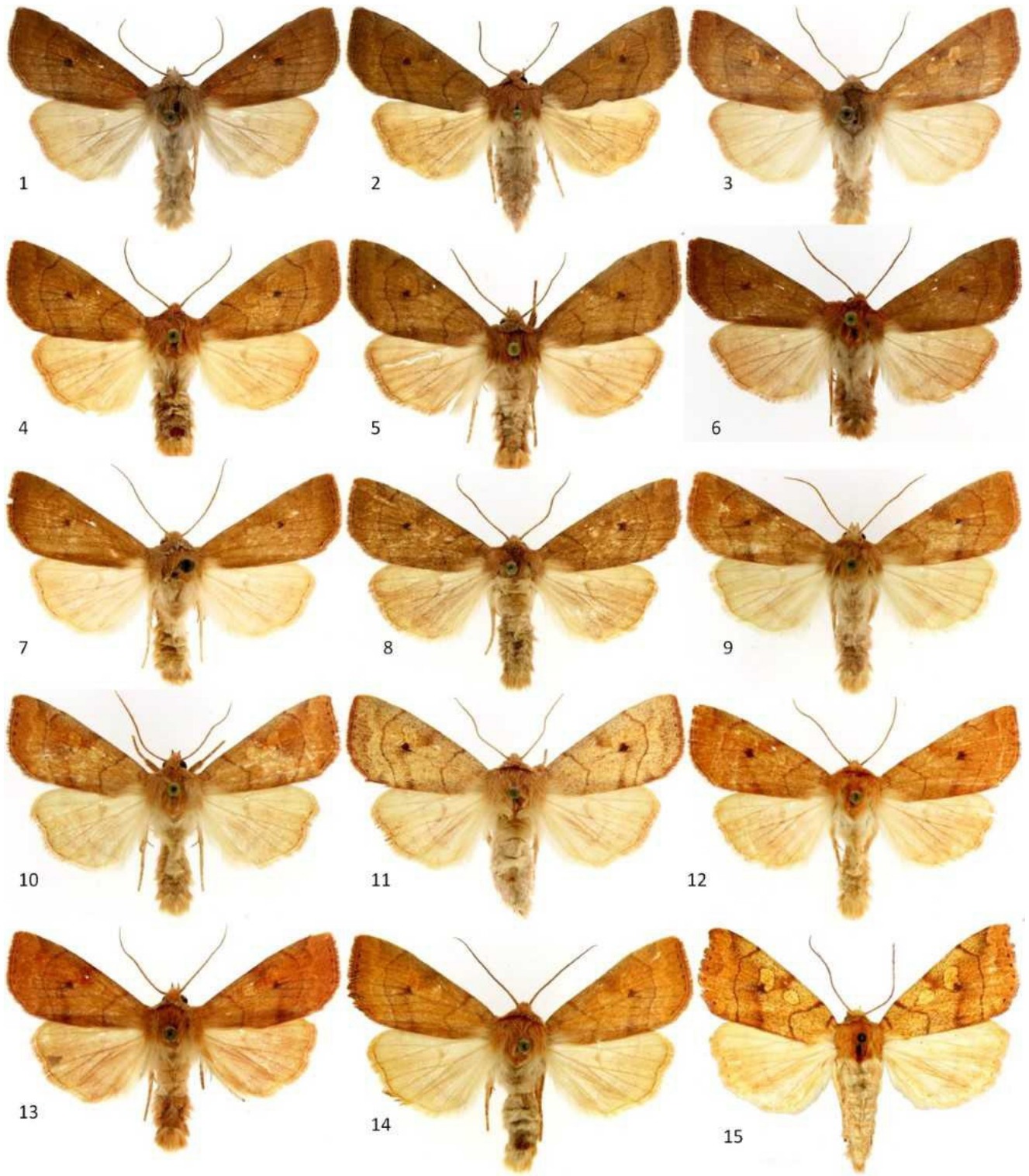


**FIGURE 130: *Enargia* species in Outagamie County (part) (Noctuidae: Noctuinae).**

*Enargia mephisto* and *Enargia infumata* have different distributions and phenologies, thus I think they represent separate species. I have found no overlap in the flight season in Wisconsin. In Outagamie County, *Enargia mephisto* flies primarily from mid June to early July, with worn specimens sometimes persisting until late July. *Enargia infumata* flies during August. *Enargia infumata* is most common in the Canadian Zone, and uncommon in the Outagamie County area and southeastern Wisconsin.

Most specimens of *Enargia mephisto* are plain brownish, as in Numbers 1-10. There is also an uncommon light tan form (Number 11). These forms are outside the range of variation found in *E. infumata*. However, there is an uncommon orange-brown form that does resemble *E. infumata* (Numbers 12-14) and probably cannot be reliably differentiated based on pattern. *Enargia infumata* has orange, orange-brown, orange-yellow, and orange-tan forms. Most phenotypes resemble *Enargia decolor* more closely than *Enargia mephisto*, but *Enargia decolor* lacks a black dot in the posterior corner of the reniform, which is usually present in *E. infumata* (and *E. mephisto*). The flight seasons of *E. infumata* and *E. decolor* may overlap in the latter part of August during some years, but *E. infumata* is usually worn when *E. decolor* is fresh.

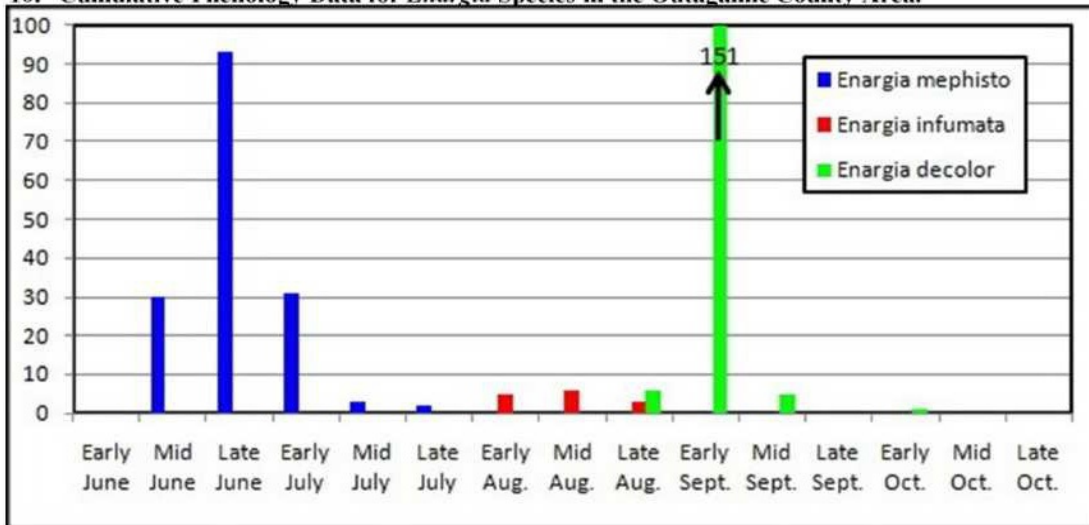
1. *Enargia mephisto* (9551): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 23 June 2023.
  2. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest trail, UV trap 24, 19 June 2021.
  3. *Enargia mephisto* (9551): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet 8, 23 June 2023.
  4. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  5. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  6. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  7. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: open hydric hardwood forest, MV trap 21, 18 June 2021.
  8. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  9. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  10. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  11. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest trail, UV trap 24, 19 June 2021.
  12. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  13. *Enargia mephisto* (9551): WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV trap 15, 23 June 2022.
  14. *Enargia mephisto* (9551): WI Outagamie County: Fallen Timbers: hydric hardwood forest edge/meadow with prairie planting, MV trap 20, 19 June 2021.
  15. *Enargia infumata* (9550): WI Forest County: Armstrong Creek Bog: UV trap, 14 August 1993.
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**FIGURE 131: 1-10: *Enargia* species in the Outagamie County Area (part); 11-16 *Chytonix* Species in the Outagamie County Area (Noctuidae: Noctuinae).**

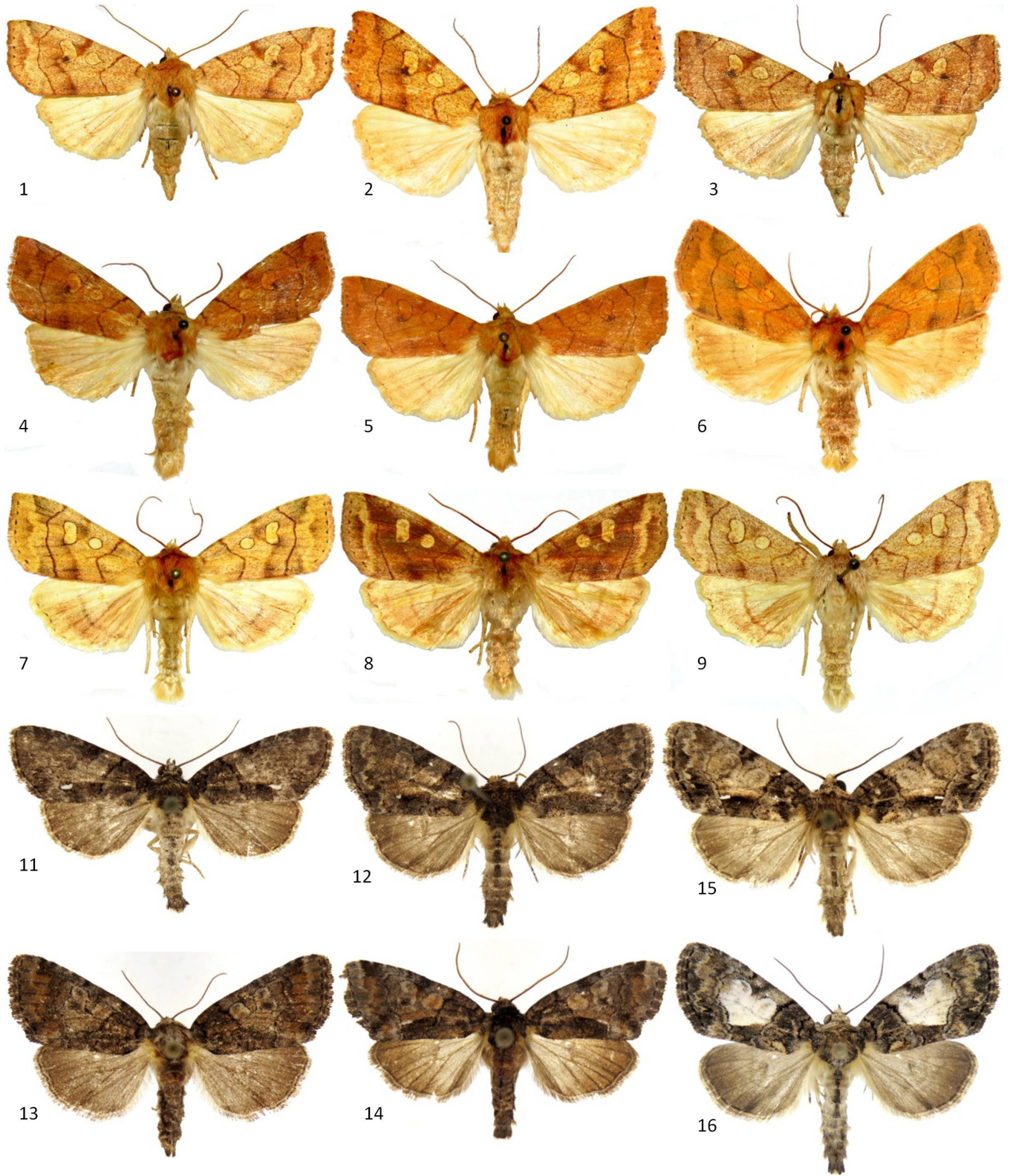
1. *Enargia infumata* (9550): WI Outagamie County: Mosquito Hill: south side of hill along base, mesic hardwood forest, bait trail, 22 August 1994.
2. *Enargia infumata* (9550): WI Forest County: Armstrong Creek Bog: UV trap, 14 August 1993.
3. *Enargia infumata* (9550): WI Outagamie County: Appleton: UV lights, 20 August 1994.
4. *Enargia infumata* (9550): WI Forest County: Armstrong Creek Bog: UV trap, 14 August 1993.
5. *Enargia infumata* (9550): WI Outagamie County: Mosquito Hill: south side of hill along base, mesic hardwood forest, bait trail, 22 August 1994.
6. *Enargia infumata* (9550): WI Marinette County: oak-pine forest/barrens interface adjacent to the Dunbar Barrens, bracken grassland, T 37N R 18E Sec 21, UV sheet, 14 August 1993.
7. *Enargia decolor* (9549): WI Portage County: Schmeeckle Reserve: 25 September 1992.
8. *Enargia decolor* (9549): WI Portage County: Schmeeckle Reserve: 2 September 1993.
9. *Enargia decolor* (9549): WI Portage County: Schmeeckle Reserve: 9 September 1993.

**10. Cumulative Phenology Data for *Enargia* Species in the Outagamie County Area.**



*Chytonix palliatricula* has lighter grey (or white) between the antemedial and subterminal lines (anterior to vein Cu<sub>2</sub>) relative to the other two species. *Chytonix sensilis* has rich contrasting brown between the postmedial and subterminal lines, and sometimes also in the basal and medial areas. These areas are dull grey in *C. rupertii*.

11. *Chytonix rupertii* (9558): WI Waukesha County: Ottawa Lake Campground: mesic hardwood forest/field, 13 July 1993, UV sheet.
12. *Chytonix rupertii* (9558): WI Waukesha County: Ottawa Lake Campground: mesic hardwood forest/field, 13 July 1993, UV sheet.
13. *Chytonix sensilis* (9557): WI Burnett County, Namekogan Barrens, oak-pine barrens, UV sheet, 5 August 1995.
14. *Chytonix sensilis* (9557): WI Burnett County, Namekogan Barrens, oak-pine barrens, UV sheet, 5 August 1995.
15. *Chytonix palliatricula* (9556): WI Outagamie County: Fallen Timbers: 2 July 1992.
16. *Chytonix palliatricula* (9556): WI Outagamie County: Appleton: MV trap, 11 July 2019.



**FIGURE 132: The *Lithophane disposita* species complex (Noctuidae: Noctuinae).**

These two phenotypes are sympatric without intermediates at six localities in Outagamie, Shawano, and Portage Counties. However, they have different distributions, thus I think they are separate species. I have seen only the typical *disposita* phenotype from the Canadian Zone.

*Lithophane* near *disposita* is a lighter greenish grey relative to the darker grey or brownish grey of typical *disposita*. Near *disposita* also has more elongate wings. Near *disposita* usually has a thin black line between the antemedial and postmedial lines below the reniform/subreniform; in typical *disposita* this marking is a stouter black bar or absent. Numbers 7 & 12 as well as 8 & 13 were photographed together in the same frame.

1. *Lithophane* near *disposita* (9892.1): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 22 October 2022.
  2. *Lithophane* near *disposita* (9892.1): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 23 October 2022.
  3. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 5 November 2020.
  4. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, bait trail, 9 November 2020.
  5. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Fallen Timbers: hydric hardwood forest/fields, bait trail, 11 April 2020.
  6. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Old Stone Bridge Trail: mesic to hydric hardwood forest/fields, bait trail, 14 October 2020.
  7. *Lithophane* near *disposita* (9892.1): WI Shawano County: Navarino Wildlife Area: sandy oak-pine uplands with mixed grassland, shrubs, and woodland, bait trail, 2 November 2022.
  8. *Lithophane* near *disposita* (9892.1): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 24 October 2022.
  9. *Lithophane* near *disposita* (9892.1): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 23 October 2022.
  10. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, bait trail, 5 October 2022.
  11. *Lithophane* near *disposita* (9892.1): WI Outagamie County: Mosquito Hill: hilltop mesic hardwood forest/grassland, on twig, 9 November 2020.
  12. *Lithophane* *disposita* (9892): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 23 October 2022.
  13. *Lithophane* *disposita* (9892): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 23 October 2022.
  14. *Lithophane* *disposita* (9892): WI Outagamie County: Fallen Timbers: hydric hardwood forest/fields, bait trail, 20 September 2021.
  15. *Lithophane* *disposita* (9892): WI Outagamie County: Fallen Timbers: hydric hardwood forest/fields, bait trail, 20 September 2021.
  16. *Lithophane* *disposita* (9892): WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest mixed with grassland, bait trail 1, 23 October 2022.
  17. *Lithophane* *disposita* (9892): WI Outagamie County: Fallen Timbers: white cedar/hardwood swamp, bait trail, 8 November 2020.
-



**FIGURE 133: The *Lithophane baileyi* and *Lithophane hemina* species complexes (Noctuidae: Noctuinae).**

BOLDSys (2022) public COI 5' sequences for what is currently considered *Lithophane baileyi* form two haplotype groups. One group includes the plain dark grey *baileyi* phenotype, whereas the other group includes the silvery *vivida* phenotypes from the Pacific northwest as well as variable phenotypes that occur in the eastern U.S. Two sympatric phenotypes occur in the Canadian and Northern Transition Zones of eastern Wisconsin that appear to correspond to both haplotype groups, although no Wisconsin material has been sequenced. Midwestern and Appalachian material of the variable phenotype differs in pattern from *vivida* of the Pacific northwest; I do not know if intermediate populations occur somewhere inbetween, and refer to this material as "*vivida* or species near."

In eastern Wisconsin, *vivida* or species near differs from *baileyi* by having a lighter silvery to bluish grey forewing coloration, and a more strongly contrasting dark band between the reniform and subreniform, extending posteriorly along the basal side of the postmedial line. Fresh specimens might also have more of a pinkish cast to the hindwing.

Note: Numbers 1 and 6 were photographed together in the same frame.

**1 & 5. *Lithophane vivida* or species near (9903):** WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest/grassland east of Highway K, bait trail, 22 October 2022.

**2 & 4. *Lithophane vivida* or species near (9903):** WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, bait trail, 24 October 2022.

**3. *Lithophane vivida* or species near (9903):** WI Portage County: Schmeckle Reserve: west of divided highway, sedge meadow surrounded by oak-pine-hardwood forest, near oak-pine barrens opening, UV trap, 18 September 1995.

**6. *Lithophane baileyi* (9902):** WI Shawano Co: Navarino Wildlife Area: oak-pine uplands south of sedge meadow with bog elements, 10 November 2022.

**7. *Lithophane baileyi* (9902):** WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 9 March 2021.

**8. *Lithophane baileyi* (9902):** WI Shawano Co: Navarino Wildlife Area: oak-pine uplands south of sedge meadow with bog elements, 10 April 2022.

**9. *Lithophane baileyi* (9902):** WI Shawano Co: Navarino Wildlife Area: oak-pine uplands south of sedge meadow with bog elements, 10 April 2022.

**10. *Lithophane baileyi* (9902):** WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 16 March 2022.

**11. *Lithophane baileyi* (9902):** WI Outagamie County: Fallen Timbers: hydric hardwood forest, bait trail, 9 March 2021.

**12. *Lithophane lanei* (9893.1):** WI Outagamie County: Fallen Timbers: white cedar/hardwood swamp, MV trap 17, 13 March 2021.

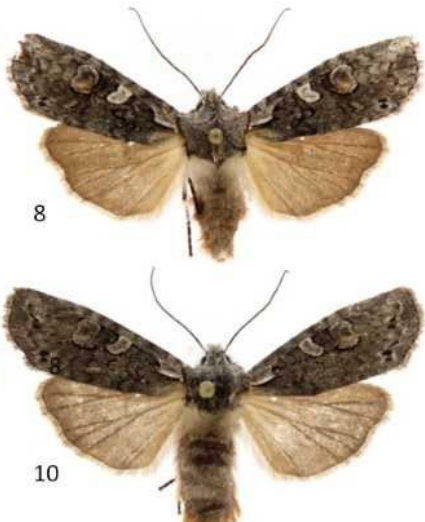
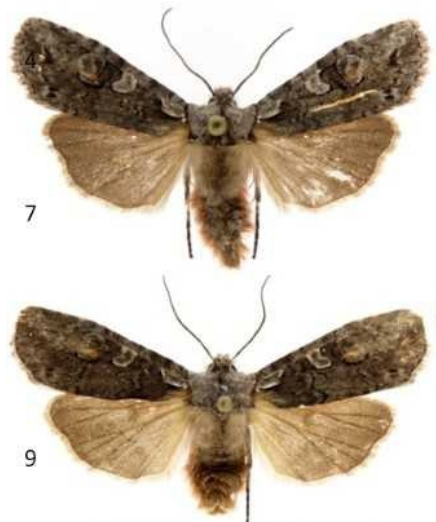
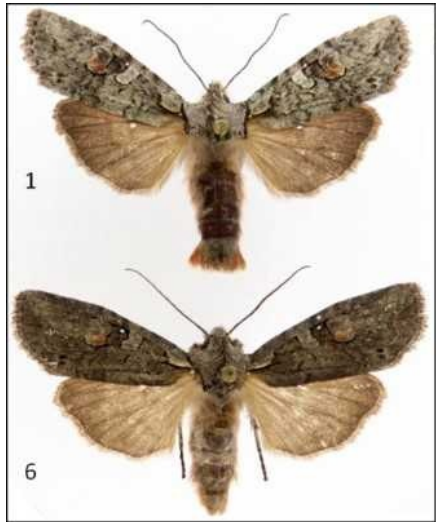
**13. *Lithophane lanei* (9893.1):** WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 22 March 2021.

**14. *Lithophane hemina* (9893):** WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 23 March 2021.

**15. *Lithophane hemina* (9893):** WI Outagamie County: Fallen Timbers: white cedar/hardwood swamp, bait trail, 9 March 2021.

**16. *Lithophane petulca* (9889):** WI Outagamie County: Mosquito Hill: hilltop/hillside mesic hardwood forest/grassland, 9 November 2020.

**17. *Lithophane petulca* (9889):** WI Shawano County: Navarino Wildlife Area: xeric-mesic-hydric oak-pine-hardwood forest/grassland east of Highway K, bait trail, 23 October 2022.





**FIGURE 134: Species Complexes in the Outagamie County Area (Notodontidae & Noctuidae).**

***Clostera inclusa* complex:** I have seen the "near *inclusa*" phenotype only from extensive Canadian Zone oak-pine barrens, including the vicinity of the Dunbar Barrens in Marinette County and the Moquah Barrens in Bayfield County. It is univoltine and flies during late May and June. It is larger and paler than typical *inclusa*. See also the *inclusa* species account.

1. ***Clostera near inclusa* (7896.1):** WI Marinette County: oak-pine forest/barrens interface adjacent to the Dunbar Barrens, T 37N R 18E Sec 21, UV light, 20 May 1995.
2. ***Clostera near inclusa* (7896.1):** WI Marinette County: intermediate succession oak-jack pine barrens mosaic adjacent to the Dunbar Barrens, T 37N R 18E Sec 21, UV light, 4 June 1995.
3. ***Clostera inclusa* complex (7896):** WI Outagamie County: Mosquito Hill: south side of hill/upland prairie planting, UV trap 6, 3 June 2020.

***Papaipema birdi* complex:** Two diagnosable phenotypes occur in the coverage area. Most are the phenotype in Numbers 4-5, which matches the *birdi* type. Phenotype 2 differs from the nominotypical phenotype by having the area between the antemedial and postmedial lines with predominately brown rather than orange scales.

4. ***Papaipema birdi* (9486) ♀:** WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, UV sheet 10, 1 September 2022.
5. ***Papaipema birdi* (9486) ♀:** WI Outagamie County: Fallen Timbers: Swamp Road Trail, sedge area in hydric hardwood forest, UV trap, 16 August 1994.
6. ***Papaipema birdi* phenotype 2 (9486) ♂:** WI Portage County: Schmeekle Reserve, sedge meadow, UV trap, 5 October 1992.
7. ***Papaipema birdi* phenotype 2 (9486) ♀:** WI Outagamie County: Mosquito Hill: building lights, 16 September 2021.

***Papaipema nelita* complex:** Species 2 has a smoother, glossier appearance, a narrower reniform, and a richer, more contrasting forewing coloration relative to species 1. Species 1 also has an earlier flight.

8. ***Papaipema nelita* species 1 (9502) ♂:** WI Outagamie County: Mosquito Hill: prairie planting/floodplain forest edge, MV sheet 10, 23 August 2022.
9. ***Papaipema nelita* species 2 (9502) ♂:** WI Waukesha County: Kettle Moraine Fen & Low Prairie State Natural Area: wet prairie/sedge meadow, UV sheet, 23 September 1994.

***Acrionicta impleta* complex:** Species 1 is univoltine with a light grey hindwing. Species 2 is multivoltine with a brownish hindwing.

10. ***Acrionicta impleta* species 1 (9257):** WI Outagamie County: Mosquito Hill: hill top mesic hardwood forest/grassland, MV trap 4, 22 May 2020.
11. ***Acrionicta impleta* species 2 (9257.1):** WI Outagamie County: Appleton: lighted sheet, 18 August 1991.

***Xestia dilucida/youngii*:** These two phenotypes are sympatric without intermediates in the Canadian and Northern Transition Zones of eastern Wisconsin, including at the Navarino Wildlife Area. However, I have found only *dilucida* in the Southern Transition Zone, including at Mosquito Hill, Fallen Timbers, and the Southern Kettle Moraine (Waukesha County).

12. ***Xestia dilucida* (10969) ♀:** WI Shawano County: Navarino Wildlife Area: sandy oak-pine barrens, MV sheet, 28 August 2022.
13. ***Xestia dilucida* (10969) ♂:** WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements/oak-pine forest edge, UV trap 18, 28 August 2022.
14. ***Xestia youngii* (10970) ♀:** WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements/oak-pine forest edge, UV trap 18, 28 August 2022.
15. ***Xestia youngii* (10970) ♂:** WI Shawano County: Navarino Wildlife Area: sedge meadow with bog elements/oak-pine forest edge, UV trap 18, 28 August 2022.

***Properigea costa* complex:** Number 16 is typical of phenotypes from southwestern Oklahoma and Missouri. The Grant County specimen is a phenotype I have not seen from the south central states, with the reddish orange replaced by brownish black, and much more extensive whitish scaling.

16. ***Properigea costa* (9589):** WI Outagamie County: Mosquito Hill: hill top mesic hardwood forest/grassland, MV trap 4, 10 July 2020.
17. ***Properigea costa* phenotype 2 (9589):** WI Grant Co.: Nelson Dewey State Park: 3 July 1992, Robert J. Borth.

***Discestra trifolii* complex:** Species 2 has a lighter forewing background color with a more contrasting reniform, claviform, and subterminal area. Species 1 is widespread in eastern North America except in the Gulf Region, whereas species 2 appears to be confined to the Canadian Zone. See also page 34.

18. ***Discestra trifolii* species 1:** WI Outagamie County: Mosquito Hill: prairie planting: MV trap 24, 24 August 2023.
19. ***Discestra trifolii* species 2:** WI Ashland County: Long Island Sand Dunes, UV trap, 18 August 1995, L. A. Ferge.

