Surveys for Prairie-Dependent Moths on Northeast South Dakota Prairies

by
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Survey Methods

Four methods of collecting prairie-dependent moths were utilized. The most successful method utilized a black light bucket trap (Figure 1). The bucket trap was operated by a 12-volt battery connected to a photo-electric switch. The trap was placed on prairie hill tops with diverse and abundant prairie vegetation. Egg cartons were placed in the bucket so that moths and other invertebrates caught in the trap had a place to hide until removed. The bucket trap could be left at a site overnight without monitoring. Another less successful method utilized a black light placed above a white sheet. This method required the author to constantly monitor the sheet and capture moths in killing jars before they flew away. The sheet was difficult to anchor even with light winds. A butterfly/moth trap baited with a mixture of stale beer and brown sugar placed in a shallow pan was effective for catching Underwing (*Catocala*) moths including *Catocala whitneyi*. The fourth and least effective method was sweep netting. Many of the flower moths *(Schinia)* are reported too hide on their host plants during the day; however no specimens were caught using this method. The best collecting nights were those with clear skies, calm winds, high humidity, and nighttime temperatures above 65 degrees.

Figure 1. Bucket trap on prairie hilltop.

Survey Results

Weather during the summer months of 2008 and 2009 often did not meet the ideal collecting conditions as described above which may have limited the number of specimens collected. The unusually cool weather definitely affected the 2009 adult flight of butterflies in northeast South Dakota as described by Skadsen (2009). The only measurable means of determining collecting success was with the bucket trap. The photo-electric switch usually activated the black light around 9:30pm with the light remaining on until sunrise around 6:00am. This allowed approximately 8.5 hours of collecting time. On average only nine species were collected per night which equates to just over one moth per hour. Because of inclement weather most of the night collecting was conducted at the prairie remnant located in the east unit of Pickerel Lake State Recreation Area in northeast Day County. Specimens were also collected below mercury vapor lights located on the park shop building and managers residence in the west unit of Pickerel Lake State Recreation Area and a baited butterfly/moth trap. Two small prairie remnants are located adjacent to the park manager's residence. Over thirty species of moths were collected during thirty-six nights of collecting at these two sites. Prairie remnants located at Hartford Beach State Park in Roberts County, and Pickerel Lake State Recreation Area and the Scarlet Fawn Prairie located in Day County were surveyed during the day on several occasions for diurnal flying species like *Proserpinus juanita* and flower moths *(Schinia*). The majority of species collected during the study were non-prairie-dependent moths associated with woody habitats. Only four prairie-dependent or possible prairie-dependent species as described by Metzler et al (2005) were collected and identified during the survey and the number of individuals of the species caught was extremely rare.

These include;

Catocala whitneyi
Whitney's underwing

Cycnia inopinatus
Unexpected cycnia

Schinia hulstia
Hulst flower moth

Schinia lucens
Leadplant flower moth

Two other species deemed prairie-dependent were collected prior to this study by the author in Day County; the Three-staffed underwing (*Catocala amestris*) and the Green-banded day-sphinx (*Proserpinus juanita*). Neither species was found during this study. Table 1 lists collection dates and locations of prairie-dependent moths collected by the author.

Table 1. Prairie-Dependent Moths Collected In Day County South Dakota

Scientific Name	Common Name	Dates Collected	Collection Site (All Day County)	Number Collected
Catocala amestris	Three-staffed Underwing	7/26/95	Pickerel Lake State Rec. Area East Unit	1
Catocala whitneyi	Whitney's Underwing	7/25/09 8/14/09 8/16/09	Pickerel Lake State Rec. Area East Unit	1 2 1
Cycnia inopinatus	Unexpected Cycnia	7/11/08	Pickerel Lake State Rec. Area West Unit	1
Proserpinus juanita	Green-banded Day-sphinx	6/25/06	Wattier Pasture Prairie	1
Schinia hulstia	Hulst Flower Moth	8/11/09	Pickerel Lake State Rec. Area East Unit	1
Schinia lucens	Leadplant Flower Moth	7/25/09 7/27/09	Pickerel Lake State Rec. Area East Unit	2 1

Another possible prairie-dependent moth, the Prairie-sage flower moth (*Schinia cumatilis*) is reported by Opler et al (2009) to have been collected in Day County (no date provided); however this species was not collected during this study.

Discussion

Unlike butterflies, very few organized studies or even casual collecting by amateur naturalists has been undertaken in northeast South Dakota, thus very little is known about the species composition and distribution of moths in general in this area and very little on species that are prairie-dependent. Metzler et al (2005) published a list of species determined to be prairie-dependent or possibly prairie-dependent based on distribution and known life histories. In many instances not enough information is known about life histories, especially larval host plants, too determine whether or not a species is in fact tallgrass prairie-dependent.

All six species listed in Table 1 are categorized by Metzler et al (2005) as being prairie-dependent or possibly prairie-dependent in the tallgrass prairie region. *Cycnia inopinatus, Schinia lucens, Catocala amestris* and *whitneyi* are all listed as prairie-dependent in the tallgrass prairie region and their larval hostplants are exclusively native grassland/prairie plants. *Proserpinus juanita* and *Schinia hulstia* are possibly prairie-dependent but more information on distribution and larval hostplants is needed to

determine the species status (Metzler et al 2005). The larvae of *Catocala amestris* and *whitneyi*, and *Schinia lucens* feed on Leadplant (*Amorpha canescens*), an abundant prairie forb found on the remnant prairie at Pickerel Lake State Recreation Area and the Wattier Pasture. The larvae of *Cycnia inopinatus* are reported to feed on several species of milkweed and dogbane.

As with prairie-dependent butterflies, certain land management practices may or may not favor the survival of moths on remnant prairie. It is reported that the larvae of the Leadplant flower moth (*Schinia lucens*) pupates several inches below ground and due to this fact can survive on prairies managed by prescribed fire. Life histories requirements of butterflies, moths (as well as other invertebrates and vertebrates) should be considered when prairie restoration efforts utilize fire, grazing, and fall haying as management practices.

Not enough specimens were collected to determine the number of prairie-dependent moths extant on northeast South Dakota tallgrass prairie remnants, based on range maps in Metzler et al (2005) another twenty or so species should be found in northeast South Dakota. The study did show that the black light bucket trap was the most effective way to collect moths as well as other invertebrates including carrion beetles, fishflies, caddisflies, and water beetles. It would have been beneficial to have more than one bucket trap operating per location or at multiple locations especially on evenings favorable to collecting; however the cost of a bucket trap including battery is approximately $300.00.

Literature Cited

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