

**A Survey of the Papaipema Moths of the Goose Lake Prairie
Nature Preserve, Grundy County, Illinois**

Presented to the Illinois Department of Conservation
and
The Nongame Wildlife Conservation Committee

Conducted by: Ron Panzer
Biology Department
Northeastern Illinois University
and George Derkovitz
Frankfort, IL

Introduction

The North American genus *Papaipema* is comprised of approximately 55 species (Quinter 1983), with roughly 40 occurring in the East and/or Midwest (Hessel 1954). Most are restricted to native plant communities by narrow host plant requirements. As a consequence, most are uncommon or rare in large portions of their range.

The Chicago region has long been considered the metropolis for many of the members of this group. Twenty-seven species were recorded in and around Chicago between the years of 1915 and 1942 by A. K. Wyatt, E. Beer, and others (Wyatt 1915-1942). We have managed to "rediscover" 22 of these species in natural areas in the Chicago region within the past 5 years.

The *Papaipema* moths of northeastern Illinois and northwestern Indiana can be categorized according to habitat type as follows: 15 prairie species; 4 fen species*; 4 savanna/woodland species; and 4 wide-ranging, unrestricted species. A site as large as The Goose Lake Prairie (GLP) should probably support 10 to 12 of the prairie species (The host plants of 14 prairie species occur on GLP).

Methods

Papaipema larvae bore into the lower stems and roots of their host plants and are very difficult to find. We visited GLP twice in July to search for these elusive forms (*P. eryngii*).

Adult *Papaipemas* are strictly nocturnal and exceedingly colonial, often occurring on only a small fraction of an apparently suitable habitat. We searched for adults on 18 occasions from late August through early October. Tractor batteries and blacklights were used to slowly move through the prairie "trolling" for localized colonies, usually from 9:00pm to 1:00am. In addition, four light traps powered by automobile batteries were moved between 6 areas and operated from 8 pm to 8am on 20 nights.

* Many "prairie species" can also be found in prairie fens.

Easily identified moths were captured, identified, and released. A small number of difficult *Papaipemas* were sacrificed and retained for further examination; Several specimens were forwarded to Eric Quinter at the American Museum of Natural History for confirmation. The remainder are housed as voucher specimens at Northeastern Illinois University.

Results

Twenty species of moths were captured and identified to species. Eight prairie-restricted *Papaipema* species were recorded, placing GLP among the richest prairie *Papaipema* sanctuaries in either Illinois or Indiana, and probably in the entire Midwest (Table 1). Of even greater importance, this site was found to support The Eryngium stem borer, *P. eryngii*; thirty-six *eryngii* adults were captured either at sheets or in light traps (most were identified and then released). Despite several hours of searching, we were unable to find the larvae of this elusive creature.

Discussion

Ten species, *P. rigida*, *P. frigida*, *P. cerussata*, *P. silphii*, *P. maritima*, *P. beeriana*, *P. sciata*, *P. impecuniosa*, *P. baptisiae*, and *P. eryngii* are especially characteristic of the tall grass prairies in this region; the latter eight were found to occur, in sizable numbers, at GLP.

The Silphium stem borer, *P. silphii*, is listed as threatened in Michigan and is an uncommon member of the upland prairie fauna in Illinois and Indiana. The Liatris stem borer, *P. beeriana*, is known from only 4 sites in Michigan† and is apparently very uncommon in Illinois and Indiana. The Culver's root stem borer, *P. Sciata*, is equally as uncommon in Illinois and Indiana. The Sneezeweed and Indigo stem borers (*P. impecuniosa* and *baptisiae*) are still relatively common, and can usually be found where their host plants occur.

The Eryngium stem borer (*P. eryngii*), previously thought to be extinct, may be the "black-footed ferret" of the tallgrass prairie. Recorded only on the prairies of the Chicago region, this beautiful

† Michigan records obtained from James Bess, Assistant Zoologist, Michigan Natural Features Inventory.

moth has not been encountered in over 50 years, and has been nominated for listing (category 2) as a federally endangered species*.

The Ironweed Papaipema, *P. cerussata*, although common to the north and east, has only been recorded once in Illinois and is apparently very rare in this state. The Maritime stem borer, *P. maritima*, has only been recorded 3 or 4 times in Michigan and seems to be equally as rare in Illinois.

Two relatively common prairie species, The Sunflower stem borer, *P. rigida*, and the Meadow-rue stem borer, *P. frigida*, as well as the uncommon Sensitive fern borer, *P. inquisita*, were not recorded during this study but very likely persist in remote sections on this site. We hope to search for these species next year.

Prescribed burning

Fires can represent a threat to Papaipema moths, all of which are present as eggs lying in the prairie litter during the spring and fall (Bird 1934, Swietzer 1988, Panzer 1988). A growing body of anecdotal evidence suggests, however, that fire-sensitive insects, Papaipema moths included, can routinely survive partial burns which leave sizable portions of their habitat unburned (Panzer 1988).

The GLP management plan requires that one third of the prairie be burned annually. Three permanent fire units of roughly 500 acres each have been designated, as seen in Figure 1.

Six species, including *P. eryngii* and *P. cerussata*, were found to occur in two or more areas within each of the 2 fire units we examined (Fig 1). Given the the widespread distribution of host plants on this site, it is likely that most Papaipema species will be found to occur within at least two, and probably in all 3, fire units**. Believing that this will prove to be the case, we see no

* Goose Lake Prairie may be the last refuge for the Eryngium stem-borer; we have searched for this mythical creature unsuccessfully on many sites in Illinois and Indiana during the past 5 years, as have others in Michigan and Indiana.)

** We plan to survey within all fire units next year in an effort to more precisely document the distribution of species throughout the site.

reason to recommend any changes in the burning regime for this site. (Note: 7 species were recorded in the section that was burned in the spring of 89.)

Literature cited

- Bird, H. 1934. Decline of the Noctuid Genus *Papaipema* (Lepidoptera) Annals of the Entom. Soc. of America. 27(4): 551-556.
- Hessel, S. A. 1954. A guide to collecting the plant-boring larvae of the genus *Papaipema* (Noctuidae). The Lepidoptera News. 8(3-4): 57-63.
- Panzer, R. 1988. Managing prairie remnants for insect conservation. Natural Areas Journal. 8 (2): 83-90.
- Quinter, E. L. 1983. in Hodges, R. W. et al, Check list of the Lepidoptera of America North of Mexico. London. E. W. Classey Ltd. and the Wedge Entom. Research Foundation.
- Swietzer, D. 1989. TNC Elemental Abstract draft: *Papaipema eryngii*.
- Wyatt, A. K. 1915-1942. Personal records - stored at the Field Museum of Natural History. Corroborating specimens are scattered among several institutions.

Table. 1 Distribution of *Papaipema* species diversity on seven prairies in the Chicago region *

Species	host plants	GLP 1,500 acres	GMP 150 acres	WCP 120 acres	TRP 80 acres	CP 40 acres	CRP 8 acres	OFF 3 acres
<i>baptisea</i>	<i>Baptisea</i> & <i>Rpocynum</i>	x	x	x		x	x	
<i>beariana</i>	<i>Liatris</i>	x	x	x		x		
<i>birdi</i>	<i>Cicuta</i>							
<i>cerussata</i>	<i>Vernonia</i>	x						
<i>eryngii</i>	<i>Eryngium</i>	x						
<i>frigida</i>	<i>Thalictrum</i>		x	x	x	x		
<i>impecuniosa</i>	<i>Helianthus</i>	x	x			x		
<i>inquaesita</i>	<i>Onoclea</i>				x			
<i>limpida</i>	<i>H. grossoseratus?</i>		x					
<i>maritima</i>	<i>Helianthus</i>	x	x					
<i>necopina</i>	<i>Helianthus</i>					x		
<i>rigida</i>	<i>Helianthus</i>		x			x		x
<i>sciata</i>	<i>Vernonia</i>	x	x			x		
<i>silphii</i>	<i>Silphium</i>	x	x	x		x	x	x
<i>speciosissima</i>	<i>Osmodium</i>				x			
Totals		8	9	4	4	8	2	2

GLP = Goose Lake Prairie; GMP = Gensberg Markham Prairie; WCP = West Chicago Prairie; TRP = Toll Road Prairie (IN) CP = Cook Prairie (IN); CRP = Chicago Ridge Prairie; OFF = Oak Forest Prairie.

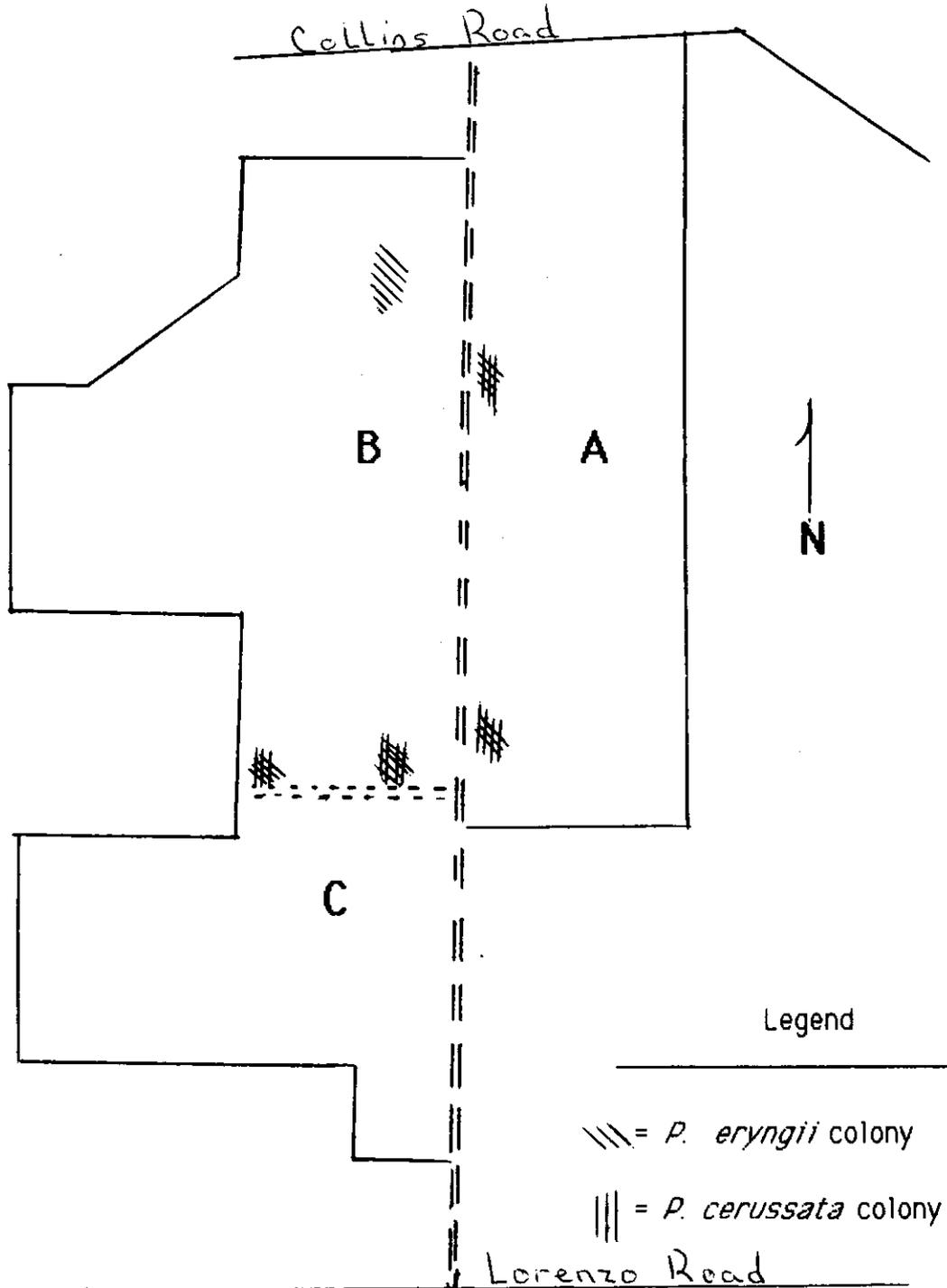
* Four "weedy" species, *P. arctivorens*, *P. cataphracta*, *P. furcata*, and *P. nebris* are not included in this comparison.

Table. 2 Distribution of *Papaipema* species within the three burn units shown in Figure 1

Species	Burn unit	A	B	C
<i>baptisiae</i>		x	x	?
<i>beeriana</i>		x	x	?
<i>cerussata</i>		x	x	?
<i>eryngii</i>		x	x	?
<i>impecuniosa</i>		x	x	?
<i>maritima</i>		x	?	?
<i>necopina</i>		?	?	?
<i>sciata</i>		?	x	?
<i>silphii</i>		x	x	?
Totals		7	7	-

A = east of tracks; B = north unit, west of tracks; C = south unit, west of tracks.

Fig. 1 Locations of *P. eryngii* and *P. cerussata* colonies within 3 burn units on the Goose Lake Prairie Nature Preserve.



**An Annotated Listing of the Moths of the Goose Lake
Prairie, with Emphasis on the genus *Papaipema***

Dates represent earliest and latest dates of capture.

**Order Lepidoptera
family Sphingidae**

Ceratomia hageni Grote **Hagen's sphinx**
This common species feeds on Osage orange. 9-19-89

family Lasiocampidae

Tolype velleda (Stoll) **Large Tolype**
This common moth reportedly feeds on a variety of woody species.
9-18-89 through 9-28-89

**family Noctuidae.
subfamily Hadeninae**

Nephelodes minians Guenee **Bronzed cutworm moth**
This is a common, wide-ranging species. Numerous on 9-16-89 (30
individuals were taken in one trap). 9-15 through 10-12-89.

Tricholita notata Strecker **Rigid goldenrod moth**
This seems to be an uncommon, prairie restricted species. Host
plants are *Salidaga rigida* and *Silphium terribinthaceum*
(Wyatt). One individual observed nectaring on *Helianthus* on
9-15-89.

subfamily Cucullinae

Chaetoglaea sericea (Morr.) **Silky sallow**
This oak-feeding species is apparently common. 9-28-89

Eucirroedia pampina (Gn) **Scalloped sallow**
This moth reportedly feeds on a variety of woody species. 9-18-89

subfamily **Rhipiyrinae**

Papaipema baptisiae (Bird) **Indigo stem borer**
This somewhat common species is known to feed on both Indigos (*Baptisia* spp.) and dogbanes (*Apocynum* spp.) 9-15 through 10-14-89

Papaipema beeriana Bird **Gayfeather stem borer**
This uncommon species feeds on blazing stars on mesic and wet mesic prairies. 9-16 through 10-5-89

Papaipema cerussata (Grote) **Ironweed stem borer**
This moth was recorded in Joliet in 1915 (A. K. Wyatt) and has not been recorded in Illinois since. Recorded 9-25 through 10-13, mostly in traps.

Papaipema eryngii Bird **Eryngium stem borer**
Recorded in Chicago, Cicero, Riverside, Norwood Park, Berwyn, and Desplaines before 1943, and has not been seen since. This moth has been nominated for listing as a federally endangered species (Category 2). Recorded 9-16 through 10-15, mostly in traps.

Papaipema impecuniosa (Grote) **Sneezeweed stem borer**
This somewhat common species apparently feeds on *Helenium autumnale* on the prairies in this region.

Papaipema maritima Bird **Maritime stem borer**
The host plants for this very uncommon species are sunflowers (*Helianthus* spp.), and include *H. laetiflorus* in this region. 9-29-89 through 10-10-89

Papaipema sciata Bird **Meadow rue stem borer**
This very uncommon species feeds on *Veronicastrum virginicum*. 9-29 through 10-10-89

Papaipema silphii Bird **Silphium stem borer**
This somewhat common prairie species feeds on *Silphium* spp. Recorded within patches of both *S. integrifolium* and *S. laciniatum* from 9-17 through 10-12-89

Leammeria digitalis Grote.

moth

This uncommon fen and sedge meadow species is thought to feed on sedges (*Carex* spp.?) 10-2 through 10-10

Hydraecia immanis Guenee

Hop vine borer

This *Silphium*-feeding species is a common associate of *P. silphii* in this region. 8-25-89.

subfamily Heliothinae

Heliathis zea (Boddie)

Corn earworm moth

This very common, wide-ranging species was found throughout this site. 9-12 through 10-15

subfamily Catocalinae

Catocala amatrix (Hubner)

The Sweetheart

Host plants of this somewhat common species are cottonwoods and black willows. Ten individuals were recorded on 4 nights in late September.

Zale lunata (Drury)

Lunate zale

The host plants of this common species include willows and plums.

Caenurgina erecta (Cramer)

Forage looper moth

This may be the most common moth in this region. Host plants are weeds.