
INSECTS

FLIES: NUISANCE OR NECESSITY?

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Introduction

Few people would disagree that flies are a nuisance. While houseflies and fruit flies are usually just annoying, the biting flies, namely horse, deer and black flies, can inflict painful, itchy bites. Naturalists are less disdainful of flies than other people because they know flies are food for bats, birds and dragonflies. But flies are more than just fodder for hungry animals, they also pollinate plants.⁵

Flies are in the order Diptera along with mosquitoes and gnats. The word 'diptera' means "two wings" in Latin. The forewings of flies are large and

membranous while the hindwings are reduced to tiny bumps called halteres. The reduction of the hindwings gives the flies more maneuverability.¹ Tiny claws and sticky pads on the legs of flies enable them to grip any surface, even while they are upside down.¹ Their mouthparts are adapted for sucking or lapping up liquids, such as flower nectar.

To determine the potential importance of flies in the pollination of native plants, two study sites were sampled for flower visitor diversity during the summer of 2004: the Living



Figure 1. Location of study sites in Manitoba

Prairie Museum (LPM) in Winnipeg, MB and the Tall Grass Prairie Preserve (TGPP) near Vita, MB (Fig. 1). The LPM is a 12-ha remnant of tallgrass prairie, completely surrounded by urban development. The TGPP is a considerably larger (2000-ha), more contiguous preserve. Both sites are in the Lake Manitoba Plain ecoregion and have a similar climate, although drainage is poorer at the TGPP.

Methodology

At each site, six 5 m x 5 m plots were established. Sampling was done every two weeks, from the second week of June to the third week of September. The number of flowers each adult insect species visited in each plot was recorded. Each plot was surveyed for 60 minutes every sampling week. Since foraging activity is low in the early morning and late afternoon, surveys were typically conducted between 12 pm and 5 pm. The visitation sequence was randomized to correct for differences in insect visits during the course of the day. Regardless of whether insects were foraging for pollen or nectar, all were considered potential pollinators. At least one specimen of each insect species was captured, placed in a killing jar with ethyl acetate and frozen for later identification by Heather White (J.B. Wallis Museum, University of Manitoba). Voucher specimens for each plant species visited by an insect were collected from outside the sample plots. The plant and insect specimens were digitally photographed, and the images and specimens deposited in The Manitoba Museum.

Results

At least 60 species of insects representing four orders were observed feeding on nectar from (and possibly pollinating) 39 plant species (Table 1).

Just over half of the insect species observed were in the order Diptera. Dipterans were responsible for 64% of all floral visits (Fig. 2). The most important dipteran family was the Syrphidae (hover flies) (Fig. 3). Syrphids were responsible for 72% of all dipteran flower visits. One species in particular, *Toxomerus marginatus*, was observed feeding on the nectar of 22 different plant species throughout the summer. However, the efficacy of *T. marginatus* in pollinating those species may be low due to its small body size and lack of abundant hairs where pollen can attach. The Scatopsidae (scavenger flies) and Muscidae (house flies) were the next most common flower-visiting dipteran families. Dipterans in 12 other families, including the Culicidae or mosquito family, accounted for about 11% of the visits.

Hymenoptera (bees and wasps) were second in terms of species abundance and floral visits, outperforming the Lepidoptera (butterflies and moths). Of the hymenopteran families, the family Apidae (bumblebees) was the most active (Fig. 4) followed by the Andrenidae (mining bees) and Halictidae (sweat bees). Hymenoptera in five other families accounted for only 3% of the visits. Insects in the dipteran and hymenopteran orders visited a similar number of plant species: 28 and 27 species respectively (Fig. 5).

Discussion

Many groups of insects are anthophilous, making use of flowers as resting and hunting sites, or as a source of nectar and pollen. A subset of these flower visitors are pollinators, transferring the pollen from the anthers of one flower to the stigma of another. The efficacy of a pollinator depends on

Table 1. Insect species observed during the study and the plant species they visited.

Order:	Family:	Name:	Achillea millefolium	Agosens glauca	Allium stellatum	Asclepias ovalifolia	Aster ciliolatus	Aster ercolides	Astragalus agrestis	Campanula rotundifolia	Cirsium rhodmanii	Comandra umbellata	Dalea purpurea	Eriogon asper	Eriogon glabellus	Fragaria virginiana	Gallardia anstata	Galium boreale	Helianthus maximiliani	Hypoxis hirsuta	Liatris ligulistylis	Total		
COLEOPTERA	Chrysomelidae	<i>Orsodachne atra</i>																					1	
	Cleridae	<i>Hydrobaenus</i> sp.																					1	
DIPTERA	Meloidae	<i>Trichodes nuttalli</i>											1										1	
	Phalacridae	<i>Epicauta pennsylvanica</i>																					0	
	Anthomyiidae	<i>Olibrus</i> sp.																						0
		<i>Crinurina</i> sp. #1																						1
	<i>Crinurina</i> sp. #2																							0
	Bombyliidae	<i>Poecilanthrax tegminiipennis</i>																					1	
	Calliphoridae	<i>Pollenia rudus</i>																					1	
	Chloropidae	<i>Chloropidae</i> sp. #1																						2
		<i>Chloropidae</i> sp. #2																						0
	Conopidae	<i>Zodion fulvifrons</i>																						0
	Culicidae	<i>Aedes nigripes</i>																						0
	Ephydriidae	<i>Lamproscatella</i> sp.																						0
		<i>Scatella</i> sp.																						1
	Muscidae	<i>Stomoxys calcitrans</i>																						0
		<i>Haematobosca alcis</i>																						2
	Otitidae	<i>Otitae</i> sp. #1																						0
		<i>Sarcophagidae</i> sp.																						1
	Scatopsidae	<i>Psectrosciara</i> sp.																						1
		<i>Eugnoriste</i> sp.																						1
	Stratiomyidae	<i>Odontomyia pubescens</i>																						0
		<i>Odontomyia virgo</i>																						1
	Syrphidae	<i>Cheilosia</i> sp.																						1
		<i>Eristalis</i> sp. #1																						1
<i>Eristalis</i> sp. #2																							2	
<i>Helophilus</i> sp. #1																							2	
<i>Helophilus</i> sp. #2																							1	
<i>Syrphus ribesii</i>																						1		
<i>Syrphus</i> sp. ?																						2		
Tachinidae	<i>Toxomerus marginatus</i>																						2	
	<i>Cylindromyia interrupta</i>																						9	
	<i>Tachina</i> sp.																						0	
	Tachinidae sp.																						1	
																							0	

Table 1, continued

Order:	Family:	Name:	Achillea millefolium	Agoseris glauca	Allium stellatum	Asclepias ovalifolia	Aster ciliolatus	Aster ercolides	Astragalus agrestis	Campanula rotundifolia	Cirsium flodmanii	Comandra umbellata	Dalea purpurea	Erigeron asper	Erigeron glabellus	Fragaria virginiana	Gallardia aristata	Galium boreale	Helianthus maximiliani	Hypoxis hirsuta	Liatris ligulistylis	Total	
		<i>Andrena</i> sp.																					1
		Andrenidae sp. #1																					1
		Andrenidae sp. #2																					1
	Anthophoridae	<i>Epeolus</i> sp.																					2
	Apidae	<i>Apis mellifera</i>																					0
		<i>Bombus perplexus</i>						1															2
		<i>Bombus terrestris</i>																					4
		<i>Bombus vagans</i>																					3
	Braconidae	Braconidae sp.																					0
	Colletidae	<i>Hylaeus</i> sp.																					1
	Formicidae	<i>Dolichoderus plagiatus</i>																					1
		Myrmicinae sp. #1																					3
		Myrmicinae sp. #2																					1
	Halictidae	<i>Augochlora</i> sp.																					6
		<i>Dialectus</i> sp. #1																					7
		Halictidae sp. #1																					2
		Halictidae sp. #2																					1
		Halictidae sp. #3																					0
		Halictidae sp. #4																					1
		<i>Halictus rubicundis</i>																					1
	Tenthredinidae	<i>Dolerus</i> sp.																					0
	?	Undetermined																					2
	Noctuidae	<i>Euxoa divergens</i>																					1
	Nymphalidae	<i>Papilio polyxenes</i>																					1
	Pieridae	<i>Colias philodice</i>																					1
	Satyridae	<i>Coenonympha tullia</i>																					1

Table 1, continued

Order:	Family:	Name:	Labella spicata	Monarda fistulosa	Pedicularis argophyllum	Pentstemon floribunda	Rosa arkansana	Rudbeckia hirta	Senecio platensis	Sisyrinchium montanum	Solidago canadensis	Solidago graminifolia	Solidago nemoralis	Solidago ptarmicoides	Solidago rigida	Symphoricarpos occidentalis	Viola nephrophylla	Zizia aptera	Zizia aurea	Zizia aurea	Zygadenus elegans	Total
COLEOPTERA	Chrysomelidae	<i>Orsodachne atra</i>																				0
	Cleridae	<i>Hydrobaenus</i> sp.																				0
		<i>Trichodes nuttalli</i>																				0
	Meloidae	<i>Epicaauta pensylvanica</i>						1														1
	Phalacridae	<i>Olibrus</i> sp.											1									2
DIPTERA	Anthomyiidae	<i>Crinurina</i> sp. #1					1															6
		<i>Crinurina</i> sp. #2																			1	1
	Bombyliidae	<i>Poecilanthrax tegminipennis</i>						1														2
	Calliphoridae	<i>Pollenia rudus</i>																				0
	Chloropidae	Chloropidae sp. #1																				1
		Chloropidae sp. #2																				1
	Conopidae	<i>Zodion fulvifrons</i>																				1
	Culicidae	<i>Aedes nigripes</i>						1														2
	Ephydriidae	<i>Lamproscatella</i> sp.																				1
		<i>Scatella</i> sp.																				1
	Muscidae	<i>Stomoxys calcitrans</i>																				2
		<i>Haematobosca elcis</i>																				2
	Otitidae	<i>Otitae</i> sp. #1																				5
	Sarcophagidae	<i>Sarcophagidae</i> sp.																				0
	Scatopsidae	<i>Psectrociara</i> sp.																				4
	Sciariidae	<i>Eugnoriste</i> sp.																				2
	Stratiomyidae	<i>Odontomyia pubescens</i>																				2
		<i>Odontomyia virgo</i>																				4
	Syrphidae	<i>Cheilosia</i> sp.																				0
		<i>Eristalis</i> sp. #1																				1
		<i>Eristalis</i> sp. #2																				3
		<i>Helophilus</i> sp. #1																				4
		<i>Helophilus</i> sp. #2																				0
		<i>Syrphus ribesii</i>																				3
		<i>Syrphus</i> sp. ?																				6
		<i>Toxomerus marginatus</i>																				14
	Tachinidae	<i>Cylindromyia interrupta</i>																				3

Table 1, continued

Order.	Family:	Name:	Lobelia spicata	Monarda fistulosa	Pedomyium argophyllum	Pentaphylla florunda	Rosa arkansana	Rudbeckia hirta	Senecio plattensis	Sisyrinchium montanum	Solidago canadensis	Solidago graminifolia	Solidago nemoralis	Solidago ptarmicoides	Solidago rigida	Symphoricarpos occidentalis	Viola nephrophylla	Zizia aptera	Zizia aurea	Zygadenus elegans	Total		
DIPTERA		<i>Tachina</i> sp.																			1		
	HYMENOPTERA	Tachinidae sp.																				1	
		Andrenidae	<i>Andrena</i> sp.		1																	4	
			Andrenidae sp. #1																	1		3	
			Andrenidae sp. #2																			1	
		Anthophoridae	<i>Epeolus</i> sp.																			1	
		Apidae	<i>Apis mellifera</i>									1											1
				<i>Bombus perplexus</i>	1							1											3
				<i>Bombus terrarius</i>	1	1	1					1	1										7
				<i>Bombus vagans</i>								1											2
			Braconidae	Braconidae sp.																1			1
		Colletidae	<i>Hylaeus</i> sp.																				0
			Formicidae	<i>Dolichoderus plagiatus</i>																			0
		Halictidae		Myrmicinae sp. #1		1						1											3
				Myrmicinae sp. #2																			0
			<i>Augochlora</i> sp.							1												5	
			<i>Dialectus</i> sp. #1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	
	Halictidae sp. #1																				4		
	Halictidae sp. #2																				2		
	Halictidae sp. #3																				1		
	Halictidae sp. #4																				1		
	<i>Halictus rubicundis</i>																		1	1	2		
	<i>Dolerus</i> sp.																			1	1		
LEPIDOPTERA	Tenthredinidae	Undetermined																			2		
	Noctuidae	<i>Euxoa divergens</i>																			1		
	Nymphalidae	<i>Papilio polyxenes</i>																			0		
	Pieridae	<i>Colias philodice</i>																			0		
	Satyridae	<i>Coenonympha inornata</i>																			0		

Figure 2. Insect visits observed at two tallgrass prairie preserves in Manitoba (n=7519)

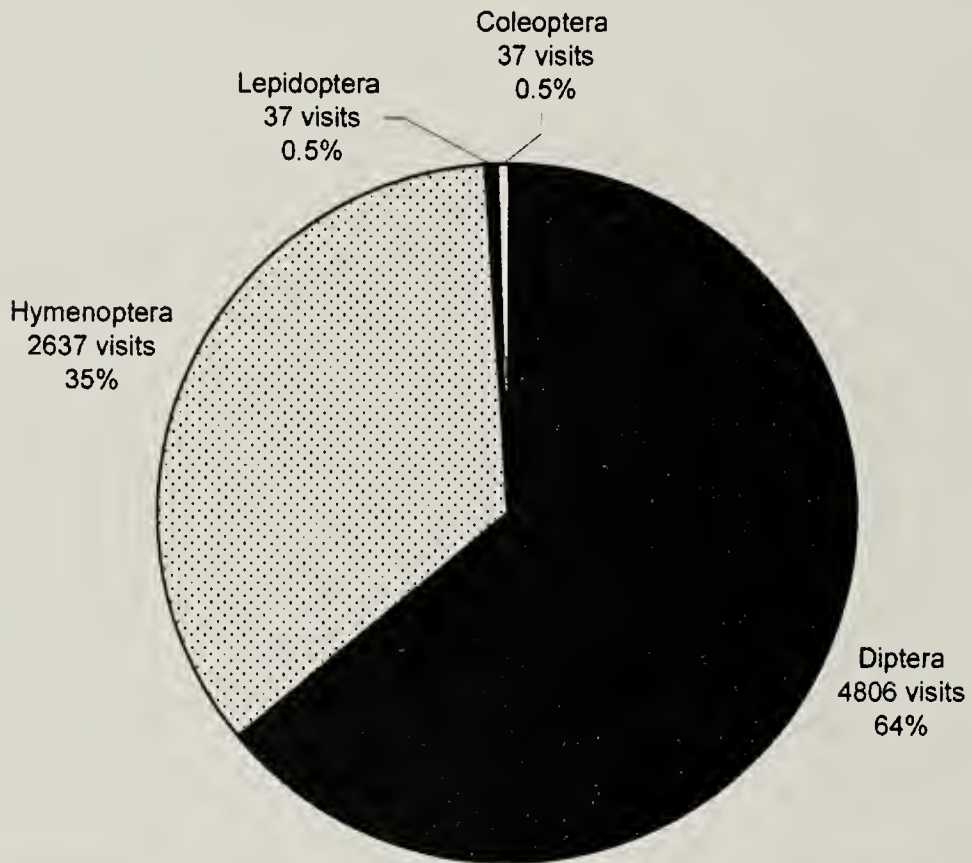


Figure 3. Percentage of visits by families in the order Diptera (n=4806)

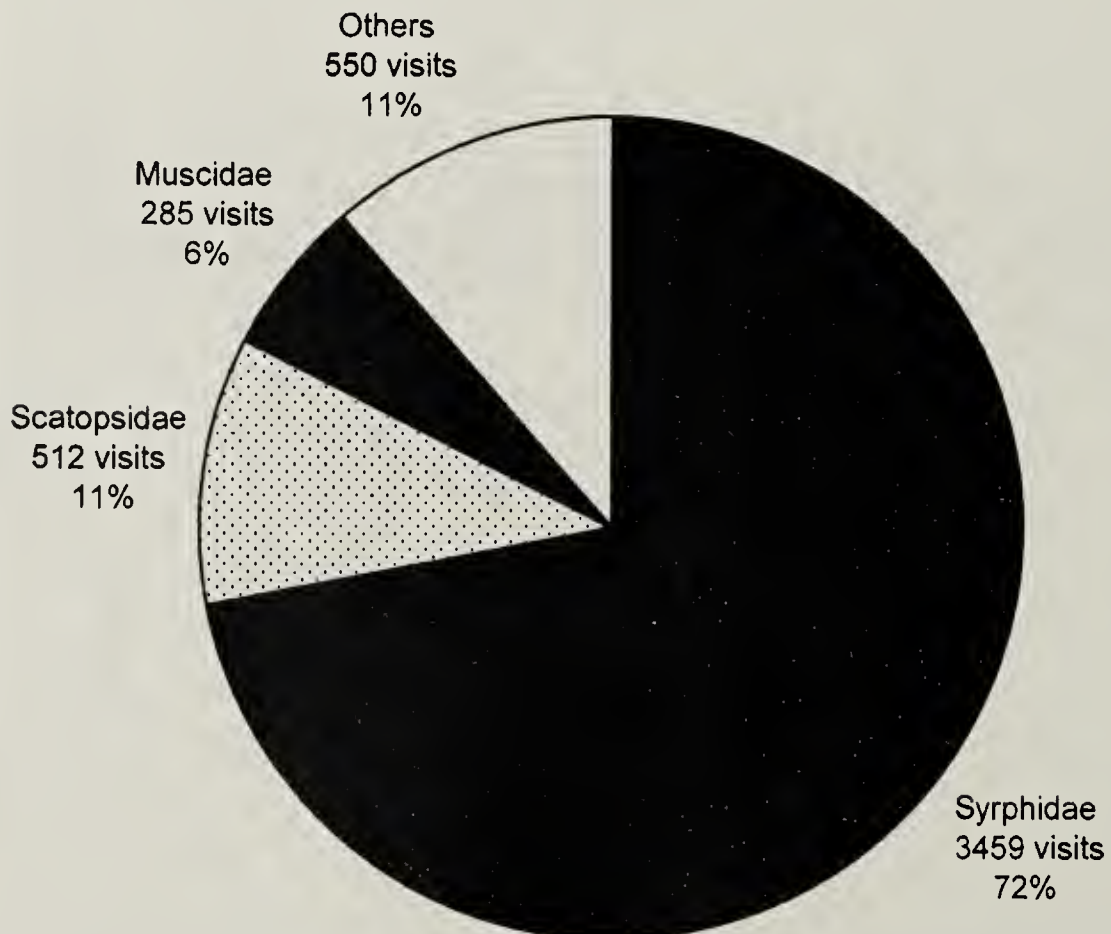


Figure 4. Percentage of visits by families in the order Hymenoptera (n =2637)

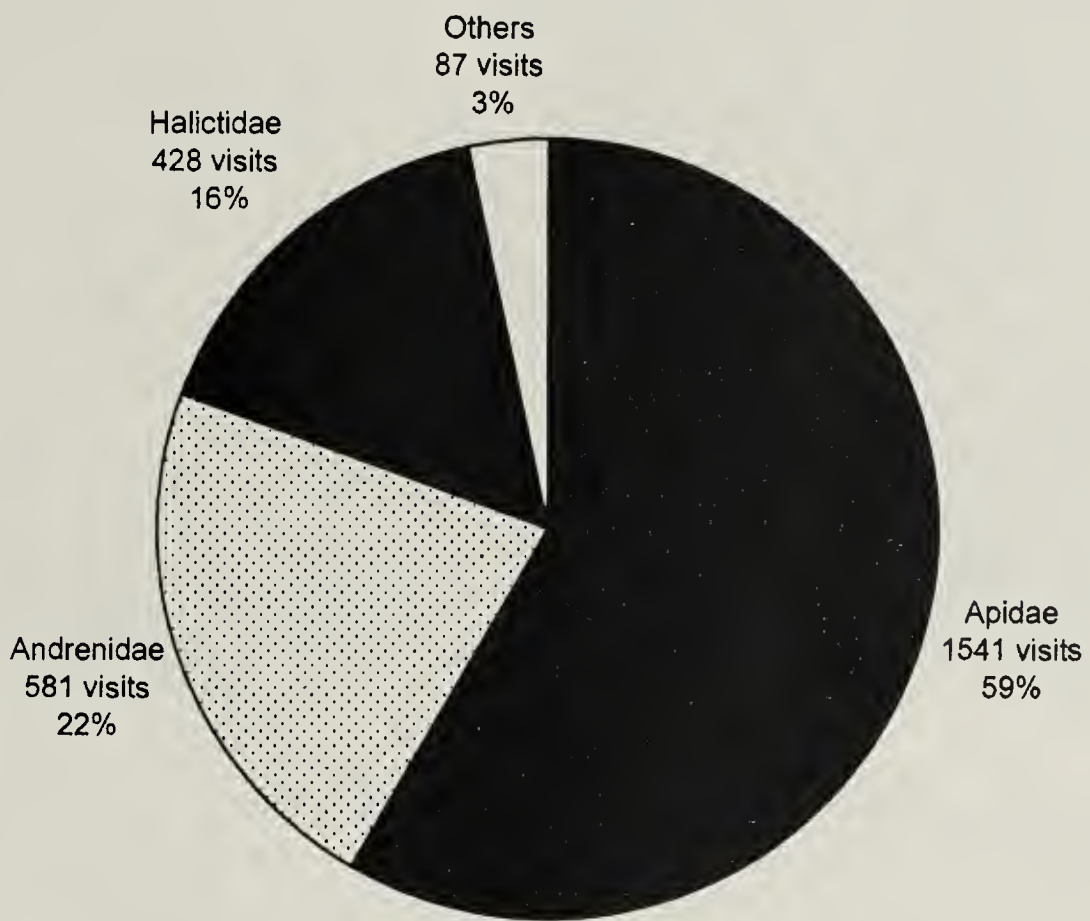
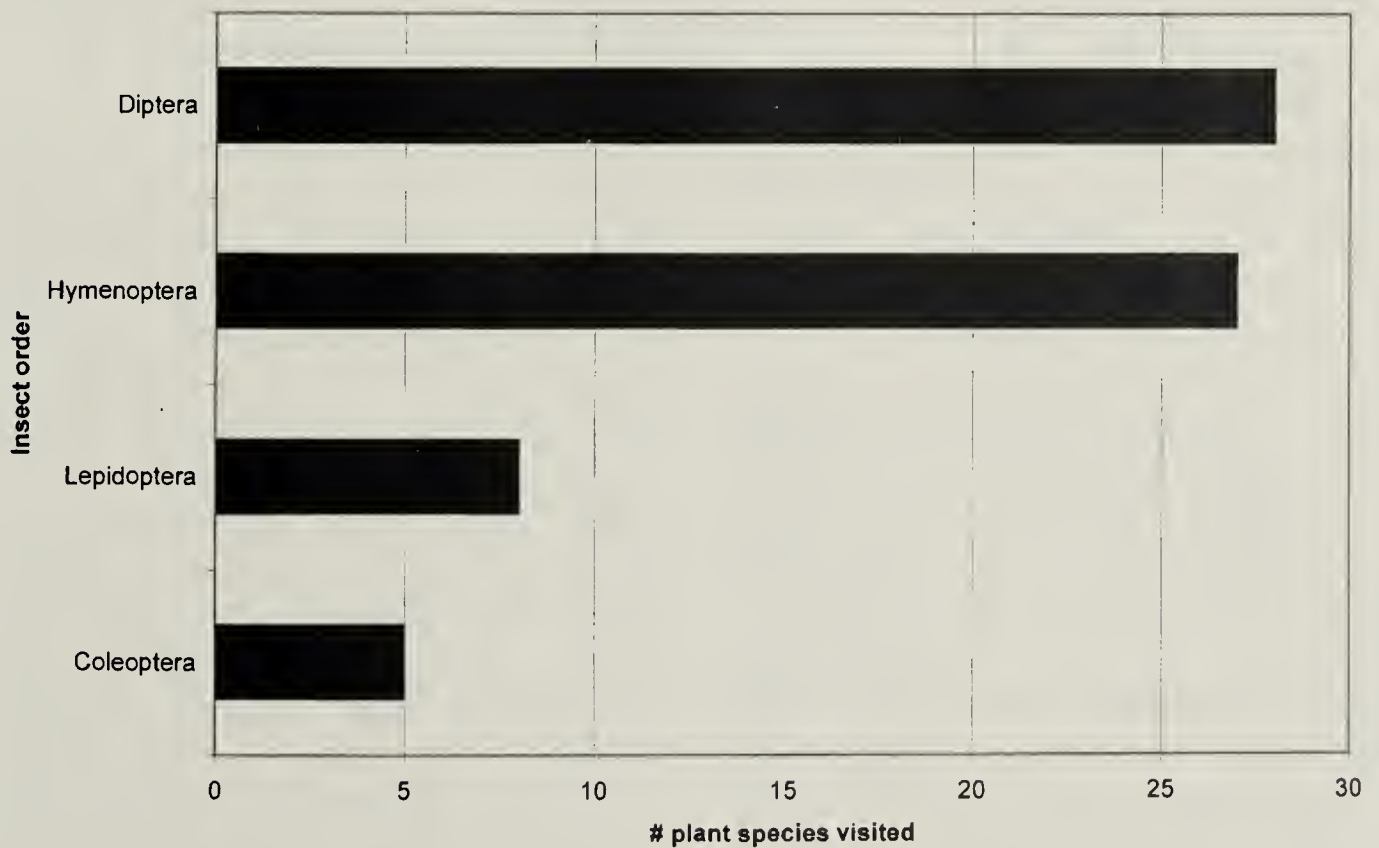


Figure 5. Mean number of plants species visited by species in each of four insect orders





Bumblebee

Wayne Lynch

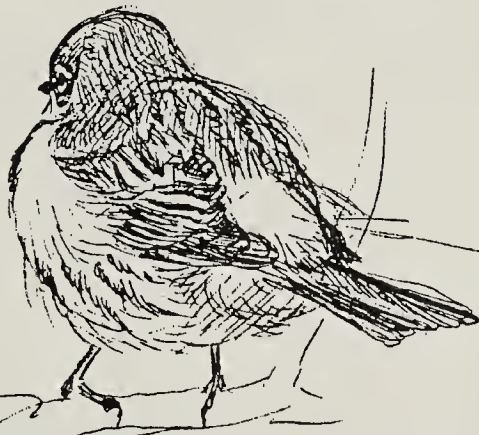
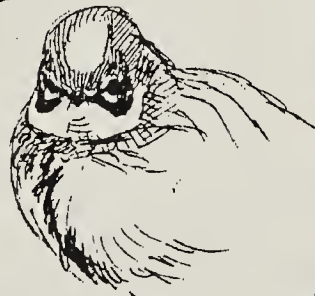
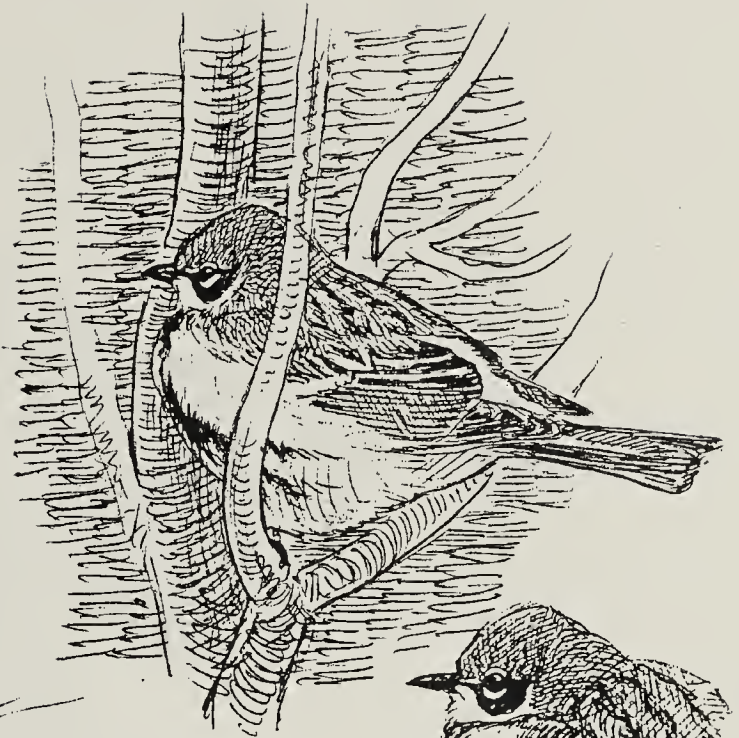
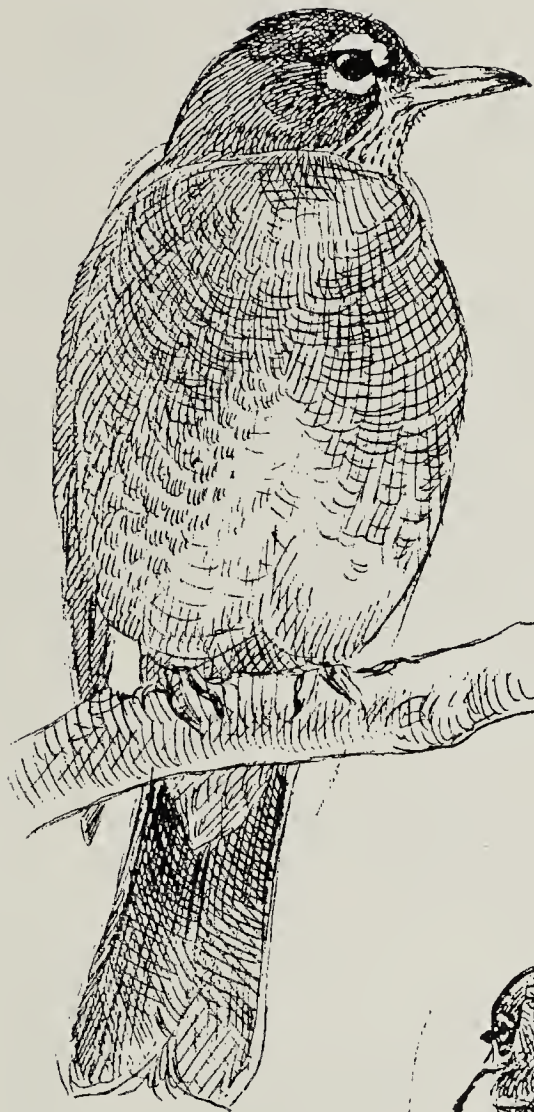
the quality (i.e. proportion of conspecific versus foreign pollen) and quantity of pollen received by a plant from that species.² The observation of an insect feeding on nectar or collecting pollen means that the insect is a potential pollinator of that plant but of unknown efficacy.

These data indicate that dipterans, particularly hover flies, may play an important role in the pollination of plants in the tallgrass prairie. The lack of observations of lepidopterans throughout the entire summer, and the low number of bee visits early in the year, were likely due to the relatively cool, wet weather experienced in Manitoba in 2004. The provincial mean temperature from June to September was 15.3°C (the long-term average is 16.8°C) and the total precipitation from May to September nearly 450 mm (the long term average is 350 mm). Butterflies and bees generally require warmer temperatures before they become active (R. Roughley, Curator, J.B. Wallis Museum, University of

Manitoba, pers. comm., 2004). Furthermore, the high moisture levels, particularly at the poorly drained TGPP site, may have reduced the available habitat for ground-dwelling bumblebees.⁶ Thus, the proportion of flower visits among different insects observed in 2004 may not be typical of more average climate conditions.

Despite frequently visiting the same number of flower species, dipterans may be less efficient pollinators than bees, which tend to have higher fidelity to a plant species within a given foraging trip.⁴ Very small flies may be able to “steal” nectar without actually receiving any pollen on their bodies.⁴ Nonetheless many dipteran species have been found to play an important role in plant pollination.^{3,4} The results of this study show that that dipterans are frequent floral visitors in tallgrass prairie and may be important pollinators, particularly when climatic conditions are too cool for more efficient pollinators like bees and butterflies.

May 2 '91



In park, 2 Myrtle
Warblers feeding on berries
with Robins

© 8/91

Paul Geraghty ©

stationary but turning head

A ♂ Myrtle Warbler which sat fluffed for a good
ten minutes nr. my pked car @ Asphalt Nks Pool.
3 ♂♂ and 1 ♀ joined it in tree but were all more
active. But he finally flitted about & then away c
others.



larger ♂
bring material for nest

it's blood red
paler on the
e his white top

Paul Gerard July 2000

'grape ochre'
edge to breast
against 'blue' work

'white'
high like
in breast & back feathers

N.E. 6 Stargl

Repina

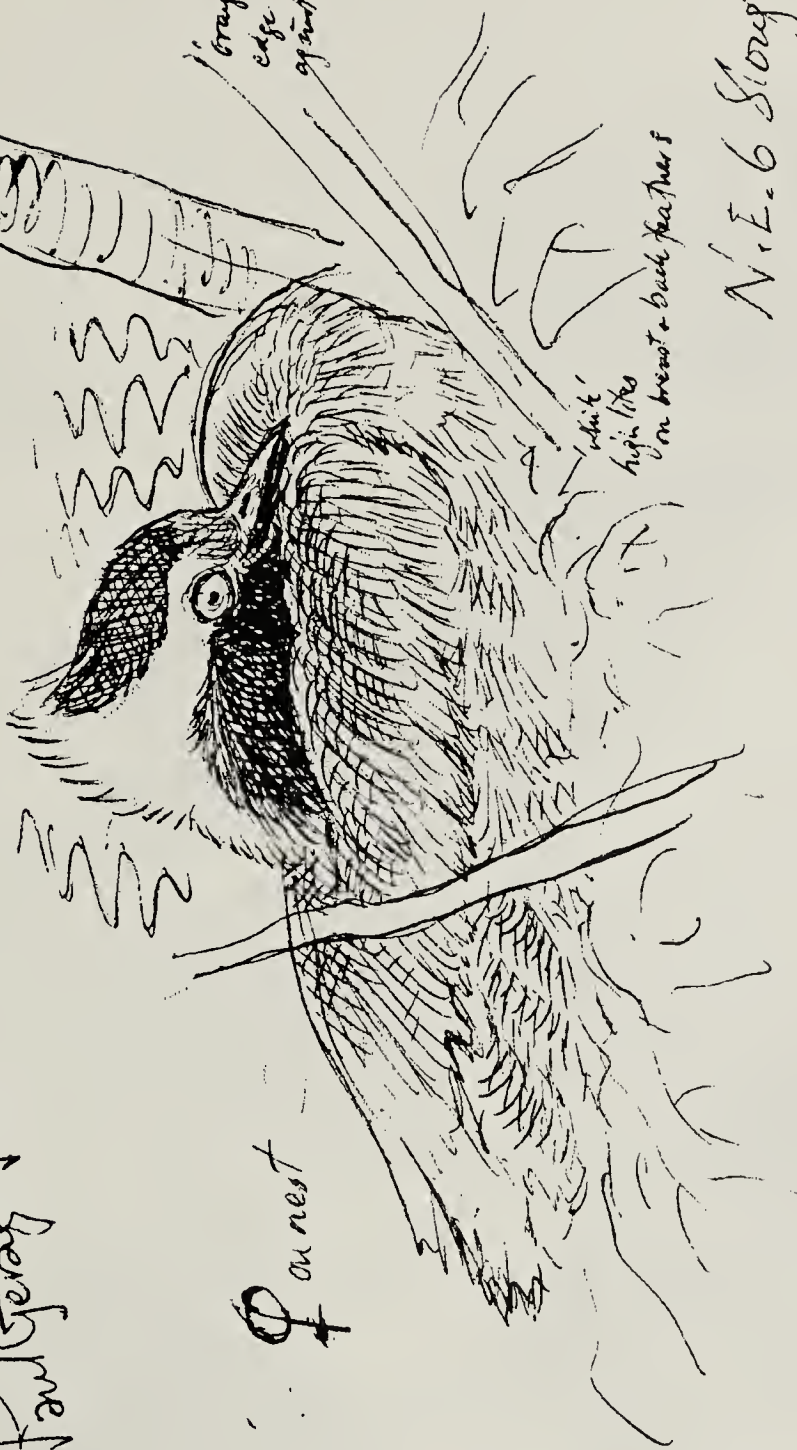
'87 May 20.

(nest previously flooded this week;
flooded again this evg; no egg visible)

♀ on nest

♀ taking over incub.
from egg (♀)

1 white egg visible



Oct 10 '99
NJ Down



*

too dark xerox

Acknowledgements

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CHECKLIST OF SASKATCHEWAN MOTHS: PART 15 - LUTE STRINGS, HOOKTIPS, URANIIDS AND GEOMETRIDS (1)

RONALD R. HOOPER, Box 757, Ft. Qu'Appelle, SK S0G 1S0

Parts 1 to 14 of this Saskatchewan moths series were previously published in *Blue Jay* and I am planning to write up more families in the near future.

Unless otherwise indicated, all the species are represented in the Royal Saskatchewan Museum collection in Regina. The species are arranged according to the website of Jim Troubridge and Don Lafontaine, *Moths of Canada*, updated by Greg Pohl in 2006.⁶ This website also has color photographs of the moths. Other helpful

websites and references are listed at the end of the article. The common names that are used are mostly according to R. J. L. Jones and C. V. Covell, Jr.^{1,2} Recent name changes are according to Minet and Scoble, and Scoble.^{4,5}

In this article, the size and early and late dates of Saskatchewan specimens is given. Some of the recorded food plants are mentioned. Abbreviations: s=south, n=north, w=west, e=east, CNC = Canadian National Collection in Ottawa.