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## Report

# Nectar plants utilized by butterflies at Trail of Tears State Park, Missouri

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## Introduction

Caterpillars are often limited to a few host plants, but adult butterflies will usually utilize a wide variety of plants as nectar sources. For many holometabolous insects, the quality and availability of nutrient resources during the adult stage correlates with fecundity, egg weight, and longevity (Boggs 1997, Mevi-Schütz and Erhardt 2002, O'Brien et al. 2004). Nectar, a primary nutrient source for adult Lepidoptera, varies by plant species in both its carbohydrate and constituent components which can affect fecundity (Romeis and Wäckers 2002). Therefore, nectar resources for adult Lepidoptera influence species occurrence, distribution, and density, thus nectar sources are an important component of butterfly conservation (Grundel et al. 2000). Studies of nectar-plant usage are useful in butterfly conservation and vegetation management activities.

Trail of Tears State Park is dedicated to interpreting a portion of the historical Trail of Tears in Missouri. Trail of Tears State Park also protects and preserves the rugged, dissected river hills associated with this section of the trail. The park, located in Cape Girardeau County in southeast Missouri, is 1,382 hectares of dry, dry mesic and mesic loess/glacial till and chert/limestone forests and woodlands that border the Mississippi River (Nelson 2005). The forest and woodland communities display a rich diversity of flora and fauna associated with both the Appalachian Mountains and the Ozark region. The oak-hickory forests are dominated by *Quercus alba* L., *Q. rubra* L., *Carya ovata* (Mill.) K. Koch, *Liriodendron tulipifera* L. with large stands of *Fagus grandifolia* Ehrh. The herbaceous plant communities of the forests typically have their largest blooming periods during the spring and early summer, with herbaceous plants of the more open woodland communities having a majority of their blooms occurring from mid-summer to late fall. Canopy openings and road right-of-ways in the park account for many of the dense stands of showy, flowering, woodland plants during summer and fall.

## Materials and Methods

From 2007 through 2011 butterflies were photographed opportunistically during butterfly surveys with the goal of documenting butterfly-plant interactions. Butterflies were identified by utilizing field guides (Brock and Kaufman 2003); names were standardized to the taxonomy of Pelham (2008). Plants were identified by using Steyermark (1963), Mohlenbrock (2002), and Yatskievych (2006) from fresh material or from photographs. Plant names are in agreement with the USDA plants database (USDA, NRCS 2012). In order to be classified as nectaring, the photograph must show that the butterfly has its proboscis in or on

the flower. Each unique day during which a butterfly species was photographed nectaring at a flower was counted as a nectaring event, multiple photographs of a species of butterfly nectaring at a flower species taken on the same day counted as a single nectaring event.

## Results and Discussion

Two hundred and fifty-nine photographic records document 45 species of butterflies utilizing 46 plant species (Table 1) as nectar sources. These 46 plant species are members of 17 plant families. Of these species, 4/46 (9%) were members of Asclepiadaceae, 18/46 (39%) were members of Asteraceae, 2/46 (4%) were members of Convolvulaceae, 6/46 (13%) were members of Fabaceae, 3/46 (7%) were members of Lamiaceae, and 3/46 (7%) were members of Polygonaceae. The remaining 11 families were each represented by a single species. Of the plant species visited 9/46 (20%) were introduced to Missouri, but these plants accounted for only 32/259 (12%) of the butterfly nectaring events. The two most visited plant species were *Asclepias tuberosa* L. and *A. purpurascens* L. which together accounted for approximately a fifth (55/259) of all nectaring events documented.

The 45 species of butterflies documented during this survey were from five families. Eighteen of the 45 species (40%) were members of Hesperidae, 6/45 (13%) were members of Papilionidae, 6/45 (13%) were members of Pieridae, 5/45 (11%) were members of Lycaenidae, and 10/45 (22%) were members of Nymphalidae. *Papilio glaucus* L. was documented nectaring 22 times on 17 species of plants, the most of any species found during the study. *Papilio troilus* L., *Battus philenor* (L.), *Eurytides marcellus* (Cramer), and *Speyeria cybele* (F.) were the next most frequently documented nectaring species. Together these species comprised a third (85/259) of nectaring interactions documented.

These data, while concretely demonstrating interactions between butterflies and nectar plants, do not provide information on nectar quality or suitability. Controlled and focused studies will be required to determine exact and optimum nectar requirements for specific species of butterflies. These data show use of a wide variety of floral nectar resources by all families of butterfly found in the study area.

Comparing the results of this study to butterfly abundance data (Table 2) generated during the North American Butterfly Association Fourth of July and Seasonal butterfly counts (NABA 2008, 2009, 2010, 2011) performed at Trail of Tears State Park during the same time period show the most counted butterfly species, *Cupido comyntas* (Godart), had five documented nectaring interactions. *Celastrina neglecta* (W.H. Edwards), the third most counted butterfly species, accounted for zero documented nectaring interactions. The rarely counted *Speyeria cybele* (F.) was documented nectaring 14 times on 11 different plant species. This comparison shows that butterfly species might have different adult food needs and therefore frequency of floral use documented might not be entirely explained by gross butterfly abundance.

Compared with other studies in which non-native plants were heavily utilized as nectar sources by adult butterflies (Giuliano et al. 2004, Fothergill and Levy-Boyd 2008, Fothergill and Vaughn 2010), non-native plants were only 12% of the nectaring interactions documented, even though non-native plants were 20% of the species documented being utilized as nectar sources. This might be due to habitat quality, attractiveness of the native plant species found at Trail of Tears State Park, or bias of an opportunistic study.

The data presented here begins the process of understanding the relationship between plant nectar and butterflies at Trail of Tears State Park and similar habitats. Only documented butterfly-plant interactions are reported within the tables and many more interactions remain to be documented. It is hoped that these data will be informative and useful in land management decisions and that future studies will further increase our understanding of these interactions and their importance.

## Acknowledgements

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**Table 1.** Plant-butterfly nectaring interactions documented at Trail of Tears State Park, Missouri during 2007-2011 sorted by plant species with dates.

Plant Family	Plant Species	1st Date	Last Date	n	Butterfly Family	Butterfly Species
Apiaceae	<i>Daucus carota</i>	1-Jun	-	1	Nymphalidae	<i>Euphydryas phaeton</i>
		14-Jul	2-Aug	2	Nymphalidae	<i>Junonia coenia</i>
		20-Jun	-	1	Papilionidae	<i>Papilio polyxenes</i>
Apocynaceae	<i>Apocynum cannabinum</i>	8-Jun	-	1	Hesperiidae	<i>Achalarus lyciades</i>
		17-Aug	-	1	Pieridae	<i>Colias sp</i>
		17-Aug	-	1	Pieridae	<i>Colias eurytheme</i>
		13-Aug	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		18-Aug	-	1	Hesperiidae	<i>Erynnis horatius</i>
		20-Aug	-	1	Hesperiidae	<i>Euphyes vestris</i>
		13-Aug	-	1	Hesperiidae	<i>Hylephila phyleus</i>
		12-Aug	-	1	Nymphalidae	<i>Junonia coenia</i>
		13-Aug	-	1	Nymphalidae	<i>Limenitis archippus</i>
		17-Aug	-	1	Papilionidae	<i>Papilio glaucus</i>
		20-Aug	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		13-Aug	-	1	Lycaenidae	<i>Strymon melinus</i>
		13-Aug	-	1	Nymphalidae	<i>Vanessa cardui</i>
		7-Jun	8-Jun	2	Hesperiidae	<i>Wallengrenia egeremet</i>
Araliaceae	<i>Aralia spinosa</i>	31-Jul	1-Aug	2	Papilionidae	<i>Papilio glaucus</i>
		31-Jul	-	1	Hesperiidae	<i>Wallengrenia egeremet</i>
Asclepiadaceae	<i>Asclepias incarnata</i>	6-Aug	-	1	Hesperiidae	<i>Anatrytone logan</i>
		6-Aug	-	1	Pieridae	<i>Colias eurytheme</i>
		31-Jul	-	1	Nymphalidae	<i>Danaus plexippus</i>
		17-Aug	-	1	Nymphalidae	<i>Euptoieta claudia</i>
		6-Aug	-	1	Hesperiidae	<i>Hylephila phyleus</i>
		2-Aug	-	1	Nymphalidae	<i>Junonia coenia</i>
		1-Aug	-	1	Papilionidae	<i>Papilio troilus</i>
		6-Aug	-	1	Hesperiidae	<i>Pholisora catullus</i>
		6-Aug	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		6-Aug	-	1	Hesperiidae	<i>Pompeius verna</i>
		18-Aug	-	1	Nymphalidae	<i>Speyeria cybele</i>
Asclepiadaceae	<i>Asclepias purpurascens</i>	28-May	10-Jun	3	Hesperiidae	<i>Achalarus lyciades</i>
		31-May	2-Jun	2	Hesperiidae	<i>Autochton cellus</i>
		14-Jun	-	1	Papilionidae	<i>Battus philenor</i>
		28-May	-	1	Nymphalidae	<i>Danaus plexippus</i>
		28-May	30-May	2	Hesperiidae	<i>Epargyreus clarus</i>
		28-May	-	1	Nymphalidae	<i>Euphydryas phaeton</i>
		10-Jun	-	1	Hesperiidae	<i>Euphyes vestris</i>
		30-May	-	1	Papilionidae	<i>Papilio glaucus</i>
		10-Jun	-	1	Hesperiidae	<i>Problema byssus</i>
		28-May	11-Jun	5	Nymphalidae	<i>Speyeria cybele</i>
		31-May	11-Jun	4	Hesperiidae	<i>Thorybes pylades</i>
Asclepiadaceae	<i>Asclepias syriaca</i>	3-Jun	-	1	Hesperiidae	<i>Wallengrenia egeremet</i>
		11-Jun	-	1	Pieridae	<i>Colias eurytheme</i>
		13-Jun	-	1	Nymphalidae	<i>Euphydryas phaeton</i>
		7-Jun	-	1	Nymphalidae	<i>Euptoieta claudia</i>
		13-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>

Plant Family	Plant Species	1st Date	Last Date	n	Butterfly Family	Butterfly Species
		20-Jun	-	1	Papilionidae	<i>Papilio polyxenes</i>
		13-Jun	-	1	Hesperiidae	<i>Problema byssus</i>
		4-Jun	-	1	Nymphalidae	<i>Speyeria cybele</i>
		11-Jun	-	1	Hesperiidae	<i>Thorybes pylades</i>
Asclepiadaceae	<i>Asclepias tuberosa</i>	30-May	-	1	Hesperiidae	<i>Achalarus lyciades</i>
		30-May	-	1	Hesperiidae	<i>Autochton cellus</i>
		3-Jun	20-Jun	4	Papilionidae	<i>Battus philenor</i>
		4-Jun	-	1	Nymphalidae	<i>Chlosyne nycteis</i>
		30-May	4-Jun	1	Pieridae	<i>Colias sp.</i>
		12-May	20-Jun	3	Nymphalidae	<i>Danaus plexippus</i>
		30-May	4-Jun	2	Nymphalidae	<i>Euphydryas phaeton</i>
		30-May	9-Jun	4	Papilionidae	<i>Eurytides marcellus</i>
		4-Jun	18-Jun	2	Papilionidae	<i>Papilio glaucus</i>
		4-Jun	11-Jun	4	Papilionidae	<i>Papilio troilus</i>
		7-Jun	-	1	Pieridae	<i>Phoebis sennae</i>
		10-Jun	20-Jun	2	Nymphalidae	<i>Phyciodes tharos</i>
		18-Jun	-	1	Pieridae	<i>Pyrisitia lisa</i>
		1-Jun	-	1	Lycaenidae	<i>Satyrium calanus</i>
		30-May	9-Jun	2	Lycaenidae	<i>Satyrium titus</i>
		30-May	10-Jun	2	Nymphalidae	<i>Speyeria cybele</i>
		30-May	-	1	Hesperiidae	<i>Thorybes pylades</i>
Asteraceae	<i>Arnoglossum atriplicifolium</i>	5-Sep	-	1	Papilionidae	<i>Papilio glaucus</i>
Asteraceae	<i>Carduus nutans</i>	8-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>
		8-Jun	-	1	Papilionidae	<i>Papilio troilus</i>
		8-Jun	-	1	Nymphalidae	<i>Speyeria cybele</i>
Asteraceae	<i>Cirsium altissimum</i>	12-Aug	-	1	Papilionidae	<i>Papilio troilus</i>
Asteraceae	<i>Cirsium discolor</i>	17-Aug	-	1	Hesperiidae	<i>Atalopedes campestris</i>
		12-Sep	-	1	Papilionidae	<i>Battus philenor</i>
		20-Aug	-	1	Nymphalidae	<i>Danaus plexippus</i>
		13-Aug	12-Sep	2	Papilionidae	<i>Papilio glaucus</i>
		18-Aug	8-Sep	2	Nymphalidae	<i>Speyeria cybele</i>
Asteraceae	<i>Cirsium sp.</i>	15-Sep	-	1	Papilionidae	<i>Papilio troilus</i>
		5-Sep	-	1	Pieridae	<i>Phoebis sennae</i>
Asteraceae	<i>Conoclinium coelestinum</i>	5-Sep	-	1	Nymphalidae	<i>Chlosyne nycteis</i>
		4-Sep	-	1	Nymphalidae	<i>Junonia coenia</i>
		4-Sep	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		29-Aug	-	1	Hesperiidae	<i>Polites themistocles</i>
		4-Sep	-	1	Lycaenidae	<i>Strymon melinus</i>
Asteraceae	<i>Echinacea purpurea</i>	1-Aug	-	1	Papilionidae	<i>Papilio glaucus</i>
		1-Aug	-	1	Papilionidae	<i>Papilio troilus</i>
		1-Aug	-	1	Nymphalidae	<i>Speyeria cybele</i>
Asteraceae	<i>Erigeron philadelphicus L.</i>	29-Apr	-	1	Hesperiidae	<i>Erynnis juvenalis</i>
		13-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>
		23-Apr	-	1	Nymphalidae	<i>Phyciodes tharos</i>
Asteraceae	<i>Pseudognaphalium obtusifolium</i>	5-Sep	-	1	Lycaenidae	<i>Strymon melinus</i>
Asteraceae	<i>Rudbeckia hirta</i>	14-Jun	-	1	Hesperiidae	<i>Achalarus lyciades</i>
		20-Jun	-	1	Hesperiidae	<i>Anatrytone logan</i>
		3-Jun	-	1	Nymphalidae	<i>Chlosyne nycteis</i>
		14-Jun	-	1	Nymphalidae	<i>Danaus plexippus</i>

Plant Family	Plant Species	1st Date	Last Date	n	Butterfly Family	Butterfly Species
		13-Jun	-	1	Hesperiidae	<i>Erynnis juvenalis</i>
		14-Jun	-	1	Nymphalidae	<i>Euptoieta claudia</i>
		14-Jun	-	1	Nymphalidae	<i>Junonia coenia</i>
		14-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>
		14-Jun	-	1	Papilionidae	<i>Papilio troilus</i>
		18-Jun	20-Jun	2	Lycaenidae	<i>Strymon melinus</i>
		15-Jun	-	1	Nymphalidae	<i>Vanessa virginiensis</i>
Asteraceae	<i>Silphium integrifolium</i>	30-Jul	-	1	Nymphalidae	<i>Junonia coenia</i>
		26-Jul	-	1	Papilionidae	<i>Papilio glaucus</i>
Asteraceae	<i>Silphium perfoliatum</i>	30-Jul	-	1	Papilionidae	<i>Battus philenor</i>
		30-Jul	-	1	Papilionidae	<i>Papilio cressphontes</i>
		29-Jul	30-Jul	2	Papilionidae	<i>Papilio glaucus</i>
		30-Jul	8-Aug	2	Nymphalidae	<i>Speyeria cybele</i>
		2-Aug	-	1	Nymphalidae	<i>Vanessa cardui</i>
Asteraceae	<i>Solidago sp.</i>	20-Sep	-	1	Nymphalidae	<i>Junonia coenia</i>
		14-Sep	-	1	Nymphalidae	<i>Vanessa cardui</i>
Asteraceae	<i>Symphotrichum patens</i>	28-Sep	-	1	Hesperiidae	<i>Atalopedes campestris</i>
		29-Sep	-	1	Pieridae	<i>Colias eurytheme</i>
		30-Sep	-	1	Lycaenidae	<i>Cupido comyntas</i>
		28-Sep	-	1	Hesperiidae	<i>Hylephila phyleus</i>
		28-Sep	29-Sep	2	Hesperiidae	<i>Pyrgus communis</i>
Asteraceae	<i>Symphotrichum pilosum</i>	30-Sep	-	1	Pieridae	<i>Colias eurytheme</i>
		1-Oct	-	1	Hesperiidae	<i>Erynnis horatius</i>
		30-Sep	-	1	Pieridae	<i>Pontia protodice</i>
		14-Sep	-	1	Lycaenidae	<i>Strymon melinus</i>
Asteraceae	<i>Taraxacum officinale</i>	11 Apr	-	1	Papilionidae	<i>Eurytides marcellus</i>
Asteraceae	<i>Verbesina helianthoides</i>	18-Jul	-	1	Lycaenidae	<i>Cupido comyntas</i>
		8-Aug	-	1	Papilionidae	<i>Papilio troilus</i>
Asteraceae	<i>Vernonia baldwinii</i>	2-Aug	-	1	Hesperiidae	<i>Anatrytone logan</i>
		2-Aug	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		12-Aug	5-Sep	2	Hesperiidae	<i>Hylephila phyleus</i>
		29-Jul	-	1	Nymphalidae	<i>Junonia coenia</i>
		5-Sep	-	1	Hesperiidae	<i>Polites themistocles</i>
		19-Aug	-	1	Lycaenidae	<i>Strymon melinus</i>
Caryophyllaceae	<i>Dianthus armeria</i>	7-Jun	8-Jun	2	Hesperiidae	<i>Thorybes pylades</i>
Convolvulaceae	<i>Ipomoea lacunosa</i>	21-Sep	-	1	Hesperiidae	<i>Atalopedes campestris</i>
		15-Sep	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		12-Sep	-	1	Papilionidae	<i>Papilio troilus</i>
		15-Sep	-	1	Pieridae	<i>Phoebis sennae</i>
Convolvulaceae	<i>Ipomoea pandurata</i>	17-Aug	-	1	Papilionidae	<i>Papilio troilus</i>
		17-Aug	18-Aug	1	Pieridae	<i>Phoebis sennae</i>
Cornaceae	<i>Cornus drummondii</i>	30-May	-	1	Hesperiidae	<i>Achalarus lyciades</i>
		30-May	-	1	Hesperiidae	<i>Thorybes pylades</i>
Fabaceae	<i>Cercis canadensis</i>	11-Apr	-	1	Lycaenidae	<i>Celastrina ladon</i>
		11-Apr	-	1	Hesperiidae	<i>Erynnis horatius</i>
		11-Apr	-	1	Papilionidae	<i>Eurytides marcellus</i>
Fabaceae	<i>Kummerowia striata</i>	20-Aug	-	1	Pieridae	<i>Phoebis sennae</i>
Fabaceae	<i>Lespedeza cuneata</i>	16-Sep	-	1	Hesperiidae	<i>Ancyloxypha numitor</i>
		15-Sep	-	1	Lycaenidae	<i>Strymon melinus</i>

Plant Family	Plant Species	1st Date	Last Date	n	Butterfly Family	Butterfly Species
Fabaceae	<i>Mellilotus officinalis</i>	7-Jun	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		11-Jun	-	1	Papilionidae	<i>Eurytides marcellus</i>
		11-Jun	-	1	Nymphalidae	<i>Junonia coenia</i>
Fabaceae	<i>Trifolium pratense</i>	7-Jul	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		7-Jun	-	1	Hesperiidae	<i>Euphyes vestris</i>
		20-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>
		20-Jun	-	1	Papilionidae	<i>Papilio polyxenes</i>
		18-Jul	-	1	Hesperiidae	<i>Polites themistocles</i>
		2-Jul	-	1	Hesperiidae	<i>Thorybes pylades</i>
		12-Jun	-	1	Hesperiidae	<i>Wallengrenia egeremet</i>
Fabaceae	<i>Trifolium repens</i>	20-Jun	-	1	Lycaenidae	<i>Cupido comyntas</i>
		22-May	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		23-May	30-May	2	Papilionidae	<i>Eurytides marcellus</i>
		6-Jul	-	1	Pieridae	<i>Nathalis iole</i>
		11-Jun	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		12-Jun	-	1	Pieridae	<i>Pyrisitia lisa</i>
		6-May	-	1	Lycaenidae	<i>Strymon melinus</i>
		30-May	-	1	Hesperiidae	<i>Wallengrenia egeremet</i>
Hydrangeaceae	<i>Hydrangea arborescens</i>	12-Jun	-	1	Papilionidae	<i>Battus philenor</i>
		13-Jun	-	1	Hesperiidae	<i>Epargyreus clarus</i>
		10-Jun	13-Jun	2	Hesperiidae	<i>Euphyes vestris</i>
		12-Jun	13-Jun	2	Papilionidae	<i>Eurytides marcellus</i>
		13-Jun	16-Jun	2	Papilionidae	<i>Papilio glaucus</i>
		12-Jun	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		18-Jun	-	1	Lycaenidae	<i>Satyrrium titus</i>
		10-Jun	-	1	Nymphalidae	<i>Speyeria cybele</i>
		13-Jun	-	1	Hesperiidae	<i>Thorybes pylades</i>
		Lamiaceae	<i>Blephilia ciliata</i>	30-May	-	1
23-May	10-Jun			3	Papilionidae	<i>Eurytides marcellus</i>
30-May	-			1	Nymphalidae	<i>Speyeria cybele</i>
Lamiaceae	<i>Monarda fistulosa</i>	12-Jun	-	1	Hesperiidae	<i>Achalarus lyciades</i>
		12-Jun	-	1	Hesperiidae	<i>Anatrytone logan</i>
		12-May	18-Jun	2	Papilionidae	<i>Battus philenor</i>
		24-Jun	-	1	Nymphalidae	<i>Danaus plexippus</i>
		8-Jun	-	1	Hesperiidae	<i>Euphyes vestris</i>
		18-Jun	-	1	Papilionidae	<i>Papilio glaucus</i>
		8-Jun	-	1	Hesperiidae	<i>Thorybes pylades</i>
		12-Jun	-	1	Hesperiidae	<i>Wallengrenia egeremet</i>
Lamiaceae	<i>Scutellaria incana</i>	14-Jul	27-Jul	3	Papilionidae	<i>Battus philenor</i>
		14-Jul	25-Jul	3	Papilionidae	<i>Papilio troilus</i>
		15-Jul	-	1	Pieridae	<i>Phoebis sennae</i>
		25-Jul	-	1	Hesperiidae	<i>Poanes zabulon</i>
Passifloraceae	<i>Passiflora incarnata</i>	9 Aug	-	1	Hesperiidae	<i>Hylephila phyleus</i>
Polemoniaceae	<i>Phlox pilosa</i>	12 May	-	1	Papilionidae	<i>Battus philenor</i>
Polygonaceae	<i>Polygonum pensylvanicum</i>	12-Jul	-	1	Lycaenidae	<i>Cupido comyntas</i>
		6-Jul	-	1	Hesperiidae	<i>Erynnis horatius</i>
		17-Aug	-	1	Hesperiidae	<i>Hylephila phyleus</i>
		12-Jul	-	1	Pieridae	<i>Nathalis iole</i>
Polygonaceae	<i>Polygonum scandens</i>	31-Jul	-	1	Hesperiidae	<i>Epargyreus clarus</i>

Plant Family	Plant Species	1st Date	Last Date	n	Butterfly Family	Butterfly Species
		8-Aug	-	1	Papilionidae	<i>Papilio glaucus</i>
Ranunculaceae	<i>Delphinium tricorne</i>	18-Apr	-	1	Papilionidae	<i>Battus philenor</i>
Verbenaceae	<i>Phyla lanceolata</i>	5-Jul	7-Jul	2	Hesperiidae	<i>Ancyloxypha numitor</i>
		5-Jul	-	1	Hesperiidae	<i>Atalopedes campestris</i>
		12-Jul	-	1	Lycaenidae	<i>Cupido comyntas</i>
		6-Jul	-	1	Hesperiidae	<i>Erynnis horatius</i>
		5-Jul	12-Jul	3	Hesperiidae	<i>Hylephila phyleus</i>
		5-Jul	-	1	Nymphalidae	<i>Phyciodes tharos</i>
		6-Jul	8-Jul	2	Pieridae	<i>Pyrisitia lisa</i>
Vitaceae	<i>Vitis cinerea</i>	6-Jun	-	1	Papilionidae	<i>Eurytides marcellus</i>

**Table 2.** Trail of Tears State Park NABA butterfly count data of numbers of individual butterflies of selected species from 2007 – 2010 and number of plant-butterfly nectaring interactions photographically documented at Trail of Tears State Park, Missouri during 2007-2011.

Butterfly Species	25-Jul-2007 <sup>1</sup>	26-Jul-2008 <sup>1</sup>	25-Apr-2009 <sup>1</sup>	18-Jul-2009 <sup>1</sup>	29-Aug-2009 <sup>1</sup>	23-May-2010 <sup>1</sup>	31-Jul-2010 <sup>1</sup>	26-Sep-2010 <sup>1</sup>	Total 2007-2010	Nectaring Interactions 2007-2011 <sup>2</sup>
<i>Cupido comyntas</i>	34	366	81	142	106	9	68	48	854	5
<i>Papilio glaucus</i>	17	108	4	4	14	11	173	0	331	21
<i>Celastrina neglecta</i>	1	0	0	5	13	91	46	0	156	0
<i>Papilio troilus</i>	19	64	3	3	6	6	53	1	155	16
<i>Phyciodes tharos</i>	23	1	33	2	13	0	23	45	140	9
<i>Eurytides marcellus</i>	2	18	75	0	0	9	2	0	106	15
<i>Colias eurytheme</i>	0	0	83	3	2	11	2	1	102	5
<i>Phoebis sennae</i>	11	17	2	1	25	5	28	1	90	6
<i>Pyrisitia lisa</i>	7	5	0	0	2	15	35	4	68	4
<i>Epargyreus clarus</i>	1	13	18	1	1	6	23	1	64	9
<i>Battus philenor</i>	2	2	33	8	2	1	3	0	51	15
<i>Speyeria cybele</i>	0	0	0	3	0	0	0	0	3	14

<sup>1</sup>Count date <sup>2</sup>This study

