

SKIPPERS AND BUTTERFLIES OF A DISJUNCT ASPEN PARKLAND AREA IN ALBERTA

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Accounts of butterfly faunas and habitat use of the Alberta aspen parkland are scarce. Case and Bird provide some information on the Peace River parkland⁵ and Thormin deals with the Beaverhill Lake area.²⁴ However, other accounts treat individual species (e.g. Bird³) or taxonomic matters (e.g. Ehrlich⁹) rather than the typical fauna of a given habitat. This paper reports on the most detailed study of a local aspen parkland butterfly fauna undertaken to date in Alberta.

The central aspen parkland section is a fairly distinctive zone in south-central Alberta. Two outliers of aspen parkland are present near Drumheller, on the Wintering Hills and on the Hand Hills. The Wintering Hills, an upland rising more than 120 m above the plains southwest of Drumheller, are a generally east-west oriented ridge, the northeastern escarpment of which supports a substantial area of aspen parkland which is separated by a distance of about 80 km from the central aspen parkland.

For this study, we selected a representative area of about 260 ha for collection and observation of butterflies. All habitats were intensively searched by the writer and S. Harris from 1976 to 1980 inclusive on 20 different days with a seasonal spread from 1 May to 3 September. Visits were timed to minimize the possibility of missing any species because of its flight period.

The study area was situated in 28-26-18-W4, about 11 km south of East Coulee, on the highest portion of the hills where elevation ranges from 945 m to 1037 m. Here the escarpment is dissected by ravines, with local relief varying from gently rolling to steeply sloping. Figure 1 shows the general appearance of the study area.

About 50% of the study area is covered by Aspen Poplar forest with a moderately well-developed low shrub understory of Rose and Buckbrush. The herbaceous component of the forests is rich and includes such species as Sprengel's Sedge, Wild



Figure 1. General view of the study area.

etch, Peavine, Canada Anemone, and Western Canada Violet.

About 30% of the study area consists of grassland, most of which was dominated by Rough Fescue prior to the era of intensive cattle grazing. Much of this grassland has been altered to the point where Porcupine Grass and June Grass are now dominant. Certain slopes with a south and west exposure support an open grass-forb vegetation typical of coulees in the region.

The remainder of the study area is occupied by shrublands and miscellaneous local vegetation types. Small stands of Hawthorn, Chokecherry, and Saskatoon are present, as are larger areas of Beaked Willow. Low shrub thickets of Buckbrush, Rose, and Gooseberry are prevalent. Miscellaneous vegetation types are Bearberry mats, White birch stand, and two small peepage areas.

The area is floristically interesting, especially from a biogeographic perspective. In a small area one can find such unlikely associates as Heart-leaved Arnica (a mountain species), White birch (a boreal forest species), and Pincushion Cactus (a prairie-badlands species).

Annotated List

In the following list the term spring refers to May and June while summer refers to July, August and the first few days of September. Butterfly phenology is described with terms like "early spring to mid-summer." Dates indicate days for which specimen records are available and are written in an abbreviated format (e.g. 29-7-78 means 29 July 1978). Most of the common names are from Cooper¹². Scientific names follow dos Santos⁷ except where more recent work indicates that a change is warranted.

Hesperiidae

TAWNY-EDGED SKIPPER (*Polites themistocles*) — a worn specimen was found 1-8-77 in low shrub habitat near aspen forest; early to mid-summer.

LONG DASH (*Polites mystic dacotah*) — uncommon in grassland; 13-7-79; flight period not known.

UNCAS SKIPPER (*Hesperia uncas uncas*) — one female was found 29-7-78 on a west-facing hillside in open Porcupine Grass-June Grass vegetation; flight period not known.

ASSINIBOIA SKIPPER (*Hesperia comma assiniboia*) — locally abundant 29-7-78, 20-8-79, 3-8-80; mid to late summer; this Insect was easily observed on flowers of *Liatris punctata* (Blazing Star) and showed pronounced hilltopping behavior; up to 8 individuals would frequently engage in rapid, erratic flights in tightly spaced groups.

NEVADA SKIPPER (*Hesperia nevada*) — very locally distributed on hilltops and ridge crests with short grass; 23-6-79.

GARITA SKIPPER (*Oarisma garita*) — abundant in grasslands; 19-6-77, 13-7-79; late spring to mid-summer; more abundant in less heavily grazed grasslands.

ARCTIC SKIPPER (*Carterocephalos palaemon mandan*) — occasional in and near aspen forest; 19-6-77; mid to late spring.

COMMON CHECKERED SKIPPER (*Pyrgus communis communis*) — abundant in grassland and low shrub habitat; 3-9-78, 23-6-79, 13-7-79; late spring to late summer.

DREAMY DUSKY WING (*Erynnis icelus*) — occasional in and near aspen forest; 21-5-78, 23-6-79; mid to late spring.

PERSIUS DUSKY WING (*Erynnis persius*) — fairly common in grassland near aspen forest; 30-5-76, 21-5-78, 9-5-80, 18-5-80; early to late spring.

AFRANIUS DUSKY WING (*Erynnis afranius*) — fairly common in grasslands; 29-7-78, 9-5-80, 11-5-80; flies in two broods, early to mid spring and mid to late summer.

NORTHERN CLOUDY WING (*Thorybes pylades*) — uncommon at the edge of aspen forest; 30-5-76, 23-6-79; mid to late spring.

SILVER-SPOTTED SKIPPER (*Epargyreus clarus clarus*) — occasional in clearings in aspen forest and along edges of forest; 23-5-76; mid to late spring.



Silver-spotted Skipper.

C. Wallis

Papilionidae

ZELICAON SWALLOWTAIL (*Papilio zelicaon nitra*) — Taxonomy follows Fisher¹¹; males of the black phenotype were found 8-5-77 and 23-6-79 on grassland hilltops; males and females of the more abundant yellow phenotype were also found hilltopping 1-5-77, 14-5-78, 29-7-78, 23-6-79, 9-5-80, 11-5-80; early spring to mid summer; this lengthy range of dates combined with the fresh condition of the 1978 record suggests either an extremely staggered emergence or a small second brood.

BADLANDS OLD WORLD SWALLOWTAIL (*Papilio machaon dodi*) — only found on a grassy hilltop; 23-6-79, 20-8-79, 9-5-80, 11-5-80, 18-5-80, 3-8-80. This interesting swallowtail was described in 1939 by J. McDunnough primarily on the basis of specimens collected

along the Red Deer River.¹⁶ Hooper's use of the name Cypress Hills Old World Swallowtail is misleading.¹² The taxon *dodi* was first described from badlands and the greatest portion of its range comprises badlands/prairie habitats. Hence the name Badland Old World Swallowtail seems more appropriate.

CANADIAN TIGER SWALLOWTAIL (*Papilio glaucus canadensis*) — abundant in and along edges of aspen forest; most frequently seen patrolling the edge of the aspen forest at heights of 2 to 5 m; 30-5-76, 23-6-79; mid to late spring.



Canadian Tiger Swallowtail.

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Pieridae

WESTERN CHECKERED WHITE (*Pieris occidentalis occidentalis*) — fairly abundant in all non-forest areas; frequently seen hilltopping; the spring brood is dramatically smaller and darker than later broods; 1-5-77, 6-5-78, 3-9-78, 23-6-79, 20-8-79, 4-8-80; early spring to late summer in multiple broods.

CABBAGE BUTTERFLY (*Pieris rapae*) — occasional in open areas; 1-5-78, 3-9-78, 2-9-79, 9-5-80; early spring to late summer.

YELLOW ALFALFA BUTTERFLY (*Colias philodice eriphyle*) — abundant in all non-forested areas; albinistic females were found fairly frequently; 30-5-76, 23-5-77, 1-8-77, 16-8-77, 29-7-78, 3-9-78, 20-8-79, 2-9-79, 18-5-80; early spring to late summer.

ALEXANDRA SULPHUR (*Colias alexandra alexandra*) — fairly abundant in native grasslands; 29-7-78, 23-6-79, 20-8-79, 18-5-80; mid spring to late summer.

All females found to date have been albinistic, a situation that appears to be normal for Alberta populations of this taxon. Ferris assigned Alberta prairie material to subspecies *astraea*¹⁰ but since then research has shown the presence of pure yellow populations in the prairie region of Alberta. The name used here for these small, yellow prairie insects is used provisionally as the most logical available name. In fact there is no published research to show that these populations are the same as the southern *C. a. alexandra*. Further study may even show that these populations represent a distinct species. This insect was not reported from the prairies of southern Saskatchewan by Hooper¹² although it probably occurs there. Here is an opportunity for naturalists in the prairies of southern Saskatchewan to provide specimens for taxonomic and biogeographic study. [There are two known specimens for southern Saskatchewan, both from the Cypress Hills. One was collected several years ago by Donald Hooper, the other in July 1977 by W. Harris and S. Lamont. — Editors]

OLYMPIA MARBLE (*Euchloe olympia*) — only one specimen found on 18-5-80; the most northwesterly reported locality for this species in North America.

Lycaenidae

ORAL HAIRSTREAK (*Harkenclenus titus immaculosus*) — males were found hilltopping on 29-7-78 and 20-8-79; mid to late summer.

ROCKY MOUNTAIN STRIPED HAIRSTREAK (*Satyrium liparops aliparops*) — this is an inconspicuous and apparently uncommon butterfly in Alberta; one female was found 16-7-77, perched on a Buckbrush leaf at the edge of aspen forest. The subspecies *fletcheri*, characterized by large orange patches on the dorsal

forewing, occurs only about 100 km to the north at Buffalo Lake. When the zone of intergradation between *fletcheri* and *aliparops* is documented in this region, it may well be a very narrow zone similar to the situation reported by Clench for two other subspecies of the Striped Hairstreak in the southeastern USA.⁹

BROWN ELFIN (*Callophrys augustinus*) — very locally distributed; found only in a Bearberry patch at the top of the escarpment; 1-5-77, 6-5-78; early to mid spring; insufficient voucher material is available to assign a subspecies name with confidence; geographic character variation of this species in Alberta needs to be investigated.

GRAY HAIRSTREAK (*Strymon melinus*) — only one specimen found on 11-5-80.

PURPLISH COPPER (*Epidemia helloides*) — found at a seepage area on 23-6-79, 2-9-79; late spring to late summer.

MELISSA BLUE (*Lycaeides melissa melissa*) — uncommon in dry grassland; 23-6-79, 2-9-79, 18-5-80, 4-8-80; mid spring to late summer.

GREENISH BLUE (*Plebejus saepiolus amica*) — fairly common in grassland and low shrub areas; 23-5-76, 4-6-77, 18-5-80; mid to late spring.

ACMON BLUE (*Plebejus acmon lutzi*) — very local in dry grassland with bare soil and umbrellaplant (*Eriogonum flavum*); 23-6-79.

RUSTIC ARCTIC BLUE (*Agriades glandon rustica*) — locally abundant in dry grassland; fond of nectaring at flowers of Silverberry (*Elaeagnus comutata*); 23-6-79, 2-9-79; this late record plus another from Rumsey in August 1979 suggests a small second brood, apparently an unreported phenomenon.

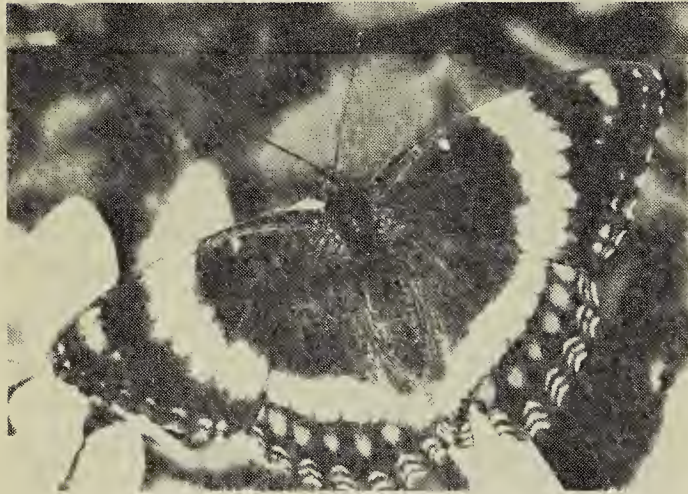
WESTERN-TAILED BLUE (*Everes amyntula albrighti*) — fairly common in and near aspen forest; 23-5-76, 30-5-76, 19-6-77; mid to late spring.

SILVERY BLUE (*Glaucopsyche lygdamus couperi*) — common in grassland and low shrub habitats; 23-5-76, 30-5-76, 1-5-77, 8-5-77, 23-5-77, 4-6-77, 14-5-78, 9-5-80, 11-5-80, 18-5-80; early to mid spring.

SPRING AZURE (*Celastrina argiolus lucia*)
 — occasional in clearings, edges of forest, and more open portions of the aspen forests; 1-5-77; early to mid spring.

Nymphalidae

WHITE ADMIRAL (*Limenitis arthemis rubrofasciata*) — occasional in aspen forest, clearings, and tall shrub thickets; 16-7-77, 13-7-79; late spring to mid-summer.



White Admiral.

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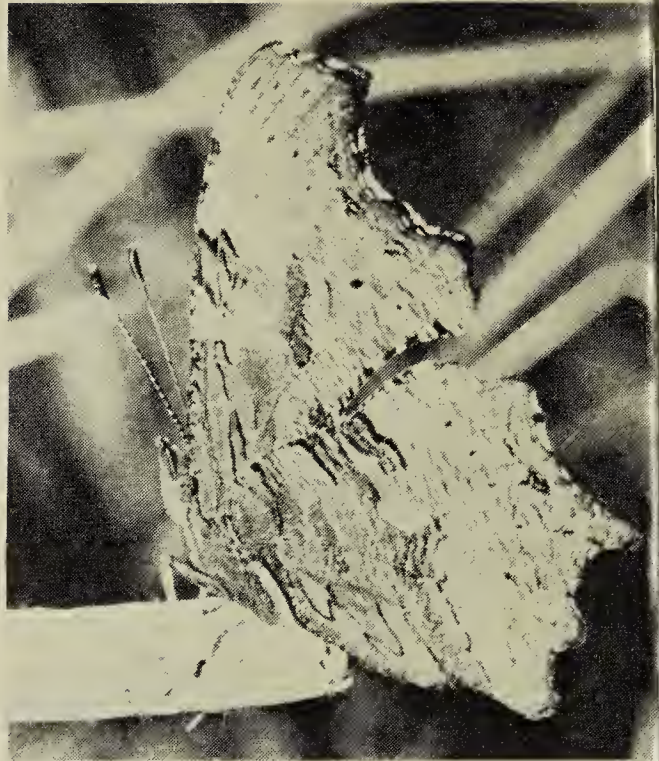
RED ADMIRAL (*Vanessa atalanta rubria*)
 — occasional in or near forest and tall shrub habitat; 19-6-77; flight period not known.

PAINTED LADY (*Cynthia cardui*) — occasional in most habitats and sometimes abundant on hilltops; late one afternoon about 50 to 60 males and females were found on a 50 m by 20 m section of grassy hilltop; 23-6-79, 20-8-79; only found in 1979, a year in which the species was generally abundant in southern Alberta.

MILBERT'S TORTOISE SHELL (*Nymphalis milberti furcillata*) — occasionally seen in all habitats; 1-5-77, 19-6-77, 13-5-79; flight period not clear.

MOURNING CLOAK (*Nymphalis antiopa antiopa*) — occasional in aspen forest and tall shrub habitat; worn, overwintered individuals were frequently seen in early spring while fresh adults were seen from mid-summer to late summer; 3-9-78.

SATYR ANGLE WING (*Polygonia satyrus*)
 — uncommon in aspen forest; 8-5-77,



Satyr Angle Wing.

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23-5-77, 11-5-80; previous literature referred Alberta material to the subspecies *satyrus* but dos Passos referred Alberta populations to *neomarsyas*; this situation needs further study.

GRAY COMMA (*Polygonia progne*) — found in aspen forest on 13-5-79 and 3-7-79; the latter record is of the distinctive summer form, *l-argenteum*.

PEARL CRESCENT (*Phyciodes tharos*) — abundant in grassland and low shrub areas; mid spring to mid-summer; 19-6-77, 16-7-77, 29-7-78, 18-5-80.

SILVER-BORDERED FRITILLARY (*Boloria selene*) — uncommon and local in or near sedge-rich seepage meadows; 13-7-79.



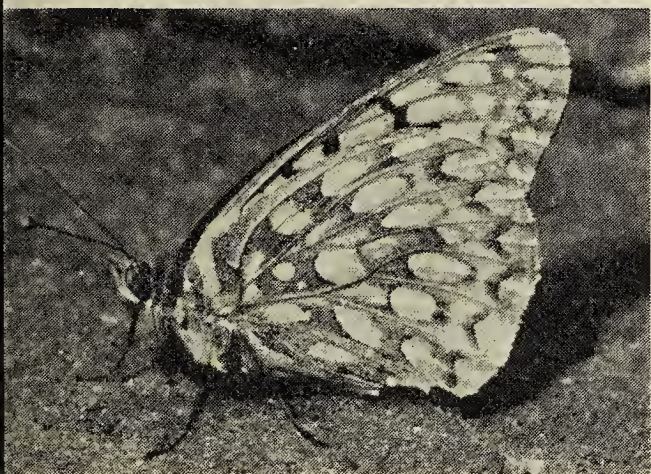
Silver-bordered Fritillary.

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Meadow Fritillary (*Boloria bellona jenistai*) — abundant in rich grassland and low shrub areas; mid spring to mid-summer, in at least two broods; 23-5-76, 30-5-76, 23-5-77, 4-6-77, 16-7-77, 21-5-78, 29-7-78, 18-5-80.

Edward's Fritillary (*Speyeria edwardsii*) — known only from one fresh male on 30-5-76 at the edge of aspen forest; an exceptionally early record for this uncommon but distinctive species.

Callippe Fritillary (*Speyeria callippe calgariana*) — locally abundant in grassland, especially on hilltops; late spring to mid-summer; 19-6-77, 29-7-78, 23-6-79, 13-7-79.



Callippe Fritillary.

C. Wallis

Atlantis Fritillary (*Speyeria atlantis*) — very abundant in open habitats; late spring to mid-summer; 19-6-77, 16-7-77, 13-7-79; although typically variable, this population is predominantly of the darker *beani* phenotype rather than the paler *helena* phenotype.

Mormonia Fritillary (*Speyeria mormonia eurynome*) — abundant in most open areas; late spring to mid-summer; 16-7-77, 29-7-78.

Great Spangled Fritillary (*Speyeria cybele pseudocarpenteri*) — very abundant, especially at the edges of aspen forest; females were frequently noted well within the woods; early to mid-summer; 16-7-77, 29-7-78, 13-7-79, 4-8-80.

Aphrodite Fritillary (*Speyeria aphrodite*) — very abundant in open

areas; early to late summer; 16-7-77, 29-7-78, 3-9-78, 20-8-79, 2-9-79, 3-8-80, 4-8-80; Kondla has identified the need for research to clarify variation at the subspecies level in Alberta.¹³

Variiegated Fritillary (*Euptoieta claudia*) — one female was found hilltopping on 20-8-79.

Satyridae

Ringlet (*Coenonympha inornata benjamini*) — abundant in richer grasslands and low shrub habitats; mid-spring to early summer; 23-5-76, 30-5-76, 23-5-77, 4-6-77, 23-6-79, 18-5-80.

Riding's Satyr (*Neominois ridingsii ridingsii*) — rare on grassy slope with considerable proportion of bare ground; 13-7-79.

Common Wood Nymph (*Cercyonis pegala ino*) — abundant in richer grassland and low shrub habitats; early to late summer; 16-7-77, 1-8-77, 29-7-78, 13-7-79, 4-8-80.

Varuna Arctic (*Oeneis uhleri varuna*) — fairly abundant in grasslands; early to late spring; 30-5-76, 8-5-77, 23-5-77, 4-6-77, 23-6-79, 9-5-80, 11-5-80, 18-5-80.

Alberta Arctic (*Oeneis alberta alberta*) — locally abundant in grasslands; early to mid spring; 1-5-77, 8-5-77, 14-5-78, 21-5-78, 13-5-79, 9-5-80, 11-5-80, 18-5-80; emergence varies by 2 to 3 weeks depending on spring weather; in late springs the main flight period of the Alberta Arctic overlaps that of the Varuna Arctic.

Red-disked Alpine (*Erebia discoidalis mcdunnoughi*) — fairly common but locally distributed in fescue grasslands; early to mid-spring; 1-5-77, 14-5-78, 11-5-80.

Common Alpine (*Erebia epipsodea*) — fairly common in richer grasslands and low shrub areas; mid-spring to early summer; 4-6-77, 23-6-79; Ehrlich shows the study area to be in a zone of intergradation between *E. e. freemani* and *E. e. epipsodea*.⁹ He also indicates that no abrupt boundaries exist between the subspecies and that considerable variation within a population masks geographic

variation unless longer series of specimens are available for study. When more material is available this population will likely be assignable to the subspecies *freemani*.

Discussion

A total of 57 species have been found, 55 of which are probably resident in the study area. The fauna is comprised of: Hesperidae 13 (23%), Papilionidae 3 (5%), Pieridae 5 (8%), Lycaenidae 12 (21%), Nymphalidae 17 (29%), Satyridae 7 (12%). Except for a substantially enriched Hesperidae fauna and depauperate Pieridae fauna, this is representative of the situation in Alberta as a whole. As in most prairie areas, the skipper fauna here is rich in comparison to the boreal and cordilleran regions of the province. For a non-cordilleran area, the *Speyeria* fauna is surprisingly rich, in both number and abundance of species. The violet flora (food plants of the greater fritillaries) is equally rich, including *Viola adunca*, *V. nephrophylla*, *V. nuttallii*, *V. pedatifida*, *V. rugulosa*.

The Satyridae are predominantly spring fliers here. The few Pieridae of the study area are found throughout the spring and summer. Most of the Lycaenidae, especially the blues, are spring fliers although the hairstreaks are distinctly summer fliers. The Nymphalidae fly most abundantly from late spring to midsummer. Skippers include spring flying species with legumes and poplars for larval food plants, and summer flying species with grasses for larval food plants. Overall abundance and diversity was greatest in the spring in the grassland and in summer in shrubland and woodland habitats.

Butterfly phenology data does not show a pronounced short term peak in species diversity as other areas in

Alberta, i.e. Calgary², Plateau Mtn. Kananaskis Provincial Park¹⁴, Standard¹³. In the present study area species diversity rises rapidly to almost maximum by mid spring with a poorly defined peak in late spring and then a slight drop followed by high diversity until midsummer. Only in late summer is there a substantial reduction in species diversity.

According to the account of mate locating behavior given by Scott, the two major methods used to locate mates are: perching behavior (male rest at characteristic sites and investigate passing objects by flying out at them) and patrolling behavior (males fly almost continuously in search of females).¹⁸

Information provided by Scott¹⁹ and personal observations show that the fauna of the study area is made up of 31 species which predominantly use patrolling behavior and 24 species which predominantly use perching behavior to locate mates. The Hesperidae are predominantly perchers while the Papilionidae are inveterate patrollers. Some species peculiarities that were noted are: the Assiniboia Skipper and Nevada Skipper characteristically perch on hill and ridge tops; the Zelicoid Swallowtail and Badlands Old World Swallowtail patrol less than 2 metres above the ground on grassy hilltops while the Tiger Swallowtail patrol mostly at heights of 2-5 metres at the edge of aspen forest. The Pieridae are all patrollers, as are most of the Lycaenidae, although the hairstreaks and coppers are perchers.

Most of the Nymphalidae are patrollers, especially the greater fritillaries which are very active. The Satyridae are interesting because the early flying species use perching behavior supplemented by patrolling while the later flying species are patrollers. The visibility of individual butterflies is correlated with the

amount of time they spend flying. The fact that patrolling males spend more time flying than do perching males has a definite influence on population estimates based on visual estimates of flying butterflies.

Since the study area is the highest in the region with many local, smaller scale topographic highs, this discussion would not be complete without treating the phenomenon of hilltopping. In the broadest sense the term refers to the congregation of insects on various kinds of topographic high points in the landscape.²⁰ The topic has generated substantial discussion and Shields presents a comprehensive literature review.²¹

Many explanations or theories have been advanced but it is overly simplistic to suggest a single best explanation for the phenomenon. In the more narrow, behavioral definition of hilltopping¹⁷ it seems most widely accepted that hilltops are meeting places for the sexes to mate. In the broader definition there are most likely a variety of factors and suitable explanations to suit the variety of species, ecological circumstances, and geographic locations involved.

Twelve of the species found in the present study area were very noticeably restricted to or were more abundant on local topographic highs. In two cases, the Brown Elfin and Common Blue, the restricted distribution of the larval food plants is clearly the causative factor. Such is not the case for the Melissa Blue or the grass feeders (Assiniboia Skipper, Nevada Skipper, Alberta Arctic). Adults of the Assiniboia Skipper are strongly attracted to flowers of Blazing Star (*Liatris punctata*) while adults of the Nevada Skipper were seen to show a similar attraction to flowers of Prairie Roundsel (*Senecio canus*) and a small yellow mustard. Thus, these insects may be attracted to nectar



Blazing Star.

Bernard de Vries.

sources abundant on hilltops rather than the hilltop situation.

Alberta Arctic behavior fits the mate-locating definition of hilltopping quite nicely. Males perch on the ridge top, periodically fluttering up several feet, apparently surveying the slope below them for females, and dashing downslope to investigate butterflies at lower elevations. This behavior has been previously described in *Oeneis uhleri uhleri* in Colorado.¹⁵

The aggressive, and more or less continuous hilltop flights of the Zelicon Swallowtail, Badlands Old World Swallowtail, Western Checkered White, Coral Hairstreak, Painted Lady, and Callippe Fritillary are also good examples of mate-locating hilltopping behavior.

The study area has a variety of butterfly habitats due to differing slope exposures, groundwater conditions, and grazing history. The grassland and shrubland habitats are much more productive for butterflies than the aspen forest. Naturalists visiting areas like this will find the shrubby edges of aspen forest and grassy hilltops to be superior places

to observe a variety of butterflies and interesting behavior.

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