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OVIPOSITION BEHAVIOR AND NECTAR SOURCES OF
THE PAWNEE MONTANE SKIPPER,
HESPERIA LEONARDUS MONTANA (HESPERIIDAE)

Additional key words: Colorado, threatened, *Bouteloua gracilis*, *Liatris punctata*, *Aster laevis*.

The pawnee montane skipper, *Hesperia leonardus montana* (Skinner) (Hesperiidae), was listed as threatened under the Endangered Species Act of 1973 on 25 September 1987 (Millar, J. L. 1987, Endangered and threatened wildlife and plants. Final rule to determine pawnee montane skipper (*Hesperia leonardus montana*) to be threatened species, 50 CFR 17, Vol. 52, No. 188, 5 pp.). The systematics and basic ecology of *H. leonardus* have been described by J. A. Scott and R. E. Stanford (1982, J. Res. Lepid. 20: 18-35). Intensive surveys during 1985 and 1986 confirmed that *H. l. montana* is restricted to an area of about 97.5 km² in the South Platte River drainage SW of Denver, Colorado; this area includes the location of the proposed Two Forks Dam and Reservoir on the South Platte River (Keenan, L. C., R. E. Stanford, S. L. Ellis, & B. A. Drummond 1986, Status report on: Pawnee montane skipper, Denver Water Dept., Denver, Colorado, 49 pp.).

S. L. Ellis (1986, Pawnee montane skipper 1986 field studies, ERT, Res. Eng. Co., Fort Collins, Colorado, Doc. D198: 82 pp.) showed that the occurrence of *H. leonardus montana* is positively correlated with the presence of *Liatris punctata* Hooker (Asteraceae), a favored nectar plant. Ellis also showed that blue grama grass, *Bouteloua gracilis* (H.B.K.)

TABLE 1. Observations of preoviposition behavior (POP), oviposition (OP), and ova attached to plants (OVA) of *Hesperia leonardus montana* in 1987. All observations were on *Bouteloua gracilis*. Time is Mountain Daylight Time.

Date	Study site	POP	OP	OVA	Elevation (m)	Time
8/21	West Creek	—	1	1	2060	1220
9/2	Sphinx Park	2	0	0	2060	1100
9/3	Swan Ranch	—	1	1	2060	1100
9/8	Sphinx Park	1	—	—	2060	1300
9/10	Dome Rock	—	—	2	2060	1100
9/10	Sphinx Park	—	—	1	2060	
9/10	Foxtan	—	1	1	1939	1215
9/10	Kennedy Gulch	—	—	2	2030	
9/10	Sugar Creek	—	—	1	2181	
9/10	Oxyoke	—	—	1	1969	
9/10	Wigwam	—	—	1	2090	
9/10	Lone Rock	—	—	1	2030	
9/10	Horse Creek	—	—	1	2131	
9/11	Wigwam Creek	—	1	1	2266	
9/15	Buffalo Creek	—	—	1	2090	
9/18	Sugar Creek	—	1	1	2060	
9/21	Deckers Camp	1	—	—	2060	
9/22-10/2		—	—	—		
	Totals	4	5	15		
	Mean elevation				2069 m	
	Range in elevation				327 m	

TABLE 2. Nectar plants visited by adult *Hesperia leonardus montana* in August and September 1987 (VC = very common, C = common, O = occasional, R = rare).

Species (family)	Frequency of use
<i>Liatris punctata</i> Hooker (Asteraceae)	VC
<i>Aster laevis</i> L. (Asteraceae)	VC
<i>Carduus nutans</i> L. (Asteraceae)	C
<i>Chrysopsis villosa</i> (Pursh) Nuttall (Asteraceae)	O
<i>Helianthus</i> sp. (Asteraceae)	O
<i>Aster porteri</i> Gray (Asteraceae)	O
<i>Heliomeris multiflora</i> Nuttall (Asteraceae)	R
<i>Senecio spartoides</i> Torrey & Gray (Asteraceae)	R
<i>Monarda fistulosa</i> L. (Lamiaceae)	R
<i>Geranium caespitosum</i> James (Geraniaceae)	R

Lag. (Poaceae), the only known larval food plant, covers about 1–3% of the ground in the skipper's habitat. During August and September 1987 we surveyed *H. l. montana* habitat in Jefferson and Douglas counties, Colorado, to determine if oviposition occurred on plants other than *Bouteloua gracilis*, to record time and elevational range of oviposition, and to identify nectar plants used by this skipper. These baseline data were collected for use in future monitoring of the effects of inundation of a portion of the skipper's habitat by the proposed Two Forks Dam and Reservoir Project. The results of the oviposition survey are presented in Table 1.

The first adult *H. l. montana* observed in 1987 was on 6 August and the last adult was seen on 29 September. Our observations of preoviposition behavior ($n = 4$), oviposition ($n = 5$), and ova found on plants ($n = 15$) support the report (Ellis *op. cit.*) that *Bouteloua gracilis* is the only grass on which oviposition takes place. During ovipositions, we observed the female flutter from base to base of clumps of *B. gracilis*, land on a clump, arch her abdomen, and place a single egg on the underside of a leaf blade about 3–8 cm above the ground. *Bouteloua gracilis* clumps chosen for oviposition were 7.6 to 10 cm in basal diameter and located on south-facing slopes between 1939 and 2266 m elevation. Oviposition took from 3 to 15 seconds to complete and occurred between 1100 h and 1300 h MDT ($n = 3$). We collected four clumps of *B. gracilis* on which we observed eggs being laid. Eggs on these four clumps hatched after 8, 19, 21, and 42 days, respectively.

Hesperia leonardus montana was observed nectaring on 10 species of plants. The most commonly visited species during August and through 10 September was *Liatris punctata*. After 10 September we noticed a marked shift to *Aster laevis* L. (Asteraceae). *Carduus nutans* L. (Asteraceae) was also a commonly visited nectar source late in the season. Other species were visited only occasionally or rarely (Table 2).

This study was commissioned by the Denver Board of Water Commissioners as part of the Environmental Impact Assessment for the proposed Two Forks Dam and Reservoir Project.

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