

# Summer Diets of Bison and Cattle in Southern Utah

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## Abstract

Diets of bison (*Bison bison*) and cattle (*Bos taurus*) were evaluated in a shrub-steppe plant community in the Henry Mountains, Utah. Bison feces comprised 99% grasses and sedges and 1% forbs. Cattle feces also were primarily grasses and sedges (95%), but in addition included significantly more forbs (5%) than did bison feces.

Bison (*Bison bison*) were considered in danger of extinction in 1895, when only 800 animals remained of the estimated 30 million present a few decades previous (Dary 1974). The species recovered through intensive management and numbered 30,000 in 1972 (Dary 1974). Increase in bison numbers resulted initially from establishment of herds on state and federal refuges. In recent decades, however, a growing market for bison meat has promoted establishment of many domestic herds.

The steady growth in bison numbers, on both public and private lands, has created a need for information on bison diets to determine carrying capacity and to assess possible conflicts for forage between bison and large herbivores already using these ranges, particularly cattle (*Bos taurus*). Information on bison diets in the shrub-steppe plant communities typical of much of western United States is limited to a description of forage classes consumed (Van Vuren 1982). Moreover, only 3 studies have compared diets of bison and cattle (Peden et al. 1974, Van Vuren 1982, Van Vuren and Bray 1983). The purpose of this study was to evaluate summer diets of bison and cattle in a shrub-steppe community of the Henry Mountains, Utah.

## Study Area and Methods

The study was conducted on the west side of Mount Ellen, in the Henry Mountains, Garfield County, Utah. The upper slopes of Mount Ellen provided summer range for 200–300 cattle and about 200 wild bison. The 200-ha study area was at the headwaters of South Creek, between 2,900 and 3,050 m elevation. Precipitation averaged about 50 cm per year. Dominant shrubs were big sagebrush (*Artemisia tridentata*), black sagebrush (*A. nova*), and snowberry (*Symphoricarpos* spp.). Grasses were chiefly native perennials and included bluegrass (*Poa* spp.), needlegrass (*Stipa* spp.), wheatgrass (*Agropyron* spp.), fescue (*Festuca* spp.), fringed brome (*Bromus ciliatus*), squirreltail (*Sitanion hystrix*), and junegrass (*Koeleria cristata*). Common forbs were penstemon (*Penstemon* spp.), cinquefoil (*Potentilla* spp.), and mountain dandelion (*Agoseris* spp.), locoweed (*Oxytropis lambertii*), and milkvetch (*Asiragalus* spp.). The source of plant names is Welsh and Moore (1973).

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Diets of bison and cattle were estimated by fecal analysis. One 15-cc sample was collected from each of 35 fresh bison feces and 35 fresh cattle feces on 9 and 10 August 1978. Feces were from 10 bison and 12–15 cattle that had grazed the previous 4 days on adjacent sites in the study area. Samples were ground in a Wiley mill over a 1-mm screen and then mounted on microscope slides, 5 per sample. Plant fragments were identified in 20 microscope fields per slide. Frequency of occurrence of each species was calculated and converted to relative density, which was used as a dry weight estimate for each species in the fecal samples (Sparks and Malechek 1968). Differences in forages in bison and cattle feces were evaluated with a *t*-test.

## Results and Discussion

Feces of both bison and cattle contained almost entirely grasses and sedges, although the percentage was higher ( $P < 0.05$ ) for bison than for cattle (Table 1). Cattle feces contained more ( $P < 0.05$ ) forbs than did bison feces, largely because of a higher ( $P < 0.05$ )

Table 1. Percent plant composition of bison and cattle feces in a shrub-steppe community in the Henry Mountains, Utah.

Forage	% composition	
	Bison	Cattle
Grasses and sedges		
<i>Agropyron</i> spp.	2	2
<i>Bromus ciliatus</i>	3	4
<i>Carex</i> spp. <sup>a</sup>	3	1
<i>Festuca</i> spp.	10	10
<i>Koeleria cristata</i> <sup>a</sup>	13	22
<i>Oryzopsis hymenoides</i>	T <sup>b</sup>	1
<i>Poa</i> spp. <sup>a</sup>	66	50
<i>Sitanion hystrix</i>	T	T
<i>Stipa</i> spp. <sup>a</sup>	1	6
Total grasses and sedges <sup>a</sup>	99	95
Forbs		
<i>Astragalus</i> spp., <i>Oxytropis</i> spp. <sup>a</sup>	T	4
Other forbs	1	1
Total forbs <sup>a</sup>	1	5
Shrubs		
<i>Artemisia</i> spp.	T	T
<i>Symphoricarpos</i> spp.	T	0
Total shrubs	T	T

<sup>a</sup>Occurred in different percentages ( $P < 0.05$ ) in bison and cattle feces.

<sup>b</sup>Trace ( $< 0.5\%$ ).

percentage of locoweed and milkvetch. Forb content of feces may not accurately reflect amounts eaten because of differential digestibility (Holechek et al. 1982). Shrubs totaled less than 1% of the feces of either species.

These results indicate a general similarity of diets; both species ate mostly grasses and included all available species in their diet. In addition, however, cattle varied their diet with significant amounts of forbs. Bison elsewhere also select grasses and sedges almost

exclusively (Meagher 1973, Peden 1976, Reynolds et al. 1978, Telfer and Cairns 1979, Van Vuren 1982, Campbell and Hinkes 1983, Van Vuren and Bray 1983). Sedges are most important in diets of herds in northern United States and Canada (Meagher 1973, Reynolds et al. 1978, Telfer and Cairns 1979, Campbell and Hinkes 1983), whereas grasses are most important in bison diets further south (Peden 1976, Van Vuren and Bray 1983, my results), a difference that reflects availability.

Peden et al. (1974) studied seasonal diets of bison and cattle under light and heavy grazing treatments on shortgrass prairie and found that percentage of grasses in bison diets was seldom less than 90% (minimum of 77%) in any season and under either grazing treatment. Cattle diets generally comprised mostly grasses, but showed much greater variability than bison diets and included up to 70% forbs and shrubs. Van Vuren (1982) found that bison in a shrub-steppe community ate 93% grasses and sedges. Cattle in the same area also ate mostly grasses and sedges, but in addition included almost 20% forbs in their diet. Van Vuren and Bray (1983) compared diets of bison and cattle in an area seeded to crested wheatgrass (*Agropyron desertorum*) and alfalfa (*Medicago sativa*) and found that whereas both species were primarily grazers, cattle included more shrubs in their diet than did bison. My results are consistent with other studies of bison and cattle diets; grasses and sedges predominate in the diets of both species, but cattle diets are more variable.

### Literature Cited

- Campbell, B.H., and M. Hinkes. 1983. Winter diets and habitat use of Alaska bison after wildfire. *Wildl. Soc. Bull.* 11:16-21.
- Dary, D.A. 1974. The buffalo book. The Swallow Press, Chicago.
- Holechek, J.L., M. Vavra, and R.D. Pieper. 1982. Botanical composition determination of range herbivore diets: a review. *J. Range Manage.* 35:309-315.
- Meagher, M.M. 1973. The bison of Yellowstone National Park. *Nat. Park Ser. Sci. Monogr. Ser. No. 1.*
- Peden, D.G. 1976. Botanical composition of bison diets on shortgrass plains. *Amer. Midl. Natur.* 96:225-229.
- Peden, D.G., G.M. Van Dyne, R.W. Rice, and R.M. Hansen. 1974. The trophic ecology of *Bison bison* L. on shortgrass plains. *J. Appl. Ecol.* 11:489-497.
- Reynolds, H.W., R.M. Hansen, and D.G. Peden. 1978. Diets of the Slave River lowland bison herd, Northwest Territories, Canada. *J. Wildl. Manage.* 42:581-590.
- Sparks, D.R., and J.C. Malechek. 1968. Estimating percentage dry weight in diets using a microscope technique. *J. Range Manage.* 21:264-265.
- Telfer, E.S., and A. Cairns. 1979. Bison-wapiti interrelationships in Elk Island National Park, Alberta. *In: Boyce, M.S. and L.D. Hayden-Wing (eds.). North American elk: ecology, behavior and management.* Univ. Wyoming.
- Van Vuren, D. 1982. Comparative ecology of bison and cattle in the Henry Mountains, Utah. *In: Peek, J.M. and P.D. Dalke (eds.). Proc. Wildlife-Livestock Relationships Symp. Univ. Idaho For., Wildl. and Range Exp. Sta., Moscow.*
- Van Vuren, D., and M.P. Bray. 1983. Diets of bison and cattle on a seeded range in southern Utah. *J. Range Manage.* 36:499-500.
- Welsh, S.L., and G. Moore. 1973. Utah plants: Tracheophyta. Brigham Young University Press, Provo, Utah.