Horses and Cattle Grazing in the Wyoming Red Desert, I. Food Habits and Dietary Overlap

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Abstract

The sagebrush-grass range in southcentral Wyoming presently supports large numbers of feral horses and domestic livestock. Diets of feral horses and cattle during summer and winter grazing were evaluated using fecal analysis under 2 stocking levels in small pastures. Horses and cattle consumed primarily grasses during the summer and winter. However, shrubs and forbs were also important dietary components. Needleandthread, Sandberg bluegrass, thickspike wheatgrass, Indian ricegrass, gray horsebrush, and winterfat were the major foods of horses and cattle during the summer and winter. Dietary overlap between horses and cattle during the summer averaged 72% and increased to 84% during the winter. Horses and cattle selected foods in a similar order.

Large increases in feral horse *(Equus caballus)* numbers have occurred in the western United States since passage of the Wild Free-Roaming Horse and Burro Act of 1971 (Artz 1977, Wolfe 1980). These increases have become a major concern to public land managers, livestock producers, and animal welfare groups. Cook (1975) reported a 20–30% annual increase in feral horse populations in the western United States yearly from 1973 through 1975. This increase in population has forced public land administration agencies to reduce domestic livestock grazing in localized areas to accommodate the grazing pressure feral horses have added on western ranges (Artz 1977). In 1974 the feral horse population in Wyoming was estimated at 4,434 animals; however a recently completed census estimates the population at 10,448 animals (USDI-BLM and USDA-FS 1980).

An important factor in determining proper animal stocking levels for a given range is the botanical composition of diets of major herbivores and the relationship of diets to available forages. Research has addressed interrelationships between feral horses, cattle *(Bos taurus)*, antelope *(Antilocapra americana)*, mule deer *(Odocoileus hemionus)*, and elk *(Cervus elaphus)* in an open range situation in the western U.S. (Hubbard and Hansen 1976, Hansen et al. 1977, Olsen and Hansen 1977, Hansen and Clark 1977, Vavra and Sneva 1978). These researchers have reported a high degree of dietary overlap between horses and cattle with a strong potential for competition. Some studies have also shown a high degree of dietary overlap between horses, mule deer, elk, and antelope during certain seasons of the year (Hubbard and Hanson 1976, Hansen et al. 1977, Olsen and Hansen 1977, Vavra and Sneva 1978). The objectives of this paper are to report food habits and dietary overlap between horses and cattle grazing together under forced moderate and heavy socking densities in Wyoming during summer and winter grazing seasons of 1981.

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Study Area

Study sites were located in the Red Desert, northeast of Rock Springs, Wyo., in Sweetwater County (Fig. 1). A semiarid climatic

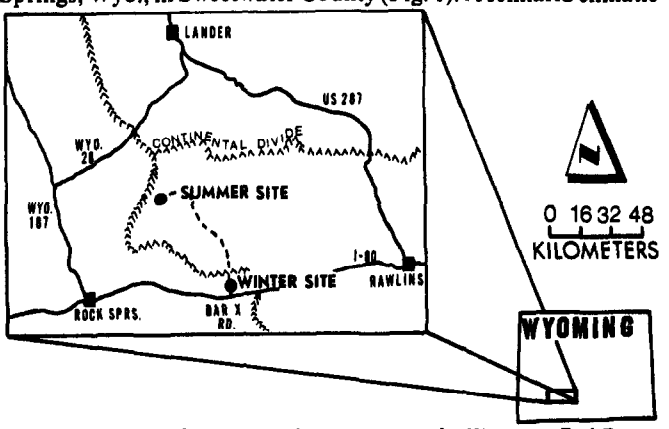

Fig. 1. *Locations of summer and winter sites in the Wyoming Red Desert.*

pattern prevails over both areas. Yearly precipitation averages 21.5 cm with approximately 40% falling from April to June. Snowfall usually occurs from October to May (BLM 1978 a,b).

Three distinct vegetation types cover most of the summer study area. The sagebrush-grass type on sandy and loamy range sites is characterized by a shrub layer of big sagebrush *(Artemisia tridentata* subsp. *tridentata, vaseyana, Wyomingensis)*, Douglas rabbitbrush *(Chrysothamnus viscidiflorus)*, winterfat *(Ceratoides lanata)*, and gray horsebrush *(Tetradymia canescens)*, with an herbaceous layer consisting of needleandthread *(Stipa comata)*, thickspike wheatgrass *(Agropyron dasystachyum)*, Indian ricegrass *(Oryzopsis hymenoides)*, needleleaf sedge *(Carex eleocharis)*, prairie Junegrass *(Koeleria cristata)*, locoweed (*Astragalus* spp.) and hoods phlox *(Phlox hoodii)*.

The saltbush type, located on saline upland range sites, is typified by nuttall saltbush *(Atriplex nuttalli)*, bud sagewort *(Artemisia spinescens)*, birdfoot sagewort *(A. pedatifida)*, Sandberg bluegrass *(Poa sandbergii)*, bottlebrush squirreltail *(Sitanion hystrix)*, winterfat, and greenmolly summercypress *(Kochia americana)*.

The greasewood-rabbitbrush type is scattered throughout the study area on the sands range site. Vegetation is characterized by greasewood *(Sarcobatus vermiculatus)*, rubber rabbitbrush *(Chrysothamnus nauseosus)*, fourwing saltbush *(Atriplex canescens)*, spiny hopsage *(Grayia spinosa)*, Sandberg bluegrass, Indian ricegrass, needleandthread, lambsquarter *(Chenopodium alba)*, western dock *(Rumex occidentalis)* and scurfpea *(Psoralea tenuiflora)*.

A sagebrush-grass type on sands, sandy, and loamy range sites covers most of the winter study area. Several large grass flats are interspersed throughout the area. Big sagebrush, Douglas rabbit

brush, rubber rabbitbrush, gray horsebrush, and fourwing saltbush dominate the shrub layer with an herbaceous layer consisting of needleandthread, Indian ricegrass, Sandberg bluegrass, thickspike wheatgrass, bottlebrush squirreltail, and winterfat. Forbs were scarce on the winter study area.

Methods

Pasture Treatments

When summer grazing began on 7 June 1981, both moderate-intensity, combined horse and cattle grazing (MHC) and heavy-intensity, combined horse and cattle grazing (HHC) were in pastures of 252 ha. Approximate stocking densities were 0.06 animal unit months (AUM)/ha for the MHC pasture, and 0.09 AUM/ha for the HHC pasture. However, on 5 July 1981 both pastures were modified by crossfencing to increase grazing pressure. The MHC pasture was reduced from 252 to 194 ha while the HHC pasture was reduced from 252 to 65 ha. Modified stocking intensities were 0.08 AUM/ha for the MHC pasture and 0.36 AUM/ha for the HHC pasture. Grazing was terminated when utilization exceeded 75% of aboveground biomass of herbaceous forage species in the HHC treatment. Summer grazing terminated on 7 August 1981. Cattle classes were allotted to simulate a cow-calf range operation. Cow-calf units, which normally grazed in the area, were obtained from a local rancher and bulls were introduced for breeding. Three yearling steers were also present in each pasture because of an initial intent to collect esophageal fistula samples. Feral horses obtained from the BLM and domestic horses were used during the study. Feral horses had been gathered in the vicinity of the study area. Domestic horses were introduced to replace intractable feral horses and facilitate feral horse handling (Jewett et al. 1982). Domestic horses were readily accepted by feral horse bands.

During the winter grazing season pasture sizes were 120 ha for both MHC and HHC treatments. Approximate stocking intensities were 0.12 AUM/ha for the MHC pasture and 0.38 AUM/ha for the HHC pasture. Desired utilization levels were the same as during the summer study. The winter grazing period was from November 7 to December 21, 1981. Only cows were used during this period as calves had been weaned and bulls and steers removed prior to onset of the winter study. The horses from the summer study were used during the winter period.

Vegetative Sampling

In the fall of 1980, range sites on both summer and winter study areas were sampled for botanical composition and standing crop biomass. A double-sampling technique, which consisted of an estimation of biomass on all quadrats (0.89 m^2), and clipping of 1/3 to 1/5 of all quadrats, was used (Wilm et al. 1944). Approximately 60 quadrats (based on variance of total production) were evaluated for each range site. Grasses and forbs were clipped to ground level, while current year's growth plus green leaves on old branches were clipped to assess shrub availability. Similarity between pastures was calculated using Kylcyznski's formula (Oosting 1956).

Botanical Composition of Diet

During June 1981 of the summer period, approximately 20 fecal samples were collected from each animal group at 2, 14-day intervals. During July and August 1981, the fecal collections were

Table 1. Forage availability and diet botanical composition (mean % ± standard deviation) pooled across trials on moderately and heavily grazed pastures on the summer site.

	Heavily grazed				Moderately grazed			
	Forage availability		Botanical composition		Forage availability		Botanical composition	
Forage	(% composition)	(kg/ha)	(Horses)[b]	(Cattle)[c]	(% composition)	(kg/ha)	(Horses)[d]	(Cattle)[e]
Grasses and Sedges:								
Indian ricegrass	8.8	34.0	11 ± 11	7 ± 4	11.7	49.4	13 ± 5	8 ± 2
Needleandthread	15.5	59.8	15 ± 12	12 ± 8	18.1	76.6	18 ± 17	13 ± 9
Thickspike wheatgrass	18.7	72.2	7 ± 5	4 ± 1	17.7	74.7	6 ± 3	5 ± 2
Bottlebrush squirreltail	1.0	3.6	2 ± 2	2 ± 2	2.7	11.2	5 ± 3	5 ± 3
Crested wheatgrass	t[a]	1.0	—	—	t	1.0	—	—
Needleleaf sedge	8.6	9.5	29 ± 7	22 ± 6	t	1.0	4 ± 1	3 ± 2
Sandberg bluegrass	t	1.0	11 ± 7	7 ± 5	t	1.0	20 ± 6	9 ± 3
Prairie Junegrass	t	1.0	4 ± 3	4 ± 4	t	1.0	4 ± 4	5 ± 5
subtotal	52.8	182.1	79	63	50.3	215.9	70	48
Shrubs:								
Big sagebrush	21.1	81.7	2 ± 1	4 ± 4	20.9	88.2	t	t
Winterfat	8.0	31.0	14 ± 4	14 ± 2	14.3	60.4	21 ± 2	20 ± 4
Fourwing saltbush	t	1.0	2 ± 2	4 ± 2	t	1.0	4 ± 3	10 ± 7
Gray horsebrush	11.2	43.3	2 ± 3	t	8.9	37.7	t	t
Douglas rabbitbrush	4.0	15.3	—	—	5.4	22.8	t	t
Spiny hopsage	t	1.0	t	3 ± 4	t	1.0	1 ± 2	2 ± 3
Others	t	1.0	1	6	t	2.0	t	3
subtotal	44.7	174.3	18	28	49.5	213.1	27	36
Forbs:								
Western dock	t	t	1 ± 1	1 ± 1	t	t	t	1 ± 2
Locoweed	t	t	t	3 ± 2	t	t	t	7 ± 5
Others	2.0	t	2	5	—	—	2	8
subtotal	2.5	1.0	3	9	t	t	3	16
TOTAL	100	357.4	100	100	100	429.2	100	100

[a]traces (<1.0%)
[b]179 samples
[c]182 samples
[d]127 samples
[e]138 samples

intensified, such that 2 identified fecal samples were collected from all horses and mature cattle each day for 3 consecutive days at 2, 14-day intervals. This more intensive collection scheme was utilized during the winter 1981 season over 3, 14-day intervals except samples were collected on alternate days.

Microhistological examination of samples followed the procedure outlined by Sparks and Malechek (1968). Ten systematically located fields per slide and 2 slides per sample were examined at 100X magnification. When using microhistological analysis there does exist the potential for under-or-over-estimation of some forages consumed by herbivores (Holechek et al. 1982). Analysis was done by the Wildlife Food Habits Laboratory at Texas Tech University, Lubbock. The same observer analyzed all fecal samples and under-or-over-estimation was not considered to be a problem. Common and scientific names of plants follow Bettle (1970).

Similarity of diets between horses and cattle was calculated using Kulcyznski's formula (Oosting 1956). The similarity index represents the percentage of the 2 diets that are identical. Diets were also compared by Spearman's rank-order correlation of category percentages in 2 diets (Snedecor and Cochran 1973).

Results and Discussion

Based on the fall 1980 clipping information, there were 357.4 and 429.2 kg/ha of forage available in the HHC and MHC pastures on the summer site, respectively (Table 1). A similarity index of 88% for species composition was calculated between these 2 treatment pastures. Overall production was slightly greater in the MHC pasture (Table 1). The major difference between pastures was the amount of needleleaf sedge and winterfat available. In the HHC pasture needleleaf sedge represented 8.6% of production whereas in the MHC it contributed only a trace to total production (Table 1). In the HHC pasture, winterfat accounted for 8.0% of the production; however in the MHC pasture it contributed 14.3% to total production (Table 1). Forb production was low in both pastures.

Based on the fall 1980 clipping information, there were 524.4 and 549.0 kg/ha of forage available for the HHC and MHC treatments on the winter site, respectively (Table 1). A similarity index of 96% for species compositions was calculated between these 2 treatment pastures.

Horses were predominantly grazers throughout the summer in both treatments (Table 1). Grasses and sedges such as needleleaf sedge, Indian ricegrass, prairie Junegrass, thickspike wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, and needleandthread contributed over 65% to the diet. Shrub use accounted for approximately 25% of the dietary content in both MHC and HHC treatments. Winterfat, fourwing saltbush, and spiny hopsage were the major shrub types used throughout the summer. Gray horsebrush use did not occur until the end of the grazing period when utilization of herbaceous material was determined to be greater than 50% in the HHC treatment (Smith et al. 1982). Forb use was negligible during the summer at both stocking rates (Table 1). Western dock was the only forb taken in amounts greater than 1% and its use was limited to early summer.

Hafez et al. (1969) reported horses are primarily grazers throughout the year. Grasses and sedges have been shown to be major constitutents in summer feral horse diets in Colorado (Hubbard and Hansen 1976, Hansen et al. 1977, Hansen and Clark 1977), Wyoming (Olsen and Hansen 1977), Oregon (Vavra and Sneva 1978), Alberta, Canada (Salter and Hudson 1979, 1980), and northeastern California and northwestern Nevada (Hanley and Hanley 1982). These papers stressed the importance of wheatgrasses (*Agropyron* spp.), needlegrasses (*Stipa* spp.), sedges (*Carex* spp.), Indian ricegrass, and prairie Junegrass during the summer season. However, in southern New Mexico, Hansen (1976) reported grasses only contributed slightly more than 50% of the diet, dropseeds (*Sporobolus* spp.) and green sprangletop *(Leptochloa dubia)* being the principal grasses taken during the summer in this study. Reiner and Urness (1982) reported the importance of beardless wheatgrass *(Agropyron inerme),* prairie Junegrass, Sandberg bluegrass, and Kentucky bluegrass *(Poa pratensis)* in summer horse diets for Cache County, Utah.

Winterfat accounted for 8 to 22% of the summer diet in our study. Work conducted in similar vegetation types has shown only 3–5% consumption of winterfat during the summer season (Hubbard and Hansen 1976, Hansen and Clark 1977, Hansen et al. 1977). This difference could be a reflection of winterfat biomass availability in this area. Winterfat averaged 8 to 14% of the botanical composition of pastures in this study (Table 1). Feist and McCullough (1976) observed that new growth of saltbushes (*Atriplex* spp.), greasewood, rabbitbrushes *(Chrysothamnus* spp.) and big sagebrush was readily consumed by horses on the Pryor Mountain Wild Horse Range. In contrast, our data show minimal use of these forages throughout the summer.

Cattle utilized a broader spectrum of forages during the summer than horses. Grasses and sedges contributed over 45% to the diets of cattle under both stocking intensities throughout the summer (Table 1). Needleleaf sedge, Indian ricegrass, prairie Junegrass, thickspike wheatgrass, Sandberg bluegrass, bottlebrush squirreltail, and needleandthread were the major grasses and sedges consumed by cattle. Cattle consumed a greater proportion of shrubs than horses, with winterfat, fourwing saltbush, and spiny hopsage being the primary species used (Table 1). Forb use by cattle was substantially greater than use by horses (Table 1). Forb use declined sharply with advancing season due to decreased availability. Locoweed, (*Astragalus* spp.) was the major forb species utilized by cattle.

Other researchers have reported that cattle coexisting with feral horses consumed in excess of 70% grasses and sedges during the summer season (Hubbard and Hansen 1976, Hansen and Clark 1977, Olsen and Hansen 1977, Hansen et al. 1977, Hanley and Hanley 1982). These papers also reported the importance of wheatgrasses, needlegrasses, sedges, Indian ricegrass, and prairie Junegrass in summer diets. Vavra and Sneva (1978) reported cattle grazing in association with feral horses in the cold desert biome of eastern Oregon utilized grasses almost exclusively, with Idaho fescue *(Festuca idahoensis),* needlegrasses, and wheatgrasses forming the major portion of the summer diet. Samuel and Howard (1982) found cattle grazing in the Wyoming High Plains utilized western wheatgrass *(Agropyron smithii),* sedges, blue grama *(Bouteloua gracilis),* and needleandthread during the summer and these accounted for 70% of the diet. Our results indicated grass and sedge use in excess of 70% did not occur until late in the summer when many shrubs and forbs were senescent or less available to grazing cattle. Winterfat, a major dietary component in our study, was used substantially more than has been reported by Hubbard and Hansen (1976), Hansen and Clark (1977), and Hansen et al. (1977). However, Kautz and Van Dyne (1978), working in northeastern Colorado, reported shrubs and forbs were major contributors to the composition of cattle diets.

Similarity indexes and rank-order correlation coefficients comparing horses and cattle for each 14-day trial interval are presented in Table 2. Horses and cattle showed a high degree of dietary overlap throughout the summer at both stocking rates. As the summer season progressed, availability of forages decreased due to forage removal and maturity. This resulted in increased dietary overlap by the end of the summer (Table 2). Horses and cattle did undergo dietary shifts during the summer. As the season progressed utilization of grasses by cattle increased. Also changes in species composition for both horse and cattle diets changed drastically as forage availability decreased.

A substantial degree of dietary overlap ($>60\%$) between feral horses and cattle on open summer range situations has been been documented throughout the western U.S. (Hubbard and Hansen 1976, Hansen and Clark 1977, Olsen and Hansen 1977, Hansen et al. 1977, Vavra and Sneva 1978, Salter and Hudson 1980). Most of

these studies indicated a strong potential for dietary competition if stocking rates of feral horses and cattle grazing together increase above recommended forage use levels.

Table 2. Summer and winter similarity indexes (%) and rank-order correlation coefficients (r_s) for horses and cattle under moderate and heavy stock densities in the Wyoming Red Desert.

	Heavy horses/cattle		Moderate horses/cattle	
Period	%	r_s	%	r_s
Summer				
Trial 1 (June 15 - June 26)	54	0.75	—No Data—	
Trial 2 (June 30 - July 5)	70	0.63	69	0.68
Trial 3 (July 17 - July 22)	77	0.82	75	0.67
Trial 4 (July 31 - August 5)	82	0.71	76	0.60
Mean	71	0.73	73	0.65
Winter				
Trial 1 (Nov. 18 - Nov. 23)	91	0.70	79	0.88
Trial 2 (Dec. 1 - Dec. 6)	88	0.82	82	0.93
Trial 3 (Dec. 17 - Dec. 20)	85	0.82	79	0.78
Mean	88	0.78	80	0.86

Horses were predominantly grazers throughout the winter in both treatments (Table 3). Needleandthread, Sandberg bluegrass, thickspike wheatgrass, and Indian ricegrass contributed over 50% of the diet during the winter. Thickspike wheatgrass utilization appears to be closely related to its association with winterfat. Once horses initiated heavy grazing of winterfat, use of thickspike wheatgrass dropped dramatically. Shrub use accounted for approximately 35% of the diet in both MHC and HHC treatments (Table 3). Winterfat, gray horsebrush, and fourwing saltbush were the primary shrub species utilized during the winter. Winterfat accounted for approximately 20% of horse and cattle diets in early winter for both stocking intensities. However, by the end of the grazing period, dietary use of winterfat had declined to approximately 10%. Horses were observed pawing winterfat and consuming root material. Feist and McCullough (1976) reported similar pawing behavior to obtain winterfat roots for horses along the Wyoming-Montana border. Forb use was negligible during the winter at both stocking rates (Table 3).

Grasses have been shown to be major constituents (>85%) in winter feral horse diets (Olsen and Hansen 1977, Vavra and Sneva 1978, Salter and Hudson 1979, Hanley and Hanley 1982). Olsen and Hansen (1977) reported the importance of wheatgrasses and needlegrasses in the winter horse diets in western Wyoming. Vavra and Sneva (1978) showed feral horses in eastern Oregon shifted from utilizing primarily Idaho fescue and needlegrasses in the summer to wheatgrasses and bottlebrush squirreltail during the winter. Sedges, fescues (*Festuca* spp.), and hairy wildrye *(Elymus innovatus)* were the most important grass species in the winter diet of feral horses in western Alberta (Salter and Hudson 1979). These studies show negligible use of shrubs during the winter season, in contrast to our findings that show shrubs contributed over 35% or more to the winter diet.

Cattle generally utilized the same forages as horses during the winter season (Table 3). Needleandthread and Sandberg bluegrass were the major grasses consumed by cattle. Winterfat, fourwing saltbush, and gray horsebrush were the important shrubs taken by cattle and accounted for approximately 35% of the winter diet (Table 3). Forb use was negligible during the winter season under both stocking intensities.

Since most cattle are supplemented during the winter season, dietary information on free-roaming cattle in this vegetation type is imited (Olsen and Hansen 1977, Vavra and Sneva 1978, Hanley

Table 3. Forage availability and diet botanical composition (mean % ± standard deviation) pooled across trials on moderately and heavily grazed pastures on the winter site.

	Heavily grazed				Moderately grazed			
	Forage availability		Botanical composition		Forage availability		Botanical composition	
Forage	(% composition)	(kg/ha)	(Horses)[b]	(Cattle)[c]	(% composition)	(kg/ha)	(Horses)[d]	(Cattle)[e]
Grasses and Sedges:								
Needleandthread	10.1	53.1	31 ± 4	34 ± 1	11.3	61.4	31 ± 5	35 ± 1
Sandberg bluegrass	4.7	24.4	22 ± 1	22 ± 6	8.5	46.3	19 ± 4	23 ± 4
Thickspike wheatgrass	9.9	52.1	5 ± 5	3 ± 2	4.3	23.3	4 ± 4	2 ± 2
Indian ricegrass	7.7	40.4	7 ± 8	5 ± 5	7.7	41.9	5 ± 8	4 ± 4
Others	t[a]	5.4	t	t	t	9.8	1	2
subtotal	32.7	175.4	66	65	32.1	182.7	60	66
Shrubs:								
Big sagebrush	37.7	197.5	t	t	38.2	207.6	t	t
Winterfat	3.9	20.2	17 ± 9	20 ± 5	3.4	18.5	16 ± 5	20 ± 5
Gray horsebrush	2.2	11.6	15 ± 9	12 ± 1	2.1	11.3	22 ± 2	7 ± 2
Fourwing saltbush	t	1.0	t	1 ± 1	t	1.0	t	6 ± 5
Others	5.9	32.7	t	t	6.2	36.2	t	t
subtotal	50.2	263.0	33	34	50.0	274.6	39	33
Forbs:								
Hooded phlox	11.1	58.1	t	t	11.4	62.1	1 ± 2	t
Birdbeak	2.4	12.5	—	—	2.8	15.0	t	—
Others	3.6	15.4	t	t	3.7	14.6	t	t
subtotal	17.1	86.0	1	1	17.9	91.7	1	1
TOTAL	100	524.4	100	100	100	549.0	100	100

[a]traces (<1.0%)
[b]240 samples
[c]216 samples
[d]90 samples
[e]72 samples

and Hanley 1982). Cattle grazing in association with feral horses in the cold desert biome of eastern Oregon utilized grasses almost exclusively, with Idaho fescue, needlegrasses, and bluebunch wheatgrass *(Agropyron spicatum)* forming the major portion of the diet during the winter (Vavra and Sneva 1978). Olsen and Hansen (1977) only reported annual average percentages for cattle grazing in western Wyoming but wheatgrasses, needlegrasses, Indian ricegrass, and saltbushes (*Atriplex* spp.) were the major forages consumed by cattle.

Horses and cattle showed a high degree of dietary overlap throughout the winter at both stocking rates (Table 3). Dietary overlap declined slightly in the HHC pasture as the winter season progressed while no trend was noted in the MHC pasture. There were indications that horses and cattle underwent a dietary shift. Indian ricegrass use by both animals was negligible in early winter but increased as availability of other major dietary components declined in late winter.

Vavra and Sneva (1978) reported a winter dietary overlap of 72.0% between feral horses and cattle grazing together in eastern Oregon. In contrast, Olsen and Hansen (1977) only found a dietary overlap of 21% during the winter season for horses and cattle grazing in western Wyoming. Our results from a similar area in Wyoming show a dietary overlap greater than 80% for horses and cattle grazing together. There is no mention by Olsen and Hansen (1977) as to whether feral horses and cattle were grazing sympatricly during this season. Selection of different habitats by free roaming animals may account for the large discrepancy.

Conclusion

Horses and cattle in our study showed a high degree of dietary overlap in both winter and summer. It has been reported that dietary overlap is not sufficient evidence for exploitative competition (Colwell and Futuyuma 1971, Pianka 1976). Pianka (1974) stressed the importance of spatial utilization of the environment as well as items used for food. Horses and cattle grazed common pastures in our study, therefore we created a high degree of spatial overlap between the two species. However, Miller (1980) reported heavy feral horse and cattle concentrations around water sources during the summer season in the Red Desert. Information is lacking on the spatial utilization of this area during the winter. The results of this one-year study would indicate a high potential for exploitation of cattle foods by horses or vice-versa under a free-roaming situation particularly during the summer when spatial overlap appears to be greatest.

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