

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

RR
Pine Ranges
Burgess Spring

March 26, 1937

STUDY OF SPECIES SELECTED BY CATTLE

"THE CATTLE DIET"

BURGESS SPRING EXPERIMENTAL RANGE
1936

Progress to Date

First Draft

By

J. R. Bentley
Junior Range Examiner



California Forest and Range Experiment Station

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Burgess Spring Experimental Range, 1936

I. Object

To determine what species make up the cattle diet on a recently out-over pine range throughout the grazing season -- species grazed and when, proportion of the total made up by each and which parts taken.

It is an integral part of the Burgess Spring plan to determine grazing capacity by studying the factors that compose it, such as yield, nutritional value and "takability" of each key species.

II. Methods

This problem is being approached from two angles; first, by examination of the species to see which have been grazed and, secondly, to observe actual grazing, or selection, by the cattle. The first is being handled systematically by periodic "utilization" examinations on ⁸²⁷ ~~825~~ quadrats but as that is a special sampling problem it will not be covered herein. This paper will report on observations of the grazing cattle and general notes on plants grazed.

Seven examinations of the cattle diet were made during the 1936 season. The stock, fifteen 2-year-old steers, were followed three days at each examination period by one or more observers immediately preceding each date of weighing the stock. A systematic record of the plants selected by stock was made each day; the results of each 3-day period were combined to make one examination record.

All observations were made "on foot". During the early season it was hard to get close enough to the cattle for accurate observations but after mid-season it was possible to wander among the herd, getting within a few feet of some individuals. Only two or three animals were very "high-strung" and they were always too nervous to graze naturally when observers were near. If they and a few easily-led steers were in a small group broken from the herd of quiet animals it was not possible to make satisfactory observations on the small group; the remaining herd were then very easily followed. Field glasses were an aid in making observations.

Systematic records were made of the cattle's choice of species. Each time a steer was observed to graze a new plant an entry was made opposite that species. The final record includes the number of times the animals chose each species. These data are not quantitative as they don't indicate exactly the volume of each species taken but are systematic qualitative records which show what was grazed and how often chosen.

The nervous steers were not easily approached so more observations were made on the tame steers. Ordinarily only one steer was observed at one time, the observer selecting one animal and then another animal. It was not always possible to tell what was taken by the steer under observation so of course some "choices" were missed. Records are more complete for the larger, easily recognizable species.

The species in the diet, or more specifically the proportion of each, depended to an extent upon the vegetation cover present where the steers were observed. For this reason the steers were followed three days for each examination in order to sample more of the whole range.

Steers chose certain plants at one examination regardless of where they were but if these species were scattered in that locality they often had to supplement them with more abundant species.

Records of cattle behavior and activity which will later be important in analyzing certain phases of the project were taken during the diet examinations. It was found that the cattle usually "shaded-up" during the day and grazed in the later afternoon and evening so the period of grazing observation was relatively short each day, at least not continuous throughout the day.

The plant parts being selected and any outstanding preferences of the stock for some species, or avidity with which grazed, were recorded at each examination.

One examination of the range was made to determine what species were being grazed by observing the plants themselves. Miscellaneous notes were added during the season.

III. Results and Conclusions

All systematic observations and most field notes bearing on this study are summarized in tables following the text.

Complete analysis of this year's data requires correlation with all the factors that were measured this year, some of which cannot be summarized now, and with factors to be measured in the future which it was not possible to study this year due to limitations of time and man power. However, some most interesting high-lights can be drawn from the data presented herein. These implications are of utmost importance in current range research problems and should be incorporated into short papers this

year to be made available to all interested.

Please keep in mind that the systematic data is a record of number of times that plants of each species were chosen, not "percent of total diet" made up by each. The degree to which the 1936 data give "percent of total diet" are discussed later. How to make the data more "quantitative" in the future will have to be considered.

The following are a few general high-lights from the 1936 data:
Composition of cattle diet on a cut-over pine range fluctuates during the season.

Changes in preference for certain species are often most abrupt.

Species which previously have not been touched will suddenly be eaten with avidity and form major part of diet.

Sudden major shifts to certain species always occurred at the time these species were maturing fruit.

Stock will often eat certain plant parts, notably fruits, before remainder of plant.

After species form fruits, this part of the plant is often chosen in preference to the remainder for sometime even though there has not been any abrupt change in total number of choices for that species.

Stock may choose certain species or plant parts in an attempt to satisfy their desires for nutrients needed in their metabolism.

Study indicates more knowledge of chemical composition of fruits needed.

More knowledge of the range animal's metabolism needed.

The animal's diet, as recorded, is composed of more species during early season than late.

Above due to changes in flora as quick-maturing plants dry and disappear. Possibly due in part to fact observer could not identify minor dry species at end of season as easily as when fresh at early season.

A few species represent the bulk of "choices" during all the season.

First six species, in order of preference, represented nearly three-fourths of total "choices" during first examinations and over ninety percent in the final record. Similarly, first two or three species make up nearly, or more than, fifty percent of the choices.

Festuca idahoensis is the most abundant species on the range and ranked high in all examinations but was only lightly utilized over all of range.

Certain species, "ice-cream plants", ranked high in preference during the periods after they were first selected until completely utilized.

Degree of utilization of entire range probably must be determined by certain most-sought-for species if vegetation flora is to be preserved.

First season results indicate that the accepted "palatabilities" for some species on national forest ranges may be too low. Notable among these are Bromus tectorum, Lupinus calcaratus and Sitanion hystrix.

Some species commonly considered worthless are eaten when plenty of other feed of similar "greenness" is available. Notable is Arctostaphylos patula.

The six species chosen most often in each of the seven examinations are shown in the table on the next page. Brief statements concerning the first year's observations on the sixteen species in this list are included in the following paragraphs.

RR
Pine Range
Burgess Spring

J. R. Bentley
March 20, 1937

CHOICE OF SPECIES BY CATTLE
Burgess Spring Experimental Range, 1936
(Summary of First Six for Each Examination)

Examination	I	II	III	IV	V	VI	VII
Examination Date	6/29 to 7/2	7/15 to 7/17	7/29 to 7/31	8/11 to 8/15	8/24 to 8/26	9/5 to 9/11	9/22 to 9/24
Species	Order of Preference						
Garex (rossa?)	1	34		6			6
Crepis occidentalis ✓	2						
Bromus marginatus	3	6				5	4
Sitanion hystrix	4		6	5	5	3	2
Madia elegans ✓	5						
Taraxacum vulgare ✓	6						
Festuca idahoensis		11	5	4	2	1	1
Parashia tridentata		23	2	3	3		
(Erigeron nevadensis?)		46					
Balsamorhiza sagittata		55					
Lupinus albus			1	1	1	2	
Bromus tectorum			3	2	6		
Arctostaphylos patula ✓			4				5
Poa sandbergii ✓					4		
Mythia mollis		2				4	3
Chrysanthemum sp.						6	
Percent of total choices	71.6	72.2		86.9	80.2	83.5	94.1

16 species 136

18 " 137

11 are the same

Lepinus calasearatus was not touched during the first examination and was chosen only a few times during the second but was the most sought for species in the next three periods from July 29 to August 26. It still held second place on September 11 although grazed only twice during the last records made later in the month. Probably the most important reason for this sudden drop was that the range had been practically "cleaned" of this species; however, the succulence of the plant dropped rapidly during the last two periods (see moisture content graph).

The species was first taken in quantity as the fruit matured. The tops of the plants were grazed mainly during the first period and then all of the plant was grazed until entirely utilized. This species probably formed a major part of the total diet during the three periods when it held number one position, for large "mouthfuls" were taken at "choice" and an appreciable bulk of forage was seen to disappear from the range. During the seventh period, when it rated number two in choice, the actual bulk may have been somewhat lower for only partial plants were left to be eaten.

Ergatis testorum, the only annual among the species most preferred by cattle, ranked high in preference during the third, fourth, and fifth examinations but was not recorded at any other time. This is another species that was not grazed until fruit was mature and then taken with great relish until it no longer made up an appreciable portion of the feed. A remarkable point is that this nearly dry species was not taken to balance a too-succulent diet of other species for by this time all key species were losing moisture rapidly. The other two species being

taken avidly at this time were Lupinus and Purshia, both with relatively high moisture contents. Perhaps these made a "balanced" diet.

This species does not have a wide distribution over the experimental range being abundant only on a large open slope near water, introduced by sheep before logging. Cattle spent more time grazing this area during the part of season they preferred B. tectorum. After it was closely utilized the cattle were not found here during the evening grazing period except as they passed across it on way to water.

Festuca idahoensis had the highest rank of all species during the entire season. It ranked first in selection three times, equaled only by lupine, and was in the first six at all examinations except the first when it ranked seventh. This is a species of recognized forage value but the results this year indicate that a good many others rank higher in takability. This is based on the fact that at the end of the 1956 season it was only lightly utilized whereas some others were "eaten to the ground".

Volume considered, fescue is the most abundant perennial species on the Burgess Spring Experimental Range which probably accounts for its high ranking during all of season.

One interesting observation was that mainly the cattle often ate the heads during the first examinations, which may tend to make the number of choices misrepresent the percent of the total diet at that time. In the last half of the season the basal leaves were selected.

Sitanion hystrix is another species which ranked among the select group five times during the season and at the other examinations was in eighth place. This species is as widely distributed as fescue.

based on a frequency of occurrence examination made early in the season. No doubt part of its high ranking is due to this. However, it was eaten greedily and while not ranking as high in number of times selected as was fescue it was utilized heavier over the range as a whole. At one time, heads of this plant were taken in preference to other parts. Near the end of the season the basal leaves of this species were greener than fescue, as shown in the moisture content graphs, and were selected by the stock. This species has often been classed well below fescue in palatability due probably to the coarse appearance of the leaves and the barbed heads. This year's results indicate that the opposite may be true. (See article on S. hystrix by L. R. Short).

Three species of recognized forage value - Purshia tridentata, Bromus marginatus (carinatus), and Carex were among the "C-of-the-week" four times during the season.

Purshia, a shrub, was passed until in fruit and was then second choice for two examinations and third for two more and then dropped to seventh and ninth in examinations VI and VII, respectively. After being grazed it ranked high in choice until nearly all of the current growth was taken and the stock were forced to "quit" it. This most palatable species is relatively scarce. It probably furnished more bulk than indicated by the number of "choices" for often the choice of one plant furnished a good many mouthfuls. This was not so true after the shrubs were well "picked over" for new growth.

Bromus marginatus, always considered a most palatable grass, never ranked below ninth in preference but was never among the first two.

This species would probably rank higher than Pectua, if it was nearly as abundant.

In the early season stock selected the heads and stems but during the late season sought the green basal leaves characteristic of this species which maintained higher late season moisture content than that of the other grasses. This early selection of grass fruit by stock was noted for other species.

Several species of Carex are present on the range but the observations are on only the one most abundant perennial sedge, probably C. roosa. This quick-growing plant was most often chosen during the first period and for the examinations it was not in the first six species chosen; it ranked seventh, thirteenth, and tenth respectively. The actual bulk consumed at one time is probably less than indicated as it produces only a small plant. It does revegetate after being clipped. Continued preference for this plant during the season is probably due to the green appearance and succulence of the small clumps until covered with snow.

Only two species occurred but twice in the preceding table. These are Wyethia mollis and Arctostaphylos patula.

Wyethia is very common in the Eastside region and general observations in the past have noted that it is grazed during the latter part of the season. This was borne out in the 1936 results. The plant was not grazed during the first examination and but sparingly during the second, third and fourth, but as it began to dry during the last of August it was in seventh place and was fourth and third during the examinations in September. Most of the choices were for the leaves. Often a whole leaf would be torn off and only a small bite taken before it was dropped to

the ground. Some say that the dry leaves make the best feed and that cattle prefer them. However, during the first September examination, when the leaves formed the major bulk of green-appearing herbage on the range, it was noted that cattle selected the greener leaves in preference to the dry.

That Arctostaphylos ranked among the first six species preferred at two examinations on a lightly grazed range, will be most startling to many grazing men. Grazing of this species to a pronounced degree is often considered as an indication of over-grazing the range as a whole. This may probably be true of some ranges but in this trial, cattle often selected it when not forced to. Casual examination of the shrubs themselves did not show appreciable grazing. Cattle were first noted taking this species during late July, as seed were forming, ranking fourth in preference. It was near tenth and twelfth in preference until the last examination in late September when it ranked fifth. Actual bulk consumed, might rank much lower than the above figures indicated but it is safe to assume that it made up an important portion of the diet, for at least part of the season. Actual nutritional values received from this species will not be known until more intensive work is done. This species was not collected for moisture and chemical determinations at the first of the season because it was assumed that it wouldn't be grazed. Collections were started later.

Chrysothamnus spp., rabbit brush, is another species usually considered as worthless, heavy grazing indicating over-grazing. This

species ranked in sixth place during early September when the plant was in full flower and eighth in late September. In the first half of August one choice of the species was recorded.

No outstanding changes in regard to the conception of this species were found this season, only that stock will eat when abundant feed is near. At a maximum it made up only about five percent of the total choices and in each choice only the flowers and upper parts of the plants were taken.

Poa sandbergii, a rather early maturing perennial grass, was grazed lightly during most examinations. It was in the first six species chosen during late August after it was completely dry, mainly the stems and heads were grazed. This species probably made up a very small percentage of the total bulk eaten.

Balsamorhiza sagittata matured and dried much earlier than did Wyethia to which it is closely related and similar in appearance, but not nearly as abundant on the range. It was taken during most of season but ranked in the upper six at only the second examination in July. After this time it was hard to find.

A perennial composite of the aster tribe, probably Erigeron nevadensis, was taken during only the second examination at which time it ranked fourth in preference. There are several similar species widely distributed in that region, but they are probably grazed lightly when the ranges are not over-stocked.

Madia elegans, occurred among the first six species selected during the first examination when the rather immature plants were selected. After maturity, this species was nipped occasionally.

Two early maturing species with milky juice, Crepis occidentalis and Taraxacum vulgare, were in the first six selected during the first examination but were not recorded in the diet after that time probably because they dried and more succulent species were taken.

It has been common observation that cattle often graze this type of plant when it is green, more especially in an annual type where the grasses dry before these.

Examination of the tables following the text show many more interesting things all of which cannot be covered here.

One point is that the first two or three species preferred at each examination make up nearly half, or more, of the total "choices" during the examination. Not all species occurring in the "6 of the week" list made up an appreciable portion of the total choices.

All records indicate number of choices. Observers noted that this did not represent actual bulk eaten. Examples are:

When a steer "chose" a Purshia plant, he took more than one bite, often a good many, before passing on to the next "choice" which might possibly be another shrub of the same species. One choice of a grass species might be only the nipping of a single head.

Because of the appreciable distance between plants, compared to annual or sod types, it is not feasible to follow the cattle and take a similar "bite" of the vegetation hoping to approximate the forage actually taken by stock. Some method is needed to record selection by species more quantitatively.

One method suggested by L. R. Short, is to time the grazing of

each species, presuming that proportional amounts of each species could be obtained during the same time of grazing. This might not be the case because some species are more easily grazed in bulk. He suggested using about twelve stop-watches, one for each of twelve key species, and record actual time spent with each species, making a tally of the choices of other species. This method would be rather complicated in the field if a "running" record of the entire daily grazing period were made. Too many things would be happening at one time.

Perhaps a general record of what the cattle eat at one time is all that is necessary from observing the cattle. Utilization can be attacked by studying the plants only.

The following tables summarize the field observations of the cattle diet. The data for "number of times taken" in the last four tables represent "number of choices" actually observed. The data in the first three were not all obtained in just this manner but may be considered as such if not otherwise noted.

The symbols under "part of plant taken" are:

L = leaves, S = stem, and F = fruit or flower.

PLANT SPECIES GRAZED BY CATTLE
(June 29-30, 1936)

Rank	Species	Times taken		Part of:		Remarks
		Total:	Percent	plant	taken	
		No.	of total	of total		
1	Carex (roosa?)	230	17.6	17.6	L	Grazed closely taken frequently
2	Crepis occidentalis	227	17.4	35.0	LFS	Grazed closely taken almost entirely
3	Bromus marginatus	159	12.2	47.2	LFS	Heads taken frequently stems occasionally
4	Sitanion Hystrix	139	10.6	57.8	LFS	Entire plant taken frequently
5	Madia elegans	93	7.1	64.9	LS	Plants not in head taken frequently
6	Taraxacum vulgare	88	6.7	71.6	LFS	Grazed closely - seldom passed up
7	Festuca idahoensis	64	4.9	76.5	LFS	Heads taken frequently stems occasionally
8	Eriogonum nudum	56	4.3	80.8	S	Stems seldom passed up
9	Crepis acuminata	54	4.1	84.9	LFS	Entire plant taken frequently
10	Balsamorhiza sagittata	35	2.7	87.6	L	Blades of leaves taken occasionally
11	Trifolium cyathiferum	30	2.3	89.9	LFS	Entire plant taken frequently
12	Phacelia heterophylla	20	1.5	91.4	FS	Top half of plant taken frequently
13	Stipa lemmonii	18	1.4	92.8	LFS	Entire plant taken occasionally
14	Stipa elmeri	16	1.2	94.0	LFS	Entire plant taken occasionally
15	Poa sandbergii	15	1.1	95.1	LFS	Entire plant taken occasionally
16	Girardinia sp.	15	1.1	96.2	L	Young plants taken occasionally
17	Agrostis sp.	8	.6	96.8	LFS	Entire plants taken frequently
18	Carex douglasii	7	.5	97.3	LS	Young plants taken occasionally
19	Senecio (arenosoides?)	6	.5	97.8	FS	Top half taken occasionally
20	Collomia grandiflora	5	.4	98.2	SL	Young plants taken occasionally
21	Chaenactis douglasii	4	.3	98.5	FS	Top half taken occasionally
22	Montselia sp.	3	.2	98.7	LFS	Succulent plants taken occasionally
23	Sarcophyton (large)	2	.1	98.9	SL	Young plants taken rarely
24	Agoseris grandiflora	2	.1	99.1	LFS	Entire plants taken frequently
25	Castilleja	2	.2	99.3	LFS	Entire plants taken rarely
26	Eriophyllum	2	.2	99.5	LFS	Entire plants taken rarely
27	Pentstemon glaber	1	.1	99.6	LFS	Entire plants taken rarely
28	Solidago elongata	1	.1	99.7	LS	Young plants taken rarely
29	Elymus sp.	1	.1	99.8	LFS	Entire plants taken frequently
30	Achillea millefolium	1	.1	99.9	LFS	Entire plants taken occasionally
31	Cryptantha affinis	1	.1	100.0	LFS	Entire plants taken rarely
32	Humardella sp.	1	.1		SL	Young plants taken rarely
		1,304				

PLANT SPECIES GRAZED BY CATTLE
(July 13 - 17, 1936)

Rank	Species	Times taken			Part of: plant	Remarks
		Total: No.	Percent of total	Percent of total		
1	<i>Festuca idahoensis</i>	186	21.7	21.7	FS	Fruits taken frequently; leaves occasionally
2	<i>Pursha tridentata</i>	178	20.8	43.5		New growth taken -- seldom passed up
3	<i>Carex (rossa)?</i>	75	8.6	51.1	L	Succulent plants seldom passed up
4	<i>Aster sp.</i>	65	7.6	58.7	LFS	Taken frequently over localized areas
5	<i>Balsamorhiza sagittata</i>	58	6.8	65.5	L	Blades of leaves taken frequently
6	<i>Bromus marginatus</i>	57	6.7	72.2	FS	Inflorescence and some stems taken frequently
7	<i>Achillea millefolium</i>	54	6.3	78.5	F	Flowering heads taken frequently
8	<i>Sitanion hystrix</i>	37	4.3	82.8	LFS	Most of plant taken frequently unless dry
9	<i>Goum triflorum</i>	31	3.6	86.4	LF	Taken frequently over localized areas
10	<i>Gilia leptalea</i>	25	2.9	89.3	LFS	Taken occasionally on skid roads
11	<i>Stipa elmeri</i>	18	2.1	91.4	FS	Taken frequently even when drying
12	<i>Eriophyllum sp.</i>	14	1.6	93.0	LFS	Entire plant taken occasionally
13	<i>Poa sandbergii</i>	9	1.1	94.1	FS	Upper parts of plant taken occasionally
14	<i>Elymus glaucus</i>	8	0.9	95.0	F	Only succulent plants found grazed
15	<i>Lupinus calcaratus</i>	7	0.8	95.8	LFS	Taken occasionally (entire plant)
16	<i>Nyctia mollis</i>	7	0.8	96.6	L	Leaf blades very occasionally taken
17	<i>Gayophytum (large)</i>	5	0.6	97.2	FS	Seen grazed only on skid roads
18	<i>Agropyron sp.</i>	4	0.5	97.7	FS	Plant rare here, but sometimes taken
19	<i>Stipa occidentalis</i>	4	0.5	98.2	LFS	Taken occasionally
20	<i>Gayophytum (small)</i>	3	0.4	98.6	FS	Grazed occasionally
21	<i>Crucifer No. 3-422</i>	3	0.4	99.0	F	Inflorescence taken -- a rare species
22	<i>Madia elegans</i>	1	0.1	99.1	LFS	Mostly passed up (flowers in heads)
23	<i>Montroelia sp.</i>	1	0.1	99.2	SF	Mostly dried -- probably a palatable sp.
24	<i>Gnaphalium occidentale</i>	1	0.1	99.3	FS	Rare -- but probably palatable
25	<i>Potentilla glandulosa</i>	1	0.1	99.5	LFS	Taken occasionally when seen by cattle
26	<i>Leonium nudicaule</i>	1	0.1	99.6	FS	Seldom taken
27	<i>Carex douglasii</i>	1	0.1	99.7	LFS	A rare species -- but not passed up
28	<i>Eriogonum umbellatum</i>	1	0.1	99.8	LFS	Very rarely taken
29	<i>Cryptantha sp.</i>	1	0.1	100.0	LFS	Rarely taken

PLANT SPECIES GRAZED BY CATTLE
Burgess Spring Experimental Range
July 29 - 31, 1936

Rank	Plant Species	Times Plant Taken		Part of Plant	Remarks
		Total No.	% of Total Total alive % Taken		
1	Lupinus calcaratus	186 ⁺	^{45.6} 85	LFS	Upper half of plant taken quite frequently
2	Parashia tridentata	68	^{16.7} 15		New growth seldom passed up
3	Bromus tectorum			LFS	Whole plant taken frequently
4	Arctostaphylos patula	36			New growth taken frequently
5	Festuca idahoensis	30	7.4	LFS	Whole plant, esp. basal leaves, frequently
6	Sitanion hystrix	20 ⁺	4.9	L	Taken occasionally (leaves mostly)
7	Carex (rosen?)	10	2.5	L	Greener plants taken frequently (when found)
8	Bromus marginatus	8 ⁺	2.0	LSF	Taken occasionally
9	Cirsium sp.	8		LF	Heads & young leaves taken occasionally
10	Eriogonum (nudum?)	6		SF	Taken occasionally
11	Eriophyllum	6		LFS	" "
12	Stipa occidentalis	4		LFS	" "
13	Achillea millefolium	4		LFS	" "
14	Elymus (glaucus?)	2 ⁺		SF	" "
15	Balsamorhiza	4		L	Leaf blades taken occasionally
16	Epilobium (?)	3		LS	Upper half taken occasionally
17	Poa sandbergii	+		LFS	Taken occasionally
18	Juncus balticus	2		LS	Taken occasionally
19	Anemone alnifolia	2			New growth taken very occasionally
20	Symphoricarpos	2			" " "
21	Clarkia sp.	1			
22	Gnaphalium (large)	1			
23	Wyethia mollis	1			Flowerheads; occasional leaf
24	Cryptantha sp.	1			
25	Stipa almeri	1			

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1/ The notes on the various species grazed did not in all instances include the number of plant units grazed. For this reason no value is listed after Bromus tectorum, but it is ranked third on the basis of the amount of time that was spent in grazing this plant; and a " + " sign appears after a few of the other species for the same reason.

PLANT SPECIES GRAZED BY CATTLE
Burgess Spring Experimental Range
August 11 - 13, 1936

Rank	Plant Species	Times Plant Taken By Cattle			Part of Plant Taken	Remarks
		Total No.	% of Total	Cumulative %		
1	Lupinus calcaratus	232	37.2	37.2	LFS	Whole plant taken
2	Bromus tectorum	137	22.0	59.0	LFS	
3	Parshia tridentata	92	14.6	73.6	SL	Current growth
4	Festuca idahoensis	48	7.7	81.3		
5	Sitanion hystrix	18	2.9	84.2		
6	Carex (roosa?)	17	2.7	86.9	L	Whole plant taken
7	Bromus marginatus	17	2.7	89.6		
8	Astragalus purshii	12	1.9	91.5	LFS	
9	Gayophytum sp.	10	1.6	93.1	LSP	Tops of plants taken
10	Wyethia mollis	7	1.1	94.2	L	
11	Trifolium cyathiferum	5	.8	95.0	LFS	
12	Arctostaphylos patula	4	.7	95.7	New growth	
13	Achillea millefolium	4	.7	96.4		
14	Eriogonum (medium?)	4	.7	97.1	FS (tops)	
15	Cirsium sp.	4	.7	97.8		
16	Arabis drummondii	3	.5	98.3		
17	Stipa lemmonii	2	.3	98.6		
18	Sambucus sp.	1	.2	98.8	FL	
19	Trisetum sp.	1	.2	99.0	SL	
20	Monardella sp.	1	.2	99.2		
21	Stipa elmeri	1	.2	99.4		
22	Pentstemon glaber	1	.2	99.6		
23	Poa nervosa	1	.2	99.8		
24	Chrysothamnus sp.	1	.2	100.0		

PLANT SPECIES GRAZED BY CATTLE

August 24 - 26, 1936

Rank	Plant Species	Times Plant Taken By Cattle			Part of Plant Taken	Remarks
		Total No.	% of Total	Cumula- tive %		
1	Lupinus calcaratus	122	24.4	24.4	LFS	Entire plant taken Mainly basal leaves
2	Festuca idahoensis	75	15.0	39.4	LFS	
3	Pursha tridentata	72	14.4	53.8	New growth FS	
4.	Poa sandbergii	47	9.4	63.2	FS	
5.	Sitanion hystrix	43	8.6	71.8	LFS	
6	Bromus tectorum	42	8.4	80.2	LFS	
7	Wyethia mollis	24	4.8	85.0	L	
8	Gayophytum sp.	24	4.8	89.8	LFS	
9	Bromus marginatus	17	3.4	93.2	LFS	
10	Arctostaphylos patula	9	1.8	95.0	New growth	
11	Stipa lemmoni	5	1.0	96.0	LFS	
12	Cirsium sp.	4	.8	96.8		
13	Carex (rosea?)	3	.6	97.4	L	Entire plant taken
14	Astragalus purshii	3	.6	98.0		
15	Symphoricarpos sp.	2	.4	98.4	New growth	
16	Balsamorhiza sagittata	2	.4	98.8	L	
17	Monardella sp.	1	.2	99.0		
18	Eriogonum (nudum?)	1	.2	99.2	FS(tops)	
19	Eriophyllum sp.	1	.2	99.4		
20	Trisetum sp.	1	.2	99.6		
21	Madia sp.	1	.2	99.8	LFS	
22	Arabis drummondii	1	.2	100.0	LFS	

Plant Species Grazed by Cattle

September 5 - 11, 1936

Rank	Plant Species	Times Plant Taken			Part of Plant Taken	Remarks
		Total No.	% of Total	Cumulative %		
1.	<i>Festuca idahoensis</i>	355	38.5	38.5	L	Basal leaves taken
2.	<i>Lupinus alcaratus</i>	154	16.7	55.2	LS(F)	Cattle "Searched" for it
3.	<i>Sitanion hystrix</i>	86	9.3	64.5	L(FS)	Mainly green leaves taken
4.	<i>Wyethia mollis</i>	66	7.2	71.7	L	Mainly green leaves taken but occasionally entire plant.
5.	<i>Bromus marginatus</i>	60	6.5	78.2	L(F)S	Green basal leaves relished.
6.	<i>Chrysothamnus</i> spp.	49	5.3	83.5	F(L)	Mainly flowers taken
7.	<i>Pursha tridentata</i>	43	4.7	88.2	New Growth	
8.	<i>Amelanchier alnifolia</i>	20	2.2	90.4	New Growth	
9.	<i>Prunus</i> sp.	15	1.6	92.0		
10.	<i>Carex</i> (rosen?)	14	1.5	93.5	L	Green leaves taken
11.	<i>Balsamorhiza sagittata</i>	10	1.1	94.6	L	
12.	<i>Arctostaphylos patula</i>	9	1.0	95.6	New Growth	
13.	<i>Artemisia tridentata</i>	6	0.7	96.3	F(L)	Flower stalk taken
14.	<i>Poa sandbergii</i>	6	0.7	97.0	LFS	Plant dry
15.	<i>Achillea millefolium</i>	6	0.7	97.7		
16.	<i>Madia</i> sp.	4	0.4	98.1		
17.	<i>Gayophytum</i> sp.	4	0.4	98.5		
18.	<i>Monardella</i> sp.	4	0.4	98.9		
19.	<i>Stipa elmeri</i>	3	0.3	99.2	LFS	Plant dry
20.	<i>Cercocarpus ledifolius</i>	3	0.3	99.5		
21.	<i>Ratibonum</i> (nuttall?)	1	0.1	99.6		
22.	<i>Astragalus purshii</i>	1	0.1	99.7		
23.	<i>Rosa</i> sp.	1	0.1	99.8		Whole plant taken
24.	<i>Erigeron inornatus</i>	1	0.1	99.8		
25.	<i>Linum lewisii</i>	1	0.1	99.9	LFS	
26.	<i>Stipa lemanii</i>	1	0.1	100.0	LFS	

RR
Pine Ranges
Burgess Spring

L. R. SHORT
October 22, 1936

PLANT SPECIES GRAZED BY CATTLE
September 22 - 24, 1936

Rank	Plant Species	Times Plant Taken			Part of Plant Taken	Remarks
		Total No.	% of Total	Cumulative %		
1	<i>Festuca idahoensis</i>	238	58.8	58.8	L(Basal)	
2	<i>Sitanion hystrix</i>	61	15.1	73.9	L(Basal)	
3	<i>Wyethia mollis</i>	37	9.1	83.0	L	
4	<i>Bromus marginatus</i>	24	5.9	88.9		
5	<i>Arctostaphylos patula</i>	11	2.7	91.6		
6	<i>Carex (rosen?)</i>	10	2.5	94.1	L	
7	<i>Ceanothus prostratus</i>	8	2.0	96.1		
8	<i>Chrysothamnus</i> sp.	5	1.2	97.3	LF	Flowers & Tips
9	<i>Purshia tridentata</i>	2	.5	97.8		
10	<i>Amelanchier alnifolia</i>	2	.5	98.3		
11	<i>Lupinus calcaratus</i>	2	.5	98.8	LFS	
12	<i>Gayophytum</i> sp.	2	.5	99.3	F	Tip
13	<i>Cercocarpus ledifolius</i>	1	.25	99.5		
14	<i>Verbascum</i> sp.	1	.25	99.8		
15	<i>Stipa elaeagi</i>	1	.25	100.0	LFS	