

Meadow Grazing—1: A Comparison of Gains of Calves and Yearlings When Summering on Native Flood Meadows and Sagebrush-Bunchgrass Range¹

C. S. COOPER, R. R. WHEELER, AND W. A. SAWYER

Agronomist, Field Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture; Research Assistant in Animal Husbandry, Oregon Agricultural Experiment Station; and Superintendent, Squaw-Butte Harney Experiment Station of the U. S. Department of Agriculture and Oregon Agricultural Experiment Station, Burns, Oregon

The number of cattle that a ranch operation may support is dependent upon the forage resources in the immediate area. In the sagebrush-bunchgrass country of eastern Oregon cattle are normally summered on the federal range which is administered by the Bureau of Land Management. During the winter the cattle are fed hay cut from native flood meadows. There are about 350,000 acres of native flood meadows in Oregon which are mostly privately owned. These meadows are continuously irrigated by wild flooding with early spring runoff from surrounding watersheds for periods ranging from six to twelve weeks. The forage produced upon them is predominantly composed of rushes (*Juncus spp.*) and sedges (*Carex spp.*).

During the past years the number of cattle permitted to run on federal range has been generally

decreased in an effort by range managers to obtain more proper utilization of the forage and thereby preventing further range deterioration. A ranch operator faced with a reduction in the use allowed on federal range must either decrease the size of his operation or look for an alternative forage resource. The grazing of native flood meadows seems to offer such an alternative resource, particularly in view of the reported increase in production from these areas with nitrogen fertilizer

(Cooper, 1955). A number of ranchers are considering the possibility of fertilizing part of their meadows to provide necessary hay supplies and grazing the remainder.

Information is presented in this paper on gains of calves for four years and gains of yearling steers for one year while grazing flood meadows, with a comparison of gains of calves and yearlings on sagebrush-bunchgrass range.

Management and Experimental Procedure

The data presented on calf gains on the meadow were taken during 1952-1955, inclusive, from calves of a small breeding herd, consisting of about thirty cows, carried on the meadow unit of the Squaw Butte Station. Calf weights for comparative purposes were taken from a like number of calves summering on the range unit of the Station. The two sets of calves were paired as closely as possible by birth date and sex.

In 1954 two groups of ten yearling steers were randomly selected. One group was grazed on the meadow and the other with the herd on the range.



FIGURE 1. Cattle summering on a native flood meadow in eastern Oregon. Meadows such as these are irrigated by natural flooding with early spring runoff from surrounding watersheds. The vegetation on these meadows is composed of sedges and rushes.

¹A contribution from the Squaw Butte-Harney Range and Livestock Experiment Station, Burns, Oregon, which is jointly operated by the Agricultural Research Service, United States Department of Agriculture and Oregon Agricultural Experiment Station. (Formerly jointly operated and financed by the Bureau of Land Management, USDI, and Oregon Agricultural Experiment Station). This report is published as Technical Paper No. 1002, Oregon Agricultural Experiment Station.

Animals on meadow pasture grazed freely until about August 1 each year. From August 1 to September 15 they consumed bunched hay cut from the pasture and meadow aftermath. Animals on the range were removed to the meadow on September 15 and grazed on meadow aftermath. Cows and calves on range were supplemented from July 20 to September 15 in 1954 and 1955 with a cottonseed meal-salt mix to provide an intake of approximately two pounds of cottonseed meal per cow per day.

Cows and calves were individually weighed at approximately monthly intervals from the beginning of the grazing season to weaning. Steers were also weighed individually at monthly intervals, but weighing was terminated on September 15. All weights were taken after the animals had been without feed and water overnight (approximately 12 hours). During the shrinking period calves remained with the cows. Only calf and steer weight data are considered in this report. These data were subjected to statistical analyses.

Results and Discussion

Calf weight gains

The average daily gains of calves from birth to weaning were computed for three periods, which were approximately May 1 to July 1, July 1 to September 15, and September 15 to November 15 (Table 1). The first period corresponds to the period of green grass on range, the second to the period of dry mature grass, and the third to the period in which both groups grazed dry meadow aftermath.

In all years calves on meadow gained more than calves on range.

The better performance during the first period is likely due to greater milk production of the dams resulting from the greater availability of forage on meadows. During the second period, July 1 to September 15, range herbage loses much of its green color and rapidly loses protein. The crude

Table 1. Average daily gains of calves on meadow or range by periods during each of four years.

Pasture	May 1 to	July 1 to	Sept. 15 to	Birth to	
	July 1	Sept. 15	Nov. 15	Weaning	
	lb.	lb.	lb.	lb.	
1952	Meadow	1.73	1.76	.69	1.44
	Range	1.30	1.07	.35	.92
	Diff.	.43	.69	.34	.52
1953	Meadow	2.04	1.96	.82	1.70
	Range	1.85	1.59	.97	1.50
	Diff.	.19	.37	-.15	.20
1954	Meadow	1.96	1.96	.87	1.51
	Range	1.75	1.53	.86	1.34
	Diff.	.21	.43	.01	.17
1955	Meadow	1.95	1.77	.93	1.61
	Range	1.81	1.51	.56	1.36
	Diff.	.14	.26	.37	.25
4 Yr. Avg.	Meadow	1.92	1.86	.83	1.56
	Range	1.68	1.42	.68	1.28
	Diff.	.24	.44	.15	.28

protein content of range grass declines to a level of about 4 percent by August 1, and continues to decline². In contrast, meadow herbage contains about six percent crude protein on August 1, and when pasture is cut and the forage bunched, no further decline in crude protein content occurs². However, as calves on meadow continued to outgain calves on range in 1954 and 1955, when the latter and their dams were supplemented, it appears that most of the differences may be attributed to a greater quantity of readily available forage on meadows. The main limiting factor affecting gains of range calves in late summer, therefore, appears to be energy and its effect on milk production of dams.

During the third period in 1952 and 1955, when cows and calves from both groups grazed meadow aftermath in common, calves which had been summered on meadow

continued to gain more than those summered on range. The difference is most likely due to a more sustained milk flow of dams. The reason why a like response was not obtained in the other years is not known.

The weaning weights of both groups followed the same pattern during the four years and were highest in 1954, lowest in 1952, and intermediate in 1953 and 1955 (Table 2). The difference in weaning weight of calves in 1952 was much larger than in the other three years. Several factors serve to explain this difference. Calves grazed on meadow in 1952 weighed an average of twelve pounds more at birth than those grazed on range, whereas in the other three years birth weights were quite comparable. It has been shown that each additional pound of birth weight of a calf is associated with about two additional pounds of weight at weaning (Sawyer, *et al.*, 1949). On this basis calves on meadow could be expected to weigh 25

²Unpublished data, Squaw Butte-Harney Experiment Station, Burns, Oregon.

Table 2. Weaning weights of calves summering on meadow or range in each of four years.

Summer Pasture	Year				Avg.
	1952	1953	1954	1955	
	lb.	lb.	lb.	lb.	lb.
Meadow	388	452	465	418	430
Range	267	406	412	369	364
Difference	121	46	53	49	66

pounds more at weaning as a result of higher birth weights. As all cows were treated alike during fall and winter, the difference in birth weight in 1952 appears to be a reflection of the summer nutrition pattern the preceding year (1951) in which the range was extremely dry. Meadows depend upon spring runoff for moisture supply and are not as readily affected by a prolonged drought during the growing season. Apparently the poor growing season of 1951 adversely affected calf birth weights of range cows in 1952.

The differences between groups in 1954 and 1955, when cows and calves on range were supplemented, was considerably less than in 1952 but is comparable to 1953. The difference in 1952 is higher than should normally be expected due to smaller calves of the range group, and the difference in 1953 is less than should be expected due to an extremely wet growing season on range.

Yearling gains

The average daily gains of yearlings in 1954 are presented for two periods—April 20 to July 10, and July 10 to September 10 (Table 3). Yearlings on range gained slightly more than those on meadow prior to July 10; however, the difference was not statistically significant. After July 10 steers on meadow gained 1.2 pounds per day more than steers on range. The

better performance of steers on meadow during the last part of the grazing season is due to a greater quantity of forage of a higher quality.

Total average gains for the entire grazing season were 244 pounds for steers on meadow as compared to 180 pounds for steers on range.

Discussion

The data presented show that cows and calves, and yearlings may be successfully grazed on native flood meadows and better performance is obtained than on range.

In making a decision on whether or not one should graze meadows a number of factors may be considered.

It is estimated that an acre of good meadow will carry a yearling, or that two acres will carry a cow and calf through a five months grazing period. On this basis each acre produced 244 pounds of yearling beef, or, at 17 cents a pound, grossed a return of \$41.00 per acre. On a hay yield

basis each acre would produce approximately one ton of hay or a gross return of about \$25.00 an acre. Clearly, utilizing the meadow by grazing is profitable at current hay and fertilizer prices.

It is not known whether nitrogen fertilizer will increase grazing capacity in the same ratio as it does hay yields. Controlled experiments are being initiated to obtain this information. It is known that 80 pounds of nitrogen will increase hay yields approximately one ton per acre (Cooper, 1955). The opportunity therefore exists to release meadow acres from hay production to grazing. If an operator producing 400 tons of hay on 400 acres, fertilized 200 acres with 80 pounds of nitrogen, he could expect to produce 400 tons on 200 acres. This would release 200 acres for pasture. The cost of fertilizer per acre would be about \$13.50, including application costs. If each of the released acres produced 244 pounds of beef valued at \$41.00, the net return from the use of fertilizer is \$27.50 per acre on 200 acres.

The practice of grazing meadows is dependent upon limited range forage resources. With present charges of 15 cents per AUM for grazing federal range, one could not expect to graze meadows on a competitive basis. However, when the range forage resource is limited, meadows offer a good alternative forage resource.

LITERATURE CITED

- COOPER, C. S. 1955. More mountain meadow hay with fertilizer. Ore. Agr. Exp. Sta. Bull. 550. 7 pp.
- SAWYER, W. A., J. C. R. LI, AND RALPH BOGART. 1949. The relative influence of age of dam, birth weight, and size of dam on weaning weight of calves. Mimeo. Rept. Squaw Butte Exp. Sta., Burns, Oregon.

Table 3. Average daily gains of yearling steers on meadow or range by periods in 1954.

Pasture	April 20	July 10
	to July 10	to Sept 10
	lb.	lb.
Meadow	1.62	1.84
Range	1.76	.65
Difference	-.14	1.19