Better Cattle Distribution Through the Use of Meal-Salt Mix

FRED N. ARES

Range Conservationist, Southwestern Forest and Range Experiment Station,[1] *Tucson, Arizona*

A BASIC principle of good range management is distributing livestock so that utilization of forage will be as uniform as possible on all parts of the range. Cattle naturally tend to congregate near watering places and on level or other favored areas with the result that unless provisions are made for distribution, parts of the range are too heavily grazed, parts grazed to the proper degree, and parts receive little or no grazing use.

Many methods are used to encourage more uniform cattle grazing. Fencing into small range units and developing watering facilities are effective but limited by economic considerations. Placing salt in little used areas, periodic closing of watering places, and herding and riding are helpful practices. Yet, because of the natural grazing habits of cattle, and the rough character of most rangelands, the pattern of grazing use is seldom fully satisfactory.

A possible new tool for controlling cattle distribution is provided by the cottonseed meal-salt mixture which is becoming a popular and widely used supplemental range feed especially in the Southwest. In contrast to other concentrates which must be hand fed, usually in corrals, the meal-salt mix can be fed free choice on the open range. This is because the salt content can be varied to regulate the amount of supplement consumed by each animal. Cattle are attracted by the cottonseed meal and by judicious placement, the mix offers great possibilities for drawing cattle into areas that otherwise would receive little use.

The consumption of large amounts of salt can be toxic or even fatal to cattle especially if water is restricted. Controlled tests by Cardon et al (1951) showed that a single dose of 2 pounds of salt resulted in salt-poisoning symptoms in a 950-pound cow within 8 hours, when water was withheld. They report that the animal undoubtedly would have died had not the rumen been washed free of salt 12 hours after the salt was administered. One month later, after the animal had fully recovered, her condition remained normal following a similar dosage of salt but with an ample water supply. Pregnant cows maintained for seven months on a diet which contained one pound of salt per day but with free access to water showed no ill effects. Calving was normal and the calves were healthy.

Some death losses of cattle on the range have been ascribed to excessive salt and further indicate the need to consider the possibility of salt poisoning in relation to water supply. In actual practice, however, many thousands of cattle are being fed various meal-salt mixes under a variety of range conditions with no ill effects. Cattle normally consume no more than one-half pound of salt per day when fed meal-salt mix free choice on the range, and it appears that the supplement might be used to enhance the distribution of cattle with little likelihood of receiving toxic doses.

[1] Maintained by the Forest Service, U. S. Department of Agriculture, for Arizona, New Mexico, and west Texas, with headquarters in Tucson, Arizona.

Plan of the Study

To test the effectiveness of meal-salt mix in controlling distribution of cattle, a study was initiated in 1950 on the Jornada Experimental Range, a unit of the Southwestern Forest and Range Experiment Station located in Dona Ana County in south central New Mexico. Two comparable pastures, designated as pastures 9 and 10, and typical of the valuable and extensive black grama range type of southern New Mexico, were used. Almost all of the forage is provided by black grama, and in accordance with the growth requirements of this valuable grass, grazing is confined to the winter-spring period, November through June. Supplemental feed in the form of cottonseed meal-salt mix is made available during the period the cattle are in the pastures. Protein content of the forage is somewhat below the minimum requirements of the cattle during late fall and winter, and the supplemental feed is taken readily. Its consumption drops rapidly after early April in most years when some growth of sand dropseed and a variety of weeds provide some green forage with a high protein content.

The pastures are level mesa range, and all parts are easily accessible to livestock. Permanent water is provided by wells located in the extreme north and south limits. In addition, pasture 10 has a small temporary tank which is usable in the early fall months. The maximum distance from water is three miles and the average maximum for both pastures about 2¼ miles. The area of pasture 9 is 3,172 acres and of pasture 10, 7,172 acres.

Pasture 9 was stocked with yearling heifers and pasture 10 with yearling steers in the 1950 grazing year. This was necessary because not enough animals of either sex were available to stock both pastures, and because it is not desirable to mix the two classes of yearlings. Any differences due to different grazing habits and gaining ability between the classes of livestock were compensated by reversing the stocking arrangement in the second year of the study. In the 1951 grazing year, pasture 9 was stocked with steers and pasture 10 with heifers. Steers were sold in the spring and other cattle were grazed on the steer pasture through the remainder of the grazing year. Weight records were made of both the steers and heifers at the time of the steer sale.

The supplemental ration used was approximately 80 percent meal and 20 percent salt. This proportion was selected in order to regulate the daily consumption at about 1½ pounds of meal per head. The low salt content also increased the attractiveness of the mix and decreased the possibility of poisoning.

To determine the effectiveness of the meal-salt ration in controlling distribution of cattle, the study was started by placing feeding sites in pasture 9 both at and away from water, and away from water, only, in pasture 10. These feeding methods were reversed the second year of the test. Thus, in pasture 9, eight feeding sites, two at water and six away from water, were established in 1950. In 1951, a total of seven sites was used in this pasture, all from ½ mile to 1½ miles away from water. For pasture 10, seven sites were used in 1950, ranging from ¾ mile to 3 miles from water. In 1951, nine sites were used, two of which were at water and the others at the same location used the year before.

The reversal of feeding methods was used to balance such factors as the different sizes and shapes of the pasture areas, travel distances to water, and the segregation of steers and heifers.

Other factors which affect distribution of livestock are rainfall and forage growth. Rainfall data were collected from five rain gages, two in pasture 9 and three in the

larger area of pasture 10 (Table 1). Annual rainfall for the test period was only 74 percent of the long-time average for the pastures in which supplement was placed at and away from water and only 69 percent of average for the pastures in which the mix was placed at water only. However, seasonal rainfall, from July through September, was only slightly below average in both pastures, and because of favorable timing, was effective for forage growth. Summer forage yield, which makes up most of the year's production and must carry the herd through until the start of growth the following summer, was slightly above average for both years.

TABLE 1

Annual and seasonal rainfall for pastures 9 and 10, Jornada Experimental Range for grazing years 1950 and 1951

PASTURE NUMBER	YEAR	TOTAL RAINFALL	
		Annual Oct. 1–Sept. 30	Seasonal July 1–Sept. 30
		Inches	*Inches*
9	1950	5.76	4.07
10	1951	7.50	4.83
Average, fed at and away from water.		6.63	4.45
10	1950	6.51	4.51
9	1951	5.78	3.77
Average, fed at water only.....		6.15	4.14

Precipitation subsequent to the summer rains often influences distribution of cattle by causing fresh growth of winter weeds and grasses which is eagerly sought by cattle. During the test period, however, winter and spring growth was not a factor in livestock distribution.

The pastures were stocked as closely as possible to the grazing capacity as determined by a forage inventory completed each year just before the yearlings were placed in the pastures. In using the forage inventory to set the stocking rate it was recognized that some areas near water would be too heavily grazed while more remote parts of the pastures would not contribute their full share of forage. Average stocking of pasture 9 was 109 head for the 2 years of the test, and for pasture 10, 145 head.

Utilization measurements were made at the close of the grazing year, using paced transects. The utilization information provided the basis for mapping the pastures into use zones to show grazing pattern. In these use zones "light" expresses a degree of grazing when less than 30 percent of the total herbage is removed; "proper" when 30 to 49 percent is taken; "heavy" when 50 to 69 percent is grazed; and "excessive" when over 70 percent of the total volume is grazed. These use standards have been developed for black grama on loose sandy soils such as occur in the test pastures.

The determination of the actual use that had been made of the pastures when grazing was terminated also provided a check of the accuracy of the forage inventory, and correctness of the stocking rate. It was found that in the feeding at and away from water the average stocking for both pastures was about 4 percent below estimated capacity. The 2-year average rate of stocking for out-station feeding tests was approximately 11 percent below estimated capacity.

Consumption records of the meal-salt mix were maintained to determine if out-station feeding would reduce the amount of the ration eaten. Where the supplement was placed both at and away from water, separate records were maintained of the amount of mix used at each location.

Use Pattern Improved by Out-Station Feeding

The tests indicate that the out-station feeding of the meal-salt mix is superior to

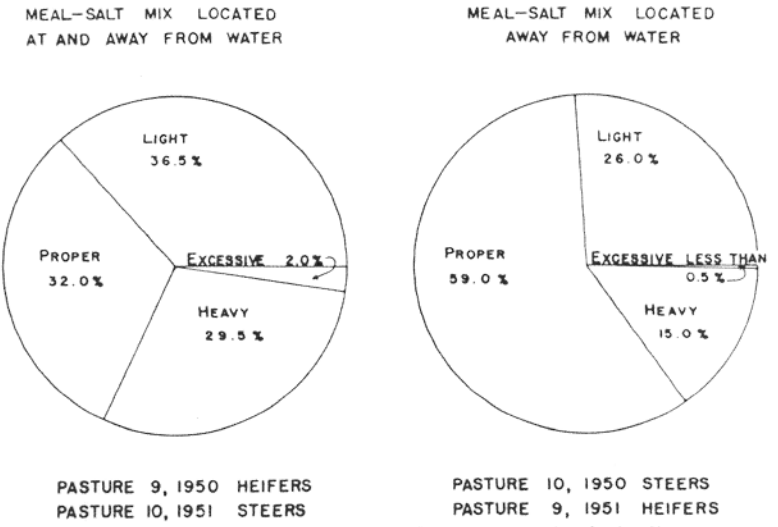

FIGURE 1. Comparative patterns of grazing use from the meal-salt feeding tests.

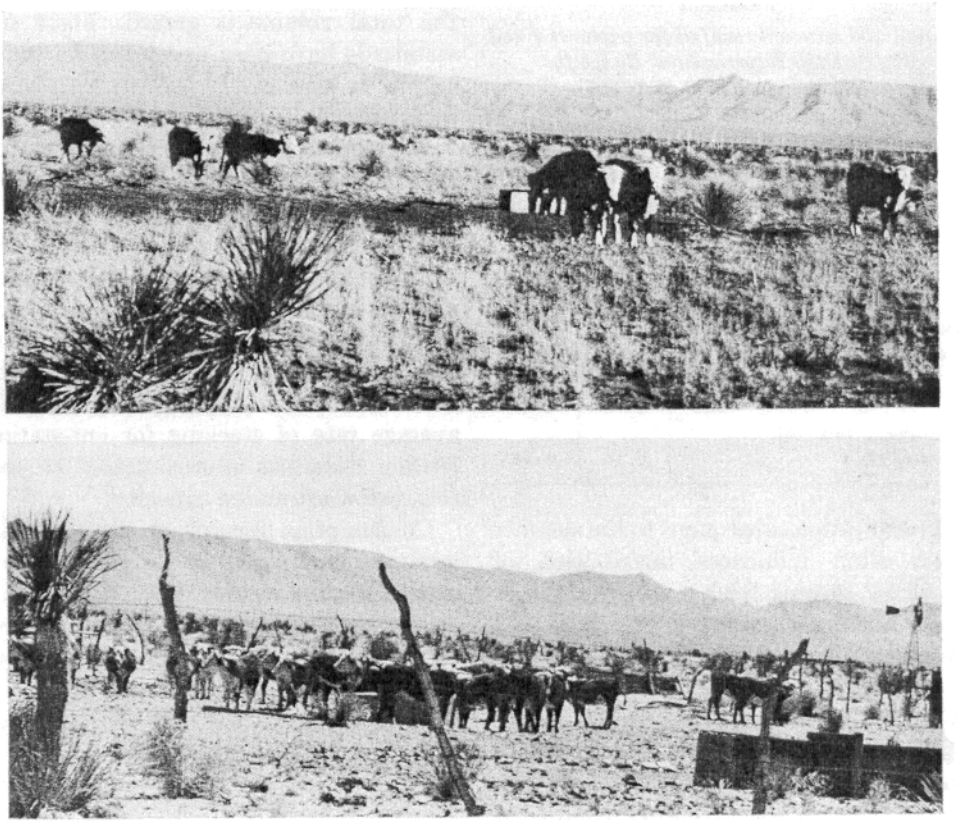

FIGURE 2. MEAL-SALT MIX CAN BE EFFECTIVE IN IMPROVING CATTLE DISTRIBUTION ON THE RANGE

Upper—Locating feeding sites near water increased the tendency for cattle to congregate and intensified the excessive use of the surrounding range. *Lower*—Feeding sites in areas which otherwise would be little used attracted the cattle to graze from 1½ to 3 miles from water.

feeding both at and away from water for improving livestock distribution (Fig. 1). Feeding away from water, only, as compared to feeding at and away from water, improves the pattern of grazing use by (a) essentially eliminating the small area of excessive use, (b) reducing the heavy-use zone by approximately half, (c) increasing the properly used area by 84 percent, and (d) reducing the area of light or no use by 29 percent. Thus, the area of overuse which damages the range, and the area of underuse which wastes forage were lessened, while the area used to a degree that would yield the most forage and yet maintain the valuable grasses was increased (Fig. 2).

In feeding at and away from water most of the supplemental feed, about 80 percent, was taken from the troughs located at water. The out-station sites were not very effective in attracting the yearlings as long as the mix was available at water. This resulted in increased trampling and local overgrazing. The practice of feeding the meal mix entirely at water would have an even greater detrimental effect on distribution of livestock grazing.

The improvement in distribution accomplished by feeding away from water was obtained with no injurious effect on the animals. Cattle being fed away from water were closely watched as some of the feeding sites were as far as 3 miles from water. Observations failed to reveal any traces of "salt poisoning" or other harmful effects. The low proportion of salt in the meal doubtless reduced the hazard, yet the mix contained enough salt to effectively regulate its consumption. After leaving the feeding stations, the cattle did not travel straight from salt to water, but continued to graze in the vicinity. This agrees with the findings of Bentley (1941), who showed that on California bunchgrass ranges cattle salted away from water spent an average of 7 hours and 40 minutes in going to water after leaving the salt ground.

TABLE 2

Comparative weight gains obtained from two methods of feeding meal-salt mix, Jornada Experimental Range

PASTURE NO.	GRAZING YEAR	AVERAGE TOTAL GAIN	AVERAGE DAILY GAIN	TOTAL FEED CONSUMED	DAILY RATION	GAIN PER POUND OF FEED
		Lbs. per head	*Lbs. per head*	*Lbs. per head*	*Lbs. per head*	*Lbs.*
9	1950	57.1	0.46	247	1.99	0.23
10	1951	51.2	.32	289	1.85	.17
Average, fed at and away from water		54.1	.39	268	1.92	.20
10	1950	22.5	.17	244	1.88	.09
9	1951	44.2	.27	241	1.48	.19
Average, fed away from water, only		33.3	.22	242	1.68	.13

Better Weight Gains Produced by Feeding at and Away from Water

An average of 0.17 pound per head greater daily weight gain at the time the steers were sold resulted from feeding the meal-salt mix at and away from water as compared with the out-station feeding (Table 2). The consumption of the supplement was also greater, but not proportionately so, resulting in more efficient weight gains per pound of feed used. Gain

per pound of feed averaged 0.07 pound or about 35 percent more than in the out-station feeding.

These findings are in accord with expectations. Maximum rate and efficiency of gain would result if the yearlings obtained all of their nutrients at water and had to expend no energy in foraging. In such a case the meal-salt mix would provide most of the ration and could not be considered a range supplement. The operation would approach essentially that of a feed lot.

The objective of sound range livestock operations is twofold; to maintain and efficiently use the range, and at the same time maintain normal growth and condition of animals. The need for and value of range supplements varies with weather and forage conditions, but on most southwestern ranges some supplements are desirable. During the fall-winter-spring period heifers wintered with no supplements lost an average of 14.2 pounds per head in 1950 and gained only 16.4 pounds per head in 1951. This study indicates that meal-salt mix placed away from water will not only favor uniform grazing but will also promote satisfactory growth and development of yearling steers for market and bring replacement heifers through the winter in good thrifty condition.

Summary

Trials conducted on the Jornada Experimental Range in southern New Mexico show that out-station feeding of meal-salt ration can be used as an effective tool for obtaining more uniform grazing use of the range by cattle. In these self-feeding tests the supplement was placed at and away from water in one pasture and away from water only in a second; the feeding method was reversed in the test pastures the second year.

Results of the 2-year test show a marked improvement in the use pattern with out-station feeding. The proper-use zone of the test pastures was increased 84 percent while the too heavily used zones near water were reduced by 52 percent. The lightly used area was reduced by 26 percent. Feeders made satisfactory weight gains and wintered in good condition under both methods of feeding, but feeding at water, only, resulted in greater supplemental feed consumption, and greater weight gains. The dual purpose of range feeding, to maintain condition and growth of the feeders and at the same time to secure most efficient use of range forage, was best realized by the out-station feeding.

Throughout the 2-year feeding test no harmful effects were observed in feeding cattle the meal-salt mix at considerable distances from water.

LITERATURE CITED

Bentley, J. R. 1941. Automatic recording of salting and watering habits of cattle. Jour. Forestry 39(10): 832–836.

Cardon, B. P., E. B. Stanley, W. J. Pistor and J. C. Nesbitt. 1951. The use of salt as a regulator of supplemental feed intake and its effect on the health of range livestock. Ariz. Agr. Expt. Sta. Bul. 239.