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The Use of Meal-Salt Mix for Better Distribution of Cattle

By FRED N. ARES

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 are 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.

New Tool Available

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 al¹ showed

that a single dose of two pounds of salt resulted in salt-poisoning symptoms in a 950-pound cow within eight 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-

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¹Cardon, 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. Univ. Ariz. Agr. Expt. Sta. Bul. 239.

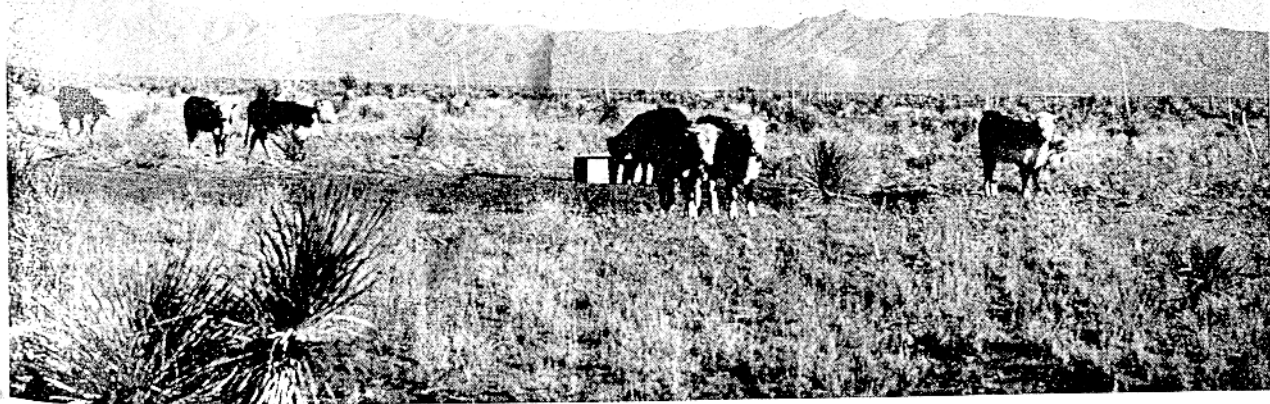


Figure 2.—Meal-salt mix can be effective in improving cattle distribution on the range. Upper: Locating feeding sites near water increased the tendency for cattle to congregate and intensified the excessive use of the surrounding range. Lower: Feeding sites in areas which otherwise would be little used attracted the cattle to graze from one and one-half to three miles from water.

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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.

Plan of the Study

To test the effectiveness of meal-salt mix in controlling distribution of cattle, a study was initiated on the Jornada Experimental Range¹ in 1950. 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 two and one-fourth 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 per cent meal and 20 per cent salt. This proportion was selected in order to regulate the daily consumption at about one and one-half pounds of meal per head. The low salt content also increased the attractiveness of the mix and decreased the pos-

sibility 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 one-half mile to a mile and one-half away from water. For pasture 10, seven sites were used in 1950, ranging from three-fourths mile to three 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 gauges, two in pasture 9 and three in the larger area of pasture 10 (table 1). Annual rainfall for the test period was only 74 per cent of the long-time average for the pastures in which supplement was placed at and away from water and only 69 per cent 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.

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 two years of the test, and 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 the grazing pattern. The determination of the actual use that had been made of the pastures when grazing was termi-

Table 1.—Annual and seasonal rainfall for pastures 9 and 10, Jornada Experimental Range, for grazing years 1950 and 1951.

Pasture No.	Year	Total Rainfall	
		Annual Oct. 1-Sept. 30 (Inches)	Seasonal July 1-Sept. 30 (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

nated 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 per cent below estimated capacity. The two-year average rate of stocking for out-station feeding tests was approximately 11 per cent 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 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 per cent, and (d) reducing the area of light or no use by 29 per cent.⁴ 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).

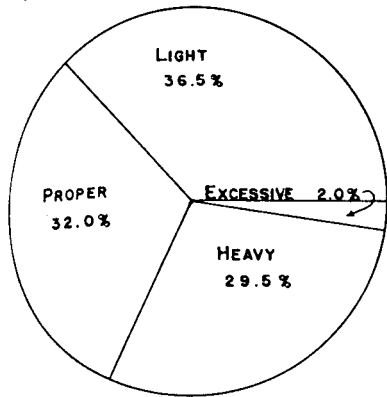
In feeding at and away from water most of the supplemental feed, about 80 per cent, was taken from the troughs located at water. The out-station sites were not very effective in attracting the yearlings as long as the mix was available at water. This resulted in increased trampling and local overgrazing. 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 wa-

⁴In these data "light" use 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.

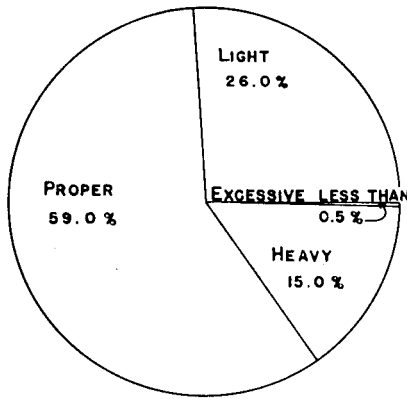
¹A unit of the Southwestern Forest and Range Experiment Station located in Dona Ana County in south central New Mexico.

MEAL-SALT MIX LOCATED AT AND AWAY FROM WATER



PASTURE 9, 1950 HEIFERS
PASTURE 10, 1951 STEERS

MEAL-SALT MIX LOCATED AWAY FROM WATER



PASTURE 10, 1950 STEERS
PASTURE 9, 1951 HEIFERS

Figure 1.—Comparative patterns of grazing use from meal-salt feeding tests.

ter 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 away as three 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,⁶ who showed that on California bunchgrass ranges cattle salted away from water spent an average of seven hours and 40 minutes in going to water after leaving the salt ground.

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 per cent more than in the out-station feeding.

⁶Bentley, J. R., 1941. Automatic recording of salting and watering habits of cattle. Jour. For. 39 (10): 832-836.

Table 2.—Comparative weight gains obtained from two methods of feeding meal-salt mix, Jornada Experimental Range.

Pasture No.	Grazing Year	Average total gain (Lbs./head)	Average daily gain (Lbs./head)	Total feed consumed (Lbs./head)	Daily ration (Lbs./head)	Gain per pound of feed (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

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 per cent while the too heavily used zones near water were reduced by 52 per cent. The lightly used area was reduced by 26 per cent. 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 two-year feeding test no harmful effects were observed in feeding cattle the meal-salt mix at considerable distances from water.

New Plan Agreed to In Affosa Campaign

Secretary of Agriculture Benson approved new agreements to eradicate foot-and-mouth disease in Mexico drawn up at a meeting in Mexico City on July 28-29 after a review by the USDA Industry Advisory Committee on Foot-and-Mouth Disease, which met in Washington Aug. 2.

The new plan calls for full cooperation with the livestock owners in the orderly control of all susceptible animals in the quarantined zone. There are an estimated 10,000 cattle, sheep, swine and goats involved.

The agreement calls for the use of the most practical methods in the evacuation of the animals consistent with the need for absolute safety in preventing spread of the disease. When no more susceptible animals remain in the infected area, the commission will supervise complete disinfection of all premises, including the burning of pastures. Then test animals will be placed in the area under observation or commission veterinarians to make certain that the virus has been eradicated. The infected area, near Gutierrez Zamora, State of Vera Cruz, will remain under quarantine.

Members of the Committee attending the Aug. 2 meeting with representatives of the Department of Agriculture were Chairman Albert K. Mitchell, Albert, N. M., who on invitation from the Department participated in the joint commission negotiations; E. Ray Cowden, Phoenix, Ariz.; C. E. Weymouth, Amarillo, Tex.; J. Elmer Brock, Kaycee, Wyo.; Wayland Hopley, Atlantic, Iowa; W. S. Moscrip, St. Paul, Minn.; Thore Naaden, Bismarck, N. D.; Lyman Brewster, Birney, Mont.

Mr. Mitchell and Mr. Brock are past presidents of the American National Cattlemen's Association.