AFFECTING BEEF CATTLE DISTRIBUTION IN RANGELAND PASTURES WITH SALT AND WATER

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Summary

Water and salt are two of the tools most frequently used by livestock producers to encourage uniform use of forages by cattle across extensive rangeland pastures. The objective of this study was to evaluate the relative utility of salt and water manipulations for moving and holding cattle in specific portions of large pastures. When water was moved to distant and seldom used sectors of pastures, cattle moved to and remained near the newly placed water source. Cattle paid little attention to salt placement; they rarely returned to salt if water was moved to a new locale or seldom visited salt when it was moved to a distant location. Livestock producers can effectively control livestock distribution patterns in large pastures by either moving portable watering systems or closing and opening access to fenced water sources. While trace mineral salt is needed year round to rectify forage mineral deficiencies in cattle, there is little chance that salt placement can effectively correct serious livestock distribution problems under the conditions encountered in this study.

Introduction

To optimize income, livestock and forage producers typically strive to obtain uniform use of herbage over as much of their pastures as possible. Several of the problems associated with grazing animals in extensive settings, however, are related to uneven patterns of use across the landscape. In many environments, required elements like forage, water, minerals, shade, or resting areas are not uniformly dispersed about an area, and physiological constraints demand that herbivores center their activities around the most limited resource (Stuth 1991). Even when numbers of animals are matched with available herbage, mismanaged grazing may alter vegetation composition or damage sensitive resources where animals tend to congregate.

After fencing, water and salt are two of the most frequently used tools for affecting cattle distribution in large pastures. Cattle are obviously attracted to water in arid regions, but mixed results have been obtained with salt and mineral supplements. Ares (1953) found improved distribution and forage utilization after dispersing a cottonseed meal-salt mix, while Martin and Ward (1973) surmised that salt alone should not be expected to cure serious distribution problems. Others reported that salt had no influence at all on where cattle elect to forage (Bailey and Welling 1999). Sodium and chlorine are required elements for cattle, with lactating cows requiring about 0.10 percent sodium in their diets (Morris 1980). Chlorine requirements are not well established and chlorine deficiency is rare under normal conditions (Neathery et al. 1981, National Research Council 1996). Both sodium and chlorine are plentiful in soils of the western half of the United States, but most of our grasses contain insufficient salt to meet nutritional requirements of cattle (Ganskopp and Bohnert 2003).

The primary goal of this study was to evaluate the effectiveness of salt and water manipulations for altering cattle distribution in large (>2,000 acre) sagebrush/steppe pastures. This was accomplished by fitting cattle with Global Positioning System (GPS) collars to quantify their travels and activities while water and salt were provided at common or separate locations.

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Experimental Protocol

The research was conducted in the three largest (2,000+ acres each) pastures on the Northern Great Basin Experimental Range. Three herds of 40 Hereford X Angus cow/calf pairs simultaneously grazed each pasture in June and July with two cows in each pasture wearing GPS collars configured to acquire the animal's position at 20-minute intervals (Fig. 1, *inside front cover*). With this schedule, 72 positions were obtained for each animal each day. The collars also contained motion sensors that allowed us to determine whether cattle were resting or grazing at each locale. One of three treatments was applied to each pasture at weekly intervals. These included: 1) salt and water together at a central point, 2) water moved to a distant locale with salt remaining in its original location, and 3) salt moved to a distant point with water remaining at its original location. Cattle were herded to each new site whenever salt or water were moved. Data analyzed included average distance from cattle to salt, average distance to water, total distance traveled per day, daily resting and grazing times, and the location of their centers of activity.

Results and Discussion

Cattle moved their centers of activity further (1,541 yards) when water was moved in a pasture than when salt (1,094 yards) was moved (Fig. 2, *inside front cover*). On average, cattle stayed within about 1,274 yards of water regardless of the resource moved (Table 1). This suggests that they followed the water tank to its new locale and remained nearby. Whenever salt or water were moved, the average distance of cattle from salt always increased, again suggesting there was little inclination for cattle to remain near salt.

If salt and water shared a common locale, cattle were found within 250 yards of salt and water 191 and 192 times within a week, respectively. When water was moved away from salt, cattle were near water 284 times and within 250 yards of salt only twice. Distance traveled per day (average = 3.59 miles), grazing time (11 hours per day), and resting time (10.1 hours per day) were unaffected by movements of salt or water. This implied that cattle did not increase their travel or alter their time spent grazing when water and salt were separated.

Management Implications

The movement of portable stock tanks or closing access to specific watering points within pastures is very effective at altering the distribution patterns of beef cattle on our arid rangelands. Cattle do not simply travel to distant water and return to their habitual foraging locations, but they alter their distribution to remain in the vicinity of water. Control of water placement may be used to 1) assure more uniform use of forages across large pastures over time, 2) attract cattle to areas not habitually used, 3) temporarily lure cattle away from seasonally sensitive portions of a pasture such as over-utilized areas or sage grouse nesting or strutting grounds, and 4) facilitate the gathering of herds in large pastures. Separations of salt and water sources will not cause cattle to alter their grazing times or expend more energy traveling each day. Finally, salt appears to be ineffective at markedly altering cattle distribution and will most likely not rectify a large-scale livestock distribution problem on sagebrush/steppe rangeland.

Due to some seasonal and year-round mineral deficiencies within our forages, however, trace mineral salt should still be furnished to rangeland cattle on a year-round basis. Dispersal of mineral sources around a pasture will certainly not cause harm. Mineral intake, however, will probably be highest where salt is placed near watering points.

Table 1. Average distance of cattle from water and salt, distance traveled per day, time spent grazing and resting per day, and area covered per day when water and salt occurred at a common locale and when water or salt were moved to a distant area in pastures in June and July 1999 near Burns, Oregon.

	Treatment			
Variable	water & salt shared location	water moved to distant area	salt moved to distant area	water & salt separated
distance (yd) to water	1142_a	1078_a	1601_a	1340_a
distance (yd) to salt	1126_a	2209_b	1648_c	1928_{bc}
distance (mi) traveled per day	3.61_a	3.43_a	3.72_a	3.58_a
grazing time (hr/day)	10.7_a	10.8_a	11.3_a	11.0_a
resting time (hr/ day)	10.2_a	10.6_a	9.5_a	10.0_a
area (ac) covered per day	785_a	573_a	1055_a	812_a
shift of center of activity (yd)	--	1541_a	1094_b	--

Values within a row sharing a common letter are not significantly different.

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