South Dakota State University
Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

South Dakota Cow-Calf Field Day Proceedings, 1982

Animal Science Reports

1982

Repellent Effects on Distribution of Steers on Native Range

D. M. Engle
South Dakota State University

J. G. Schimmel

COW—CALF DAY

REPELLENT EFFECTS ON DISTRIBUTION OF STEERS ON NATIVE RANGE

D. M. Engle and J. G. Schimmel

Department of Animal and Range Sciences

COW-CALF 82-6

Summary

Poor distribution of livestock use over a range is a common limitation to proper and optimum use of many ranges. When the range as a whole is properly used, livestock typically overuse those areas that are especially attractive to them. Use of conventional distribution tools are sometimes inappropriate or ineffective in correcting livestock distribution problems. This study evaluated a commercially available big game repellent for deterring yearling steer use of preferred grazing areas.

Repellent sprayed areas had fewer cow chips ($P<.10$) 1 week following application on subirrigated range sites but not on silty range sites. In general, treatment did not deter occupation of yearling steers on preferred grazing areas around potholes.

Introduction

Proper use of a range, although dependent upon many factors, is often complicated by poor distribution of livestock. Animals naturally congregate at preferred locations. Cattle prefer accessible areas such as valley bottoms, low saddles between drainages, level benches, mesas and areas adjacent to water sources. Drainageways often receive additional run-in water from surrounding slopes, resulting in continuous season-long forage growth that attracts cattle in large numbers leading to overutilization. These same areas are sometimes critical habitat areas for wildlife or critical management areas for other uses. Areas which are steep, rough or distant from water are preferred less by cattle and are usually underused or unused (Mueggler, 1956; Cook, 1966). Overstocking of a range is commonly a result of nonuniform distribution in which the preferred use areas are overused and nonpreferred areas are underused. By obtaining more uniform use of an entire range, range condition may be improved on the preferred areas. This would allow increased stocking rates without attendant overuse of any one area on the range.

Salting, an inexpensive method to improve distribution of use in underused areas, may not be effective in reducing utilization near water (Martin and Ward, 1973). Water developments can be used effectively to control utilization, but this usually requires construction of additional watering facilities,

---

The authors express appreciation to The Nature Conservancy for providing the study area and to TNC staff who provided invaluable assistance in conducting the study. DEER-AWAY, Minneapolis, Minnesota, provided a portion of the repellent used in the study.

controlling access to water sources or hauling water. Fencing can be extremely effective in controlling access to preferred areas, either as drift fences or cross fences; but, like water developments, fences are usually a permanent and costly alternative. Roads and trails have been found to be effective in improving access and use of inaccessible areas (Workman and Hooper, 1968) but have not been shown to be of great benefit in averting overuse on preferred areas (Roath and Kruger, 1982). Generally, management practices to improve uniformity of grazing use have been designed to either prevent access to preferred areas or to attract animals to nonpreferred areas (e.g., water, salt, trails). To our knowledge, no studies have been conducted on practices or methods used to repel livestock from preferred use areas. This study was designed to test the effectiveness of a repellent to deter steer occupation of preferred areas.

Procedures

The study was conducted in 1982 on the Samual H. Ordway Memorial Prairie in north central South Dakota, about 6 miles east of Leola. The area is mesic Mixed Prairie in the glaciated pothole region of the Northern Great Plains. Topography of the area is gently undulating to undulating with slope steepness of 6% or less. Drainage patterns of these glacial till plains are not well developed so that the landscape is characterized by dry uplands interrupted by mesic, often ponded depressions (potholes). The average annual precipitation for Leola is approximately 19 inches with a single peak of 3.7 inches in June. Vegetation is dominated by a mixture of mid and tall grasses. Big bluestem (*Andropogon gerardii*), a warm season grass, and Kentucky bluegrass (*Poa pratensis*) are the dominant species of depressions. Green needlegrass (*Stipa viridula*) and Kentucky bluegrass, both cool season species, dominate the upland sites. In most years, the depressions provide additional run-in water for forage growth which results in continuous season-long heavy grazing pressure on these sites. Vegetation on upland sites usually matures early in the grazing season when soil water is depleted. Grazing pressure is concentrated on vegetation in depressions because of continuous forage growth throughout the summer.

The 400-acre study pasture was grazed with yearling steers at approximately .69 AUMs (animal unit months) per acre from May 28 to August 28. Steers weighed an average of 728 lb at the beginning and 789 lb at the end of the study period.

In mid-June, 13 potholes were selected for study. Each of the selected potholes contained ponded water. On July 20, a commercially available deer and elk repellent with an active ingredient of putrescent whole egg solids was applied in a liquid spray at about 15 gallons per acre to a narrow band of vegetation encircling six potholes. The treated vegetation was dominated by big bluestem, characteristic dominant of the subirrigated range site. Seven other potholes were selected for comparison and were not treated with the repellent.

Distribution of yearling steers was measured by "cow chip" counts on two belt transects (10 ft x 100 ft) located at each pothole. One transect was located along the edge of the pothole in the big bluestem dominated vegetation (subirrigated range site) and the other was located 82 ft up slope in green needlegrass-Kentucky bluegrass dominated vegetation (silty range site). Cow chip counts have been suggested as an indicator of relative time spent on various areas of a range (Mueggler, 1965; Cook, 1966).

Analysis of variance was performed on cow chip data by the General Linear Model Procedure in the Statistical Analysis System (Barr et al., 1979). The two basic hypotheses tested in this analysis were (1) the repellent was effective in controlling the grazing distribution of yearling steers and (2) the repellent was equally effective on subirrigated and silty range sites.

Results and Discussion

The overall least squares means of the number of cow chips counted for both treatments and both range sites were 7.04 on June 29, 6.62 on July 3, 2.65 on July 27, 3.88 on August 10 and 4.96 on August 23. The number of cow chips counted was not statistically different between treatments at any of the observation dates before and after the repellent application on July 20. Only 4.1% of the variation in cow chip numbers was accounted for by treatment.

The effect of repellent on occupation of yearling steers around prairie potholes as estimated by cow chip counts on subirrigated range sites and silty range sites are shown in figures 1 and 2, respectively. The effect of the repellent on the number of cow chips did not differ between subirrigated and silty range sites on July 3, July 29 and August 23. However, responses to repellent were different ($P<.10$) between range sites on July 27 and August 10. Repellent reduced the number of cow chips 1 week after application on the subirrigated range sites but not on silty range sites. However, silty range sites surrounding repellent-sprayed potholes had higher occupation by steers 3 weeks after application.

In conclusion, the repellent was at best marginally effective in reducing the occupation of yearling steers around prairie potholes. The dependence of response to treatment on range sites would suggest further study is needed on ranges where differences in occupation are greater between preferred and non-preferred areas.

Literature Cited

Barr, A. J., J. H. Goodnight, J. P. Sall and J. T. Helwig. 1979. A User Guide to SAS 79. SAS Institute, Gary, NC.

Cook, C. W. 1965. Factors affecting utilization of mountain slopes by cattle. J. Range Manage. 19:200-204.

Martin, S. C. and D. E. Ward. 1973. Salt and meal-salt help to distribute cattle use on semi-desert range. J. Range Manage. 26:94-97.

Mueggler, W. E. 1965. Cattle distribution on steep slopes. J. Range Manage. 18:255-257.

Roath, L. R. and W. C. Krueger. 1982. Cattle grazing and behavior on a forested range. J. Range Manage. 35:332-338.

Workman, J. P. and J. F. Hooper. 1968. Preliminary economic evaluation of cattle distribution practices on mountain rangelands. J. Range Manage. 21:301-304.

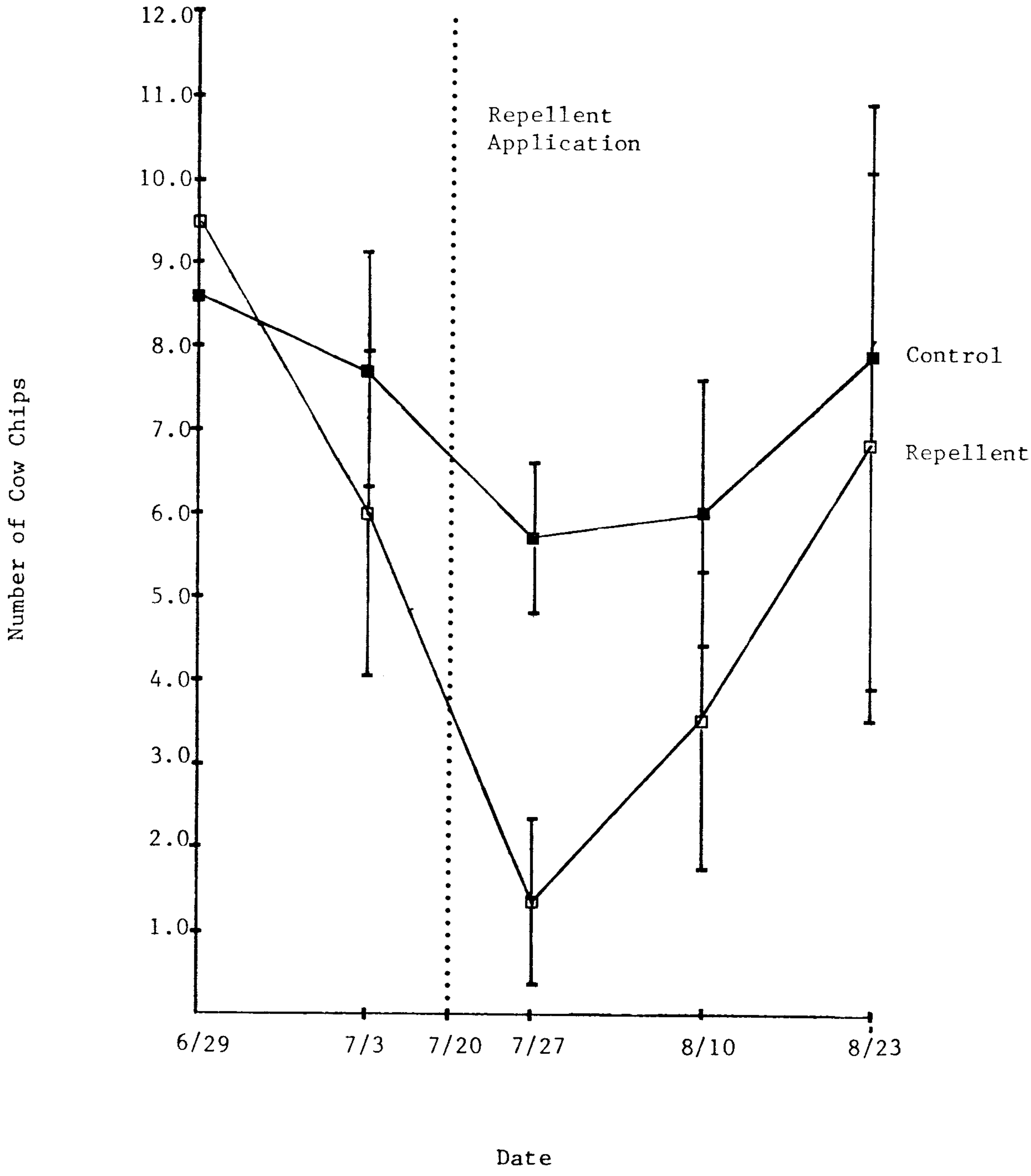

Figure 1. Least squares means of cow chip numbers on subirrigated range sites.

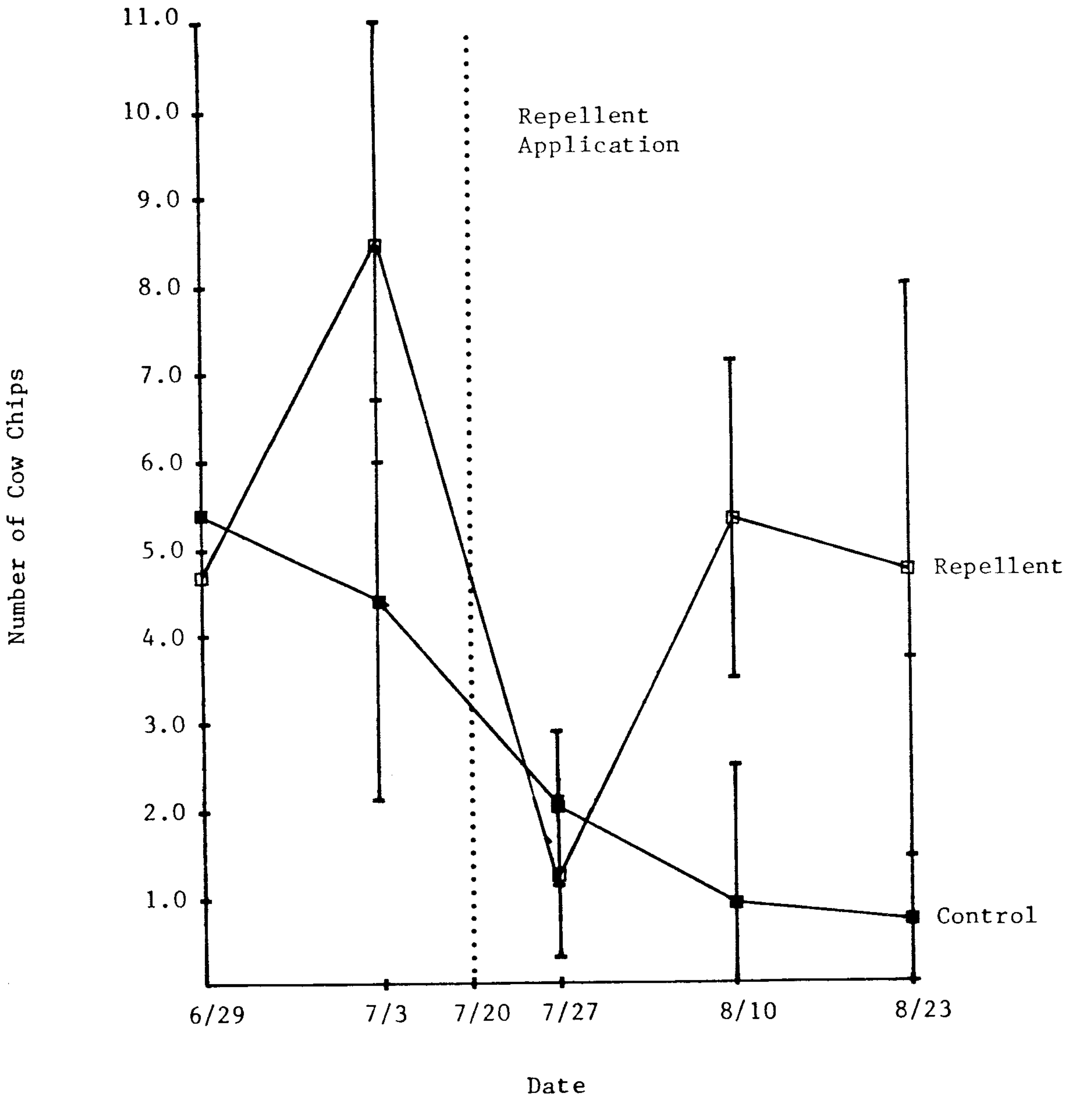

Figure 2. Least squares means of cow chip numbers on silty range sites.