

Differences in rangeland use patterns of cattle with contrasting stress coping styles

Wesley, R.L.¹, A.F. Cibils^{1*}, E.R. Pollak¹, S.H. Cox², J.T. Mulliniks¹, M. K. Petersen¹, and E. L. Fredrickson³

¹Department of Animal and Range Sciences, and ²Corona Range and Livestock Research Center, New Mexico State University, Las Cruces, NM 88003, USA. ³USDA-ARS Jornada Experimental Range, Las Cruces, NM 88003, USA. *Corresponding author: acibils@nmsu.edu

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Introduction

Individuals in most animal groups exhibit consistent behavioral differences within or across situations (feeding, mating, predator avoidance, etc.) that are known as *behavioral syndromes* (Sih et al. 2004). Proactive vs. reactive behavioral syndromes have been observed in many animal species and have been shown to influence the way in which individuals cope with stress (Koolhaas et al. 1999). Animals with proactive stress coping styles exhibit short attack latencies, active avoidance, defensive aggression, aggressive territorial control, and rigid routines. Reactive individuals, on the other hand, exhibit more conservative withdrawal responses, adapt quicker to change, and respond with immobility when confronted with danger (Koolhaas et al. 1999). To date, no research has been conducted that relates behavioral syndromes of rangeland-raised livestock with landscape use and animal performance. Our objective was to describe the relationships between coping style, patterns of rangeland use, and performance of rangeland-raised beef cows.

Materials and Methods

We conducted our study at a woodland-dominated site in central New Mexico (USA). Thirty six 3 year old cows were classified into groups on the basis of their stress coping style. Multiple criteria were used to classify individuals into such groups using Discriminant Function Analysis. Cows were tracked with Lotek® GPS collars (Lotek Wireless, Newmarket ON) for approximately 45 days during the calving seasons of 2006 and 2007. Eighteen cows were tracked in each season. Randomly selected calves were fitted with lightweight custom built GPS collars containing Garmin Legend® GPS units (Garmin Inc. USA) during the 2007 season. A number of cow and calf production parameters were measured on each individual.

Results

Compared to cows classified as having a proactive stress coping style (PR), reactive individuals (RE) tended to spend more time at water (means \pm SD; PR: 73 \pm 50 min/day; RE: 172 \pm 40 min/day), travel similar distances (PR: 5,323 \pm 636 m/day; RE: 5,194 \pm 587 m/day), explore smaller areas (PR: 21 \pm 3 ha/day; RE: 17 \pm 3 ha/day), and exhibit more concentrated search patterns as shown by the ratio of distance traveled to area explored in a day (PR: 264 \pm 44 m traveled : ha explored; RE: 313 \pm 73 m traveled : ha explored). Reactive individuals also had lighter body weights (PR: 955 \pm 72 kg; RE: 869 \pm 62 kg), longer postpartum anestrus periods (PR: 44 \pm 14 days; RE: 68 \pm 18 days), and weaned lighter calves (PR: 207 \pm 37 kg, RE: 179 \pm 20 kg). Collectively, cow-calf location relations measured in 2007 suggested that productivity of calves born to highly proactive cows was lower than that of calves born to less proactive animals. The former tended to spend less time close to their calves, to travel farther from their offspring and thus wean lighter calves than the latter.

Discussion and conclusion

Behavioral syndromes appeared to influence feeding site selection and landscape use patterns of cattle in this study. Selective culling on the basis of animal stress coping style could be used as a tool to achieve landscape use and livestock production management objectives on rangelands.

References

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