RANGELANDS

DIFFERENCES IN RANGELAND USE PATTERNS OF YOUNG COWS WITH DIFFERENT STRESS COPING STYLES: PRELIMINARY RESULTS

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THE STORY IN BRIEF: Individuals in most animal groups exhibit consistent behavioral differences within or across situations (feeding, mating, predator avoidance, etc.) known as *behavioral syndromes* (Sih et al. 2004). Proactive (more nervous) vs. reactive (calmer) behavioral syndromes have been observed in many animal species and have been shown to influence how individuals cope with stress (Koolhaas et al. 1999). We investigated the relationships between stress coping styles, patterns of rangeland use, and performance of thirty six 3-year-old cows during two consecutive calving seasons (2006-07). We found that calmer cows (classified as reactive) spent more time at water, explored smaller areas in any given day, had lower body weights, longer postpartum anestrous periods, and weaned lighter calves than cows classified as proactive (more nervous cows). Because our results are based on a limited number of animals which belong to a fairly docile herd, they should be considered preliminary. Further work investigating these relationships is underway.

THE PROBLEM: Animals are thought to exhibit suites of correlated behaviors (behavioral syndromes). Therefore, a cow's response to a stressful situation (such as individual confinement), could be indicative of a specific grazing behavior style which could be associated with distinct rangeland use patterns and consequent animal production levels. To date, no research has been conducted that relates behavioral syndromes of rangeland-raised livestock with landscape use and animal performance.

OBJECTIVE: Our objective was to describe the relationships between animal stress coping style, patterns of rangeland use, and performance of rangeland-raised beef cows.

EXPECTED OUTCOMES: We expect to determine the feasibility of identifying cattle behavioral types associated with specific rangeland use patterns.

DURATION: 2006 – (These data are preliminary)

APPROACH: Our study was conducted in pastures with pinyon-juniper woodland. Thirty-six 3-year-old cows were classified into two groups on the basis of their stress coping style. Multiple criteria were used to classify individuals into such groups using Discriminant Function Analysis (Table 1). 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: When compared to cows classified as having a proactive stress coping style (PR), reactive individuals (RE) tended to spend more time at water (means ± SD; PR: 73 ± 50 min/day; RE: 172 ± 40 min/day), travel similar distances (PR: 5,323 ± 636 m/day; RE: 5,194 ± 587 m/day), explore smaller areas (PR: 21 ± 3 ha/day; RE: 17 ± 3 ha/day), and exhibit more concentrated search patterns as shown by the ratio of distance traveled to area explored daily (PR: 264 ± 44 m traveled : ha explored; RE: 313 ± 73 m traveled : ha explored). Reactive individuals also had lighter body weights (PR: 434 ± 33 kg; RE: 395 ± 28 kg), longer postpartum anestrous periods (PR: 44 ± 14 days; RE: 68 ± 18 days), and weaned lighter calves (PR: 207 ± 37 kg, RE: 179 ± 20 kg). Collectively, cow-calf location relations measured in 2007 suggested that productivity of calves born to highly proactive cows was less than that of calves born to less proactive animals. The former tended spent less time near their calves traveling further from their offspring; thus, weaning lighter calves than the latter.

POTENTIAL APPLICATION: Cows classified as exhibiting different behavioral syndromes showed differences in productivity and pasture use patterns. If these results are confirmed in upcoming seasons, then selective culling on the basis of animal stress coping style could be a useful tool to achieve landscape use and livestock production management objectives on rangelands.

EDUCATIONAL PLAN: A detailed account of the results of this study will be submitted for publication in a peer-reviewed rangeland management journal. Our final article will be posted on the Corona Range and Livestock Research Center's web site (http://corona.nmsu.edu).

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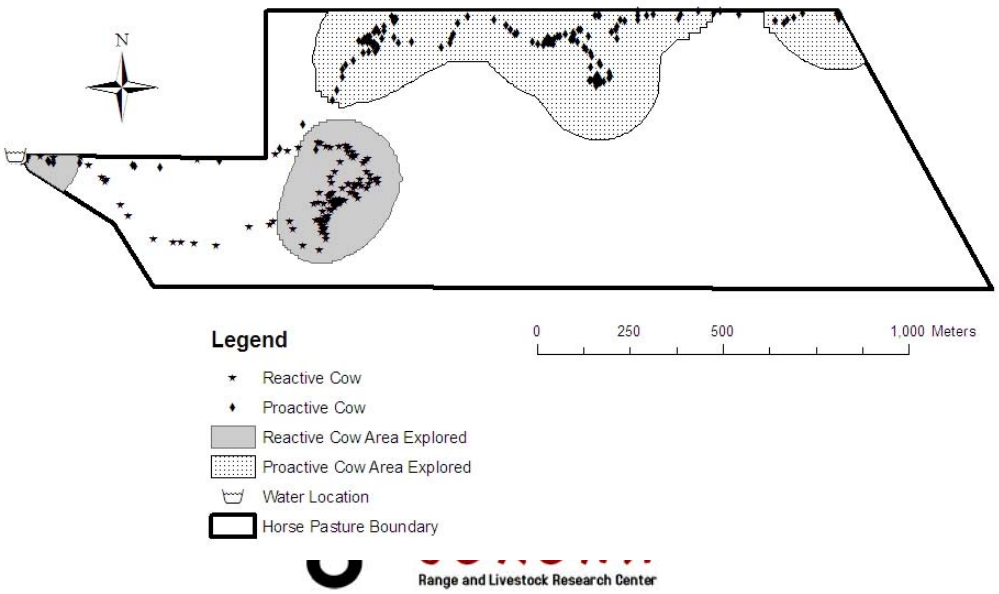

Figure 1: Example of the daily area explored by a reactive and a proactive cow (23 March 2006). Shaded areas represent 95% kernel volume density estimates.

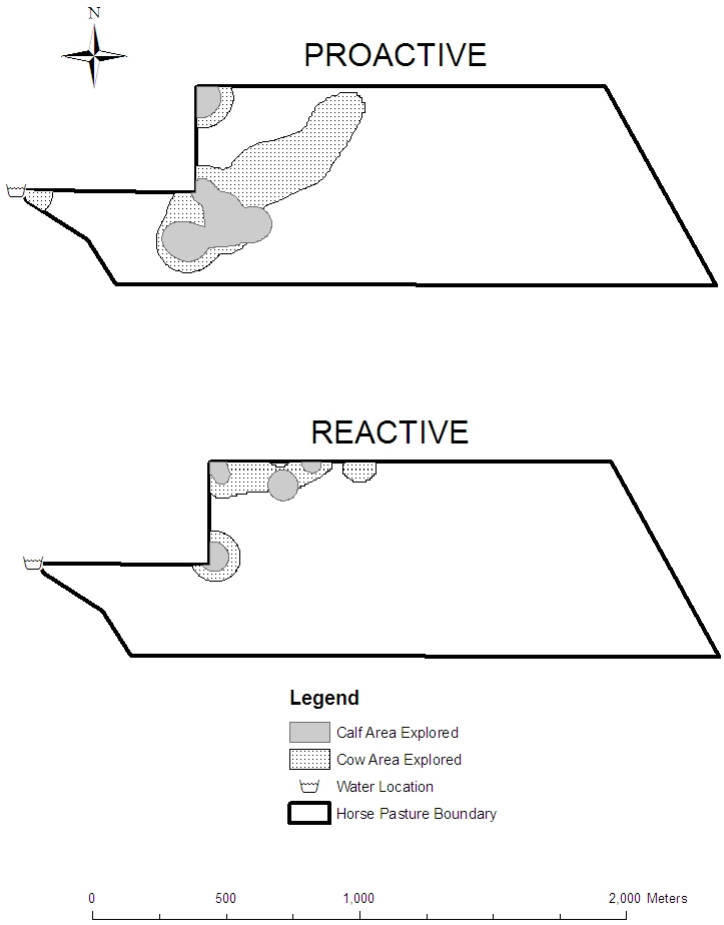

Figure 2: Example of the daily area explored by a proactive and a reactive cow and their calves (10 April 2007). Shaded areas represent 95% kernel volume density estimates.

Table 1: List of most important variables used to classify 3 year old postpartum range beef cows into proactive and reactive groups

	Proactive (n=25)		Reactive (n=8)	
Response variable	mean	Std Dev	Mean	Std Dev
Supplement Feeding Rate, sec	561	228	4390	1535
Body Weight, kg	955	72	869	62
Social Dominance, index of displacement	0.50	0.22	0.49	0.26
Blood Cortisol, ng/ml	8.77	4.41	5.51	1.43
Adjusted 205day weaning weight, kg	207	37	179	20
Length of postpartum anestrous, days	44	14	68	18
Time to reach body weight nadir, days	72	21	89	18
Time in Juniper, min/day	23	15	39	23
Average distance traveled, m/day	5323	636	5194	587
Average distance from water, m/day	885	81	835	122
Maximum distance from water, m/day	1376	114	1308	104
Average time spent at water, min/day	73	50	172	44
Average area explored, ha/day	20.48	3.06	17.25	4.13
Average distance traveled per area explored, m/ha/day	264	44	313	73