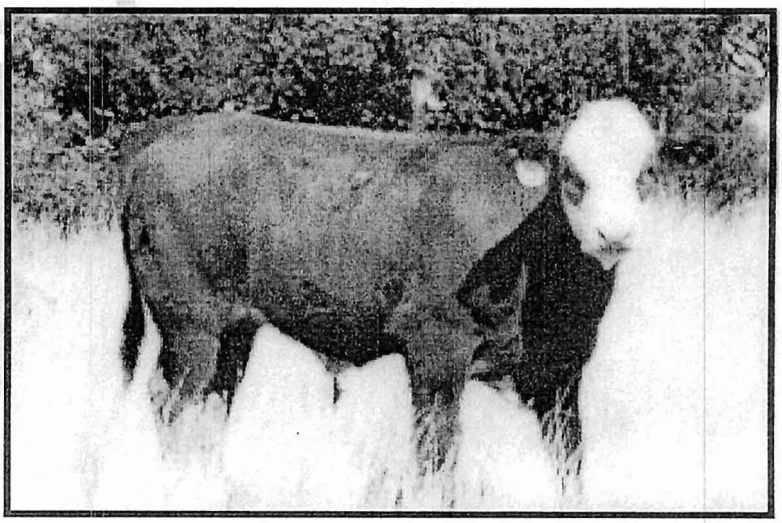
2005 Cattle Growers'
Short Course Proceedings & Livestock Research Briefs



April 7-8, 2005

Sgt. Willie Estrada Memorial Civic Center
Alamogordo, New Mexico

College of Agriculture and Home Economics
• Agricultural Experiment Station
• Cooperative Extension Service
New Mexico Cattle Growers' Association

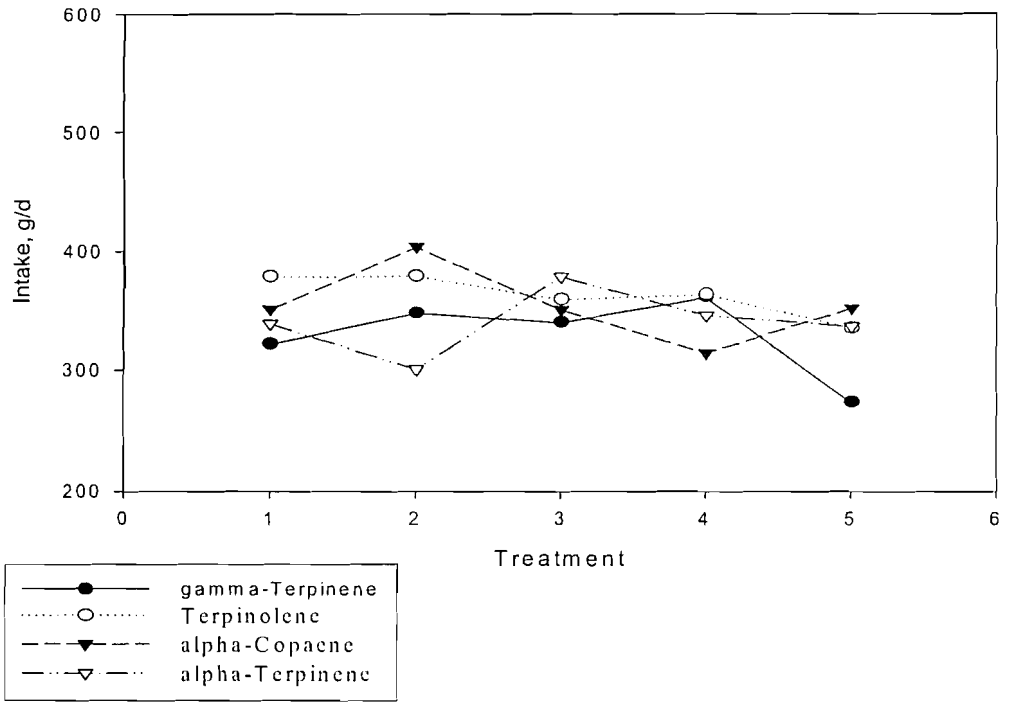
surface fires to carry, however the real question is will the treatments decrease the risk of severe fire behavior in the event of a wildfire. This is only part of a larger study addressing the effects of silvicultural treatments on watershed processes, large ungulates, predators, and small mammals. Results of this research will help provide managers with information needed to choose the treatment that best matches their objectives, whether it is reducing the risk of stand replacing wildfires or producing a more productive and diverse plant community.

LIVESTOCK RESEARCH ON THE JORNADA EXPERIMENTAL RANGE

Rick Estell, Dean Anderson, Ed Fredrickson

Introduction: The mission of the research program at the Jornada Experimental Range is to develop new technologies for management and remediation of desert rangelands. This program leverages the research history at the 193,000 acre Jornada Experimental Range under the stewardship of the USDA to address four general objectives. These are to: 1) quantify key ecological processes that characterize functions of arid rangelands, 2) identify, evaluate and describe methods for monitoring and assessing desert rangeland conditions, 3) design and test techniques for remediating degraded rangelands and 4) develop agricultural practices appropriate for livestock production in desert environments. Scientists at the Jornada collaborate with researchers from New Mexico State University and other institutions throughout the world to achieve these objectives. The following are a few of the current projects at the Jornada related to livestock research. For more information about these or the many other studies in progress, or to obtain publication lists or specific publications, please contact our office (bgamboa@nmsu.edu) or visit our website (usda-ars.nmsu.edu).

Role of Phytochemistry in Diet Selection by Livestock on Arid Rangelands: Shrub encroachment into arid and semiarid rangelands generally results in less forage for livestock. Palatability of these shrubs is often low due to high concentrations of secondary chemicals. We found that crude extracts isolated with organic solvents from tarbush (*Flourensia cernua)* and applied to alfalfa pellets dramatically decreased intake by lambs. However, little is known about how specific compounds affect herbivory. To date, only four of the 15 volatile compounds we have examined reduced intake when tested individually (camphor, alpha-pinene, caryophyllene oxide and camphene). In the present study, four more chemicals were evaluated: gamma-terpinene, terpinolene, alpha-copaene and alpha-terpinene. One of these chemicals was applied to alfalfa pellets in five concentrations (0, .5, 1, 2 and 10X, with X being the concentration of that chemical on the leaf surface of tarbush) in each of four experiments. Forty-five lambs (9 lambs/treatment) were individually fed treated pellets and intake was measured during a 20-min interval for 5 d. The only treatment effect ($P < 0.02$) observed was for alpha-copaene, with intake on the 2X treatment lower than other treatments; however, the 10X treatment did not differ from other treatments. In summary, none of the four chemicals



tested in the present studies were strongly related to intake of alfalfa pellets by lambs under these conditions.

Controlling Flerds using Directional Virtual Fencing (DVF™): Bonding is the term used to describe the process of socializing small ruminants to consistently remain within line-of-sight of cattle under free-ranging conditions. This mixed-species group has been termed a flerd (flock + herd). Flerds can reduce coyote predation, facilitate management, eliminate the need for sheep-proof fence and improve animal distribution across a landscape. Because of the bonded sheep's consistent association with cattle, a study was conducted during April and May of 2004 to evaluate the possibility of controlling a small flerd using Directional Virtual Fencing (DVF™). DVF™ uses ramped sound and electric shock administered on either side of an animal to keep it within a Virtual Paddock (VP™) using minimum stress should the animal attempt to penetrate a Virtual Boundary (VB™) defining the VP™ perimeter. With only three cows wearing DVF™ devices, it was possible to control a flerd containing 18 animals. Based on Global Positioning System data obtained from all animals, it was shown that the flerd was controlled using DVF™. Also, more of the available landscape was used by cattle than sheep (Table 1). In conclusion, DVF™ offers an additional method to control flerds without conventional fencing when it becomes commercially available.

Livestock Foraging Behaviors in Desert Landscapes: The criollo cattle of northern Mexico have coevolved with the arid and semiarid regions of North America for approximately 450 years. Prior to their first introduction to the New World by Columbus during his second voyage in 1493, these cattle were raised in semiarid regions of southern Spain and the Canary Islands. It is thought that these cattle originated from North African deserts. The cattle from Algeria and Libya have a striking resemblance to the Mexican criollo cow. Since their introduction to the New World, criollo cattle were extensively managed with very few inputs and thus were subjected to intensive natural selection. Hypothesizing that these animals may have significant adaptations to arid environments that may be useful for current and future livestock producers, we have begun to study

isolated populations in arid regions of both the Sierra Tarahumara and the sierras of Baja California Sur. The latter region receives less than four inches of rainfall annually, with daily temperatures well over 100°F for much of the year, creating some of the most challenging environments in North America. We imported cattle from the Chinipas region of Chihuahua to the Jornada Experimental Range and are conducting joint research with Mexican scientists Gerardo Bezanilla and Jose Rios from the Universidad Autónoma de Chihuahua to explore behavioral and physiological adaptations that may have resulted from their long tenure in these challenging environments. Distance traveled by these animals was evaluated at the Jornada in a 3000 acre pasture with good forage conditions. In this study, Chinipas cattle traveled 7.9 ± 0.7 miles per day and covered a larger area of the pasture than Angus x Hereford cattle, which traveled 6.0 ± .4 miles. These data support observations that criollo cattle travel further and use steeper slopes than British or Continental breeds.

Table 1. Area used by a herd before (Pre-cuing), during (Cuing) and following (Post-cuing) control with Directional Virtual Fencing (DVF™).

Dates in 2004[a]	Treatments[b]	Number		Avail. Area (ha)	Polygon area[d] (ha)		Mean path area[f] (ha)	
		Cattle[c]	Sheep		Cattle[e]	Sheep[e]	Cattle[e]	Sheep[e]
April 26-28	Pre-cuing	3	3	466	37	27	1.3 ± 0.15	0.7 ± 0.04
May 2-5	Cuing	4	2	58	40	37	2.3 ± 0.08	0.9 ± 0.27
5-7	Cuing	4	7	58	50	47	1.7 ± 0.10	0.6 ± 0.05
10-12	Cuing	4	7	108	75	62	1.5 ± 0.18	0.6 ± 0.03
12-14	Cuing	4	14	108	70	68	1.6 ± 0.30	0.6 ± 0.04
17-19	Post-cuing	4	14	466	82	73	1.3 ± 0.43	0.6 ± 0.02

[a]Data missing between April 28 and May 17 are the result of malfunctioning in one or more DVF™ devices used to control animals behind the Virtual Boundary (VB™).
[b]During pre- and post-cuing, only location data were obtained from all animals with Global Positioning System (GPS) data. During cuing, DVF™ devices were activated to attempt to control animals within the confines of a Virtual Paddock (VP™) consisting of three conventional fences and one VB™.
[c]Three cows and one calf were used. On April 26-28, the calf was not instrumented with a GPS unit.
[d]Area enclosing the smallest polygon that included all animals of the same species.
[e]Garmin Legends® and a Gieko® were used to collect GPS data (one location per minute) for the calf, all sheep, and one cow during post-cuing. All other GPS data were obtained using DVF™ devices.
[f]Mean area (± SD) based on a band 1 m wide x total distance traveled (m) for each species (excluding calf).