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CLAYTON LIVESTOCK RESEARCH CENTER

2023 ANNUAL REPORT

THE NMSU AGRICULTURAL EXPERIMENT STATION SUPPORTS RESEARCH THAT ADDRESSES REAL-WORLD PROBLEMS. RESEARCH IS AT THE CORE OF NMSU'S MISSION TO IMPROVE THE LIVES OF PEOPLE GLOBALLY.
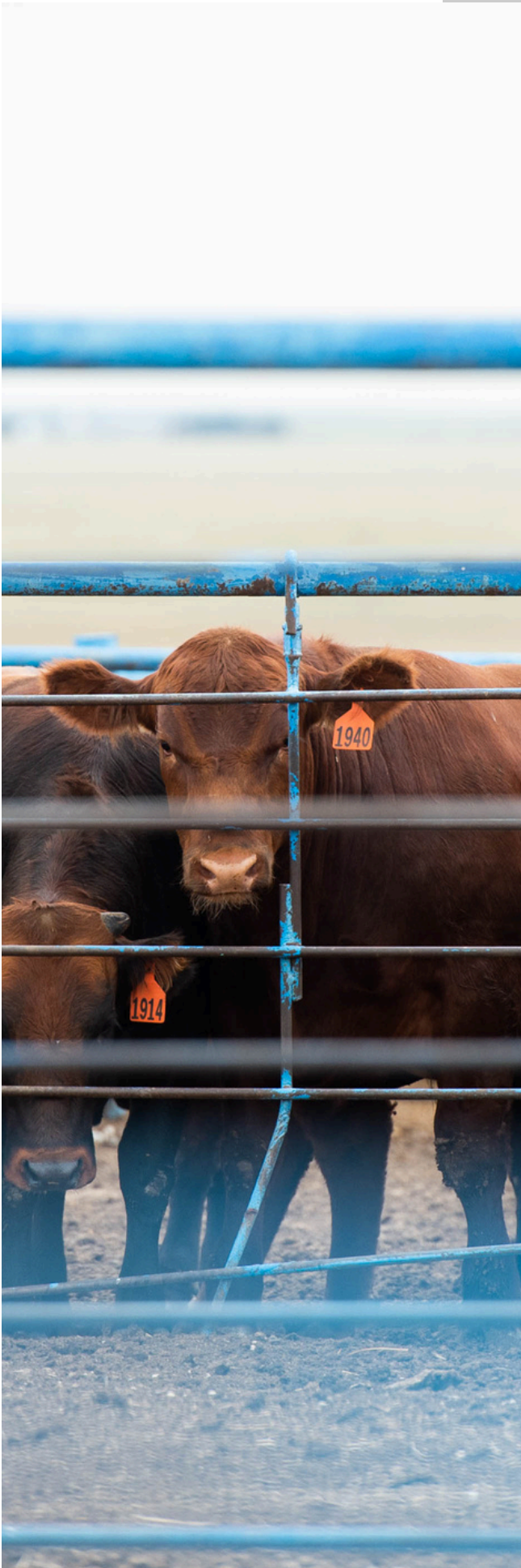
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These are not formal Agricultural Experiment Station research results. Readers are cautioned against drawing conclusions or making recommendations as a result of the summaries in this report. In many instances, data represents only one of several years' results that will ultimately constitute the final formal report for a project.

None of the data are authorized for release or publication without the written prior approval of the New Mexico Agricultural Experiment Station.

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AGRICULTURAL SCIENCE CENTER LOCATIONS MAP

AGRICULTURAL SCIENCE CENTERS
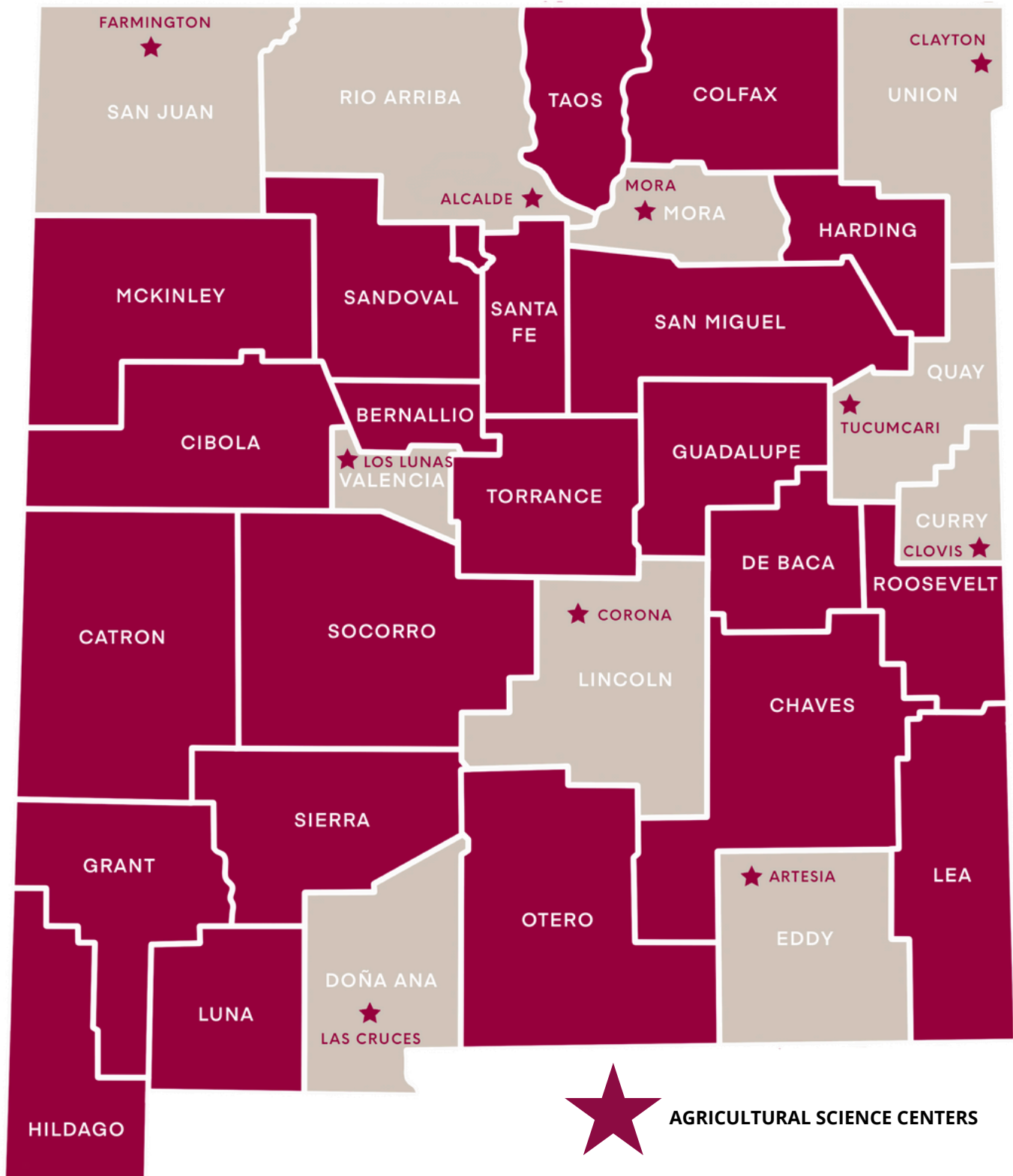
EXECUTIVE SUMMARY

From the road you may notice the Clayton Livestock Research Center (CLRC) has new signage and maybe that more attention is being taken to keeping the grounds a bit more appealing, what you may not notice is the investment in upgrades that have taken place over the past several years through funding from the New Mexico Legislature and sales, as well as, the addition of new faculty and changes in staffing.

We welcome our new faculty Dr. Mozart Fonseca as he begins his tenure with us. Dr. Fonseca brings his experience from the University of Nevada, Reno to New Mexico where he will be a resident scientist at the CLRC. Mike Barnes has shifted to overall operations management and Devon Dillion accepted the position of assistant operations manager. Dr. Glenn Duff will continue his current research program, as well as, a new collaboration with Dr. Fonseca, and we look forward to what our new research team can accomplish over the next few years.

While on the outside you might notice new overhead doors, the feed mill was completely augmented with a complete electrical upgrade and computer-controlled operations to now be state-of-the-art in ration blending and delivery. Over at the processing barn, the workroom and sample prep area have been completely renovated with new counters, HVAC, restrooms, and a foyer for enjoying a break now and again from the weather.


These improvements, along with the additions of a new center pivot irrigation system, digital individual animal feeders, greenhouse gas emissions monitoring equipment, and soil carbon measuring instrumentation bring new opportunities to CLR for funding and research that meet the needs of the industry today and in the future.

While we have had several graduate and undergraduate students who spent time at CLRC over this past year, I would like to recognize Kenzie Smithyman for being selected as one of the 2023 Western Section American Society of Animal Science Young Scholars this past year. This is a great honor to add to her building list of accomplishments since coming to NMSU and I congratulate her for her excellent work ethic and research aptitude.

All of us at CLRC look forward to what we can do this coming year and we are proud of what has been done thus far. Feel free to contact any of us for a discussion or to schedule a tour of our facilities.

RESEARCH HIGHLIGHTS
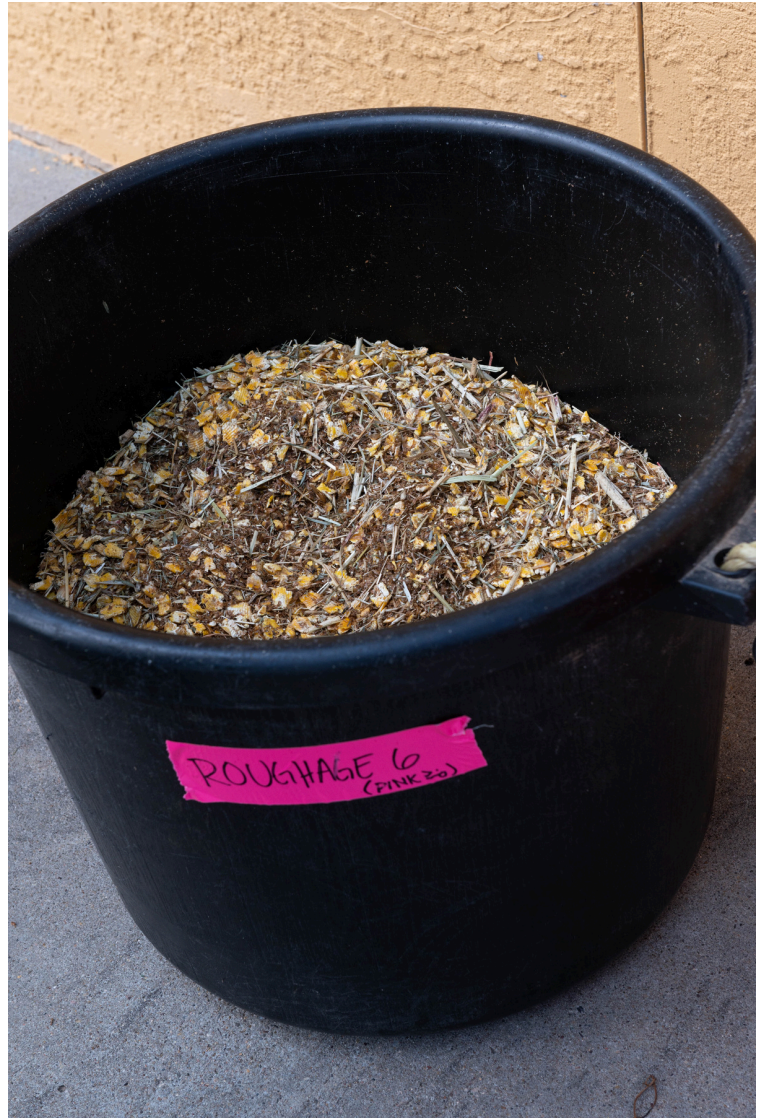
COMPARISON OF VISUAL SCORE WITH VAGINAL TEMPERATURE IN NEWLY RECEIVED BEEF CATTLE

Investigators: Glenn Duff (glennd@nmsu.edu) and Clint Loest

PROJECT OVERVIEW

Newly received feedlot cattle frequently succumb to bovine respiratory disease (BRD), which can be visually diagnosed and medically treated by employing a 4-point scoring system based on depression, appetite, respiration, and temperature (DART). Cattle are treated with antimicrobial medications for BRD if they have a rectal temperature (RT) ≥ 40°C and a DART score of 2 (scale = 1 to 4), or if they have a DART score of 3 or 4 regardless of the 40°C RT threshold. However, cattle often exhibit several visible clinical symptoms of BRD but do not have an RT above the 40°C threshold to warrant medical treatment.

MEETING THE NEEDS OF NEW MEXICO

Improving the health of beef cattle will help producers in the state remain competitive. This study helps to identify the health of beef cattle.

IMPACT

Improving the health of newly received beef cattle positively impacts the beef industry. To improve health, there is a need to properly identify sick animals. Researchers conducted a study to evaluate if DART (a visual method of using visual symptoms of depression, anorexia, respiratory, and temperature) scoring could be used to identify cattle with elevated vaginal temperatures (VT) throughout a 28-day receiving period. Upon feedlot arrival, 198 crossbred heifers (primarily Angus influence; initial BW = 219 ± 63 kg) were initially processed, weighed, and allocated to one of 10 soil-surfaced pens (12 ´ 35 m; 20 heifers per pen). A blank Controlled Intravaginal Drug Release (CIDR) device attached with an indwelling temperature probe (iButton DS1925L) was inserted vaginally into each heifer to collect and store VT every 10 minutes for 28 days. All heifers were evaluated daily (0700 h) for signs of morbidity by three individuals (blinded from each other) implementing the DART scoring system. Researchers concluded that the observers were not accurate at identifying sick animals and the longer the animals had an elevated temperature, the less accurate the observers were at detection.

DART Score 1

DART Score 2

DART Score 3

DART Score 4

COMPARISON OF RARAMURI CRIOLLO CROSSBRED CATTLE TO STRAIGHT-BRED ANGUS, RED ANGUS, OR BRANGUS CATTLE ON PERFORMANCE AND CARCASS CHARACTERISTICS

Investigators: Glenn Duff (glennd@nmsu.edu) and Rick Estell

PROJECT OVERVIEW

Researchers are evaluating the effects of a semi-arid environment-adapted Ramuri Criollo cattle crossed with Angus, Red Angus, or Brangus cattle. Data are lacking on the performance and carcass characteristics of the crossed calves. Calves were finished at the CLRC (50% finished at the Texas A&M Bushland Station) and sent to a commercial harvest facility. SmartFeed bunks have been installed and individual feeding data are being analyzed for year three. Data from years one and two suggests that cattle performed equally well compared with their counterparts and all cattle were similar in carcass characteristics. Strip loin samples have been sent to Texas A&M College Station for taste panel analysis. Data from the research conducted at the Clayton Livestock Research Center can be used regionally, nationally, and internationally on the management of beef cattle. Based on data from years one and two, no discounts should be realized for crossbreeding Ramurari cattle with traditional beef breeds.

MEETING THE NEEDS OF NEW MEXICO

The use of semi-adapted cattle may offer an alternative to traditional beef cattle in New Mexico. These cattle are smaller framed and would consume less forage when grazing. Crossbreeding programs that can be utilized to improve the prices of these smaller framed cattle may lead to more adaptation to the breeds.

IMPACT

In the semi-arid regions, smaller framed cattle are beneficial due to lower feed intake than traditional larger framed cattle. However, there is a discount at the market since there is a perception that these cattle will not perform as well or produce a desirable carcass. Researchers evaluated a specific subtype of Criollo cattle that has been shown to utilize the landscape differently than traditional beef breeds. These cattle were crossed with Angus, Red Angus, or Brangus cattle and finished in the feedlot. Cattle were harvested at Tyson Meats in Amarillo, TX, graded according to standard conditions, and loin strips were shipped to Texas A&M University for taste panel analysis.

Pictures of Research on next page

COMPARISON OF RARAMURI CRIOLLO CROSSBRED CATTLE TO STRAIGHT-BRED ANGUS, RED ANGUS, OR BRANGUS CATTLE ON PERFORMANCE AND CARCASS CHARACTERISTICS

Investigators: Glenn Duff (glennd@nmsu.edu) and Rick Estell

BY THE NUMBERS

RESEARCH PUBLICATIONS

- Smithyman, Mackenzie M., Glenn C. Duff, Consuelo Sowers, Robert Steiner, Clint A. Loest. 2023. PSVI-12 Comparison of a Visual Health Scoring System with Vaginal Temperatures of Newly Received Feedlot Heifers. Journal of Animal Science, Volume 101, Issue Supplement_3, November 2023, Pages 416–417, https://doi.org/10.1093/jas/skad281.493

OUTREACH ACTIVITIES

- The annual field day was held at the CLRC on September 18, 2023, with more than 60 participants. The program featured a tour of the improvements to the processing barn and feed mill. Participants also heard about research being conducted with SmartFeed, SmartWeigh, and GreenFeed systems.

- On September 26, 25 a Virtual Fence workshop was conducted at the CLRC with more than 50 participants. The workshop was co-hosted by the USDA Southern Plains Climate Hub USDA ARS OCPARC, El Reno, OK. A history of Virtual Fencing was presented by Dr. Dean Andersen (USDA, ARS, retired) along with an informant shared by Vence and No-fence on the current technologies.

- The local Clayton High School Agriculture program on October 4th, 2023. Students toured the feedmill, processing barn, and laboratory and were able to get up close to a cannulated heifer.

PEOPLE

COOPERATORS AND COLLABORATORS

- NMSU Animal and Range Sciences
- NMSU Extension Animal and Natural Resources
- NMSU Agricultural Science Center at Clovis
- USDA Jornada Experimental Range
- USDA NIFA
- Texas A & M University
- Asombro Education
- BlueStem (Oklahoma)
- Cargill
- Merck Animal Health
- No-Fence South West
- Southern Plains Climate Hubs
- Vence
- Zinpro for sample analysis
- Corta Madera Ranch (California)
- Dugout Ranch (Utah)

UNDERGRADUATE STUDENTS

- Cassie Smithyman, Undergraduate Intern

GRADUATE STUDENTS

- Mackenzie Smithyman, Ph.D. Candidate
- Bianca Birkenstock, Ph.D. Candidate
- Lucas Mota, Ph.D. Candidate

ASC PERSONNEL

- Glenn Duff - Professor
- Mike Barnes - Farm Manager
- Devon Dillon - Assistant Farm Manager
- Shad Cox - Interim Research Director