Sustainable Southwest Beef

knowledge and tools for ranch and rangeland resilience

Sustainable Southwest Beef CAP Newsletter
May 2021

From The Leadership - A message from Glenn Duff

Hello all:

I continue to be in awe with the amount of work that the CAP grant teams continue to accomplish. This newsletter highlights the work being completed with the various teams on the grant. The scope of this project is broad and includes educational programing for K-12 students to graduate student education. In addition research and outreach components includes applied research through projects using current technologies in the field. I want to personally thank all of the participants working on this important project. Additionally, we are getting the word out with webinars, publications, regular meetings for the various teams and our first quarterly meeting was held with the advisory committee. We are, however, looking forward to in person meetings some time in the future. If you receive this newsletter, you are an important part of this project as well.

Regards,

Glenn Duff

Welcome

Dr. Santiago Utsumi will be stepping in as the project's precision

ranching lead. He comes to NMSU after working at Michigan State University for several years developing precision livestock farming systems.

Jason Smith serves as the Interim Project Leader for the Animal Nutrition Laboratory in Amarillo, Texas A&M AgriLife Research/USDA-ARS Research Feedlot and Metabolism Laboratory at Bushland.

Ethan Wright will be joining the project Extension team and will be doing science team liaison duties.

Kudos

Dr. Matthew McIntosh defended his dissertation entitled "Sustainable Grazing Management in the Chihuahuan Desert: Traditional and Novel Approaches to Adapt to a Changing Climate" April 9, 2021.

Kudos to Skye Aney, who graduated with his Master's degree in December 2020 and subsequently became the full-time Program Coordinator for the extension team.

Reanna Burnett accepted the full time position of Education Resources Coordinator in early 2021. Thanks to her for her continued project support.

Congratulations to Coury Dorn, a Graduate Research Assistant with the extension team for graduating with his Master's degree in December 2020 and accepting a new position with the State of New Mexico which will begin in late May 2021. Kudos and we will miss him!

Breed Comparison

The first set of data from the on-ranch cow/calf part of the breed comparison project conducted in 2020 was recently summarized in a dissertation by Matt McIntosh (congratulations Dr. McIntosh!). Although the first year of the project was cut short by a severe drought, we were able to collect three months of data on the Chihuahuahuan Desert Rangeland Research Center. We compared supplement intake, calf birthweights, cow weights, and body condition scores of a heritage cattle biotype (Raramuri Criollo; RC) and a more traditional desert-adapted breed (Brangus; BR). Our results indicate that when cows had free-choice access to 18% crude protein lick tubs, Brangus cows ate more than twice as much supplement as RC (0.21 vs. 0.08 kg/cow/day).

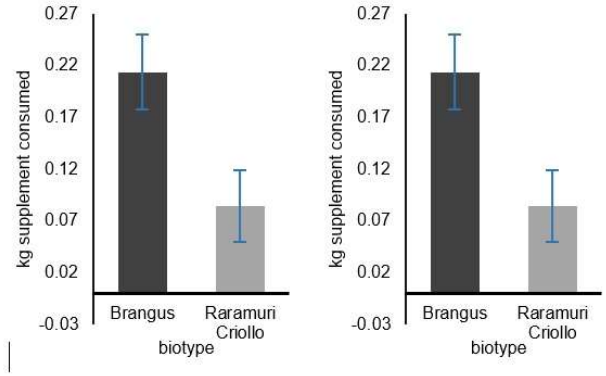


Figure 1. Means and standard errors of kilograms of supplement consumed per cow per day per biotype (*P* < 0.05; left) and Means and standard errors of kilograms of supplement consumed per kilogram bodyweight (*P* < 0.05; right).

Brangus cows weighed more at the beginning (535.0 vs. 345.5 kg) and end (582.2 vs. 357.0 kg) than their RC counterparts. However, on a percent of body weight basis, weight change for the two breeds was similar. On a 1-5 scale, body condition score of Brangus (4.1) was greater than RC (3.2) at the beginning of the study, but both had similar scores at the end (4.1 vs. 3.9 for BR and RC, respectively). Both Brangus and RC cows were bred to Brangus bulls. Calf weights were not different for BR (31.5 kg) and RC (29.6 kg). Our preliminary results suggest that lighter weight RC cows consume less supplemental feed, produce comparable sized crossbred calves, and may exert a lower environmental footprint on the landscape.

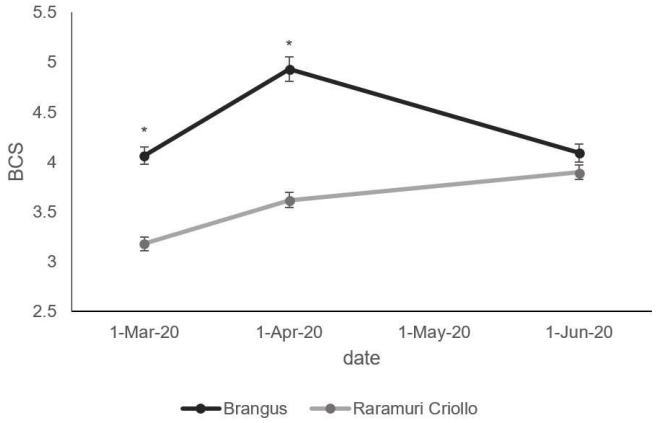


Figure 2. Mean body condition scores (BCS) on a 1 to 5 scale

(one being the thinnest and five being the heaviest) of Raramuri Criollo and Brangus mature cows at three time points across our study period at the CDRRC, 2020.

	Mean ± SEM		
	Desert Brangus	Raramuri Criollo	*P* - value
Beginning weight (kg)[a]	535.02 ± 14.75	345.51 ± 11.82	< 0.01
End weight (kg)[b]	582.19 ± 14.46	357.04 ± 12.04	< 0.01
Weight change (kg)	76.46 ± 21.95	11.48 ± 17.51	0.03
Bodyweight change (%)	8.51 ± 2.35	2.85 ± 1.81	0.13
Average daily gain (kg)	0.47 ± 0.10	0.12 ± 0.07	< 0.01
Calf birth weights (kg)	31.52 ± 1.04	29.56 ± 0.89	0.16
Calf birth weight as % of cows weight	6.08 ± 0.35	8.52 ± 0.28	< 0.01

[a]beginning weights were recorded on March 7, 2020

[b]end weights were recorded on June 9, 2020
Bodyweight change (%) was calculated as the end weight divided by the beginning weight
Average daily gain was calculated as (final weight – beginning weight) / days between weighing

Table 1. Beginning and end live weights, weight change, percent bodyweight change, and average daily gain of mature Raramuri Criollo and Brangus cows at the CDRRC 2020.

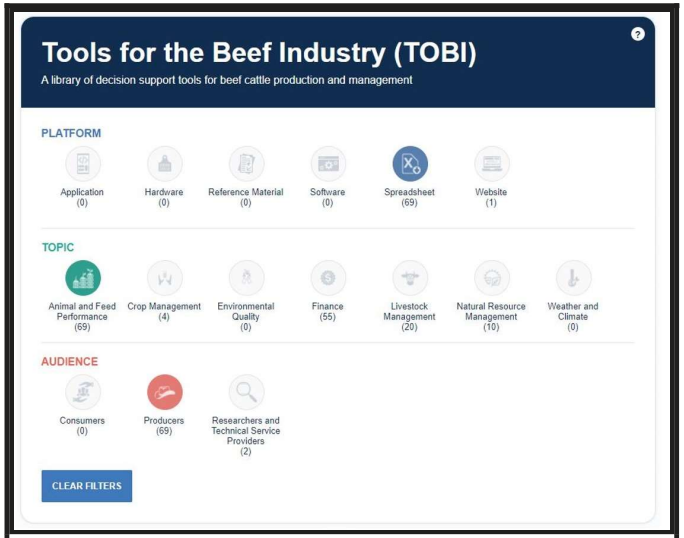
TOBI - A Decision Support Toolshed for the Beef Production Industry

Since the rise of computing technology in the late 20th century, researchers and extension teams worldwide have been harnessing its power to create, test, and distribute decision support tools (DSTs). A DST is just as it sounds; it's a program that, given the user's inputs, performs calculations, yields estimates, projected financial values, and other relevant information. The user takes that information and uses it as another piece in the puzzle of business or production management to inform the crucial decisions made during their production cycles.

The Sustainable Southwest Beef Project's extension and knowledge co-production team has created a toolshed that makes it easy for agriculturalists, beef producers, farmers, and anyone else who is interested, to find a "Cow"culator with the click of a mouse. The new toolshed "Tools for the Beef Industry", aka TOBI, is accessible at https://webapps.jornada.nmsu.edu/livestock/ and searches a database of over 550 DSTs published by cooperative extension, domestic and international universities and government agencies, NGOs, and private developers. Producers, extension agents, agricultural consultants, researchers, and many others can find tools to help them in their work.

By bringing all these DSTs together in one easy search application, it is hoped that TOBI will greatly reduce the time it might take an individual to locate a tool for their needs, putting time back into producer's schedules, and at the same time potentially presenting a wider array of

tools to choose from than might be otherwise encountered. Users can search for tools by the platform – smartphone application, software, spreadsheet, etc., by topic – finance, livestock management, animal and feed performance, etc., and by the tool's primary audience – producers, consumers, or researchers and technical service providers. This toolshed represents one of the many components that will help make up the Southwestern Beef Knowledge System which will be completed at the end of the project.



A TOBI user might use the search configuration above to find spreadsheets that calculate rations, track animal records, assist with financial values, and many other tools.

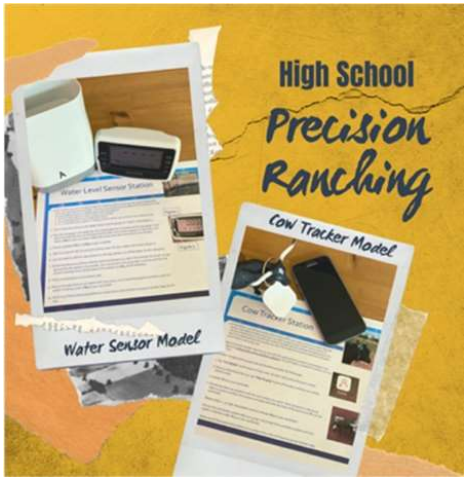
Upcoming Workshops for 3rd Grade and High School Teachers

The Asombro Institute for Science Education is hosting free, virtual teacher workshops in September related to the Sustainable Southwest Beef project. Please help us share information about these opportunities with teachers throughout our project region. Applications are being accepted now.

Curious About Cows? Engaging NGSS Lessons on Current Criollo Cattle Research (for 3rd-grade teachers)

- Wednesday, September 16 (4 - 6 PM, Mountain time)

- Third-grade teachers will get training on using Asombro's new 3rd-grade lesson on criollo traits in their classrooms. They'll each receive a kit of supplies for the lesson and a $50 stipend.



Terrific Technologies for Ranching: Bringing Sustainable Solutions into the Classroom (for high school teachers)

- Saturday, September 18 (9 – 11 AM, Mountain time)
- High school science/agriculture teachers will learn about the Sustainable Southwest Beef project and three high school lessons that they can use in their classrooms. Educators will receive a classroom set of supplies for the lessons and a $50 stipend.

More details about these workshops and a link to the simple, required workshop applications can be found here: asombro.org/teacher-workshops.

Precision Technology Research at Scotland's Rural College

John Holland and Tony Waterhouse are research partners from Scotland's Rural College (SRUC). John is an ecologist with a focus upon interactions of livestock systems with extensive pasturelands and Tony is a livestock scientist now focussing upon precision livestock systems.

SRUC has a global reputation in many elements of agricultural research and is renowned for its adoption for over 100 years of the three elements of education, extension and research. One of SRUC's resources is the Hill and Mountain Research Centre (HMRC), located in the Scottish Highlands, which is the research base for John and Tony and a centre for sustainable livestock production and precision livestock research.

Involvement in the SW Beef CAP project began with a visit by Andres Cibils from NMSU to the HMRC in 2018, under a Fulbright Scholarship. John and Tony have been leading advocates of LoRaWAN/IoT technologies in pastoral agricultural systems and were able to demonstrate to Andres the potential for their use in extensive farming systems. The HMRC was one of the first in rural Scotland to establish a Low Power Wide Area Network with a range of real-time environmental and livestock sensors (the range of environmental sensors can be seen here).

Their experiences in real-time livestock tracking was important in the early days of establishing the precision ranching elements of the SW Beef CAP. Taking this forward, the rapid expansion of commercial virtual farming systems in Europe, has enabled the new virtual fencing element to be included in a new phase of the precision ranching work.

The SW Beef CAP has also helped to propel forward work at SRUC. New projects involving real-time wearable technology, particularly looking at low-cost proximity beacons, linked to LoRa communicating devices, some fixed and some on livestock, is the next phase of work that will interlink, and be shared with, US colleagues. This is within an EU funded sheep and goat project (TechCare) where the focus is upon animal welfare, but at its core is ‘precision ranching’. Work on a combined dashboard, linking the wide range of environmental sensors with livestock sensors at SRUC is also a parallel development which is under way with local partners.

Upcoming Events

Webinar: Meat Quality Panel - May 5th, 12:00-1:30 pm MDT. Register here**.**

Join us for presentations and a panel discussion with Dr. Ty Lawrence, Dr. Rhonda Miller, and Mr. Scott Brinker about the fundamentals of how beef carcasses and cuts are evaluated and how those evaluations relate to consumer preferences, with a focus on medical food service. Dr. Lawrence will discuss what happens at the slaughter plant when the Beef Carcass Research Center is doing its work and what he is looking for. Dr. Miller will discuss what happens in her meat quality laboratory, what cut(s) are selected for testing and why, and how those tests relate to retail consumer preferences. Mr. Brinker will share what his nutritional objectives are in medical food service, what role beef plays in medical food service, how he makes make sourcing decisions, and the approximate economics of the medical food service plate.

Webinar: Beef Supply Chain Options - August TBD

Hear about the various supply chain options for beef cattle producers in the Southwest.

Publications

Peer Reviewed

Elias, E., Aney, S., Duff, G., Gifford, C. Spiegal, S., Cibils, A. Steiner, J., Estell, R. 2020. Snapshot of rancher perspectives on creative cattle management options. Rangelands 42(6):191-195. https://doi.org/10.1016/j.rala.2020.09.004

McIntosh, M., Gonzalez, A., Cibils, A., Estell, R., Nyamuryekunge, S., Almeida, F.R. and Spiegal, S., 2020. A Phenotypic Characterization of Rarámuri Criollo Cattle Introduced into the Southwestern United States. Archivos Latinoamericanos de Producción Animal 28(3-4), 111-119. https://ojs.alpa.uy/index.php/ojs_files/article/view/2832

Nyamuryekung'e, S., Cibils, A.F., Estell, R.E., McIntosh, M., VanLeeuwen, D., Steele, C., González, A.L., Spiegal, S., Continanza, F.G., 2021. Foraging Behavior of Heritage versus Desert-Adapted Commercial Rangeland Beef Cows in Relation to Dam-Offspring Contact Patterns. Rangeland Ecology & Management 74, 43-49. https://doi.org/10.1016/j.rama.2020.11.001

Case Study

Bickle, E., R. (2020). “Heritage Cattle Genetics for Drought Resilience.” CCAST. Retrieved from https://arcg.is/1ay59r. (This case study features Rob Paulin and the Corta Madera Ranch)

Abstracts and Presentations

Dorn, Coury. “A Survey of Decision Support Tools for the Beef Cattle Industry.” Presentation, Society for Range Management 2021 Annual Meeting (virtual), February 15-18, 2021.

Dynamic webmap of grass-fed beef producers & retailers within the footprint of the project https://southwestbeef.org/grass-fed-beef, which adds to the understanding and knowledge of the extent of grass-finishing in the southwest.

Our mailing address is:
beefsw@gmail.com

This newsletter is based upon work that is supported by the National Institute of Food and Agriculture, U.S Department of Agriculture, under award number 2019-69012-29853, "Novel Strategies to Increase Sustainability of Beef Production Systems in the Western United States."