

Desert-Adapted Cows: The Rarámuri Criollo

Sustainable Southwest Beef Project



The Sustainable Southwest Beef research project involves more than 40 scientists, ranchers, extension agents, and educators. The team is looking for solutions to challenges faced by ranchers, including increased demand for beef, increasing preference for beef produced in an environmentally friendly way, and climate change. The project focuses on three strategies that might increase the sustainability of ranching in the southwestern United States: Rarámuri Criollo, precision tools, and beef supply chain options.

What are Rarámuri Criollo?

The Rarámuri Criollo cattle is one of 33 known types of heritage Criollo cattle. Its bloodline goes back hundreds of years in deserts of North America. In the 1600s, missionaries introduced Criollo to the Tarahumara Indians in the Copper Canyon area of Mexico. The Tarahumara gave the Rarámuri its name, which means “the light-footed ones.” They kept the cattle with little crossing with other breeds, so Rarámuri Criollo have undergone generations of natural selection in dry, hot regions in Mexico. They are, therefore, well adapted to these same conditions in the southwestern United States.

How Do Rarámuri Criollo Differ from Other Cattle?

Rarámuri Criollo cattle are easily identified by their horns. They typically have short hair, which probably makes them more tolerant of high temperatures than other cattle. They are also smaller than other breeds raised in the Southwest, such as Angus and Angus-Hereford crossbreeds. On average, Criollo cows weigh 370 kilograms (816 pounds). Their smaller size helps them move over steep, rocky land and survive with less food. Yet horns and small size create problems when selling the cows at auction. The conventional beef industry (including feedlots and packing plants) is designed for larger cows without horns, so smaller cows with horns are not favored.



Figure 1. Rarámuri Criollo cows and a crossbred calf (center). Look carefully to see the GPS collar on the cow on the left. Photo courtesy of Sustainable Southwest Beef Project.

What Research Has Already Been Done?

Many studies show differences in grazing behavior between Rarámuri Criollo and other cattle. Rarámuri

Criollo cows explore larger areas, especially during drier seasons when there is less food available. This has two benefits. First, it spreads the cows out, reducing their environmental impact on the land. Second, the Rarámuri Criollo can find more of their own food and require less supplementary feed, such as hay and cottonseed cakes, which are expensive and use more land to produce.

What are the New Areas of Research and Possible Barriers to Promoting Rarámuri Criollo?

In the Sustainable Southwest Beef project, scientists are learning more about Rarámuri Criollo behavior and movement. This work uses Global Positioning System (GPS) collars (Figure 1) that transmit information on cow location, speed, and body temperature.

Scientists are also breeding Rarámuri Criollo with conventional cattle breeds to determine if this will result in larger calves that are easier to sell in the traditional beef supply chain. Scientists are testing the beef produced from Rarámuri Criollo, ensuring that it is appetizing and meets beef quality standards.

The project is also investigating tradeoffs between Rarámuri Criollo, crossbreeds, and traditional cattle. For example, Rarámuri Criollo can stay on rangelands rather than being shipped to feedlots. The beef is marketed as “grass-fed beef” which some consumers prefer. However, when cows stay on rangelands, they grow more slowly. This results in higher lifetime production of methane, a greenhouse gas. Another potential barrier to widespread use of Rarámuri Criollo is ranchers’ willingness to raise them. At the 2020 Southwest Beef Symposium, only 11% of ranchers surveyed said they would be interested in learning more about breeds like Rarámuri Criollo for their ranches.

Sources

- Anderson, D.M., Estell, R.E., Gonzalez, A.L., Cibils, A.F., Torell, L.A., 2015. Criollo cattle: heritage genetics for arid landscapes. *Rangelands* 37, 62-67.
- Elias, E., Aney, S., Duff, G., Gifford, C., Spiegel, S., Cibils, A., Steiner, J. and Estell, R., 2020. Snapshot of rancher perspectives on creative cattle management options. *Rangelands*, 42, 191-195.
- Enyinnaya, J.C. 2016. The economics of criollo cattle production in the deserts of southern New Mexico. *Master of Science Thesis*, New Mexico State University.
- McIntosh, M., Gonzalez, A., Cibils, A., Estell, R., Nyamuryekunge, S., Almeida, F.R. and Spiegel, S., 2020. A phenotypic characterization of Rarámuri Criollo cattle introduced into the southwestern United States. *Archivos Latinoamericanos de Producción Animal* 28, 111-119.
- Nyamuryekung'e, S., Cibils, A.F., Estell, R.E., McIntosh, M., VanLeeuwen, D., Steele, C., González, A.L., Spiegel, 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.

Career Corner: Dr. Andrés Cibils

Dr. Andrés Cibils is the Director of the USDA Southern Plains Climate Hub. He and his team conduct applied research and synthesize and communicate scientific advances to farmers, ranchers, and land managers in Kansas, Oklahoma, and Texas. They focus on science-based weather and climate information to help reduce risk and build resilience in agriculture.

Before becoming the Southern Plains Climate Hub Director, Dr. Cibils was a National Program Leader at the USDA National Institute of Food and Agriculture (NIFA) and a Professor in the Department of Animal and Range Science at New Mexico State University (NMSU). At NIFA, he administered funding programs to support research, education, and extension. At NMSU, he taught classes, mentored graduate students, and served as the principal investigator of the Sustainable Southwest Beef Project.

His favorite part of his current job is collaborating with researchers, extension agents, and educators to make science accessible to end-users. He enjoys being able to contribute to addressing climate change and its impacts on agriculture in the southern Great Plains.

