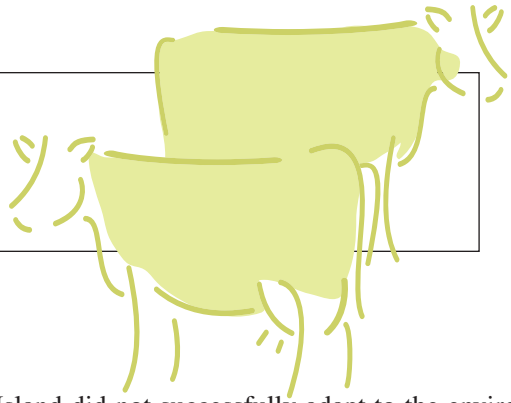
Feral Cattle on Chirikof Island

Isolated and Genetically Distinct



About 60 miles southwest of Alaska's Kodiak Island, a small, flat landmass rises out of the Pacific Ocean.

Treeless, desolate, and cold, the low-lying Chirikof Island is at the mercy of wind and waves. Its harsh climate has discouraged human settlement, but Chirikof—named for the Russian explorer who claimed it in the 18th century—is not uninhabited. For more than 100 years, the island has been home to a herd of feral cattle whose origin is unknown.

How have the cattle survived such extreme conditions with little to no human management? Could this information shed light on how North American commercial breeds respond to similar circumstances? The answers may lie in the cattle's genes.

A team of scientists from the Agricultural Research Service's Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana, and Matt Cronin of the University of Alaska-Fairbanks (UAF) set out to compare these cattle to several commonly used breeds. To isolate DNA, they obtained blood, semen, or tissue samples from the cattle on Chirikof Island, from beef breeders, and from the ARS National Animal Germplasm Program (NAGP) in Fort Collins, Colorado. They also obtained genotypes for 60 Siberian Yakut cattle from a Finnish collaborator.

ARS and UAF scientists then worked with colleagues at Colorado State University in analyzing genetic differences between the breeds. They determined that Chirikof Island cattle had a relatively small degree of genetic relatedness with the other breeds.

"While there were occasional genetic similarities," says Michael D. MacNeil, a geneticist at the Miles City laboratory, "the cattle on Chirikof Island were genetically quite unique relative to our commonly used commercial breeds."

Among the commercial breeds, Chirikof Island cattle were most closely related to Highland, Hereford, and Angus. They were slightly more similar to Siberian Yakut cattle. Yakut are small, stocky, and extremely hardy; but they live under the shadow of extinction, so the availability of their genetic material is increasingly limited.

"Our analysis suggests that U.S. genotypes that were introduced to Chirikof Island did not successfully adapt to the environment. As a result, they had little impact on the feral population, which further strengthens the hypothesis that the cattle are unique in their ability to survive on this island," said NAGP geneticist Harvey Blackburn.

The researchers concluded that the Chirikof cattle and their genetic samples may be worth conserving—not only for their uniqueness, but also because they may have benefits for the cattle industry.

Though the ARS study did not include analysis of the effects of the cattle's unique genes, they may relate to characteristics—such as cold-hardiness or adaptability to specific forages—that would be valuable for cattle breeders and producers.—By **Laura McGinnis,** ARS.

This research is part of Food Animal Production, an ARS national program (#101) described on the World Wide Web at www.nps.ars.usda.gov.

Michael D. MacNeil is with the USDA-ARS Fort Keogh Livestock and Range Research Laboratory, 243 Fort Keogh Rd., Miles City, MT 59301-4016; phone (406) 874-8213, fax (406) 874-8289, e-mail mike.macneil@ars.usda.gov.

Harvey D. Blackburn is with the USDA-ARS National Center for Genetic Resources Preservation, 1111 South Mason St., Fort Collins, CO 80521-4500; phone (970) 495-3268, fax (970) 221-1427, e-mail harvey.blackburn@ars.usda.gov. ✷