

## All cattle descend from one small herd, study finds

March 27, 2012  
Courtesy of University College London  
and World Science staff

**All living cattle descend from as few as 80 animals domesticated from wild oxen in the Near East some 10,500 years ago, according to a new genetic study.**

**Scientists extracted DNA from the bones of domestic cattle found at Iranian archaeological sites. The samples came from a region where archaeologists believe cattle were first domesticated, and from a time not long after farming was invented.**



All living cattle descend from as few as 80 animals domesticated from wild oxen in the Near East some 10,500 years ago, according to a new genetic study. (Image courtesy U.S.D.A.)

**The researchers studied how small differences in the DNA of those cattle, as well as living cattle, could have arisen given known differences in population histories. Using computer simulations they found that the DNA variations could only have arisen if a small number of animals, about 80, were originally domesticated from wild oxen.**

**The study appears in the current issue of the journal *Molecular Biology and Evolution*.**

**“This is a surprisingly small number of cattle. We know from archaeological remains that the wild ancestors of modern-day cattle, known as aurochs, were common throughout Asia and Europe, so there would have been plenty of opportunities to capture and domesticate them,” said Mark Thomas, geneticist and an author of the study based at University College London.**

**“Wild aurochs are very different beasts from modern domestic cattle,” added Joachim Burger, an author of the study based at the University of Mainz, Germany. “They were much bigger than**

modern cattle, and wouldn't have had the domestic traits we see today, such as docility. So capturing these animals in the first place would not have been easy, and even if some people did manage to snare them alive, their continued management and breeding would still have presented considerable challenges until they had been bred for smaller size and more docile behavior."

Ruth Bollongino of France's National Center for Scientific Research and the University of Mainz, Germany, lead author of the study, said a hot climate made it a challenge to get useable DNA samples.

"Getting reliable DNA sequences from remains found in cold environments is routine," she explained. "That is why mammoths were one of the first extinct species to have their DNA read. But getting reliable DNA from bones found in hot regions is much more difficult because temperature is so critical for DNA survival. This meant we had to be extremely careful that we did not end up reading contaminating DNA sequences from living, or only recently dead cattle."

Archaeological studies on the number and size of prehistoric animal bones have found that cattle, goats, sheep and pigs were all first domesticated in the Near East. But how many animals were domesticated for any of those species is a much harder question to answer.

"In this study genetic analysis allowed us to answer questions that until now archaeologists would not even attempt to address," said Jean-Denis Vigne a bio-archaeologist at the National Center in France and co-author of the study. "A small number of cattle progenitors is consistent with the restricted area for which archaeologists have evidence for early cattle domestication circa 10,500 years ago. This restricted area could be explained by the fact that cattle breeding, contrary to, for example, goat herding, would have been very difficult for mobile societies, and that only some of them were actually sedentary at that time in the Near East."