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ECCE EQUUS

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Modern horses, zebras, and asses belong to the genus *Equus*, the only surviving genus in a once diverse family, the Equidae. Based on fossil records, the genus appears to have originated in North America about 4 million years ago and spread to Eurasia (presumably by crossing the Bering land bridge) 2 to 3 million years ago. Following that original emigration, there were additional westward migrations to Asia and return migrations back to North America, as well as several extinctions of *Equus* species in North America. The last prehistoric North American horses died out between 13,000 and 11,000 years ago, at the end of the Pleistocene, but by then *Equus* had spread to Asia, Europe, and Africa.

Animals that on paleontological grounds could be recognized as subspecies of the modern horse originated in North America between 1 million and 2 million years ago. When Linnaeus coined the species name, *E. caballus*, however, he only had the domesticated animal in mind. Its closest wild ancestor may have been the tarpan, often classified as *E. ferus*; there is no evidence, though, that the tarpan was a different species. In any case the domesticated horse probably did not arise at a single place and time, but was bred from several wild varieties by Eurasian herders.

In recent years, molecular biology has provided new tools for working out the relationships among species and subspecies of equids. For example, based on mutation rates for mitochondrial DNA (mtDNA) Ann Forstén, of the Zoological Institute at the University of Helsinki, has estimated

that *E. caballus* originated approximately 1.7 million years ago in North America. More to the point is her analysis of *E. lambei*, the Yukon horse, which was the most recent *Equus* species in North America prior to the horse's disappearance from the continent. Her examination of *E. lambei* mtDNA (preserved in the Alaskan permafrost) has revealed that the species is genetically equivalent to *E. caballus*. That conclusion has been further supported by Michael Hofreiter, of the Department of Evolutionary Genetics at the Max Planck Institute in Leipzig, Germany, who has found that the variation fell within that of modern horses.

These recent findings have an unexpected implication. It is well known that domesticated horses were introduced into North America beginning with the Spanish conquest, and that escaped horses subsequently spread throughout the American Great Plains. Customarily, such wild horses that survive today are designated "feral" and regarded as intrusive, exotic animals, unlike the native horses that died out at the end of the Pleistocene. But as *E. caballus*, they are not so alien after all. The fact that horses were domesticated before they were reintroduced matters little from a biological viewpoint. Indeed, domestication altered them little, as we can see by how quickly horses revert to ancient behavioral patterns in the wild.

Consider this parallel. To all intents and purposes, the Mongolian wild horse (*E. przewalskii*, or *E. caballus przewalskii*) disappeared from its habitat in Mongolia

and northern China a hundred years ago. It survived only in zoos and reserves. That is not domestication in the classic sense, but it is captivity, with keepers providing food and veterinarians providing health care. Then surplus animals were released during the 1990s and now repopulate a portion of their native range in Mongolia and China. Are they a reintroduced native species or not? And how does their claim to endemism differ from that of *E. caballus* in North America, except for the length and degree of captivity?

The wild horse in the United States is generally labeled non-native by most federal and state agencies dealing with wildlife management, whose legal mandate is usually to protect native wildlife and prevent non-native species from having ecologically harmful effects. But the two key elements for defining an animal as a native species are where it originated and whether or not it coevolved with its habitat. *E. caballus* can lay claim to doing both in North America. So a good argument can be made that it, too, should enjoy protection as a form of native wildlife.

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