

Summary of Findings of the DNA Analysis of Several American Breeds

Summary by D. P. Sponenberg

Analysis by Ámparo Martínez Martínez and Juan Vicente Delgado Bermejo

Breeds included were:

Goats: San Clemente Island, Arapawa, and Spanish (Texas)

cattle: Texas Longhorn (all CTLR registered)

swine: Mulefoot, Guinea, Red Wattle

horse: Mustang (various)

These were examined by microsatellite analysis. Number of microsatellites tested were 26 for goats, 27 for cattle, 25 for swine, and 23 for horses.

Goat

Goat breeds included in the analysis were from Spain: Majorera, Palmera, Tinerfeña, Blanca Andaluza, Blanca Celtíberica, Malagueña, Murciana, Granadina. From Latin America: Moxotó (Brazil), Criolla Boliviana (Bolivia), Criolla Cubana (Cuba). Others: Cape Verde, Alpine, Boer, Anglo-Nubian, and Saanen.

The overall within-population variation for Arapawa and San Clemente Island goats was low, for Spanish goats was higher. This indicates that the history of foundation and subsequent isolation for Arapawa and San Clemente Island goats is accurate. These are relatively homogeneous populations, and each distinct from the other.

When compared to other populations the USA Spanish group clusters strongly with the other Iberian breeds. This indicates that the history on these is indeed accurate, and that they belong here. The Arapawa does not cluster here, but is off in a corner somewhere between Anglo-Nubian and Boer. This does not imply a relationship with these breeds, but does indicate that Arapawas are very unlikely to have had an Iberian origin. The San Clemente Island goats are very remote from the other breeds. Some aspects of the analysis suggest a similar remoteness from other breeds for the Arapawa, but that should be followed up by further analysis with a broader array of breeds in the comparison. Specifically, if the Arapawas are "Old English" then including more North Atlantic goat breeds would likely point to this conclusion.

The analysis indicates that the Arapawa and San Clemente are breeds, and that they are relatively inbred. The sampling technique was broad (not all from one subpopulation) so this is no doubt accurate. Steps for effective conservation and avoidance of further inbreeding are necessary. Each is genetically unique, and not a part of a larger breed group as far as we know now.

Cattle

The Texas Longhorns were all from CTLR cattle – which are selected to be phenotypically and genetically unmixed with Asian or Northern European cattle. They were compared to a host of Iberian and Iberian-based breeds, as well as Herefords and Holsteins. They cluster, as expected, with the Iberian breeds, and most closely with the Mexican Criollo which is not surprising. They "are what we thought they were" and warrant close attention to their conservation.

Swine

The swine were compared with Iberian and Latin American breeds, as well as with the Black Canary Island breed. Too few Red Wattle Hogs were submitted for them to be analyzed on a population basis. The Duroc was also included.

The Guinea Hog and Mulefoot are both very homogeneous, indicating small populations with long isolation. In other words, they match the history and there has been little or no crossbreeding in any recent years. Mulefoot hogs are closely clustered with other criollo breeds, and the Guinea hog is very remote from any other breed in the analysis.

Horses

The mustangs were from a wide range of origins. I thought I had carefully noted that on the submission, but the analysis does not reflect geographic origin. So – I'll send that information along and see if it helps them at all.