GUANACO 1 - Working to Save Peru's Endangered Guanacos

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The guanaco is the largest wild artiodactyl in South America and a primary landscape species. Hemiauchenia, the direct ancestor migrated from North to South America three million years ago and the oldest known fossil guanaco remains date to two million years ago in Argentina. They have also been found at Tarija, Bolivia, on the eastern slope of the Andes, but did not spread into the high Andes before the establishment of modern climatic conditions approximately 12,000 years ago. Prior to European contact, guanacos were found along the Pacific shore and into the high Andes, from approximately 8º South latitude to Tierra del Fuego, as well as east into the Paraguayan Chaco and across the pampas to the Atlantic Ocean near Buenos Aires. The prehispanic guanaco population has been estimated at 30 to 50 million. These numbers rapidly declined during the European conquest, and by the mid-nineteenth century the impact of indiscriminate hunting and commercial sheep rearing had reduced the guanaco population to 7 million. At present an estimated 600,000 survive.

Four poorly defined subspecies of guanaco have been described: the first, L. g. guanicoe (Müller, 1776), in Patagonia, Tierra del Fuego and Argentina from 35° S latitude south; the second, L.g. huanacus (Molina, 1782), in central Chile; the third, L.g. cacsilensis Lönnberg, 1913, in southern Peru, north west Argentina, northern Chile and Bolivia; and the fourth, L.g. voglii Krumbiegel, 1944, on the eastern slope of the Argentine Andes at 21-32° S latitude. None the less, the characteristics which set each subspecies apart are not fully detailed in these early works, and recent research on DNA suggests that only two are valid, the larger, darker southern guanacos (collectively L.g. guanicoe) and the smaller, lighter coloured L.g. cacsilensis found at the northern boundary. Osteological remains from Andean archaeological sites document the origin of llama domestication from the guanaco at high elevation localities within the range of L.g. cacsilensis starting some 6,000 years ago, and this has recently been confirmed by DNA analysis. There is no evidence, archaeological or molecular, that the Patagonian guanaco was ever domesticated, although tamed animals were sometimes kept.

Lower left , Huallhua, Ayacucho Department

Upper right, group of 5, Chavin, Ica Department

Lower right, group of 3, Salinas and Aguada Blanca Reserve Arequipa Department

Background Calipuy Reserve, La Libertad Department

Group of 2 guanacos at Yarabamba, Arequipa Department

All guanacos exhibit similar coloration varying from dark reddish brown in the southern populations to lighter brown with ocher yellow tones in the northern subspecies. The chest, belly and internal portion of the legs are more or less pure white, the head grey to black with white around the lips, eyes and borders of the ears. Fiber diameter varies from 16.5 to 24 microns and contains from 5 to 20% hair. Withers height of adult animals varies from 110 to 120 cm for guanacos from Patagonia and Tierra del Fuego, compared to 100 cm for the small northern guanaco, with live weights for adult animals at 120-130 and 96 kilos respectively.

Guanaco numbers have continued to decline since European contact. In the early 1950's, reports stated that uncontrolled hunting of yearling chulengos in Patagonia threatened survival of the species, and in 1969 the Peruvian guanaco population was found to be on the edge of extinction. In 1974, the IUCN (International Union for the Conservation of Nature and Natural Resources) declared the guanaco a vulnerable species. At present the guanaco receives protection 14 reserves in Argentina, 4 in Chile, 3 in Peru and one in Bolivia, leaving only the Paraguayan populations unprotected. The IUCN South American Camelid Specialist Group has urgently recommended increased protection for the guanaco, especially for the northernmost populations.

When the American Committee for International Wildlife Protection survey of Peruvian mammals reported in 1969 that both the Peruvian vicuña and guanaco populations were on the verge of extinction, the Peruvian government responded rapidly, declaring both species endangered, and the subsequent successful rescue of the vicuña is well known. The story of the Peruvian guanaco, however, is very different and it has remained virtually unknown to science, and on the verge of extinction. Only 5,000 animals are estimated to survive, 3,500 of which are located in Peru.

A large-scale scientific study aimed at saving the Peruvian guanaco from extinction was begun in July 2003. Known as GUANACO 1, the joint project is financed by the Darwin Initiative of the UK and headed by Michael W. Bruford of Cardiff University (UK) and Jane C. Wheeler of CONOPA (Peru). Utilizing a combination of genetic studies, population viability analysis and ecological surveying, the goal of the project is to produce a management plan for conservation, and the human capacity to implement it, as well as to continue such studies on similarly imperiled Peruvian species in the future.

GUANACO 1 builds on an earlier Darwin Initiative project on Peruvian vicuña population genetics and conservation that we carried out during the 1990's. Thanks to collaboration with the authorities at CONACS (Peru's National Council for South American Camelids), we were able to sample vicuña populations throughout the country, taking blood samples for DNA extraction when the animals were rounded up for shearing. The subsequent study of genetic variation in each population confirmed that the vicuña has gone through a genetic bottleneck and defined the special management requirements needed to insure the preservation of genetic biodiversity in this species. In order to obtain the same information for the guanaco, we also need to obtain DNA but, since capturing them has proven next to impossible we have been forced to find another source, extracting it from fecal samples. I won't go into all the additional nicknames our project has been given as we have crossed the country collecting the necessary samples, but will say that it hasn't been easy. Sport hunting and other human activities have driven most guanacos into inaccessible and very difficult terrain, and successful extraction of DNA from feces has required tremendous effort.

Our sampling began with the largest population, 538 reported, at Calipuy

Calipuy Reserve, La Libertad Department

National Reserve in the Department of La Libertad, at the extreme northern end of guanaco distribution in Peru. This population is the most accessable, and, being protected, was the easiest to sample. Utilizing a powerful spotting scope to observe defecation events, and two sets of radios to triangulate the location of the sample and permit its collection and preservation in the shortest possible time, the team soon worked out the most efficient procedures. More than 30 samples were collected and returned to the lab in Lima even before the field vehicle, an infamous green pickup which has more often let us down that helped us out. Having expeditiously sampled Calipuy, the team optimistically moved on towards the south, only to find that the problems were just beginning.

Chavin, Ica Department

The second largest population, 456 guanacos, at Chavin in the Department of Ica brought them down to earth with a thud. The very dry environment was totally different from Calipuy and the animals were located on steep, often inaccessible scree covered slopes which placed everyone's life in danger. Sampling the third largest population, just over 300 animals, at Huayhuas, near the Pampa Galeras vicuña reserve in the Department of Ayacucho, proved somewhat easier, in part because a group of animals took pity and crossed the road in front of the team, and seven left samples within easy reach. But the worst came at the end, trying to find the 142 guanacos reported for Machahuay in Arequipa, the 79 reported for Yanaque in Moquegua and the 51 reported for Vilani in Tacna. Despite a major investment of time and effort, only 17 samples were collected. Time after time the request for a guide to assist in finding the guanacos elicited an offer to help hunt them, reflecting what seems to be a massive recent reduction in their numbers of animals in extreme southern Peru.

Once the samples reached the lab, extraction of the DNA was undertaken. This proved a long and arduous process, and the samples from Calipuy, the best quality of all in reguards to freshness, turned out the be the most difficult apparently due to something in their diet which caused a breakdown in the DNA. We do not know what plant is to blame, but it is certain that the habitat at Calipuy is the most lush and moist of all those sampled. After extraction, analysis a portion of the cytochrome b gene was undertaken and has been completed for all the samples. The analysis of 12 microsatellites for determination of genetic variability in the populations is still in process.

At the beginning of April we will hold a PHVA meeting in Lima to evaluate the results of the GUANACO 1 project and arrive at a management plan by concensus. PHVA stands for Population, Habitat Viability Assessment and refers to the VORTEX statistical program used by scientists to determine the probability that a population will survive or become extinct. Over two days we will bring together representatives of all interested parties, Peruvian government authorities, politicians, farmers, sports hunters, miners, educators, lawyers, environmental rights groups, scientists etc. for head on discussions, with input from IUCN specialists and experts concerning the experience of Argentina, Chile, Bolivia and Paraguay in guanaco conservation, with the goal of preparing a management plan to assure the survival of L.g. cacsilensis. Hopefully all those who attend will be justified in donning the "I helped save the Peruvian guanaco from extinction" tee shirt at the end of the meeting.

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Author's Note:

The Guanaco 1 field work was carried out by: Domingo Hoces, Rocio Quispe, Katherine Yaya, Hugo Castillo, Alvaro Veliz, Karina Cabello, Josmel Pacheco, Stieve Marthans and Fabricio Cartagena under permits from Peru,s Instituto Nacional de Recursos Naturales, INRENA.

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