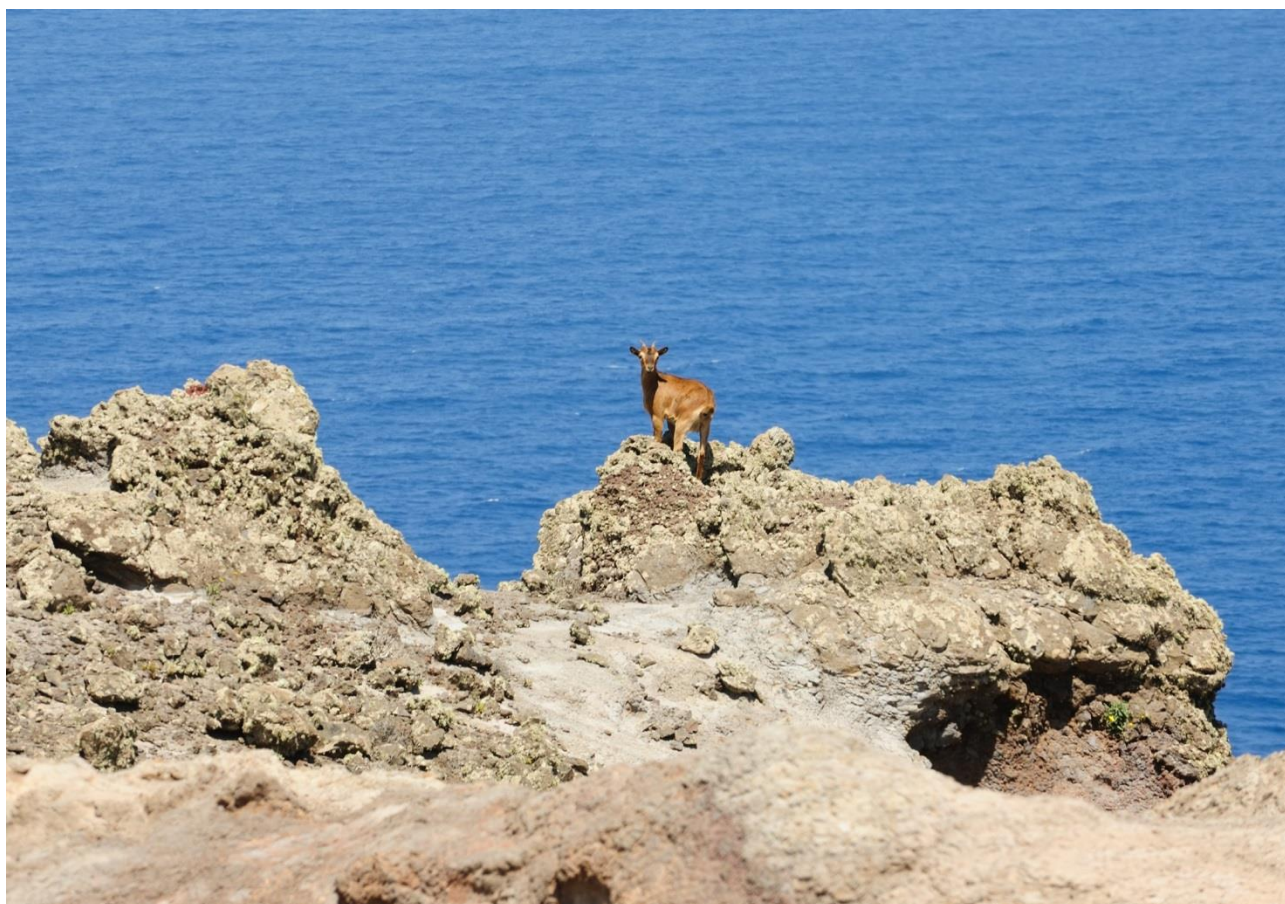




## Feral Goat populations on the Atlantic Islands: The Case of Deserta Grande Goats

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*Deserta Grande. Young adult female. photo H. Reis*

Feral goat populations occur on some islands in the Atlantic area. Some of them are the result of recent release of current domestic stock but other populations of feral goats are considered ancient introductions, such as the feral goats of Deserta Grande islet, one of three islands (Chao, Deserta Grande and Bugio) that form a sub-archipelago of the Autonomous Region of Madeira (Portugal).

The probably oldest introduction of goats on the Atlantic islands took place more than two thousand years ago on the Canary Islands archipelago with the arrival of the first settlers the "Guanches" who introduced the prehispanic goat, pig and

sheep. Later on, other feral goat populations were introduced to Selvagem Grande islet, Deserta Grande, Bugio, Madeira and Porto Santo islands, northern atlantic Santa Maria island (Azores archipelago) and also down to the south Atlantic, Rombo islets (Cape Verde archipelago), Santa Helena, Ascension and Tristan da Cunha islands. Some of them disappeared within the past 150 years due to intensive hunting or as a result of environmental actions to restore island habitats.

Over centuries some populations of the originally introduced prehispanic type goats survived in inaccessible mountain areas of the Canary Is-

lands, but only two small populations still existed in the middle of the XX century in the "Caldera of Taburiente" on la Palma Island and Pico de la Zarza in Jandia, Fuerteventura Island. Local hunters and shepherds from la Palma island hunted the last Prehispanic type goats, whose meat was indeed highly esteemed. On Fuerteventura island a German landlord ordered the protection of "Valdomero", the remnant small feral goats of "Pico de la Zarza", for trapping and shooting in the few water points located in the cliffs. They competed for grass and water resources with the milk goat flocks and imported karakul sheep. Actual autochthonous Canary breeds are the result of a mixture of prehispanic type and new goat stocks introduced after European colonization. According to genetic characterization studies the basic haplotype of the prehispanic goat still occurs in the today Canary breeds by maternal lineage.

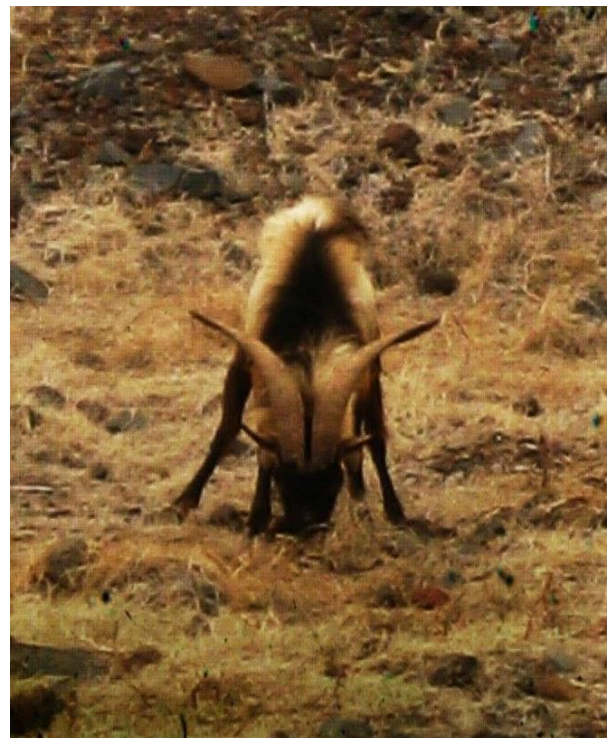
Historic documents proved that feral goats were introduced in the Desertas islands of Madeira by Portuguese sailors in 1420. An order of the Madeiran Governors from the 18th July 1481 to buy a batch of feral bucks from the Canaries and release them on those Portuguese islands to "refresh" the existent goat population. This indicates an earlier introduction. Some feral goats were released in Selvagem Grande islet as well, it is the biggest island of Selvagens sub-archipelago located closer to the Canary Islands than Madeira. During the 20st century expeditions to Selvagens there were no reports of any feral goat viewings there. It seems as if the last feral goats were hunted by sailors and fishermen during the 19th century.

In the case of Desertas, reports about evidence of feral goats occurred over centuries but morphological description details of the animals in Deserta Grande and Bugio islet were missing. Also, local people of Madeira who went for hunting with dogs from time to time (Frutuoso G. Saudades da Terra) but did not describe the goats they hunted. Likewise, in sport magazines or geological and zoological expeditions publications descriptions were missing. Later a detailed description of the Desertas goats was made and the morphological differences between the Deserta Grande and Bugio populations were recognised. At that time Desertas were the property of the British families Cossart and Hinton who invited hunters on the way to Africa for goat-, rabbit- and even the monk seal hunting. (Country Life illustrated p 173 volume 6, December 1899):

"The goats on the Deserta Grande are of a rusty brown, with black markings on the back and shoulders. Sometimes grey goats occur. On Bugio a big deep black type occurs. The horns of the Deserta goat range from 12 - 15 inches length with a span of 15 to 18 inches, the largest on

Bugio measured 25.5 inches from tip to tip, 20 inches round the curve, 16 inches from corner to corner and 7.5 inches each horn round the base. The she-goats are as slight and active as gazelles, and their small straight horns are never more than 3 or 4 inches long" (1 inch = 2.54cm).

An article from 1909 describes: "Deserta goats are brown in colour, although here and there one may meet some with a light grey buck. On Bugio there are a number of both rabbits and goats, the latter are of much larger size than those on Deserta and are of a jet black colour" (Kobel W.H.1909: Goat shooting in the islands. In: Madeira Old and New Chapter XVI p.212).



*Adult male of Deserta Grande. Photo Dário Abreu*

Kobel described the island adaptation, morphology and possible origin of the goats. There is some evidence of protective coloration and reversion to the wild type in the markings and colour of the Deserta goats which continues to approximate more closely to that of the rocks among which they live. Black and white animals were eliminated possibly through their conspicuousness. The goats of Desertas were usually hunted by drive-hunting. The beaters came from a village called Caniço and learned their work while hunting puffins on the cliffs. A hunted buck was 30 inch high at shoulder and of brown colour with dark fore-quarters and beard, a black saddle and dark line running down the back, 13 inch long horns had the spiral twist (J.B. Stat-ham 1922: Through Angola - A Coming Colony chapter I - Wild goats of the Desertas).

It is well known that dwarfism is an evolutionary response of large mammals to islands habitats where is less space and food. In a closer study of horn type, body proportions and colouration pattern of the stuffed prehispanic goats of the Canary Museum in comparison with Deserta Grande feral goat populations several similarities such as small size, similar physical proportions, shape of the horns and predominant coloration that manifest the wild allele. This suggests a common link between both populations, but also with some domestic Serrana goats from Madeira and Azores. It was generically considered that the origin of the domestic goats of the Portuguese islands were introduced from Portugal (Algarve). The Bugio black goat population is an exemption because of its size and colour. Bugio islet proves habitats for mammals only in the southern half of its territory, because of its extreme orography, lack of permanent fresh water and scarce pastures it has a capacity for not more than about eighty individuals. This raises the reasonable doubt regarding the "antiquity" of this black breed of the Bugio Islet. Actually, due to several droughts the population decreased, and fresh animals were introduced to the islands for hunting.

In fact, a variety of different species were introduced on Deserta but didn't survive over time, such as the introduced Mediterranean Sardinia Moufflons on Deserta Grande or hares introduced in the smallest islet Chao and Deserta Grande, chicken, cats and Guinea fowl too.

The Bugio black goat population suggests that they are like the black feral goat population introduced around 1800 in Île Europe located in the Mozambique Channel. The Bugio black goats were eradicated in 2009 as collateral effect of invasive rodents poisoning under the EU Life Project SOS Freira de Bugio. The eradication of the Île Europe black goats is "pending". That population located in the Indic Ocean where the original black and white domestic goats were introduced two hundred years ago, still a black population occurs in almost 99% of individuals. In recent years, first individuals show a wild colouration with

brown and dark markings (TAAF reports). Currently, in the Mid-Atlantic islands area, only the feral brown goat population of Deserta Grande is still alive, reputed to be an ancient introduction in the Madeira Islands, regardless of its possible prehispanic origin or landrace breeds (Serrana) introduced in the past.

Such feral populations need more attention by the Institutions. On the Canary and Azores islands, local projects for recovering and standardising autochthonous breeds have been developed after first investigations in the eighties. It is very probable that Madeira island area has its specific genotypes present in local sheep, pigs, and goats. There are also varieties of cultivated plants need to be conserved.

The Madeira local domestic goats so called "Serrana" often occur as a mixture of introduced foreign and popular commercial breeds. This is a direct cause of local genotypes disappearance. The isolated feral population of Deserta Grande could represent a local genotype in the Madeira and Azores area.

Within actions to eradicate invasive species on Deserta Grande more than 900 feral goats have been shot from 2014 to 2017 (Progress Report of European Life Recover Natur Ilhas Desertas published data (31 / 8 / 2017) IFCN RAM). Recent media statements talk about approximately 200 individuals remaining to be eradicated. Several wild species are critically endangered. However, the implementation of an action protocol is needed that allows genetic studies to determine occurrences of feral populations and local varieties present in nature protected areas. A greater cooperation and understanding between institutions, Ministries of Agriculture and Environment is needed. The protection of biodiversity is a priority but also the protection of local resources and the genetic diversity of local breeds are also of great importance. Agrobiodiversity is an accepted part of biodiversity; this fact often gets forgotten.



*Deserta Grande feral Goat and kid. Photo: JC Gutierrez*