

The Genetics, Habitat and Future of the White Lion
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In my essay I hope to explore the roots of the White Lion and the difficulties experienced by their population due to their distinctive colour. I have always been fascinated by the beauty and rarity of the White Lion and I hope that by completing this essay I will have gained a little more knowledge on their genetic makeup, their history and habitat, populations and their future.

The genetics behind the White Lion

The White Lion, which is sometimes referred to as the “blonde lion”, is a genetic mutation of the common, tawny African Lion, *Panther leo*. A White Lion cub is the offspring of 2 lions which carry the “autosomal recessive gene”. This does not necessarily mean that all the cubs in the litter will be white, but if both parents do not carry the gene, then none of the cubs will be white.

The White Lion phenotype is Leucistic; they are not albinos which they are often mistaken for. Like albinism, leucism is the reduction in pigmentation, but unlike albinism, which is only the reduction of melanin production, leucism is a result of a reduction in all types of skin pigment. Research shows that in the White Lion, the production of the yellow pigment in the hair shaft, Phaeomelanin is reduced, giving rise to the white colour. White Lions, especially the males, display the black pigment Eumelanin in the hair shaft in all the usual places; the tip of the tail and mane and behind the ears. The Eumelanin is of degraded quality and appears as an off black/brownish colour referred to as sepia. They also have black on the tip of their noses and lining their eyes and pigmentation in their paw pads.

Another difference in albinism and leucism is the difference in eye colour. As albinos lack melanin in their retina and iris, the blood vessels in the eyes are visible and this results in their characteristic red eyes. Leucism, on the other hand, results in normal eye colour. Young cubs of both Tawny and White Lions have bluish iris colour, which changes slowly to yellow within the span of a few months. (Robinson R. & De Vos V. 1982)

Studies carried out based on pedigree data available for White Lions in captivity show that the White Lions are whitest at birth with individual variance in the degree of pigmentation or soiling of the coat being displayed after the adolescent and adult moults. The

autosomal recessive allele responsible for leucism has been called c^{ch} and is described as a mutant in an allelic series at the albino locus C that characteristically causes the degradation in pigmentation. (Robinson R. 1991)

The History and Habitat of the White Lion

Accounts of the existence of White Lions have been around for centuries in Africa but have often been dismissed as superstition. In African folklore, it is said that the White Lions were children of the sun god sent down to earth as a gift.

The 1st official record of a White Lion sighting was in the early 1940's in the Peru area of Timbavati by a European lady who's family owned large parts of the land in that area.. In 1959 two White Lion cubs were seen in the Krugar Park Region but were never seen again. The first White Lion cubs to be captured were detained in 1975 from a litter born in the Timbavati Game Reserve. Two White Lion cubs, 1 male and 1 female and their tawny brother were captured by researcher Chris McBride. The following year, 1976, a female white cub was born to a pride in the Timbavati region. The lioness was shot at the age of 2 and her skin was sold in a shop in Sabi a town not far from the Krugar National Park.

It was the view of Mr. McBride that the White lion cubs were in danger of starvation as their white colour made them stand out so they were bound to be unsuccessful hunters according to him. The idea that the White Lions cannot survive in the wild due to a lack of camouflage has never been scientifically proven.

White Lions have only ever been found in the Krugar National Park and the first captured White Lions were taken from the Timbavati Game Reserve, a private game reserve adjacent to the Krugar National Park. This suggests that the White Lion gene pool was limited to here. There is evidence to suggest that the White Lions survived successfully in their natural distribution range for a minimum of 56 recorded years. (Tucker & Turner 2008) After the world became aware of the existence of the rare White Lions, demand for them became great. Trophy hunters wanted to shoot them and zoos wanted to exhibit them. The White Lions were artificially removed from their habitat and exploited for financial gain by hunting operations and captive breeding institutions. Lion culling in the Krugar National Park in the 1970's and trophy hunting of male lions in the Timbavati significantly depleted the gene pool as it not only White Lions, but tawny lions carrying the recessive genes were killed. Captive breeding saw a lot of inbreeding, mating fathers with daughters etc to produce more of these rare lions to sell to interested parties for large sums of money. This further reduced the gene pool of the White Lion. All White Lions in captivity can be traced back to the mating of a tawny lion carrying the recessive gene with his white daughter in 1982. In 1995 there were fewer than 10 White Lions worldwide.

In the wild, there were less than a handful of births from 1980-1993, and none from 1993-2006. (Turner J. 2008) There was technically a 12 year extinction where no White Lions had been observed in their natural habitat. Their natural habitat is the Greater Timbavati Region, South Africa. This region displays white sandy river beds and in the winter the long grass in this area is scorched pale. (Turner J. 2008) This suggests that the White Lion's colour would be more advantageous in this region than the tawny colour. This contradicts the opinions of those, including Mr. McBride, who suggested the White Lions were at a distinct disadvantage when it came to hunting due to their lack of camouflage.

The population and future of the White Lion

Currently there are 302 White Lions in captivity. In the wild, in 2006 a pride were reintroduced into the natural habitat of the Timbavati Region by the Global White Lion

Protection Trust. This is a “non-profit conservation and community development organisation” (www.whitelions.org homepage) set up in 2002 by Linda Tucker. This organisation and its dedicated staff and researchers are devoted to trying to re-establish a White Lion population in their natural habitat. To date, the organisation has reintroduced to the semi free-roaming conditions of the 1000 hectare control area of the Trust’s founding property in the Greater Timbavati (Turner J. 2008) a pride of un-imprinted White Lions. Observation of the pride shows that they are hunting successfully, despite their colour and are thriving in their natural habitat. The White Lions are “apex predators” this means that they successfully hunt during the day and the night. The reintroduced lions had been observed hunting and killing prey as big as a giraffe.

In 2008, the Global White Lion Trust reported that the daughter of their original reintroduced lioness had given birth to 3 White Lion cubs. These were the first White Lion cubs to be born in the wild in 14 years. This indicates the fantastic success of the work done by the Global White Lion Trust.

The ongoing work of the Global White Lion Trust aims to change the classification of the White Lion. Currently the White Lion falls into the same group as the African Lion, *Panthera leo* because it is not recognised as a separate subspecies. This means that the White Lions are not protected from hunters because any permit issues to hunt an African Lion can be used to hunt a White Lion. (Turner J. 2008) The Global White Lion Trust has embarked on ground-breaking research to identify the genetic marker which distinguishes the White Lion from the tawny lion. If they were to identify the genetic marker, a proposed case to have the White Lion classified as a “critically endangered subspecies/regional polymorphism (variant)” would be more viable.

The IUCN (International Union for Conservation of Nature) which “helps the world find pragmatic solutions to our most pressing environment and development challenges” compiles a Red List which is “the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies.”(www.iucn.org) As the White Lion is not classed as a subspecies; its status is shared with *Panthera leo* and is only listed as Vulnerable. This is hardly adequate for an animal which had 12 years of technical extinction in the wild.

The Global White Lion Trust can take hope from the case of the “Spirit Bear” (Kermode Bear) in British Columbia, Canada. The Spirit Bear is a white variation of the Black Bear, *Ursus americanus* and it is unique to one location in the world. The white colour in the coat is believed to be present as a result of a double recessive allele; this is exactly the same as in the case of the White Lion. Unlike the White Lion however, the Spirit Bear has been classified as a subspecies, *Ursus americanus kermodei*. Seeing as the factors which led to the reclassification of the Spirit Bear are very similar to the factors which make the White Lion unique, it gives hope that a reclassification of *Panthera leo* could be possible.

In conclusion, for the foreseeable future, the plight of the White Lion continues. In order for the situation to change, the White Lion must gain status as a subspecies on *Panthera leo* to stand any chance of a population increase in the wild. As it stands, the White Lion has no protection from hunters with permits to kill lions. This could be detrimental to the reintroduced pride of the Global White Lion Trust. The Trust is carrying out research on an ongoing basis to try and find the vital genetic marker which will provide the distinction needed to class the White Lion as a subspecies. They are also appealing to the South African government to realise the rarity and native importance of the White Lions. Until this is

realised or the genetic marker discovered, the only rise in the White Lion population will be the birth of captive inbred cubs.

If the South African government can be encouraged to see the existence of the White Lion could be used to boost tourism in the area then maybe they will have more interest in the preservation of these sacred creatures. With captive births, the genetic pool is being decreased as the cub's produces are more often than not inbred. This can also lead to health problems for the cubs which in the long run is cruel and an inhumane way of producing more White Lion cubs. It is my opinion that any zoo or private captive institution owning White Lions should all come together and find a way to produce the most genetically pure White Lions which could potentially be reintroduced to the wild. This would be in the interest of the long term survival of these beautiful animals.

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