

## DEMOGRAPHY, DISTRIBUTION AND MANAGEMENT OF WALIA IBEX (*Capra walie*)

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### ABSTRACT

The Walia ibex (*Capra walie*) is an endemic species representing the genus *Capra* in Ethiopia. The Simen Mountains National Park (SMNP) is the southern limit of the genus and the only place where the species is found. This review paper will attempt to discuss the conservation status and management problems of the endemic Walia ibex. The size of the population has been increasing slightly since the last one decade. Management system has been improved. However, there is only one single population and the size of the habitat is very small. Human population around the Park and its surroundings is increasing from time to time. Overgrazing and transmission of diseases from domestic livestock and hybridization are serious threats that need especial attention by conservation managers.

Key words: critically endangered, Ethiopia, population trend, re-introduction, Simen mountains, suitable habitat.

### RESUMEN

#### *Demografía, distribución y manejo de la población de Capra walie*

La ibex walie (*Capra walie*), es una especie endémica de Etiopía y es el representante más meridional del género *Capra* en el mundo, en concreto en el Parque nacional de las Montañas de Simein, único enclave en el que la podemos encontrar. En este trabajo se intenta discutir el estatus de conservación y los problemas de manejo de esta especie. El tamaño de la población se ha incrementado paulatinamente en los últimos años y de forma más consistente en la última década. El sistema de manejo se ha considerado efectivo. Sin embargo, el existir solo una población y que el hábitat sea cada vez más pequeño implica problemas de viabilidad de la especie. La población humana en los alrededores del Parque aumenta de forma importante y ocupa las zonas de transición del mismo. Por lo que el Sobre pastoreo y la transmisión de enfermedades del ganado

doméstico y sobretodo la posible hibridación son los problemas más serios y acuciantes que requieren una especial atención por parte de los gestores.

Palabras clave: Cabra walie, tamaño poblacional, problemas de manejo.

## INTRODUCTION

Ethiopia is renowned for its endemic fauna and flora, which arise from the vast extent and isolation of its highlands within the Afrotropical region (Stephens *et al.* 2001). Northern highlands of Ethiopia in general and the Simen mountains in particular have been a center of attention for various European explorers mainly interested in the collection of plant and animal specimens. The Simen mountains, especially Mounts Buahit is known for being type locality for many plant species of the African afro-alpine ecosystem (Edwards 1996). The SMNP has international significance due to its biodiversity, its many endemic species, and its outstanding bio-physical features.

SMNP is endowed with outstanding wildlife in areas where natural habitats remained. However, it is under heavy human pressure. Rural poverty is widespread and is undermining the agricultural subsistence system at an accelerating pace. The Park and its restriction on human use were abolished for sometime in 1980s, the sustainability of the mountain livelihood system of the people in Simen could not be guaranteed (Hurni & Eva 2000). Hence, there has been a growing concern about a wide spread of biodiversity loss in the mountain ecosystem of Ethiopia where large portion of endemism is found (Nemomissa & Puff 1998, Hurni & Eva 2000). Studies and reports have shown substantial declines in the status of many groups of animals and plants. While human pressures are increasing, the fate of important components of biological diversity of the Park will remain questionable.

## BIODIVERSITY

The unique biodiversity of the area includes Walia ibex (*Capra walie*), Ethiopian wolf (*Canis simensis*), Gelada baboon (*Theropithecus gelada*) and notable plant species such as the Giant Lobelia (*Lobelia rynchopetalum*), among others. The Walia ibex in-migrated into Simen during the ice age (Nievergelt 1981), only a few thousand years earlier than human land users (Hurni & Eva

2000). Because of this rare endemic animal, Simen received the attention of the global conservation community, which called for its protection and survival. This external initiative led to create a National Park, thus forming a protected area where nature would be safeguarded (Hurni & Eva 2000).

When it was established, the SMNP covers an effective area of 225 km<sup>2</sup>, although later analysis of the coordinates made the total area to be much small (136 km<sup>2</sup>). The Park was gazetted in 1969 and its borders were described in writing following the recommendations given by a UNESCO mission in 1965, which had visited the area at the request of the Ethiopia government. In 1978, the world heritage committee inscribed the Park in the World Heritage List, thus ensuring the Park an international status. Current area is substantially expanded bringing the total area to 412 km<sup>2</sup>.

### ***The Walia ibex***

The genus *Capra* is naturally distributed throughout the Palearctic and north-eastern Africa. *Walia ibex* (*Capra walie*), a member of the sub-family Caprinae, is the only representative species of the Palearctic ibexes in Ethiopia. This animal is a medium-sized mountain ungulate, showing a marked sexual dimorphism (Shackleton 1997). The species is endemic to Simen and was described as critically endangered species (IUCN 1994). They are confined to small mountain ranges in northern Ethiopia. Ever since E. Rüppell set his foot to Simen in the early 1830's, and described and reported the *Walia ibex* for the scientific communities of the world, the species has been remained known for its elegance and uniqueness at local, national and international level.

Mitochondrial DNA coding genes, in particular, the sequence of cyt b have been proved to be useful for resolving phylogenetic patterns among artiodactyls within evolutionary time frames less than 20 million years (Randi *et al.* 1998). The *Walia ibex* is so unique mainly because it is confined to a single small area and found nowhere else in the world. Recent analysis (Gebremedhin *et al.* 2009) of the phylogeny of the species using molecular phylogenetics of mitochondrial and nuclear DNA reveals that the *Walia ibex* forms a single clad with that of Nubian ibex, and that the later is paraphyletic. The study also showed that *Walia*

ibex potentially has been isolated from Nubian ibex for up to 0.8 million years, which is about the same distance between Alpine ibex and Spanish ibex (Pidancier *et al.* 2006), and more than the distance between Brown bear and Polar bear. Interestingly, ecological niche modeling analysis also showed that *Walia ibex* and Nubian ibex have different bioclimatic niches (Gebremedhin *et al.* 2009). The combination of ecological modeling and phylogeny suggests *Walia ibex* to be considered as an independent unit for conservation.

### **Distribution**

The distribution of *Walia ibex*, even in the mountain chains, is mostly restricted to the edge of the escarpment, which is stretched from west to southeast to roughly 80km (Figure 1). The analysis of ecological modeling (Gebremedhin *et al.* 2009) attempted to identify further areas potentially suitable outside the present range of the species. These areas are possible candidates for introduction or reintroduction. Unfortunately, there is currently no information available about the former distribution of *Walia ibex* outside the Simen mountains. Knowledge about potential habitat, however, is very important for the conservation of this species, as the establishment of a separate population may serve as an insurance policy against any catastrophe that may affect the *Walia ibex* population (Festa-Bianchet 2009).

It is believed that formerly long before it was reduced to its present population size and range, *Walia ibex* was widely spread over the Simen mountains. Many of the species previous ranges are no longer harboring it, and the species has been seriously threatened and included in the IUCN Red List as critically endangered in the mid 1990's (IUCN 1994). Currently most remaining animals are found within the boundaries of the SMNP, majority of them at the eastern side. Considerable portion of the population inhabit the central part of the Park. The western side shelter very few individuals. There is no clear justification for the low population size at the western part, and more research is needed to understand the ecological, behavioral and genetic status of the species. The low population size at the western part of the Park could be due to the reportedly increased predation by leopard which was explained by the frequency of number

of domestic animals killed. But also there might have been poaching problem by local communities as over 70 traps have been collected in 2001/2002.

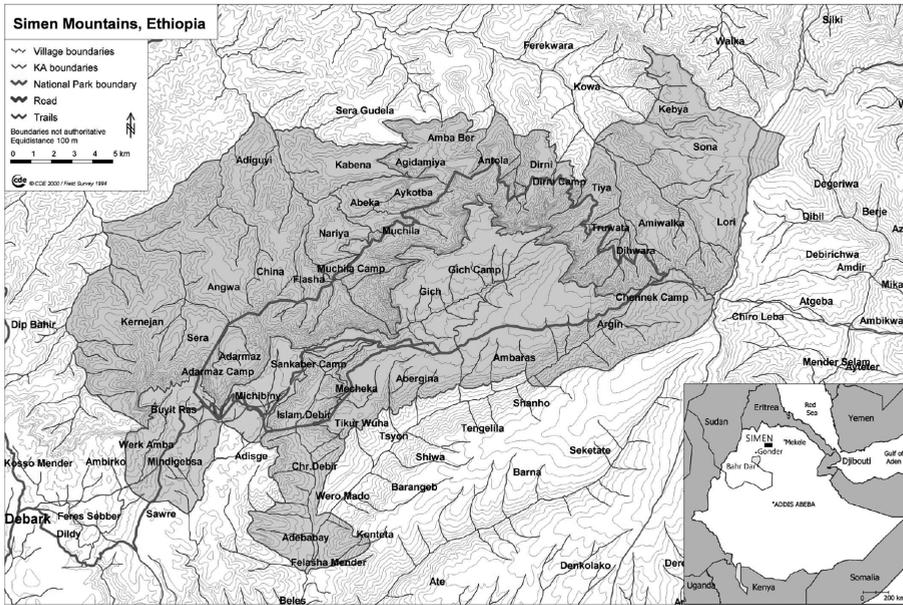


Figure. 1. Distribution of *Walia ibex* in SMNP.

## Population Size

Walia counts have been done at least twice a year since the past fifteen years, with some intermittent counts in the years before. Counts are made at different (about 47) observation points where two to three men with experiences of spotting and counting ibex are assigned for each points and count simultaneously at a predetermined time and date. The natural topography of the Simen would allow having enough time to count a group of ibex by a given group of observers without being double-counted by the other observers at the next observation points. The time serious census data obtained from the SMNP's Office shows that the population size of *Walia ibex* has been increasing since the last decade, unlike

the gloomy picture of the population size in the early and mid 1990s. About two decades ago, the population size of the species was estimated to be between 150-200 individuals. Currently, there is information that the population size has increased slightly - estimated to be over 700 individuals (SMNP unpublished data). Nevertheless, the validity of this number is yet to be confirmed applying rigorous scientific research.

It would also be interesting to know how the distribution pattern of the *Walia ibex* was before man and livestock intervene and started changing the natural ecosystem of alpine environment of the Simen (Figure 2). Taking literatures of empirical observations of different *Capra* species and subspecies into consideration, it is believed that ibex do not range into areas far off the escarpment (Nievergelt 1981). However, it was observed that change in distribution pattern within the last thirty years shows the *Walia ibex*'s ability to respond to man's behavior and their flexibility within their habitat in the SMNP. More interestingly, unlike the previous assumption, the *Walia ibex* in the SMNP show clear tendencies to use the high plateau as feeding grounds (Nievergelt *et al.* 1998).

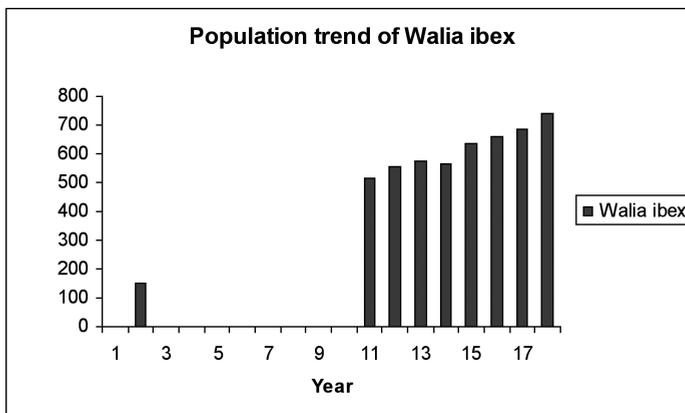


Figure 2. Population trend of *Walia ibex* (from 1993-2009)  
(No census data for 1993, 1995-2002).

## Threats

*Walia ibex* use various habitat types such as the *Erica* forest, grasslands, escarpments, plateaus and others and inhabits rocky gorges, precipices and moorland. The *Erica* forest and other vegetation of the SMNP are valuable to the local communities and have been a major conservation issues for many years. Tree cuttings, grazing and grass cuttings conflict with maintaining the biodiversity of the park and more specifically with the globally significant and flagship species of the Park. Most of the ideal habitat ranges of the species are under serious human pressure; habitat change and shrinkage, overgrazing and poaching are the main threats. Carnivores such as leopard and Verreaux's Eagle (*Aquila verreauxii*) are also considered as predators.

In his comparative study of the state of the vegetation in 1973 and 1996 in the western part of the grassland surveyed at the Simen Mountains National Park, Burnard (1998) showed strong evidence of the growing impact of overgrazing where eroded and very heavily overgrazed areas have doubled in size. Today, nearly a quarter of the area is heavily overgrazed or even destroyed. Less than one third of the remaining area (mainly on the edges) can be considered to be in a nearly natural state (Burnard 1998). It is obvious that human impact has reached a level where the vegetation structure over large area is either disturbed or destroyed and the original diversity reduced. This would have a serious impact on the ecology and food preferences of the *Walia ibex* and other highland ungulates of the Simen. Because of the severe impact of the environmental degradation caused by the heavy overgrazing and cultivation, and the resulted decline in population of flagship species, the Park was listed as a World Heritage Site in Danger in 1996 (Hurni & Eva 2000).

## Management

The *Walia ibex* has been separated from Nubian ibex for about one million years (Gebremedhin *et al.* 2009). The species has been isolated and independently evolving as a conservation unit (*sensu*, Moritz 1999). As a single and small population bounded to a small, narrow mountain range, it is susceptible to various humane-induced and environmental factors which have been remaining

big concern for conservation biologists. After many years of almost stagnancy, population size is increasing (Figure 2). This will have both positive and negative implications. The increase in number will have a potential to ensure population viability. On the contrary, given the small range of the current protected area, carrying capacity will be a challenge in the near future, requiring for strategy to curb the problem. Natural colonization is possible provided that proper habitat management is employed in areas with relatively less human settlement.

Recent intervention of the Integrated Conservation and Development Project-funded by the Austrian Government and implemented in collaboration with the Parks Authority of the Amhara Regional Government resulted with very positive impacts on the management of the Park which was reflected by the increase in number of the species. Recently, the Walia ibex down-listed to the category of the endangered (Gebremedhin & Grubb 2008) from its previous level of critically endangered (IUCN 1994). Having survived two decades of war, the main threat to Walia ibex is habitat destruction caused by human encroachment, extremely limiting its natural habitat. There were over thirty thousand inhabitants in and around the National Park. Few Walia ibex occasionally move to the south-east of their natural range to feed on cultivated crops at places where there is cultivation of barely and other crops on steep gradient. These lead to conflict with local farmers.

There was the tradition that Walia ibex used to move to different mountains areas outside of their present ranges. However, the tradition was interrupted with the increase in human population and expansion of villages (Nievergelt *et al.* 1998). A case in point could be Arquazy - a small village which was established and expanded in the last 15 years. The establishment of the village as a market center for the rural communities blocked the natural movement of the Walia ibex between populations or sub-populations of Silki and Buahit. Human developments in mountain areas, particularly residential areas, fences or major highways, can effectively block travel routes of mountain ungulates and increase the risk of extinction of isolated populations (Festa-Bianchet undated). Realizing the impact of breakage of connectivity, the SMNP recently took a serious measure of relocating about 150 families to nearby villages and demolished the village, through compensation fund from the regional government and the UNESCO.

The positive action taken by the government and the Park Office to ensure the continuity of the Park as natural heritage was well appreciated by the world heritage committee and is considering removing the Park from the list of world heritage sites in danger.

### ***Recommendation***

There are many relevant reasons to protect the Simen Mountains National Park for the future generations. The reasons can be ecological, cultural and economical. Maintaining the fragile ecosystem as a functional watershed for the lowland communities is one of the primaries. Saving rare and endemic mountain ungulates would mean fulfilling the international responsibility to conserve biodiversity as the Park and its resources has global significance. It was learnt, despite the need for more investigation on genetics, ecological, socio-economic and other issues, that the *Walia ibex* is highly threatened species that needs close attention by relevant bodies. The potential suitable sites could be additional alternatives to reintroduce the *Walia ibex*, in to their ancient territories.

Reintroduction is being practiced for a number of larger herbivores. Given the slight increment in *Walia ibex* population after many years of stagnancy, reintroduction into suitable habitats is probably the best option to rapidly counteract immediate extinction risks. Habitat protection and reintroductions have facilitated the successful recovery of other ungulates, such as *C. ibex* (Maudet *et al.* 2002), the Arabian oryx (*Oryx leucoryx*) (IUCN 1998), and bighorn sheep (*Ovis canidensis*) (Singer *et al.* 2000). Genetic study using few faeces samples revealed that there is high inbreeding, and low genetic diversity in the population, probably a consequence of prolonged demographic decline over the last 3000 years (Gebremedhin *et al.* 2009). Genetic study has been overlooked in the management history of the *Walia ibex*. Consideration of such study will have paramount significance in the future conservation of the species especially if reintroduction to other areas is to be considered in the future as an alternative strategy. Successful story of reintroduction programmes of the small population of Alpine ibex (*Capra ibex*) in the Gran Paradiso (Italy) with a current total of over 40000 individuals expanded along the Alps of Europe has been

cited. However, in terms of genetic diversity, the species is among the lowest mammals (Maudet *et al.* 2002) signaling the importance of consideration of genetic issues in reintroduction.

Despite the need for more investigation on genetics, ecological, socio-economic and other issues, it is clear that the *Walia ibex* is a highly threatened species that needs close attention by relevant agencies. The existence of potential suitable sites outside the present ranges of the species could be an additional management option, with the possibility to reintroduce the *Walia ibex*, in their (perhaps) ancient historical distributional range. Further investigation on the suitability of the identified potential sites should be carried out for future consideration of reestablishing animals.

It is noted that, Simen presents a unique situation as it forms a contact zone between two faunistic regions, the palaeartic region in the north, and the Ethiopia region in the south and comprises of species with origins from both regions. Protecting the island-like afro-alpine setting which resulted in the development of unique fauna would have significance conservation implication for ensuring the mountain herbivores in general, and the rare and endemic *Walia ibex*, in particular.

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