THE RESULTS OF A STUDY OF THE POPULATION AND DISTRIBUTION OF SNOW LEOPARDS (UNCIA UNCIA SCHREBER 1775) OF TSAGAAN SHUVUUT NATURAL RESERVE THROUGH AUTOMATIC CAMERAS AND FUR SPOTS

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SUMMARY

Snow leopard is one of the endangered species that has been listed in the Red book of Threatened Species of the International Union for Conservation of Nature (IUCN) as well as in 11 countries of Central Asia, including Mongolia. The main reasons of endangerment include the disappearance and decrease of their prey population due to livestock feeding into their habitat, illegal hunting to sell beautiful skins, hunting of their prey and vanishing of their habitat due to the impacts of human activities. Determining the habitation, population number, and density and comprehensively identifying the factors of influence have vital importance in conserving the population of snow leopards in Mongolia and Russia, the northernmost habitants of the world's snow leopards.

KEYWORDS: *Unciauncia, Snow leopard*

FOREWORD

If an area is inhabited by a snow leopard, it indicates that its preys wild sheep, ibex, and marmot. They are called the Umbrella species of highland climate, because they prey ungulate mammals and certain geographical territories are studied together as a result of the research and preservation activities of snow leopards.

This graceful and beautiful creature is a symbol of pristine nature of Mongolia, a flagship species, which help introduce Mongolia to foreigners, and a charismatic species, which can attract tourists and scientists (Purevsuren, 2009). However, in the last few years conflict between snow leopards and local residents increased due to the deterioration and regression of their habitat, and diminishing of the population of their prey from direct or indirect influences of humans. Therefore, it is our responsibility to keep stable and healthy population of snow leopards and leave it to our later generations. This study was made on the pictures of endangered and secretive wild carnivore of highland climate taken by automatic camera in order to determine its population and density using the patterns of their coats, which was carried out for the first time in Mongolia.

Taking pictures and recording videos by an automatic camera placed in their habitat provided us with an opportunity to discover the animal's characters and characteristics of their habitat. Making an analyses and recommendations on the materials besides conducting research and compiling data will be

the basis to preserve the population of the endangered species in nature.

In science, "Leopard" means irbiiz or snow cat in ancient Turkic language. Comte de Buffon, a famous French naturalist, for the first time wrote about the leopard on 5 pages in his book "Natural history" in 1761. Later in 1775, German scientist Schreber entered this species in scientific name. The taxonomy of snow leopard is Unciauncia. The snow leopard is distributed in an area of 2 million km square in 12 countries of highland climate such as Pamir, Kindukush, Himalaya, Tyani-shani, Kharkhorum, Altai and Soyon (McCarthy, 2003)

The shoulder height of an adult snow leopard is around 60 cm, the body length is 112-125 cm, and tail length is 92-105 cm with a male weighing 45-55 kg and a female weighing 33-40 kg [5]. It has long, thin body, stocky limbs and small rounded ears. They have spotted fur with white, yellowish underparts, having dark rosettes of a diameter of 6-8 cm on white yellowish and yellowish bodies with small spots of the same color on their heads and foreheads. Cubs at birth have full dark spots [1.2.3]. The spots of the snow leopards increase in size and thin as they mature, showing white yellowish base color, which led locals to distinguish them into two types for their color - spotted dark, blue and spotted yellowish. Spotted dark, blue is called young and spotted yellowish is called an adult [4].

We estimated the population of snow leopards of Tsagaan Shuvuut Mountain Special Protected Area using automatic camera, made analyses on the photos, identifying the pattern of their fur spots, determined the influences on their habitats, and thereby, developed a recommendation about the preservation of the leopards.

RESEARCH MATERIALS AND METHODS

We have conducted the study by placing 11 automatic cameras at three locations – Khoid sair, Umnu sair and Yoliin am of Tsagaan Shuvuut MountainSpecial Protected Area , Sagil sum, Uvs aimag from August 2013 to February 2014 in order to take photos of the snow leopards.

1. We took the photos using Bushnell digital cameras made in China, which takes photos on sensing movements. We placed the cameras at Khoid sair, Umnu sair, Yol am of Tsagaan Shuvuut Special Protected Area as well as at locations that has good opportunities of taking photos, such as paths snow leopards take and near rocky terrains where they leave tracks and marks.

2. When placing the automatic cameras we considered the characteristics of an area, land shaft uniqueness, environmental aspects and tracks, and markings left by the leopard.

3. Our cameras were placed following the paths and trails, and at the base of cliffs and rocks, where leopards pass through.

we adjusted the camera settings, checking to ensure the correctness of dates, cards and whether the cameras are taking photos, and finally palced them on a rock or a tree at 30-40 cm height at a suitable area for taking photos..

Identifying the patterns and features of fur covers of the snow leopards

We have identified the pattern layouts of the spots of the fur covers by analyzing the covered body parts of the photos and videos of the leopards in accordance with the material methods of the project research conducted by Russian scientist Istomov Shishinski S.V. in nature reserves.

- The small spots at their foreheads are different for every leopard.
- If the spots of their foreheads are different, they are two animals.
- If 3-5 sections of its body spots are the same, it is one animal.

RESEARCH RESULTS

There are total of 34478 photos and videos that have been taken by the automatic cameras within the 12 month in the period from August 2013 to July 2014. The graphic shows that majority or 79% of the photos are 'other' photos.

Automatic cameras take or record photos and videos upon sensing movements, showing photos of vegetation and grass moved by wind. Also, 14% of videos consist of 'other' videos. In the summer time, there were lots of grass grown, meaning that videos have shot when grasses moved and in the winter season when it snowed or stormed. 3% consists of animal photos.

The photos and videos not only can help the study snow leopards, but also can be materials that can aid in conducting studies to develop the compilation of species that inhabit the area. There were more videos of snow leopards which allowed us to compare the photos and videos when identifying, aiding in attaining more realistic numbers and data.

1% of the video consisted livestock, which indicates that there was a family nearby the automatic camera.
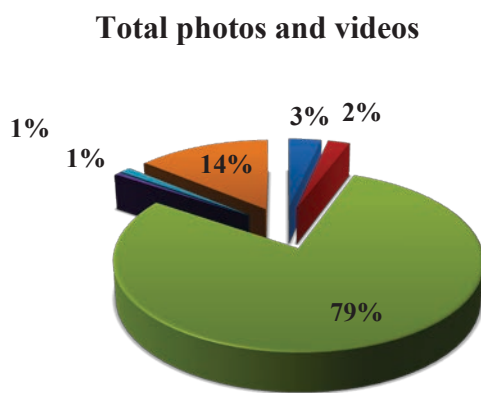
Total photos and videos

Fig. 1. Photos and videos recorded in the automatic cameras

Snow leopards have long, thick fur that is suited for inhabiting in high mountains. It covers their bodies with tails when lying in cold winter. There were 381 photos and 38 videos of snow leopards recorded in the automatic camera. The 381 photos have been numbered from L1 to L381 and each has been compared for identification. The automatic cameras have been set to take 3 photos and then make 20 second videoь while some of them have been set to take only photos.

The study shows that the spots of foreheads, hip section, around right front leg, tail and abdomen have unique characteristics that form many kinds of patterns. The spot patterns have important function in the estimation of the population of wild animals as they contain certain characteristics that distinguish a certain animal from others.

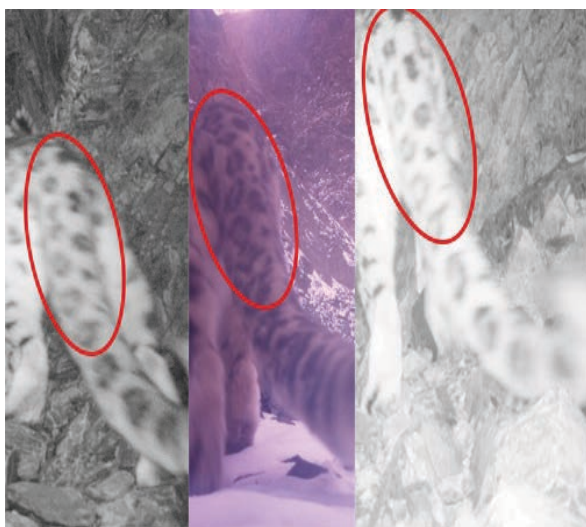**Results of identifying snow leopards by their spot patterns**

Fig.2. Identification through tail spots

Fig.3. Thigh and shoulder spots

When identifying the photos recorded in the camera, we compared the unique spots and patterns of the animals. The tail spots were different in each leopard, which is one of the main identifications. Numerous small spots on their foreheads are different for each leopard. If the spots on their foreheads are different, then they are two different animals. If 3-5 sections on their bodies are the same, it is taken the same animal.
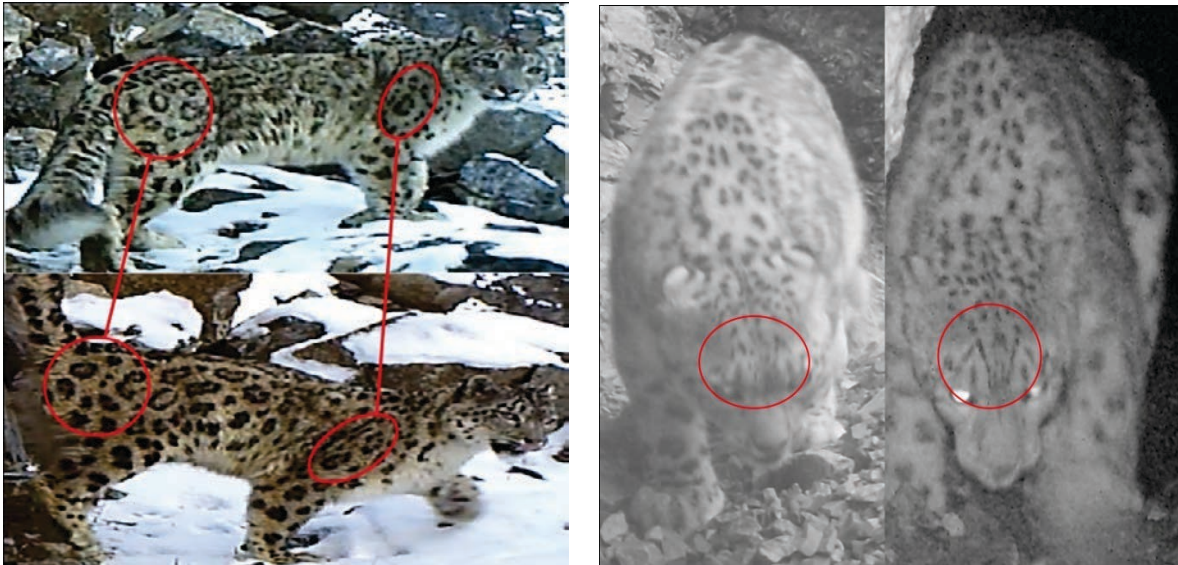

Fig.4. Shoulder spots, jaw spots

CONCLUSION

1. We have conducted the study by placing 21 automatic cameras in 1134.341 thousand hectares of land in the areas in the section of Tsagaan Shuvuut Mountain. We have found that snow leopards of Tsagaan Shuvuut Mountain usually inhabit areas such as Khoid sair, Umnu sair and Yoliin am. There are 11 snow leopards in that area of the mountain with a density of 0.009. The snow leopards of Tsagaan Shuvuut Mountain usually stay in Khoid sair and Umnu sair, inhabiting and going up and down those 2 sairs.

2. We differentiated one animal from others by their unique patterns as we identified them through spots of 2 body parts – tail and forehead, when studying the fur covers and spot patterns of the snow leopard recorded in the automatic cameras. We identified 11 snow leopards by the comparison of 381 photos of snow leopards by their fur cover spot patterns. We, also, identified 8 leopards when we studied the 38 videos of snow leopards.

3. From the people who have participated in the /verbal survey/ about the snow leopards, 76% has answered that they have seen them, 15% has answered that they have seen their attack on livestock and 9% has seen tracks. Our study confirms the locals' claim that the population of the snow leopards are growing.

4. It is necessary to conserve the snow leopards with the participation of locals and to implement innovative methods and technologies to provide the species with the conditions to increase its population stably as nature intended after we make estimations of their habitats and population.

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