

Distribution in the wild and the captive raising of snow leopards in Xinjiang, China

Full Text:

Wild snow leopards are regarded as a first-class protected animal in China and as an endangered species by the World Conservation Union. Knowledge of the natural ranges and numbers of wild snow leopards is necessary to formulate effective protective measures by local organizations. Wild snow leopards in China are principally distributed in the northwest and southwest of the country, including the five provinces and autonomous regions of Qinghai Province, Xizang (Tibet) Autonomous Region, Gansu Province, Xinjiang Uygur Autonomous Region and Sichuan Province.

As a result of the influence of human activities, the environment of wild snow leopards has been continually affected in a detrimental fashion. The natural range of wild leopards has gradually been reduced and their existing number is tending to decline. The ultimate aim of adopting weak and sick cubs into zoos is to increase the amount of wild snow leopards and improve their health under the conditions of captive feeding and nursing, then to reintroduce them to their natural reserves. This will be the only way to preserve snow leopards in the future. Therefore, it is extremely urgent to summarize the success and failure in captive feeding and in the prevention and treatment of frequently occurring diseases in captive snow leopards.

DISTRIBUTION OF WILD SNOW LEOPARDS IN XINJIANG

In the mountainous areas of the Pamirs, Kunlun Mountains and Aertai Mountains located in the south of Xinjiang, the terrain is remote and difficult of access. It is sparsely populated and has poor transport facilities. These vast areas provide intact ecological environments where various kinds of wild animals subsist and multiply. Snow leopards usually inhabit relative inaccessible mountainous areas and zones of bare rock and snow at 3600 m elevation and above. Several species of wild sheep and goats occur here, especially the ibex, blue sheep and argali sheep. From survey information, concentrations of snow leopards were found in the mountainous area of Qiaogeli Mountain near the upper reaches of the Yerqiang River, next to Minfeng County, Qiemo County and Yutian County.

When their food in alpine areas is deficient in the winter, wild snow leopards migrate to the lower zones to catch grazing livestock. For instance, more than 100 sheep are killed by snow leopards in the winter every year in Tashkuergan County. In Yeyike, a village of Minfeng County, over 10 hides of snow leopards were confiscated from 1976 to 1980.

The Tianshan Mountains (from Poluokunu Mountain in the west to the Hami Prefecture in the east and from Luntai County, Aresu Prefecture and Tulufan Prefecture to the Qitai area in the south) is the biggest mountain range in central Xinjiang, but snow leopards are thinly scattered in this area because of the influence of human activities, good transportation facilities and rapid development. Snow leopards in the Aertai Mountains located in the north of Xinjiang are also thinly scattered because of the low elevation and the influence of human hunting in this area. Captive snow leopards were first kept at Urumqi Zoo at the end of the 1940s. From that time all snow leopards at this zoo have come from the Tianshan Mountains.

Calculated on the basis of its carnivorous diet, about 200 to 250 snow leopards exist in the ranges of the Xinjiang Autonomous Region. This figure is based on the social investigations of Yili Prefecture, practical surveys in the north and south of Xinjiang by Xinjiang Forestry Bureau and statistics regarding criminal cases on snow leopard poaching. Of the total snow leopard population in Xinjinag, 70% is in the Pamirs, 15% in the Tianshan Mountains, 10% in the Kunlun Mountains and 5% in the Aertai Mountains.

CARE OF CAPTIVE SNOW LEOPARDS

It is the good natural environment for snow leopard in Xinjiang that provides the Urumqi Zoo with both collecting opportunities and appropriate captive living conditions. Snow leopards were first raised in captivity in Urumqi in 1949 and by the end of 1990 about 30 had been kept. All of these animals were obtained from the Tianshan Mountains, including Urumqi County, Qitai County, and the Tulufan, Tuokexun, Jinhe, Bole, and Huocheng areas. Fourteen snow leopards were received at the Urumqi Zoo in the 1960s, 8 of them (57%) cubs. Nine snow leopards were collected in the 1970s, of which 7 (78%) were cubs. Six cubs were received in the 1980s.

General Environment -- Urumqi, at an elevation of 918 m, is located in the central part of Eurasia and forms a narrow band of a city from south to north. There are three mountain ranges, to the east, south and west. It is far from the ocean and has a continental semi-arid climate. The diffusion of air is poor above the city, with inversion layers prominent in the winter. South and southeast winds are dominant in spring, whereas north and northwest winds are predominant in winter. Over 24 years the average annual temperature of the city is 6.1°C, average annual precipitation 281 mm, average annual relative humidity 59% and average sunshine time 2669.6 hrs. The population, vehicles and coal consumption in this area have increased year by year and the principal pollutants are dust and other suspended particles, so that the atmospheric pollution in this area is of the soot-dust type.

The Urumqi Zoo is located in the south of the city. There is an industrial area and three major roads just outside the zoo, so that various vehicles and other sources produce an endless stream of exhaust gases. Urumqi Zoo is about 310,000 m² in area and the animal houses are surrounded by groves and green land. The 80 m² snow leopard house is a classical one consisting of 3 parts, an exhibition room with a heating pipeline, a 40 m² exercise ground (average daily sunshine 7.3 hours) fenced with the reinforcing bars and wire mesh, and a 20 m² nest-room with concrete floor. This last space is between the exhibition room and the exercise ground. The outdoor temperature reaches -24 to -36°C every January, but the room temperature is kept at 6°C.

There are 6 similar animal houses in a large exhibition center. Concrete walls with a small door separate the nest-rooms and the exercise grounds are separated by fences of reinforcing bars. The next-door neighbors of snow leopards are tigers. These two large cats can survey the patterns of behavior and smell the excretion products of each other. Snow leopards usually take their rests at noon, but they are often disturbed by visitors who are eager to see the snow leopards' charms of behavior and long tails.

Feeding Management -- The food of snow leopards is thawed mutton throughout the four seasons of the year. Occasionally, they eat bits of beef or meat of calves without live foods and the viscera and blood of animals. There is one fast day per week. Compared with snow leopards that catch wild sheep and goats, mountain hares, marmots, snowcocks, other rodents and even locusts, the food of captive snow leopards is extremely monotonous and lacks some required nutrient elements.

A litter of snow leopard cubs are fed in one pan and according to their age the food is minced, diced, sliced and/or cubed mutton. Drinking water is pumped from underground where pollutants are not found. Snow leopards can freely take daily-changed water from a large iron basin. The concrete floors in the snow leopard house are washed with water every day and sprayed with disinfectant every week. When a disease occurs in other houses in the exhibition center, the ground and fences of the snow leopard house must be sterilized with a flame-thrower.

Prevention and Treatment of Diseases -- Frequently encountered diseases of captive snow leopards can be summarized as follows:

1) Endoparasites: *Toxascaris leonina*, *Ascaris limbata* and other endoparasites have been found in snow leopards, and all are naturally occurring infections. Antiscolic measures must therefore be performed on all wild animals, including snow leopards, as soon as they are received in the zoo. Fenbendazole is an effective, safe and wide-spectrum antiscolic used in our practice. Under normal conditions, it is most appropriate to use the medicine two times (in the spring and in the autumn) every year.

2) Dyspepsia and Gastroenteritis: Indigestion and gastroenteritis, especially in cubs, are two frequently occurring diseases which are caused by the low temperature of meat, overeating, a small exercise ground or stale food. Mortality from these two diseases is also higher among cubs.

3) Upper Respiratory Tract Infection and Pneumonia: These are another two common diseases in captive snow leopards. The affected animals show a slight and very brief cough with low and deep voice, similar to a "keng-keng" sound. The causal treatment and the conservation treatment in time can enhance the curative effect in these two diseases.

4) Hypersensitive Nephritis: This is also a frequently occurring disease of captive snow leopards. Clinical signs are diuresis and acratia. In laboratory examination the content of the urinary protein is increased. Sometimes occult blood is found without inflammatory cells. These signs disappear when a large dose of vitamin C is injected or orally administrated.

5) Sarcoptidosis: A one-year old snow leopard contracted sarcoptidosis when she was adopted from the Tuokexun area. In the clinical examination patchy trichomadesis, dermatitis and pruritus were seen on her head, trunk and limbs. She completely recovered when medicine was externally applied.

- 6) Staphylococcal Infection: One snow leopard unfortunately died of this infection. Diagnosis was confirmed from smear and culture examinations and animal inoculations.
- 7) Acute Death Caused by Pulmonary Edema: The death of one snow leopard appeared to be associated with a heat-wave in the summer.

DISCUSSION

In Xinjiang wild snow leopards inhabit the most mountainous areas, usually at elevations of 2600-4000 m. These areas include the Pamirs, the middle of Kunlun and Aerjin Mountains in the south of Xinjiang, and the Tianshan North, the Tianshan South and Aertai Mountains in the north of Xinjiang. Adult wild snow leopards and their cubs have been found in Tulufan, Tuokexun and Jinghe areas which are located at 1000 m to 5000 m elevation. These findings indicate that snow leopards have a wide potential ecological adaptability.

In the north of Xinjiang wild animals have been disturbed by the rapidly developing economies and the increased population. The number of wild snow leopards has sharply declined. From survey information, the capture of snow leopards in these areas was uncommercial, although they were occasionally trapped by the natives and offered to the zoo for adoption. For this reason the hides of snow leopards have not been traded in markets of these areas. In contrast, there exists only sparse population, poor transport facilities and slowly developing economies in the Pamir and Kunlun Mountain areas in the south of Xinjiang and snow leopards are more abundant there. However, stealthy hunting, smuggling and reselling at a profit in these areas often occurs because bones of snow leopards can be used as medicine and their hides make superior furs. Therefore, it is necessary to strengthen the propaganda and education about preserving the resources of wild animals and coordinate the appropriate measures of law.

When wild snow leopards are raised in the zoo their natural patterns of behavior are changed, and many disadvantages occur during this captivity. These include:

- 1) Severe pollution of atmosphere in the city such as industrial waste gas, exhaust of vehicles, soot and human behavior. Compared with fresh and clean air in the mountains, captive snow leopards are more sensitive to the polluted air and their cardiovascular and respiratory systems are the first to be affected.
- 2) For captive snow leopards, the diverse live foods of their natural range is changed to the monotonous thawed mutton without the viscera of animals, and the intake of vitamins and microelements therefore greatly declines. In the long term the monotonous food can alter the food preference of snow leopards and further worsen the imbalance of nutrient intake. For this reason the significance of adding diverse and live foods or some vitamins and microelements is clear in the feeding of captive snow leopards.
- 3) In order to catch their own food wild snow leopards must run and jump on the rugged and rough mountain ridges. This large amount of exercise maintains the good function of their hearts and lungs. Enclosed in the small and narrow houses, captive snow leopards eat three meals a day and, without a chance to run and jump, and get very little exercise. Muscles of captive snow leopards are therefore usually atrophied, myodynamia is reduced, and signs such as anorexia and dysphoria sometimes occurred in affected snow leopards.
- 4) Long-term and chronic effects of noxious stressors such as the hot environment, low elevation, deficiency of ultraviolet radiation, noise pollution and lamplight can injure the nonspecific immunologic functions of captive snow leopards, producing chronic stress diseases.

The site for keeping captive snow leopards should have several characteristics that include the following: a large exercise ground, quiet environment (irritant intensity of stressors less than the natural ones is best), diminished pollution, cold environment in winter (more cold irritation received by snow leopards is best), prevention of heatstroke in summer, increased ultraviolet radiation, live foods, added vitamins and microelements, and a good breeding environment. Otherwise, the site may not be effective for preserving snow leopards.

Any person who kills wild snow leopards is punished by law. Preservation of the ecological environment, wild animals and wild plants should be strengthened, and this will encourage the survival and reproduction of wild snow leopards.