

A PRELIMINARY STUDY ON THE GEOGRAPHICAL DISTRIBUTION OF SNOW LEOPARDS IN CHINA

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In recent years major international conservation organizations such as the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund (WWF) have been deeply concerned about the fate of some endangered big cats. Both tiger and snow leopard belong to the endangered species in the Red Data Book. For the Bengal tiger a great deal of work has been done so that its species survival problem has been fundamentally solved. Snow leopard is the next object of relief. Beginning from the 1980's, reports and writings on this animal have obviously increased and international contacts and meetings are also more frequent. China has joined in the international coordination since 1984 by making preliminary studies on its status in Qinghai and Xinjiang. For the first time we participate in the International Snow Leopard Symposium in the hope of exchanging views with our foreign colleagues on how to better conserve this rare and precious animal which is distributed over a wide area in our country.

RANGE IN CHINA

Concerning the problem of geographical distribution of snow leopards in China, there were only small scale regional surveys but no large scale nationwide investigations in the past. The joint survey undertaken by Dr. George Schaller and Chinese zoologists since 1984 is the beginning of a five-year systematic study of this animal in China. Qinghai is the center of distribution of snow leopards in China. Surveys for other areas are similarly necessary, although there is no such plan so far.

Even though it is not yet clear what the total population of snow leopard is in China, judging from its wide range which occupies almost all the high mountain districts over western China and an area far greater than any other snow leopard inhabiting countries, there is reason to believe that numerically it must be ranked first in the world.

The area of the *five* great provinces (Xinjiang, Gansu, Zinghai, Sichuan and Tibet) in northwest and southwest China is almost half of the total area of China. Quite a large part of plateau and mountain district, especially the southwestern part of Qinghai, the southwestern and southeastern parts of Xinjiang, and the remote north-western part of Tibet, are not yet opened to faunal investigation. Theoretically speaking, all these regions are ideal habitats for the snow leopards, but we are not quite certain about the actual conditions there.

Only a small part of our snow leopard habitats have undergone preliminary faunal investigation, but the conditions of the larger part have been understood through snow leopard collectors. It is not a comprehensive understanding, but it does give a fair idea on the local populations. Much of the data and information of this paper were obtained from individuals who collect for zoos.

There are two other localities where snow leopards allegedly occur but have not been confirmed. One is the Helanshan mountain range in Northern Ningxia Autonomous Region and the second is the

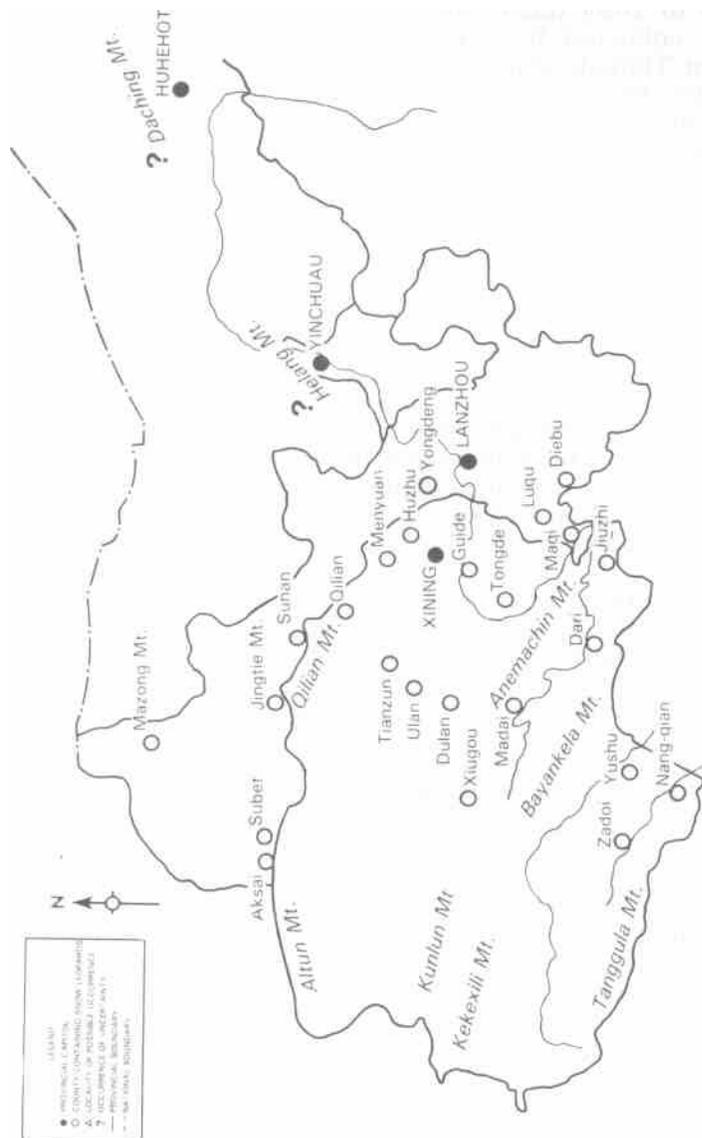
Yinshan mountain range in the central part of Inner Mongolia Autonomous Region. Very little wild animal collections, as well as faunal investigations, have been carried out in these regions.

The problem of poaching which involves endangered precious animals is one of international scope. China is no exception. This paper will make a preliminary approach to the question of poaching the snow leopards in China.

QINGHAI PROVINCE

The great majority of Chinese captive snow leopards have come from the Qinghai province (Figure 1). but this does not mean that Qinghai is the province with the largest snow leopard population in China, nor that the populations of Xinjiang and Tibet are definitely smaller. The fact is that snow leopard collection has been continuous for nearly 30 years from many mountains in the northern, southern and central parts of Qinghai. Excluding those which died in the course of collection, at least 150 have been collected from that province. It should be added that there has been little collecting in the eastern part and no collecting at all in the western part which occupies nearly one-third of the total area of Qinghai. For this area, the northern half is largely occupied by the Zaidam Basin. Apparently no snow leopard live on the basin. But the southern half which forms a part of the great Qinghai-Tibetan Plateau has many great mountain ranges, such as the Kunlun Mountain, the Tanggula Mountain, and the Kekexile Mountain. This is actually an unspoiled paradise for the alpine animals, including the snow leopard. But nothing is known concerning the snow leopard resources of this unexploited land.

Snow Leopard Status in China



The extensiveness of the snow leopard range in Qinghai was clearly reflected by the statistics compiled by the Xining Zoo's collection from 1968 to 1984 (Liao Yanfa, 1983; 1985). According to the table, 22 were collected from Qiliang county, two from Menyuan county, 13 from Tianzun county, all in northern Qinghai; two from Yushu county, two from Nang-qian county, two from Jiuzhi county, six from Zadoi county, in Southern Qinghai; three from Guide county and two from Iru/hu county in Eastern Qianhai, making a total of 73. In addition, two more were collected from Ulan County, Central Qianhai, in the spring of 1986.

According to Liao (1985), in addition to the 12 counties mentioned above, snow leopards are also found in the counties of Golmud, Guinan, Xinghai, Chengdoi, Qumalai, Ma-xin, Ban-ma, and Da-ri, a total of 20 counties. In addition, Zhang Guangdeng (1985) said it is also found at Tongde county in eastern Qinghai. Furthermore, a publication by the Guang Min Ri Bao on July 22, 1984, reported "Snow leopards in Qinghai are distributed over six prefectures, 27 counties." That means that 27 of the 37 Qinghai counties have snow leopards, not to mention the vast "no man's land" of western Qinghai.

Although one may use these statistics as a basis for judging

the population density of snow leopards in the various habitats, it is not an entirely reliable indicator for the result of collection is not simply dependent upon the local population density, but also on the "enthusiasm" of hunters. Figures indicate the Qilian, Tianzun and Du-lan were the counties from which most of the captives came. No doubt the resources here are rich, but there is a more important reason why more captives were obtained from here (see the section on poaching below). Liao Yanfa (1983) also mentioned Madoi, Zadoi and Nang-qian as places where more snow leopards could be found. The smaller numbers of collection from these places could be explained as the lack of "enthusiasm" here. In this connection, there was another figure for reference. A collecting station set up at Yushu by the Beijing Zoo in the 1950's captured 21 snow leopards from the same localities between 1957 and 1973.

More precisely, the village of Yeniugou of Qilian county and Sule village of Tianzun county are two prime places for the collection of snow leopards. On nine occasions between 1973 and 1981, 12 specimens were collected from Ycniugou. On another nine occasions, from 1982 to 1984, 11 specimens were collected from Sule. Liao Yanfa (1983) and Zhang Guangdeng (1985) both believe that there are fewer snow leopards in eastern Qinghai.

Zhang Ci-zu (1980) discovered during his survey around Xiugou, in the eastern part of Kunlun Mountain, central Qinghai, that there appeared to be fewer snow leopards than before, "diminishing to the point of extinction." The mountain folks caught as many as they could for two reasons: snow leopards were treated as pests, and their pelts and bones could earn money.

GANSU PROVINCE

Located between Qinghai and Gansu, the Qilian Mountain Range (5,547m) is one of the major habitats of snow leopards. Zoological gardens of Gansu province have collected a number of snow leopards from the northern side of this range. The Jiuquan Zoo collected ten individuals from the Qilian mountains between 1976 and 1985, and the Lanzhou Zoo had collected three or four specimens.



FIGURE 2. Qullian mountain range, habitat of the snow leopard (Photo by Liao Yanfa).

According to Sun Yangxing (1983), in addition to the

Qilian

Mountains, snow leopards are also found in the mountains of Jing-tie-shan, Dang-jing-shan, Ma-zong-shan and Hei-shan in Gansu. He has related the following incidences: (1) A miner living in Jing-tie-shan, south of Jiuquan, using steel-cable loop placed on the beaten track of snow leopards, caught one in 1977; (2) Charcoal burners in Ma-zong-shan, in northwest Gansu near the Inner Mongolian border, discovered a snow leopard feeding on a dead bharal during one of their hunting trips in 1958. The cat ran away upon the approach of man; (3) In April 1983, a shepherd attending his flock at Aksai county caught a snow leopard with his lasso. Aksai is located at the foot of the Altun Mountain, in southwest Gansu near the Xinjiang border; (4) Another herdsman discovered a female snow leopard with two cubs at Subei county in western Qilian Mountain in August 1978. He drove off

the female and captured the cubs; (5) Another pair of snow leopard cubs were captured by a young woodcutter under a rock ledge at Sunan county, in the central part of Qilian Mountain in July 1977; (6) At Xigouzi, Qilian Mountain, in the winter of 1975, a large snow leopard entered the sheep pen of a herdsman at night and killed seven sheep. It came again on the third night and was seized by a trap, but it managed to run away still caught in the trap.

Sun revealed that according to a report made by the Gansu Wildlife Investigation Group in 1977, the snow leopard population of the Jiuquan region was estimated at about 350. If this figure is reliable, it means that snow leopard population in western Gansu is considerable.

There are snow leopards also in southeastern Gansu, primarily in the high mountains (Xiqingshan and Minshan) of the Gannan Autonomous Prefecture. The Lanzhou Park Zoo has collected a few from this region.

A notice issued in May 1974 by the Gansu Bureau of Agriculture and Forestry on the conservation of wildlife resources listed the following places as habitats of snow leopards in Gansu: the Qilian Mountains in Subei, Sunan, Wuwei and Aksai counties, plus some parts of the Gannan Autonomous Prefecture. On the other hand, Ni Xin-min (1977), based on the result of a survey made from October 1974 to December 1976, listed all seven counties (Zhouqu, Diebu, Zhou-ni, Luqu, Maqu, Xiahe, Lintan) of the prefecture as containing snow leopards and put a + mark (indicating fewer than 100) under each county. This region is connected to the eastern part of Qinghai.

Another source said that there were also snow leopards in the mountains around Yongdeng, over 100 km northwest of Lanzhou, in Central Gansu. According to Chen Jun (1960), a preliminary survey conducted in this area in the summer of 1959 stated that there were snow leopards (admittedly very few) found on the northern slope of the Lian-cheng-xia Mountain at an elevation of 2,600 to 2,700m.

A book entitled *Report of Mammalian Survey in Qinghai and Gansu*, published in 1964, said almost nothing about snow leopard except to give its habitat as eastern Qilian Mountain, western Qilian Mountain and the mountains around the Zaidam Basin, each place with a single + mark.

SICHUAN PROVINCE

High mountains with an elevation of 400 to 500 meters in western Sichuan are also snow leopard habitat (Figure 3). According to the *Sichuan Economic Animals Vol. I* (1980), the snow leopard in Sichuan is found in the following counties: Baoxing, Xiaojin, Jinchuan, Ganse, Dege and Batang. Another publication, *A List of Sichuan Economic Animals and Their Distribution*, adds three more counties:

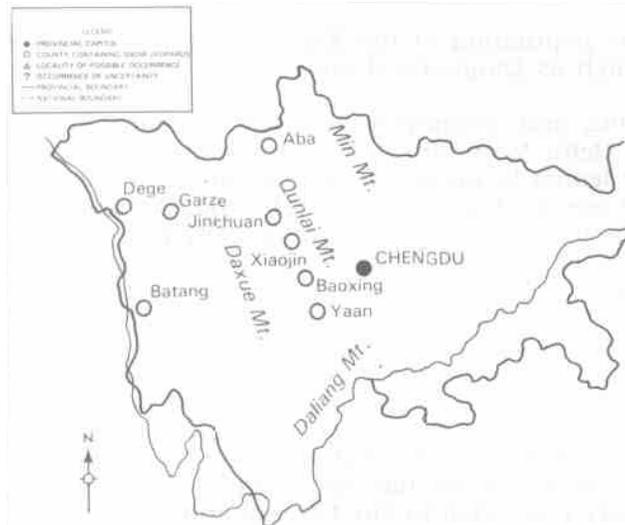


FIGURE 3. Snow leopard distribution In Sichuan Province.

Aba, Liangshan, and Ya-an. Thus the range of snow leopard in Western Sichuan reaches Aba to the north, Liangshan to the south, and Batang and Dege to the west. Aba is close to Jiuzhi and Banma of Qinghai Province, all belonging to the Bayankala Mountain Range. Batang and Dege closely neighbor Tibet, with Que-er-shan and Mang-kang-shan in the vicinity. From the viewpoint of natural geography, the high mountain zone of western Sichuan belongs to the same geographic and faunal system as the mountain chains of eastern Tibet and southeastern Qinghai. It could be regarded as a contiguous habitat for the snow leopard.

Regions like Jinchuan, Xiaojin, Baoxing and Ha-an all belong to the Qionglai Mountain Range, the habitat for the giant panda and golden monkey. Baoxing was the place where Beijing Zoo collected its first snow leopard in the winter of 1955.

XINJIANG PROVINCE

Xinjiang has similar natural conditions and wildlife resources as Qinghai but with an area more than twice that of Qinghai (Figure 4). There are great mountain ranges in northern, western, central, southeastern, and southwestern parts of Xinjiang. The population of alpine animals of Xinjiang should not be smaller than Qinghai's as the range of snow leopards in Xinjiang is even wider than in Qinghai. Based on these points, the population of the Xinjiang snow leopard must presumably be as high as Qinghai's, despite the smaller number collected and trapped.

Both Beijing and Urutnqi have collected snow leopards from Altai Mountain, Beita Mountain and mountains to the east of Hami. The three snow leopards presently on exhibition at the Urumqi Zoo came from these areas a few years ago. The zoo had also obtained two from Tacheng, in northwest Xinjiang, in the 1970s. A survey on the wildlife resources of the five north Xinjiang counties conducted by Wang Tingzheng et al (1983) in July-October 1975 named snow leopard as one of the thirty mammals occurring in that area. Only small numbers are said to be living in the counties of Bu-er-jin and Habaho.

The Tian (alternative spelling: Tien) Shan Mountain Range has

been renowned for its snow leopards as Russian hunters collected a large number from the western section of the range years ago. They undoubtedly occurred in the central and eastern sections too. However, very little collection has been made in these sections and only a few have been collected by the Urumqi and Kashgar Zoos.

Zhang die (1959), who made several months of "preliminary acquaintance" of the mammal resources on the southern slope of Tian Shan, collected a number of small mammals only. As for the snow leopard, he saw only a number of furs in the animal product stores at Korla, Baichen and Aksu, presumably collected from the Tian Shan. An investigation on the wildlife resources of the Pamir Mountain Range conducted by the Xinjiang Bureau of Environment Protection in 1981 to 1982 noted bear, fox, lynx, and numerous herbivores, but no snow leopard, although it is considered to be one of the local fauna.

According to Zhou JIadi (1985), zoologists of the Academia Sinica, while making preliminary survey in the Kunlun-Altun Basin area in the summer of 1982, collected specimens there.

A nature reserve was established for the Altun Mountain region in 1985. Preliminary surveys have included collecting and photographing some of the major wild animals but not the snow leopard, although they are known to be there. This highly elusive and nocturnal animal is extremely difficult to discover anywhere. Faunal investigation has not yet been conducted on the Kunlun and Kara-Kunlun Mountains in southern Xinjiang.

TIBET AUTONOMOUS REGION

Tibet has an area of more than 1,200,000 km², and is second only to Xinjiang in size (Figure 5). High mountains and plateaus are scattered throughout the land. Well-known mountain ranges include the Himalaya, Gangdise, Tanggula, Hengduan and Kekexile. Snow leopards occur in these snow-capped and wildlife-abundant mountains, just as they do in the high mountains of Qinghai and Xinjiang.

Snow Leopard Status In China

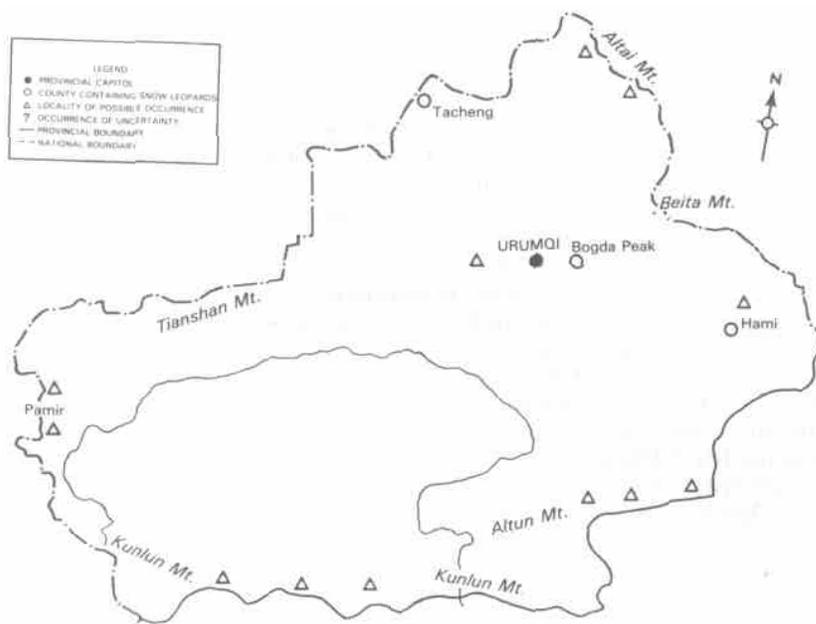


FIGURE 4. Snow leopard distribution In Xinjiang Autonomous Region.



FIGURE 5. Snow leopard distribution in Tibet Autonomous Region.

Nevertheless, most parts of these Tibetan mountains are still unexploited and uninvestigated. Surveys made on some regions are quite superficial. Hence, the status of the snow leopard is not clear in Tibet.

One of the authors, Liao Yanfa, worked for six months at Naqu in northern Tibet and learned that snow leopards had been found at Nange, Shenja and Anduo. This information was later confirmed by a survey staged in an area between the Tanggula and Nianqing Tanggula mountains in the summer of 1985.

When Zhang Ci-zu, deputy-director of the Shanghai Zoo, was collecting animals in the eastern Himalayas in southeast Tibet in 1979, he was told that snow leopards marauding sheep in the vicinity of Milin were shot by soldiers.

Zheng Changlin (1979) gave a table on the distribution of mammals in the Ali and adjacent areas. This reference states that snow leopards are found at Rutog, in the western Himalaya; Geji, Gerzi and Cuochin on the Changtang Plateau, the middle and eastern sections of the Himalaya, the southeastern part of Tibet and the Nianqing Tanggula Mountain. This information was not based on actual collections but on interviews and reference materials.

The status of snow leopard distribution and population in Tibet is a question pending more investigation.

SNOW LEOPARDS IN OTHER AREAS

Snow leopard furs were not uncommon in Chinese stores and markets before the 1949 Liberation. When asked about their sources, the answers often referred to Ningxia or Inner Mongolia, but it was not certain whether these were the animal's birthplace or the fur's assembly centers. There was also unconfirmed information that snow leopards had been seen in the Helanshan Mountain Range in Ningxia and the Yinshan Mountain Range in Inner Mongolia. Concerning the latter, a book written by Zhao Kentang et al (1984) has added confirmation lately. According to this source, two militia-men hunted down a snow leopard in a ravine after 48 hours of tracking in the Daqingshan in 1963. "This was the first and the only snow leopard discovered on that mountain," wrote Zhao Kentang, and added that "there is an eastward moving tendency for the snow leopard, who is gradually moving eastward from the Qinghai-Tibetan Plateau into the Alashan League and Bayanjour League in Inner Mongolia during the

past few dozen years." The location of Alashan and Bayanjor is close to the Helanshan and Yinshan mountains.

A snow leopard is solitary in nature indeed, but it is impossible for any animal to exist in total isolation. The discovery of the "only" snow leopard in Daqingshan may indicate the possible existence of more snow leopards in other parts of the Yinshan Range. Daqingshan Is located to the northwest of Huhehot. The presence of snow leopard here may be viewed as the eastern limit of its range.

PROBLEM OF POACHING AND CONSERVATION

Despite its status as a nationally protected species, the snow leopard in China is not totally exempt from poaching. Although poaching is occasional and has a limited scope, it warrants grave attention because sometimes the case is serious.

A report published by the Guang Ming Ri Bao on May 1, 1984, revealed the following facts: In Haixi Prefecture, Qinghai Province, a man by the name of Chen Taihe "had hunted down 13 snow leopards in recent years and sold them for 2,300 yuan. His illegal activities were ignored by his own unit and the governmental departments concerned. In the course of poaching, Chen had caused the death of at least three snow leopards."

As of this writing, nothing has been heard of how this case was settled. But further inquiry revealed that it was even more serious than the newspaper report. The fact is, 12 miners including Chen Taihe of Tianzun county had hunted down a total of 28 snow leopards in 12 years from 1972 to 1984, including 15 adults, six subadults, and seven young (under one year) animals. Chen himself hunted down 12 animals and caused the death of two others. All the poaching took place at Sule village, Ttanzun County.

Another case occurred in the spring of 1983. Eight people of a minority nationality had killed altogether 18 snow leopards and captured another young one in the mountains near the Goulli village, Dulan county, in central Qinghai, from February to May 1983. The young animal died shortly after capture. All were sold to purchasing agents.

The two cases quoted above may indicate the abundance of snow leopards in some parts of Qinghai on one hand and the seriousness of poaching activities on the other. Another item worthy of notice is that both cases of poaching occurred in the vicinity of mines. As for other areas, although nothing like the above has been reported thus far, it may be assumed that poaching or illegal hunting is inevitable at far off districts and deep mountains. The rapid decline of snow leopard resources at Xiugou, central Qinghai, as reported by Zhang Ci-xu (1980), is another indication.

Snow leopards are poached mainly for three reasons: the fur, the bone and the living animal. Snow leopard furs are rarely seen in the Chinese fur stores or markets today and this fur has never been popular in China. Its market value is much lower than the fur of spotted leopard. The ratio difference is: South China leopard fur, 100%; North China leopard fur, 80%; snow leopard fur, 50-70%. Chinese do not make coats with the fur of snow leopards because the hair is too long and its patterns not so distinctive. It is either used by minority nationals making fur hats or sleeves, or exported to foreign countries. Since China became a signatory of the CITES, the exportation of snow leopard furs is limited.

It is different situation with bones. For a long time, leopard bone had been used as a substitute for tiger bone in the manufacture

of drug wine selling far and wide in China and Southeast Asia. The poaching of snow leopard in China is therefore closely connected with this business.

As for the living specimen, the only buyers are undoubtedly zoological gardens. This is indeed a complicated problem. With the exception of three zoo-born animals, all snow leopards kept by Chinese zoos are wild-caught. Although the animals were captured illegally, if everyone refused to buy them, they would be killed and sold for skin and bone, which would mean an even greater loss. The solution of this problem rests on fundamental decisions and actions beginning with the legalization and enforcement of the game law, assisted by publicity campaigns that must be widespread and deeply rooted, so that no more country folk would like to or dare engage in poaching.

CONCLUSIONS

Snow leopards in China are known to exist in the provinces of Qinghai, Gansu, Xinjiang, Sichuan and Tibet, and also parts of Inner Mongolia and Ningxia. The range of snow leopards in China is so extensive and covers more than one-third of China. Although actual population is not known, it can be reasonably assumed that it must rank first among all the snow leopard inhabiting countries.

Population surveys for the snow leopards in China are a prerequisite for the effective conservation of this animal. We now understand more about its distribution and density in the Qinghai Province, but not the others. With the beginning of a coordinated investigation undertaken jointly by Chinese and foreign zoologists in Qinghai, it is hoped that further actions like this will be followed in other provinces.

Poaching of snow leopards in some districts has been serious. It is not yet totally under control. But with the tightening of conservation measures, the problem will be settled before long. As a whole, snow leopard resources in China are largely intact.

REFERENCES

- Chen Jun. 1960. A preliminary survey on the mammals and their habitats along the Tatong River in Yongdeng District. Lanzhou. *J. of Zoology*, 4(3).
- Liao Yanfa. 1983. A preliminary study on the geographical distribution of snow leopards in Qinghai Province. *Chinese Zoo Yearbook*, 6.
- Liao Yanfa. 1985. The geographical distribution of ounces in Qinghai Province. *Acta Theriologica Sinica*, 5(3).
- Ni Xinmin. 1979. A survey on precious animal resources of the Gannan Tibetan Nationality Autonomous Prefecture, Gansu Province. *J. of Zoology*, 3.
- Sun Yangxing. 1983. Capturing snow leopards by native methods. *Chinese Zoo Yearbook*, 6.
- Tan Bangjie. 1984. The status of felids in China. Paper submitted to the meeting of IUCN/SSC Cat Specialist Group. Kanha National Park. India.
- Wang Tingzheng et al. 1983. Animal resources in the Altai and Beitashan Region of Xinjiang. *Wildlife (Bimonthly)*, 3.
- Xie Lianhui. 1985. My First Visit to the Altai Mountain. *Chinese Wildlife (Bimonthly)*, 1.
- Zhang Jie. 1959. A Preliminary Understanding on the Mammalian Fauna of the Southern Slope of Tianshan, Xinjiang. *J. of Zoology*, 3.
- Zhang Jie. and Wang Zungyi. 1963. Mammalian fauna of Qinghai. *Acta Zoologica Sinica*, 15(1).
- Zhang Ci-zu. 1980. A preliminary

survey on the rare and precious
animals of the Qinghai-Tibetan Plateau. The Natural Science. 3.
Zhang Guangdeng. 1985. A Survey on the Hainan Prefecture of
Qinghai. *J. of Zoology*, 4. Zhao Kentang et al. 1984. Precious
Birds and Beasts of Inner
Mongolia. The Inner Mongolia Publishing House. Zheng Changlin.
1979. A report on the Fauna! and *Flora Survey of the
Alt Region of Tibet*. Science Publishing House.