

Distribution and endemic causes of existing endangered and critically endangered species of snakes in China

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Abstract. China has a vast territory, rich resources, diverse habitats, and many unique species. Paying attention to China's endemic species can increase a deeper understanding of these endemic species and protect biodiversity at the same time. This study is mainly about the endemic species of snakes in China and is also a partial summary of the research on snakes in China. Use literature research methods to study the distribution, endemic causes, and population trends of endangered and critically endangered snake species in China. This helps us understand how to protect the populations of endangered and critically endangered species of snakes and better study them. The study found that most endangered and critically endangered Chinese endemic species are distributed in the Qinghai-Tibet Plateau, Sichuan, and other northwest areas, while a small number are distributed in Liaoning, Hong Kong, Taiwan, and other regions. Part of the reason for the uniqueness is that the unique geographical environment is suitable for the survival of snakes, and the other part is forced selection due to relatively isolated geographical location or crustal movement. This research aims to better understand and pay attention to China's endemic snake species and protect endangered and critically endangered species.

Keywords: Endemic species of China, endangered snakes, critically endangered snakes, population trends.

1. Introduction

By investigating the literature to find endangered and critically endangered species of unique snakes found in China, The paper can find that there are the following types: *Thermophis bailey* (found in 1907), *Euprepophis perlaceus* (found in 1929), *Hebius miyajimae* (found in 1931), *Gloydus shedaoensis* (found in 1979), *Achalinus jinggangensis* (found in 1983), *Protobothrops mangshanensis* (found in 1990), *Indotyphlops lazelli* (found in 2004), *Thermophis zhaoermii* (found in 2008), *Opisthotropis laui* (found in 2013). There are many types of ecosystems in China, and different endemic species of snakes have different needs for the ecosystem, so the distribution of endemic species is not concentrated. By studying their needs, the paper can analyze why these snakes are unique to China. The research can also further understand why their population numbers change. There are many types of ecosystems in China, and different endemic species of snakes have different needs for the ecosystem, so the distribution of endemic species is not concentrated. By studying their needs, the study can analyze why these snakes are unique to China. It can also further understand why

their population numbers change. Using the literature research method can obtain more authoritative information and facilitate summary.

2. Distribution and population status of endemic species of snakes

2.1. *Thermophis baileyi* and *Thermophis zhaoermii*:

Within its distribution range, hot spring snakes are all found in hot spring areas. They can be said to be the most widely distributed species among reptiles. They measured the longitude ($87^{\circ}12' \sim 92^{\circ}14'$ east longitude), latitude ($28^{\circ}70' \sim 30^{\circ}90'$ north latitude), and altitude (3600~4900m) of 14 distribution points, and recorded the ground temperature and water temperature of the producing area. and humidity. According to the distribution of hot springs in the Qinghai-Tibet Plateau, the author found that hot spring snakes are more common in the east and central areas. If other natural conditions are suitable, it is estimated that they are also distributed in hot springs in Sichuan and possibly northern Yunnan. So far, there are 2 known species of the genus Hot Spring Snake. They are all endemic to my country and are found on the Qinghai-Tibet Plateau, but they are distributed on the east and west sides of the Hengduan Mountains. Analysis may indicate that hot spring snakes were already widespread on the Qinghai-Tibet Plateau before the Hengduan Mountains were formed. After the formation of Hengduan Mountain, a north-south mountain with alternating high mountains and deep valleys, the hot spring snakes on both sides further differentiated, and the morphological differences were not very obvious. However, the molecular sequencing showed significant differences between the two species [1]. Hot spring snakes are mainly distributed in hot spring areas at mid-low latitudes and high altitudes, and prey on fish and frogs along rivers and streams. Hot springs on the Qinghai-Tibet Plateau are widely distributed and have high environmental humidity, which is suitable for hot spring snakes to survive. During their long evolution, hot spring snakes have also evolved markings that may be beneficial to absorbing radiant heat and adapting to the living environment of the Tibetan Plateau. The main reason for the decrease in hot spring snakes is the local development of geothermal resources and hot springs, which has resulted in substantial destruction of the hot spring snake's habitat.

2.2. *Euprepiophis perlaceus*

At present, the known distribution areas of the transverse-spotted jade snake are mainly in western Sichuan, including Ya'an (Shimian, Baoxing), Leshan (Mabian, Ebian), and Garze (Luding). The horizontal-spotted jade snake is more active in the morning, dusk, and night, so it is difficult to find. It is generally found in relatively open and flat valley broad-leaved forest areas at an altitude of 1600 m to 2700 m. It is often found on roadsides near streams; it has also been found in piles of dead leaves and dead trees under the forest (with a little sunlight transmitting). May inhabit dense forest understory near piles of dead leaves and rocks [2]. In general, the distribution of the elaphe snake is very narrow and the number is quite rare. According to the terrestrial wildlife survey in Sichuan Province, the number is estimated to be less than 10,000. At the same time, the distribution of the elaphe snake is uneven, and the number is relatively abundant in some local areas. For example, in the original distribution areas of Wenchuan Wolong Nature Reserve and Ya'an, no terrestrial wildlife survey was found in Sichuan Province; while in the Tianwan River area of Shimian County, the density was 194 individuals/km² [3].

2.3. *Hebius miyajimae*

Hebius miyajimae is mainly distributed in the understory, shrubs, and grasses of low-altitude mountainous areas in Taiwan, belonging to a forest ecosystem. The population is currently on a downward trend, and the main threats are the reduction of habitat quality and human activities. (not much information)

2.4. *Gloydius shedaoensis*

The current population of Snake Island vipers is 20281 ± 591 individuals, among which the largest numbers are found in 6 ditches and 2 ditches on Snake Island. They mainly live in shrubs and meadows but are also found on forest edges, beside pools, roads, and rocks. Only places with dense forests and kudzu vines are less dense. The distribution ranges of snake island vipers in different age groups are different, with larvae and sub-adults mainly distributed in shrubs and meadows. Adults are mainly found in woods. Old adults are mainly found on bare ground. The main factors affecting the number and distribution of snake island vipers include food, vegetation type, water source and rocks, etc [4]. Water source problem is a unique reason for the scarcity of *Gloydius shedaoensis*. There is no fresh water source on Snake Island. The snakes on Snake Island only rely on natural precipitation and dew for drinking water. Precipitation is another key factor for snake survival and activity. Water is more important to Snake Island vipers than food. Snake Island vipers can survive without food for months or even a year. Long-term water shortage will seriously affect the survival and reproduction of Snake Island vipers, especially in spring and autumn. The younger the snake, the more sensitive it is to lack of water. Long-term observations have found that lack of water during the peak activity seasons of the Snake Island Viper in spring and autumn will increase the Snake Island Viper's mortality by 10% to 30%, reduce its appearance rate by 30% to 60%, and reduce its reproduction rate by 30% to 50% [5].

3. *Achalinus jinggangensis*

Achalinus jinggangensis is mainly distributed in forests, shrubs, and debris piles in Jiangxi and Hunan Provinces, China, and belongs to a subtropical forest ecosystem. The current population size is at a rare level. *Achalinus jinggangensis* is an extremely endangered species. The main reasons for its population decline are narrow habitat distribution and habitat destruction. (no much information)

3.1. *Protobothrops mangshanensis*

Mangshan National Nature Reserve is located at 112.43L-1130 East Longitude 0', north latitude 24.54L-25. ∞', with a total area of nearly 20,000 hectares. More spring and summer. Rain, the air is moist. There is no severe cold in winter, no scorching heat in summer, and evergreen all year round, and the climate is pleasant. It has a typical subtropical forest climate. The narrow distribution area, extremely small population size, and human destruction of habitat are all reasons for the scarcity of the *protobothrops mangshanensis*. But what deserves more attention is that its population structure is imbalanced and its population is on a decreasing trend. It is speculated that there are the following reasons: first, the investigation is not in-depth yet, but this possibility is very small because in the investigation that lasted several years, it is impossible for a snake at this stage not to be discovered; second, the snake was attacked in Wen Yelin destroy. When food sources are reduced, adult snakes will eat young snakes as food. Or the baby snake cannot grow due to insufficient food sources and starves to death; third, the hatching rate is not high, or the sex ratio is unbalanced, etc. Regardless of the factors, the *protobothrops mangshanensis* is a declining population with no successors [6].

3.2. *Indotyphlops lazelli*

Indotyphlops lazelli are mainly distributed in Hong Kong's islands or coastal forests, farmland, and shrubs. *Indotyphlops lazelli* is a critically endangered species and its population is rare, but its population trend is unknown. The main threats are habitat destruction and narrow distribution areas. (no more information). *Opisthotropis laui* is mainly distributed in the forests of Guangdong. (no more information).

4. The status of endemic snakes in China

According to the statistics of The Red List of China Species and the analysis of Chinese Snake, the number of Chinese snakes (including extremely dangerous and vulnerable) is 72, of which 25 unique snake species account for 347% of all threatened snakes in China, and 463% of snakes unique to

China; There are 4 species with the most serious threats (extremely dangerous): Typhlopslazelli, Thermophis baileyi, Zhaoermiamangshanensis and Gloydiusshedaoensis .account for 74% of the number of unique snake species in China, accounting for 80% of the number of extremely dangerous snake species in China; Near dangerous or nearly vulnerable 3 species accounted for 56% of the unique snakes in China and 125% of all nearly dangerous snake species in China; 25 species accounted for 463% of snakes and 306% of all snakes in China; another data deficiency accounted for 19% of snakes.

Table 1. List of Endangered Snakes Endemic to China and Their Threat Status [7].

	Distribution	Endangered level	Risk factors or population status
Typhlops kohunensis?shina 1916	Taiwan	DD	Not found in the wild for many years
Typhlops hx-lliW alhch and Pauwels 2004	HongKong	CR	Narrow distribution area (currently only recorded on Hong Kong Island)
COLUBR IDAE			
Achalinus ha inanus Huang 1975	Hainan	VU	Very narrow distribution area
Achalinus jingganggensis(Zong and Ma 1983)	Jiangxi	VU	Narrow distribution area
Achalinus ngerMaki 1931	Taiwan	VU	Very narrow distribution area
Amphicana metusia Inger Zhao Shaffep and Wus 1990	Sichuan	VU	The distribution area is extremely narrow and susceptible to interference
Amphicsma miyajinae (Maki 1931)	Taiwan	VU	The distribution area is extremely narrow and susceptible to interference
Amphiesnoides omatirps (Wemer 1924)	Southern provinces	VU	The distribution area is narrow and the number is rare
Boga guangximsisW en1992	Guangxi	VU	Narrow distribution area
Ca hma ra yumnanmsis Che moy19b	Yunnan	VU	Only the model origin is known
D nodon msonatun Hu and Zhao1972	Hainan	VU	The distribution area is narrow and susceptible to human interference
Elaphe perhea Skjneger 1929	Sichuan	VU	Narrow distribution area
O lgodon belhs(Stanky 1917)	Fujian, Yunnan, Guangxi	NT	The distribution area is narrow and fragmented

Table 1. (continued)

<i>Olgodon lng shennsis</i> Cheng and Huang 197e	Guangxi, Guizhou	VU	narrow distribution area
<i>O lgodon mehonatus</i> W all 1922	Tibet	VU	Rare in quantity, only a few specimens are known
<i>O ligodon multionatis</i> Zhao and Jiang 1981	Gansu, Shaanxi, Sichuan	VU	The distribution area is small and severely fragmented, and the quality of the habitat has declined
<i>O lgodon ning shanensis</i> Yuan 1983	Shaanxi	VU	Rare in quantity, only the type specimen is known
<i>Opisthotmpis cheni</i> Zhao 1999	Hunan	VU	Rare in quantity, only the type specimen is known
<i>O pisthotmpis guangx nsis</i> Jiang and Huang 1978	Guangxi	VU	Rare in quantity, only a few specimens are known
<i>Opisthotmpis maxwelli</i> Boulenger 1914	Fujian, Zhejiang, Guangxi	VU	Rare in quantity, only a few specimens are known
<i>P lag inpholis un posocularis</i> Zhao Jiang and Huang 1978	Yunnan	VU	Rare in quantity, only the type specimen is known
<i>Rhabdophis ad kri</i> Zhao 1997	Hainan	NT	Narrow distribution area
<i>Themophis bailyi</i> (Wall 1907)	Tibet, Sichuan	CR	Small habitat, reduced quality, fewer adults
<i>Zaocys dhumnades</i> (Cantos 1842)	Southeast, Southwest and North China provinces and regions	VU	Population numbers continue to decrease
V I P E R D A E			
<i>Zhaoem ia mangshanensis</i> (Zhao 1990)	Hunan	CR	The distribution area is small and poaching is serious
<i>G bydins shedaoensis</i> (Zhao 1979)	Liaoning	CR	Habitat quality declines

Table 1. (continued)

G bydius stauchi(Bedraga 1912)	Gansu, Southwest and North China provinces	VU	The population has decreased by 30% in 10 years
Ovophis zayuensis(Jiang 1977)	Tibet	NT	The distribution area is narrow and the number is rare
Trinemeunus gracilis?shina 1920	Taiwan	VU	Only distributed in Taiwan Island, the number is unknown

Note: The classification of threat levels of endemic snakes in China refers to the “Red List of Chinese Species” CR Critically Endangered; VU Vulnerable; NT Near Threatened; DD data is lacking

The current threats to endemic species in China are mainly due to their small distribution areas and habitat destruction by human activities. In view of the above reasons, we can increase the protection of the habitats of unique species of snakes, establish nature reserves, and severely punish illegal hunting and trafficking of wild animals. Or develop artificial breeding technology based on snake characteristics and establish a breeding base. *Protobothrops mangshanensis* is a good case. The existence of each endemic species is related to its special living habits and the unique ecological environment of its distribution area. Protecting them is of great significance.

The current situation of endemic snake resources, especially the lack of data and the types not concerned, was investigated and evaluated to improve the rare and endangered species in China [7].

5. Conclusion

This article mainly uses China’s endangered and critically endangered endemic snake species as examples to investigate and analyze their distribution characteristics and reasons for being threatened. It can be seen that the distribution of these snakes is not concentrated, but most of them are distributed in central and southwestern China. Very few are distributed along the southern coast, such as Guangdong, Hong Kong, Taiwan, and other places. Some cases are distributed in the northeastern Liaoning area. Most of them prefer forest ecosystems whose habitats are dominated by forests and shrubs. A small number of them are located in plateau ecosystems and freshwater wetland ecosystems near hot springs. The main threat to endemic species of snakes is their narrow distribution area, so a series of protective measures can also be implemented. This paper also has certain limitations. First, some of the cited papers were published earlier and the current status may have been updated. Secondly, the research mainly focuses on endangered and critically endangered endemic species and does not consider other vulnerable and near-endangered endemic species, which has certain limitations. A more systematic investigation may help discover new species of snakes in the future.

References

- [1] Zhao Er-Mi. Hot-Spring Snakes. The Snakes Endemic To Qinghai-Xizang Plateau [J]. Journal Of The Cun (Natural Sciences Edition). Vol.17. No.4. 2008. 6-9.
- [2] Ding Li, Gan Shao-Xiong, Shi Jing-Song, Huang Yao-Hua, Li Shu-Bin, Liu Jia-Bin, Zhou Sheng-Yan, Zhou Cai-Quan. A Supplementary Description Of *Euprepophis Perlacea* (Stejneger, 1929) Using a New Distribution Record In Shaanxi Province [J]. Journal Of Sichuan Forestry Science And Technology. Vol. 38, No.2, 2017, 37-39.
- [3] Hu Jie, Li Yan-Hong, Li Cao, Hu Jin-Chu, Wang Hong-Jia. The Present Status Of Transverse—Banded Racer [C]. Sichuan Journal Of Zoology.
- [4] Liu Peng. Population Dynamics Habitat Selection, And Conservation Of *Gloydius Shedaoensis* In Snake Island, Dalian, China [D]. 2008.

- [5] Tian Huasen, Zhang Fengjiang. Biological Characteristics And Protective Countermeasures Of *Gloydus Shedaoensis* [J]. Journal Of Liaoning Forestry Science & Technology, No.2, 2002, 35-40.
- [6] Chen Yuanhui. The Current Status Of *Ermia Mangshanensis* And Conservation Strategy [C]. Sichuan Journal Of Zoology.
- [7] Zhou Zhengyan, Li Pipeng, Lu Yuyan, Dong Bingjun. The Chinese Endemic Snake Resources And Proposals To Protection. Sichuan Journal Of Zoology. Vol.27, No.1,2008. 46-47.