CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

To include all populations of the unlisted yet endangered *Protobothrops mangshanensis* (Zhao, 1990), endemic to China to Appendix II of CITES.

a) in accordance with Resolution Conf. 9.24 (Rev. CoP14), Annex 2a, criteria B, it is necessary to regulate the international trade in *Protobothrops mangshanensis* (Zhao, 1990) to ensure that its wild population is not reduced by stress from over-harvest for pet collection.

B. Proponent

China*.

C. Supporting statement

1. Taxonomy

1.1 Class:	REPTILIA	
1.2 Order:	SERPENTES	
1.3 Family:	Viperidae	
1.4 Genus, species:	*Protobothrops mangshanensis*	
1.5 Scientific synonyms:	*Trimeresurus mangshanensis, Ermia mangshanensis, Zhaoermia mangshanensis*	
1.6 Common names:	English:	Mangshan pit viper, Mt. Mang pit viper
	Chinese:	莽山烙铁头蛇，莽山原矛头蝮，小青龙.
1.7 Code numbers:	N/A	

2. Overview

The purpose of this proposal is to list *Protobothrops mangshanensis* into Appendix II of CITES. The first specimen of the snake was found in Mt. Mang (112° 43'～113° 0' E，24° 52'～25° 23' N) in 1989. Zhao and Chen (1990) described and named the type specimen as *Trimeresurus mangshanensis*. Zhang (1993) pointed out the snake had some unique characters in skull morphology and should be designated to a

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genus novum, the *Ermia*. However Gumprecht and Tillack (2004) pointed out that the *Ermia* had been already used to name a kind of locust. Hence they changed *Ermia* into a new generic name *Zhaoermia* in honour of Professor Ermi Zhao. Recently Guo *et al*. (2007) studied the phylogeny of Asian pit vipers with molecular markers in addition to morphological comparison. They found the *Zhaoermia* should be classified as *Protobothrops*. Zhao (1998) categorized the species as Critically Endangered in the *China Red Data Book of Endangered Animals*, late; Zhao *et al*. (2009) retained the species as CR in the *China Species Red List*. Zhou (2012) reassessed the status of the species, and classified it as Endangered (EN) in *IUCN Red List of Threatened Species*.

Protobothrops mangshanensis inhabits in an area of only 105 km^2 of subtropical forests around Mt. Mang in southern China. Density of *Protobothrops mangshanensis* was estimated about 3-5 individuals per km^2 and not more than 500 Mangshan pit vipers lived in the wild (Gong *et al*. 2012). The population of *Protobothrops mangshanensis* is decreasing owing to over-harvesting and other factors (Zhao *et al*. 2009, Zhou 2012). Although Mangshan pit viper is under protection in its distribution area, most of which is covered by two National Nature Reserves, the species is still under potential threat from poaching and over-harvesting for international terrarium keeping and pet trade. Climate disasters like cold waves and snow disasters may threaten the survival of the pit viper. The survival of wild population of Mangshan pit viper is threatened, if the international trade in the species is not regulated.

3. Species characteristics

3.1 Distribution

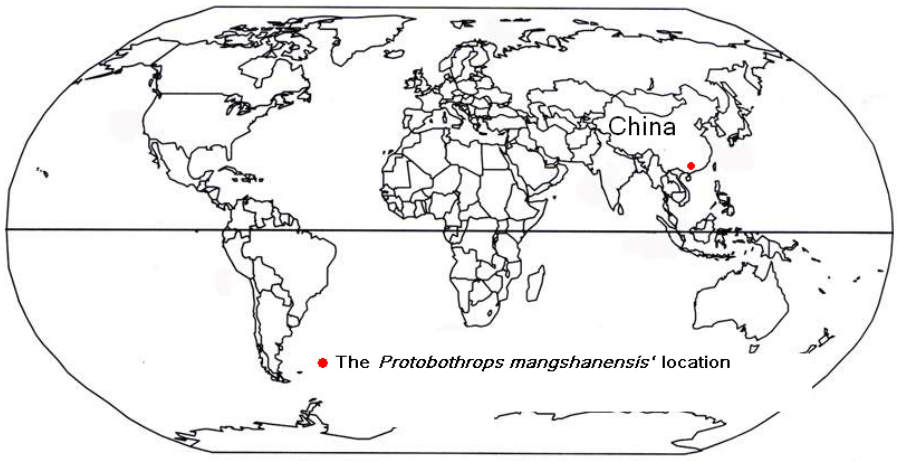

Figure 1 Distribution of *Protobothrops mangshanensis*.

The Mangshan pit viper inhabits an area of 105 km2 in Mt. Mang in southern China.

3.2 Habitat

Protobothrops mangshanensis is endemic to southern China and inhabits a very restricted area in central part of the Nanling Mountain. The Mangshan pit viper lives in primary forests and occasionally secondary forests on the mountain slopes between 500-1600 m in the Mangshan National Nature Reserve and the Nanling National Nature Reserve (Chen 2002, Chen 2003, Gong *et al*. 2012), usually near streams.

The climate of the Mt. Mang is a monsoon-type humid subtropical climate. The annual mean temperature is 17.2ºC and the averaged annual precipitation is over 2000 mm according to meteorological statistics from 1958 to 2003 (Editorial Board of the Chronicle of the Mt. Mang 2004). The vegetation presents a “crossroad” form of southern, central, eastern and southwestern China. Subtropical evergreen broad-leaved forests and coniferous and broad-leaved mingled forests are finely preserved (Editorial Board of the Chronicle of the Mt. Mang 2004). Fifty-two species of snake including two endemic species have been recorded in the Mt. Mang area (Chen 1998, Chen 2000, Yuan *et al*. 2010).

3.3 Biological characteristics

Protobothrops mangshanensis has large body size and its venom is of extreme toxicity. The size of the adult pit viper is more than 2 m long and its weight is up to 4 kg. The pit viper is mainly nocturnal and arboreal. It moves slowly and mainly preys on small birds and rodents with a lethal injection of venom. The reproduction mode of the pit viper is oviparous (Chen 1996, Gumprecht *et al*. 2002, Chen 2004, Zhao 2006, Chen 2010, Yu *et al*. 2010).

Due to its rarity and concealment, the Mangshan pit viper is difficult to be found in the wild. Thus, quantitative data on biological characteristics and population status of Mangshan pit viper are vague. Based on the records from artificial feeding in southern China, the pit viper spawns a number of 20-31 pieces of oval eggs in June-July. A mother pit viper coils around the eggs and responds aggressively to potential threats. The eggs are incubated at 25-30 ºC for about 60 days (Gumprecht, 2002). Lengths of hatched snakes are about 330-460 mm long and weigh 15-30 g. Hatching rate varies in artificial incubation (Chen 1996, Gumprecht *et al*. 2002, Chen 2004, Zhao 2006, Chen 2010, Yu *et al*. 2010). There are no data on the sexual maturity time and the life expectancy of Mangshan pit viper.

3.4 Morphological characteristics

The head of *Protobothrops mangshanensis* is triangular in appearance and the snout is narrow and circle. The head and snack are distinct obviously. A pit located between the eyes and the nostril on either side of the head. The iris is yellowish green. Top of the head covered with small scales of which the supraoculars are the largest.

The ground colour of the body is black brown, with a series of irregular yellow green patches or bands. The patch of dorsal scales has about 40 scales in each group, accounting for 3-5 rows of equidistant yellow-green stripes. Ventral scales mixed with large and slightly triangular yellow-green spots, besides black brown, with a series of irregular yellow green patches or bands. The head is more symmetrical with dark-brown and yellow-green stripes. The stain of the front of the tail is consistent with those of the torso, and the posterior half of the tail shows to be pale yellow or green, or almost white. The stain of juvenile and adult is completely consistent (Zhao and Chen 1990, Zhao 1998, Zhao 2006, Yu *et al*. 2010).

Figure 2 Photos show the appearance of *Protobothrops mangshanensis*.

3.5 Role of the species in its ecosystem

Protobothrops mangshanensis prey on small birds and rodents. Although they have major predatory influence on ecosystem, pit vipers are not usually considered as top carnivores (Nowak *et al*. 2008), so is the Mangshan pit viper.

4. Status and trends

4.1 Habitat trends

According to previous investigation, distribution of *Protobothrops mangshanensis* is restricted to two national nature reserves and its adjacent area. The Mangshan National Nature Reserve covers a major distribution of the Mangshan pit viper. The Mt. Mang locates in an area between densely populated central and southern China. Local communities in nature reserves where the Mangshan pit viper occurs are still living in poverty. From 1930s to 1990s, the land of the Mt. Mang was designated as a state-run forest farm. The primary forest has been logged. Small hydroelectric stations were established in 1980s (Editorial Board of the Chronicle of the Mt. Mang 2004). In 1992, the Mangshan National Forest Park was created. Two years later, the Mangshan National Nature Reserve was established. Logging has been banned in Mt. Mang since 1999. Since then, local livelihood and budgets for administrative operation and management mainly rely on incomes from small local hydroelectric industry and forest tourism. The forests are well protected to conserve soil and water, hence to maintain sustainable income from selling electric power. To develop added values of the scarce primary forests in a densely populated area, the Mangshan National Nature Reserve began to offer tourism services in its Buffer Zone in 2003. Nanling National Nature Reserve was established in 1994 which manages a minor distribution area of the Mangshan pit viper. Nanling National Nature Reserve also began to develop tourism in the early 21th century.

Sometimes, climate disasters devastate local forests. For instance, from Jan. to Feb., 2008, an extreme cold wave with the frequency of once in one hundred years invaded in southern China and damaged the forests with thick ice sheets. A large number of trees were fallen and a large number of wild animals were frozen to death during the cold wave (Cao and Chang 2010). According to statistics from local forest administrative agency, one third of the forests in the Mt. Mang were damaged during the cold wave. The forests in the Core Zone of Mangshan pit vipers were heavily damaged. Bodies of python, salamander, masked civet and birds were found during a consequential survey. The extreme cold wave certainly had serious impacts on habitats and survival of *Protobothrops mangshanensis* (Gong *et al*. 2012).

4.2 Population size

Population density of *Protobothrops mangshanensis* is low in the wild. Only a few *Protobothrops mangshanensis* recorded were reported. Based on field surveys and community interviews from 1990 to 2010, the density of the Mangshan pit viper is estimated at about 3-5 individuals per km^2 (Chen 2003, Chen 2010, Gong *et al*. 2012). Population size of *Protobothrops mangshanensis* in the wild is estimated not more than 500 individuals (Chen 2003, Chen 2010, Gong *et al*. 2012).

4.3 Population structure

Data collected by now are insufficient to describe a population structure exactly due to the difficulty in finding Mangshan pit viper in the wild.

4.4 Population trends

Protobothrops mangshanensis occurs in a narrow area with low population density. The pit viper was not scientifically recorded until 1989. Several population surveys were conducted and population was estimated at 300-500 individuals in 2000 (Chen 2002). In 2010, it is estimated that the species in the wild has a population size of no more than 500 individuals (Gong *et al*. 2012). Population trend of pit viper is unclear due to short observing period. A decline in the population size inferred from high levels of harvesting for terrarium keeping and pet trade and climate disasters like the cold wave in 2008 (Zhao *et al*. 2009, Gong *et al*. 2012, Zhou 2012).

4.5 Geographic trends

No data could be used in estimating its geographic trends because of its narrow distribution area and the recentness of discovery.

5. Threats

There are several threats that may threat the survival of *Protobothrops mangshanensis.* Main threat is over-harvesting. Climate catastrophes could have influence in the survival of the species. Local people used to kill pit vipers for preventing being poisoned by the venom ejected by pit viper. Local people also used to eat snake or make snake liquor as traditional medicine (Zhao 1998, Chen 1998). After the implementation of protection to the species, such unspecific harvesting decreased in recent years. However, the Mangshan pit viper is explored as a target of rare zoological collection or reptilian pet of high value for international trade (Gong *et al*. 2012). Its rarity, extraordinary size and spectacular appearance make it bound into favour in global terrarium keeping and pet lover. It was recorded that over 30 individuals had been poached and sold in the black market, at a price over US$1000/kg (Gong *et al*. 2012).

6. Utilization and trade

6.1 National utilization

There used to be a traditional custom of catching snakes as bush meats, for making dried medicine materials or medicinal liquor in the community around the distribution area of the Mangshan pit viper. However no specific utilization of *Protobothrops mangshanensis* as food or medicine is developed (Chen 1998). Although crystal structure of venom protein, and biochemical and biological activities of the venom of *Protobothrops mangshanensis* were studied (Mebs *et al*. 2006, Murakami *et al*. 2008, Liu *et al*. 2011,Nie *et al*. 2011), this species is hardly exploited by the venom industry due to its low availability. Mangshan pit viper is traded as exotic pets or as founders of captive-bred stocks or in zoological exhibitions. Some individuals had been captive and been traded as private pets at somewhere in Hunan, China (VenomLand 2012).

6.2 Legal trade

So far, no legal trade of wild caught *Protobothrops mangshanensis* which was authorized by national or local forest administrative agency has been recorded.

6.3 Parts and derivatives in trade

Based on the main types of utilization, trade products of *Protobothrops mangshanensis* are live individuals or eggs, probably intact dried specimens.

6.4 Illegal trade

It is documented that over 30 Mangshan pit vipers were illegally harvested and sold in black market from 2007 to 2012. Price has reached US$ 1,000 per kilogram in black market (Gong *et al*. 2012). Private holding, trade and exchange are believed always there; but it is hard to estimate the scale. There exists a network of *Protobothrops mangshanensis* trafficking. The pit viper was peddled at online forums by terrarium keepers in Hong Kong and Germany. One of the traders said that 30 to 40 Mangshan pit vipers had been disposed off through network (VenomLand 2012).

6.5 Actual or potential trade impacts

The wild population of *Protobothrops mangshanensis* is declining due to the unsustainable harvesting and illegal trade (Gong *et al*. 2012). As the largest threat to its survival, over-exploitation and the trafficking of Mangshan pit viper have a purpose of fulfil the desires for herpeton collections and reptilian pets.

Although zoos and terrarium keepers were reported to achieve success in captive breeding of *Protobothrops mangshanensis* (Gumprecht *et al*. 2002), the small number of breeding groups cannot satisfy such extensive demands for global pet lovers. Even if plenty captive-bred pit vipers are yielded, once an international commercial market of the Mangshan pit viper is formed, demands for new recruits from the wild to expand the breeding group may lead to poaching and over-harvest.

Therefore, international trade in *Protobothrops mangshanensis* is critical to the survival of the species.

7. Legal instruments

7.1 National

The Lists of Wildlife under Special State Protection of China and the List of Wild Animals under Special Local Protection in the Hunan Province, China were both issued and were put into effect in 1989, a few years before the Mangshan pit viper was recorded. The Lists of Wildlife under Special State Protection has been amended in 2004; the Mangshan pit viper was not included; thus it receives little legal protection in national range. In 2000, a List of Terrestrial Wildlife under State Protection, which are Beneficial or of Important Economic or Scientific Value has listed *Protobothrops mangshanensis*. However, the species listed in the List of Terrestrial Wildlife under State Protection, which are Beneficial or of Important Economic or Scientific Value had lower conservation priority than those species listed in the Lists of Wildlife under Special State Protection of China. In 2002, the species was put on the revised List of Wild Animals under Special Local Protection in Hunan Province, China. Nevertheless, Mangshan pit viper is not considered as a legally protected wild animal in the Guangdong Province, which governs a part of range of the pit viper. However, in accordance with the Regulations of the People's Republic of China on Nature Reserves, issued in 1994, the Mangshan pit viper is protected in the Mangshan National Nature Reserve and the Nanling National Nature Reserve, and the pit viper cannot be hunted without an official permit.

In Hunan Province, to capture a *Protobothrops mangshanensis* should be authorized by a local forest administrative agency at county-level, and is verified by a forest bureau of city-level. In accordance with the Law of the People's Republic of China on the Protection of Wildlife, those intend to hunt a wild animal, like Mangshan pit viper, even though it has not been included in the Lists of Wildlife under Special State Protection of China yet, should acquire a certification of hunting and should submit to the quota management of hunting. However, in the land outside the Hunan Province and the Nanling National Nature Reserve, there is no legal protection for the snake. Thus, *Protobothrops mangshanensis* were poached and traded to Hong Kong or overseas. Recently, *Protobothrops mangshanensis* is proposed to be included in the List of Wildlife under First Class Protection in China. Yet, the amendment of List of Wildlife under First Class Protection in China is not proclaimed.

7.2 International

The Mangshan pit viper is endemic to China, which has not been covered by the protection of any international convention; hence there is no relative international mechanism or regulation to control the international trade of the species.

8. Species management

8.1 Management measures

In June, 1994, the Mangshan pit viper was listed as one of the prioritized protected reptiles in the China Biodiversity Action Plan. In accordance with the state government spirit aforesaid, the Mangshan National Nature Reserve then issued a Notification on Prioritized Protection of the Mangshan Pit Viper and Other Reptiles; and the local government of Yizhang County, Hunan Province, China, where the Mangshan National Nature Reserve is located, also issued a Notification on Key Protection of the Mangshan Pit Viper to Ban the Hunting of the Species till June, 1995 (Chen 1998). In 2005, herpetologist specifically called for recognition and action of state government to take the protection of the species seriously (Editorial Board of the Journal of Snake 2008). A Workshop on Conserving the Mangshan Pit Viper was held in 2008.

The Mangshan Forest Administrative Agency began to use confiscated snakes to form founder group and to artificially incubate the Mangshan pit viper in 1994. The program was succeeded and the agency released 89 hatched snakes into the wild until 2003 (Chen 2003). In 2004, the State Forestry Administration of China introduced a series of control measures to ban the direct consumption of snakes as food national wide (National Report of China, CITES Asian Snake Trade Workshop, 2011).

8.2 Population monitoring

Surveys have been conducted in the Mangshan National Nature Reserve from 1990 to 1997, followed a special investigation on the pit viper in 1998. From 2007 to 2010, Gong *et al*. investigated the snake in the Mangshan National Nature Reserve and the Nanling National Nature Reserve. Survey continues from 2010 on. Several Mangshan pit vipers were hereby recorded in the wild, as well as at villages, in a restaurant or in black markets (Yang Daode, 2012, personal communication).

8.3 Control measures

8.3.1 International

No international measure was set to control the trade of the pit viper by now.

8.3.2 Domestic

Public communication on the uniqueness and conservation value of the Mangshan pit viper has been carried out in conservation awareness program in ecotourism of Mangshan National Nature Reserve. The reserve distributes printed material and built a special museum of the Mangshan pit viper. However, no conservation measures have been taken in the Nanling National Nature Reserve and its adjacent area which is an important habitat of Mangshan pit viper.

8.4 Captive breeding and artificial propagation

The Mangshan Forest Administrative Agency began to study the captive breeding of the Mangshan pit viper in 1994; and had successfully incubated over 100 baby snakes in total. Most of them were released in to the wild (Chen 2003). However, second generation (F2) of the Mangshan pit viper were never produced in captive stock in China. It was reported that the San Diego Zoo had succeeded in incubating the Mangshan pit viper in 2002 (Gumprecht *et al*. 2002). Captive status of Mangshan pit vipers at open institution is summarized in following.

Table 1. Holding List of *Protobothrops mangshanensis* till April 2012

Institution	**Male**	**Female**	**Other**	**Birth (last 12 month）**	**Total**
All 15 Institutions 3 Regions	23	24	3	10	60
Region: China 4 Institutions, Male: 0 , Female: 4, Other: 7					
Changsha Ecological Park	0	0	2	2	2
Hunan Shehuang Snake Farm	0	0	5	5	5
Mangshan Nature Museum	0	3	0	0	3
Shaoguan Amoy Tiger Captive Breeding Centre	0	1	0	0	1
Region: Europe 2 Institutions, Male: 5 , Female: 5, Other: 0					
Zoological Society of London	4	4	0	0	8
Moscow Zoological Park	1	1	0	0	2
Region: North America 9 Institutions, Male: 18 , Female: 18, Other: 3					
Dallas Zoo	1	1	2	1	4
Bronx Zoo/Wildlife Conservation Society	3	4	0	2	7
Gladys Porter Zoo	1	0	0	0	1
Zoo Atlanta	1	1	0	0	2
San Diego Zoo	5	6	0	0	11
San Antonio Zoological Gardens & Aquarium	0	1	0	0	1

Institution	Male	Female	Other	Birth (last 12 month）	Total
Saint Louis Zoological Park	3	2	1	0	6
Los Angeles Zoo & Botanical Gardens	3	2	0	0	5
Riverbanks Zoo and Garden	1	1	0	0	2

Note: data of Chinese institutions are summarised from field survey in April, 2012; other data are accessed from International Species Information System, the ISIS, in 20th April, 2012.

There are private keepers holding the species in Hong Kong, Switzerland, Germany and America, and some of them may form small breeding groups. For example, a terrarium keeper in Leipzig narrated in his webpage that in 2005, he got one female Mangshan pit viper born in 2002 from an American zoo, after then he obtained two male Mangshan pit vipers from a herpetologist in 2007 (Moeller 2012). A snake supplier in Hong Kong stated in a web forum that he had begun to nurture the *Protobothrops mangshanensis* since 2000, and the snake began to breed in 2002. He peddled purported F2 individuals on website (VenomLand 2012). However, the exact origin, number of breeding group and number of total individuals of captive-bred *Protobothrops mangshanensis* are still not known.

8.5 Habitat conservation

The distributing area of the pit viper mainly locates in two national nature reserves, with a major distributing area in Mangshan National Nature Reserve of 75km^2 and a minor distributing area of 30km^2 is in the Nanling National Nature Reserve (Gong *et al*. 2012). An unknown portion of habitat of the Mangshan pit viper is located outside above mentoned two reserves. It is banned to log forests in both nature reserves, thus primary forests on which the survival of the Mangshan pit viper relies are preserved. Reserve staffs routinely patrol along the roads in the reserves, but most of the area is the high rising mountain peaks and deep valleys that are inaccessible.

The local communities in nature reserves used to collect forest by-products as their supplementary income. On the other hand, the administrative agencies of the reserves lack of funding support from state government finance. Budgets for administrative operation and management rely on incomes from small hydroelectric industry and tourism. Therefore, such a finance situation may constrain the management and developments of the nature reserve.

9. Information on similar species

Protobothrops mangshanensis is targeted with a purpose to fulfil the demand of terrarium keeping and pet collection. Its distinct morphological and biological characteristics set a high-valued position in the market of reptile collection. *Protobothrops mangshanensis* can be distinguished easily from its relatives in the same genus, like the *P. jerdonii* and the *P. kaulbacki*, with the yellow green stain on head, the white tail, and the large body size of adults.

10. Conclusions

The endangered *Protobothrops mangshanensis* occurs in small forested mountainous area in southern China. Population size of the *Protobothrops mangshanensis* is small and is inferred declining. The survival of this endemic species is mainly threatened by over-harvest as a result of terrarium collection and international trade. To ensure that the harvest of individual from the wild for pet collection would not reduce the survival of the species, China proposes to include all populations of *Protobothrops mangshanensis* into CITES Appendix II, and to regulate international trade in the species.

11. Additional remarks

No

12. References

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