

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



Seventeenth meeting of the Conference of the Parties  
Johannesburg (South Africa), 24 September – 5 October 2016

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

To include Chinese endemic species *Paramesotriton hongkongensis* (Myers and Leviton, 1962) to Appendix II of CITES. In accordance with Resolution Conf. 9.24 (Rev. CoP16), Annex 2a, criteria B, it is known or can be inferred or projected that the regulation of trade in *Paramesotriton hongkongensis* is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting for pet trade and habitat degradation

B. Proponent

China<sup>\*</sup>

C. Supporting statement

1. Taxonomy

- 1.1 Class: Amphibia
- 1.2 Order: Caudata
- 1.3 Family: Salamandridae
- 1.4 Genus, species or subspecies, including author and year: *Paramesotriton hongkongensis* (Myers and Leviton, 1962)
- 1.5 Scientific synonyms: *Trituroides hongkongensis* Myers and Leviton, 1962, *Paramesotriton chinensis hongkongensis* — Fei, Ye, and Huang, 1990
- 1.6 Common names: English: Hong Kong newt · Hong Kong warty newt  
Chinese: 香港瘰螈, 香港蝾螈
- 1.7 Code numbers: N/A.

2. Overview

The Hong Kong newt, *Paramesotriton hongkongensis* (Meyers & Leviton 1962) is endemic to China. It has a restricted distribution in Hong Kong Special Administrative Region, China and the coastal Guangdong Province of China (Miller 2004, Zhang et al. 2011, Fu et al 2013). This relatively large and robust newt lives

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<sup>\*</sup> The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

in pools of stony montane streams and most of them still have a period of terrestrial phase time (Fu et al. 2013). The newt is categorized as Near Threatened in the IUCN Red List of Threatened Species and actually is close to qualifying for Vulnerable (Lau and Chan 2004). It is designated as a protected species under Hong Kong Wild Animals Protection Ordinance of the Hong Kong SAR, China in 1997 (Lau and Chan 2004, Zhang et al. 2011). Since 2000, *Paramesotriton hongkongensis* has been included in the Lists of terrestrial wildlife under state protection of China, which are beneficial or of important economic or scientific value. Consequently wild harvest of the species should get approval from local competent departments.

Human disturbances, especially the illegal collection of significant numbers for international pet trade threaten the survival of wild populations of the species. Because of its bright coloured patches on the body surface, *Paramesotriton hongkongensis* is often captured from its breeding sites in streams and is traded as pet (Zhang et al. 2011). *Paramesotriton* is one of the four most common genera of Salamandridae that imported into US (USFWS OLE 2015). It was found that Asian Caudata pets imported to Europe from Hong Kong carried an ancient new-type amphibian chytrid fungus, *Batrachochytrium salamandrivorans* (Bsal). The chytrid may infect the aboriginal caudata in Europe and cause severe damage to the native species (Martel, et al., 2014; Stokstad, 2014; Stuart, 2014). In January 13, 2016, the U.S. Fish and Wildlife Service amended its regulations to add 201 species of salamanders including Hong Kong newt to the list of injurious animals (DIFWS 2016).

Live individuals of *Paramesotriton hongkongensis* are poached from wild populations mostly in mainland China also in Hong Kong, and most of them are smuggled into Hong Kong then to foreign countries. During 2005-2010, there were 223 924 individuals of *Paramesotriton hongkongensis* imported into US from Hong Kong (Kolby, et al., 2014). Most traded individuals of *Paramesotriton hongkongensis* are adults captured from the wild. The newt normally experiences slow growth and may take 3-5 years to reach sexual maturity (Fu et al. 2013). Due to their specific behaviour of breeding aggregation and immigration in fixed breeding pools, poaching for pet trade would deplete parent stocks of wild populations and consequently harm the survival of the species in the wild. Meanwhile, habitat alteration, stream channelization, and water pollution led to habitat degradation. Although the species is relatively common in its narrowing distribution area, the population trend is evaluated as decreasing (Lau and Chan 2004). Conservation plans for maintaining existing population of *Paramesotriton hongkongensis* are needed to prevent further decline (Zhang et al. 2011). If the international trade in *Paramesotriton hongkongensis* is under the control of CITES convention, the harvest and utilization of wild populations will be sustainable, traceable and will not be detrimental to the survival of the wild populations of *Paramesotriton hongkongensis*.

### 3. Species characteristics

#### 3.1 Distribution

*Paramesotriton hongkongensis* is restrictively distributed in several isolated locations on the mainland New Territories, Lantau Island, Hong Kong Island of Hong Kong SAR, and Shenzhen, Longmen, Dongguan, Conghua and Zengcheng of Guangdong Province (Karsen, et al., 1998; Fei, et al., 2006, 2012; Mülle, 2004; Zhang, et al., 2011; Zhang, 2013) (Annex 1, Figure 1).

#### 3.2 Habitat

The newts live in small montane streams and pools of stony montane streams with cobbles, boulders and riparian vegetation at the altitude of 100-940m around (Fei, et al. 2006, 2012 ;Zhang, 2013)(Annex 1, Figure 2). Their aquatic phase occurs mainly but not entirely within the dry season (Fu et al. 2013). Pools that the newts live in are relatively easy to explore because of their small size, relatively uniform rocky substrates, clear water, and very little overhanging vegetation. The vegetation around are mainly broad-leaved evergreen or bushes (Fu et al. 2013).

#### 3.3 Biological characteristics

*Paramesotriton hongkongensis* is a robust, largely aquatic species. Adults often rest on the rocks at the bottom of the stream or at riverside. They feed on small animals mostly Brotia snails, Caridina shrimp, newt eggs, baetid mayflies, and calamoceratid caddisflies (Fei, et al., 2006, 2012, Fu et al. 2013).

Breeding occurs in the dry, cool season from September to next May (Fu et al. 2013). During reproduction period, they immigrate and aggregate in breeding pools in cold water. In the breeding season, the male displays by beating its tail, which develops a white or bluish markings which is visible in dim light. Sperm is transferred to the female in a spermatophore. Female spawns about 120 eggs, mostly adhered to the stems and leaves of aquatic plants. Hatching is normally after 21-41 days, and the larvae finish their metamorphosis after two months. Some of them change their life from water to land. Juveniles become sexually mature when they have body length of 5-13 cm after three to five years. Hong Kong newt may have a life span about 10 years, which is similar with its relative, the *Paramesotriton chinensis* (Fei, et al., 2006, 2012; Fu, et al., 2013; Zhang, 2013) (Annex 1, Picture 3-4).

The adult newts remain in breeding pools for an average of 45 days then return to land after reproduction (Fu et al. 2013). From June to August, they go into estivation in montane streams and in the crevices or under rocks with abundant aquatic plants (Zhang, 2013). *Paramesotriton hongkongensis* has death feigning behaviour when threatened. It warns predators of toxins secreted from their skin with colourful red or orange spots on the belly and pungent odour of skin mucus (Zhang, 2013).

### 3.4 Morphological characteristics

Common characters of the genus *Paramesotriton*: Skin is rough, the whole body colouration is light brown or dark brown. The vertebral ridge on the middle back is light in colour, and ventral side is covered with regular and equal orange-red or orange rounded spots. Two-thirds part in front of lower edge of tail is orange-red or sometimes with dark horizontal blotches. Head flattened, longer than wide with truncated snout. Labial fold distinctive, glandular vertebral ridge is on head and back. No fontanel, and the shape of vomerine tooth is “^” shaped. The “V” shaped swell in occipital region is connected with vertebral ridge. Premaxillary single, front nasal process is long, right and left nasal bone separated; maxillary is short, not touch with quadrate. No costal grooves, and warts are relatively large, formed into longitudinal ridges. Four limbs long, and digits are overlapped when adpressed to the body. Fingers 4 and toes 5, without webbing. Tail is relatively short Tail-tip blunt (Fei, et al., 2006, 2012) (Annex 1, Picture 5).

Sometimes confused with *Paramesotriton chinensis*, *Paramesotriton hongkongensis* is less warty and has a more pronounced cranial and back ridge, which makes it appear more pentagonal in shape. This species is typically stocky and tends to display large irregular orange to red spots on its belly, with colouration running down the length of the underside of the tail. The snout-to-tail length of the newt is about 11 to 15 cm. Females averaged 5% longer than males. Tail length is 73% and 89% of head-body length in male and females, respectively. Adults normally reach lengths of 14-16cm and have a smooth olive to dark brown body. Colouration can largely vary from area of origin with some showing a variable vertebral orange ridge (Fei, et al., 2006, 2012 Fu et al. 2013).

### 3.5 Role of the species in its ecosystem

*Paramesotriton hongkongensis* has a medium trophic level, and are the consumer of small aquatic invertebrates and newt eggs. They need high-quality environment and are sensitive to environmental change, which make them important indicator species.

## 4. Status and trends

### 4.1 Habitat trends

The distribution area is only 20 000 km<sup>2</sup>, and fragmented in islands and natural reserves. *Paramesotriton hongkongensis* habits in clear streams with high critical requirements on water quality. Frequent human activities and ecological tourism development intensified the ecological environmental change of the habitat. And with the influence of climate, the habitat area and quality are continue to decrease (Lau and Chan, 2004; Fei, et al., 2012; Zhang, et al., 2011). Moreover, the habitats are greatly influenced by hydropower development and human life. During the immigration to the reproduction site, *Paramesotriton hongkongensis* might fall from smooth vertical drainage canal wall and dried to death, and some individuals were caught by tourists or crushed by vehicles (Zhang, 2013). Deforestation, water pollution and hydropower station construction outside the protected area can destroy the habitat. And tourism and water channelizing in natural parks may reduce the habitat suitability of the species.

## 4.2 Population size

Few extensive studies on population size and monitoring have been conducted on *Paramesotriton hongkongensis*. From a field survey on amphibian and reptile resource in one of the early established natural reserves of Guangdong Province in 2006, the population of *Paramesotriton hongkongensis* has a small number compared to other amphibian species (Gu, et al., 2007). The investigation results of the Wutongshan National Scenic Spot, Shenzhen, Guangdong in 2012, the Yinpingshan Natural Reserve and Forest Park, Dongguan, Guangdong during 2011-2012 and the Dapeng Peninsula National Geopark of Shenzhen, Guangdong during the winter of 2012 revealed populations of Hong Kong newt were relatively abundant (Zhuang et al. 2013, Tang, et al., 2015). On the contrary, in forest park or sites with many tourists, no *Paramesotriton hongkongensis* was found habituating, because of human interference and the change of water quality (Zhang, 2013). During the study on reproduction of *Paramesotriton hongkongensis* in New Territories, Lantau island and Hong Kong island from 2007-2009, researchers tagged 1312 unique adults of the species from 10 sites within 4 streams and the highest density in the four study sites is about 1.2 to 6.2 newts/ m<sup>2</sup> in the breeding pools (Fu, et al., 2013).

## 4.3 Population structure

A genetic distance research revealed that the two mainland populations of *Paramesotriton hongkongensis* are more distant from each other than from the island population (Zhang et al. 2011). A basic study on ecology of six Hong Kong newt populations in Hong Kong Island, Lantau Island and the mainland New Territories revealed that, no systematic difference in adult body condition (size-weight relationship) among streams (Fu, et al.2013). In Hong Kong populations, sex ratio changed across the breeding season and males make up larger proportions of populations in earlier breeding season and the population sex ratios are strongly female-biased in the late breeding season (Fu et al. 2013).

## 4.4 Population trends

Although there still lacks clear data about population trends of *Paramesotriton hongkongensis* in general, the populations of the species are affected by poaching for pet trade. In the IUCN evaluation of 2004, the populations of *Paramesotriton hongkongensis* were estimated decreasing (Lau and Chan, 2004). However, because of the decrease in habitat quality and poaching caused by pet trade, its population is being decreased rapidly and will soon be under threatened status (Zhang, et al., 2011).

## 4.5 Geographic trends

As the only member of the Old-World Caudata found in Hong Kong, *Paramesotriton hongkongensis* has a highly restricted distribution that separates by mountain ridges and marine barriers (Zhang et al. 2011). If ecological corridors between natural reserves and protected areas maintain well, distribution of the newt may expand to near montane along the coastal of Guangdong Province (Tang et al. 2015).

## 5. Threats

The threats that *Paramesotriton hongkongensis* faces are anthropogenic disturbances like habitat use alteration, stream channelization, water pollution, and illegal harvest for pet trade (Zhang et al. 2011). The collection of significant numbers for the pet trade is the particular threat to this species (Lau and Chan, 2004).

## 6. Utilization and trade

### 6.1 National utilization

To varying degrees, the domestic and foreign related research institutions and universities collect *Paramesotriton hongkongensis* for science research. The institutes and universities which are now known to have captured *Paramesotriton hongkongensis* for research and teaching and kept the specimens include Texas State University, Chengdu Institute of Biology, Chinese Academy of Sciences, Kunming Institute of Zoology, CAS, South China Institute of Endangered Animals, Hunan

Normal University, South China Normal University, Sun Yat-sen University and Kadoorie Farm and Botanic Garden in Hong Kong.

## 6.2 Legal trade

Every year a lot of individuals of *Paramesotriton hongkongensis* are exported to US and other countries and regions in Europe via Hong Kong. *Paramesotriton* is one of the four most common genera of Salamabdridae imported into US (From Department of the interior Fish and Wildlife Service, 2016, page1543).

*Paramesotriton hongkongensis* is traded in the name of Hong Kong newt or giant fire-bellied newt. For most species of Asian newts, the price is about 20-50 Euro per individual in Europe, and 10-35 USD in US. According to the records of Law Enforcement Management Information System (LEMIS) maintained by the United States Fish and Wildlife Service (USFWS), during a 5-year period (1 January 2006 -26 December 2010), 223 924 individuals of *Paramesotriton hongkongensis* were imported into US from Hong Kong (Kolby et al., 2014). However it was found that the *Cynops* exported from Hong Kong were mixed with the specimens of *Paramesotriton* during a wildlife trade investigation at South China (including Hong Kong and Macau), in 1994-1995 (Lau et al., 1995). The amount of *Paramesotriton hongkongensis* exported from Hong Kong to US during the six years (2005-2010) might exceed 300 000.

## 6.3 Parts and derivatives in trade

Trade products of *Paramesotriton hongkongensis* are mainly live adults. There is no evidence that any part or derivative of the species have been traded.

## 6.4 Illegal trade

Because their bodies are covered with colourful markings, they are often collected and bred as pet. In the early 1990s, *Paramesotriton hongkongensis* had appeared at the interior pet markets in big cities, and then smuggled abroad in large quantities. In a trade survey in 1993-1994, 9,350 Japanese fire-bellied newts (*Cynops pyrrhogaster*) were exported from Hong Kong to Thailand but there were no record of importing this species from Japan during the study period. This was either due to misplaced records or the species was misidentified and is actually oriental fire-bellied newt (*C. orientalis*) or some other Chinese newt species (*Paramesotriton* spp.) which is found in China and its importation to Hong Kong requires no permission from the Agriculture and Fisheries Department (Lau et al., 1995). *Paramesotriton hongkongensis* has been protected under wild animals protection ordinance in Hong Kong since 1997, and was listed in the Lists of terrestrial wildlife under state protection of China, which are beneficial or of important economic or scientific value and thus was protect in mainland in 2000. In the pet market survey from 2006-2008, *Paramesotriton hongkongensis* was often recorded (Gong, 2008).

The international trade volume of *Paramesotriton hongkongensis* is much large (see also 6.2, Legal trade). In domestic, online trading is primary nowadays, supplemented by retail in flower and aquarium markets mainly in Guangdong Province. Large number of individuals were smuggled to Hong Kong, and then exported to Europe and US. When searching "Paramesotriton+sale or +trade" on web, the information about the species of *Paramesotriton* for sale almost appear on every websites for amphibian trade. On the website <http://www.caudata.org>, there are lots of posts to share the experiences such as breeding, disease treatment of *Paramesotriton hongkongensis* (Annex 2, Figure 1). *Paramesotriton* may be one of the favourite Caudata species of pet lovers in Europe and the United States (Annex 2).

## 6.5 Actual or potential trade impacts

Most traded individuals of *Paramesotriton hongkongensis* are adults captured from the wild. Due to their specific behaviour of breeding aggregation and immigration in fixed breeding pools, poaching for pet trade would deplete parent stocks of wild populations and consequently harm the survival of the species in the wild. Although illegal harvest of the species is against in Hong Kong also in mainland China, breeding pools of the newts are scattered in montane and relatively easy to explore (Fu et al. 2013), hence it is hard to guard against poaching. Pollution in habitat and illegal pet trade have led to the decreasing trend in the population. With the development of pet market internationally and

domestically, poaching and illegal trade will be ever more often and would be detrimental to the survival of the species.

## 7. Legal instruments

### 7.1 National

*Paramesotriton hongkongensis* was included in *Lists of terrestrial wildlife under state protection, which are beneficial or of important economic or scientific value* which was published in 2000. In Hong Kong, it has been protected by law and listed as protected animal under the *Wild Animals Protection Ordinance* (Cap. 170), since 1997.

*Regulations on the Nature Reserves of the People's Republic of China* ban illegal harvest of any individuals which distribute in the nature reserves.

China government is rectifying and will publish the new *Lists of National Key Protected Wild Animals of China* in which the *Paramesotriton hongkongensis* would be listed under second class state protection. More strict measures will be taken on the capture, fishing, sale, purchase, transportation and carrying of the species and the habitat protection will also be strengthened.

### 7.2 International

On 13th of January, 2016, US published an interim rule (DIFWS, 2016). All the Caudata species including *Paramesotriton hongkongensis* are banned to be imported or transported between states. The rule had come into effect on 28th of February, 2016, and the live individuals, dead bodies and eggs of all species included in the list are banned to be imported. Before this, *Paramesotriton hongkongensis* and other species of *Paramesotriton* had been included in the list of Aquatic Invasive Species on the website of Washington Department of Fish and Wildlife ([http://wdfw.wa.gov/ais/salamanders\\_newts.html](http://wdfw.wa.gov/ais/salamanders_newts.html)), and the importation is prohibited.

## 8. Species management

### 8.1 Management measures

Besides Hong Kong, some populations of *Paramesotriton hongkongensis* distributed in Guangdong Province are in natural reserves or protected area of parks like the Yinping Mountain Natural Reserve, the Forest Park of Dongguan, the Nankunshan Province Natural Reserve and the Wutongshan National Scenic Spot of Shenzhen. The populations in nature reserves are protected according to *Regulations on the Nature Reserves of the People's Republic of China*, and illegal harvest is banned. In Hong Kong, this species is protected and managed under *Country Parks Ordinance* and *The Wild Animals Protection Ordinance*.

### 8.2 Population monitoring

Early in 2008, IUCN /SSC/ Amphibian Specialist Group-China Region made the national action plan on Chinese amphibian protection including population monitoring under the support from relevant Dept. of Wildlife Conservation and Nature Reserve Management of State Forestry Administration, Ministry of Agriculture and, and CI, and WWF. In 2011, The China government launched the nationwide amphibian monitoring project. The project was organized by Nanjing Institute of Environmental Science, Ministry of Environmental Protection with Chinese amphibian experts and staff from nature reserve to conduct long-term monitoring of amphibians. Up to end of March, 2016, in mainland China (including Hainan Island), a total of 113 monitoring sites had been established, and the monitoring sites cover the nature reserves and their surrounding area. The project request that the amphibians are monitored three times a year, in April, June, and August-October, respectively.

### 8.3 Control measures

#### 8.3.1 International

On 13th of January, 2016, US published an interim rule (DIFWS, 2016). All the Caudata species including *Paramesotriton hongkongensis* are banned to be imported or transported between states. The rule had come into effect on 28th of February, 2016, and the live

individuals, dead bodies and eggs of all species included in the list are banned to be imported. Before this, *Paramesotriton hongkongensis* and other species of *Paramesotriton* had been included in the list of Aquatic Invasive Species on the website of Washington Department of Fish and Wildlife ([http://wdfw.wa.gov/ais/salamanders\\_newts.html](http://wdfw.wa.gov/ais/salamanders_newts.html)), and the importation is prohibited.

### 8.3.2 Domestic

Although the species is not yet included in *The Lists of Wildlife under Special State Protection of China*, *Paramesotriton hongkongensis* is under protection against poaching (see 7.1, Legal instrument-National).

### 8.4 Captive breeding and artificial propagation

*Paramesotriton hongkongensis* has successfully reproduced artificially in US, Europe and Hong Kong (Lau and Chan, 2004; Selfridge, 2011). The species has proven to be a hardy species in captive conditions. *Paramesotriton hongkongensis* can be shy, liking hiding places provided by rocks and plants, with over hanging vegetation imitating their natural habitat.

### 8.5 Habitat conservation

Besides Hong Kong, some populations of *Paramesotriton hongkongensis* distributed in Guangdong Province are in natural reserves or protected area of parks like the Yinping Mountain Natural Reserve, the Forest Park of Dongguan, the Nankunshan Province Natural Reserve and the Wutongshan National Scenic Spot of Shenzhen. In natural reserves and parks, habitat is well conserved.

## 9. Information on similar species

There are altogether 13 species in *Paramesotriton*. *Paramesotriton hongkongensis* which are included in this proposal and other 12 species are very similar. Furthermore, *Paramesotriton* and other salamanders from the same family Salamandridae (*Pachytriton*, *Cynops* and *Hypselotriton*) have orange blotches in the belly, and are also much similar. It is difficult for non-professional identification, and there often is misjudgment in trade management. The morphological character photos of the representative species in the four genera above are specially provided in Annex 2, and a rapid identification is listed (Annex 2).

## 10. Consultations

The China Management and Scientific Authorities for CITES undertook consultations with conservation groups and other Government agencies. The Management Authority of Hong Kong SAR is supportive to the proposed listing and considers that the listing can ensure the sustainability and legality of the specimens in trade and thus help conservation of the species. The feedback from these consultations has been incorporated into this proposal.

## 11. Additional remarks

N/A

## 12. References

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**Annex 1. Illustrations and Information about *Paramesotriton hongkongensis***

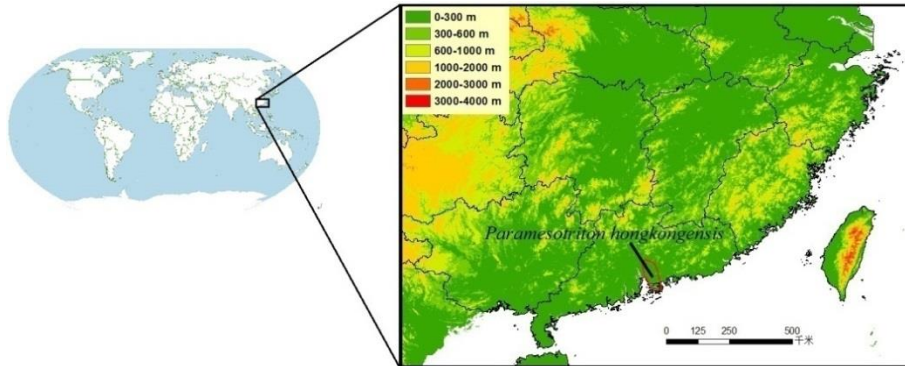


Figure 1. Distribution map of *Paramesotriton hongkongensis*



Figure 2. Typical habitat of *Paramesotriton hongkongensis*



Figure 3. Habit and mating behaviour





Figure 4. Development and growth of Hong Kong newt  
 A-B : eggs and embryo › C-E : larvae › F-G : baby Hong Kong newt





Figure 5. Morphological characteristics of Hong Kong newt


**Similar species and identification key**


- 1) 


*Paramesotriton caudopunctatus*, endemic to China
- 2) 


*Paramesotriton chinensis*, endemic to China
- 3) 

*Paramesotriton fuzhongensis*, endemic to China
- 4) 

*Paramesotriton hongkongensis*, endemic to China
- 5) 

*Paramesotriton labiatus*, endemic to China
- 6) 

*Paramesotriton longliensis*, endemic to China
- 7) 

*Paramesotriton maolanensis*, endemic to China
- 8) 

*Paramesotriton qixilingensis*, endemic to China

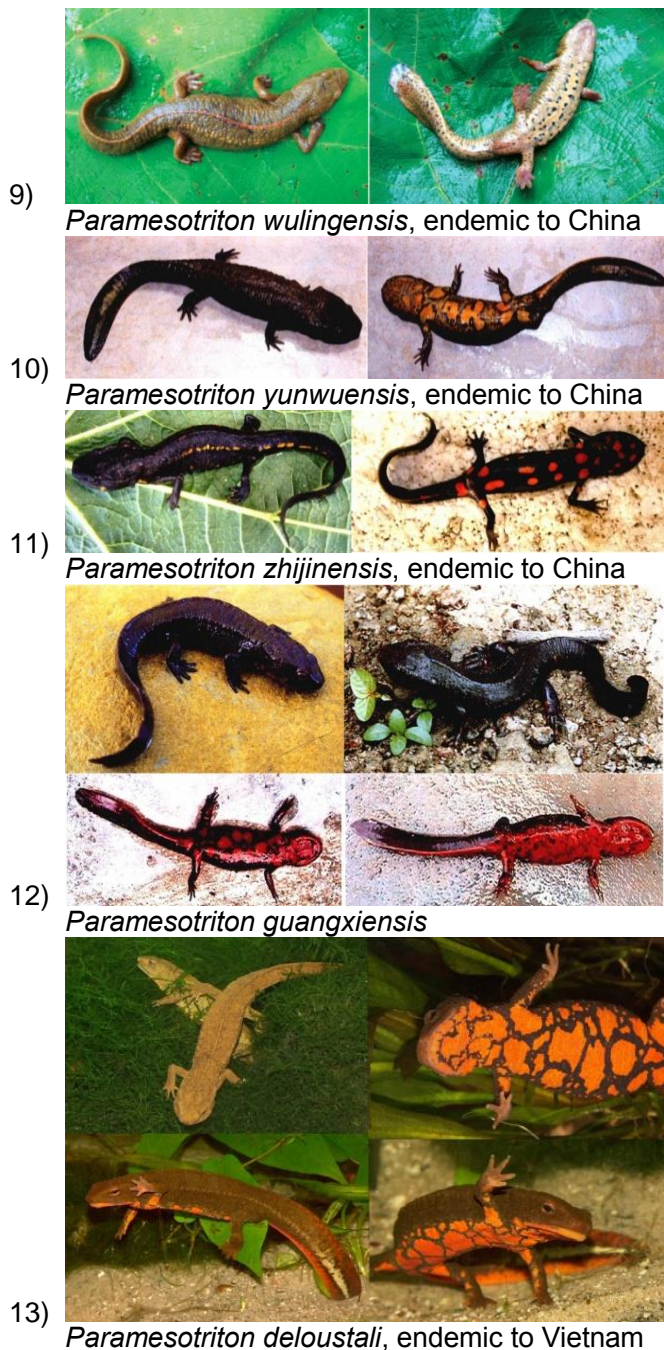


Figure 6. morphological characteristics of 13 species of *Paramesotriton*

The following identification key synthesizes previous work (Fei et al. 2006, Wu et al. 2009, 2010a, Gu et al. 2012a, 2012b, Yuan et al. 2014).

1. Skin relatively smooth.....2  
Very rough skin.....4
2. Few granular warts on the head and body; eyes not reduced .....3  
Granular warts absent on the head and body; reduced eyes .....*P. maolanensis*
3. Body slender and flat; tail long; vertebral ridge inconspicuous.....*P. labiatus*  
Body not slender and flat; tail short; vertebral ridge conspicuous.....*P. hongkongensis*
4. Body small; dorsolateral ridge with yellow or orange tint.....5  
Body robust; dorsal ridge is the same color as other parts of the dorsal surface.....8

5. Scent glands absent on snout; vestigial gills and gill filaments absent.....6  
 Scent glands on snout; 3 gill filaments behind head. ....*P. zhijinensis*
6. No fleshy protuberance present in branchial region; three colored spots on tail of males.....7  
 Fleshy protuberance present in branchial region; three colored spots on tail of males.....*P. longliensis*
7. Dorsum olive brown; frontal branch of pterygoid arrived at the posterior edge of maxillary.....*P. wulingensis*  
 Dorsum pale yellow; frontal branch of pterygoid not contacting posterior edge of maxillary.*P. caudopunctatus*
8. Small, irregular orange-red spots on its chin, venter, underside of axillae, and cloaca.....9  
 Large irregular orange-red spots on its chin, venter, underside of axillae, and cloaca.....10
9. Tail gradually tapers from base to tip without expanding posteriorly; tail fins underdevelopment; dorsal and lateral sides of the trunk with many clustered, conical warts; cloaca of females relatively flat....*P. qixilingensis*  
 Tail expands posteriorly to form tail fin; warts small; cloaca of females raised..... *P. chinensis*
10. Vertebral ridge flat or low; few granular warts.....*P. yunwuensis*  
 High vertebral ridge; densely granulated warts.....11
11. Digit tips only overlap when forelimbs and hind limbs adpressed.....12  
 Palm and tarsus overlap when forelimbs and hind limbs adpressed.....*P. fuzhongensis*
12. Extended forelimb reaches midpoint of eye.....*P. deloustali*  
 Extended forelimb reaches posterior edge of eye only.....*P. guangxiensis*