



Overview of the salamandrid genus *Paramesotriton* (Chang, 1935) Warty Newts



Paramesotriton chinensis, photo © Jessica J. Miller, <http://www.livingunderworld.org>

INTRODUCTION

Newts of the genus *Paramesotriton* are collectively referred to as Warty Newts, a reflection of their tuberculate skin. Warty newts are a robust group, all possessing thick, powerful limbs and tail, a triangular shaped head, bright colored bellies, and the characteristic "warty" skin. *Paramesotriton* are closely related to the genera *Cynops* and *Pachytriton* (Zhao, 1989), for which many similar characteristics are shared, including breeding behavior, secondary characteristics (sexual dimorphism), and habitat.

Newts of the genus *Paramesotriton* are found in China, Vietnam, and Laos. Warty Newts are a rather understudied group, at present time, and require some work in the future in terms of classification. In general, there are seven recognized species, *P. caudopunctatus*, *P. chinensis*, *P. deloustali*, *P. fuzhongensis*, *P. guangxiensis*, *P. hongkongensis*, and *P. laoensis*. This set is widely accepted, however, some would argue the validity of this arrangement. *P. hongkongensis*, *P. guangxiensis*, and *P. fuzhongensis* are sometimes treated as synonyms or subspecies of *P. chinensis*, despite some notable physical differences. Many do not adhere to the validity of *P. fuzhongensis* at the species level, and instead consider it a synonym of *P. guangxiensis*. To further complicate matters, *P. guangxiensis* is often treated as a synonym of *P. deloustali*, a theory that sends *P. fuzhongensis* further into obscurity. Some have argued that *Paramesotriton* populations in northern Vietnam and southern Guangxi Province, China, consist of *P. guangxiensis*, while the rare *P. deloustali* are confined only to the Tam Dao region of Vietnam. On the other hand, many propose that *P. deloustali* are found outside the Tam Dao region, and even extend as far as southern China. *P. laoensis*, found in

Laos, has been described most recently, and is accompanied by limited information. This species is markedly different in appearance from the others, possessing bright coloration about the dorsum, and as far as is known, *P. laoensis* is allopatric with all other species. Currently, the status of *P. laoensis* at the species level is mostly accepted, however, this species often goes unrecognized in phylogenetic studies.

Recent molecular data (Lu, et al., 2004) have shown that *P. fuzhongensis* is indeed a legitimate species, distinct from *P. guangxiensis*. Further studies based on morphological and molecular studies are needed to properly define or differentiate *P. deloustali* and *P. guangxiensis*. *P. caudopunctatus* is thought to be the most basal *Paramesotriton* species, a status eluded to by its notable external and morphological characteristics. Lu, et al. (2004) show that the Vietnamese and Chinese species form a monophyletic group. Unfortunately, *P. laoensis* was not included in this study, however, this species' status and phylogenetic relationship are addressed in Bryant & Papenfuss (2002).

MEET THE WARTY NEWTS

Paramesotriton caudopunctatus (Liu & Hu, 1973) Spot Tailed Warty Newt

Taxonomic Synonyms: *Trituroides caudopunctatus* (Liu & Hu, *In* Hu, Zhao, and Liu, 1973), *Paramesotriton caudopunctatus* (Bischoff & Böhme, 1980), *Paramesotriton caudomaculatus* (Seidel, 1981), *Allomesotriton caudopunctatus* (Freytag, 1983) *Paramesotriton* (*Allomesotriton*) *caudopunctatus* (Pang, Jiang, and Hu, 1992)
Vernacular Names: Spot Tailed Warty Newt, Spotted Tail Warty Newt, Spotted Tail Warty Newt

Paramesotriton caudopunctatus is a rather large species, reaching lengths up to 8 inches from snout to tail end. The overall coloration is light to dark brown dorsally, usually with an orange or red dorsal stripe down the spine. The dorsal stripe often has a distinct black coloration surrounding it, appearing almost like a shadow; a characteristic that is absent in, or is very reduced in *P. chinensis*, a species which also sometimes possesses a colored dorsal stripe into adulthood. Occasionally, the dorsal surface from the back of the head to the tail is black or dark colored, while the remainder of the body and tail are brown. The back is rather straight, with two distinctly flat areas on either side of the dorsal ridge, which are marked at the outer edges by warty ridges, and that give the body an elongated-cube shape. The warty ridges extend from the back of the head, along the sides of the body, to the beginning of the tail, but may be reduced in smoother individuals. Some may develop a greenish or bluish hue that is especially noticeable about the dorsum.

P. caudopunctatus are almost fully aquatic as adults and juveniles, and may possess rather smooth skin compared to *P. fuzhongensis*, *P. guangxiensis*, and *P. chinensis*, while others may have characteristic warty skin. *P. caudopunctatus* have conspicuously long snouts that one might describe as "dog-like" in appearance when compared to the other species. This appearance is distinct among the genus, and results from a long, narrow skull (Sparreboom, 1981). The digits are rather short and stubby on all four limbs. The belly pattern typically consists of orangish-yellow, or pale peach lines and dots, as opposed to large, bright colored blotches. Some may have greenish-gray colored bellies and throats, with no hint of bright coloration at all, while others may have nearly solid colored bellies of bright or pale orange. Males possess distinct spots along the lateral side of the tail, concentrated at the distal part, at all times of the year; a trait not observed in other *Paramesotriton* species. The spots vary in size and color, but there is usually an elongated spot at the very end of the rounded tail tip. The tail spots are whitish-cream, pale peach, or orange colored, and clearly outlined in solid or disconnected black markings. Tail spots usually become more distinct during the breeding season. Female *P. caudopunctatus* sometimes possess similar spotting about the tail, which is usually reduced in comparison to a typical male. In addition to the longer snout, the tail spotting is unique to *P. caudopunctatus*, and positively distinguishes this species from any other in the genus.

Males can be distinguished from females by their pronounced tail spots, and wider head. Females also possess longer tails that usually lack spotting. In the first photo below, the narrower head profile and lack of tail spots can be seen in the female to the left, when compared to a typical male.

Juveniles look very similar to adults, with defined orange-red dorsal stripe, and light brown coloration. The long snout is also distinguishable in juveniles, even in recently morphed individuals. In captivity, juveniles can be raised in a semi-aquatic environment identical to the adults, however, it is unknown if a terrestrial phase is experienced in the wild.

DISTRIBUTION

P. caudopunctatus are found in the Guizhou (Kweichow) Province, and the Guangxi Zhuang Autonomous Region, China. Territory overlaps with *P. fuzhongensis* in the northern Xilin Hill area, Fuchuan Xian, northeastern Guangxi. Males are territorial, and display aggression toward other males in their vicinity, especially during breeding times. Females have a tendency to guard eggs, and so may become more aggressive at this time, as well.



Paramesotriton chinensis (Gray, 1859) Chinese Warty Newt

Taxonomic Synonyms: *Cynops chinensis* (Gray, 1859), *Triton chinensis* (Strauch, 1870), *Triton sinensis* (Sauvage, 1876), *Molge sinensis* (Boulenger, 1882), *Diemictylus sinensis* (Stejneger, 1907), *Triturus sinensis* (Dunn, 1918), *Triton chinensis* (Wolterstorff, 1925), *Cynops chinensis* (Wolterstorff & Herre, 1935), *Trituroides chinensis* (Chang, 1935), *Triturus sinensis boringi* (Herre, 1939), *Triturus chinensis* (Pope & Boring, 1940), *Paramesotriton chinensis* (Freytag, 1962), *Trituroides hongkongensis* (Myers & Leviton, 1962), *Trituroides chinensis* (Anonymous, 1977), *Paramesotriton chinensis chinensis* (Fei, Ye, and Huang, 1991), *Paramesotriton chinensis hongkongensis* (Fei, Ye, and Huang, 1991)

Vernacular Names: Chinese Warty Newt

Paramesotriton chinensis are perhaps the most varied in terms of coloration and pattern. This species can be light gray to dark brown, and sometimes olive colored, with or without an orange or yellow dorsal stripe. The dorsum may be mottled with black, olive, or brown, and may have small yellow or orange dots irregularly scattered about. Others may possess a solid colored dorsum, without dorsal a stripe or bright colored markings. The ventral pattern varies from irregular blotches to small dots of orange or yellow surrounded by contrasting black or dark gray coloration, which extends to the throat and lower jaw area. Some have suggested that females possess completely black tail tips that fade into lighter coloration up the margin of the tail, however, this has been debated by some who claim to have males with entirely black tails. Breeding males are easy to differentiate due to the common development of a bluish line or sheen along the tail.

Larvae are uniform black, including the gills and feet. New morphs and juveniles are black or dark brown initially, often with light spots on the bases of the limbs. Most individuals will lighten up with age, into a greenish-olive, gray, or brown overall coloration.

P. hongkongensis are often treated as a subspecies or synonym of *P. chinensis*, although both species display distinct physical characteristics and captive preferences. *P. chinensis* possess less laterally compressed tails compared to *P. hongkongensis*, whose tails appear to have a high fin, often with small waves on the upper side. *P. chinensis* lack prominent cranial ridges, and warty dorso-lateral ridges, both of which are present in *P. hongkongensis*. The belly pattern of *P. hongkongensis* usually consists of smaller, fleck-like orange or yellow markings, compared to the larger blotches of *P. chinensis*. *P. chinensis* larvae are also markedly different in appearance when compared to *P. hongkongensis* larvae. *P. chinensis* larvae are uniform black in coloration, including the gills, whereas *P. hongkongensis* larvae possess cream colored gills, snouts, and toes.

DISTRIBUTION

P. chinensis are found eastern China, including the provinces of Anhui (Anhui), Zhejiang (Chekiang), Hunan, Fujian, Guangdong, and Guangxi. Wild adults are thought to remain terrestrial outside of the breeding season.



Paramesotriton deloustali (Bourret, 1934) Tam Dao Warty Newt

Taxonomic Synonyms: *Mesotriton deloustali* (Bourret, 1934), *Pachytriton deloustali* (Chang, 1935), *Paramesotriton deloustali* (Chang, 1935)

Vernacular Names: Tam Dao Warty Newt, Vietnamese Salamander, Vietnamese Newt

Paramesotriton deloustali is the largest species of the genus, and is characterized by an unusually large head. The belly pattern of *P. deloustali* is often unique, as well, sometimes consisting of orange-yellow or reddish, disconnected blotches, each containing black or dark brown mottling within its circumference. Often times, the belly pattern of *P. deloustali* is comprised of consistent shaped blotches, with a large percentage of bright coloration. The belly color may also be carmine red, as opposed to the common orangish-yellow seen in other species. Typically, there is more bright coloration than dark colored mottling on the ventral side of this species. The tail is also rather impressive, being thicker, and more laterally compressed. Overall, *P. deloustali* resembles *P. hongkongensis* in general body and tail appearance, and color, but again, the head and body size are uniquely large in *P. deloustali*.

Male *P. deloustali* can be differentiated from females by their smaller size, longer limbs and head, and shorter tail. Also apparent in breeding males is a bluish sheen about the lateral side of the tail, a characteristic also observed in other *Paramesotriton* species.

P. deloustali are one of the rarest amphibian species, and have been seldom bred in captivity. *P. deloustali* is listed in the Red Data Book of Vietnam as Endangered (2000), as Vulnerable in the IUCN Red List (2000), and is found in Appendix II of the [UNEP - WCMP World Conservation Monitoring Program](#). *P. deloustali* is also protected in Vietnam by Government Decree No. 40/2002/ND-CP (2002), which prohibits any exploitation. Despite *P. deloustali*'s government and international protection, individuals inevitably show up in the pet trade, especially in local shops in Vietnam and surrounding countries.

P. deloustali are found in the Tam Dao mountain range (Vinh Phuc, Thai Nguyen, and Tuyen Quang Provinces), Xin Man (Ha Giang Province), Van Ban (Lao Cai Province), Ba Be District (Bac Kan Province), and Cho Don District (Bac Kan Province). *P. deloustali* is also said to occur in the Lang Son Province.

DISTRIBUTION

Populations in the Ba Be, Cho Don, and Bach Thong Districts, Bac Kan Province, are concentrated in 5

communes; Dong Phuc, Quang Khe, Bang Phuc, Tan Lap, and Quang Bach, in and around Ba Be National Park. Field studies show that in these districts, *P. deloustali* is found in shallow, slow-moving streams with sand and gravel bottoms. *P. deloustali* males are territorial, and may claim areas of a meter or more in the wild. Although most do not regard *P. deloustali* as economically important, some locals from the fore mentioned areas occasionally use a dried, or powdered form of *P. deloustali* for medicinal purposes.

Until recently, the mountainous regions of Phja Bjooc and Tam Dao, Vinh Phuc, Thai Nguyen, and Tuyen Quang Provinces, and the Ba Be National Park area, Bac Can (Bac Kan) Province, Vietnam, were considered wild paradises of sorts, where escape from the thriving life of nearby Hanoi could be reached. These mountain ranges are watershed forests of the streams flowing into Cau River and Ba Be Lake. The climate of Tam Dao in particular is warm and humid, with ambient temperatures averaging around 86°F during the summer, and 50°F during the winter months. Unfortunately, *Paramesotriton deloustali*'s serene Tam Dao habitat has been radically changed since the late 80's and early 90's, as a result of political and economical changes. During these times, more construction and industrialization commenced in an effort to increase tourism, in addition to increased logging of the surrounding forests. The increased industrialization of the mountain ranges introduced toxins and pollution into the environment, and significantly reduced *P. deloustali*'s habitat. In 1997, *P. deloustali* were considered extinct in the wild, after chemical runoff from a nearby hotel construction site polluted the salamanders only known habitat, an artificial water basin in the Tam Dao mountain Range. Recently, the Tam Dao mountain range has been proclaimed a Natural Reserve, which has halted logging of the surrounding forests, and decreased nearby construction. However, *P. deloustali*'s Tam Dao range still includes a nearby developing village, which could well impact the livelihood of *P. deloustali* in this area.

Wild *P. deloustali* populations were discovered around the Na Nheo village situated in the Hoang Lien mountains, Lao Cai Province, Vietnam, in 2002. Some have speculated that these populations, and any Vietnamese populations discovered outside of Tam Dao are not *P. deloustali*, but are un-described salamanders, or possibly unknown populations of the Chinese species, particularly *P. guangxiensis*. In any event, these populations are treated as *P. deloustali* for the most part, and no studies have yet presented knowledge otherwise. Specimens collected in 2002 were all found around rivers and streams near the fore mentioned village, at elevations of 600 - 900 meters, and from one stream at 1000 meters. A population of *P. deloustali* was also discovered near the Ban Xe village, Na Chi commune, Xin Man District, in 2002.

In the wild, *P. deloustali* are thought to remain aquatic year-round, without a hibernation or aestivation period. Adults are found mostly in the sluggish pools of moving streams, in the mountainous regions of northern Vietnam, although some may also venture into faster flowing waters. Territorial behavior has been observed in males in the wild, as well as in captivity. In the Tam Dao range, breeding activity has been documented during the winter season, when temperatures quickly drop.



Paramesotriton fuzhongensis (Wen, 1989) Fuzhong Warty Newt

Taxonomic Synonyms: None, although *P. fuzhongensis* is sometimes regarded as a subspecies of both *P. chinensis* and *P. guangxiensis*.

Vernacular Names: Fuzhong Warty Newt

Paramesotriton fuzhongensis often possess varying dorsal patterns, and considerably warty skin. The dorsal coloration is usually a dark brownish-olive color, sometimes mottled with a second, either lighter or darker, color. This is not always the case, as some individuals may be a solid brown or olive colored dorsally. *P. fuzhongensis* sometimes have tiny dots of the same orange-red color of the belly irregularly dispersed about the dorsum. A light orange or yellow dorsal stripe is also apparent in some newts. The belly pattern usually consists of large, disconnected orange or reddish blotches. During the breeding season, male *P. fuzhongensis* develop the bluish-purple sheen along the tail that is common in other *Paramesotriton* species, as well as some *Cynops* and *Pachytriton* species. The skin also becomes smoother, and sometimes lighter colored. The eyes of *P. fuzhongensis* are light colored, and the snout ends in a rather blunt and squared manner. Males can be differentiated from females by their shorter, and higher tails, smaller reddish-orange spots on the throat region, and longer vent (Wen, 1989).

Larvae of *P. fuzhongensis* are black or dark brown, usually with reddish colored gills. Some may also have cream colored dots about the dorsum and abdomen. Juveniles are medium to dark brown dorsally, sometimes with orangish-red dots about the dorsum, and orangish-red dorsal stripes. The short, squared snout is obvious at an early stage in development.

P. fuzhongensis is often treated as a subspecies or form of *P. guangxiensis*, despite some notable physical differences. Lu, et al. (2004) define *P. fuzhongensis* as a valid species based on molecular studies, which supports Wen's (1989) original classification at this level. According to Wen (1989), *P. fuzhongensis* can be differentiated from *P. guangxiensis* by their longer and narrower head, longer and lower tail, and the possession of black mottling or blotching about the dorsum in many individuals, which is almost never observed in *P. guangxiensis*. Wen (1989) notes that *P. fuzhongensis* possess more granular skin, such that the warts are more frequent and in higher concentrations, as well as longer, and less laterally compressed tails, when compared to *P. guangxiensis*, and that the forelimbs of *P. fuzhongensis* reach as far as between the eye and nostril when drawn forward, while those of *P. guangxiensis* do not reach quite as far. Based

on X-Rays of skeletal structure, it appears as though the forelimbs of *P. guangxiensis*, when compared to *P. fuzhongensis*, are positioned farther back relative to the eye position, which may be observable in life. *P. fuzhongensis*, and *P. guangxiensis* for that matter, are rather understudied in captivity and in the wild, and their taxonomic designation could possibly change in the future.

A recent trend in identifying warty newts has developed as a result of uncharacteristic species showing up in the pet trade, where unidentifiable species are ambiguously designated *P. fuzhongensis* or *P. guangxiensis*. This has added to existing doubts about the taxonomic status, or even the legitimacy, of these two species. In reality, there are probably some undecided species or subspecies that are simply placed in the most similar appearing species, for lack of better knowledge.

P. fuzhongensis have been described by some keepers as slightly to moderately aggressive, while other keepers have noted typical territorial/aggressive behavior, especially in breeding males

DISTRIBUTION

P. fuzhongensis are found in northeastern Guangxi Province, China. The natural habitat consists of mid-slope streams, surrounded by broad-leaf forests (Wen, 1989). The Guangxi Zhuang Autonomous Region is considered subtropical, and humid; typical monsoon climate. The monsoon season occurs from April to September, during the summer months. Winter is short, and mild. Guangxi's topography consists of mountains, hilly landscape, and plains regions. From northwest to southeast, a gradient of descending elevation is formed, and covers an average range of 3,000-6,000 at the highest peaks, down to 300-1,500. Average temperatures in Guangxi range from 74°F to 85°F during the warmest month, July, and 42°F to 60°F during the coldest month, January.



Paramesotriton guangxiensis (Huang, Tang, & Tang, 1983) Guangxi Warty Newt

Taxonomic Synonyms: *Trituroides guangxiensis* (Huang, Tang, and Tang, 1983), *Paramesotriton guangxiensis* (Zhao & Hu, 1984), *Paramesotriton guangxiensis* (Zhang & Wen, 2000)
Vernacular Names: Guangxi Warty Newt

Paramesotriton guangxiensis are robust, with large heads and thick limbs. The dorsum is typically uniform dark brown, and the venter consists of variations of bright blotches of reddish-orange, over a dark background. *P. guangxiensis* is often lumped into the same species as *P. fuzhongensis*, although *P. fuzhongensis* has been designated at the species level. Still some do not adhere to

this placement. Whether or not species level taxonomic classification is accurate in the case of *P. guangxiensis* or not, there are significant enough differences in terms of physical appearance to differentiate this "type" from other *Paramesotriton*'s, and so remarks seem warranted. In general, *P. guangxiensis* can be differentiated from *P. fuzhongensis* by their shorter and broader head, shorter and taller tail, and lack of black mottling or spotting about the dorsum (Wen, 1989). Wen (1989) notes that *P. fuzhongensis* possess more granular skin, such that the warts are more frequent and in higher concentrations, as well as longer, and less laterally compressed tails, and that the forelimbs of *P. fuzhongensis* reach as far as between the eye and nostril when drawn forward, while those of *P. guangxiensis* do not reach this length. Based on X-Rays of skeletal structure, it appears as though the forelimbs of *P. guangxiensis*, when compared to *P. fuzhongensis*, are positioned farther back relative to the eye position, which may be observable in life.

A recent trend in identifying warty newts has developed as a result of uncharacteristic species showing up in the pet trade, where unidentifiable species are ambiguously designated *P. fuzhongensis* or *P. guangxiensis*. This has added to existing doubts about the taxonomic status, or even the legitimacy, of these two species. In reality, there are probably some undecided species or subspecies that are simply placed in the most similar appearing species, for lack of better knowledge.

Paramesotriton guangxiensis are found in southwestern Guangxi Province, China. *P. guangxiensis* are only known from their type locality, at Paiyang Mountain, Mingjiang, Ningming County, Nanning Prefecture, although it is speculated that newts found in northeastern Cao Bang province, Vietnam, are also *P. guangxiensis*. The Guangxi Zhuang Autonomous Region is considered subtropical, and humid; typical monsoon climate. The monsoon season occurs from April to September, during the summer months. Winter is short, and mild. Guangxi's topography consists of mountains, hilly landscape, and plains regions. From northwest to southeast, a gradient of descending elevation is formed, and covers an average range of 3,000-6,000 at the highest peaks, down to 300-1,500. Average temperatures in Guangxi range from 74°F to 85°F during the warmest month, July, and 42°F to 60°F during the coldest month, January.

Some have argued that *P. guangxiensis* extend into northeastern Vietnam, in the province of Cao Bang, where they are mistaken for *P. deloustali* populations. In fact, it has been suggested that any Vietnamese populations outside of the Tam Dao region of Vietnam are actually *P. guangxiensis*. Others have suggested that populations of *P. guangxiensis* in southern China are actually *P. deloustali*. To further complicate matters, some do not adhere to the validity of the two species, and instead treat the two as synonyms. Molecular studies by Lu, et al. (2004) showed that *P. guangxiensis* and *P. deloustali* are indeed very close in relation, if not synonymous, however, more work is needed in terms of classification and distribution.

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Paramesotriton hongkongensis (Meyers and Leviton, 1962) Hong Kong Warty Newt

Taxonomic Synonyms: *Trituroides hongkongensis* (Myers & Leviton, 1962), *Paramesotriton hongkongensis* (Freytag, 1962), *Paramesotriton chinensis hongkongensis* (Fei, Ye, and Huang, 1991)

Vernacular Names: Hong Kong Warty Newt, Hong Kong Newt

Paramesotriton hongkongensis is a robust species, with thick limbs and tail. This species can be distinguished from the other *Paramesotriton* species by the presence of prominent cranial ridges, and the least warty skin of the genus. *P. hongkongensis* is almost always a solid, medium to dark brown color without any significant mottling or bright coloration on the dorsum. The tail may fade into a light tannish-orange, with dark specks. The belly pattern is variable, but usually consists of small to medium sized, disconnected blotches or large flecks of orange or reddish on a dark gray or black background. The belly pattern continues up the throat to the lower jaw. Most individuals also have the same orange or reddish color along the bottom edge of the tail. The tails of aquatic adults are laterally compressed, typically with small waves on the upper side, which are more prominent in males. During the breeding season, males develop significantly smooth skin, swollen cloaca, and a distinct bluish-purple sheen along the lateral sides of the tail. *P. hongkongensis* usually have thick, warty ridges starting from the back of the head, and running along the sides of the body and onto the anterior portion of the tail.

Larvae are dark brown or black dorsally, with cream colored snouts, gills, and toes, and sometimes with a cream colored dorsal stripe that extends down the tail. Juveniles are initially uniform black or dark brown, and develop lighter color with age.

P. hongkongensis is often treated as a subspecies of *P. chinensis*, however, many do not adhere to this classification based on the disjunctive distribution of the two, and differences in physical appearance. *P. hongkongensis* are larger, and more robust than *P. chinensis*. Two unique characteristics of *P. hongkongensis* are the presence of cranial ridges, and less warty skin compared to the other species. *P. hongkongensis* are typically one solid color, dorsally, whereas *P. chinensis* may be mottled with darker or lighter coloration. The belly pattern is also different in that *P. hongkongensis* typically have large flecks of bright coloration, and *P. chinensis* usually have large, irregular blotches. The larvae of *P. hongkongensis* also possess cream colored attributes, as described previously, whereas *P. chinensis* larvae are uniform black. The habitat preference is also different, with

P. hongkongensis unique in preferring a subtropical pond type environment.

DISTRIBUTION & HABITAT

P. hongkongensis are found in sluggish pools within moving streams in the mountains of Hong Kong. Although once found along the Fujian-Guangdong coast region of China, *P. hongkongensis* are now restricted to Hong Kong. One documented habitat of *P. hongkongensis* is the Tung Lung Stream, and surrounding streams, Lantau North County Park (Lantau Island), Hong Kong. Tung Lung Stream is situated atop the Tung Chung Valley, at altitudes of up to 800 meters above sea level, and splits into approximately 10 waterfalls (Chan, 1999). The untamed surrounding mountains are very steep, consisting of sheer cliffs and gorges. The streams are surrounded by dense forest, of which grow a couple of subtropical orchid species, *Pholidota chinensis*, and *Coelogyne fimbriata*, eluding to the presence a moderately warm, humid environment (Chan, 1999). In general, Hong Kong is a subtropical environment, with a monsoon season from March to May, followed by a humid summer with temperatures as high as 95°F, and finally a cooler, drier winter. However, the climate experiences considerable fluctuations. It can be assumed that the temperatures are lower at higher elevations, however, the presences of subtropical orchids indicates that at least the Tung Lung Stream habitat of *P. hongkongensis* may be at least warmer, and more humid than temperate zones.



Aggression is likely related to the breeding season, when males become more aggressive in their competition for females. Males housed together without females may remain compatible, and show no signs of aggression.

Paramesotriton laoensis (Stuart & Papenfuss, 2002) Laos Warty Newt

Taxonomic Synonyms: None
Vernacular Names: Laos Warty Newt

Paramesotriton laoensis, the most recent discovery, is found in northern Laos. *P. laoensis* possess the typical warty skin, triangular shaped head, and thick limbs and tail common to warty newts. The dorsum of *P. laoensis*, however, is markedly different from any other species, consisting mostly of tannish-yellow coloration with some intermittent black areas, and a tannish dorsal stripe that extends from just beyond the snout to just after the cloacal region. The tannish color make the newts cryptic in their habitat, which consists of un-shaded streams. The limbs, feet, and tail are dark black, making this newt especially striking. The belly consists of yellowish-orange, or reddish

blotches mottled with dark black coloration. The bright belly color continues up the throat, and sometimes down the bottom side of the tail. This species possesses cranial ridges, in a similar fashion as *P. hongkongensis*, that are typically tannish-yellow colored. *P. laoensis* also have markedly large paratoid glands projecting from the back of the head. Like *P. fuzhongensis*, *P. laoensis* have a thick upper lip that overlaps the lower. This characteristic aids salamanders in feeding in water, indicating that *P. laoensis* is mostly aquatic. Unlike other members of this genus, *P. laoensis* possess a reduced tongue pad, lacking a free posterior region, a characteristic of *Pachytriton*. *P. laoensis* was placed in the genus *Paramesotriton* based on skull shape, maxillary orientation, and number of trunk vertebrae. Based on these observations, this new species shares more morphological characteristics with *Paramesotriton* than with *Pachytriton*, *Cynops*, *Echinotriton*, and *Tylototriton*. Males and females are approximately the same size, ranging between 6.0 and 7.4 inches.

DISTRIBUTION & HABITAT

P. laoensis were discovered in the Phoukhou District, Xiang Khouang Province, Laos. This species is also found at the base of Phou Sang Kat Mountain, and the Saysamboun Special Zone. *P. laoensis* inhabit shallow streams with light currents. Because of their cryptic coloration, they are seem moving about during the day, as well as at night.





Paramesotriton caudopunctatus, adult male (notice the spots on the tail). Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton caudopunctatus, adult female (notice lack of spots on tail). Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton caudopunctatus, juvenile. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton chinensis, adult female. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



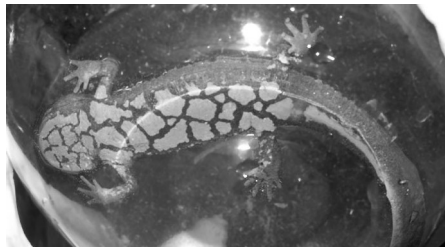
Paramesotriton chinensis, adult female. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton chinensis, adult female. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton deloustali, adult. Photo © L. Forwood



Paramesotriton deloustali, adult. Photo © L. Forwood



Paramesotriton deloustali, adult. Photo © Henk Wallays, Henk.Wallays@pandora.be



Paramesotriton fuzhongensis, adult. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton fuzhongensis, adult. Photo © Jessica J. Miller, <http://www.livingunderworld.org>



Paramesotriton fuzhongensis, adult. Photo © Andrew Clark

OVERVIEW OF THE SALAMANDRID GENUS PARAMESOTRITON

Jessica J. Miller 2004, Living Underworld



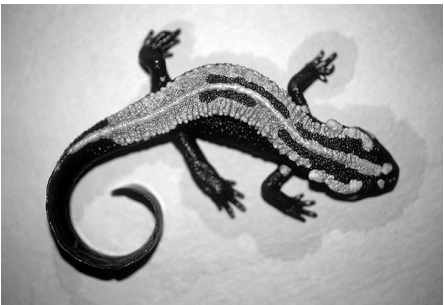
Paramesotriton hongkongensis, adult female.
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Paramesotriton hongkongensis, adult male.
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Paramesotriton hongkongensis, adult female.
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Paramesotriton laoensis, adult. Photo © Bryan L. Stuart

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