



Tylototriton shanjing (Nussbaum, Brodie, & Yang, 1995) Mandarin Newt



Tylototriton shanjing, photo © Jessica J. Miller, <http://www.livingunderworld.org>

Tylototriton shanjing* vs. *Tylototriton verrucosus

In general, *T. shanjing* have dark brown to black, semi-rough bodies with bright orange heads, tails, dorsal ridges, legs, and feet. There are typically 6-14 orange paratoid glands (glands with large concentrations of toxins), often referred to as warts, on both sides of the mild dorsal ridge that mark the rib peaks, and that make for a striking and unique appearance. The crown-like cranial ridges, that have given rise to the vernacular name *Emperor Newt*, are thought to be for protection against predation. *T. shanjing* are a medium sized newt, with adults attaining lengths up to 8 inches from snout to tail end. Although there are unique individuals found from time to time, *T. shanjing* is rather consistent in appearance, at least compared to the wide variations found within the *T. verrucosus* complex.

Until recently, *T. verrucosus* had been described as uniform brown or black, sometimes with faded orange-yellow coloration about the snout, lower tail margin, and scattered about the belly, with an overall dark appearance in comparison to *T. shanjing*. However, there are several new types appearing in the pet trade that possess varying color schemes from dark black, to moderate levels of orange, to high levels of orange that appear similar to the bright colors characteristic of *T. shanjing*. Currently there are at least three, probably more, distinct variations of the *T. verrucosus* complex appearing in the pet trade, all of which lack origin information and description. The main difference between these animals is coloration, however, at least one type is smaller, with a distinct head, body, and tail shape. Tables 1.1-1.2 show photos of *T. shanjing* and a few variations of the *T. verrucosus* complex for physical comparison. Also note the highly aquatic behavior of *T. verrucosus* compared to the mostly terrestrial lifestyle of *T. shanjing*.

Although often markedly different in appearance, *T. shanjing* was formerly included in the species *T.*

verrucosus, the Himalayan Newt. Today, *T. shanjing* is regarded as a separate species that possess rather distinct color and pattern, with consistent orange markings about the body, head, and appendages. *T. verrucosus*, on the other hand, varies from uniform black to bright coloration similar to *T. shanjing*, albeit more subdued, and just about everything in between. Upon viewing a dark morph *T. verrucosus* in the vicinity of a typical *T. shanjing*, it is difficult to understand why the two had been regarded as the same species for so long. However, the lightest type of *T. verrucosus* is very similar in appearance to *T. shanjing*, even though there are size and habitat differences that easily distinguish the two. Backtracking through history, all the way back to Anderson, 1871, it seems that the differences in appearance between the dark *T. verrucosus* and the current *T. shanjing* were neglected due to the fact that a dark *T. verrucosus* and a true *T. shanjing* were never collected together for analysis at any one time, rendering comparison impossible, at least until Nussbaum, Brodie, and Yang, 1995 (Nussbaum, Brodie, Yang, 1995).

Based on morphological and geographical differences, Ronald A. Nussbaum, Edmund D. Brodie, Jr., and Yang Datong, 1995, described the light form found in China as the distinct species *Tylototriton shanjing*, meaning "Mountain Demon/Spirit" (shan=mountain, jing=demon/spirit). According to Nussbaum, Brodie, and Yang, 1995, *T. shanjing* and *T. verrucosus* are allopatric, with *T. shanjing* occurring in northern, western, and southwestern Yunnan Province, and *T. verrucosus* in extreme western Yunnan, Myanmar (Burma), northeastern India, Bhutan, Nepal, and possibly northern Vietnam. Although their distributions are close at certain points, there is no evidence of integration between the two species. Those who have observed the two species in captivity can attest to the differing habitat preference; *T. shanjing* is terrestrial outside the breeding season, while *T. verrucosus* will enter water at any time in the right conditions, and will even remain aquatic year-round in warmer temperatures. It is generally accepted that *T. shanjing* will remain a separate species from *T. verrucosus*, however, the new forms of *T. verrucosus* appearing in the pet trade indicate there is more work to be done with this particular taxa. Also, some populations of *T. shanjing* differ markedly by tail size, body length, and number of teeth, eluding to the feasibility of at least one *T. shanjing* subspecies (Nussbaum, Brodie, Yang, 1995).

CONSERVATION STATUS

T. verrucosus has been classified as state major protective wildlife grade II in China since 1988 (Zhao, 1998). Although *T. shanjing* was considered the same species as *T. verrucosus* until 1995, it does not carry the same protection as *T. verrucosus*, and is basically unprotected from over-collection and habitat destruction. The main threats to *T.*

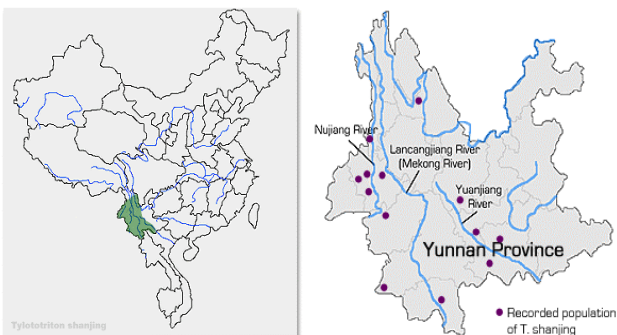
shanjing are human encroachment, habitat destruction, and recently, over collection for the pet trade.

In 2004 alone, thousands of Asian newts, including representatives of *T. shanjing*, *T. kweichowensis*, *T. taliangensis*, and *Echinotriton andersoni*, were collected and exported throughout the world for the pet trade. Such over collection has no doubt affected their numbers in the wild, seeing as though the fore mentioned species occupy such small distributions. During their breeding season, these species collected and shipped out to other countries by the thousands. By the time these newts make it to the stores, they are often sick and close to death, and usually die shortly after being purchased. Unfortunately, for the hundreds of newts collected for trade, very few end up reproducing in captivity. The same can be said for other Asian species, including *Cynops*, *Paramesotriton*, *Hynobius*, and *Pachytriton*. Hopefully, captive breeding successes will only increase, reducing or eliminating the desire to purchase from pet stores, and in turn helping to preserve wild populations. Currently, these species are in a dangerous position, for as they become more rare, they are simultaneously more coveted by pet keepers.

IUCN		None
CITES		None
Other		See Above

NATURAL HABITAT & DISTRIBUTION

T. shanjing are found in northern, central, western, and southwestern Yunnan province, China, often near the Nu River (Nujiang), Lancang (Lancangjiang, Mekong) River, and Yuan River (Yuanjiang). The Nu and Lancang Rivers run from Tibet, southerly through Yunnan Province. *T. shanjing* are found in moist, vegetated areas, also often close to ponds, irrigation canals, and rice fields. *T. shanjing* do not usually enter bodies of water outside of the breeding season, and remain hidden in dark places during the day. Documented populations are known to occur between 1000-2500 meters above sea level (Nussbaum, Brodie, Yang, 1995). This is not surprising, as Yunnan is almost entirely mountainous. The maps below shows the general distribution of *T. shanjing* in the Yunnan Province of China. The map below-right shows documented populations in Yunnan Province (adapted from Nussbaum, Brodie, and Yang, 1995).



Yunnan is a highly diverse region, and home to more than half of China's plant and animal species. The climate is varied, with glacial and temperate zones in the northwest, mild to subtropical climates in central and eastern areas,

and hot, tropical climates in the south. *T. shanjing* are found in temperate northwestern Yunnan, including the Lijiang Prefecture, the subtropical western/central Yunnan, and even into down into the tropical southwestern region. Of course, it's entirely possible that *T. shanjing* inhabits only cooler microhabitats in the tropical zones, however, even such environments would be significantly warmer than the colder areas of northern Yunnan. Yunnan is approximately 94% highland, and 6% flatlands, and so it is assumed that *T. shanjing* are found in mostly, if not entirely, in mountainous regions. Yunnan also experiences two distinct seasons; dry, and monsoon. In Yunnan, the monsoon season begins lightly in May, with the heaviest rains between June and September, and tapers off in October. As Table 1.3 shows, the monsoon season coincides with the warmer, summer season, and that annual rainfall and temperatures vary greatly in different regions of Yunnan.

BREEDING BEHAVIOR

Sexual dimorphism is limited in *T. shanjing*. In general, females can be distinguished from males by their larger, more robust size. During the breeding season, males will develop swollen cloaca, and laterally compressed tails.

In the wild, the breeding season occurs from May to August, which corresponds to the monsoon season in their distribution in Yunnan (see Table 1.3). Courtship may consist of the male and female turning in circles, underwater, with their snouts nearly touching. Females will lay their eggs singly, or in strings attached to submersed plants, rocks, or other materials. Some have also reported eggs being deposited on moist land.

It is presumed that most captive individuals, at least in the US and Europe, are likely from the warmer southern regions of Yunnan that are less mountainous and closer to surrounding countries, while newts from the higher elevation populations of northern Yunnan are probably not collected for trade often. At least a few breeders have reported success after a winter at temperatures in the low to mid 60's, followed by a more humid and warmer period with temperatures in the low to mid 70's.

Larvae and new morphs are thought to require temperatures in the low to mid 70's, preferably not below 69°F. These higher temperatures correspond to the warmer temperatures experienced during summer in the wild. Sustained lower temperatures may prove fatal to larvae and new morphs.



Tylototriton shanjing, photo © Henk Wallays, Wallays@skynet.be

At least a few successful captive breeders of *T. shanjing* noted that the breeding adults were long-term, established captives housed in a moderately spacious tank. The establishment of a small colony, or at least one healthy male-female pair is probably a crucial factor for breeding this species in captivity, especially considering that most imported newts are unhealthy and do not live long. Again, populations of *T. shanjing* are found in variable climates, and it can be assumed that *T. shanjing's* affinity to breed depends heavily on the environmental conditions of their natural habitat, as is the case with most species. In general, individuals from tropical southern Yunnan are probably exposed to higher temperatures year-round, while those from colder northern populations may not tolerate temperatures as high. The lack knowledge of climate preference for captive individuals may be a key reason *T. shanjing* is so difficult to breed in captivity, in addition to the difficulties of attaining healthy individuals.

Fortunately, the breeding habits of *T. shanjing* are at least a little more known today, and captive breeding successes are slowly increasing. There have been a few successful breeding projects in zoos, and by dedicated enthusiasts in recent times. Hopefully, in the near future *T. shanjing* will be bred in captivity often, and will become abundant in the caudate community. It seems that the more common a species, the less desirable it becomes, which can reduce its appeal to buyers, and thus to collectors as well. In theory, as a species becomes less sought after, it is collected less often from the wild, and thus wild populations may be positively impacted by such captive breeding successes.

TABLES



	
<p>Table 1.1: Typical <i>Tylototriton shanjing</i> coloration and pattern. <i>T. shanjing</i> are generally differentiated from <i>T. verrucosus</i> by their more terrestrial behavior, brighter orange coloration, usually in higher levels, and narrower heads.</p>	

Table 1.2: Variation among members of the *Tylototriton verrucosus* complex
 The photos above show individuals of the *T. verrucosus* complex displaying a wide range of coloration and shape, including high levels of orange, moderate levels of orange, and high levels of black. Also note the differences in tail and head shape. Whether the differences in appearance between members of the *T. verrucosus* complex warrant race or subspecies classification is unknown at this time.

Table 1.2 is included in the *T. shanjing* database entry to show that at least one type of *T. verrucosus* are similar in appearance to *T. shanjing*, and to shed light on the possible reasons Anderson and his predecessors might have overlooked the obvious differences between the two species. As mentioned previously, it is assumed that the differences between the two species were overlooked because only one type, i.e. bright orange (*shanjing*) or dark (*verrucosus*), were collected for study at any one time, making a morphological comparison impossible (Nussbaum, Brodie, Yang, 1995). Also, if lighter colored specimens of the *T. verrucosus* complex were compared to typical *T. shanjing* specimens, it's easy to understand how and why they may have been included in the same species.

Table 1.3 - Climates of selected Yunnan Prefectures, China, over the past 20 years. Blue text indicates monsoon months.



Lijiang Prefecture												
month	1	2	3	4	5	6	7	8	9	10	11	12
average temp. °F	42.8	46.4	50.0	55.4	62.6	64.4	64.4	62.6	60.8	55.4	48.2	42.8
average high °F	57.2	59.0	64.4	68.0	73.4	73.6	73.6	73.6	71.6	68.0	62.6	57.2
average low °F	30.2	35.6	41.0	46.4	51.8	57.2	59.0	57.2	53.6	48.2	37.4	32.0
rainfall (inches)	.0394	.236	.433	.827	2.32	7.09	9.37	8.66	5.63	2.76	.512	.157



Dali Prefecture												
month	1	2	3	4	5	6	7	8	9	10	11	12
average temp. °F	46.4	50.0	55.4	60.8	66.2	68.0	60.8	64.4	64.4	59.0	53.6	48.2
average high °F	60.8	62.6	68.0	73.4	77.0	77.0	77.0	75.2	75.2	69.8	64.4	60.8
average low °F	37.4	39.2	44.6	50.0	55.4	42.8	62.6	60.8	59.0	51.8	44.6	37.4
rainfall (inches)	.551	.866	1.30	.827	2.64	8.23	7.24	9.41	6.46	3.94	1.3	.591



Dehong Prefecture												
month	1	2	3	4	5	6	7	8	9	10	11	12
average temp. °F	53.6	57.2	64.4	69.8	73.4	75.5	75.2	75.2	73.4	69.8	62.6	55.4
average high °F	71.6	75.2	82.4	86.0	86.0	82.4	82.4	82.4	82.4	80.6	77.0	73.4
average low °F	42.8	44.6	50.0	59.0	64.4	69.8	69.8	69.8	68.0	62.6	53.6	44.6
rainfall (inches)	.472	.709	.709	2.24	5.20	12.3	15.9	14.0	6.46	4.96	1.85	.709



Kunming Prefecture												
month	1	2	3	4	5	6	7	8	9	10	11	12
average temp. °F	46.4	48.2	53.6	60.8	66.2	66.4	68.0	66.2	62.6	59.0	51.8	46.4
average high °F	59.0	62.6	69.8	75.2	77.0	75.2	75.2	75.2	73.4	68.0	64.4	59.0
average low °F	33.8	37.4	42.8	48.2	57.2	60.8	62.2	60.8	51.8	51.8	44.6	37.4
rainfall (inches)	.512	.433	.630	1.06	3.74	7.01	8.70	8.35	3.58	3.58	1.61	.551



Xishuangbanna Prefecture												
month	1	2	3	4	5	6	7	8	9	10	11	12
average temp. °F	60.8	64.4	69.8	75.2	78.8	78.8	77.0	77.0	75.2	73.4	64.4	60.8
average high °F	77.0	82.4	89.6	91.4	91.4	87.8	86.0	86.0	87.8	84.2	84.2	75.2
average low °F	51.8	51.8	55.4	62.6	69.8	71.6	71.6	71.6	69.8	66.2	60.8	53.6
rainfall (inches)	.709	.433	.787	2.01	5.24	7.32	8.50	9.69	5.39	3.90	2.01	1.02

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