



Two new species of *Tylototriton* from Thailand (Amphibia: Urodela: Salamandridae)

KANTO NISHIKAWA^{1,4}, WICHASE KHONSUE^{2,4}, PORRAWEE POMCHOTE^{2,3} & MASAFUMI MATSUI¹

¹Graduate School of Human and Environmental Studies, Kyoto University, Yoshida Nihonmatsu-cho, Sakyo-ku, Kyoto 606–8501, Japan

²Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand

³Primate Research Institute, Kyoto University, Kanrin 41-2, Inuyama, Aichi 484-8506, Japan

⁴Corresponding authors. E-mail: hynobius@zoo.zool.kyoto-u.ac.jp (Kanto Nishikawa) and Wichase.K@chula.ac.th (Wichase Khonsue)

Abstract

Three morphological groups are found in a salamandrid newt *Tylototriton shanjing* from Thailand. We describe two of them as new species, one from northern and the other from northeastern Thailand, based on molecular and morphological data, however we could not make a taxonomic decision on the remaining one group because of the lack of voucher specimens and sufficient genetic data. The northern species differs morphologically from all known congeners by having the combination of orange to reddish brown markings, narrow and sharply protruding dorsolateral bony ridges on head, weakly segmented vertebral ridge, and long and high tail. The northeastern species is characterized by having the combination of yellow, orange, or reddish brown markings, wide and moderately protruding dorsolateral bony ridges on head, smooth vertebral ridge, black limbs, and black tail except for edges. Validity of taxonomic subdivision of the genus *Tylototriton* is discussed.

Key words: *Tylototriton*, Molecular phylogeny, Morphology, New species, Thailand

Introduction

The salamandrid genus *Tylototriton* is widely distributed from eastern Himalaya, Indochina, to central and southern China, and includes a total of 17 species/subspecies (after Zhao *et al.* 2012, Hou *et al.* 2012, and Nishikawa *et al.*, 2013): *T. asperrimus* Unterstein, 1930; *T. broadoridgus* Shen, Jiang, et Mo, 2012; *T. daweishanensis* Zhao, Rao, Liu, Li, et Yuan, 2012; *T. hainanensis* Fei, Ye, et Yang, 1984; *T. kweichowensis* Fang et Chang, 1932; *T. lizhenchangi* Hou, Zhang, Jiang, Li et Lu, 2012; *T. notialis* Stuart, Phimmachak, Sivongxay, et Robichaud, 2010; *T. pseudoverrucosus* Hou, Gu, Zhang, Zeng, Li, et Lu, 2012; *T. shanjing* Nussbaum, Brodie, et Yang, 1995; *T. taliangensis* Liu, 1950; *T. verrucosus verrucosus* Anderson, 1871; *T. verrucosus pulcherrima* Hou, Zhang, Li, et Lu, 2012; *T. vietnamensis* Böhme, Schöttler, Nguyen, et Köhler, 2005; *T. wenxianensis wenxianensis* Fei, Ye, et Yang, 1984; *T. wenxianensis dabienicus* Chen, Wang, et Tao, 2010; *T. yangi* Hou, Zhang, Zhou, Li, et Lu, 2012; and *T. zieglerei* Nishikawa, Matsui, et Nguyen, 2013. Following Stuart *et al.* (2010), we here treated *T. shanjing* as a valid species, in contrast to Zhang *et al.* (2007) who relegated it to a junior synonym of *T. verrucosus*.

These species are divided into two subgenera, *Tylototriton* Dubois et Raffaëlli, 2009 (= the *T. verrucosus* group [Fei *et al.* 2005]) and *Yaotriton* Dubois et Raffaëlli, 2009 (= the *T. asperrimus* group [Fei *et al.* 2005]). The subgenus *Tylototriton* includes *T. daweishanensis*, *T. kweichowensis*, *T. pseudoverrucosus*, *T. shanjing*, *T. taliangensis*, *T. verrucosus* (also *v. pulcherrima*), and *T. yangi*, while *Yaotriton* includes *T. asperrimus*, *T. broadoridgus*, *T. hainanensis*, *T. lizhenchangi*, *T. notialis*, *T. vietnamensis*, *T. wenxianensis* (also *w. dabienicus*), and *T. zieglerei* (Zhao *et al.* 2012, Hou *et al.* 2012, Nishikawa *et al.*, 2013).

Within this decade, a total of 10 new species/subspecies were described in the genus *Tylototriton*, which greatly increased the number of taxa nearly two and half folds. However, still more cryptic lineages are suggested

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APPENDIX 1. Specimens examined.

- Tylostrotion asperrimus*: CIB GX200807010–16 (seven males) from Mt. Dayao, Jinxiu Yao Autonomous County, Guangxi Zhuang Autonomous Region, China.
- T. hainanensis*: CIB 83360–63 (four males) from Jianfengling, Hainan Province, China.
- T. kweichowensis*: KUHE 40314 (one female) from pet trade; KUHE 46534, 46535 (one male and one female) from Shuicheng County, Guizhou Province, China.
- T. lizhenchangi*: KUHE 42316 and 42317 (two males) from Mt. Mang, Yizhang County, Hunan Province, China.
- T. notialis*: VNMN 1194 (one male) from Pu Hoat District, Nghe An Province, Vietnam.
- T. shanjing*: NMNS 3682, 3682-6, 13, 38, 42, 53, 56, 68, 69, 92 (seven males and three females) from Jingdong County, Yunnan Province, China
- T. taliangensis*: KUHE 40180, and 43361–63 (four males) from pet trade.
- T. verrucosus verrucosus*: CAS 234478, 234480–81 (one male and two females) from Nu Jiang, Yunnan Province, China.
- T. verrucosus pulcherrima*: KUHE 46406 (one female) from pet trade.
- T. vietnamensis*: KUHE 55172, VNMN 3032, 3168, 3363, 3364, 3374 (six males) from Yen Tu District, Bac Giang Province, Vietnam.
- T. wenzianensis wenzianensis*: CIB 750041 (one male) from Pingwu County, Sichuan Province, China.
- T. yangi*: KUHE 42282–83 (two females) from pet trade.
- T. ziegleri*: VNMN 3390 (one male) from Quan Ba District, Ha Giang Province, Vietnam, VNMN 907, 1310–16 (eight males) from Bac Quang District, Ha Giang Province, Vietnam, VNMN 3389 (one male) from Bao Lac District, Cao Bang Province, Vietnam, NSMT-H 05679–88 (nine males and one female) from Nguyen Binh District, Cao Bang Province, Vietnam.