

Range extension of *Takydromus sylvaticus* (Pope, 1928) with notes on morphological variation and sexual dimorphism

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Abstract. The Chung-an ground lizard, *Takydromus sylvaticus* is a poorly known species that is restricted to a few localities in South China. Here we report the fourth recorded locality of *T. sylvaticus* based on voucher specimens collected from Ren-hua County, Guangdong Province, China. Morphological comparisons between our voucher specimens and previous collections allow us to provide information on scale variations, age-dependent color differentiation, and sexual dimorphism for this poorly known species.

Keywords. *Takydromus sylvaticus*, geographic range, China, variation, sexual dimorphism.

Introduction

The Chung-an ground lizard, *Takydromus sylvaticus* (previously known as *Platyplacopus sylvaticus*) was first described based on five female specimens collected on Chung-an County, Fujian Province, China (Pope, 1928). It is known as a distinct and geographically restricted lizard in South China (Zhao et al., 1999). The second record was only located in Anhui Province in 2002, 74 years after its first discovery (Tang and Xiang, 2002; Tang et al., 2007). A very recent discovery was from Yangjifeng Nature Reserve, (YJF hereafter) Jiangxi Province, in 2009 representing the third reported locality (Le et al., 2009).

We carried out biodiversity surveys in YJF and Ren-hua (RH hereafter) County, Guangdong Province from April, 2008 to December, 2009. Two more specimens of *T. sylvaticus* from YJF and another three from RH were collected. The latter series of specimens represent the fourth recorded locality of this species. In this note, we describe the fourth record of *T. sylvaticus* and its current geographical distribution pattern in South China. Moreover, morphological comparisons between our voucher specimens and previous collections (Pope, 1929; Tang et al., 2007) allow us to provide additional information on scale variation, age-dependent color differentiation and sexual dimorphism.

Material and Methods

Specimens SYS r000148, SYS r000178 and SYS r000205 were collected from RH at about 180 m a.s.l., in April and July 2008 and December 2009, respectively. Specimen SYS r000159 from YJF was collected on 8 June 2008; SYS r000184 and SYS r000207 also from YJF, were collected on 2 October 2008. Specimens SYS r000184 and SYS r000207, fed with small spiders, crickets and locusts, were kept together in a terrarium for more than a year until their death, November 2009 and March 2010, respectively. All specimens were preserved in 80% ethanol and deposited at The Museum of Biology, Sun Yat-sen University. Specimen SYS r00148 and SYS r000178 were damaged so that some scale characters and measurements were not available.

Scale counts and measurements follow Arnold (1997) and Zhao et al. (1999): Snout-vent length (SVL) measured from the tip of rostral scale to the vent, Tail length (TailL) measured from the tip of tail to the vent. Measurements were made with digital calipers to the nearest 0.1 mm. Sexes were determined by dissection.

Results and Discussion

All of our specimens match the diagnosis of *Takydromus sylvaticus* (Pope, 1928; Tang et al., 2007), and are different from *T. dorsalis*, the most closely related species by having more dorsal scales in the median longitudinal row between axilla and groin (43–48, vs. 32–40 in *T. dorsalis*), more rows of large dorsal scales between the hind legs (10, vs. 7–8 in *T. dorsalis*), two distinct white longitudinal stripes on each side of the body (absent in *T. dorsalis*), and lacking a black stripe extending from the preocular region posteriorly through eyelid margin to the anterior edge of ear opening (present in *T. dorsalis*).

Measurements and scale characters of individual specimens are listed in Table 1. Prefrontals are separated by a scale between frontonasal and frontal

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Figure 1. A-E: SYS r000207, female (A, photography on 13 October, 2008; B, on 05 November 2008; C, on 20 March 2009; D, on 12 April 2009; E, on 8 March, 2010); F-G: SYS r000184, female (F, photography on 05 November 2008; G, on 12 April 2009); H: SYS r000159, male; I: SYS r000205, male; J: SYS r000178, female.

Table 1. Comparison of scales characters among the Jiangxi specimens and Guangdong specimens.

	SYSr0148	SYSr0159	SYSr0178	SYSr0184	SYSr0205	SYSr0207
Sex	female	male**	male	female	male	female
Locality	Guangdong Prov.	Jiangxi Prov.	Guangdong Prov.	Jiangxi Prov.	Guangdong Prov.	Jiangxi Prov.
SVL	48.47	36.9	50.1	38.7	38.3	47.1
TailL*	144.0	123.2	u	124.5	132.6	172.2
Rostral contacting frontonasal*	1	1	0	1	0	1
Prefrontals contacting each other*	1	1	1	1	0	1
Prefrontal contacts 2 th supraocular*	0/1	1	0	1	1	1
Parietals contacting each other*	1	1	0	0	0	0
Scales posterior to interparietal	2	1	2	1	2	2
Chin shields (L/R)	4/4	4/4	4/4	4/5	5/5	4/4
subdigital lamellae (L/R) *	u	27/28	29/29	29/29	28/u	29/29
Supraciliary (L/R) *	5/5	4/4	u	4/5	4/6	5/4

*: 1=present; 0=absent; u=unvariable (Specimen damage)

** : Sex was misjudged as female by Le et al (2009) without dissection.

in SYS r000205, but not in the other five specimens, in which the prefrontals contact each other medially. Although Tang et al., (2007) stated that the prefrontals of *T. sylvaticus* contacted each other medially in Anhui's specimens, a tiny scale was clearly present between prefrontals of specimen NMNS 4334 (Fig. 2-D). Pope (1929), however, did not mention this tiny scale in the type specimens.

The number of chin shields varies among specimens, e.g., five on both sides in SYS r000205, four on left and

five on right sides in SYS r000184, four on both sides in the remaining four specimens. Both Anhui and type specimens (Pope, 1929; Tang et al., 2007) have four chin shields on both sides.

Pope (1929) did not mention the presence of tiny scales behind the parietals in type specimens. In our SYS r000159 and SYS r000148, the parietals contact each other behind the interparietal whereas the parietals of the other four specimens and Anhui's specimens (Tang et al., 2007) were separated by 1-3 scales behind

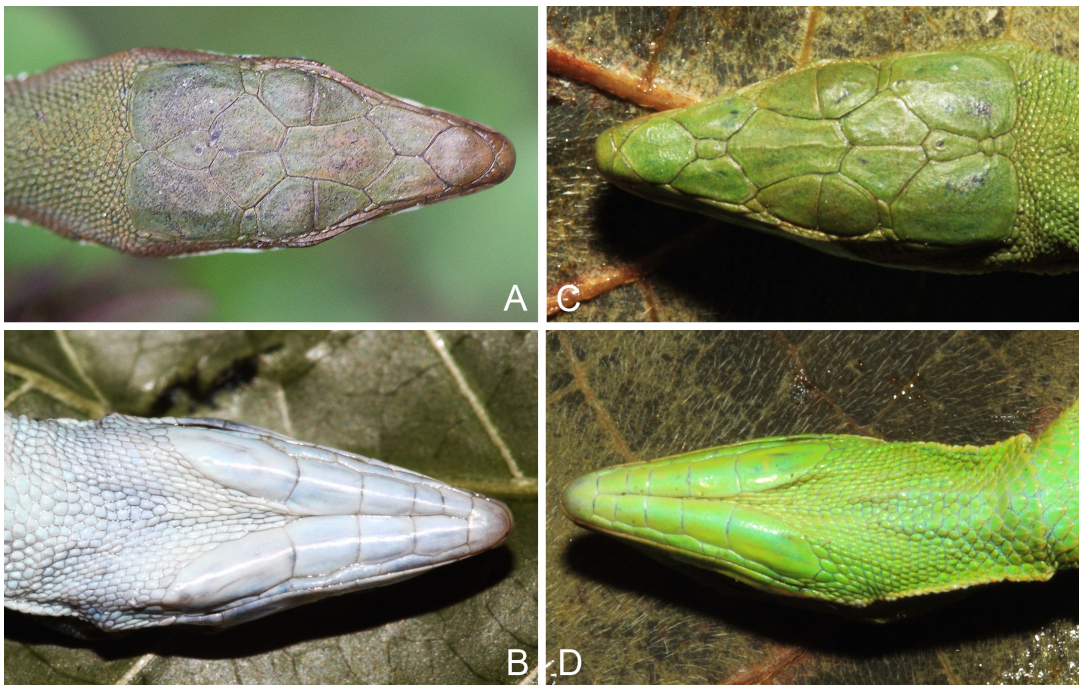


Figure 2. A: Dorsal view of head (SYS r000159), showing the parietals contacting each other behind interparietal; B: ventral view of head (SYS r000184), showing five chin shields on right side; C: dorsal view of head (SYS r000205), showing prefrontals contacting each other; D: ventral view of head (SYS r000205), showing five chin shields on both sides.



Figure 3. Map of Southeastern China showing locations where currently known *Takydromus sylvaticus* were collected: Chung-an County, Fujian Province; Lingnan Nature Reserve, Anhui Province; Yangjifeng Nature Reserve, Jiangxi Province and Ren-hua County, Guangdong Province, China.

the interparietal.

The first supraocular is enlarged and the prefrontal is not in contact with the 2nd supraocular on both sides in SYS r000178 and on the left side in SYS r000148, whereas the prefrontal is in contact with the 2nd supraocular in other four specimens. This character was mentioned neither in Anhui's specimens nor in type specimens.

In our six specimens, three females and three males, the medial four rows of ventral scales were weakly keeled but the outermost rows were strongly keeled in females; whereas all ventral scales were strongly keeled in males. Tang et al (2007) described the sexual dimorphism of the species as “all ventral scales of males were keeled”; in females, the medial four rows of ventral scales were “smooth, with keels occurring only on outermost rows”. But Tang et al. (2007) also mentioned that this character is not reliable for sex diagnosis in this species since one of the female type specimens had keeled ventral scales (Pope, 1929). Thus, based on currently available specimens, the sexual dimorphism of the species may be revised as: all ventral scales are strongly keeled in males; the medial four rows of ventral scales are smooth

or weakly keeled and outermost rows are strongly keeled in females.

Tang et al. (2007) stated that the Anhui specimens possessed a thin and yellowish green upper stripe extending from the pileus along the common border of dorsal and lateral scales to the dorsolateral sides of the tail. This upper stripe was not mentioned in types (Pope, 1929) and absent in our juvenile SYSr000184 specimen when captured. Five of our six specimens exhibited the upper stripes. We kept SYSr000184 and SYSr000207 for about a year and found that SYSr000184 displayed the upper light stripe with age, while the indistinct upper yellowish green stripe of SYSr000207 gradually became distinct with age (Fig. 1, A-E). In addition, the upper stripe of the subadult SYS r000159 and SYS r000205 was indistinct, even nearly invisible in SYS r000205 (Fig. 1. H & I). Thus, we postulate that the formation of the upper light stripe may be age-dependent: absent in juvenile, gradually becoming indistinct upper yellowish green with age, and finally white and distinct in adult.

The overall coloration of *T. sylvaticus* seems to be constantly changing in life. When captured, the coloration of the juvenile specimens SYS r000184

was different from those of adults or subadults in that: head, neck, entire forelegs and hind legs reddish brown; dorsum of body dull olive green. The dorsum of body became vivid and emerald green, and only the lateral sides of head, forelegs (except for proximal third of upper arms), knee and toes remained reddish brown in the adult. Both SYS r000184 and SYS r000207 present the above coloration change in lab (Fig. 1. A-G).

Our new record from RH (located in Nanling Mountains that lies on the border of Guangdong and Hunan Province), Guangdong Province, is about 515 km west of the type locality, i.e., Chung-an County (located in northern slope of Wuyi Mountains), Fujian Province. This new discovery extends the geographic distribution from the Baijishan Range and north of Wuyi Mountains southwestward to Nanling Mountains. Since all known regions form a relatively integral mountain chain with similar climate and habitats, we predict that the actual geographic distribution of *T. sylvaticus* may cover the entire Wuyi Mountains, Nanling Mountains and the mountains at the junction of Fujian, Zhejiang, Jiangxi, and Anhui Provinces. It may also possibly occur in the southern Hunan Province.

In our field surveys, most *T. sylvaticus* specimens were collected on the ground, soil slope or rocky banks along the streams immediately outside the forest. Specimen SYS r000151 was found climbing the vertical house wall in a village. We often observed *T. sylvaticus* climbing trees, which is not reported before (Pope, 1929; Zhao et al., 2002; Tang and Xiang, 2002; Tang et al., 2007). It seems this species is able to adapt to various habitats: forest floor, forest valley, the edge of forests adjacent to

villages. The presence of *T. sylvaticus* around the human habitation indicates that this species may be vulnerable to the impact of human activities. Nevertheless, detailed knowledge of distribution and habitat utilization are required to allow evaluation on the current conservation status of this South Chinese endemic lizard species.

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