

A New Insular Species of *Cyrtodactylus* Gray, 1827 (Squamata, Gekkonidae), from the Surin Islands, Phang-nga Province, Southern Thailand

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ABSTRACT: A new species of the cyrtodactyline gecko, *Cyrtodactylus surin* sp. nov., is described from the Surin Islands located off the west coast of Southern Thailand in Phang-nga Province. This species is similar to *C. macrotuberculatus* on the basis of its strong tuberculation on the dorsum but is differentiated from that species on the basis of scale characteristics in the prelocal region. This represents the first endemic species known from the offshore islands of Thailand

KEY WORDS: Thailand, Reptilia, Gekkonidae, *Cyrtodactylus surin* sp. nov., taxonomy, insular species.

INTRODUCTION

Geckos in the Genus *Cyrtodactylus* Gray, 1827 occur in tropical Southeast Asia and the Indo-Australian Archipelagos. About 115 species of this genus are known worldwide and have been listed by (Uetz, 2006). At least 18 species of cyrtodactyline geckos have been recognized in Thailand including: *C. angularis* (Smith, 1921), *C. brevipalmatus* (Smith, 1923); *C. chanhomae* Bauer, Sumontha and Pauwels, 2003; *C. consobrinus* (Peters, 1871); *C. erythropros* Bauer, Kunya, Sumontha, Niyomwan, Panitvong, Pauwels, Chanhome and Kunya, 2009; *C. interdigitalis* Ulber, 1993; *C. intermedius* (Smith, 1917); *C. jarujini* Ulber, 1993; *C. macrotuberculatus* Grismer & Ahmad, 2008; *C. oldhami* (Theobald, 1876); *C. papilionoides* Ulber and Grossmann, 1991; *C. peguensis* (Boulenger, 1893); *C. pulchellus* Gray, 1827; *C. quadrivirgatus* Taylor, 1962; *C. sumontha* Bauer, Pauwels and Chanhome, 2002; *C. thirakhupti* Pauwels, Bauer, Sumontha and Chanhome, 2004; *C. tigroides* Bauer,

Sumontha and Pauwels, 2003; and *C. variegates* (Blyth, 1859).

Most of them are found on the mainland. Only one species, *C. intermedius* is often found on the islands close to the coasts of the Southeastern Region. We herein describe a new species of *Cyrtodactylus* from the Surin Islands, Phang-nga Province, Southern Thailand.

MATERIALS AND METHODS

Specimens examined -

THNHM 9526-28; loc. Surin Islands, Phang-nga Province; dated 23 December 2005; coll. S. Mekchai and B. Chantasawan.

The following measurements were taken with a dial calliper following the methods of Bauer *et al.* (2002, 2003):

CrusL - crus length (from base of the heel to the knee).

EarL - ear length (the longest dimension of the ear).

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EyeEar- eye-ear distance (the distance from the anterior edge of the ear opening to the posterior corner of the eye).

FAL - forearm length (from the base of the palm to the elbow).

HD - head depth (the maximum height of the head).

HL - head length (the distance between the retroarticular process of the jaw and the snout tip).

Hw - head width (the maximum width of the head).

IN - internarial distance (the distance between the nares).

NE - the distance between anteriormost point of the eye and the nostril.

IO - interorbital distance (the shortest distance between the left and right supraciliary scale rows).

OD - orbital diameter (the greatest diameter of the orbit).

SED - snout-eye distance (the distance between the anteriormost point of the eye and the tip of the snout).

SVL - snout-vent length (the distance from the tip of the snout to the vent).

TailL - tail length (the distance from the vent to the tip of the tail).

TailW - tail width (measured at the widest point of the tail).

TrL - trunk length (the distance from the axilla to the groin, measured from the posterior edge of the forelimb insertion to the anterior edge of the hind-limb insertion).

Values are reported to the nearest 0.01 mm. Measurements and scale counts were taken on the left sides of the animals. Scale counts and external observations of morphology were made using an Olympus sz30 stereo dissecting microscope.

***Cyrtodactylus surin* sp. nov.**

Figures 2-3.

Holotype: THNHM 9527, adult male; snout-vent length; 72.6 mm, tail length 73.8 mm (tail regenerated); loc. Surin Islands, Phang-nga Province; dated 23 Dec. 2005; coll. S. Makchai and B. Chantasuwana.

Paratypes: THNHM 9526, adult male; snout-vent length 80.4 mm; tail length 59.2 mm; THNHM 9528; adult female; snout-vent length 67.3 mm; tail length 63.7 mm; field data is the same as the holotype.

Etymology: The specific epithet *surin* come from the name of the offshore Islands, Surin Islands, Phang-nga Province, Southern Thailand, where the new species was discovered.

Characteristics

The medium sized cyrtodactyline gecko is distinguished from all other southern Thai species by having very large trihedral keeled tubercles on the body limbs and tail. Tubercles are present on the occiput and on the top of head. There are 25 ventral scales, transversely enlarged median, subcaudal scales: 34 femoroprecloacal scales: 4 precloacal pores, 2 pores on each side with no femoral pores and no precloacal groove.

Description

Holotype: THNHM 9527. Adult male SVL = 72.6 mm. The head is large, moderate in length (HL/SVL=0.30) and wide (HW/HL= 0.66), somewhat flattened (HD/HL=0.42), distinct from the neck, and triangular in dorsal profile. The orbital region is concave. The frontal and prefrontal regions are deeply concave. The canthus rostralis is sharply rounded. The snout is elongate (SED/HL= 0.42) and rounded in dorsal profile. The eye is large (OD/HL= 0.25). The ear opening is

elliptical and moderate in size ($\text{EarL/HL} = 0.11$) and obliquely oriented. The distance between the eye and the ear is greater than the diameter of the eye. The rostral square is deeply divided dorsally, bordered posteriorly by left and right supranasals, and the internasal, is bordered laterally by the first supralabial. The external nares are bordered anteriorly by rostral, dorsally by a large anterior supranasal and small posterior supranasal, posteriorly by granular scales, ventrally by a large anterior supranasal and small posterior supranasal, posteriorly by granular scales, and ventrally by the first supralabial. There are eleven (left and right) square supralabials. The first supralabial is the largest. There are ten infralabials (left and right). The rostral and loreal scales are raised and are larger than the granular scales on the top of the head and occiput. Those on the canthus rostralis are the largest. The scales on the occiput are intermixed with enlarged tubercles. The mental scales are triangular, bordered laterally, infralabially and posteriorly left and right by rectangular postmentals that contact medially for 50% of their length. There are small, granular scales on the throat without conical tubercles.

The body is relatively short ($\text{TrL/SVL} = 0.43$) with well-defined tuberculate ventrolateral folds. The dorsal scales are small, granular, and interspersed with very large trihedral regularly arranged keeled tubercles separated by no more than three granules at their base. The tubercles extend from the occiput to the caudal constriction but not onto the regenerated tail. The tubercles on the occiput and nape are relatively small. Those on the body are larger. There are approximately 16-18 longitudinal rows of tubercles on the mid-body. There are 22 large flat imbricate ventral

scales between the ventrolateral body folds. The ventral scales are much larger than the dorsal scales. The precloacal scales are large, smooth, and there is no precloacal groove. There are two precloacal pores on each side. The ventral scales of the thigh are flat and imbricate. The ventral tibial scales are flat, imbricate, and slightly keeled. There are two rows of enlarged flat imbricate femoral scales extending from knee to knee through the precloacal region, where they are continuous with enlarged precloacal scales. There are 34 femoroprecloacal scales, no femoral pores and the posteoventral margin of the thigh lacks conical scales.

The forelimbs are moderately robust and relatively short ($\text{FAL/SVL} = 0.18$). There are virtually no granular scales on the dorsal surfaces of the forelimbs: only large trihedral keeled tubercles. The palmer scales are rounded. The digits are well-developed and inflected at the basal interphalangeal joints. The subdigital lamellae are nearly square proximal to the joint inflection, and only slightly expanded distally to the inflection. The digits are narrower distal to the joints. The claws are well-developed, sheathed by dorsal and ventral scales. The hind-limbs are more robust than the forelimbs, moderate in length ($\text{CrusL/SVL} = 0.20$), with virtually no granular scales on the dorsal surfaces. On the hind-limbs, there are large trihedral keeled tubercles. The digits are well-developed, inflected basally at the interphalangeal joints. The basal subdigital lamellae are broad and rectangular (3-5-5-4-5 left manus; 5-5-5-7-5 left pes). There are narrow lamellae distal to the digital inflection excluding the claw sheath: 8-9-11-10-9 (left manus), 8-9-11-11-12 (left pes). Interdigital webbing is absent. The relative lengths of the digits are:

IV=III>II>V>I (manus), IV=III>II>V>I (pes).

The tail is regenerated, 73.8 mm in length, 6.3 mm in width and tapers to a point. The dorsal scales at the base of the tail are square, smooth, flat, subimbricate and lack tubercles. There is a median row of transversely enlarged subcaudal scales. There are three small postcloacal tubercles at the base of the tail on the hemipeneal swellings. All the post scales are flat, large and imbricate.

Colour in preservative

The specimen is pale brown on the top of head and dorsum. A broad dark brown stripe with a cream edge begins at the back of the orbit and runs back to join with a broad dark brown cream edged stripe around the back of head. A broad pale brown cream edged patch begins at the angle of the jaw and runs above the shoulder above the axilla level. There are indistinct narrow pale brown bands on the dorsum, with no bands on the limbs. The tail has broad. Pale brown bands alternate with narrow cream bands. The ventral area is pale yellow.

Distribution

Cyrtodactylus surin sp. nov. is known only from the Surin Islands in the Andaman Sea, off the west coast of Phang-nga Province, Southern Thailand.

Ecology

Cyrtodactylus surin is a common species found in the forest habitat. Specimens have been observed at night on tree trunks 1 metre above the ground.

Comparison with other species

Cyrtodactylus surin sp. nov. may be distinguished from the following Thai species as follows: from *C. thirakupti*; by the presence of precloacal pores: from *C. intermedius*, *C. oldhami*, *C. peguensis*, *C. quadrivirgatus*, and *C. sumonthai*; by the absence of femoral pores: from *C. pulchellus* by the absence of a precloacal groove: from *C. angularis*, *C. erythroops*, *C. papilionoides*, *C. peguensis*, and *C. oldhami*; which are spotted and blotched, by its banded pattern: from *C. quadriangularis* which has longitudinal stripes, by its banded pattern: and from *C. brepalmatus* and *C. interdigitalis* by the absence of remnant toe-webbing. The new species is seen to be similar to other Thai species by the presence of preanal pores without the femoral pores of *C. erythroops*. *Cyrtodactylus surin* sp. nov. is similar to *C. macrotuberculosis* on the basis of having very large trihedral keeled tubercles on the body limbs and tail, but is distinguished from that species by the lack of large tubercles in the gular region and throat, and the lack of a precloacal groove and femoral pores (Bauer, Pauwels and Chanhome, 2002; Bauer, Sumotha and Pauwels, 2003; Bauer *et al.*, 2009; Chan-rd *et al.*, 1999; Nabhitabhata, Chan-ard and Chauynkern, 2000; Chan-ard *et al.*, 2003; Pauwels *et al.*, 2004; Smith, 1923; Smith, 1935; Taylor, 1962; Taylor, 1963; Ulber, 1993; Ulber and Grossmann, 1991).

DISCUSSION

The characteristics of the new species are similar to *Cyrtodactylus macromaculatus* Grismer and Ahmad (2008), which occurs on Langkawi Island and Peninsular Malaysia, but Thai specimens lack a precloacal groove and femoral pores, and the body size is much smaller. It is similar to *Cyrtodactylus*

pulchellus in the lack of large tubercles in the gular region and throat, but is distinguished from *C. pulchellus* by the lack of a preloacal groove and the body size is much smaller. Morphologically, it appears that the three species are related. *Cyrtodactylus pulchellus* is distributed in the peninsula region of Thailand and

Malaysia, while *C. macrotuberculatus* and the new species are endemic to offshore islands. Unfortunately tissue samples of the new species were not collected, because molecular analysis would establish this evolutionary relationship. It is hoped that this analysis is conducted in the future.

Table 1. Measurement of Thai specimens of *Cyrtodactylus* from Surin Islands.

THNHM no.	9526	9527	9528
CrusL	17.2	14.8	13.0
EarL	2.9	2.6	2.2
EyeEar	8.1	7.5	7.2
FAL	14.4	13.6	12.7
HD	10.1	9.2	9.1
HL	28.8	21.8	20.9
HW	16.3	14.5	13.8
IN	2.9	2.8	2.9
NE	7.5	7.4	6.4
IO	4.2	3.9	3.7
OD	6.4	5.5	5.6
SED	10.5	9.2	9.5
SVL	80.4	72.6	67.3
TailL	59.2	73.8	63.7
TailW	7.2	6.3	6.8
TrL	35.2	31.5	30.0

Table 2. Measurement ratios of the new species compared with the holotype of *Cyrtodactylus macrotuberculatus* (the values of the holotype followed Grismer and Ahmad, 2008).

	SVL	HL/SVL	HW/HL	HD/HL	SED/HL	OD/HL	EarL/HL	TrL/SVL	FAL/SVL	CrusL/SVL
THNHM 9527 (Holotype)	72.6	0.30	0.66	0.42	0.42	0.25	0.11	0.43	0.18	0.20
THNHM 9526 (Paratype, female)	80.4	0.35	0.56	0.35	0.36	0.22	0.10	0.43	0.17	0.20
THNHM 9527 (Paratype, male)	67.3	0.31	0.66	0.43	0.45	0.26	0.10	0.45	0.19	0.19
<i>C. macrotuberculosis</i> Holotype ZRC 2.6754	119.0	0.28	0.72	0.43	0.42	0.23	0.08	0.43	0.16	0.17

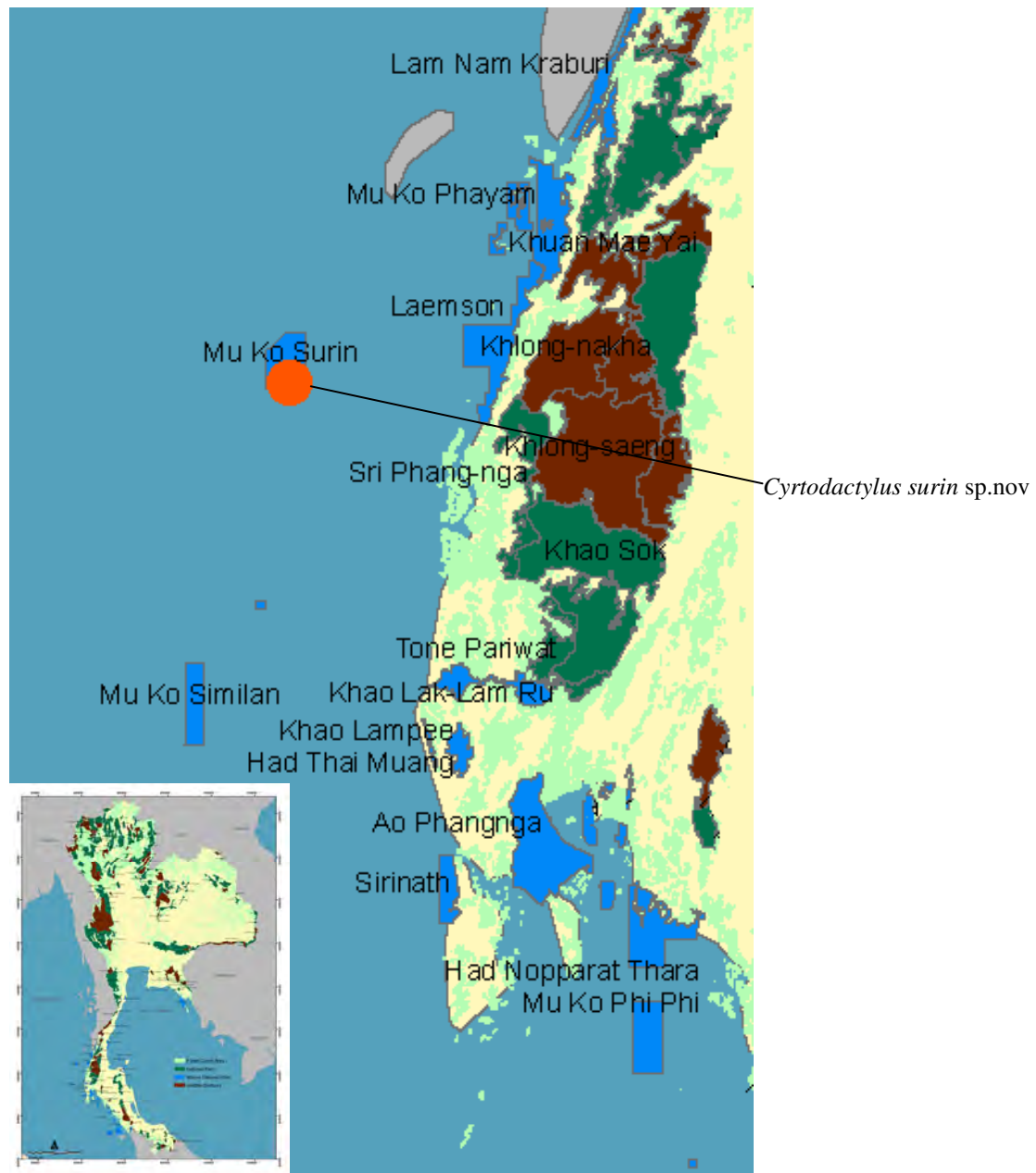


Figure 1. Distribution of *Cyrtodactylus surin* sp.nov. on the Surin Islands, Phang-nga Province, Southern Thailand.

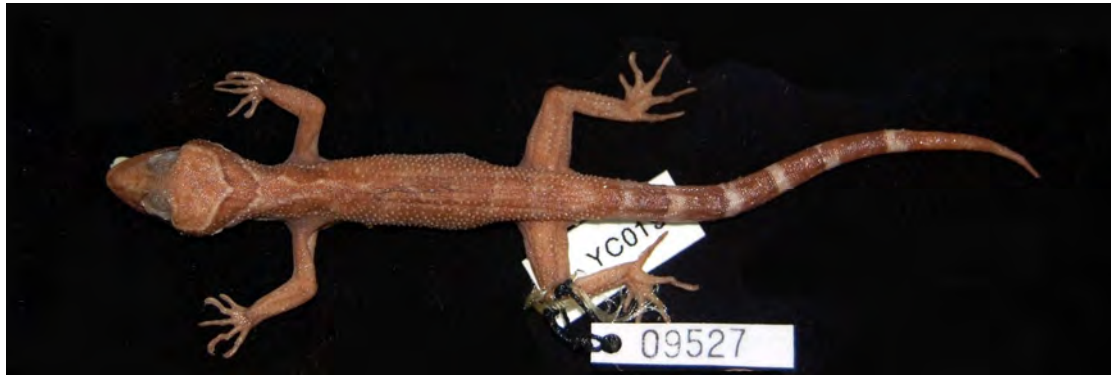


Figure 2. Dorsal view of the holotype of *Cyrtodactylus surin* sp. nov. (THNHM 9527).



Figure 3. Holotype of *Cyrtodactylus surin* sp. nov. (THNHM 9527) showing the smooth gular region (upper left); femoroprecloacal scales (upper right) and ventral views of the left hand (lower left) and left foot (lower right).

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REFERENCES

- Bauer, A.M., O.S.G. Pauwels, and L. Chanhom, 2002. A New Species of Cave-dwelling *Cyrtodactylus* (Squamata: Gekkonidae) from

- Thailand. *Natural History Journal of Chulalongkorn University*. 2 (2): 19-29.
- Bauer, A.M., M. Sumontha, and O.S.G. Pauwels. 2003. Two new species of *Cyrtodactylus* (Reptilia: Squamata: Gekkonidae) from Thailand. *Zootaxa*. 376: 1–18.
- Bauer, A., K. Kunya, M. Sumontha, P. Niyomwan, N. Panitvong, O.S.G. Pauwels, L. Chanhome and T. Kunya, 2009. *Cyrtodactylus erythrops* (Squamata: Gekkonidae), a new cave-dwelling gecko from Mae Hong Son Province, Thailand. *Zootaxa*. 2124: 51-62.
- Chan-ard, T., W. Grossmann, A. Gumprecht and K.-D. Schulz. 1999. Amphibians and Reptiles of Peninsular Malaysia and Thailand, an Illustrated Checklist. Bushmaster Publications, Würselen, Germany. 240 pp.
- Chan-ard, T., Y. Chauynkern and S. Thong-aree. 2003. The Diversity of Herpetofauna in Hala-Bala Wildlife Sanctuary, Yala and Narathiwat Provinces. *BRT 2003 Research Report*: 245-258.
- Grismer, L.L. and N. Ahmad. 2008. A new insular species of *Cyrtodactylus* (Squamata: Gekkonidae) from the Langkawi Archipelago, Kedah, Peninsular Malaysia. *Zootaxa*. 1924: 53-68.
- Nabhitabhata, J., T. Chan-ard and Y. Chauynkern. 2000. *Checklist of amphibians and reptiles in Thailand*. Office of Environmental Policy and Planning, Bangkok. 152 pp.
- Pauwels, O.S.G., A. Bauer, M. Sumontha and L. Chanhome. 2004. *Cyrtodactylus thirakhupti* (Squamata: Gekkonidae), a new cave-dwelling gecko from southern Thailand. *Zootaxa*. 772: 1–11.
- Smith, M.A. 1923. Notes on reptiles and batrachians from Siam and Indo-China (No. 2). *J. Nat. Hist. Soc. Siam*. 6 (1): 47-53.
- Smith, M.A. 1935. *Reptiles and Amphibia, Vol. II. The fauna of British India, including Ceylon and Burma*. Taylor and Francis, London. 440 pp.
- Taylor, E.H. 1962. New oriental reptiles. *Kans. Univ. Sci. Bull.* 43: 209-263.
- Taylor, E.H. 1963. The lizards of Thailand. *University of Kansas Science Bulletin*. 44: 687-1077.
- Uetz, P., The Reptile Database, <http://www.reptile-database.org>, accessed 23 May 2006.
- Ulber, T. 1993. Bemerkungen über cyrtodactyline Geckos aus Thailand nebst Beschreibungen von zwei neuen Arten (Reptilia: Gekkonidae). *Mitteilungen aus dem zoologischen Museum in Birken*. 69(2): 187-200.
- Ulber T. and W. Grossmann 1991. Ein weiterer neuer Gecko aus Zentral-Thailand: *Cyrtodactylus papilionoides* sp. nov. (Reptilia: Sauria: Gekkonidae). *Sauria*. 13(1) 1991: 13-22.