

## Additional Localities of *Limnonectes kohchangae* (Smith, 1922) (Anura, Dicroglossidae) in Thailand

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**ABSTRACT:** Twelve of frogs were collected from small streams in the Khlong Yai District, Trat Province by a team from the Thailand Natural History Museum (THNHM) during February and April, 2009. The morphological characteristics are identical to the description of *Limnonectes kohchangae* (Smith, 1922). The type locality of this species is Koh Chang in the Inner Gulf of Thailand. The discovery of this new location, confirms the distribution of this species on the mainland.

**KEY WORDS:** new locality, *Limnonectes kohchangae*, Anura, Dicroglossidae.

### INTRODUCTION

*Limnonectes kohchangae* is one the species protected by the Reservation and Protection of Wild Animal B.E. 2535 (WARPA). It was first described under the name *Rana kohchangae* from Koh Chang Island in the Inner Gulf of Siam and has also been also found on Koh Kut, Koh Mehsi, and on the adjacent mainland at Ok Yam (Smith, 1922). Taylor (1962) stated that in the case of *kohchangae* its occurrence on the mainland suggests that it may occupy the same territory as *Rana pileata* (= *Limnonectes gyldenstolpei*). These frogs are usually encountered along small streams.

In recent years, many biologists have reported the wider distribution of this species in the Cardamom Range of Cambodia (Ohler *et al.*, 2002; Stuart and Emmett, 2006; Grismer *et al.*, 2007; Grismer *et al.*, 2008). For this reason Thai localities on the mainland have been further investigated.

### MATERIALS AND METHODS

A team from the Thailand Natural History Museum visited a forest in Khlong

Yai District, Trat Province, from 16-20 February and 16-20 April, 2009. They collected a small number of specimens from several streams. The Voucher specimens were preserved in 10% buffered formalin and later transferred to 70% ethanol. Comparative material was examined at the Thailand Natural History Museum (THNHM), Pathum Thani, Thailand.

Measurements were made with dial callipers to the nearest 0.1 mm.

### RESULTS

The descriptions of all specimens are as follows: A small frog. The average snout-vent length of the males is 38.1 mm, and of the females is 38.0 mm. The head is broader than long. The snout is rounded, scarcely projecting beyond the mouth, longer than the eye diameter; the canthus rostralis is obtuse; the loreal region is slightly concave, and the nostril is a little nearer the tip of the snout than the eye. The tympanum is very distinct and larger than the eye. The tibio-tarsal articulation stretches between the eye and the tip of the snout. The fingers are moderately long with the tips swollen into very small discs.

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The first digit is as long as the second or slightly longer. The subarticular tubercles are moderately sized. The hind limbs are moderate and the heels are slightly overlapping when the limbs are folded at right angles to the body. The toes are moderate with the tips also dilated into small but very distinct discs. The toes are nearly fully webbed: the web reaching to the distal tubercle of the fourth toe. A tarsal fold is present and the inner metatarsal tubercle is moderate but there is no outer tubercle.

There are many rounded glandules and short folds on the upper parts of the body. There is a strong curved fold from the eye to the shoulder.

The colour of the upper parts of body is olive brown, with lighter and darker markings. There is a pale bar between the eyes and the lips, and dark bars on the limbs. The ventral side of body is yellowish white.

The female is similar to the male, but it has no enlargement of the head or tooth-like projections on the lower jaws (odontoids). Males have internal vocal sacs.

The measurements of all specimens are shown in table 2.

These characteristics fit with the original description of the type specimen given in Smith (1922).

## DISCUSSION

The type locality of *Limnonectes kohchangae* is Koh Chang, Koh Kut and

Koh Mehsi in the Inner Gulf of Thailand and it has been reported from the adjacent mainland at Ok Yam (Smith, 1922). The exact location is unknown. The localities in Khlong Yai District, Trat Province, are new for this species. Populations of adults and juveniles were found in small streams: for example, Saphan Hin Falls, Ta Nuk Falls and Hung Nam Kieo stream. The species has also been found in the Cambodian Cardamom Mountains (Ohler *et al.*, 2002; Stuart and Emmett, 2006; Grismer *et al.*, 2007; Grismer *et al.*, 2008).

When discussing the ecology of *Limnonectes kohchangae*, Taylor (1962) stated that in the case of *kohchangae* its occurrence on the mainland suggests that it may occupy the same territory as *Rana pileata* (= *Limnonectes gyldenstolpei*) as these frogs are usually encountered along small streams. That is confirmed since all of these specimens we collected in small streams flowing from the steep mountains to the coast of the Gulf of Thailand.

## Specimens examined

HNHM 15391-92, 15401-05, Saphan Hin Falls, Khlong Yai District, Trat Province, coll.: Chan-ard, Mekchai and Rassamee, February, 2009.

THNHM 15618, Ta Nuk Falls, Khlong Yai District, Trat Province, coll.: Chan-ard, Mekchai and Rassamee, April 2009.

THNHM 15367, 15369-71, 15373-74, Khlong Plieu falls, Koh Chang, Trat Province, coll.: Chan-ard and Chauynkern, 9 March 2007.

**Table 1.** Adult frogs of *Limnonectes kohchangae* from Koh Chang and the mainland of Trat Province (Khlong Yai District), Codes and abbreviations for characters: SVL, snout-vent length; F disk, disks on distal end of fingers; T disk, disks on distal end of toes; Web, extent of webbing on feet; MTT, number of metatarsal tubercles; tibitars, where the tibiotarsal projection stretches on the body; HP, heel position when the limbs are folded at right angles to the body.

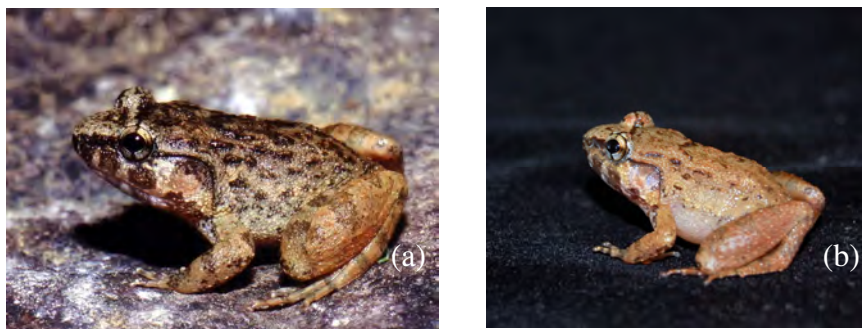
	<b>Khlong Yai</b>	<b>Koh Chang</b>
<b>Male SVL (mm)</b>	38.1 (n=3)	33.8 (n=3)
<b>Female SVL (mm)</b>	38.0 (n=3)	31.6 (n=3)
<b>Head</b>	Broad	Broad
<b>Snout profile</b>	Bluntly round	Bluntly round
<b>Odontoid in male</b>	Present	Present
<b>Vocal sac in male</b>	Internal	Internal
<b>Dorsal skin</b>	Rounded glandules or short folds	Rounded glandules or short folds
<b>Supratympanum fold</b>	Present	Present
<b>F disk</b>	Present	Present
<b>T disk</b>	Present	Present
<b>Web</b>	To distal tubercle of T4	To distal tubercle of T4
<b>MTT</b>	1	1
<b>Tibitars</b>	Reaching to between the eye and the tip of the snout	Reaching to between the eye and the tip of the snout
<b>HP</b>	Slightly overlapping	Slightly overlapping

**Table 2.** Measurements (in mm) of *L. kohchangae* in this study.

THNHM No.	15391	15392	15401	15402	15403	15405	15367	15370	15371	15373	15374	15618
sex	f	m	f	f	m	m	f	f	m	f	m	m
Snout to vent	30.55	34.5	34.0	30.5	35.0	32.0	37.0	38.0	37.0	39.0	41.5	35.9
Length of head	12.0	14.0	13.0	11.0	14.0	13.0	15.0	15.0	15.0	15.5	18.8	15.0
Width of head	13.0	14.5	14.0	12.0	15.0	15.0	16.0	15.5	16.0	16.5	19.5	15.5
Snout	4.5	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.7	6.0	5.5
Eye	4.75	5.0	5.0	5.0	5.0	5.1	5.5	5.5	5.5	5.7	6.0	5.0
Interorbital width	3.0	3.0	4.0	3.0	3.5	3.5	4.0	4.0	3.5	4.0	4.5	3.0
Tympanum	5.0	5.0	5.0	4.5	5.0	5.0	5.2	5.5	5.6	5.8	6.5	5.3
Tympanum	21.0	22.0	21.5	19.5	20.5	21.5	23.4	24.0	24.0	23.0	26.0	21.5
Fore limb	56.5	65.0	60.5	60.0	57.5	60.0	67.2	65.5	65.5	65.5	67.3	59.8
Hind limb	17.5	17.5	18.0	18.0	17.0	18.0	20.0	19.5	19.5	19.5	19.8	17
Tibia foot	24.0	29.0	25.5	25.0	24.0	24.5	27.8	27.0	27.0	27.0	28.3	25.3



**Figure 1.** Map of Khlong Yai District, Trat Province, red spots shown the locations of new localities of *Limnonectes kohchangae*.



**Figure 2.** *Limnonectes kohchangae* (a) photo taken from Koh Chang, (b) TNHNM 15618 from Ta Nuk Falls, Khlong Yai District, Trat Province.

## ACKNOWLEDGEMENTS

Thanks to the National Science Museum (NSM) for financial support for the inventory project on biodiversity of the south-eastern region of Thailand and to Mr. Michael Cota for his kind assistance with article review.

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## **Additional Locality of an Endemic Legless Skink, *Isopachys roulei* (Angel, 1920)(Squamata, Scincidae) from Northeastern Thailand**

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**ABSTRACT:** A single specimen of a legless skink in the genus *Isopachys* Lönnberg, 1916 was identified as *I. roulei* (Angel, 1920). The specimen described here was found living in a different habitat far from the type locality. The new location is recorded as a new locality for this species.

**KEY WORDS:** *Isopachys roulei*, Lygosomine.

### **INTRODUCTION**

The genus *Isopachys* Lönnberg, 1916 are scincid lizards, which lack external appendages. Four species of this genus are known in Thailand. They are *I. anguinoides* (Boulenger, 1914), *I. roulei* (Angel, 1920), *I. gyldenstolpei* Lönnberg, 1916 and *I. borealis* Lang and Böhme, 1990. Most specimens of this legless skink have been taken in dry sandy soils in which they can easily burrow. *I. anguinoides*, *I. gyldenstolpei* and *I. roulei* have been collected beneath rotten logs and grass and under debris of various types (Smith, 1935; Taylor, 1963). Only *I. borealis* has been taken in top soils of cultivated land (sweet potato and pineapple plantations) in clearings with moderate sunlight (Lang and Böhme, 1991). The Thailand Natural History Museum (THNHM) has received a specimen which clearly belongs to this genus from the Northeastern Region of

Thailand. It is identified as *Isopachys roulei*.

### **MATERIALS AND METHODS**

A single specimen (THNHM 15362) was collected from Ban Lampiakpattana, Tambon Nonsomboon, Amphoe Soeng Sang, Nakhon Ratchasima Province, Thailand (latitude 14° 19.545' N; longitude 102° 25.473' E) by Kirati Kunya dated 13 January 2009. The specimen was preserved in 10% buffered formalin and later transferred to 70% ethanol.

The snout-vent length and tail length of this single specimen has been measured with a calliper to the nearest 0.1 mm. A comparison of the main characteristics with a large series of legless skinks in the genus *Isopachys* in the THNHM was made by following the study of Lang and Böhme (1990) as shown in Table 1.

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## Specimens examined

*Isopachys anguinoides* - THNHM 3041-46, Nong Kae, Prachuap Khiri Khan, coll.: Soderberg and Norlander, 2 June 1966; THNHM 3028-29, 3037-40, Nong Kae, Prachuap Khiri Khan, coll.: P. Soderberg, 23-25 June 1996; THNHM 11285-93, Hat Wanakorn, Thap Sakae, Prachuap Khiri Khan, col.: Chan-ard and Chauynkern, 11 April 2001; THNHM 1285-87, 1315-27, Pa-La-U, Prachuap Khiri Khan, coll.: Chan-ard and Chauynkern, 15-20 December 2002; THNHM 1313-14, Ban Krang, Kaeng Krachan, Petchburi, col.: Chan-ard and Chauynkern, 21 December 2002; THNHM 1258-60, Ban Krang, Kaeng Krachan, Petchburi, col.: Chan-ard and Chauynkern, 27 July 2004; THNHM 10147-48, Cha-Um, Phetchaburi, coll.: Chan-ard, Mekchai and Lhaoteaw, 25 October 2006.

*Isopachys borealis* - THNHM 15366, Lansak, Uthai Thani, coll.: a staff of Khao Nang Ram Wildlife Research Station, no date reported.

*Isopachys gyldenstolpei* - THNHM 3056-57 (no data); THNHM 13877-78, Nong Kae, Prachuap Khiri Khan, coll.: P. Soderberg, 23 June 1966; THNHM 13879-80, Kanchanaburi, coll.: J. Fluker, 9 August 1966; THNHM 1306-12, 1466-67, Cha-um, Phetchaburi, coll.: Chan-ard and Chauynkern, 21 June 2004.

*Isopachys roulei* - THNHM 3047, Chom Thian, Bang Lamung, Chonburi, coll.: P. Soderberg, March, 1964.

## RESULTS

The measurements of the single specimen agree with Taylor's (1965) description and that of Lang and Böhme (1990). Its snout-vent length is 75.2 mm and the tail length is 42.1 mm, which is

smaller than Taylor's specimens. Its snout is flattened anteriorly, somewhat wedge-shaped. The nasals are very large, broadly in contact mesially. Frontonasal and prefrontal scales are present. The frontonasals are separated. Limbs are absent. The scale number on the mid-body is 18 rows. A dark marking occurs on the top of the head. The body is fawn to buff with two dark lines from the occiput to the end of the tail. The tail tip is blunt. The chin, belly, and the area under the tail are dark.

A series of Taylor (1965) specimens is known from Bangsaen, Chonburi Province which we believe is the type locality. We have another single specimen (THNHM 3047) from Chom Thian, Bang Lamung, Chonburi, which was collected by P. Soderberg in 1964. These localities are close to coastal areas. This new locality in Nakhon Ratchasima Province is very far from the sea and sandy beaches. The specimen was caught in sandy soil in a cassava plantation close to a farmer's house. It was found when the house owner carried the soil to place in his backyard. We identify this location as a new habitat for this species.

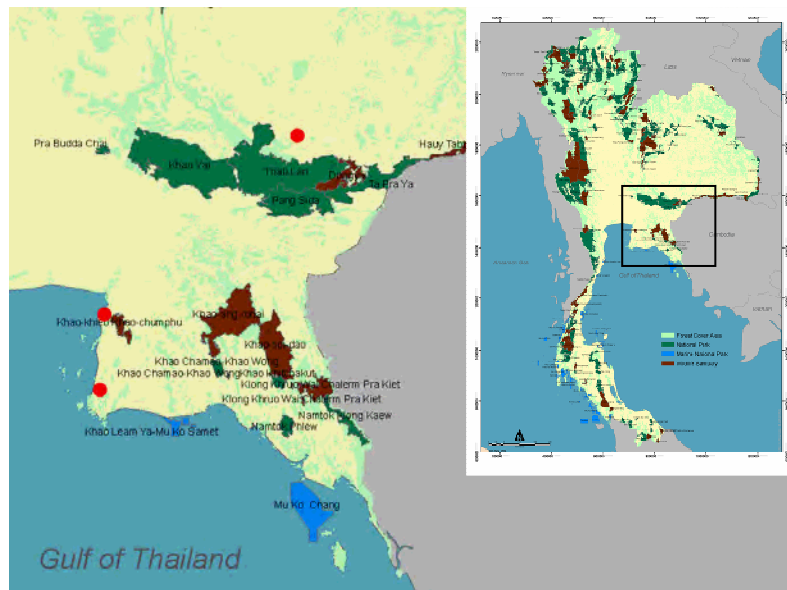
## CONCLUSION

The morphology of a legless skink which was collected from Nakhon Ratchasima Province matches *Isopachys roulei*, when compared with the original description, and when examining specimens in the Thailand Natural History Museum (THNHM). The type locality of this scincid species is recorded as Bang Saen, Chonburi Province. Many specimens that have previously been found in the neighbouring Chom Thian Beach area are deposited in THNHM collection. The new record establishes a new locality for this species.

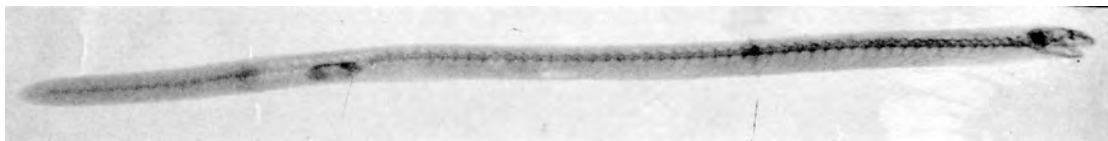
**Table 1.** Comparative table of characteristics differentiating the four recognized species of *Isopachys* with THNHM 15362 (modified from Lang and Böhme, 1991).

	<i>anguinoides</i>	<i>roulei</i>	<i>gyldenstolpei</i>	<i>borealis</i>	THNHM 15362
Nasal scales	separated	contact	contact	contact	contact
Frontal/ frontonasal	equal	FN larger	fused	FN smaller	FN larger
Frontoparietals	contact	separated	separated	separated	separated
Prefrontal scales	paired	paired	fused with frontal	fused with frontal	paired
Third temporal scale	present	present	fused	present	present
Post mental scale	present	fused	fused	fused	fused
# supralabials	5	4	4	5	4
# scales at neck	26-27	20-23	29-31	23-28	22
# scales at midbody	21-24	18	24-28	20-22	18
# scales at tail	15-18	14-15	19	14-17	15
# scales parietal-vent	108	125-135	203	140-152	133
SVL (mm)	60-71	82-106	167-220	77-177	75.2
Tail tip shape	tapering	tapering	blunt	blunt	tapering





**Figure 1.** Map of Thailand shows the localities of *Isopachys roulei*, the red circle on top is the new locality in Nakhon Ratchasima Province, other in the middle is type locality, and below is Chom Thian Beach in Chon Buri Province.



**Figure 2.** *Isopachys roulei* THNHM 15362.



**Figure 3.** *Isopachys roulei* THNHM 15362 (a) dorsal, and (b) ventral view.

## ACKNOWLEDGEMENTS

We wish to thank Dr. Sophon Dumnui (Director General of The Zoological Park Organization Under The Royal Patronage of H.M. The King, Thailand); Mr. Bunyat Insuwan (Director of Nakhonratchasima Zoo The Zoological Park Organization Under The Royal Patronage of H.M. The King, Thailand); Mr. Vichai Chanrattanachai (Nakhonratchasima Zoo, The Zoological Park Organization Under The Royal Patronage of H.M. The King, Thailand); and Mr. Inn Shidacha (61 M00 6 Ban Lampiakpattana, Soengsang District, Nakhon Ratchasima Province), for facilitating our field work. We also thank the Thailand Natural History Museum (THNHM) for permission to study their specimens of *Isopachys* spp.

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