

Additional Anuran and Saurian Records for Phuket, South Thailand

TZI MING LEONG ^{1*}, TANYA CHAN-ARD ² and YODCHAIY CHUAYNKERN ²

¹ *Systematics and Ecology Laboratory, Department of Biological Sciences,
National University of Singapore, 119260, SINGAPORE*

² *Herpetology Section, Reference Collection Division, National Science Museum,
Klong Luang, Pathumthani 12120, THAILAND*

Abstract.—A total of nine new herpetofaunal records are reported for Phuket island, including five anurans (*Ansonia malayana*, *Microhyla heymonsi*, *Megophrys parva*, *Limnonectes macrognathus*, *Taylorana hascheana*) and four saurians (*Acanthosaura armata*, *Draco taeniopterus*, *Cyrtodactylus oldhami*, *Mabuya macularia*), all supported with voucher specimens. This brings the total number of amphibian and lizard species for the island to 26 and 27 respectively.

Key words: Phuket; island; herpetofauna; anura; sauria

INTRODUCTION

The best known example of concerted efforts at surveying the herpetofauna of the island of Phuket (GPS 8°00' N, 98°20' E; south of Phang Nga province, peninsular Thailand) was by Dawn W. Frith and Clifford B. Frith, both of whom reported on the amphibian and snake faunas respectively in the same volume of the Natural History Bulletin of the Siam Society in 1977, after staying on the island from 1974-1976. Subsequently, heightened research efforts on the island and the adjacent mainland have produced a more complete picture of the herpetofaunal composition of Phuket island, including the lizards and terrapins. In recent years, there have been comprehensive compilations of and additions to the herpetofauna of Phuket, Phang Nga, and

Khao Lak (Grossmann and Tillack, 2000, 2001a, 2001b; Pauwels and Bauer, 2001; Pauwels et al., 1999, 2002).

Thus far, no endemic species are known from the island, suggesting a long history of connectedness with the peninsula and a very recent (geological time) isolation from this mainland. From the maps prepared by Voris (2000), it seems apparent that at sea-levels of 30 m below present day levels (BPL), Phuket appears to be distinct from the mainland (Voris, 2000: fig. 1f). However, in actual fact, this is not the case and at 20 m BPL, the Phang Nga Bay we know today would be mostly land, with Phuket still connected to the mainland in the north and on the east. Hence, it would only be safe to say that at 10 m BPL, there was certain separation between the two. Phuket has only been an island for the past five or six thousand years (Harold K. Voris, pers. comm.). Even then, the likelihood of faunal exchanges across the narrow channel would be very high still (Olivier S. G. Pauwels, pers. comm.). In spite of the current state of severely reduced original

* Corresponding author.

Tel: 65-6874-4193

E-mail: scip0132@nus.edu.sg

forest cover, the herpetofaunal records have in fact been on the rise, a clear result of increased research efforts. Prior to this report, 21 amphibians and 23 lizards were known for Phuket. In this paper, we report five anurans (Class Amphibia, Order Anura) and four lizards (Class Reptilia, Order Sauria) that were previously unrecorded for the island. Each species is presented in greater detail below.

MATERIALS AND METHODS

A review of the amphibian and reptile collection at the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR), National University of Singapore, revealed that certain species previously collected from Phuket (mainly August-September 2001; T. M. Leong et al.) actually constituted new island records. The sex of each individual was determined as far as possible. Snout-vent lengths (SVL) and tail lengths were measured (to 0.1mm) using slide verniers. Vouchers were assigned catalog numbers (ZRC). Representative specimens will subsequently be deposited at the herpetology collection of the National Science Museum, Thailand.

RESULTS

New Anuran Records

Family Bufonidae

Ansonia malayana Inger, 1960

This represents the third Bufonid to occur on the island, other than *Bufo melanostictus* and *Bufo parvus*. The Phuket population of *A. malayana* agrees with Inger's (1960) description of the Thai series from Chumporn and Tasan, exhibiting characteristics that depart from the topotypic series from Larut Hills, Perak, Peninsular Malaysia. There are noticeable differences in (a) ventral ornamentation: larger yellow spots in the Thai series, compared with small yellow dots in the Malaysian series, and (b) webbing of hind foot: slightly more extensive webbing in the Thai series.

Material examined: sub-adult (ZRC.1.8483; SVL 14.9 mm; Kathu waterfalls); males (ZRC.1.8454, 8479; SVL 24.1, 23.9 mm; Kathu waterfalls); females (ZRC.1.8455-8458, 8480-8481, 8581; SVL 26.6-29.3 mm; Kathu and Manik waterfalls). Topotypic material examined: ZRC.1.6025-6030, 6044-6047, 10551-10565, 10579-10589 (Peninsular Malaysia: Perak; Bukit Larut).

Family Microhylidae

Microhyla heymonsi Vogt, 1911

Metamorphs already displayed the diagnostic dark lateral bands. This is the second species of *Microhyla* known on Phuket, apart from *M. ornata* (Duméril and Bibron, 1841). *M. heymonsi* is a widespread species, known from China, India, Nicobars, Vietnam, Thailand, Peninsular Malaysia and Sumatra (Iskandar & Colijn, 2000).

Material examined: emergents (ZRC.1.8505-8506; SVL 5.1-5.5 mm; open area outside Manik waterfalls).

Family Megophryidae

Megophrys parva (Boulenger, 1893)

The lack of any dermal projections on the upper eye-lid is a diagnostic character. Pigmented nuptial pads are clearly visible on the dorsal surfaces of their first and second fingers. Larvae of *Megophrys* were collected from Ton Sai waterfalls, and are most likely referable to this species. This is the only species of *Megophrys* known from the island thus far. In addition to Thailand, this species is also known from Myanmar, south China, and north India (Iskandar and Colijn, 2000).

Material examined: adultmales (ZRC.1.8489-8492, 8595-8596; SVL 43.5-47.4 mm; Kathu waterfalls); larvae (ZRC.1.8578-8579, Gosner stages 30 and 38; Ton Sai waterfalls).

Family Ranidae

Limnonectes macrognathus (Boulenger, 1917)

Diagnostic characters could be clearly distinguished, especially in mature males. These include an enlarged head; with swellings on the occipital region and posterior to the inter-orbital area (swellings not projecting as a free flap);

tympanum equal to, or greater than eye diameter; head deepened (dorso-ventral) and slightly widened posteriorly; lower jaw with distinct odontoid processes (Taylor, 1962). In life, all specimens displayed a sulphur yellow colour ventrally, at the thoracic and abdominal areas, continuing onto the underside of their hindlimbs. Externally, *L. macrognathus* is superficially similar to *L. doriae* (Boulenger, 1887), which had been recorded by D. W. Frith (1977) from Phuket. Hence, the occurrence of true *L. doriae* on the island remains to be verified. However, there is also the possibility that both *L. macrognathus* and *L. doriae* might co-occur syntopically on the island. *L. macrognathus* is known from Myanmar, Thailand and Peninsular Malaysia (Iskandar and Colijn, 2000).

Material examined: ZRC.1.8453a-c (SVL 30.2-42.9 mm; Kathu waterfalls); ZRC.1.8485 (male, SVL 47.4 mm; Kathu waterfalls); ZRC.1.8486-8488 (SVL 29.2-48.2 mm; Kathu waterfalls); ZRC.1.8582 (male, SVL 44.7 mm; Manik waterfalls); ZRC.1.8593 (SVL 40.8 mm; Kathu waterfalls).

Taylorana hascheana (Stoliczka, 1870)

Diagnostic characters include its small size and reduced webbing of fourth toe. In life, the throat to belly was light yellow, while the underside of the hind limbs were deep orange. Outside of Thailand, this species is known from Peninsular Malaysia to the south, and Vietnam and India to the north (Manthey and Grossmann, 1997).

Material examined: ZRC.1.8452 (SVL 33.2 mm); ZRC.1.8484 (SVL 31.1 mm); both from Kathu waterfalls.

New Saurian Records

Family Agamidae

Acanthosaura armata (Hardwicke and Gray, 1827)

This represents the second species of *Acanthosaura* known to occur on the island, apart from *A. crucigera* Boulenger, 1885 (Grossmann and Tillack, 2000). *A. armata* has been previously recorded from South Thailand

(Nakhon Si Thammarat province), Peninsular Malaysia (including Penang and Tioman islands), Sumatra, and the Anambas islands (Manthey and Grossmann, 1997).

Material examined: ZRC.2.5225 (Adult female; SVL 110.4 mm, tail 151.5 mm; Bang Pae waterfalls).

Draco taeniopterus Günther, 1861

This small species of *Draco* has not been recorded for the island previously, in addition to *D. blandfordii* Boulenger, 1885, *D. maculatus* (Gray, 1845) and *D. volans sumatranus* Schlegel, 1844 (Grossmann and Tillack, 2000). Elsewhere, *D. taeniopterus* is known from Burma, Thailand, and Cambodia (Manthey and Grossmann, 1997).

Material examined: ZRC.2.5219 (adult female, gravid; SVL 74.2 mm, tail 95.8 mm; Kathu waterfalls).

Family Gekkonidae

Cyrtodactylus oldhami (Theobald, 1876)

This is the second representative of the genus *Cyrtodactylus* to be found on the island, in addition to *C. brevipalmatus* (Smith, 1923). *C. oldhami* is known from Burma and Thailand (Manthey & Grossmann, 1997).

Material examined: ZRC.2.4907 (adult female; SVL 81.2 mm, tail 88.9 mm; Kathu waterfalls); ZRC.2.5213 (adult male; SVL 79.4 mm, tail 80.9 mm; Kathu waterfalls); ZRC.2.5226 (adult female; SVL 84.6 mm, tail 92.8 mm; Kathu waterfalls); ZRC.2.5230 (sub-adult male; SVL 64.7 mm, tail 79.0 mm; Manik waterfalls).

Family Scincidae

Mabuya macularia (Blyth, 1853)

In life, throat adorned with orange-red colouration (breeding male). This is the second species of *Mabuya* known from Phuket, other than the widespread human-commensal *M. multifasciata* (Kuhl, 1820). *M. macularia* itself is also relatively widespread, ranging from India, throughout mainland Southeast Asia, down to northern Peninsular Malaysia (Cox et al., 1998).

Material examined: ZRC.2.5231 (adult male, hemipenes everted; SVL 58.5 mm, tail 61.7 mm, two pre-anals present, 13 sub-digital lamellae on 4th toe; Ton Sai waterfalls).

DISCUSSION

Of the five new anuran records for Phuket, at least three (*Ansonia malayana*, *Microhyla heymonsi* and *Taylorana hascheana*) have been recorded from Khao Lak (mainland) previously, with *M. heymonsi* known from Phang Nga as well (Grossmann and Tillack, 2000). Although *Megophrys aceras* and *M. longipes* have been found in Khao Lak, neither have been discovered in Phuket so far (Grossmann and Tillack, 2000). Conversely, no confirmed examples of true *M. parva* have been found from either Khao Lak or Phang Nga, but an as yet unidentified *Megophrys* had been collected from Khao Lak (Grossmann and Tillack, 2000) and may turn out to be this species. The occurrence of *Limnonectes doriae* in Khao Lak, Phang Nga and Phuket will require further investigation and verification, as there is potential confusion with other members in this species group, such as *L. kohchangae*, *L. macrognathus* and *L. pileatus*.

The recently described Megophryid *Leptobranchium smithi* Matsui, Nabhitabhata and Panha, 1999 (Type locality: Ton Nam Plu waterfall, Khao Chong, Trang Province) had actually been previously reported as occurring in Phuket (Matsui et al., 1999), but was not reflected in the table compiled by Grossmann and Tillack (2000). Nevertheless, voucher specimens of adults, larvae and metamorphs (ZRC.1.8459-8478, 8583-8592, 8594; Kathu and Manik waterfalls) belonging to this species were examined. Larval *L. smithi* were often found together with the loach *Schistura robertsi* Kottelat, 1990, as they shared similar microhabitats of the larger pools in between cascades. Emergents attained SVL's of ca. 24 mm at complete metamorphosis. *L. smithi* has sub-

sequently been recorded from Assam, northeast India (Sengupta et al., 2001).

Of the four new lizard records, three (except *Acanthosaura armata*) have been recorded from Phang Nga as well (Grossmann and Tillack, 2000). As with the anuran records, it is not surprising that species found on the adjacent mainland are also known to occur on Phuket as well, bearing testimony to earlier land connections. At the same time, it is actually encouraging to discover that even more species of terrestrial herpetofauna are surviving within the last pockets of remnant primary and secondary forest of Phuket, which essentially form the island's key central catchment area for water supplies. As in many places around

Southeast Asia, the long term viability of such isolated, fragmented populations will always be questioned. In the meantime, however, the potential for unearthing even more records for the island still remains promising. Inclusive of new records, the current tally for amphibian species on Phuket stands at 26, and 27 for lizards.

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