A Preliminary Annotated Checklist of the Amphibians and Reptiles of the Kulen Promtep Wildlife Sanctuary in Northern Cambodia

Timo HARTMANN¹*, Flora IHLOW¹*, Sarah EDWARDS², SOVATH Sothanin³, Markus HANDSCHUH⁴ and Wolfgang BÖHME¹

¹ Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), Adenauerallee 160, 53113 Bonn, Germany
² Frontier Cambodia, 390, Sangkat Boeung Keng Kang III, Khan Chamkarmon, Phnom Penh, Cambodia
³ Department of National Parks, Ministry of Environment (MoE), 48, Samdech Preah Sihanouk, Tonle Bassac, Khan Chamkarmorn, Phnom Penh, Cambodia
⁴ Angkor Centre for Conservation of Biodiversity (ACCB), Kbal Spean, Phnom Kulen National Park, Siem Reap, Cambodia

Abstract We present the first herpetological checklist for the Kulen Promtep Wildlife Sanctuary in northern Cambodia, with records of 22 species of amphibians and 33 species of reptiles belonging to 44 genera in 22 families. The checklist includes three species (Ingerophrynus macrotis, Micryletta inornata, Scincella melanosticta) which in Cambodia were formerly only known to occur in the Cardamom Mountains in the southwest of the country. Our findings highlight the importance of countrywide herpetological baseline surveys in lowland habitats.

Keywords Amphibia, Reptilia, Kulen Promtep Wildlife Sanctuary, Cambodia, distribution, range extension, taxonomy

1. Introduction

In addition to historical compilations (Bourret, 1941, 1942; Saint Girons, 1972), recent field surveys greatly improved the knowledge on Cambodia’s herpetofauna. These surveys mainly focussed on the Cardamom Mountains in southwestern Cambodia (Daltry and Chheang, 2000; Daltry and Traeholt, 2003; Daltry and Wüster, 2002; Grismer et al., 2007a, 2007b, 2008a, 2008b, 2010; Long et al., 2002; Neang et al., 2010, 2011; Ohler et al., 2002; Stuart and Emmett, 2006; Stuart and Platt, 2004; Swan and Daltry, 2002; Wood et al., 2010) and the uplands in northeastern and eastern Cambodia (Geissler et al., 2012; Long et al., 2000; Neang et al., 2011; Rowley et al., 2010; Stuart et al., 2006, 2010). Herpetological field work focussing on lowlands and low-lying hills of northern Central Cambodia is still very little (Bezuijen et al., 2009; Hartmann et al., 2009, 2010, 2011; Ihlow et al., 2012). Regarding amphibians, Neang and Holden (2008) provided a field guide for the whole of Cambodia.

Herein, we present the records of amphibians and reptiles collected between 2009 and 2011 in the Kulen Promtep Wildlife Sanctuary in northern Cambodia.

2. Survey Sites

The Kulen Promtep Wildlife Sanctuary (KPWS) is located within the Northern Plains of Cambodia, close to the Thai border (Figure 1). The KPWS mainly lies within the Preah Vihear Province, but it also reaches into the provinces of Siem Reap and Oddar Meanchey. Covering an area of 402 500 ha, the KPWS is Cambodia’s largest protected area (ICEM, 2003). It was established in 1993 and is under the jurisdiction of the Cambodian Ministry of Environment (MoE). The Preah Vihear part of the KPWS is jointly managed by MoE and the Wildlife Conservation
The KPWS is a lowland area with an average elevation of around 50 m above sea level (a.s.l.). Only few scattered hills such as Phnom Pol reach up to approximately 450 m a.s.l. The Sen River, a major tributary of the Tonle Sap crosses the KPWS in the southeast and causes seasonal flooding during the rainy season. The KPWS has a low population density and limited agriculture.

The Preah Vihear part of the KPWS is mainly covered by open deciduous dipterocarp forest communities and grassland savannahs, but also includes some areas with semi-evergreen gallery forest communities. At the survey sites (Figure 2), the vegetation mainly consists of disturbed open deciduous dipterocarp forest with interspersed patches of grasslands, bamboo, and semi-evergreen gallery forest (Figure 3 A–D). During the rainy season large areas are flooded, while during the dry season the area is heavily affected by fire clearings.

The Oddar Meanchey section in the northwest of the KPWS has an average elevation of 100 m a.s.l. and is covered with lowland semi-evergreen forest which is partly degraded by anthropogenic influence (Figure 3 E–F). The main survey sites (Figure 2) were 500 m away from seasonal or permanent rivers or streams. Each site was situated within 500–2500 m of forest edge habitat abutted by slash and burn farming areas used for different agricultural purposes by locals.

3. Material and Methods

From 9th to 16th of July 2009, T. Hartmann collected 38 voucher specimens during a rapid survey in the Kulen District, Preah Vihear Province. All specimens were collected in the field by hand or snake stick, while actively searching by day and night. The specimens were photographed prior to euthanasia, and subsequently fixed and preserved in 70% ethanol. All specimens were deposited and comparative material was examined at the Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), Bonn, Germany.

During two intensive long-term tortoise surveys from 1st of August 2009 to 1st of January 2010 and from 29th of August to 23rd of September 2011, F. Ihlow photo-vouched a total of 64 amphibian and reptile records from different sites in the Preah Vihear Province. Individuals were encountered during daytime, often along seasonal ponds, puddles and marshes. Some individuals were discovered hiding under bark or in leaf litter.

Furthermore, S. Edwards collected 37 photographic vouchers taken during herpetological surveys conducted by Frontier Cambodia over three periods; January to March, April to June, and July to September 2011, totalling 210 days within the Oddar Meanchey part of KPWS. Individuals were caught in the field either by hand or pitfall traps. Prior to photograph and release, some individuals were measured using callipers to the nearest 0.1 mm or a tape measure to 0.1 cm (SVL = snout-vent length, TL = tail length, SCL = straight carapace length), and the weight was recorded to the nearest 0.1 g.

All photo-vouchers are archived in the Herpetological Photographic Archive of the Zoologisches Forschungsmuseum
4. Results

A total of 55 species (22 amphibians and 33 reptiles) were recorded. Of these, 24 species are characteristic of anthropogenically modified environments (Table 1) and currently have wide ranges in mainland Southeast Asia, hence these species will not be dealt with further herein.

Detailed accounts of the remaining 31 species recorded from the KPWS and their current International Union for Conservation of Nature (IUCN) status (IUCN, 2012), as well as their previously known distribution within Cambodia are presented below:

Figure 3 Habitat types at the survey sites in the KPWS. A: Open deciduous dipterocarp forest, Photo by F. Ihlow; B: Flooded open deciduous dipterocarp forest, Photo by F. Ihlow; C: Semi-evergreen gallery forest, Photo by F. Ihlow; D: Savannah grassland, Photo by F. Ihlow; E: Disturbed and degraded habitat, Photo by S. Edwards; F: Undisturbed semi-evergreen forest, Photo by S. Edwards.
Table 1  Voucher numbers and coordinates of capture localities of amphibian and reptile species from the KPWS that are characteristic of anthropogenically modified environments (*sensu* Stuart and Emmett, 2006; Stuart *et al.*, 2006; Bezuijen *et al.*, 2009).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Voucher number</th>
<th>Coordinates</th>
<th>District</th>
<th>Province</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bufonidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Duttaphrynus melanostictus</em> (Schneider, 1799)</td>
<td>ZFMK 90394</td>
<td>13°55'14.9&quot; N 104°49'39.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 01</td>
<td>14°04'41.3&quot; N 104°10'36.9&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><strong>Microhylidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Kaloula pulchra</em> Gray, 1831</td>
<td>ZFMK-PA FI 01</td>
<td>13°51'57.5&quot; N 104°49'31.0&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 02</td>
<td>14°04'43.3&quot; N 104°11'25.5&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><em>Microhyla butleri</em> Boulenger, 1900</td>
<td>ZFMK-PA SE 03</td>
<td>14°04'33.0&quot; N 104°10'36.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><em>Microhyla fissipes</em> Boulenger, 1884</td>
<td>ZFMK-PA SE 04</td>
<td>14°04'33.0&quot; N 104°10'36.7&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><em>Microhyla heymonsi</em> Vogt, 1911</td>
<td>ZFMK-PA SE 05</td>
<td>14°04'40.8&quot; N 104°10'38.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><em>Microhyla pulchra</em> (Hallowell, 1861)</td>
<td>ZFMK 90398</td>
<td>13°53'06.2&quot; N 104°52'55.2&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 07</td>
<td>14°04'33.0&quot; N 104°10'36.7&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><strong>Dicroglossidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Fejervarya limnocharis</em> (Gravenhorst, 1829)</td>
<td>ZFMK 90402-405</td>
<td>13°55'14.9&quot; N 104°49'39.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 04</td>
<td>13°51'01.3&quot; N 104°50'12.7&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 09</td>
<td>14°04'41.3&quot; N 104°10'36.9&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><em>Hoplobatrachus rugulosus</em> (Wiegmann, 1834)</td>
<td>ZFMK 90399-401</td>
<td>13°55'14.9&quot; N 104°49'39.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 11</td>
<td>14°04'43.1&quot; N 104°10'36.6&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><em>Occidozyga lima</em> (Gravenhorst, 1829)</td>
<td>ZFMK 90406</td>
<td>13°51'57.4&quot; N 104°49'30.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 05</td>
<td>13°51'46.7&quot; N 104°50'33.9&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><em>Occidozyga martensii</em> (Peters, 1867)</td>
<td>ZFMK 90407</td>
<td>13°51'57.4&quot; N 104°49'30.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 12</td>
<td>14°04'43.1&quot; N 104°10'36.6&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><strong>Ranidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Hylarana erythraea</em> (Schlegel, 1837)</td>
<td>ZFMK 90408-409</td>
<td>13°49'04.1&quot; N 104°08'34.3&quot; E</td>
<td>Anlong Veng</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 07</td>
<td>14°04'49.5&quot; N 104°52'45.4&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><em>Hylarana macrodactyla</em> Günther, 1858</td>
<td>ZFMK 90408-409</td>
<td>13°51'01.3&quot; N 104°50'12.7&quot; E</td>
<td>Anlong Veng</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><strong>Rhacophoridae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Polypedates leucomystax</em> (Gravenhorst, 1829)</td>
<td>ZFMK 90410</td>
<td>13°49'04.1&quot; N 104°49'38.2&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 08</td>
<td>13°51'01.3&quot; N 104°50'12.7&quot; E</td>
<td>Anlong Veng</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA SE 14</td>
<td>14°04'19.6&quot; N 104°52'45.4&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><strong>Agamidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Calotes versicolor</em> (Daudin, 1802)</td>
<td>ZFMK 90414</td>
<td>13°51'31.2&quot; N 104°50'08.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 09</td>
<td>13°51'31.2&quot; N 104°50'08.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><strong>Scincidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Eutropis macularia</em> (Blyth, 1853)</td>
<td>ZFMK 90415</td>
<td>13°53'06.2&quot; N 104°52'55.2&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 10</td>
<td>13°51'01.3&quot; N 104°50'12.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><em>Eutropis multifasciata</em> (Kuhl, 1820)</td>
<td>ZFMK 90416-417</td>
<td>13°51'57.4&quot; N 104°49'30.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td></td>
<td>ZFMK 90418</td>
<td>13°53'06.2&quot; N 104°52'55.2&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><strong>Gekkonidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gekko gecko</em> (Linnaeus, 1758)</td>
<td>ZFMK-PA SE 15-16</td>
<td>14°04'41.3&quot; N 104°10'36.9&quot; E</td>
<td>Trapeang Prasat</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td></td>
<td>ZFMK-PA FI 11</td>
<td>13°51'57.5&quot; N 104°49'31.3&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><strong>Pythonidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Python reticulatus</em> (Schneider, 1801)</td>
<td>ZFMK-PA SE 18</td>
<td>14°02'58.7&quot; N 104°07'10.0&quot; E</td>
<td>Anlong Veng</td>
<td>Oddar Meanchey</td>
</tr>
<tr>
<td><strong>Colubridae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dendrelaphis pictus</em> (Gemel, 1789)</td>
<td>ZFMK 90393</td>
<td>13°51'57.4&quot; N 104°49'30.8&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
<tr>
<td><strong>Pythonidae</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Python reticulatus</em> (Schneider, 1801)</td>
<td>ZFMK-PA TH 01</td>
<td>13°55'14.9&quot; N 104°49'39.7&quot; E</td>
<td>Kulen</td>
<td>Preah Vihear</td>
</tr>
</tbody>
</table>

Table 1 Voucher numbers and coordinates of capture localities of amphibian and reptile species from the KPWS that are characteristic of anthropogenically modified environments (*sensu* Stuart and Emmett, 2006; Stuart *et al.*, 2006; Bezuijen *et al.*, 2009).
Amphibia
Ichthyophiidae

Ichthyophis sp. (Figure 4 A)

**Photo voucher:** Oddar Meanchey Province, Anlong Veng District: ZFMK-PA SE 20, 14°04'26.9" N 104°8'17.1" E, 101 m a.s.l., 15 August 2011. Photo voucher by J. Allison.

**Remarks:** One subadult specimen (ZFMK-PA SE 20; SVL 126.1 mm, weighted 2.5 g) resembles Taylor’s (1968) diagnosis of the genus *Ichthyophis* in having a distinct postanal tail and annuli forming a median, posteriorly directed ventral angle. It resembles Cambodian specimens of *Ichthyophis kohtaoensis* (Neang and Holden, 2008; Stuart et al., 2006) and *Ichthyophis sp.* (Grismer et al., 2008b) in having a wide yellow, lateral body stripe running the length of the body.

Since the confusing taxonomy of the several striped, putative species known from Southeast Asia is not yet resolved (Gower et al., 2002; Grismer et al., 2008b), any specific assignment of our photographically recorded specimen would be premature.

The individual was found at a place next to a small stream within undisturbed semi-evergreen forest at 20:15 h.

Stuart et al. (2006) reported *Ichthyophis kohtaoensis* from Ratanakiri Province. Grismer et al. (2008b) recorded striped *Ichthyophis*, which were assigned to *Ichthyophis kohtaoensis* by Neang and Holden (2008) from Veal Veng District, Pursat Province.

Bufonidae

*Ingerophrynus macrotis* (Boulenger, 1877) (Figure 4 B)

**IUCN status:** Least Concern (LC).

**Photo voucher:** Preah Vihear Province, Kulen District: ZFMK-PA FI 14, 13°51'29.6" N 104°50'25.0" E, 53 m a.s.l., 16 September 2011; ZFMK-PA FI 15, 13°51'46.7" N 104°50'33.9" E, 65 m a.s.l., 9 September 2009; ZFMK-PA FI 16–17, 13°51'33.6" N 104°50'10.4" E, 65 m a.s.l., 17 September 2009. Photo vouchers by F. Ihlow.

**Remarks:** Four adult females (ZFMK-PA FI 14–17) agree with the expanded diagnosis of Taylor (1962) in the lack of cranial crests and having low parotoid glands only little larger than eyelid; possession of a large tympanum, equal to or little less than eye diameter; body covered with numerous tubercles of varying sizes, those on head smallest; no tarsal fold, but a row of larger tubercles on tarsus; large rounded palmar tubercle; the first finger longer than the second; subarticular tubercles on hand bifid.

All four individuals were encountered between 10:00 and 16:00 h, on the humid forest floor in an open deciduous dipterocarp forest community.

This species was previously reported from the Cardamom Mountains (Daltry and Traeholt, 2003; Grismer et al., 2007b; Long et al., 2002; Ohler et al., 2002; Stuart and Emmett, 2006), Mondulkiri (Long et al., 2000) and Kratie provinces (Bezuijen et al., 2009).

Microhylidae

*Calluella guttulata* (Blyth, 1856)

**Photo voucher:** Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 21, 14°04'45.9" N 104°10'50.07" E, 96 m a.s.l., 16 May 2011. Photo voucher by S. Edwards.

**Remarks:** One subadult individual (ZFMK-PA SE 21; SVL 27.5; weighted 1.9 g) is in accordance to Stuart and Emmett’s (2006) description of the specimens from the Cardamom Mountains in having an obtusely rounded snout longer than eye diameter; the forth finger shorter than the second; webbing on the fourth toe nearly reaching proximal subarticular tubercle, with a continuing fringe to tip. The dorsum is light brown with distinct cream-edged dark brown irregular markings. It also resembles Taylor’s (1962) colour description in having transverse black stripes on back of thighs and a distinct diagonal dark brown mark following the supratympanic fold.

The individual was captured in a pitfall trap (08:45 h) in an area of semi-evergreen forest heavily degraded for agricultural use.

The species has been recently recorded from the Cardamom Mountains (Grismer et al., 2008a; Stuart and Emmett, 2006) and Kratie Province (Bezuijen et al., 2009).

*Kalophrynus interlineatus* (Blyth, 1855) (Figure 4 C)

**Photo voucher:** Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 22, 14°04'33.0" N 104°10'36.7" E, 92 m a.s.l., 13 January 2011. Photo voucher by S. Edwards.

**Remarks:** One subadult specimen (ZFMK-PA SE 22;
SVL 34 mm, weighted 3.0 g) matches the diagnosis given by Parker (1934) and Matsui et al. (1996) in having toes less than one-third webbed, with the third toe webbing not extending beyond the distal subarticular tubercle and the free portion of the fifth toe longer than the distance from snout to nostril.

The individual was found close to an oxcart track in semi-evergreen forest (19:20 h).

It was previously recorded from the Cardamom Mountains (Grismer et al., 2008a; Ohler et al., 2002; Swan and Daltry, 2002; Stuart and Emmett, 2006) and Mondulkiri Province (Stuart et al., 2006). Parker (1934) and Bourret (1942) reported the species from Cambodia without further locality information.

**Microhyla berdmorei** (Blyth, 1856)

IUCN status: Least Concern (LC).

Photo voucher: Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 23, 14°4'41.3" N 104°10'36.9" E, 94 m a.s.l., 8 February 2011. Photo voucher by S. Edwards.

Remarks: An adult female (ZFMK-PA SE 23; 38.4 mm, weighted 6.7 g) is in accordance with Bain and Nguyen’s (2004) characterization by having an obtusely pointed snout profile; smooth dorsal skin with only small tubercles; the first finger shorter than one-half of the second; fully webbed, elongated toes, bearing well-developed discs; two metatarsal tubercles and tibiotalar joint beyond snout tip.

The individual was found opportunistically at 13:00 h on the side of a stream in semi-evergreen forest bordering a large area degraded for agricultural use.

The species has been recorded from the Cardamom Mountains (Grismer et al., 2008a; Ohler et al., 2002; Stuart and Emmett, 2006), Kratie (Bezuilen et al., 2009), and Mondulkiri and Virachey provinces (Stuart et al., 2006). Neang and Holden (2008) classified the species as common and probably found across Cambodia.

**Micryletta inornata** (Boulenger, 1890)

IUCN status: Least Concern (LC).

Photo voucher: Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 23, 14°4'41.3" N 104°10'36.9" E, 94 m a.s.l., 8 February 2011. Photo voucher by S. Edwards.

Remarks: One adult specimen (ZFMK-PA SE 24; SVL 21.6 mm, weighted 0.8 g) is in accordance with Bain and Nguyen’s (2004) characterization by having a blunt snout profile; smooth dorsal skin; the first finger longer than one-half of the second; no discs and median grooves at finger and toe tips; toes not completely webbed, with only one metatarsal tubercle.

The individual was found in a small stream at 17:40 h in a semi-evergreen forest which borders an area heavily degraded for agricultural use.

In Cambodia, *Micryletta inornata* has only been recorded from the Cardamom Mountains (Grismer et al., 2008b; Ohler et al., 2002; Stuart and Emmett, 2006). Van Dijk et al. (2009) stated that the species occurs throughout Cambodia, but without naming exact localities.

**Ranidae**

*Hylarana lateralis* (Boulenger, 1877) (Figure 4 D)

IUCN status: Least Concern (LC).

Photo voucher: Preah Vihear Province, Kulen District: ZFMK-PA FI 18–19, 13°51'07.5" N 104°49'31.3" E, 42 m, 16 September 2011. Photo vouchers by F. Ihlow.

Remarks: Two adult males (ZFMK-PA FI 18–19) are in accordance with Taylor’s (1962) diagnosis in having a distinct, moderately thick dorsolateral fold; tympanum large, slightly less than eye; upper jaw thickened with white stripe, becoming slightly elevated posteriorly; strong posttympanic tubercle behind mouth angle; males possessing well-developed humeral glands and small posterior vocal slits.

In contrast to the latest assignment of the taxon *lateralis* to the genus *Pelophylax* by Frost et al. (2006), recent molecular analyses by Pyron and Wiens (2011) suggested its close relationship to *Hylarana erythraea*, *Hylarana macrodactyla* and *Hylarana guentheri*. Molecular analysis by Stuart (2008) even positioned the type species of *Hylarana (H. erythraea)* as sister taxon to *lateralis*. Even though the latter authors suggested this species to be imbedded within *Hylarana*, and far from *Pelophylax*, but none of them made any necessary taxonomic change. Herein, we follow Chen et al. (2005) and replace the taxon *lateralis* in *Hylarana*.

Both males were encountered between 11:00 and 12:00 h, hidden under dense vegetation and humid leaf litter next to a tree in open deciduous dipterocarp forest.

The species was previously reported from Mondulkiri (Long et al., 2000; Ohler et al., 2002), Kratie (Neang and Holden, 2008), and Takeo provinces (Bourret, 1942).

**Rhacophoridae**

*Chiromantis nongkhorensis* (Boulenger, 1877) (Figure 4 E)

IUCN status: Least Concern (LC).


Photo voucher: Oddar Meanchey Province, Anlong Veng District: ZFMK-PA SE 25, 14°04'19.6" N 104°08'34.3"

Remarks: One adult female specimen (ZFMK-PA SE 25; SVL 33.5 mm, weighted 1.0 g) agree with Cochran’s (1927) original description of the type series from Nong Khor, Chonburi Province. Both have the two outer fingers appearing to be opposable to the two inner ones; webbing only at the base of the two outer fingers; interorbital distance much greater than the width of the upper eyelid.

The adult female was collected at 19:50 h after a continuous rain during the day and was sitting on bamboo leaves in a patch of bamboo forest in close proximity to a small pond. The Oddar Meanchey individual was found in a tree at the edge of a large seasonal pond in an area of semi-evergreen forest at 20:16 h.

Recently, the species has been reported from the Cardamom Mountains (Grismer et al., 2007b, 2008a; Stuart and Emmett, 2006) and Mondulkiri Province (Stuart et al., 2006).

*Theloderma stellatum* Taylor, 1962 (Figure 4 F)

IUCN status: Near Threatened (NT).

Photo voucher: Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 26, 14°4'33.0" N 104°10'36.7" E, 92 m a.s.l., 3 February 2011. Photo voucher by S. Edwards.

Remarks: One adult individual (ZFMK-PA SE 26; SVL 19.9 mm, weighted 0.6 g) agrees with Taylor’s (1962) original description by having its dorsal surface covered in whitish asperities; fingers about one-third webbed, the third finger disc nearly equal to the diameter of tympanum; whitish, velvety nuptial pad on the dorsal and ventral surface with light reticulations.

The individual was found at 18:46 h close to an oxcart track in semi-evergreen forest.

Stuart and Emmett (2006) recorded the species in the Cardamom Mountains (Daltry and Chheang, 2000; Grismer et al., 2007b; Swan and Daltry, 2002; Stuart and Platt, 2004), and Battambang, Kandal and Kampong Thom provinces (Stuart and Platt, 2004).

*Heosemys annandalii* (Boulenger, 1903) (Figure 5 B)

IUCN status: Endangered (EN).


Remarks: The carapace of an old *H. annandalii* agrees with the descriptions given by Stuart et al. (2001) and Stuart and Platt (2004) in having no distinct vertebral keel. The carapace is much longer than broad. Furthermore, the remaining scutes lack a pale coloured vertebral stripe. The remaining margins of the plastron and bridge agree with Taylor (1970) in the absence of a regular radiating pattern.

The large carapace was photo-vouchered (ZFMK-PA FI 23; SCL 46.3 cm) at a local residence in Tmat Paeuy Village. Locals used the carapace as a storage bin. According to the owner, the animal was collected for human consumption in a place close to the village approximately 60 years ago.

Stuart and Platt (2004) reported *H. annandalii* from Battambang, Siem Reap, and Kampong Thom provinces. The photographic record of *H. annandalii* from Kratie Province provided by Bezuijen et al. (2009) is based on a misidentification of the much smaller species *Malayemys subtrijuga*: the depicted shell (Figure 12 in Bezuijen et al., 2009; SCL 13 cm) labelled as sub-adult specimen of *H. annandalii*, clearly possesses three distinct ridges at its carapace, the posterior carapace margin is unserrated and the edge of the marginal scutes show light yellowish
borders. In addition, the plastron of the shown shell is yellow with a pattern of regular black blotches. Each scute possesses a black blotch, two blotches are present on the pectoral and abdominal scutes with the second one being on the bridge, exactly as described in the diagnosis of *M. subtrijuga* given by Taylor (1970).

*Heosemys grandis* (Gray, 1860) (Figure 5 E)  
**IUCN status:** Vulnerable (VU).

**Photo voucher:** Preah Vhear Province, Choam Khsant District: ZFMK-PA FI 26, 14°05’03.9” N 104°33’45.9” E, 57 m a.s.l., 12 December 2009; ZFMK-PA FI 27, 14°05’23.9” N 104°41’51.5” E, 62 m a.s.l., 19 December 2009; and ZFMK-PA FI 29-30, 14°03’01.7” N 104°42’18.3” E, 59 m a.s.l., 8 December 2009. Kulen District: ZFMK-PA FI 24–25, 13°51’57.5” N 104°40’20.6” E, 52 m a.s.l., 7 November 2009. Tbeng Meanchey
Vol. 4 Asian Herpetological Research

Each marginal scute shows a triangular black spot on the ventral side. The plastrons are pale yellow in colour and each scute possesses a dark blotch. The plastrons are not hinged. The heads are large with six or more yellow nasal stripes, therewith clearly distinguished from its congener *Malayemys macrocephala* (bearing four or less nasal stripes).

One life juvenile *M. subtrijuga* (ZFMK-PA FI 31; SCL 6.5 cm, weighted 50.5 g) was discovered entangled in a fishing net set by a local fisherman. The animal was freed by the fisherman after handed over for taking measurements and photo-vouchers. An adult female (ZFMK-PA FI 32; SCL 18.2 cm) was encountered at 11:02 h hidden in dense bamboo near a small stream. The turtle had four leaches attached to its posterior marginal scutes. Another subadult (ZFMK-PA FI 33; SCL 12.2 cm, weighted 260 g) and two plastrons (ZFMK-PA FI 34–35) were found at a villager’s house in Pyuor Chruk Village. A complete shell (ZFMK-PA FI 36; SCL 16 cm) was photo-vouched at Yeang Village at a local residence. Two plastrons (ZFMK-PA FI 38; SCL 15.2 cm, 15 cm) were discovered at a villager’s house in Chaom Srae Village. In addition, one juvenile was recorded in a villager’s house at Krala Peas Village (ZFMK-PA FI 39). All shells recorded at local residences originate from animals collected locally for consumption.

Stuart and Platt (2004) recorded *M. subtrijuga* from Battambang, Kampong Thom, Kandal, Koh Kong and Siem Reap provinces. Bezuijen *et al.* (2009) reported one subadult specimen of *M. subtrijuga* from Kratie Province and misidentified it as *H. annandalii* (See above).

*Siebenrockiella crassicollis* (Gray, 1831) (Figure 5 G)

**IUCN status:** Vulnerable (VU).

**Photo voucher:** Preah Vihear Province, Choam Khsant District: ZFMK-PA FI 40, 13°52’40.4” N 104°58’56.1” E, 50 m a.s.l., 6 December 2009. Photo vouchers by F. Ihlow.

**Remarks:** Nine individuals agree with Taylor’s (1970) diagnosis in possessing a tricarinate, and moderately arched carapace of uniform brown colouration. The lateral keels do not extend across the fourth vertebral scute. The shell of a subadult (ZFMK-PA FI 40; SCL 15.2 cm) was found at a villager’s residence in Krala Peas
Tortoises were photo-vouchered in a local house at Krala Village. One carapace and one complete shell of female were encountered in a resident’s house at Choam Antil (ZFMK-PA FI 48; SCL 16.5 cm) and one complete shell of a female (ZFMK-PA FI 49; SCL 24.5 cm) were found in a local house at Tmat Paeuy Village.

Both were collected by residents for human consumption close to the villages with hunting dogs.

Stuart and Platt (2004) reported S. crassicollis from Kampong Thom and Koh Kong provinces.

Testudinidae

Indotestudo elongata (Blyth, 1854) (Figure 5 F) IUCN status: Endangered (EN).

Photo voucher: Preah Vihear Province, Choam Khseant District: ZFMK-PA FI 47, 13°58’ N 104°53’ E, 62 m a.s.l., 19 September 2009; ZFMK-PA FI 48–49, 14°05’03.9” N 104°33’45.9” E, 52 m a.s.l., 12 December 2009; ZFMK-PA FI 59–60, 14°03’01.7” N 104°42’18.3” E, 59 m a.s.l., 8 December 2009; and ZFMK-PA FI 61–62, 14°01’53.4” N 104°36’29.8” E, 56 m a.s.l., 9 December 2009. Kulen District: ZFMK-PA FI 42, 13°51’34.6” N 104°50’02.7” E, 53 m a.s.l., 4 August 2009; ZFMK-PA FI 43, 13°51’09.5” N 104°50’03.7” E, 54 m a.s.l., 23 November 2009; and ZFMK-PA FI 44–46, 13°51’57.5” N 104°40’20.6” E, 53 m a.s.l., 7 November 2009. Tbeng Meanchey District: ZFMK-PA FI 63–64, 13°52’40.4” N 104°58’56.1” E, 50 m a.s.l., 11 December 2009. Photo vouchers by F. Ihlow.

Remarks: Fourteen specimens agree with Taylor’s (1970) diagnosis in having an elongated carapace with a single supracaudal scute. The carapace is yellow in colour with more or less distinct black blotches on the centre of each scute.

A large female (ZFMK-PA FI 42; SCL 24 cm) was encountered at 06:26 h in a patch of open deciduous dipterocarp forest with dense bamboo understory. One subadult female (ZFMK-PA FI 43; SCL 15.2 cm, weighted 600 g) was encountered at 11:29 h in its daytime retreat in dense bamboo understory within an open deciduous dipterocarp forest. Both animals were weighed, measured and photo-vouchered prior to their release. The carapace of an adult male (ZFMK-PA FI 45; SCL 22.9 cm), an adult female (ZFMK-PA FI 44; SCL 22.3 cm) and a subadult female (ZFMK-PA FI 46; SCL 14.4 cm) were photo-vouchered in a resident’s house at Pyuor Chruk Village. Two adult females (ZFMK-PA FI 47; SCL 22.2 cm, weighted 1120 g; SCL 20.4 cm, weighted 1120 g) were found in a local house at Tmat Paeuy Village. Both were collected by residents for human consumption within 5 kilometres of the village. One living specimen (ZFMK-PA FI 48; SCL 16.5 cm) and one complete shell of a female (ZFMK-PA FI 49; SCL 24.5 cm) were encountered in a resident’s house at Choam Antil Village. One carapace and one complete shell of female tortoises were photo-vouchered in a local house at Krala Peas Village (ZFMK-PA FI 63–64). One carapace of an adult male and one complete shell of a subadult female were photo-vouchered in a local house at Yeang Village (ZFMK-PA FI 59–60). One complete shell of a male measuring 18.0 cm SCL and a plastron of a female were recorded from Choam Srae Village (ZFMK-PA FI 61–62).

In Cambodia, I. elongata is known from the Cardamom Mountains (Chuaynkern et al., 2004; Daltry and Chheang, 2000; Grismer et al., 2007b; Long et al., 2002; Smith, 1931; Stuart and Platt, 2004), Kratie (Bezuijen et al., 2009), Mondulkiri (Stuart and Platt, 2004) and Pursat provinces (Bourret, 1941).

Trionychidae

Amyda cartilaginea (Boddaert, 1770) (Figure 5 H) IUCN status: Vulnerable (VU).


Remarks: Three plastrons agree with Boulenger’s (1889) diagnosis as the epiplastra are in contact in front of the entoplastra, which form an obtuse or a right angle. They fully match Karl’s (1998) expanded description in having the hyo- and hypoplastra fused into hyohypoplastra, which possess a prominent processus hypoplastralis medialis anterior, and Taylor’s (1970) diagnosis in possessing long and slender anterior processes of the epiplastra.

The plastron of one individual (ZFMK-PA FI 50) was encountered and photo-vouchered in a local house at Pyuor Chruk Village. According to the resident, the animal was collected for human consumption in a stream close to the village. The plastron was dried and smoked to conserve it for trade. Two plastrons of A. cartilaginea were photo-vouchered at local residences in Krala Peas Village (ZFMK-PA FI 51–52).

The species was previously reported from the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Tracholt, 2003; Stuart and Platt, 2004; Swan and Daltry, 2002), Kratie (Bezuijen et al., 2009), and Stung Treng provinces (Singh et al., 2004).

Agamidae

Calotes mystaceus Duméril & Bibron, 1837 (Figure 6 A) IUCN status: Not assessed.


Photo voucher: Oddar Meanchey Province, Trapeang
Prasat District: ZFMK-PA SE 27, 14°04'45.9" N 104°10'50.1" E, 96 m a.s.l., 28 April 2011. Photo voucher by S. Edwards.

Remarks: One juvenile (ZFMK 90413) and one adult male (ZFMK-PA SE 27; SVL 114.1, TL 223.3 mm, weighted 56 g) are in full accordance with...
with the diagnosis of Taylor (1963) in bearing backwards and upward pointing scales on the sides of the body; an oblique fold and triangular pit in front of shoulder covered by small granular scales; dorsal scales larger than ventrals, postorbital spine absent. They also agree with Stuart et al.’s (2006) description in having one spine above the tympanum and one on the occiput about midway between the tympanum and nuchal crest. The characteristic and eponymous white stripe on the upper lip and side of head known in adults is not yet discernible in the juvenile specimen.

The juvenile specimen was collected at 14:30 h on the ground close to a tree in open dipterocarp forest. The adult male was found at 07:51 h in a pitfall trap in an area of semi-evergreen forest heavily degraded for agricultural use.

In Cambodia, \textit{C. mystaceus} is known from the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Traeholt, 2003; Stuart and Emmett, 2006; Swan and Daltry, 2002), Kratie (Bezuijen et al., 2009), Mondulkiri and Ratanakiri provinces (Stuart et al., 2006).

\textbf{Leiolepis rubritaeniata Mertens, 1961}

\textbf{ICU\textsc{n} status:} Not assessed.

\textbf{Sight record:} Preah Vihear Province, Kulen District: 13°52'39.2" N 104°51'54.5" E, 42 m a.s.l., 10 July 2009. Sight record by T. Hartmann.

\textbf{Remarks:} One adult male was observed basking. In comparison with additional material of \textit{L. rubritaeniata} from the Phnom Kulen National Park in Siem Reap Province, Cambodia (ZF\textsc{m}K 90305-90307, ZFMK 92599–605), the characteristic colouration pattern fully agrees with the thorough description given by Peters (1971) in having a polygonal almost net-like pattern made of the borders of faded ocelli at dorsum; colourful alternating black and reddish-barred expandable flank markings reduced to proximate post-axillary region; plain reddish-orange on lateral half of flanks up to groin. Following Peters’ (1971) revision of the genus, the dorsal and lateral coloration of males in \textit{Leiolepis} is a valid taxonomic character to distinguish between taxa.

We follow Hartmann et al. (2012) in recognizing the taxon \textit{rubritaeniata} as a full species.

The specimen was observed using binoculars at 11:00 h on a sunny day in a sparsely overgrown sandy grassland area adjacent to an open dipterocarp forest.

Previously, it was only reported from Siem Reap Province (Hartmann et al., 2012).

\textbf{Physignathus cocincinus} Cuvier, 1829 (Figure 6 B)

\textbf{I\textsc{c}U\textsc{n} status:} Not assessed.


\textbf{Remarks:} One adult (ZF\textsc{m}K-PA SE 28; SVL 184 mm, TL 482 mm, weighted 180 g) and one juvenile (ZF\textsc{m}K-PA SE 29; SVL 150.2 mm, TL 102.4 mm, weighted 5 g) were recorded, and they are in full accordance with Taylor’s (1963) expanded description by having two diverging series of enlarged scales on lower jaw, larger than infralabials; strongly compressed tails, heavily keeled below; scales at base of the elongated fourth toe bordering outer edge of digit with a high compressed keel. The adult also agrees with Taylor’s (1963) description in having a well-developed continuous nuchal and dorsal crest, while the caudal crest is well separated by a hiatus.

Both individuals were found close to a small river in an area where semi-evergreen forest and forest heavily degraded for agricultural use abutted (08:10 h and 15:51 h).

The species was previously reported from Kratie (Bezuijen et al., 2009), Mondulkiri, Stung Treng and Virachey provinces (Stuart et al., 2006), and the Cardamom Mountains (Daltry and Chheang, 2000; Grismer et al., 2007b; Long et al., 2002; Stuart and Emmett, 2006; Swan and Daltry, 2002).

\textbf{Lacertidae}

\textbf{Takydromus sexlineatus Daudin, 1802} (Figure 6 C)

\textbf{I\textsc{c}U\textsc{n} status:} Least Concern (LC).

\textbf{Photo voucher:} Preah Vihear Province, Kulen District: ZFMK-PA FI 53, 13°51’57.4" N 104°49’30.8" E, 56 m a.s.l., 16 September 2009. Photo voucher by F. Ihlow.

\textbf{Remarks:} One adult male (ZF\textsc{m}K-PA FI 53) matches Smith’s (1935) and Taylor’s (1963) descriptions of \textit{Takydromus sexlineatus ocellatus} Cuvier, 1829, in having a tail nearly four times as long as distance from snout to vent; nasals meeting on median line; frontal scale keeled; 12 ventral rows of enlarged keeled scales, keels forming continuous straight lines; a single preanal pore on each side and a large anal scale flanked by two small scales on each side. It resembles Smith’s (1935) and Taylor’s (1963) description of \textit{Takydromus sexlineatus sexlineatus} Daudin, 1802 in having smooth (not keeled) head shields, except for the feebly keeled frontal scales. It disagrees with the Cambodian specimens of Grismer et al. (2008a), Stuart et al. (2006) and Stuart and Emmett (2006) in having prominent oscellate spots on flanks.

The individual was captured by hand at 13:18 h in a pile of old fishing net in Takeng Village.
This species was previously reported from the Cardamom Mountains (Grismer et al., 2008b; Stuart and Emmett, 2006), Mondulkiri and Ratanakiri provinces (Stuart et al., 2006).

Scincidae

Lipinia vittigera (Boulenger, 1894) (Figure 6 D)

IUCN status: Not assessed.

Material examined: Preah Vihear Province, Kulen District: ZFMK 90419, 13°53'06.2" N 104°52'55.2" E, 70 m a.s.l., 10 July 2009. Collected by T. Hartmann.


Remarks: Two adult females (ZFMK 90419, ZFMK-PA SE 30; SVL 40.2 mm, TL 46.0 mm, weighted 1.1 g) match the description of Lipinia vittigera by Taylor (1963) in having a pointed snout; ear opening smaller than transparent disk on eyelid, without lobules; two large preanals; transversely widened subcaudals; light vertebral stripe extending from tip of snout to base of tail bordered by black body fields; and flanks light with black flecks.

One female was collected at 12:30 h foraging on a fallen tree trunk in a small patch of disturbed semi-evergreen forest. While the other individual was caught at 06:40 h in a pitfall set in an area of semi-evergreen forest within 100 m of the forest’s border to a heavily degraded area used for agriculture.

In Cambodia, L. vittigera is known from the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Traeholt, 2003; Grismer et al., 2007b; Long et al., 2002, Stuart and Emmett, 2006, Swan and Daltry, 2002), Kratie (Bezuijen et al., 2009), and Siem Reap provinces (Geissler et al., 2011).

Lygosoma bowringii (Günther, 1864) (Figure 6 E)

IUCN status: Not assessed.


Remarks: Three individuals (ZFMK-PA SE 31–32; SVL 47.8–48.2 mm, TL 50.5–59.4 mm, weighted 2.7–3.6 g; ZFMK-PA FI 54) are in full accordance with the expanded diagnosis given by Geissler et al. (2011) and Taylor (1963) in having paired frontoparietals; 28 midbody scale rows; very short limbs, not touching when adpressed and smooth dorsal scales. Their colouration exactly resembles the specimen depicted in Geissler et al. (2011) in having a brown dorsum, each scale with a blackish spot forming longitudinal lines; dorsolateral stripe thick, dark brown, light-edged above; flanks and lateral parts of head an tail base spotted with black and white; ventral surface cream with bright yellow.

One individual was encountered behind a loose bark on an old tree trunk at 13:20 h in open dipterocarp forest. Two individuals were found at 06:30 h in a pitfall trap in an area of forest heavily disturbed and used for agricultural purposes.

Previously, it was recorded from the Cardamom Mountains (Daltry and Chheang, 2000; Grismer et al., 2007b; Stuart and Emmett, 2006; Swan and Daltry, 2002), Kratie (Bezuijen et al., 2009), and Siem Reap provinces (Geissler et al., 2011).

Scincella melanosticta (Boulenger, 1887) (Figure 6 F)

IUCN status: Not assessed.

Material examined: Preah Vihear Province, Kulen District: ZFMK 90420–423, 13°53'06.2" N 104°52'55.2" E, 70 m a.s.l., 10 July 2009. Collected by T. Hartmann.

Remarks: Four specimens (ZFMK 90420–423) are in full accordance with Taylor’s (1963), Ouboter’s (1986) and Stuart and Emmett’s (2006) diagnoses in slightly overlapping adpressed limbs; scales in 32–38 rows; prefrontals in broad contact; colouration in life golden brown above, with black spots scattered on dorsal scales and black dorsolateral band broken up by small whitish spots.

The specimens were collected between 10:00 h and 13:00 h in leaf litter between rocks in a small patch of disturbed semi-evergreen forest.

In Cambodia, S. melanosticta has so far only been reported from the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Traeholt, 2003; Grismer et al., 2007b; Long et al., 2002, Stuart and Emmett, 2006).

Gekkonidae

Dixonius siamensis (Boulenger, 1894) (Figure 6 G)

IUCN status: Not assessed.

Material examined: Preah Vihear Province, Kulen District: ZFMK 90424, 13°53'06.2" N 104°52'55.2" E, 10 July 2009. Collected by T. Hartmann.


Remarks: One juvenile (ZFMK 90424) and one adult (ZFMK-PA FI 55) agree closely with the expanded diagnosis by Taylor (1963) in having widened lamellae
at terminal part of digits; a vertebral series of fine body scales flanked by 5 rows of enlarged, keeled scales that blend ventrally into large, imbricate, cycloid scales, ventral scales with minute posterior serrations; subcaudals transversely widened; preanal pores in a curving angular series; lacking a dark lateral stripe on the head; and lips barred with cream and black.

Both individuals were encountered between 08:10 h and 14:30 h inactively hiding under wooden debris in a disturbed area of open deciduous dipterocarp forest.

This ground dwelling gekkonid lizard was previously found in the Cardamom Mountains (Daltry and Chheang, 2000; Grismer et al., 2007b), and in Kratie Province (Bezuijen et al., 2009).

Varanidae

Varanus nebulosus (Gray, 1831) (Figure 6 H)

IUCN status: Not assessed*.

* IUCN still treats V. nebulosus as a subspecies of Varanus bengalensis which is listed as Least Concern (LC).


Remarks: One subadult individual (ZFMK-PA FI 56; SVL 33 cm) fully agrees with Taylor’s (1963) diagnosis in having elongated nostrils twice as close to the eye as to the tip of the snout; scales on neck only slightly enlarged, subcircular and without keels; dark above without transverse bands; ear larger than eye opening.

The individual was encountered during at 11:05 h in open deciduous dipterocarp forest community with dense bamboo understory.

In Cambodia, V. nebulosus has been reported from lowland forest areas in eastern Cambodia (Long et al., 2000), Kratie Province (Bezuijen et al., 2009), and the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Traeholt, 2003).

Xenopeltidae

Xenopeltis unicolor Boie, 1827 (Figure 7 A)

IUCN status: Least Concern (LC).


Remarks: One adult specimen (ZFMK 90431) is in full accordance to Taylor’s (1963) and Orlov’s (2001) expanded diagnoses in having two postorbital scales; 15 midbody scalerows; widened ventrals; 8 supralabial and 176 ventral scales. It also agrees with Stuart et al.’s (2006) description of the specimens from the Virachey National Park in having smooth, highly iridescent scales; brown dorsal scales, with the first row being creamy-white edged in brown, the second to fourth rows brown edged in creamy-white; creamy-white ventral scales, brown at outer edges posteriorly and a wedge-shaped head, indistinct from neck.

We follow Pauwels et al.’s (2003) arguments, which are in agreement with Article 50.1 of the Code (ICZN, 1999) and recognize Boie (1827) as the sole author of this taxon.

The specimen was collected shortly after dusk (18:30 h) while moving rapidly out of a flooded rice field into adjacent scrub.

Previously, X. unicolor was recorded from the Cardamom Mountains (Stuart and Emmett, 2006) and Stung Treng Province (Stuart et al., 2006). Bourret (1934) and Saint Girons (1972) reported the species from the lowlands of Cambodia.

Pareatidae

Pareas margaritophorus (Jan, 1866)

IUCN status: Not assessed.

Photo voucher: Oddar Meanchey Province, Trapeang Prasat District: ZFMK-PA SE 33, 14°2'58.7" N 104°7'10.0" E, 97 m a.s.l., 07 February 2011. Photo voucher by S. Edwards.

Remarks: One adult individual (ZFMK-PA SE 33) is in full accordance to Smith’s (1943) description in having supralabials separated from eye by suboculars; absence of a mental groove; dorsal scales smooth; 15 mid-body scale rows; head being distinct from neck; body laterally not compressed; dorsal scales greyish, edged in black; series of transversely aligned black spots extending from neck to tail base and a distinct whitish nuchal band.

The individual was found at 15:30 h in an area of semi-evergreen forest bordering an area of heavily disturbed and used for agriculture.

Previously, this species was recorded from the Cardamom Mountains (Grismer et al., 2007b, 2008a; Stuart and Emmett, 2006) and Stung Treng Province (Stuart et al., 2006).

Homalopsidae

Enhydris bocourti (Jan, 1865) (Figure 7 B)

IUCN status: Least Concern (LC).

Photo voucher: Oddar Meanchey Province, Anlong Veng District: ZFMK-PA SE 35, 14°4'19.6" N 104°8'34.3" E, 104 m a.s.l., 10 August 2011. Photo voucher by S. Edwards.

Remarks: One adult individual (ZFMK-PA SE 35) is in full accordance to Stuart and Emmett’s (2006) and
Figure 6  Lizards of the KPWS. A: Juvenile Calotes mystaceus (ZFMK 90413), Photo by T. Hartmann; B: Adult Physignathus cocincinus (ZFMK-PA SE 28), Photo by S. Edwards; C: Male Takydromus sexlineatus (ZFMK-PA FI 53), Photo by F. Ihlow; D: Adult female Lipinia vitigera (ZFMK 90419), Photo by T. Hartmann; E: Adult male Lygosoma bowringii (ZFMK-PA SE 31), Photo by S. Edwards; F: Adult female Scincella melanosticta (ZFMK 90420), Photo by T. Hartmann; G: Juvenile Dixonius siamensis (ZFMK 90424), Photo by T. Hartmann; H: Subadult Varanus nebulosus (ZFMK-PA FI 56), Photo by F. Ihlow.
Murphy’s (2007) descriptions of a specimen from the Cardamom Mountains in having a stout habitus; nasals in contact; smooth scales; coloration in life dark brown with yellowish-brown bands on back; dark colouration on back tapering into vertical bars on sides that reach the yellow venter.

The photographed individual was encountered at 19:20 h actively swimming in a large, seasonal pond in an area of undisturbed semi-evergreen forest.

The species was known from the Cardamom Mountains (Bourret, 1934; Stuart and Emmett, 2006), and Battambang, Kampong Chhnang, Kampong Thom, Kampot, Pursat and Siem Reap provinces (Brooks et al., 2007; Saint Girons, 1972; Stuart et al., 2000).

**Colubridae**

*Psammodynastes pulverulentus* (Boie, 1827) (Figure 7 C)

IUCN status: Not assessed.


**Remarks:** One adult individual (ZFMK-PA SE 36) matches Smith’s (1943) and Taylor’s (1965) descriptions in having two enlarged, fang-like teeth anteriorly; a short snout, truncate in profile; internasals much smaller than prefrontals; narrow, elongate, bell-shaped frontal; one preocular forming part of the canthus rostralis.

The individual was found at 15:15 h on the banks of a permanent small stream in an undisturbed place of semi-evergreen forest used as a basecamp during surveys.

The species was well recorded from the Cardamom Mountains (Daltry and Chheang, 2000; Daltry and Traeholt, 2003; Grismer et al., 2007a, 2008b; Long et al., 2002; Saint Girons, 1972; Stuart and Emmett, 2006). Saint Girons (1972) also reported the species from central Cambodia.

*Oligodon taeniatus* (Günther, 1861) (Figure 7 D)

IUCN status: Not assessed.

Photo voucher: Preah Vihear Province, Kulen District: ZFMK-PA FI 57, 13°51’32.02” N 104°50’31.00” E, 52 m a.s.l., 11 September 2011. Photo voucher by F. Ihlow.

**Remarks:** We assign our photographed individual

---

**Figure 7** Snakes of the KPWS. A: Adult *Xenopeltis unicolor* (ZFMK 90431), Photo by T. Hartmann; B: *Enhydris bocourti* (ZFMK-PA SE 35), Photo by S. Edwards; C: *Psammodynastes pulverulentus* (ZFMK-PA SE 36), Photo by A. O’Brien; D: *Oligodon taeniatus* (ZFMK-PA FI 57), Photo by F. Ihlow.
(ZFMK-PA FI 57) to *O. taeniatus* based on its accordance to the differential diagnosis given by David *et al.* (2008). Our individual differs from all other species of the *taeniatus*-group in having 19 scale rows at midbody and a pattern made of one vertebral stripe edged with two paravertebral stripes, plus one dorsolateral stripe on each side.

The individual was captured basking on a tree trunk at 09:28 h at the edge of a flooded open deciduous dipterocarp forest patch.

David *et al.* (2008) listed specimens of *O. taeniatus* collected from Battambang, Koh Kong, Kampong Chhnang, Phnom Penh and Siem Reap provinces.

**Natricidae**

*Xenochrophis flavipunctatus* (Hallowell, 1860)

*IUCN status*: Not assessed.

**Material examined**: Preah Vihear Province, Kulen District: ZFMK 90429, 13°49'04.1" N 104°49'38.2" E, 52 m a.s.l., 12 July 2009. Collected by T. Hartmann.

**Photo voucher**: Preah Vihear Province, Kulen District: ZFMK-PA FI 58, 13°51'32.02" N 104°50'31.00" E, 52 m a.s.l., 11 September 2011. Photo voucher by F. Ihlow.

**Remarks**: One adult (ZFMK-PA FI 58) and one subadult (ZFMK 90429) match Vogel and David’s (2006) colouration-based characterisation in having a dorsal pattern made of small dark blotches and streaks, larger on sides; small white dorsolateral dots; a well-defined mouchal marking, in a direct V-shape; two well-defined subocular streaks, with the posterior one extending from the eye to the corner of the mouth. In meristics, the subadult specimen matches Vogel and David’s (2006) account in having 134 ventral and 78 subcaudal scales.

In contrast to the photo-vouchered adult, the juvenile specimen disagrees with Vogel and David’s (2006) description in having only very faint (in contrast to broad and distinct) dark margins at ventral and subcaudal scales. However, Vogel and David (2006) point out the highly variable colouration in *X. flavipunctatus* and also mention the reddish hues, which are very distinct in our subadult specimen.

The subadult specimen was collected at 20:30 h after emerging from a small pond within a patch of bamboo in open dipterocarp forest. The adult individual was caught by locals using electric fishing equipment at 07:45 h in a small pond within open dipterocarp forest, and then it was handed over for taking photo-vouchers.

Previously, it was recorded from the Cardamom Mountains (Daltry and Chheang, 2000; Long *et al.*, 2001; Swan and Daltry, 2002), Battambang, Kampong Chhnang and Siem Reap provinces (Brooks *et al.*, 2007).

Bezuijen *et al.*, (2009) identified three specimens from Kratie Province as *Xenochrophis piscator*, based on the absence of the above-mentioned broad and distinct dark margins on their ventral scales.

**5. Discussion**

Our records of 22 species of amphibians and 33 species of reptiles belonging to 44 genera in 22 families from the KPWS in the Northern Plains of Cambodia include three species (*Ingerophynus macrotis*, *Micryletta inornata*, and *Scincella melanosticta*) that had previously only been reported from the Cardamom Mountains in the southwest of the country.

However, all the three species are known to occur in neighbouring Laos and Vietnam (Bain and Hurley, 2011). Hence, our records indicate that these species may also be present in Cambodia’s eastern provinces. Therewith, our findings of the three species further support Bain and Hurley’s (2011) assumption in not recognizing the Lower Mekong River as a general zoogeographic barrier for amphibians and reptiles.

The relative conservation importance of the study area for its herpetofauna is somewhat heterogeneous. On the one hand, 43.6% of the species (59.1% in amphibians, 33.3% in reptiles) recorded in the study area are characteristic for anthropogenically modified environments (*sensu* Bezuijen *et al.*, 2009; Stuart *et al.*, 2006; Stuart and Emmett, 2006) and have broad geographic ranges in mainland Southeast Asia. On the other hand, our records also include two globally Endangered species (*Heosemys annandalii* and *Indotestudo elongata*), five globally Vulnerable species (*Cuora amboinensis*, *Heosemys grandis*, *Malayemys subtrijuga*, *Siebenrockiella crassicollis*, and *Amyda cartilaginea*) and one globally Near Threatened species (*Theloderma stellatum*) (IUCN, 2012). Due to illegal logging, deforestation for agriculture, and hunting for human consumption, it is likely that the populations of those already threatened species will further decline in the KPWS, especially due to the accessibility of the mostly flat, open lowland habitats. Considering these threats, our records of these eight highly conservation-relevant species underline the importance of countrywide herpetological baseline surveys in lowland habitats.

Still, our annotated checklist of the herpetofauna of the KPWS represents only an initial first step to reveal all information on its herpetofauna. Our number of recorded species is certainly not representing the total number of species occurring at the KPWS. A noticeable number of
expected widespread lowland species (e.g., *Glyphoglossus molossus*, *Varanus salvator*, *Ptyas korros*, *Naja kaouthia*, and *Calloselasma rhodostoma*) were not found, but are very likely to occur at the KPWS as well. However, only further fieldwork will prove the existence of these species in the study area.

**Acknowledgements** We are grateful to H. E. Chay Smith [General Director of the General Department for Administration of Nature Conservation and Protection (GDANCP), Ministry of Environment (MoE) of the Royal Government of Cambodia], for kindly issuing the relevant permits (GDANCP/MoE no: 277). We thank Sy Ramony (Director of Department of National Parks and Wildlife Sanctuaries of GDANCP, MoE) for his generous support. Furthermore, T. Hartmann and F. Ihlow are indebted to Ea Sokah (Project Manager and Director of the KPWS) for kindly supporting our surveys, and to Hugo Rainey (former technical advisor of the Northern Plains Project and Cambodia Vulture Conservation Project, WCS Cambodia) for facilitating the permit processes and for his manifold support.

S. Edwards would like to thank all Frontier Cambodia field staff, research assistants and the KPWS rangers. S. Edwards is also especially grateful to Aaron Sexton for his support and logistical assistance during fieldwork. S. Edwards thanks Zoe Balfmforth and Sam Lloyd, for providing technical support. T. Hartmann is indebted to Neang Thy (Department of National Parks and Wildlife Sanctuaries of GDANCP, MoE) for facilitating the export permit process for the specimens. F. Ihlow is indebted to all the KPWS rangers, the boatdriver Mr. On, Mr. Sochenda Chim, Mr. Vann Rours (WCS), Mr. Yim Yoeun, Mr. Phu Sokeng and Mr. Song Chansocheat for their daily support and assistance in several matters of translation and organisation. We thank J. Allison and A. O’Brien for kindly providing photographs.

Fieldwork of T. Hartmann was partially funded by the Alexander Koenig Gesellschaft (AKG) and the Angkor Centre for Conservation of Biodiversity (ACCB). The first survey of F. Ihlow was financially supported by the ACCB and the European Association of Zoos and Aquaria (EAZA) Shellshock Campaign, provided through the Turtle Conservation Fund (TCF). The second survey of F. Ihlow was kindly funded by the Schildkröten-Interessengemeinschaft Schweiz (SIGS) and the Fonds zum Schutz weltweit bedrohter Amphibien und Reptilien of the Zoological Society for the Conservation of Species and Populations (ZGAP) and the German Society for Herpetology and Herpetoculture (DGHT).

**References**


Daltry J. C., Traeholt C. 2003. Reptile and amphibian survey. In Daltry J. C., Momberg F. (Eds.), Biodiversity Assessment of the Southern Cardamoms and Botum Sakor Peninsula. Phnom Penh, Cambodia: WildAid Cambodia Program, and Department of Forestry and Wildlife, 82–100


David P., Vogel G., Van Rooijen J. 2008. A revision of the Oligodon taeniatus (Günther, 1861) group (Squamata: Colubridae), with the description of three new species from the Indochinese Region. Zootaxa, 165: 1–49


