Range extension for *Duttaphrynus kotagamai* (Amphibia: Bufonidae) and a preliminary checklist of herpetofauna from the Uda Māliboda Trail in Samanala Nature Reserve, Sri Lanka

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Abstract.—Uda Māliboda Trail is an unstudied, remarkable forest located in the northwest region of Samanala Nature Reserve (SNR) in Sri Lanka's wet zone. Here we report the first record of *D. kotagamai* from Uda Māliboda Trail and the lowest elevation records of four highland Rhacophoridae frogs: *Pseudophilautus alto*, *P. asankai*, *P. femoralis*, and *Taruga eques*. Further, we present results of a preliminary study of herpetofaunal diversity in Uda Māliboda Trail. Thirty-four amphibian (26 endemic and 19 Threatened) and 59 reptile (32 endemic and 19 Threatened) species were observed. This wet zone forest supports high herpetofaunal diversity; however activities such as deforestation, human encroachment, mining, agriculture, dumping, road construction, and a hydroelectric power station threaten the ecology of this biologically diverse forest.

Key words. Amphibians, awareness, conservation, *Duttaphrynus*, global biodiversity hotspot, *Pseudophilautus*, reptiles, Sri Lanka, threatened, wet zone

Introduction

Western Ghats and Sri Lanka have collectively been designated a global biodiversity hotspot (Mittermeier et al. 2004; Myers et al. 2000). Favorable environmental factors such as high rainfall, humidity, and a high density of undergrowth vegetation in this region have assisted in sustaining regional diversity and distinctness (Bosuyt et al. 2005; Gunawardene et al. 2007). Sri Lanka comprises the smaller portion of the hotspot, with a total land area of 65,610 km². Despite its small size, the region has a spectacular assemblage of amphibians and reptiles. Recent molecular studies on amphibians (Rhacophoridae and Caecilians) and Uropeltid snakes have shown that Sri Lanka has maintained a fauna distinct from the Indian mainland (Bosuyt et al. 2004; Meegaskumbura et al. 2002; Pethiyagoda 2005), yet these subregions are separated only by about 300 kilometers (direct distance).

Of Sri Lanka’s three major climatic zones (wet, intermediate, and dry) the wet zone harbors a significantly high level of herpetofaunal diversity and endemism (Bambaradeniya et al. 2003; Senanayake et al. 1977; Wijesinghe and Dayawansa 2002). The wet zone receives abundant rainfall (annual average 3,000 mm), has considerable forest cover, and maintains favorable humidity and temperatures to support such high herpetofaunal diversity. Previous studies have noted that some herpetofaunal species as well as the wet zone forests themselves are threatened due to a variety of human activities (e.g., IUCN-SL and MENR-SL 2007). Many wet zone forests have yet to be studied. Uda Māliboda in the Kegalle district (Sabaragamuwa Province) is one such unstudied wet zone forest.

Kotagama’s dwarf toad (*Duttaphrynus kotagamai*) is endemic and Endangered and is one of the rarest bufonids in Sri Lanka (De Silva 2009). Originally described from the Sinharaja World Heritage Site in 1994 by Prithviraj Fernando and Nihal Dayawansa (Fernando et al. 1994) this toad is known only from the Kitulgala, Massena, Erathna, and Delwala forest areas (Dutta and Manamendra-Arachchi 1996; Goonatilake and Goonatilake 2002). The wet zone receives abundant rainfall (annual average 3,000 mm), has considerable forest cover, and maintains favorable humidity and temperatures to support such high herpetofaunal diversity. Previous studies have noted that some herpetofaunal species as well as the wet zone forests themselves are threatened due to a variety of human activities (e.g., IUCN-SL and MENR-SL 2007). Many wet zone forests have yet to be studied. Uda Māliboda in the Kegalle district (Sabaragamuwa Province) is one such unstudied wet zone forest.

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lake 2001). It favors a few primary lowland rain forests in the wet zone with elevations below 1,070 m (IUCN-SL 2011). According to Manamendra-Arachchi and Pethiyagoda (2006) the holophoront (USNM 311595 H) has been lost from the National Museum of Natural History, Washington, D.C. (USA). Herein we describe new localities and a range extension for *D. kotagamai* from a lowland rain forest in the northwestern boundary of the Samanala Nature Reserve (SNR) and further provide a preliminary checklist of herpetofauna from the Uda Mäliboda Forest area.

### Materials and methods

We used visual encounter survey methods (Crump and Scott 1994) to conduct herpetofaunal surveys for a total of 17 days and nights between 2006 and 2011. Night searches were performed using headlamps and flashlights. We searched specific microhabitats including underneath stones and decaying logs, inside tree holes, and other potential herpetofaunal retreats. Road kills and data from animals dispatched by villagers were also used as sources of information. Specimens were hand captured, photographed, identified using field guides and scientific publications (Ashton et al. 1997; De Silva 2009; Dutta and Manamendra-Arachchi 1996; Maduwage et al 2009; Manamendra-Arachchi et al. 2007; Manamendra-Arachchi and Pethiyagoda 2006; Meegaskumbura et al. 2010; Somaweera 2006; Somaweera and Somaweera 2009; Vogel and Rooijen 2011; Wickramasinghe et al. 2007a, b), and then released back to the original capture site without injury. Species nomenclature was based on Frost et al. (2006), Kotaki et al. (2010), Sumida et al. (2007), and Senaratna (2001), and conservation status was evaluated on the IUCN-SL and MENR-SL (2007).

### Study area and habitats

The Samanala Nature Reserve (SNR) is one of the largest and most important forest areas for endemic biodiversity in Sri Lanka and is owned by the Central Highlands World Heritage Centre (UNESCO 2011). The Study area lies between 6°53’01.58” N and 80°26’31.18” E with elevations ranging from 300-700 m (Fig. 1). This forest area is part of the Kegalle district in Sabaragamuwa Province. Average annual rainfall ranges from 3,000-4,500 mm and the average annual temperature is 27.9 °C (Fig. 2). The vegetation of Uda Mäliboda Trail is categorized as lowland wet evergreen forest (Gunatilleke and Gunatileke 1990) and is comprised of the following dominant genera: *Doona*, *Stemonoporus*, *Calophyllum*, *Syzygium*, *Shorea*, *Dipterocarpus*, *Cullenia*, and *Mesua* (Table 1).

Pilgrims use four main trails annually between December and April to reach Adams Peak to worship. The Uda Mäliboda Trail starts from the “Uda Mäliboda village” and continues through Madähinnma (Kuruwita trail) via Adams Peak (elevation 2,245 m). This is the longest trail and is seldom used by pilgrims since it consists of rough terrain and narrow foot paths (Karunarathna et al. 2011).

![Figure 1. Map of study area (sky view source: Google map).](amphibian-reptile-conservation.org)
Uda Mäliboda trail and a preliminary herpetofaunal checklist

Results and discussion

**New record for *D. kotagamai***

We report the occurrence of the Endangered, rare, and endemic *D. kotagamai* (Fernando and Dayawansa 1994) from Uda Mäliboda forest (Uda Mäliboda Trail) in the northwest region of the Samanala Nature Reserve (SNR = Peak Wilderness Sanctuary). According to Fernando et al. (1994), this species is distinguished from other *Duttaphrynus* species known from Sri Lanka and southern India by combination of the following characters: prominent parietal ridges on the head; long and narrow unlobulated parotoid glands; most areas of the anterior back are smooth; warts present on upper flank, supraorbital, and parietal ridges; tips of digits and tips of spinous warts black; first finger slightly longer than second finger (Fernando et al. 1994). Coloration in life is described as: orange-brown on dorsal surface mottled with dark brown (juveniles dorsal color is light golden); light cross band between eyes and distinct dark cross band on forearm, forefoot, tarsus, and tibia; less distinct cross band on upper arm and femur; lower jaw with alternate dark and light markings; ventral surface whitish mottled with dark brown, especially over sternum.

Eleven *D. kotagamai* were encountered during our survey. These toads were only found in primary forest and absent from human-disturbed areas. Except for one specimen, all were found within ~10 m of a small stream. (Fig. 3), and all but four individuals were observed at night. Three individuals from Uda Mäliboda measured: two males SVL 32.6 mm, 35.2 mm, and a female SVL 38.5 mm. We also found *D. kotagamai* in another previously unknown locality on an adjacent mountain in De-raniyagala in Kegalle district (Table 2). This mountain is located about five km north of Uda Mäliboda. There are no previous records of *D. kotagamai* from the Uda Mäliboda Trail (SNR; see De Silva 2009; Dutta and Manamendra-Arachchi 1996; IUCN-SL 2011; Manamendra-Arachchi and Pethiyagoda 2006; Goonatilake and Goonatilke 2001). The Uda Mäliboda locality is approximately six km (direct distance) from “Eratne” (Kuru river basin), the nearest published location. The direct distance between the onymotope and the new location is about 80 km. All of these areas have closed canopies with wet and cool habitats (Fig. 4).

<table>
<thead>
<tr>
<th>Prominent layer</th>
<th>Plant species diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canopy</td>
<td>Adinandra lasiopetala, Bhesa ceylanica, Calophyllum trapezifolium, Cullenia ceylanica, Shorea affinis, S. gardneri, Litsea gardneri, and Palaquium rubiginosum</td>
</tr>
<tr>
<td>Subcanopy</td>
<td>Apodytes dimidiata, Artocarpus nobilis, Calophyllum walkeri, Caryota urens, Cinnamomum ovalifolium, Cryptocarya wightiana, Dillenia triqueta, Elaeocarpus amoenus, Eugenia mabaeoides, Garcinia quaesita, Gordonia speciosa, Madhuca moonii, Mesua ferrea, Oncosperma fasciculatum, Schumacheria alnifolia, Stemonoporus gardneri, S. oblongifolia, Syzygium firmum, and S. turbinatum</td>
</tr>
<tr>
<td>Climbers</td>
<td>Calamus thwaitesi, Cosinium fenestratum, Cyclea peltata, Freycinetia walkerii, Rubus rugosus, and Smilax perfoliata</td>
</tr>
<tr>
<td>Understory</td>
<td>Acronychia pedunculata, Agrostistachys coriacea, Alpinia abundiflora, Amomum echinocarpum, Amomum masticatorium, Amorphophallus paoniiolius, Arundina graminifolia, Calanthes sp., Cinnamomum verum, Clusia rosea, Cyatha crinita, Hedychium coronarium, Hortonia ovalifolia, Ipsea speciosa, Macaranga indica, Neolitsea cassinia, Osbeckia aspera, Osbeckia lantana, Rhodomyrtus tomentosa, Strobilanthes sp., Syzygium cordifolium, Syzygium revolutum, and Utricularia striatula</td>
</tr>
</tbody>
</table>

**Table 1. Floral species presence in different level of Uda Mäliboda area (Uda Mäliboda Trail in SNR).**

Figure 2. View of forest in Uda Maliboda (larger water resource in the SNR).
Based on the infrequent calls heard during our survey periods this species is presumably rare in Uda Mäliboda. It is aggressive when handled and releases a low-pitched distress call “crick, crick, crick...”. With two new locations and a subsequent range extension, we can trace the probable distribution of *D. kotagamai* prior to fragmentation. The new locations indicate a larger distribution than previously concluded. As a result of severe fragmentation and habitat degradation in the area, local extinctions of previous populations have likely occurred in the past with current populations known only from a few isolated primary forest patches.

**Herpetofaunal diversity**

During the study we encountered 34 amphibian species representing 15 genera and seven families (Table 3). Among those genera *Adenomus, Lankanectes, Nannophrys*, and *Taruga* are endemic to Sri Lanka. Our results show that at least 31% of Sri Lanka’s extant amphibians occur in the Uda Mäliboda area (Fig. 5). Twenty-six of the 34 species encountered (76%) are endemic, five (14%) are considered Near Threatened, four (11%) are Vulnerable, and ten (29%) are classified as Endangered (IUCN-SL and MENR-SL 2007). Families with the greatest number of endemic species include Rhacophoridae (16 species) and Dicroglossidae (six species), while the family Ichthyophiidae, Ranidae (two species each) and Nyctibatrachidae (one species) show the lowest rates of endemism. When considering the 34 species by their primary mode of living, 15 (44.1%) were arboreal, 10 (29.4%) terrestrial, seven (20.6%) aquatic, and two (5.9%) fossorial species.

Most amphibian species observed after brief periods of rain since many species frequently use temporary pools created by these showers. Two large streams course forest acting as barriers that restrict some species to particular habitats. Among the most commonly encountered amphibians were *Pseudophilautus folicola*, found on low growing woody vegetation near water bodies under closed canopy, and *Fejervarya kirtisinghei*, occurred near water bodies lacking canopy. Four Endangered and endemic highland species: *P. alto* (1,890-2,135 m elevation), *P. asankai* (810-1,830 m), *P. femoralis* (1,600-2,135 m), and *Taruga eques* (1,750-2,300 m; Manamendra-Arachchi and Pethiyagoda 2006) were encountered at this study site, approximately 700 m elevation (lowest elevation ever recorded for these species).

We report a range extension for *Pseudophilautus sarasinorum*, an Endangered species previously known only from the following localities: Peradeniya (07°16’ N, 80°37’ E; Onymotope); Bogawantalawa-Balangoda road (near 25th km post), elevation 1,300 m (06°45’ N, 80°2’ E); Corbett’s Gap, elevation 1,000 m (07°22’ N, 80°50’ E); Hunnasgiriya, elevation 367 m (07°23’ N, 80°41’ E); Agra Arboretum, elevation 1,555 m (06°50’ N, 78°45’ E).
Uda Mäliboda trail and a preliminary herpetofaunal checklist

N, 80°40’ E; Manamendra-Arachchi and Pethiyagoda (2005). Sumida et al. (2007) suggested the Sri Lankan population of *F. limnocharis* (in Dutta and Manamendra-Arachchi 1996; Manamendra-Arachchi and Pethiyagoda 2006) could be *F. syhadrensis*. However, recent molecular evidence revealed the Sri Lankan population of *F. cf. syhadrensis* is a separate and unnamed population belonging to a unique clade, together with *F. granosa* and *F. pierrei* (Kotaki et al. 2010). Therefore, we refrain from referring to the third *Fejervarya* species in Sri Lanka as *F. limnocharis* (in Dutta and Manamendra-Arachchi 1996; Manamendra-Arachchi and Pethiyagoda 2006) and instead refer it to as *F. cf. syhadrensis*.

Fifty-nine species of reptiles representing 37 genera from 11 families were recorded during these surveys (Table 4). Among those genera *Aspidura*, *Balanophis*, *Ceratophora*, *Cercaspis*, *Haplocercus*, *Lankascincus*, *Lyriocephalus*, and *Nessia* are considered endemic to Sri Lanka. Twenty-eight percent of Sri Lanka’s extant reptiles were recorded in the study area (Fig. 5) including 28 species of lizards and 31 species of snakes. Of these 59 reptile species 32 (54%) are endemic, six (10%) Data Deficient, ten (17%) Near Threatened, five (8%) Vulnerable, and four (7%) Endangered (IUCN-SL and MENR-SL 2007). Families with the greatest species representation include Colubridae (17 species), Scincidae (11 species), and Gekkonidae (nine species), while the least represented family were Cylindrophidae, Pythonidae, and Typhlopidae (one species each). The highest number of endemic species were in the family Scincidae (nine species) and Colubridae (seven species), while the lowest number were in Cylindrophidae, Elapidae, and Typhlopidae (one species each). When considering the 59 species by primary mode of living: 24 (40.7%) were terrestrial, 21 (35.6%) arboreal, 11 (18.6%) fossorial, and three (5.1%) aquatic species.

Among the reptiles, *Otocryptis wiegmanni*, *Lankascincus greeri*, *Dendrelaphis schokari*, and *Hypnale zara* were the most commonly encountered species in and around footpaths. One unidentified species from the genus *Cyrtodactylus* was recorded during this survey and may be new to science. Several species of lizards (*Cnemaspis scalpensis*, *C. silvula*, *Hemiphyllodactylus typus*, *Eutropis beddomii*, and *Varanus bengalensis*) and snakes (*Boiga beddomei*, *Cercaspis carinatus*, *Haplocercus ceylonensis*, *Aspidura guentheri*, *Balanophis ceylonensis*, and *Typhlops mirus*) are noteworthy records. The Uda Mäliboda forest area also supports three highly venomous snakes: *Bungarus ceylonicus* (Sri Lanka krait), *Daboia russelii* (Russell’s viper), and *Naja naja* (Indian cobra). Hence, both venomous and non-venomous snakes are frequently killed in this area due to fear and ignorance as a precautionary measure against snakebites. We failed to record any turtle species in the area, possibly due to low water temperatures in streams.

<table>
<thead>
<tr>
<th>Date</th>
<th>Sex</th>
<th>Micro-habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 January 2009</td>
<td>Male</td>
<td>Mid-stream boulder</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Forest floor with leaf litter</td>
</tr>
<tr>
<td>Female</td>
<td>Stream-bank boulder</td>
<td></td>
</tr>
<tr>
<td>17 April 2009</td>
<td>Female</td>
<td>Rock crevice</td>
</tr>
<tr>
<td>Male</td>
<td>Stream-bank boulder</td>
<td></td>
</tr>
<tr>
<td>25 December 2009</td>
<td>Male</td>
<td>Stream-bank</td>
</tr>
<tr>
<td>07 May 2010</td>
<td>Male</td>
<td>Stream-bank</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Stream-bank</td>
</tr>
<tr>
<td>22 August 2010</td>
<td>Female</td>
<td>Forest floor with leaf litter</td>
</tr>
<tr>
<td>Male</td>
<td>On footpath</td>
<td></td>
</tr>
<tr>
<td>03 October 2011</td>
<td>Male</td>
<td>Stream-bank boulder</td>
</tr>
</tbody>
</table>

Table 2. Description of the 11 observed *D. kotagamai* individuals during the study period from Uda Mäliboda.

**Figure 5.** Comparison of amphibian (left) and reptile (right) diversity of Uda Mäliboda area with rest of the Sri Lankan species (Abbreviations: NOSL – total number of species in Sri Lanka; NOU – total number of species in Uda Mäliboda; ENSL – number of endemic species to Sri Lanka; ENU – number of endemic species in Uda Mäliboda; TRSL – number of threatened species in Sri Lanka and TRU – number of threatened species in Uda Mäliboda).
Table 3. Checklist of amphibian species in the Uda Mâliboda area (Abbreviations: E – endemic; EN – Endangered; VU – Vulnerable; NT – Near Threatened).

<table>
<thead>
<tr>
<th>Family and species name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bufonidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Adenomus kelaartii</em></td>
<td>Kelaart’s dwarf toad</td>
</tr>
<tr>
<td><em>Duttaphrynus kotagamai</em></td>
<td>Kotagama’s dwarf toad</td>
</tr>
<tr>
<td><em>Duttaphrynus melanostictus</em></td>
<td>Common house toad</td>
</tr>
<tr>
<td><strong>Microhylidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Kaloula taprobanica</em></td>
<td>Common bull frog</td>
</tr>
<tr>
<td><em>Microhyla rubra</em></td>
<td>Red narrow mouth frog</td>
</tr>
<tr>
<td><em>Ramanella nagaoi</em></td>
<td>Nagao’s pugsnout frog</td>
</tr>
<tr>
<td><em>Ramanella obscura</em></td>
<td>Green-brown pugsnout frog</td>
</tr>
<tr>
<td><strong>Nyctibatrachidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Lankanectes corrugatus</em></td>
<td>Corrugated water frog</td>
</tr>
<tr>
<td><strong>Dicroglossidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Euphlyctis cyanophylctis</em></td>
<td>Skipper frog</td>
</tr>
<tr>
<td><em>Euphlyctis hexadactylus</em></td>
<td>Sixtoe green frog</td>
</tr>
<tr>
<td><em>Fejervarya kirtisinghe</em></td>
<td>Montain paddy field frog</td>
</tr>
<tr>
<td><em>Fejervarya cf. syadrensis</em></td>
<td>Common paddy field frog</td>
</tr>
<tr>
<td><em>Hoplobatrachus crassus</em></td>
<td>Jordon’s bull frog</td>
</tr>
<tr>
<td><em>Nanophrys ceylonensis</em></td>
<td>Sri Lanka rock frog</td>
</tr>
<tr>
<td><strong>Rhacophoridae</strong></td>
<td></td>
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<tr>
<td><em>Pseudophilautus abudus</em></td>
<td>Labugagama shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus alto</em></td>
<td>Horton plains shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus asankai</em></td>
<td>Asanka’s shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus cavoirostris</em></td>
<td>Hollow snouted shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus femoralis</em></td>
<td>Leafnesting shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus folicola</em></td>
<td>Leaf dwelling shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus hoipolloi</em></td>
<td>Anthropogenic shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus popularis</em></td>
<td>Common shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus reticulatus</em></td>
<td>Reticulated-thigh shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus rus</em></td>
<td>Kandiyan shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus sarasinorum</em></td>
<td>Muller’s shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus sordidus</em></td>
<td>Grubby shrub frog</td>
</tr>
<tr>
<td><em>Pseudophilautus stictomus</em></td>
<td>Orange-canthal shrub frog</td>
</tr>
<tr>
<td><strong>Polypedates cruciger</strong></td>
<td>Common hour-glass tree frog</td>
</tr>
<tr>
<td><em>Taruga eques</em></td>
<td>Mountain tree frog</td>
</tr>
<tr>
<td><em>Taruga longinasus</em></td>
<td>Long-snout tree frog</td>
</tr>
<tr>
<td><strong>Ranidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Hylarana aurantiaca</em></td>
<td>Small wood frog VU</td>
</tr>
<tr>
<td><em>Hylarana temporalis</em></td>
<td>Common wood frog EN</td>
</tr>
<tr>
<td><strong>Ichthyophiidae</strong></td>
<td></td>
</tr>
<tr>
<td><em>Ichthyophis glatiosus</em></td>
<td>Common yellow-band caecilian</td>
</tr>
<tr>
<td><em>Ichthyophis pseudangularis</em></td>
<td>Lesser yellow-band caecilian</td>
</tr>
</tbody>
</table>

**Threats and conservation**

We believe the high diversity in wet zone forest habitats is due mainly to availability of abundant suitable micro-habitat features (e.g., tree holes, caves, tree barks, rock boulders, crevices, water holes, decaying logs, loose soil, and other small niches) which create favorable environmental conditions for herpetofauna. According to our results, Uda Mâliboda area has a rich herpetofaunal diversity and endemism compared with other wet zone forests in Sri Lanka. A large number of people including tourists, devotees, and laborers annually visit Adams Peak via Uda Mâliboda Trail located within the SNR. As a result endemic and Threatened species, like many other fauna, are seriously affected by increasing pressure caused by habitat loss and degradation in montane forests, lower montane forests, and marshes. Major threats identified include illegal timber harvesting, illegal human encroachment, slash and burn forest clearing for human settlement and monoculture plantations (especially for tea cultivation), and gem mining. According to interviews with illegal timber harvesters, some rare tree species may be new to science are being harvested. Therefore, a further comprehensive study of flora is recommended.

Present human activities, the most severe being the construction of a hydroelectric power plant, continue to degrade and erode the remaining vestiges of this lush primary forest. Additionally, garbage (polythene) disposal along the Uda Mâliboda Trail by visitors and devotees is a threat that must be duly monitored by the Department of Wildlife Conservation (DWC) and the Forest Department (FD) of Sri Lanka. The Young Zoologists’ Association (YZA) together with the Central Environmental Authority (CEA) has conducted annual polythene removal programs on other trail (Hatton) of SNR for the past 10 years. This has prompted other Government institutions and non-governmental organizations to engage in similar activities. We recommend that such programs be initiated on this trail in order to prevent further degradation of this lush forest.

Some human-altered landscapes such as tea plantations and *Pinus, Eucalyptus, Cyprus*, and *Casuarina* forest plantations are located in the foothills of the SNR. Most of these altered landscapes can be found up to about 800 m in elevation. There is an ongoing hydroelectric power plant development project in the study area (Fig. 6) and increased road traffic further threatens the area’s fauna. Since a considerable area of the forest is altered by human activity, herpetofauna face increased threats because, in general, they are often highly sensitive to even slight environmental changes (e.g., McCallum 2007; Pough et al. 2004; Spellerberg 1991). Thus, the identification and designation of forest reserves on the perimeter of the SNR could function as suitable buffer zones. Additionally, public awareness programs are needed to help guide local people and policy makers de-
velop agendas that consider the importance of herpetofauna in maintaining a balanced and healthy ecosystem. There is no doubt that SNR provides habitat for a high number of amphibian and reptiles species (many endemic and Threatened). We affirm that it is one of the most important herpetofaunal diversity areas in Sri Lanka, especially when considering the future conservation of endemic and threatened herpetofauna. Sri Lanka is known as an important herpetofaunal global hotspot (Bossuyt et al. 2004; Gunawardene et al. 2007; Meegas-kumbura et al. 2002; Pethiyagoda 2005) and harbors an unusually high number of endemic species. Therefore, scientists and policy makers are strongly encouraged to make efforts conducting further research on other faunal groups, vegetation, and the forest’s ecosystem as a whole. Furthermore, preserving the valuable herpetofaunal resources of the Uda Mäliboda Trail is paramount to the conservation of global biological diversity.

**Acknowledgments.**—We would like to express our sincere gratitude to Thasun Amarasinghe (Taprobanica) for reviewing the earlier draft of the manuscript. We also thank Mendis Wickramasinghe (HFS), Aruna Ka-

### Table 4. Checklist of reptile species in Uda Mäliboda area (Abbreviations: E – endemic; EN – Endangered; VU – Vulnerable; NT – Near Threatened; DD – Data Deficient.)

<table>
<thead>
<tr>
<th>Family and species name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agamidae</strong></td>
<td></td>
</tr>
<tr>
<td>Calotes calotes</td>
<td>Green garden lizard</td>
</tr>
<tr>
<td>Calotes liolepis</td>
<td>Whistling lizard E, VU</td>
</tr>
<tr>
<td>Calotes versicolor</td>
<td>Common garden lizard</td>
</tr>
<tr>
<td>Ceratophora aspera</td>
<td>Rough horn lizard E, EN</td>
</tr>
<tr>
<td>Lyriocephalus scutatus</td>
<td>Lyre-head lizard E, NT</td>
</tr>
<tr>
<td>Otocryptis wiegmanni</td>
<td>Sri Lankan kangaroo lizard E, NT</td>
</tr>
<tr>
<td><strong>Gekkonidae</strong></td>
<td></td>
</tr>
<tr>
<td>Cnemaspis scalpensis</td>
<td>Gannoruva day gecko E, DD</td>
</tr>
<tr>
<td>Cnemaspis silvula</td>
<td>Forest day gecko E</td>
</tr>
<tr>
<td>Cyrtodactylus cf. subsolanus</td>
<td>Forest gecko sp.</td>
</tr>
<tr>
<td>Geckoaella triedris</td>
<td>Spotted bowfinger gecko E, NT</td>
</tr>
<tr>
<td>Gehyra mutilata</td>
<td>Four-claw gecko</td>
</tr>
<tr>
<td>Hemiphyllodactylus typus</td>
<td>Slender gecko EN</td>
</tr>
<tr>
<td>Hemidactylus depressus</td>
<td>Kandyan gecko E</td>
</tr>
<tr>
<td>Hemidactylus frenatus</td>
<td>Common house gecko</td>
</tr>
<tr>
<td>Hemidactylus parvimaculatus</td>
<td>Spotted house gecko</td>
</tr>
<tr>
<td><strong>Scincidae</strong></td>
<td></td>
</tr>
<tr>
<td>Eutropis beddomei</td>
<td>Beddome’s stripe skink E, EN</td>
</tr>
<tr>
<td>Eutropis carinata</td>
<td>Common skink</td>
</tr>
<tr>
<td>Eutropis macularia</td>
<td>Bronzegreen little skink</td>
</tr>
<tr>
<td>Eutropis madarasi</td>
<td>Spotted skink E, NT</td>
</tr>
<tr>
<td>Lankascincus dorsicatenatus</td>
<td>Catenated lankaskink E</td>
</tr>
<tr>
<td>Lankascincus fallax</td>
<td>Common lankaskink E</td>
</tr>
<tr>
<td>Lankascincus gansi</td>
<td>Gans’s lankaskink E, NT</td>
</tr>
<tr>
<td>Lankascincus greeri</td>
<td>Greer’s lankaskink E</td>
</tr>
<tr>
<td>Lankascincus munindradasi</td>
<td>Munindradasa’s lankaskink E, DD</td>
</tr>
<tr>
<td>Lankascincusripudadens</td>
<td>Peakwilderness lankaskink E, DD</td>
</tr>
<tr>
<td>Nessia bartonii</td>
<td>Three toed snakeskink E, EN</td>
</tr>
<tr>
<td><strong>Varanidae</strong></td>
<td></td>
</tr>
<tr>
<td>Varanus bengalensis</td>
<td>Land monitor</td>
</tr>
<tr>
<td>Varanus salvator</td>
<td>Water monitor</td>
</tr>
<tr>
<td><strong>Pythonidae</strong></td>
<td></td>
</tr>
<tr>
<td>Python molurus</td>
<td>Indian python</td>
</tr>
<tr>
<td><strong>Cylindrophidae</strong></td>
<td></td>
</tr>
<tr>
<td>Cylindrophismaculatus</td>
<td>Sri Lanka pipe snake E, NT</td>
</tr>
<tr>
<td><strong>Colubridae</strong></td>
<td></td>
</tr>
<tr>
<td>Ahaetulla nasuta</td>
<td>Green vine snake</td>
</tr>
<tr>
<td>Ahaenella pulverulenta</td>
<td>Brown vine snake NT</td>
</tr>
<tr>
<td>Boiga barnesi</td>
<td>Barnes’s cat snake E, NT</td>
</tr>
<tr>
<td>Boiga beddomei</td>
<td>Beddoms cat snake DD</td>
</tr>
<tr>
<td>Boiga ceylonensis</td>
<td>Sri Lanka cat snake VU</td>
</tr>
<tr>
<td>Cercaspis carinatus</td>
<td>Sri Lanka wolf snake E, VU</td>
</tr>
<tr>
<td>Coeloganthus helena</td>
<td>Trinket snake</td>
</tr>
<tr>
<td>Dendrelaphis bifrenalis</td>
<td>Boulenger’s bronze back E</td>
</tr>
<tr>
<td>Dendrelaphis caudolineolatus</td>
<td>Gunther’s bronze back E</td>
</tr>
</tbody>
</table>

Roll of reptiles

<table>
<thead>
<tr>
<th>Family and species name</th>
<th>Common name</th>
</tr>
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<tbody>
<tr>
<td><strong>Colubridae</strong></td>
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</tr>
<tr>
<td>Dendrelaphis schokari</td>
<td>Common bronze back E</td>
</tr>
<tr>
<td>Haplocercus ceylonensis</td>
<td>Black spine snake E, DD</td>
</tr>
<tr>
<td>Lycodon aulicus</td>
<td>Common wolf snake</td>
</tr>
<tr>
<td>Lycodon striatus</td>
<td>Shaw’s wolf snake</td>
</tr>
<tr>
<td>Oligodon calamarius</td>
<td>Templeton’s kukri snake E, VU</td>
</tr>
<tr>
<td>Oligodon sublineatus</td>
<td>Dumerul’s kuki snake E</td>
</tr>
<tr>
<td>Ptyas mucosa</td>
<td>Rat snake</td>
</tr>
<tr>
<td>Sibynophis subpunctatus</td>
<td>Jerdon’s polyodont</td>
</tr>
<tr>
<td><strong>Naticidae</strong></td>
<td></td>
</tr>
<tr>
<td>Amphiesma stolatum</td>
<td>Buff striped keelback</td>
</tr>
<tr>
<td>Aspidura guentheri</td>
<td>Ferguson’s roughside E, NT</td>
</tr>
<tr>
<td>Balanops ceylonensis</td>
<td>Sri Lanka keelback E, VU</td>
</tr>
<tr>
<td>Atretium schistosum</td>
<td>Olive keelback</td>
</tr>
<tr>
<td>Xenochrophis asperrimus</td>
<td>Checkered keelback E</td>
</tr>
<tr>
<td><strong>Typhlopidae</strong></td>
<td></td>
</tr>
<tr>
<td>Typhlops mirus</td>
<td>Jan’s blind snake E, DD</td>
</tr>
<tr>
<td><strong>Elapidae</strong></td>
<td></td>
</tr>
<tr>
<td>Bungarus ceylonicus</td>
<td>Sri Lanka krait E, NT</td>
</tr>
<tr>
<td>Naja naja</td>
<td>Indian cobra</td>
</tr>
<tr>
<td><strong>Viperidae</strong></td>
<td></td>
</tr>
<tr>
<td>Daboia russelii</td>
<td>Russell’s viper</td>
</tr>
<tr>
<td>Hypnale hypnale</td>
<td>Merrem’s hump nose viper</td>
</tr>
<tr>
<td>Hypnale zara</td>
<td>Zara’s hump-nosed viper E</td>
</tr>
<tr>
<td>Trimeresurus trigonocephalus</td>
<td>Green pit viper E</td>
</tr>
</tbody>
</table>
runathilake, Nadeesh Gamage, Mahesh De Silva (YZA), Prof. Deepthi Yakandawala, Dr. Suranjan Fernando (University of Peradeniya), and other members of the Young Zoologists’ Association of Sri Lanka (YZA) for various help with this study. Villagers in the Uda Mâliboda area are acknowledged for their cooperation, sharing their observations, and logistic support. Finally, we would like to give our special thanks to John Rudge, Daniel Fogell, Kanishka Ukuwela, and Craig Hassapakis (ARC) for reviewing the initial daft of the manuscript and making improvements.

Literature cited


Uda Mäliboda trail and a preliminary herpetofaunal checklist

Figure 7. Duttaphrynus Kotagamai (Male; Endangered).

Figure 8. Lankanectes corrugatus (relict).

Figure 9. Psedophilautus femoralis (Endangered).

Figure 10. Psedophilautus reticulates (Endangered).

Figure 11. Pseudophilautus alto (Endangered).

Figure 12. Pseudophilautus sarasinorum (Endangered).

Figure 13. Ramanella nagaoi (Vulnerable).

Figure 14. Taruga longinasus (Endangered).
Figure 15. Oligodon calamarius (Vulnerable).

Figure 16. Dendrelaphis schokari (Endemic).

Figure 17. Amphiesma stolatum (red variety).

Figure 18. Trimeresurus trigonocephalus (plain variety).

Figure 19. Hemidactylus depressus (endemic).

Figure 20. Unidentified Cyrtodactylus cf. subsolanus.

Figure 21. Lankascincus greeri (endemic).

Figure 22. Eutropis macularia (common).


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Figure 23. Ceratophora aspera (Endangered).

Figure 24. Calotes liolepis (Vulnerable).
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