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Insectivorous Small Mammals in Northern and Middle Myanmar

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Abstract. We conducted two field surveys in northern (Putao, Kachin) and middle (Pyin Oo Lwin, Mandaray) Myanmar and collected three species of insectivorous small mammals. They are one species of a mole, *Parascaptor leucura*, in Putao and Pyin Oo Lwin and two shrews, *Suncus murinus* and *Anourosorex squamipes* in Putao. The mole is known as fossorial living in the underground and constructing tunnel networks. The shrews have variable life styles, characterized by their tail length. Two shrew species, *S. murinus* and *A. squamipes*, inhabit at the terrestrial and semifossorial environments, respectively. The latter species has conspicuously a short tail as an adaptive feature to its habitat. These three species coexist at the same place in Putao. It was considered that they divided their niches to avoid the competition for the food resources.

Key words: Talpidae, Soricidae, Soricomorpha, Eulipotyphla, Insectivora, morphology, Myanmar.

Introduction

The landscape of Myanmar is for 677 square kilometers with variable environmental conditions, steep mountainous area connecting to Himalayas in the north and widespread plain coastal area in the south. Also, the Ayeyarwady River (Irrawaddy) is dividing this country into the western and the eastern areas. Nearly all area of the country is registered as a part of the hotspot of biodiversity 'Indo-Burma' and 'Himalaya' (Conservation International, 2007).

About 230 species of terrestrial mammals have been known from Myanmar (Wilson & Reeder, 2005). Among them, 21 species are order Soricomorpha (shrews, moles and hedgehogs). Taxonomic study of small mammals in Myanmar has not been done enough by recent methods, e.g. numerical analysis using morphological measurements, karyotype or molecular phylogenetic studies. Recent activities of specimen collection in the other country of southeastern Asia, including Vietnam, Laos and Thailand, have continuously brought the knowledge of new taxa of the small mammals based on new methodologies. To understand the diversity of small mamamals in Myanmar

and the relationships to the corresponding taxa of surrounding countries, we conducted two field works in the northern and middle Myanmar for the preliminary examination of insectivorous small mammals.

Materials and Methods

The first survey was conducted at Yikyawdi Village, Putao, Kachin State (GPS: N27° 15′ 11.2″; E97° 25′ 24.1″; 460 m asl.) in 5–7, December, 2010. We set 20 sharman's live traps and 10 mole traps in the farmland (Fig. 1a). Second survey was done at Pyin Oo Lwin, Mandalay Region (GPS: N22° 00′ 05.3″; E96° 28′ 25.8″; 1100 m asl.) in 7–9, December, 2010, only with the 10 mole traps at the Kandawgyi Hill Resort lodge (Fig. 1b). Collected animals were measured and prepared for museum skin and fluid (70% ethanol fixed) body specimens. Measurements of external morphology were body weight (BW), head and body length (HB), tail length (TL), length of fore foot (FFL) for talpid, width of fore foot (FFW) for talpid, hind foot length (HFL) and ear length (E) for shrews. Both the short and long diameters of testis were also recorded in the male specimen. Some tissues (liver, skin and reproductive organs) extracted for further biological researches were fixed or preserved in suitable fixatives or media. In the laboratory, heads were removed from the fixed body and cleaned for the skull specimens. All specimens are deposited in the mammal collection of National Museum of Nature and Science, Tokyo, with the acronym of "NSMT-M".

Results and Discussion

In Putao, we collected one mole species be-

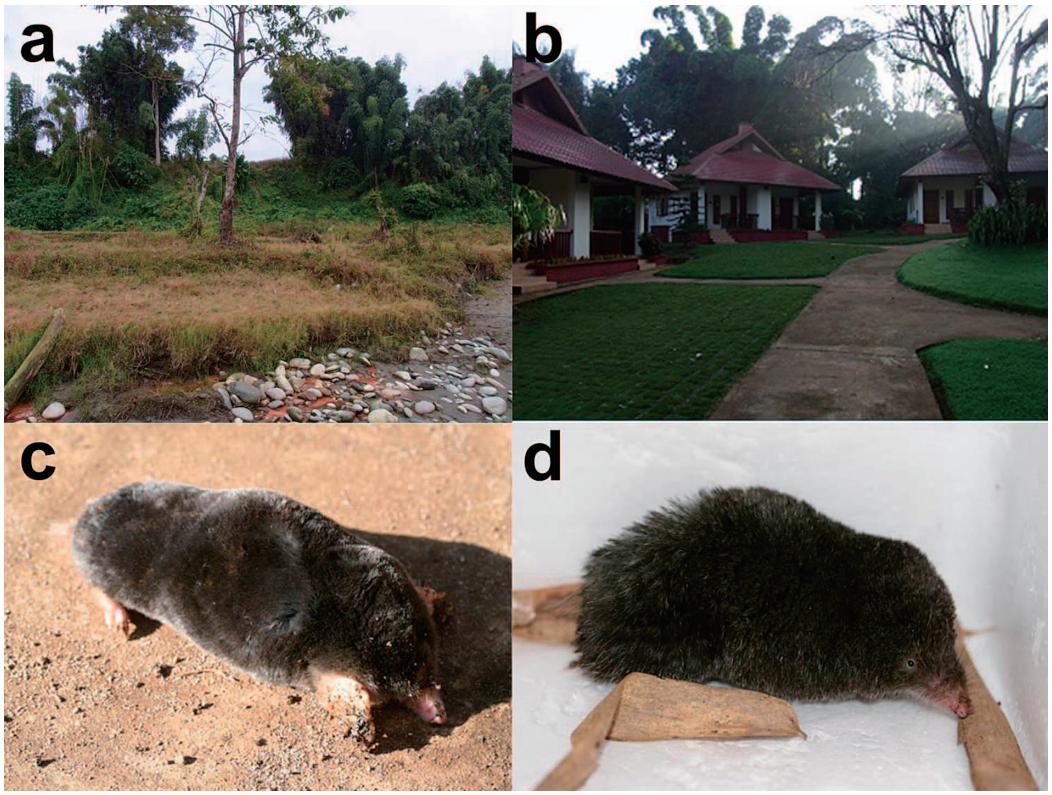

Fig. 1. Collecting localities (a, Putao; b, Pyin Oo Lwin) and collected animals (c, *Parascaptor leucura*; d, *Anourosorex squamipes*).

Table 1. List of the specimens of insectivorous small mammals collected from Myanmar.

NSMT-M	Species	Sex	Data	Locality	BW	TL	Tail	HF	Ear	Testis
38354	*Parascaptor leucura*	♂	2010, Dec., 7	Yikyawdi Village, Putao, Kachin	45.70	133.0	14.0	14.0	—	6.5×4.1
38355	*Suncus murinus*	♀	2010, Dec., 7	Yikyawdi Village, Putao, Kachin	23.70	178.0	63.0	17.5	10.0	—
38356	*Anourosorex squamipes*	♀	2010, Dec., 7	Yikyawdi Village, Putao, Kachin	22.10	121.0	16.5	16.0	2.0	—
38401	*Parascaptor leucura*	♀	2010, Dec., 8	Pyin Oo Lwin, Mandalay	43.20	133.0	13.0	14.0	—	—

* BW, body weight (g); TL, total length (mm); Tail, tail length (mm); HF, hind foot length (mm); Ear, ear length (mm); Testis, long×short diameter of testis (mm).

longing to the family Talpidae and two shrew species belonging to the family Soricidae (shrew family) of the order Soricomorpha. In Pyin Woo Lwin, we collected only one mole species around the lodge. External measurements of specimens are shown in Table 1. It is interesting that these three species coexist at the same place of Putao. It was considered that they divided their niches to avoid the competition for the food resources (Abe 1985).

Mole

Four genera of Asian Talpids were identified by their unique dental formula. The dental formula of a collected mole was determined as I3/3, C1/1, P3/4, M3/3＝42 (Fig. 2). This character indicates that this mole belongs to the genus *Parascaptor* Gill, 1875. This genus includes only one species, the white-tailed mole *P. leucura* (Blyth, 1850). The morphological characters of moles collected from two localities in our surveys were small-sized, rather long tail with whitish hairs and long muzzle with triangular naked portion in ventral side. These characters correspond to those of *P. leucura*.

Parascaptor leucura (Fig. 1c) was described in 1850 from a specimen collected in Cherrapunji, Meghalaya, India (Blyth, 1850). Present known distribution of *P. leucura* is from Assam region of India to western Yunnan Province of China through northern Myanmer. Most of the localities were reported at the relatively high elevation. For example, type locality of this species is about 1500 m a.s.l. Cranbrook (1962) reported the mole runs were found at the height from 2,000 to 7,000 feet (about 600 m to 2,100 m). Choudhury (1997) described one live mole in Phillobari RF, Tinsukia district, Assam. It was observed crossing the road in his field trip. This location is described as only '139 m above msl'. The specimen was not available because this mole was released. Wang (2003) reviewed widespread distribution of this species in western Yunnan Province and south Szehuan province of China. The distribution areas are estimated as much higher than 1,000 m a.s.l. because of the mountainous nature of the areas. In the lowland of the areas, other genera (*Euroscaptor* or *Mogera*) of moles are inhabiting, supposing to be competition of distribution between species. Our first location of Putao is only above 400 m a.s.l., thus considered as relatively low altitudinal record.

Our second location of Pyin Woo Lwin is near to the northern Thailand where different genus of talpid, *Euroscaptor*, is known to distribute (Yoshiyuki, 1988). This Kloss's mole, *E. klossi*, is distributed to the western and northern Thailand, and some authors reported to be in southwestern China and Vietnam (Osgood, 1932; Wang, 2003), but the distribution in Vietnam was neglected (Kawada *et al*., 2009). There is no record of *E. klossi* or other species of this genus in Myanmar. The distance between Pyin Woo Lwin and the locality of *E. klossi* was around 300 km and numerous mountains and streams separate the distribution of these species. To identify the distribution limit of *Parascaptor* and to know the presence of *Euroscaptor*, further survey in eastern Myanmar should be conducted.

Our collecting results indicate that *P.*

Fig. 2. Skull of *Parascaptor leucura* (NSMT-M38401).

leucura has a wide range of distribution in Myanmar from north to middle. Further collecting efforts at the several locations need to clarify the range of genus *Parascaptor*, with a special interest on the border with genus *Euroscaptor* that occupies eastern area from Thailand. In each locality, *P. leucura* was collected in the farmland and around the human residence. Although this species were previously considered as a mountainous species, possible to be also occurred in the artificial places in northern to middle Myanmar. This species may easily disperse to the farms, parks or etc., if there is surrounded or contacted by the mountain forests.

Shrews

The house musk shrew, *Suncus murinus* and the mole shrew, *Anourosorex squamipes* were collected by the sharman's live traps set at the grassland surrounding the rice field in Putao. *Suncus murinus* is widely distributed to east coast of Africa to Japan. Body size of *S. murinus* is variable among localities, bound from the largest continental population to smallest insular population (Ishikawa *et al*. 1989). For example as the largest population of Bangladesh, male and female individuals have more than 150 g and less than 100 g in body weight, respectively. On the contrary, smallest population from Tarama island of Japan has the body weight of 35–45 g in males and 25–35 g in females (Jogahara & Oda, 2011). A female specimen of Putao, we collected, had body weight 23.7 g (Table 1), thus fell into the smallest size of this species. It is interesting to check the size variation of *S. murinus* around Myanmar because the largest (Bangladesh) and smallest populations coexist in this area.

According to the mitochondrial haplotype analysis, it is known that two distinct groups (south Asian continental group and southeast Asia—insular group) possessed considerable extent of genetic diversity in Myanmar (Yamagata, 2011). It is important that Myanmar is located at the boundary between these two groups. Further study is necessary to check which group this small specimen belongs to.

Another soricid species, *A. squamipes*, was collected by a sharman's live trap set at the same place where *S. murinus* was obtained. These two soricid shrews completely coexist in the grassland in Putao. This species is characterized by the very short tail length (only 16.5 mm, Table. 1), as an adapted trait to the semifossorial lifestyle, i.e. living under the litters with digging shallow tunnels. Genus *Anourosorex* is distributed from Himalaya to Southwestern China and Taiwan, and is subdivided into four species, *A. assamensis* (N. E. India), *A. schmidi* (northen N. E. India and Buhtan), *A. squamipes* (Southwestern China, north and west Myanmar, east India, north Vietnam and Thailand) and *A. yamashinai* (Taiwan). Our specimen (Fig. 1d) was tentatively identified as *A. squamipes* based on the collecting locality. This species is basically recorded from high mountainous places. Allen (1938) described that this species was collected from 5,800 to 10,000 feet (1,700 m to 3,000 m) in southwestern China. Our collecting site, Putao, (460 m asl) is considered as quite low record.

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北部・中部ミャンマーの食虫類

川田伸一郎・数馬恒平・朝比奈はるか・土田貴志・冨永典子・佐竹元吉

ミャンマー北部（カチン州プタオ）及び中部（マンダレー区ピンウーリン）において小哺乳類の調査を行い，3種の食虫類を捕獲した．モグラ科の一種アッサムモグラ *Parascaptor leucura* はいずれの調査地でも捕獲でき，トガリネズミ科の二種ジャコウネズミ *Suncus murinus* とモグラジネズミ *Anourosorex squamipes* がプタオのみで捕獲された．モグラ類は地下にトンネル網を形成して地中生活を行うことで知られる．またトガリネズミ類は様々な生活型を示すが，それらは尾の長さに反映されている．すなわちジャコウネズミは地上性で長い尾をもつのに対して，半地中性のモグラジネズミは非常に短い尾をもつ．これら3種は異なるニッチを持つことにより，餌資源に対する競合関係を避けることで，プタオの同一地点に共存できていると考えられる．