

**STUDY OF SMALL NON-VOLANT MAMMALS
IN CHU MOM RAY NATIONAL PARK (VIETNAM, KON TUM PROVINCE)**

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The small mammals' surveys were carried out in the Chu Mom Ray National Park during 2014-2015 by the Joint Vietnam-Russian Tropical Research and Technological Centre. This national park is located in Sa Thay and Ngoc Hoi districts of the Kon Tum province, close to the point where Vietnam, Cambodia and Laos meet. These preliminary studies focused mainly on taxonomical list composition and obtaining the data on biology of most abundant species of small non-volant mammals, which construct a background of fauna of the region.

I. MATERIAL AND METHODS

Field surveys were carried out during 1-12 May, 15-27 November 2014 and from 28 March to 13 April 2015 in eastern part of the National Park and its vicinity. Fieldworks were carried out in two localities 1) southward of Ro Koi Forest Station, 14°30'17" N, 107°43'22"E, elevation 680-750 m asl; 2) westward of Bar Goc Forest Station ("Botanical Garden"), 14°26'01"N, 107°43'14"E, elevation 710 m asl. The different biotopes at distances of 2-6 km from these forest stations were surveyed – secondary broadleaf forest, secondary forest with bamboo, forest along small streams, banks of river. Two types of trap were used. Large cage live-traps (25 × 11 × 11 cm) were set up, baited by a piece of foam rubber saturated with vegetable oil and pieces of apple, which was replaced every third day. Pitfall traps, i.e., plastic glasses 15 cm deep and 10 cm in diameter, were buried flush with the ground surface. All specimens were measured (standard external body measurements) and weighted; age, sex and generative status were also recorded. Some species which difficult for identification in the field were sampled for genetic verification.

Additional information was obtained by interviewing local authorities and house owners.

II. RESULTS

We report 22 species of small non-volant mammals (insectivores and rodents) from the Chu Mom Ray National Park based on visual records and trapped specimens. The following list provide short information for species collected.

Order Scandentia

Family Tupaiidae

***Dendrogale murina* – Northern Smooth-tailed Treeshrew**

The species was firstly recorded for Sa Thay district by Dao Van Tien & Tran Hong Viet (1984). During our surveys in 2014 two specimens were obtained from local people who caught it near small forest spring southward of Ro Koi Station. Northern smooth-tailed tree shrew is

widely distributed species in Southern Vietnam; nevertheless, it is rather rear and scanty species in most areas except for the Cat Tien National Park, Dong Nai province where it is abundant.

Order Soricomorpha

Family Soricidae

***Crocidura tanakae* – South-Asian Gray Shrew**

This species is one of the most abundant and widely distributed South Asian white-toothed shrews. A widespread and common species known throughout Vietnam (Abramov *et al.*, 2013). Few specimens were trapped during our surveys. This medium-sized shrew species was not recorded in Chu Mom Ray National Park before (Dao Van Tien & Tran Hong Viet, 1984).

***Chimarrogale varennei* – Asian Water Shrew**

The species common and widely distributed in Vietnam, but rather rare recorded due to its cryptic mode of life. In May 2014-2015 a few specimens were caught by live cage-traps set up along a small streams and Dak Char river.

Order Erinaceomorpha

Family Galericiidae

***Hylomys cf. microtinus* – Short-tailed Gymnure**

Two specimens of short-tailed gymnure were collected in May 2014 southward of Ro Koi station. Gymnures were caught by cage-traps in secondary broadleaf forest. It should be noted that species attribution and taxonomical status of the short-tailed gymnures from Vietnam formerly regarded as *Hylomys suillus* (Dang Ngoc Can *et al.*, 2008), still have to be approved. As it was shown by genetic analysis (Bannikova *et al.*, 2014) *Hylomys suillus* proper should be restricted to Java Island, whereas gymnures from Vietnam should be identified as other species (*H. microtinus*, or *H. siamensis*, or another taxa).

Order Rodentia

Family Muridae

***Mus pahari* - Indochinese Shrew-like Mouse**

Vietnam is known to inhabit by four *Mus* species (Lunde & Nguyen Truong Son, 2001; Dang Ngoc Can *et al.*, 2008). Most of the species inhabit open habitats or are synanthropic (like domestic mouse *Mus musculus*). Indochinese shrew-like mouse is the only species which actually inhabits forests. This species is widely distributed in Vietnam, however it rarely can be trapped and only a few specimens are listed in scientific collections. A single specimen was collected in vicinity of Ro Koi station.

***Chiropodomys gliroides* – Indomalayan Pencil-tailed Tree Mouse**

The species is known to be distributed widely enough in Vietnam but being recorded by only few specimens from everywhere. Few adult animals were trapped by cage traps set on tree branches and bamboo stems in both studied localities in Chu Mom Ray.

***Maxomys moi* – Indochinese Mountain Spiny Rat**

The species was described from the Lang Bian mountain at the south part of the Dalat Plateau. The Indochinese mountain spiny rat mainly recorded from highlands of Southern and Central Vietnam in Quang Tri, Quang Nam, Kon Tum and Lam Dong provinces (Dang Ngoc

Can *et al.*, 2008 and our records) and adjacent southern Laos on Plateau Bolovens. We collect only one specimen in May 2014.

***Rattus nitidus* – Himalayan Field Rat**

Widespread Asian species. Three specimens were caught in disturbed evergreen forest in vicinity of Ro Koi station in May 2014. This species is also abundant in deforested and agricultural areas around the national park.

***Rattus andamanensis* – Indochinese Forest Rat**

That is most abundant species of *Rattus* in the studied area. We caught four specimens. These animals were caught by traps set on branches and sloping tree trunks served as natural bridges over different kinds of ravines, forest springs, or other kinds of cross-country terrains and traps set on stream banks. Based on both detailed investigations of cranial characters and mtDNA data we can attribute these rats to *Rattus andamanensis* follows the recent point of view which combine *Rattus remotus* and *Rattus koratensis* from Vietnam together with *R. andamanensis* from Thailand.

***Leopoldamys revertens* – Giant Indomalayan Tree Rat**

One of the largest forest rat species in Vietnam. The species is common for southern region of Vietnam. Formerly this taxon was regarded as *L. sabanus*, but see Balakirev *et al.* (2013) for taxonomic review of *Leopoldamys* in continental Indochina. Three specimens were collected in vicinity of Ro Koi station and one more was obtained from locals in vicinity of National Park.

***Niviventer huang* – Indomalayan White-bellied Rat**

One of the most common forest rats everywhere in Southern Vietnam, it is abundant in Chu Mom Ray National Park. Few specimens were collected during surveys in 2014-2015. All animals were trapped by cage traps set on tree branches, fallen trees or bamboo stems elevated on 2-5 m above ground level. This species was recorded at the most forest biotopes studied. We do not perform the DNA analysis for Chu Mom Ray specimens, but based on morphological data, we can assume that the animals can be attributed to *Niviventer huang* which is southern species from *fulvescens*-group within *Niviventer* genus (Balakirev *et al.*, 2012).

***Niviventer tenaster* – Indochinese Mountain White-bellied Rat**

Three animals, which were preliminary attributed to larger *Niviventer* species, namely *N. tenaster* were caught on the ground and on natural bridges over forest stream at November, 2014. These fairly large rats (head and body length 158-160 mm, length of tail 186-195 mm), are appreciably distinctive from above mentioned *Niviventer huang* and are known to belong to different phylogenetic lineage within the genus.

***Niviventer bukit* – Malayan White-Bellied Rat**

Another one species which is relative with those listed above is also recorded. This is *N. bukit*, which is considerably smaller and hardly if any possible to misidentified with the former. By general appearance, the specimens (two individuals) we caught at Chu Mom Ray are similar with its conspecifics are known to inhabit the Cat Tien National Park, Bu Gia Map Nature Reserve and wide areas all over in Southern Indochina (Balakirev *et al.*, 2012).

***Chiromyscus langbianis* – Dalat White-Bellied Tree Rat**

This species which during decades treated as one of *Niviventer* species is currently proved to belong to another, closely related genus *Chiromyscus* (Balakirev *et al.*, 2014). We succeed in

obtaining one specimens by trap set upon the tree branches. By its appearance the animal is undistinguished from specimens collected in Dalat Plateau (Bi Dup - Nui Ba National Park).

***Berylmys bowersi* – Bower’s White-toothed Rat**

Two adult specimens were caught at old dipterocarp forest patch by trap settled on fallen trees trunk. The animals have a usual for this species exterior. This species was not recorded for Chu Mom Ray National Park and its vicinities (Thomas, 1927; Dao Van Tien & Tran Hong Viet, 1984; Dang Huy Huynh, 2005).

***Berylmys berdmorei* – Berdmore’s White-toothed Rat**

Adult female was trapped at the edge of forest near the river. One another specimen was taken from the local people who caught it at manioc field. So, it is apparent that both the *Berylmys* species have sympatric distribution in Chu Mom Ray National Park and probably coexist in secondary or disturbed forests.

Family Spalacidae

***Rhizomys pruinosus* – Indomalayan Bamboo Rat**

One specimen was taken from the local people who caught it at bamboo forest southward of Ro Koi Station. The species was listed previously for Sa Thay District (Dao Van Tien & Tran Hong Viet, 1984) but not indicated by Dang Huy Huynh, (2005) for the Chu Mom Ray National Park. Thomas (1927) mentioned two specimens collected near Dakto (northward of Chu Mom Ray).

Family Sciuridae

***Callosciurus erythraeus flavimanus* – Pallas’s Squirrel**

Widely distributed and common species in Vietnam. This species was often observed during day-time excursions around forest camp southward of Ro Koi Station in 2014-2015. One animal used as a voucher specimen was caught at November 2014 on a bank of small forest spring. The animals inhabits the Chu Mom Ray National Park look like an intermediate morpha between typical *C. erythraeus* (bearing chestnut belly coloration) known to inhabit northern part of Vietnam and *C. e. flavimanus* from the southern regions which clearly distinguished by yellow belly coloration. The animals in the studied region have orange coloration of ventral side. We found in the collection of the Institute of Ecology and Biological Resources of National Academy of Science of Vietnam, Hanoi, one specimen from Ha Tinh Province with the same intermediate coloration. The red-bellied squirrels (*Callosciurus erythraeus flavimanus*) which are known to inhabit Southern Vietnam are sometimes regarded as a distinct species *C. flavimanus* but we follow to recently accepted taxonomical conception (see also Dang Ngoc Can *et al.*, 2008) and treat it as a morph.

***Dremomys rufigenis* – Asian Red-cheeked Squirrel**

We recorded four animals (three adults and one subadult) obtained by locals settlers from somewhere at the central part of the Chu Mom Ray National Park. By our eye, these animals do not have any apparent traits which could allow to distinguish it from its conspecifics inhabits northern or southern regions (for example, Nghe An and Lam Dong provinces where we had the chance to observe this species).

***Tamiops maritimus* – Maritime Striped Squirrel**

Common species in Vietnam. Striped squirrels were often observed during day-time excursions southward of Ro Koi Station in 2014-2015. Three animals which we studied, two

adult and one young, were caught by local settlers anywhere at the depth of forest. The species identification based on characters mentioned by Lunde D & Nguyen Trung Son (2001).

***Ratufa bicolor* – Black Giant Squirrel**

Common species in Vietnam. Giant squirrels were often observed during day-time excursions around forest camp southward of Ro Koi Station in 2015.

***Menetes berdmorei* – Indochinese Ground Squirrel**

Common species in Vietnam. One specimen was observed in May 2015 near Ro Koi Station.

Conclusions. The Chu Mom Ray National Park is undoubtedly of interest for zoogeography and comparative ecology of small mammals' communities. That is the large patch of forest between Kon Tum Plateau (Central Highlands) and Dalat Plateau providing the natural refugium for a number of animal species. Isolated Chu Mom Ray mountains have areas with lowland and montane evergreen forests, which are mainly distributed in surrounding territories of Tay Nguyen Plateau.

In total, we recorded in Chu Mom Ray National Park only 22 species of small mammals, including rodents, insectivorous and tree-shrews, whereas Dao Van Tien & Tran Hong Viet (1984) listed 29 species of same groups of small mammals. The results of faunistic surveys here are greatly affected by climate seasonality in Southern Vietnam. Thus, the species composition of small non-volant mammals recorded at May 2014 and May 2015 was appreciably different to results obtained in November 2014. Some species (*Mus pahari*, *Chiropodomys gliroides*), were recorded in the National Park only in spring, and, vice versa, some of *Niviventer* species were abundant in November, but not recorded in May. In spite of considerably effort made we failed to obtain such of strongly bamboo associated species as *Hapalomys delacouri*, though studied habitats are suitable for it. We not found any traces of moles *Euroscaptor parvidens* which is known for Chu Mom Ray (Abramov *et al.*, 2013). Anyway we found a few species which previously were not recorded for Chu Mom Ray (*Berylmys bowersi*, *Crocidura tanakae*, *Mus pahari*).

The fauna of mammals in Chu Mom Ray is proved to be rather unique for Central Vietnam. The most apparent feature is that the squirrels are represented by northern species whereas the rats are predominately represents the southern species. Additional surveys should be conducted in different seasons and/or by using different trapping techniques, to obtain full and irrefragable data on the diversity of mammalian fauna of Chu Mom Ray and its relations with local faunas of other regions of Vietnam.

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NGHIÊN CỨU THÚ NHỎ Ở VƯỜN QUỐC GIA CHƯ MÔM RAY, TỈNH KON TUM, VIỆT NAM

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TÓM TẮT

Vườn Quốc gia Chư Mom Ray là khu vực có những nét đặc trưng về địa lý động vật, trong đó có nhóm thú nhỏ. Là khu vực nằm giữa vùng núi của Kon Tum ở phía bắc và cao nguyên Đà Lạt ở phía nam, nơi đây có các sinh cảnh rừng đất thấp, rừng thường xanh trên núi.

Đã ghi nhận được tại Vườn Quốc gia Chư Mom Ray 22 loài thú nhỏ, bao gồm nhóm gặm nhấm, nhóm ăn côn trùng và chuột chù. Có sự biến động rõ rệt về thành phần loài theo mùa. Một số loài (*Mus Pahari*, *Chiropodomys gliroides*) chỉ được ghi nhận duy nhất trong mùa xuân. Ngược lại, một số loài thuộc giống *Niviventer* có số lượng phong phú trong tháng mười một, nhưng không được ghi nhận trong tháng năm. Đã bổ sung một số loài cho khu hệ thú của vườn quốc gia là *Berylmys bowersi*, *crocidura tanakae*, *Mus pahari*.