Progress Report

Project title:

Exploring the ecological link between dung beetles and globally threatened mammals in limestone tropical forests of the UNESCO Global Geopark Non Nuoc Cao Bang, Vietnam

Project ID: 45991-B

I. Achievements and progress to date

During the reporting period, our team focused on establishing core field survey systems and implementing the principal research activities outlined in the approved project proposal.

1. Records of target mammal species from camera trapping and field surveys

We established an integrated mammal survey framework combining camera trapping, direct field observations, and indirect evidence from dung samples across key habitats within Phia Oac–Phia Den National Park (PO–PD) and the Cao Vit Gibbon Species and Habitat Conservation Area (Cao Vit CA). This approach enabled an assessment of the distribution and current status of three globally threatened mammal species: the Cao Vit Gibbon (*Nomascus nasutus*), Mainland Serow (*Capricornis sumatraensis*), and Forest Musk Deer (*Moschus berezovskii*).

Camera traps were deployed at selected sites within both protected areas. Camera locations were chosen along animal trails, ridge lines, limestone valleys, and areas showing clear signs of mammal activity, based on prior field experience and consultations with local forest rangers.

Camera-trap data and direct field observations confirmed the presence of all three target species within the Cao Vit CA. However, during the current reporting period, none of the target mammals were confirmed in PO–PD National Park.

a. Mainland Serow (*Capricornis sumatraensis*)

The Mainland Serow was recorded at one camera-trap site (22.91414°N, 106.53786°E). In addition, dung samples attributable to this species were found on steep limestone slopes and forested cliff areas, indicating regular use of these rugged habitats (Figure 1)

b. Forest Musk Deer (*Moschus berezovskii*)

The Forest Musk Deer was recorded at three camera-trap sites within the Cao Vit CA (Table 1). The species was detected in limestone mountain habitats at elevations ranging from approximately 400 to 1,000 m a.s.l. Most records were obtained from steep, rugged terrain, suggesting a strong preference for difficult-to-access areas.

Camera-trap images and dung records indicated that Forest Musk Deer mainly occurred in open to semi-open forest habitats with a well-developed grass and shrub layer. These sites were often located near village edges rather than within dense old-growth forest. Activity patterns inferred from camera-trap timestamps showed both diurnal and nocturnal activity, suggesting a flexible daily activity rhythm in the study area.

Table 1. Camera-trap records of Forest Musk Deer (*Moschus berezovskii*) in the Cao Vit Gibbon Species and Habitat Conservation Area.

Camera trap site	Coordinates (WGS84)	Elevation (m a.s.l.)	Habitat type	Number of individuals	Date	Time	Notes
CAM6	22.761570/ 106.537734	671 m	Open limestone forest with grass layer	1	18/8/2025	12:37	Fig. 2
				1	30/8/2025	12:58	
				1	5/09/2025	1:35	
				1	27/9/2025	5:57	
				1	13/10/2025	19:17	
CAM9	22.760661/ 106.522227	620 m		1	3/8/2025	19:59	Fig. 3
				1	11/8/2025	7:16	
				1	15/8/2025	18:44	
				1	20/9/2025	6:08	
				1	13/10/2025	17:40	
				1	31/10/2025	5:17	
CAM11	22.761192/ 106.522688	600 m		1	2/8/2025	8:28	Fig. 4
				1	22/8/2025	7:46	
				1	26/8/2025	18:41	
				1	14/9/2025	12:42	
				1	2/10/2025	10:46	

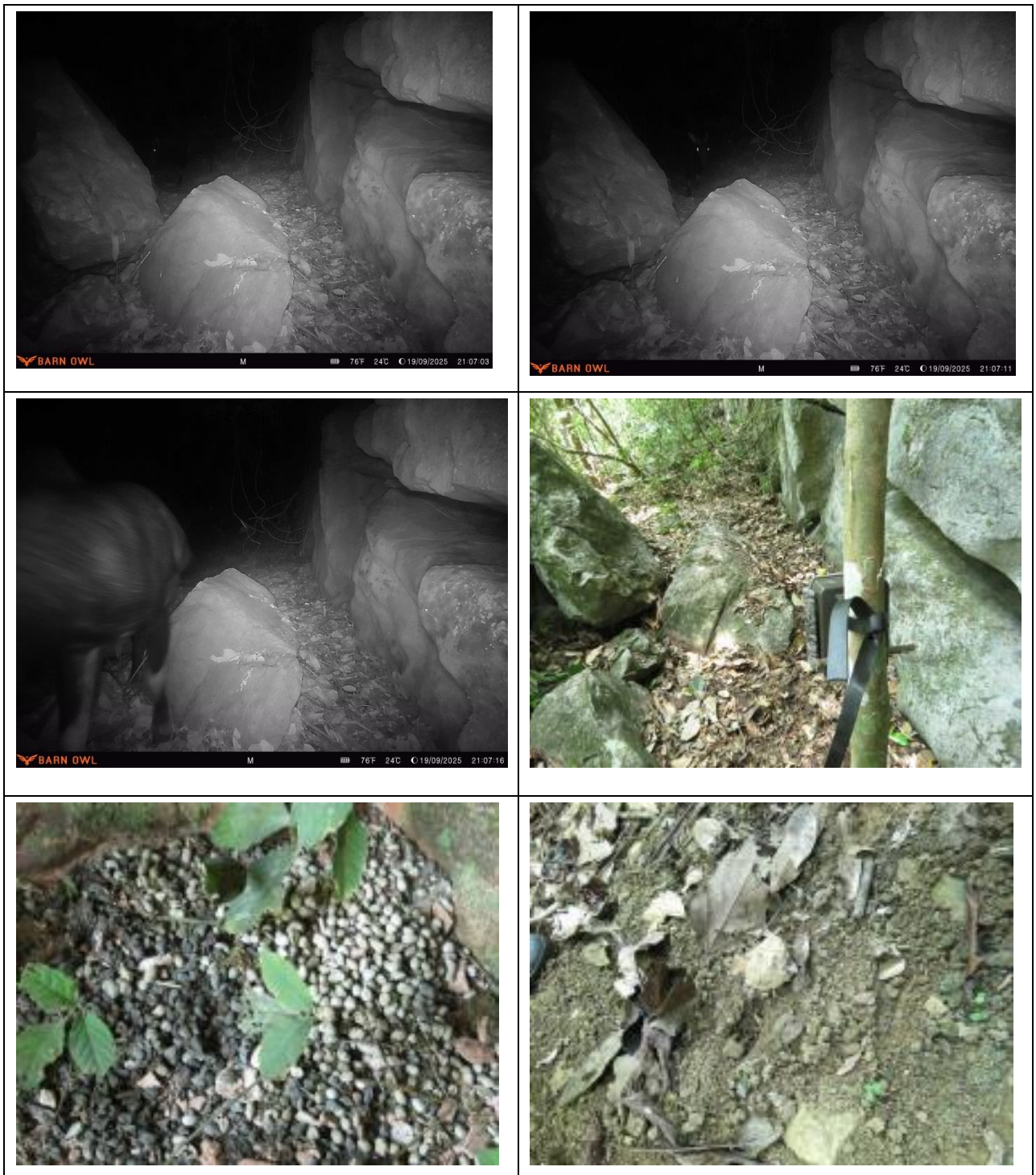

Figure 1. Camera-trap records, dung samples, and footprints of *Capricornis sumatraensis* and its associated habitats

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Figure 2. Camera-trap records of *Moschus berezovskii* and its associated habitats in CAM6 site

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Figure 3. Camera-trap records of *Moschus berezovskii* and its associated habitats in CAM9 site

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Figure 4. Camera-trap records of *Moschus berezovskii* and its associated habitats in CAM11 site

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c. Cao Vit Gibbon (*Nomascus nasutus*)

We conducted surveys along three transects covering ten valleys (Min, Hoài, Vi, Cô, Gu, Chi Rôông, Ngọc Man, Phai Tao, Bong Bip, and Tua Noc) across three communes (Ngọc Khê, Ngọc Côn, and Phong Nam). The total survey effort covered approximately 20 km of transects.

During field surveys, Cao Vit Gibbons were visually observed on two occasions and detected acoustically on eight occasions through calls, confirming their continued presence and activity within the surveyed valleys.

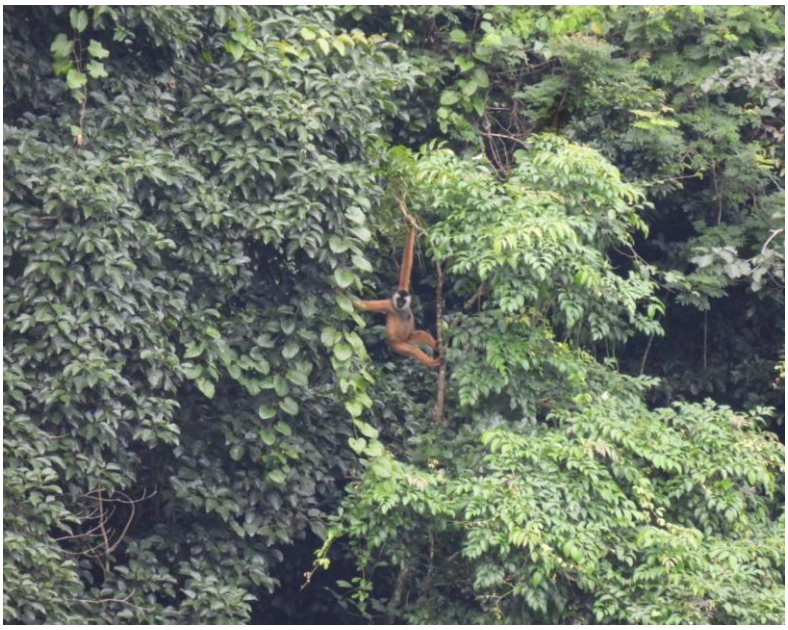

Fig.5. The Cao Vit Gibbon (Nomascus nasutus)

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2. Capacity building and field-based training for local stakeholders

During the reporting period, on-site training and field mentoring were conducted for five local forest protection groups, including community patrol members, local guides, and forest rangers. Training sessions were organised directly in the study areas to maximise practical learning and immediate application.

Field-based training focused on:

- Installation, checking, and maintenance of camera traps;
- Identification of mammal signs, tracks, and dung in limestone forest environments;

- Setting up dung-baited pitfall traps for dung beetle surveys;
- Recording basic field data, using GPS devices, and ensuring field safety.

Fig. 6. Field-based training for local stakeholders