

## CONSERVATION OF THE RED - SHANKED DOUC LANGURS (*Pygathix nemaesus*) IN BACH MA NATIONAL PARK: AN UPDATE ON DISTRIBUTION AND POPULATION SIZE

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### SUMMARY

The red-shanked douc langur *Pygathix nemaesus* is a rare and endangered primate species endemic to Vietnam, Lao PDR and Cambodia. The red-shanked douc langurs were previously found in Bach Ma National Park and their population has been mainly recorded in the northeastern Park, however, there is still a lack of information about distribution and population status in the southwestern Park. To improve conservation prospects of the species there, the present study aims to update the database on distribution and population status of the red-shanked douc langurs in Bach Ma National Park, Thua Thien - Hue province. The line transect surveys were carried out from 14 lines in Bach Ma National Park in 2018 - 2019. The results showed that 08 groups of the red-shanked douc langurs were recorded in the areas of Bach Ma National Park. The population size was estimated around from 68 to 86 individuals. The number of groups and population size of the red-shanked douc langurs recorded in the present study is larger than that in the previous reports. Two groups of the red-shanked douc langurs were recorded for the first time in the southwestern area of Bach Ma National Park. The habitats of this species in Bach Ma National Park mainly occur in the rich and medium forests of evergreen broad-leaved forest (TXG and TXB) and were recorded at the elevations from 500 m to 1,400 m above sea level. The present study has identified 04 main threats affecting the habitats and red-shanked douc langurs in Bach Ma National Park, including hunting, illegally exploiting forest products, development of tourism supported by road constructions and buildings, and conversion of forest into agricultural land and acacia plantations, among which illegal hunting is the most serious threat to the red-shanked douc langurs in the study area.

**Keywords:** Bach Ma, distribution, habitat, population, *Pygathix nemaesus*.

### 1. INTRODUCTION

The red-shanked douc langur (*Pygathix nemaesus*) is a rare primate species with high scientific and conservation values. This species is listed as Endangered in the IUCN Red List of Threatened Species (2019) and the Vietnam Red Book (2007). In Decree 06 (2019) of the Prime Minister, the red - shanked douc langur is classified as a rare animal with a high risk needing of protection (group IB). In the world, the previous studies and surveys have identified that the red-shanked douc langurs are only distributed along the Truong Son range which are in the forested areas bordering between Southern Laos and Central Vietnam (Coudrat *et al.*, 2014). This species also occur in a small part of Northeast Cambodia (Coudrat *et al.*, 2014). At the international level, the largest population of the red-shanked douc langurs is known to occur at Nakai-Nam Theun National Protected Area in Central Laos with an estimate of about 4,420 groups (Coudrat *et al.*, 2014). Meanwhile, the

populations of this species are strongly dispersed and fragmented by deforestation, forest land encroachment, conversion of forests for agriculture and roads. In Vietnam, the distribution of the red-shanked douc langurs range from Pu Mat National Park, Nghe An province in the north (19°02'N) to the Kon Ha Nung area, Gia Lai province in the South (14°33'N) (Nadler *et al.*, 2003). The largest population of the red-shanked douc langurs occur in Phong Nha - Ke Bang National Park with the size ranging from 445 to 2,137 individuals (Haus *et al.*, 2009), and with the constant hunting pressure on douc species for traditional medicine, local consumption and international trade, the survival of the species in Vietnam is uncertain. In Son Tra Nature Reserve, the population of the red-shanked douc langurs was estimated around from 700 individuals (Vu Ngoc Thanh *et al.*, 2016) to 1,300 individuals (Greenviet, 2017), and thus, this area is also considered as an important site for conservation of the species in Vietnam. In

Son Tra peninsula (Da Nang city), the red-shanked douc langurs have been investigated for more details about the conservation status and behavioural ecology (Lippold and Vu Ngoc Thanh, 2008; Dinh Thi Phuong Anh *et al.*, 2010; Vu Ngoc Thanh *et al.*, 2016; Lippold *et al.*, 2018), but the information on the distribution and population status in the remaining special use forest areas in Vietnam is still very limited.

Bach Ma National Park covers an area of 37,487 ha and is located in Central Vietnam. This is one of the National Parks with high biodiversity. Bach Ma National Park is located in the central Truong Son range and lies on a high mountain ridge that runs west-east from the Laotian border to the East Sea. This ridge interrupts the coastal plain of Vietnam, and therefore, is believed to form a biogeographical boundary between the faunas and floras of northern and southern Vietnam. Thus, Bach Ma National Park is considered one of areas having the rich diversity of the fauna with many endemic and rare species. Scientists have recorded 1,493 animal species in Bach Ma National Park, including 132 mammal species, 358 bird species, 31 reptile species, 21 amphibian species, 57 fish species and 894 species of insects (Nguyen Vu Khoi *et al.*, 2004). The red-shanked douc langurs were previously found in Bach Ma National Park and their population has been mainly recorded in the northeastern Park (the old area of the Park before 2008) (Huynh Van Keo and Van Ngoc Thinh, 1998; Le Doan Anh *et al.*, 2012), but there is still a lack of information about distribution and population status in the southwestern Park (the expanded area of the Park from 2008). Furthermore, the red-shanked douc langurs are threatened in many regions by poaching for medicine, food, and trading (Coudrat *et al.*, 2014). Therefore, updating the information on the distribution and population status will support managers and experts to develop the conservation and monitoring programs of the red-shanked douc langurs in

Bach Ma National Park. The objective of this study is to update the database on the distribution and population status of the red-shanked douc langurs in Bach Ma National Park, Thua Thien - Hue province.

## **2. MATERIAL AND METHODS**

### **2.1. Intensive interview method**

In total, 30 people were selected to interview, including 10 rangers, 10 local hunters, and 10 local people who frequently go into the forest and who possess knowledge of the primates and other mammals in the forest areas near to their residences. In this way, the basic information such as the distribution, hunting status, locations of recent observations, frequency, habitat, trading, and threats to the species could be obtained. Geographical coordinates and altitudes were recorded by a Global Positioning System. Photos and brochures with the features and behavioral characteristics of the red-shanked douc langurs were used during the interview process.

### **2.2. Line transect survey method**

Based on the interview results, the line transect surveys were conducted to record the presence and main habitats of the red-shanked douc langurs in Bach Ma National Park. The line transect surveys were conducted on 14 lines in 14 different sectors, including sectors 229, 230, 375, 376, 208, 211, 210, 385, 384, 412, 416, 427, 430 and 410 (Table 1). The lengths of transects varied between 3.0 km and 5.0 km with a total length of 63 km walk (Table 1). Once located, the doucs were watched, counted, and differentiated by sex and age. Age and sex of doucs were based on criteria outlined by Lippold (1977). The observer walked the line transects between 6:00 and 10:00 and; 14:00 and 18:00. During the line transect surveys the observer walked very slowly and as quietly as possible at a speed of 1.5 - 2 km/h. Each line transect was surveyed in a period of 2 - 5 field-days. GPS waypoints were collected at all sight locations.

**Table 1. The locations and duration of the line transect surveys focused on the red-shanked douc langur in Bach Ma National Park**

No.	Routes	Sectors	Main habitat	Transect length (km)	Duration	Number of days
1	Route 1	229	TXG	3.1	16 August to 17 August 2018	02
2	Route 2	230	TXB	4.5	18 August to 19 August 2018	02
3	Route 3	375	TXB	5.0	20 August to 22 August 2018	03
4	Route 4	376	TXG	4.1	23 August to 25 August 2018	03
5	Route 5	208	TXN, TXB	4.9	02 September to 04 September 2018	03
6	Route 6	211	TXB	4.8	06 September to 08 September 2018	03
7	Route 7	210	TXG	4.7	09 September to 10 September 2018	02
8	Route 8	385	TXG	4.5	15 September to 17 September 2018	03
9	Route 9	384	TXG	4.0	18 September to 20 September 2018	03
10	Route 10	412	TXB	5.0	25 September to 29 September 2018	05
11	Route 11	416	TXB	4.6	02 February to 05 February 2019	04
12	Route 13	427	TXB, TXG	4.0	10 February to 12 February 2019	03
13	Route 14	430	TXN, TXG	4.8	15 February to 17 February 2019	03
14	Route 15	410	TXG	5.0	25 February to 28 February 2019	04
<b>Total</b>						<b>43</b>

**2.3. Habitat identification**

Based on the current map of Bach Ma National Park on forest resources in 2017, interviews, and line transect surveys, the types of habitats of the species were identified as following: the rich forests of evergreen broad-leaved forest (TXG); the middle forests of evergreen broad-leaved forest (TXB); the poor forests of evergreen broad-leaved forest (TXN).

**2.4. Data Analysis**

The survey and collection data were synthesized, analyzed, and processed on Excel software. The quantitative and qualitative information were analyzed in combination with tables and charts to illustrate the results such as distribution, number of individuals in group, group structure (age and sex) and main habitats of the red-shanked douc langurs.

**3. RESULTS AND DISCUSSION**

**3.1. The distribution and population status of the red-shanked douc langurs in Bach Ma National Park**

As a result of 43 field-days of the surveys on 14 lines, there were records of 08 groups in total of 68-86 individuals of the red-shanked douc langurs (Table 2, Figures 1 and 2). There were 06 groups distributed in the Northeastern area of Bach Ma National Park, comprising the sectors such as 229, 230, 375, 376, 384 and 208. The other two groups were distributed in the southwestern area of the Park, including the sectors 416 and 410 (Table 2, figure 1). The largest group consisted of 18 to 20 individuals in line 1 (sector 229) (Table 2), while the smallest group had 5 to 7 individuals in line 4 (sector 376) (Table 2). The average of each group was about 8 to 10 individuals.

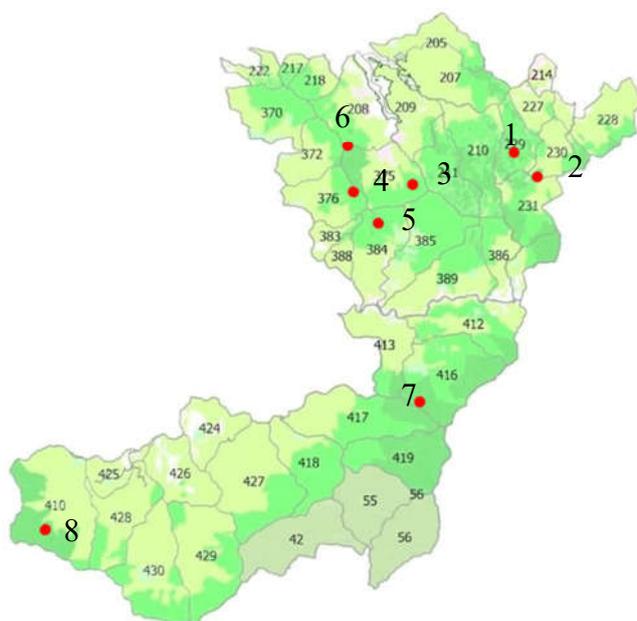


Figure 1. Distribution of the red-shanked douc langurs in Bach Ma National Park



Figure 2. A group of the red-shanked douc langurs in Bach Ma National Park

Table 2. The group structure of the red-shanked douc langurs in Bach Ma National Park

Groups	Sectors	Number of individuals	Estimated individuals	Male	Female	Juvenile	Infant
1	229	18	20	4	11	2	1
2	230	8	12	2	5	1	0
3	375	6	8	1	3	1	1
4	376	5	7	2	3	0	0
5	384	10	13	3	5	1	1
6	208	6	7	1	4	1	0
7	416	7	9	2	4	0	1
8	410	8	10	-	-	-	-
<b>Total</b>		68	86	15	36	5	4

Note: “-” the group structure has not been indentified in the field survey.

Huynh Van Keo and Van Ngoc Thinh (1998) recorded about 30 individuals of the red-shanked douc langurs in Bach Ma National Park. Meanwhile, Vo Cong Chanh (2009) found around 4 groups of the red-shanked douc langurs with a population size of about 39 individuals. The most recent research results of Le Doan Anh *et al.* (2012) showed that Bach Ma National Park also had about 4 groups and 1 lone individual of the red-shanked douc langurs with a population estimated from 35 to 43 individuals. In the present study a total of 8 groups of the red-shanked douc langurs were recorded in Bach Ma National Park and had nearly 4 times more than the previous report of

Le Doan Anh *et al.* (2012). Moreover, the population size with 68 to 86 individuals in the present study was more than double that of the latest published by Le Doan Anh *et al.* (2012).

The number of groups and population size of the red-shanked douc langurs which are larger than the previous research results, may be associated with the expansion of the survey area, especially in the southwestern area of Bach Ma National Park. Previous studies mainly focused on the survey of the red-shanked douc langurs in the Northeastern area of Bach Ma National Park (Vo Cong Chanh, 2009; Le Doan Anh *et al.*, 2012). In the present

study two groups of red-shanked douc langurs were detected for the first time in the southwestern area of Bach Ma National Park. Furthermore, the survey results in the northeastern area of Bach Ma National Park also recorded two more groups in the sectors 208 and 376 compared to the latest study by Le Doan Anh *et al.* (2012).

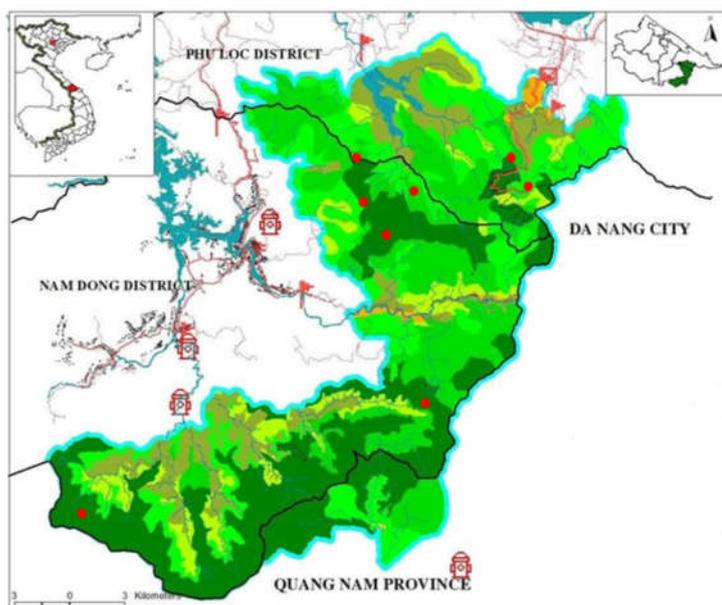
**3.2. The characteristics of distribution in relation to habitats and elevation of the red-shanked douc langurs in Bach Ma National Park**

The field observations showed that the red-shanked douc langurs mainly inhabit both rich and middle, evergreen broad-leaved forests

(TXG and TXB) in Bach Ma National Park which is remote with tall trees and minimal disturbance by humans. (Table 3, figure 3). Only 2 groups in the sectors 230 and 375 were detected in the habitat of medium, evergreen broad-leaved forest (TXB). Furthermore, the study results have not recorded the occurrence of the red-shanked douc langurs in the habitat of poor, evergreen broad-leaved forest (TXN). In general, the areas with the rich and medium forests were the main habitats of the red-shanked douc langurs which were also reported in the previous study (Dinh Thi Phuong Anh *et al.*, 2010).

**Table 3. The distribution of the red-shanked douc langurs in relation to habitats and elevation in Bach Ma National Park**

Groups	Sectors	Elevation (m)	Coordinate	Habitat condition		
				TXG	TXB	TXN
1	229	1,344	16° 11' 39''N, 107° 51' 40''E	+	+	
2	230	674	16° 12' 02''N, 107° 52' 14''E		+	
3	375	591	16° 11' 16''N, 107° 48' 22''E		+	
4	376	741	16° 12' 48''N, 107° 47' 02''E	+	+	
5	384	919	16° 10' 47''N, 107° 46' 48''E	+		
6	208	641	16° 05' 46''N, 107° 48' 17''E	+	+	
7	416	796	16° 05' 46''N, 107° 48' 17''E	+		
8	410	909	16° 02' 18''N, 107° 38' 12''E	+		



**Figure 3. The distribution of the red-shanked douc langurs in relation to habitats (forest conditions) in Bach Ma National Park**

The field surveys showed that all the red-shanked douc langurs were distributed at elevations from 500 m to 1,400 m above sea level in Bach Ma National Park. This result was consistent with the previous report (Le Doan Anh *et al.*, 2012).

### **3.3. Threats to the red-shanked douc langur population in Bach Ma National Park**

Through the field surveys combined with the interview information, the present study has identified the 4 main threats to the red-shanked douc langurs in Bach Ma National Park, including hunting, illegally exploiting forest products, development of tourism supported by road constructions and buildings, and conversion of forest into agricultural land and acacia plantations, of which the hunting is the most direct and serious threat to the red-shanked douc langurs in the areas of Bach Ma National Park. From 2015 to 2018, the Bach Ma National Park Forestry Protection Department has discovered and handled 193 violations of the forest protection and development law. They also handled and confiscated 13 kg of the products of the red-shanked douc langurs at the same time. In fact, the number of the hunting and trapping of the wildlife species in general and the red-shanked douc langurs in particular may be higher.

### **3.4. Recommendations**

The forest rangers of Bach Ma National Park should regularly monitor and protect the distribution areas of the red-shanked douc langurs, especially the locations that have been recorded the presence of the species, such as the sectors 229, 230, 375, 376, 384, 208, 416 and 410.

Further field surveys in other sectors, which have the same habitat conditions, are essential to provide sufficient information on the distribution and population status of the red-shanked douc langurs.

The forest rangers of Bach Ma National Park should enhance the law enforcement in forest and wildlife protection by strengthening patrols, removing traps, and by severely punishing law-breakers.

The management board of Bach Ma National Park should coordinate with local authorities to develop a propaganda plan in order to raise awareness with local people

about the role of wildlife in general and the red-shanked douc langurs in particular for biodiversity, especially needing them to focus on awareness of who are local hunters and local students.

### **4. CONCLUSIONS**

The survey results have recorded 08 groups of the red-shanked douc langurs in Bach Ma National Park with the estimated population of about from 68 to 86 individuals.

The number of groups and population size of the red-shanked douc langurs recorded in the present study was larger than that in the previous reports.

The two groups of the red-shanked douc langurs were recorded for the first time in the southwestern area of Bach Ma National Park.

The habitats of the red-shanked douc langurs in Bach Ma National Park mainly occur in the rich and medium, evergreen broad-leaved forests (TXG and TXB) and were recorded at the elevations from 500 m to 1,400 m above sea level.

The present study has identified 04 main threats affecting the habitats and the red-shanked douc langur species in Bach Ma National Park, including the hunting, illegal exploiting of forest products, development of tourism supported by road construction and buildings, and conversion of forest into agricultural land and acacia plantations, of which the illegal hunting is the most serious threat to the red-shanked douc langurs in the study area.

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**BẢO TỒN LOÀI VOOC CHÀ VÀ CHÂN NÂU (*Pygathrix nemaeus*)  
Ở VƯỜN QUỐC GIA BẠCH MÃ, TỈNH THỪA THIÊN - HUẾ:  
CẬP NHẬT VỀ PHÂN BỐ VÀ HIỆN TRẠNG QUẦN THỂ**

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**TÓM TẮT**

Voọc chà và chân nâu *Pygathrix nemaeus* là một trong những loài linh trưởng quý hiếm được xếp vào nhóm nguy cấp có phân bố đặc hữu ở Việt Nam, CHDCND Lào và Campuchia. Một số nghiên cứu trước đây đã ghi nhận sự hiện diện của loài Voọc chà và chân nâu ở Vườn Quốc gia Bạch Mã. Các báo cáo trước đây về tình trạng quần thể loài Voọc chà và chân nâu chủ yếu tập trung ở khu vực phía Đông Bắc của Vườn, tuy nhiên chưa có nhiều thông tin về điều tra quần thể loài ở khu vực phía Tây Nam của Vườn. Để cải thiện triển vọng bảo tồn loài ở khu vực nghiên cứu, mục tiêu của nghiên cứu này nhằm cập nhật cơ sở dữ liệu về hiện trạng phân bố và quần thể của loài Voọc chà và chân nâu ở Vườn Quốc gia Bạch Mã, tỉnh Thừa Thiên - Huế. Điều tra thực địa theo tuyến đã được tiến hành trên 14 tuyến thuộc 14 tiểu khu của Vườn Quốc gia Bạch Mã. Kết quả nghiên cứu đã ghi nhận được 08 đàn Voọc chà và chân nâu hiện phân bố ở Vườn Quốc gia Bạch Mã với ước lượng quần thể khoảng từ 68 đến 86 cá thể. So với các kết quả nghiên cứu gần đây thì số đàn và kích thước quần thể của loài Voọc chà và chân nâu được ghi nhận ở trong nghiên cứu này là lớn hơn. Lần đầu tiên ghi nhận được 02 đàn có phân bố ở khu vực phía Tây Nam của Vườn. Sinh cảnh sống của loài Voọc chà và chân nâu ở khu vực Vườn Quốc gia Bạch Mã chủ yếu là ở sinh cảnh rừng gỗ núi đất lá rộng thường xanh giàu (TXG) và trung bình (TXB) và phân bố ở độ cao trên 500 m đến gần 1.400 m so với mực nước biển. Có 04 mối đe dọa chính ảnh hưởng đến sinh cảnh và loài Voọc chà và chân nâu phân bố ở các ở các khu vực Vườn Quốc gia Bạch Mã gồm: săn bắt, khai thác gỗ và lâm sản trái phép, xây dựng đường và các công trình phục vụ du lịch và lấn chiếm đất rừng làm rẫy, trồng keo. Trong đó săn bắt trái phép là mối đe dọa nghiêm trọng nhất đối với loài Voọc chà và chân nâu ở Vườn Quốc gia Bạch Mã.

**Từ khóa:** Bạch Mã, phân bố, *Pygathrix nemaeus*, quần thể, sinh cảnh.

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