



the bp conservation programme



Final Report

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A field survey for the grey-shanked douc langurs (*Pygathrix cinerea*) in Vietnam



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List of figures

- Fig.1: Distinguished three species of douc langurs in Indochina
Fig.2: Map of surveyed area
Fig.3: An interview in Kon Cha Rang natural reserve area
Fig.4: A grey-shanked douc langur in Kon Cha Rang natural reserve area
Fig.5: Distribution of grey-shanked douc in Kon Cha Rang, Kon Ka Kinh and buffer zone
Fig.6: A grey-shanked douc langur in Kon Ka Kinh national park
Fig.7: Collecting faeces sample in the field
Fig.8: A skull of a douc langur collected in Ngut Mountain, Kon Ka Kinh NP
Fig.9: Habitat of douc langur in Kon Cha Rang
Fig.10: Habitat of douc langur in Kon Ka Kinh
Fig.11: Stuffs of douc langurs in Son Lang village
Fig.12: Traps were collected in the field
Fig.13: Logging operation in the buffer zone area of Kon Cha Rang
Fig.14: A civet was trapped in Kon Ka Kinh
Fig.15: Illegal logging in Kon Ka Kinh
Fig.16: Clear cutting for agriculture land
Fig.17: Distribution of the grey-shanked douc langur before survey
Fig.18: Distribution of the grey-shanked douc langur after survey
Fig.19: Percentage of presence/absence in the surveyed transects.

List of tables

- Table 1: Group structure of the grey-shanked douc langur
Table 2: List of wildlife products in the restaurants
Table 3: List of animals recorded in the Kon Cha Rang natural reserve and Kon Ka Kinh national park

Contents

Project member

List of figures

List of tables

Acknowledgments

Summary

1. Introduction, Aims and Objectives

1.1 Background of project

1.2 Aims and Objectives

1.3 Study sites

1.3.1 Kon Cha Rang natural reserve area

1.3.2 Kon Ka Kinh national park

2. Methodologies

2.1 Interview methods

2.1.1 Who will be interviewed?

2.1.2 Interview structure

2.2 Field Survey methods

2.2.1 Materials and documents

2.2.2 Field survey methods

2.2.3 Specimen collecting

2.3 Mapping

2.4 Time schedules

3. Results

3.1 Distribution and relative density estimate of the grey-shanked douc in Kon Cha Rang natural reserve area and its buffer zone

3.1.1 Distribution of the grey-shanked douc in Kon Cha Rang

3.1.1.1 Interview result

3.1.1.2 Field result

3.1.1.3 DNA analysing specimens collected in Kon Cha Rang

3.1.2 Relative density estimate

3.2 Distribution and relative density estimate of the grey-shanked douc in Kon Ka Kinh national park and its buffer zone

3.2.1 Distribution

3.2.1.1 Interview result

3.2.1.2 Field results

3.2.2 Relative density estimate

3.3 Group structure and group size

3.4 Habitat Description

3.4.1 Habitats of the grey-shanked douc langurs

3.5 Conservation status

3.5.1 Human impacts in Kon Cha Rang nature reserve area and its buffer zone

3.5.1.1 Hunting and trapping

3.5.1.2 Wildlife trade

3.5.1.3 Logging

3.5.2 Human impacts in Ka Ka Kinh national park and its buffer zone

3.5.2.1 Hunting and trapping

3.5.2.2 Wildlife trade

3.5.2.3 Logging and shifting farms

3.6 Records of other animals in field

3.6.1 Primate fauna

3.6.2 Other animals

3.7 Information of potential corridor area

4. Discussion

4.1 Distribution

4.2 Relative density estimate

4.3 Chance to conserve the species

5. Recommendations for conservation in Kon Cha Rang natural reserve area and Kon Ka Kinh national park

5.1 For Kon Cha Rang Nature reserve

5.2 For Kon Ka Kinh National park

6. Conclusions

Reference

Figures

Appendix

Acknowledgments

The project is one of winners of the “BP Conservation Programme” in 2004. The field work was conducted with generous financial support of from BP conservation programme. It is a good start to conserve the grey-shanked douc langur in the Central Highland of Vietnam, especially at Kon Ka Kinh national park and Kon Cha Rang natural reserve area.

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Summary

A field survey to investigate the grey-shanked douc langurs (*Pygathrix cinerea*) in Kon Cha Rang natural reserve area, Kon Ka Kinh national park and buffer zone area, Vietnam was conducted in 25th, July to 31th, August and from 8th to 30th, November, 2004. The result has show that the grey-shanked douc langurs distribute in both protected forests and in the buffer zone. The main habitats of the species in this area are primary forest and secondary forest with the forest type is montane evergreen forest (900-1300m). It is the first time the grey-shanked douc langur was recorded at the elevation of 1400m. The distribution of the species also was confirmed up to the latitude 14^o13'N, the most southern in their distribution boundary. Using relative density estimate method Presence/Absence, the result suggested that population of the grey-shanked douc in the area is quite abundant. 49% of total transects with occurrence of the species was recorded. The DNA analysing has pointed out that population of grey-shanked douc langur in Kon Cha Rang is genetically close to the population in Ba To, Quang Ngai. Main threats to the species are hunting, logging and wildlife trading. Conservation on the grey-shanked douc in the area will get more improvement if the staffs of the two protected areas get more train. Awareness programme should be carried out in the local communities. And a forest corridor in between should be immediately established.

1. Introduction, Aims and Objectives

1.1 Background of project

Vietnam is home to 24 taxa of primates. The country has the greatest diversity of primates in the mainland of South-east Asia (Bleisch, 2002). The country is also recognised as an important hotspot of biodiversity in the world. In the late of 20th century, the world witnessed several new discoveries of large mammals in Vietnam such as the Saola (*Pseudoryx nghetinhensis*) found in 1992 and the Truong Son muntjac (*Muntiacus truongsonhensis*) found in 1994 (Dung *et al.* 1994).

Recently, primatologists have surprised with the rediscovery of the black langur (Nadler, 1998, Le Khac Quyet, 2004) and the eastern black-crested gibbon (*Nomascus nasutus*) in the north of Vietnam (Nadler, 2003; Le Quang Trung & Trinh Dinh Hoang, 2004).

Despite the diversity of Vietnam's primates, almost of them is on the edge of extinction and facing a hard challenge for long time survival. 5 of Vietnam's species are in the listed in "the world top 25 endangered primate". Those are: Grey-shanked douc langur (*Pygathrix cinerea*) Tonkin snub-nosed monkeys (*Rhinopithecus avunculus*), Cat Ba langur (*Trachypithecus poliocephalus*), Delacour's langur (*Trachypithecus delacouri*), and Easter black gibbon (*Nomascus nasutus*) (Mittermeier *et al.*, 2004).

The douc langur group provides an interesting story in the scientific world since there has been a long debate on their taxonomy. The red-shanked douc was described in 1771 (Linnaeus, 1771), the black-shanked douc in 1871 (Milne-Edwards, 1871), while the last description of a new douc langur, the grey-shanked douc langurs in 1997 Nadler (Nadler, 1997). It took about 126 years until the scientist recognized a third sub-species of douc langurs.

Douc langurs are restricted to Vietnam, Laos and Cambodia, east of the Mekong (Fooden, 1996, Nadler *et al.* 2003). *P. nemaus*, the northern form, extends from about 18°40'N latitude in Lao and 19°30'N in Vietnam. *P. cinerea* is in the central provinces of Vietnam, and *P. nigripes* is in the South of Vietnam and eastern Cambodia (Fig.1).

However, logging and hunting are threatening their survival by taking away vast amounts of their habitat and causing rapid decline of their populations. In fact, they could disappear in the wild before scientists gain more knowledge of their distribution, behaviour and ecology (Ha, 2000). Among the three species, the grey-shanked douc is considered as the most critically endangered species.

Although the species considered as one of the most endangered primates in the world it was insufficient knowledge and conservation affords for them apart from few field surveys was done in 1990's.

Planning a conservation strategy for the species depends on how much we know about their population, distribution and ecological behaviours. Therefore a research on the distribution and population status of grey-shanked douc langurs is urgent necessary. This research chooses the Kon Cha Rang natural reserve area and Kon Ka Kinh national park as potentially important conservation areas for this species in the future.

1.2 Aims and Objectives

- Investigate the distribution of the grey-shanked douc langur in the two forest protected area and in the buffer-zone. Gather information of other primates inside the two protected forests.
- Investigate the population abundance of the species in the Kon Ka Kinh national park, the Kon Cha Rang natural reserve area and the buffer zone.
- Collect information of forest conditions in surveyed areas as well as information of threats that the species are facing to in order to suggest conservation strategies to protect them.
- Gather information on agricultural usage of the land, human structure and land rights situation in order to suggest the provincial government on establishing of a forest corridor between the two protected areas.

1.3 Study sites (Fig.2)

1.3.1 Kon Cha Rang nature reserve area

The natural reserve area locates in the North-east of Gia Lai province. It belongs to Son Lang village, K'Bang district. It is about 70km to K'Bang town. The surface area is 15.900 ha, comprising a strict protection area of 8,746 ha and a forest rehabilitation area of 7,154 ha. A buffer zone with about 56.000ha in Son Lang and Dak Roong communes, K'Bang district is established.

Coordinate: N 14⁰25' to 14⁰35'
E 108⁰30' to 108⁰39'

The terrain in Kon Chu Rang is characterised by a mix between hilly mountain and highland. Kon Cha Rang natural reserve area is situated in the upper part of Kon River apart of Kon Ha Nung highland block. The average altitude is about 900-1000m in the north part of nature reserve and the highest point is Mount Kon Cha Rang at 1.452m. The lowest point is at the area is 800m.

Forest covers 15,610 ha or 98% of the total area of Kon Cha Rang nature reserve. The main forest type is montane evergreen forest, distributed at the altitudes between 900 and 1,500 m in the north-west of the nature reserve. The flora system is dominated by a number of species from the *Fagaceae*, *Lauraceae* and *Magnoliaceae* families, mixed with gymnosperms, such as *Podocarpus imbricatus* and *Dacrydium elatum*. Lowland evergreen forest occurs at the elevation below 900m. There is about 2% of the natural reserve area is covered scrub vegetation. Canopy cover is 80%. (Birdlife source book, 2001).

1.3.2 Kon Ka Kinh national park

The national park locates in the north-east of Pleicu city (about 45 km). It situates in several villages of three districts: Kon Pne, Dak Roong, K'roong communises in K'Bang district, Ha Dong commune in Dak Doa district and Ayun commune in Mang Yang district. The surface area of national park is 41,710 ha.

Coordinate: 14⁰09' - 14⁰30'N
108⁰16' - 108⁰28' E

The whole national park locates in the Kon Tum Plateau. In the North is Mount Ngoc Linh, the highest mountain in the Central Highlands. The mountains in the north and north-east are high and steep. The highest mountain in Kon Ka Kinh is 1,748 m. To the south and the south-west, the topography is flatter, and altitudes are below 500m.

The river system of the national park flows in two main directions. The streams fall to the east side will flow to China Sea follow the Ba river valley. The streams fall in to the west side forms part of the catchments of the MeKong River (Le Trong Trai, *et al.*2000).

Kon Ka Kinh national park contains 33,565 ha of forest, equivalent to 80% of the total area. The national park consists of large range of montane evergreen forest types across an altitudinal range from 700m to 1,784m (Birdlife source book, 2001).

2. Methodologies

2.1 Interview methods

The interviews were made before the field survey taken place. The interviews will collect information of all primates in the area with a focus on the grey-shanked douc langurs. Questionnaires were used to get information. The aim of using questionnaires is to get correct information on the occurrence of grey-shanked douc langurs in each area and partly support estimation of population abundance.

The questions used in this survey included open-ended and closed questions. Open-ended questions are used to gather useful general information. The use of these questions allows respondents to answer in their own way, without influence from the interviewer. Closed questions, which produce standardized data, can be analysed statistically. These were used to collect information regarding populations of the langurs and the changing condition of forests. The questionnaire followed guidelines in Peterson (2000).

In the primate section, questions were designed based on the different external characteristics of four the distinctive groups of Vietnamese primates: gibbons, langurs, macaques and lorises, as described in “The field guide to investigate mammals in Vietnam” (Le, 1999). Characteristics of each species were distinguished using the “Field guide to identify primates in Vietnam” (Baker, 2000). The questions were collected and grouped based on our experience from previous surveys of primates.

Questions concerning douc langurs were based on knowledge of their growth processes (Lippold, 1977) and, in particular, characteristics of each of three species which are kept in the Endangered Primates Rescue Centre (EPRC).

2.1.1 Who will be interviewed?

Interviews and discussion were carried out with local staff from forest protection departments (FPD) and the staffs at the forest protected area in beginning. Questions were concerned with the occurrence of primates in the areas, forest condition and forest type, and fact about hunting pressure and wildlife trading in the area. Normally, the FPD office staff gave us access to the annual report on the forest and wildlife as well as the forest offence cases during a year.

In the villages, the interviews were focussed on hunters, collectors, traders and local people who had farms inside the forest. Questions mostly concerned the distribution and abundance of primates.

2.1.2 Interview structure

The survey team visited respondents at a suitable time (normally in the later afternoon when they were back from the field). The aims of the interview were briefly introduced to the interviewee. They were asked if they were willing to provide information. Once they agreed to the interview being taken, they were asked questions directly, and their answers were noted by the interviewer following same structure as in the written questionnaires. Some times interview sheets were used when junior surveyors carried out the interview. Interviews were mostly carried out with one interviewee, but occasionally with a group of 2-3 people. Interviews took from 20 to 30 minutes to complete. Respondents were asked to describe each type of primate that they had seen. If local people described a monkey with a long white tail (the most typical characteristic of douc langur), they were then asked to give more details such as the place that they had seen them and the number of individuals in the group.

Pictures of douc langurs and others primates were shown to respondents at the end of interviews. These pictures are used to check whether respondents could clearly recognize the animals that they had described. Special care was taken when they were asked to identify species from the set of douc langur pictures.

2.2 Field Survey methods

2.2.1 Materials and documents

The most important source of information available on the grey-shanked douc langurs was available at the EPRC. All documents relevant to douc langurs, such as previous reports, satellite maps and field guides have been collected and reviewed in this report. Almost all the data concerning land use was collected from forest protection department (FPD). Field equipments included tents, binoculars, compass, 35mm camera, GPS, specimen collection boxes, touches, pens, notebooks and topography maps of each area.

2.2.2 Field survey methods

The survey team contacted the national park and nature reserve area in advance to ask for permission to do research in the field. This connection was helpful for fieldwork in term of gaining a clear understanding of local communities and forest condition in the area. We were always accompanied by staffs from the national park or the nature reserve area, along with local field guides who knew the terrain and wild life.

The relative density estimate method was used for this survey due to the shortage time of survey. The species Presence/Absence records method was used to collect the data on population density. The area where is close to the recent sighting of douc langurs was chosen for setting up a camp. In each camp site, transects which cross different forest types were visited. Almost transects were drew on a terrain map with GPS and surveyors cut through the forest follow the map. In several areas where are difficult topography then exiting trails have been used instead. Each transect is at least 4 km long (5 km in average). Field observations usually begin at 06h00 and finish at 18h00.

During the surveys, the number of encounters with the species in each transect was recorded. The distance to the centre of the group was measured. Group structure was determined whenever the langurs were encountered. And the time of observation and name

of location were noted and marked with the GPS. The number of animals, their sexes and an estimation of each individual's age was recorded. The habitat, where the langurs occur was noted.

2.2.3 Specimen collecting

Specimens including all remain from hunted animals, such as skull, skin, hairs, tail and bones. The name of localities, times of collection and names of collectors were noted with a tag. Fresh samples such as the skin of newly dead animals, or faeces, were stored in small glass bottles using alcohol (90^o). Hair samples were kept dry in small cardboard boxes.

Skulls will be collected and keep separately with tags. All skulls with tooth remains were kept with care for aging purposes. Skulls brought by local people were first examined to determine whether they were macaques or langurs before going into the field. Douc langurs kept as household pet or exhibited in markets were photographed and their origin was inquired about.

2.3 Mapping

The localities where the grey-shanked douc langurs are observed will be marked with a GPS that allowed drawing of exact distribution maps for the grey-shanked douc langur later on. All specimens collected in the field were sent to the German primate research centre (GPRC) for DNA analysis.

2.4 Time schedules

The survey in Kon Cha Rang natural reserve area and its buffer zone was conducted from the 25th July to 31th August. And survey in Kon Ka Kinh national park and its buffer zone was run from 8th to 30th of November.

3. Results

3.1 Distribution and relative density estimate of the grey-shanked douc in Kon Cha Rang natural reserve area and its buffer zone

3.1.1 Distribution of the grey-shanked douc in Kon Cha Rang

3.1.1.1 Interview result

About 17.5 hours of data collecting were taken place in villages around Kon Cha Rang natural reserve. 35 people including local people, hunters and rangers who live near by the nature reserve were interviewed (Fig.3). The result shows that there were many sightings of grey-shanked douc langur inside and outside of the nature reserve. The two locations with the most recent sightings of the species were Thac 50 and Kon River. And there wasn't information of other type of douc langurs. According to local people, the species is quite easy to hunt. They estimated some hundreds of the langurs had been killed in the last fifteen years and the group size of the species decreased. It is rare to meet a group with more than 20 individuals now while they could see a group of 50 individuals in the past.

Local people informed that a hunter from Kon Voong village, K'Bang district killed 4 langurs in Kon River area 3 weeks before the survey began. A local people live in Thon 5 hamlet saw a group of langur in Trai Dam stream in August, 2004. This group contains about 20 individuals.

At the interviews an important note for investigating of occurrence of the langur in the field was learnt. It is langur hunting site. The area where langur was hunted by local hunters is characterised by one big tree (with diameter about 30-40 cm) surrounded by several small tree with the top cut down. The big tree is normally a resting place of the group. And all the small trees were cut down to wider target.

3.1.1.2 Field result

3 observations of the grey-shanked douc langur in Kon Cha Rang were made. The first group was seen at 9h00'- 9h30' am in 4th of August in Kon River area, in the location (49P 0232717, UTM 1609332). The group was found on their translocation. The calls made by a juvenile one and half year old were heard. She was behind the group. 10 minutes later, 7 individuals of the group sitting on a big tree were seen. The alpha male moved in front of group. A proximally, this group contains about 20 individuals since they were divided in three sub-groups. The distance from surveyors to the central of the group is about 30-40 m (Fig.4).

Six faeces sample of this group were collected. There was quite a lot of dung on the ground. It indicates that the group was eating for a long time before we came, and their sleeping site was also near by.

It was noted that at the same time of observing the langur groups, 3 individuals of macaques (*Macaca* sp) were eating in the place close to the douc langur group.

The second group of the grey-shanked douc was seen in Suoi Cat area the location (49P 0240373 UTM 1606206). This group was seen only in 15 minutes in the 17th of August. At about 14h 30'pm, the sound of crashing branches and animal moving on trees was heard. And in opposite slope about 35 m in distance 4 individuals of the grey-shanked douc langur were seen. Later on a group of stump-tailed macaques (*Macaca acrotoidea*) was seen in a place quite close to the group of langur. The macaques quickly run away by climbing down to the ground when they saw surveyors

while the group of langur hid in the tree. The group consist of more than 10 individuals.

The third group was exposed in Thac 50 area which locates in (49P 0242786 UTM 1608424). The group was observed from 10h40' until 11h30' am. In beginning, one sub-adult about 2 years old was seen when she swung behind the group. At 11h20' am whole group were resting in the high big tree (40m height) with a lot of big branches while the big alpha male moved in front and slept alone in another tree near by. The distance from the group to surveyor is only about 10m.

Six individuals resting in the tree were counted. However, this group contain at least 11 animals. The whole group were very quite during their resting time. It is remarked that resting time start quite early at 11h20'am. Performance of the alpha male in the wild is similar to a male douc langur in captivity. He sat on branch with two fore-arms holding up to branches. The limbs hang down and his head was down.

3.1.2 Relative density estimate

There 19 transects have been investigated for the grey-shanked douc langur in Kon Cha Rang. All together, in 9 transects evidence of presence of the grey-shanked douc langurs were recorded, equivalent of 46%. Following that, 3 direct observations of the grey-shanked douc langurs were made in 3 transects (occupied 16%); evidences of occurrence of the langurs were found in 6 transects (occupied 31%) with two transects are langur hunting sites and 4 transects found remain food, leaves and fruits.

3.1.3 DNA analysing specimens collected in Kon Cha Rang

Result of DNA analysis of specimens collected in Kon Cha Rang natural reserve area found out that the faeces samples belong to two individuals of grey-shanked douc langurs. And the DNA sequence of the grey-shanked douc langur in Kon Cha Rang is highly identical with DNA sequence of the individuals found in Ba To district, Quang Ngai province in 2000 (Roos.C, per comm.).

3.2 Distribution and relative density estimate of the grey-shanked douc in Kon Ka Kinh national park and its buffer zone (Fig.5)

3.2.1 Distribution

3.2.1.1 Interview result

Because of shortage time for field work and the national park is too lager. Interview was the most important to get information of distribution of the langur in this survey. Interviews were carried out around the national park.

There was 22 hours of data collecting in villages. 45 local people including hunters, collectors, traders and rangers were joined in interview processes. Local people described and recognized the douc langurs very well. Again, there were no other types of the douc langurs except the grey-shanked douc langur had been described by local people.

In the south of the park interviews were conducted in two hamlets De K'Gieng and De K'Toc, AYun village, Mang Yang district.

In De K'Gieng hamlet, the result shows that a fruit collector saw a group of grey-shanked douc langur in Ha Ngoi stream in October, 2004. According to him, this group contains about 30 individuals. One hunter saw one group in Thac Ba Tang in

September, 2004. And three grey-shanked douc langurs were hunted by the local people in 8th November, 2004.

In De K'Toc hamlet, a group of langur was seen in Kon Bo Xi contains about 10 animals. This group is seen often by local people and collector. In Kon Bo Lu area, hunter and fruit collector claimed that saw a group with 30 individuals in September, 2004.

In the east part of the national park interviews were conducted in Dak Roong village, K'Bang District. Surveyors found that local people use meat of douc langur quite often. A piece of rib of a hunted douc langur was collected from a village police. The police claimed that the animal was hunted in Kon Bong hamlet, about 30km further north from Dak Roong village. One old hunter, who lives in this area for 60 years informed that the grey-shanked douc langur distributed in the whole area before the national park and Dak Roong forest enterprise were established. In 1999, he hunted 5 douc langurs in the forest between the Kon Ka Kinh national park and Kon Cha Rang natural reserve area. It is now become logging area of Dak Roong forest enterprise.

In the west part of the national park interviews were carried out in Ha Dong village, Dak Doa district. The grey-shanked douc langur was also described very well in all the hamlets where we have visited. There are 5 hamlets where interviews were taken place including Kon Bo Ram, Kon Nat, Kon Dot, Kon Mo Ha and Kon So Loc.

A honey collector, who lives in Kon Nat saw a group of douc langur in the Ngut mountain area in September, 2004. He estimated that the group contained about 20 individuals. Another hunter live in Kon Dot claimed that he hunted 3 douc langurs in Kon Dot forest in January, 2004.

3.2.1.2 Field results

2 observations of the grey-shanked douc langurs in Kon Ka Kinh national park were made. The first observation was made in Ha Ngoi stream which is belong to the forest sub-area number 433 (1 sub-area =1000ha; the system that Forest protection department use to manage forest). The group was found at position (49P 0212198, UTM 1574507). It was 11h 00' am when they were moving to a resting place. The sound that made of moved branches when animal leaping was to help us to find out the group which was just about 150m way. 11h 10' surveyor approached close to the group and observed them clearly. 13 individuals were resting in a big branch. From 11h10' to 11h 35'the whole group were resting quietly and they seem did not know the appearance of surveyors. Approximately, this group contains 20-25 individuals. The distance from the surveyor to the central of this group is 30 m.

During observation calls were recorded. There were mostly calls of females having a baby around her. The sound "Kojjc Kojjc Kojjc" and "Kojjc Kojjc Kojjc Kojjc" were heard. The calls made by male are much louder than female. The sounds "Khajc Khajc Khajc" were heard for two minutes.

Second observation of the langur was made in Ngut mountain, Ha Dong village. The area belong to forest sub-area number 435 (49P 0209567; UTM 1583184). At first, the calls made by male attracted our attention. There were 7 separate calls were made by him. The sounds "Khajc Khajc Khajc" and "Khajc Khajc Khajc Khajc Khajc" were heard in 10h35'am. Surveyors located the position of the group by following the call of male.

A group eating in a tree at a distance about 40m was seen (Fig.6). There are two babies from this group were playing with their mother. Estimate, this group contains about 10-15 individuals. From 11h00' to 11h30', it was raining therefore the whole group did not move too much as normal, they sat quietly and pluck off the leaves. At 12h 05' a baby move very close to the observers about 20 m, this baby is about 1 year old with the fur already change to grey colour. From 12h00 a.m the whole group were resting and sit quietly. The group moved up to the top of mountain 12h 30' after rain stopped. The elevation in the place where observation was made is about 1400m. Faeces samples were collected in Ngut mountain (Fig.7).

A skull from one hunted langur has been found in a small hut along a stream in Ngut mountainous area (Fig.8). A pieces of langur meat was collected in Dak Roong village, K' Bang district.

3.2.2 Relative density estimate

There were 3 areas have been chosen as the main camp sites for investigate abundance of the langurs including Ha Ngoi stream area, forest sub-area number 110 and Ngut mountainous area. Two groups the grey-shanked douc langurs have been found with total of 30-40 individuals approximately.

8 transects have been surveyed. In 4 transects, evidences of presence of the grey-shanked douc were found (equivalent of 50%). In which, direct observations of the grey-shanked douc langur were made in 2 transects (equivalent of 25%) and dung and food remains were found in 2 transects (equivalent of 25%).

However, this result was impacted by bad weather during the survey time. 4 transects were visited during the raining day due to the unexpected storm in the area.

3.3 Group structure and group size

Table 1: Group structure of the grey-shanked douc langur

Groups	Adult	Sub-adult	Infant	Group size
KCR 1	7	2	0	9-20
KCR 2	4	?	?	4-10
KCR 3	6	1	0	7-11
KKK 1	12	?	2	14-25
KKK 2	6	?	2	8-15
Total				42-81

5 groups of the grey-shanked douc langur were been observed in the field with about 42-81 individuals. Almost of groups have maximum of group size less than 20 individuals. There is only one group with group size exceed 20 individuals occupied 20%. 4 groups contain less than 20 individuals in each group that equivalent about 80% of observations.

Results from interviewed data also show that the sightings of group with more than 20 individuals are minor. There are only 17% of recent sightings made by local people.

3.4 Habitat description

3.4.1 Habitats of the grey-shanked douc langurs

Langurs were found at the altitude from 900m to 1200m, especially in Kon Ka Kinh national park the langurs were found at 1400m above sea level (Ngut mountains). The habitat is characterised by montane evergreen forest. The canopy is about 80% in average but in some areas the canopy can reach 95%. The forest is dominated with trees belong to the families, *Fagaceae*, *Lauraceae*, *Magnoliaceae*, *Gymnospermae*, *Ericaceae*. In the locations where the animals have found, the density of the big tree with the diameter from 40-80 cm is quite high. The encounters to the animals often take place in the slope of mountain, where the density of the tree is thickness. The forest is typical by many fruits available around July and August of the year

5 observations of the grey-shanked douc langurs were made in primary forest. Almost of the groups were seen in big trees (diameter 40-120cm) with the height about 25-35m. These trees have many big branches, where the whole group can move around and rest (Fig.9 and Fig.10).

3.5 Conservation status

3.5.1 Human impacts in Kon Chu Rang natural reserve area and its buffer zone

Illegal activities such as hunting, trapping, wildlife trade were recorded inside the nature reserve. Local people, mainly the Bana minority group, still cut forest inside the natural reserve for coffee and crop grow. Coffee farms are popular in the hamlet 5, hamlet 4 Son Lang village. Shifting farms were found in Kon Voong hamlet, Dak Roong village.

3.5.1.1 Hunting and trapping

From September to December every year when the raining season come hunting, fishing, plant collecting to make medicine will happen. Such activities become traditions of BaNa minority people live around the national park and the natural reserve area because during the raining season there is no job for local people in the field and in the village.

In the field, survey group saw a hunter with a gun coming out from the natural reserve area in the 31 of July. He is known as one of the famous hunters live in Kon Voong hamlet. And five douc langurs were killed by him within the month. The monkeys were sold to medicine shop in the Son Lang village. At the local shop, 100 gram of “monkey balm” has a price about 35.000 VND (~2.5 \$US).

Traps were set up a lot inside the natural reserve area. Surveyors found and destroyed about 4,00m fenced trap in Trai Dam-Song Kon, 2,000m fenced trap in Thac 50. 70 string traps in all types were collected (Fig.11). 16 hunting camps inside the natural reserve area were recorded. The camps located mainly along Kon River and small streams coming to Kon River. These camps are used every year by hunters during the primate hunting season around September and October when the rain reach the pick. One hunter admitted that he shot about 20 douc langurs every year in the hunting season. Three stuffs of the grey-shanked douc langurs kept in a local family were found. According to owner, she brought the first two hunted douc langurs in September, 2002 and the third one was bought in October in the same year. They were

all origin from hamlet 2, Son Lang village (Fig.12). In total, about 30-35 hunters, collectors and fisherman were seen during survey time.

3.5.1.2 Wildlife trade

Trading wildlife is forbidden by the natural reserve area. But wildlife meat was quite popular in the hamlets where surveyors had been. And it is not difficult to order wildlife meat in these places. Investigations were made to get the fact of trading activities in this area. And following is record of price of 1kg wildlife meat in local wildlife restaurant and wild life trade shop.

Table 2: List of wildlife products in the restaurants

No	Product name	Price
1	Wild pig meat	30.000 VND/1kg
2	Serow meat	25.000 VND/1kg
3	Turtle	200.000 VND/1kg
4	Douc langur meat	18.000 VND/1kg
5	“Douc balm”	35.000 VND/100gram
6	Macaque meat	18.000 VND/1kg
7	“Macaque balm”	30.000 VND/100gram

3.5.1.3 Logging

There aren't logging activities inside the natural reserve area. However, forest enterprise Tram Lap is bordered with Kon Cha Rang natural reserve in north-west. The forest enterprise has 2,000 ha is being exploiting. Logging activities are disturbing on the distribution of the all animals live inside the natural reserve area include the grey-shanked douc langur. It created a lot of noise in the upper part of Kon River (Fig.13).

3.5.2 Human impacts in Ka Ka Kinh national park and in the buffer zone

3.5.2.1 Hunting and trapping

4 hunting camps were found in Ngut mountainous area. A skull from a douc langur in a hut was collected. It indicates that hunting is real threats to the population of grey-shanked douc langur in this area. Animals were hunted mainly used as foods and their bones are sold for medicine maker. According to local ranger, during the survey time, there were 3 individuals were killed by the hunter in the De K'Gieng hamlet.

Traps are also occurred inside the national park and the buffer zone (Fig.14). Almost of traps are set to catch the terrestrial animals such as wild pig, civet, deer and turtles therefore they do not directly harm to the langur. But trapping activities make a lot of disturb to the langur's distribution because of significant number of people work in the forest for checking up the traps. In the field a common civet caught in trap was rescued by survey team.

Among the hamlets, Kon Bong, Dak Roong village in K'Bang district is well known with a lot of hunting operations is going on. This hamlet is close to in the east of the border to the national park and become a main supply of wildlife meat to Dak Roong village and other places. In the field, a piece of dry meat of douc langur was collected. It is a part of a hunted langur from Kon Bong hamlet.

3.5.2.2 Wildlife trade

Two wildlife shops were visited by surveyors in the Ayun village. In both places, picture of the grey-shanked douc langurs was immediately recognized. Traders informed that local hunter often sell them bone of the monkey included douc langur. It is clear that douc langur still be hunted for medicine making. Although the trader claimed that it is less monkey bones in nowadays. According to them, after the establishment of Kon Ka Kinh national park in 2002 most of the guns kept in village were confiscated. Common animal in trade consist of wild pig, turtles, porcupine.

3.5.2.3 Logging and shifting farms

There are lot of illegal logging activities happen since the Kon Ka Kinh national park contains high value timber (Fig.15). Illegal loggings make a lot of disturb to the species especially in the buffer zone area De K'toc hamlet, Ayun village and K'Roong village.

Seriously, the Dak Roong forest enterprise, which locates in the east of Kon Ka Kinh, is logging very close to the national park. This area was suggested as part of forest corridor between the Kon Cha Rang and Kon Ka Kinh. If logging activities continuing in the next two year in this area then potential corridor area will be destroyed and the suitable habitat for the grey-shanked douc langur will be wipe out.

Beside, shifting farms of BaNa minority people were found in Ha Dong village, Dak Doa district. The demand of agriculture land have lead to vast of forest was cut down. It happens not only in secondary forest around the village but also take place in the primary forest (Fig.16).

3.6 Records of other animals in field

3.6.1 Primate fauna

A group of yellow-cheeked gibbon (*Nomascus gabriellae*) was observed in the 1th of August. This group has 3 individuals including a couple and one juvenile. The juvenile is about one and half year old. Animals were found at 7h20' am after we heard their singing in the early morning. Their habitat characterized by the sub-tropical evergreen forest at the elevation about 1000m. In total, 8 groups of gibbon have heard during the field survey in Kon Cha Rang natural reserve area. And 6 groups were found in Trai Dam- Song Kon, and other 2 groups are found in Thac 50.

One group of the stump-tailed macaques (*Macaca acrtoides*) was seen also in the Kon Cha Rang natural reserve area. This group contains about 3-7 individuals.

3.6.2 Other animals

During survey time observations of Black Giant Squirrels, wild pigs, squirrels, turtles and many species of birds were made. Footprints of Tigers, Bears and Porcupines were also recorded.

Table 3: List of animals recorded in the Kon Cha Rang natural reserve and Kon Ka Kinh national park

No.	English name	Scientific name	Notes
1.	Grey-shanked douc langur	<i>Pygathrix cinerea</i>	Observed
2.	Yellow-cheeked crested gibbon	<i>Nomascus gabriellae</i>	Observed
3.	Stump-tailed macaque	<i>Macaca arctoides</i>	Observed
4.	Tiger	<i>Panthera tigris</i>	Footprint
5.	Bear	<i>Ursus sp</i>	Footprint
6.	Large-toothed Ferret badger	<i>Melogale personata</i>	Observed
7.	Wild pig	<i>Sus scrofa</i>	Observed
8.	Porcupine	<i>Hytrix sp</i>	Footprint
9.	Black Giant Squirrel	<i>Ratufa bicolor</i>	Observed

3.7 Information in potential corridor area

Kon Ka Kinh national park is situated 12 km west of Kon Cha Rang natural reserve area, to which it is linked by intervening forest area. Before the two protected forest area were established in 1999 and in 2002, there were many suggestions from conservationists and senior staffs of forest protection department (FPD) that a forest corridor between the two areas should be set up to support a viable populations of large mammals, such as tiger (Le, *et al*, 1999). This recommendation was also contained within the Tropical Forestry Action Plan (MOF, 1991) and the Biodiversity Action Plan for Vietnam (Government of SRV/ GEF 1994).

However, the fact is that logging stills go on in the connected buffer zone between the two protected forests. Loggings activities are managed by the Dak Roong forest enterprise and Tram Lap forest enterprise. The two forest enterprises are governmental companies and the land right is belong to the Gia Lai provincial government. Tram Lap has about 20,000 ha of forest and there are 4,800m³ of timber exploited in year 2004. The logging activities have already reached the sub-area number 8 and sub-area number 10. The areas situate in the upper part of Kon River which is very close to the border of Kon Cha Rang natural reserve area. The Dak Roong forest enterprise has about 35,000 ha and it allows for exploiting of 5,000m³ of timber in year 2004.

According to the two directors of Kon Ka Kinh and Kon Cha Rang, the provincial government have decided to decrease number of timber exploited in the buffer zone area in 2005. A part of forest (5,000 ha) in Tram Lap foresting enterprise will be transferred to Kon Cha Rang natural reserve area. However, the lack of research on biodiversity and endangered species in the buffer zone area is one of the reasons made the provincial government do not ban completely logging activities and set up a forest corridor.

4. Discussion

4.1 Distribution of the grey-shanked douc langurs

The grey-shanked douc langur was described as sub-species (*Pygathrix nemaeus cinerea*) in 1997 (Nadler, 1997). There was a little known of the sub-species before this description. In 1995, some specimens in Hanoi National University Museum (HNM) raised a question whether the grey-shanked douc langur is a separated taxon or they are hybrid between the red-shanked douc (*Pygathrix nemaeus nemaeus*) and

black-shanked douc (*Pygathrix nemaeus nigripes*) (Lippold and Vu Ngoc Thanh, 1995).

Recently, researches on genetic of douc langurs have confirmed that there exist three separated taxa of doucs in Indochina (Roos, 1999). Colin Groves also supported the systematic of the three species by his independent research on morphology (Groves, 2001). However, there is a lack of field research on distribution of them which is might bring up a complete overview on their systematic.

In 1990s, Lippold and Vu Ngoc Thanh have conducted several surveys on the douc langur in Vietnam. These surveys aimed to find out the distribution and conservation status of the douc langurs. There were two important conclusions on their papers. Firstly, a sympatric of the red-shanked douc and the black-shanked douc was discovered in Kon Cha Rang natural reserve area (14⁰25'-14⁰35'N/108⁰30'-108⁰39'E). Secondly, the area between 14⁰00' -14⁰45'N/ 107⁰45' -108⁰35'E was suggested as a centre origin of all the doucs (Lippold and Vu, 1995; Lippold, 1998).

This survey was conducted in two months crossed different habitats in Kon Cha Rang natural reserve, Kon Ka Kinh national park and the buffer zone area. However, there was no single observation of black-shanked or red-shanked douc langur. Only observations of the grey-shanked douc langur were made. Two groups were found in Thac 50 area and one group in Song Kon- Trai Dam area. In geographical relation, the group in Song Kon- Trai Dam is close to the population of grey-shanked douc langur in Ba To (10 km in distance). And two groups in Thac 50 are close to populations of the grey-shanked douc langur in An Lao (8 km in distance). And more, in the technical report of Kon Cha Rang natural reserve area, Le Trong Trai, 2000 informed about two specimens of the grey-shanked douc langurs found in Dak Droong village. In this survey, we also found three specimens of the grey-shanked douc langur in Son Lang village.

On the paper "History of douc langur" a picture of the grey-shanked douc langur was labelled as black-shanked douc langur *Pygathrix nemaeus nigripes*, (Lippold, 1998). In fact, to identify the difference between the grey-shanked douc and the black-shanked douc langur in the field is extremely difficult if only base on the coat of them. The key character to distinguish them is the colour of skin on their face. An adult black-shanked has a dark blue skin while an adult of grey-shanked has a bright orange skin. However, a juvenile and a infant of grey-shanked also have dark blue skin before they change to real bright orange as a adult (Nadler, per com). It is difficult to see clearly the difference if the animal move in the forest.

Nadler *et al* (2003) pointed out that occurrence of the black-shanked douc langur was confirmed in Nui Ba- Bi Dup nature reserve area, Ma Drak and Cu Jut, Dak Lac province These localities locate in the south of latitude 13⁰00'N. It hasn't had any confirmed information of the black-shanked douc langur extended the latitude 13⁰30'N (Nadler *et al*, 2003).

On the survey, 40 hours collecting data by interview were made with contribution of more than 70 people including hunters, fruit collectors, rangers and staffs in the national park, the natural reserve area and forest enterprise. But there wasn't information of other type of douc langurs except the grey-shanked douc langur. In

addition, the observations and DNA analysing sample of the douc langur in the field allow us to give a confident conclusion that there is only the grey-shanked douc langur distributing in Kon Ka Kinh national park, Kon Cha Rang natural reserve area and buffer zone areas. We also conclude that the black-shanked langurs do not occur in Kon Cha Rang natural reserve area. A sympatric between black-shanked douc langur and red-shanked douc langur also doesn't exist.

The result from this survey confirmed that the grey-shanked douc langur does exist in Kon Cha Rang nature reserve area, Kon Ka Kinh national park and the buffer zone areas. This finding has pointed out that the distribution of this species is much larger than what scientists have knew before (Fig.17 and Fig.18). The southern border of their distribution expanded to the latitude $14^{\circ} 13'N$.

4.2 Relative density estimate

In total, 27 transects were investigate for presence of the grey-shanked douc langur. 5 direct observations of the langur were made in 5 transects. It is equivalent 19% of total transects. Evidences of presence such as dung, remain foods, langur hunting sites were found in 8 transects. It is equivalent 30% of total transects. It mean that in 13 transects (about 49% of total transects) the presence of the grey-shanked douc langur have been recorded. This result might suggest that the population of the grey-shanked douc langur in this area is quite abundant.

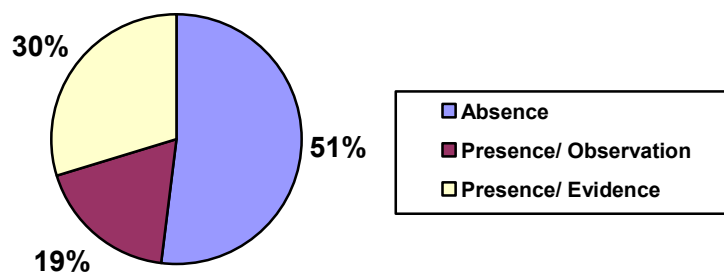


Fig.19: Percentage of presence/absence in the surveyed transects

4.3 Chance to conserve the species

The discovery of grey-shanked douc langur is very significance for conservation on the species. Existing of the species inside the two protected forest areas would bring more chance to protect them successfully. Relative density estimation of the population of the grey-shanked douc langur also suggests that the area has quite abundant individuals. Therefore, it would become a species conservation area in the future.

This result also propose that the area includes Ba To, Quang Ngai province, An Lao, Binh Dinh province, Kon Cha Rang and Kon Ka Kinh form an important distribution area of the grey-shanked douc langur in the Central Highland of Vietnam. The bordered area of four provinces Quang Ngai, Binh Dinh, Kon Tum and Gia Lai contains a good habitat for the grey-shanked douc langur.

However, conservation activities in the two protected forests have not yet stabilised. The management aboard in Kon Cha Rang natural reserve was officially started to work within six months. Only 11 staffs are working there and almost of them have no knowledge and experience in conservation. The Kon Ka Kinh national park has not settled down their office while 45 staffs in the national park are lack of understanding in biology and conservation. Further training in conservation such as a short-term programme on monitoring wildlife population, education workshop or a visit to a conservation site would be useful for them. And all training should be taken place immediately to ensure that they will manage the natural reserve area in the right way.

Confirmation of occurrence of the grey-shanked douc langur, an endemic species of Vietnam, in Kon Ka Kinh and Kon Cha Rang and the buffer zone areas suggest that the Gia Lai provincial government should give a quicker decision on setting up a forest corridor for long-term conservation of the grey-shanked douc langur in this area including Kon Ka Kinh, Kon Cha Rang and buffer zone area. It also suggests that the logging activity in the north of Tram Lap and Dak Roong forest enterprise should be banned. The forest corridor if it will be established should have a wide about 5 km toward Gia Lai, Quang Ngai border line.

5. Recommendations for conservation in Kon Cha Rang natural reserve area and Kon Ka Kinh national park

5.1 Kon Cha Rang natural reserve area

- Ranger force and staffs of the Kon Cha Rang nature reserve area should have more training about wildlife identify, monitoring primate population.
- Patrol should do more regularly and concentrate on hunting season from September to December every year. All the traps and hunting camps used yearly hunter should be destroyed immediately in order to prevent more animals from injury and dead.
- Thac 50 area seems the most important habitat of the grey-shanked douc langur and has a good habitat for them. It should become a strict protected area.
- Education programme for local people should be carried out by the natural reserve area in cooperation with Tram Lap forest enterprise and schools in Son Lang village. Education programme should focus and consider the traditions of Ba Na minority people living in this area. Since local people have had basic understanding on value of douc langur in their area. This is result from the last project conducted by San Diego Zoo and Hanoi national university.
- The village should have regulations to prevent illegal migration. Illegal migration will make a lot of pressure on the agriculture land and migrated people usually destroyed forest for coffee trees.

5.2 Kon Ka Kinh National park

- It is necessary to improve knowledge of range and staffs in Kon Ka Kinh national park in term of field survey techniques and patrolling techniques since almost of staff are young. They are all very enthusiastic to improve quality of their work.
- The Kon Ka Kinh national park should have an introduction document about the park so that researchers and scientists can know more about this area and can do more research on it the buffer zone areas.

- It is need more training for staffs who running the education programme for local people living around the national park. A complete education programme in cooperate with local schools should be planed and conducted in the near future.
- In Dak Roong village bordering with the national park in the east turn out to be one of the most important areas need to put more control because many illegal activities such as hunting, wildlife trading and logging are happening in there.
- Shifting farms in Ha Dong are happening quite complex. It is necessary to set up a mobile ranger group to checking up and control the situation.

6. Conclusions

- There are only the grey-shanked douc langurs live in Kon Cha Rang natural reserve area, Kon Ka Kinh national park and buffer zone. It doesn't exist any other type of douc langurs in this area. Therefore, it doesn't exist any sympatric of the grey-shanked douc langur with other douc langur species. The distribution of the species is confirmed up to the latitude 14⁰13'N toward the south of Vietnam.
- The population of the grey-shanked douc langur in Kon Cha Rang, Kon Ka Kinh and buffer zone areas is quite abundant. It forms one of the biggest populations remain in the Central Highland of Vietnam. The opportunity to see them in the area is still high with 45 % success by follow transects.
- DNA sequence of the grey-shanked douc langur in Kon Cha Rang natural reserve area has a high identical with the DNA sequence of individuals found in Ba To, Quang Ngai province.
- The first time the grey-shanked douc langur was recorded at the elevation 1400m above the sea level. The main habitats of the species in this area are primary forest and secondary forest with the forest type is montane evergreen forest (900-1300m).
- Main threats to the species are hunting, logging and wildlife trading. Hunting is the most danger for this species since the species still is being use as food of BaNa minority people and the demands of medicine product made of primate such as "monkey balm" is very high by local communities. Logging activities are destroying the habitat of species in the buffer zone areas, especially in the connecting area between two nature reserve areas.
- For long-term conservation of the grey-shanked douc langurs, it is necessary to continue conservation affords in this area by helping the two protected areas such as short-term training for staffs, raising awareness on conservation and the species for local people.
- A forest corridor between Kon Ka Kinh national park and Kon Cha Rang natural reserve area is extremely necessary for maintaining a sustainable population of the grey-shanked douc langur. It should be set up immediately.

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Figures



Fig.1: Distinguished three species of douc langurs in Indochina

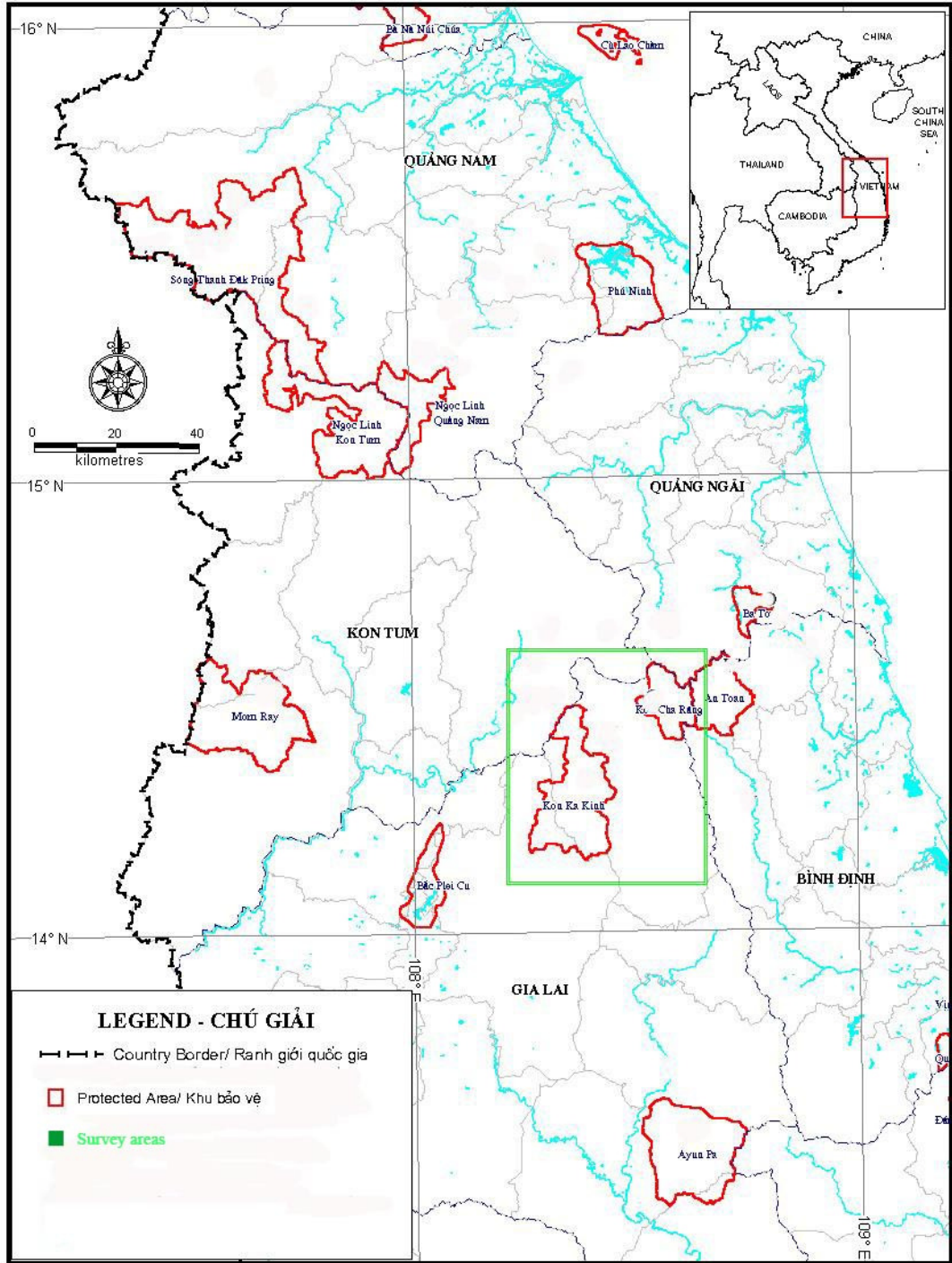


Fig.2: Map of surveyed area



Fig.3: An interview in Kon Cha Rang natural reserve area



Fig.4: A grey-shanked douc langur in Kon Cha Rang natural reserve area

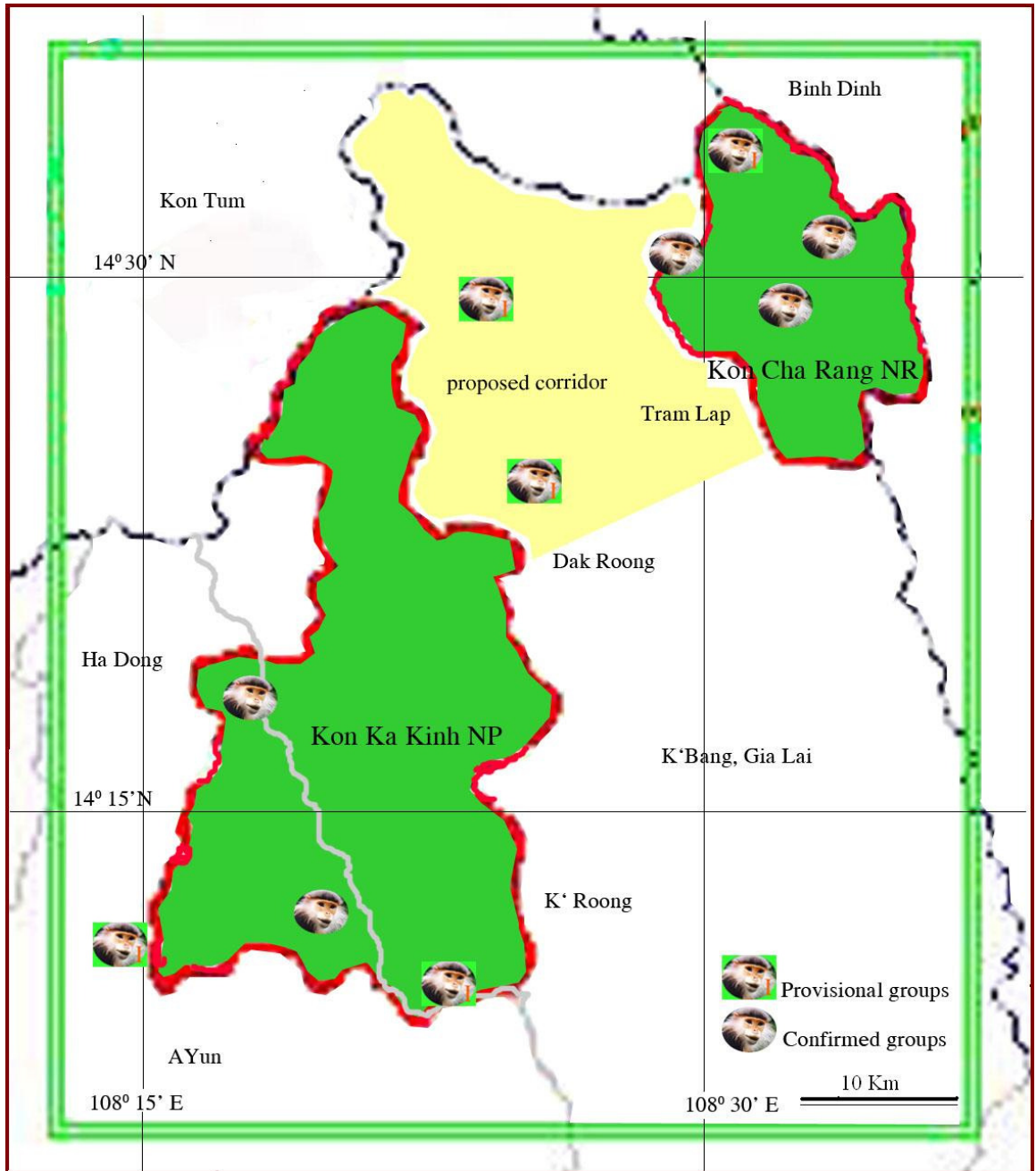


Fig.5: Distribution of grey-shanked douc in Kon Cha Rang, Kon Ka Kinh and buffer zone



Fig.6: A grey-shanked douc langur in Kon Ka Kinh national park



Fig.7: Collecting faeces sample in the field



Fig.8: A skull of a douc langur collected in Ngut mountain, Kon Ka Kinh NP



Fig.9: Habitat of douc langur in Kon Cha Rang



Fig.10: Habitat of douc langur in Kon Ka Kinh



Fig.11: Stuffs of douc langurs in Son Lang village



Fig.12: Traps were collected in the field



Fig.13: Logging operation in the buffer zone area of Kon Cha Rang



Fig.14: A civet was trapped



Fig.15: Illegal logging in Kon Ka Kinh



Fig.16: Clear cutting for agriculture land

DISTRIBUTION OF GREY-SHANKED DOUC LANGUR (*Pygathrix cinerea*) IN VIETNAM

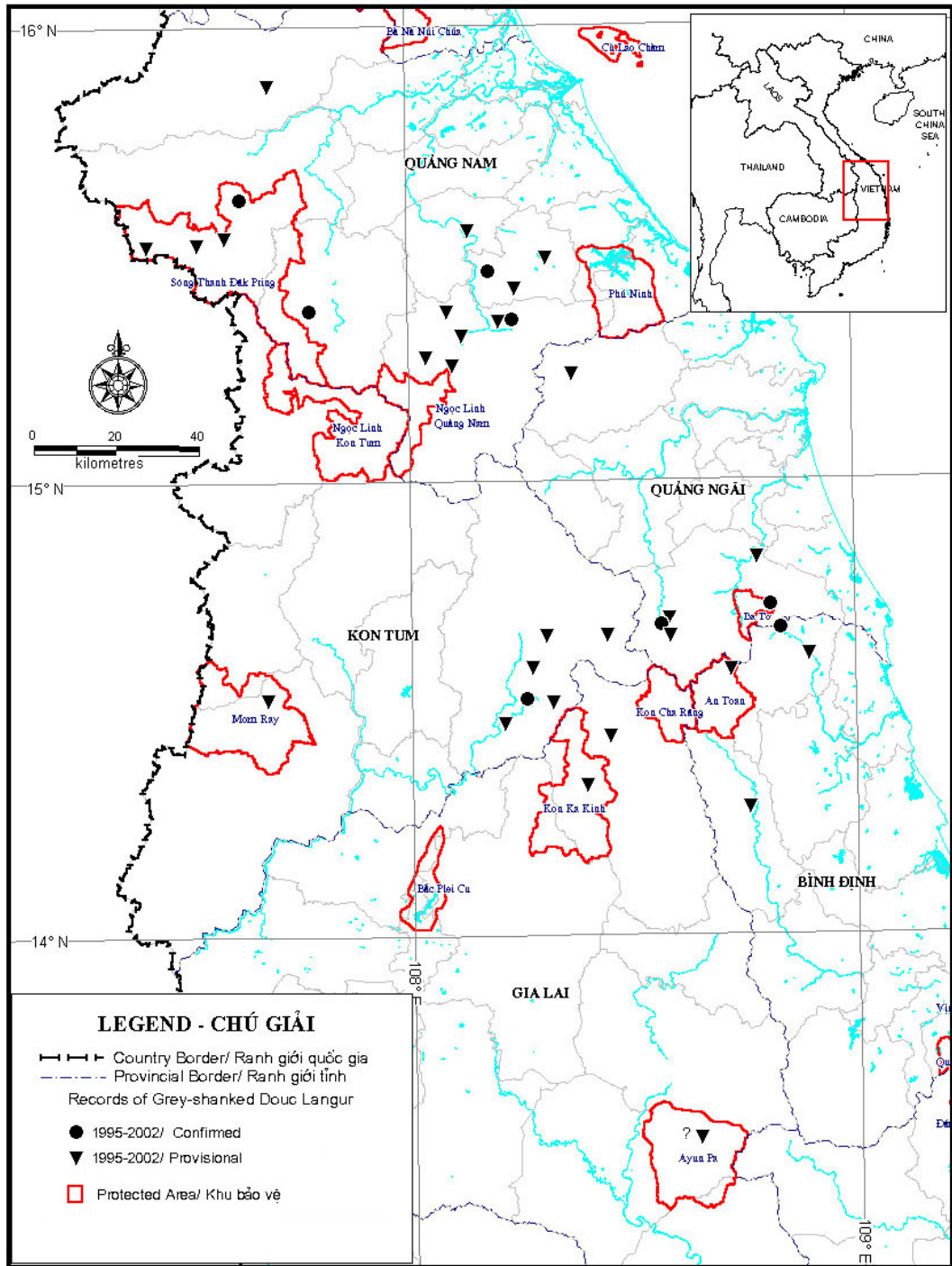


Fig.17: Distribution of the grey-shanked douc langur before survey

DISTRIBUTION OF GREY-SHANKED DOUC LANGUR (*Pygathrix cinerea*) IN VIETNAM

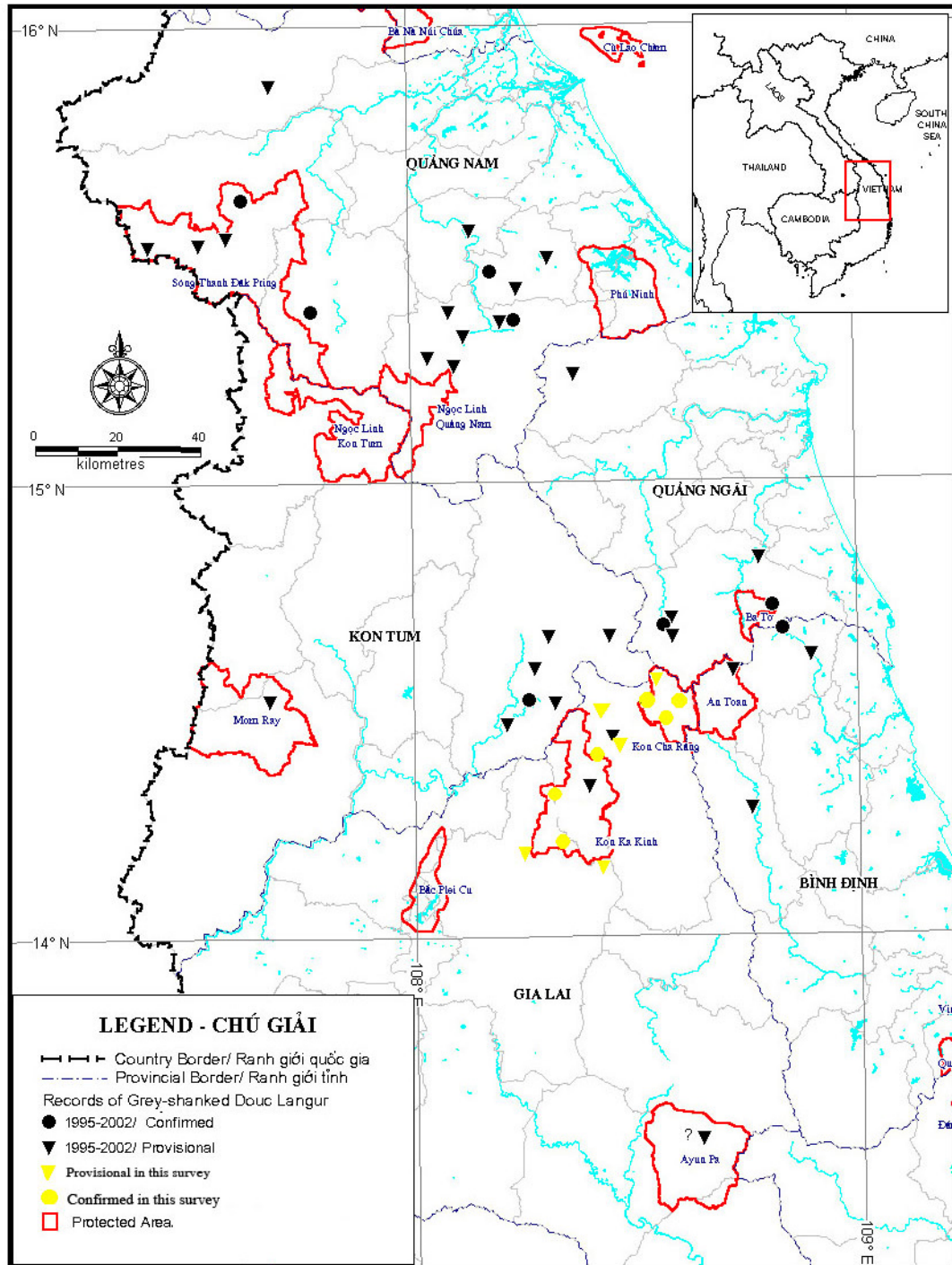


Fig.18: Distribution of the grey-shanked douc langur after survey

Appendix 1: Survey position and notes

No	Date	Position	Notes
1.	July 31st	0233785-1608979	Camp
2.	August 1st	0233501-1609816	Saw gibbon group of 3 individuals
3.		0233003-1609358	
4.	August 2nd	Camp	Heard 1 group of gibbon 280N
5.		0234239-1609305	
6.		0234894-1609054	
7.		0235201-1609034	
8.		0235635-1608468	
9.		0234848-1609114	
10.	August 3rd	0234129-1607955	
11.		0234109-1607820	
12.		0235593-1607480	Langur hunted site.
13.		0236423-1608700	
14.		0234382-1608565	
15.	August 4th	0232977-1609237	Heard 1 group of gibbon 290N
16.		0232717-1609332	Saw 1 group of grey-shanked douc
17.		0232385-1609379	
18.	August 5th	0234533-1608313	
19.		0235674-1607416	Heard 1 group of gibbon 260N
20.		0236641-1606916	
21.	August 6th	0233906-1609635	
22.		0234408-1609635	
23.		0234545-1610415	
24.		0234795-1610827	Saw gibbon's faeces
25.		0235237-1610821	
26.		0235568-1611264	
27.		0235502-1611264	
28.	August 7th	0233251-1609244	
29.		0232319-1609378	Heard 2 group of gibbon 260N, 240N
30.		0231949-1609384	
31.	August 8th	0235656-1608444	Heard 1 group of gibbon 265N
32.		0235474-1606851	
33.		0235488-1606828	
34.		0236295-1606496	
35.		0236748-1605640	
36.	August 9th	0234197-1609757	
37.		0234809-1609741	
38.		0234754-1609994	
39.	August 15th	0242217-1606559	Camp
40.	August 16th	0241710-1606117	
41.		0241853-1605450	
42.	August 17th	0241600-1607106	
43.		0241165-1606649	Heard 2 group of gibbon 220N
44.		0240843-1606328	
45.		0241070-1606377	
46.		0240373-1606200	
47.		0240348-1606192	

A field survey on the grey-shanked douc langurs

48.		0241568-1606257	Saw 1 group of macaque and 1 group of douc langur.
49.	August 18th	Camp	Heard 1 group of gibbon 20N
50.		0240290-1604793	
51.		0240350-1604541	
52.		0241424-1605447	
53.	August 19th	0241458-1606813	
54.		0241120-1607207	
55.		0240517-1607895	
56.	August 21st	0242600-1606716	
57.		0242457-1607134	
58.		0242690-1607542	
59.	August 22nd	0243108-1606784	
60.		0243211-1606944	
61.		0243458-1607157	
62.	August 23rd	0242456-1607889	
63.		0242786-1608424	Saw 1 group of grey-shanked douc
64.		0242395-1608548	
65.		0242312-1608646	
66.	August 24th	0242017-1607335	
67.		0241595-1607630	
68.		0241196-1608000	
69.		0240880-1608211	
70.	November 13th	0209278-1561678	
71.		0208000-1569464	
72.		0210439-1571536	
73.		2010797-1573818	
74.		0211370-1574094	
75.		0210989-1574473	
76.	November 14th	0211329-1574915	Saw a group of langur
77.		0212137-1576073	Saw a group of Macaca sp
78.		0212198-1574507	
79.		0210841-1574496	
80.		0211324-1574917	
81.		0211191-1573593	
82.	November 18th	0212486-1566566	
83.		0213582-1567686	
84.		0214502-1567845	
85.		0216109-1566947	
86.		0216462-1566458	
87.		0217029-1566253	
88.		0218288-1566753	
89.		0216535-1566740	
90.	November 19th	0212486-1565432	
91.		0215769-1654815	
92.		0215191-1564500	
93.		0214243-1565549	
94.	November 23rd	0203853-1584238	
95.		0206320-1585228	
96.		0208983-1584858	

97.	November 24th	0209593-1584434	
98.		0210061-1584224	
99.		0210322-1583449	
100.		0209952-1583337	
101.		0210415-1583110	
102.		0210377-1582889	
103.	November 25th	0209598-1582348	Saw a group of langurs
104.		0209557-1582696	
105.		0210212-1582116	
106.	November 26th	0209335-1584379	
107.		0209184-1584631	
108.		0208983-1584858	

Appendix 2: Interview sheet used for the survey

(Questionnaire for primate survey with an emphasis on the douc langurs *Pygathrix* sp)

Name of interviewee:

Age:

Job:

How long have you lived in this village?

Mammal questions section

Have you seen big mammals in the area?

What kind of mammals you have seen?

When was the last time have you seen them?

A long time ago (years): Recently (months):

How many of them you have seen?

Do they remain in the area?

Do you have monkeys in your area?

Primate questions section

How many different primates you have seen?

Description of species 01

What is the name in your language?

What is colour of their coat?

Dark brown **Grey**

How big is the adult?

20-15kg **10-5kg** **less than 5kg** **Less than 1kg**

Do they have a tail?

Yes **No**

How long is the tail?

Longer than their body size **Half of body size** **Very short**

What is the colour of their tail?

Same as body colour **White**

What does the tail look like?

Type of cat tail **Type of squirrel tail** **Type of pig tail**

Where do the species live?

Always in the tree **Partly on ground** **Near stream or river**

Does the species invade your crop?

Yes **No**

Question section for the douc langur group

What is the face colour of the adult?

Orange (yellow) **Dark blue (black)** **Not clear**

What is the colour of their wrists?

Same colour as body **White colour** **Not clear**

What is the colour of their lower-legs?

Red **grey** **black** **Not clear**

What does their beard look like?

White and long **White and short** **Not clear**

What is the colour of their neck?

Same colour as body **Mix orange and white** **Not clear**

How do they live?

Solitary **Live in group**

How many of them live in a group?

5-10 **10-20** **more than 20** **other**

How many different groups have you seen?

Group 1 Name of area Individuals....

Group 2..... Name of area Individuals

When the last have you seen this species?

Long time ago (years): **1-2 years** **2-5 years** **more than 5 years**

Recently (months): **Within one month** **3-6 months** **More than 6 months**

Time and date of interview

Checking with pictures (note by interviewers)

Which picture matches the species that you have described?

Species 1: perfect ... confuse ...

Species 2: perfect ... confuse ...

