

Full Length Research Paper

## Hunting of Preuss's red colobus (*Procolobus preussi*) in Korup National Park, Cameroon

Sylvie Nguedem Fonkwo<sup>1\*</sup>, Mpoame Mbida<sup>2</sup>, Tsi Evaristus Angwafo<sup>3</sup> and  
Valentine Buh Ebua<sup>2</sup>

<sup>1</sup>Department of Biological Sciences, Faculty of Science, the University of Bamenda, Bamenda, Cameroon.

<sup>2</sup>Department of Animal Biology, Faculty of Science, University of Dschang, Dschang, Cameroon.

<sup>3</sup>Department of Forestry, Faculty of Agronomy and Agricultural Sciences (FASA), University of Dschang, Dschang, Cameroon.

Received 29 April, 2017; Accepted 2 September, 2017

This study was carried out in Korup Region to investigate the reasons for hunting preuss's red colobus (PRC) in Korup National Park (KNP) Cameroon in order to contribute to its sustainable management. Questionnaires (open and closed end) were used to gather personal information from hunters on different hunting tactics, reasons for hunting PRC and threats to this species in KNP for a period of one month (January 2014). One hundred and eighty-seven hunters responded to questionnaires that were distributed in all 5 villages in the park and 5 other villages randomly selected from the 23 villages surrounding KNP. Excel software was used and all variables were used to calculate relative proportions. Results showed that 53.5% of hunters use shotguns and 46.5% use both shotgun and wire snares in hunting. Majority of the hunters (46%) practice both hunting and farming, 32% practice solely hunting, 18% practice hunting and fishing, and 4% practice hunting, farming and fishing. A large proportion (73.3%) of hunters does hunt PRC for protein and income. However, 45.3% of them do not eat PRC because of its bad odour, and 22% do not eat it because the meat is hard. Hunters in KNP depend on hunting for their survival. Therefore, this calls for conservation action, such as introducing an alternative source of livelihood and protein to hunters, which will help to improve their standard of living and supply protein for their healthy growth, thereby discouraging hunting.

**Key words:** Hunting, Korup National Park, anthropogenic activity, survival, *Procolobus preussi*.

### INTRODUCTION

In Africa, primates are threatened with extinction (Fa et al., 2002). Hunting has been a greater threat to primates than habitat degradation in west and central Africa

because local communities depend on bush meat as a food source (Milner-Gulland et al., 2003). Primates are particularly vulnerable to overexploitation due to the fact

\*Corresponding author. E-mail: [snguedem@gmail.com](mailto:snguedem@gmail.com). Tel: 237 677693571.

that they live at relatively low densities and have slow life-histories and also tend to be social, active and therefore highly visible by day (Cowlshaw and Dunbar, 2000). However, large-bodied slow-reproducing species are more at risk of the effects of human threats than fast-reproducing species (Isaac and Cowlshaw, 2004). The mode of hunting is also important. Trapping with wire snares is still the most common type of hunting practiced in the forests of equatorial Africa. Though trapping generally targets duikers and rodents (Noss, 2000), it also endangers terrestrial primates such as apes and mandrills owing to its indiscriminate nature. Further, the introduction of firearms has contributed to changes in hunting patterns, such that arboreal primates such as red colobus are increasingly hunted with guns (Balinga, 2005). The red colobus monkeys of Central and West Africa are known to be the most threatened than any other taxonomic group of primates in Africa due to the fact that they are vulnerable to hunters (Struhsaker, 2005; Waltert et al., 2002). Overhunting is the main threat to this species, the cause of most of its population decline in Korup National Park (IUCN, 2010; Struhsaker, 2010). Therefore, the reasons as to why PRC is hunted are investigated in this study.

### Problem statement

Primate hunting is widespread over many parts of the Guineo-Congolian rainforest zone of Africa and especially in certain West and Central African countries like Sierra Leone, Nigeria, Cameroon and Equatorial Guinea (Isaac and Cowlshaw, 2004). Primates are hunted for both subsistence (local consumption) and commercial purposes (large-scale market). Hunting is considered to be a more serious threat to primates in the Guineo-Congolian rainforest zone of west and central Africa than anywhere else in the world because of its high demand (Abernethy et al., 2013). In KNP, Cameroon, Linder (2008) recorded 648 hunted carcasses of monkeys in Ikenge village inside KNP including 78% of the most frequently recorded species (Putty-nosed monkeys, Mona monkey and Preuss's red colobus). It is almost certain that primates have been greatly reduced or even exterminated from many areas as a result of such hunting pressure. According to Eniang (2002), the population of Preuss's red colobus in Ikpan forest block of the Cross River National Park, Nigeria has been greatly reduced as a result of illegal hunting in that area. More than 10 Preuss's red colobus were hunted within three months during their research in the park, and they noticed an increase in the number of poacher's camps as they moved further into the park. Therefore, this work is aimed at contributing to the sustainable management and conservation of PRC in the southern part of KNP through the analysis of hunting activities on the species. The

different methods and tools used in hunting were examined, and the purpose for hunting PRC was determined, considering the perception of the local population with respect to conservation of PRC, and finally, measures to mitigate hunting of PRC were proposed.

## MATERIALS AND METHODS

### Description of the study area

The study area is located in Korup National Park (KNP), South West Region of Cameroon, between 4°53' to 5°28'N and 8°42' to 9°16' E, with a surface area of 1.260 km<sup>2</sup> mostly undisturbed primary forest (Figure 1). It is adjacent to the border with Nigeria and lies near the center of the Cross-Sanaga-Bioko coastal forests ecoregion (World Wide Fund for Nature, 2001). Korup climate is characterized by two seasons: one dry season from November to mid-March and one wet season from mid-March to October. Temperature varies little throughout the year and the mean annual maximum temperature is 30.2°C. Korup region is known for its taxonomic richness and diversity of primates. These primates also show a high degree of endemism in this region (Linda and Oates, 2011). KNP harbours 14 species of primates, eight are diurnal and six of them are under threats of extinction. Preuss's red colobus is endemic to this part of mainland Africa (Grubb et al., 2003) and it is rated as Critically Endangered (IUCN, 2010).

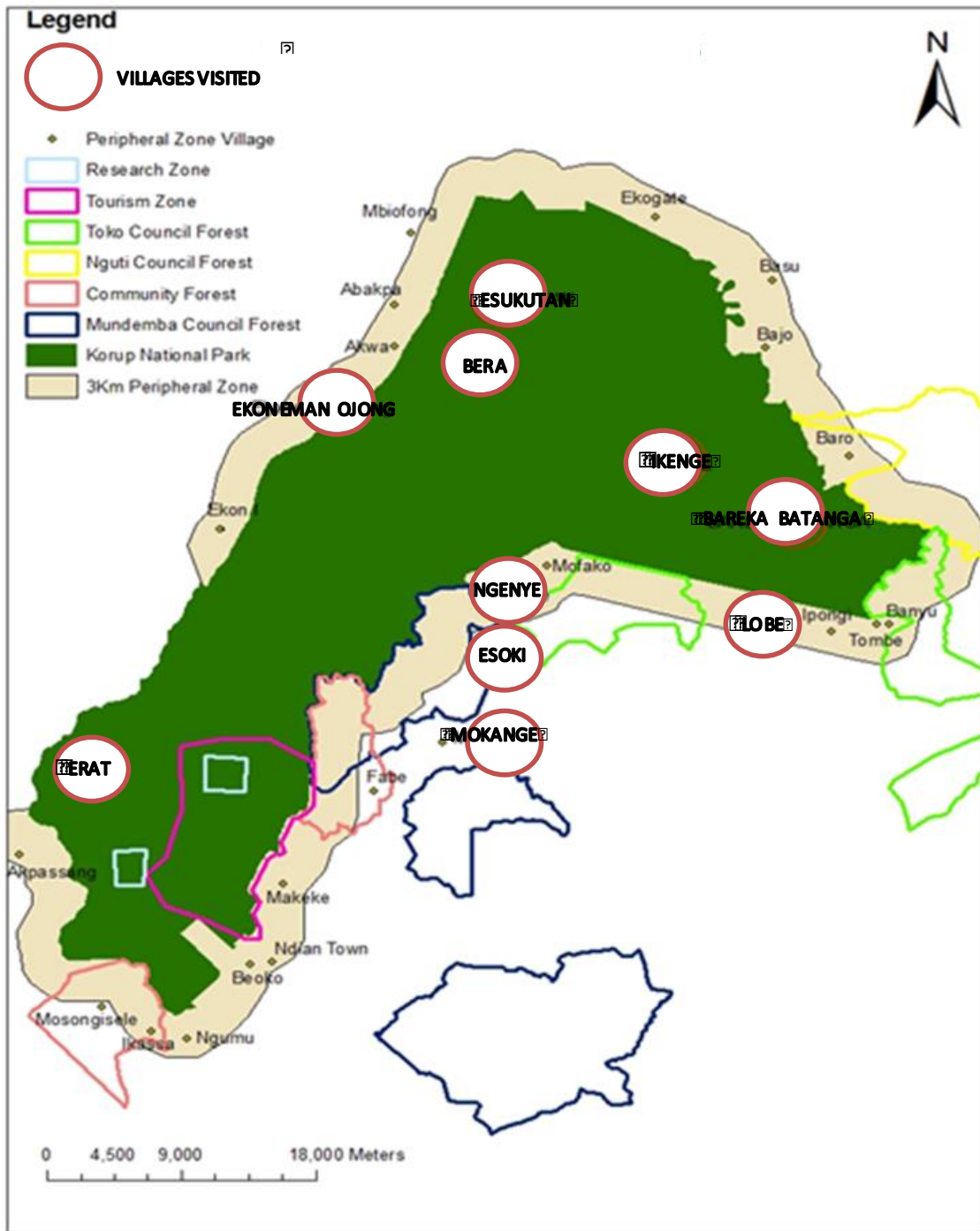
Hunting is the main threat to large-bodied mammals including PRC in KNP. Commercial logging has never taken place in KNP, even though farm bush surrounds all the villages that are found inside the park, the soil is poor in nutrients, and together with its designated conservation status, have largely protected KNP from widespread cultivation (Ministry of Forestry and Wildlife, 2008).

### Data collection

Questionnaires were used to gather information from hunters concerning PRC threats in and out of KNP for a period of one month (January, 2014). All five villages inside the park (Erat, Bera, Esukutan, Ikenge and Bareka Batanga) were surveyed. Another five villages (Mokange, Esoki, Ngenye, Lobe Bat and Ekoneman Ojong) (Figure 1) were randomly selected from the 23 existing villages around the periphery of the park. One hundred and eighty-seven hunters responded to all the questionnaires administered to hunters in these ten villages. The following questions were asked: what are the different tools and methods used in hunting, other occupation of hunters, reasons for hunting PRC, and reasons for not eating PRC. For each village visited, the village chief and council was informed and the purpose of the study was presented prior to the interviews. All the hunters available in each village were gathered, informed about the purpose of the study, including the anonymous and confidential nature of their responses. A questionnaire was then given to each individual to complete, accompanied by photographs of the different species of primates present in and around KNP. An assistant from the team was present to interpret questions in their local dialect when necessary. Each village was visited at least twice for the whole period of data collection to make sure that all the hunters in the selected villages were properly/satisfactorily administered questionnaires.

### Analysis

Data obtained from questionnaires administered to hunters (tools,



**Figure 1.** Map of Korup region showing villages of the study site where questionnaires were administered to the hunters (Koruo management 2007-2013).

methods, other occupations, hunting seasons, reasons for hunting and why hunters do not eat PRC) were analysed using Excel software. Analysis consisted of inserting all variables into an Excel worksheet. Each variable represented a title and all related titles were grouped in a new Excel table and calculations of relative proportions were done.

## RESULTS

### Tools and hunting methods

Several tools and methods are used in carrying out

**Table 1.** Reasons why some hunters do hunt PRC.

Reason for hunting Preuss's red colobus	Percentage of hunters
Hunt for food	24.72
Hunt to generate income	17.23
Hunt for food and income	9.76
Use as pet	10.3
For cultural rites	7.07
For medicinal purposes	2.26
For passion/ recreation	1.19
No response	27.39
Total	100

**Table 2.** Reasons why some hunters do not eat PRC.

Reason for not eating Preuss's red colobus	Percentage of hunters
Bad odour	45.40
Meat is tough	22.70
Sensitize by KRCS not to kill or eat primates	9.00
Parent don't like it because it is tasteless	4.50
Don't like it	4.50
Resemble human beings	4.50
Did not respond	9.00
Total	100.00

hunting in Korup National park such as shotguns used in hunting and wire snares use in trapping.

According to the 187 hunters that were administered questionnaires, 53.5% mentioned that they hunt solely with shotgun and 46.5% of them use both shotgun and wire snares in hunting.

### Occupation of respondents

The people of Korup region practice mainly hunting, farming and fishing as sources of livelihood. The occupation of the respondents from the questionnaires shows that 46% of them practice hunting and farming, 32% practice solely hunting, 18% practice both hunting and farming and 4% practice hunting, farming and fishing. In addition to the three main occupations (hunting, farming and fishing), some of the respondents do carry out menial jobs such as small trades, porting, guiding, craftwork, making modern furniture, tailoring and teaching.

### Reasons for hunting

Out of the 187 hunters administered questionnaires,

73.26% gave reasons as to why they hunt PRC. Table 1 shows the various reasons given by hunters as to why they hunt PRC. A majority (24.72%) of the hunters do hunt for food, followed by 17.23% of hunters who hunt to generate income. However, very few hunters (1.19 and 2.26%) hunt for passion/recreation or for medicinal purposes, respectively.

### Reasons why hunters do not eat Preuss's red colobus

Even though majority (88.2%) of the hunters do eat PRC, however, few (11.6%) of them do not. As shown in Table 2, majority (45.4%) of the hunters in KNP do not eat Preuss's red colobus because of its bad and irritating odour, and 22.7% of hunters said the flesh of Preuss's red colobus is too hard, and takes longer time to get ready as compared to other primates. Moreover, 4.5% of the hunters do not eat it because it resembles humans.

### Perception of local population of the Korup region on KNP

Some of the hunters (10.70%) said the local communities

in KNP depend more on forest activities for their survival and that they are proud of the KNP. It is their source of development and a natural gift from God. The animals (especially drill, PRC and Chimpanzees) in the park provide income that is used to educate children, build houses, pay for medication and even marry women with part. Much of the bush meat is sold in local markets, towns in Cameroon and in Nigeria. Most of the species taken to Nigeria are endangered (Drill, PRC and chimpanzees). Some locals feel happy shooting or killing animals in the forest but only one hunter said during the questionnaire session that he feels good killing PRC. In as much as this forest is lucrative to the people, it is also dangerous to them. Some men and women complained that these wild animals destroy their crops. A greater number of hunters (80%) do not see the benefit of conservation; the reason being that KNP is their source of living.

## DISCUSSION

Hunting is an all year activity in Korup region. However, the intensity of this activity declines from December to March because it is the peak-farming season (Okon and Ekobo, 2007). During this season, hunters concentrate more on farming and only those who have no other occupation are involved fully in hunting. According to Lindsey et al. (2011), bush meat hunting is affected by the patterns in agricultural activity, which dictates household food availability and amount of time people have available for hunting. However, hunters in KNP carry out hunting year round even during peak farming season although there is a drop in the intensity during such period. Fishing activity in this area is done mostly for home consumption by men and women and less for sale. However, fishing in this area does not really have a significant effect on hunting because it is carried out only on a small scale for home consumption. Sometimes the rivers are polluted with Gammalin 20 that renders the rivers devoid of fish, thereby discouraging fishing activity in the area. Farming brings in additional income to hunters. Some of the produce like plantains, bananas, cassava, peppers, etc. are consumed at home and sold locally, while others like cocoa are entirely for export. Farming in this area can be a means to reduce hunting pressure due to the fact that these hunters sometimes concentrated on their farms during the peak period of farming. Therefore, if farming activity is encouraged by giving the hunters farm equipment, and large farmland out of the park and other necessities they need to improve their yields, then it will play an important role in conservation (Walter et al., 2002). Fishing could also help in reducing hunting pressure if strong roles and regulations are put in place to stop the use of Gammalin or any other poisonous substance used in fishing. Control

should be done in the size of fishes caught and the sizes of nets used to catch these fishes (Dunn and Okon, 2003). Gun hunting is the only reliable method that can be used to hunt PRC and it is one of the common tools used in hunting in both day-time and night in KNP. According to Ntumwel (2012), gun hunting is common in KNP because cartridges are cheap and many hunters can afford them. A large part of hunters (74.47%) admitted that they do hunt PRC for food and income. They have ready market in villages around the park and in Nigeria that brings in income that they use to supply basic needs for their family. Also, this species serves as a source of protein to the local people. This is supported by Linder (2008) who attests that PRC accounts for a greater proportion (25%) of the total primate sales in Mundemba town. Hunting provides 30 to 80% of income and almost 100% of protein to the rural households in Central and West Africa (Fa et al., 2009). This shows that they will continue to hunt this species to sustain their family if they continue to rely on hunting without any other alternative source of income and protein. Therefore, they do not see anything wrong in killing this species as long as it will give them money and protein.

Some hunters accepted that they keep PRC as pets for the fact that they want their children to play with them and when matured they can be sold. They went further and explained that even if young PRC are kept as a pet, it is only for a short period of time. This is because it is difficult to feed them and most often, they die. None of them admitted to have ever sold a live young PRC. Study of Ntumwel (2012) and this study portray a low percentage (21.9 and 1.6%, respectively) of hunters using parts of PRC for medicinal purpose, and other purposes in KNP, which is to the advantage of PRC. The lesser the demand of parts of red colobus for medicinal purposes, the lesser the hunting of the species.

Bad odor, hardness of PRC meat and sensitization can serve as a means to discourage PRC hunting, even though very few hunters are aware that PRC is a Critically Endangered Species and are forbidden to hunt. Therefore, hunters need to be sensitized and create awareness of the danger of killing this species so as to reduce the rate of hunting. Very few people in KNP consider PRC as taboo and these few people believed that any pregnant woman who eats PRC will give birth to a child having the orange colour of PRC. PRC as a taboo is gradually dying out in Korup region as is confirmed by Ntumwel (2012) where less than 20% of the people believed that PRC is a taboo to the community. This species has no significant cultural value to the people in Korup. This is important for conservation because there will be less demand for PRC.

## Conclusion

In Korup National Park, guns and traps are the tools used



in hunting, and gun is the major tool used in hunting PRC because of their arboreal nature. This implies that gun hunting in KNP has an impact on the survival of PRC.

The majority of the hunters do hunt PRC because it serves as a source of protein and provides income to sustain their families. With this, PRC are at risk of declining in population size or being exterminated in KNP if action is not taken.

Factors such as farming, fishing, bad odour, meat hardness of PRC and sensitization can serve as a means of reducing the rate of hunting in KNP, because these factors offer alternative means of sustenance, and/or make hunting of this species less attractive.

## RECOMMENDATIONS

In order to properly conserve primate species in KNP, it would be important for the park management to identify primate biodiversity hot spots. The southern part of KNP would therefore be the most appropriate areas to focus primate conservation efforts.

People who are involved in bush meat trade should be identified. The trading of PRC meat should be a serious offense that will result in a higher fine. This fine should be made known and announced to all villages in Korup region. The public should also be informed that hunting or selling of PRC meat is considered as a high offense. For example, PRC poachers should receive higher fines or be denied bail.

Provision of an alternative activity for hunters such as using them during research work in the park will go a long way to discourage them from this increasingly large threat from hunting. This will help increase their skills as guides and alleviate their poverty stricken-situation.

PRC is one of the species of primates that is rare to see in protected areas in Cameroon. The conservation of this species will attract ecotourism and research work in KNP.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

## ACKNOWLEDGEMENTS

The authors acknowledge World Wide Fund for Nature (WWF- Cameroon) who funded the data collection process. They are grateful to Mr Nkwoi Bodie and crew who assisted in administering questionnaires to the hunters in the different villages.

## REFERENCES

Abernethy KA, Coad L, Taylor G, Lee ME, Maisels F (2013). Extent and

- ecological consequences of hunting in Central African rainforests in the 21st century. *Phil. Trans. R. Soc. B Biol. Sci.* 368:1631-1652.
- Balinga V (2005). Competitive uses of Wildlife. *Unasylva* 29:22-25.
- Cowlishaw G, Dunbar R (2000). *Primate Conservation Biology*. The University of Chicago Press, Chicago.
- Dunn A, Okon D (2003). Monitoring the Abundance of Diurnal Primates and Duikers in Korup National Park, Cameroon, 2001-2003. Report from the Korup Project, Cameroon. 8p.
- Eniang A (2002). The survey of Preuss's red colobus (*Procolobus badius preussi*) in Ikpan Forest Block of the Cross River National Park, Nigeria. Unpublished report to NCF-WCS Nigeria, Biodiversity Conservation Project 10p.
- Fa JE, Peres CA, Meeuwig J (2002). Bushmeat exploitation in tropical forests: an intercontinental comparison. *Conserv. Biol.* 16:232-237.
- Fa JE, Albrechtsen L, Johnson PJ, Macdonald DW (2009). Linkages between household wealth, bushmeat and other animal protein consumption are not invariant: evidence from Rio Muni, Equatorial Guinea. *Anim. Conserv.* 12:599-610.
- Grubb P, Butynski TM, Oates JF, Bearder SK, Disotell TR, Grooves CP, Struhsaker TT (2003). Assessment of the diversity of African primates. *Int. J. Primatol.* 24:1301-1357.
- International Union for Conservation of Nature and Natural Resources, (IUCN) (2010). IUCN Red List of Threatened Species - Version 2010.4. Available under: [www.iucnredlist.org](http://www.iucnredlist.org) (accessed on 19 March 2011).
- Isaac NJB, Cowlishaw G (2004). How species respond to multiple extinction threats. *Proc. R. Soc. Ser.* 271:1135-1141.
- Linder JM (2008). The Impact of Hunting on Primates in Korup National Park, Cameroon: Implication for Primate Conservation. PhD Thesis, City University of New York, New York 145-162.
- Lindsey PA, Romañach SS, Matema S, Matema C, Mupamhadzi I, Muvengwi J (2011). Dynamics and underlying causes of illegal bushmeat trade in Zimbabwe. *Oryx* 45:84.
- Milner-Gulland EJ, Bennett EL, Abernethy K, Bakarr M, Bodmer R, Brashares J, Cowlishaw G, Elkan P, Eves H, Fa JE, Peres C, Roberts C, Robinson J, Rowcliffe M, Wilkie D (2003). Wild meat: The bigger picture. *Trends Ecol. Evol.* 18:351-357.
- Ministry of Forestry and Wildlife (2008). A management plan for Korup National Park and its peripheral zone 2008-2013, Report. pp. 78-84.
- Noss AJ (2000). The impacts of cable snare hunting on wildlife populations in the forests of the Central African Republic. *Conserv. Biol.* 12:390-398.
- Ntumwel BC (2012). Conservation status of Preuss's red colobus (*Procolobus preussi*) and red-capped Mangabey (*Cercocebus torquatus*) in the Korup region, South-West Cameroon. Unpublished Master thesis, University of Dschang, Cameroon. 63p.
- Okon D, Ekobo A (2007). Monitoring large mammals and human activities in Korup National Park. Report to WWF Coastal Forests Program.
- Struhsaker TT (2005). Conservation of red colobus and their habitat. *Int. J. Primatol.* 26(3):525-538.
- Struhsaker TT (2010). The red colobus monkeys: Variation in demography, behavior, and ecology of endangered species. Oxford University Press. pp. 253-255.
- Waltert M, Lien K, Muhlenberg M (2002). Further declines of threatened primates in the Korup Project Area, South-west Cameroon. *Oryx* 36:257-265.
- World Wide Fund for Nature (2001). Cross-Sanaga- Bioko Coastal Forests.