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An Inventory of Biodiversity in the Badiar National Park, Guinea Conakry: Implication for Conservation

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Abstract: This study aims at making the inventory of plants and animals species of Badiar park (Guinea Conakry) by highlighting the species richness and investigating different human activities done around the park. This park is ecologically and socio economically important ecosystem. It attracts many tourists because of its high biodiversity. Plant inventory was done by making plots (25 m^2) and animals' names were recorded based on our sight, their nests, footprints, droppings and excrements. Human activities were recorded based on the observation. Microsoft Excel was used to analyze data. Results showed that some plant species are classified vulnerable by IUCN such as *Ceiba pentandra*, *Cassia sieberiana* and *Combretum micranthum*. Others are threatened like *Khaya senegalensis* and *Tamarindus indica*. A mammal species *Pan troglodytes* is on the red list of IUCN: Endangered. One bird species is at risk (*Ciconia ciconia*) and another is vulnerable (*Psittacus senegalensis*). Two reptiles species are at risk (*Python sebae* and *Python regius*), others are vulnerable (*Crocodylus niloticus* and *Varanus niloticus*). All amphibian species found are vulnerable (*Bufo superciliaris*, *Hyperiolus concolor* and *Hyperiolus guineensis*). Human activities done around the park include medicinal plants collection, hunting and wood collection.

Key words: Plant and animal species, inventory, Badiar National Park, Guinea Conakry, IUCN, China

INTRODUCTION

Degradation and disappearance of various components of biodiversity (individuals, populations, species, communities, habitats, ecosystems, landscapes) and the need to conserve a significant portion of it remains a major challenge the world over. The situation is even worse in tropical regions, where human ecological footprint now exceeds biocapacity. To preserve the biological diversity of these ecological systems, accurate information about their biodiversity is required. Developing and using this type of information is, therefore, an essential part of conservation programs. For example, biodiversity inventory over a landscape aids in the identification of high priority areas (Myers *et al*., 2000; Carroll, 2004), its value in understanding the extent of biodiversity in natural forest ecosystems, their direct implications for conservation planning and monitoring of forest species and the provision of vital information for identifying economically useful plants as well as rare, threatened or vulnerable species, which may require urgent conservation (Ssegawa and Nkuutu, 2006).

This study highlights the Badiar Park, which is an ecologically and socio-economically important ecosystem, in Guinea Conakry. The park has always attracted the attention of zoologists because of its large number of vertebrate species, but also botanists because of its high diversity of vascular plants (Wallinga, 1995; Robinson and Bennette, 2002; Lebrun and Stork, 1991; Ba *et al*., 1997, 1998). Communities living around the forest utilize it for fuelwood, timber and medicinal plants. Unfortunately, there is an increasing selective exploitation of ecologically and socioeconomically important plant and animal species, thus threatening the integrity of the ecological system. This study aims at: making the inventory of plants and animals species of Badiar park, highlighting the species richness in the park and investigating different human activities done around the park. To reach these objectives, the following hypotheses are formulated and will be verified upon completion of this study:

- The park contains many animal and plant species that are not so far known by the population
- Due to different human activities, there are some plants and animals which are threatened to extinction

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MATERIALS AND METHODS

Study area

Location: Established in 2002, the Badiar Biosphere Reserve is located in northern Guinea, situated on the foothills of the Fouta Djallon and is adjacent to the Niokolo-Koba National Park in Senegal. Geographic coordinates vary between 12°30-12°42 North latitude and the meridian 13°12 and 13° 30 West longitudes. It covers an area of 284,300 ha of savannah, open woodlands and gallery forests (Ba *et al*., 1997). It consists of three core areas: National Park Badiar, the forest of Southern Badiar (8,600 ha) and the Forest of Ndama (67,040 ha), which cover a total area of 113, 800 ha, three buffer zones (32,800 ha) and a transition/peripheral zone (137,700 ha) (Ba *et al*., 1997).

The major ecosystem type is a tropical dry forest (including Monsoon forests). The altitude ranges between 22-500 m (above sea level) with Mount Badiar being the highest peaks. Rainfall is about 1,200 mm per annum. Two seasons can be distinguished: a rainy season extending from June-October and a dry season from November to May (Ba *et al*., 1997).

Fauna and flora: Among the rich fauna are many threatened species such as hyenas (*Crocuta crocuta*), the Derby eland (*Taurotragus derbianus*), elephants (*Loxodonta africana*), lions (*Panthera leo*) and chimpanzees (*Pan troglodytes*). The flora is dominated by *Byranthus brownii*, *Cassipourea congoensis*, *Diospyrus* sp., *Elaeis guineensis*, etc., common in the gallery forest. For the open savanna, *Afzelia africana*, *Pterocarpus crinacus*, *Anogeissus leicarpus* etc. are common. The ecological milieu is also dominated by shrub such as *Combretum* sp., *Detarium microcarpum* and *Gardenia ternifolia*. The savanna grassland is dominated by the *Andropogon*, *Vetoveria*, *Panicum* sp., *Mitragyna inermis*.

Socioeconomic characteristics: The region is inhabited by over 82,400 people from diverse ethnic and cultural backgrounds, including the Coniagui, the Bassari Badiaranké and others of more recent foreign origin: Fulani, Foulakounda, Sarakollé, Malinke. Ecoconomic activities are dominated by agriculture (subsistence), livestock, hunting, beekeeping and fishing, the use of bamboo and raffia palm are also common. The local population participates in the management of the biosphere reserve (Ba *et al*., 1997).

Variables measured: Field work took place from January-March 2009. The aim was to assess the numbers and names different animals and plants met in the field. Moreover, different human activities done around the forest were recorded.

Animal variables: The primary data collection on animals was based on the sight (seeing animals, the nests, footprints, droppings and excrement). The secondary data were obtained from the documents on terrestrial vertebrates.

Plant variables: The primary data on plants were obtained from the inventory of all plants species met in plots (25 m^2) made in different locations into the forest. Then all plants species (grasses, shrubs, trees) were counted and named by their families and species. The secondary data were obtained from the documents (Berhaut, 1967; Ba *et al*., 1997).

Anthropogenic activities around the park: Different human activities were recorded based on the observation, while collecting data on plants and animals species. We have also discussed this issue with people living around the park in order to get more information.

Data analysis: Microsoft excel was used to analyze data.

RESULTS AND DISCUSSION

The results showed that the three first families that are well represented in species are the Combretaceae, the Caesalpiniaceae and Compositeae with 15, 10 and 6 sp., respectively. The families of Compositeae, Melastomataceae and Mimosaceae, Euphorbiaceae and Rubiaceae are represented by 6, 5 and 4 sp., respectively. The least represented families with only one species are Apocynaceae, Arecaceae, Bignoniaceae, Capparaceae, Celastraceae, Cochlospermaceae, Ebenaceae, Hymenocardiaceae, Icacinaceae, Labiaceae, Loganiaceae and Verbenaceae.

Among the species recorded in the study area, some of them are classified vulnerable by IUCN. Those are the following: *Xylipia aethiopica* (Annonaceae), *Ceiba pentandra* (Bombacaceae), *Cassia sieberiana* (Caesalpiniaceae), *Combretum micranthum* (Combretaceae), *Alchornia cardifolia* (Euphorbiaceae), *Indigofera tinctoria* (Fabaceae), *Parkia biglobosa* (Mimosaceae), *Lophira lanceolata* (Ochnaceae), *Borassus aethiopicum* and *Rafia sudanica* (Palmaceae), *Cola latifolia* (Sterculiaceae). We also found the threatened species (Lucas and Synge, 1978) like *Afzelia africana*, *Cassia podocarpa* and *Tamarindus indica* (Caesalpiniaceae), *Guiera senegalensis* (Combretaceae)

and *Khaya senegalensis* (Meliaceae). According to CITES (Convention International on the Trade of Endangered sp.) all those species must be carefully conserved and prevented from any human threat. The results also revealed that four species of mammals are listed by CITES and IUCN namely *Panthera pardus* (CITES), *Lycaon pictus*, *Hyppopotamus amphibus* (CITES) and *Pan troglodytes* by IUCN (Keita and Balde, 2005). Other species are threatened: *Cercopithecus diana*, *Cercopithecus petaurista*, *Bubalus bubalus*, *Syncerus caffer*, *Colobus baibadius*, *Phacochaerus aethiopicus* and *Phacochaerus porcus* (Bah *et al*., 1997). Others are at risk: *Cercocebus torquatus*, *Felis aurata*, *Panthera leo*, *Panthera pardus*, *Crocuta crocuta* and *Loxodonta africana* (Bah *et al*., 1997).

Some birds' species are at risk (*Ciconia ciconia* and *Haliaetus vocifer*). Another species is vulnerable (*Psittacus senegalensis*) (Bah *et al*., 1997). Some reptiles species are: *Python sebae* and *Python regius*; two others are vulnerable: *Crocodylus niloticus* and *Varanus niloticus* (Bah *et al*., 1997). The amphibian species are all vulnerable: *Bufo superciliaris*, *Hyperiolus concolor* and *Hyperiolus guineensis* (Bah *et al*., 1997).

Human activities around the park: Medicinal plants collection: The surrounding population resorts to the use of medicinal plants because there is a big distance between the hospital and their homes. Even though there is a need for the population to use medicinal plants, their efficiency has not been proved yet. An example of a disease mostly treated by medicinal plants is the paludism. It's a common and endemic disease in the area. Here is a list of medicinal plants used to treat some diseases (Table 1).

Hunting: The most hunted animals are the elephants (*Loxodonta africana*) especially for their ivory, the leopards (*Panthera pardus*) for skin, the antelopes (*Antilopus neotragus*), buffaloes (*Syncerus caffer*) and hippopotamus (*Hippopotamus amphibus*) for meat. There is also the western bush pig (*Potamochoerus porcus*). There are also some animals hunted for medicinal use such as elephant (*Loxodonta africana*) whose sperm fights against sexual weakness; lion (*Panthera leo*) whose mite fat war bills, while relieving pain and rheumatism.

Wood collection: The wood is collected for double domestic purpose: the first is for heating (firewood) and the second is for house construction. The most used trees for construction and or firewood are shown in Table 2.

Table 1: Medicinal plants used

Scientific names	Disease treated	Part used
Lannea acida	Diarrhea, sore	Sheet
Lannea velutina	Headache, conjunctivitis	Sheet
Bombax costatum	Caries, headache	Sheet
Afzelia africana	Fibroma, stomach pain, irregular menstrual cycles	Sheet
Cassia siebericana	Paludism, fever, cough, aches, nephritis, vertigo, rheumatism, stomach aches, night blindness	Sheet
Tamarindus indica	Conjonctivite, constipation	Sheet, bark, fruit
Anogeissus leiocarpus	Paludism, ictere, dysentery, headache, gastro-enteritis	Sheet
Combretum glutinosum	Dysentery	Sheet
Combretum micranthum	Paludism	Sheet
Hymenocardia acida	Help the child fast to walk	Root

Table 2: Trees for construction and/or firewood

Scientific name	Usage
Borassus aethiopum	Construction
Ceiba pentandra	
Afzelia africana	
Parkia bicolor	
Khaya senegalensis	
Lophira alata	
Oxytenanthera abyssinica	
Acacia sp.	Firewood
Andropogon incomptus	
Isachne guineensis	
Combretum nigricans	

Data analysis, 2009

CONCLUSION

This study aimed at making inventory of plant and animal species in the Badiar National Park as well as highlighting different threats against its conservation. In total, 31 plant families containing 106 plant species were recorded and the most three represented families are Combretaceae, Caesalpiniaceae and Compositeae with 15, 10 and 10 sp., respectively. Some species (both animals and plants) have a special status from CITES or IUCN, the reason why they must be carefully conserved and prevented. We have also recorded different human activities around the park such as Medicinal plants collection, hunting and firewood collection.

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