CONSERVING PLANT DIVERSITY IN THE MASSIF DU CHAILLU OF GABON: LINKING CONSERVATION AND PARATAXONOMY

report on parataxonomy training in Waka National Park
June 2005-August 2006

Gretchen Walters
Missouri Botanical Garden
September 2006

Summary

This report summarizes the parataxonomy activities conducted in and around Waka National Park (WNP), Gabon from June 2005 to present. These activities are funded by the Beneficia Foundation as part of the matching funds for our AID subcontract with the Smithsonian Institution.

A team from the Missouri Botanical Garden (MBG), the Herbier National du Gabon (HNG), and the Wildlife Conservation Society (WCS) selected and trained local people during the Smithsonian Biodiversity Plot work in WNP in June-July 2005 in methods of plant collection and biodiversity assessment. Those selected during the training became MBG staff managed on-site by WCS in WNP and by HNG and MBG in Libreville. They now conduct independent field missions in the park to collect much needed botanical information on plant rarity and endemism. Outside the park, they work in nearby villages to collect ethnobotanical information in pygmy and Mitschogo villages. In the future, we hope to have them trained at the national forestry school which will then enable them to become civil servants and then posted to WNP as park staff. We hope to extend this program to other national parks in Gabon, thus creating a solid base of civil servants well versed in conservation and botanical methods and assessment. This project will most likely be replicated in the future as more funding is sought.

Introduction

Conservation organizations have recently come under fire for placing more emphasis on protection of biological diversity than on addressing local needs (Chapin 2004). This scenario often results in "fortress conservation" initiatives (Gartlan 1998) that ultimately fail. Recent studies of conservation and development projects show that success in preserving biological diversity is strongly and positively linked to working with local people (Adams et al. 2004). Today, one of the greatest challenges to conservation is to realize this goal.

One way to bring indigenous people into conservation projects is providing means for them to contribute their knowledge on local plant resource use and distribution to conservation projects. Combining western data collection methodology and indigenous knowledge can begin to bridge the gap between international and national conservation and local knowledge while also providing employment near protected areas (Sheil and Lawrence 2004). Local ethnobotanists are proud to share their knowledge, feel valued by the national park in their "backyard", and significantly contribute to biodiversity and ethnobotanical data lacking by national environmental management agencies (Janzen 2002, 2004). Such approaches to local conservation have worked incredibly well in developing countries (Basset et al 2004, Janzen 2004, Goldstein 2004) and in the Missouri Botanical Garden's experience have contributed successfully to work in Tanzania, Costa Rica, Madagascar, and Panama. In return, local people become players in conservation initiatives involving their natural resources and gain valuable skills used to find jobs in the environmental sector or later pursue high school diplomas or advanced degrees.

Such training has been found to be particularly effective in impacting local people in Gabon where previous socio-botanical training resulted in a 75% retention rate of trained villagers (Thibault and Blaney 2001). This attests to the return on

investing in training local people in Gabon. Yet, to be successful, villagers must feel that their contributions are meaningful and must have continued support through mentorship. The setting must also be conducive to conservation activities with a good field base and links to national conservation and government organizations already supporting work in the area. Gabon, Central Africa is the perfect place in which to support local ethnobotanists. Gabon is one of the botanically most diverse tropical African countries (Pomeroy 1993) with an estimated 7,000 plant species (Sosef et al 2006). Numerous species are located in remote mountain ranges such as the Massif du Chaillu where several parks were created to preserve this diverse flora. Gabon has the right combination of biodiversity, conservation activity, and a high level of indigenous plant knowledge. Linking these together will increase local capacity while simultaneously increasing the national government's capacity to govern its resources.

Ethnobotany is the study of the ways in which people use plants. It provides a forum for integrating indigenous knowledge into conservation activities (Salick & Ethnobiology Working Group 2002). In rural Gabon, knowledge of plant use is highly prized and often plays an important role in providing medical care as well as food to supplement agriculture. Useful plants were highly regarded and publicized by the Gabonese priest Abbey Raponda-Walker, whose book, *Les Plantes Utiles du Gabon* (Raponda Walker 1961), details the intimate link between Gabonese people and their forests.

Four years ago, Gabon established a new national park system. A substantial effort was made to locate the parks in areas that simultaneously protected biodiversity and habitat while also minimizing conflict with local populations over resource use within park boundaries. However, in many areas, villages surround parks, and several parks contain areas that have been used traditionally by local residents as a source of materials, primarily from hunting and gathering. Much of the plant material gathered today in Gabonese forests is used to provide medicine or basic nutrition. While information on traditional use of plants is available for some ethnic groups, the practices of many others remain unknown. Working with local people to gather data and document traditional resource use in and around national parks offers an opportunity to develop participatory conservation.

Site Description. Waka National Park, Massif du Chaillu

Biological significance

The Waka NP has remained relatively unexplored by botanists. Only some 295 species had been collected in the Waka NP previous to the activities reported here. This number has since been doubled for the park, in part through the activities presented in this report.

Among these collections there were interesting findings (see next page). Recently, a completely new genus has been found for the family of the Flacourtiaceae. This is very exceptional as new genera nowadays are only seldom found.

The NE part of the park was targeted first as it was already and recently logged. The biodiversity assessment had to validate whether the forest was still botanically valuable enough for conservation.

The Massif du Chaillu mountain range, located in south-central Gabon, just south of Lope National Park, is a southward extension of the Monts de Cristal Mountains. The Massif is included in the newly established Waka National Park, encompassing 1070 km^2. Although the area was selectively logged in the 1960s, its forests and wildlife populations are largely intact. Sightings of elephants and gorillas

occur regularly, and the endemic sun-tailed guenon (*Cercopithecus solatus*) occurs within the park. Recent botanical exploration work done by MBG and our partner institutions has led to the re-discovery of two endemic palm species that were once economically important to the Mitshogo people of the area. Our current inventory efforts are focusing on a mountainous area adjacent to the park that we believe has particularly high plant diversity and that may serve as a refuge for locally endemic species. There are many ancient villages in the area, and the pre-European human populations appear to have been relatively large, as evidenced by the presence of plantations of oil palm (*Elaeis guineensis*) and atanga trees (*Dacryodes edulis*). In recent history, the mountain chains that run through the park have served as a corridor for human migration as well as hunting and gathering expeditions by Babongo pygmies and Mitshogo people, and these groups still rely heavily on forest resources, both within and outside the park.

Project Goal and Time Line

This project, co-financed by the Smithsonian Institution (USAID) and the Beneficia Foundation, has the goals of selecting and training parataxonomists in botanical, ecological, and ethnobotanical methods in Waka National Park; it is hoped that in coming years, this work and training would serve as a foundation of information and expertise required by this new national park.

This project has several phases, the first of which was conducted during the establishing of the BDP's. The year long program was as follows:

June 2005	Initial selection of parataxonomy participants
July 2005	Training of parataxonomist and ecoguards during plot establishment
Sept. – Nov. 2005	Training in forest navigation
Jan. 2006 – present	Collection of ecological, botanical, and ethnobotanical data in and around Waka National Park

Meeting with Key Partners: HNG, WCS

This initial training was part of a larger parataxonomy project incorporating local partners. We collaborated with the following partners: the Herbier National du Gabon (HNG), whose expertise involves the documentation of Gabon's biodiversity; and the Wildlife Conservation Society (WCS), which assists Waka National Park (WNP) in the management of the park headquarters, staff, and operation, and the Smithsonian Institution (SI) who established 1 ha plots in WNP and contributed to the training of these parataxonomists.

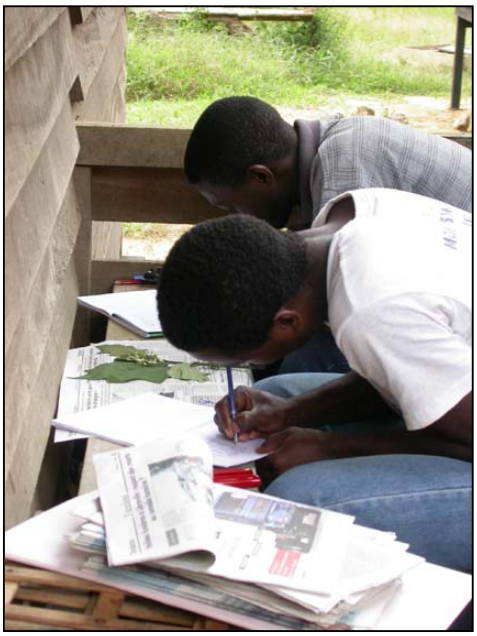
Partners met prior to plot establishment in June 2005, to discuss their roles in the project. Gretchen Walters represented MBG, and other partners were represented by Dr. Ludovic Ngok, Director of HNG, Gaspard Abitsi, WCS Site Assistant of WNP, and Malcolm Starkey, WCS Technical Assistant to WNP. WCS agreed to provide on-site support for the parataxonomists, including personnel management, coordination of contracts, transport logistics, salary, and emergency medical care. HNG agreed to help organize botanical training and to seek additional training opportunities for the parataxonomists. MBG's commitment involved the selection and training of the parataxonomists, and off-site management. SI, not present at the

meeting, co-funded the training of the parataxonomists in the field, which was then furthered by CARPE matching funding for the activity by the Beneficia Foundation.

Selection of Parataxonomists from Villages Near Waka National Park

In late June 2005, Ngok, Abitsi, and Walters made a tour of four villages surrounding Waka National Park: Mimongo, Séka Séka, Etéké, and Moukabou. At right, Ngok and Abitsi interview Estelle Mamadou, one of the selected parataxonomists. We also met with local authorities in Mimongo (the seat of the Provincial authority), including the Mayor and the Sous-préfet. We explained the goals of the project and asked for their assistance in locating candidates for the parataxonomist training positions. In each of the four villages, the chief facilitated the interview process, which screened a total of 17 applicants. The candidates were evaluated on their current knowledge of plants, educational level, enthusiasm, personality, current occupation, and eventual prospects for pursuing higher education. In most cases the candidates had a maximum educational level of 10^{th} grade and little or no future formal educational prospects. The four candidates selected to participate in the botanical training ranked high in all of the evaluation categories. Some of them had an advanced knowledge of useful plants, and all showed a willingness to learn about botanical techniques and biodiversity in Waka National Park. The four successful candidates were invited to participate in a botanical training exercise to take place immediately at Waka, and they all accepted.

Training of Parataxonomists and National Park Staff



We then conducted a two-week botanical field course in which the four parataxonomists were joined by six ecoguards from the Park. They were trained in methods of botanical collection (as seen in the photo to the right) and establishment of large tree-plots; both of these methods were used to evaluate the biodiversity of the area. Instructors were drawn from a variety of backgrounds and were associated with various park projects.

The first week of training focused on providing the participants with the basic background needed to collect plants. They were also introduced to the history of conservation in Gabon and to the goals of the park. The second week focused on field book data entry, plant drying, and an introduction to establishing and censusing vegetation plots, a tool useful for understanding diversity patterns in various forest types.

Topics and instructors included, in order of presentation:

- Introduction to basic botany, field book entries, plant pressing: Gretchen Walters (MBG)
- Introduction to botany in Gabon: Dr. Ludovic Ngok (HNG)
- Introduction to conservation in Gabon: Gaspard Abitsi (WCS)
- Introduction to ecological methods (plots): Mike Balinga (SI)
- Plant collection, pressing, and drying: Joseph Mayombo (HNG)
- Field data recording: Jean Claude Mouandza (WCS)
- Plot Establishment: Mike Balinga (SI)
- Collection of Palms: Dr. Terry Sunderland and Mike Balinga (Smithsonian Institution)
- Identification of canopy trees: Yves Issembe (HNG)

Following the two-week training period, instructors met to select two parataxonomists for continued training during a one-year period in Waka National Park, funded by the Beneficia Foundation. The two successful candidates were Estelle Mamadou and Juvenal Boussiengui.

Complementary field training. The two parataxonomists chosen for continued on-site training were incorporated into the existing Waka National Park staff as ecoguards, who are responsible for monitoring forest diversity. Together with other ecoguards, they participated in a three-month training program from September to November 2005 that focused on several essential skills:

- Map reading and navigation in closed canopy forest
- Collection of botanical and faunal information (incl. insects)
- Report writing

Training was conducted by the Wildlife Conservation Society and their partners. Instruction was given by Gaspard Abitsi (WCS), Dr. Fiona Maisels (WCS), and Jean Pierre van der Weghe (WCS), along with botanists from HNG and MBG.

Project Follow-up

Since the initial training in June and July 2005, the parataxonomists have continued to work in WNP, participating in a variety of ecological, botanical, and ethnobotanical studies. Their work continues to be funded by the Beneficia Foundation. With current AID funding from the SI subcontract to Missouri, another parataxonomist was added to the network, this time from Ivindo National Park. Herbarium training was provided to WNP parataxonomists in May of 2006, coordinated by HNG. Ethnobotanical work began in June 2006.

The specimens collected by these parataxonomists constitute an on-going contribution to baseline data collection in Gabon National Parks. Only 1 of the 13 National Parks have a checklist, leaving the rest without a solid understanding of the plant diversity protected within their borders. Furthermore, there are numerous areas in Gabon which lack any information on their forests (Sosef et al. 2006) thus underscoring the need for more botanical information. With the parataxonomy program, we hope to increase the collection of plant data in the parks, thus increasing

our understanding of rare plants, discovering new species, and ultimately better managing the precious forests now under protection in Gabon.

The two-parataxonomists trained during this project will, in the next few years, participate in training at the Ecole National des Eaux et Forets, making them candidates to become future park employees, thus making a lasting contribution to conservation of the Massif du Chaillu.

Acknowledgements:
MBG wishes to thank Ludovic Ngok, Joseph Mayombo, Yves Issembe, and Benoit Bziengui of HNG; Malcolm Starkey, Gaspard Abitsi, and Jean Claude Mouandza of WCS; Terry Sunderland and Mike Balinga of SI; Joseph Mounigou, the Conservateur of Waka National Park, for authorization. This project was financed by USAID and the Beneficia Foundation.

Literature

Adams, W. M., Aveling, Ros, Brockington, Dan, Dickson, Barney, Elliott, Jo, Hutton, Jon, Roe, Dilys, Vira, Bhaskar, and Wolmer, William. Biodiversity conservation and the eradication of poverty. Science 306, 1146-49. 2004.

Basset, Y, V. Novotny, S. Miller, G. Weiblen, O. Missa & A. Stewart. 2004. Conservation and biological monitoring of tropical forests: the role of parataxonomists. J. Applied Ecol. 41: 163-174.

Chapin, Mac. A challenge to conservationists. Worldwatch . 2004.

Gartlan, Steve. Every man for himself and god against all: history, social science and the conservation of nature. 1997. World Wildlife Fund for Nature Annual Conference on People and Conservation.

Goldstein, P.Z. 2004. Systematic collection data in North American invertebrate conservation and monitoring programs. J. Applied Ecol. 41: 175-180.

Janzen D. 2002. Biodiversity is us. All Taxa Biodiversity Inventory 3:3.

Janzen, D. 2004. Setting up tropical biodiversity conservation through non-damaging use: participation by parataxonomists. J. Applied Ecol. 41: 181-187.

Pomeroy, D. 1993. Centers of high diversity in Africa. Conservation Biology 7(4): 901-907.

Raponda-Walker, A. 1961. Les Plantes Utiles du Gabon. Le Chevalier Pub., Paris. Pp. 614.

Salick, Jan and Ethnobiology Working Group. Intellectual Imperatives in Ethnobiology (NSF Biocomplexity Report). 2002. St. Louis, Missouri, Missouri Botanical Garden.

Sosef, M.S.M., J.J. Wieringa, C.C.H. Jongkind, G. Achoundong, Y. Azizet Issembe, D. Bedigian, R.G. van den Berg, F.J. Breteler, M. Cheek, J. Degreef, R. Faden, P. Goldblatt, L.J.G. van der Maesen, L. Ngok Banak, R. Niangadouma, T. Nzabi, B. Nziengui, Z.S. Rogers, T. Stvart, J.L.C.H. van Valkenburg, G. Walters & J.J.F.E. de Wilde. 2006. Check-list des plantes vasculaires du Gabon. Scripta Botanica 35.

Sheil, D. and A. Lawrence. 2004. Tropical biologists, local people and conservation: new opportunities for collaboration. Trends in Ecology and Evolution 19 (12): 634-638.

Thibault, M, & S. Blaney. 2001. Sustainable human resources in a protected area in southwestern Gabon. Conservation Biology 15(3): 591-595.