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PROJECT NO. 101405 - BRONZE AWARD WINNER

ECOLOGY, DISTRIBUTION, STATUS AND PROTECTION OF THREE CONGOLESE FRUIT BATS

FINAL REPORT

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I. Project Summary

In September and October of 2005 a field project was executed aimed at finding three species of fruit bat (Megachiroptera) in the southwest of the Democratic Republic of Congo and of the Republic of Congo: *Epomophorus grandis* (Sanborn, 1950), *Micropteropus intermedius* Hayman, 1963 and *Epomophorus* cf. *labiatus* (Temminck, 1837). The first two species are Data Deficient in IUCN's Red List of threatened species; the third has not been assessed.

The species have not been found. The results of the project indicate that the diversity of Megachiroptera in the two regions may still be relatively rich. Two species were captured which are new for the province of Bas-Congo in the Democratic Republic of Congo, *Myonycteris torquata* (Dobson, 1878) and *Scotoonycteris zenkeri* Matschie, 1894, and one species was captured which is new for the region of Pointe Noire in the Republic of Congo: *Eidolon helvum* (Kerr, 1792).

In one village, indiscriminate hunting of fruit bats was observed. A number of observations were done on the feeding of fruit bats on particular fruits.

It is argued that the search for the three species should be continued over a greater length of time. A plea is made to include Megachiroptera in national considerations and plans for biodiversity conservation, to promote the environmental awareness and education of local populations, and to establish a national Species Survival Committee, in both countries.

II. Introduction

Bats (Order Chiroptera) are the only flying mammals. Globally, more than 1000 species (Simmons, 2005) have been described. There are two Suborders: Microchiroptera and Megachiroptera. Microchiroptera are generally rather small and, in the Old World, carnivorous; most of them eat insects, but some species may take larger prey. Megachiroptera are generally larger – but not in all cases - and are herbivorous; depending on the species they may eat fruits, flowers, pollen and nectar, and in some cases leaves. Megachiroptera are often called fruit bats.

According to Hutson, Mickleburgh & Racey (2001), the Democratic Republic of Congo is home to at least 95 species of bats, 17 of which belong to the Megachiroptera. From the Province of Bas-Congo, 36 bat species are known, ten of which are Megachiroptera (Hayman, Misonne & Verheyen, 1966; Bergmans, 1997):

Rousettus aegyptiacus (É. Geoffroy-St. Hilaire, 1810)
Eidolon helvum (Kerr, 1792)
Epomophorus cf. *labiatus* (Temminck, 1837) (as *E. labiatus minor*)
Epomophorus wahlbergi (Sundevall, 1846)
Micropteropus intermedius Hayman, 1963
Micropteropus pusillus (Peters, 1867)
Hypsignathus monstrosus H. Allen, 1861
Epomops franqueti (Tomes, 1860)
Lissonycteris angolensis (Bocage, 1898)
Megaloglossus woermanni Pagenstecher, 1885.

It should perhaps be noted here that some of the identifications in Hayman *et al.* (1966) have later been corrected; *Epomophorus gambianus* (Ogilby, 1835) does not occur in Bas-Congo,

and the specimen underlying this record has been re-identified as *Epomophorus wahlbergi*, while *Epomophorus anurus* Heuglin, 1864 is now considered a synonym of *E. labiatus* and *Myonycteris wroughtoni* Andersen, 1908 a synonym of *M. torquata* (Dobson, 1878). The number of bat species known from the Republic of Congo is 34, of which 13 are Megachiroptera (Bergmans, 1979; Dowsett, Harrison & Granjon, 1991). In the southwest of the Republic of Congo, in Pointe Noire and immediate environs, seven species of Megachiroptera have been collected (Bergmans, 1979):

Epomophorus grandis (Sanborn, 1950)
Epomophorus cf. labiatus
Epomophorus wahlbergi
Micropteropus pusillus
Epomops franqueti
Lissonycteris angolensis
Myonycteris torquatus (Dobson, 1878).

Further research will no doubt increase these numbers.

In the subtropics and tropics of the Old World, Megachiroptera are ecologically important because they pollinate the flowers and disseminate the seeds of many forest and savanna tree species. (In the forests and savannas of subtropical and tropical Central and South America this role is performed by a specialized group of Microchiroptera.)

The Megachiroptera are probably not the exclusive pollinators and seed dispersers of all these tree species but their contribution may be disproportionately large. Until today, not much research has been done to quantify this statement. An exception is Thomas (1991), who found that 94 to 100 % of all the seeds of the Cape fig tree *Ficus capensis* Thunb., in Ivory Coast are dispersed by fruit bats.

The conservation of Megachiroptera, and thus our knowledge of them, is essential to the conservation of Old World tropical and subtropical forests and tree savannas. The species of African fruit bats are reasonably well-known, but there are some regions from where very few data on these bats are available.

One of these regions is the west-east band of "Mosaic of Guineo-Congolian lowland rain forest and secondary grassland" (vegetation type according to White, 1983) just south of the Central African rainforest block, running from the Atlantic Ocean coast of the southern Republic of Congo towards the northern tip of Lake Tanganyika, roughly between 11° and 28° E and 4° and 8° S (Bergmans, 1999).

The western part of this region, from the coast via the southwest of the Republic of Congo and the southwest of the Democratic Republic of Congo to the northeast of Angola, is inhabited by two endemic fruit bat species, *Epomophorus grandis* and *Micropteropus intermedius* Hayman, 1963.

In the same region a third form has been collected which has been associated with a species, *Epomophorus cf. labiatus*. *Epomophorus labiatus* is otherwise known from East Africa only (see Bergmans, 1988, 1989). If this association is correct, the large distributional gap calls for further investigation of the characteristics of this taxon in this region.

It has been suggested by IUCN that the first two species would be endangered (Baillie & Groombridge, 1996), while the third has not been assessed. Quite recently, the first two have been re-classified as Data Deficient (Bergmans, 1999; IUCN, 2004). The reason was that too little is known about these bats to warrant their assessment as Endangered. Very little bat collecting has been carried out in this region and both *Epomophorus grandis* and *Micropteropus intermedius* are known from four specimens only. New data on their continued existence and conservation status are necessary for a true assessment by IUCN.

During the last decades, forests and trees in the southwest of the Republic of Congo have been degraded by deforestation and drought. In the province of Bas-Congo in the Democratic Republic of Congo they have been further degraded by the extra demands of many thousands of war refugees from Angola and from the country itself.

It is likely therefore that these bat species, supposedly inhabitants of tree savannas and forest margins, have suffered greatly. Not much natural forest cover has remained. Even many traditional village forests have been degraded or destroyed. Precipitation in Bas-Congo is rapidly decreasing and would already be down to about 50 % of its original volume (Ir. Damien Ndosimau Kuyenga, verbal communication, June 2002).

The fruit bat species in question are poorly known - never well observed in the wild, very rare in collections - and possibly threatened by the recent changes in their natural environment. For their successful conservation, more knowledge about them is very necessary - and their ecological problems may be exemplary moreover for many other species in the region, both animals and plants.

For these reasons, the Kinshasa-based Non-Governmental Organization (NGO) “*Observatoire Congolais pour la Protection de l’Environnement*” (OCPE), consisting mainly of biologists and environmentalists and acquainted with the province of Bas-Congo, in collaboration with the University Marien Ngwabi of Brazzaville, developed a project aimed to find out more about the ecology, distribution, status and protection of these three species.

In general, the project was aimed at improving and extending scientific knowledge of taxonomy, biology, ecology, distribution and conservation status of the three species in the general region of Bas-Congo and adjoining Southwest Republic of Congo, at drafting recommendations for IUCN Red List status, and promoting their conservation by law and by local participative conservation. The project consisted of:

- 1) A study of the literature on African fruit bats and vegetation, and of conservation law and protected areas;
- 2) Field work at four sites where the fruit bat species concerned might be expected. In the field, consultation of local populations about fruit bat occurrence, possible fruit bat damage to fruit harvests, and choice of study sites (i.e. where to put up mist nets); at the study sites, inventories of food tree species; the collection of some voucher specimens of each of the three study species, and of skin samples of the flight membrane of other Megachiroptera, in particular Epomophorinae (the subfamily of the study species), for DNA analysis.
- 3) Analyses of DNA by the University of Amsterdam.
- 4) Preparation of a report and of an article for a journal.

- 5) A discussion of the results with the authorities in both countries, to review conservation measures relating to the three species such as representation in protected areas.
- 6) A discussion with the local populations at sites where one or more of the three species occur, about participatory conservation activities and benefits.
- 7) Recommendations to IUCN to adapt Red List status of the three species, to reflect the results of the project.
- 8) A discussion of the follow up.

Of course, the project activities 5, 6, and 7 were optional, depending on whether one or more of the three study species would be found.

The present report describes the project and its results.

III. Materials and methods

To carry out this project, grants were requested, and obtained, from the BP Conservation Programme in the United Kingdom and from the Van Tienhoven Foundation in The Netherlands.

In the Democratic Republic of Congo, the ministry of Scientific Research has given OCPE the permission to carry out the research related to this project, with as partner the Group for Studies and Research of Biological Diversity (GERDIB) in the Republic of Congo.

A permit to work in the protected area of Luki Forest Reserve was obtained from the Institut Congolais pour la Conservation de la Nature (ICCN), which also supported the project in the field.

A permit to work in the forest near Pointe Noire in the Republic of Congo was obtained from the Department of Fauna and Protected Areas in Brazzaville. For the other localities no special permits were required.

Field work equipment was bought partly in Amsterdam and partly in Kinshasa. Mist nets to capture bats were bought from the Vogeltrekstation (Institut pour l'Etude de la Migration des Oiseaux) in Heteren, The Netherlands. The necessary literature to know the vegetation and to identify the flora of the region (Pauwels, 1993; Pendje & Baya, 1992; Doumenge, 1996; Latham, 2004) and to know the distribution of bats and identify fruit bats (Hayman, Misonne & Verheyen, 1966; Bergmans, 1997) was obtained prior to the field work.

The field research was carried out by two teams, each consisting of three members of OCPE, and for the Republic of Congo in collaboration with a representative of the University Marien Ngwabi in Brazzaville in the Republic of Congo.

Before going into the field, the teams received training in the systematics of Chiroptera and in bat field work techniques from Professor Dr. Sébastien Ifuta of the University of Kinshasa.

The training consisted specifically on methods of capture, recognizing and classifying bats on the field and to collect data on fruit bat occurrence, biology, ecology, food species, status and conservation.

The team camped to each research site for 2 weeks maximum with a few days less in the case of Luki Reserve (11 days) and of Zongo forest (10 days) mainly for some terrain difficulties in reaching the areas. The team placed nets to capture fruit bats. In each site two local guides were hired by the team for field techniques support. The sites of nets instalment were decided with the expertise of local guides. During the night a monitoring of nets was conducted and bats falling into the nets were collected for onsite research.

Plants used by bats in the areas were identified, in order to serve in further conservation efforts.

Bats were first of all identified using classification keys on the field. After identification, only some individuals belonging to the family of Epomophorinae object of the research had a small skin samples collected. These samples were kept in small plastic tubes for DNA analysis. Only few individuals that could not be identified on field on the field were taken for laboratory analysis.

Every individual captured and not belonging to the Epomophorinae was released. In each research site the team interviewed local communities' relationship with fruit bats, the possible bats damages to local communities' harvests, the populations' observation of the bats' situation in the areas, the challenges and benefits of the bats conservation in the areas. The interview targeted principally people over 18 years old, hunters, and farmers (men and women).

After interviews of local communities in each site, the team organized meetings of sensitization of villagers and communities about the need of forests and bats conservation.



Talking with men and hunters about Forests and Bats Conservation in the Zongo Area (Photo OCPE 2005)

The field research has focussed on four localities, three of which in Bas-Congo:

- 1) Mayumbe Forest near Luki Forest Reserve, in a mosaic of forest and moist savanna;
- 2) Near Mbanza-Ngungu, in a mosaic of forest and savanna;
- 3) Zongo Forest; and one in the Republic of Congo,
- 4) Pointe Noire coastal forest.

This choice was based on existing knowledge on the distribution of the species concerned (Bergmans, 1989). At each of these localities, a team of OCPE members, in the Republic of Congo extended with a representative of the University Marien Ngwabi of Brazzaville, made camp for two weeks to discuss with the local population and to collect data on fruit bat occurrence, biology, ecology, food species, status and conservation.

The teams have searched for fruit bats, especially for the three project species mentioned - *Epomophorus grandis*, *Micropteropus intermedius* and *Epomophorus cf. labiatus*. They collected skin samples of other fruit bats, especially Epomophorinae, in absolute alcohol to serve for DNA analysis and took pictures of other fruit bats. Of the three project species, three specimens per locality would be collected, while further specimens, and bats belonging to other species, were to be released.

The first team, which worked at Luki Biosphere Reserve (Mayumbe Forest) and Mbanza-Ngungu, consisted of Peter Lukamba, Danny Kianawa, and Jeannine Miyalu, all three biologists and environmentalist. The second team, which worked at Pointe-Noire and Zongo Forest, consisted of Bill Kabamba, Franck Kashita, and Nady Mpiana, all three also biologist and environmentalist. For the trip to Pointe Noire, Nady Mpiana was replaced by Boniface Nzaka of the *Centre de Recherche Forestière du Littoral* (CRFL) of the Republic of Congo. The teams were lead by Patrick KIPALU, biologist and environmentalist.

To guarantee a proper analysis of the results of the project, assistance was sought and obtained from a number of specialists. Three botanists consented to identify tree species in the case of difficulties: Dr. Kibungu Kembelo, Director of the Botanical garden at Kisanthu, Bas-Congo; Professor. Dr. Ir. Jos (L. J. G.) van der Maesen, University of Wageningen, The Netherlands; and Dr. Luc Pauwels of the National Botanical Garden at Miese, Belgium. Dr. Wim Bergmans of the Zoological Museum of the University of Amsterdam, The Netherlands, who acted as external adviser of OCPE during the duration of the whole project, would check OCPE's identifications of fruit bats. Dr. Miguel Vences of the same institution guaranteed the analysis of DNA samples of fruit bats (by sequencing a fragment of the mitochondrial gene 16S). Dr. Mansour Aliabadian of the Zoological Museum took upon him to carry out the analysis.

IV. Results per Study Site

The sites have been arranged in an order from west to east.

1. Pointe Noire

Pointe Noire was reached by taking a boat from Kinshasa to Brazzaville and a flight from there to Pointe Noire. The local guides were Mr. Hubert Tshe and Mr. Boniface Zanza. The study site was south of Pointe Noire, near the river Louaya and just behind the beach, at 04°49'- 04°50'S and 11°51'-11°52'E, at an altitude of 1-4 m. The nets (3) were set up in a savanna with *Hypparhenia diplandra*, tertiary forest, and destroyed mangrove forest. There was a stand of *Borassum aethiopicum* which served as part of the ecological niche for bats, both as a habitat and as provider of food for fruit bats.

The camp was active from the September 27th to the October 09th of 2005. The urbanization and the recent wars have changed completely the face of environment in this area. Consequently the forest has been completely destroyed and probabilities to observe bats were significantly reduced. Nevertheless, following local guides, the team placed 3 nets in savannas where some few fruit bats specimens have been observed.

The 2 specimens caught represented two species of Megachiroptera, *Eidolon helvum* (Kerr, 1792) and *Epomophorus wahlbergi* (Sundevall, 1846), and two Microchiroptera: 3 specimens of *Eptesicus tenuipinnis* (Peters, 1872) and 1 specimen of *Pipistrellus nanus* (Peters, 1852).

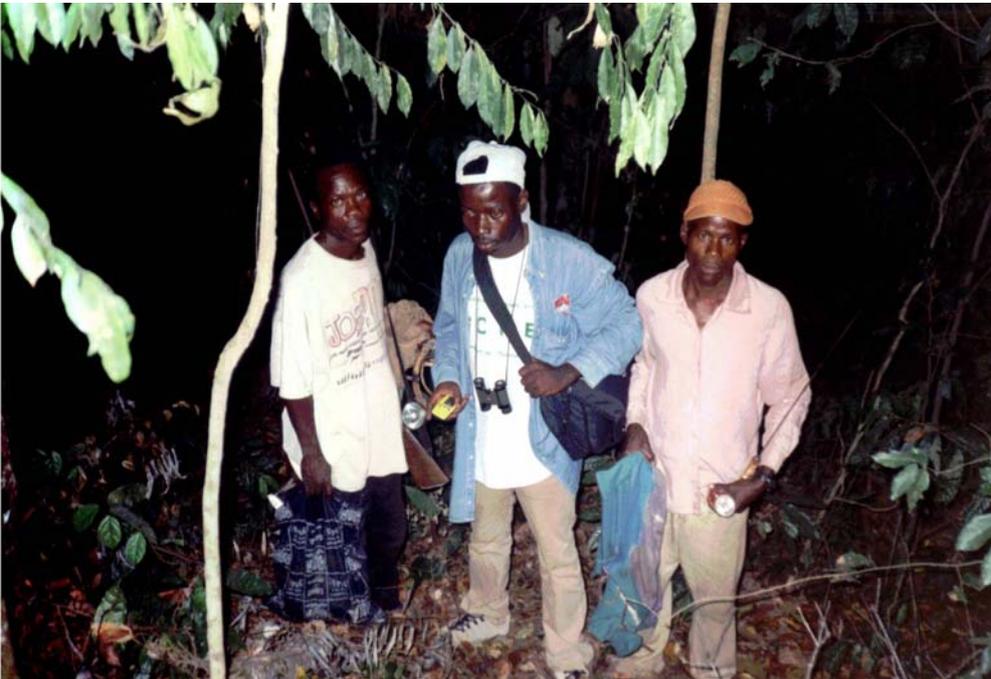
After the local communities' interview, we learned that the changes in the environment and wars have been the major reasons for bats disappearing in the region. The populations do not eat bats in these villages according to their habits. There is not enough bats in the area to be eaten anyway and since the bats population is decreased considerably, no significant damages are perpetrated by bats into communities' harvest, according to villagers interviewed.



Installing Bats Nets at Pointe-Noire (Photo OCPE 2005)



Installing Bats Nets at Pointe-Noire (Photo OCPE 2005)



Bats Nets Night Monitoring at Pointe-Noire (Photo OCPE 2005)

2. Mayumbe Forest near Luki Forest Reserve.

The Luki Biosphere Reserve is in the southwest of the Congolese Mayumbe Forest between 05°43'N and 05°30'S, and 13°04'E and 13°17'E and presents the southern extreme of the Guineo-Congolian rainforest (Pendje & Baya, 1992).

The reserve is about 33,000 ha and can be described as a 24 km square. The road from Tshela to Boma runs at 1 km from its western border.

In the southeast the reserve it is cut by the Boma-Matadi national highway. As all Biosphere Reserves, the Luki reserve is an area where decision makers, scientists, managers and the local population cooperate voluntarily to develop a management model for soil and water which allows satisfying the needs of the people while at the same time conserving natural processes and biological resources.

The site was reached by public transport. The camp was active from the 15th to the 26th of September 2005. First, an interview was held with the local chief. The team learned that the local population does not hunt bats for consumption although the people are worried about the damage that fruit bats cause to bananas and mangoes, which form their source of income. The interview further resulted in the identification of a local guide, Mr. N'Landu, and of the places where to put up mistnets.

The first night, 16th/17th September, a net was set up next to a stream in a fallow area at 04°23'S, 15°19'E, altitude 320 m. Tree species were *Bosquea angolensis*, *Hylodendron gabonensis*, *Futunia latifolia*, *Caloncoba welwitschii*, *Pycnanthus angolensis*, *Cola brineli*, *Aidia ocrolesca*, *Afromomum* sp., *Panicum maximum*, *Chromolaena odoratum* and *Musa* spp. At about 20.30 pm the first fruit bat was netted: *Megaloglossus woermanni* Pagenstecher, 1885, known from surrounding localities but not yet from (near) Luki Forest Reserve. It is one of the smallest species of African rainforest fruit bats and has a long, narrow snout and a long tongue. It is a flower visitor and nectar feeder.

The second night, 17th/18th September, nets were set up in a secondary forest, at altitude 312 m. Dominant species were *Bambusa vulgaris* and some Amaranthaceae, around fish ponds. The nets were placed at 17.30 pm, near a pipe in the form of a cave. At 18.30 pm 5 bats were captured, all *Hipposideros caffer* (Sundevall, 1846; Microchiroptera). In the morning of the 18th September at 06.30 am two more fruit bat species had been netted: 10 specimens of *Epomops franqueti* (Tomes, 1860) and 4 of *Myonycteris torquata* (Dobson, 1878).



Specimen Captured Mayumbe Forest (Photo OCPE 2005)

The third night, 18th/19th September, nets were placed in the midst of a tree nursery next to Luki bridge, at altitude 434 m. The nets were placed near a *Ficus mucoso* and a stand of *Lova trichiloides*, *Albizia adiantifolia*, *Elaeis guineensis*, *Militia excelsa*, *Spathodea campaniculata* and *Phyllanthus discodens*. At 06.00 am in the morning of the 19th, 3 specimens of *Epomops franqueti* and 2 of *Myonycteris torquata* were found in the nets. The same species were captured during the rest of the time on that site.



Nets Night Monitoring at Mayumbe/Luki Forest (Photo 2005)

3. Zongo Forest.

Zongo is a city in the District of Lukaya, at 04°46'S, 14°55'E, altitude 473 m, about 143 km from Kinshasa. To reach the site one has to follow National Route 1, west of Kinshasa, and after 90 km, at Sonabata, take the junction for Zongo. Because the Sonabata-Zongo road is in a very bad state it was necessary to rent a jeep. The camp here was active from 14 to 23 October 2005.

At Zongo there is a touristic waterfall and a hydro-electric plant on the river Inkisi. There is still forest, but the vegetation is dominated by tree savanna, with *Hypparhenia diplandra* as the dominant species.

After an interview with Mr. Mvuzu, chief of the village Matanda at 5 km from Zongo, Mr. Mvuzu guided the team, to a place called Mongo, at 04°45'S, 14°53'E, altitude 492 m, where all the hunters of the village go to catch bats all through the night, using fishing nets. The next day, two local guides were hired and assisted the team in field work in the region.

After interviews conducted by the team to the village population; it came out that fruit bats are the mammals most frequently consumed by the local population in the Zongo area. A relatively large population of bats has been observed on the area. And the bats are causing damages to fruit trees and villagers' harvests.

The forest vegetation includes *Musanga cecropioides* and *Caloncoba welwitschii*, the fruits of which are eaten by bats. Three nets were placed here at 18.00 pm every day; specimens of the

fruit bat *Eidolon helvum* (Kerr, 1792) were taken from the net every day that the camp was active. This is a species which lives in large colonies and is hunted in many places in Africa. According to the population, in the local savanna bats eat the fruits of *Hypparhenia diplandra*, *Hymenocardia acida* and *Annona senegalensis*.



Bats Nets Night Monitoring at Zongo Forest (Photo OCPE 2005)

4. Mbanza-Ngungu.

This city is at 04°25S, 15°18'E, at an altitude of 436 m, in the District of the Waterfalls (District des Cataractes) at 100 km from Kinshasa. It is the granary of Kinshasa for the first necessities of life.

The site was reached by public transport. Among other things, Mbanza-Ngungu is known for the very extensive cave system south of the city.

The camp was active for 14 days with the help of local guides and a bat researcher (experts) that the team had found on the ground. But the team left 9 days after arriving in the area because of a contagious illness that was going on in the villages around.

There is a society in Mbanza-Ngungu, the Association des Aménageurs et Gestionnaires des Milieux Cryptiques au Congo (AGMC), led by Mr. Alexis Kimbembu, which has already executed bat studies in the cave system. In all the caves which have been visited and which harboured bats, only *Microchiroptera* have been found.

Because of some contagious sickness at that time in the area, the team of OCPE has left some mistnets with the AGMC, which has later led to the capture of *Micropteropus pusillus* (Peters, 1867) et *Scotonycteris zenkeri* Matschie, 1894 and *Eidolon helvum* in a secondary forest with *Musanga cecropioides*.

V. Generals Results

The seven species of Megachiroptera and two of Microchiroptera that have been captured and identified by the teams of OCPE and the University of Brazzaville and representatives of AGMC with the help of the key in Bergmans (1997), are listed in Table 1.

Order	Family	Subfamily	Species	Localities
Megachiroptera	Pteropodidae	Rousettinae	<i>Eidolon helvum</i>	- S of Pointe Noire; - Mongo (near Zongo); - near Mbanza-Ngungu
		Epomophorinae	1. <i>Epomophorus wahlbergi</i> 2. <i>Micropteropus pusillus</i> 3. <i>Epomops franqueti</i> 4. <i>Myonycteris torquata</i> 5. <i>Megaloglossus woermanni</i> 6. <i>Scotonycteris zenkeri</i>	S of Pointe Noire Near Mbanza-Ngungu Near Luki F.R. Near Luki F.R. Near Luki F.R. Near Mbanza-Ngungu
Microchiroptera	Hipposideridae		<i>Hipposideros caffer</i>	Near Luki F.R.
	Vespertilionidae	Vespertilioninae	1. <i>Eptesicus tenuipinnis</i> 2. <i>Pipistrellus nanus</i>	S of Pointe Noire

Table 1. Taxonomy and collecting localities of the bat species captured during the project.

Of the ten species of Megachiroptera known to occur in Bas-Congo, four have been captured during the present project period: *Eidolon helvum*, *Micropteropus pusillus*, *Epomops franqueti*, and *Megaloglossus woermanni*. Two species have been captured which are new for Bas-Congo: *Myonycteris torquata* and *Scotonycteris zenkeri*.

The DNA analyses at the University of Amsterdam have been incorporated in a larger programme and have not yet been finalized at the time of writing. The reason behind this is a change in personnel. Dr. Miguel Vences has left office and Dr. Mansour Aliabadian has

subsequently volunteered to carry out the analyses, with the restriction that the work has to fit into his already very busy programme.

Observations by team members and interviewed villagers on bat species and fruit species consumed by them have been summarized in Table 2.

Tree Family	Tree species	Bat species observed as visitors and fruit consumers
Annonaceae	<i>Annona senegalensis</i>	<i>=/= Eidolon helvum</i>
Arecaceae	<i>Borassus aethiopum</i>	<i>Eidolon helvum; Epomophorus wahlbergi</i>
Hymenocardiaceae	<i>Hymenocardia acida</i>	<i>=/= Eidolon helvum</i>
Moraceae	<i>Chlorophora excelsa</i> <i>Ficus mucoso</i>	<i>Epomops franqueti; Myonycteris torquata</i> <i>Epomops franqueti, Myonycteris torquata</i>
Musaceae	<i>Musa spp.</i>	<i>Megaloglossus woermanni</i>
Rubiaceae	<i>Nauclea diderichii</i>	<i>=/= Eidolon helvum, Epomophorus wahlbergi</i>
	<i>Mangifera indica</i>	<i>Epomophorus wahlbergi</i>
	<i>Musanga cecropioides</i>	<i>Eidolon helvum</i>
	<i>Caloncola welwitschii</i>	<i>Eidolon helvum</i>

Table 2. Tree species and visiting bats and fruit consumers observed during the project.

Megachiroptera are attracted by the odours of ripe fruits. The seeds are rejected by the hundreds after they have passed the intestinal channel, either under the tree where the bat is eating - as this passage lasts only about 30 minutes -, or under the tree where the bat sleeps. Thus, seeds are dispersed away from the mother tree. Often, bat fruits are false fruits, such as those of *Chlorophora excelsa*, *Ficus mucoso* and *Nauclea diderichii*, with many very small seeds.

VI. Discussion

The field work went well, even if the project species have not been found. Of the ten species of Megachiroptera known from Bas-Congo, only four have been captured during the project. But a further two species have been caught that are new for the province of Bas-Congo: *Myonycteris torquata* and *Scotonycteris zenkeri*. Of the seven species known from in and around Pointe Noire, only one has been captured, but a second species was captured there which had not been reported from Pointe Noire before: *Eidolon helvum*.

As just mentioned, not one specimen of the three project species was captured.

All this indicates in the first place that there is still considerable fruit bats diversity in both the Pointe Noire region and the province of Bas-Congo.

There may be several reasons why the project species have not been caught. These may be the same reasons why the other species - six of those known from Pointe Noire and six known from Bas-Congo - have not been caught. Bergmans, who worked in and around Pointe Noire for about six weeks, collected many dozens of *Micropteropus pusillus*, 12 specimens of *Epomophorus wahlbergi* and seven of *Epomops franqueti*, but only two specimens of *Lissonycteris angolensis*, and one of *Myonycteris torquata*, *Epomophorus grandis* and *Epomophorus cf. labiatus* each (Bergmans, 1972).

The reasons may be either that the project has not lasted long enough, or that the nets have not been put up in the right places, or that the season was not right. The project was too limited in time and space to allow large capture, and for a possible 4th reason, that particular species have become rare or have disappeared altogether.

According to some of the local people, the project species would still be around. Considering what species have been caught, the most likely reason for not capturing particular species seems that the project has not lasted long enough, and the season was not the right one for large bats movements, implying that the longer and the more active collecting activities are carried out in a certain region, the more different species of bats are likely to be caught - up to a limit, of course. Concerning the three project species, this gives some hope that in the future they may still be found again.

The unregulated hunting as observed at an unprotected area like the forest of Mongo, by people who ignore the basal biological and ecological principles and act as if natural resources like forests, trees and species like bats have no end, does not contribute to this hope.

These people know that species - not only bats - are disappearing, but have no alternative food resources. South of Pointe Noire, the littoral zone has been given out in small parcels, which have been largely deforested; mangrove forest and its flora and fauna have practically disappeared.

On the other hand, the situation in protected areas like the Luki Forest Reserve is much better. By cultural tradition, the people there are not given to forest destruction and hunting, or to bats consumption, and bats are plentiful. The fact that near Mbanza-Ngungu a specimen of the rainforest species *Scotonycteris zenkeri* was captured is also a hopeful sign, as it indicates that

there is still habitat for such species. It also means that an effort should be done to assess whether some of this habitat should and could be protected.

The data collected on the associations of particular fruit bat species and tree fruit species are in need of confirmation and extension. This is a subject where seasonality will certainly play a very significant role. For fruit bats to stay in a particular region, there needs to be food all year round. A study of this subject should therefore also last at least one year.

OCPE hopes to locate the financial means to continue the search for the three project bat species. A further activity should be the education of local populations on the dangers of indiscriminate and uncritical use of natural resources, such as hunting fruit bats without regulations.

VII. Conclusion and Recommendations

The research project has been conducted by a team of young conservationists motivated and with a burning desire to make a difference in their world. Despite field challenges, and other difficulties encountered during the work, the project has been conducted in a certain way that permitted to reach its goals.

If all species researched have not been found because of limitations in time of the project and the season during which the project has been conducted, however valuable information has been collected to advance the cause of bats conservation in both Congo. Three new species have been discovered by project; two for the DRC and one for the Pointe-Noire region in the Republic of Congo.

There is an important need to emphasize that the change on the environment (deforestation) and wars in both Congo are heavily impacting the evolution of biodiversity in general and of bats in particular.

Based on observations conducted on the ground and information collected through local communities during the project;

Considering the need of biodiversity and bats conservation particularly for this project, the team project has formulated the following recommendations:

For the government of the Democratic Republic of the Congo (DRC);

- The support and organization through ICCN of sensibilization's campaigns, not only populations - children and adults - but also national and provincial authorities concerned, about the necessity of forest and fruit bats conservation;
- The national media in DRC (environmental programs on the national TV channel RTNC and the private TV and Radio channels), must be encouraged and supported to vehicle the message of conservation;
- International conservation and development organizations with representations in DRC and funds abroad should be approached with information and proposals to invest in the follow-up of this project through the ICCN in partnership with local organizations;

- To promote and put into place national policies for a sustainable management of all flying mammals (fruit bats);
- Investing more and more in activities of raising awareness of population about the necessity of a sustainable environmental management;
- Develop, fund and support programs of inventories of animals and plants species reported on the Red Lists of IUCN and occurring in the Democratic republic of the Congo, for their survival;
- To encourage and support the creation of local conservation organization in rural areas for a participatory natural resources management.
- To create and support mechanisms of empowerment of rural populations to meet the socio-economic development and conservation's needs of the country.

For the government of the Republic of the Congo:

The same recommendations for the Democratic Republic of the Congo are also valuable for the Republic of the Congo.

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