WATERFOWL CATCHES BY FISHERMEN IN MALI.

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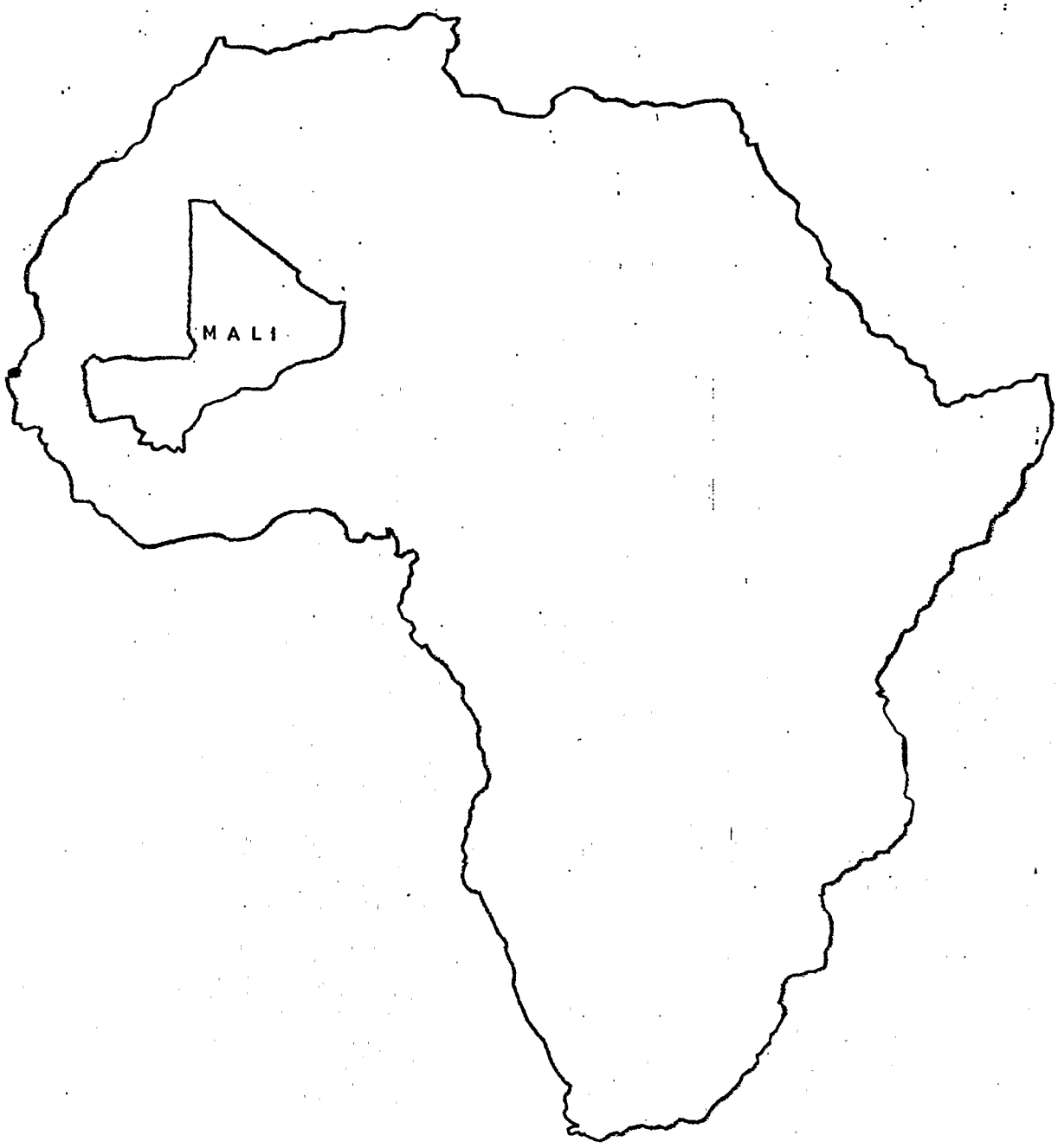
République du MALI

I. INTRODUCTION.

The agenda of this congress indicates that a major preoccupation of ornithologists is the protection of birds. It is thus important to know against what birds need to be protected, and what causes their mortality or disappearance. This paper concerns extensive captures of ducks and other water birds by fishermen in Mali.

In Mali, Niger's Central Delta (also known as the Niger's Inundation Zone) is a 30,000 square kilometers area, 20,000 of which are annually flooded. It is one of the most important places where palearctic migrants winter in Africa. Located in the Sahelian region, this place annually hosts enormous concentrations of migratory birds from Europe and Asia. Several aerial surveys, conducted by O.R.S.T.O.M., C.R.B.P.O. of Paris Museum, as well as a U.I.C.N.-W.W.F. Project have estimated the Anatids (in particular Garganey and Pintail) numbers to be between 500,000 and 1,500,000 (see TRECA, to be published, a).

In their African winter quarters, these ducks and water birds essentially feed on seeds which may be either wild plants or rice (see TRECA, 1975; TRECA, 1977; TRECA, 1981 a and b; TRECA, 1984 and TRECA, to be published, b). The damage to rice fields was said to be such that O.R.S.T.O.M. funded a study in Senegal and Mali: most of the Niger Central Delta rice-fields showed losses ranging between 10 and 15 %. Damage was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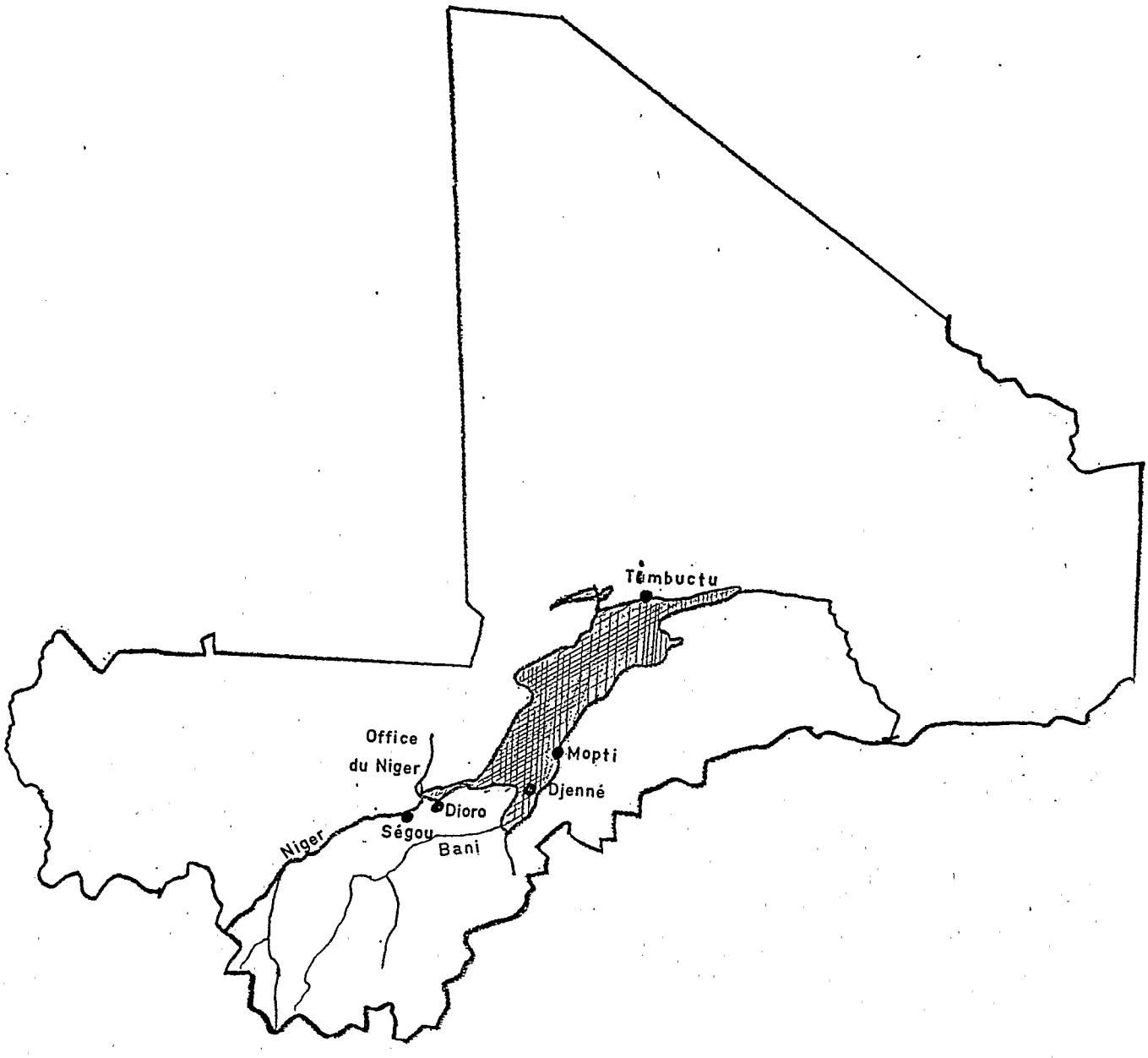
greater in floating rice-fields than in the less numerous but better engineered standing rice-fields. Floating rice is a variety of rice whose stems grow according to water level to a hight which may be 1 or 2 m, or even more. The ends of stems float at the water surface. When water is drained out of the rice-fields, the stems do not stand up and lie down on the mud. So the seeds of floating rice are at ground level, allowing small species of birds to eat seeds on the head. On the contrary, standing rice which need levelled ground and a much better water level control grow to only about 0.8 m high and stand up even after the water has been drained out of the rice-fields. Ruff and garganey are not able to eat rice seeds of standing rice before harvest. Standing rice has a better production than floating rice but need far more costly engineering of rice-fields prior cultivation.

In this study, it appeared that the most effective methods of protecting rice-fields are those indirect ones that attempt to reduce those fields' attraction to birds , i.e., appropriate engineering of rice-fields and adequate management: building of embankments for a better water control, soil levelling, weed removal in order to suppress any patches of free water in the fields (which attract ducks at night), adequate maintenance of draining canals (to facilitate the quick draining of fields at the time of rice ripening). But at the same time, it is essential to provide ducks and other waterfowl with places where they will feel safe and where no damage can be done. Protection methods most frequently used now in Mali are principally direct, frightening methods: oil lamps, firing blank cartridges, guarding of fields, etc...(TRECA, to be published, c).

However, the rice-growing population who, at harvest time, suffer damage by water birds, also benefit from these same birds which are captured and eaten. This practice is so widespread in the Niger Central Delta that it was decided to estimate the numbers of captured birds: bird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and rice-field protection must be based on all possible recordable data concerning the ecology and dynamics of bird populations.

II. BIRD NETTING.

Fishermen of the Bozo tribe in the Niger Central Delta and specially those of the Mopti-Djenné area, normally capture waterfowl with nets designed for fishing (5 cm wide mesh). These nets are placed above shallow water (usually 10 to 30 cm water depth), fastened on thin poles, approximately 1.20 to 1.80 m high. Nets are approximately 60 to 80 cm wide and 12 m long. They are tightened horizontally, so that it forms a kind of pocket. The principle is exactly the same as the one of mist-nets which ornithologists know well, but with one pocket only and are white. Several nets may be placed in line. Poles are sometimes fastened with ropes to resist wind.

This method of snaring waterfowl, very efficient if nets are adequately placed, was probably already in use during the last century, since the oral tradition reports that it was common, in the Djenné area, to serve wild ducks to guests (Amadou Hampaté BA).

III. ESTIMATING THE DUCK CATCHES.

A. On markets.

Water birds caught with nets by fishermen are used as food by the human population. If most of the small birds (i.e. Sandpiper, Stint, Kingfisher...) captured will be eaten on the spot in small fishermen camps, or in neighbouring villages, a major proportion of the ducks caught will be brought onto market towns where they will be sold at 125 F CFA a piece for garganey (about 0.25 US $) and 250 F CFA for pintails (about 0.50 US $), which means approximately 4 pintail or 8 garganey for the price of one chicken.

Usually, Mopti was the most important market place for selling waterfowl (the East of the Delta), but the drought affecting the Sahelian belt for the last 15 years has considerably reduced the numbers of ducks found on this market. The discharges of the Niger and Bani rivers have been so poor in 1984 that the Mopti rice-fields 25,000 ha could not be flooded, and consequently very few ducks were caught there last year. Relatively important groups of ducks have been gathering on the Dioro rice-fields, at the far West of the Delta, where controlled discharges from the Markala dam made it possible to grow 12,800 ha of rice, between July and December, 1984.

About 50 fishermen from the Djenné-Mopti area, on the other side of the Delta, came to the Dioro rice-fields, where they lived only on water bird captures. The numbers of ducks I counted on Dioro daily market, added to the estimated numbers of ducks sold at those times when I was not there (numbers based on conversations with women-sellers) and the addition of some percentage of ducks sold or eaten before reaching the Dioro market (based on data collected in interviewing village heads), provided a rough idea of the total quantities of ducks captured in the whole area.

B. In nets or pouches.

Ducks and other water birds caught in nets can be numbered at dawn. This practice, however, can only be applied on a daily basis to only a few nets. Another practice is to wait for the fishermen's return to the village and count the birds they carry back with them. That way, about 10 fishermen (or 12 to 15 nets) can be checked daily.

Normally, before being removed from the nets, birds get their throats (and in case of small species, their heads) cut and small birds get plucked before fishermen return to their camp. Species are thus not all identifiable.

IV. RESULTS.

A. Ducks.

1°) Dioro region.

TABLE I. Numbers of ducks caught, in 1984-1985, estimation (est.) or observation (obs.).

period *		mean numbers on Dioro's market	eaten on the spot	minimum total per day	days	Total
1 - 15 déc.	(est.)	50/day	30/day	80	15	1,200
16 - 31 déc.	(est.)	150/day	50/day	200	16	3,200
1 - 15 jan.	(est.)	300/day	100/day	400	15	6,000
16 - 31 jan.	(obs.)	150/day	50/day	200	16	3,200
1 - 06 féb.	(obs.)	40/day	40/day	80	6	480
7 - 15 féb.	(obs.)	0/day	50/day	50	9	450
TOTAL						14,530

* The periods have been determined after talks with women-sellers on Dioro market and with fishermen.

Thus, the total number of ducks captured on the Dioro's 12,800 ha is approximately 15,000, at the minimum, broken down as follow: 75 % garganey, (i.e. 11,000 to 11,500 garganey), and 25 % pintail, (i.e. 3,500 to 4,000 pintail).

Estimating birds caught directly in nets or in pouches generally confirms the daily captures, during the times I personally spent on rice-fields, by extrapolating the numbers of the 5 to 10 net catches examined per day, to the about 70 nets placed in the region.

2°) Other regions of the Niger delta.

The information collected from different sources tend to prove that the numbers of ducks caught this year in the Niger central delta (Dioro region excluded), have been relatively low. However, during aerial surveys conducted with the U.I.C.N.-W.W.F. Project, (or 25 flight hours in November, 1984, and again 23 hours in January, 1985), nets could be seen to have been placed above water to catch waterfowl in several areas. These nets were often placed on ponds near which large groups of ducks could be counted. Also, even though in Mopti market itself no ducks were seen for sale this year, some restaurant owners did get ducks (pers. obs.). As in Dioro, the fewer the ducks caught, the bigger the proportion of them which never reaches big market places.

U.I.C.N.-W.W.F. aerial censuses in November 1984 and January 1985 gave a figure of 200-300 nets setted in the whole Delta (the Dioro area excepted).It has not be possible to determinate the neting success, but it is certain that quite a number of ducks (and other birds) have been caught that way during the 1984-1985 season.

B. Other birds.

Birds caught, other than ducks, arrive rarely on big markets. Only counts in nets or in pouches fishermen carry back to their camps may thus have a significance. It would be too hasardous to give a figure for each species caught, but during controls in nets or in pouches, equivalent numbers of ducks and other birds are usually found.

Table II give the list of species most often caught in nets. Among these, Ruff were, with ducks, the commonest and were sometimes found for sale on markets. No accurate figure is available since not every bird is identifiable after removal from the net.

TABLE II. List of birds most often seen in nets.

scientific name	french name	english name	occurence in nets
Anas querquedula	Sarcelle d'été	Garganey	very often
Anas acuta	Canard pilet	Pintail	often
Dendrocygna viduata	Dendrocygne veuf	Black bellied Whistling Duck	sometimes
Philomachus pugnax	Chevalier combattant	Ruff	very often
Limosa limosa	Barge à queue noire	Black tailed Godwit	sometimes
Tringa glareola	Chevalier sylvain	Wood Sandpiper	often
Tringa hypoleucos	Chevalier guignette	Common Sandpiper	often
Tringa nebularia	Chevalier aboyeur	Greenshank	sometimes
Tringa ochropus	Chevalier cul-blanc	Green Sandpiper	rarely
Gallinago gallinago	Bécassine des marais	Common Snipe	rarely
Charadrius hiaticula	Grand gravelot	Ringed Plover	often
Charadrius dubius	Petit gravelot	Little Ringed Plover	often
Calidris minuta	Bécasseau minute	Little Stint	often
Sterna caspia	Sterne caspienne	Caspian Tern	sometimes
Himantopus himantopus	Echasse blanche	Black-winged Stilt	sometimes
Rostratula bengalensis	Rhynchée	Painted Snipe	sometimes
Glareola pratincola	Glaréole à collier	Pratincole	sometimes
Ceryle rudis	Martin-pêcheur pie	Pied Kingfisher	sometimes
Ixobrychus sturmii	Butor de Sturm	Dwarf Bittern	rarely

V. DISCUSSION.

The numerous catches of birds and particularly of Anatidae, have become current practice in the Niger Central Delta, in Mali. These catches have a certain effect on bird populations. For example, it appears from talks with rice growing organisation responsibles and personnal observations that ducks on the Dioro rice-fields have probably never, at any time, exceeded 15,000 individuals, during the harvest period December 1984 - January 1985. We have, however, calculated that at least 15,000 of them were caught there. Thus, ducks populations feeding on the Dioro rice-fields have suffered an important reduction in numbers but they appear to have maintained more or less constant numbers only due to new incomers. Ducks who have not come to these rice-fields had great difficulties to find food and accumulate fat before the prenuptial migration (pers. obs. in Mopti area in November and December 1984): garganey were seen feeding during night and most of the day, behaviouring exactly as garganey in Sénégal, in 1972-1973, after a severe drought, which were seen eating unusual food like water lilies tubers they could not always swallow, and which were so eager finding something to eat they did not even bother looking for danger like a man with a gun, 2 meters close!, (see TRECA, 1981, a). In Sénégal, garganey weighted 425.7 g as a mean in the years between 1974 and 1978, (January-March period, n=46), mean confidence limits: 410.6 - 440.9 g, but only 356.8 g in January - March 1973, (n=15), mean confidence limits: 340.2 - 373.2 g (TRECA, unpublished datas). Compared with those starving birds, ducks in the Dioro rice-fields were on the contrary very fat and thus in better condition and better able to reduce their mortality on their way back to breeding grounds in Europe or Asia, but their losses before departure, due to netting, were considerable.

Another aspect of this practice of netting birds is, if not frightening pest birds, since nets are set so that they are almost

invisible, at least to reduce their damage by decreasing their numbers. If no catch occured on Dioro rice-fields, damage may well have been twice as important. This year, grain-feeding water birds alone, (mainly garganey, pintail and ruff) have ruined 6 % of the rice harvest on the Dioro rice-fields (TRECA, 1985).

The practice, traditional in the Niger Central Delta, of netting birds seems to be spreading, in terms of numbers of nets placed, as well as in geographical distribution, slowly from the Mopti-Djenné area to the whole of the Delta, as far north as Timbuctu, and even on the "Office du Niger" zone,(large rice-growing program on the Sahel Canal), or on the "Opération Riz Ségou", west and out of the Delta. This increasing activity of fishermen specialising in bird catches may very well be related to the decrease in fish stocks in the Niger Central Delta, after a 15 year drought, as well as to the drop of nets' costs since synthetic fibrous nets, more resistent and cheaper, appeared on the Malian market.

It will soon become more and more important, to consider this considerable reduction of birds in studies of Dynamics of populations, and to propose the creation of reserves where shooting (now completely forbidden in Mali), poaching and netting will be prohibited. A U.I.C.N.-W.W.F. Project, working with the Forestry Service in Mali, is now exploring the possibilities of creating one or several bird reserves within the Niger Central Delta. The "Parc National des Oiseaux du Djoudj" experience, in Sénégal, proves that such a reserve might attract birds and particularly Anatids. This would reduce their stress on crops and, at the same time, might also reduce their population decrease.

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VII. LIST OF ABBREVIATIONS.

C.R.B.P.O.	Centre de Recherches sur la Biologie des Populations d'Oiseaux.
O.R.S.T.O.M.	Institut Francais de Recherche Scientifique pour le Développement en Coopération.
U.I.C.N.	Union Internationale pour la Conservation de la Nature.
W.W.F.	World Wildlife Fund.

VIII. SUMMARY.

Fishermen of the Niger Central Delta, in Mali, have long ago learned how to capture ducks and other water birds with fish nets placed over water.

At the end of 1984,-beginning of 1985, at least 15,000 migratory ducks and as many other water birds were trapped this way in the 12,800 ha of the Dioro rice-fields. The numbers of ducks captured at that time in the whole delta is unknown.

These captures probably limit water birds' damage to rice by reducing considerably their populations feeding on rice-fields, but this practice, which appears to have spread in the last few years, should be compensated with the developpement of water birds' refuges.

IX. ACKNOWLEDGEMENTS.

It is a pleasure to thank Dr. Steve COBB, Director of the U.I.C.N.-W.W.F. Project for Conservation of Natural Resources in the Niger Central Delta for comments and correction of the manuscript, and also for kindly enabling me to participate in the Central Delta aerial censuses he conducted.

Thanks also to Mr. Nampa SANOGHO, Director of the malian Forestry Service for autorisation of publishing this paper.