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THE BIRDS OF PENDJARI AND ARLI NATIONAL PARKS
(BENIN AND UPPER VOLTA)

by A. A. Green and J. A. Sayer

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INTRODUCTION

Pendjari National Park (27,400 km²) and Arli National Park (800 km²) are contiguous and situated in the Volta Depression across the border between north-western Benin and south-eastern Upper Volta (Fig. 1). They are surrounded by other wildlife reserves, the most notable of which is the "W" National Park (10,000 km²) lying astride the borders of Upper Volta, Niger and Benin and taking its name from the W-shaped bend in the River Niger which marks its north-eastern boundary. Quartzite cliffs of the Atacora range forming the southern boundary of the Volta Depression, mark the limit of the Pendjari National Park. The terrain of the parks is generally flat with an elevation of 160-200 m. There is a range of low hills of jaspes and quartzite in the Pendjari Park and some sandstone escarpments 100 m high at Tambarga, Gobnangou and Pagou in the Arli Park. South of these escarpments the bedrock is shale while to the north it is granite.

The parks lie within the Sudan savanna zone, the 1,000 mm isohyet and the 27.5° isotherm passing through Arli Park and the 1,100 mm isohyet passing through the southern part of the Pendjari Park. The rainy season lasts from early May until September with heaviest rainfall in August. Temperatures are moderate at this time (20° to 35°C), but during the dry season when the dusty harmattan wind blows from the north east, nights are cool (9° to 18°), days hot (33° to 37°), and humidity very low. In the late dry season in March and April it is extremely hot with night time minima of 27° to 30° and day time maxima of 39° to 44°C.

With its source in the Atacora range the Pendjari river flows throughout the year, and has an extensive floodplain with numerous marshes and ponds. These are replenished by the rains and in September by the annual inundation of the floodplain by the river itself. All other rivers are seasonal; one of the principal ones, the Arli river, retains large pools in its bed throughout the year. The only other water in the area in the dry season is some pools in the Pantiani, Podiega and Yapiti streams. One very isolated water-hole at Bali in the Podiega floodplain is significant, being the only water source in the centre of the Pendjari Park in the late dry season. Several rare and accidental birds have been seen there.

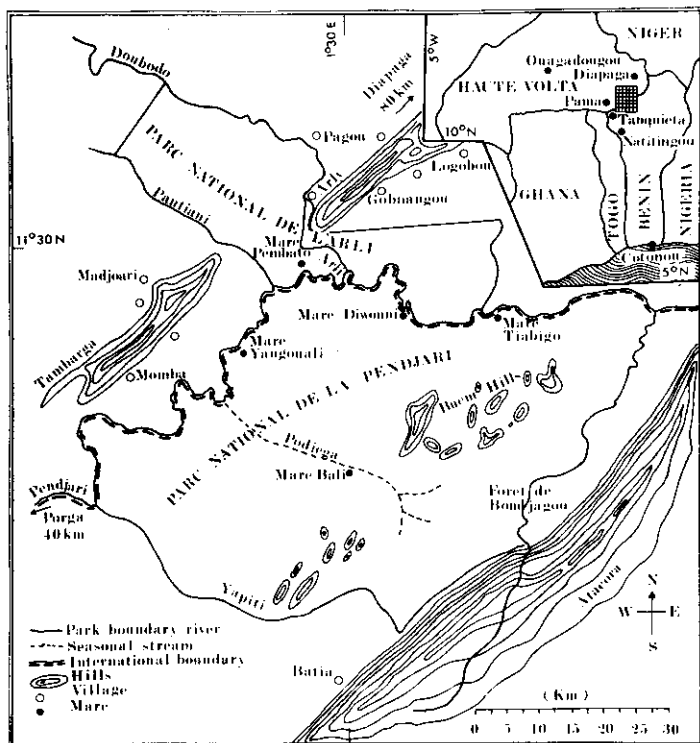


Figure 1. Map of Pendjari National Park (Benin) and Arli National Park (Upper Volta).

The parks were created in 1954 to protect the endemic large mammals. Particularly common are Buffalo *Syncerus caffer*, Hippopotamus *Hippopotamus amphibius*, Western Kob *Kobus kob*, Defassa Waterbuck *K. defassa*, Roan Antelope *Hippotragus equinus*, Western Hartebeest *Alcelaphus buselaphus* and Warthog *Phacochoerus aethiopicus* (Green 1979; FAO 1979). Other animals typical of the sudano-guinean zone also occur, including six more antelopes and four species of primates. Lions *Panthera leo*, Leopards *Panthera pardus*, Cheetah *Acinonyx jubatus* and Spotted Hyaena *Crocuta crocuta* also occur and their presence certainly influence the abundance and status of raptorial and scavenging birds.

There have been very few studies of the birds of Benin. Berlioz (1956) studied a small collection from the south of the country and Brunel (1958) published some observations also mainly from forested areas near the coast. Villiers (in Dekeyser 1951) gave an account of a collection made during a two week visit to an area south west of the Pendjari park, but the park itself was not studied. Thiollay (1977) has information on raptors seen during some brief visits to the parks. The present paper is based upon field work carried out while conducting surveys of the two parks in connection with the preparation of management plans (FAO 1979). A.A.G. has spent six years in the area in both of the parks and J.A.S. worked in the Pendjari for four years. The parks are normally inaccessible in the rainy season but A.A.G. has visited the area by boat and on foot then; however, our work has been much more intensive in the dry season.

The bird fauna of the parks is typical of the sudano-guinean zone, but special geomorphological features - particularly the cliffs and rocky habitats of the escarpments and the wetlands of the Pendjari floodplain - result in a bird fauna richer than that the parks' environs. Raptors are particularly varied and abundant, presumably because of the almost total absence of disturbance by man and the consequent abundance of small mammals, carrion of large mammals, and of birds of species which are hunted outside the protected areas.

Although birds are protected within the parks, two recent developments pose threats to some species. It is becoming increasingly common for poachers to poison the waters of the parks with agricultural pesticides misappropriated for the purpose. Endrin has been used, and very large numbers of fish and some large mammals killed as a result. We have no direct evidence of deaths of birds, but they must be threatened by sub-lethal poisoning if they eat contaminated carrion; fish-eating birds must also be affected. The second threat stems from the possibility that aerial spraying of insecticides may be used to control tsetse flies *Glossina* spp. to prevent them spreading into surrounding populated areas. Parts of the "W" park have already been sprayed with endosulphan, and although this insecticide is of rather low avian toxicity, it may affect insectivorous birds via non-target invertebrates. Endosulphan is highly toxic to fish and its use in the "W" park has resulted in the elimination of 90% of the fish from the Mekrou river, the park's

principal water course, presumably with adverse consequences for fish eating birds. Long term changes in the use of the land, which would result from these areas being opened up to humans and cattle, would also pose a threat to the conservation of natural communities.

DISCUSSION

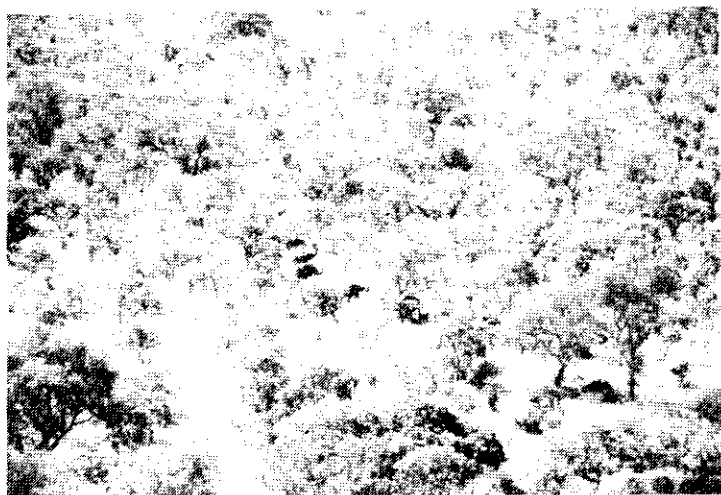
The Appendix lists the 278 species of birds that we have recorded in the area. We have attempted to indicate the migratory status and abundance of each, except those of which we have few observations. Records of certain inconspicuous species relate only to those few occasions when we used mist nets. The habitat in which we have recorded each species is shown; we recognise six main habitats supporting distinctive bird communities: riparian, dry floodplain, wetland, cliffs and rocky areas, savanna, and areas of human habitation. Scientific nomenclature follows White (1960-65) and common names Mackworth-Præd & Grant (1970).

Riparian

There is a fringing forest of *Parinari congensis*, *Cola laurifolia*, *Syzygium guineense*, *Pterocarpus santalinoides*, etc. on the banks of the larger streams and rivers. Further back from the water courses there is often a levee dominated by *Borassus aethiopicum*, *Daniellia oliveri*, *Anogeissus leiocarpus*, *Terminalia* spp., and *Combretum* spp. At Bondjagou, where the Pendjari river cuts through the Atacora range, there is a well developed gallery forest. Although the habitat is rich in birds, few true forest species have been recorded. Records of the Fantee Rough-Wing Swallow *Psalidoprocne obscura*, Sulphur-breasted Bush-Shrike *Malaconotus sulfureopectus* and Superb Sunbird *Nectarinia superba* from Bondjagou forest are the most northerly for Benin. A Little Bittern *Ixobrychus minutus* was observed in the riparian zone near the Mare Diwouni in September 1977 when the floodplain and marshes were entirely inundated. A solitary Skimmer *Rhyncops flavirostris* was seen just outside the park boundary on the Pendjari river west of the Yapiti in March 1977. The White-headed Plover *Vanellus albiceps*, common along the Mekrou river in "W" park, is rare and irregular on the Pendjari.

Dry floodplain

There are extensive areas of open grasslands fringed by savannas dominated by *Acacia sieberiana*, *Mitragyna inermis*, or by *Terminalia macroptera*. They are only flooded for a brief period in the rainy season, but the soils are water-logged for several months. They burn early in the dry season and become the habitat of White Storks *Ciconia ciconia* of which flocks of 20 to 60 birds are recorded each year in late November or December. Abdim's Stork *C. abdimii* appears



Figures 2 and 3. Fig. 2 (upper), hill and cliff habitat, Falaise de Tambarga. Fig. 3 (lower), savanna habitat, Pendjari National Park.

each year just before the onset of the rains (there is a single record for February). Crowned Cranes *Balearica pavonina* are quite common in the dry season, but numbers fluctuate from year to year. Several hundred were present around the Mare Diwouni in early 1975. Denham's Bustard *Neotis denhami* is common. The Secretary Bird *Sagittarius serpentarius* is present in small numbers throughout the dry season.

Wetlands

Several, but not all, of the large shallow open-water lakes dry up during the dry season. Some are surrounded by tall grasses and shrubs; others, particularly those regularly visited by the large herbivores, have open, muddy margins suitable for waders. Large concentrations of water birds such as those found on the Niger river do not occur, but several species of ducks, storks and herons occur in small numbers. The Saddle-bill *Ephippiorhynchus senegalensis* breeds in the area, and the Open-bill *Anastomus lamelligerus* is rare although we have recorded it frequently in the "W" park along the Niger river. We have isolated records of Pink-backed Pelican *Pelecanus rufescens*, Osprey *Pandion haliaetus*, White-winged Black Tern *Sterna leucoptera* and Black Tern *S. nigra*.

Hill and cliffs (Fig. 2)

The rocky cliffs are sparsely wooded with *Burkia africana*, *Detarium microcarpum*, *Lannea acida*, *Sterculia setigera*, and *Combretum ghasalense*. On deeper soils on the summits of the Gobnangou and Atacora escarpments a wooded savanna of greater species diversity occurs, dominated by *Isoberlinia doka* and *Azelia africana*. Cliff Chats *Myrmecocichla cinnamomeiventris* occur on many of the rocky escarpments. Hall and Moreau (1970) describe only the white-crowned form *M. c. coronata* from this area, but we have (as yet unsubstantiated) observations of males with the black crowns characteristic of the westerly subspecies *M. c. bambarae* and *M. c. cavernicola*. If sympatry of two of these forms is confirmed then their subspecific status would need to be reviewed. The Rock-living Cisticola *Cisticola aberrans* is common on the Gobnangou escarpment but has not been recorded further south.

Savanna (Fig. 3)

The largest area of the parks is covered by wooded or scrub savanna; the former contains those tree species mentioned for the rocky habitats, with *Pterocarpus erinaceus* and *Butyrospermum paradoxum*. The scrub savanna is dominated by *Combretum* spp., *Acacia* spp. and *Crossopteryx febrifuga*. This habitat is poor in bird species; the arid scrub areas have fewer birds than the more humid, more densely wooded ones in the southern part of the region. The

African Oriole *Oriolus auratus* and the Bearded Barbet *Lybius dubius* are more frequent in the south. Species occurring in the driest areas include the Red-billed Hornbill *Tockus erythrorhynchus*, Heuglin's Red-breasted Wheatear *Oenanthe heuglinii*, Vieillot's Barbet *Lybius vieilloti*, Red-tailed Bush-lark *Mirafra nigricans* and Temminck's Courser *Cursorius temminckii*. The Yellow-mantled Widow-bird *Euplectes macrourus*, which is quite frequent in Pendjari park, has not been recorded north of the Pendjari river floodplain.

Human occupation sites

The parks are uninhabited except for a small number of staff who remain throughout the year at the Pendjari hotel near the Mare Diwouni and for a few families of fishermen at Arli village. Certain species associated with villages are not encountered in the parks except in these two locations. The Pied Crow *Corvus albus* is common both to the north and south of the parks, but has not been recorded from within their boundaries. The Red-rumped Swallow *Hirundo daurica* is quite scarce in the parks, but is abundant in the surrounding villages. Weaver-birds are particularly abundant around the Pendjari hotel and around villages outside the park boundaries.

The parks are notable for their abundance of raptors. This can perhaps be attributed to the vast area of parks and reserves with its sparse human population and to the high density of mammals. From game censuses in 1973-74 we have estimated that the herbivore biomass exceeds 2,000 kg/km² for Arli National Park (Green 1979). Vultures are associated with the large population of game animals. Up to 12 Lappet-faced Vultures *Aegypius tracheliotus* have been seen together at the Mare Nabindo west of Arli park. The Ruppell's Griffon *Gyps ruppellii* breeds in the dry season (October-May) on the cliffs of Pagou and Tambarga adjacent to Arli park (Green 1977). This species is known to breed in West Africa only in a very few locations in Cameroon, Nigeria, Mali and Senegal.

The Bateleur *Terathopius caudatus* was noted by Thiollay (1977) as being ten times more abundant in the parks than elsewhere in the area; it breeds in tall trees along the Pendjari river. In 1976-77 a pair nested in a *Daniellia oliveri* next to our camp at Mare Diwouni; in October 1978 a pair appeared to be preparing to nest again here. Short-toed Eagles *Circaetus gallicus* are common in the savanna, but we have not observed the Brown Harrier-eagle *C. g. beaudouini* which was recorded by Thiollay (1977) from Pendjari park. Thiollay also recorded the Hobby *Falco cuvieri* from the *Borassus aethiopicum* woodlands along the Pendjari river; we have recorded the Red-necked Falcon *Falco chiquera* only in this habitat, where it is quite frequent. The Fish Eagle *Haliaeetus vocifer* breeds commonly along the Pendjari and Arli rivers. Of the harriers we have found Montagu's Circus *pygargus* to be much more common than the Pale Circus *macrourus*.

Verreaux's Eagle-owl *Bubo lacteus* breeds near Mare Diwouni, where a pair was observed in 1977 from January to July and in 1978

from July to December. This species was also observed along the Arli river south of Arli village in April 1974. The Fishing Owl *Scotopelia peli* has been observed during boat trips on the Pendjari river and along the Arli river near Pagou. In December 1972 a single Marsh Owl *Asio capensis* was killed by a vehicle near the Pantiani stream in the west of Arli park.

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APPENDIX. ANNOTATED LIST OF BIRDS OBSERVED IN PENDJARI AND ARLI NATIONAL PARKS
(BENIN AND UPPER VOLTA) DURING 1972-1978

- Species* Sequence and nomenclature follow White (1960-65).
- Status* R, resident whole year; I, irregular visitor; A, intra-African migrant; P, palaeartic migrant.
- Abundance* A, one or two sightings; B, rare; C, frequent; D, common; E, abundant.
- Nesting* A cross indicates a definite breeding record within the parks.
- Month* Indicates the months during which the species has been observed.
- Habitat* The habitats in which each species is most commonly observed is indicated by a cross. The habitats are
- A: Riparian B: Dry floodplain C: Wetland
D: Cliffs and rocky hills E: Savanna F: Human occupation site.
- Gaps in the table indicate that inadequate information was available.

SPECIES	ABUNDANCE			NESTING						SPECIES	ABUNDANCE			NESTING							
	STATUS			MONTH	A	B	C	D	E		F	STATUS			MONTH	A	B	C	D	E	F
PELECANIDAE										ARDEIDAE											
<i>Pelecanus rufescens</i>	I	A	4							<i>Ixobrychus minutus</i>	I	A	9								
PHALACROCORACIDAE										<i>I. sturmi</i>	II	A	12								
<i>Phalacrocorax africanus</i>		C	11-4							<i>Nycticorax nycticorax</i>	R	C	1-12								
<i>Anhinga rufa</i>	R	C	1-12	x						<i>Ardeola ralloides</i>	R	C	12-3								

