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Notes on a breeding colony of the African River Martin *Pseudochelidon eurystomina* in Gabon

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Summary

Observations of a breeding colony of African River Martins are reported from the Port Gentil area, Gabon. An "open-bill" display, social gathering of nest-material, and hole excavation are described. Predation by Palm-nut Vultures *Gypohierax angolensis* is inferred.

Résumé

Les observations sur une colonie d'Hirondelles de rivière aux environs de Port Gentil, Gabon, sont présentées. Une parade du "bec-ouvert", le ramassage social des matériaux du nid et le creusement des troux sont décrits. La prédation par le Vautour palmiste *Gypohierax angolensis* est inferée.

Introduction

Recent summaries of the biology of the African River Martin *Pseudochelidon eurystomina* have been compiled by Turner & Rose (1989) and Keith *et al.* (1992). Breeding on sand bars on the Congo and Oubangui rivers has been described by Chapin (1953). During the early rainy season a part of the population breeds in the coastal savannas of Gabon. H. Morand showed me a breeding colony near Gamba (2°45'S, 10°00'E) on 29 Oct 1988; some limited observations from this locality have been incorporated by Keith *et al.* (1992). In September-October 1989 I made more detailed observations of a breeding colony further north near Animba, 30 km SSE of Port Gentil (0°58'S, 8°54'E), which are reported in this paper. There is no evidence that the River Martins nested in this area during the three preceding years although a flock of over 100 was seen flying over on 4 Sep 1988. They were again absent in 1990 and 1991 (P. Stouthamer pers. comm.).

Locality and Terrain

The main Animba breeding colony was situated in grassy savanna surrounded by swamp forest. This site is 5 km from the Atlantic coast and 4 km from the nearest river. A second, much smaller, colony was discovered in a separate savanna plain 2.5 km to the south-east. In contrast to the Gamba colony, where nest holes were preferentially located in old sand ridges elevated 1.5 m above the surrounding plain, both of the Animba colonies were constructed on a very gently inclined surface within the plain, although in both cases well above the level reached by flooding during the early part of the rainy season.

The soil consists mainly of white sand. Vegetation comprises grasses (*Loudetia simplex*, *Rhynchelitrum filifolium*) and sedges (*Cyperus tenax*) (P. Christy pers. comm.). In September, at the end of the dry season, the grass was short, partly due to seasonal burning, partly to grazing by buffalo and other herbivores, allowing good views of the birds at the entrances to nest holes. With the onset of the rains, the grass grew rapidly and, by the end of October, visibility of the nest holes was much more restricted. Access to the edge of the colony by vehicle was possible until 15 Oct 1989. Thereafter flooding of lower-lying parts of the plain necessitated walking or wading the last 2 km of track. The main colony was situated close to an old sand track leading to an abandoned village. The area was occasionally visited by local farmers seeking freshwater fish in the surrounding swamp forest, and by hunters.

Chronology

Although westward migration of River Martins across Gabon may begin as early as April (Brosset & Erard 1986), the main passage occurs between June and early September (Erard 1981). All the birds seen on passage in northeast Gabon in August were in adult plumage (P. Christy pers. comm.). The birds arrive on the coast at Gamba from mid-August onwards (D. Sargeant pers. comm.).

The first arrival of River Martins in the Animba study area was noted on 10 Sep 1989, when two birds flew over. On 23 Sep 1989, the main colony was discovered by P. Stouthamer. My own observations began on the following day and continued every weekend until the abandonment of the colony, with the exception of 5 Nov 1989 when heavy rain prevented access. Observations of the activities at the main colony are summarised in Table 1.

The smaller colony had about 100 holes on 24 Sep 1989 (although at least one was occupied by Grey-rumped Swallow *Hirundo griseopyga*), and was close to the location where a colony of Rosy Bee-eaters *Merops malimbicus* had nested the previous year, but not in 1989. It appeared to be progressively abandoned during the study period, with no evidence of successful breeding. Few holes showed signs of

fresh sand excavation on 15 Oct. Possibly the majority of the River Martins moved to the main colony. All observations which follow refer to the main colony.

Table 1. Chronology of activities at a colony of *Pseudochelidon eurystomina* at Animba, Gabon, in 1989.

Observation dates:	Sep 24	October 1	8	15	22	29	Nov 11
Open-bill, wing-quivering display	x	x	x	x			
Excavation of nest-holes	x	x			x		
Gathering of nest material	x	x	x	x			
Broken egg-shells at surface			x				
Adults bringing food to nests			x	x	x	x	
Adults carrying away faecal sacs			x	x	x		
Naked nestlings seen at surface				x			
Gypohierax at colony				x		x	
Numbers of adult Martins seen	300	600	600	430	300	100	0

Colony area, density and population

The approximate area of the main colony was estimated (by pacing out the perimeter with a compass) as 3900 m² on 24 Sep 1989. Locally there were as many as 9 holes per m², although many of these were probably abortive attempts (or perhaps used by unpaired individuals for roosting). The minimum distance between pairs of birds on the ground was estimated (from photographs) as about 60 cm, equivalent to 2-3 pairs per m².

Table 1 shows some estimates of numbers of individuals visible at the surface of the colony, made in the late afternoons (17.00-17.45) when the majority had returned from feeding. Because some birds were already within the holes (incubating), these figures are minimum estimates.

Displays and calls

Observations were made from inside a vehicle on the perimeter of the colony. All birds further than 2 m away ignored the car.

An "open-bill" display given on the ground was noted during the first four weeks, but was most prevalent on 24 Sep 1989. One bird, with bill open, wings drooped and quivering and throat feathers raised, approached another from the side or from

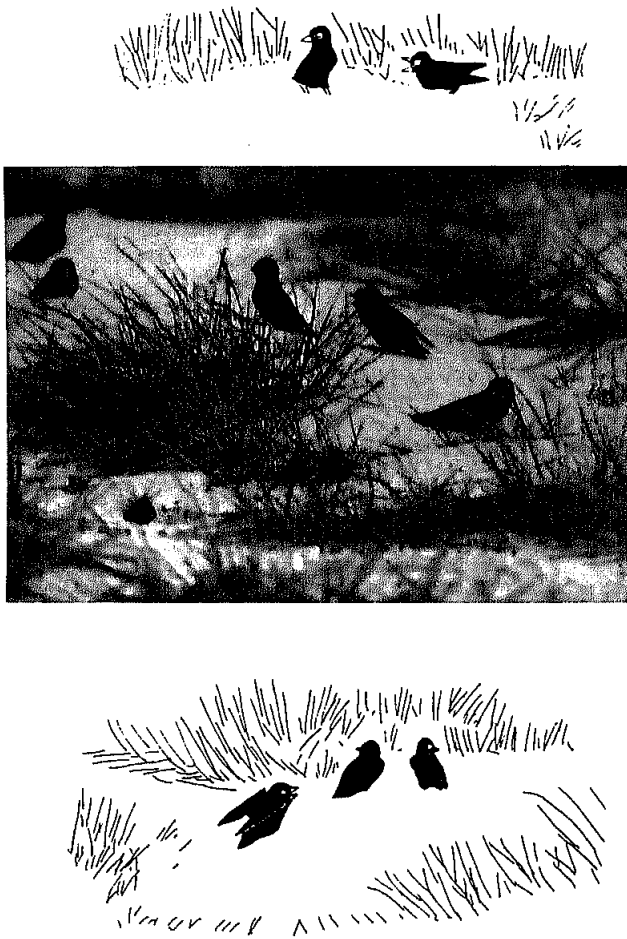

Figure 1. "Open-bill" displays of River Martins. The sketches are traced fr photographs.

behind, keeping its head lower than the second bird and often looking up at it (Fig. 1). This display was accompanied by distinctive "greek greek" calls. In one case, the first bird attempted to copulate with the second. In most cases, the second bird was not receptive and repulsed the first. An open bill without wing-quivering, by an unreceptive bird, preceded attack. No successful copulations were actually observed; it is possible that this takes place in depressions within the colony where the birds are obscured from view by clumps of grass. Soliciting birds were sometimes persistent and were repeatedly driven off. However, an unsuccessful individual often tried its luck with other birds in adjacent parts of the colony. On one occasion, two birds were seen apparently attempting copulation with a third bird, all three with open bills; they all flew off together. In another case, a soliciting bird was driven off by the second bird, which then proceeded to solicit a third individual. Once a soliciting bird, after being driven off, entered a hole. In another case, a displaying bird (with open bill) was mounted by one which was not displaying. In another, a soliciting bird approached a second, which did not attack but assumed a parallel position with wings drooping and throat feathers raised, before entering a nearby hole. This was repeated three times at the same location within 5 min., but the first bird did not follow the second into the hole.

This display was not confined to the area around the nest-holes; soliciting individuals continued to display to other birds within a flock collecting nest material from the periphery of the colony. D. Sargeant (pers. comm.) has observed the same display on the beach at Gamba, some kilometres from the colony there, and Brosset & Erard (1977) recorded a somewhat similar display at M'Passa (northeast Gabon) in February-March, when the birds were on eastward passage.

The interpretation of the "open-bill, wing-quivering" display as pair-bonding courtship (mentioned in Keith *et al.* 1992) has been questioned by R. Wilkinson (pers. comm.) who suggests that it may simply be soliciting copulation. However, he notes that the pseudo-juvenile behaviour appears strange for a supposed male soliciting copulation with a female. Could the displaying individuals be females? Further observations are required, but resolution of the problem is hindered by the identical appearance of the sexes and the restless nature of the birds, which makes observations of individuals necessarily short.

Other displays were rare. Some birds were seen digging sand, but only for a few seconds at a time. One soliciting bird was later seen trying to pull grass stems, as if collecting nest material. Both these cases may be examples of (ritualised) displacement activity.

Erard (1981) and D. Sargeant (pers. comm.) have noted that the birds often fly close together in pairs in large flocks, noticeable even when feeding high up. It is possible that the birds were displaying in flight, as observed in October over the Congo coast (Dowsett-Lemaire & Dowsett 1991) and on southwestward migration in northeast Gabon as early as April-May ("vols aile dans aile par paires et trios": Brosset & Erard 1986). It is not known how this behaviour relates to displays on the

ground.

The calls of birds at the colony were tape-recorded on 1 Oct 1989 when most of the birds were present, and on 15 Oct 1989 when there were reduced numbers. Copies of these recordings have been deposited with the British Library of Wildlife Sounds and with C. Chappuis. A large variety of calls was noted. The "greek" call associated with the "open-bill" display has already been mentioned. Other calls included a high-pitched "prree" and a deeper "yuk". Adults returning to nest-holes at dusk gave a soft call before entering (presumably to inform a partner already inside), and calls also provided a signal for change-over of adults in holes in the early morning. On 29 Oct 1989, nestlings were heard calling "kyow kyow kyow" within the nest-holes.

Daily Movements

Bird behaviour at the colony was once observed at dusk (30 Sep 1989) and at dawn the following day. All birds roosted in holes during the night. There was no surface activity until 5.57 (some four minutes after the onset of a general dawn chorus in the neighbouring forest), when the River Martins began streaming out of the holes. The mass exodus took 6 min. A small proportion (about 100 birds) reappeared overhead at 6.07, some calling; more birds then came out of the holes, their place being taken by the returning birds. By 6.10, a general return to the colony was underway. "Open-bill" displays on the ground began at 6.15. Many birds remained on the surface, displaying and preening until 7.15 when there was a heavy rain shower, at which most flew up or entered holes. After the shower, at 7.25, there were fewer birds on the surface and these were more restless, flying up together at about one-minute intervals. The River Martins were disturbed by larger birds flying over, such as Ayres' Hawk-Eagle *Hieraaetus dubius*, Hamerkop *Scopus umbretta* and Red-eyed Dove *Streptopelia semitorquata*. The flock flew around almost silently for a minute, in a formation resembling that of European Starlings *Sturnus vulgaris*, before landing and resuming normal social vocalizations. More Martins returned at 8.20, and "open-bill, wing-quivering" displays continued. Some nest material was brought to holes at 8.55. By 9.15, there were less than 100 birds at the surface of the colony, but a flock of about 150 was seen collecting nest material from an area of longer grass on the south side of the colony. By 10.05 most of the birds had flown off, leaving none at the surface; however, several birds flew out of holes when I approached on foot. The time of general mid-morning departure from the colony was quite variable; on 24 Sep 1989, there were only some 20 birds overhead at 8.40, while on 15 Oct 1989 there was little activity in the area after 8.10.

Until about 16.15, activity was limited to a few birds returning to or leaving nest-holes. Thereafter a flock resumed collecting nest-material in the longer grass, and most of the colony gradually returned and resumed displays, preening, and

excavation of holes. Birds at neighbouring nest-holes generally tolerated each other up to a minimum distance of about 0.6 m. In one case, two birds repeatedly attacked each other, flying up to 1 m above ground level. At 17.55 the majority left again to feed. They returned between 18.15 and 18.25, and entered the holes directly; few remained above ground as dusk fell.

Nest-holes and materials

On 30 Sep 1989, two birds were observed excavating the same hole with their feet. Each took its turn to dig within the hole, while the other was positioned a few cm behind, moving the pile of sand, generated by the bird in front, further away from the entrance to the hole.

Further excavation activity was noted up to 22 Oct 1989, no doubt in maintenance of the holes to counter effects of caving and rain. More of the holes constructed along the old sandy vehicle track were washed in by rain than those in the grassy area, where the sand was firmer.

Martins were seen bringing nest-material to the holes on 1 Oct 1989. It consisted of grass stems (about 15 cm long) and shorter pieces of 4-5 cm. On 8 Oct 1989, bundles of short grass were brought.

The dimensions of four holes were studied (after abandonment of the colony) on 17 Dec 1989. The average horizontal length was 152 cm (range 130-179 cm) and the average maximum vertical depth below the surface was 66 cm (range 50-80 cm). Two of the holes were straight; in the other two there was a slight deviation to the right. The terminal chamber was not noticeably wider than the rest of the hole. A thin layer of rotting grass stems was found at the bottom of the hole. In the colony in general, there appeared to be no preferred orientation to the holes.

Food

Adult River Martins, probably from the Animba colony, were seen feeding over the river, 5 km southeast of the colony, and as far as 16 km to the northwest. From 8 Oct 1989, adults were seen bringing food to the nests. Sometimes the items were large enough to protrude from the bird's bill; such items, tentatively identified through binoculars, included day-flying moths (Lepidoptera) and a grey beetle (Coleoptera). In most other cases, on arrival at the nest-hole, movements in the throat of the adult suggested manipulation of a bolus in preparation for feeding the nestlings. Some adults were once observed apparently eating sand, and one bird tried to eat the remains of a broken egg shell on the ground.

Faecal sacs were carried out of the hole and dropped by the flying adult some metres away. Pellets were dumped near the entrance of the hole by the adult, walking

away from it. In samples of pellets and encapsulated faeces collected on 24 Sep, 1 Oct, and 15 Oct 1989, 65% of prey items were alate ants (Formicidae), while 24% were termites (Isoptera) (Fry 1992).

Nestlings

Two naked nestlings were seen on 15 Oct 1989. One of them, found dead at the surface, was collected, preserved in alcohol, and subsequently deposited at the British Museum, Tring (Reg. No. A/1991.1.1). The other was seen crawling around outside the entrance of a hole. After several adults attacked it, it moved back into the hole.

No feathered nestlings were seen, although the remains of some were found on 29 Oct 1989 scattered around the entrances of 20 nest holes. These consisted mainly of partly grown flight feathers, the longest being 88 mm; the ratio of sheath length to total feather length for 36 feathers was 0.31 ± 0.06 (x ± s.d.).

Predation

On 15 Oct 1989, nine Palm-nut Vultures *Gypohierax angolensis* were seen on the ground at the colony, on the same day that naked River Martin nestlings were seen at the surface. On 29 Oct 1989, 18 Palm-nut Vultures (including five immatures) were seen at the colony, when feathers of River Martin nestlings were found. The presence of these raptors deterred many of the adult Martins from entering the nest-holes. As I approached on foot, the raptors flew off and the Martins resumed their normal traffic in and out of nest-holes, until I was within 30 m of the colony.

Although local villagers are known to trap Black-headed Bee-Eaters *Merops breweri* at their nest holes for food, there was no evidence of human interference at the Martins' colony.

Colony abandonment

The last positive sightings of River Martins were made on 29 Oct 1989. The colony must have been abandoned some time between this date and 11 Nov 1989. No fledglings were seen in the area but D. Sargeant (pers. comm.) observed six immatures near Gamba on 7 Dec 1989. P. Christy (pers. comm.) has seen large numbers of immatures on eastward migration at Makokou (northeast Gabon) in February-March.

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