

Short Note

Nests and eggs of the Black-headed Bee-eater (*Merops breweri*) in Gabon, with notes on other bee-eaters

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The Black-headed Bee-eater (*Merops breweri*) is one of the largest African bee-eaters. It is restricted to forest-edge habitats of the northern parts of the Congo Basin, with isolated populations in SE Nigeria and the Central African Republic and scattered records as far west as the Ivory Coast (Borrow and Demey, 2001). Despite its large size and relative conspicuousness, however, little is known about its nest, eggs, and nesting behavior. Moreover, the little that is known is based mainly on observations of isolated populations in Nigeria and the Democratic Republic of Congo. (Maes and Louette 1983, Fry 1984, Fry *et al.* 1988, Fry *et al.* 1992)

The following observations on the nesting and behavior of the Black-headed Bee-eater and associated species were made in patches of savanna in the coastal area of Loango National Park, Gabon (2°20'S 9°35'E) during October 2002. This region of the newly-proclaimed park comprised a mosaic of riverine and lowland rainforest interspersed with patches of sandy savanna that run parallel to the coastline.

On 2 October 2002, a Black-headed Bee-eater was flushed from sparsely vegetated sandy ground approximately 22m from the forest edge. A possible nest hole was located in the sandy soil and marked with flagging tape. After sunset on 5 October, a wire funnel trap was set over the burrow. About an hour after sunrise on 6 October, the funnel trap contained a single Black-headed Bee-eater. The bird was photographed and collected (USNM 630862, ♀, 48.5 g, brood patch present). The burrow was excavated and measured (See Table 1, nest 1), and two featherless chicks (ca. 1 week old) were found in the nesting chamber (USNM 630926 and USNM 630927). A desiccated egg (USNM 630928, 25.1 x 25.6mm), presumed to be from the same breeding group, was lying outside the burrow.

On 7 October, two more burrows were discovered in another savanna clearing separated from the beach by a narrow strip of lowland forest (02°20' 18.8"S 09°35' 25.9"E). Funnel traps were set that evening and checked the following day. One trap produced a pair of Grey-rumped Swallows (*Pseudhirundo griseopygia*) (USNM 630887, 10.5g; USNM 630888, ♀, 9.0g, ovary 5x3mm, largest ova 1mm) and the other trap a pair of Black-headed Bee-eaters (USNM 630889, ♀, 51.0g, ovary 8x5mm, largest ova 1.5mm, oviduct 2mm at cloaca, brood patch; USNM 627698, ♂, 50.0 g,

left testis 5.5 x 3mm). The burrow, 15m from the forest edge, was excavated and measured. (see Table 1, nest 2). Four dull white round eggs (one broken) were found in the nesting chamber with the following measurements: 24.9 x 21.4mm, 24.5 x 20.3mm, and 26.0 x 21.5mm. The eggs contained well-developed embryos with a small amount of external yolk still present.

We captured another Black-headed Bee-eater on 9 October at a nearby burrow (Table 1, nest 3), 10m from the forest edge (USNM 630891, ♀, 50.5 g, ovary 9 x 5mm, largest ova 1.5mm, oviduct 4mm at cloaca, brood patch). Three dull white round eggs were collected from the nest chamber (USNM 630930, 24.2 x 22.0mm, 24.9 x 22.3mm, and 25.3 x 22.2mm).

On 12 October, a single bee-eater (USNM 630924, ♀, 50.5 g, ovary 8 x 5mm, largest ova 2.5mm, thickened brood patch) was captured from a burrow 20m from the forest edge. The nest was excavated and measured the following day. (see Table 1, nest 4). A Sand Snake (*Psammophis cf. phillipsii*, Hallowell 1884) was found in the nesting chamber and was collected (PEMR 5451). The stomach of the snake contained one undigested egg, presumably from the nest of the bee-eater, and one broken dull white egg was found in the nesting chamber.

On 14 October, a final bee-eater burrow was discovered in a savannah clearing. The nest was excavated and measured (see Table 1, nest 5). One dull white egg showing some blood was found in the nesting chamber and collected (USNM 630929, 25.1 x 21.6mm).

The flattened ellipsoid nesting chambers of all the bee-eater burrows were unlined and in-line with the descent of the burrow (i.e. there was no slight elevation in the burrow angle before the chamber). The floor of the chamber was free of any faecal matter, and remnants of beetles and other insects parts were scattered throughout the chamber. Due to the size of the beetle parts it is probable that they were from regurgitated pellets rather than disintegrated faeces.

All the bee-eater burrows were dug in the sandy soil of the savannah/forest mosaic of the Loango National Park. These savanna patches were heavily rooted by Red River Hogs (*Potamochoerus porcus*) and inundated by heavy rains that started in late October. The measurements taken from the burrows suggest that these bee-eaters nest below the

Table 1: Measurements of Black-headed Bee-eater nest burrows in Gabon

Nest	Depth cm	Length cm	Angle*	Entrance diameter cm	Chamber diameter x height cm	Orientation	Metres from forest edge	No. of eggs
1	65	239	15.8	9	25 X 10	N	22	3
2	50	190	15.2	9	23 X 14	S	15	4
3	50	195	14.8	9.5	24 X 14	S	10	3
4	60	320	10.8	9	20 X 15	N	20	2+
5	60	247	14.0	–	20 X 10	WNW	20	1
Avg	57.0	238.2	14.1	9.1	22.4 X 12.6	–	17.4	–

* (angle calculated by \sin^{-1} (depth/length))

normal rooting depth (ca. <30cm, from casual observations of authors) of Red River Hogs. Although there was no upturn in the nest burrow prior to the nesting chamber, the angle and length of the burrow may allow for rainwater to drain into the sandy ground before flooding the nesting chamber. It is evident from our results that nest tunnels in this study were substantially longer (190–238–320mm versus 110–210mm) and less steeply inclined (10,8–14,1–15,8 degrees versus 20 degrees) than those recorded previously (Fry *et al.* 1988; Fry *et al.* 1992). Whether these differences reflect local adaptation to soil conditions or possible predator avoidance, requires further study.

In Nigeria and the Democratic Republic of Congo nest-digging was recorded in January, with egg-laying occurring in January, hatching in March and fledging in April (Fry and Fry 1992, Maes and Louette 1983). The current record of nesting and hatching in October in Gabon does not accord with this timing, but nesting appears to correlate with the onset of the rainy seasons in all places. In general, our observations accord well with previous nesting details for the species, and support the view that nests are generally solitary, that incubation is done primarily or exclusively by the female, and that during this period the male roosts with her in the nest at night.

A number of observations on other bee-eaters nesting in the region were also made. Large numbers of typical Blue-breasted Bee-eaters (*Merops v. variegatus*) were present, foraging from small bushes within the savannah patches and adjacent forest edge. One family group, consisting of 2 adults and 3 fledged juveniles, were captured and collected (USNM 627692, 627694, 630859, 630860, 630867) on 06 October from a nesting hole in a level savannah patch approximately 15m from the savannah/forest edge. Breeding by solitary pairs has been recorded (Fry *et al.* 1992) in grassy hillsides (Cameroon), earth banks (Ethiopia), and shelving lakeside ground (Zambia), but these all suggest a preference for sloped landscapes. The presence of the juveniles supports the Fry and Fry (1992) record of egg-laying in Gabon in August–September, but it has also been recorded in January–April in adjacent Cameroon (Gartshore 1984).

A large breeding aggregation, probably in excess of 1000 individuals, of the Rosy Bee-eater (*Merops malimbicus*) was also observed in a nearby sandy savanna clearing (02°19'47"S 09°35'37"E). The habitat and colony are illustrated in Ward *et al.* (p 116–117, 2004). The nesting burrows were concentrated in two areas, each about 20 x 20m in extent and over 30m from the forest edge at the closest point. They each comprised hundreds of burrows, many less than one meter apart. Other birds associated with the Rosy Bee-eater colony included the Grey-rumped Swallow (*Pseudhirundo griseopygia*) and African River Martin (*Pseudocheilidon eurystomina*). The former were observed entering and exiting nesting holes on the perimeter of the colony. The latter were observed to rest with Rosy Bee-eaters at mid-day on the adjacent sandy beach, but were only observed infrequently. Likewise, the martins were seen flying amongst the bee-eaters near and over the colony, but were not seen using burrows for roosting or breeding in the area.

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