Short Notes — Notes Courtes

Blue-billed Malimbe *Malimbus nitens* associating with crocodiles outside the breeding season

Blue-billed Malimbe *Malimbus nitens* is known to prefer the vicinity of dens of Central African Dwarf Crocodile *Osteolaemus tetraspis* (see Eaton *et al.* 2009 for recent taxonomy) for nesting, presumably because of the nest protection provided by the presence of crocodiles (Din 1982, Hudgens 1997). Blue-billed Malimbe builds conspicuous nests on branches overhanging forest rivers and ponds, sometimes in small colonies (Craig 2010).

While studying crocodiles in a private forest park in Gabon, I found that, although it was non-breeding season, Blue-billed Malimbe occurred only at a forest pond inhabited by a crocodile and did not occur at ponds with no crocodiles present. I tested the hypothesis of association in a national park in Cameroon, also during non-breeding season of Blue-billed Malimbe. The significant association found suggests that nest protection might not be the only reason for the birds' preference for ponds inhabited by crocodiles.

Observations were conducted in Lekedi Park, Gabon (1°47´S, 13°1´E) on 3–9 Apr 2009, and in Korup National Park, Cameroon (4°59´N, 8°50´E), on 13–30 Apr 2009. Sixteen forest ponds (five in Lekedi and 11 in Korup), including pools in small forest streams, were watched from shore from 1 h before sunrise until 3 h after sunset. If an adult crocodile was seen, the same pond was watched for another night and morning, but this difference in observation effort did not create a bias because at all sites where Blue-billed Malimbes were found their presence was noted within the first 8 h of observation. All ponds were 50–200 m^2 in size and no more than 1 m deep, located in primary lowland rainforest and surrounded by dense vegetation. Forest away from the ponds was not systematically surveyed for birds. In Lekedi Park the number of ponds sampled was too small for statistical analysis, but in Korup National Park co-occurrence was tested using Fisher's Exact Probability Test, with the number of ponds as the independent variable.

In Lekedi Park, five stagnant ponds were observed. Only one had a dwarf crocodile, an adult 120 cm long (all sizes given by visual estimate). The only Blue-billed Malimbe seen in the park in seven days was found at that pond, where it was present on both evenings and both mornings of observation. The bird could be individually recognized by an asymmetrical streak on its breast.

In Korup NP, 11 ponds (one stagnant pond and ten stream pools with very slow current) were observed. Two stream pools had dwarf crocodiles (an adult 150 cm long and a sub-adult 60 cm long). Blue-billed Malimbes were seen at both ponds with crocodiles, but not at other ponds (2-tailed $P = 0.0182$), nor elsewhere in the park in

16 days. Only single birds were seen, once at the pond with the sub-adult crocodile and twice (on two consecutive mornings) at the pond with the adult crocodile (it is unknown if the two latter sightings were of the same bird or of two different individuals).

All birds seen at both sites were in adult plumage. The bird seen at the pond with the sub-adult crocodile had a smaller red breast patch, indicating that it was likely a female. None of the birds was heard singing, although all three produced short calls. There was no sign of nests at any of the pools. No differences in habitat parameters between ponds with and without crocodiles were noted, although it is, of course, possible that some unknown differences existed. All birds were actively foraging, at 1–15 m above ground (at all sites, the canopy was > 20 m high). No fruiting trees were seen near the ponds, so foraging was probably for invertebrates. Searching through vine tangles and clumps of dry leaves, reportedly common in this species (Craig 2010) was observed only once, in Korup NP.

Interviews with park rangers in Korup NP showed that local people were well aware of the year-round association between the bird and the crocodile. According to the rangers, poachers trapping dwarf crocodiles for bush-meat use the presence of Blue-billed Malimbe as an indicator of dwarf crocodiles' presence. Locating dwarf crocodiles without this clue requires prolonged observations of forest ponds, because the crocodiles are extremely cryptic following decades of extreme hunting pressure (Eaton 2006).

The association of Blue-billed Malimbe with Central African Dwarf Crocodile was first noted in Nigeria (Din 1982) and then in Ghana (Hudgens 1997). It was assumed that the birds benefit from protection against nest predators provided by the crocodiles. However, my observations were made in April, while the breeding season of Blue-billed Malimbe is Dec–Mar in Gabon, and May–Jun and Sep–Oct in Cameroon (Craig 2010). Why do some Blue-billed Malimbes prefer ponds with dwarf crocodiles outside the breeding season? It is possible that the birds simply remain in the vicinity of the nesting site, but this is unlikely as this species is suspected to move over large area of the forest when not breeding (Craig 2010). Nothing is known about roosting habits of Blue-billed Malimbe; it could be suggested that the birds stay close to safe roosting sites near the ponds (A.J.F.K. Craig *in litt.*), but roosting was not observed during night-time observations of the ponds. It is also possible that their preference for ponds with crocodiles is so strong that it persists outside the breeding season for no adaptive reason, or that some birds start guarding future breeding sites in advance or linger for a while after the end of the breeding season. Another possibility is that crocodiles are beneficial to the birds in some way other than repelling nest predators. Studies have shown (Fittkau 1973, Bondavalli & Ulanowicz 1999, Borquin 2008) that crocodilians can substantially alter the ecology of surrounding habitat. In particular, they control fish populations, and the resulting increase in insect numbers could be beneficial for the malimbes, which are predominantly insectivorous (Craig 2010).

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Additions to the avifauna of Omo Forest Reserve, SW Nigeria

The Omo forest is one of the most important protected areas in southwestern Nigeria. The avifauna of the forest has been well surveyed by Green *et al.* (2007) and Olmos & Turshak (2009), and the latter described the biogeographical importance of the area and the conservation threats to it. A detailed map of the forest and the surrounding areas was provided by Green *et al* (2007) who also described the main vegetation types.

In this note I provide three additions to the list of bird species recorded in the forest, with three other records that are also of interest. I spent two nights at J-4 (28–