

## CONTENTS

VOLUME 30(4), December 1997

Editorial .....	1
KAESTNER, PG. Cyber-Cindy .....	2
BROWN, CJ. Early Record of a Yellowbilled Kite .....	6
HINES, C, <i>et al.</i> A Rash of Rarities .....	8
BOIX HINZEN, C. Beware! Gin Traps at the Sewage Works .	17
BROWN, CJ. "Stanley's Bustard" in Etosha National Park ...	19
McGIVERN, D. Von Bach Dam Bird List .....	21
MENDELSON, J. Namibian Hornbills in Nest Boxes .....	22
BOIX HINZEN, C. Notes on Misdirected Feeding Behaviour .	26
BROWN, CJ. Ospreys at Friedenau Dam .....	29
HINES, C. Grey-headed Sparrow Complex in Namibia .....	30
THE BROWN FAMILY. The Pavlovian Phenomenon .....	32
SHORT NOTES .....	38
McGIVERN, D. Western Etosha and Hobatere .....	40
LUDWIG, DE. Birdwatch 97 .....	41
PROJECTS & ACTIVITIES	
Co-sponsored Bird Race: Members Welcome! .....	43
Update on the Namibian Tree Atlas Project .....	44

## EDITORIAL

This is the final edition of *Lanioturdus* for 1997 — the fourth of the year and an achievement for all those people who contributed to the journal over the past year. Although we have seldom exceeded 40 pages in any one edition we feel that the value of the magazine has increased in that we are keeping our members informed and hopefully fostering more interest in birding in Namibia as a whole. Many thanks to all the authors and artists who submitted material for the year and I hope that the articles will keep on rolling in to make 1998 as successful as 1997.

The summer heat is upon us and with the first migrants having already arrived, you should all be looking forward to some excellent birding over the coming holiday period. This may be a particularly interesting year — the predictions of the weather boffins is that *El Nino* is likely to negatively influence the rainfall patterns in the country. This in turn will have a major effect on the distribution and breeding of birds over the next couple of months. I encourage all of you to get out there and look at what's going on — keep field notes on your observations and make some comparisons with what you know of previous years. This applies equally to common as well as rarer species. How much do we really know about doves in this country? I have noticed that in Bushmanland and at Aris, near Windhoek, that the numbers of Namaqua Doves is highly variable both within and between years. I suspect the same thing of Laughing Doves which seem to disappear at certain times of the year. Keeping basic notes and records can tell us so much about the birds we take for granted (many of which are surprisingly poorly studied). Your notes and records do not have to take the form of detailed scientific observations — casual and incidental observations are also valuable. Collect information, put it together in the form of an article and send it to *Lanioturdus*. Anyone can do it and I encourage of all of you to try!!!

On behalf of the Namibia Bird Club Committee, I would like to wish you all a merry Christmas and a prosperous New Year. Good birding in 1998 and let's hear from you.

## NAMIBIAN HORNBILLS IN NEST BOXES

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Of all families of birds in Africa, hornbills are amongst the most prominent. Several species are to be found in most areas, the birds are conspicuous, and their large sizes and loud calls draw attention to their presence. While it may be simple to record the presence of hornbills, it is not as easy to find and to observe events taking place in their nests. All species in Africa nest in holes in trees or cliffs. Adult females of all species — except for the two species of ground hornbills — are sealed into the holes, providing nest sites that are both secure from predators and difficult to find. The only way for an ornithologist to get into a nest is to break open the sealed plug or to saw open a separate entrance into the nest chamber. Both are unsatisfactory options!

Another possibility is to persuade the birds to use a nest that you can get into — an artificial nest box. Since 1989 I have been doing just this by erecting nest boxes in the Daan Viljoen Nature Reserve, some 15 kilometres west of Windhoek in Namibia. My efforts really build on initiatives started 15 years ago by Ben Riekert and the late Charles Clinning. The two of them erected some 26 boxes in the summer of 1980/81 to see what they could attract. Several pairs nested in the boxes during the next summer and things have gone from strength to strength ever since. Some boxes have been lost or have fallen apart over the years, but we now have about 140 boxes for hornbills after having added 10 in 1989, 70 in 1992 and then 50 more boxes in 1994.

There have been about 450 nesting attempts by hornbills in the boxes over the past eight summers. The great majority have been by Monteiro's *Tockus monteiri*, while similar numbers of attempts have been made by the other three species: Redbilled Hornbill (*T. erythrorhynchus*), Grey (*T. nasutus*) and Yellowbilled (*T. flavirostris*). Redbilled Hornbills seem to have moved into the area in recent years, since they were not recorded nesting in boxes between 1981 and 1986. A number of other species of hole-nesting birds

use the large hornbill boxes, such as Cape Glossy Starlings (*Lamprotornis nitens*), African Hoopoes (*Upupa epops*), Scops (*Otus senegalensis*) and Pearlspotted Owls (*Glaucidium perlatum*), and Lilacbreasted (*Coracias caudata*) and Purple Rollers (*C. naevia*). We also have about 40 much smaller boxes designed to attract nesting tits, and these now provide nest sites for Carps' (*Parus carpi*) and Ashy Tits (*P. cinerascens*), Scimitar-billed Hoopoes (*Phoeniculus cyanomelas*) and Tree Rats (*Thalloomus paeduculus*).

The sequence of breeding events is much the same among the four hornbill species. The pair spends several days lining the nest and adding some sealing to its entrance. The female then seals herself into the chamber and several days later starts laying a clutch. Successive eggs are laid at variable intervals of between two and seven days, and she also starts to lose all her wing and tail feathers while laying. These feathers grow again over six or seven weeks, so she is flightless and entirely dependent on the male during this period. He feeds her through a slit in the sealed nest entrance. The chicks hatch at intervals of several days, and the male then increases his feeding rate to provide for them as well. About half way through the nestling period, the female has a complete new set of flight feathers and she leaves the nest. The chicks seal up the entrance again and the female helps the male to provide them with food.

Since job and other commitments prevent me from spending much time actually studying the hornbills, I have encouraged others to visit Namibia to conduct research on these hornbills. The unusual nesting system of hornbills combined with the availability in nest boxes provides great opportunities for investigating a number of biological questions. For example, many birds store fat reserves while breeding, and female hornbills are no exception, losing up to 30% of their weight between when the eggs hatch and their emergence from the nest. How are these reserves used? This question could be addressed by looking at fat storage in the four species, in nests with different brood sizes, in nests with high and low food supplies, in early and in late season nests, and by comparing fat loss with daily energy expenditure. Marcel Klaassen and Allix Brenninkmeijer from the Netherlands tested ways of measuring energy expenditure by converting

nest boxes into oxygen chambers. This allows one to measure the rate of oxygen consumption and carbon dioxide production by the female and chicks.

Another question concerns why some birds time the laying and start of incubation so that the eggs hatch at the same time, while others have their eggs hatch at staggered intervals. Hornbills adopt the latter strategy to such a degree that the eldest chick, hatching and growing rapidly for several days before the last chick hatches, may be ten times heavier than the youngest one. The smallest members of the brood cannot compete for food and soon die. Mark Stanback, previously at the University of Washington in Seattle and now at Davidson College in North Carolina, has been looking at this question by arranging clutches and broods such that some broods are staggered while others hatch on the same day. Another "hot" topic investigated by Mark and Tim Birkhead from the University of Sheffield concerns the issue of sperm competition and storage. Most birds mate repeatedly during the laying period, so females don't have to store sperm over the several days during which eggs are produced. Successive eggs are fertilised by successive matings, and this system allows for eggs in a clutch to be fertilised by different males. Female hornbills, however, have to carry and store a full load of sperm. One intriguing possibility is that the sealed nests give males greater confidence in their paternity of the chicks. If the male is "certain" that the female is carrying his sperm when she starts her period of incarceration, he can be "sure" that he has fathered the chicks. Christian Boix from the University of Cape Town's Percy FitzPatrick Institute of African Ornithology is now continuing the research started by Mark Stanback on sperm storage and hatching strategies.

One aspect that interests me is how the female "decides" on when to leave during the nestling period. Factors that might make her leave earlier are a rapid completion of her moult, the chicks being large enough to reach up and take food delivered through the nest entrance, and the male being unable to provide enough food. Contrasting conditions would lead to the female delaying her exit. In one inconclusive set of experiments we changed the amount of nesting material at the bottom of the boxes, so that some nest chambers were deeper and others shallower. Our prediction was

that females in deeper nests would remain longer until their chicks were big enough to reach the higher nest entrance.

Another fascinating question concerns how males "know" what size of prey their chicks can swallow. Small chicks can only eat tiny food items, but bigger ones readily gulp down large grasshoppers, crickets and other insects. It is clear that males bring food items of various sizes, but they never get to see how big their chicks are. An obvious possibility worth testing is that the males respond to the calls of chicks, with the calls of small chicks "telling" the males that only small items can be eaten.

The hornbills in Daan Viljoen adopt two basic breeding strategies: Grey and Yellowbilled Hornbills breed regularly, are less dependent on rain to stimulate their breeding, lay small clutches of two to four eggs, and obtain much of their food from trees. By contrast, Redbilled and Monteiro's Hornbills forage on the ground, breed opportunistically after good rain, and have clutches varying from two to eight eggs. Comparisons between these two groups could shed light on one of the greatest puzzles in southern Africa: the ability of so many animals to respond rapidly to rain and the increased supply of food that comes with the rain.

The green leaves that many eagles bring to their nests have been shown to be rich in chemicals that probably help to chase off parasites. Monteiro's Hornbills bring in very large numbers of millipedes to their nests which are crunched up and dropped into the nest to form a solid layer of crushed corpses. It seems to me possible that these may provide chemical deterrents to ants and other insects that might harm the females and chicks. Both females and chicks are of course extremely vulnerable to attack in their sealed chambers.

The number of birds in any area is usually dependent on food supply, the degree of predation and parasitism, and the availability of nests. Ben Riekert found that the density of breeding hornbills in areas with nest boxes to be several times higher than in adjoining areas. From this we could predict that individuals having the use of a nest box would defend that site and use it repeatedly and consistently, year in and year out. We would also

predict occupation rates to decline as the number of boxes increases. Neither prediction seems to hold water at Daan Viljoen, suggesting that other factors play important roles in determining the distribution and numbers of hornbills. Since one of the species, Monteiro's Hornbill, is a Namibian endemic, sorting out answers to these kinds of puzzles has obvious lessons for conservation practices in Namibia. The more we know about birds, including behaviour which may seem trivial or bizarre, the more we will understand of what matters to them and their continued healthy existence.

#### Further reading

Kemp, A.C. 1995. *The Hornbills*. Oxford University Press, New York.



### NOTES ON MISDIRECTED FEEDING BEHAVIOUR

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During early 1996, whilst collecting breeding behaviour notes on hornbills at Daan Viljoen Game Reserve, I had the chance to witness a rather interesting and thought-evoking feeding event between a foraging Yellowbilled Hornbill (*Tockus flavirostris*) male and a sealed-in, incubating Grey Hornbill (*Tockus nasutus*) female.

I was busy recording male feeding frequencies at this particular nest box, when during one of the male's foraging trips I recognised an approaching Yellowbilled Hornbill male belonging to a breeding pair nesting 200 m downstream. He was foraging on the ground making slow progress towards the Camelthorn where the Grey Hornbill nest box was located. An emperor moth fled its path and sought safety in the groove that remains between a nest box and the tree.

The hornbill followed in close pursuit, scrambled up the tree and fished the moth out of the groove and then flew onto the nest box carrying the moth in its bill and proceeded to bash it. At this point the sealed-in Grey Hornbill female having carefully interpreted the activities taking place outside and certain that her mate had landed on the box, began to claim her share of food.

With the prey in his bill, and surrounded by the quivering calls from a begging female, the Yellowbilled Hornbill frantically inspected the nest box until he detected the protruding beak and source of the begging shrieks. Attracted by these stimulating shrills, the Yellowbilled Hornbill bent over and fed the moth to the Grey Hornbill female. However, after doing this he ignored all further begging shrills, seized another moth from the same groove and flew off towards his own territory where minutes later I saw him feeding his own partner.

When I commented on this to John Mendelsohn, he mentioned having recorded this behaviour in a similar instance when a male Yellowbilled Hornbill was observed provisioning Grey Hornbill chicks (*Lanioturdus* 1990). But the 1996 breeding season was not over yet, and by June 1996 I had the chance to witness several other similar events amongst hornbills.

During mid-February (1996) I observed a male Yellowbilled Hornbill feeding a cricket to a neighbouring incubating female of Monteiro's Hornbill and, in April during the chick rearing period, I recorded a female Redbilled Hornbill feeding a brood of Monteiro's Hornbill chicks at the nest box — and not just once — on three different occasions!

Finally, in mid-May 1996, a pair of Monteiro's Hornbills which had their clutch predated by a Nile monitor (*Varanus niloticus*), decided to join their neighbours down the road at the next nest box. This pair helped raise five chicks that were not their own progeny, and to which, presumably, were completely unrelated.

I commented these sightings to Prof MA du Plessis who recalled once seeing an adult female hornbill being fed by an adult male Redbilled