



Breeding and other behaviour of Woodland Kingfisher

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ABOVE The colour-ringed pair which was the focus for much of the duration of this study © Warwick Tarboton.

The accompanying notes have been compiled from nine years of observations of a colour-ringed pair of Woodland Kingfishers that have bred in our garden outside Modimolle since December 2011.

In the first six years the birds bred in a hollow wooden log attached horizontally under the eaves of the house, with an outward-facing, 50 mm wide entrance hole. In the

three years subsequent to this they used an artificial structure that simulated the original nest, a horizontal tube made from 200 mm PVC pipe closed at both ends with an entrance at one end. This too was placed under the eaves of the house. Using a torch, the horizontal entrance enabled one to quickly and with minimal disturbance inspect the inside of the nest to check its contents. The birds became ac-



customed to our presence and this was facilitated by providing them with meal worms from time to time. They were not ringed in the first year (the summer of 2010/11) but the sex of each was identified by their behaviour and they were individually recognisable from small differences in their facial masks. In year 2, the male, identified by his tameness, returned but a new female (this assumed due to her shyness) joined him. The two were colour-ringed in this year and this marked pair returned annually to breed in the garden, the male (green) for the next six years before failing to return from migration, and the female (red) for the next seven years; in the two most recent years male-green was replaced by a new mate (male-blue).



ABOVE The horizontal nest box design facilitated easy and a quick inspection of the nest contents with minimal disturbance.

TOP The artificial, PVC pipe nest box used by the birds in recent years.

In year 2 (2011/12) both were fitted with geolocators and when they returned from their winter quarters nine months later, these were removed and the data were downloaded from the trackers. The female was tracked to Central African Republic and the male to South Sudan (Tarboton and Tarboton 2014). Both spent seven months away from their breeding area, each going to a different destination north of the equator about 500 km apart and each coming back south, then and in subsequent years, to the same nest site and same partner.

Their arrival back from the tropics varied from year to year

e.g. male-green arrived in different years on 16, 19, and 27 November and 4 December, while female-red arrived 13, 17, 18, 22, and 26 November in different years. Their departure from the breeding area was equally variable, male-green being last seen in the nesting area on 19, 28 March, and 14 April, and female-red on 5, 10, and 23 March.

In the first days after their arrival and preceding egg-laying, both sexes wing-flashed (BELOW), called frequently (OPPOSITE TOP), performed courtship feeding (OPPOSITE BOTTOM), and engaged in numerous vocal disputes with neighbouring birds, but this subsided once egg-laying began.





In all but two cases, eggs were laid and incubation commenced within the first eight days of December; it occurred once on 18 December when female-red arrived back alone and had to court and mate with a new male (male-blue), and once on 27 December - we were away during early December this year and we may have missed an early clutch failure and this was a relaying. They successfully raised young in all nine years and in two years laid a second clutch in early February and raised young from one of these. In nine years they laid two 2-egg (c/2) clutches, seven 3-egg (c/3) clutches, and two 4-egg (c/4) clutches and they fledged 22 young. It was not possible to establish how many of these reached independence as the young often



ABOVE Two nestlings in their nest box.

BELOW The male with three fledglings.





ABOVE *An anting Woodland Kingfisher.*

moved away from the nesting area; certainly, some fell prey to Black Sparrowhawk and African Gos-hawk.

The nests of about 17 other pairs of Woodland Kingfisher in the area were intermittently monitored during the nine years: clutch size in 30 instances (this includes the above sample) was five c/2, 22 c/3 and three c/4. In 31/36 cases at least one chick fledged from a clutch laid. In the 90-hectare retirement complex where we live, we established that our pair was one of nine pairs breeding here in the 2010-2011 summer, i.e. about 10 ha/pair, probably an artificially high density given the garden environment with mowed lawns and a surplus of nest sites. The two closest simultaneously active nests

in that year were 90 m apart. Of 30 nest sites used by these kingfishers in the wider area over the same time period, six were in old woodpecker (Golden-tailed Woodpecker?) holes, 10 were in sisal (or log) stems put up in gardens for barbets, 10 were in the same PVC pipe nests as used by our pair (described above), three were in cavities under the roofs of houses and one (which collapsed) was in a Lesser Striped Swallow nest from which the tunnel had been removed.

In the days preceding egg-laying the pair frequently call and display to each other and the male regularly feeds her with prey items he's caught. In two observed in-

stances copulation lasted no more than a few seconds. Clutches are laid one egg per day, and in a few observed instances this happened early in the morning. Incubation commences with the laying of the third egg. In the 2010-2011 summer we recorded incubation behaviour via a remote camera over several days for a total of 85 hours and simultaneously recorded ambient temperatures. On average, the eggs were attended by one or other parent for 83% of the day, this being higher on cool/rainy days and lower on hot days. During the day the male and female shared the incubation evenly (respectively 51% and 49%) while at night the female sat on the eggs. Incubation shifts were very variable; the male averaging 45 min/shift (range 19-71 min) and the female averaging 57 min (range 10-118 min). Changeovers took place when the relieving

partner arrived and announced his or her presence by calling, this usually prompting the incubating bird to leave the nest.

The incubation period was determined in eight instances: 18 days (n=5) and 19 days (n=3). On hatching the egg-shells are taken out and dropped away from the nest. The fledging period was determined in nine instances: it averaged 24 days and was mostly between 22-24 days, but in two cases was 26 and 28 days. Prey items brought to feed the nestlings included adult moths (Pallid Emperor), Lepidoptera larvae, stick insects, mantids, grasshoppers, frogs (Bushveld Rain Frog, Red Toad, Natal Sand Frog, Common River Frog, and Painted Reed Frog), geckos, skinks and two snakes (Dwarf Sand Snake and Spotted Bush Snake). The adults used a large bird bath in the garden to splash-bath, sometimes doing



LEFT Splash-bathing is performed regularly during the day.



A great variety of prey items were brought to the chicks, including mantids (ABOVE) and a Spotted Bush Snake (LEFT).

this several times a day.

Woodland Kingfishers are unusually vocal birds. They usually respond vocally whenever they hear another bird calling within their hearing range, they routinely greet one another by calling when the pair come together, and they call loudly and shrilly whenever potential danger is perceived close to the nest. The characteristic 'ki, tirrorr' call of this species is uttered by both sexes but, in the case of females, the second part of the call is more subdued and trails off sooner than in the male. Males involved in a territorial conflict increase the volume and extend the length of the 'tirrorr' part of the call, their bodies sometimes quivering from the exertion.

Calling between the pair often extends from the 'ki-tirrorr' call into other refrains, e.g. to a fast 'kyu-kyu-kyu-kyu ...' or a trilling 'tirrorr-irreeee-tirrorreeee'. Both sexes also use a sharp, repeated 'chew-chew-chew....' that appears to function as a summons to establish the whereabouts of the mate. The alarm call is a shrill, harsh 'chachachacha ...'. Lastly, especially during courtship when the sexes are in close proximity they utter soft, whispering 'hhh, hhh, hhh ...,' notes that are only audible from a few metres away.

References

Tarboton W and Tarboton M (2014) Travel log. Migration of the Woodland Kingfisher. *African Birdlife* 2(4):54-61.