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# OBSERVATIONS ON THE STRIPED KINGFISHER *HALCYON CHELICUTI*

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The Striped Kingfisher *Halcyon chelicuti* occurs throughout the savannas of tropical Africa and is represented in West Africa by *H. c. chelicuti*. In several respects the species is atypical of the genus, being smaller, with a slighter bill and duller plumage, and occupying more arid habitats than any others (Table 1, also Bannerman 1930-51). It is most closely related to *H. albiventris*, which also shows a reduction in the amount of the brilliant blue plumage characteristic of most *Halcyon* species.

Very little has been published on the biology of *H. chelicuti*, the fullest accounts being those by Hoesch (1933), Priest (1934), and Bannerman (1930-51). This paper draws together some previous observations, and records new information gathered during a study of the Senegal Kingfisher *H. senegalensis* in Mole National Park, Ghana, in 1974 and 1975 (Greig-Smith 197Xa, 197Xb, and in prep). I visited Mole from 7 July to 28 August 1974, 3 July to 3 September 1975, and 28 October to 3 December 1975 (i.e. the wet season and early dry season). Observations were made almost daily, and information was gathered on all aspects of behaviour seen.

## HABITATS AND DISPERSION

Throughout its range, *H. chelicuti* occupies wooded savanna or *Acacia* scrub, normally far from open water (Bannerman 1930-51, Chapin 1939, Vincent 1946). This results in segregation from other savanna *Halcyon* species, all of which are associated with water to some degree (Table 1). At Mole, I saw no encounters between Striped Kingfishers and the other *Halcyons* in the area (*H. senegalensis*, *H. malimbica*, and *H. leucocephala*), but Pygmy Kingfishers *Ceyx picta* were seen occasionally in the same habitats as *H. chelicuti*.

Territories of *H. chelicuti* were widely spaced, and apparently not contiguous. I only once saw a direct confrontation between adjacent pairs, although there were frequent vocal displays involving neighbours (see below). One territory was about 3.0 ha in size, and contained about one hundred mature trees, up to 12 m high, including many of the commonest savanna species (e.g. *Burkea africana*, *Butyrospermum paradoxum*, *Combretum* spp, *Daniellia oliveri*, *Isoberlinia doka*).

## DIET AND FORAGING

Like all Halcyon species, Striped Kingfishers forage by a "sit-and-wait" strategy, choosing elevated perches from which to pursue prey on the ground. The diet apparently consists mainly of insects - notably grasshoppers - although beetles, caterpillars, mantids, butterflies, moths, cicadas, and termites have been recorded as prey by other observers (Priest 1934, Chapin 1939, Vincent 1946, Clancey 1964, Mackworth-Praed & Grant 1970, Thiollay 1970), while Hoesch (1933) mentioned lizards and "Doppelsleichen" as prey in S.W. Africa. At Mole, I saw birds capture grasshoppers (62% of identifiable prey), beetles (19%), (?hymenopteran) larvae (12%), and butterflies (6%).

The birds' usual feeding technique is in general similar to that used by Senegal Kingfishers (Greig-Smith 197Xb). They often showed sudden alert movements (e.g. of the head, and shifts of stance) before diving to the ground in pursuit of prey, after which they returned to the same or a nearby perch to handle the prey (however, Hoesch (1933) saw moths captured in flight). In about half the incidents, handling involved vigorous knocking of the insect on the branch to one side of the bird, probably in order to immobilise it (see Fry 1969, Greig-Smith 197Xa), interspersed with attempts at swallowing (see also Hoesch 1933). Beetles, larvae, and the smallest grasshoppers were not knocked, being swallowed after a few adjustments in the bill. There were no territorial displays during prey handling, in contrast to H. senegalensis (Greig-Smith 197Xa), perhaps because H. chelicuti used less exposed perches, and only rarely employed visual displays (see below). The perches used for foraging were mostly about 2.5 to 3.5 m high, in all the available savanna trees.

In a sample of 31 capture attempts, 25 (81%) were successful, a higher proportion than in H. senegalensis (59%, - see Greig-Smith 197Xa). This difference may be due to the fact that most of the dives by Striped Kingfishers were onto short grass or bare earth, whereas many of the Senegal Kingfishers' dives were into a flooded marsh, where prey's chances of escape would probably be higher. Measured rates of foraging varied from 3.3 to 16.7 dives per 100 mins foraging, comparable to the rates recorded for H. senegalensis (Greig-Smith 197Xa). I once saw regurgitation of a pellet containing fragments of insects, and pellet ejection is apparently regular in captives (McLeroth 1969).

## BREEDING

Striped Kingfishers are non-migratory in West Africa (Elgood, Fry & Dowsett 1973) and elsewhere (e.g. Hoesch 1933, Priest 1934), and apparently breed during the wet season throughout their range (Hoesch 1933, Priest 1934, Traylor 1965, Mackworth-Praed & Grant 1970-73). Thus at Mole the birds were probably breeding during July and August, though the only breeding behaviour seen was allofeeding between 19 July and 14 August 1974. Allofeeding also occurs in H. senegalensis, but differs in two respects.

In H. senegalensis, the female adopted a crouching posture, and food was presented by the male in a single brief action (Greig-Smith 197Xb). In H. chelicuti, the bird receiving food (presumably the female) perched erect (Fig. 1), and the transfer of food involved prolonged efforts to break off pieces of the prey (beetles in all the incidents observed). In early August, one bird of a pair (the female?) begged from its mate, gaping with wings drooped and shivered.

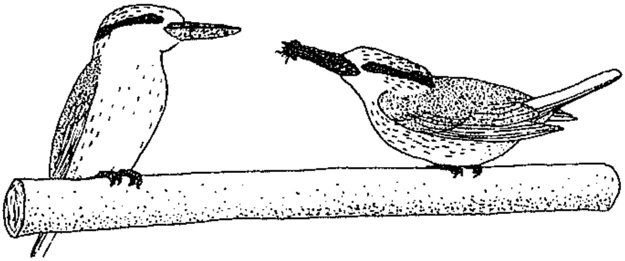

Figure 1 Postures of donating (on right) and receiving Striped Kingfishers during allofeeding

Nests are in holes in trees, usually those excavated by barbets or woodpeckers (Hoesch 1933, Bannerman 1930-51, Priest 1934, Chapin 1939, Roberts 1940, Vincent 1946) (birds roost in such holes outside the breeding season - Hoesch 1933). Nests have also been recorded in swallows' mud nests (Bannerman 1930-51, Chapin 1939), and Vincent (1934) suggested that the kingfishers may excavate holes themselves (see Meintjies 1943 and Greig-Smith 197Xb for evidence suggesting excavation by H. senegalensis). Descriptions of nests and the behaviour of adults at the nest are given by Hoesch (1933) and Vincent (1946). The clutch is 3 to 5 eggs (Hoesch 1933, Priest 1934, Chapin 1939, Mackworth-Praed & Grant 1970-73, Serle & Morel 1977).

## VOCALISATIONS AND DISPLAYS

The calls of H. chelicuti have been described by most authors (e.g. Hoesch 1933, Bannerman 1930-51, Priest 1934, Chapin 1939, Clancey 1964, Mackworth-Praed & Grant 1970-73), and have recently received attention because of a theoretical interest in 'duetting' (e.g. Wickler 1976).

The characteristic "cheer-oh" call, given from a normal perching posture, consists of two parts: an introductory note followed after 0.3 sec by a brief trill, the whole call lasting about 1.2 sec (Fig. 2). This structure is similar to the call of H. senegalensis (Greig-Smith 197Xb), but much shorter. At Mole, most "cheer-oh" calls (62%) were given in apparent isolation from other behaviour, though 23% followed immediately after calls by neighbouring territory-holders (Table 2). Calls were often single, but were usually in bouts of up to about ten. Fig. 3 presents the numbers of calls heard at different times of day during the wet season (July and August), though excluding those associated with "duets" (see below). Most observation-time was spent between 0700-1100 and 1600-1830, and the totals for the second and third time periods in Fig. 3 are therefore exaggerated. Taking that into account, Fig. 3 shows that most calls were given in early morning (starting just before sunrise, at about 0515), then decreasing numbers in the middle of the day, none in late afternoon, and a brief burst in late evening. These last calls were all heard between 1835 and 1845 (just after sunset) and were particularly loud and distinct. On most occasions, all birds within earshot called in response to the first of these evening calls. The pattern of most frequent calling at dawn and dusk, with a 'chorus' at dusk, has also been recorded by Priest (1934), Chapin (1939), and Mackworth-Praed & Grant (1970-73). It seems likely that the function of the "cheer-oh" call is connected with advertisement of territory ownership.

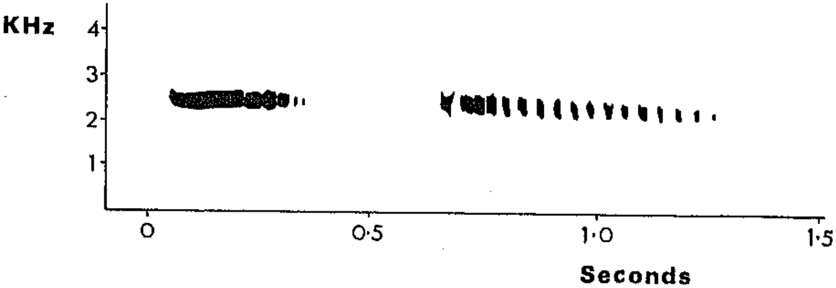

Figure 2 Sonagram of the "cheer-oh" call of Halcyon chelicuti (from a recording made in Kenya by M.E.W.North, on the disc 'More Voices of African Birds')

"Duets" between mates consisted of a combined visual and vocal display in which the birds perched facing one another, often on an exposed branch, and called repeatedly while rapidly spreading and closing the wings. The

Table 1 Weights, dimensions and habitats of adult *Halcyon* kingfishers mist-netted at Mole National Park

| SPECIES | n | WEIGHT (g) | WING (mm) | EXPOSED CULMEN (mm) | BILL/WING | HABITATS |
|---|---|---|---|---|---|---|
| *H. chelicuti* | 3 | 33.8 | 73.3 | 26.0 | 0.35 | savanna |
| *H. leucocephala* | 1 | 44.0 | 99.0 | 38.5 | 0.39 | marsh/fringes of pools |
| *H. senegalensis* | 2 | 54.7 | 104.0 | 47.5 | 0.46 | marsh/woodland along streams |
| *H. malimbica* | 12 | 91.8 | 119.5 | 50.9 | 0.42 | dense riverine forest |

Table 2 Contexts of "cheer-oh" calls of *Halcyon chelicuti*

| | During aggressive incident | In response to call from mate | In response to call from neighbour | In isolation, mates together | In isolation, mates apart |
|---|---|---|---|---|---|
| Number of calls | 6 | 3 | 43 | 19 | 115 |

Table 3 Contexts of head-bobbing by *Halcyon chelicuti*

| | Before flight | After flight | While calling | After allo-feeding | Staring at prey or intruder | In isolation, mates together | In isolatio mates apart |
|---|---|---|---|---|---|---|---|
| Number of incidents | 15 | 9 | 2 | 1 | 17 | 18 | 40 |

posture adopted was very erect, the head raised slightly, and the tail strongly cocked, exposing the brilliant blue rump and rectrices, which are otherwise visible only in flight. Neither calls nor wingspreads were closely synchronised, since birds sometimes started the display in unison, but ended it giving the actions alternately. The first calls, and often a few before the pair came together, were typical "cheer-oh" calls (Fig. 2), but were then altered to a prolonged series of trilled notes (Fig. 4), separated by intervals of 0.5 sec or less, and becoming more rapid as the display progressed. Wingspreads similarly became more rapid, initially being held for 1-2 sec, but later for less than 0.5 sec.

This display has been mentioned by Hoesch (1933), Chapin (1939), Clancey (1964), Mackworth-Praed & Grant (1970-73), and Wickler (1976), and is similar in most respects to the duet of H. senegalensis (Greig-Smith 197Xb).

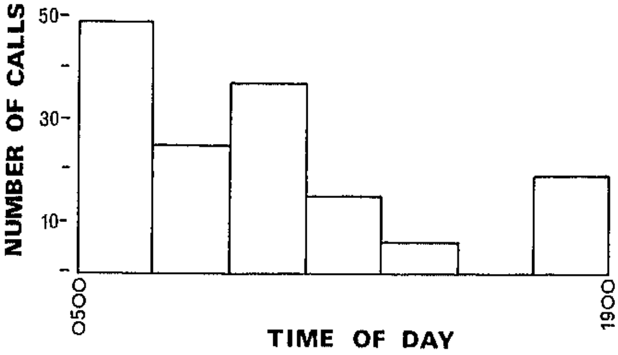

Figure 3 Diurnal pattern of "cheer-oh" calls of Halcyon chelicuti

Wickler (1976) cited evidence which suggests that the duet is a communal territorial display, and may not convey any information between mates, which is the principal alternative advantage proposed for duetting (see Thorpe 1972). At Mole, duets were visible and audible over large distances, and mates were always perched within about 1 m of one another, while Hoesch (1933) found that duets occur before, during, and after the breeding season, so that Wickler's interpretation may be correct. However, it appears that the function of territorial advertisement is fulfilled by the "cheer-oh" calls, and I never saw nor heard other birds in the vicinity of a duetting pair (but see Wickler 1976). Therefore it seems possible that the duet may include some communication between mates, perhaps related to synchronisation of breeding activity (see Thorpe 1972).

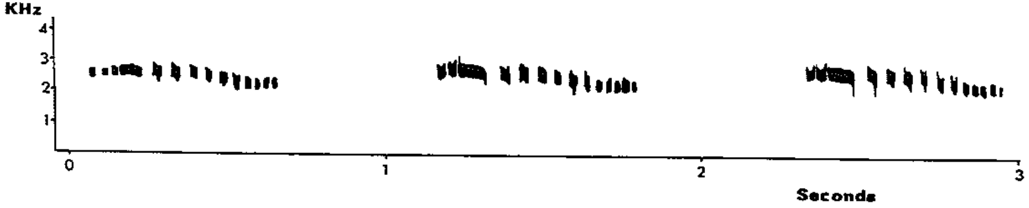

Figure 4 Sonagram of the calls given during 'duets' by Striped Kingfishers (from a recording made in Kenya by M. E. W. North, on the disc 'More Voices of African Birds').

In addition to these calls, I heard weak trills given in apparent isolation, and once a harsh rasping alarm call. Vincent (1946) mentioned a low squeak as an alarm call. Lowe (1937) stated that the species has a song resembling that of the shrike Tchagra senegala, but no other observer has heard this, and it may be an error.

## AGGRESSION

The only occasion on which I saw aggression between Striped Kingfishers was in July 1975, when a bird chased one of a pair, after which the other gave eight wingspreads in quick succession, together with trilled calls, whereupon the birds dispersed.

Interspecific aggression has been noted for H. chelicuti (Mackworth-Praed & Grant 1970-73, Hoesch 1933), though McLeroth (1969) found that two captive young birds were very tolerant of intruding robin-chats Erythropygia leucophrys and bulbuls Pycnonotus barbatus. The birds at Mole attacked several species which entered their territories, including doves Streptopelia senegalensis, canaries Serinus mozambicus, wydahs Vidua macroura, and warblers Eremomela pusilla. They became alert on the arrival of bulbuls and shrikes Corvinella corvina. However, they were remarkably tolerant of the approach of humans, allowing approach to distances of less than 3 m (see also Bannerman 1930-51, Priest 1934, Vincent 1946). Hoesch (1933) was attacked in the vicinity of the kingfishers' nest.

## OTHER BEHAVIOUR

Most comfort behaviour was very similar to that described for H. senegalensis by Greig-Smith (197Xb), though in addition to regular bill-wiping on the branch to one side of the bird, there was occasionally a curious vigorous stab at the branch between the feet, the function of which is obscure. One bird was seen bathing, by repeated plunges into a shallow puddle, followed by vigorous preening. Sunbathing, relatively common in H. senegalensis, did not occur; indeed, perches exposed to the sun were very rarely used.

Rapid vertical head-bobbing was common, occurring in bouts of 2-5, in a variety of contexts (Table 3). Bobs before taking flight were often more pronounced than at other times. This behaviour occurs very rarely in H. senegalensis (Greig-Smith 197Xb), and has been seen in H. malimbica (Walker 1939, and pers. obs.), but it is most common in the small river kingfishers Ceyx picta and Alcedo cristata (pers. obs.). It might function as an aid to judgement of distance, perhaps necessitated by the small size of the species which use it (see also Hoesch 1933). However, some Polynesian Halcyon kingfishers apparently use head-bobbing as a social display (D. T. Holyoak, pers. comm.) which might also be the case here. McLeroth (1969) records head-bobs in alarm and during calling by captive H. chelicuti.

When looking at prey or at an intruder, birds often cocked their heads sideways, an action I have seen in no other Halcyon species. Prior to flight, the whole body was sometimes dipped momentarily - perhaps a flight-intention signal. Rapid outward flicks of the wing-tips may also have been intention signals, although they occurred in several different contexts.

## DISCUSSION

In its exclusive territoriality and aggression to other species, H. chelicuti resembles H. senegalensis, in which these features were considered to be adaptations to a sit-and-wait foraging strategy (Greig-Smith 197Xb). In other ways the behaviour of H. chelicuti is very different, probably as a result of its preference for arid habitats.

The small size of the birds (which may be appropriate to their dietary opportunities in savanna), and the abundance of birds of prey in the savanna at Mole (Greig-Smith 1976) are likely to make them particularly susceptible to predation. Their cryptic plumage, habitual passivity, avoidance of exposed perches, brief calls, and lack of obvious visual displays (such as the aerial flights and wingspreads of H. senegalensis; see Greig-Smith 197Xb) may all contribute to reducing the risks of predation. Hoesch (1933) and McLeroth (1969) have described the response of Striped Kingfishers to the appearance of birds of prey, involving the adoption of an immobile, elongated posture that tends to camouflage the bird against the branch on which it is perched (though Hoesch interpreted the associated exposure of the blue rump as a display intended to startle the predator).

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