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Derek Engelbrecht

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BREEDING BIOLOGY

GROWTH AND DEVELOPMENT OF CROAKING CISTICOLA *CISTICOLA NATALENSIS* NESTLINGS

Derek Engelbrecht

Department of Biodiversity, University of Limpopo, Private Bag X1106,
SOVENGA, 0727

Email: derek.engelbrecht@ul.ac.za

Introduction

The unusually large size and the characteristic call of the Croaking Cisticola *Cisticola natalensis* arguably make it one of the more distinctive species in the family. Croaking Cisticolas are common and widespread throughout grasslands, savannas and the edges of seasonal wetlands in Africa, inhabiting open areas with coarse, tall grass and scattered bushes (Erard et al. 1997; Ryan & Dean 2006). As with many other cisticolas, its biology is poorly known and mainly based on anecdotal observations. With an incubation period of 18 days and nestling period of 13–16 days, its nesting cycle seems unusually protracted for a cisticola (Erard et al. 1997; Ryan & Dean 2006).

Here I describe for the first time the growth and development of Croaking Cisticola nestlings at a single nest. Knowledge of nestling development is important for future studies where nestling age estimates are required (e.g. daily survival estimates) and provides valuable insight into the overall adaptive nesting strategies of birds.

Figure 1. *The nest of the Croaking Cisticola with two hatchlings and two eggs. Note the liberal use of "woolly" lining typical of the species.*

Methods

On 8 January 2016, a Croaking Cisticola nest containing four eggs were found in the grasslands adjacent to Haenertsburg (23°56'S; 29°56'E), South Africa. The nest was visited on alternate days to determine the hatching date. On 21 January 2016 at 08h10, two eggs had hatched, one egg was pipped and in the process of hatching and the remaining egg was still intact (Figure 1).

Growth and development of nestlings were recorded on alternate days until they were 10 days old. After day 10 the nest was inspected from

a distance to prevent the nestlings from 'exploding' prematurely from the nest due to disturbance. All measurements were recorded within 90 minutes after sunrise. To distinguish individual nestlings, they were marked on the thigh with a non-toxic marker pen and fitted with metal rings when they were eight days old. Nestling development was described with regard to

(i) plumage development,
(ii) increase in mass (g) measured with a portable digital electronic scale,
(iii) increase in tarsus length (mm), and
(iv) length of the wing chord (mm) as described by de Beer *et al.* (2001).

The growth rate of each nestling was determined by fitting a logistic equation of the form: $x(t) = A / (1 + \exp[-K(t - ti)])$, where $x(t)$ is the mass or length at age t, A is the asymptote of the growth curve, K is the growth rate constant, and ti is the age (days) at the inflection point of the growth curve (using the logistic growth curve, this occurs when half of the value of the asymptote has been reached (Ricklefs 1967)). The $t_{10–90}$, i.e. the time (days) required to undertake growth from 10% to 90% of the asymptote, was also estimated. For the logistic growth curve this can be calculated as $t_{10–90} = 4.394/K$. All statistical analyses were performed using Microsoft Excel for Windows.

Results and discussion

The nestlings hatched asynchronously, with three nestlings hatching on 21 January 2016 and the fourth nestling on 22 January 2016. This is consistent with the pattern of onset of contact incubation commencing with laying of the third or penultimate egg in some cisticolas (Erard et al. 1997; Engelbrecht & Dippenaar 2005; Engelbrecht & van Tonder 2009). Most cisticolas commence with incubation upon clutch completion (Ryan 2006).

Nestling development

Figure 2. *Croaking Cisticola nestlings aged one day (#3) and two days (#1, 2 and 4) days*

Newly hatched nestlings (day 0) were naked and blind with a pale flesh-coloured skin. The two newly hatchlings weighed 1.30 g and 1.35 g respectively. The bill was a yellowish-horn colour and the gape flanges a slightly paler, yellow colour. The inside of the mouth was a pale, fleshy-pink colour and there were two posterolateral tongue spots and no spots at the bill tips. Figure 2 shows one- and two-day old nestlings. Apart from size, there is no obvious difference in the appearance of a newly hatched and a one-day old nestling. The size discrepancy between one- and two-day old nestlings is clearly visible in Figure 2

Figure 3. *A 10-day old Croaking Cisticola nestling*

.At two days of age, individual dermal papillae were clearly visible under the skin and the feather tracts appeared as darkened areas under the skin (Figure 2). The remiges, mainly the secondaries but some proximal primaries, appeared as minute, stubby quills (Figure 2, #2). The eyes were still closed. At three days of age the eyes were still closed but tiny eye-slits were visible. The skin had become a darker pinkish colour, the upper mandible became a darker, brownish-horn colour and the remiges erupted through the skin (in pin) but none of the other tracts yet. Most tracts had at least some feathers in pin on day four and the eyes were open but the nestlings preferred to keep their eyes open as slits. The feathers continued to grow on days five and six and the eyes were held mostly open from day five onwards. On day seven the first remiges and secondary coverts began to emerge from their sheaths (in brush). On day eight all the tracts had most of their feathers in brush but all the feathers on the capital tract and ventral cervical region were still in pin. All of the tracts, except the capital and ventral cervical region, were in brush on day 10, although the primary coverts had only just started emerging from their sheaths (Figure 3). Upon fledging on day 13 all the feathers were well in brush.

Growth

The growth patterns for increase in mass, and growth of the tarsus and wing chord are presented in Figures 4–6. The youngest nestling disappeared after day five and its growth data were therefore not included in the analyses of data. The means of the growth parameters of the remaining three nestlings are presented in Table 1.

Growth was fast, averaging K = 0.32, but similar to the growth rate of Tinkling Cisticola nestlings (Engelbrecht & van Tonder 2009). The $t_{10\text{-}90}$ estimates show that most growth is completed at or shortly after fledging for the parameters recorded. This trend was also observed for the Desert and Tinkling Cisticola *Cisticola rufilatus* (Engelbrecht & Dippenaar 2005; Engelbrecht & van Tonder 2009).

Table 1. *Means of the parameters of the logistic growth curve for the increase in mass and growth of the tarsus and wing chord of three Croaking Cisticola nestlings.*

	A	*K*	*ti*	$t_{10–90}$
Mass (g)	24.47	0.33	7.97	13.50
Tarsus (mm)	22.87	0.32	7.77	19.07
Wing (mm)	24.77	0.31	8.18	12.28

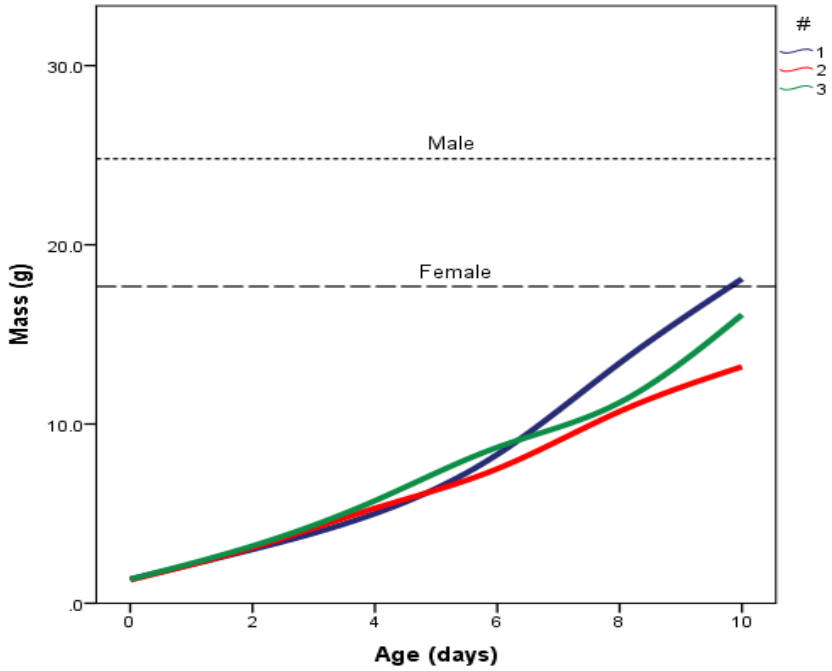

Figure 4. *Growth patterns for increase in mass of three Croaking Cisticola nestlings. Means for adult males and females are shown.*

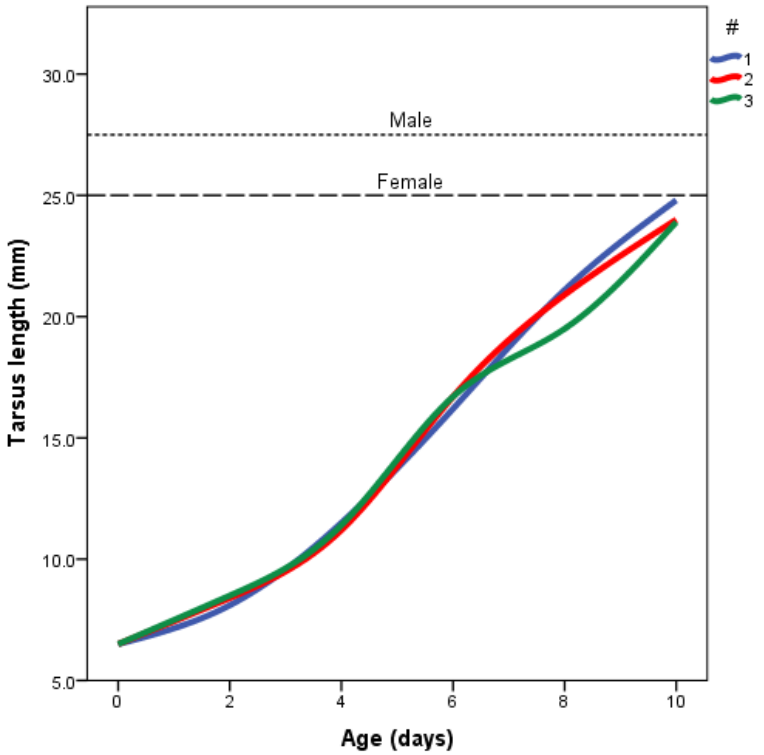

Figure 5. *Growth patterns for increase in the length of the tarsus of three Croaking Cisticola nestlings*. Means for adult males and females are shown.

Nestling behaviour

From about day five onwards the nestlings made a harsh hissing call when disturbed. This anti-predation strategy presumably serves to startle any potential predators and is typical of many cistocolid nestlings (Engelbrecht & Dippenaar 2005; Ryan & Dean 2006; Engelbrecht & van Tonder 2009). There was little, if any, interaction amongst the nestlings and they generally lay silently and motionless, with their heads tucked tightly into the wall of the nest. There was no build-up of faecal matter in the nest during the course of the nestling period. The female either consumed the faecal sacs or carried it away from the nest, but in the latter stages of the nestling period, I observed nestlings defecating over the rim of the nest entrance. The nestlings fledged around mid-morning on 3 February 2016.

In conclusion, although these findings are based on nestlings in a single nest, it presents the first detailed information of the growth and development of Croaking Cisticola nestlings and may serve as a baseline for inter- and intraspecific comparisons of the growth and development of cisticolas.

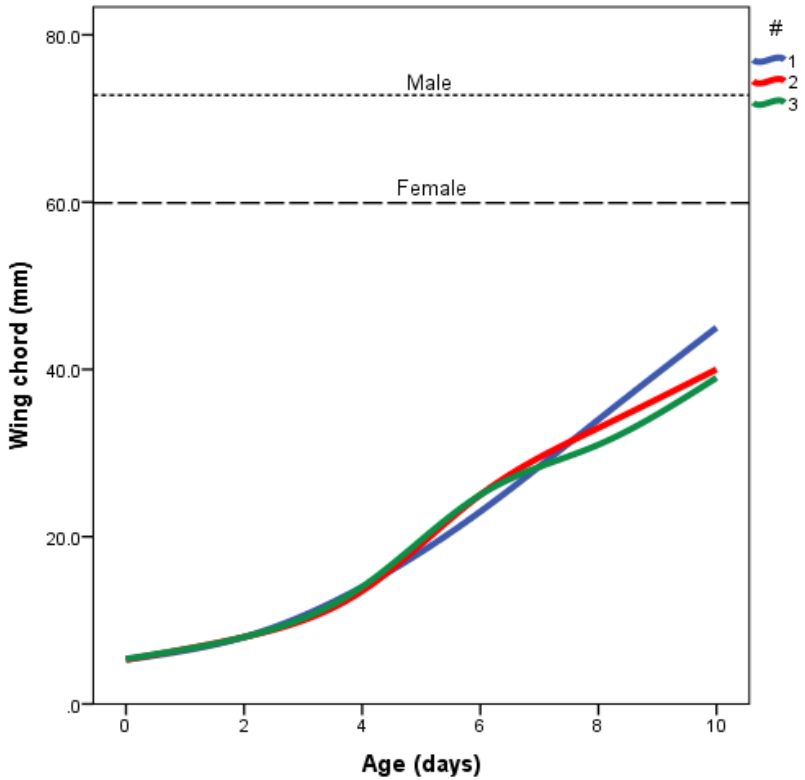

Figure 6. *Growth patterns for increase in the length of the wing chord of three Croaking Cisticola nestlings. Means for adult males and females are shown.*

References

de Beer SJ, Lockwood GM, Raijmakers JHFA, Raijmakers JMH, Scott WA, Oschadleus HD, Underhill LG (eds) 2001. SAFRING bird ringing manual. ADU Guide 5. Avian Demography Unit: Cape Town.

Engelbrecht D, Dippenaar 2005. Nestling growth, plumage Development and rate of prey delivery at a nest of the Desert Cisticola, *Cisticola aridula.* African Zoology 40: 151–153.

Engelbrecht D, van Tonder R 2009. Aspects of the breeding biology of the Tinkling Cisticola *Cisticola rufilatus*. Ostrich 80: 111–113.

Erard C, Fry CH, Grimes LG, Irwin MPS, Keith S, Lack PC, Pearson DJ, Tye A 1997. Sylviidae, Old World warblers. In: Urban EK, Fry CH, Keith S (eds). The birds of Africa. Vol. V. Academic Press, London. pp. 57–431.

Ricklefs RE 1967. A graphical method of fitting equations to growth curves. Ecology 48: 978–980.

Ryan PG 2006. Family Cisticoliidae (Cisticolas and Allies). In: del Hoyo J, Elliott A, Christie DA (eds). Handbook of the birds of the world. Vol. 11. Old World flycatchers to Old World warblers. Lynx Edicions, Barcelona. pp. 378–491.

Ryan PG, Dean WRJ 2006. Croaking Cisticola. In: del Hoyo J, Elliott A, Christie DA (eds). Handbook of the birds of the world. Vol. 11. Old World flycatchers to Old World warblers. Lynx Edicions, Barcelona. p. 452.