Biodiversity Observations

http://bo.adu.org.za

An electronic journal published by the Animal Demography Unit at the University of Cape Town

The scope of Biodiversity Observations consists of papers describing observations about biodiversity in general, including animals, plants, algae and fungi. This includes observations of behaviour, breeding and flowering patterns, distributions and range extensions, foraging, food, movement, measurements, habitat and colouration/plumage variations. Biotic interactions such as pollination, fruit dispersal, herbivory and predation fall within the scope, as well as the use of indigenous and exotic species by humans. Observations of naturalised plants and animals will also be considered. Biodiversity Observations will also publish a variety of other interesting or relevant biodiversity material: reports of projects and conferences, annotated checklists for a site or region, specialist bibliographies, book reviews and any other appropriate material. Further details and guidelines to authors are on this website.

Lead Editor: Arnold van der Westhuizen – Paper Editor: Les G Underhill

---

ASPECTS OF THE BREEDING BIOLOGY OF ANGOLA SWALLOWS *HIRUNDO ANGOLENSIS* IN UGANDA

Steven W Evans

Recommended citation format:
Evans SW 2016**.** Aspects of the breeding biology of Angola Swallows *Hirundo angolensis* in Uganda. Biodiversity Observations 7.48: 1–6.

URL: http://bo.adu.org.za/content.php?id=241

Published online: 15 August 2016

– ISSN 2219-0341 –

BREEDING BIOLOGY

ASPECTS OF THE BREEDING BIOLOGY OF ANGOLA SWALLOWS *HIRUNDO ANGOLENSIS* IN UGANDA

Steven W Evans

Research Fellow, SARCHI Chair on Biodiversity Value and Change in the Vhembe Biosphere Reserve, School of Mathematical and Natural Sciences, University of Venda, Private Bag X5050, Thohoyandou 0950, South Africa

Email: stevenwe@vodamail.co.za

Abstract

The dimensions of three nests were measured, and the time activity-budget of a pair of Angola Swallows *Hirundo angolensis* was monitored at a nest at a convention centre in Uganda. Two adult Angola Swallows tending to three 5–7 day old nestlings spent the majority of their time (76.6–94.8%) away from the nest, presumably foraging. Nestlings were provisioned from 5.2 to 10.0 provisions per nestling per hour. The mean external width and depth of three Angola Swallow nests were 12.0 cm (sd=0.87 cm) and 6.9 cm (sd=0.87 cm) respectively. Compared to Blue Swallows *Hirundo atrocaerulea*, the pair of Angola Swallows had shorter and more frequent brooding and foraging periods per hour. Consequently these Angola Swallow nestlings were fed more frequently than Blue Swallow nestlings.

Introduction

Time activity-budgets have been used to measure the trade-offs birds make between self-maintenance and breeding, and how these trade-offs are affected by changes in the environment i.e. birds life-history strategies (Sæther 1988, Linden & Møller 1989, Evans & Bouwman 2000). These trade-offs can at times shift entirely to self-maintenance. In Mpumalanga, South Africa, adult Blue Swallows *Hirundo atrocaerulea* abandon eggs or nestlings following four or more days of adverse weather conditions in favour of self-maintenance and attempt to breed again when weather conditions have improved (Evans 2008).

The Angola Swallow *Hirundo angolensis* is distributed through Rwanda and Burundi, western Angola, Congo, Tanzania, Kenya and Gabon, western and eastern Democratic Republic of the Congo (DRC), southern Uganda, and northern Malawi and Zambia (Keith et al. 1992). Angola Swallows build an open cup-shaped nest consisting of mud and straw (Keith et al. 1992). In Uganda, egg-laying occurs mostly in January to July and October to December (Keith et al. 1992). The clutch size is 2–3 eggs (n=9 clutches) (Keith et al. 1992). The incubation period is 17–18 days (7 nests in Uganda) and the nestling period is 22–27 days (Keith et al. 1992). Male and female Angola Swallows cannot be reliably distinguished in the field because they have identical plumages (Turner & Rose 1989) and the ranges of the lengths of the outer tail feathers and masses for males and females overlap extensively (Keith et al. 1992). It is unknown whether both the male and female or whether the female alone incubates the eggs and broods the young nestlings. The time-activity budgets of nesting African birds are poorly known. This study provides the first description of the diurnal time-activity budgets of breeding male and female Angola Swallows tending to 5–7 day old nestlings. In addition, it provides the first measurements of the nests of Angola Swallows.

Methods

The study of the Angola Swallow was conducted over three days, 6–8 June 2001, at a convention centre (Banana Village, 00° 06' 01" N, 32° 31' 22" E, 1162 m asl) situated between Entebbe and Kampala in Uganda. Banana Village is 11 km from Entebbe, and 250 m from Lake Victoria. The village lies within a rural farming area of Uganda consisting of a mosaic of dwellings, maintained lawns and gardens, other buildings, some banana plantations, natural grassland grazed by cattle, natural vegetation consisting of open grasslands interspersed with clumps of shrubs and some trees. Hourly temperature data for Entebbe for the

times when the observations at the nest were made were obtained from http://www.wunderground.com/.

The monitoring of nest activity was conducted at a nest containing three nestlings estimated to be 5–7 days of age, based on the size of the nestlings and the extent of their feather development. The nest was situated on a wooden roof-beam near the underside of the highest point of a cone-shaped thatched roof. The roof had a pitch of c. 23° from the horizontal. I sat in a chair c. 6 m away from the nest and could conduct observations of the nest from this position with the aid of a pair of binoculars (Swarovski 10×40). Because the observations were made at a convention centre, the birds were accustomed to people being near their nest. Consequently, so long as I remained seated, my presence near the nest had no discernible influence on the activities of the birds. On my arrival and departure from the nest the birds were agitated, flying in and out of the nest area but not perching on the nest or in the nest area. This agitation was accompanied by more vocalizing when flying in and out of the nest to feed the nestlings. I waited for both birds to complete two feeds of the nestlings before commencing with the observations. On all occasions these two feeds took place within five minutes after I sat down to start the observations.

At least two adults were provisioning the nestlings because they would occasionally arrive together and take turns in provisioning the nestlings. Unfortunately there are no external features by which male and female Angola Swallows can be distinguished (Keith et al. 1994, Turner & Rose 1989). Because brooding was intermittent, as occurs in other hirundines in which only the female broods the nestlings (Evans 2008), it was likely that it was only the female Angola Swallow which was brooding the nestlings. The total amount of time expended by both birds on foraging, provisioning the nestlings, visiting the nest and perching on or near the nest were divided by two to determine the total amount of time expended on each activity per bird. The total amount of time expended on brooding was subtracted from the amount of time spent foraging for the female bird. These values were used to calculate the percentage of the time spent by the male and female birds on each activity. Nestlings were assumed to be fed in turns by both parents with no preference shown.

In addition to recording the time activity budgets of the adult birds at the nest at Banana Village, the dimensions of another three active Angola Swallow nests were obtained using a 15 cm and 30 cm ruler. The contents of these three nests were recorded.

Results

One of the four nests contained three nestlings and the other three nests each contained three eggs. The three nests with eggs where built above the verandas on the northern side of two round-houses. The fourth nest containing the three nestlings was built on the western side of a thatch-

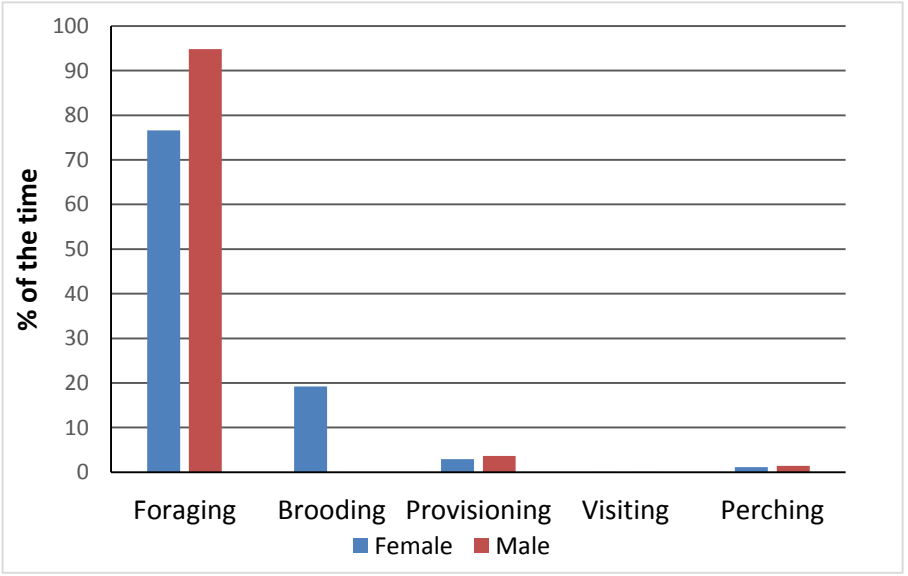

Figure 1. The percentage of the time expended by a pair of adult Angola Swallows on different activities when the nestlings were 5–7 days old.

roofed pagoda. The period 6–8 June was within the known laying period, January to July, for Angola Swallows in Uganda (Keith et al 1992).

I made a total of 5.25 hours of time-budget observations on each bird of the pair of Angola Swallows (10.5 bird-hours). The observations were made at intervals spaced throughout the day, in the morning before the meeting started, at lunch time and in the late afternoon after the meeting had ended.

The two adult Angola Swallows tending to three 5–7 day old nestlings spent the majority of their time (76.6–94.8%) away from the nest, presumably spending most of that time foraging (Figure 1). Intermittent brooding accounted for 19.2% of the time of one bird, probably the female (Figure 1). Intervals between successive bouts of brooding ranged from 2.5–30.1 minutes (Table 1). Provisioning of the nestlings accounted for 3.0–3.7% of the adult birds' time and lasted from 0.02–0.95 min (Table 1). Nestlings were provisioned from 5.2 to 10.0 provisions per nestling per hour (p n^{-1} h^{-1}) (Table 1). The birds spent the least amount of time (1.2–1.5%) perched near the nest and visiting the nest (Figure 1). A visit was defined as an adult perched on the rim of the nest with no feeding of the nestlings occurring (Figure 1, Table 1). The adult birds were observed foraging in light rainfall but stopped foraging during heavy rainfall, and perched near the nest.

The mean external width and depth of three Angola Swallow nests was 12.0 cm (sd=0.87 cm) and 6.9 cm (sd=0.87 cm) respectively (Table 2). The mean internal width and depth of three Angola Swallow nests was 6.0 cm (sd=0.35 cm) and 4.1 cm (sd=0.52 cm) respectively (Table 2).

Table 1. The time expended on different activities by adult Angola Swallows tending to three 5–7 day old nestlings. Temperatures were measured hourly at Entebbe, 11km distant, at the same time the observations were made (http://www.wunderground.com/). Results are based on 5.25 hours of observations

Activity	Sample size	Minimum	Mean	Std Dev	Maximum
Brooding period (minutes	19	1.07	3.43	3.58	14.22
No. of brooding periods/hour	5	2	2.97	1.44	5
Period between brooding periods (minute)	18	2.48	14.15	8.43	30.13
Provisioning period (min)	96	0.02	0.21	12.2	0.95
No. of provisioning periods/hour	96	17	19.14	6.1	30
No. of provisioning periods/nestlings/hour	32	5.23	6.38	2.03	10
Period between provisionings (minute)	111	0.03	3.15	3.82	20.65
Foraging periods (minute)	125	0.02	4.15	4.27	28.22
No. of foraging periods/hour	5	17	23.89	7.51	36
Time visiting the nest (minute)	4	0.02	0.11	0.1	0.23
No. of visits to the nest/hour	5	0	0.8	0.84	2
Perching period (minute)	30	0.02	0.26	0.24	0.98
No. of perching periods/hour	5	3	5.26	2.04	8.31
Temperature (°C)	9		20.78	2.33	
Rainfall duration (%)	9		2.69		

Discussion

For 41 of the 84 species of hirundines, information on incubation strategy is available; for 19 species only the female incubates the eggs and for 22 species both male and female incubate the eggs (Turner & Rose 1989, Keith et al. 1992, Turner 2004). This information is available for 13 of the 14 species in the genus *Hirundo*; for nine species only the female incubates the eggs and for four species both the male and female incubate the eggs (Turner & Rose 1989, Keith et al. 1992, Turner 2004). Information on which sex both incubates the eggs and broods the nestlings is available for only five species of hirundines. Both the male and female Common Sand Martin *Riparia riparia* incubate the eggs and both brood the nestlings (Turner & Rose 1989, Keith et al. 1992, Turner 2004). Only female Northern Rough-winged Swallow *Stelgidopteryx serripennis*, Pacific Swallow *Hirundo tahitica*, Wire-tailed Swallow *Hirundo smithii* and Pearl-breasted Swallow *Hirundo dimidiata* incubate the eggs and brood the nestlings (Turner & Rose 1989, Keith et al. 1992, Turner 2004). Although the sample size is small (*n*=5), it appears that the sex which incubates is also the sex that broods. The intermittent brooding of the nestlings by Angola Swallows suggested that only the female probably incubated the eggs. Angola Swallow and Blue Swallow nestling periods are 22–27 days and 20–26 days respectively (Turner & Rose 1989, Keith et al. 1992, Evans 2008). Blue Swallow nestlings are brooded, by the female only, for 8–9 days after hatching (Evans 2008) and this is probably similar for the Angola Swallow.

Not being able to distinguish male and female Angola Swallows in the field means that the relative contribution of each to provisioning the nestlings cannot be determined. Other studies have found that female hirundines provision the nestlings more frequently than males (Moreau 1939, Evans 2008). The number and duration of brooding, provisioning and foraging periods of hirundines are variable and are affected by the age of the nestlings, temperature (Evans & Bouwman 2000), and the presence or absence of rainfall (Moreau 1939, Evans & Bouwman 2000) and/or fog (Evans & Bouwman 2000). The search for extra-pair copulations by male and female hirundines also affects the duration of periods spent away from the nest (Saino et al. 1999).

For Blue and Angola Swallows, most of their time during the early stages of nestling development was spent on foraging, brooding the nestlings (female only), and the provisioning the nestlings (Evans 2008). Both species spent a small amount of time visiting and perching near the nest (Evans 2008). Intermittent brooding of three 6–7 day old nestlings by female Blue Swallows accounted for 17% of their time (Evans 2008) and was similar to the proportion of the time an Angola Swallow spent brooding of 19.2% (Figure 1). The mean brooding period of female Blue Swallows tending to three 6–7 day old nestlings was 9.9 minutes (n=26, sd=6.0 minutes) (Evans 2008), more than twice as long as the mean brooding period of 3.4 minutes by an Angola Swallow (Table 1). Female Blue Swallows brooded their nestlings on average twice per hour (n=28, sd=0.6) (Evans 2008) whereas an Angola Swallow brooded for closer to three periods per hour (Table 1). Male and female Angola Swallows provisioned their three 5–7 day old nestlings at more than three times the rate (2.1 p n^{-1} h^{-1}, sd = 0.69) at which male and female Blue Swallows provisioned their three 6–7 day old nestlings (Evans 2008). The longer brooding period of female Blue Swallows means less time for foraging and less food delivered to the nestlings compared to Angola Swallows. Compared to Blue Swallows, Angola Swallows had shorter and more frequent brooding and foraging periods. Angola Swallow nestlings were fed more frequently than Blue Swallow nestlings were.

Dimensions are available for 12 of the 28 species of hirundines that build open cup-shaped nests, like the Angola Swallow's (Table 2) (Keith et al 1992, Tarboton 2001, Turner 2004). Based on the dimensions of external width and depth, the Angola Swallow's nest was most similar in size to the nests of the Wire-tailed and Blue Swallows (Tarboton 2001). Future measurements of Angola Swallow's nests should include the internal and external length of each nest.

Table 2. The dimensions of the open cup-shaped nests of 12 hirundines**.**

Species, reference	External dimensions												Internal dimensions											
	Width (cm)				Length (cm)				Depth (cm)				Width (cm)				Length (cm)				Depth (cm)			
	n	min	Mean (sd)	max	n	min	mean (sd)	max	n	min	mean (sd)	max	n	min	mean (sd)	max	n	min	mean (sd)	max	n	min	mean (sd)	max
Barn Swallow Cramp 1988			20								10													
Angola Swallow Present study	3		12.0 (0.9)						3		6.9 (0.9)		3		6.0 (0.3)						3		4.1 (0.5)	
White-throated Swallow Tarboton 2001		10		12						9		12												
Ethiopian Swallow Keith et al. 1992			10		1		8		1		13													
Wire-tailed Swallow Tarboton 2001		10	12	15						4	6	10												
Blue Swallow Tarboton 2001		11.5	12	15						6	8	14		6	8	9						3	4	5
White-throated Blue Swallow Keith et al. 1992	1		11						1		5.5		1		7.5						1		3	
Black-and-rufous Swallow Turner & Rose 1989, Keith et al. 1992	1		8		1		5.5						1		6						1		4.5	
Pearl-breasted Swallow Schmidt 1959	10	12.5	13	13.5					10		4.5		10		9.5						10		3	
Pearl-breasted Swallow Tarboton 2001		11		13.5						4.5		7.5			9.5								3	
Crag Martin Keith et al. 1992	4		14.4		4		10		4		8.2				12.3				7.9				10.2	
Rock Martin Tarboton 2001			15							5		7			7.5								2.5	

Acknowledgements

I acknowledge the financial and logistic support of the National Research Foundation (NRF) and the Department of Science and Technology (DST) through the South African Research Chairs Initiative (SARChI) Chair on Biodiversity Value and Change in the Vhembe Biosphere Reserve, hosted and supported by the University of Venda, and co-hosted by the Centre for Invasion Biology (C·I·B) at Stellenbosch University. Peter Taylor improved the manuscript by commenting on an earlier draft.

References

Cramp S 1988. Handbook of the birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic Vol. 5. Oxford University Press, Oxford.

Evans SW, Bouwman H 2000. A preliminary look at the influence of mist and rain on the reproductive success of the Blue Swallow *Hirundo atrocaerulea*. Proceedings of the 9th Pan African Ornithological Congress. Ostrich 71: 83–86.

Evans SW 2008. The conservation ecology and breeding biology of the Blue Swallow *Hirundo atrocaerulea*, Sundevall 1850, in South Africa. PhD Thesis, North-West University, Potchefstroom.

Keith S, Urban EK, Fry CH (eds) 1992. Birds of Africa. Vol. 4. London. Academic Press.

Linden M, Møller AP 1989. Cost of reproduction and covariation of life history traits in birds. Trends in Ecology and Evolution 4: 367–371.

Moreau RE 1939. Numerical data on African birds' behaviour at the nest: *Hirundo s. smithii* Leach, the Wire-tailed Swallow. Proceedings of the Zoological Society of London 109A: 109–125.

Saino N, Primmer CR, Ellegren H, Møller AP 1999. Breeding synchrony and paternity in the Barn Swallow (*Hirundo rustica*). Behavioural Ecology and Sociobiology 45: 211–218.

Schmidt RK 1959. Notes on the Pearl-breasted Swallow *Hirundo dimidiata* in the south-western Cape. Ostrich 30: 155–158.

Tarboton WR 2001. A guide to the nests and eggs of southern African birds. Struik, Cape Town.

Turner A, Rose C 1989. A handbook to the swallows and martins of the world. Christopher Helm, London.

Turner AK 2004. Family Hirundinidae (swallows and martins). In: Handbook of the birds of the world, Vol. 9: Cotingas to pipits and wagtails, Del Hoyo J, Elliott A, Christie DA. (eds). Lynx Edicions, Barcelona: 602–640.