

# Breeding habits and nesting success of the Village Weaver *Ploceuscucullatus*, at Khartoum, Sudan

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**Abstract:** Field observations were made of the breeding habits of the Village Weaver *Ploceuscucullatus* at sites in Khartoum State, Sudan. Descriptions are given of the nest, nest sites, and the roles played by males and females of the polygynous mating system during the nesting period. Nest building commenced in April first season and in February the second season, before the onset of the June-July rains, to ensure that there would be abundant food (grass seeds and insects) available when young were in the nest. Breeding success was moderate with only 55 of 144 eggs, (38%) producing fledglings from a sample of 25 nests.

**Keywords:** Breeding, Nest sit, Nesting success, Village Weavers & Sudan

## 1. Introduction

The Village Weaver *Ploceuscucullatus* is a large heavy-billed masked weaver. The extent of black on breeding male's heads varies geographically, but all races have a mottled black and yellow back. There have been few general records and studies on the breeding biology and behaviour of Village Weavers in Sudan.

The distribution of 44 weaver species in Sudan was recorded [18]. Village Weavers are widely distributed in Sudan from ErRoseires to Darfur southwards and are very common in Equatoria [2].

[4, 5, 6, 7 & 8] provided detailed descriptions of the displays and breeding behaviour of the Village Weaver in captivity and in the field in Central Africa (DRC) and South Africa (Kruger Park). [9] described the nesting and mate selection in Village Weavers, both in captivity and in the field in West Africa. [15] studied nest colour as a factor in nest selection by female Village Weavers. [16] studied the ecology and evolution of breeding adaption in the Village Weaver. The present study describes the nesting habits and breeding success in a population of Village Weavers in Khartoum State, Sudan.

## 2. Methods

This study was carried out from April to September 2011 and from February to September 2012. The main study site was Ahmed Yousif (agricultural Farm), in the Soba area. On the farm there are scattered trees such as *Acacia mellifera*, *BanEucalyptus sp.*, Heglig *Balanites-aegyptiaca*, *MiskateProsopis sp.*, Palm tree, *Phoenix-dactylifera*, Dom, *Hyphanaethebica*, Aradaaib, *Pithecebiu dulce*, AishElfar, *Eragrostis sp.* and Neem tree, *Azadirachta indica*. The farm produced irrigated cereals such as Sorghum and millet. The farm was surrounded by *Acacia mellifera* trees. There was no permanent running water, but water for irrigation was pumped from a well.

Weavers nested primarily in *Balanitesaegyptiaca*. A total of 126 visits were made to the colonies. Dates of nest building and occurrence of eggs and young were recorded. Twenty-

five nests were carefully followed from the start of nest building until incubation and hatching. Due to the difficulty in reaching nests, nesting success was estimated from these 25 nests (in both seasons).

Observations were carried out from 6:00 AM to 20:00 PM. Birds were observed using binoculars (Canon 8×25 IS). A collapsible ladder of 8 metres length was used to investigate the nests.

## 3. Results

Nest building started in the first season (April- September 2011) and in the second season (February - September 2012). The first record of egg 1 in the first season was on 30 May 2011 and the last on 20 August 2011. The first egg laid in the second season was on 20 February 2012 and the last one was on 2 September 2012 (Figures 1 & 2). The first young hatched in the first season in June 2011 and the last in August 2011; in the second season the first young hatched in April 2011 and the last in August 2012.

Nests on Ahmed Yousif Farm were built in Heglig tree *B.egyptiaca* (latitude 15°28' 24" N and longitude 32° 36' 05" E) during the first season. Away from Ahmed Yousif Farm, some birds nested in Palm tree *Phoenix dactylifera* (longitude 32° 35' 22" N and latitude 15° 27' 35" E), Neem tree, *Azadirachta indica* (latitude 15° 28' 24" N and longitude 32° 35' 37" E) and Damas tree, *Conocarpus lancifolius* (latitude 15° 27' 38" N and longitude 32° 35' 32" E). Birds also nested in Mahogany tree, *khayasenegalensis* (latitude 15° 39' 28" N and longitude 32° 31' 05" E) at Faculty of Agriculture and Forestry (Shumbat) at north side of The River Nile Bahri (Khartoum North; when the Blue Nile and White Nile converge they form the River Nile). At Alsablokah Cataract about 100 Kms from Khartoum they bred at Sunut tree *Acacia nilotica* (longitude 32° 41' 40" E and latitude 16° 20' 19" N) and Safsaf *Polygonum sp.* (longitude 32° 14' 17" E and latitude 16° 20' 03" N). Also along The Blue Nile bank, and at Blue Nile bank (Nile Avenue) from University of Khartoum Main Campus to Almnshyah bridge they bred at Sunut tree *Acacia nilotica* (longitude 32° 35' 15" E and latitude 15° 35' 46" North).

The maximum number of nests in the first season at Ahmed Yousif Farm was 130 nests and the maximum number of nests in over all sites in the second season was 1268 nests (Table II).

The mean height of nests above the ground level was  $7.35 \pm 1.05$  m (n=46). The lowest height recorded nests were 3m above the ground in Sunut *Acacia nilotica* and Safsaf trees, *Polygonumsp* and the highest was 10m in a Mahogany tree *khayasenegalensis*. The heights of trees in which nests were built varies from 4-10 m. Males collected nesting materials, mostly green long strips of leaves from the Palm tree, *Phoenix dactylifera* and green *NegelaCynodondadylon* (later the females added Mesquite leaves *Prosopis sp.*, Mahogny leaves *khayasenegalensis*. Feathers and cotton were used as lining material).

Males foraged for green nesting materials. Each male built 2-5 nests (n=40 males). Then attracted females by courtship which was seen closely to the nests. The male displaying his nests to visiting females. During both seasons a number of males were seen with 2-4 females in his nests (n=50). Complete nests were ovoid shape; the nest has a short entrance tube and is separated from the egg chamber by an inner ridge. In two instances nests were discovered with 2 chambers. External measurements of nests were: height  $34.5 \pm 3.1$ cm width  $42.5 \pm 3.2$ cm; entrance area  $19.1 \pm 3.0$ cm. Nest chambers were usually lined with leaves, cotton and feathers. The first egg appeared in the nest within one to two days after the start of nest building. Eggs were then laid on successive days. The mean clutch size was  $2.0 \pm 1.6$  in 68 nests (Table I). During this study some birds after losing their eggs or their young they attempted another brood, some had made four attempts. Incubation was only by females (n=100). The average incubation period was 13 days based on 115 nests. Females incubated at night and during the day females incubated for 1-38 minutes (means 16 minutes). Young were fed by both parents. Examination of crop contents of 3 dead young revealed a diet of grass seeds, fresh vegetation, fruits, ants, worms, rice and wheat (from garbage).

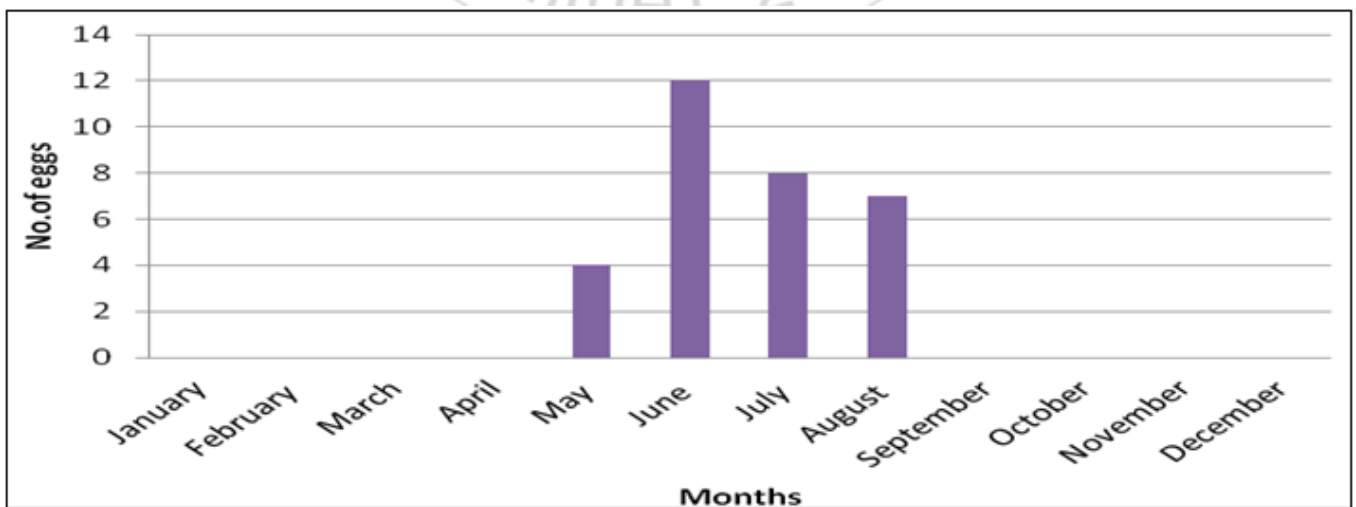
Nesting success was moderate. In the first season it was 34.6% and in the second season it was 40%. Failure was probably due to predation. 85 nests were probably predated. When broken eggs/young were found on the ground (sometimes partially eaten), this could be due to gusting wind, human interference and predation. Whole clutches were taken from nests and nests were damaged. Direct observations of attacks were never seen, but Black Kite *Milvus migrans* and Nile rats *Arvicanthusniloticus* were seen around the colony. Cuckoos *Chrysococcyus sp.* were seen trying to lay eggs in nests (twice). Predation by Nile rats (*Arvicanthusniloticus*) probably occurred at night.

**Table 1:** Nesting Success of the Village Weaver at Ahmed Yousif Farm during the first season (2011) and the second season (2012).

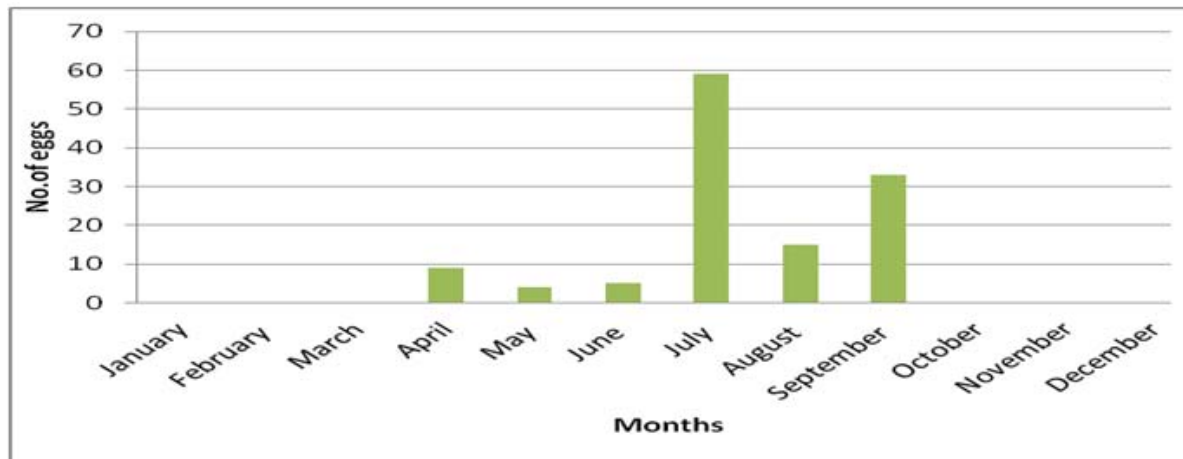
Counts	Total in 2011	Total in 2012
Nests built	150	200
Nests completed	130	180
Monitored nests in which eggs were laid	13	55
eggs laid	26	115
Mean clutch size	$2 \pm 0.16$	$2 \pm 0.16$
Eggs hatched	9	46
Proportion of eggs hatched per nest	0.345	0.652
Nests monitored to fledging	6	19
young fledged	9	46
Nesting success (young/eggs laid)	34.6%	40%

**Table 2:** The maximum number of nests found in different sites during the first season (2011) and the second season (2012)

Common English Name of Tress	Scientific Name	Maximum No of Nests	Seasons
Heglig tree	<i>Balanitiesaegyptiaca</i>	130	First season
Heglig tree	<i>Balanitiesaegyptiaca</i>	180	Second seasons
Palm tree	<i>Phoenix dactylifera</i>	112	Second seasons
Neem tree	<i>Azadirachtaindica</i>	16	Second seasons
Damas tree	<i>Conocarpuslancifolius</i>	570	Second seasons
Mahogany tree	<i>khayasenegalensis</i>	225	Second seasons
Sunut tree	<i>Acacia nilotica</i>	70	Second seasons
Safsaf	<i>Polygonumsp</i>	45	Second seasons
Sunut tree	<i>Acacia nilotica</i>	50	Second seasons



**Figure 1:** Number of eggs laid by the Village Weaver in the first breeding season (April to September, 2011) at Ahmed Yousif Farm



**Figure 2:** Number of eggs laid by the Village Weaver in the second breeding season (February- September, 2012) in the same tree used in the first season

#### 4. Discussion

In this present study Village Weavers bred during the rainy season in Sudan. [7] studying Village Weavers in West Africa in Richard -Toll (16° 25'N and 15°42' W) found their birds in the wild bred during the rainy season when it comes. In this present study Village Weavers started nest building before the start of rains, but the majority of nests were built several weeks after rain fell. Similar results were found in the Red Bishop *Euplectes orix* in South Africa. Rainfall prior to breeding seems to influence the number of nests built [10, 12]. Early nest building activities may be due to searching a site in a tree, or males had to build up to five nests to attract females (males are polygynous). Most eggs were laid in June but the greatest number of nests recorded was in August. [13] found that rain is an important factor initiating colony formation and establishing breeding synchrony within Village Weaver colonies. [11] said that the length of the Village Weaver breeding season is determined by the length of the rainy season. Breeding during the rainy season will ensure that half ripe grass seeds are abundant for nestlings.

Clutch size of the Village Weaver in this investigation was  $2.0 \pm 1.6$ . [19] found the clutch size of Village Weaver in captivity in Los Angeles to be 2.26, which is similar to our finding. The most common clutch size for Village Weaver in the field has been recorded as 2 followed by 3 and 1 [17, 1, 3 & 7]. So clutch size in this present study is in accordance with these findings. Nest success in this study was moderate (Tables I). Nests were destroyed probably by predators, (but actual predation was not seen), gusting wind and human interference. [14] had seen a snake (probably a sand snake, *Psammodromus*) taking young from nest built in *Sunt tree Acacia nilotica* tree at Alsablokah area.

#### References

[1] **Bannerman, D. A. (1949).** The birds of tropical West Africa. Volume 7. Edinburgh: Oliver and Boyd.  
 [2] **Cave, f. O. & Macdonald, J. D. (1955).** Birds of the Sudan. Edinburgh & London: Oliver & Boyd.  
 [3] **Chapin, J.P. (1954).** The birds of Belgian Congo. Part 4. Bulletin of the American museum of natural history 75b: 1-846.  
 [4] **Collias, N.E. & Collias, E.C. (1959).** Breeding behaviour of the black-headed weaverbird, *textorcuuiatusgraueri* (hartert), in the belgiancongo.

Proceedings of the first pan-african ornithological congress. *Ostrich supplement 3*: 233-241.  
 [5] **Collias, N.E. & Collias, E.C. (1964).** Evolution of nest building in the weaverbirds (ploceidae). University of california publications in zoology 73: 1-162.  
 [6] **Collias, N.E. & Collias, E.C. (1967).** A quantitative analysis of breeding behavior in the african village weaver bird. *Auk* 84: 396-411.  
 [7] **Collias, N.E. & Collias, E.C. (1970).** The behaviour of the West African village weaverbird. *Ibis* 112: 457-480.  
 [8] **Collias, N.E. & Collias, E.C. (1971).** Ecology and behaviour of the spotted-backed weaverbird in the kruger national park. *Koedoe* 14: 1-27.  
 [9] **Collias, N.E. & Victoria, J.K. (1978).** Nest and mate selection in the village weaverbird *ploceuscucullatus*. *Animal behaviour* 26: 470-479.  
 [10] **Craig, A. A. J. F. K. (1982).** The breeding season of red bishop *euplectes orix*. *Ostrich* 53: 112-114.  
 [11] **Da camara-smeets, M. (1982).** Nesting of the Village Weaver *ploceuscucullatus*. *Ibis* 124: 241-251.  
 [12] **Friedl T.W.P. (2002).** The effect of rainfall on the breeding behaviour of the red bishop *Euplectes orix*. *Ostrich* 73: 181-184.  
 [13] **Hall, J.R. (1970).** Synchrony and social stimulation in colonies of the black-headed weaver *Ploceuscucullatus* and vieillot's black weaver *Melanopteryx nigerrimus*. *Ibis* 112: 93-104.  
 [14] **Hamed, d. M. (2004).** Personal communication. University of khartoum.  
 [15] **Jacobs, C.H., Collias, N.E. & Fujimoto, J.T. (1978).** Nest colour as a factor in nest selection by female village weaverbirds. *Animal behaviour* 26: 463-469.  
 [16] **Lahti, D.C. (2003).** Ecology and evolution of breeding adaptations in the village weaver *Ploceuscucullatus*. Phd. Thesis; university of Michigan, ann arbor.  
 [17] **Moreau, R.E. (1942).** The nesting of african birds in association with other living things. *Ibis* 84: 240-263.  
 [18] **Nikolaus, G. (1987).** Distribution atals of sudan bird with notes on habitat and status. *Bonner zoologischemonographien*, n., 25.  
 [19] **Victoria, J.K. (1972).** Clutch characteristics and egg discriminative ability of the african village weaverbird *Ploceuscucullatus*. *Ibis* 114: 367-376.