

# Mate Attraction Dominates the Behavior of a Colonially Breeding Bird

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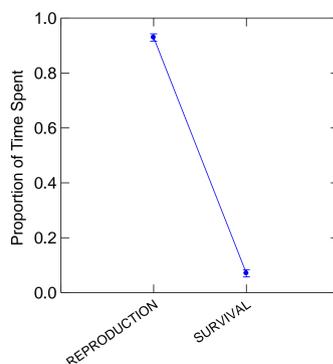
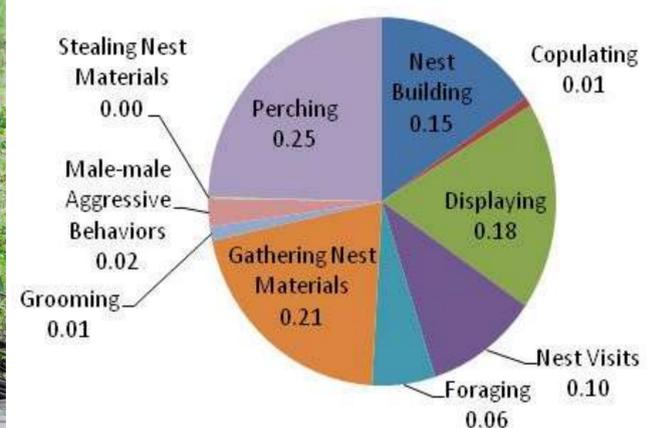
The African village weaver (*Ploceus cucullatus*) is a polygynous bird that nests in often large colonies. Male village weavers are noted for their spectacular nestbuilding and their flapping displays beneath their nests to attract mates. We video-recorded, coded (with JWatcher) and analyzed the behavior of a colony of village weavers in Awash National Park, Ethiopia, at the height of the breeding season. We found that male village weavers (1) spent most of their time on behaviors related to reproduction rather than survival; (2) spent a greater proportion of time on behaviors involving female choice (i.e., nest building and display) vs. male-male competition (i.e. territory defense and stealing nest material); and (3) performed their mating displays in synchrony. These results support predictions of intense sexual selection in polygynous animals, and suggest that village weaver colonies function as leks, or competitive mating displays to females.

## BACKGROUND

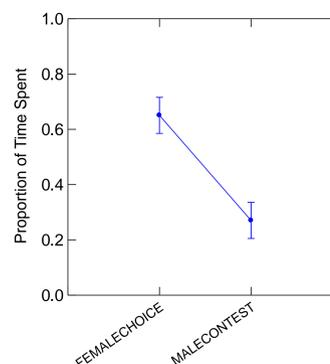
The African village weaver is a polygynous passerine bird. The male weaves a complex nest, and displays to females by hanging upside down from the nest and flapping his bright yellow wings. If the female accepts she lines the inside of the nest, copulates with the male and lays her eggs. The male continues to build more nests to attract more mates. If the female rejects the nest, the male tears down the nest and builds a new one. Males also establish and guard their territories aggressively, to prevent other males from mating with their females or stealing nesting materials. These weaverbirds breed in colonies and appear to breed in synchrony. Locating food and reducing the risk of predation and brood parasitism are thought to be the main advantages of the breeding colony in weavers. However, living in colonies also increases the competition for nesting space, resources, and females.



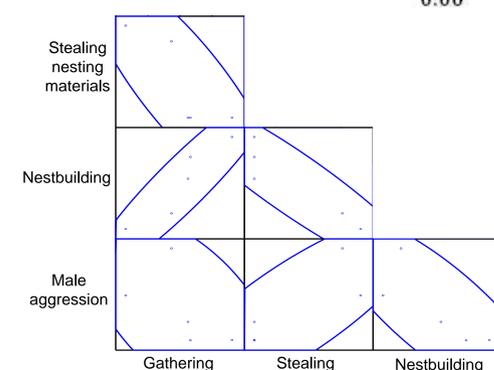
## Proportion of Time Budgeted to Various Behaviors



Male investment in different components of fitness (ANOVA,  $p < 0.0001$ )



Male investment in sexually selected traits (ANOVA,  $p = 0.003$ )



Tradeoff between male competition and nestbuilding (Pearson Correlations: -0.83, 0.93, -0.92, -0.56, 0.82, -0.81)



## Male breeding display synchrony:

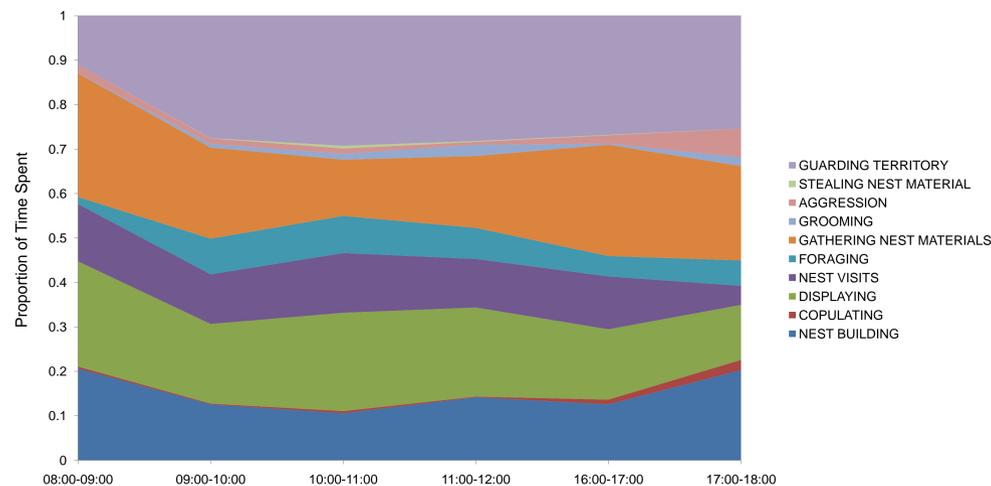
We developed a 0 – 1 display synchrony index

$$S_i = \frac{\sum n_{dt(t)}}{T}$$

Where  $S_i$  is the synchrony of display between male  $i$  and  $n_{dt}$  neighbors during time period of duration  $T$ , and  $n_{dt(t)}$  is the number of neighboring males in display at time  $t$ . Males in this colony displayed with a synchrony of 0.252, as compared with 0.128 predicted by chance alone.

## BEHAVIORAL REPERTOIRE

SURVIVAL	REPRODUCTION
<ul style="list-style-type: none"> <li>Foraging</li> <li>Grooming</li> </ul>	<ul style="list-style-type: none"> <li>Copulation</li> </ul>
	<b>FEMALE CHOICE</b> <ul style="list-style-type: none"> <li>Displaying</li> <li>Nest building</li> <li>Gathering nest materials</li> </ul>
	<b>MALE COMPETITION</b> <ul style="list-style-type: none"> <li>Aggression</li> <li>Stealing nest materials</li> <li>Guarding territory</li> </ul>



Activity by Time of Day

## MAIN RESULTS

(1) Male village weavers spend more time on behaviors related to reproduction than to survival.

- In polygynous mating systems, few males mate with all of the females; the rest of the males may not get to mate with any female (Andersson, *Sexual Selection*, 1994).
- Living in colonies increases that competition for nesting spaces, resources, and females.
- Because competition for mates is high, we would expect the village weaver to spend more time on behavior directly related to reproduction.

(2) Male village weavers spend more time on behaviors involving female choice (nest building and display) than male-male competition (territory defense and stealing nest material).

- Male village weavers use advertisement displays to attract females to their nests.
- Female village weavers choose the male that they will mate with partly based on the quality of the nest.
- The reproductive fitness of the male is directly dependent on these behaviors, and female choice seems to be the predominant mechanism of sexual selection in this species.

(3) Male village weavers perform their mating displays in synchrony

- Breeding and nest-building has been thought to be highly synchronized (Hall, *Ibis*, 1970).
- Females forage in flocks while males construct the nests; perhaps females are attracted at a distance by synchronous male displays
- Males may use the colony as a stage for synchronous competitive mate choice display (lek), via both the quality of nest construction and the intense flapping display.

(4) Investing in one's nest (gathering materials & building) is negatively correlated across males with direct competition (chasing other males & stealing their materials)

- Male weavers are known to engage regularly in aggression and stealing (Roulin, *Ostrich*, 1999).
- A tradeoff exists between nesting and male-male competition, such that males apparently invest in one strategy or the other but not both, at least during a given day.
- This effect is not simply due to lack of time, since both chasing males and stealing nesting material only accounted for a small fraction of any male's time budget.

