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INFLUENCE OF ROOSTING-POINT PROXIMITY ON VILLAGE WEAVERBIRD (*Ploceus cucullatus*) DAMAGE TO MAIZE IN THE SASA-AJIBODE AGROECOSYSTEM, IBADAN, SOUTHWEST NIGERIA

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Abstract
Village weaverbirds (Ploceus cucullatus) are major avian pests associated with significant cereal losses in Sub-Saharan Africa. In Southwest Nigeria, their colonial roosting behaviour and flock-foraging patterns pose substantial threats to maize production. However, the influence of environmental factors on the damage caused by weaverbirds to cereal crops in Nigeria is underreported. This study assessed the relationship between the distance of roosting points and maize damage levels in farmers' fields within the Sasa-Ajibode agroecosystem of the University of Ibadan. Four 30 m transects, spaced 5 m apart and positioned 7 m from the nearest farms, were used to assess maize-ear damage on a 0–2 scale. Roosting colonies were identified, and population estimates were conducted through nest counts. Results showed that approximately 25% of maize cobs were damaged at 10 m from roosting sites, aligning with farmers' reports of substantial losses. A total of 124 birds were estimated from 71 nests located on Bambusa vulgaris, Elaeis guineensis and Ficus spp. The findings revealed significant spatial influence of roosting proximity on crop depredation, which underscores the need for affordable, coordinated management approaches, such as automated noise repellents and wind-driven scarers. These results have implications for maize protection strategies and food security within peri-urban Ibadan.

Keywords: *Village weaver bird, Crop raiding, Maize production, Crop loss, Roosting, Nesting, Pest status*

Introduction

Bird depredation on field crops is a long-standing challenge across Sub-Saharan Africa, where cereal production is highly vulnerable to granivorous avian pests (Benjamin *et al*., 2024). Among the most problematic species is the Village weaverbird (*Ploceus cucullatus*), a colonial breeder known for forming dense nesting clusters on tall trees, often near farmlands (Camara-Smeets, 1982; Craig, 2010; Amadi *et al.,* 2024). The species' strong flocking behaviour, combined with its ability to track crop phenology, makes it a persistent threat to maize farmers during the grain-filling and milky stages (Maurice *et al.*, 2020; BirdLife International, 2020).

In Nigeria, maize (*Zea mays*) remains a staple crop of both economic and nutritional importance. Within Southwest Nigeria, smallholder farmers consistently report heavy losses from weaverbird raiding, yet empirical studies quantifying the farm-level drivers of damage remain limited (Orodele *et al*., 2023). While a few studies have examined landscape-scale factors influencing bird depredation (Oduntan, 2018; Badmus *et al*., 2024). Fewer still have investigated micro-spatial variables, particularly the proximity of roosting points to crop fields.

Farmers' reports indicate that maize fields located close to weaverbird roosting trees tend to experience disproportionately high damage levels. This is biologically plausible because weaverbirds make frequent, short-range feeding flights from their roosts to nearby food resources (Craig and Hartley, 2020). However, without quantitative evidence, pest-management strategies remain poorly targeted, often relying on labour-intensive and inefficient methods such as constant field guarding, clapping, or burning tyres (Suleiman *et al.*, 2021).

This study contributes field-based evidence by quantifying the extent to which distance from roosting points affects damage severity on standing maize ears in the Sasa-Ajibode agroecosystem. The findings provide essential information for developing cost-effective bird-control strategies appropriate for low-income farmers in peri-urban Ibadan.

Materials and Methods

Study Area

The study was conducted within the Sasa-Ajibode agroecosystem of the University of Ibadan, Ibadan, Nigeria (7°26' N, 3°54' E). The area comprises mixed-crop fields cultivated predominantly by smallholder farmers, interspersed with patches of trees commonly used as roosting sites by weaverbirds. The farmers actively engage in both wetland and dryland farming.

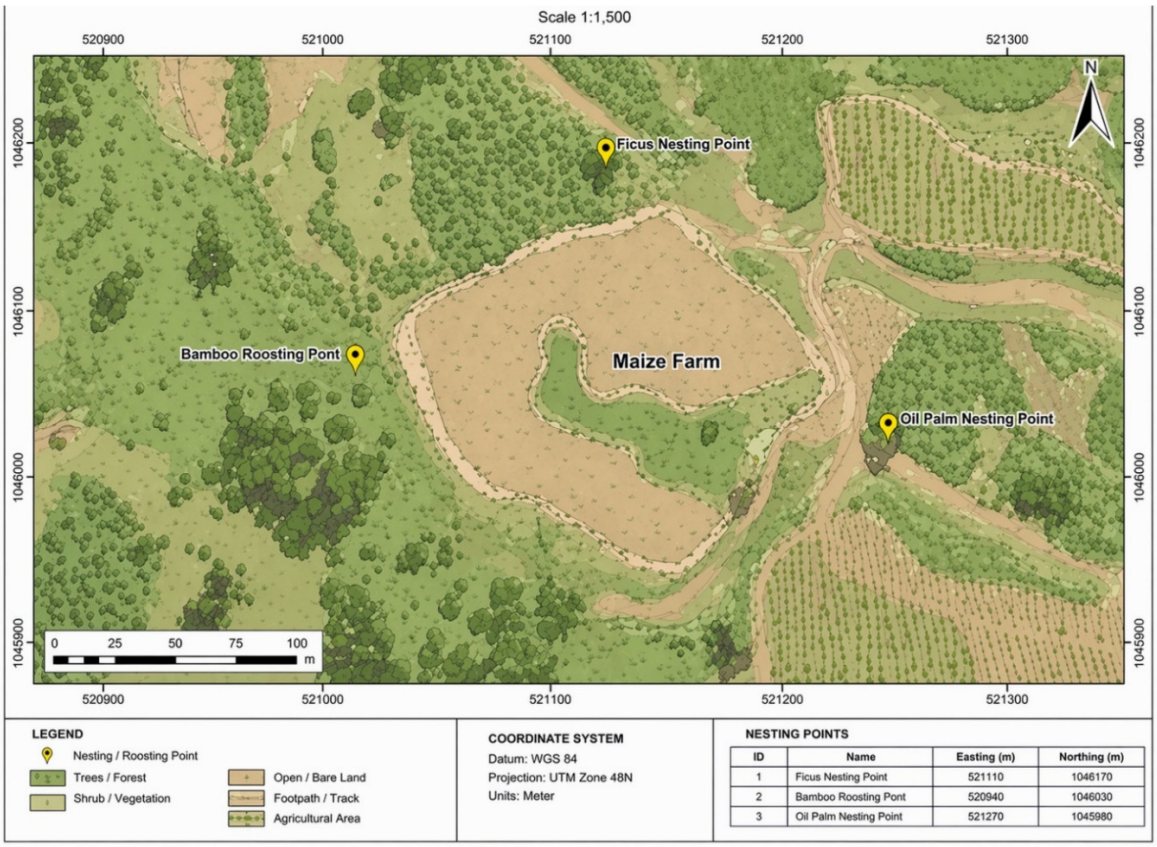

Fig. 1: Aerial map of the study area showing some habitat characteristics of the weaverbird in 2021

Field Sampling Design

Four transects, each 30 m long, were positioned 7 m away from the nearest maize field boundary. Each transect was spaced 5 m apart to ensure representative sampling. Data collected along each of the transects include the number of stands (NoS), the number of cobs per stand (NoCS), and the number of damaged cobs (NoCD). Maize ears were examined along each transect and scored for bird damage using a standardised 0–2 scale:

0 = No visible damage

1 = Partial damage (sheath tear/ grain exposure)

2 = Severe damage (Curled sheath/ Grain removal)

Roosting-Point Identification

Roosting trees were identified, and the number of nests on each tree was counted. A working density of 1.73 individuals per nest was adopted following the method of Yisau *et al*. (2014). The derived density was used to estimate the total population of village weaverbirds raiding the experimental plot.

Data Analysis

Damage frequency (%) was calculated for each transect line to assess the proximity effect to the active site of the village weaverbirds, which causes the damage, as follows:

$$\% \text{ Damaged} = \frac{Total\ NoCD}{Total\ NoCS} \times 100$$

Spatial patterns were examined by comparing damage levels across transects positioned at varying distances from roosting trees. The correlation coefficient was determined for the mean distance from the roosting point and the mean number of damaged cobs per stand to obtain a prediction equation. Additionally, frequency of counts, cross tabulation, and chi-square analysis were carried out using the survey data obtained.

Results

Roosting Characteristics and Bird Population

A total of 71 nests were recorded across three tree species: *Bambusa vulgaris* (bamboo), *Elaeis guineensis* (oil palm), and *Ficus* spp. The local population was approximated at 124 individuals (Table 1), indicative of an active breeding colony.

Table 1: Estimation of weaverbird population at Sasa-Ajibode farming community in 2020/ 2021 farming season

Trees	Tree status	Number of nests	Estimated Population*
Bambusa vulgaris	Roosting point	-	-
Elaeis guineensis 1	Nesting point	5	9
Elaeis guineensis 2	Nesting point	7	12
Ficus spp 1	Nesting point	16	28
Ficus spp 2	Nesting point	31	54
Ficus spp 3	Nesting point	12	21
Total		71	124

Note: * = Population estimated using the density of Yisau *et al.* (2014)

Effect of Roosting Proximity on Maize Damage

Maize fields located closest to the roosting points exhibited the highest damage levels. Approximately 25% of cobs at 10 m from the roosting trees were damaged - consistent with farmers' reports. Damage decreased gradually with increasing distance from the roosting points.

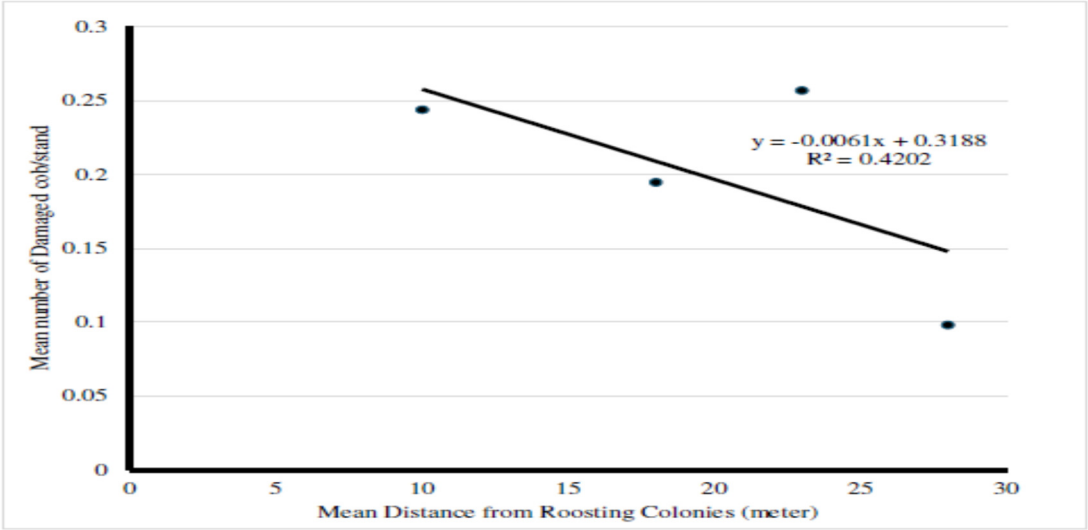

Fig. 2: Relationship between the mean of damaged cobs per stand and the mean distance from the bird's roosting point at 2 Weeks to harvesting

Discussion

The study demonstrates a clear relationship between roosting proximity and maize damage intensity. Similar patterns have been documented in East and Southern Africa (Jackson, 1974; Manikowski, 1987; Msoffe *et al*., 2008), where weaverbirds preferentially forage near their breeding colonies to minimize energy expenditure. This behaviour explains the observed damage gradient decreasing with distance from roosting trees.

The dominance of bamboo, oil palm, and *Ficus* as nesting sites aligns with previous findings that Village weaverbirds favour tall, flexible trees that can support large clusters of nests (Craig, 2010). The presence of such trees near farmlands directly increases pest pressure. Given the socioeconomic constraints of smallholder farmers, low-cost deterrent systems are essential. Automated noise repellents and wind-driven scarers have shown promise in similar contexts (Oduntan, 2018; Uzma *et al*., 2021). However, isolated use on single farms is often ineffective due to flock mobility; coordinated community-level action is therefore recommended.

The findings carry significant implications for food security in Ibadan, where maize contributes to household nutrition, poultry feed, and local commerce.

Conclusion

Village weaverbirds pose substantial threats to maize production in the Sasa-Ajibode agroecosystem. Damage levels strongly depend on the distance between maize farms and weaverbird roosting points. Management strategies must therefore incorporate spatial considerations when planning farm layouts and designing deterrent interventions. Affordable, farmer-friendly tools - such as automated sound devices and wind-driven scarers - should be promoted and implemented in a coordinated fashion for maximum impact.

Recommendations

Buffer zones should be established by discouraging the presence of roosting trees within 30–50 m of maize fields, adopting low-cost deterrents such as automated timing-based noise emitters and wind-powered scare devices, promoting community-level coordination to prevent the displacement of birds from one farm to another, and conducting seasonal monitoring of nesting activities to forecast periods of high risk. Further research should quantify economic losses and assess specific repellent systems within local environmental conditions.

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