



## The effects of bird species on farming activities within Osun grove, Osogbo, Osun State, Nigeria

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### Abstract

The effects of bird species on farming activities were assessed within the study area. Results showed that the effects were both positive and negative, though the positive impact could not be quantified. Summated Likert scale was used to analyse the negative effects of bird species on farming activities. Data obtained indicated that the most damaged crop by bird species was *Sorghum bicolor* (Guinea corn) (1.69) and the least damaged was *Dioscorea rotundata* (yam) (1.04) on the scale value. Of the crops damaged by birds in the study area occurred at pre-germination, post germination and fruiting stages 9.4, 28.1 and 62.5% respectively. Also about 3,165 of the 6,000 domestic fowls hatched from 1998 to 2002 were lost to predator bird species. This is a significant economic loss to the peasant farmers in the study area.

**Key words:** Crop damage, predator bird species, economic loss.

### Introduction

The class Aves includes all species of birds. It comprises of about 10,000 recognised species, which descended from one another through the process of adaptation by natural selection <sup>6</sup>. Over 850 species of them have been recognised in Nigeria <sup>3</sup>. This represents about forty percent of Africa's 2,200 different species <sup>9</sup>.

Birds are found almost everywhere both in villages and big cities and because they are very dynamic, they can easily be seen and observed for several purposes. For example, birds have been used recently to monitor Environmental Impact Assessment (E.I.A) because they are very sensitive to environmental changes. Some birds are generally believed by local people to be both indicators of season and time, and to some extent certain bird species can be used to predict the period of the day and night, e.g., cock crows at dawn.

Bird farming enables some people to be economically self reliant and has reduced the number of the unemployed human population in some society. They are also used as national symbols. For example in the Roman Empire, the symbolic eagle in Europe was the Golden Eagle <sup>6</sup>, while the Eagle is also used in the Nigeria's coat of arms to represent strength. Birds are regarded as divine messengers in primitive culture, thus to understand them is to understand divine revelations.

Despite the fact that bird populations are for the most part beneficial, there are occasions when individuals of certain species can seriously compete with human interest <sup>4</sup>. Some of these creatures create serious pest problems where they occur singly or in small group but especially when in large aggregation <sup>7</sup>. The objective of this study was to identify different bird species that constitute pest within Osun grove and their impact on farming activities within the study area.

### Materials and Methods

**The study area:** Osogbo is a Yoruba town in southwestern part of Nigeria. It is situated on latitude 7.70°N and longitude 4.5°E. It lies mainly in the deciduous forest area, which spreads towards the grassland of Ikirun, north of Osogbo. It experiences two main seasons like every other places in Osun State. These are dry and wet seasons. The wet season is between March and October with mean annual rainfall of above 1000 mm. Relative humidity is generally high, often greater than 60% during the day and not less than 70% at night. Air temperature is generally high (22–35°C).

**Source of data and sampling technique:** The data were obtained through on-site field assessment of the bird species in the farm locations and also via administration of structured questionnaire. The study area (Osun grove) is within two Local Government areas namely Osogbo Local Government area and Olorunda Local Government Area. Multi-stage sampling procedure was adopted in this study using a three-stage design.

**Stage I:** Osogbo Local Government Area was selected based on the fact that the protected part of the grove is located within this area.

**Stage II:** Three villages out of six were selected based on their notable involvement in agricultural practices near the grove.

**Stage III:** 50% of the farmers were sampled using simple random sampling. Questionnaires were administered on 125 farmers to elicit information on the impact of bird species on their farming activities.

Likert scale was used to analyse level of crops damaged by birds following the method described by Ghost <sup>5</sup>. The scale consists of four statements on the level of crops damaged by each bird to which each of the respondents reacted.

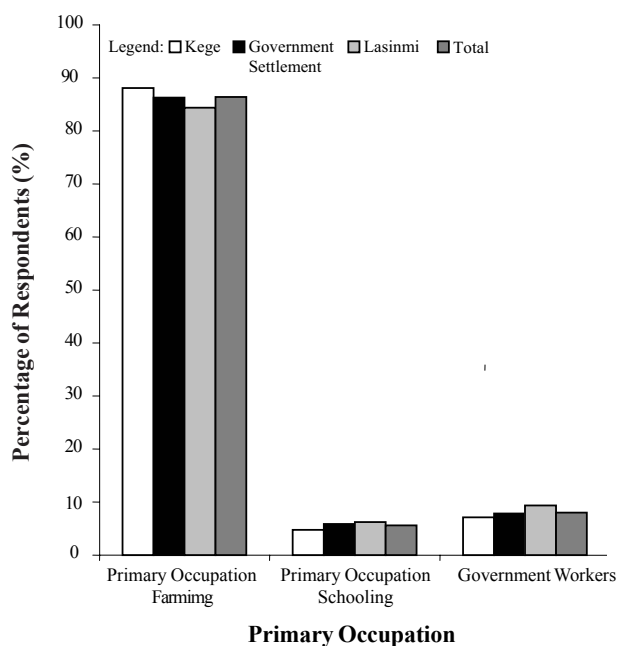


Figure 1. Occupational structures of the respondents in Osun grove.

The respondents indicated their degree of agreement or disagreement to the level of damage of crops by birds as observed in their farms. Each response was given a numerical score ranging from 1 for no destruction to 4 for total destruction. The total score of all respondents for the damage of a crop by each bird species was divided by the total number of respondents and the mean value used in computing the level of crops damaged by the pest bird species.

### Results and Discussion

Farming is the primary occupation of the respondents (Fig. 1). It is known that the study area is an ecological niche inhabiting about 21 bird species whose population frequency vary with months (Tables 1a-b). The feeding habits of some of the bird species have direct effects on farming (Table 2). However, this impact is both positive and negative. Some birds such as long-tailed nightjar, grey hornbill and yellow-fronted canary are insect eaters. They help to feed on insects that destroy cultivated crops, thus reducing the population of insect pests in the farm. Similarly, *Ardeola ibis* (cattle egret) is another insect eater with positive impact. It helps to reduce the number of ticks on cattle. They are always sighted where there are cattle. Conversely, some birds including *Mesopicos pyrrhogaster* (grey woodpecker) and *Mesopicos gocertae* (fire-bellied woodpecker) have negative impact in that they feed on insects residing inside tree trunks by using their beak to carve holes into the tree. Such crevices expose the tree to more hazards of infection, disease and damage of the wood.

Some birds feed on seeds. These include *Streptopelia semitorquata* (red-eyed turtle-dove), *Lonchura bicolor* (black manikin), *Tockus nasutus* (grey hornbill) and *Centropus senegalensis* (Senegal coucal) (Table 3). However, due to incomplete digestion in the alimentary canal of the bird, some of the seeds

Table 1a. Bird species in the study area classified based on their families.

Bird species	Zoological name	Family
Black kite	<i>Milvus migrans</i>	Acciptridae
Lizard buzzard	<i>Kaupifalcon monogrammicus</i>	Acciptridae
Grasshopper buzzard	<i>Bustastur rufipennis</i>	Acciptridae
Long-tailed night jar	<i>Caprimulgus climacurs</i>	Caprimulgidae
Red-eyed turtle dove	<i>Streptopelia semitorquata</i>	Columbidae
Grey hornbill	<i>Tockus nasutus</i>	Bucerotidae
Levailant cuckoo	<i>Clamator levallant</i>	Cuculidae
Yellow-fronted canary	<i>Serinus mozambicus</i>	Fringillidae
Senegal coucal	<i>Centropus senegalensis</i>	Cuculidae
Cattle egret	<i>Ardeola ibis</i>	Ardeidae
Double-spurred francolin	<i>Francolinus bicalaratus</i>	Phasianidae
Red-backed shrike	<i>Lanius colluris</i>	Liniidae
Mosque swallow	<i>Hirundo senegalensis</i>	Hirundinidae
Village weaver	<i>Ploceus cucullatus</i>	Ploceidae
Bronze mannikin	<i>Lonchura cucullata</i>	Esterilidae
Black mannikin	<i>Lonchura bicolor</i>	Esterilidae
Grey heron	<i>Ardea cinerea</i>	Ardidae
Grey woodpecker	<i>Mesopicos pyrrhogaster</i>	Picidae
Fire-bellied woodpecker	<i>Mesopicos gocertae</i>	Picidae
Wood chat shrike	<i>Lanius senator</i>	Laniidae
Black weaver	<i>Ploceus cucullatus</i>	Ploceidae

Source: Akinola and Inah<sup>2</sup>

are egested without being digested. Sometimes some of these undigested seeds fall on some tree species such as cocoa, kola-nut and mango where some of them (seeds) are known to germinate and grow as parasites on the host trees. If they are not quickly controlled, they can eventually develop to kill the host tree.

The grain eaters include *Francolinus bicalaratus* (double-spurred francolin), *Ploceus cucullatus cucullatus* (village weaver) and *Ploceus cucullatus* (black weaver). These bird species feed mostly on precious grains cultivated by the farmers. Farmers complained that right from the time of planting to harvesting, these birds destroy farms. Francolin damage crop by digging out planted seeds and feeding on them. Sometimes affected farmers had to reseed for more than six times before a particular stand matures (Table 4).

Village weaver birds defoliate the palm trees and use the leaves to build their nests. This defoliation does not allow the palm trees to yield fruit to their fullest potential. They also feed on grains, which the farmers termed to be disastrous to their economy. Most

Table 1b. Monthly frequencies of bird species in the study area.

Bird species	Dec	Feb	Jan	Total	May	June	July	Total
Black kite	157	93	68	318	0	0	0	0
Grasshopper buzzard	161	74	51	286	101	183	372	656
Double-spurred francolin	95	275	126	496	217	175	295	687
Long-tailed night jar	73	96	148	317	86	88	171	345
Redeye turtle dove	86	215	186	487	105	84	197	386
Grey hornbill	101	98	81	280	51	181	271	503
Levailant cuckoo	0	89	81	170	103	115	46	264
Yellow-fronted canari	95	56	106	257	70	95	117	282
Senegal coucal	214	172	117	503	221	158	261	640
Cattle egret	572	419	403	1394	62	91	94	247
Red-backed shrike	112	65	109	286	0	0	0	0
Mosque swallow	164	213	146	523	189	101	116	406
Village weaver	948	532	501	1981	1288	1103	1321	3712
Bronze mannikin	305	84	214	603	261	299	425	985
Grey heron	32	214	123	369	141	159	48	348
Black mannikin	90	32	79	201	125	115	101	341
Grey woodpecker	120	137	142	399	163	187	141	491
Fire-bellied woodpecker	147	193	133	473	94	102	84	280
Lizard buzzard	217	141	191	549	197	291	315	785
Woodchat shrike	327	223	278	828	0	0	0	0
Black weaver	1745	1013	1225	3983	1108	1127	2312	4547
<b>Total</b>	<b>5761</b>	<b>4434</b>	<b>4508</b>	<b>14703</b>	<b>4564</b>	<b>4654</b>	<b>6687</b>	<b>15905</b>

Source: Akinola and Inah<sup>2</sup>

**Table 2.** Food items eaten by bird species in the study area.

Bird species	Insects	Seeds	Grain	Flesh	Fruit
Black kite				*	
Grasshopper buzzard				*	
Double-spurred francolin			*		
Long-tailed night jar		*	*		
Redeye turtle dove		*			
Grey hornbill	*				
Levaillant cuckoo					
Yellow-fronted canari	*				
Senegal coucal		*			
Cattle egret	*				
Red-backed shrike	*				
Mosque swallow	*				
Village weaver			*		
Bronze mannikin	*				
Grey heron				*	
Black mannikin	*				
Grey woodpecker	*				
Fire-bellied woodpecker	*				
Lizard buzzard	*				
Woodchat shrike	*				
Black weaver			*		
Total	11	3	4	3	

\* = Food items eaten by birds.

**Table 3.** List of bird species and crops damaged.

Bird species	Paw-paw ( <i>Carica papaya</i> )	Guinea corn ( <i>Sorghum bicolor</i> )	Cocoa yam ( <i>Colocasia esculenta</i> )	Cassava ( <i>Manihot esculenta</i> )	Maize ( <i>Zea mays</i> )	Rice ( <i>Oryza sativa</i> )	Plantain ( <i>Musa spp.</i> )	Yam ( <i>Dioscorea spp.</i> )	Kola nut ( <i>Cola millennia</i> )	Palm tree ( <i>Elaeis guineensis</i> )
Double-spurred francolin	x	√	√	√	√	√	X	√	X	X
Black weaver	√	√	X	X	X	√	√	X	X	√
Village weaver	√	√	X	X	X	√	√	X	X	√
Fire-bellied woodpecker	X	X	X	X	X	X	X	X	√	√
Grey woodpecker	X	X	X	X	X	X	X	X	√	√
Senegal coucal	X	X	X	X	X	X	√	X	X	X
Red eyed dove	√	X	X	X	X	X	X	X	X	X

Legend: √= Attacked/Destroyed; X=Not Attacked/Destroyed.

**Table 4.** Stages of attack on crops by bird species in the study area.

Bird species	Paw-paw ( <i>Carica papaya</i> )	Guinea corn ( <i>Sorghum bicolor</i> )	Cocoa yam ( <i>Colocasia esculenta</i> )	Cassava ( <i>Manihot esculenta</i> )	Maize ( <i>Zea mays</i> )	Rice ( <i>Oryza sativa</i> )	Plantain ( <i>Musa spp.</i> )	Yam ( <i>Dioscorea spp.</i> )	Kola nut ( <i>Cola millennia</i> )	Palm tree ( <i>Elaeis guineensis</i> )
Double-spurred francolin		xΘ+	x	X	xΘ+	xΘ+		X		
Black weaver	x	x			X	X	x			x+
Village weaver	x	x			X	X	x			x+
Fire-bellied woodpecker									+	+
Grey woodpecker									+	+
Senegal coucal							x			
Red eyed dove	x									

Legend: X = Fruiting stage, Θ =Planting stage, + = After germination

farmers complained that because there is abundance of food, i.e., grains, the populations of the village weaver and black weaver are increasing at an alarming rate. Since the staple food for most people around the grove involves the use of grain, this has made it difficult to change the type of crops planted. Thus year in and year out, there is abundance of food in the study area for birds to feed on. This is supported by Afolayan and Ajayi<sup>1</sup>, who reported that the distribution of animals depends largely on availability of food. Their presence, however, makes the work of the farmers to be very tedious. They have made frantic efforts in order to ensure that they do not loose all their products to these pest birds. Sometimes they go personally and drive the birds away from their farms. They cannot also leave their crops to be harvested at will. Thus

harvesting is always tasking because they have to harvest crops on time in order to reduce the loss arising from the birds continual feeding on them.

Different stages of attack on crops and percentage of crop damaged at various stages are shown in Tables 4 and 5 respectively. Of the crops 9.38% were attacked at pre-germination stage while 62.5% were attacked at fruiting stage. Table 6 shows data generated through the Likert scale used in analysing the level of crop damaged by pest birds.

Raising of chicken is another minor source of income for farmers, which in the study locations has also suffered a set back due to predation activities of birds. About 3,165 of 6,326 of domestic chicks hatched between 1998 and 2002 were lost to birds of prey during these periods (Figs 2 and 3). This shows that almost 50% of the domestic chicks that were hatched were lost to birds of prey (Fig. 4). This is a significant economic loss to peasant farmers. Farmers have tried to curb this by dipping the feathers of newly hatched chicks into local dyes and also by putting them inside the cage for about two weeks after being hatched. This method has been a bit successful but it has not entirely stopped the

**Table 5.** Percentage of crops damaged by birds at various stages in the study area.

Crop	Stage of crop damaged		
	Pre-germination	Post-germination	Fruiting
Paw-paw ( <i>Carica papy</i> )			3
Guinea corn ( <i>Sorghum bicolor</i> )	1	1	3
Cocoa yam ( <i>Colocasia esculenta</i> )			1
Cassava ( <i>Manihot esculenta</i> )			1
Maize ( <i>Zea mays</i> )	1	1	3
Rice ( <i>Oryza sativa</i> )	1	1	3
Plantain ( <i>Musa spp.</i> )			3
Yam ( <i>Dioscorea spp.</i> )			1
Kola nut ( <i>Cola millennia</i> )			2
Palm tree ( <i>Elaeis guineensis</i> )			4
Total	3	9	20
Percentage	9.38	28.13	62.5

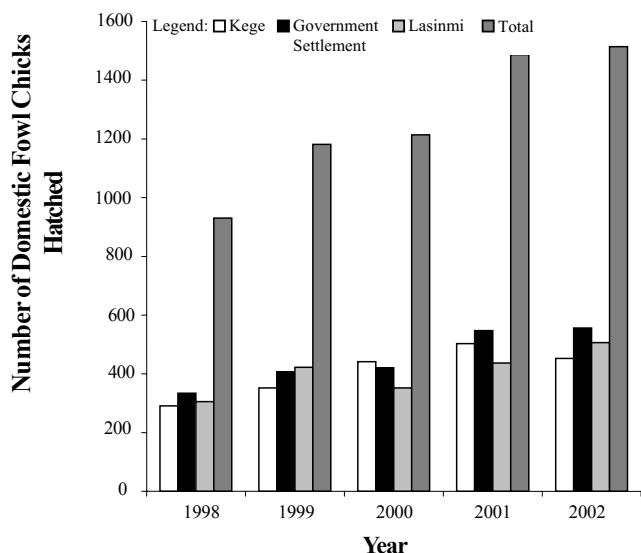


Figure 2. Total number of domestic fowl chicks hatched from 1998 – 2002 in the study location.

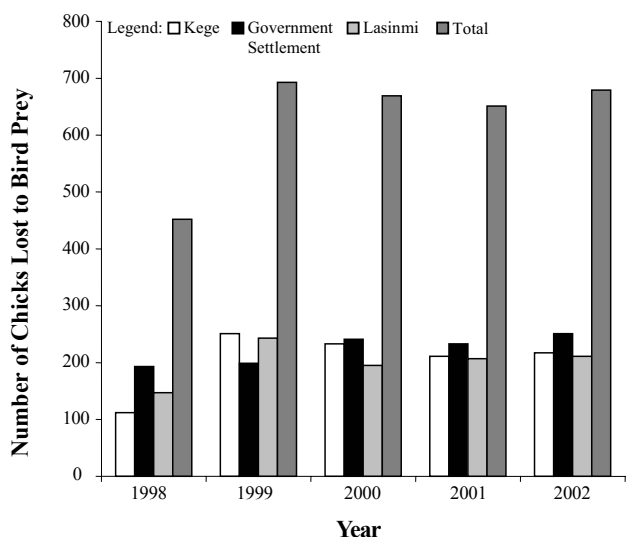


Figure 3. Total number of domestic fowl chicks lost to bird species (predators) in the study location.

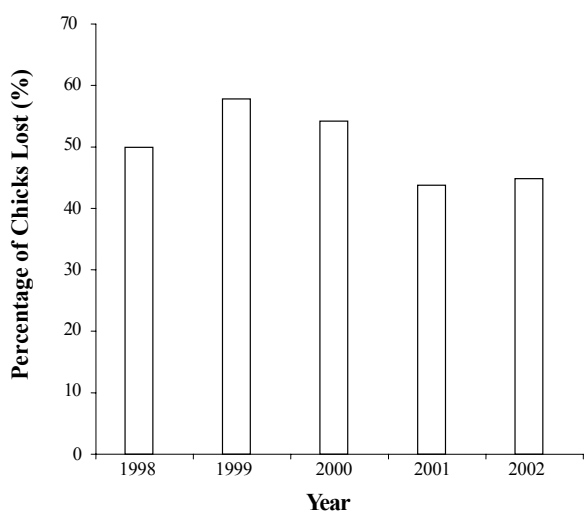


Figure 4. Percentage of domestic fowl chicks lost to bird species in the three study locations.

domestic fowls from being preyed upon by birds.

### Conclusions

The bird species have great impact on the farming activities within the study area. The effects are both positive and negative. Some of them are insect eaters. They feed on insects that destroy crops there by having positive impact via biological pest control, while some are grain eaters which cause serious set back on the yield of farm crops, by destroying them at various stages of growth. This always caused the farmers to harvest their crops within a particular period (earlier than where there is no pest activity).

The Likert scale was used in analysing the level of crops damaged by pest bird species (Table 6). *Sorghum bicolor* (Guinea corn) had the highest average value of 1.69 while *Dioscorea rotundata* (yam) had the least one (1.04). The most destructive bird-pest was *Ploceus cucullatus* (black weaver) (2.15) while the least destructive one was *Centropus senegalensis* (Senegal coucal) (1.09).

The bird species also caused reduction in the number of domestic fowls being reared on free range system by the villagers in the study area. Over 6,000 domestic fowls were hatched between 1998 and 2002 out of which about 3,165 were lost to birds of prey during these periods. This economic loss of over 50% of the domestic fowls to predator bird species in the study area is in conformity with a similar loss of about 53% of crops by farmers in Bauchi State, Nigeria, to Guinea fowls and *Quelea quelea* (Quelea birds)<sup>8</sup>.

### Recommendations

- 1) Extension agencies should educate farmers on how to preserve their harvested crops from being damaged by bird species.
- 2) Farmers should cultivate plant species that are not appealing to birds' species. These crops would not attract the pest bird species to the farms. When these measures are implemented, crops lost to bird species in the study area may be reduced to some extent and the crop yield would increase, thus increasing the joy of farmers in the Osun Osogbo grove via food security and income from sale of some of the harvested crops.

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