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AVIAN PESTS OF CEREAL CROPS IN RAINFOREST AND SAVANNA AGRO-ECOLOGICAL ZONES, ONDO STATE, NIGERIA

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ABSTRACT

The impacts of wildlife, especially birds, on agriculture cannot be underestimated, resulting into human-wildlife conflicts. This study identified avian pests of rice and maize in two agro-ecological zones of Ondo State, Nigeria. Information gathered from informal interviews and questionnaires administered to FADAMA farmers in local communities, together with direct observations made over exploratory transects, were used to survey avian pests. A total of 27 avian pest species of rice and maize belonging to nine families and three orders were recorded in the two agro-ecological zones in Ondo State. In the Savanna agro-ecological zone, a total of 18 avian pest species belonging to nine families and three orders were recorded whereas in the Rainforest agro-ecological zone, a total of 21 avian pest species belonging to eight families and two orders were recorded. Farmers revealed that bird damage is a serious problem which usually leads to reduction in yield, harvest quality and interest in production. Human bird scarers and scare crows were reported as the most effective control measures against birds' infestation and damage. There should be a synergized efforts towards Integrated Pest Management (IPM) involving farmers, crop scientists and ornithologists to ensure the survival of birds in agrarian areas as well as improve crop yield. This approach will not only help farmers but also conservationists.

Keywords: Avian Pest, Farmers, Cereal Crops, Integrated Pest Management, Agro-ecological zones.

INTRODUCTION

Management of wildlife as pests needs to be underpinned by good scientific understanding of the problems. Birds cause damage in many agricultural systems around the world (Cummings *et al.*, 1995; Bishop *et al*., 2003). Birds cause visual damage patterns to crops such as, direct damage when seeds or grains are eaten by birds; and indirect (mechanical) damage that occurs when a flock of birds is active in a rice or maize field, resulting in grains that fall to the ground (Tracey *et al.*, 2007).

Around the world bird pests such as starlings (*Sturnus vulgaris*) (Scharlemann *et al*., 2004), mynas (*Acridotheres tristis*), blackbirds (*Turdus merula*), wood–pigeons (*Columba palumbus*) (Sekercioglu *et al*., 2004), corvids (Corvidae) (Tews *et al*., 2004), honeyeaters (Meliphagidae) (Tracey *et al*., 2007), lorikeets (Loriinae) (Tracey *et al*., 2007), rosellas (*Platycercus* spp.), cockatoos and corellas (Cacatuidae) are known to cause significant damage to horticultural crops. Some of these species also cause damage to cereal crops (Daszak *et al*., 2000), feedlots and grain storage areas and are potential hosts of parasites and diseases. Over 100 bird species are regarded as pests in Australia and New Zealand (Tracey *et al*., 2005; Tracey *et al*., 2007), which cause significant costs to agriculture (Owens and Bennett, 2000) and pose unmeasured risks to the environment, human and animal health.

Rice and Maize are two of the most important cereal crops worldwide, has the potential to play a significant role in achieving global food security. However, several biotic and abiotic stresses seriously jeopardize this potential. According to Oerke (2005), some 15% of global rice production is lost to animal pests (arthropods, nematodes, rodents, birds, slugs and snails). The Global Rice Science Partnership (GRiSP) identifies birds as

the second most important biotic constraint in African rice production after weeds, based on farmer surveys in 20 African countries (IRRI *et al*., 2010). Despite current control practices, birds cause substantial losses to the African rice and maize sector.

The survival of birds in agrarian areas requires the attention of farmers, crop scientists and ornithologists in order to synergize efforts towards Integrated Pest Management (IPM). This approach will not only help farmers but also conservationists. Few avian studies have been carried out on farmland habitat in Nigeria to assess species composition in relation to farm management practices. The limited studies in Nigeria confirm that more research needs to be carried out on tropical farmland biodiversity and these have great potential to contribute to maintaining the populations of common and rare bird species through well-informed management of agricultural development in Nigeria. Hence, this research provides baseline information of immense importance to other researchers in the management of birds in the study areas. Ondo State is an agrarian community with no documentation on avian pests of agricultural crops. The main objective of this study wa 12 identify avian pests of rice and maize and ide... the control measures employed by farmers to reduce the impact of bird damage in the two agro-ecological zones.

MATERIALS AND METHODS

Study Areas

Ondo State is predominantly an agricultural State with over 60% of its labour force deriving their income from farming. The state lies between latitudes 5^0 45' and 7^0 52'N and longitudes $4^0$20' and 6^0 05'E (Figure 1). Its land area is about 15,500 Km^2. Ondo State is bounded on the east by Edo and Delta states, on the west by Ogun and Osun States, on the north by Ekiti and Kogi States and to the south by the Bight of Benin and the Atlantic Ocean. The natural vegetation is the high forest, composed of many varieties of hardwood timber such as *Melicia excelsa, Antaris africana, Terminalia superba, Lophira procera and Symphonia globulifera.* In the northern districts, the vegetation consists of woody savanna featuring such tree species as *Blighia sapida* (Sunshine Liberation Forum, 2011).

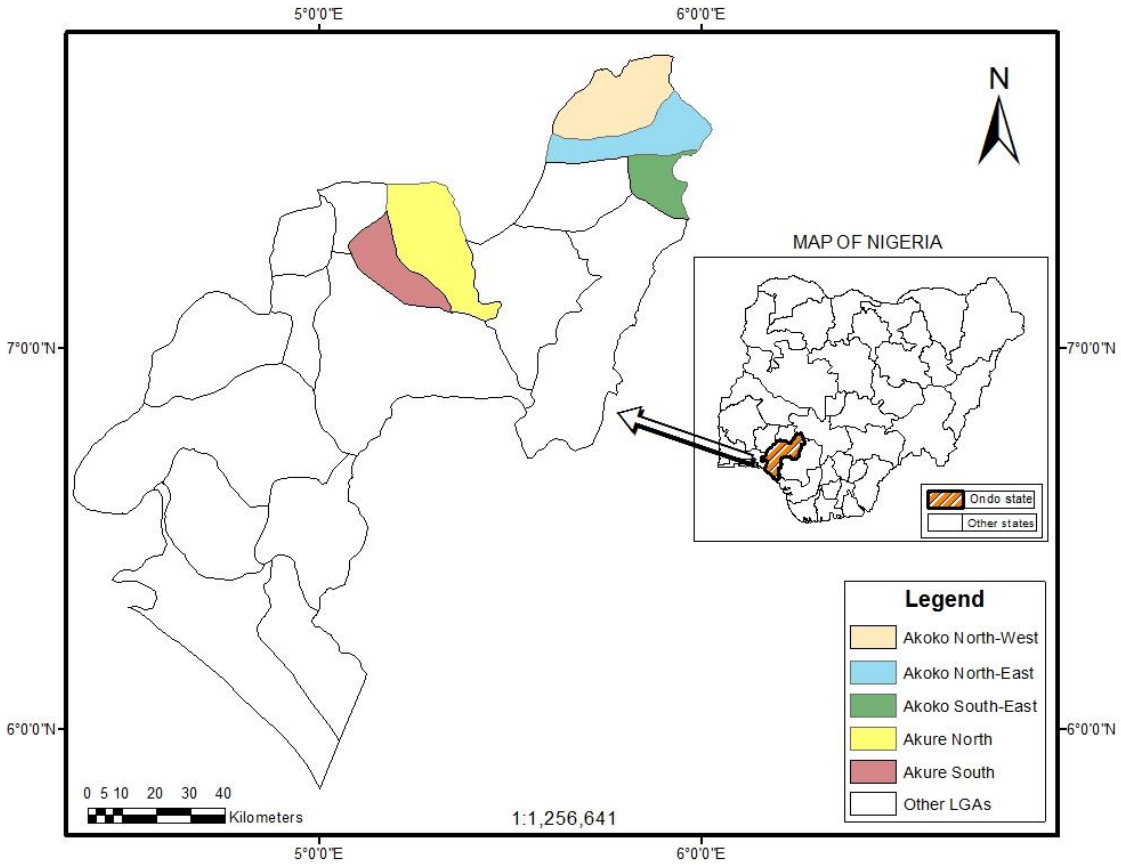

Figure 1: Map of Ondo State showing the study areas (Inset Map of Nigeria)

Data Collection

Questionnaire Survey

The survey instrument consisted of different questions that solicited information about farmers' demographic and socio-economic characteristics, birds affecting their crops, the stage that their crops are mostly vulnerable to bird attacks, level of Bird Pest Infestation (BPI) and damage, and the control measures employed to reduce bird damage. The self-administered questionnaires were administered to registered Fadama farmers comprising of rice and maize farmers in the two agro-ecological zones. The information obtained from the Fadama office, ADP (Agricultural Development Programme) Alagbaka, Akure revealed that the two zones selected for the study have 112 registered Fadama maize and rice farmers (Table 1).

Table 1: Population and sampling size

S/No	Senatorial Districts and Local Government Areas	Number of registered Fadama farmers	Number of respondents' selected	Percentage (%) of respondents' selected
1	**Ondo North (Savannah)**			
	Akoko North East	15	12	80
	Akoko North West	15	15	100
	Akoko South East	10	10	100
2	**Ondo Central (Rainforest)**			
	Akure North	48	36	75
	Akure South	24	19	79.2
	TOTAL	112	92	82.1

Field Observations

Ondo North and Ondo Central senatorial districts in the Savanna and Rainforest agro-ecological zones of the State were strategically selected for the study. In the Savanna zone, towns selected include; Akungba-Akoko, Ikare-Akoko, Isua-Akoko and Oba-Akoko based on the information received from ADP (Agricultural Development Programme), Fadama office, Alagbaka, Akure, Ondo State. In the Rainforest zone, towns selected include; Owo, Ogbese, Akure and Iju-Itaogbolu. The study was centred on rice and maize avian pests. The field study began early August, 2016 at the height of the season when rice and maize crops were being cultivated by farmers and direct visual observations could be made. Point and line transects counts for patch-scale ecological studies of terrestrial birds were combined to sample avian birds (Bibby *et al*., 2010). For each farm, 4 line transects of at least 500metres (depending on the length of the farm) each was laid with point stations along transect with varying distance of 100m between stations. Bird activity was observed for 10 minutes for each point station. For each day, survey was done for 6 hours period between 8:00am to 10:00am in the morning, 12:00pm to 2:00pm in the afternoon and 4:00pm to 6:00pm in the evening. All bird species sighted in the farms and their environs were also identified and compiled (Appendix 1)

Statistical Analysis

Data obtained were entered into excel (version 13) spread sheet prior to both descriptive and inferential statistics. Most of the data obtained through questionnaire were analysed descriptively using General Linear Model and presented in tables and bar charts. The software package R version 3.2.2 (R development core team, 2014) was used for statistical analyses.

RESULTS

Demographic and Socio-economic characteristics of respondents

The result of demographic and socio-economic characteristics of respondents shows that 93% of the respondents were males and 7% were females with the Majority between 41 to 50years of age. Majority (87%) were married and 56% were Christians, 43% had secondary education while 35% had primary education. Majority (63%) had between 6 to 10 years farming experience and 66% had inherited their farms which ranged from one to five hectares of maize or rice or both (Table 2).

Table 2: Demographic and Socio-economic characteristics of respondents

Variable	Percentage (%)
Sex	
Male	93
Female	7
Age (Years)	
18-25	4
26-40	34
41-50	42
Above 50	20
Marital status	
Single	3
Married	87
Divorced	1
Widowed	9
Religion	
Christianity	56
Islam	44
Traditional worshipper	0
Education	
No formal education	10
Primary	35
Secondary	43
Tertiary	12
Years of experience in farming	
1-5	11
6-10	63
11-15	9
16-20	14
Above 20	3
Form of land ownership	
Purchase	13
Inherited	66
Rent	21
Area of farm (hectares)	
1-5	100
6-10	0
11-15	0
Crop(s) constantly planted	
Rice	14
Maize	18
Both	68

Avian pest species of rice and maize identified in the two agro-ecological zones

A total of 27 avian pest species belonging to nine families and three orders were recorded in the two agro-ecological zones in Ondo State. However, 21 avian pest species belonging to eight families and two orders were observed in the rainforest zone and 18 avian pest species belonging to eight families and three orders were observed in the savanna zone (Table 3). The order "Passeriformes" constituted the predominant group representing 85.2% of the avian pest species while the families "Cisticolidae" and "Ploceidae" were lesser families representing 29.6% and 25.9% respectively of the avian pest species in the two agro-ecological zones (Table 4 and 5). Fourteen (14) avian bird species were identified directly on rice plants and 17 bird species on maize plants (Table 6).

Table 3: Diversity of avian pests in the two agro-ecological zones of Ondo State

Zones	Orders	Families	Species
Rainforest	2	8	21
Savanna	3	8	18

Table 4: Avian pests' species identified in the two agro-ecological zones of Ondo State

S/No	Common Name	Scientific Name	Order	Family
1	Village weaver	*Ploceus cucullatus*	Passeriformes	Ploceidae
2	Double-spurred francolin	*Francolinus bicalcaratus*	Galliformes	Phasianidae
3	Northern red bishop	*Euplectes franciscanus*	Passeriformes	Ploceidae
4	Bronze mannikin	*Spermestes cucullatus*	Passeriformes	Estrildidae
5	Black-and-white manikin	*Spermestes bicolor*	Passeriformes	Estrildidae
6	Orange-cheeked waxbill	*Estrilda melpoda*	Passeriformes	Estrildidae
7	Pin-tailed whydah	*Vidua macroura*	Passeriformes	Viduidae
8	Grey-backed camaroptera	*Camaroptera brachyura*	Passeriformes	Cisticolidae
9	Northern grey-headed sparrow	*Passer griseus*	Passeriformes	Passeridae
10	Black-necked weaver	*Ploceus nigricollis*	Passeriformes	Ploceidae
11	Yellow-mantled widowbird	*Euplectes macrourus*	Passeriformes	Viduidae
12	Yellow-mantled weaver	*Ploceus tricolor*	Passeriformes	Ploceidae
13	Red-eyed dove	*Streptopelia semitorquata*	Columbiformes	Columbidae
14	Laughing dove	*Streptopelia senegalensis*	Columbiformes	Columbidae
15	Blue-spotted wood dove	*Turtur afer*	Columbiformes	Columbidae
16	Red-headed quelea	*Quelea erythrops*	Passeriformes	Ploceidae
17	Black-winged bishop	*Euplectes hordeaceus*	Passeriformes	Ploceidae
18	Vieillot's black weaver	*Ploceus nigerrimus*	Passeriformes	Ploceidae
19	Yellow-breasted apalis	*Apalis flavida*	Passeriformes	Cisticolidae
20	Winding cisticola	*Cisticola galactotes*	Passeriformes	Cisticolidae
21	Whistling cisticola	*Cisticola lateralis*	Passeriformes	Cisticolidae
22	Tawny-flanked prinia	*Prinia subflava*	Passeriformes	Cisticolidae
23	Yellow-throated longclaw	*Macronyx croceus*	Passeriformes	Motacillidae
24	Olive-green camaroptera	*Camaroptera chloronota*	Passeriformes	Cisticolidae
25	Common bulbul	*Pycnonotus barbatus*	Passeriformes	Pycnonotidae
26	Short-winged cisticola	*Cisticola brachypterus*	Passeriformes	Cisticolidae
27	Red-faced cisticola	*Cisticola erythrops*	Passeriformes	Cisticolidae

Table 5: Avian pests species identified based on agro-ecological zones of Ondo State

S/No	Common Name	Scientific Name	Rainforest	Savanna
1	Village weaver	*Ploceus cucullatus*	√	√
2	Double-spurred francolin	*Francolinus bicalcaratus*	×	√
3	Northern red bishop	*Euplectes franciscanus*	√	√
4	Bronze mannikin	*Spermestes cucullatus*	√	√
5	Black-and-white manikin	*Spermestes bicolor*	√	×
6	Orange-cheeked waxbill	*Estrilda melpoda*	√	√
7	Pin-tailed whydah	*Vidua macroura*	√	×
8	Grey-backed camaroptera	*Camaroptera brachyura*	√	×
9	Northern grey-headed sparrow	*Passer griseus*	√	√
10	Black-necked weaver	*Ploceus nigricollis*	√	√
11	Yellow-mantled widowbird	*Euplectes macrourus*	√	√
12	Yellow-mantled weaver	*Ploceus tricolor*	√	√
13	Red-eyed dove	*Streptopelia semitorquata*	√	√
14	Laughing dove	*Streptopelia senegalensis*	√	√
15	Blue-spotted wood dove	*Turtur afer*	√	×
16	Red-headed quelea	*Quelea erythrops*	√	×
17	Black-winged bishop	*Euplectes hordeaceus*	√	√
18	Vieillot's black weaver	*Ploceus nigerrimus*	×	√
19	Yellow-breasted apalis	*Apalis flavida*	√	×
20	Winding cisticola	*Cisticola galactotes*	√	√
21	Whistling cisticola	*Cisticola lateralis*	×	√
22	Tawny-flanked prinia	*Prinia subflava*	×	√
23	Yellow-throated longclaw	*Macronyx croceus*	×	√
24	Olive-green camaroptera	*Camaroptera chloronota*	√	×
25	Common bulbul	*Pycnonotus barbatus*	√	√
26	Short-winged cisticola	*Cisticola brachypterus*	√	√
27	Red-faced cisticola	*Cisticola erythrops*	×	√

Note: √ Species is present
×Species is absent

Table 6: Avian pests species identified based on cereal crops under study

S/No	Common Name	Scientific Name	Rice	Maize
1	Village weaver	*Ploceus cucullatus*	√	√
2	Double-spurred francolin	*Francolinus bicalcaratus*	-	√
3	Northern red bishop	*Euplectes franciscanus*	√	√
4	Bronze manikin	*Spermestes cucullatus*	√	O
5	Black-and-white manikin	*Spermestes bicolor*	√	O
6	Orange-cheeked waxbill	*Estrilda melpoda*	×	√
7	Pin-tailed whydah	*Vidua macroura*	-	√
8	Grey-backed camaroptera	*Camaroptera brachyura*	-	√
9	Northern grey-headed sparrow	*Passer griseus*	-	√
10	Black-necked weaver	*Ploceus nigricollis*	√	√
11	Yellow-mantled widowbird	*Euplectes macrourus*	√	O
12	Yellow-mantled weaver	*Ploceus tricolor*	√	√
13	Red-eyed dove	*Streptopelia semitorquata*	√	O
14	Laughing dove	*Streptopelia senegalensis*	√	O
15	Blue-spotted wood dove	*Turtur afer*	√	×
16	Red-headed quelea	*Quelea erythrops*	√	√
17	Black-winged bishop	*Euplectes hordeaceus*	√	√
18	Vieillot's black weaver	*Ploceus nigerrimus*	√	-
19	Yellow-breasted apalis	*Apalis flavida*	-	×
20	Winding cisticola	*Cisticola galactotes*	√	√
21	Whistling cisticola	*Cisticola lateralis*	O	√
22	Tawny-flanked prinia	*Prinia subflava*	×	√
23	Yellow-throated longclaw	*Macronyx croceus*	-	×
24	Olive-green camaroptera	*Camaroptera chloronota*	-	√
25	Common bulbul	*Pycnonotus barbatus*	-	×
26	Short-winged cisticola	*Cisticola brachypterus*	-	√
27	Red-faced cisticola	*Cisticola erythrops*	-	√

Note: √ = Important pest species
O = Occasional pest species
× = Only perched on crop
= No activity

Table 7: Stages of crop (rice and maize) vulnerability to bird attacks

S/No	Common Name	Scientific Name	Milking stage	Maturity stage
1	Village weaver	*Ploceus cucullatus*	√	√
2	Double-spurred francolin	*Francolinus bicalcaratus*	-	√
3	Northern red bishop	*Euplectes franciscanus*	√	-
4	Bronze manikin	*Spermestes cucullatus*	√	-
5	Black-and-white manikin	*Spermestes bicolor*	√	-
6	Orange-cheeked waxbill	*Estrilda melpoda*	√	-
7	Pin-tailed whydah	*Vidua macroura*	√	-
8	Grey-backed camaroptera	*Camaroptera brachyura*	√	-
9	Northern grey-headed sparrow	*Passer griseus*	-	√
10	Black-necked weaver	*Ploceus nigricollis*	-	√
11	Yellow-mantled widowbird	*Euplectes macrourus*	√	-
12	Yellow-mantled weaver	*Ploceus tricolor*	-	√
13	Red-eyed dove	*Streptopelia semitorquata*	√	-
14	Laughing dove	*Streptopelia senegalensis*	√	-
15	Blue-spotted wood dove	*Turtur afer*	-	√
16	Red-headed quelea	*Quelea erythrops*	√	√
17	Black-winged bishop	*Euplectes hordeaceus*	√	√
18	Vieillot's black weaver	*Ploceus nigerrimus*	√	-
19	Yellow-breasted apalis	*Apalis flavida*	-	√
20	Winding cisticola	*Cisticola galactotes*	√	-
21	Whistling cisticola	*Cisticola lateralis*	√	-
22	Tawny-flanked prinia	*Prinia subflava*	√	-
23	Yellow-throated longclaw	*Macronyx croceus*	-	√
24	Olive-green camaroptera	*Camaroptera chloronota*	-	√
25	Common bulbul	*Pycnonotus barbatus*	-	-
26	Short-winged cisticola	*Cisticola brachypterus*	√	√
27	Red-faced cisticola	Cisticola erythrops	√	-

Note: √ = Yes; - = No

Frequency of avian pest occurrence across the two agro-ecological zones

Although, the mean abundance of avian pests of rice (118) was significantly lower than maize (235) in the Savanna and Rainforest with mean abundance of avian pests of 162 and 207 for rice and maize respectively. The frequency of avian pests' occurrence in the two agro-ecological zones shows no significant difference (Chi-square = 0.0066, P = 0.935) (Figure 2).

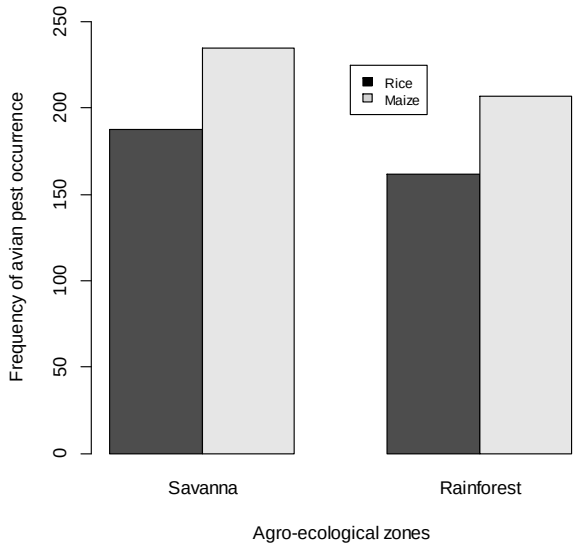

Figure 2: Frequency of avian pest occurrence across the two agro-ecological zones

Control measures employed to reduce bird damage

The study revealed that human bird scarer (85%) is the major control measure employed by farmers to reduce bird damage on their farms. Human bird scarers and Scare crows (52%) were reported to be mostly used to control birds' damage in the study areas. Other control measures employed by farmers included chemical poisoning of seeds, video cassette and the use of local concoctions (Figure 3).

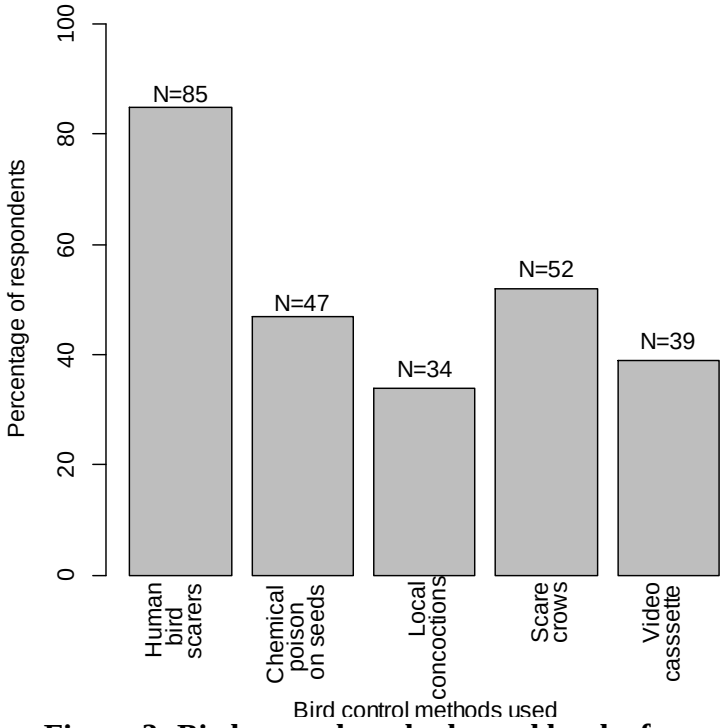

Figure 3: Bird control methods used by the farmers

Plate 1: Scare-crows used as control measure against bird damage

DISCUSSION

Avian pest species identified in the two agro-ecological zones

The Village Weaver (*Ploceus cucullatus) was* the most abundant avian pest in both maize and rice farms. Other avian pests observed in rice farm include the Bronze mannikin, Black-necked weaver, Yellow-mantled weaver, Vieillot's black weaver, Red-headed quelea, Yellow-throated longclaw and Orange-cheeked waxbill. Avian pests observed in maize farm include the Double-spurred francolin, Northern-red bishop, Black and white mannikin, Pin-tailed whydah, Grey-backed camaroptera, Red-eye dove, Winding cisticola, Yellow-breasted apalis, Tawny-flanked prinia, Red-faced cisticola and Northern-grey headed sparrow.The study revealed that weaver birds would consume rice and maize when available. *Ploceus cucullatus* were undoubtedly the major avian pest of both rice and maize in the two agro-ecological zones. This agreed with previous studies carried out in the south-western region of the country (Funmilayo and Akande, 2007). Rice is one of the five crops most frequently damaged by birds in the Western States of Nigeria (Funmilayo and Akande, 2007). Generally, birds were sighted and recorded more on maize farm than rice farm. There was no significant difference between the frequency of avian pest occurrence in the two agro-ecological zones for both Rice and Maize ($P=0.935$) while the correlation between the relative abundance and mean abundance of avian pests showed a significant relationship in the two agro-ecological zones ($P<0.01$).

Control measures employed to reduce bird damage

The cost of control must not exceed the cost of damage, thus, farmers must minimize cost of damage. Among the different control measures employed, the study revealed that human bird scarers and scare crows were the most effective methods. Catapult and slings were other prime equipment used to scare birds. Scare crows were made by putting together pieces of wood and mounting worn clothing on the wood to mimic the presence of a farmer on the farm. Some farmers tied old videotapes to stakes round the periphery of the farm. The videotape vibrated under wind pressure and the humming sounds produced as a result of the vibration deter birds. On some of the farms, the farmers also employed the use of juju (local concoctions) for scaring the birds away from the farms. Regardless of the above control methods usually employed, farmers in the study areas believed that present conventional techniques were not effective enough to control crop losses, and they demanded for modern scientific and sustainable techniques which may help them to reduce the losses more effectively. Effective control measures cause avian pest species to avoid farm areas which corroborated studies done by (Mason *et al*., 2009). Village Weavers cause extensive damage to both rice and maize. Some birds (such as Bronze manikin, Black and white manikin, Yellow-mantled widowbird, Red-eyed dove, Laughing dove and Winding cisticola) specialized in feeding on rice, some (such as Double-spurred francolin, Orange-cheeked waxbill, Pin-tailed whydah, Grey-backed camaroptera and Northern grey-headed sparrow) feed on maize while some (such as Village weaver, Northern red bishop, Black-necked weaver, Yellow-mantled weaver, Red-headed quelea and Black-winged bishop) feed on both. Birds mostly affect crops during early stages of germination and milking stages and also late stages of maturity and harvesting stages. Human bird scaring method was the most effective control method. Bird damage was perceived by farmers as a serious problem. Thus, there is great need to find sustainable solution for reducing crop damage. It is also important to introduce current control methods used in developed countries and adapt suitable ones for our local use. Conservation of avian pests in the study area demands the attention of farmers, crop scientists and ornithologists thereby promoting Integrated Pest Management (IPM).

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APPENDIX

Checklist of bird species identified in the study areas

S/No	Common Name	Scientific Name	Family
1	Village weaver	*Ploceus cucullatus*	Ploceidae
2	Double-spurred francolin	*Francolinus bicalcaratus*	Phasianidae
3	Northern red bishop	*Euplectes franciscanus*	Ploceidae
4	Bronze manikin	*Spermestes cucullatus*	Estrildidae
5	Black and white manikin	*Spermestes fringilloides*	Estrildidae
6	Orange-cheeked waxbill	*Estrilda melpoda*	Estrildidae
7	Pin-tailed whydah	*Vidua macroura*	Viduidae
8	Grey-backed camaroptera	*Camaroptera brachyura*	Cisticolidae
9	Northern grey-headed sparrow	*Passer griseus*	Passeridae
10	Black-necked weaver	*Ploceus nigricollis*	Ploceidae
11	Yellow-mantled widowbird	*Euplectes macrourus*	Viduidae
12	Yellow-mantled weaver	*Ploceus tricolor*	Ploceidae
13	Red-eyed dove	*Streptopelia semitorquata*	Columbidae
14	Laughing dove	*Streptopelia senegalensis*	Columbidae
15	Blue-spotted wood dove	*Turtur afer*	Columbidae
16	Red-headed quelea	*Quelea erythrops*	Ploceidae
17	Black-winged bishop	*Euplectes hordeaceus*	Ploceidae
18	Vieillot's black weaver	*Ploceus nigerrimus*	Ploceidae
19	Yellow-breasted apalis	*Apalis flavida*	Cisticolidae
20	Winding cisticola	*Cisticola galactotes*	Cisticolidae
21	Whistling cisticola	*Cisticola lateralis*	Cisticolidae
22	Tawny-flanked prinia	*Prinia subflava*	Cisticolidae
23	Yellow-throated longclaw	*Macronyx croceus*	Motacillidae
24	Olive-green camaroptera	*Camaroptera chloronota*	Cisticolidae
25	Common bulbul	*Pycnonotus barbatus*	Pycnonotidae
26	Short-winged cisticola	*Cisticola brachypterus*	Cisticolidae
27	Red-faced cisticola	*Cisticola erythrops*	Cisticolidae
28	Western grey plantain-eater	*Crinifer piscator*	Musophagidae
29	Variable sunbird	*Cinnyris venustus*	Nectariniidae
30	Senegal coucal	*Centropus senegalensis*	Cuculinae
31	Cattle egret	*Bubulcus ibis*	Ardeidae
32	Willow warbler	*Phylloscopus trochilus*	Sylviidae
33	Fork-tailed drongo	*Dicrurus admilis*	Dicruridae
34	African grey hornbill	*Tockus nasutus*	Bucerotidae
35	Black kite	*Milvus migrans*	Accipitridae
36	Grey-headed kingfisher	*Halcyon leucocephala*	Alcedinidae
37	Pied flycatcher	*Ficedula hypoleuca*	Muscapidae
38	Splendid sunbird	*Cinnyris coccinigastrus*	Nectariniidae
39	Northern black flycatcher	*Melaenornis edolioides*	Monarchidae
40	Green-headed sunbird	*Cyanomitra verticalis*	Nectariniidae
41	Ethiopian swallow	*Hirundo aethiopica*	Hirundinidae
42	Northern puffback	*Dryoscopus gambensis*	Malaconotidae
43	African paradise flycatcher	*Terpsiphone viridis*	Monarchidae
44	African thrush	*Turdus pelios*	Turdidae
45	Scarlet-chested sunbird	*Chalcomitra senegalensis*	Nectariniidae
46	Collared sunbird	*Hedydipna collaris*	Nectariniidae
47	Lesser striped swallow	*Hirundo abyssinica*	Hirundinidae
48	Lanner falcon	*Falco biarmicus*	Falconidae
49	African pied hornbill	*Tockus fasciatus*	Bucerotidae
50	Pied crow	*Corvus albus*	Corvidae

51	Rock martin	*Hirundo fuligula*	Hirundinidae
52	African green-pigeon	*Treron calvus*	Columbidae
53	Intermediate egret	*Egretta intermedia*	Ardeidae
54	Little swift	*Apus affinis*	Apodidae
55	African palm swift	*Cypsiurus parvus*	Apodidae
56	Piapiac	*Ptilostomus afer*	Corvidae
57	Black-bellied seedcracker	*Pyrenestes ostrinus*	Estrildidae