Hedgerows: A Conservative Measure for Farmland Birds

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Abstract: Hedgerows are row of shrubs with or without trees which form a boundary on farmlands and could be of benefits to wildlife especially birds. Seven maize farmlands with hedgerows around Laminga, Sabongari, and Rizek Villages in Jos East Local Government Area of Plateau state were surveyed for this study. Each farmland was (100 x 100m) with 1km apart from each other. The survey for abundance of farmlands birds was conducted from May 5th to August 5th 2012. Point count sampling method was used for census of birds on farmlands. Points were chosen by stratified random sampling with distance of 30 m between each point, 3 sample points were selected per farm and 10 minutes were spent at each point. Birds were surveyed in the morning (0600hrs-1000hrs) and evening (1600hrs-1800hrs) each day using pair of binoculars (Olivium; 8x42 mm) and bird identification book. A 20 x 20 m quadrat was placed at each cardinal point (30m distance) per farmland and number of trees and shrubs were counted. The results showed that shrub density and mean abundance per farm was 0.45; 0.79±0.18, trees density and mean abundance per each farm was 0.26; 0.75±0.03. Birds abundance was statistically significant with regards to numbers of shrubs on each farm (R²= 0.66, P= 1.917e-05) but not statistically significant with numbers of trees which is attributed to small sample size of trees present on each farm. Most farmlands in the study area have been intensively cultivated that the numbers of trees found at the margin were few and greatly dispersed.

Keywords: Conservative, Farmland birds, Hedgerows and Measure

INTRODUCTION

Farmland birds are bird species that depend largely on farmlands and hedgerows for their food and nesting site (Fuller, Gregory, Gibbons, Marchant, Wilson, Baillie, and Carter, 1995). They are used as indicator to assess the general quality of farmed environment because of their position in food chain (“The farmland bird Indicator” 2007). But, over the past four decades, these species have shown alarming declines in numbers and range which has strongly been linked to agricultural intensification such as removal of hedgerows for the cultivation of crops (Bright, Morris and Winspear, 2008).

Hedgerows are row of shrubs with or without trees; used to form boundaries on farmlands, barrier for livestock control, habitat and source of food for wildlife especially birds (Richard and Nina, 1987; Baudry, Bunce, and Burel, 2000). It can be planted or naturally arisen from destroyed forest or vegetation due to anthropogenic activities such as farming, lumbering, intensive use of pesticides, grazing etc. (Usieta,2008). Hedgerows not only conserved wildlife species, it also provides other ecosystem services such as, prevention of soil erosion through reducing wind and water run-off, intercepting the amount of pesticides, fertilizers and sediments that reaches the water course, reducing flooding and remove water faster from the ground through evapotranspiration (Baudry et al., 2000).

This study therefore investigates the effects of hedgerows on the abundance of farmland birds on cultivated maize farmlands.

MATERIALS AND METHODS

Study area

The study was carried out on farmlands around Laminga, Sabongari, and Rizek villages of Jos East Local Government Area (LGA), Jos Plateau State. Jos East lies along Latitude 9°56’N and Longitude 9°06’E and located North East of Jos. It has an area of 1,020 km² and a population of 85,602 according to National Population Census (NPC, 2006) which are predominantly farmers. The major crops cultivated are: Maize (Zea may), Guinea corn (Sorghum bicolour), Acha (Cucumis sativus), Garden egg (Solanum melongena) Irish potato (Solanum tuberosum), Sweet potato (Ipomea batatas), Cucumber (Cucumis sativus), and Tomatoes (Solanum lycopersicum). But this study only carry out survey on maize farmlands been the major crop that was planted when the survey was conducted.
RESEARCH DESIGN
A total of 7 farmlands (100×100m) each, 1 km apart from each other were surveyed for farmland birds and studied for hedgerows. The size of the farmlands was measured with Global Positioning System (GPS).

Avian survey
Avian survey was conducted from May 5th to August 5th, 2012. It was carried out in two sessions: morning (0600hours-1000hours) and evening (1600hours-1800hours). Point count sampling method was used in the bird census because of the terrain of the farmlands. Points were chosen by stratified random sampling with distance of 30 m between each point. 3 sample points were selected per farm. 10 minutes were spent at each point counting and observing the activities of birds on the hedgerows with a pair of binoculars (Olivum: 8×42 mm) and a field guide (Borrow and Demey, 2010) to confirm identifications. All birds seen and heard within the hedgerows were recorded.

Measurement of hedgerow across farmlands
A 20 × 20 m quadrat was placed at each cardinal point (30m distance) per farmland and the following vegetation measurements were taken.

- Number of trees.
- Number of shrubs.

Statistical analysis
R statistical software package was used for statistical analyses. General Linear Model was used with bird abundance as dependent variable and hedgerows (number of trees and shrubs) per farmland as predicting variables.

RESULTS
The sample size of shrubs was higher compared to trees, shrubs density and mean abundance per farm was (0.45, 0.79±0.18), while trees density and mean abundance per farm was (0.26, 0.75±0.03). Therefore, shrubs shows a significant effects on birds abundance (R² = 0.66, P= 1.917e-05).

DISCUSSION
Abundance of birds on farmlands was attributed to the numbers of hedgerows (shrubs and trees) and agricultural practices taking place on the farmlands. In this study, the numbers of shrubs were statistically significant compared to abundance of farmland birds (R² = 0.66, P= 1.917e-05) Figure 2. The numbers of shrubs increased as the numbers of birds was increasing. Shrubs serves as habitat, cover for protection, source of food and nesting sites. The numbers of trees were not statistically significant with regards to the numbers of birds found on each farmland. This was attributed to the small sample size, because weather condition such as rainfall, sunshine and humidity where been checked. Surveys carried out on rainy days were repeated. Surveys were carried out in the mornings and evenings when temperature was favourable for birds’ activities.

Most farmlands in the study area were intensively cultivated and the number of trees found at the margin were few and greatly dispersed. There were no continuous rows of trees that could serve as habitat. Most trees were in the open which tends to expose birds to predators and harsh weather conditions. A wide range of hedgerows provided habitats for more species of birds due to the possibility of meeting their numerous...
needs such as foraging, roosting and nesting (Usieta, 2008). In Britain, Hinsley and Bellamy (2000) reported that bird species abundance, richness and diversity showed a positive relationship with hedgerows. Dispersed hedgerows are unfavourable to most birds.

CONCLUSION
It is evident from this study that hedgerows are good predictor of abundance of farmland birds species. Hedgerow provides microhabitats for birds with protection from predators, harsh weather condition and provision of food resources. Farmers should be enlightened by extension workers on the importance of hedgerows to biodiversity and the environment at large.

ACKNOWLEDGEMENT
I sincerely appreciate AP Leventis for sponsorship and the financial assistance provided towards the success of this work; my supervisor, Dr. Adams Chaskda, for his immense contributions and inputs towards making this work a huge success, and finally to my classmates and all APLORI family for their inputs.

REFERENCES