Population Estimate of African Green Pigeon (*Treron Calvus*) in Ekiti State, Nigeria

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Abstract: The population estimate of African Green Pigeon in Ekiti State, Nigeria was investigated between 2014 and 2015. Point count method, through direct observation was adopted for the study. A total of five (5) locations (A =Aramoko/Ijero Ekiti, B=Isan Ekiti, C =Ikogosi Ekiti, D= Awo/Igede Ekiti and E= Iyemero Ekiti) were selected for the study. The number of counting points established at each station was based on the size of the forest. African Green Pigeon was observed to be present in seven out of the 20 locations visited. A mean total of the population estimates of 102 birds were counted during the wet and dry season of the study, 42 during the dry season and 60 counted during the wet season. Site A had the highest mean bird number (9 ± 4.24 and 15 ± 1.14 in the dry and wet seasons) while station E had the least mean number (8± 0.70 birds in the dry and 9± 2.82 birds in the wet season). It was concluded that the population of African Green Pigeon had greatly reduced due to the level of anthropogenic activities in the state. Therefore, for sustainability and to avoid loss of biodiversity, urgent conservation measures of the habitat management may help to conserve the declining population size of African Green Pigeon as well as other fauna and flora species of the forests in Ekiti state.

Keywords: Habitat, African Green Pigeon, Population decline, Conservation

Introduction

Birds are among the best-known parts of the earth's biodiversity, but quantified knowledge is far from complete for most species and this leads to an obstacle in conservation of birds (Aerts et al., 2008; Mason et al., 2005). Birds play a vital role in floral biology and pollination of plants; about half of the plants communities are clearly adapted to bird pollination as well as indicates environmental health and they have been considered as indicator species of inhabited areas (Colwell, 2010, Rajasheka and Venkatesha, 2011). Newton, (2004) acknowledged the fact that, in the last 400 years, human actions alone eliminated about 127 of approximate 9,672 modern species of birds. Activities like fire wood collection, logging, and agriculture, filling of wetlands, human settlement, building of infrastructures, roads, drainage construction, and industries among others have altered lots of habitats. Myer (1992) reported that, the loss of tropical ecosystem is of particular concern because the biome contains over half of the world species. Agricultural encroachment and unsustainable silvicultural practices has been implicated for these losses Blockhus (1992). Many studies have examined the impact of habitat loss and fragmentation due to agriculture on tropical bird communities (Naidoo, 2004 and Marsden 2006). Relatively, few studies have focused on bird communities in Africa (Soderstrom 2003; Mangnall and Crowe, 2003). Although, African Green Pigeon (*Treron calvus*) appears to be widely distributed, very few studies have been conducted on them (Ali, 1987) and some studies are mostly based on morphological adaptations (Bhattacharya 1994) but status survey had not been investigated. BirdLife International and IUCN placed African Green Pigeon (*Treron calvus*) under Least concern category owing to its supposed wide distribution and abundance but there is little information on it (Birdlife International 2010; and IUCN 2014).

The problem of forest fragmentation is extremely severe in West Africa due to rapid population growth and agricultural land use according to Manu, 2007. Nigeria has about 940 out of about 1,850 species of bird in Africa, out of which 4 species are endemic, while 5 are rare or accidental species (Lepage, 2006). About 37 of the bird species that occur in Nigeria are among the biological resources the world may lose as a result of threat from human related activities that takes its toll on the environment as reported by Ezealor, (2002).

Habitat change is the greatest driver of biodiversity loss, as natural systems are being degraded and converted into other land uses, often permanently according to millennium Ecosystem Assessment (2005). Habitat loss, destruction and degradation are the major threat to avian species richness and diversity. This loss of habitats can be as a result of man-made or natural causes. The conservation of bird species is challenging because birds generally, often travel across boundaries, making concerted conservation efforts hard to implement (Kirby, 2006). In time past, the population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a
continuing decline estimated to be >10% in ten years or three generations, or with a specified population structure). For these reasons the species is evaluated as Least Concern according to BirdLife International (2010). However, the species had been observed to be locally rare and gradually diminishing in numbers, therefore safeguarding the species should be a priority.

Considering the fact that the population status of African Green Pigeon (Treron calvus) in the wild is globally unknown, research has it that African Green Pigeon might be facing serious threat from habitat loss and hunting pressures (Walker 2007, Del Hoyo et al., 1997; and Gibbs et al., 2001). This is due to human activities which in the past century had rapidly altered ecosystems throughout the planet and these activities is still ongoing and the process will continue, forcing a decline in the population and threatening number of species with extinction (Gibbs et al., 2001).

Agbelusi (1995) and Ayodele (1999) discussed that no form of wildlife management can be possible or successful without any reliable background information on their population, habitat utilization, and species composition and conservation status of the animal or wildlife species concerned. Like other many other states in Nigeria, Ekiti State being an agrarian community suffer from impacts of agricultural encroachment and unsustainable silvicultural practices. Therefore, the study is aimed at presenting data on the status of African Green Pigeon (Treron calvus) in Ekiti State, Nigeria.

**MATERIALS AND METHODS**

**Study Area**

The study was conducted in Ekiti State located between latitude 7° 30’ and 8° 15’ North of the equator and longitude 4° 47’ and 5° 40’ of the Greenwich Meridian. The relief of Ekiti State consists of undulating plains. The climate is of the Lowland Tropical Rain Forest type with distinct wet and dry seasons with a total annual rainfall of about 1400mm with a low co-efficient variation of about 30% during the rainfall peak months, and with an average of about 112 rainy days per annum, Adebayo (1993).

The expected climax vegetation is the evergreen high forest composed of many varieties of hardwood timber, such as Terminalia superba, Khaya ivorensis, Melicia excelsa and Antiaris africana. The state is covered by secondary forest. To the northern part, there is the forest savanna. This is a woody savanna featuring such tree species as Blighia sapida, Parkia biglobosa, Adansonia digitata and Butyrospermum paradoxer; the natural vegetation has been very much degraded as a result of human activities, the chief of which is bush fallow farming system. An important aspect of the vegetation of the state is the prevalence of tree crops cultivated in large plantations (Ogunjemite, 2004).

**Reconnaissance Survey**

Reconnaissance surveys were conducted between December 2013 and January 2014, using extensive forest reconnaissance “Reece survey” of Walsh and White (1999). A total of 13 locations were visited during the reconnaissance survey to know the five locations, which is where the birds are readily available.

**Methods of Data collection:**

**Population Estimate of African Green Pigeon in Ekiti State.**

Point count method described by Ralph et al, (1993); Redman et al., (2009); and Knapp & Keeley, (2001) was used in collecting information on the population estimate of African Green Pigeon in 5 locations where African Green Pigeon were known to be present based on the reconnaissance survey. A total of 15 counting points were established in 5 counting locations/stations. Counting points had a fixed radius of 20m, which was permanently marked and revisited on each counting occasion. The study lasted for 6 months; 3 months in the dry season (February – April 2014) and 3 months in the wet season (May - July 2015).

The counting of bird was done twice daily, in the morning from 06: 00 hour to 09:30 hours and in the afternoon from 16:30 hour to 18:30 hours. Bird survey was carried out for 5 days in a week by allocating a day to a counting station. The actual counting lasted for 20 minutes during which birds seen or heard (calls/song) was recorded. The observation was aided with a pair of Olympus binocular (10 × 50). A field guide book on “Birds of Western Africa” by Borrow and Demey (2013) was used for proper identification of African Green Pigeon where necessary.

**Statistical Data Analysis**

Data obtained were analyzed using both descriptive statistics (frequency of occurrence and percentage) and analytical statistics (diversity index, abundance and T-test analysis). The student’s t-test analysis was adopted to compare sightings between the wet and dry season using PAST software, Hammer et al., (2001).

**Bird Population and Abundance**

A mean total of 97 birds were counted during the wet and dry season of the study, 46 during the dry season and 51 counted during the wet season. Total mean number of bird in Counting Station A in the dry period was 10 and 9 in the wet season, accounting for a standard error of 15±1.14 birds sighted in the dry season and ±4.24 in the wet season. Counting Station B forest patches, had a total of 29 birds, 9 sighted in
the dry and 14 in the wet period, 14±4.28 as standard error of birds sighted in the wet season and 3±0.25 for the dry season while counting Station C forest patches with 8 birds sighted in the dry and 12 birds recorded.

Figure 1: Spatial distribution of African Green Pigeon across the study site.
Source: field work 2015.

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Counting Station D forest patches produces a total of 10 birds sighted in the dry and 8 birds seen in the wet season accounting for a 10±0.70 birds sighted during the dry period and 3±2.82 in the wet period. A total of 9 birds in the dry and 8 birds in the wet season in station E were seen with standard mean of 0.9±2.82 in the dry and 3±0.07 in the wet season. The species richness and abundance varied between the five Counting Station possibly influenced by the variations in altitude and the type of vegetation, these are in agreement with the findings of forest birds by (Aerts et al. 2008; and Simons et al. 2006).

Table 1: Mean of the population (frequency) of Bird sighted in both Dry and Wet Season in Ekiti State.

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean (Wet)</th>
<th>Mean (Dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15±1.14</td>
<td>3±4.24</td>
</tr>
<tr>
<td>B</td>
<td>14±4.28</td>
<td>3±0.25</td>
</tr>
<tr>
<td>C</td>
<td>12±6.57</td>
<td>3±2.23</td>
</tr>
<tr>
<td>D</td>
<td>10±0.70</td>
<td>3±2.82</td>
</tr>
<tr>
<td>E</td>
<td>0.9±2.82</td>
<td>3±0.70</td>
</tr>
</tbody>
</table>

Source: field work 2015.

Seasonal Effect on Bird population
A total 47% of African green Pigeon populations were recorded in the dry season of this study February – April, 2015, while 53% was recorded for the wet season. Analytical statistics (T-test) conducted to
determine variation of seasonal sightings reveals that there is a strong significant difference in the wet and dry season sightings (Table 2). This means that season is a determinant factor when considering the population of the bird. It was generally observed from the result that African Green pigeon being frugivores solely depend on the forest tree species for the production of fruits and seeds which serves as food for the bird. The fruiting period of most forest trees occurs in the wet season and this directly has a significant effect on the population of African Green Pigeon seen on seasonal basis according to Meehan et al., (2005).

Figure 2: Seasonal Population Estimates of African Green Pigeon in the study Area.

Table 2: Student T-test for Bird sighted per Season

<table>
<thead>
<tr>
<th></th>
<th>Dry season</th>
<th>Wet season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>9.2</td>
<td>10.2</td>
</tr>
<tr>
<td>Variance</td>
<td>0.7</td>
<td>7.2</td>
</tr>
<tr>
<td>Observations</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Df</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>-0.690065559</td>
<td>0.528103096</td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>2.776445105</td>
<td></td>
</tr>
</tbody>
</table>

Since probability is less than 0.05. There is variation between the seasonal sightings at P>0.05. It means there is no significant difference between dry and wet season sightings.

Population estimate (%) of African Green Pigeon in Ekiti State

Counting Station B has the largest percentage count of 24%. This is unconnected from the fact that tradition plays a major role in conservation of natural biodiversity. “Igbo Efun” in Isan Ekiti is a small piece of land with different coloured soils and the area is traditionally bared for mining activities. The abundance of tree species for nesting and fruit production is one of the reasons for the presence of more species population and abundance; this is also confirmed by the findings of Hiwot (2007). Stations A and C are next with percentage count of 20% and 21% respectively. This is also high because of the tourism potential and conservation status in stations C. Counting stations D and E which have percentage count of 18% and 17% respectively.

Figure 3: Percentage of Bird Distribution in Both Dry and Wet Season in Ekiti State.

DISCUSSION

African Green Pigeon depend sole on high tree for breeding and due to habitat loss, most breeding sessions are being altered and this has a great consequence on the population of the species.

It is evident that the rate of forest degradation in the state has contributed to the gradual loss of the world’s avian species. The African Green Pigeon in Ekiti State suffers the effect of habitat loss, the African Green Pigeon generally are elevation dependent birds and this brings them in to conflict with man. The birds are observed to have close relationship with mostly indigenous trees in the wild and these trees are gradually going into extinction as a result of deforestation by man and changes in the Ecozone. Although the little forest patches with scattered indigenous tress still contribute to the current population size of African Green Pigeon in Ekiti State.

Therefore, for sustainability and to avoid extinction of African Green Pigeon, there is need for urgent conservation measures to preserve and embark on reforestation, planting only indigenous trees instead of the exotic species that has taken over most forest reserves and a general check against the noticed changes in the Eco-zone of Ekiti state.
CONCLUSION AND RECOMMENDATION

There is a global gradual decline and rapid reduction in the population status of African Green Pigeon due to the level of anthropogenic activities as reported by Walker 2007, Del Hoyo et al., 1997; and Gibbs et al., 2001).

Therefore, there is need for IUCN to review its status rating of African Green Pigeon from least concerned to endangered species to give the species the needed attention.

Also, the government of Nigeria should encourage and empower environmental and wildlife education, and to make stiffer penalties for perpetrators of environmental crime, most especially in areas of deforestation. Afforestation and a well-articulated avian research funding that support conservation should be encouraged as well.

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