Greener Journal of Agricultural Sciences

ISSN: 2276-7770

ICV: 6.15

Submitted: 16/12/2015

Submitted: 21/12/2015

Published: 29/01/2016

Subject Area of Article: Food, Ecology

DOI: <http://doi.org/10.15580/GJAS.2016.1.121615169>

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Research Article (DOI <http://doi.org/10.15580/GJAS.2016.1.121615169>)

Food and Feeding Ecology of Common Bulbul (*Pycnonotus barbatus*) in Leventis Foundation Agricultural School Ilesa South Western Nigeria

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ABSTRACT

This study examined the food and feeding ecology of the Common Bulbul (*Pycnonotus babatus*) in Leventis Foundation Nigeria Agricultural Training School, South Western Nigeria. Direct field observation method was used to collect data for 12 months on the food and feeding ecology of these bird species. The study area was divided into three compartments according to land use types (secondary forest, Farmland and Developed Area). The result showed that the Common bulbul consumed variety of plants and insects, *Ficus exaparataa* provided the highest food source (fruits and seeds) and they also consumed the leaves and flowers of the following plants *Moringa oleifera*, *Delonis regia* and *Boerhavia diffusa*. Tree species provided the highest food source of 66.7% and insects 33.7%. The result revealed that the Common Bulbul Utilized the three Compartments within the study area and that secondary forest provided highest food materials of 69.68%, Farmland 21.12% and Developed area 9.2%

Key Words: Food, Ecology, Habits, conservation.

INTRODUCTION

Common Bulbul has an extremely large range in Nigeria, the bird species occur in different numbers of habitats within the country's vegetation that range from the mangrove along the coast in the south to the Sahel in the north (Borrow, and Demey, 2012). This bird does not approach the thresholds for Vulnerable under the range size criterion (Extent of Occurrence <20,000 km² combined with a declining or fluctuating range size, habitat extent/quality, or population size and a small number of locations or severe fragmentation (*del Hoyo et al. 2005*). It has been widely demonstrated that food abundance and distribution are the primary determinants of foraging behaviour in bird species (Lan, et al, 2013). Optimal foraging behavior, however, may encompass other conflicting activities such as anti- predator behaviors that lead animals to trade food intake rate against other activities. Decision-making based on trade-offs may be influenced by the internal state of the animal (Krebs and Kacelnik 1991). Closely related birds nearly always show differences in the frequency of use of foraging maneuvers (Liu, 1992). Feeding is an essential activity in bird's life which is indispensable for their survival, but the demands of food acquisition impose significant challenges to both the physiology and behavior of birds. (Chen and Hsieh, 2002). The study of feeding ecology is thus imperative for understanding the species ecological adaptation to the environment and is also a crucial factor to be considered while examining their economic status. The Common Bulbul is very widely distributed throughout the Nigeria. These small birds form a complex and stable society and are very social even during breeding (Morrison et al, 1990). Studies regarding feeding of common Bulbul have not been undertaken in this part of the country hence, this study will provide baseline information that will help in the conservation of this bird species.

MATERIALS AND METHODS

Study Area

Leventis Foundation Agricultural Training School, Ilesa is located on the former premises of the former Farm Institute Ilesa in Tropical rain forest zone with central coordinates of 078.055' 032 N and 068.33.55 E. It is about 45 km from Oshogbo the capital of Osun of State, Southwest Nigeria. Two rivers run across the area creating a valley of watershed and the land mass is 360 ha including the administrative blocks. The area is 360-400 m above the sea level which is characterized by lateritic soils, sloping topography and hydromorphic valley bottom soils typical for most of the southwestern part of Nigeria. Annual rainfall varies between 1600 and 2000 ml, mean annual temperature is 30 °C and the relative humidity is not below 40 % during dry season and 100 % during the wet season (Mengistu, and Salami, 2007). The study site experiences a bimodal annual rainfall pattern, between April and July and from September to October, separated by dry season. Vegetation is predominantly rainforest, including wetlands along the rivers and *Panicum maximum* dominated open land. Among the common trees are *Celtis zenkerii*, *Triplochiton scleroxylon*, *Antiaris africana*, *Pycnanthus angolensis* and *Alstonia boonei* (Keay 1989).

Method

The study area was divided into three compartments according to land use types, Secondary Forest, Farmland and Developed areas, and observations of the diet and feeding ecology was carried in these compartments. Present study on feeding ecology of Common Bulbul (*Pycnonotus barbatus*) was made on 22 groups ranging in size from 2 to 8 individuals. The data was collected during a continuous period of 12 months from January, to December, 2014. Data was collected from the field by direct observation method and by using binocular (Bushnell 7 X 50) whenever found necessary (Anthal and Sadi, 2013). The observations were made early in the morning or late in the evening when common Bulbul are actively feeding with least disturbance to the birds. Individual groups of these birds were followed for periods varying from 2 to 6 hours. While following groups it was usually possible to keep some birds in view at all times, but rarely possible to see all members of the group together. During each scan, observations on the foraging habitat, type of feeding method employed, feeding session, size of the flock, type of diet and association with other bird species were recorded. Seasonal changes in the feeding habits of the Common Bulbul were studied too.

RESULTS

From this study the result showed that the Common Bulbul feed on variety of plants and insect species. Plant provided highest source of food source (66.7%) and insects (33.7%) *Ficus exaparataa* constituted the highest (8.7%) fruits consumed by Common Bulbul. The result revealed that these birds consumed flowers and leaves of *Moringa oleifera*, *Delonis regia* and *Boerhavia diffusa*. It was observed that the Common Bulbul change food with season, depending on the available preferred food in the season. From the result obtained it showed that Common Bulbul utilized the three compartments in the study area. The secondary forest provided the highest food source of 69.8%, followed by Farmland 21.12% and Developed area 9.2%

Table 1: Plant Species Consumed by Common Bulbul in the Study Area

Common Name	Scientific Name	Family	Parts Eaten	Observations (%)
Fig Tree	<i>Ficus Exaparata</i>	Moraceae	Fruits	8.7
Flame of the Forest	<i>Delonis regia</i>	Leguminosae	Flowers	2
Fig Tree	<i>Ficus Pilota</i>	Moraceae	Fruits	6.5
Hog Plum	<i>Spondia Mombin</i>	Anacardiaceae	Fruits	2.4
Neam	<i>Azadirachita indica</i>	<u>Meliaceae</u>	Seeds	3.4
Banana	<i>Musa spp</i>	<u>Musaceae</u>	Fruits	3.1
African Breadfruit	<i>Treculia Africana</i>	Moraceae	Fruits	1.6
Vervet Amond Tree	<i>Dallium guineese</i>	Leguminosae	Fruits	2
Rice	<u><i>Oryza glaberrima</i></u>	<u>Poaceae</u>	Seeds	2.2
Plantain	<i>Musa paradisiacal</i>	<u>Musaceae</u>	Fruits	1.9
Vitex donania	<i>Vitex donania</i>	Verbenacea	Fruits	1.1
Guava	<u><i>Psidium guajava</i></u>	<u>Myrtaceae</u>	fruits/seeds	1.1
Moriga	<i>Moringa Oleifera</i>	Moringacea	Leaves/flower s	4.7
	<i>Nuclea Dedirrichi</i>	Rubiaceae	fruits/seeds	1.8
Wild Mango Tree or Dilka	<i>irvingia gabolensis</i>	Irvingiaceae	Fruits	1.6
Cola	<i>Cola Giganta</i>	Sterculiaceae	Fruits	1.3
Star Apple	<i>Chrysopyllum albidum</i>	Sapotaceae	Fruits	1.2
	<i>Blighia sapida</i>	Sapindaceae	fruits	1
Wild vegetable	<i>myranthus arboreus</i>	Moraceae	Fruits	1.2
Medicinal plant	<i>Alhornea cordifolia</i>	Euphorbiaceae	Fruits	1.8
Fig Tree	<i>Ficus thonigi</i>	Moraceae	Fruits	2.1
	<i>Musanga cecropiodes</i>	Moraceae	Flower	2.8
Solalum spp	<u><i>Solanum pimpinellifolium</i></u>	Solanaccea	<u>seeds</u>	1.5
Maize	<i>Zea mays</i>	<u>Poaceae</u>	Seeds	2.3
Pepper	<u><i>Capsicum annuum</i></u>	Piperaceae	Seeds	2.1
<u>four o'clock family</u>	<i>Boerhavia diffusa</i>	Nyctaginaceae	<u>Flowers</u>	2.2
Guinea Grass	<i>Panicum maximum</i>	Gramineae	Seeds	2.7
				66.3

Table 2: Plant Species Consumed by Common Bulbul in the Study Area

Common Name	Scientific Name	Family	Parts Eaten	Observation (%)
Butter fly	Graphium pylades	Papilionidae	Adult winged	4.2
	Papillio cynorta	Papilionidae	Adult winged	3.1
	Amouris tartarreu	Danaidae	Adult winged	2.4
	Leptocisia marginea	Pieridae	Adult winged	1.8
	<i>Eritis melania</i>	Hesperidae	Adult Winged	1.8
	Anthene lachares	Hesperidae	Adult Winged	0.5
	Colotis evippe	pieridae	Adult winged	0.53
Termites	Macrotermes bellicosus	Termitidae	Adult winged	1.3
	Macrotermes natalensis	Termitidae	Adult winged	0.92
Green Bug	Nezera viridula	Pentatomidae	Adult winged	2.5
Caterpillars	Anapha venata	Notodontidae	Whole	0.77
	<i>Anaphe reticulata</i>	Notodontidae	Larva	1.4
	<i>Anaphe infracta</i>	Notodontidae	Larva	1.6
Moths	<i>Platysphinx phyllis</i>	<u>Sphingidae</u>	Ault winged	1,3
	<i>Ebodina lagoana</i>	<u>Tortricidae</u>	Adult winged	1.2
	<i>Phragmataecia fuscifusa</i>	<u>Cossidae</u>	Adult winged	2.6
Grasshoppers	<i>Acridium perigrinum</i>	Acrididae	Adult winged	1.4
	<i>Cyrtacanthacris aeruginosa</i>	Acrididae	Adult winged	1.6
	<i>unicolor</i>		winged	
	<i>Schistocerca gregaria</i>	Acrididae	Adult winged	1.7
			Adult winged	0.98
	<i>Zonocerus variegatus</i>	Pyrgomorphidae	Whole	0.41
Beetles	<i>Oryctes boas</i>	Scarabaeid	Whole	0.99
				33.7

Figure 1: Utilized compartments in the Study Area

DISCUSSIONS

From the result obtained in this study it showed that the Common Bulbul consumed variety of plant species and insects. Ali (1970) reported that the Red-vented Bulbul *Pycnonotus cafer* nipped open mature buds of mistletoe (*Loranthaceae*) and probed into the exposed corolla tubes for nectar. In Africa, species such as *Criniger barbatus* and *Andropadus tephrolaemus* took all their fruits from a perch, while another species *Andropadus latirostris* frequently used its wings to pick a fruit while fluttering or flying (Moermond 1990). Gleaning of fruits while airborne has also been recorded in the Square-tailed Black Bulbul *Hypsipetes ganeesa* in southern India (Balakrishnan, 2007). The most consumed plants materials are the fig trees (*Ficus Exaparata* and *Ficus Pilota*). This is in agreement with (Rana, 1970) who reported Bulbuls constituted the major frugivores of *Streblus asper* fruits in the mixed dry deciduous forests in India. From this study the fruits nectar and flowers were higher (66.3%) than the insects (33.7%) consumed. This is consistent with (Narang, 1989) who reported that fruits comprised a major proportion of diet for bulbul species (*Pycnonotus luteolus* and *Pycnonotus. cafer*) in the tropical dry evergreen forest in India. Ali, and Ripley (1996) who carried out similar research observed that 74 % of the feeding visits by birds on fruit bearing plants were made by two species of bulbuls, *Pycnonotus. cafer* and *Pycnonotus. luteolus* in a dry mixed deciduous forest in Western Ghats. In this present study, it was observed that the common bulbul consumed various species of insects, which is in agreement Hsu and Lin (1994) report that the Bulbuls consumed insects in the order Coleoptera was their main food sources in the oil palm plantation. The most preferable beetle was the pollinating weevil; *Elaeidobius kamerunicus* (*Curculionidae*) followed by rove beetle (*Staphylinidae*) and bark beetle (*Scolytidae*). Besides that, this bird also fed on leafhoppers (Order *Homoptera: Cicadellidae*), mosquitoes (Order *Diptera: Culidae*), bugs (Order *Hemiptera*) and ants (Order *Hymenoptera: Formicidae*). However, this bird species completely avoided feeding on insects from the order *Odonata*, *Orthoptera*, *Dictyoptera* and *s* in the oil palm ecosystem. Carlson and Owre (2009) also reported that Bulbuls in Haiwai fed on seeds, fruits and nectar of plant species, variety of insects and small reptiles. The rich proteins in invertebrates promote faster growth, but they are more difficult to obtain than plant food (Morton, 1973, Earle, and Oatley. 1983).

In this study, it was observed that the Common Bulbul consumed variation of food-intake through the day: Feeding in Common Bulbul occurs intermittently throughout the day. The intensity of food-intake gets accelerated from the awakening after the reconnection calls and then gradually slows down. During dry season days, they start feeding in early hours (0600 to 0630 hours) but during wet season days, it starts as late as 0730 hours. The intensity of food intake again increases around 1430 hours in the dry season and 1530 hours in wet season. They spend on an average 62.2% of the day time for feeding in dry season (average day length-12 hours) and 56.12% in wet season (average day length-11 hours). Light rain showers are no obstacle for feeding to these birds but feeding activities are restricted during heavy rainfall. Many species of birds spend more than 50% of their day foraging and feeding, particularly in the morning and evening (Wienecke and Robertson, 2002; Scott et al., 2003) purposely to reduce risk of predation, maximize energy store and increase social activities. It was also observed that change in season play a major role in the diet of these birds. Feeding depend on the available fruits, or seeds which are

suitable for consumption. These observations are in agreement with (Balakrishnan, 2010; Wilson et al, 2002). This is also consistent with Root and Hughes (2012) who reported that European raptors feed exclusively on animal food, apart from the few exceptional such as the honey Buzzard which like to eat soft fruits. Kirkwood (2009) noted that some bird species change their diet with season; species for which crops form a large percentage of their diet include Ducks, Geese and Doves etc. Farms provide three major sources of food for birds including; invertebrates of the soil, crops and naturally occurring plants and green vegetation of the growing plants (Li and Wu, 2005; Las-Casas et al., 2012). Avian species of various groups are excellently adapted for various means of obtaining food and many of them are food specialist (Wellicome et al., 2013).

From the field observations in this study, the Common Bulbul carried out its foraging activities in different ecosystem. It was observed utilize the three compartments in the study area Secondary forest, Farmland and Developed area. From the result obtained, 68.9% of the food consumed is obtained from the secondary forest, 21.12% from the farmland while, 9.2% from the developed Area. This result is confirmed by Corlett (1998) who noted that Common Bulbul using different foraging microhabitat and in diet have been used by these birds to reduced competition, which makes co-existence possible for closely related species. Common Bulbul is selective in their diet. From field observation, it was noted that these bird species does not consumed all fruits and insects in the wild. This is consistent with Royama (1970) who reported that many bird species often feed selectively, and utilizes such factors as prey palatability, nutritive value, abundance and prey size and hardness. It appears that, though birds were living in suburban areas, they were still more dependent on wild plant species for food as compared to other frugivorous birds, thus causing minimal harm to human crops (Dhindsa and Saini, 1994). The consumption of leaves and flowers of *Moringa Oleifera*, *Delonix regia* and *Boerhavia diffusa* was an interesting observation because leaf consumption is common not in birds. This is consistent with Anthal and Sadi (2013) who reported the consumption of leaves by Jungle Babbler (*Turdoides striatus sindianus*).

CONCLUSION

The results of this study clearly indicate that Jungle Common Bulbul (*Pycnonotus babatus*) consumed both plant and animal resources available to them in the study area. But, compared to insect's foods, the plant food, mainly fruits and seeds are consumed in larger proportions. The Common Bulbul therefore help in the dispersal of seeds and keep check on various harmful insects like grasshoppers, beetles, termites, caterpillars etc., which are injurious to the agricultural crops and stored grains. The Common bulbul is a useful species for farmers.

ACKNOWLEDGMENTS

The authors are very grateful to the staff and management of Leventis Foundation Nigeria Ltd and Agricultural Training School for their support during the period of the study.

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Cite this Article: Okosodo E.F., Orimaye J.O. and Obasogie F.O. (2016). Food and Feeding Ecology of Common Bulbul (*Pycnonotus barbatus*) in Leventis Foundation Agricultural School Ilesa South Western Nigeria. Greener Journal of Agricultural Sciences, 6(1): 010-016, <http://doi.org/10.15580/GJAS.2016.1.121615169>.