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Food preference and feeding ecology of the Northern grey-headed sparrow (*Passer griseus*) in Ilaro Ogun State Nigeria for sustainable tourism

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Abstract

A study on the food preference and feeding ecology of the *Passer griseus* in Ilaro Ogun state Nigeria for sustainable tourism was carried out for 12 Months In 2022. The study area was divided into three blocks: the residential block, the forest/farmland block, and the nonresidential block. Data on the diet and feeding ecology of 20 pairs of Northern Grey Headed Sparrows with individual sizes ranging from one to three were gathered over the course of a sustained 12-month period (January-December 2022). The Direct Observation method was used for this investigation. Field observations were conducted from dawn to dusk using binoculars (Bushnell 750) to observe when birds were actively feeding and causing the least disruptions. On each visit, we collected data regarding the foraging area, the method of feeding, the feeding session, the number of birds, the type of diets, and any associations with other bird species. The seasonal fluctuations in the bird's dietary habits were investigated. The results show that plant species resources (34.12%) and cereal crops (51%) made up these bird species' primary food sources, respectively. The result also revealed that *Ficus thonnigii* 7,1% was the highest plant resource fed upon, which was followed by *Ficus exsaparata* 6.3% and *Azadirictha indica* 5.1% respectively. The result of the cereal crops consumed showed that *Oryza sativa* 10.6% has the highest and this is followed by zea mays 9.6%, and panicum maximum 8.4%. The results of the insects fed upon by the *Passer griseus* indicates that *macrotemes bellicosus* has the highest frequency of observations at 4.2% and this followed by *Macrtemes natalensis* at 3.1, The result of habitat utilization showed that Residential Block has the highest percentage of utilization 40%, this is followed by forest/farmland 35%. The family composition indicates the plant species belong to 14 families with Moraceae having the highest number of plant species, this was followed by Fabaceae and Leguminoseae with 2 plant species respectively.

Keywords: Diet, Foraging ecology, home range, sustainable tourism

Introduction

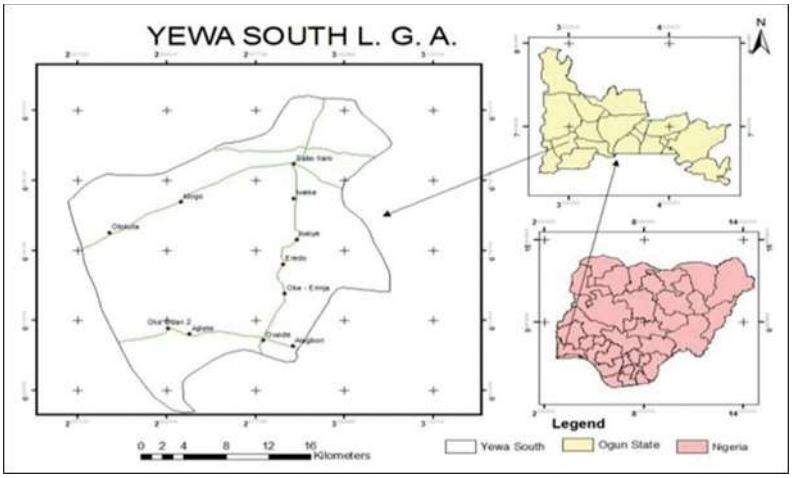
Parts of Africa, the Middle East, and Central Asia are home to the Northern Grey-headed Sparrow (*Passer griseus*), a species of sparrow. It is a little passerine bird, usually about 15 cm long. It features a white underpart, a chestnut-brown back, and a grey head. Although it will eat insects and other small invertebrates, seeds make up the majority of its diet. It can be found in brush, farming, and open grassland (Aerts et al, 2019). It inhabits the same position that the house sparrow does in Eurasia and can be found in a variety of open environments, particularly broad forests and residential areas (Clement, et al,1993). The adult northern grey-headed sparrow has a chestnut body with small white shoulder patches, chestnut wings, and a pale grey head with a white moustache stripe. Although the young birds lack the white wing patch and are a little duller, the sexes are similar. There are three subspecies, and they differ in their tones of plumage, particularly in terms of the darkness of their heads. In its range, this sparrow is mainly a resident, but there is some seasonal migration and groups of up to 50 birds can form beyond the spawning season. It constructs a cup nest in trees, thatch, or previous bird nests, and lays 2-4 eggs (Clement et al. 1993). Since it is present in human settlements and is utilized by pets, this study is crucial even if the conservation status is the least concern (LC). The people who use these bird species for spiritual purposes sometimes murder and damage them. As a result, this study's knowledge of nutrition and foraging ecology will aid in conservation planning and increase awareness of this species' prospects for tourism.

Materials and method

Study area

Ilaro is a town in the Yewa South Local Government Area of Ogun State, Nigeria. Its geographic coordinates are 6.8894°N, 3.0471°E. T, Ilaro is home to several notable institutions, including the Federal Polytechnic, Ilaro, and the Olabisi Onabanjo University Teaching Hospital. The town also has a vibrant market, where various goods and commodities are traded. Ilaro is known for its cultural heritage and traditional festivals, such as the Agemo Festival, which is celebrated annually to commemorate the town's historical ties to the ancient Egba Kingdom. The festival involves various rituals, dances, and performances, and is a major attraction for tourists and visitors to the town March through November mark the start of the region's rainy season, while December through February marks its end. Around 1700 to 2000 mm of rainfall per year. 26°C is the area's mean yearly temperature. The soils in the heavily worn basement complex formation zones in the rainforest zone of southwest Nigeria are primarily ferruginous tropical soils, a typical type of this species. In the higher reaches of the succession, the soils are old, well-drained, red, stony, and flinty. The majority of the topsoil in the region has a sandy loam texture. [5,6] The

region's native vegetation is a tropical rainforest with emergent growth, many canopies, and lianas. Milicia excelsa, Afzelia bipindensis, Brachystegia Nigeria, Lovoa trichilioides, Terminalia ivorensis, Terminalalia superba, and Triplochiton cleroxylon are a few of the trees that are most frequently seen in the area. However aside from the regions used for farming, the region's natural vegetation has now been reduced to grassland and secondary regrowth forest thickets.



Firgure1. Map of the study area

Data Collection

The research area was separated into three blocks for the purpose of this investigation the residential block, the forest/farmland block, and the nonresidential block. During the course of a sustained 12-month period, information on the food and feeding ecology of 20 pairs of Northern Grey Headed Sparrows with individual sizes ranging from one to three was acquired (January-December 2022). Direct Observation method from Okosodo, et al. (2016) was used for this investigation. Early in the early morning or late in the evening, when birds are vigorously feeding with the least amount of disturbance, field observations were done using binoculars (Bushnell 7*50), if appropriate. Individual pairs were observed for intervals ranging from 5 to 20 minutes. It was typically able to maintain some birds in view at all times, but it was rarely an option to see the entire group of birds at once. On each visit, we collected data regarding the foraging area, the method of feeding, the feeding session, the number of birds, the type of diets, and any associations with other bird species. The seasonal fluctuations in the bird's dietary habits were investigated.

Data Analysis

Descriptive statistics were used to examine the Data gathered from the observations. The makeup of the bird species families was investigated using the computer program PAST Model version 3.

Results

Despite being a granivore in general, the Northern Grey Headed Sparrow also consumed fruits, leaves, flowers, and insects. The results show that plant species resources (34.12%) and cereal crops (51%) made up these bird species' primary food sources, respectively.

The result also revealed that *Ficus thonnigii* 7,1% was the highest plant resource fed upon, which was followed by *Ficus exsaparata* 6.3% and *Azadirictha indica* 5.1% respectively Figure 3. The result of the cereal crops consumed showed that *Oryza sativa* 10.6% has the highest and followed by Zea mays 9.6%, and panicum maximum 8.4% Fig. 4. The results of the insects fed upon by the *Passer griseus* indicates that *macrotemes bellicosus* has the highest frequency of observations at 4.2% and this is followed by *Macrtemes natalensis* 3.1% Fig. 5. The result of habitat utilization showed that Residential Block has the highest percentage of utilization 40%, this is followed by forest/farmland 35% Figure 6. The family composition indicates the plant species belong to 14 families with Moraceae having the highest number of plant species, this was followed by Fabaceae and Leguminoseae with 2 plant species respectively Fig. 7.

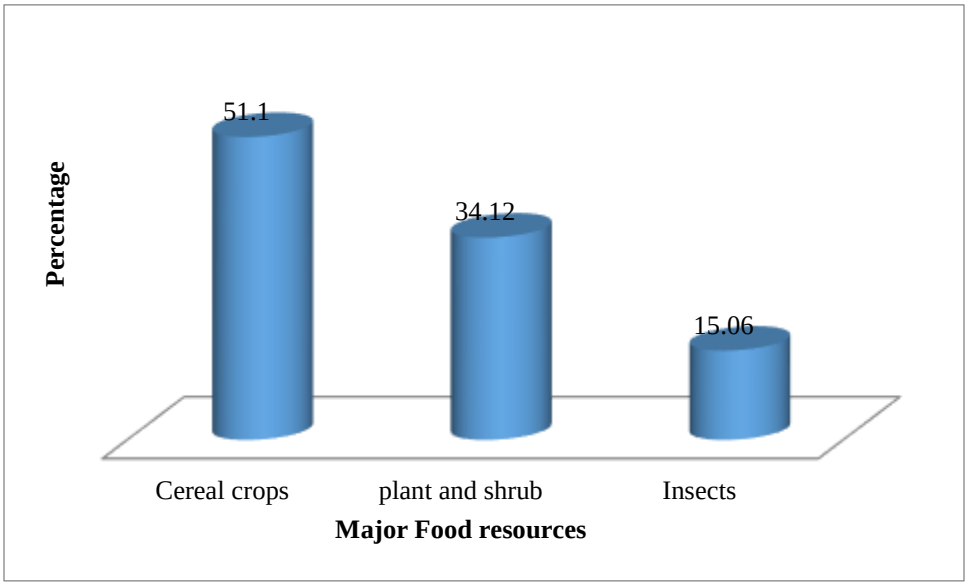


Figure 2. Major food resources consumed by *Passer griseus* in the study area

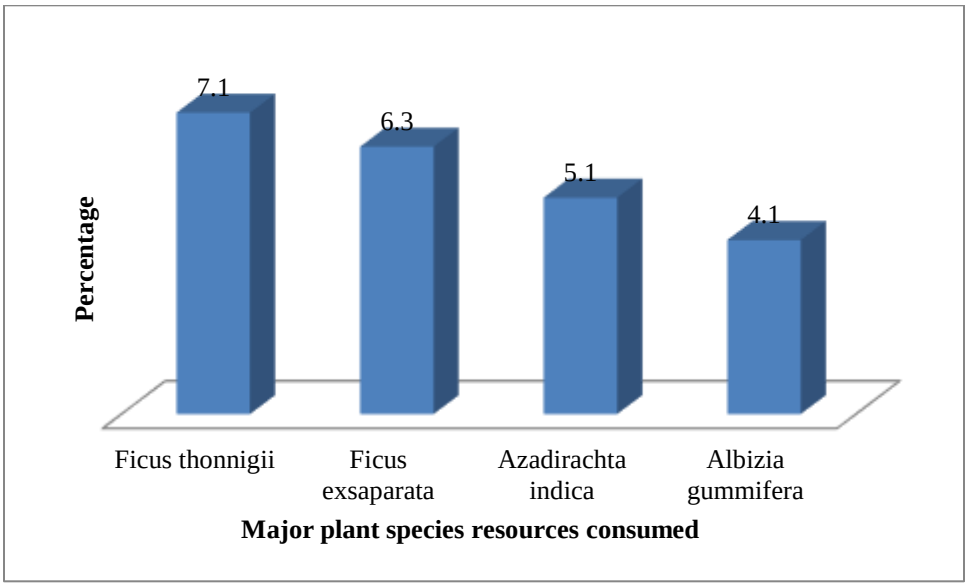


Figure 3. Major plant species consumed by *Passer griseus* in the study area

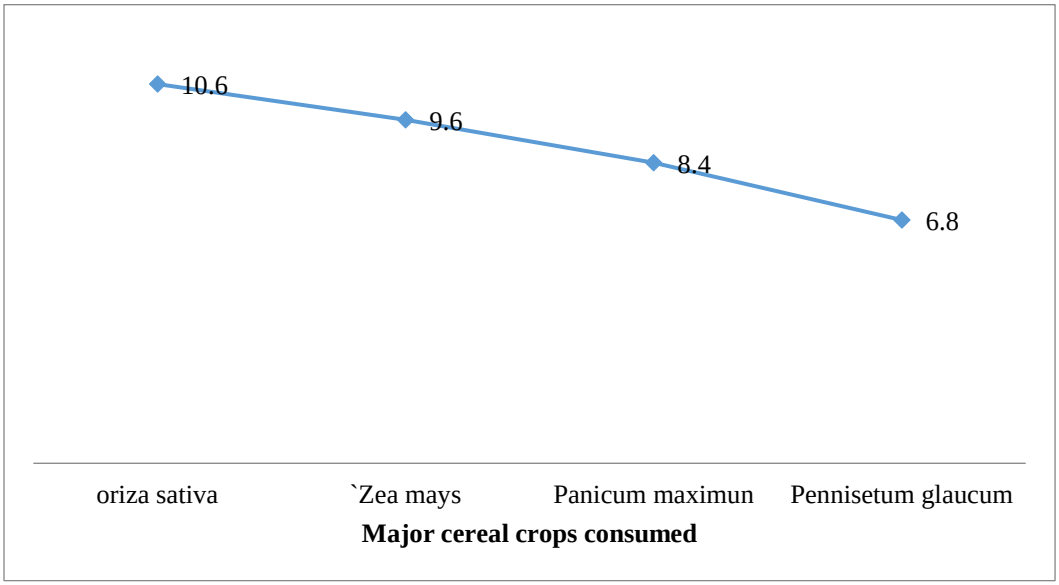


Figure 4. Major cereal crops consumed by *Passer griseus* in the study area

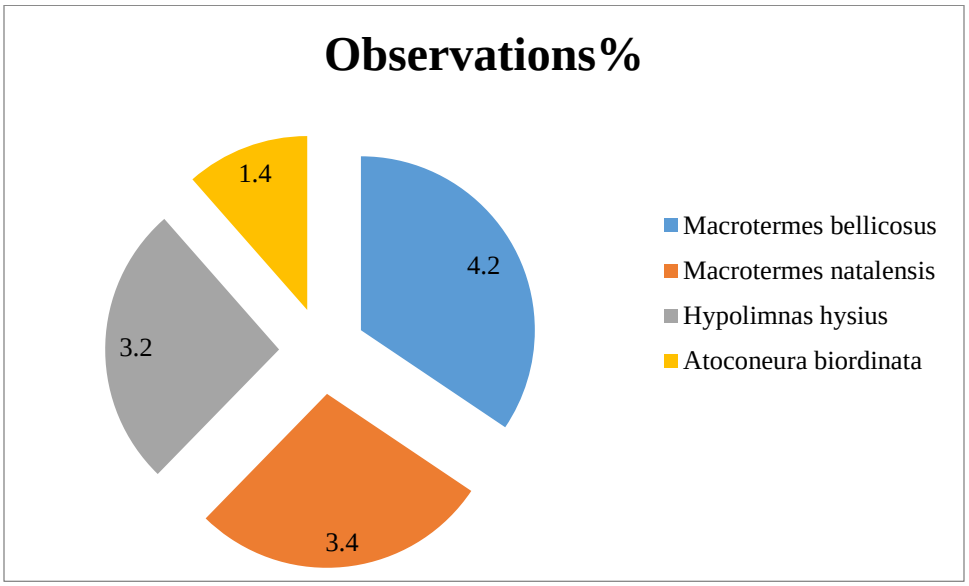


Figure 5. Major insects consumed by *Passer griseus* in the study area

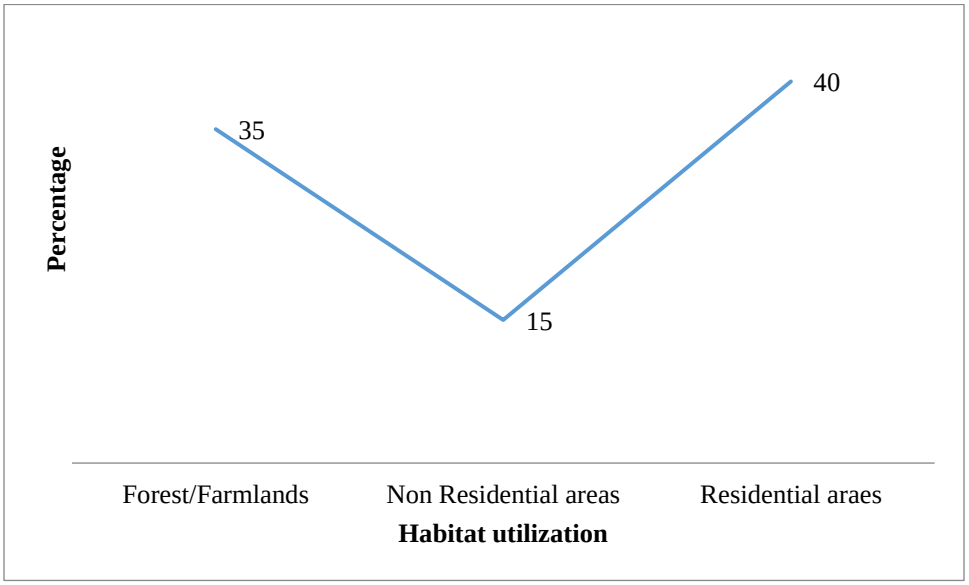


Figure 6. Habitat utilization by *Passer griseus* in the study area

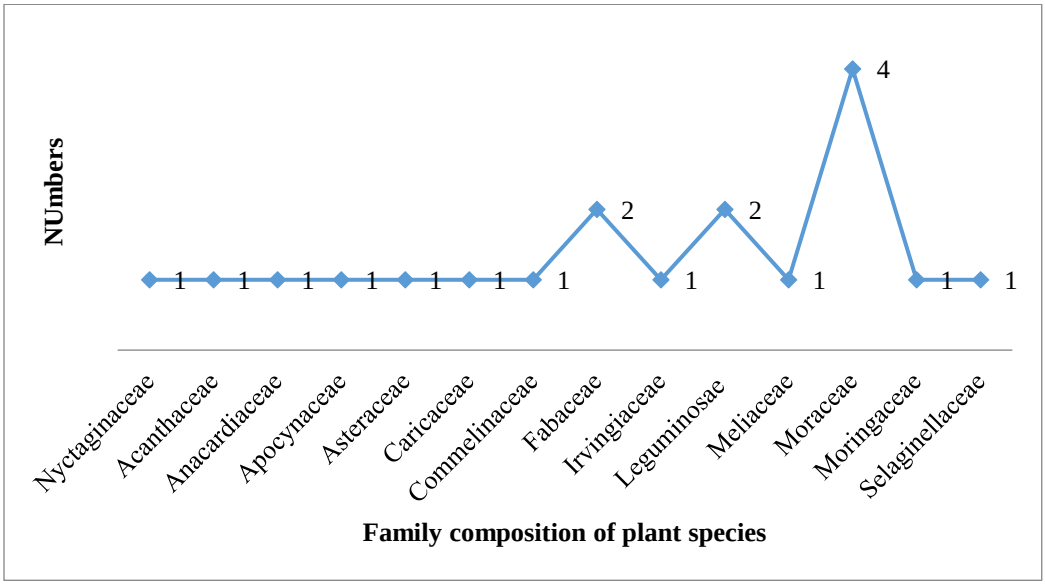


Figure 7. Family composition of plant species fed upon by resources in the study area

Discussion

The northern green-headed sparrow is primarily granivorous, meaning its diet consists mainly of seeds. But they will also feed on insects, fruits, leaves and flowers. They forage on the ground, in shrubs, and in trees. They will also visit bird feeders for seeds and suet. During the breeding season, they will feed their young insects and other invertebrates. This is supported by various authors Greenlaw, 2007 who reported that *Turdus pelios consumedinsects, earthworm and fruits of Azadirachta indica in South Africa.* Dorn,et al, (2011) reported that the insects formed the major bulk of *Turdus pelios* matter and numerically important ones were the Orthoptera, Coleoptera and Isoptera which accounted for almost two-thirds of the insects. They are known to feed on a variety of seeds from grasses, weeds, and other plants. They may also occasionally eat insects, especially during the breeding season when they need more protein for egg production and feeding their young. Feeding The researcher observed that the bird species feed on the ground in the residential and in the middle layer of trees in the forest and farmland blocks. This agrees with Brown, and Amadon, (2012) who rep[orted that during the breeding season, the northern green-headed sparrow can be found foraging on the ground or in low vegetation. They use a "hop and scratch" technique to uncover seeds and insects from the leaf litter or grass. During the non-breeding season, they may join mixed-species flocks and forage in trees and shrubs for seeds. The feeding behaviour of the northern grey-headed sparrow, like many bird species, can vary depending on a number of factors, including the time of year, weather conditions, and availability of food sources. However, in general, sparrows tend to be most active and feed most heavily during the morning and late afternoon or early evening hours. During the

breeding season, northern grey-headed sparrows may start foraging for food shortly after sunrise, as they need to gather enough food to sustain themselves and their young throughout the day. They may take breaks from foraging during the hottest part of the day and resume feeding activity in the late afternoon. Northern grey-headed sparrows are primarily granivorous, meaning they mainly feed on seeds. Northern grey-headed sparrows are primarily granivorous, meaning their diet consists mainly of seeds. However, like many bird species, they may occasionally consume other plant material, such as flowers and leaves. There are a few reasons why a sparrow might eat flowers and leaves. One possibility is that they may be seeking additional nutrients or minerals that are not present in their primary seed-based diet. Some flowers and leaves are rich in vitamins, minerals, and other micronutrients that birds need to stay healthy. Another possibility is that a sparrow might eat flowers and leaves as a way to supplement their diet during times when seeds are less available. For example, during the winter months, when food sources may be more scarce, sparrows may turn to other plant materials to help them survive. It's also possible that some sparrows may simply enjoy the taste of flowers and leaves and consume them for that reason alone. However, it's important to note that while flowers and leaves may provide some nutritional benefits, they are not a primary food source for northern grey-headed sparrows and should not make up a significant portion of their diet (Marshall et al., 2016, McWilliams and Karasov, 2014). In a study of house sparrows conducted in Italy, researchers found that sparrows consumed a wide variety of plant material, including flowers and leaves, throughout the year. The researchers suggest that this behaviour may be related to the availability of seeds and other primary food sources in the area (Borgoni and Gambeloni, 2011).

The study clearly indicates that the Northern Grey Headed Sparrow fed on grain seeds, fruits, leaves, flowers and insects in the study area. On habitat utilization, it was found that the bird species utilize residential blocks more than rest blocks. It was also observed that it feeds on the ground and on top of shrubs and middle-layer trees. Although the conservation status is the least concern, the fact it utilizes degraded forest ecosystems, urbanized area residential areas and use as pets makes it important for sustainable tourism development. Food and feeding ecology play an important role in promoting sustainable tourism by encouraging environmentally responsible practices and supporting local communities. Overall, the food and feeding ecology of bird species can play an important role in promoting tourism. Whether it is through birdwatching, eco-tourism, food tours, or agriculture, birds can attract tourists and help to promote local economies. Bird species can also play a role in agriculture and farming, as they may help to control pests and pollinate crops. Some farmers may offer bird-watching tours or highlight the role of birds in their farming practices as a way to promote tourism. For example, the use of

Barn Owls to control rodent populations in rice fields in India has led to the development of bird-watching tours in the region.

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