

**MIZAN-TEPI UNIVERSITY**

**TEPI CAMPUS**

**COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE**

**DEPARTMENT OF BIOLOGY**

**TITLE: BIRD SPECIES COMPOSTION, DIVERSITY AND ABUNDACE IN MTU, TEPI CAMPUS.**

Submitted to the department of biology in partial fulfillment of the requirements for the degree of bachelor of science in biology.

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**Abstract**

Birds are one of the most important components of biodiversity that has huge ecological, economical, and aesthetic values. The main objective of this study wil into assess species composition, diversity and abundance of bird in Mizan Tepi University, Tepi campus. Line transect and point count method were employ to collect data on bird species diversity and composition. Direct observations of birds by binocular were made. Shannon diversity index will use to calculate the species diversity. identified. Of the record species, there will be**,**Mizan Tepiuniversity main campus is one of the areas with high avian composition in Ethiopia. The campus will rich in bird species diversity including wetland and forest bird observe during the study. Anthropogenic activities and disturbance of natural vegetation, over grazing, recession farming, and over exploitation were the major threats of the bird species. Anthropogenic disturbances should be minimize to conserve avian diversity in the campus.

**Key word:**

diversity,

conservation threat

,antrpogenic impact

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# 1. INTRODUCTION

## 1.1 Back ground of the study

Biodiversity is among the issues of most human concern of this century and a lot of discussions are going on throughout the world on the conservation and sustainable use of the existing biodiversity. This is mainly due to the fact that the rapid alteration of the earth's environment may lead to a loss of stability of the ecosystems which will be detrimental to the survival of mankind (Bibby *et al*., 1998). It is essential that we have to understand the biological and biogeographical entities (Clout and Hay, 1989). Due to the rapid disappearance of species, problem has come to be regarded as the worst situation that the earth’s environment has had to face. Thus, species loss is more serious than pollution and global warming (Colwell, 2010).

Patterns of species composition and diversity are the results of historical, evolutionary and ecological processes. The species composition in a given area is mostly explain by historical factors such as dispersal events, geographical isolation, and extinction due to future climatic and geological events, and in much less extent by some ecological factors such as competition and predation (Dorst, 1974). A number of variables have been found to influence bird species diversity within a landscape. These include habitat patch in which the species nests, the landscape, degree of fragmentation and vegetation characteristics of the habitat (Evans and Rosenberg, 2000).

Both individual and interactive factors may be involved in maintaining species richness and composition of an area. Differences in species richness and composition among localities within a landscape and among landscapes may be due to species interactions as well as the interaction of each species with the abiotic environment. Environmental heterogeneity, habitat and climate can affect species distributions (James *et al*., 1997).

Morphology of birds range is from their smallest size of hummingbirds to ostriches larger than a big man. Birds walk, run, hop, swim, perch, cling, fly and even dig. They live in woodlands, open areas, cities, farms, lakes, and swamps. Birds are beautiful animals and many people enjoy with watching birds (Jokimak *et al*., 2002). Birds occupy town- and city-dwellers (Kress, 2000). Forest fragmentation has been characterized by reduced patch size and increased patch isolation, each of which has distinctive impacts on biodiversity (Nichols *et al*., 2000). Certain avian density, abundance, richness and diversity are usually positively correlated with remnant habitat in a fragmented landscape (Padian and Chiappe, 1998 ). Fragmentation keeps on reducing habitat quality, though the effects may vary from species to species or among functional groups, one can generally expect reduction in avian species richness, density, abundance, diversity or other parameters like mobility (e.g., of forest specialists). This can affect species persistence, population dynamics and ecological interactions within and among avian communities thus leading to local extermination of avian species and functional groups in small fragments (Redman *et al*., 2009).

Environmental changes due to forest loss and fragmentation are highly likely to affect bird dispersal ability (Singupta and Dalwani, 2008) and resource use (Sibanda, 1997) as well as ecosystem functioning such as pollination, seed dispersal and pest controls amongst others. The changes impair proper ecosystem functioning. Birds are important indicators of biodiversity (Shimelis Ayinalem and Yilman Delelegn, 2004) that could provide better information for species conservation. Traits such as habitat use, dietary guild, foraging strata, nest type, nesting strata and flocking guild may be better predictors of species responses to fragmentation processes in human dominated landscapes (Steinkamp, 2003).

The ecology of Ethiopia is vastly under study and the current status is on degrading rapidly due to human population growth and their intensive activities (Shimels Aynalem and Afework Bekele, 2009). Much of the natural landscape has been cleared for agricultural activities. Mizan Tepi University main, campus comprises diversified biota. However, no survey is conduct on the diversity and composition of birds in the area. Thus, this study will conduct to assess the diversity and composition of birds.

## 1.2 Statement of the problem

Land development and urbanization present particular challenges in conservation of biodiversity. Human settlement, agricultural expansion, drainage and overgrazing have result in the conversion of natural habitats of birds into crop-land and pastures (Mesfin and Teklu, 2014). Trees, bushes, creepers are very important vegetation growth form plants to birds (Lepage, 2018). Climate change affects both the vegetation and bird composition and diversity. The human activities have impacts on the composition and diversity of birds. Only little is known about the effects of these expansions and habitat loss on to bird species diversity and composition (Mengesha and Afework Bekele, 2015).

## 1.3 Hypothesis (questionnaire)

1. What is the species diversity of birds in Tepi campus?

2. What is the species richness and evenness of birds in a campus?

3. What are factors that affect diversity and distribution of birds in Tepi campus?

## 1.4 Objective of the study

### 1.4.1 General objective

* The general objective of the study will to assess the species composition, diversity and abundance of birds in Mizan Tepi University main campus.

### 1.4.2 Specific objective

* To assess bird species diversity in Mizan Tepi University, Tepi campus
* To assess the composition of bird species in the study area.
* To determine the relative abundance of birds in the study habitats.
* To examine habitat association of birds in the study area.

## 1.5 Significant of the study

Birds are important as bio-indicators and in ecosystem functioning such as pollination, seed dispersal and insect pest. This study mainly focuses on bird’s species richness, composition and their biodiversity in Mizan Tepi University main campus. The result of the study will give information about the current diversity and composition of birds at different habitats in the study area. The result is also important as background information of bird diversity for further study.

# 2. LITERATURE REVIEW

## 2.1 Ecological Importance of Birds

Birds are good environmental indicators revealing the status of ecosystems. Diversification of birds plays a very important role in the health of an ecosystem. Birds are important bio-indicators of water quality and also potential tourist attractions(Ash and Atkin, 2009). Particularly, birds have been shown to be effective bio-indicators for monitoring habitat change. From the perspective of ecosystem functions, birds are crucial for maintaining ecosystem. The role of birds is ecosystem functioning (Pol, 2006). They act as pollination, seed dispersal and insect pest controls pollinators and seed. The genetic linking characteristics of seed dispersing frugivores and pollinating nectarivores helps in transferring genetic materials from one plants to another (Posa and Sodhi, 2006). Birds occupy various types of habitats, from open field to forest, wetlands, desert to High Mountain where it is quite tough for human or other animals to live. Many species require a mixed type of habitats.. Birds play an important role in ecosystem by being as a part of the food web. However, birds can influence various mode of life in the wetland ecosystem. In a wetland ecosystem biotic factors are mostly dependent on the seasons and hydrology (Alelign *et al*., 2017).

## 2.2 Diversity

Diversity is one of the most important community attributes which can determine stability, productivity and migration (Jokimaki *et al*., 2002). About 1855 out of 9856 bird species in the world are migratory (Redman et al., 2009). There are about 10,000 bird species in the world widespread from the poles to the equator, deserts to the middle of the oceans, on the highest mountains to the center of the cities and everywhere as an eye-catching form of animal life (Simons *et al*., 2006). Since the diversity and distribution of birds along the landscape are not uniform (Bibby *et al.,* 1992), their patterns are intensely associate to environmental factors like climate, topography and habitats. Tropical mountains are providing sheltering high diversity of avifauna with many other flora and fauna (Nicholas *et al.,* 2000). The highest diversity of birds are found in forest and at settlement. Habitat diversity or spatial heterogeneity influences the diversity of birds positively (Tesfahunegn, 2016). Larger area of the habitat tends to increase the bird diversity (Kruuk *et al*., 1967).

### 2.2.1. Bird’s species diversity in Ethiopia

Ethiopia is a vast ecologically diverse country bless with extensive and unique environmental conditions (Esayas and Afework Bekele, 2011). The elevation range from 110 m asl, at the Danakil of Afar depression to high altitude at 4500 m asl at Ras Dajen rise to the wide variations in climatic conditions **(**Tesfahunegn, 2016**)**. This in turn has led to the formation of diverse ecosystem from moist rain forest to desert ecosystems contributing to the formation of diverse plants and animal assemblages**.** Ethiopia has 857 species of birds, of which 20 are endemic, 31 are globally threatened ones and 13 species restricted to the geographical region of Ethiopian and Eritrean highlands and thus, shared only by Ethiopia and Eritrea (Shimels Ayinalem and Afework Bekele, 2009). Despite the rich diversity of birds in Ethiopia, habitat destruction, fragmentation and loss have been observed for decades and severely impacted the survival of bird species (Alelign *et al*., 2017). Forest loss and forest fragmentation have been widely recognized for their significant impacts on avian biodiversity(Simon *et al*., 2006). Bird diversity and abundance significantly differ between habitat types. The abundance of bird species will positively correlate with shrub and grassy habitat (Mengesha and Afework Bekele, 2015)**.** However, the ornithology of Ethiopia is still in its infancy. Only few researchers have conduct studies on the diversity and ecology of avian species in some parts of Ethiopia (Esayas Mengesha and Afework Bekele, 2011). As a result, the bird’s check list of Ethiopia is still far from complete.

## 2.3. Anthropogenic Impact on birds’ diversity

Anthropogenic factors can have major impacts on ecosystem functioning and stability, which are often reflect in changes to biodiversity that includes wildlife. Biological community is an assemblage of populations of two or more different species occupying the same geographical area and characterized by type of species present, species diversity and their relative abundance (Evans and Rosenberg, 2000). Land-use is a dynamic process that changes in space and time depending on prevailing socio-economic and biophysical conditions (Esikuri, 1998). Changes in land-use have strong impacts on biological communities (Kruck *et al*., 1967). Different literature has noted that changes in surface water as a result of land-use changes have made a significant impact on local biodiversity like birds, other wildlife species and subsequently erode local economies reliant on those resources (Esikuri, 1998). Among wildlife, birds have been more susceptible to and affecte by environmental changes such as land-use changes (Kolecek *et al*., 2010). Particularly, alteration of environment of freshwater lakes by land use changes is known to have negative effect on water-bird community structure (Aerts *et al*., 2008).

Deforestation is one of the anthropogenic activities which may affect the habitats of birds**.** Of the total land area of Ethiopia, only 4 percent is covered with forests (Reference) Deforestation is being cleared by increasing human populations and agricultural expansion. Fires threat to forests, whether they are set intentionally to clear land for agriculture. Firing causes distracting bird habitats. Urbanization leads to a reduction in biodiversity due to the transformation of natural habitats into agricultural, industrial and urbanized areas (Steinkamp, 2003). Thus, urban development reduces quality of habitats and has resulted in declines in animal populations (Foster 1996; Kahn and McDonald, 1997; Hostetler and Knowles-Yanez, 2003).Habitat patches in a developed area typically support fewer species. Development facilitates the spread of urban-associated species along corridors of urban land-use (Kress, 2000). Given the current rate of land development, understanding the factors affecting bird diversity is critical to developing and implementing appropriate conservation strategies. Fragmentation decreases core habitats and increases habitat edges. Urban development may affect bird communities by changing the quantity or quality of the habitats. Urban development may also affect bird communities according to their Foraging guild. The availability of food resources is important in determining community structure, including bird species richness and relative abundances (Tilman, 1982).

## 2.4 Conservation Threat

Migratory birds are affect by flight hazard and transmission line. Changes in land use pattern results in the degradation of habitat and these habitat degradation is regarded as the most known causes of decline in waterfowl populations (Sibanda, 1997). According to Birdlife International (2010), the world’s biodiversity is being lost faster than ever. Rapid human population growth and economic development is also responsible for overexploitation of natural resources in this hotspot. With this scenario, the challenges for the ecologist or conservationists are to identify the areas that need immediate conservation action. Birds are facing several threats such as deforestation, hunting, habitat loss and climatic changes. Birds are ideal bio-indicators and useful models for studying a variety of environmental problems, and the importance of local landscapes for avian conservation can only be understood by knowing the structure of the bird community in the region concerned Sengupta and Dalwani, 2008).

# 3. MATERIALS AND METHODS

## 3.1 Description of the study site

The study will conduct at Mizan Tepi University, Tepi is atown in sousern Ethiopia the vowels is the nam are pronounce as in English word tape and pea , location in The sheka zone of the south west of Ethiopia region,this town has a latitude and longitude of 712' N 35'27 E/7.200' N 35.450 E with amean elevation of 1.097m above area level. and TEPi town temperature elevation annual high temparture 25.95'c (78,71F) annual low temperature 14,67'c (58,41'cF) average annual precip 158,65mm (6.25 in) warmest mouth February (29,2'c/84,56F) coldest month (13,94'c/57.09F) and currently Tepi-town is locate to Tepi -Addis Ababa 611km.

## 3.2 Study habitats stratification

3.2.1 Semi-forest habitat

The study area composed different habitats based on vegetation composition. Semiforest habitat characterized by woody, shrub and herbaceous plants that used for birds as a habitat for food source and roosting site. There are different species of trees such as *Cordia Africana, Ficus spp. Jacaranda, Gravillae* etc., are dominant tree species found in this study habitat. It is full of Grivate monkey and small mammals and different insects are found in the habitat. The habitat cover the larger parts of the study area.

3.2.2 wetland habitat

The wetland is characterized by stagnant water with small plants species including, long and short grasses spp., macrophytes submerged plants in the habitat. The habitat is grazing site for cattle. Some of the species of amphibian and reptiles are found in this habitat.

3.2.3 Open habitat

The habitat is characterized by scattered trees, shrubs, grasses and herbs are plant species.

The habitat is composed of sparsely distributed trees and herbaceous plants and it cover with grasses and dominated by grivate monkey and other small mammals Buildings are found in the habitat. Human activity is frequent in the habitat

## 3.2 Materials

The materials used for this research include phone camera for recording coordinates in theto capture photograph; Bird Guide book to identify birds; Along with the survey data sheet, pencils will be used for recording birds and vegetation data.

## 3.3 Methods

Data collection and analysis

Bird data collectio will conducted from August 1st to March 30, 2021 on the study area. Seven line transects with length 700 m and each width 25 m, and point count survey will conduct by on foot walking in the study habitats. Bird count was done using phone camira for observing birds from far, and Bird Guide will used to confirm the identification of the birds. Birds was identified to the species level and their taxonomic groups were properly categorized. This study will limit to diurnal birds. Bird survey will conduct from 5:00 am till 10:00 am in the morning, and 3:00 pm to 6:00 pm in the late afternoon when the birds are more active. During the survey, the following parameters will record for every bird species as: (i) name of birds; (ii) the number of bird species at every sighting; (iii) habitat types.

## 3.4 Data analysis

Bird data collection will record in SPSS. Species diversity will determined using Shannon-Weiner diversity Index. Shannon-Weiner diversity Index takes into account the number of species richness as well as evenness.

 …………………………………………………………..(1)

Where; H’ = Shannon-Weiner Index

Pi = Proportion of the ith species

ln = Natural logarithm

Species evenness (E) will be analyzed as follows:

**E = H’/ H max** where:

E = Shannon-Wiener Evenness Index

H’ = Shannon-Wiener Diversity Index

H max = ln S= natural logarithm of the total number of species (S) in each month (Tramer, 1969)

The relative abundance of each species will be calculated as the proportion of individuals of a given species to the total number of individuals in the community.

**4.Budget break down and working calendar**

**4.1 Budget break down**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Item | Unit | Cost per unit | Required amount | Total |  |  |  |
| Pen | No | 20 | 4 | 80 |  |  |  |
| Pencil | No | 10 | 2 | 20 |  |  |  |
| Printing | Price | 150 | 3 | 450 |  |  |  |
| Double A | Price | 200 | 2 | 400 |  |  |  |
| Duplication | Price | 100 | 3 | 300 |  |  |  |
| Paper | No | 100 | 2 | 200 |  |  |  |

**4.2 Work calendar 2015**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | Dec | Jan | Febr | March | April | May | Jun | Julay | Aug |
| Title selection |  |  |  | \*\* |  |  |  |  |  |
| Proposal preparation |  |  |  |  | \*\* |  |  |  |  |
| Proposal submission |  |  |  |  | \*\* |  |  |  |  |
| First deraft coment of proposal |  |  |  |  | \*\* |  |  |  |  |
| Final proposal preparation |  |  |  |  | \*\* |  |  |  |  |
| Research data collection |  |  |  |  |  | \*\* |  |  |  |
| Interview and questioner data collection |  |  |  |  |  | \*  \* |  |  |  |
| Data analysis |  |  |  |  |  |  | \*\* |  |  |
| Report writing |  |  |  |  |  |  | \*\* |  |  |
| Research paper preparation |  |  |  |  |  |  |  | \*\* |  |
| Research submission |  |  |  |  |  |  |  | \*\* |  |

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