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FEEDING GUILDS OF THE BIRD COMMUNITIES ON PASOSO ISLAND

Moh. Ihsan[1*], Yusran[1], Sitti Ramlah[1], Sri Ningsih[1], Rukmi[1], Fauziah Ramadhana[1]

Faculty of Forestry, Tadulako University
Jl. Soekarno Hatta Km.9 Palu, Sulawesi Tengah 94118

*Email: mallo.junior@gmail.com

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ABSTRACT

Food is one of the crucial factors for the survival of birds. The interaction between habitats and birds, as well as the role of birds as environmental bioindicators, can be understood through feeding guilds by examining their responses to disturbances. This study aims to analyze the feeding guilds of bird communities on Pasoso Island. The data collection method used was the strip transect method. Data were analyzed using descriptive analysis based on bird species composition according to their guilds. The results of this study show that 33 bird species were found on Pasoso Island, classified into 10 types of feeding guilds. Based on the number of species, the insect-eating guild had the highest number (9 species) compared to other guild categories. The coastal invertebrate-eating guild and raptor guild had the fewest species, with only one species recorded in each. Regarding the number of individuals, the insect-eating guild dominated with 42 individuals, followed by the fruit-eating guild with 29 individuals. On average, the fewest individuals were found in the coastal invertebrate-eating and raptor guilds, with only one individual in each.

Keywords: Birds, Guild, Feeding, Pasoso

INTRODUCTION

Birds are one of Indonesia's treasures in terms of biodiversity. The richness of bird species in Indonesia reaches 1,836 species, with 542 species being endemic to the country. This further establishes Indonesia as the nation with the highest number of endemic bird species in the world (Burung Indonesia, 2024).

Birds are a type of wildlife found in nature, present in almost all types of habitats and vegetated environments at various altitudes. Bird habitats can encompass various ecosystem types, both natural and artificial (Latuny, 2024). The presence of birds can indicate that an ecosystem still maintains good environmental quality. Environmental quality greatly influences bird species, as it can disrupt their survival (Safanah et al., 2017).

Vegetation is one of the environmental factors that influence the presence of bird species. Vegetation conditions are closely related to the availability of food sources for birds. Kristianti et al. (2017) stated that birds are more easily found in locations with an abundance of food sources that can meet their survival needs. Supartono et al. (2015) also noted that food availability in a habitat is one of the main factors determining the presence of bird populations.

Food sources are a key function of habitats for bird species. The availability of food greatly influences bird diversity, making the presence of various types of food-producing plants essential

for providing continuous food throughout the year to maintain the sustainability and existence of birds (Putri, 2015).

Food is an important factor for bird life. The interaction between habitat and birds, as well as the role of birds as environmental bioindicators, can be understood through the study of food groups (guilds) by examining their response to disturbances (Ramadhani et al., 2023; Bachri et al., 2020; Gray et al., 2007). Knowledge and data about bird food groups are crucial as they provide an understanding of the environment's ability to support bird life through the flow of energy in the food chain (Ramadhani et al., 2023).

The presence of a guild at a location indicates that the guild's resource needs at that site are being met. Therefore, the abundance of a guild in a location generally correlates with the habitat's carrying capacity for that guild (Nurvianto, 2009).

The study of guilds is essential as an initial overview of bird community conditions and as a foundation for supporting the management of the Pasoso Island area, particularly its bird community. Based on this, research was conducted on the food guilds of the bird community on Pasoso Island.

METHOD

The research was conducted on Pasoso Island, Balaesang Tanjung District, Central Sulawesi Province. Data collection took place in July-August 2024. Observations were made in the morning from 06:00 to 09:00 WIB and in the afternoon from 15:00 to 18:00 WIB. Observations were conducted during the peak bird activity in the morning and afternoon to minimize bias and ensure accurate results (Bibby et al., 2000).

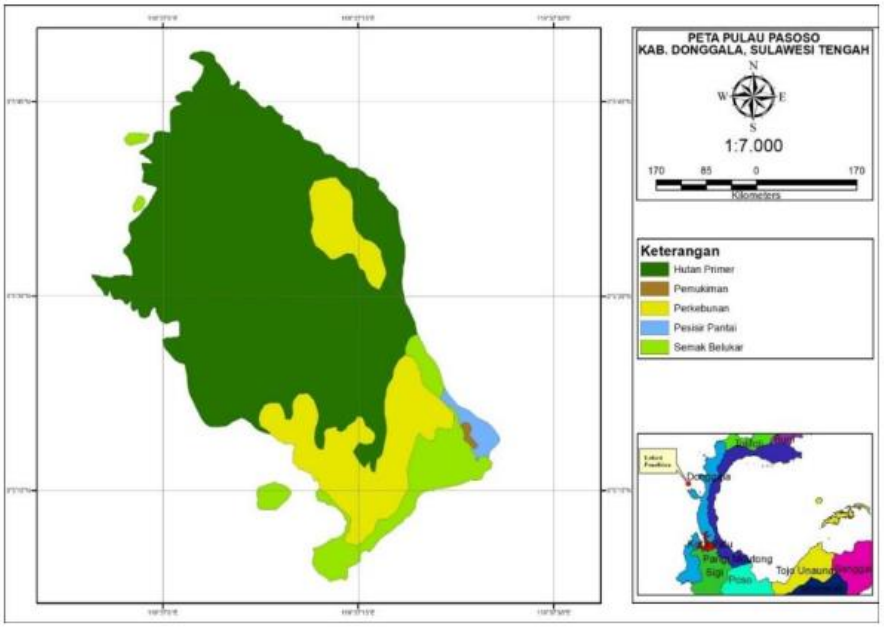

Figure 1. *Research Location on Pasoso Island*

The tools and materials used included writing instruments, Nikon binoculars, a Nikon D300s DSLR camera, a compass, a hand counter, a tally sheet, a GPS, and the Field Guide to Birds of Wallacea (Coates & Bishop, 2000).

The data collection method used was the strip transect method. A strip transect is a wildlife population observation method through sampling, where the sampling unit is an observation path (Sutherland, 2006). Technically, this method is implemented by having the observer walk along the direction and central line of the transect slowly while recording all bird species encountered,

both directly and indirectly. In this study, four transects were used, placed in four different habitat types for observation. Data collection was repeated four times as a correction factor.

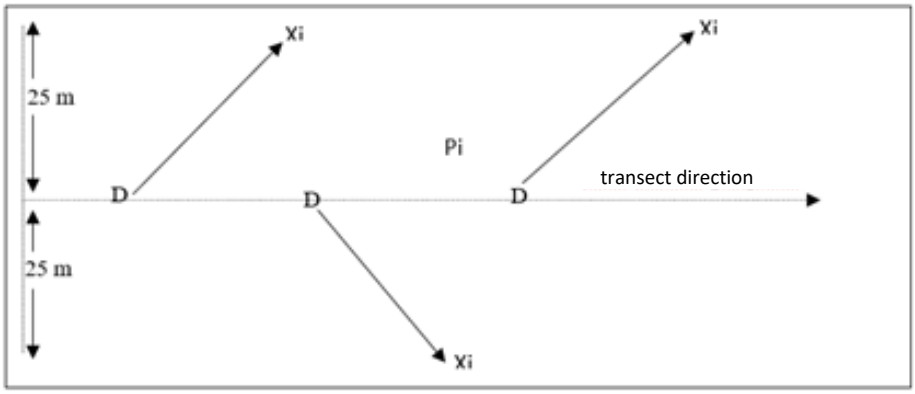

Figure 2. *Strip Transect Method*

Data Analysis

Based on their feeding habits, the birds at the study site were grouped into seven guilds: insectivores (insect eaters), frugivores (fruit eaters), granivores (seed eaters), nectarivores (nectar eaters), carnivores (meat eaters), piscivores (fish eaters), and omnivores (mixed eaters). Guilds with variations will be further developed based on their specific feeding methods. The results were then analyzed using descriptive methods based on the bird species encountered and their guild composition.

Results and Discussion

Bird Species Composition

This research was conducted in four habitat types on Pasoso Island: primary forest, ecotone, garden, and shrub habitats. Based on the findings, a total of 33 bird species from 18 families were identified. The Columbidae family was the most diverse, with nine species, compared to other families. Of the 33 species observed, four were endemic to the region. The complete bird species composition is shown in Figure 3 below:

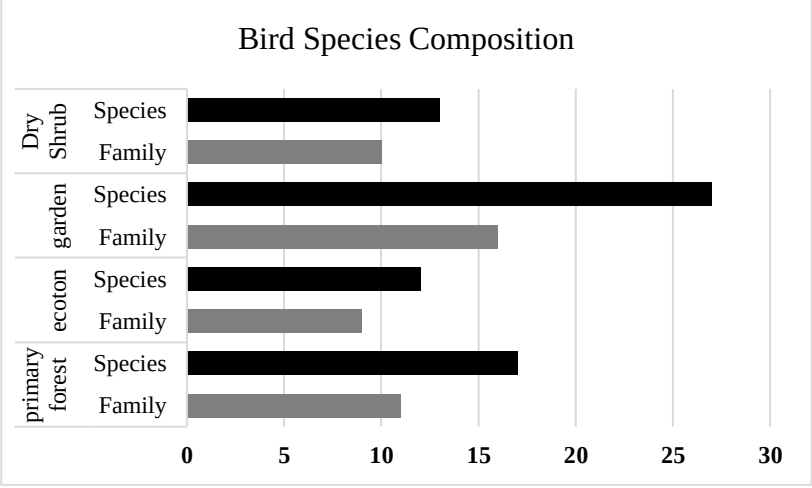

Figure 3. *Composition of bird species on Pasoso Island*

The birds found were distributed across all the observed habitat types; however, only a small number of bird species were active in all habitat types at the research site. A total of five bird species were recorded in all habitat types, six species in three habitat types, eight species in two habitat types, and fifteen species were found only in one habitat type. This distribution pattern reflects the spread and habitat preferences of the bird species present. It is suspected that this pattern is due to the relatively small size of Pasoso Island, which results in limited food resources compared to the mainland. This condition affects the availability of resources needed by bird species, particularly food sources, leading to species having specific habitat preferences.

Based on their ecological categories, there are generally five main groups of birds found on Pasoso Island: seabirds (one species), waterbirds (six species), terrestrial birds (23 species), migratory birds (one species), and aerial birds (five species). This study also recorded a rare event with the rediscovery of the nicobar pigeon (*Caloenas nicobarica*), previously considered locally extinct on Pasoso Island since the 1980s. Additionally, this study documented the presence of the yellow-crested cockatoo (*Cacatua sulphurea*), with only one individual remaining. This species is endangered and protected by law.

Food Guilds

The results of this study show that a total of 33 bird species were found on Pasoso Island, classified into 10 types of feeding guilds. Three of these guilds are subcategories of the insectivorous guild (Table 1).

Table 1. Feeding Guilds of Bird Species on Pasoso Island

Number	Species name	Latin name	Family	Total
Insectivore on the twigs (15,2%)				
1	Golden-bellied gerygone	*Gerygone sulphurea*	Acanthizidae	5
2	Plaintive cuckoo	*Cacomantis merulinus*	Cuculidae	1
3	Lemon-bellied white-eye	*Zosterops chloris*	Zosteropidae	17
4	White-shouldered triller	*Lalage sueurii*	Campephagidae	3
5	Little bronze cuckoo	*Chrysococcyx minutillus*	Cuculidae	2
Flying insect eater (9,1%)				
6	Uniform swiftlet	*Aerodramus vanikorensis*	Apodidae	7
7	Glossy swiftlet	*Collocalia esculenta*	Apodidae	3
8	Pacific Swallow	*Hirundo tahitica*	Hirundinidae	1
Insectivores on the forest floor (3%)				
20	Philippine megapode	*Megapodius cumingii*	Megapodidae	3
Piscivore (15,2)				
9	Collared kingfisher	*Todiramphus chloris*	Alcedinidae	7
10	Striated heron	*Butorides striata*	Ardeidae	1
11	Frigatebirds	*Fregata Sp.*	Fregatidae	1
12	Brahminy kite	*Haliastur indus*	Accipitridae	2
13	Purple heron	*Ardea purpurea*	Ardeidae	1
Coastal invertebrate eater (3%)				

Number	Species name	Latin name	Family	Total
14	Common Sandpiper	*Actitis hypoleucos*	Scolopacidae	1
Mixed eater (15,2%)				
15	Black-billed koel	*Eudynamys melanorhynchus*	Cuculidae	
16	Barred rail	*Gallirallus torquatus*	Rallidae	2
17	Wandering Whistling-duck	*Dendrocygna arcuata*	Anatidae	3
18	White-breasted waterhen	*Amaurornis phoenicurus*	Rallidae	2
19	Asian Glossy Starling	*Aplonis panayensis*	Sturnidae	4
Granivore (6,1)				
21	Common emerald dove	*Chalcophaps indica*	Columbidae	1
22	Nicobar pigeon	*Caloenas nicobarica*	Columbidae	1
Frugivore (24,2%)				
23	Black-naped fruit dove	*Ptilinopus melanospilus*	Columbidae	9
24	Amboyna cuckoo-dove	*Macropygia amboinensis*	Columbidae	1
25	Green imperial pigeon	*Ducula aenea*	Columbidae	4
26	Pied imperial pigeon	*Ducula bicolor*	Columbidae	11
27	Silver-tipped imperial pigeon	*Ducula luctuosa*	Columbidae	1
28	Pink-necked green pigeon	*Treron vernans*	Columbidae	1
29	Grey-cheeked green pigeon	*Treron griseicauda*	Columbidae	1
30	Yellow-crested cockatoo	*Cacatua sulphurea sulphurea*	Cacatuidae	1
Nectar feeder (6,1%)				
31	Brown-throated sunbird	*Anthreptes malacensis*	Nectariniidae	2
32	Garden sunbird	*Cinnyris jugularis*	Nectariniidae	9
Predator (3%)				
33	Sulawesi serpent eagle	*Spilornis rufipectus*	Accipitridae	1

The guilds formed represent an overview of the available resources based on the characteristics of the research location. This aligns with Sastranegara (2014), who stated that the diversity of food resources depends on habitat conditions within a specific habitat type.

The research site is a small island dominated by coral cliffs along its edges. This condition leads to the formation of piscivore bird guilds and coastal invertebrate-eating bird guilds. The narrow beach area results in the coastal invertebrate-eating bird guild consisting of only one species with a single individual. Additionally, other guilds that have formed are typical of those found in bird habitats. According to Rohiyan et al. (2014), birds tend to be rare or even absent in environments that do not support their survival. In contrast, they are more likely to be found in habitats with an abundance of resources that support their life. The variation in food resources reflects the quality of a habitat, as the habitat provides resources that birds can utilize to sustain their existence (Ramadhani et al., 2023). Based on the number of bird species found on Pasoso Island, the insectivore guild category had the highest number of species, with 9 species, followed by the frugivore guild category with 8 species. Meanwhile, the coastal invertebrate-eating birds and the predator birds guild categories had the fewest species, with only one species found in each category.

Based on the number of individuals, the insectivore guild dominated with a total of 42 individuals, followed by the frugivore with 29 individuals. The lowest average number of individuals was observed in the coastal invertebrate-eating and predatory bird guilds, with only one individual recorded in each (Figure 4).

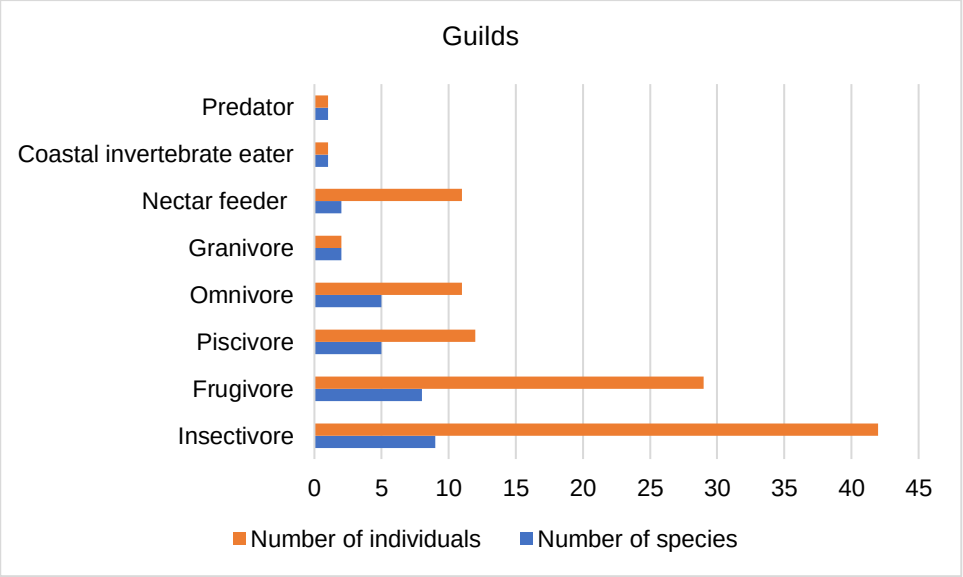

Figure 4. *Guild Composition Based on Number of Species and Number of Individuals*

Based on the overall results, the insectivore guild was the dominant group across all habitat types studied, both in terms of species richness and individual abundance. Insects, which serve as the primary food source for this guild, are a relatively stable resource in bird habitats. These food sources are available year-round, with fluctuations depending on environmental conditions, and during the study, insects were found to be abundant. The diversity of food sources within this guild led to the formation of three variations of insect-eating guilds. According to Arslangundogdu (2010), insects are a food source available year-round, providing a stable food supply. The number of species and individuals within this guild is influenced by the availability of food resources. This suggests that each food guild responds differently to environmental conditions (Rofiq, 2021).

The coastal invertebrate eater bird guild and the predatory bird guild have the lowest number of species and individuals. Although both guilds exhibit similar conditions, the factors contributing to the low numbers of species and individuals differ. The low numbers in the coastal invertebrate eater guild are due to the habitat characteristics at the research site. Pasoso Island has a relatively narrow beach area, which limits the foraging space for species in this guild. In contrast, the low numbers in the predatory bird guild are influenced by ecological factors. Species in this guild are top predators, which ecologically occupy a smaller proportion compared to species at lower trophic levels. Additionally, another factor contributing to the low number of species and individuals in the predatory bird guild is that eagles, as apex predators, have wide foraging ranges and tend to hunt solitarily. Therefore, the research site represents just one of their foraging locations, in addition to other habitat types around Pasoso Island. This aligns with Zuluaga et al. (2022), who stated that eagles, as apex predators, are key components of ecosystems. They have wide foraging ranges and require large forest habitats.

The frugivore bird guild is the dominant guild after the insectivore bird guild, representing 24.2% of the total guilds. This guild consists of eight species of frugivore birds. Most species in

this guild belong to the Columbidae family, with only one species from the Cacatuidae family. This condition indicates that fruit was relatively abundant during the study period. This aligns with the findings of Porkily et al. (2023), who stated that the abundance of bird species is influenced by the presence of flowering and fruit-bearing plants, which serve as food sources for birds. Conversely, trees that do not bear fruit have a much lower encounter rate with birds. Vegetation that does not produce food is used only as resting or perching areas, which can reduce bird diversity (Pratama et al., 2021; Saputri et al., 2022).

Although fruit as a food source is available based on the fruiting seasons of plants, the available fruit resources are sufficient to meet the needs of all fruit-eating bird species at the research site. This is consistent with the findings of Ihsan (2021), which showed that fruit availability on Pasoso Island is relatively abundant and almost constant throughout the year. Each plant species tends to have a different peak period for fruit or young leaf production, but they complement each other when the production of one food source declines, ensuring abundant food availability year-round.

The research site, surrounded by the sea, makes the piscivore bird guild quite dominant in the area. Although fish resources are abundant, the island's extreme conditions—dominated by coral cliffs—result in shallow waters and a relatively narrow coastline. According to Rumblat et al. (2016), shallow waters are the primary feeding grounds for fish-eating birds. However, these shallow waters only form during low tide, and during the study period, the low tide season had not yet begun.

This condition resulted in the fish-eating birds observed at the research site being composed of species that forage for fish in deeper waters as well as those that feed along the coastline. The Brahminy kite and Frigatebirds are examples of species that prey on fish from deeper waters, while the Collared kingfisher, the Purple heron, and the Striated heron obtain their food from coastal areas.

CONCLUSION

The results of this study show that 33 bird species were found on Pasoso Island, classified into 10 feeding guilds. Based on the number of bird species, the insectivore guild has the highest species richness, with 9 species, compared to other guild categories. The coastal invertebrate-eating guild and the predatory bird guild have the fewest species, with only one species each. In terms of individual abundance, the insectivore guild dominates with 42 individuals, followed by the frugivore guild with 29 individuals. The categories with the fewest individuals are the coastal invertebrate-eating guild and the predatory bird guild, each represented by only one individual.

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