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ANALYSE THE STUDY OF VARIOUS NATURE OF HABITAT AFFECTS THE BIRDS

Mohd Ajmal[1], Dr.NisharAhmad Ganie [2]

[1]Research Scholar , Dept. of Zoology ,Sri Satya Sai University of Technology and Medical Sciences, Sehore Bhopal-Indore Road, Madhya Pradesh, India

[2]Research Guide, Dept. of Zoology ,Sri Satya Sai University of Technology and Medical Sciences

ABSTRACT

There needs to be more research into the factors that influence and can be used to predict bird diversity in different environments. The primary goal of this research was to compare the diversity and distribution of species across different habitats. The secondary goal was to learn what features of habitats tend to attract a wide variety of bird species. Using data from the Taiwan Breeding Bird Survey (which took place between 2010 and 2016), we looked at how different types of habitat in the landscape influenced the species of birds that called it home. Forestland, farmland, grassland, freshwater wetland, aquaculture ponds and saltpans, coastal land, and constructed space are just some of the 26 habitat types that make up the landscape. The number of bird individuals, the number of bird species, the Margalef Richness Index, and the Pielou Evenness Index were used as ecological indices. The findings suggested that forest cover, with the exception of windbreak forests, had a negative impact on bird populations. The diversity of birds was found to increase in areas with both natural and farmland-related habitats. The natural environment also contributed to greater species parity. Green spaces in cities cannot replicate the positive impact of forested areas on biodiversity. Important habitats that contributed to greater species richness and evenness included conifer forests, bamboo forests, windbreak forests, mixed forests, tall grasslands, and orchards.

Keywords: Habitat, diversity, the Margalef Richness Index, and the Pielou Evenness Index

1. INTRODUCTION

People often form strong bonds with their pets. More than two-thirds of American homes have a pet, and their owners tend to treat them like members of the family.[1] Pet ownership is expensive, costing an average of $8,000 over the course of a medium-sized dog's lifetime and $10,000 over the course of a cat's (cats typically live longer than dogs), so it's hard to see how evolution would reward us for spending money on an organism with which we don't share any genes and which is unlikely to ever repay our generosity. In addition to the financial commitment, companion

animals also have other drawbacks. [2] The likelihood of being seriously injured or killed by a dog in the United States is one hundred times higher than by a venomous snake, and each year, more than 85,000 people visit emergency rooms after suffering injuries from accidents caused by their pets. Companion animals are a major source of human illness transmission. These include brucellosis, roundworms, skin mites, E. coli, salmonella, giardia, ringworms, and cat scratch fever. [3] Furthermore, pets are the second leading cause of neighbour disputes, after late-night noise. Although not shared by all cultures, many people around the world keep pets, and many explanations have been proposed for this practise. Among these are the failure of parental instincts to kick in, biophilia (the hypothetical biological basis of a love of nature), social contagion, middle-class people's tendency to adopt the practises of the wealthy, the desire to teach responsibility and kindness to children, social isolation in urban societies, and the need to dominate the natural world. [4] The importance of companion animals in many people's lives is undeniable, and yet the reasons for the explosion in the popularity of keeping pets as a cultural phenomenon remain a mystery. When asked to describe the bond they share with their pets, owners will likely speak of the love and care they shower upon their animals, as well as the love and happiness they receive in return. This common observation belies the difficulties researchers have had with measuring and capturing the mutual benefits of human-animal interaction. [5]

The National Institutes of Health (NIH) convened a technology assessment workshop on the health benefits of pets in 1987 (NIH, 1987) to provide researchers with a synopsis of existing data and a roadmap for future study, as well as arm the general public with the knowledge it needed to make educated decisions about the topic.[6] In order to determine which ideas need a more solid scientific foundation, researchers in five different fields were convened to examine the existing literature. Topics covered included the positive effects pets have on heart health, the positive effects pets have on the development of children, the positive effects pets have on social and therapeutic outcomes, and the potential dangers inherent in human-animal relationships. [7] In addition, the group proposed some avenues for additional study. A workshop focused on the topic twenty years after the initial meeting and discovered that little had changed in our understanding of the benefits pets have on human health and happiness

More research is necessary to fully understand the positive effects of these connections on people's mental and physical health in both everyday life and therapeutic settings. [8] Future, fruitful areas of HAI research will be illustrated through a combination of topical areas and methods. Animals are often treated as if they were human family members, and their owners spend a great deal of time, effort, and money on them. Over $58 billion was spent annually on pets in the United States in 2014. Most pet owners believe their companion animals are beneficial to them and can fulfil their psychological needs, which contributes to the widespread popularity of keeping pets. Although this makes sense on a gut level, it is not yet known to what

extent pets can provide for their owners' emotional or social needs or how much of an impact pets have on their owners' health. [9] As an added note, it is unclear if pets can provide their owners with any additional emotional support beyond that which is provided by a close personal relationship. The present study used concepts and methods from self-determination theory to tackle these questions and investigate the unique effect of pet need fulfilment on everyday people's well-being and level of psychological distress. The idea that living with an animal can improve human health and psychological well-being is known as the "pet effect." There is growing evidence that having a pet helps people physiologically, especially when they are going through difficult times in their lives. One study found that pet owners had a better chance of survival one year after a heart attack compared to those who did not have pets.

Studies have shown that hypertensive stockbrokers who own pets have lower blood pressure. Psychologically speaking, it was discovered that when people's feelings of isolation were artificially heightened, they were more likely to find comfort in their animal companions. Also, having a pet has been shown to mitigate the negative effects of being rejected socially. [10] Nonetheless, despite claims regarding the health and mental benefits of animal companionship, the practicality of this literature is constrained by a number of issues. For instance, studies that back up the "pet effect" typically show that people in distress find their pets to be a source of psychological support; however, it is unclear whether pets have the same effect on the non-distressed. Health is thought to be affected by a wide variety of psychological and social factors. The family pet is frequently forgotten about as a member of the family. The health benefits of owning a pet are widely recognised, but they are especially significant for people of retirement age. Having a pet can be a great way to bridge the generation gap and bring people of all ages together.

Domesticated animals are those that have been trained to provide human companionship and entertainment rather than practical purposes. Pets have long been prescribed by psychiatrists, psychologists, and family doctors to help alleviate "loneliness, depression, and other emotional problems, including inactivity and stress" in their patients. Researchers have struggled to put a number on the benefits that having a pet can have on the health of both the pet and the owner. [11] Over time, research has accumulated to prove how crucial social connections are to human well-being. The importance of social networks to people's health and longevity has been repeatedly demonstrated by scientific studies. Improved cardiovascular health is associated with a lower risk of nephritis, pneumonia, cancer, depression, and suicide. It is hypothesised that interpersonal bonds can mitigate the potentially devastating long-term effects of stress on health. Any positive social interaction that makes a person feel loved, valued, and included in a web of reciprocal obligations can be considered a relationship. The pet achieves this function by making the owner feel loved, respected, and indispensable. [12]

2.MATERIALS AND METHOD

Data sources.

We used sampling design, survey methods, and species coverage information from the 2010–2016 Taiwan Breeding Bird Survey (BBS Taiwan) to examine the connection between landscape habitat and bird ecology. BBS Taiwan is a nationwide monitoring project that began in 2009 to conduct surveys of breeding bird populations. The study areas included the islands of Taiwan and Orchid, totalling 36,190 km^2 and characterised by 70% mountainous terrain and humid subtropical and tropical monsoon climates, respectively. There were two types of sampling plots used: those that were preselected and those that weren't. Pre-selected sampling plots were spread across the study area and were divided into 91 strata to account for environmental gradients and habitats across 41 eco-regions and three elevations (0 to 1,000 m, 1,000 to 2,500 m, and 2,500 to 4,000 m). Pre-determined sampling sites, numbering 450, were chosen using stratified random sampling to represent 5 percent of the study area. A 1 km by 1 km grid is used for each sampling site. Long-term monitoring efforts took vehicle accessibility into account. Volunteer surveyors set up a sampling plot for areas that weren't preselected. A survey of bird species and populations, as well as an assessment of the diversity of birds in the area, both permanent residents and seasonal visitors, were conducted using point counts.

The point count has three benefits:

(1) it is not constrained by Taiwan's various mountain roads;

(2) it makes it simple to clarify the connection between birds and their surroundings; and

(3) it allows precise control over the amount of time spent surveying individual points.

Six to ten sampling points were located within a 100-meter radius of each sampling site. In order to avoid recording the same information twice, at least 200 metres of straight line separation was used between each sampling point. In the peak of Taiwan's bird breeding season, all sampling sites were surveyed twice a year by enthusiastic birdwatchers (March to June). There was a pause of at least two weeks. Bird point counts were performed at each sampling location for 6 minutes, starting no more than 4 hours after sunrise. Over 80% of bird species can be counted using the point-count method in just 6 minutes during the breeding season. Excursions and workshops were held to help survey takers fully grasp the survey method and produce high-quality data. The BBS Taiwan workgroup double-checked the survey points' locations, the accuracy of the time period and distance, the identification of rare or easily misidentified species, and the presence of unusually high numbers. In each location where the survey was conducted, data on the types and total numbers of birds

was collected. The Bird Record Committee of the Chinese Wild Bird Federation compiled the Checklist of Birds of Taiwan, which is used as the basis for the avian classification system.

The regulating factors

As the presence or absence of wind and other weather conditions greatly influenced the likelihood of spotting birds, meteorological data was recorded at each survey site. According to the Beaufort wind force scale, there were four different categories of wind speed: no wind (less than 1.6 m/s), a light breeze (1.6–5.4 m/s), a moderate breeze (5.5–10.7 m/s), and a strong breeze (more than 10.8 m/s). The weather was classified as either clear, partly cloudy, cloudy, dense fog, or rainy. In the data analysis, the dummy variable was used to store the weather type.

Information sifting.

The four ecological indices for birds were used in a hierarchical multiple regression analysis to examine the correlation between habitat types and sub-types. As a first step, we fed in the control variables like wind and weather into Model 1. Model 2's independent variables, such as habitat type and subtype, were entered as dummy variables. Each hierarchical multiple regression analysis followed the same procedure. Number of birds (N), number of species (S), Margalef Richness Index (d), and Pielou Evenness Index (J') were the only independent variables that varied. We used Cook's D statistics less than 1.0 to examine the potential impact of outliers in these models. The tolerance and variance inflation factors were evaluated, but no evidence of multicollinearity (VIF) was found. Significant standardised beta coefficients and model changes were reported. The current release of SPSS was used for all statistical analysis.

3.RESULTS

Table 1. Descriptive statistics for bird diversity

Index	Min	Max	Mean	S.D
No. of birds (N)	1.00	467.00	17.24	16.49
No. of species (S)	1.00	24.00	5.94	2.87
Margalef Richness index (d)	0.00	5.20	1.84	0.84

Pielou Evenness index (J)	0.00	1.00	0.85	0.22

Table 1 shows the average (SD) of 17.234 (16.49) birds and 5.94 (2.87).

Table 2. Descriptive statistics for landscape habitat types

Type of landscape habitat	n	%
Forestland	17890	58.4
Broadleaf forest	11095	36.19
Conifer forest	885	2.88
Mixed conifer broadleaf forest	2792	9.10
Bamboo forest	1123	3.66
Mixed bamboo broadleaf forest	3350	10.92
Windbreak forest	318	1.04

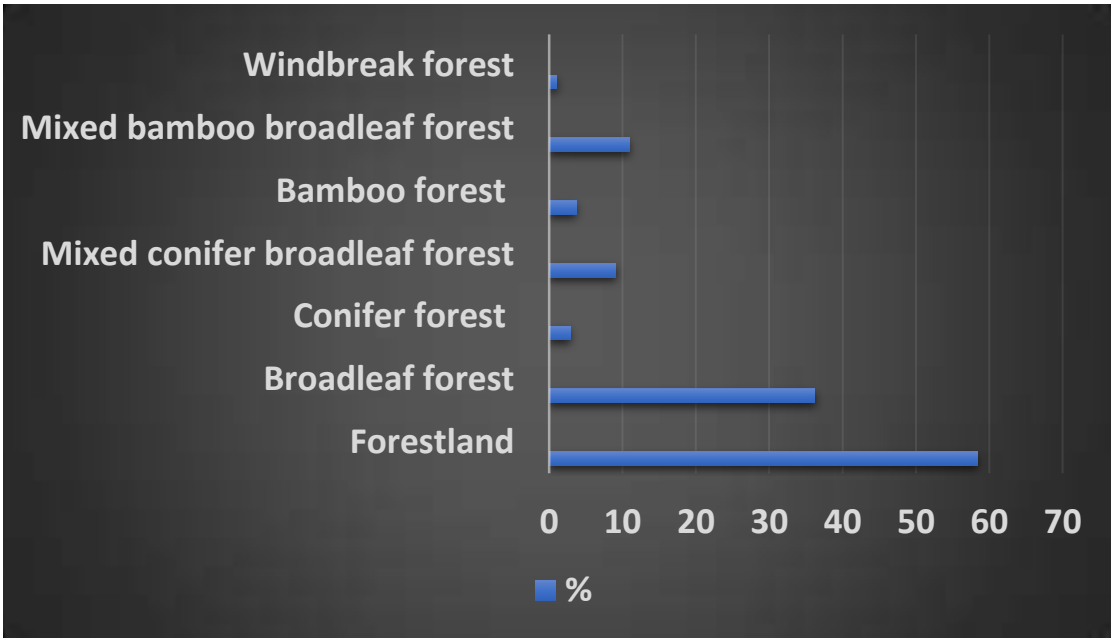

Fig 1. Graphical representation of landscape habitat

Table 1 shows that the most common types of landscape sub-habitats were Forestland (58.4%), Mixed Bamboo-Broadleaf Forest (10.92%), and Mixed Conifer-Broadleaf Forest (9.10%).

Table 3. Descriptive statistics for grassland habitat types

Type of grassland habitat	n	%
Grassland	5905	19.3
Tall grassland (height >0.5m)	3357	10.95
Low grassland (height <0.5m)	1558	5.08
High marsh (height >0.5m)	564	1.84
Low marsh (height <0.5m)	210	0.68
Bamboo grassland	305	1.0

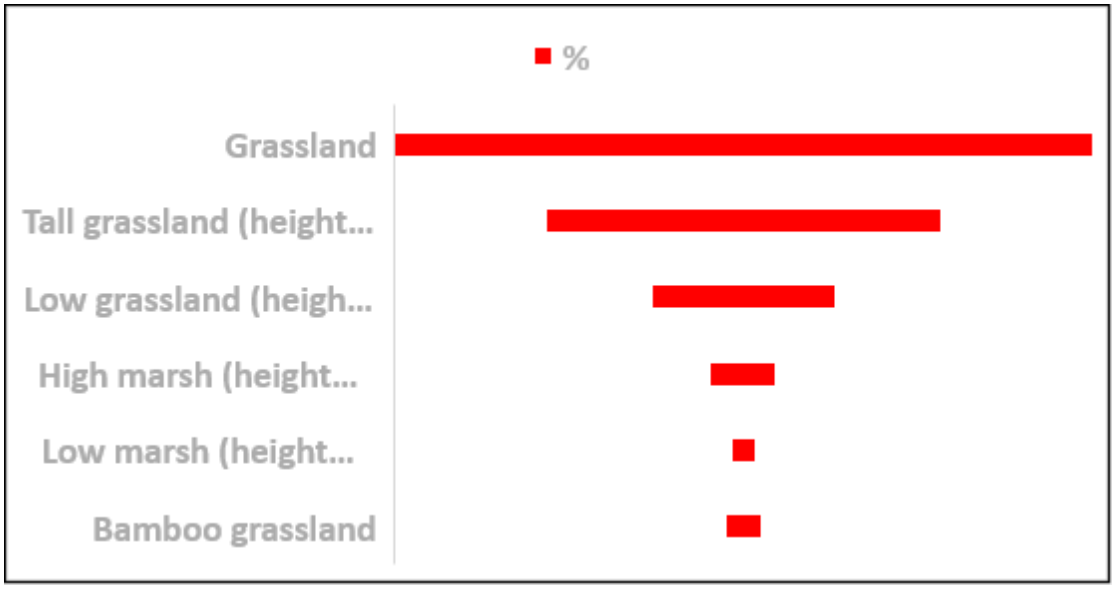

Fig 2. Graphical representation of grassland habitat

The various forms of grassland can be seen in Table 2. The most prevalent types of landscape sub-habitats were grassland (19.3%) and tall grassland (10.9%).

4.DISCUSSIONS

The results demonstrated that natural and human-related habitats differed in terms of bird species richness and evenness. [13] It's possible to distinguish various tree features with precision. Most other types of natural, farmland-related, and human-created habitats, with the exception of coastland, saw an increase in bird populations, whereas a lower bird number was a primary characteristic of forests. Previous research consistently found a higher bird density in urban areas. Grasslands, freshwater wetlands, aquaculture ponds, and saltpans were also found to have high bird populations, in addition to urban and agricultural zones. [14] There was a rise in both species richness and species evenness in forested and grassy areas. Differences in bird populations between forest and grassland might be due to differences in the availability of food. Bird populations fluctuate locally due to differences in food availability, which may be greatest in grasslands. The distribution of bird species was more positively affected by natural habitats than by those associated with agricultural land or urban areas. Vegetated habitats like forests, grasslands, wetlands, and farms all help increase biodiversity. Species diversity was reduced in developed areas. [15]

5.CONCLUSIONS

There was a correlation between the presence of mixed trees, conifer forests, and bamboo forests, all of which helped to increase biodiversity. While pure broadleaf forests had no effect on the diversity of bird species, mixed broadleaf forests actually improved the situation. Human activity (disturbance) in the area of the broadleaf forest likely muddied the waters in terms of the relationship between the two. The diversity and abundance of bird species are positively impacted by forested land, which urban greenspaces cannot replicate. Forest cover can be used to estimate bird diversity and abundance. The diversity and abundance of forest species were greatly aided by the presence of mixed tree stands, conifer forests, and bamboo groves. Tall grasslands and orchards were critical habitats in other landscapes for increasing the richness and evenness of bird species. On the other hand, bird communities in aquatic farmland tend to be dominated by a small number of species. Species dominance is also observed in flooded and dried fields found in aquaculture ponds and saltpans. Due to the abandoned fields, there was a rise in biodiversity. Human interference should be reduced if bird ecosystems are to be restored.

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