Majalah Pusat Pengajian Biologi UiTMCNS
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ISSN 2773-5869
9 772773 586005

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A QUICK NOTE ON BIRD DIVERSITY AND ABUNDANCE-RELATING FACTORS

By

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Birds are warm-blooded, beaked vertebrates belonging to the class Aves. Feathers distinguish birds from all other animal species. Birds have a four-chambered heart (like mammals), modified forelimbs that serve as wings, sharp vision, and calcium-rich eggshells. Their olfactory capabilities are not highly developed. Birds are found almost everywhere in a variety of terrestrial and aquatic habitats.

The availability of key resources such as food, water, vegetation cover, and weather conditions all play a role in determining the spatial distribution of bird species, as well as the success of their breeding and their ability to survive (Adhikari et. al., 2019). The changing of the seasons is one of the most important factors that have a significant impact on the diversity of birds and the availability of key resources (Katuwal et. al., 2016). A variety of land uses, such as forests, shrubs, grasslands, wetlands, agricultural land, and urban areas, all influence bird population density and diversity by providing foraging opportunities and nesting sites for a variety of bird species (Hu et. al., 2017). It is essential for planning and developing species conservation strategies to possess a comprehensive understanding of the factors that affect bird abundance and distribution at spatial and temporal changes.

The structure of avian communities can be influenced by urban development because it can change the local resources that are available. These resources include habitat structure, microclimate, supplemental food, and the abundance of predators and brood parasites. Urban forests have twice as much fruit, feeders, and preferred nesting substrate for cardinals as rural forests, according to research showing a strong positive correlation between urbanization and numbers of the northern cardinal (Cardinalis cardinalis) (Leston & Rodewald, 2006). Urban areas may offer new food sources or modify the local climate in ways that have an effect on birds, in addition to the changes that urbanization causes to occur in the local vegetation. A bird's distribution, abundance, habitat selection, annual survivability, sociality, and foraging behavior can all be influenced by supplemental food provided at feeding stations, particularly during the winter months (Atchison & Rodewald, 2006). Moreover, due to the combined effects of increased anthropogenic heating, decreased vegetated surfaces, and increased concrete and pavement, wintering birds in urban areas are expected to benefit from higher temperatures, also known as the urban heat island effect. This effect is caused when temperatures rise due to increased anthropogenic heating (Marzluff & Rodewald, 2008).

Figure 1: The Blue-eared Kingfisher, *Alcedo meninting* can be found in lowland forest up to 900 m above sea level

Abiotic factors such as temperature and precipitation influence the composition and species richness of avian communities.

During the winter, when food resources are significantly lower and weather conditions are more unpredictable, birds adopt a nomadic lifestyle in which they explore a wider variety of habitats across larger areas (Wiktander et. al., 2001). Birds move away from the hottest areas during the summer in order to reduce the effects of overheating and drought stress (Jiguet et. al., 2011). This finding appears to be supported by recent changes in species and assemblages that have occurred in response to extreme heat waves. Therefore, temperature and habitat structure play a significant role when it comes to the composition of local communities in temperate regions, and this seasonal environmental scenario is expected to lead to intra-annual variation in bird diversity patterns (Seoane, et. al., 2013).

The intensification of land use produces regions that may include a continuum of environmental conditions ranging from "wildlands" to rural, suburban, and urban lands. These regions are created when land is converted from its natural state to more productive use (Marzluff et. al., 2001). It is important to characterize the general effect of land-use intensification on bird community diversity and abundance where suburban development is intruding on agricultural lands containing wild lands and small reserves. These areas all together support traces of the historical vegetation in which the species most affected by development are previously assumed to survive (Chapman & Reich, 2007).

Figure 2: The Black-headed Bulbul, *Brachypodius atriceps* inhabits forests, forest edges, secondary growths, low scrubs along rivers, and roadside vegetation up to 1,000 metres.

The intensification of land use frequently results in an increase in the number of birds present (Crooks et. al., 2004).

This is likely the result of increased primary productivity brought about by human activities such as fertilization, irrigation, and the accidental or intentional introduction of food.

It may also be the result of habitat enhancements including plantings and buildings that provide more opportunities for territory or nesting sites, or it may be the result of a reduction in the number of predators.

However, as land use continues to become more intensive, species richness and diversity frequently decrease (Chapman & Reich, 2007). Suburbanization, for instance, results in the displacement of native vegetation, which in turn leads to a decrease in the species diversity of native birds (Cam et. al., 2000). While the loss of habitat specialists in urban centers of towns has led to the formation of a homogenous bird community that is devoid of species that nest in the ground or in the scrub (Clergeau et. al., 2006). Furthermore, the expansion and intensification of agricultural practices also have been primary contributors to the decline of biodiversity in both temperate and tropical regions (Mahood et. al., 2012). There is a wide range of possible disparities between agricultural systems and the natural ecosystem. These disparities can range from wildlife-friendly systems that retain large proportions of the native faunal and floral communities to extensive crop monocultures that typically have a low diversity of plant and animal species (Tscharntke et. al., 2012). Therefore, these patterns indicate that a moderate level of land-use intensification leads to the greatest biodiversity and species richness in a region (Chapman & Reich, 2007).

Figure 3: The Great Hornbill, *Buceros bicornis* can be found forest areas from lowlands to highlands up to 1,500 m above sea level.

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