

Migratory birdwatchers' dress code: an analysis of clothing color choices on bird responses and behavior

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh warna pakaian pengamat terhadap respons dan perilaku burung migran dalam kegiatan birdwatching. Metode yang digunakan adalah observasi eksperimental lapangan yang dilakukan di kawasan Batubara Mangrove Park, Pantai Sejarah, dengan membandingkan dua kategori warna pakaian, yaitu warna cerah dan warna netral. Subjek penelitian difokuskan pada burung migran jenis *Numenius madagascariensis* yang dikenal sensitif terhadap perubahan lingkungan visual. Data dikumpulkan melalui pengamatan langsung terhadap perilaku burung, seperti frekuensi terbang, aktivitas makan, pergerakan, dan tingkat kewaspadaan. Hasil penelitian menunjukkan bahwa penggunaan warna pakaian cerah meningkatkan respons kewaspadaan burung, ditandai dengan meningkatnya frekuensi berpindah dan menurunnya aktivitas mencari makan. Sebaliknya, penggunaan warna netral cenderung tidak menimbulkan gangguan signifikan sehingga perilaku burung tetap alami. Temuan ini menegaskan bahwa pemilihan warna pakaian merupakan bagian penting dari etika pengamatan burung untuk meminimalkan gangguan terhadap satwa serta mendukung efektivitas penelitian dan konservasi.

Kata Kunci: etika berpakaian; birdwatching; burung migran; respons perilaku

ABSTRACT

*This study aims to analyze the influence of observer clothing color on the responses and behavior of migratory birds during birdwatching activities. The method used was experimental field observation conducted in the Batubara Mangrove Park area, Historical Beach, by comparing two categories of clothing colors, namely bright colors and neutral colors. The research subjects focused on the migratory bird species *Numenius madagascariensis*, which is known to be sensitive to changes in the visual environment. Data were collected through direct observation of bird behavior, such as flight frequency, feeding activity, movement, and alertness level. The results showed that the use of bright clothing colors increased the birds' alertness response, characterized by increased frequency of movement and decreased foraging activity. Conversely, the use of neutral colors tended not to cause significant disturbance so that bird behavior remained natural. These findings confirm that clothing color selection is an important part of birdwatching ethics to minimize disturbance to animals and support research and conservation effectiveness.*

Keyword: dress code; birdwatching; migratory birds; behavioral responses

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1. INTRODUCTION

Migratory birds are one of the animals that play an important role in nature. They travel thousands of kilometers from their place of origin to find temporary resting areas, search for food, and restore their energy before returning to their breeding grounds (Putra et al., 2020).

The presence of migratory birds in Indonesia is generally associated with their habit of utilizing wetland areas for feeding while waiting for the time to return to their breeding sites (Oktafitria et al., 2023).

Therefore, their presence in a migration area indicates that the environment is still suitable for habitation and can serve as a bioindicator of ecosystem quality. Migratory birds also play important ecological roles as seed dispersers, regulators of the food chain, and contributors to environmental aesthetics, which makes their habitats potential birdwatching tourism destinations (Insyira et al., 2025). Birdwatching activities can provide positive contributions to the conservation of migratory birds and their habitats (Priyono & Rahayu, 2023).

Sejarah Beach, Batubara Regency, North Sumatra, is part of the East Asian–Australasian Flyway (EAAF), which serves as an important migration route for thousands of migratory birds (Putra et al., 2017). This area is a wetland ecosystem with mangrove forests that play a crucial role in supporting the existence of migratory birds. Wetlands function as stopover sites, providing resting areas as well as macrozoobenthos, which serve as the primary food source for migratory birds (Putra et al., 2017). Therefore, this location is considered highly strategic for observing migratory birds.

This study uses the Eastern Curlew (*Numenius madagascariensis*) as a representative species to examine the behavioral responses of birds to the color of observers' clothing. This species was selected due to its endangered conservation status according to IUCN data, making the findings important for supporting conservation and preservation efforts (BirdLife International, 2024).

The Eastern Curlew is a type of shorebird whose primary diet consists of marine organisms found in soft mud or sandy substrates. Its long, curved bill enables it to extract prey from within the substrate (Tijo et al., 2024).

Observation activities, commonly known as birdwatching, play a significant role in wildlife and environmental conservation. However, several ethical considerations must be followed during observation, including the selection of clothing color. Birdwatchers are advised to avoid wearing bright and striking colors, as these may disturb birds and trigger avoidance behavior. Instead, it is recommended to wear colors that blend with the natural environment, as birds possess highly developed visual and auditory sensitivity (Suana et al., 2022). Observers are also encouraged to move slowly and minimize noise to reduce disturbance.

Birds are known to be highly sensitive to high-contrast color spectra (Zhou & Liang, 2020). They are capable of detecting changes in objects and colors within their natural environment due to their advanced visual system (Olsson et al., 2015). As a result, observers must carefully consider clothing ethics during birdwatching activities.

Due to this sensitivity, birds may perceive high-contrast colors as potential threats, leading to increased alertness and disruption of natural behavior, which can affect the validity of observational data. Therefore, this study focuses on the ethics of clothing selection in migratory bird observation to minimize disturbance and ensure optimal research outcomes.

2. RESEARCH METHOD

A. Approach and Location

This study employs a field-based experimental observation method to examine the extent to which the color of an observer's clothing influences bird behavior. The primary focus is to compare birds' responses when exposed to observers wearing bright-colored clothing versus neutral-colored clothing. The observational design is structured to closely replicate real birdwatching conditions, ensuring that the collected data accurately reflect birds' natural responses to visual disturbances in their habitat.

The study was conducted in the Pantai Sejarah area, Batubara Regency, North Sumatra. This location represents a wetland ecosystem with mangrove forests that are essential for migratory birds. The Eastern Curlew (*Numenius madagascariensis*) was selected as the main subject due to its consistent presence in the area and its high sensitivity to environmental changes.

B. Tools and Materials

The primary variable in this study is the category of clothing color, which consists of contrasting colors (purple and orange) and neutral colors (dark green, brown, and gray) that blend with the natural environment. Supporting instruments include binoculars for observing bird activity from a distance, a camera for documentation, and field notes to systematically record observations.

C. Data Collection Procedure

To minimize disturbance while maintaining a broad field of view, observations were conducted from a tower approximately 4 meters in height. Data collection was carried out over six days and scheduled according to tidal cycles, which correspond to peak feeding activity of birds.

During each observation session, the duration was kept consistent. Observers were required to remain calm and restrict movement so that clothing color remained the primary influencing factor. Several behavioral parameters were recorded, including flight frequency, avoidance behavior, changes in movement direction, and passive activities such as resting or remaining stationary.

D. Data Analysis

All field observations were documented using observation sheets and validated through photo and video recordings. The data were analyzed descriptively to identify behavioral tendencies under each clothing color treatment. An increase in flight frequency and alertness was interpreted as a disturbance response. In contrast, stable behavior, such as continuous feeding or resting, indicated minimal disturbance. Based on this comparative analysis, conclusions were drawn regarding the influence of clothing color on the behavior of migratory birds.

3. RESULTS AND DISCUSSION

Research on the color of clothing worn by observers indicates significant differences in the behavioral responses of migratory birds. Bright clothing colors, such as vivid purple or orange, tend to increase the alertness level of birds. This heightened alertness is reflected in behavioral changes, including moving away from the observation area, increased flight frequency, changes in movement direction, and the cessation of foraging activities.

Table 1. Behavioral data of Eastern Curlew when observers wear neutral-colored clothing

No	Waktu		Kriteria					Jumlah
			Makan	Istirahat	Perawatan Tubuh	Agresi	Bergerak	
1.	28 januari	Pagi	4	22	13	0	2	41
		Sore	19	9	12	0	9	49
2.	29 januari	Pagi	9	5	20	1	1	36
		Siang	0	25	10	0	0	35
		Sore	1	14	15	0	3	33
3.	30 januari	pagi	30	0	0	1	2	33

Table 2. Behavioral data of Eastern Curlew when observers wear bright-colored clothing

No	Waktu		Kriteria					Jumlah
			Makan	Istirahat	Perawatan Tubuh	Agresi	Bergerak	
1.	31 januari	Pagi	4	8	9	0	11	32
		Sore	15	5	7	0	15	42
2.	1 februari	Pagi	8	3	15	1	8	35
		Siang	0	16	9	0	17	42
		Sore	1	10	9	0	14	34
3.	2 februari	pagi	20	0	0	1	12	33

Based on the data presented in Tables 1 and 2, clear differences can be observed in the responses and behaviors of birds under different clothing color conditions. Movement-related behaviors are more frequent when observers wear bright-colored clothing, while feeding activity tends to decrease. In contrast, when observers wear neutral-colored clothing, birds exhibit fewer movement behaviors and maintain higher levels of feeding activity. This indicates that bright colors act as a disturbance stimulus, whereas neutral colors allow birds to behave more naturally.

Birds possess a tetrachromatic vision system, which makes them highly sensitive to a wide range of colors, including ultraviolet wavelengths. This system consists of four types of photoreceptors in the retina, enabling birds to detect subtle visual changes in their environment, particularly objects that contrast with their natural surroundings (Olsson et al., 2015). As a result, visually conspicuous objects are more easily perceived as potential threats.

Previous studies have shown that migratory birds tend to interpret conspicuous visual stimuli as danger signals. When birds perceive a threat, they increase their alertness by stopping feeding, scanning their surroundings, and eventually flying away as a defensive response (Fernandez-Juricic et al., 2010). This reaction represents an adaptive survival mechanism to avoid predators. Furthermore, visual disturbances that strongly contrast with natural habitats can trigger stress responses in birds. Zhou and Liang (2020) emphasized that highly conspicuous colors in vegetated environments force birds to expend additional energy to maintain vigilance. If such disturbances occur repeatedly, they may reduce foraging efficiency, which is particularly critical for migratory birds that depend on energy reserves for long-distance flights.

Conversely, the use of clothing colors that blend with the natural environment, such as dark green, brown, or gray, has been proven effective in camouflaging the observer's presence. By minimizing visual contrast, the stimuli perceived by birds are reduced, allowing them to continue their natural activities, including feeding and social interaction, without significant disturbance.

This finding is consistent with the ethical principles of birdwatching, which emphasize minimizing disturbance to wildlife. Therefore, both in birdwatching practices and field-based ecological research, the use of neutral-colored clothing is strongly recommended to maintain the natural behavior and comfort of birds in their habitat (Steven et al., 2011).

4. CONCLUSION

The color of an observer's clothing can influence changes in bird behavior, potentially hindering the observation process as birds may feel disturbed and exhibit unnatural responses. Bright and high-contrast colors, such as purple, red, and orange, tend to interfere with observation activities by increasing bird alertness and triggering avoidance behavior. In contrast, neutral colors such as brown, dark green, and gray are considered safer, as they blend with the natural environment and minimize visual disturbance.

Therefore, observation ethics, particularly in the selection of clothing color, must be carefully considered to ensure that birds do not feel threatened or disturbed, allowing their natural behavior to be observed accurately.

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