

Diversity, Dominance, and Conservation Status of Bird Species Traded in Bird Shops Around of Jambi City

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Abstract

Maintaining bird diversity is essential for preserving biodiversity. The popularity of bird keeping as a hobby is due to their attractive colours and sounds, as well as their economic value. However, the breeding and trading of various bird species has led to the development of bird races and competitions. This study aims to determine the diversity, dominance, and conservation status of songbird species that are traded and competed in Jambi City. The study is a descriptive field research that showcases our expertise in the field. In August 2023, the study confidently employed structured observations and interviews through a questionnaire. The analysis confidently used the variety index, evenness index, and dominance index. The research confidently identified ten species, two of which are protected: The Cucak hijau *Chloropsis sonneratii* (Chloropseidae) and the Serindit melayu *Loriculus galgulus* (Psittacidae). The bird species have been classified into three categories based on their IUCN conservation status: endangered (10%) *Chloropsis sonneratii*, vulnerable (20%) *Alophoixus tephrogenys* and *Zosterops melanurus*, and least concern (70%) *Copsychus saularis*, *Kittacincla malabarica*, *Leptocoma brasiliانا*, *Zosterops simplex*, *Loriculus galgulus*, *Agapornis* sp., and *Serinus canaries*

Keywords: Bird trading, Diversity, Bird shop, Conservation Status, Bird contest



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INTRODUCTION

The global decline in biodiversity is primarily driven by habitat loss and destruction, environmental pollution (Meza-Madrid et al., 2024), natural resource exploitation, hunting, illegal capture, and wildlife trade, all of which pose a danger to biodiversity conservation (Hill et al., 2023). In addition to biodiversity loss, wildlife trade contributes to the spread of zoonotic diseases. 72% of zoonotic disease outbreak originate from wild animal species, posing a major risk to humans (Banjade et al., 2020). Wildlife trade in birds ranks as the third-largest illegal activity globally, after the trade in illicit drugs and weapons (De Oliveira et al., 2020).

Birds are among the most exploited vertebrates in the global wildlife trade. This exploitation, particularly in trade, has led to the decreases and extinctions of populations worldwide. Birds represent the most significant group of animals traded illegally, accounting for approximately 80% of all illegally sold wild animals (De Oliveira et al., 2020). Southeast Asia is known for its bird diversity, yet this high diversity has also made it a hub for bird trade, particularly in Indonesia. The bird trade has led to the near extinction in the wild of various types and subspecies of birds, such as the Bali Starling (*Leucopsar rothschildi*), Black-Winged Myna (*Acridotheres melanopterus*), Javan Green Magpie (*Cissa thalassina*), and the White-Rumped Shama (*Copsychus malabaricus*) (Ng et al., 2017).

Cultural practices in bird keeping have reached a threat to the sustainability of the species. The rarity indications of a bird species attract the desire to keep the bird itself, which has an impact on increasing the risk of a higher threat of extinction (Fink et al., 2021). The main goal of the Convention on Biological Diversity and the UN Sustainable Development Goals for 2030 states that species loss has become a global environmental crisis, along with climate change (Li & Chen, 2024).

Indonesia is one of the richest countries in the world in terms of bird species, with 1974 recorded species, 527 of which are endemic (Ramadhani et al., 2022). Birds are part of people's activities and lifestyle (Kik et al., 2023) which is reflected in their socio-cultural role in dance, clothing, paintings, and local wisdom (Senior et al., 2022). The bird keeping is deeply ingrained in Southeast Asian civilization and culture, particularly on the Indonesian islands of Java and Bali. A recent household study revealed that 31% of households keep birds, with an estimated 70 million birds kept in the Java region (Fink et al., 2021). Another study revealed that approximately 21.8% of the population in five major cities keep birds as pets (Angguni et al., 2021).

Bird chirping is regarded as one of the most appealing aspects of songbird care. Aside from that, aesthetic and economic considerations fuel the bulk of people's desire to maintain birds, particularly in metropolitan areas (Alhasni, 2021). The strong interest in birds in urban communities has resulted in the establishment of numerous competitions. Excessive capturing and exploitation are used to maintain bird populations in urban settings. The growing popularity of pet birds in society has given rise to the term "chirping mania." This chirping craze not only keeps birds but also competes for the birds they possess. There is also a group of bird keepers in Mexico known as Pajereros, who only sell birds. This, of course, differs from those in Indonesia. Apart from exchanging birds, you can participate in chirping contests (Roldán-Clarà et al., 2017). Songbird competitions have been held in Indonesia since

1976. The birds in the competition are judged on song rhythm, volume, length, and physical appearance (Angguni et al., 2021).

The growing popularity of singing contests has led to an increase in demand for songbirds. This high demand will endanger the preservation of birds in nature due to widespread capture of birds in the wild (Subrata et al., 2022) since they have the potential for economic gain. A staggering 95% of traded birds are captured in the wild, with only 5% being produced through captive breeding (Andriyani et al., 2022).

Bird contests organized by bird lovers have a beneficial value as well, as they can provide information and knowledge about the diversity of the bird species under consideration, as well as how birds act and care for them. Caring for singing birds also contributes to bird conservation by raising public knowledge and concern about environmental sustainability (Subrata et al., 2022). This study aimed to identify different types of songbirds, estimate the diversity of the songbird species traded in Jambi City, and categorize them based on their conservation status.

METHOD

The research was conducted in Jambi City from July to September 2023 using a descriptive approach. The data was collected through observations and structured interviews with five informants who are active in participating in bird contests and knowledgeable about the various types of birds available in bird shops that are bought by the public, especially songbirds for contests in the Jambi City area. This research confidently focuses on the types of songbirds traded for contests. The informants interviewed were five bird traders who confidently traded birds in their shops located on the side of the road. Data was also confidently collected on the types of birds competed in four bird competition venues: Nirvana Field, Simpang Rimbo Village, Sunderland Field, Bagan Pete Village, Pal 7, Kenali Bawah Village, and Payo Selincah Village.

Every bird in the bird shop is documented for field identification using morphological characteristics. Aside from that, the identification method incorporates a determination book from the Field Guide to Birds in Indonesia - Greater Sunda (Sumatra, Kalimantan, Java, and Bali) and experts from BISA Indonesia, as well as confirmation of appropriateness via the <https://www.ebird.org/>. To study bird species diversity, we employ species diversity index analysis with the Shannon-Wiener function equation (Kurniawan et al., 2020; Kurniawan & Soesilohadi, 2020; Andriyani et al., 2022).

$$H' = - \sum p_i \ln p_i$$

Description: The Shannon-Wiener index value (H') is calculated by summing the proportion (pi) of each species (i) in the community multiplied by the natural logarithm of pi

This formula provides a precise measurement of species diversity within the community. The function equation summarizes Pielou's evenness index, which determines the evenness of each species in the community (Andriyani et al., 2022).

$$J = H' / H \max \text{ atau } J = - \sum p_i \ln (p_i) / \ln(S)$$

Explanation: H' = Shannon-Wiener index value and p_i = proportion of each species i . S is the number of species. Thus, H' is the sum of all $p_i \ln p_i$ for all species in the community,

Simpson's dominance index is used for comparison with the diversity index using the formula: Simpson Index (C) (Kurniawan & Soesilohadi, 2020). The dominance index ranges from 0-1, the lower the dominance, the less a species dominates the number of individuals.

$$C = \sum_{i=1}^s \left[\frac{n_i}{N} \right]^2$$

Explanation:

C = Simpson dominance index

n_i = number of individuals of type i

N = Total number of individuals

S = Number of genera

RESULTS AND DISCUSSIONS

Eight types of birds were contested with various types of ticket and prize categories based on data obtained from four locations in Nirvana Field, Simpang Rimbo Village, Sunderland Field, Bagan Pete Village, Pal 7 Kenali Bawah Village, and Payo Selincah Village. This data provides a comprehensive understanding of the bird species present in the area and their popularity among bird enthusiasts. The types of birds contested were Murai Batu (*Kittacincla malabarica*), Kacer (*Copsychus saularis*), Lovebird (*Agapornis* sp.), Canary (*Serinus canaries*), Cucak hijau (*Chloropsis sonneratii*), Kapas tembak (*Alophoixus tephrogenys*), Konin (*Leptocoma brasiliiana*), and Serindit (*Loriculus galgulus*).

A total of 321 songbird individuals were recorded from 10 species belonging to 7 families, following interviews with five bird seller informants in Jambi City. These findings demonstrate a clear pattern in the bird trade market in Jambi City. Lovebirds (131 individuals or 40.81%) and canaries (93 individuals or 28.97%) were the most commonly traded contest birds in bird shops. Mulyadi & Dede, (2020) research in Bandung City found that the majority of traded birds, such as lovebirds, canaries, magpies, and other species, support this conclusion.

Diversity Index, Evenness Index, and Dominance Index

The analysis of the diversity index shows a moderate level of diversity of bird species traded in Jambi town ($H' = 1.69$), but the species uniformity index shows a low level of species uniformity of birds traded in the same region (below 0.75). Andriyani et al., (2022) reported a high diversity index ($H' = 3.38$), evenness index ($J = 0.82$) and dominance index ($C = 0.26$) for traded bird species, demonstrating a clear relationship between dominance and diversity indices in traded bird species. The dominance index

was compared with the diversity index value, revealing that communities with high dominance index values have lower diversity index values, and vice versa (Kurniawan et al., 2020). When the dominance index value reaches zero, no species will have a greater number of members in the population (Sirait et al., 2018).

Table 1. Types of contest birds traded in Jambi City bird shops

Local name	Family and species	Number individual					N	IUCN Redlist	Note
		A	B	C	D	E			
Cucak hijau ***	Chloropseidae <i>Chloropsis sonneratii</i> **	2	3	2	2	2	11	EN	Bird contest, Songbirds for training
Kacer ***	Muscicapidae <i>Copsychus saularis</i>	4	5	4	2	2	17	LC	Bird contest
Murai batu ***	<i>Kittacincla malabarica</i>	3	3	5	4	4	19	LC	Bird contest
Kapas tembak ***	Pycnonotidae <i>Alophoixus tephrogenys</i>	1	2	-	2	-	5	VU	Bird contest, Songbirds for training
Konin ***	Nectariniidae <i>Leptocoma brasiliana</i>	9	4	-	-	2	15	LC	Bird contest, Songbirds for training
Pleci ***	Zosteropidae <i>Zosterops simplex</i>	-	2	-	-	9	11	LC	Bird contest, Songbirds for training
	<i>Zosterops melanurus</i>	-	4	-	-	10	14	VU	Bird contest, Songbirds for training
Serindit ***	Psittacidae <i>Loriculus galgulus</i> **	-	-	-	5	-	5	LC	Bird contest, Songbirds for training
Lovebird*	<i>Agapornis</i> sp.*	30	25	20	20	36	131	LC	Bird contest, Songbirds for training
Kenari *	Fringilidae <i>Serinus canaries</i> *	5	5	14	54	15	93	LC	Bird contest, Songbirds for training
Number of individual birds							307		
Diversity index (H')							1,69	< 3	
Evenness Index (J)							0,21	< 0,75	
Dominance index							0,26		

Table Explanation:

We maintain the confidentiality of bird shop locations as agreed with the owners. To refer to them, we use the following initials: A = Bird Shop MBP, B = Bird Shop GMB SB, C = Bird Shop AQ, D = Bird Shop KB, and Bird Shop AOTB. The Code * is an imported bird species; The code ** Protected bird based on the Minister of Environment and Forestry of the Republic of Indonesia, No. P.106/MENLHK/SETJEN/KUM.1/12/2018; Threatened species based on The IUCN Red List (EN : endangered; VU : Vulnerable; LC : Least Concern); The code *** mark is a bird species obtained from bird hunters from the forest

Based on the results of the analysis, the decline in species richness may be key to the sustainability of songbirds as traded contest birds. [Andriyani et al., \(2022\)](#) assert that the sustainability of songbirds in the global wildlife trade is significantly impacted by the decline in species richness, which is primarily caused by poaching. The global wildlife trade has led to the exploitation of birds, resulting in population declines and extinctions worldwide. [De Oliveira et al., \(2020\)](#) assert that birds are the most significant group of animals in the illegal wildlife trade, accounting for approximately 80% of all traded wildlife.

The results of this study also show that the types of contest birds that are contested are mostly local birds (80%) when compared to imported birds. This study confirms the findings of [Angguni et al., \(2021\)](#) that local birds are more frequently entered into bird contest competitions (80%) compared to imported birds, demonstrating a clear preference for local species among Indonesian people. The species entered into these competitions are primarily from Sumatra, Java, and Kalimantan. Conservation measures are crucial for maintaining species richness in nature, particularly for freely traded contest bird species, in order to prevent the sixth

mass extinction. The Asian region is experiencing an increasing trend towards illegal wildlife trade, making these measures even more imperative (Uprety et al., 2021).

Protected contest bird species and their IUCN conservation status.

All 10 bird species traded as contest birds in Jambi City are protected under the Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018, including *Chloropsis sonneratii* (Chloropseidae), also known as the Cucak hijau, and *Loriculus galgulus* (Psittacidae), also known as the Serindit melayu. Based on the IUCN conservation status, the bird species fall into three categories. Endangered species include one species or (10%) of *Chloropsis sonneratii* (Chloropseidae), also known as the Cucak hijau, and two species or (20%) of *Alophoixus tephrogenys* (Pycnonotidae), also known as the Kapas tembak and *Zosterops melanurus* (Zosteropidae), also known as the Pleci. The remaining seven species or (70%) are *Copsychus saularis* (Muscicapidae), also known as the Kacer, *Kittacincla malabarica* (Muscicapidae), also known as the Murai batu, *Leptocoma brasiliana* (Nectariniidae), also known as the Konin, *Zosterops simplex* (Zosteropidae), also known as the Pleci, *Loriculus galgulus* (Psittacidae) also known as the Serindit, *Agapornis* sp. (Psittacidae), also known as the Lovebird, and *Serinus canaries* (Fringilidae), also known as the Kenari. The prohibition of commercial trade of protected bird species is necessary (Putri et al., 2021). Although 70% of traded songbird species are currently classified as Least Concern, it is important to avoid excessive exploitation in the wild to prevent any potential harm to their conservation status.

Origin and conservation status of traded birds.

The origin of contest birds from 10 bird species traded in bird shops in Jambi City is 80% from the forest. The collection of bird species from the wild has an impact on the decline in the population of certain species, thus disturbing the balance of the ecosystem. Human-caused disturbance is the most influential factor in bird population decline compared to forest area and vegetation density (Simamora et al., 2021). Bird traders prefer and supply birds that come from poachers/trappers in the wild/forest. Wild-caught birds by hunters/bird trappers are cheaper than captive-bred birds (Putri et al., 2021).

CITES International Trade Status and IUCN Threatenedness

The global decline in biodiversity is caused by several factors, including habitat destruction, overexploitation, invasion of ecostatic species, and climate change. Bird trade without socialised regulations can lead to overexploitation and species extinction (Li & Jiang, 2014). The Convention on International Trade of Endangered Species (CITES) regulates international trade in flora and fauna, including birds and their parts. This international agreement effectively safeguards the sustainability of bird species involved in international trade. It is worth noting that no bird species were included in the CITES international trade, as confirmed by the study. The conservation status of a threatened species is a reliable indicator of its likelihood of survival. The conservation status determination considers not only the remaining population count, but also population size changes over time, breeding success rates, and known threats.

It is important to note that the IUCN Red List is the most widely recognized conservation status classification system globally. The IUCN Red List catalogues endangered plant and animal species worldwide, with the purpose of drawing attention to these species and encouraging direct conservation efforts (Nainggolan et al., 2019).

CONCLUSION

Bird keeping and trading are deeply ingrained in Indonesian culture. However, the consequences of these practices, namely species extinction, are a cause for concern. In Jambi City, bird trading has grown due to the high demand for pets and contests. It is important to acknowledge that this rampant trading is driven solely by economic gain. The research has confidently identified two bird species, *Chloropsis sonneratii* and *Loriculus galgulus*, as protected species.

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