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Vanishing Voices: Tracing the Trade Networks and Distribution Pathways of Songbirds in Banda Aceh Markets

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Abstract: Tracing the trade and distribution pathways refers to the systematic analysis of the origins, movement routes, and distribution patterns of a commodity, such as songbirds, from its source to the final market or end consumer. This study explored the dynamics of bird trade in the markets of Banda Aceh city, focusing on species diversity, conservation status, species origin, and trade patterns. The study was conducted in nine sub-districts, covering 18 bird shops, using a descriptive qualitative approach. Data were collected through direct observation, market surveys, and structured interviews with traders. Species identification was conducted using the *Birds of the Indonesian Archipelago* guide, while conservation status was evaluated based on the IUCN Red List and CITES Appendices. In addition, Geographic Information System (GIS) software was used to map bird trade distribution channels. The results showed the presence of 54 bird species with a total of 638 individuals, mostly from the *Passeriformes* order. The most commonly traded species was *Acridotheres javanicus* (kerak kerbau), with 132 individuals, reflecting its high demand due to its adaptability and affordability. Conservation analysis showed the vulnerability of species such as *Gracula religiosa* (Nias parrot), which is listed in Appendix II of CITES, and *Rubigula dispar* (yellow finch), which is categorized as Vulnerable. This research highlights the complex relationship between the local bird trade and conservation efforts, and the importance of stricter regulation and increased public awareness to protect threatened species. The findings make an important contribution to policy recommendations in order to promote sustainable bird trade and biodiversity conservation in Banda Aceh.

Keywords: Bird trade; Banda Aceh; *Passeriformes*

Introduction

Indonesia has incredible biodiversity, encompassing around 31,750 species, which equates to 1.75% of the total species that have been identified worldwide. As part of this huge contribution to diversity, Indonesia is also home to 17% of the world's birds. Indonesia's bird diversity makes a significant impact, making it the fourth most avifauna-rich country in the world, after Colombia, Brazil and Peru (Setiawan, 2022). This diversity shows levels that range from moderate to high, with a total of 1,771 bird species, including 513 endemic species, which play an important role in maintaining ecosystem balance in various habitats in Indonesia. (Nainggolan et al., 2019; Prasetyo & Wulandari, 2020).

Order *Passeriformes*, which is known as a songbird. (Hujatulatif et al., 2022) plays an important role in the ecosystem. The existence of birds in this order is strongly influenced by the presence of preserved vegetation in

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their habitat, which supports their nesting and foraging. Some species in this order also have economic value, such as the *cucak kutilang*, which shows the importance of conservation efforts to maintain ecosystem balance and sustainability of natural resources. According to (Syafiq et al., 2023), this order also plays an important role in biodiversity, with a wide ecological niche that allows adaptation to a variety of habitat types and food sources, such as fruits, small insects, and seeds. As the most diverse group of birds, this order includes more than half of all known bird species, genera and families. The *Passeriformes* order is distributed worldwide, inhabiting almost all types of habitats, except polar regions. The size of birds in this order varies from crows weighing more than 1.5 kilograms to short-tailed dwarf tyrants whose average weight is only about 4.2 grams (Oud et al., 2020).

The trade in birds, especially the *Passeriformes* order, is influenced by various factors, one of which is the high demand from consumers. This demand arises because most birds are used in competitions and as pets, making bird keeping a popular hobby. (Abdullah et al., 2024). This creates a lucrative market opportunity for traders. The presence of these birds in a variety of habitats and the ease of breeding makes them easily accessible to traders (Dickinson et al., 2024). Although the trade is driven by economic and social factors, such as high consumer demand and ease of access, conservation issues remain a major concern. Based on the explanation of (Donald et al., 2024), low public awareness of the conservation status of bird species has resulted in the trade continuing despite involving endangered birds.

Another factor that contributes to the bird trade is the lack of supervision and strict law enforcement against illegal trade. In addition, low levels of public education on the importance of wild bird conservation and lack of access to environmental education contribute to rampant bird poaching and trade activities. People in some areas do not fully understand the important role of birds in maintaining the balance of the ecosystem. Low economic factors are also a major driver of poaching, as for some communities, these birds are seen as a more accessible source of income. (Chng et al., 2018). Therefore, national and international regulations, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), are crucial in controlling trade in birds and other threatened species to protect biodiversity and prevent extinction (Nijman, Abdullah, Adjutant et al., 2018). In Indonesia, wildlife protection laws such as the Regulation of the Minister of Environment and Forestry (PermenLHK, 2018) Republic of Indonesia Number P.106/MENLHK/ SETJEN/KUM.1/12/2018 (Nijman et al., 2022; Nijman, Abdullah, Ardiansyah, et al., 2024) is also crucial in maintaining populations of endangered species, including birds. Strict law enforcement against poaching and illegal trade is necessary to maintain stable bird populations.

Research on the distribution and trade routes of birds in the *Passeriformes* order in Aceh Province, especially in Banda Aceh City, is still very limited. Some previous studies, such as those conducted by (Fentiany et al., 2018) in the Deudap Pulo Aceh area, identified 43 species from 25 families, with the *Passeriformes* order as the dominant group. In addition, research in the Banda Aceh City Forest by (Siti & Kamal Samsul, 2022) identified 20 species from 10 families, with the *Passeriformes* order continuing to dominate. However, more in-depth studies on the distribution and trade dynamics of birds in the *Passeriformes* order are still lacking and require further attention. The objectives of this study were to identify bird species of the Order *Passeriformes* sold in the bird market of Banda Aceh city, study the dynamics of bird trade to understand its influence on trade practices, and analyze commonly used trade distribution channels and their influencing factors.

Method

This study was conducted in nine sub-districts in Banda Aceh city, namely Baiturrahman, Banda Raya, Jaya Baru, Kuta Alam, Kuta Raja, Luengbata, Meuraxa, Syiah Kuala, and Ulee Kareng, which can be seen in Figure 1, with a time span from April to July 2024. The approach used was qualitative with a descriptive design, aiming to explore the dynamics of bird trade in Banda Aceh markets, with a particular focus on Passeriformes species. Data collection was conducted through direct observation, market surveys, and interviews using open-ended and structured interview instruments with traders. The main objectives of the data collection were to obtain information on traded bird species, volumes, conservation status, and to map the distribution channels of birds based on their origin. (Mulyadi & Dede, 2020; Nurmaliah et al., 2024; Rentschlar et al., 2018). Furthermore, qualitative analysis was conducted using a narrative interpretation approach to identify bird species in the trade, determine the volume of these species, evaluate their conservation status, and map distribution pathways based on the origin of the trafficked birds.

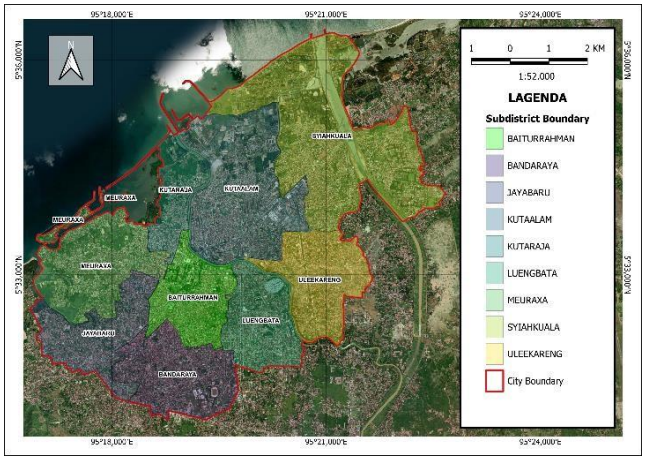

Figure 1. Research Location

Table 1. Research instruments

Tool Name	Usability
Voice recorder (Hanphone)	Recording during field observations (interviews with traders)
Camera	Document the type of birds being traded (photo and video)
GPS	To determine the location of the bird market
Bird species identification book "Birds of the Indonesian Archipelago second edition"	As a guide to the identification of species found
Research instruments	Recording observation results

Data for this study were collected through a market survey conducted in nine sub-districts of Banda Aceh city over a two-month period. This qualitative survey involved bird traders to identify the species traded, the volume of species, as well as the distribution of capture origin of the birds traded, in addition to evaluating the selling price of the species. (Damara et al., 2022; Harris et al., 2015; Van Kuijk et al., 2022). Market survey methods included direct observation and interviews with traders to identify bird species of the Order Passeriformes, species volumes, and species selling prices, with the species identification process referring to the *Guide to the Birds of Sumatra, Java, Bali and* Kalimantan (Eaton et al., 2016 *in* Siregar & Siregar, 2019). These interviews focused on questions regarding the most traded species, price fluctuations, and communication regarding species identification between traders and researchers.

The threat status of bird species was then determined based on criteria set out by the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (Tri Mulyana et al., 2019). As well as bird protection in Indonesia, which refers to the Regulation of the Minister of Environment and Forestry (Permen LHK, 2018) of the Republic of Indonesia Number P.106/MENLHK/SETJEN/KUM.1/12/2018. In addition, the threat status of bird trade is determined based on international regulations governed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), where birds from the Passeriformes Order are often included in the CITES list due to the threat of uncontrolled international trade (Heinrich et al., 2018). Interviews with bird traffickers also provided further insight into the distribution routes and transaction points of the bird trade. The next step was to analyze the data using Geographic Information System (GIS) software to map the distribution and trade routes of Passeriformes birds in Banda Aceh city.

Result and Discussion

Species Identification of Traded Birds

Research conducted in nine sub-districts of Banda Aceh city identified 18 bird shops actively involved in the trade of various bird species. Most of the traded bird species belonged to the Order Passeriformes, with a total of 54 species recorded in Table 2.

Table 2. Traded Bird Species

English Name	Species Scientific Name	Family	∑
Javan Myna	*Acridotheres javanicus*	*Sturnidae*	132
Common Iora	*Aegithina tiphia*	*Nectariniidae*	13
Crimson Sunbird	*Aethopyga siparaja*	*Nectariniidae*	1
Temminck's Sunbird	*Aethopyga temminckii*	*Pycnonotidae*	3
Brown-cheeked Nightingale	*Alophoixus bres*	*Pycnonotidae*	2
Gray-cheeked Nightingale	*Alophoixus tephrogenys*	*Nectariniidae*	3
Brown-throated Sunbird	*Anthreptes malacensis*	*Sturnidae*	10
Asian Glossy Starling	*Aplonis panayensis*	*Nectariniidae*	1
Thick-billed Spiderhunter	*Arachnothera crassirostris*	*Laniidae*	3
Black-headed Nightingale	*Brachypodius atriceps*	*Pycnonotidae*	4
Greater Green Leafbird	*Chloropsis sonnerati*	*Chloropseidae*	30
Lesser Green Leafbird	*Chloropsis cyanopogon*	*Chloropseidae*	14
Blue-winged Leafbird	*Chloropsis moluccensis*	*Chloropseidae*	14

English Name	Species Scientific Name	Family	∑
Olive-backed Sunbird	*Cinnyris jugularis*	*Nectariniidae*	13
White-rumped Shama	*Copsychus malabaricus*	*Muscicapidae*	23
Rufous-tailed Shama	*Copsychus pyrropygus*	*Muscicapidae*	1
Oriental Magpie-Robin	*Copsychus saularis*	*Muscicapidae*	34
Chestnut-winged Babbler	*Cyanoderma bicolor*	*Timaliidae*	1
Bronzed Drongo	*Dicrurus aeneus*	*Dicruridae*	5
Ashy Drongo	*Dicrurus leucophaeus*	*Dicruridae*	1
Orange-bellied Flowerpecker	*Dicaeum trigonostigma*	*Dicaeidae*	2
White-crowned Forktail	*Enicurus leschenaulti*	*Muscicapidae*	2
Black-and-white Laughingthrush	*Garrulax bicolor*	*Leiothrichidae*	4
Common Hill Myna	*Gracula religiosa*	*Sturnidae*	8
Javan Pied Starling	*Gracupica jalla*	*Pittidae*	7
Van Hasselt's Sunbird	*Leptocoma brasiliana*	*Pycnonotidae*	32
Scaly-breasted Munia	*Lonchura punctulata*	*Nectariniidae*	2
White-headed Munia	*Lonchura maja*	*Estrildidae*	9
Pin-striped Tit-Babbler	*Mixornis gularis*	*Estrildidae*	1
Ferruginous Flycatcher	*Muscicapa ferruginea*	*Timaliidae*	1
Black-naped Oriole	*Oriolus chinensis*	*Muscicapidae*	3
Ashy Tailorbird	*Orthotomus ruficeps*	*Oriolidae*	4
Common Tailorbird	*Orthotomus sutorius*	*Cisticolidae*	1
Cinereous Tit	*Parus cinereus*	*Cisticolidae*	7
Great Tit	*Parus major*	*Paridae*	12
Eurasian Tree Sparrow	*Passer montanus*	*Paridae*	28
Scarlet Minivet	*Pericrocotus flammeus*	*Campephagidae*	1
Baya Weaver	*Ploceus philippinus*	*Ploceidae*	15
Bar-winged Prinia	*Prinia familiaris*	*Cisticolidae*	3
Black-throated Laughingthrush	*Pterorhinus chinensis*	*Leiothrichidae*	1
Chestnut-capped Laughingthrush	*Pterorhinus mitratus*	*Leiothrichidae*	12
Sooty-headed Nightingale	*Pycnonotus aurigaster*	*Pycnonotidae*	21
Yellow-vented Nightingale	*Pycnonotus goiavier*	*Pycnonotidae*	22
Olive-winged Nightingale	*Pycnonotus plumosus*	*Pycnonotidae*	14
Cream-vented Nightingale	*Pycnonotus simplex*	*Pycnonotidae*	2
Spot-necked Nightingale	*Pycnonotus tympanistrigus*	*Pycnonotidae*	2
Black-headed Nightingale	*Rubigula dispar*	*Pycnonotidae*	40
Finch-billed Myna	*Scissirostrum dubium*	*Pycnonotidae*	2
Domestic Canary	*Serinus canaria*	*Sturnidae*	58
Velvet-fronted Nuthatch	*Sitta frontalis*	*Sittidae*	3
Gray-throated Babbler	*Stachyris leucotis*	*Timaliidae*	1
Cape White-eye	*Zosterops melanurus*	*Zosteropidae*	1
Blue-winged Pitta	*Hydrornis guajanus*	*Pittidae*	8
Charlotte's Nightingale	*Iole charlottae*	*Pycnonotidae*	1
Number of Individuals ∑			638

This study identified 638 individual birds traded in the Banda Aceh bird market. The species with the highest number of individuals was *Acridotheres javanicus* (Javan Myna) from the Sturnidae family, with a total of 132 individuals. The high trade rate of this species reflects the high demand triggered by the ability of *Acridotheres javanicus* to adapt well to urban environments. (Saroyo et al., 2024). On the other hand, some species such as *Pericrocotus flammeus* (Scarlet Minivet), *Dicrurus leucophaeus* (Ashy Drongo), and *Leptocoma brasiliana* (Van Hasselt's Sunbird) were only found in single individuals. The presence of these very low numbers of species suggests a specialized trade pattern to meet the demands of collectors or specific needs.

In terms of family diversity, birds from the Pycnonotidae family are one of the most common groups, with species such as *Rubigula dispar* (Black-headed Bulbul) and *Pycnonotus goiavier* (Yellow-vented Bulbul) in demand for their calls and plumage colors. In addition, the Chloropseidae family is also quite dominant with species such as *Chloropsis sonnerati* (Greater Green Leafbird), which is often traded for its beauty and song ability. In contrast, families such as Campephagidae, Dicruridae, and Zosteropidae were represented by only a few individuals, reflecting the lower preference of buyers in this market. This pattern confirms that people's preferences for pet birds are strongly influenced by aesthetic factors and song ability.

Trends in the bird trade in Banda Aceh are in line with patterns found elsewhere in Southeast Asia, where species with aesthetic value and distinctive sounds are the main focus of trade (Lee et al., 2016). Birds from the Pycnonotidae and Chloropseidae families that have melodious voices and striking colors are popular among songbird enthusiasts. However, the trade of rare species, despite their small numbers, can pose a serious threat to their survival in natural habitats (Fiennes et al., 2016). As stated by (Nijman et al., 2021), the irregular trade in birds has the potential to result in the decline of species populations in the wild.

Conservation Status of Traded Species

After identifying 54 bird species traded in Banda Aceh City, researchers then recorded the conservation status of each species based on three main references. These references included the Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018, the International Union for Conservation of Nature (IUCN) Red List, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as listed in Figures 2, 3, 4.

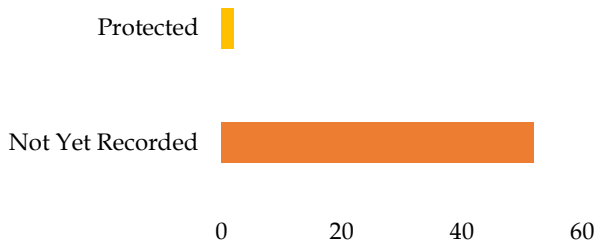

Figure 2. Conservation Status According to Permen LHK No. P.106/MENLHK/SETJEN/KUM.1/12/2018

The results showed that of the species listed, only a small proportion are legally protected under the Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN/KUM.1/12/2018. Some of the protected species include *Aethopyga siparaja*, *Chloropsis sonnerati*, *Chloropsis cyanopogon*, *Chloropsis moluccensis*, *Garrulax bicolor*, and *Hydrornis guajanus*. Meanwhile, other species, although not on national protection lists, have varying international conservation status, demonstrating the importance of attention to transboundary protection regulations to protect biodiversity as a whole.

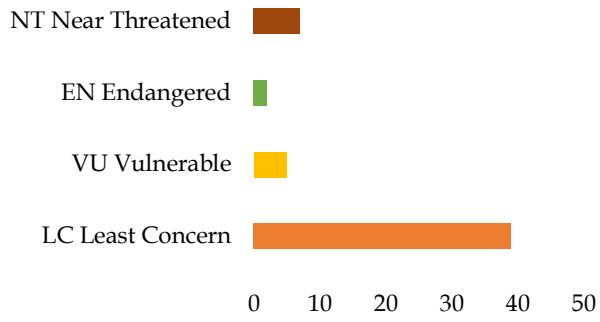

Figure 3. Conservation Status According to IUCN 2024

Based on IUCN 2024 data, a number of bird species are categorized as Vulnerable (VU), including *Acridotheres javanicus*, *Alophoixus tephrogenys*, *Rubigula dispar*, *Scissirostrum dubium*, and *Zosterops melanurus*. This status indicates that their populations in the wild face serious threats that may affect their long-term survival. In addition, some species have been listed as Endangered (EN), such as *Alophoixus bres* and *Chloropsis sonnerati*, which means they are in a more critical condition with a higher risk of extinction. On the other hand, several other species have Near Threatened (NT) status, which includes *Chloropsis cyanopogon*, *Copsychus pyrropygus*, *Garrulax bicolor*, *Prinia familiaris*, *Pterorhinus mitratus*, and *Iole charlottae*, which although not yet classified as threatened, still show indications of potential risk in the future. Meanwhile, most of the species on this list were given Least Concern (LC) status, indicating that they are not currently considered to be on the brink of extinction in the near future.

In terms of international trade regulations, CITES 2024 in Figure 4 lists only two species in Appendix II, namely *Copsychus malabaricus* and *Gracula religiosa*, indicating that trade in these two species is restricted to prevent threats to their survival in the wild. Although many bird species are not protected locally, some face serious threats internationally, especially those categorized as Vulnerable, Endangered, or Near Threatened on the IUCN list. This emphasizes the importance of strengthening national regulations and international cooperation to conserve bird species in Indonesia. (Masykur et al., 2023). More effective implementation of conservation policies is urgently needed to protect species identified as experiencing significant population declines, in accordance with the recommendations proposed by (Setiawan, 2022).

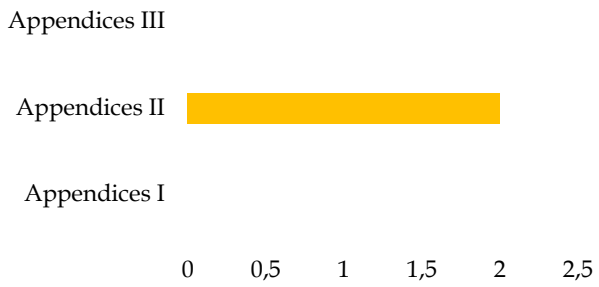

Figure 4. Conservation Status According to CITES Appendices 2024

Price Dynamics of Traded Birds

Table 2 shows the variation in prices reflecting the rarity, aesthetic value, and vocal ability of the species being traded. The lowest price was recorded for the Eurasian Tree Sparrow (*Passer montanus*), which sold for IDR 5,000-15,000, while the highest price reached IDR 7,000,000 for the Black- throated Laughingthrush (*Pterorhinus chinensis*), a rare species in demand for its attractive appearance. Some mid- priced birds, such as the Javan Myna (*Acridotheres javanicus*) and Sooty-headed Bulbul (*Pycnonotus aurigaster*), sell for IDR 25,000-50,000, reflecting their abundant availability. Meanwhile, species with a particular appeal, such as the White-rumped Shama (*Copsychus malabaricus*), have prices that vary up to IDR 8,000,000, indicating that aesthetic factors and vocal ability greatly affect their economic value. Rare species such as Blue-winged Pitta (*Hydrornis guajanus*) and Crimson Sunbird (*Aethopyga siparaja*), although sold in small quantities, still command high prices of IDR 750,000 and IDR 80,000, indicating that rarity is the main attraction in this trade.

Table 3. Selling Price of Bird Species traded

English Name	Species Scientific Name	Selling Price (Rp)
Javan Myna	*Acridotheres javanicus*	Rp.25,000-50,000
Common Iora	*Aegithina tiphia*	Rp. 80,000
Crimson Sunbird	*Aethopyga siparaja*	Rp. 80,000
Temminck's Sunbird	*Aethopyga temminckii*	Rp. 100,000
Brown-cheeked Nightingale	*Alophoixus bres*	Rp. 1,200,000
Gray-cheeked Nightingale	*Alophoixus tephrogenys*	Rp. 1,200,000
Brown-throated Sunbird	*Anthreptes malacensis*	Rp.35,000- 250,000
Asian Glossy Starling	*Aplonis panayensis*	Rp. 100,000
Thick-billed Spiderhunter	*Arachnothera crassirostris*	Rp. 150,000
Black-headed Nightingale	*Brachypodius atriceps*	Rp. 1,200,000
Greater Green Leafbird	*Chloropsis sonnerati*	Rp.450,000- 1,300,000
Lesser Green Leafbird	*Chloropsis cyanopogon*	Rp. 250,000
Blue-winged Leafbird	*Chloropsis moluccensis*	Rp.80,000-250,000
Olive-backed Sunbird	*Cinnyris jugularis*	Rp. 80,000
White-rumped Shama	*Copsychus malabaricus*	Rp.80,000-8,000,000
Rufous-tailed Shama	*Copsychus pyrropygus*	Rp. 300,000
Oriental Magpie-Robin	*Copsychus saularis*	Rp.80,000- 4,000,000
Chestnut-winged Babbler	*Cyanoderma bicolor*	Rp. 100,000
Bronzed Drongo	*Dicrurus aeneus*	Rp. 80,000
Ashy Drongo	*Dicrurus leucophaeus*	Rp. 1,000,000
Orange-bellied Flowerpecker	*Dicaeum trigonostigma*	Rp. 1,000,000
White-crowned Forktail	*Enicurus leschenaulti*	Rp. 100,000
Black-and-white Laughingthrush	*Garrulax bicolor*	Rp. 800,000
Common Hill Myna	*Gracula religiosa*	Rp.2,000,000 - 3,000,000
Javan Pied Starling	*Gracupica jalla*	Rp. 300,000
Van Hasselt's Sunbird	*Leptocoma brasiliana*	Rp. 80,000
Scaly-breasted Munia	*Lonchura punctulata*	Rp. 600,000
White-headed Munia	*Lonchura maja*	Rp. 600,000
Pin-striped Tit-Babbler	*Mixornis gularis*	Rp. 100,000
Ferruginous Flycatcher	*Muscicapa ferruginea*	Rp. 100,000
Black-naped Oriole	*Oriolus chinensis*	Rp.80,000-200,000
Ashy Tailorbird	*Orthotomus ruficeps*	Rp. 80,000
Common Tailorbird	*Orthotomus sutorius*	Rp. 80,000
Cinereous Tit	*Parus cinereus*	Rp. 80,000
Great Tit	*Parus major*	Rp.35,000 - 400,000
Eurasian Tree Sparrow	*Passer montanus*	Rp.5,000 - 15,000
Scarlet Minivet	*Pericrocotus flammeus*	Rp. 350,000

English Name	Species Scientific Name	Selling Price (Rp)
Baya Weaver	*Ploceus philippinus*	Rp.30,000- 100,000
Bar-winged Prinia	*Prinia familiaris*	Rp. 80,000
Black-throated Laughingthrush	*Pterorhinus chinensis*	Rp. 7,000,000
Chestnut-capped Laughingthrush	*Pterorhinus mitratus*	Rp.50,000 - 80,000
Sooty-headed Nightingale	*Pycnonotus aurigaster*	Rp.25,000 - 50,000
Yellow-vented Nightingale	*Pycnonotus goiavier*	Rp.25,000 - 50,000
Olive-winged Nightingale	*Pycnonotus plumosus*	Rp. 1,200,000
Cream-vented Nightingale	*Pycnonotus simplex*	Rp. 1,200,000
Spot-necked Nightingale	*Pycnonotus tympanistrigus*	Rp. 3,000,000
Black-headed Nightingale	*Rubigula dispar*	Rp. 1,200,000
Finch-billed Myna	*Scissirostrum dubium*	Rp. 500,000
Domestic Canary	*Serinus canaria domestica*	Rp.250,000- 300,000
Velvet-fronted Nuthatch	*Sitta frontalis*	Rp. 100,000
Gray-throated Babbler	*Stachyris leucotis*	Rp. 350,000
Cape White-eye	*Zosterops melanurus*	Rp. 80,000
Blue-winged Pitta	*Hydrornis guajanus*	Rp. 750,000
Charlotte's Nightingale	*Iole charlottae*	Rp. 1,200,000

The results of this research on the selling price of bird species confirm that the trade in wild birds still threatens the sustainability of bird populations in their natural habitat, and also emphasizes that the rarity of species tends to increase their market value, even though the number of birds traded is small. This phenomenon shows that consumer demand is often oriented towards aesthetics and exclusivity. With birds such as the White-rumped Shama being valued at millions of rupiah, it appears that the bird trade is not only oriented towards availability, but also the prestige that comes with it. (Yasmin & Satria, 2024).

Distribution of Origin of Traded Birds

The birds traded in Banda Aceh come from various parts of Aceh, including Sabang, Aceh Besar, Lhokseumawe, Simeulue, and mountainous areas such as Central Aceh and Southeast Aceh. These areas have high biodiversity, such as tropical rainforests and coastal areas, which provide habitat for many bird species. The distribution map further clarifies this pattern by grouping regions by color, reflecting the level of involvement of the district or city in the bird trade. Areas colored pink, such as Sabang, North Aceh, Simeulue, and East Aceh, have only 0- 1 subdistrict as a source of birds, so their contribution is low.

Meanwhile, green represents areas such as Central Aceh, Bener Meriah, Banda Aceh City, Pidie, and Lhokseumawe City, which each have 2-3 subdistricts as bird sources, reflecting a medium level of engagement. Blue represents areas with higher activity, such as Gayo Lues and Aceh Jaya, which have 3-4 subdistricts as sources of birds. Finally, Aceh Besar district, represented in red, has more than four sub-districts as the main source of traded birds, with areas such as Lamteuba, Tangse, and Pintu Rime Gayo being the main centers of bird capture, as shown in Figure 5.

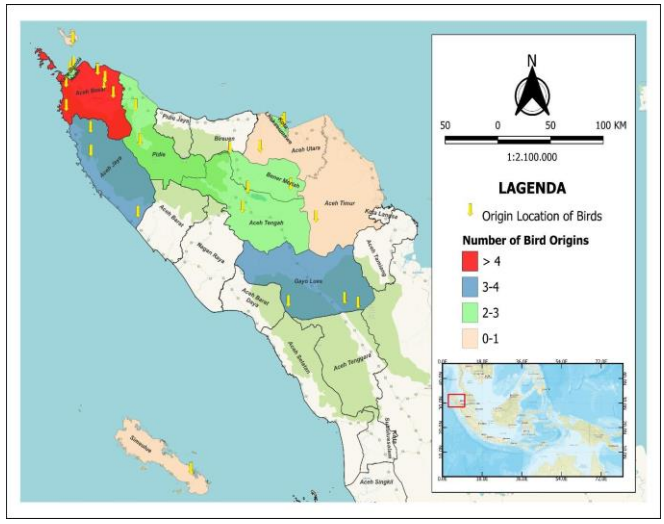

Figure 5. Distributions of Origin of Bird Species traded

The origin distribution map above shows that the high contribution of some regions in the bird trade has the potential to put great pressure on wild bird populations in Aceh. In particular, mountainous areas such as Aceh Besar and its surroundings are home to exotic bird species that have high market value. Lack of monitoring of poaching and weak law enforcement are the main factors driving this activity, including the trade of protected species. In addition, the low level of public education regarding the importance of wild bird conservation exacerbates the situation, due to a lack of understanding of the long-term impacts of illegal trade on biodiversity. Low economic factors in some areas are also a major driver of poaching activities, with communities often seeing bird capture and trade as a quick and easy source of income.

This phenomenon threatens the sustainability of wild birds in Aceh, especially in conservation areas such as Ketambe and Bebesen, which are under great pressure due to uncontrolled capture. As mentioned by (Wilson-

Holt & Roe, 2021) conservation efforts that involve community education are critical to mitigating the negative impacts of the wild bird trade. Measures such as strengthening conservation policies, species protection campaigns, raising public awareness, and alternative economic empowerment programs must be implemented immediately to maintain Aceh's biodiversity amidst the high market demand for songbirds and ornamental birds.

Conclusion

Research on bird trade in the Banda Aceh municipal market identified 54 species from the *Passeriformes* order, with a total of 638 individuals traded. Among the species that dominated the market, *Acridotheres javanicus* (Javan Myna) was the most common due to its good adaptability to urban environments as well as its relatively affordable price. In contrast, rare species such as *Copsychus malabaricus* (White-rumped Shama) and *Rubigula dispar* (Black-headed Bulbul) have a much higher economic value, reflecting the high market demand driven by their physical beauty and vocal quality. Based on conservation status analysis, some species such as *Acridotheres javanicus* and *Chloropsis sonnerati* (Greater Green Leafbird) are categorized as vulnerable, while *Gracula religiosa* (Common Hill Myna) and *Copsychus malabaricus* are listed in Appendix II of CITES, which restricts their trade to prevent extinction. In terms of distribution, most of the traded birds come from the Aceh Besar region, which is the main source of bird supply to the Banda Aceh market. Price dynamics in this market show that species rarity and high market demand significantly affect prices, with rare birds such as *Pterorhinus chinensis* (Black-throated Laughingthrush) fetching up to IDR 7,000,000. The results of this study underscore the urgency of stricter monitoring of the bird trade to protect endangered species and ensure the sustainability of bird ecosystems in the Aceh region.

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Author Contributions
The research Vanishing Voices: Tracing the Trade Networks and Distribution Pathways of Songbirds in Banda Aceh Markets was implemented through the collaborative role of various parties. Hanif Raihan was responsible for data collection and field observations, supported by Ibu Devi Syafrianti as the main supervisor who acted as a data collaborator and main correspondent for the publication. Mr Abdullah, Head of the Elephant Conservation and Forest Biodiversity Research Centre at Syiah Kuala University, contributed to species identification and distribution analysis. Corrections to the conservation data and species protection strategies were made by Ms Fitrah Asma Ulhusna, while refinement of the scientific writing was handled by Mr Yaumil Istiqlal M. Nur. Mr Ismul Huda supported the establishment of the research framework through assistance in data management, and Mrs Cut Nurmaliah as the research leader provided strategic direction and trust in the implementation of this research.

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Conflicts of Interest
The author confirms that there is no conflict of interest in the research carried out.

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