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Ethno -ornithology as a basis for sustainable tourism in dry forests

Etno-ornitología como base del turismo sostenible en bosques secos

Etno-ornitologia como base para o turismo sustentável em florestas secas

Sonia Rosete Blandariz ¹ , Claudia Valentina Gómez Pisco ¹ ,
Humberto Antonio González González ² , Romina Stephania Saénz Veliz ¹ ,
Franklin Edmundo Pin Figueroa ¹ 

¹Southern State University of Manabí, Ecuador.

²Autonomous University of Guerrero, Chilpancingo de los Bravo, Mexico.

* Corresponding author: sonia.rosete@unesum.edu.ec

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ABSTRACT

The objective of this study was to document local ethno-ornithological knowledge and to characterize the tourism potential of the avifauna in El Chial community, Manabí Province, Ecuador. Free listing, semi-structured interviews, surveys, and field surveys were applied, complemented by spatial analysis using GIS. A total of 14 bird species belonging to 10 families were identified, distributed across four types of land cover: grasslands (175.55 ha), natural forest (122.76 ha), traditional crops (122.39 ha), and shrub vegetation (69.86 ha). The species with the highest cultural salience were *Psittacara erythrogenys* (0.66), *Pionus menstruus* (0.53), and *Brotogeris pyrrhopterus* (0.53), all



psittacids with high tourism appeal due to their coloration, vocalization, and gregarious behavior. Local knowledge largely coincides with documented ecological patterns, including feeding habits, nesting sites, and reproductive periods. The *Melanerpes pucherani*, *Ortalis erythroptera*, and *Momotus subrufescens* were recognized as suitable for interpretive walks and environmental education. In agricultural areas, *Molothrus bonariensis* and *Crotophaga sulcirostris* stood out for their accessibility and ease of observation, facilitating initial birdwatching experiences. The results demonstrate that local birdlife constitutes a strategic resource for designing community-based tourism products grounded in conservation, Montubio identity, and sustainable dry forest management. This study highlights that the integration of traditional knowledge, ecological analysis, and spatial tools provides a solid foundation for the development of sustainable birdwatching tourism in rural territories.

Keywords: avifauna, dry forest, ethno-ornithology, local knowledge, sustainable tourism.

RESUMEN

El objetivo del estudio fue documentar el conocimiento etno-ornitológico local y caracterizar el potencial turístico de la avifauna del Recinto El Chial, provincia de Manabí, Ecuador. Se aplicaron listas libres, entrevistas semiestructuradas, encuestas y recorridos de campo, complementados con análisis espaciales mediante SIG. Se identificaron 14 especies de aves pertenecientes a 10 familias, distribuidas en cuatro tipos de cobertura: pastizales (175,55 ha), bosque natural (122,76 ha), cultivos tradicionales (122,39 ha) y vegetación arbustiva (69,86 ha). Las especies con mayor saliencia cultural fueron *Psittacara erythrogenys* (0,66), *Pionus menstruus* (0,53) y *Brotogeris pyrrhopterus* (0,53), todas psitácidas de alto atractivo turístico por su colorido, vocalización y comportamiento grupal. El conocimiento local coincidió ampliamente con patrones ecológicos documentados, incluyendo hábitos alimenticios, sitios de nidificación y períodos reproductivos. La especie *Melanerpes pucherani*, *Ortalis erythroptera* y *Momotus subrufescens*, fueron reconocidas como idóneas para caminatas interpretativas y educación ambiental. En áreas agrícolas, *Molothrus bonariensis* y *Crotophaga sulcirostris* se destacan por su accesibilidad y facilidad de observación, lo que permite experiencias



iniciales de observadores de aves. Los resultados demuestran que la avifauna local constituye un recurso estratégico para diseñar productos turísticos comunitarios basados en conservación, identidad montubia y manejo sostenible del bosque seco. Este estudio evidencia que la integración entre conocimiento tradicional, análisis ecológico y herramientas espaciales ofrece una base sólida para el desarrollo de aviturismo sostenible en territorios rurales.

Palabras clave: avifauna, bosque seco, conocimiento local, etno-ornitología, turismo sostenible.

RESUMO

O objetivo deste estudo foi documentar o conhecimento etno-oritológico local e caracterizar o potencial turístico da avifauna do Recinto El Chial, província de Manabí, Equador. Foram aplicadas listas livres, entrevistas semiestruturadas, questionários e levantamentos de campo, complementados com análises espaciais por meio de SIG. Foram identificadas 14 espécies de aves pertencentes a 10 famílias, distribuídas em quatro tipos de cobertura: pastagens (175,55 ha), floresta natural (122,76 ha), cultivos tradicionais (122,39 ha) e vegetação arbustiva (69,86 ha). As espécies com maior saliência cultural foram *Psittacara erythrogenys* (0,66), *Pionus menstruus* (0,53) e *Brotogetis pyrrhopterus* (0,53), todas psitacídeas de alto atrativo turístico devido à sua coloração, vocalização e comportamento gregário. O conhecimento local coincidiu amplamente com os padrões ecológicos documentados, incluindo hábitos alimentares, locais de nidificação e períodos reprodutivos. As espécies *Melanerpes pucherani*, *Ortalis erythroptera* e *Momotus subrufescens* foram reconhecidas como adequadas para caminhadas interpretativas e educação ambiental. Em áreas agrícolas, *Molothrus bonariensis* e *Crotophaga sulcirostris* destacam-se pela sua acessibilidade e facilidade de observação, permitindo experiências iniciais de observação de aves. Os resultados demonstram que a avifauna local constitui um recurso estratégico para o desenvolvimento de produtos turísticos comunitários baseados na conservação, na identidade montubia e no manejo sustentável da floresta seca. Este estudo evidencia que a integração entre conhecimento tradicional, análise ecológica e ferramentas espaciais oferece uma base sólida para o desenvolvimento do turismo de observação de aves sustentável em territórios rurais.



Palabras-chave: avifauna, conocimiento local, etno-ornitología, floresta seca, turismo sustentável.

INTRODUCTION

The relationship between birds and human communities is central to understanding the cultural, ecological, and perceptual dimensions of territory. Ethno-ornithology analyzes these interactions, their integration with traditional knowledge, ecology, and social practices (Delfino, 2024) and has gained global relevance for its ability to make non-Western knowledge visible and strengthen community conservation processes (Bastian. *et al.*, 2024). It has also been shown that the cultural value assigned to birds directly influences their ecological perception and attitudes towards their protection (Aticho *et al.*, 2025), which makes these studies useful tools for designing participatory socio-environmental strategies.

Ethno -ornithological studies remain scarce and are concentrated in Andean or Amazonian regions. In Ecuador, although there has been progress in birdwatching tourism and ornithological monitoring (Freile *et al.*, 2024), the tropical dry forest continues to be underrepresented in the scientific literature, despite its high level of threat and its potential for low-impact tourism activities (Rivera Mateos *et al.*, 2025).

This gap is even more evident in coastal Montubio territories, where knowledge of avifauna is profound and the product of constant interaction with the landscape. However, research that simultaneously integrates local knowledge, ecological analysis, cultural salience, GIS, and tourism assessment in dry forest ecosystems is lacking. El Chial offers an ideal setting to address these interactions, as it is a territory where the human-environment relationship is evident daily. Birdwatching tourism has also become established as a practice capable of promoting responsible behavior and generating local income when based on ecological knowledge and community participation (Saha and Chakraborty, 2025). Aesthetic factors such as coloration, behavior, and song significantly influence observers' preferences (Ananda *et al.*, 2025), which often coincide with species of high cultural value, generating synergies between identity and conservation.



In this research, the integration of local knowledge, ecological data, and spatial analysis is structured through the use of cultural salience, an ethnobiological indicator that weighs the frequency and order of mention in free lists and allows for the identification of priority species for interpretation, education, and tourism. This approach links ecological field records, habitat distribution obtained through GIS, and Montubio knowledge, generating a solid framework for understanding the cultural and tourism roles of avifauna.

Ethno -ornithological knowledge and characterize the tourism potential of the avifauna of the El Chial area, Manabí province, Ecuador, through the integration of participatory methods, ecological inventories, and spatial analysis. By addressing a poorly studied ecosystem and applying cultural salience indicators contrasted with field observations, the research contributes to closing a scientific gap regarding the relationship between avifauna, Montubio identity, and tourism in Ecuadorian dry forests, and provides a basis for the design of interpretive trails and community conservation strategies.

MATERIALS AND METHODS

Study area

The El Chial community, located in the rural parish of Sucre in the 24 de Mayo canton (Figure 1), is a small Montubio community of approximately 215 inhabitants. The population maintains a close relationship with the natural environment and is primarily engaged in agricultural activities, which strengthens its connection to the productive cycles and biodiversity of the dry forest (National Institute of Statistics and Censuses [INEC], 2022). The local birdlife is part of their cultural identity and represents a key resource for sustainable birdwatching initiatives. The territory presents a mosaic of tropical dry forest, agricultural areas, and open zones that favor the presence of a diversity of wildlife species. Its approximate coordinates are -1.25331°, -80.45626°, and the community is connected by the Tropezón-El Chial-Jipijapa road (Military Geographic Institute [IGM], 2013), which facilitates access and enhances its suitability for low-impact tourism activities.



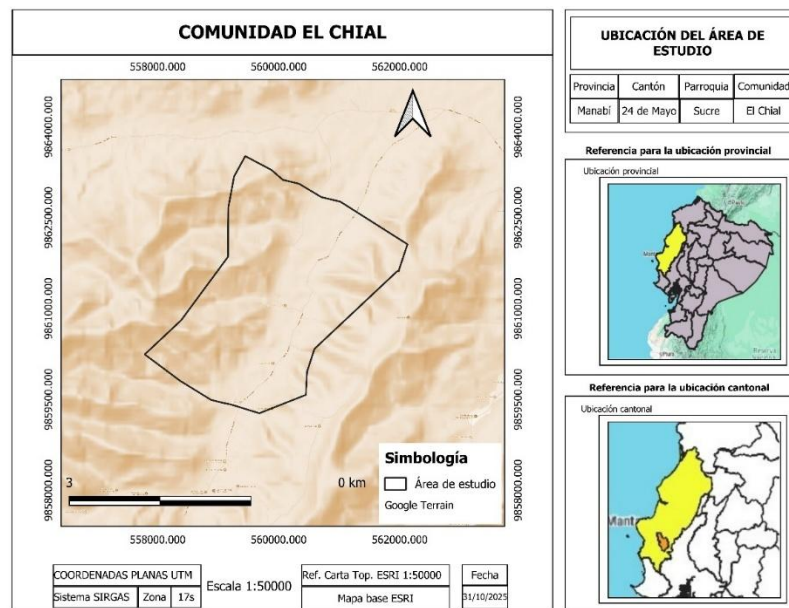


Figure 1. - Location map of the study area corresponding to the El Chial community, 24 de Mayo canton, Manabí province

Source: Own elaboration based on satellite image (Google Terrain) and the cartography of the IGM (2013).

Statement of Ethics

All participants were informed beforehand about the purpose of the study and provided their free, informed, and oral consent for interviews, recordings, photographs, and/or the publication of their knowledge. The interviews were conducted in accordance with the guidelines of the International Society of Ethnobiology 's Code of Ethics. Furthermore, in compliance with the obligations of the Nagoya Protocol, it was established that the rights of use and ownership of any traditional knowledge belong exclusively to the informants, and that any use other than scientific publication will require their additional consent, as well as an explicit agreement regarding access to the benefits derived from its eventual subsequent use.

Data collection

The study was conducted between June 2024 and March 2025, a period that allowed for the incorporation of seasonal variations in the dry forest. Twenty participants were selected using snowball sampling, a method well-suited for identifying key informants in rural communities where ecological knowledge is transmitted intergenerationally.



Only individuals aged 40 and over were included, as this group possesses greater accumulated experience in agriculture, traditional hunting, and land management. The sample consisted primarily of male farmers, followed by women engaged in domestic and agroforestry activities. Final selection was based on information saturation, reached when interviews and open lists no longer yielded new species or narratives.

The free-listing technique (Quinlan, 2005) was used, in which participants individually and spontaneously mentioned, without restriction, the birds they recognized in their environment. This technique allows for the identification of local knowledge and the relative importance of species based on their frequency and order of mention. In parallel, 20 semi-structured interviews of 30–40 minutes each were conducted on Saturdays and Sundays between 4:00 and 7:00 p.m. to accommodate agricultural work schedules. The interviews explored local knowledge about birds, observed behaviors, beliefs, symbolic value, perceptions of birdwatching tourism, and perceived threats. Thematic coding allowed for the identification of relevant cultural and ecological patterns.

The same participants completed an in-person questionnaire. This instrument assessed visual recognition of species using photographs and the perceived tourist appeal. It also identified viable activities for birdwatching, the main barriers to their development, and the community's willingness to participate in birdwatching tourism initiatives. The data were analyzed using descriptive statistics in R, and visual comparisons were generated between species and attributes.

The ecological component consisted of four 1-km transects established in natural forest, shrubland, pastureland, and traditional crops. Each transect was surveyed four times (twice during the dry season and twice during the rainy season) during peak bird activity times (5:30–8:30 a.m. and 4:00–6:00 p.m.). Bird presence, behavior, and habitat preference were recorded through direct observation and photography. No specimens were collected; taxonomic identification was confirmed by ornithologist Juan Fernando Freile Ortiz, ensuring the accuracy of the records.

Data analysis

Spatial analysis was performed using ILWIS 3.31 and the 10-m resolution Sentinel-2 image, supplemented by ground-truthing verification. Natural forest, shrubland,



grassland, and traditional cropland cover were identified through supervised classification and subsequent manual adjustments. All bird observations were georeferenced and overlaid on the land use and land cover map, and spatial incidence maps for each species were also generated. Cartographic products were produced using the UTM 17M South projection with the WGS 1984 datum.

The analysis integrated ethnographic, ecological, and spatial information using a comparative approach. Free lists were processed using the FLARES application (Wenceslaus *et al.*, 2017). The cultural salience of each species was calculated using Smith's index (S) (Smith, 1993), which weights the frequency of mention and the order of appearance in the lists. Additionally, the salience index approach proposed by Sutrop (2001) was considered, which allows for estimating the cognitive prominence of elements within local knowledge. Salience values, expressed on a scale of 0 to 1, were used to identify the most culturally relevant species and compare them with their ecological frequency recorded in the field, in order to analyze the correspondence between local knowledge and biological availability.

Ecological data were analyzed in R, where clustering methods were applied using the *vegan* and *dendextend* packages to identify associations between species based on their relative presence, ecological behavior, and cultural relevance. Simultaneously, georeferenced records were integrated into maps generated in ILWIS, allowing for the examination of spatial distribution patterns and habitat preferences.

The triangulation between traditional knowledge, ecological observations, and spatial mapping provided a solid interpretive framework for assessing the cultural, ecological, and touristic value of the local birdlife, strengthening the analytical consistency and reproducibility of the study.

RESULTS AND DISCUSSION

The study recorded 14 bird species belonging to 10 families (Table 1). These species are distributed across a landscape comprised of four main land cover types: natural forest (122.76 ha), traditional crops (122.39 ha), pastureland (175.55 ha), and shrubland (69.86



ha) (Figure 2). The combination of these elements creates an ecological mosaic where generalist and specialist birds coexist, favored by the heterogeneity of available microhabitats. This pattern is consistent with the capacity of dry forest to support diverse bird communities, even under conditions of human activity.

Table 1. - Bird species identified in the El Chial area, 24 de Mayo Canton, Ecuador. BN = Natural forest; VA = Shrub vegetation; CT = Traditional crops; PA = Pastures

Scientific Name	Popular Name	Family	Location (BN/VA/CT/PA)	Frequency	IUCN Category (2025)
<i>Brotogeris pyrrhopterus</i> (Latham, 1801)	Golden-winged parakeet	Psittacidae	BN, VA, CT	Occasional	VU - Vulnerable
<i>Crotophaga sulcirostris</i> (Swainson, 1827)	Tit-tailed Flycatcher	Cuculidae	VA, CT, PA	Very common	LC-Least Concern
<i>Furnarius cinnamomeus</i> (Lesson, 1844)	Cinnamon ovenbird	Furnariidae	BN, VA, CT	Frequent	LC-Least Concern
<i>Melanerpes pucherani</i> (Malherbe, 1849)	White-breasted woodpecker	Picidae	BN, VA, CT	Occasional	LC-Least Concern
<i>Mimus longicaudatus</i> Tschudi, 1844	Mockingbird long tailed	Mimidae	VA, CT	Frequent	LC-Least Concern
<i>Molothrus bonariensis</i> (Gmelin, 1789)	Shiny thrush	Icteridae	BN, VA, CT, PA	Very common	LC-Least Concern
<i>Momotus subrufescens</i> PL Sclater, 1853	Rufous Motmot	Momotidae	BN, VA	Occasional	LC-Least Concern
<i>Ortalis erythroptera</i> Sclater and Salvin, 1870	Red-winged chachalaca	Cracidae	BN	Frequent	VU - Vulnerable
<i>Pionus menstruus</i> (Linnaeus, 1766)	Blue parrot	Psittacidae	BN, VA	Occasional	LC-Least Concern
<i>Psittacara erythrogenys</i> Lesson, 1844	Red-fronted parrot	Psittacidae	BN	Occasional	NT - Near Threatened



<i>Sicalis flaveola</i> (Linnaeus, 1766)	Yellow Chirigüe	Thraupidae	BN, VA	Frequent	LC-Least Concern
<i>Troglodytes aeson</i> (Vieillot, 1809)	Northern Wren	Troglodytidae	VA, PA	Occasional	LC-Least Concern
<i>Tyrannus niveigularis</i> PL Sclater, 1860	White- throated goldcrest	Tyrannidae	VA, CT, PA	Frequent	LC-Least Concern
<i>Zenaida auriculata</i> (Des Murs, 1847)	Eared pigeon	Columbidae	BN, VA, CT	Very common	LC-Least Concern

Source: Prepared by the author based on interviews, surveys, field observation checklist and IUCN record (2025).

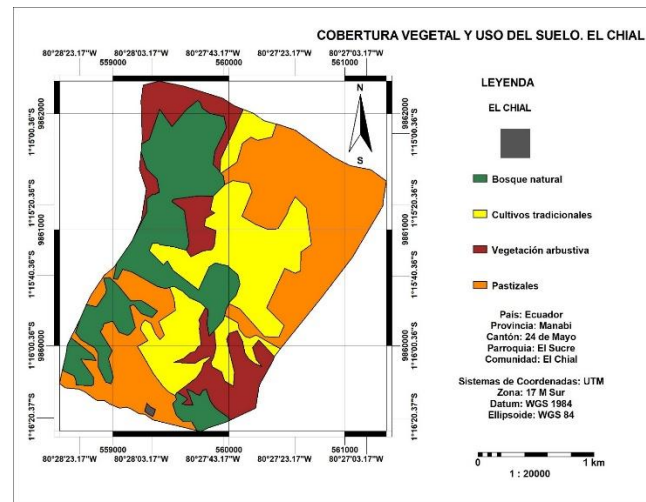


Figure 2. - Vegetation cover and land use map of the El Chial area, 24 de Mayo canton, Manabí

Source: Prepared by the author using satellite images (Google Terrain) and field data processed in ILWIS 3.31.

The persistence of species associated with remnant forests alongside birds adapted to agricultural areas suggests that the territory maintains a functional structure capable of providing food resources, shelter, and breeding sites. This ecological behavior has been documented in other rural landscapes where mixed land uses support different trophic guild structures and life strategies (Castillo-Vizueté *et al.*, 2021; Rivera Mateos *et al.*, 2025). In this sense, the diversity recorded in El Chial reinforces the importance of



traditional agroecological systems as biological corridors and key areas for the conservation of dry forest avifauna.

Field observations revealed clear differences in the ecological frequency of the recorded species. Three birds were very frequent in agricultural areas (traditional crops) (*Molothrus bonariensis*, *Crotophaga sulcirostris* and *Zenaida auriculata*), favored by open habitats and accessible resources. Five species showed intermediate frequency, present in open areas and forest edges, while six species were occasional, mainly associated with natural and secondary forests (shrub vegetation). The latter include visually attractive psittacines such as *Psittacara erythrogenys*, *Pionus menstruus* and *Brotogeris pyrrhopterus*, whose colorfulness and vocalization give it remarkable tourist potential despite its lower abundance.

The species classified as Vulnerable (VU), *Brotogeris pyrrhopterus* and *Ortalis erythroptera* species were accurately identified by the inhabitants, who associated the parakeet and the chachalaca with "the oldest forests" and "the large trees where they always return." These perceptions coincide with their predominant presence in natural forest (BNNF) and shrubby vegetation (VASV), where they find food and shelter. Their ecological frequency is low or occasional, which reinforces their need for conservation. The only Near Threatened (NT) species is *Psittacara erythrogenys* was observed exclusively in natural forest and was recognized by its intense vocalizations and group behavior. Several interviewees noted that it "appears when there are wild fruits," which coincides with its use of native trees as a food source.

Species listed as Least Concern (LC) show a marked relationship with disturbed environments. *Crotophaga sulcirostris*, *Molothrus bonariensis* and *Zenaida auriculata*, all very common, are concentrated in traditional crops (TC) and pastures (PA), where residents indicated that they "are always in the cornfields" or "follow the harvest." Their abundance facilitates their observation and makes them ideal species for basic birdwatching activities. Other common species in open and mixed environments are *Furnarius cinnamomeus*, *Mimus longicaudatus*, *Sicalis flaveola* and *Tyrannus niveigularis*. The inhabitants mentioned that "the ovenbird always looks for mud in the crops," "the mockingbird sings in the bushes along the roadside," and "the wren is seen at dusk," descriptions that coincide with its distribution in shrubby vegetation (SV) and crops



(TC). Insectivorous and forest species— *Melanerpes pucherani*, *Momotus subrufescens*, *Pionus menstruus* and *Troglodytes* The motmot was recorded less frequently and linked to quieter areas. Comments such as "the motmot comes out where there is shade and humidity" or "the woodpecker can be heard pecking at dry branches" show an accurate local understanding of their behavior.

The spatial distribution of the observations confirms the concentration of *Molothrus bonariensis*, *Crotophaga sulcirostris* and *Zenaida auriculata* in traditional crops and pastures. In contrast, occasional species such as *Psittacara erythrogenys*, *Pionus menstruus* and *Brotoeris pyrrhopterus* were recorded mainly in fragments of natural forest and shrub vegetation. This pattern coincides with the landscape structure of the El Chial area, where forest remnants support more sensitive species. The ethno-ornithological map and spatial distribution (Figure 3) shows that generalist species are concentrated in the agricultural matrix, while psittacines and sensitive species are restricted to fragments of natural and secondary forest (shrub vegetation). This spatial pattern coincides with what was reported by the interviewees ("the parrots are always in the woods").

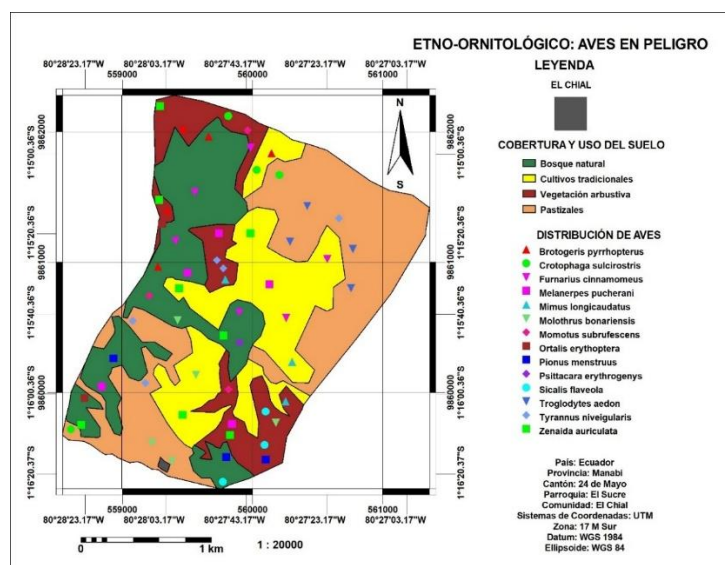


Figure 3. - Ethno-ornithological map and spatial distribution of birds in the El Chial area.

Source: Prepared by the author based on georeferenced observations and community perceptions (2024–2025), processed in ILWIS 3.31 (Datum WGS 1984, UTM 17M South).



The discrepancy between cultural salience and ecological frequency is evident both in the values obtained in the free lists (Table 2) and in the polar visualization that relates both variables (Figure 4). *Psittacara erythrogenys* exhibited the highest salience ($S = 0.67$), despite being an occasional species in the landscape, followed by *Pionus menstruus* and *Brotogeris pyrrhopterus* ($S \approx 0.53$). In contrast, *Crotophaga sulcirostris* one of the most common and ecologically frequent birds, registered a very low salience value ($S = 0.21$). Spearman's correlation analysis confirmed this dissociation ($\rho < 0.40$; $p > 0.05$), indicating that the cultural importance assigned by the community is not determined by the abundance observed in the field.

This weak association between cultural salience and ecological frequency coincides with ethno -ornithological studies that show that cognitive salience responds to symbolic, aesthetic and functional attributes rather than mere presence or abundance (Aticho *et al.*, 2025). Thus, showy and vocal species such as *Psittacara erythrogenys* and *Pionus Menstruus* acquire high cultural value despite their relative scarcity, while common birds such as *Crotophaga Sulcirostris* lack symbolic prominence. These results reinforce the need to integrate ecological and sociocultural criteria in the planning of birdwatching routes, and avoid models based solely on abundance or ease of sighting.

Table 2. - Cultural salience and ecological frequency of the species recorded in the El Chial Enclosure

No.	Species (Scientific name)	Salience (S)	Ecological frequency	Frequency code
1	<i>Psittacara erythrogenys</i>	0.6688	Occasional	1
2	<i>Pionus menstruus</i>	0.5339	Occasional	1
3	<i>Brotogeris pyrrhopterus</i>	0.5316	Occasional	1
4	<i>Mimus longicaudatus</i>	0.4677	Frequent	2
5	<i>Zenaida auriculata</i>	0.4429	Very common	3
6	<i>Melanerpes pucherani</i>	0.4337	Occasional	1
7	<i>Furnarius cinnamon</i>	0.3891	Frequent	2
8	<i>Ortalis erythroptera</i>	0.3856	Frequent	2
9	<i>Sicalis flaveola</i>	0.3845	Frequent	2
10	<i>Tyrannus niveigularis</i>	0.3753	Frequent	2
11	<i>Molothrus bonariensis</i>	0.3580	Very common	3
12	<i>Momotus subrufescens</i>	0.3295	Occasional	1
13	<i>Troglodytes aedon</i>	0.2333	Occasional	1
14	<i>Crotophaga sulcirostris</i>	0.2161	Very common	3

Source: Prepared by the author using field data (2024–2025).



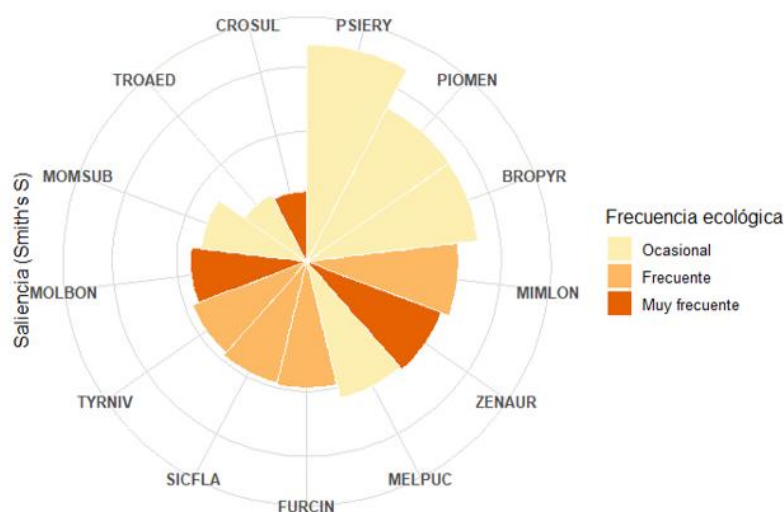


Figure 4. - Relationship between cultural salience and ecological frequency of birds recorded in El Chial (Manabí, Ecuador). BROPYR = *Brotopogon pyrrhopterus*; CROSUL = *Crotophaga sulcirostris*; FURCIN = *Furnarius cinnamomeus*; MELPUC = *Melanerpes pucherani*; MIMLON = *Mimus longicaudatus*; MOLBON = *Molothrus bonariensis*; MOMSUB = *Momotus subrufescens*; ORTERY = *Ortalis erythroptera*; PIOMEN = *Pionus menstruus*; PSIERY = *Psittacula erythrogastra*; SICFLA = *Sicalis flaveola*; TROAED = *Troglodytes aedon*; TYRNIV = *Tyrannus niveigularis*; ZENAU = *Zenaidura macroura*

Source: Prepared by the author based on fieldwork (2024–2025).

The cluster analysis performed using Bray-Curtis matrices revealed three ecological-cultural clusters (Figure 5). The first group includes psittacines of high cultural value and tourism potential; the second comprises common species from agricultural areas, easy to observe and suitable for educational activities; and the third includes mixed species associated with forest edges and open areas. The dendrogram structure showed acceptable cophenetic consistency (>0.80), indicating stable clustering without the need for additional bootstrap procedures.



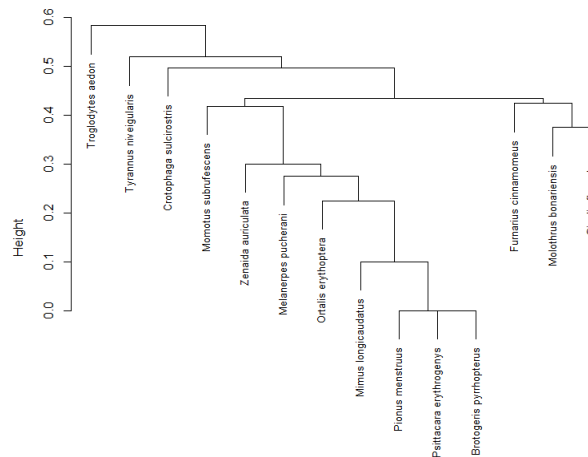


Figure 5. - Proximity dendrogram between bird species of the El Chial Enclosure, generated from the co-occurrence and Jaccard distance matrix

Source: Own elaboration with data from the study (R 4.x; vegan and dendextend packages).

The spatial distribution of birds in the El Chial area showed clear patterns associated with the four main landscape cover types. Psittacines — *Brotogeris pyrrhopterus*, *Pionus menstruus* and *Psittacara erythrogenys* — were concentrated in remnants of natural forest and in areas with large trees, coinciding with the sectors that the inhabitants identify as “old forests”. In contrast, *Crotophaga sulcirostris*, *Molothrus bonariensis* and *Zenaida auriculata* were more abundant in agricultural areas and pastures. Shrub vegetation acted as an intermediate zone that supported species with varied requirements, including *Mimus longicaudatus*, *Sicalis flaveola* and *Momotus subrufescens*. This pattern confirms that the ecological mosaic of the area maintains a functional avifaunal structure, where fragments of dry forest and productive spaces complement ecological niches, as has also been documented in other neotropical rural landscapes (Castillo-Vizuite *et al.*, 2021; Rivera Mateos *et al.*, 2025).

The ecological distribution closely coincided with community perceptions. Residents accurately identified sites of high bird activity, such as tall trees as parrot refuges and shrublands as song areas for the mockingbird. This agreement confirms the validity of local ecological knowledge as a tool for mapping microhabitats and prioritizing areas for birdwatching tourism, in line with recent findings that highlight the capacity of rural communities to monitor bird dynamics with high accuracy (Delfino, 2024; Aticho *et al.*, 2025). The coincidence between records, narratives and spatial distribution highlights



the potential of integrating GIS with traditional knowledge to delimit interpretive routes and conservation areas of the dry forest.

The interviews provided detailed descriptions of the behavior and ecology of several species. *Molothrus bonariensis* was associated with the consumption of corn and insects exposed during harvest, and territoriality towards species such as the "pilis" (*Pteroglossus* sp.) was even demonstrated. sp.), which coincides with its widely reported opportunistic diet. *Momotus subrufescens*, called "brujo", and *Troglodytes*, known as "chawi", revealed symbolic meanings linked to local narratives, reflecting the more than Western relationships between humans and birds described by Bastian *et al.* (2024). Likewise, species such as *Furnarius cinnamomeus* and *Melanerpes pucherani* were recognized for specific behaviors (building mud nests, drilling logs), aspects relevant to educational activities and nature photography.

Those interviewed clearly identified the species with the greatest tourism potential. Fruit-eating psittacines—particularly *Psittacar erythrognys*, *Pionus menstruus* and *Brotozeris Ppyrrhopterus*—were valued for their coloring and vocalizations, attributes that previous studies indicate are key determinants for species selection in birdwatching products (Ananda *et al.*, 2025). In open spaces, *Mimus longicaudatus* and *Zenaida auriculata* were considered suitable for introductory birdwatching activities due to their accessibility and conspicuous habits, consistent with research on inclusive tourism and observation in open landscapes (Saha and Chakraborty, 2025). These community perceptions outline a diversified offering that articulates specialized observation, educational tours, and cultural experiences.

The social meanings attributed to keystone species demonstrate an active ethno - ornithological dimension. The association of *Momotus subrufescens* with traditional narratives, or the use of the song of *Troglodytes aedon* as a social indicator, coincides with Hounnouvi 's findings *et al.* (2025) on the symbolic function of certain birds in rural African communities. This cultural component complements the ecological and tourist value, strengthening the relevance of strategies that integrate local identity and conservation, in accordance with the participatory action approaches proposed by Reason and Bradbury (2008).



Taken together, the results show that the avifauna of the El Chial area forms an ecological and cultural system that is highly adaptable to sustainable tourism initiatives. The coexistence of emblematic dry forest species, birds associated with agricultural areas, and taxa with strong symbolic significance provides a solid foundation for developing interpretive trails. The consistency between local knowledge, ecological observations, and spatial analysis confirms that the community possesses a keen understanding of the territory, a crucial aspect for building co-management and community-based birdwatching initiatives.

CONCLUSIONS

The study shows that integrating local ethno -ornithological knowledge with ecological assessments and spatial analysis is a sound approach to identifying priority species and guiding the development of sustainable biodiversity-based tourism in tropical dry forest ecosystems.

The results demonstrate that the cultural relevance attributed to birds by rural communities complements traditional ecological indicators, allowing for a more comprehensive socio-ecological assessment for birdwatching tourism planning and biocultural conservation.

Chial area presents favorable conditions for the implementation of community bird tourism models that link the conservation of the dry forest, the Montubio cultural identity, and the generation of local economic alternatives.

The applied methodological approach provides a replicable framework for neotropical rural territories where traditional knowledge can strengthen sustainable tourism strategies and participatory biodiversity management.

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Conflicts of interest:

The authors declare no conflicts of interest.

Authors' contribution:

The authors have participated in the writing of the work and analysis of the documents.



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