RGSA – Revista de Gestão Social e Ambiental
ISSN: 1981-982X
Data de submissão: 11/09/2023
Data de aceite: 13/12/2023
DOI: https://doi.org/10.24857/rgsa.v18n3-030
Organização: Comitê Científico Interinstitucional
Editora Chefe: Christian Luiz da Silva
Avaliação: Double Blind Review pelo SEER/OJS

ETHNO-ORNITHOLOGICAL STUDY OF CINEGETIC AVIFAUNA IN THE JAGUARARI MOUNTAIN REGION, BAHIA, BRAZIL: FOOD PRACTICES AND CONSERVATION

Alan Ferreira Bonfim[1]
Juracy Marques dos Santos[2]
Renato de Almeida[3]
Elon Souza Aniceto[4]

ABSTRACT

Objective: The research objective was to record the species of cinegetic birds, capture techniques used by hunters, and implement practices that preserve mountain birds.

Method: The study adopted a qualitative-quantitative methodology. Data collection occurred through interviews with local experts, focusing on investigating the use of avifauna by rural communities and its implications for conservation in the region.

Results and conclusions: The knowledge of 20 rural residents of the municipality of Jaguarari, Bahia, Brazil, was recorded. We identified 11 ethnospecies used as trophic resources, in which birds with high body mass are the hunting targets. Regarding the capture, five techniques were recorded (*arapuca*, trapdoor, slingshot, shotgun, and jackfruit sap). Thus, the diversity of technologies in hunting birds is remarkable and common in the region.

Research implications: The study reports the abundance and diversity of exploited birds, highlighting the importance of preserving the local avifauna. This conservation not only protects local ecological knowledge but also contributes to the protection of avifauna.

Originality/value: The research is unique in taking an ethno-ornithological approach to analyzing the interaction between society and local avifauna, highlighting species vulnerable to extinction, such as the white-browed guan (*Penelope Jacucaca*). It emphasizes the diversity of exploited birds and the importance of preserving local ecological knowledge. This approach contributes significantly to conservation and sustainable development strategies in the Jaguarari mountain region, Bahia, Brazil.

Keywords: Avifauna, Conservation, Ethno-ornithology, Human Ecology, *Sertão* Mountains.

ESTUDO ETNO-ORNITOLÓGICO DA AVIFAUNA CINEGÉTICA NA REGIÃO MONTANHA DO JAGUARARI, BAHIA, BRASIL: PRÁTICAS ALIMENTARES E CONSERVAÇÃO

RESUMO

Objetivo: O objetivo da pesquisa foi registrar as espécies de aves cinegéticas, técnicas de captura utilizadas pelos caçadores e implementar práticas que preservem as aves serranas.

[1] Universidade do Estado da Bahia (UNEB) - campus III, Juazeiro, Bahia, Brazil.
E-mail: alanbonfim.ecoh@gmail.com Orcid: https://orcid.org/0009-0001-0398-694X.
[2] Universidade do Estado da Bahia (UNEB) - campus III, Juazeiro, Bahia, Brazil. E-mail: jumsantos@uneb.br
Orcid: https://orcid.org/0000-0003-2020-1785
[3] Universidade Federal do Recôncavo da Bahia (UFRB), Cruz das Almas, Bahia, Brazil.
E-mail: renato.almeida@ufrb.edu.br Orcid: https://orcid.org/0000-0002-1242-3495
[4] Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF), Campos dos Goytacazes, Rio de Janeiro, Brazil. E-mail: elon1995@pq.uenf.br Orcid: https://orcid.org/0000-0002-6967-2361

Método: O estudo adotou metodologia quali-quantitativa. A coleta de dados ocorreu por meio de entrevistas com especialistas locais, com foco na investigação do uso da avifauna pelas comunidades rurais e suas implicações para a conservação na região.

Resultados e conclusões: Foram registrados os conhecimentos de 20 moradores rurais do município de Jaguarari, Bahia, Brasil. Identificamos 11 etnoespécies utilizadas como recursos tróficos, nas quais aves com elevada massa corporal são os alvos de caça. Quanto à captura, foram registradas cinco técnicas (arapuca, alçapão, estilingue, espingarda e seiva de jaca). Assim, a diversidade de tecnologias na caça de aves é notável e comum na região.

Implicações de pesquisa: O estudo relata a abundância e diversidade de aves exploradas, destacando a importância da preservação da avifauna local. Esta conservação não só protege o conhecimento ecológico local, mas também contribui para a protecção da avifauna.

Originalidade/valor: A pesquisa é única por adotar uma abordagem etno-ornitológica para analisar a interação entre a sociedade e a avifauna local, destacando espécies vulneráveis à extinção, como a jacu-de-sobrancelha-branca (Penelope Jacucaca). Enfatiza a diversidade de aves exploradas e a importância de preservar o conhecimento ecológico local. Esta abordagem contribui significativamente para estratégias de conservação e desenvolvimento sustentável na região serrana de Jaguarari, Bahia, Brasil.

Palavras-chave: Avifauna, Conservação, Etno-ornitologia, Ecologia Humana, Serra do Sertão.

1 INTRODUCTION

The relationships between the human species and wildlife have always been recorded throughout the history of humanity, including petroglyph remains (Verdade, 2004). However, human behavior and its relationship with animals evolved long before the first historical records, manifesting in the artistic context and science (Sax, 2001).

Animals have been used for many purposes in many cultures worldwide, serving as a trophic resource, medicine, religious rituals, and others. With this, the human species became one of the most efficient predators on the planet, using animals for many purposes (Alves & Souto, 2010).

Alves et al. (2008) highlight the essential connection between the human species and fauna, involving relationships of dependence or codependency relevant to humanity. The use of wild birds, for example, seems deeply rooted in the cultural context of several rural communities in the Brazilian semiarid (Alves et al., 2012; Fernandes et al., 2012).

The behavior of the human species towards animals is typically delineated through values, knowledge, and perceptions (Drews, 2002). Therefore, it seems appropriate to investigate the meanings through perception and traditional knowledge to contribute to understanding how species are exploited in several sociocultural contexts.

This is the main field of interest in human ecology, an approach that inserts the population into ecosystems, investigating their relationships and the resulting implications (Marques, 2012), incorporating several factors, including society, culture, economy, and ecology.

In the sphere of human ecology, ethnoscience has evolved into ethnobiology, a multidisciplinary area dedicated to investigating the cultural influences that configure the interaction between humans and the environment. This area of study focuses on analyzing

cognitive processes involved in human thought, especially those applied to the classification of nature, with particular emphasis on categorizing living beings (Begossi., 1993; Posey., 1987).

With this, ethnozoology becomes a fundamental tool in this context, given its multidisciplinary approach that studies the thoughts, perceptions, feelings, and behaviors linked to the relationships between humans and animals in ecosystems (Marques, 2002). Nola & Robbins (2021) report that emotive meanings and cultural practices influence a society's perception, identification, and classification of animals.

The transmission of knowledge from one generation to another occurs mainly through language and is symbolically manifested in the environment (Diegues, 2007). Pires (1993) expands our understanding, highlighting that human beings result from a complex interaction between genetic factors, environmental and social influences present in their surroundings, and the cultural heritage of their social group.

Therefore, how natural resources are obtained can give us important clues to the pressure exerted on avifauna and local culture. In the case of birds, we know that they are used in many ways (food, magic-religious, pets) by societies (Alves et al., 2009; Bezerra et al., 2012; Fernandes-Ferreira et al., 2012; Sick., 1997).

In this sense, ethno-ornithology, a branch of ethnobiology, investigates the interactions between birds and human communities, exploring the use of birds in cultural and traditional contexts. Its focus extends to the conservation of birds and the preservation of ancestral knowledge related to these animals (Tidemann & Gosler, 2010).

Research can be carried out to elucidate these trophic interactions addressing the local nomenclature, uses of avifauna, application of the concept of use value (UV) adapted by Phillips et al. (1994), and the analysis of addressed content. The latter is a valuable research tool that helps understand society's perceptions, allowing the interpretation of social reality (Silva, 2005).

In summary, investigations on cinegetic practices and local ecological knowledge are fundamental in formulating sustainable management and exploitation strategies. Regarding avifauna, it is necessary to consider that the techniques' effectiveness and their impact may vary considerably (Alves et al., 2009).

It is essential to highlight that the population reduction of several species is directly related to capturing these animals for illegal wildlife trafficking combined with predatory hunting. These are the main contributors to the population decline (Bezerra et al., 2011/2012; Fernandes-Ferreira et al., 2012).

The main objective of this study was to record the local knowledge from rural communities located in the mountain region of Jaguarari, BA, especially regarding the avifauna used as a food source. Therefore, we sought to investigate these communities' perceptions and practical knowledge about birds, culminating in developing a checklist of bird species used as a trophic resource and their capture methods.

2 METHODOLOGY

The study was conducted in the municipality of Jaguarari (10°14'37" S and 40°11'4" W), located in the North Center of Bahia state, in the mountainous complex Serra da Jacobina, in the semiarid. The Brazilian Institute of Geography and Statistics (IBGE, 2022) estimated through calculations of population projections that the human population is 32,703 inhabitants, with an altitude of 665 m, a demographic density of 13.25 inhabitants/km2, and a Human Development Index of 0.659. The research involved rural communities in the mountain region of Jaguarari-Ba (Figure 1) in three locations: Catuni da Grota (-10.30415 -40.18934), Serra dos Morgados (-10.23266, -40.23111), and Cachoeira de Betes (-10.350867 -40.223912).

According to Siqueira Filho et al. (2021). The region is characterized by its landscape diversity, abundant water resources, and historical value. However, the highlight is its botanical richness, which includes rare, endemic, and endangered species. This region is the confluence point of several ecosystems, such as Caatinga, Cerrado, Campo Rupestre, and Atlantic Forest. Remarkably, the Serra dos Morgados, in Jaguarari, is home to plant species characteristic of the Atlantic Forest, such as the ambay pumpwood (*Cecropia pachystachya*), gameleira*(Ficus gomelleira*), quina (*Aspidosperma discolor*), and amargoso (*Aspidosperma nigricans*).

The objective and nature of the research were explained to each resident in our study. Then, they were asked to sign the informed consent form. The research was approved by the Institutional Research Ethics Committee of the Universidade do Estado da Bahia (protocol CAAE: 58440922.0.0000.0057).

The first stage of the work was initial contact with the residents to establish a relationship of trust with the interviewer. The informants were selected using the snowball technique (Albuquerque & Lucena, 2004), in which a local informant indicates another of similar competence. Thus, data collection was initiated by conducting interviews with local or native experts who are self-declared and locally recognized as culturally competent people (Marques, 1995). The conversation was recorded and later transcribed for better effectiveness of the thesis proposal.

Interviews were conducted using semi-structured forms that explored themes related to the region's knowledge and use of bird species. The questions addressed details about the practice of hunting, such as the place of capture, the techniques, and the variety of birds.

The use value (UV) was calculated to quantify the local importance of each mentioned species, in the view of the local experts, by the formula $UV = \Sigma U/n$; where UV is the use value of the species, U is the number of citations per species, and n is the number of informants. We used the method adapted by Phillips et al. (1994), in which the UV is a tool to assess the importance of specifications from a regional or local perspective based on the perception of people in the community.

The use value (UV) ranges from 0 to 1. Closer proximity to 1 (one) indicates that it is highly valuable and is critical in meeting human needs or maintaining the balance of ecosystems. On the other hand, a value close to 0 (zero) indicates that the species has little or no direct utility or influence in the human or ecological context.

This metric can be used in several areas, such as biodiversity conservation, environmental impact assessment, and decision-making on sustainable use of natural resources, allowing us to classify and prioritize the importance of species in different contexts.

The cinegetic avifauna was identified through the Sigrist Bird Guide (2015), records, photographs during interviews, and the List of Birds of Brazil of the Brazilian Ornithological Records Committee (CBRO) 13th edition (2021). After the data collection, a list was elaborated in an electronic spreadsheet with the cinegetic birds, hunting methods, type of preparation, number of citations, and use value.

It was necessary to organize the transcripts of the individual interviews in order to understand the content better. To this end, we chose to perform a content analysis methodology, as defined by Bardin (1977/2016), who describes it as:

> [...] a set of communication analysis techniques through systematic and objective procedures for describing the content of messages and indicators that allow us to infer information about the directions of origin and reception of these messages.

This methodological approach was applied to extract significant information and understand the communication in the interviews and discussions, providing a solid basis for

further analysis. We followed the steps suggested by Bardin (1977/2016). We broke down the content analysis into elements, such as pre-analysis of the content, investigation of the material, the processing of the reviewed analyses, deduction, and interpretation.

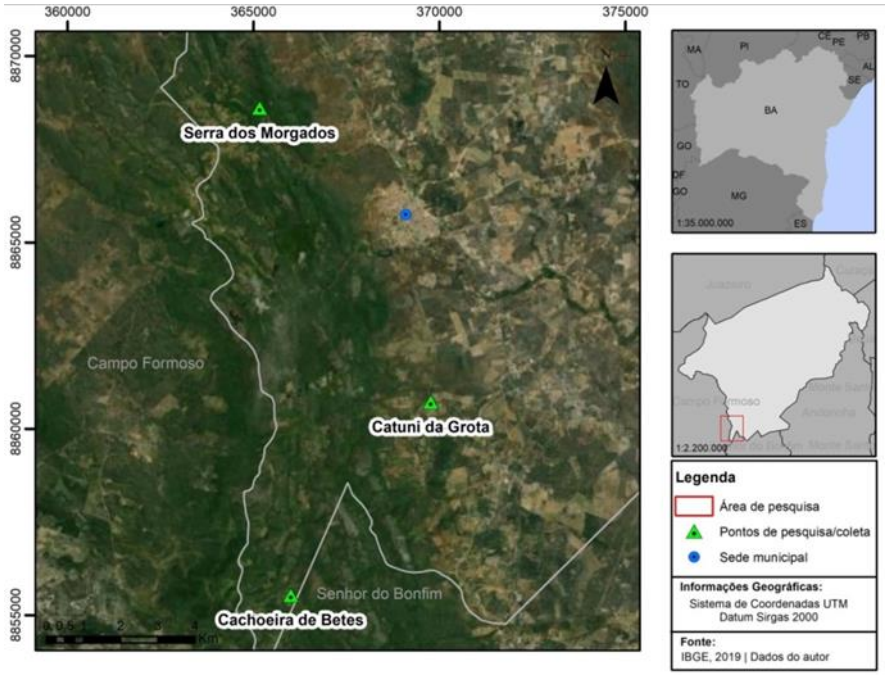

Figure 1 Location of the study area. Serras de Jaguarari, Bahia, Northeastern Brazil.
Source: IBGE (2019) by Gilmar Oliveira (2023).

3 RESULTS AND DISCUSSIONS

Data collection was carried out monthly between February and May 2023. We interviewed 20 local experts of both gender identities, aged 32-79 years, and practicing the following professions: farmer, retired, self-employed, mason, teacher, and student. The informants' education degree included literacy to higher education, with low illiteracy. The residence time of specialists in the study area ranged from less than 10 to more than 80 years. All are rural residents of the mountain region of the municipality.

Regarding the trophic use of mountain avifauna, the interviewees cited 11 ethnospecies distributed in 10 genera, belonging to five families and four orders (Table I). They are hunted mainly because of the taste of meat, availability, and ease of capturing. The family with the highest number of cited species was Columbidae (4 species), followed by Tinamidae (3 species) and Cracidae (2 species).

The families Columbidae and Cracidae play a significant role as food sources in many communities across the country (Sick, 1997). These birds are widely appreciated in Jaguarari as a valuable addition to the protein-rich diet, recognized for their capacity to accumulate body mass and pleasant taste.

The species that presented the highest UV were, respectively, small-billed tinamou (*Crypturellus parvirostris*) with UV=0.55; ruddy ground dove (*Columbina talpacoti*) with UV=0.35; and white-bellied nothura (*Nothura borachira*) with UV=0.30.

> - In the old days, I used to eat them a lot. When I was a child, my father killed a lot... white-tipped dove, small-billed tinamou, red-winged tinamou, *codorniz* as he used to call, *codorna-do-mato*, white-browed guan, many birds! Nowadays, we hardly hear the singing anymore. It is rare when we hear the singing of a white-tipped dove, small-

> billed tinamou, a white-browed guan. I was amazed that I saw, not long time ago, in a walk around, we saw a white-browed guan, but it is rare. Nowadays, we no longer use much, at least our palate here, no longer use it as food. In the old days, I used to eat them a lot, the time as a child, my father killed a lot... white-tipped dove, small-billed tinamou, red-winged tinamou, *codorniz* as he used to call, *codorna-do-mato*, *codorniz*. white-browed guan, many birds (m. B, 41 years old).

It is essential to address that the use value of species on a scale from 0 to 1 generally refers to a metric that assesses how vital or beneficial a given species is to human or ecosystem activities. This value is assigned based on several factors, such as the usefulness of a species in food, medicine, and rituals, among other ecosystem services.

All species cited locally by experts have been recorded in Brazilian territory, as documented in references such as Sick (1997) and Piacentini et al. (2015). A notable example is the white-browed guan (Penelope jacucaca), endemic to the Caatinga biome as indicated by Sick (1997) and Sigrist (2009). This species also appears on the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN, 2022) as vulnerable to extinction, caused mainly by excessive hunting activity.

Table 1. List of species used as trophic resources and their respective use values in the mountain region of Jaguarari, Bahia state, Brazil.

Scientific name	Common name	UV (ΣU/n)
Galliformes		
Cracidae (Rafinesque, 1815)		
**Ortalis araucuan* (Spix, 1825)	East Brazilian chachalaca	0.10
**Penelope jacucaca* (Spix, 1825)	White-browed guan	0.10
Tinamiformes		
Tinamidae (Gray, 1840)		
**Rhynchotus rufescens* (Temminck, 1815).	Red-winged tinamou	0.15
**Nothura boraquira* (Spix, 1825).	White-bellied nothura	0.30
**Crypturellus parvirostris* (Wagler, 1827).	Small-billed tinamou	0.55
Passeriformes		
Passerellidae (Cabanis & Heine, 1850).		
**Zonotrichia capensis* (Statius Muller, 1776).	Rufous-collared sparrow	0.05
Turdidae (Rafinesque, 1815).		
**Turdus rufiventris (Vieillot, 1818).*	Rufous-bellied thrush	0.10
Columbiformes		
Columbidae (Leach, 1820)		
**Columbina squammata (Lesson, 1831)*	Scaled dove	0.05
**Zenaida auriculata* (Des Murs, 1847)	Eared dove	0.25
** Leptotila verreauxi (Bonaparte, 1855)*	White-tipped dove	0.30
**Columbina talpacoti* (Temminck, 1811)	Ruddy ground dove	0.35

Source: the authors (2023).

One fact also contributes to the discussion: the eared dove (*Zenaida auriculata*) stands out as a frequently cited bird. This result corroborates the analysis by Barbosa et al. (2010), demonstrating that this species is also one of the most mentioned birds for food consumption in the municipality of Queimadas, in the semiarid of Paraíba state.

According to the IUCN List of Endangered Species (2022), *Z. auriculata* is in the low-concern category. However, there is a need for more studies to confirm the population situation of this bird since its meat is highly appreciated in Northeastern Brazil, and studies on the density of avifauna in Caatinga environments are scarce.

In addition, it is a migratory species that moves within the Caatinga according to the availability of seeds and rainfall regime (Olmos et al., 2005). Therefore, it is essential to assess whether hunting activity does not affect their reproduction period.

Given the above, after carrying out the data collection procedures and adopting specific methodologies to understand the local use of birds, the data assumed a patchwork form in our information collection, needing to be united for the conclusion of the work.

In this context, the content analysis proposed by Bardin (1977/2016) played a fundamental role in organizing the emerging data and pointing out possible answers to the research. Several "fragments" required integration to address the research issue and meet our objectives.

The recorded speeches seemed to address the theme of bird consumption in the past and present. It is important to consider the context in which they were obtained and the participant's age (41 years). Thus, we were able to identify several record units that refer to the consumption of birds in the past and the current decline in this consumption:

"*In the old days, I used to eat them a lot, the time as a child, my father killed a lot... white-tipped dove, small-billed tinamou, red-winged tinamou, codorniz as he used to call, codorna-do-mato, white-browed guan, many birds!*".

"*Nowadays, we hardly hear the singing anymore, it is rare when we hear the singing of a white-tipped dove...*" (M. B, 41 years old).

Based on the units of registration, we can categorize the text, identifying the following classes:

- Changes in bird consumption over time: encompasses reports of bird consumption in past times, especially during the individual's childhood;
- Perception of the rarity of the cited birds: refers to the perception that birds are becoming rare and their singings are little heard these days;
- Changes in palate and food use: addresses changes in food preferences, indicating that the birds mentioned above are no longer used as trophic resources, at least to the interviewee. It suggests a transformation in palate and eating habits these days.

Once the categories are defined, it is possible to encode and classify fragments from the interviews. Some speeches indicated notable changes in bird consumption over time. In the past, birds were commonly used as food, especially during childhood. Currently, they are perceived as rare, and their singing is heard infrequently. It suggests a possible decrease in the population of these birds and an impact on local culinary traditions.

In addition, the change in palate and eating habits is highlighted, with the interviewee stating that these birds are no longer used as food, at least in his personal experience. Several reasons may contribute to the change in palate toward bird consumption over time, especially in the context of rural communities. Some possible influences include:

- Cultural changes: Transformations in food culture over generations may have influenced food preferences. Migration, exposure to different cultures, and globalization can introduce new foods and culinary practices;
- Availability of options: Increasing the availability of other protein sources may have reduced the reliance on birds in the diet. Access to a variety of foods may have led people to explore different options, changing their preferences;
- Environmental concerns: Increasing environmental awareness may have influenced food habits. If there were concerns about the conservation of certain bird species, people might have avoided their consumption to support the preservation of local fauna.

Significantly, these factors can interact in complex and varied ways between different communities and individuals. A complete understanding of these changes would require further analysis of the region's specific social, economic, and cultural dynamics.

In short, the speeches reflect the transformations in the local consumption of some birds, highlighting the importance of better addressing these changes from the content analysis perspective to understand the context and implications of these transformations.

Regarding the capture of birds, five distinct hunting techniques were identified and divided into two groups: active (slingshot and shotgun), which requires the direct presence of the hunter, and passive (trapdoor, *arapuca*, and jackfruit sap), which involves the use of traps, with the presence of the hunter only at the time of collection.

Importantly, hunting is an activity that has been carried out by humanity since ancient times. Throughout history, a variety of techniques have been developed to aid in the capture and reduction of desired species. The choice of these techniques depends on the target species, the available resources, and the specific for which the captured animal will be destined (Alves et al., 2010).

Macdonald et al. (2011) highlight that body size is the predominant factor to consider when hunting for food since it results in a great amount of protein available for consumption by the hunter.

> -I think it was disorderly hunting, in addition to deforestation, because they look for food elsewhere since they no longer find it here. It is... the capture that they also made in excess, perhaps (M. B, 41 years old).

The most frequently cited techniques were: *arapuca* (N=10), trapdoor (N=9), slingshot (N=7), jackfruit sap(N=7), and shotgun (N=5). Alves et al. (2009) and Bezerra et al. (2012) detailed more precise investigation and technique information. The preparation of slaughtered birds involves various methods according to the size of the bird, age, and the method of capture. Roasted (n = 7), fried (n = 6), and boiled (n = 1) were the most frequent.

> - There is the *arapuca*, it is a form that people capture. It is made with some sticks, right? You will put them in shape, make a square with them, and go up the sticks. Around, there are the wires that will wrap until you reach the top. I don't know how to describe it very well (L. M., 22 years old).
> -When they are acquired, it is with slingshot, or else makes *arapuca* so they fall, throws corn, makes a trap and they silly, fall, innocent (I. M. 73 years old).
> - The jackfruit sap, it wraps on a stick branch, and then they put it next to the cage, which already has one, so they can be attracted by the singing; when the other comes to sit there, it gets stuck in the sap (L. M. 22 years old).

Here again, the content analysis provides clues about observations and practices related to the capture of birds in the studied area and the possible causes for the decrease in these bird populations in the region. In this way, we analyzed the main points based on the provided information:

The first speech (M. B., 41 years old) suggests that the impact of disorderly hunting and deforestation contributed to the scarcity of birds in the region. The interviewee believes that lack of food and overhunting can lead birds to look for food in other regions.

In addition, the speeches also highlight several capture techniques, such as *arapuca*, slingshot, and jackfruit sap, which are described in detail. The interviewees explain how these traps are set up and used to catch the birds. The other speeches reinforce traditional methods of capturing birds.

Another interviewee (L. M, 22 years old) describes in detail the use of *arapucas* made from wood and wires to capture birds. This technology was mentioned by different interviewees during the study, reinforcing the cultural aspects that are transmitted to present generations.

A third fragment (I. M, 73) mentions corn traps to catch birds, while another (L. M, 22 years old) describes jackfruit sap to trap birds in cages. It also reinforces using baits (such as corn) to attract birds to the traps. Jackfruit sap is highlighted as a specific bait for trapping birds, especially songbirds.

Capturing with jackfruit sap is an entirely artisanal practice. Only a wooden cylinder coated with the sticky sap from the jackfruit tree, which is naturally glutinous, is used to create such an instrument. This technique is often used to capture live birds, especially Passerines.

Therefore, such speeches reflect the traditional methods of capturing birds in the region, which may have contributed to the decline in bird populations over time. In addition, one of the speeches highlights the importance of considering factors such as deforestation and disorderly hunting in analyzing the current scenario of birds in the region. It reinforces the need to address environmental and conservation issues regarding bird consumption in Northeast Brazil, especially in the north mountainous regions of Bahia.

As Alves et al. (2009) highlighted, many Caatinga species exhibit seasonal local habits. Therefore, the hunter's success in capturing specimens depends on applying several techniques, requiring them to have information about the ecological characteristics of the species, such as feeding, preferential habitat, and reproduction period, among others.

However, there is a difference between the generations. Younger interviewees described making *arapucas* and using jackfruit sap, while older interviewees mentioned catching with slingshot and more traditional traps. These different choices of techniques reflect a generational variation in the studied region.

In any case, the speeches reveal the persistence of traditional methods of capturing birds in the region. This information may provide important clues to understanding the relationship between local practices and the decline of bird populations in the Caatinga, as well as developing conservation strategies for the used species and local knowledge conforms featured below:

> -They are now increasing because the people ceased to catch more. In this case, they have already decreased the amount, right? Because they caught more. It is because the people killed and took the animals to be trapped in the cage. If they were free in nature singing around our house, wouldn't it be better? Prettier too? Nowadays, no one wants to get stuck in a cage, the little birds must stay free in the forest (E. M, 43 years old).

In terms of content analysis, this testimony reveals a perceived change in people's attitudes towards catching birds. There is an appreciation of the freedom of birds and a reflection on their beauty and the benefit of their freedom. In addition, the speech indicates a possible cultural change regarding the capture and confinement of birds. According to the speech, there is an increase in the bird population because people have stopped catching them. One wonders if the birds free in nature would not be better and more beautiful, seeking an aesthetic and ethical appreciation for wildlife.

The bird species used as trophic resources are captured in different environments like mountain areas, dense forests in areas known as bogs and with preserved vegetation, zones with less dense forests with inselbergs and open areas, and water bodies such as springs and streams.

A highlight presented unanimously among the interviewees is that 10 species are considered unfit for human consumption due to factors associated with food taboos (Table II). The food taboo is usually related to symbolic aspects (Campos, 2011). In the mountain region of Jaguarari, masked water tyrant (*Fluvicola nengeta*) and black vulture (*Coragyps atratus*) are not in the human diet due to their eating behaviors. They are considered dirty birds by the interviewees.

These taboos are related to food ecology and the species' behavior but also to considerations of a religious and spiritualistic nature. Consequently, the meat of these birds is usually discarded, as local experts reinforce:

> - Eat everything, do not eat this, this smooth-billed ani! But the rest... Eat *rolinha*, rufous-bellied thrush, and rufous-collared sparrow; if they are dry or toasted, they go away with coffee and *farofa*.
> - No, I do not know why. It must be because it is very disgusting, like the great kiskadee and this smooth-billed ani, guira cuckoo, they eat the bugs of large animals, such as tick, botfly, right? (I. M. 73 years old).
> - Are they prepared? It is... Cut... Crack like chicken and salt. And then you can cook or toast, toast on the coals (J. N. 44 years old).

The additional information provided by the local experts allows for some deepening. Birds like ruddy ground dove (*Columbina talpacoti*), rufous-bellied thrush (*Turdus rufiventris*), and others are references, indicating that these birds are consumed as part of the local diet. In the first speech (I. M, 73 years old), the interviewee mentions that most birds are eaten except for the smooth-billed ani (*Crotophaga ani*). He describes that other birds, such as those mentioned above and the rufous-collared sparrow (*Zonotrichia capensis*), are enjoyed and consumed, usually prepared in a dry and toasted way, accompanying coffee and *farofa*.

That same informant (I. M, 73 years old) explains a possible rationalization of the non-consumption of the smooth-billed ani. In addition, other birds, such as great kiskadee (*Pitangus sulphuratus*), are not consumed because they feed on parasites of larger animals such as ticks and botflies. Not consuming them seems linked to the perception that these birds may have parasites, making them "disgusting."

Another expert (J. N, 44 years old) described the process of preparing birds for consumption. He mentioned that the birds are cut, salted, and then boiled or roasted over coals before being consumed.

So, there is a practice of consuming birds in the region, although some specific birds are avoided, such as the smooth-billed ani. This exclusion is due to the cultural perception of disgusting eating habits. In addition, the preparation of birds involves cutting, salting, and cooking, which are aspects of traditional local cuisine. This information reveals a connection between food culture and the region's birds.

Table 2. List of not-eaten ethnospecies and their respective use values in the mountain region of Jaguarari, Bahia state, Brazil.

Scientific name	Common name	UV (ΣU/n)
Cuculiformes		
Cuculidae (Leach, 1820)		
**Guira guira* (Gmelin, 1788)	Guira cuckoo	0.05
**Crotophaga ani* (Linnaeus, 1758)	Smooth-billed ani	0.05
Passeriformes		
Passerellidae (Cabanis & Heine, 1850)		
**Zonotrichia capensis* (Statius Muller, 1776)	Rufous-collared sparrow	0.15
Thraupidae (Cabanis, 1847)		
**Coryphospingus pileatus* (Wied, 1821)		
Tyrannidae (Vigors, 1825)	Grey pileated finch	0.05
** Pitangus sulphuratus* (Linnaeus, 1766)	Great kiskadee	0.05
**Fluvicola nengeta* (Linnaeus, 1766)	Masked water tyrant	0.20
Troglodytidae (Swainson, 1831)		
**Troglodytes musculus* (Naumann, 1823)	Southern house-wren	0.05
Cathartiformes	Black vulture	0.10
Cathartidae (Lafresnaye, 1839)		

**Coragyps atratus* (Bechstein, 1793)		
Falconiformes	Crested caracara	0.05
Falconidae (Leach, 1820)		
**Caracara plancus* (Miller, 1777)		

Source: the authors (2023).

In Northeast Brazil, avoiding the consumption of white wagtail is widespread since hunting or eating this bird is considered a form of offense to Our Lady. This ethno-conservative stance contributes to keeping the white wagtail out of the interest of human populations (Farias & Alves, 2007; Farias et al., 2010; Marques, 2005).

Thus, based on the information presented, some bird species are not consumed in the Jaguarari mountain region. Eating habits reflect broader issues, such as avoiding the consumption of white wagtail (*Fluvicola nengeta*) in the Northeast region of Brazil, motivated by cultural and religious reasons. Thus, to obtain detailed information about the species of birds not used locally, it would be necessary to carry out more specific studies or consult local sources surrounding that particular region's avifauna.

4 FINAL CONSIDERATIONS

It is evident that in Brazil, the protection of avifauna is critical to the conservation of species and ecosystems, especially in areas strongly impacted by the exploitation of natural resources.

Our study demonstrated that even though it is illegal, eating wild birds is widespread in the mountain communities of Jaguarari, Bahia. The use value varies significantly and is closely linked to local culture and bird ecology. However, the consumption of wild bird meats has the potential to unbalance ecosystems, as evidenced by the diversity of birds mentioned by local experts.

The illegal hunting and consumption of these birds pose a direct threat to ecosystems, which can lead to a decline in populations and, ultimately, the extinction of some species. It also affects their ecological function, including seed dispersal and pest control, directly affecting ecological balance and human health.

The results suggest the need to utilize the use value as a strategic indicator for identifying and conserving key species. Even if most of these species are not currently threatened, overexploitation can drive them to extinction. Many of them are targets of hunting, resulting in significantly more killings than officially recorded.

The use value of wild birds can be both economic and cultural. However, these uses must be continuously sustainable and legal, ensuring the preservation of biodiversity for future generations. Birds are important in ecosystems as pollinators, seed dispersers, and insect predators. In addition, some species have cultural and religious significance, playing an essential role in local traditions. Therefore, ethnographic research on birds and their relationship with humanity can open the way for discoveries and advances in many areas of knowledge.

ACKNOWLEDGEMENTS

Thanks to the *stricto sensu* Graduate Program in Human Ecology and Socio-Environmental Management of the Universidade do Estado da Bahia (UNEB), Campus Juazeiro -BA. The Brazilian Society of Human Ecology (SABEH). The movement Save the Mountains (SAS). And to the residents of the north *sertão* mountains of Bahia.

REFERENCES

Albuquerque, UP, Cunha, LUFC, Lucena, RFP, & Alves, RRN (2014). Métodos e Técnicas em Etnobiologia e Etnoecologia. Springer. Berlim, Alemanha.

Alves, RRN, & Souto, W. (2010). Etnozoologia: Conceitos, considerações históricas e importância. In Etnozoologia no Brasil: importância, status atual e perspectivas (Alves, RRN, Souto, WMS, & Mourão, JS, Eds.), pp. NUPPEA, Recife.

Alves, RRN, Gonçalves, MBR, & Vieira, WLS (2012). Caça, uso e conservação de vertebrados no semiárido brasileiro. Trópico. Conservar. Ciência, 5, 394-416.

Alves, RRN, Mendonça, LET, Confessor, MVA, Vieira, WLS, & Lopez, LCS (2009). Estratégias de caça utilizadas no semiárido do Nordeste do Brasil. J. Etnobiol. Etnomed., 5(12), 1-16.

Alves, RRN, Silva, CC, & Alves, HN (2008). Aspectos socioeconômicos do comércio de plantas e animais medicinais nas áreas metropolitanas do Norte e Nordeste do Brasil. Rev. Ciência. Terra, 8(1), 181-189.

Ávila-Pires. (1993). Princípios de Ecologia Humana. EDUFRGS: Porto Alegre.
Barbosa, JAA, Nóbrega, VA, & Alves, RRN (2010). Aspectos da caça e comércio ilegal da avifauna silvestre por povos tradicionais do Semiárido paraibano. Rev. Ciência. Terra, 10, 39–49.

Bardin, L. (1977). Análise de Conteúdo. Edições 70, Lisboa.

Bardin, L. (2016). Análise de Conteúdo. Edições 70, São Paulo.

Begossi, A. (1993). Ecologia humana: uma abordagem das relações homem-ambiente. Caracas: Interciência 18(3), p: 121-131.

Bezerra, DMM, Araújo, HFP, & Alves, RRN (2011). Avifauna silvestre como recurso alimentar em áreas do semiárido no estado do Rio Grande do Norte, Brasil. Sitientibus Sér. Cs. Biol., 11, 177-183.

Bezerra, DMM, Araújo, HFP, & Alves, RRN (2012). Captura de aves silvestres no semiárido brasileiro: técnicas cinegéticas e implicações para conservação. Trópico. Conservar. Ciências, 5, 50-66.

Campos, MAA (2011). Cruzando saberes: etnoecologia e caça no Rio Cuieiras. Annablume. 1ª edição, 102p.
Comitê Brasileiro de Registros Ornitológicos. (2021). Lista das aves do Brasil. 13ª Edição. Disponível em http://www.cbro.org.br . Acesso em: 23 de outubro de 2023.

Diegues, AC, & Arruda, RSV (2007). Saberes tradicionais e biodiversidade no Brasil. Ministério do Meio Ambiente, Brasília.

Doente, H. (1997). Ornitologia Brasileira. Edição Revista e Ampliada por José Fernando Pacheco (coord.). Rio de Janeiro: Nova Fronteira, 912p.

Drews, C. (2002). Atitudes, conhecimentos e animais selvagens como animais de estimação na Costa Rica. Antrozoös, 15(2), 119-138.

Farias, GB e Alves, AGC (2010). Relações mitológicas entre as aves "Lavandeira" Fluvicola nengeta e Motacilla alba no Nordeste do Brasil e Noroeste da Espanha: possíveis implicações culturais para a conservação. J. Etnobiol., 30(2), 240-251.

Farias, GB, & Alves, AGC (2007). Aspectos históricos e conceitos da etnoornitologia. Biotemas, 20(1), 91-100.

Fernandes-Ferreira, H., Mendonça, SU, Ferreira, CAFS, & Alves, RRN (2012). Caça uso e conservação de aves no Nordeste do Brasil. Biodiversos. Conservação, 21, 221-244.

IBGE (2022). Instituto Brasileiro de Geografia e Estatística. Disponível em http://www.ibge.gov.br . Acesso em: 23 de outubro de 2023.

Macdonald, DW, Johnson, PJ, Albredhtsen, L., Dutton, A., Seymour, S., Dupain, J., Hall, A., & Fa, JE (2011). Associação da massa corporal com o preço da carne de caça na Nigéria e nos Camarões. Conservar. Biol., 25, 1220-1228.

Marques, JGW (1995). Pescando Pescadores: etnoecologia abrangente no baixo São Francisco alagoano.

Marques, JGW (2002). O olhar (des) multiplicado: O papel do interdisciplinar e do qualitativo na pesquisa etnobiológica e etnoecológica. In: Métodos de coleta e análise de dados em etnobiologia, etnoecologia e disciplinas correlatas (Amorozo, MCM, Ming, LC, & Silva, SP, Eds.), pp. UNESP/CNPq, Rio Claro, Brasil.

Marques, JGW (2005). 'É pecado matar a esperança, mas todo mundo que matar o sarigue'. Etnoconservação e catolicismo popular no Brasil. Em Alves, AGC.

MARQUES, Juracy. (2012). Ecologia da Alma. Petrolina: Franciscana.

Nolan, JM e Robbins, MCE (2001). Significado emocional e organização cognitiva dos domínios etnozoológicos. J. Antropol. Linguista., 11(2), 240-249.

Olmos, F. (2005). Aves ameaçadas, prioridades e políticas de conservação no Brasil. Natureza & Conservação, 3, 21–42.

Phillips, O., Gentry, AH, Reynel, C., Wilki, P., & Gávez-Durand, CB (1994). Etnobotânica quantitativa e conservação amazônica. Biol. Conservação, 8, 225-248.

Piacentini, VQ, Aleixo, A., Agne, CE, Maurício, GN, Pacheco, JF, Bravo, GA, Brito, GRR, Naka, LN, Olmos, F., Posso, S., Silveira, LF, Betini, GS , Carrano, E., Franz, I., Lees, AC, Lima, LM, Pioli, D., Schunck, F., Amaral, FR, Bencke, GA, Cohn-Haft, M., Figueiredo, LF, &

Straube , FC (2015). Lista comentada das aves do Brasil pelo Comitê Brasileiro de Registros Ornitológicos. Rev. Brás. Ornitol., 23, 91-298.

Posey, DA (1987). Etnobiologia: teoria e prática. Em: Ribeiro, D. Suma etnológica brasileira. 1. Petrópolis: Vozes. Qualitativa na pesquisa etnobiológica e etnoecológica.

Sax, B. (2001). O Zoológico Mítico: uma lista de animais nos mitos, lendas e literatura mundial. ABC-CLIO Inc., Santa Bárbara, EUA.

Sigrist, T. (2009). O Guia de Campo Avis Brasilis para as Aves do Brasil. Placas e mapas. Vinhedo, Avis Brasilis, São Paulo, Brasil.

Sigrist, T. (2015). Guia de Bolso Avis Brasilis - Avifauna Brasileira. Avis Brasilis, São Paulo, Brasil.

Silva, CR, Gobbi, BC, & Simão, AA (2005). O uso da análise de conteúdo como uma ferramenta para a pesquisa qualitativa: Descrição e aplicação do método. Órgão. Rurais Agroindustriais, 7(1), 70-81.

Siqueira Filho, JA, & Lira, MM (2021). Conservação das Serras da Jacobina: O Encontro das Floras do Brasil. SABEH, Paulo Afonso, BA, cap. 12, pág. 409-458.

Tidemann, S. e Gosler, A. (2010). Etno-ornitologia: Aves, Povos Indígenas, Cultura e Sociedade. Publicações Earthscan Ltd.

UICN (2022). Lista Vermelha de Espécies Ameaçadas da IUCN. Versão 2022-2. https://www.iucnredlist.org . Acessado em 24 de outubro de 2023.

Verdade, LM (2004). A exploração da fauna silvestre no Brasil: jacarés, sistemas e recursos humanos. Biota Neotropica, 4(2).