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Translated from the original in spanish **Original article**

Information and tourist use of terrestrial mammals

Conocimiento y uso turístico de los mamíferos terrestres

Conhecimento e uso turístico dos mamíferos terrestres

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ABSTRACT

The cultural relevance of terrestrial mammals in driving wildlife tourism is addressed by assessing their cultural value and importance to local communities. This study aimed to record the knowledge and tourist use of terrestrial mammals in Jipijapa, Manabí, Ecuador. Surveys were conducted among local residents and experts to collect the mammals and their uses, followed by calculating the importance value of each species. The results revealed the presence of 52 mammal species, most of them threatened. The uses were education and

awareness (86 mentions), wildlife observation (81), photo hunting tourism (80), ecotourism (74), adventure tourism (73) and theme park attractions (22). The species of greatest importance and cultural value are *Ateles fusciceps, Bradypus variegatus, Desmodus rotundus, Didelphis marsupialis, Glyphonycteris daviesi, Lycalopex sechurae, Nasua narica, Simosciurus stramineus, Tamandua mexicana* and *Vampyrum spectrum*, associated with cultural landscapes. This ethnozoological approach provides a solid basis for the planning and analysis of tourism activities focused on local fauna, which contributes to the conservation of biodiversity and the sustainable development of the region.

Keywords: ethnozoology, informant consensus factor, relative citation frequency, relative importance, cultural value.

RESUMEN

La relevancia cultural de los mamíferos terrestres en el impulso del turismo de vida silvestre se aborda mediante la evaluación de su valor cultural y su importancia para las comunidades locales. Este estudio tuvo como objetivo registrar el conocimiento y uso turístico de los mamíferos terrestres en Jipijapa, Manabí, Ecuador. Se realizaron encuestas a residentes locales y expertos para recopilar los mamíferos y sus usos, seguido del cálculo del valor de importancia de cada especie. Los resultados revelaron la presencia de 52 especies de mamíferos, la mayoría de ellas amenazadas. Los usos fueron educación y sensibilización (86 menciones), observación de vida silvestre (81), turismo de caza fotográfica (80), ecoturismo (74), turismo de aventura (73) y atracciones en parques temáticos (22). Las especies de mayor importancia y valor cultural son *Ateles fusciceps, Bradypus variegatus, Desmodus rotundus, Didelphis marsupialis, Glyphonycteris daviesi, Lycalopex sechurae, Nasua narica, Simosciurus stramineus, Tamandua mexicana y Vampyrum spectrum*, asociadas a paisajes culturales. Este enfoque etnozoológico proporciona una base sólida para la planificación y análisis de actividades turísticas centradas en la fauna local, lo que contribuye a la conservación de la biodiversidad y al desarrollo sostenible de la región.

Palabras clave: etnozoología, factor de consenso del informante, frecuencia relativa de citación, importancia relativa, valor cultural.

RESUMO

A relevância cultural dos mamíferos terrestres na condução do turismo de vida selvagem é abordada através da avaliação do seu valor cultural e importância para as comunidades locais. Este estudo teve como objetivo registrar o conhecimento e o uso turístico dos mamíferos terrestres em Jipijapa, Manabí, Equador. Foram realizadas pesquisas entre moradores locais e especialistas para coletar os mamíferos e seus usos, seguido do cálculo do valor de importância de cada espécie. Os resultados revelaram a presença de 52 espécies de mamíferos, a maioria ameaçadas. Os usos foram educação e conscientização (86 menções), observação de vida selvagem (81), turismo de caça fotográfica (80), ecoturismo (74), turismo de aventura (73) e atrações em parques temáticos (22). As espécies de maior importância e valor cultural são *Ateles fusciceps, Bradypus variegatus, Desmodus rotundus, Didelphis marsupialis, Glyphonycteris daviesi, Lycalopex sechurae, Nasua narica, Simosciurus stramineus, Tamandua mexicana* e *Vampyrum spectro*, associadas a paisagens culturais. Esta abordagem etnozoológica fornece uma base sólida para o planeamento e análise de atividades turísticas focadas na fauna local, o que contribui para a conservação da biodiversidade e o desenvolvimento sustentável da região.

Palavras-chave: etnozoologia, fator de consenso do informante, frequência relativa de citação, importância relativa, valor cultural.

INTRODUCTION

Ethnozoological studies are fundamental to understanding bioecology and sociocultural links between humans and animals (Nóbrega *et al.,* 2018). Through them, it is possible to identify and understand the use of wildlife for various purposes, such as food, traditional medicine, trade, religion, culture and tourism. Wildlife tourism has emerged as a growing

industry, with an increasing demand for authentic and sustainable experiences that allow visitors to connect with nature (Sthapit *et al.*, 2024).

Terrestrial mammals play a crucial role in this type of tourism due to their cultural and ecological appeal. Their presence not only contributes to biodiversity, but also has a deep symbolic and emotional value in diverse cultures around the world.

In many cultures, land mammals are seen as symbols of strength, freedom and wisdom. For example, elephants in Africa are not only a pillar of the ecosystem, but are also respected in many local cultures for their intelligence and longevity, making them a key attraction for tourists seeking a deeper connection with the natural and cultural environment (Blake *et al.*, 2008).

The appeal of land mammals is also reflected in the economy. Gidebo (2023) pointed that wildlife tourism represents a significant source of income for many developing countries, providing employment and promoting natural habitat conservation. Furthermore, the experience of observing mammals in their natural environment offers tourists a unique opportunity for education and awareness about the importance of conserving endangered species (Duffus and Dearden, 1990).

Despite the relevance of terrestrial mammals, their integration into tourism programs is not always easy, due to the complex relationship between these animals and human cultures. This study focuses on documenting the knowledge and tourist use of terrestrial mammals in Jipijapa, Manabí, Ecuador. The findings will contribute to the formulation of conscious tourism strategies that value the cultural heritage linked to these species, promote the conservation of biological diversity and generate income for local communities.

MATERIALS AND METHODS

Area of study

The study was carried out in the Jipijapa canton, Manabí, coastal region of Ecuador. Its territorial extension is 1,419.086 km and it is located at the geographic coordinates 1°20'00"S and 80°35'00"W. It is limited to the north by the Montecristi, Portoviejo and Santa Ana cantons; to the south by the Guayas Province and the Puerto López Canton, to the east by the Paján and 24 de Mayo Cantons and to the west by the Pacific Ocean. Jipijapa has a human population of 78,117, where the majority is mestizo (73.1%) and montubia (24.5%).

Ethics statement

All participants were informed about the purpose of the study and their oral, free, prior and informed consent to interview, record, photograph and/or publish their knowledge was obtained at the beginning of each interview. All interviews were in accordance with the Code of Ethics of the International Society of Ethnobiology (ISBE, 2008. Considering also the obligations of the Nagoya Protocol, it was approved that "*the right of use and ownership of any traditional knowledge of all informants remains with them, and that any use of the information, except for scientific publication, requires the additional consent of the traditional owners and consensus on access to the benefits derived from its possible further use*" (Convention on Biological Diversity, 2011).

Data collection

This study combines ethnozoological data, zoological data on mammals (Brito *et al.*, 2023) and conservation information (IUCN, 2024). Ethnozoological data on tourism use of terrestrial mammals were collected between May 2022 and January 2024 through semi-structured interviews. The sampling process was purposive and participants were selected because they could provide relevant information for this study. Of the 100 experts identified as having knowledge of the species and working in the tourism sector, six agreed to participate in this study in greater depth.

At the beginning of each interview, participants were given a brief description of wild terrestrial mammals, beginning with the importance of conducting their study in the area and their use in tourism. They were told that these are animals such as foxes, armadillos, bats, monkeys, mice, and opossums, and that we wanted to know what mammals they had seen in the area. After the introduction, participants were asked to comment on the points about terrestrial mammals that immediately came to mind (~15 min). Next, they were shown photos of mammals and asked to identify vernacular names and usage (~45 min). Information about wild terrestrial mammals was documented, specifically with data on (1) their popular names, (2) where they can be found most easily, and (3) tourist uses. In addition, observations were made and photographs were taken at relevant locations, whenever possible to document unmentioned uses and also to observe ethnozoological practices. Depending on the weather and the willingness of the participants, a "walk through the area" was conducted to observe the species (~45 min). To confirm previous information and gain more knowledge about various mammals, participants were shown an illustrated catalogue of mammals (Brito *et al.*, 2023), which included the species of the region (~45 min). Some participants were visited a second time to complete the first interview or to confirm information. The illustrated catalogue of mammals (Brito *et al.*, 2023) was used to identify species. Species were not collected.

Data analysis

For data analysis, all reported species and their relevant ethnozoological data (potential use in tourism) were entered into a Microsoft® Excel spreadsheet in a report-of-use (UR) order, following the categories of the ethnozoological data collection standard (Terrance, 2014). Six broad tourism use categories were determined for several emic subcategories (MOSTOWLANSKY and ROTA, 2020) (Table 1). For example, the "wildlife observation" category reflects the knowledge and perception of local communities regarding these species, including cultural or religious uses (mammals that have a symbolic, cultural or religious meaning for the community), impact of mammals on agriculture and livestock (perceptions about how terrestrial mammals affect agricultural and livestock activities), myths and legends (local stories, beliefs and legends involving terrestrial mammals), as well

as dangers and precautions (knowledge about the dangers associated with certain terrestrial mammals and the precautions to be taken) among others.

Table 1. *- Categories of tourist uses assigned for tourist activities*

Categories (Codes)	**Description of tourist activities**
Theme Park Attractions (APT)	Theme Park attractions offer recreational and educational experiences in environments that replicate natural habitats, allowing for the safe observation of terrestrial mammals. These facilities promote wildlife awareness and conservation through interactive programs and educational activities, contributing to local economic development and the preservation of biodiversity.
Ecotourism (ECT)	Ecotourism is a form of sustainable tourism that allows visitors to explore and enjoy natural areas, focusing on the observation and conservation of terrestrial mammals. It promotes respect for the environment and local cultures, educating tourists about the importance of preserving biodiversity.
Education and awareness raising (ESD)	Education and awareness-raising in the context of wildlife tourism refers to activities designed to inform and raise awareness among visitors about the importance of conserving terrestrial mammals and their habitats. These activities include talks, workshops and interactive programs that highlight the ecological and cultural value of these species, encouraging responsible attitudes and behaviors toward nature.
Wildlife Observation (WVO)	Wildlife watching is a tourist activity that allows visitors to see and study terrestrial mammals in their natural habitat. This practice promotes the appreciation and conservation of local fauna, offering an educational and recreational experience that enhances the value of ecosystems and fosters respect for biodiversity.
Adventure tourism (TAV)	Adventure tourism is a type of tourism that offers exciting and challenging experiences in natural environments. Focused on activities like hiking. Climbing, and exploring terrestrial mammal habitats, this type of tourism promotes connection with nature and biodiversity conservation, while providing visitors with a unique and stimulating experience.
Photo Hunting Tourism (TCF)	Photo hunting tourism is an activity where visitors seek to capture images of terrestrial mammals and other species in their natural environment, without causing harm or disturbing the animals. This practice promotes respect for wildlife and conservation, providing an exciting and educational experience that contributes to the appreciation and protection of natural ecosystems.

ethnobotanyR package (Whitney, 2022) was used within the R environment. The basic values of Citation Frequency (CF), Number of Uses Reports (UR), Number of Uses (NU), as well as the Cultural Importance (CI), Relative Citation Frequency (RFC), Relative Importance (RI) and Cultural Value (CV) indices were obtained (Tardio and Pardo-de-Santayana, 2008).

RESULTS AND DISCUSSION

A total of 52 species of terrestrial mammals were inventoried in the rural area of Jipijapa canton, Ecuador (Table 1). One endemic species (*Simosciurus stramineus*). According to the IUCN status (2024), 49 species are at risk of extinction (94.2%). *Ateles fusciceps* was listed as critically endangered (CR); *Heteromys teleus* has been classified as endangered (EN), while *Caluromys derbianus, Lichonycteris obscura, Lycalopex sechurae* and *Sigmodontomys Alfari* were assessed as Vulnerable (VU). Forty species have been assessed in the less threatened group described as Least Concern (LC), these include *Bradypus variegatus, Didelphis marsupialis, Marmosa simonsi, Nasua nose, Philander melanurus, Simosciurus stramineus, Syntheosciurus granatensis* and *Mexican Tamandua.*

According to the results obtained, all these species are closely linked to cultural landscapes, i.e. areas transformed by human intervention, which adds a unique component to their study. Agricultural expansion, driven mainly by the cultivation of corn and other short-cycle species, constitutes the most significant threat to the mammal population in the area. In addition to this pressure on the habitat, other worrying threats were identified, such as the overexploitation of species for the manufacture of artisanal objects with their skin (*Syntheosciurus granatensi*), the persecution of species considered harmful, such as some mice (*Aegialomys xantheolus*) and bats (*Vampyressa thyone*), poisoning (*Philander melanurus*), mortality caused by human-made equipment and disruptions caused by climate change.

Despite the wide distribution of these terrestrial mammals in the country (de la Torre *et al*., 2012; Barros-Diaz *et al*., 2023), they face many dangers, the most important being death on the roads, in addition to urban expansion in rural areas, which threatens their natural habitat, in addition to the lack or absence of rainfall in the coastal region of Ecuador. This list reflects the diversity of mammals in the area, and highlights the importance of implementing conservation measures, especially for *Ateles fusciceps* and *Heteromys teleus* which are in the most threatened categories according to the IUCN (2024).

Terrestrial mammals have different tourist uses, among the most reported we have: education and awareness (48 species), photographic hunting tourism (48), adventure tourism (47), wildlife observation (46), ecotourism (42) and attractions in theme parks (10) (Table 2). These results show the experiential, social, functional, financial and spiritual motivations for the use of wildlife (Thomas-Walters *et al*., 2021).

Table 2. *- List of mammal species from Jipijapa, Manabí, Ecuador. Endemism. Uses.APT - Theme Park Attractions, ECT - Ecotourism, EDS - Education and Awareness Raising, OVS - Wildlife Observation, TAV - Adventure Tourism, TCF - Photographic Hunting Tourism*

Scientific name	**Threat Category**	**Uses**
Aegialomys xantheolus (Thomas, 1894)	Least Concern	ECT, EDS, OVS, TAV, TCF
Artibeus aequatorialis (Larsen et al. 2010)	Least Concern	ECT, EDS, OVS, TAV, TCF
Artibeus fraterculus (Anthony, 1924)	Insufficient data	ECT, EDS, OVS, TAV, TCF
Ateles fusciceps (Gray, 1866)	Critical danger	APT, ECT, EDS, OVS, TAV, TCF
Bradypus variegatus (Schinz , 1825)	Least Concern	ECT, EDS, OVS, TAV, TCF
Caluromys derbianus (Waterhouse, 1841)	Vulnerable	APT, EDS, OVS
Carollia brevicaudum (Schinz , 1821)	Least Concern	EDS, TAV, TCF
Carollia perspicillata (Linnaeus , 1758)	Least Concern	EDS, OVS, TAV, TCF
Centronycteris (Thomas, 1912)	Least Concern	EDS, TAV, TCF
Chiroderma villosum (Peters, 1860)	Least Concern	EDS, OVS, TAV, TCF
Chironectes minimus (Zimmermann, 1780)	Near Threatened	APT, EDS, OVS, TCF

Desmodus rotundus (Geoffroy, 1810)	Least Concern	ECT, EDS, OVS, TAV, TCF
Diclidurus albus Wied-Neuwied , 1820	Least Concern	ECT, EDS, OVS, TCF
Didelphis marsupialis (Linnaeus , 1758)	Least Concern	APT, ECT, EDS, OVS, TAV, TCF
Gardnerycteris crenulatum (Geoffroy, 1803)	Least Concern	ECT, OVS, TAV, TCF
Glossophaga soricin (Pallas, 1766)	Least Concern	ECT, EDS, OVS, TAV, TCF
Glyphonycteris daviesi (Hill, 1964).	Insufficient data	ECT, EDS, OVS, TAV, TCF
Handleyomys Alfaroi (Allen, 1891)	Least Concern	ECT, EDS, OVS, TAV, TCF
Heteromys teleus (Anderson and Jarrin, 2002)	Endangered	ECT, EDS, OVS, TAV, TCF
Lichonycteris obscura (Thomas, 1895)	Vulnerable	EDS, OVS, TAV, TCF
Lonchophylla concave (Goldman, 1914)	Least Concern	ECT, EDS, OVS, TAV, TCF
Lonchophylla robusta (Miller, 1912)	Least Concern	ECT, OVS, TAV, TCF
Lonchorhina aurita (Tomes, 1863)	Least Concern	ECT, EDS, OVS, TAV, TCF
Lycalopex sechurae (Thomas, 1900)	Vulnerable	APT, ECT, EDS, OVS, TAV, TCF
Marmosa simonsi (Thomas, 1899)	Least Concern	ECT, EDS, OVS, TAV, TCF
Melanomys caliginosus (Tomes, 1860)	Least Concern	ECT, EDS, OVS, TAV, TCF
Micronycteris hirsuta (Peters, 1869)	Least Concern	ECT, OVS, TAV, TCF
Micronycteris megalotis (Gray, 1842)	Least Concern	EDS, OVS, TAV, TCF
Molossus molossus (Pallas, 1766)	Least Concern	ECT, OVS, TAV, TCF
Myotis nigricans (Schinz , 1821)	Least Concern	ECT, EDS, OVS, TAV, TCF
Myotis riparius (Handley, 1960)	Least Concern	ECT, EDS, OVS, TAV
Nasua nose (Linnaeus , 1766)	Least Concern	ECT, EDS, OVS, TAV, TCF
Nyctinomops macrotis (Gray, 1839)	Least Concern	ECT, EDS, TAV
Oecomys bicolor (Tomes, 1860)	Least Concern	ECT, EDS, OVS, TAV, TCF
Philander melanurus (Thomas, 1899)	Least Concern	APT, EDS, OVS
Phyllostomus discoloured (Wagner, 1843)	Least Concern	OVS, TAV, TCF
Platyrrhinus umbratus (Lyon, 1902)	Least Concern	ECT, EDS, TCF
Proechimys decumanus (Thomas, 1899)	Least Concern	ECT, EDS, OVS, TAV, TCF
Proechimys semispinosus (Thomas, 1860)	Least Concern	ECT, EDS, OVS, TAV, TCF

Rhinophylla alethina (Handley, 1966)	Insufficient data	ECT, EDS, OVS, TAV, TCF
Sigmodon peruanus (Allen, 1897)	Least Concern	ECT, EDS, OVS, TAV, TCF
Sigmodontomys Alfari (Allen, 1897)	Vulnerable	ECT, EDS, TAV, TCF
Simosciurus stramineus (Eydoux and Souleyet, 1841)	Least Concern	APT, ECT, EDS, OVS, TAV, TCF
Sturnira bakeri (Velazco and Patterson, 2014)	Not evaluated	ECT, EDS, OVS, TAV, TCF
Sturnira luis (Davis, 1980)	Least Concern	ECT, EDS, TAV, TCF
Syntheosciurus granatensis (Humboldt, 1811)	Least Concern	APT, EDS, OVS, TCF
Mexican tamandua (Saussure, 1860)	Least Concern	ECT, EDS, OVS, TAV, TCF
Trachops cirrhosus (Spix , 1823)	Least Concern	ECT, EDS, TAV
Transandinomys bolivaris (Allen, 1901)	Least Concern	ECT, EDS, OVS, TAV, TCF
Transandinomys talamancae (Allen, 1891)	Least Concern	ECT, OVS, TCF,
Vampyressa thyone (Thomas, 1909)	Least Concern	ECT, EDS, OVS, TAV, TCF
Vampyrum spectrum (Linnaeus, 1758)	Near Threatened	APT, ECT, EDS, OVS, TAV, TCF

The results of the analysis of use reports, based on the frequency of citations by informants, revealed a total of 416 total use reports (URs), with the majority being in education and awareness (86 mentions), followed by wildlife observation (81), photo-hunting tourism (80), ecotourism (74), adventure tourism (73), and theme park attractions (22) (Table 3). Various studies have examined the impact of tourism on wildlife. In South America, the most common tourism uses have been observed to include education and awareness, wildlife observation, and photo-hunting tourism (Carlos and García-Londoño, 2023). These approaches not only provide exciting experiences for visitors, but also generate economic revenue and promote conservation. However, it is crucial to approach tourism sustainably to protect mammals and their natural environment.

Table 3. *- Number of use reports (UR) and percentage of use categories*

Categories (codes)	**UR**	**Percentage**
Education and awareness raising (ESD)	86	20.67
Wildlife Observation (WVO)	81	19.47
Photo Hunting Tourism (TCF)	80	19,23
Ecotourism (ECT)	74	17.79
Adventure tourism (TAV)	73	17.55
Theme Park Attractions (APT)	22	5.29
Total	416	100

The most commonly used category was Education and Awareness Raising (EDS), followed by Wildlife Observation (WVO) and Photographic Hunting Tourism (PHT) (Figure 1). Biodiversity and conservation education plays an essential role in raising awareness among tourists about the importance of protecting these species in their natural environment. This is in line with the educational value pointed out by Meng. *et al.* (2024), who identify the intrinsic and educational value of intangible cultural heritage as a key factor for the development of educational tourism. Furthermore, photographic hunting tourism is presented as an ethical alternative to physical hunting, promoting the responsible observation of species such as *Chironectes minimus* and *Glyphonycteris daviesi*, aligning with the sustainable tourism strategies proposed by Roblek *et al.* (2021).

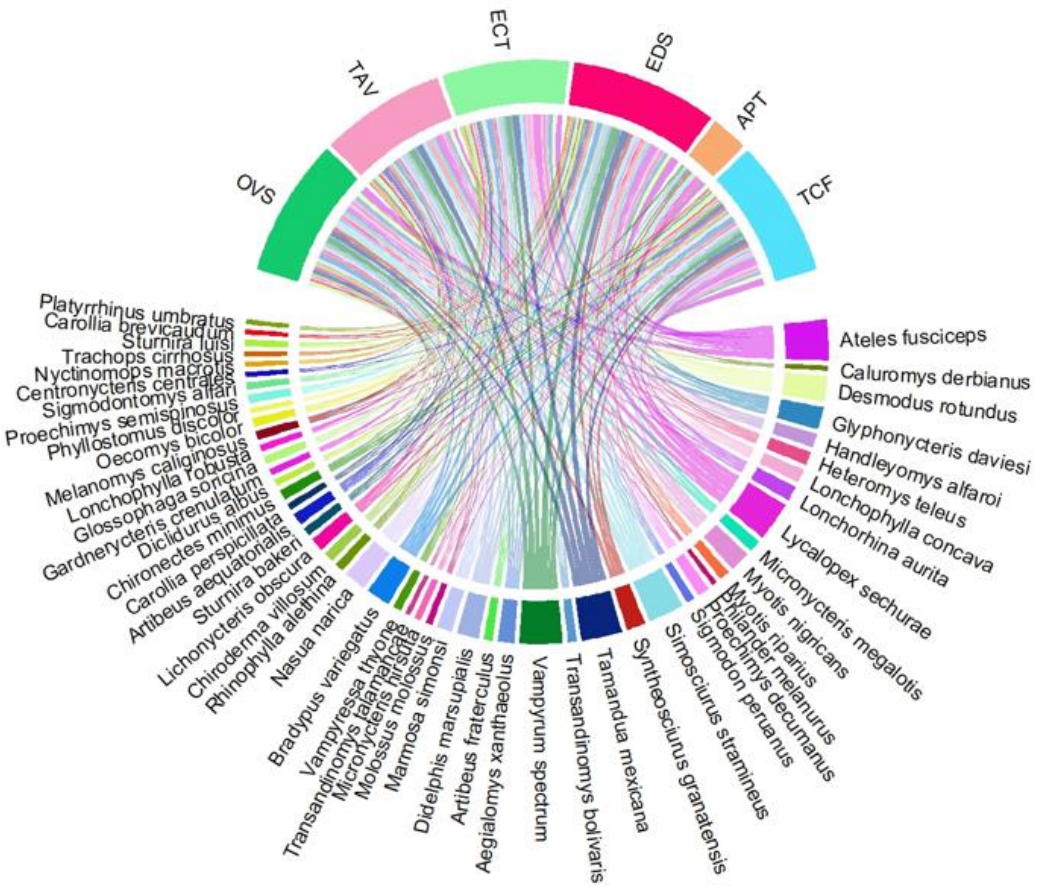

Figure 1. *- Distribution of species and their contribution to the use categories. The six (6) tourism activities (upper half) related to each of the 52 terrestrial mammal species (lower half) are shown. EDS = Education and awareness, OVS = Wildlife observation, TCF = Photographic hunting tourism, ECT = Ecotourism, TAV = Adventure tourism and APT= Theme Park attractions*

The species of greatest cultural importance (CI) and cultural value (CV) is *Vampyrum spectrum* (CI = 4.167; CV = 4.167), followed by *Ateles fusciceps* (CI = 4.000; CV = 4.000), *Tamandua mexicana* (CI = 4.000; CV = 3.333), *Lycalopex sechurae* (CI = 3.833; CV = 3.833), *Simosciurus stramineus* (IC = 3,500; CV = 3,500), *Desmodus rotundus* (CI = 2,500; CV = 1,042), *Bradypus variegatus* (CI = 2.333; CV = 0.972), *Didelphis marsupialis* (CI = 2.167; CV = 1.083), *Glyphonycteris daviesi* (CI = 2.167; CV = 0.903) and *Nasua nose* (CI = 2.167; CV = 0.903) (Figure 2, Table 4). Each of these species has a cultural meaning that is reflected in legends, rituals

and traditional uses, being key elements in the cultural identity and heritage of the communities.

Vampyrum spectrum, known as the spectral bat, is enigmatic and respected in Jipijapa, known for its size "larger than other bats" and rarity or "very scarce in the area". In the local culture, it is seen as a link between the earthly and spiritual world, acting as a messenger of supernatural forces. Its presence is associated with protection and fear, as it is believed to guard against evil spirits and announce significant changes. In cultural rituals, its guidance is invoked and its habitat is respected, recognizing its crucial role in both the ecosystem and the cultural heritage of the region. This cultural perception aligns with scientific documentation, such as the study by Pacheco-Figueroa *et al*. (2022), which first reported the species in Tabasco, Mexico, that highlight the importance of conservation and the need to protect its habitat from threats such as habitat loss and human interaction, topics also addressed by Saldaña-Vázquez *et al.* (2023), in this analysis of threats to bats in the Anthropocene. In addition, the first record of *Vampyrum spectrum* in Imbabura Province, Ecuador by Cueva *et al.* (2013) highlights the species' adaptation to diverse habitats and reinforces the need to integrate conservation with cultural respect for local fauna. This combination of cultural and scientific perspectives is crucial to understanding and preserving the ecological and cultural role of the spectral bat in different regions.

Ateles fusciceps plays a crucial role in the ecosystems of Jipijapa, Ecuador, mainly as a seed disperser. Its agility in moving between trees and consuming various fruits makes it an essential agent for the regeneration of tropical forests, contributing to the diversity and ecological health of its habitat. In addition to its ecological importance, this primate has a deep cultural meaning for Jipijapa communities, where it is seen as a symbol of freedom and connection with nature. Local legends consider it a protective spirit of the forest, capable of guiding travelers and predicting good harvests. This cultural perception coincides with that pointed out by Sánchez (2024), who states that *Ateles fusciceps* acts as a seed disperser over long distances, being perceived as a messenger of fertilization and vital activation in Andean-Amazonian representations. The protection and respect for this species in Jipijapa reflects an integration of its ecological and cultural role, where hunting is

prohibited and its preservation is promoted as an integral part of local identity and cultural heritage.

For its part, *Lycalopex sechurae* is a symbol of cunning and survival in challenging environments. This canine has been the subject of numerous legends, and its presence in regional folklore makes it a species of cultural relevance. In addition, its ability to adapt to dry environments and its varied diet make it an important ecological regulator in its habitat (Stahl, 2012). While *Simosciurus stramineus,* is a species that has been integrated into the daily life of rural communities. Its presence is common in agricultural areas, where it is seen both as a charismatic animal and as a competitor for crops. Despite this, the species has a restricted distribution and is little studied (Lizcano *et al.,* 2016).

The data showed significant differences in the species ranking obtained by the different established indices (Table 4). Although the first four species (*Ateles fusciceps, Lycalopex sechurae, Simosciurus stramineus*, *Tamandua mexicana and Vampyrum spectrum)* are the same in all, the order varies depending on the index chosen. The RI and CV indexes place *Vampyrum spectrum* in the first place because these two indices assign greater importance to the multiplicity of uses and the species was mentioned in a greater number of use categories (NU=6). However, *Ateles fusciceps and Simosciurus stramineus* should logically be considered the most important, since they predominate in the landscape and are mentioned by a greater number of informants in the interviews carried out with the largest number of collaborators.

In addition, it was observed that some species, commonly called "rats or field mice" or "bats", generate feelings of fear among local inhabitants. Among the most notable species for tourists visiting the trails are *Aegialomys xantheolus, Handleyomys alfaroi, Marmosa simonsi* and *Myotis nigricans.* However, it is relevant to note that all these species have reduced populations in the study area, with *Vampyrum spectrum* that generates a greater feeling of fear. This analysis provides a solid basis for understanding mammal biodiversity in the region and its relevance to tourism and conservation.

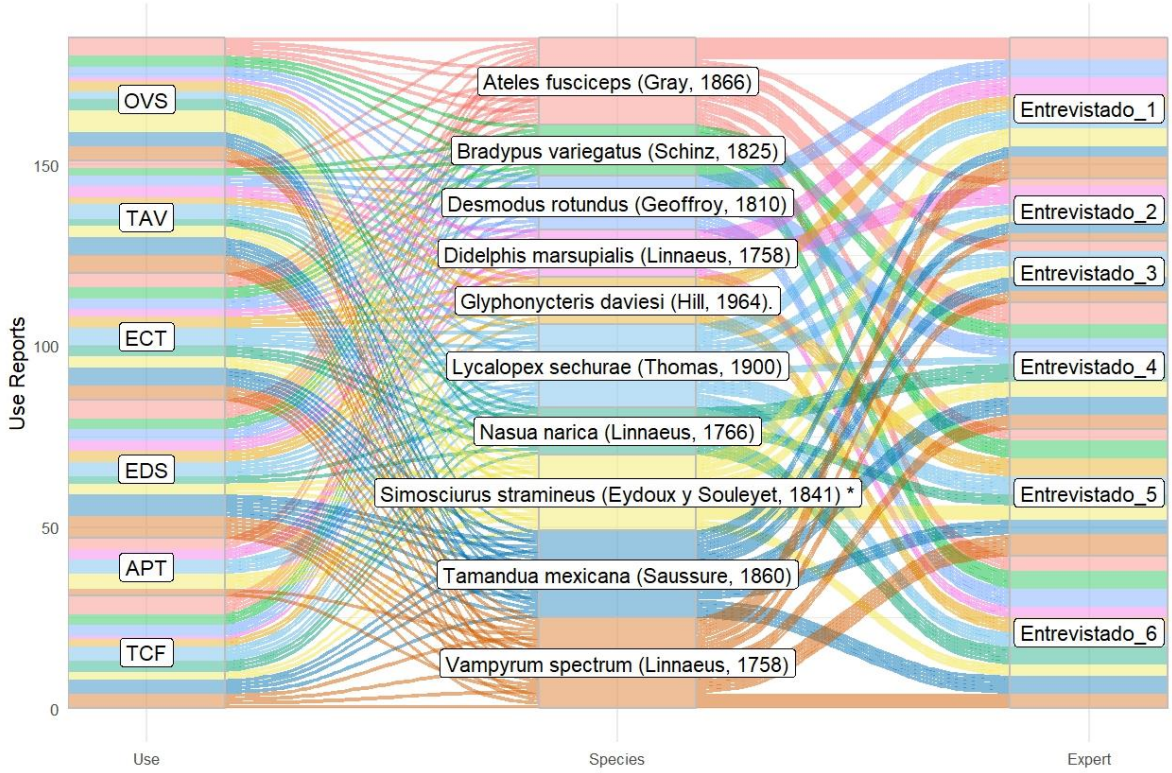

Figure 2. *- Distribution between tourism uses, species and key informants. Reports are shown for each of the six (6) tourism uses (left) related to each of the 10 species of terrestrial mammals of greatest importance and cultural value (center) and each of the 6 key informants or experts (right). Uses: EDS = Education and awareness, OVS = Wildlife observation, TCF = Photographic hunting tourism, ECT = Ecotourism, TAV = Adventure tourism and APT= Attractions in theme parks, *Endemism*

In this context, it is essential to develop a specific marketing strategy for Jipijapa that highlights the presence of mammals preferred by tourists and promotes the potential for observing these species in the area. It is also recommended to disseminate a list of "attractive" animals for visitors, which could contribute to strengthening ecotourism and promoting the conservation of biodiversity in the region.

Table 4. *- Evaluation of terrestrial mammals useful for tourism, using four quantitative indices. List of the 52 species following the CI index and classification of the species, based on each index. FC=frequency of citation, UR=number of reported uses, NU=number of uses, CI=cultural importance, RFC=relative frequency of citation, RI=relative importance, CV=cultural value*

Species	Basic Values			Indexes				Ranking			
	FC	UR	NU	CI	RFC	RI	CV	CI	RFC	RI	CV
Vampyrum spectrum	6	25	6	4,167	1,000	1,000	4,167	1	5	4	1
Ateles fusciceps	6	24	6	4,000	1,000	1,000	4,000	2	1	1	2
Mexican Tamandua	6	24	5	4,000	1,000	0.917	3,333	3	4	5	5
Lycalopex sechurae	6	23	6	3,833	1,000	1,000	3,833	4	2	2	3
Simosciurus stramineus	6	21	6	3,500	1,000	1,000	3,500	5	3	3	4
Desmodus rotundus	3	15	5	2,500	0.500	0.667	1,042	6	8	8	7
Bradypus variegatus	3	14	5	2,333	0.500	0.667	0.972	7	7	7	8
Didelphis marsupialis	3	13	6	2,167	0.500	0.750	1,083	8	9	6	6
Glyphonycteris daviesi	3	13	5	2,167	0.500	0.667	0.903	9	10	9	9
Nasua nose	3	13	5	2,167	0.500	0.667	0.903	10	12	11	10
Myotis nigricans	3	12	5	2,000	0.500	0.667	0.833	11	11	10	11
Syntheosciurus granatensis	4	11	4	1,833	0.667	0.667	0.815	12	6	12	12
Aegialomys xanthaeolus	2	10	5	1,667	0.333	0.583	0.463	13	13	13	13
Lonchorhina aurita	2	9	5	1,500	0.333	0.583	0.417	14	21	18	14
Marmosa simonsi	2	9	5	1,500	0.333	0.583	0.417	15	22	19	15
Handleyomys Alfaroi	2	8	5	1,333	0.333	0.583	0.370	16	17	15	16
Heteromys teleus	2	8	5	1,333	0.333	0.583	0.370	17	18	16	17
Lichonycteris obscura	2	8	4	1,333	0.333	0.500	0.296	18	19	25	21
Lonchophylla concave	2	8	5	1,333	0.333	0.583	0.370	19	20	17	18
Artibeus aequatorialis	2	7	5	1,167	0.333	0.583	0.324	20	14	14	19
Micronycteris megalotis	2	7	4	1,167	0.333	0.500	0.259	21	23	27	22
Proechimys decumanus	2	7	5	1,167	0.333	0.583	0.324	22	25	20	20
Chiroderma villosum	2	6	4	1,000	0.333	0.500	0.222	23	15	22	23
Chironectes minimus	2	6	4	1,000	0.333	0.500	0.222	24	16	23	24
Myotis riparius	2	6	4	1,000	0.333	0.500	0.222	25	24	28	25

Artibeus fraterculus	1	5	5	0.833	0.167	0.500	0.116	26	26	21	26
Glossophaga soricin	1	5	5	0.833	0.167	0.500	0.116	27	33	24	27
Melanomys caliginosus	1	5	5	0.833	0.167	0.500	0.116	28	35	26	28
Oecomys bicolor	1	5	5	0.833	0.167	0.500	0.116	29	39	29	29
Proechimys semispinosus	1	5	5	0.833	0.167	0.500	0.116	30	43	30	30
Rhinophylla alethina	1	5	5	0.833	0.167	0.500	0.116	31	44	31	31
Sigmodon peruanus	1	5	5	0.833	0.167	0.500	0.116	32	45	32	32
Sturnira bakery	1	5	5	0.833	0.167	0.500	0.116	33	47	33	33
Transandinomys bolivaris	1	5	5	0.833	0.167	0.500	0.116	34	50	34	34
Vampyressa thyone	1	5	5	0.833	1,167	0.500	0.116	35	52	35	35
Carollia perspicillata	1	4	4	0.667	0.167	0.417	0.074	36	29	36	36
Diclidurus albus	1	4	4	0.667	0.167	0.417	0.074	37	31	37	37
Gardnerycteris crenulatum	1	4	4	0.667	0.167	0.417	0.074	38	32	38	38
Lonchophylla robusta	1	4	4	0.667	0.167	0.417	0.074	39	34	39	39
Micronycteris hirsuta	1	4	4	0.667	0.167	0.417	0.074	40	36	40	40
Molossus Molossus	1	4	4	0.667	0.167	0.417	0.074	41	37	41	41
Sigmodontomys Alfari	1	4	4	0.667	0.167	0.417	0.074	42	46	42	42
Sturnira luis	1	4	4	0.667	0.167	0.417	0.074	43	48	43	43
Caluromys derbianus	1	3	3	0.500	0.167	0.333	0.042	44	27	44	44
Carollia brevicaudum	1	3	3	0.500	0.167	0.333	0.042	45	28	45	45
Centronycteris centralis	1	3	3	0.500	0.167	0.333	0.042	46	30	46	46
Nyctinomops macrotis	1	3	3	0.500	0.167	0.333	0.042	47	38	47	47
Philander melanurus	1	3	3	0.500	0.167	0.333	0.042	48	40	48	48
Phyllostomus discoloured	1	3	3	0.500	0.167	0.333	0.042	49	41	49	49
Platyrrhinus umbratus	1	3	3	0.500	0.167	0.333	0.042	50	42	50	50
Trachops cirrhosus	1	3	3	0.500	0.167	0.333	0.042	51	49	51	51
Transandinomys talamancae	1	3	3	0.500	0.167	0.333	0.042	52	51	52	52

Descriptive statistics of the results obtained, using various indices and basic values, show that the RI index tended to overvalue the species (mean=0.542, standard deviation=0.181) compared to other indices. This is because the relative frequency of citations and the relative number of use categories are normalized by dividing by the maximum value, which ranges between 0.333 and 1.00. In contrast, the CV index assigned the highest values (mean=0.611, standard deviation=1.083) (Table 5). These findings underline the urgency of implementing effective tourism strategies that generate economic income for the conservation of these species, taking advantage of traditional knowledge about their uses in tourism activities. The research supports the viability of reconciling tourism activity with effective wildlife conservation in the Jipijapa canton. However, the importance of maintaining constant monitoring of mammal populations is emphasized, especially in light of the foreseeable increase in nature tourism and its possible impacts on species abundance.

Table 5. *- Descriptive statistics of the results obtained with four quantitative indices (N=6), FC=citation frequency, UR=number of reported uses, NU=number of uses, CI=cultural importance, RFC=relative citation frequency, RI=relative importance, CV=cultural value*

	Basic values			**Indexes**			
	FC	**UR**	**NU**	**CI**	**RFC**	**RI**	**CV**
Average	2,019	8	4,481	1,333	0.36	0.542	0.611
Pussycat	1	3	3	0.5	0.167	0.333	0.042
Maximum	6	25	6	4,167	0.167	1,000	4,167
Standard deviation	1,515	6,013	0.896	1,002	0.2781	0.181	1,083
Standard error	0.21	0.834	0.124	0.139	0.0391	0.025	0.15

CONCLUSIONS

52 species of wild terrestrial mammals were listed in Jipijapa, with tourist uses of education and awareness (48 species), photographic hunting tourism (48), adventure tourism (47), wildlife observation (46), Ecotourism (42) and attractions in theme parks (10).

Vampyrum spectrum and *Ateles fusciceps* are vital in Jipijapa, Ecuador, both ecologically and culturally. The spectral bat is respected for its link to the supernatural, and the spider monkey is crucial to forest regeneration and valued as a protector. Both reflect the connection between the community and its environment, with their conservation being key to ecological and cultural balance.

The species of greatest importance and cultural value are *Ateles fusciceps, Bradypus variegatus, Desmodus rotundus, Didelphis marsupialis, Glyphonycteris daviesi, Lycalopex sechurae, Nasua nose*, *Simosciurus stramineus, Tamandua mexicana* and *Vampyrum spectrum.*

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