

Consumption of wild animals in extractive communities in the State of Acre, Brazilian Amazon

Leandro Siqueira de Souza¹, Melissa Progênio², Leilandio Siqueira de Souza³, Francisco Glauco de Araújo Santos^{3,4}

1. Laboratório de Biologia e Parasitologia de Mamíferos Silvestres Reservatórios, Instituto Oswaldo Cruz – IOC/Fiocruz, Rio de Janeiro, RJ, Brasil.

leandrosiqueirasouza@gmail.com

<http://lattes.cnpq.br/9476068507008594>

<http://orcid.org/0000-0003-4148-8092>

2. Programa de Pós-graduação em Ecologia de Ambientes Aquáticos Continentais (Universidade Estadual de Maringá – UEM, Brasil).

melissasilvaprogenio@gmail.com

<http://lattes.cnpq.br/7256740606421125>

<http://orcid.org/0000-0002-0083-3358>

3. Laboratório de Patologia e Apoio a Vida Silvestre, Universidade Federal do Acre, Rio Branco, AC, Brasil.

leilandio73@gmail.com

<http://lattes.cnpq.br/3112668466655407>

<http://orcid.org/0000-0002-2428-4455>

4. Professor Doutor do Curso de Medicina Veterinária (Universidade Federal do Acre, Rio Branco, AC, Brasil).

francisco.araujo@ufac.br

<http://lattes.cnpq.br/0311212600269869>

<http://orcid.org/0000-0002-4682-529X>

ABSTRACT

Wildlife for subsistence is a nutritional source of high protein and is important for the livelihoods of traditional communities. It is imperative to know and record the main species, hunting techniques, and time frame used by the residents in order to understand the degree of threat and introduce conservation measures. This study was designed to list the main species of wild animals used as food resources and identify the main hunting techniques used by residents of the Cazumbá-Iracema extractive reserve in Sena Madureira, Acre, Brazil. The information was collected through semi-structured interviews. For each animal species cited, its respective use value (UV) was calculated. The registered hunting fauna were represented by 22 families and distributed over 40 species. Of the studied animals, wild pork (*Pecari tajacu*), deer (*Mazama* sp.), armadillo (*Dasypus novemcinctus*), guan (*Penelope jacquacu*), inhambu-chicken (*Tinamus guttatus*), inhambu-macucáu (*Crypturellus undulatus*), macaws (*Ara* spp.), parrots (*Amazona* spp.), and tortoises (*Chelonoidis denticulata*) were the most commonly consumed. The main collection methods consisted of ambush (42.7%) and shotguns (41.7%), especially in closed areas of forest. The hunting of wild animals is still an important food resource for rural communities, but the maintenance of local biodiversity is equally important. Thus, environmental education programs should be developed so that residents are cognizant of the use of natural resources without causing hunting pressure and imbalance in the ecosystem.

Keywords: ethnozoology; fauna; livelihood; wildlife hunting.

Consumo de animais silvestres em comunidades extrativistas do Estado do Acre, Amazônia brasileira

RESUMO

A fauna silvestre para subsistência é uma fonte nutricional de alto valor proteico e importante para subsistência de comunidades tradicionais. Conhecer as espécies cinegéticas, as técnicas e o período de captura são aspectos fundamentais para compreender a forma de uso, o grau de ameaça da caça e introduzir medidas de conservação. Este estudo objetivou listar as principais espécies de animais silvestres utilizados como recurso alimentar e identificar as principais técnicas de caça utilizadas pelos moradores da Reserva Extrativista Cazumbá-Iracema em Sena Madureira, Acre. As informações foram coletadas por meio de entrevistas com os moradores da reserva. Para cada espécie de animal citada foi calculado seu respectivo valor de uso (VU). A fauna cinegética registrada foi representada por 22 famílias, distribuídas em 40 espécies. Entre os animais mais consumidos estão, o porco-do-mato (*Pecari tajacu*), o veado (*Mazama* sp.), o tatu-galinha (*Dasypus novemcinctus*), o jacu (*Penelope jacquacu*), a inhambu-galinha (*Tinamus guttatus*), a inhambu-macucáu (*Crypturellus undulatus*), a arara (*Ara* sp.), o papagaio (*Amazona* sp.) e o jabuti (*Chelonoidis denticulata*). Os principais métodos de caça consistiram principalmente em esperas (42,7%) e espingardas (41,7%), tendo preferência por áreas de florestas fechadas. A caça de animais silvestres ainda é um importante recurso alimentar para as comunidades rurais. Programas de educação ambiental devem ser desenvolvidos para que os moradores tenham mais conhecimento sobre como utilizar os recursos naturais sem causarem pressão de caça e, conseqüentemente, desequilíbrio no ecossistema.

Palavras-chave: caça à vida selvagem, etnozoologia, fauna, subsistência.

Introduction

Extractive reserves exist as a 'National System of Conservation Units' category where human presence is needed in the conservation of biodiversity (BRANCO; SOARES, 2019). The state of Acre has an area of 2,704,354 hectares (16.74%) occupied by Federal Extractive Reserves (RESEX) (SIVIERO et al., 2019). In these areas, the use of wildlife for subsistence provides a nutritional source of high protein and is important for the livelihood of residents (PERES, 2000, FIGUEIRA et al., 2003; PIANCA, 2004; REZENDE; SCHIAVETTI, 2010).

Constant hunting of wild life has been identified as a cause of extinction or population decline of several species (THIOLLAY, 2005; THOISY et al., 2005). It is important to identify how these resources are relevant within the context of conservation strategies (ALVES et al., 2008).

Identifying the species (along with the techniques and period of hunting) is fundamental to understanding the degree of threat from hunting, in order to introduce conservation measures (TRINCA, 2004). Therefore, this study aimed to identify the main species of wild animals used as food resources and identify the main hunting techniques used by residents of Cazumbá-Iracema Extractive Reserve in Sena Madureira, Acre, Brazil.

Methodology

The study was conducted in the Cazumbá-Iracema Extractive Reserve (Resex Cazumbá-Iracema) created by Presidential Ordinance

on 19 September 2002. The Cazumbá-Iracema Resex is located in the state of Acre, Western Amazon, at 09° 01' - 10° 12' S and 68°50' - 70°11' W. The reserve is divided into five macro-regions: Alto Caeté, Médio Caeté, Cazumbá, Redenção Jacareúba, and Riozinho da Cachoeira. Interviews with families from Alto Caeté, Médio Caeté, and Cazumbá were conducted with semi-structured questionnaires to identify the wild animals that were consumed and the method of capture.

The fieldwork was carried out between November 2017 and February 2018, through home visits to families, where two objectives of the investigation and application of the clarification term were explained, a questionnaire was applied with questions about which wild animals (Birds and Mammals) were used for consumption and techniques used for slaughter. For the interviewees, those over 18 are mainly responsible for the hair in the house. The informants were selected on the recommendation of the two interviewees themselves, a technique called "snowball" (BAILEY, 1982), which consists of an informant to indicate two other informants located by those recognized as guardians of knowledge. The interviews are recorded with the greatest possible fidelity and organized in a standardized database.

The animals were identified according to the characteristics mentioned by the interviewees, a technique called taxonomic clue (MARTINS, 2008), in which the description was compared with a list of species for the region, in this case the Reserve Management Plan (ICMBIO, 2007) and also the Mammals of Brazil guide was

used: identification guide (REIS et al., 2011), where the interviewees indicated the possible animals hunted.

For each animal species mentioned, its use value (UV) was calculated (adapted from the proposal by Phillips et al. (1994), which showed the relative importance of species consumed locally. The use value was calculated using the formula $UV = \Sigma U / n$; where UV = use value of the species, U = number of citations per species, n = number of informants. The calculation of the frequency of the main techniques and the main weapons and locations used by residents was carried out using OpenEpi (version 3) software.

The data in this environmental research were collected collected with the approval of the Ethics Committee of the Instituto

Oswaldo Cruz (opinion nº 3.678.281) and sent to the Chico Mendes Institute for Biodiversity Conservation (ICMbio) and included in the Authorization and Information Biodiversity System (SISBIO No. 67436297).

Results

Interviews were conducted with 42 families from different communities. The animals that were hunted (according to the surveys) were represented by 22 families, distributed over 40 species (Table 1). The birds showed the highest abundance (n = 23), followed by mammals (n = 16), and reptiles (n = 01). The calculated use values (UV) ranged from 0.02 to 1.00 (Table 1).

Table 1. Species of wild animal used as food subsistence by the inhabitants of Cazumbá-Iracema Extractive Reserve, Sena Madureira, Acre, Brazil. UV = Use Value.

Class / Family / Scientific Name	Place name	UV	Total
REPTILIA			
Testudinidae			
<i>Chelonoidis denticulata</i>	tortoise	0.98	41
BIRDS			
Tinamidae			
<i>Tinamus guttatus</i>	inhambu crow	0.74	31
<i>Tinamus tao</i>	inhambu blue	0.43	18
<i>Tinamus major</i>	inhambu-foot-saw	0.05	2
<i>Crypturellus undulatus</i>	inhambu-macucau	0.62	26
<i>Crypturellus cinereus</i>	inhambu black	0.45	19
<i>Crypturellus soui</i>	inhambu-surulinda	0.14	6
<i>Crypturellus strigulosus</i>	inhambu clock	0.10	4
<i>Crypturellus</i> sp.	inhambuzinho	0.24	10
Cracidae			
<i>Penelope jacquacu</i>	guan	0.86	36
<i>Mitu</i> sp.	mutum	0.10	4
<i>Aburria kujubi</i>	cujubi	0.17	7
<i>Ortalis guttata</i>	aracua	0.24	10
Psophiidae			
<i>Psophia leucoptera</i>	jacamim	0.21	9
Rallidae			
<i>Aramides saracura</i>	saracura	0.10	4
Columbidae			
<i>Columbina talpacoti</i>	turtledove	0.02	1
<i>Leptotila</i> sp.	juriti	0.12	5
Psittacidae			
<i>Amazona</i> sp.	parrot	0.60	25
<i>Ara</i> sp.	macaw	0.62	26
<i>Aratinga</i> sp.	maraca	0.24	10
Ramphastidae			
<i>Ramphastos tucanus</i>	toucan	0.29	12
Anatidae			
<i>Cairina</i> sp.	duck-eating fox	0.07	3
Ciconiidae			
<i>Ciconia</i> sp.	maguari	0.02	1
Opisthocomidae			
<i>Opisthocomus hoazin</i>	gipsy	0.02	1
MAMMALIA			
Atelidae			
<i>Alouatta</i> sp.	monkey guariba	0.60	25
Dasyopodidae			
<i>Cabassous unicinctus</i>	armadillo tail leatherback	0.02	1
<i>Dasyopus novemcinctus</i>	armadillo	0.67	28
Tayassuidae			
<i>Tayassu pecari</i>	peccary	0.24	10
<i>Pecari tajacu</i>	wild pig	1.00	42
Hydrochaeridae			
<i>Hydrochaeris hydrochaeris</i>	capybara	0.19	8
Cebidae			
<i>Aotus</i> sp.	night monkey	0.02	1
<i>Ateles chamek</i>	black monkey	0.05	2
<i>Cebus apella</i>	capuchin	0.02	1
<i>Saimiri boliviensis</i>	jack-of-smell	0.07	3
Dasyproctidae			
<i>Myoprocta</i> sp.	cutiara	0.12	5
Tapiridae			
<i>Tapirus terrestris</i>	tapir	0.55	23
Cervidae			
<i>Mazama</i> sp.	deer	0.90	38
Sciuridae			
<i>Sciurus</i> sp.	coati	0.43	18
Procyonidae			
<i>Nasua nasua</i>	coati	0.05	2
Mustelidae			
<i>Eira barbara</i>	irara	0.02	1

Among mammals, the wild pig (*Pecari tajacu*; UV = 1.0), deer (*Mazama* spp.; UV = 0.90), and armadillo (*Dasyopus novemcinctus*; UV = 0.67) were the species with the highest UV. Among the birds, guans (*Penelope jacquacu*; UV = 0.86), inhambu- chicken (*Tinamus*

guttatus; UV = 0.74), inhambu-macucau (*Crypturellus undulatus*; UV = 0.62), the macaws (*Ara* spp.; UV = 0.62), and parrots (*Amazona* spp.; UV = 0.60) were the species of preference. Of the three species of reptile, the tortoise (*Chelonoidis denticulata*) was most

liked to be hunted by the locals (UV = 0.98) (Table 1).

The hunting and capturing of animals were accomplished by various techniques, which were employed individually or in combination. About 42.7% of households used ambush accompanied by shotguns, 41.7% used only shotguns, hunting with dogs accompanied by shotguns (9.4%), or other methods such as traps (for birds and small nocturnal mammals 6.3%).

Discussion

Generally, consumption of mammals is more frequent (LEMOS et al., 2018). But in this study the consumption of birds as a food source was higher. It is suggested that may be due to easy capture or being the most abundance source available in the locality. The species of hunting animals included in this study along with its use are aligned with other ethnozoological studies (ALVES et al., 2009; 2012; PEREIRA; SCHIAVETTI, 2010). By identifying the species use can determine the magnitude of their extraction in each region thus providing essential information to assess the pressure of this activity on the local fauna (LEMOS et al., 2018).

Although birds had a higher number of species still mammals are preferred by residents because of larger amount of biomass (PERES; NASCIMENTO, 2006; ALVES et al., 2012). Second Redford and Robinson (1987) usually the hunters capture more mammals than birds and more birds than reptiles, our findings corroborates with. Souza-Mazurek et al. (2000), a study conducted in Amazon state demonstrated that mammals represent 91% of the total weight of most widely consumed species.

Regarding the capture methods, Amazonian traditional communities mostly used accompanied waits firearms (shotgun) to capture terrestrial mammals such as paca, agouti, deer, wild pig and armadillo (AYRES; AYRES, 1979; MARQUES; DULEBA, 2004). Hunting with dogs is little used in the reserve, as few hunters have hunting dogs, and those who have generally use only a dog for hunting, since large packs hinder the meeting of hunting, because they make a lot of noise in the woods, away the prey (GUIMARAES et al., 2019), making it difficult to slaughter or causes animals to migrate away from homes, becoming a predatory practice, and according to residents, is not the goal.

The practice of hunting in no anthropized areas is just one of the extractive activities traditionally carried out inside the forest (OLIVEIRA et al., 2018). These areas are preferred as mostly animals visits frequently due to the availability of food resources at certain times of the year thus increasing the chances of successful hunting (FIGUEIREDO; BARROS, 2015). Hunting in anthropized areas for wild mammals is carried out mainly through the waits with firearms, but some species of birds such as inhambus, saracura and toucan, are rather found in these areas, according to reports from residents.

According to the list of threatened species by International Union for Conservation of Nature (IUCN, 2019), animals cited five are in the vulnerable category extinction, being a reptile (*Chelonoidis denticulata*), two birds (*Tinamus tao* and *Ramphastos tucanus*) and two mammals (*Tayassu pecari* and *Tapirus terrestris*). In the category in danger was cited only one species (*Ateles chamek*).

Second Alves et al. (2012) consumption game species recorded in the endangered animals list of endangered places us before the challenge of seeking forms of exploitation that minimize the impact on these species, such as the development of educational programs in management of wild life for the population aware of the importance of conserving and maintain biodiversity and extract natural resources in a balanced way.

In Acre state, some organizations have already begun monitoring programs on the use of wildlife with participation of local communities (e.g monitoring, planning, recording and decision-making), which brings benefits to conservation of fauna and develops the ability and power of decision making in local communities (CHAVES et al., 2018). Therefore, it is necessary to identify the present and future risks on hunted species, particularly those that are already endangered or vulnerable to extinction. Hunting control is an important aspect of the management of the Conservation Unit (FIGUEIREDO; BARROS, 2015).

In Resex Cazumbá-Iracema, residents consider the life cycle of animals that keep them, traditional communities of Brazil know the importance of the maintenance of local fauna and flora, as they are in the forest every day and realize that a conserved forest offers more features. In this way, the dialogue with the local community is of utmost importance and combine environmental education about hunting is a fundamental tool for the permanence of local wildlife in the forests.

Conclusion

The results of research show that the use of wild animals as a food source is still an important tool used for maintaining rural communities in the Brazilian Amazon protected areas. These traditional communities are of paramount importance for the maintenance of local biodiversity. Environmental education programs should be developed so that residents have more knowledge on how to use natural resources without causing imbalance in the ecosystem.

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