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# ETHNOZOOLOGY AS COMPLEMENTARY METHOD TO INVENTORY MEDIUM AND LARGE-BODIED MAMMALS: THE CASE STUDY OF SERRA DO OURO BRANCO, BRAZIL

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**Abstract:** We evaluated the use of both ethnozoological and conventional sampling methods to the inventory medium and large-bodied mammals. Our study was conducted at Serra do Ouro Branco, southern portion of Espinhaço Range, Minas Gerais state, Brazil. Ethnozoological methods comprehended interviews and projective tests carried out with 107 residents of three communities, while the conventional sampling was 36 days of diurnal and nocturnal census. We registered 28 mammal species through ethnozoological methods and 20 through conventional methods. Considering the long coexistence of the residents with local fauna and the temporal limitations of conventional methods, it was expected to find a small richness through conventional methods. However, it is important to stress that these methods are complementary and species level identification in many cases would be not possible without conventional sampling. In addition, considering the difficulties to sample mammals, the union of these approaches was positive and had the advantage of involving the local population in the process. The interviews provided additional information that may contribute to understand the conservation status of the species locally and to elaborate conservation strategies based on the interactions of the local human population with the mammals.

**Keywords:** Atlantic Forest; Cerrado; Mammalia; Miguel Burnier; Minas Gerais.

## INTRODUCTION

Brazil is the world's second richest country in mammal species according to Internacional Union for Conservation Nature (IUCN 2008), considering 648 species occurring in Brazil and 670 in Indonesia. Nevertheless, according to the latest Brazilian checklist there are 701 species in Brazil (Paglia *et al.* 2012), which may raise it to the status of the richest country in mammal species

diversity. Since around 15% (110) of the mammalian species are threatened in Brazil (MMA 2014), and major impacts are associated with habitat loss and fragmentation, proper inventorying is essential to outline management plans (Droege *et al.* 1998, Silveira *et al.* 2010).

The inventory of medium and large-bodied mammals (> 1 kg) is difficult due to the cryptic habit and low abundance of the animals (Pardini *et al.* 2003). Thus, it is particularly important to include as many techniques as possible to improve the chances to record the species of an area. Access the knowledge from the resident human population is considered a fast and low-cost alternative that might increase the speed and efficiency of the mammal fauna inventories (Rocha-Mendes *et al.* 2005, Hanazaki *et al.* 2009, Souza & Alves 2014, Vliet et al. 2014). Furthermore, the communication between researchers and the local populations have been used to address conservation efforts (Alves & Souto 2015). The local knowledge can be accessed through the Ethnozoology, an interdisciplinary science that evaluates knowledge, beliefs and behavior of human population in relation to other species of animals (Alves & Souto 2015).

In an ethnozoological study carried out in the Serra do Ouro Branco, Minas Gerais state, Brazil, the uses of vertebrate species for medicinal, commercial and feeding purposes were analyzed. This study indicated that local people knows more about mammals with which they coexist either through conflict, admiration, fear, economic or food interests (Pinto *et al.* 2012, 2015). In addition, other ethnozoological studies revealed great interest by mammals as target for hunting (Alves *et al.* 2012, Vliet *et al.* 2014, Alves & Souto 2015, Alves *et al.* 2016).

The Serra do Ouro Branco (SOB) is localized in the extreme south of the Espinhaço Mountain Range, a region belonging to the World Network of Biosphere Reserves of United Nations Educational, Scientific, and Cultural Organization (UNESCO 2005), due to its cultural and biological richness, associated with an elevated endemism of flora and fauna. Despite being a priority area for conservation (Myers *et al.* 2000, MMA 2007), mammalian fauna from this region is poorly studied (Lessa *et al.* 2008) and the region is under constant impacts caused by agriculture and intensive mining. In order to evaluate the losses caused by these activities, studies on the biodiversity composition are primordial.

In 2009, two Conservation Units (CUs) were created at SOB: (i) Serra do Ouro Branco State Park (SOBSP), where ecotourism is allowed, but exploitation of fauna, flora, or other resources are prohibited; and (ii) Itatiaia State Natural Monument (ISNM), where the use of land and natural resources are allowed with few restrictions (Brasil 2000). Thus, the conservation of the local biodiversity depends on combined efforts between local communities and environmental agencies (Brasil 2000). Studies conducted in these CUs revealed high richness of amphibians (São Pedro & Feio 2011), lizards (Cruz *et al.* 2014), and small mammals (Braga *et al.* 2016). The fauna of small mammals includes rare species not found in other studied areas of the Espinhaço Mountain Range (Braga *et al.* 2016).

Considering the lack of knowledge about the medium and large-bodied mammal species composition of SOB, we inventoried this region through conventional zoological and ethno-zoological methods aiming to evaluate the efficiency of ethnozoological methods in number of species, accuracy, and convergence with zoological methods and also to contribute with the knowledge about mammal diversity in this region.

## MATERIAL AND METHODS

### *Study area*

The elevation range in SOB varies between 1,250 and 1,568m above sea level. Climate in the region is mesothermic, with average temperature of 20.7ºC and 1,190 mm of mean annual rainfall. Rainy season occurs from November to March and a dry season from April to September. Vegetation varies with altitude, with remnants of Atlantic Forest in various degrees of conservation, as well as diverse physiognomies of Cerrado, including rupestrian fields and Cerrado *strictu sensu* (Paula *et al.* 2005).

We performed the sampling of medium and large-bodied and semi-structured interviews in three rural communities in the edge of the CUs (SOBSP and ISNM): Itatiaia, Lavrinha, and Morro do Gabriel (Figure 1). Among them, Itatiaia

(20°28'S, 43°37'W) is the largest (80 houses) and oldest rural community. Its foundation date is uncertain, but the oldest buildings indicate human establishment in late seventeenth century or early eighteenth century, in the beginning of the gold cycle in Minas Gerais state. Lavrinha, located 4 km away from Itatiaia (20°28'S, 43°37'W), is composed of five residences inhabited by members of the same family. Morro do Gabriel (20°26'S, 43°41'W) is composed of 11 residences and its inhabitants are immigrants of nearby cities attracted by gold mining activities and retired people. Additionally, we also sampled in the surroundings of the SOB, a site at Miguel Burnier municipality showing the same type of vegetation (20°26'15"S, 43°46'33"W), around 5 km away from the other study sites.

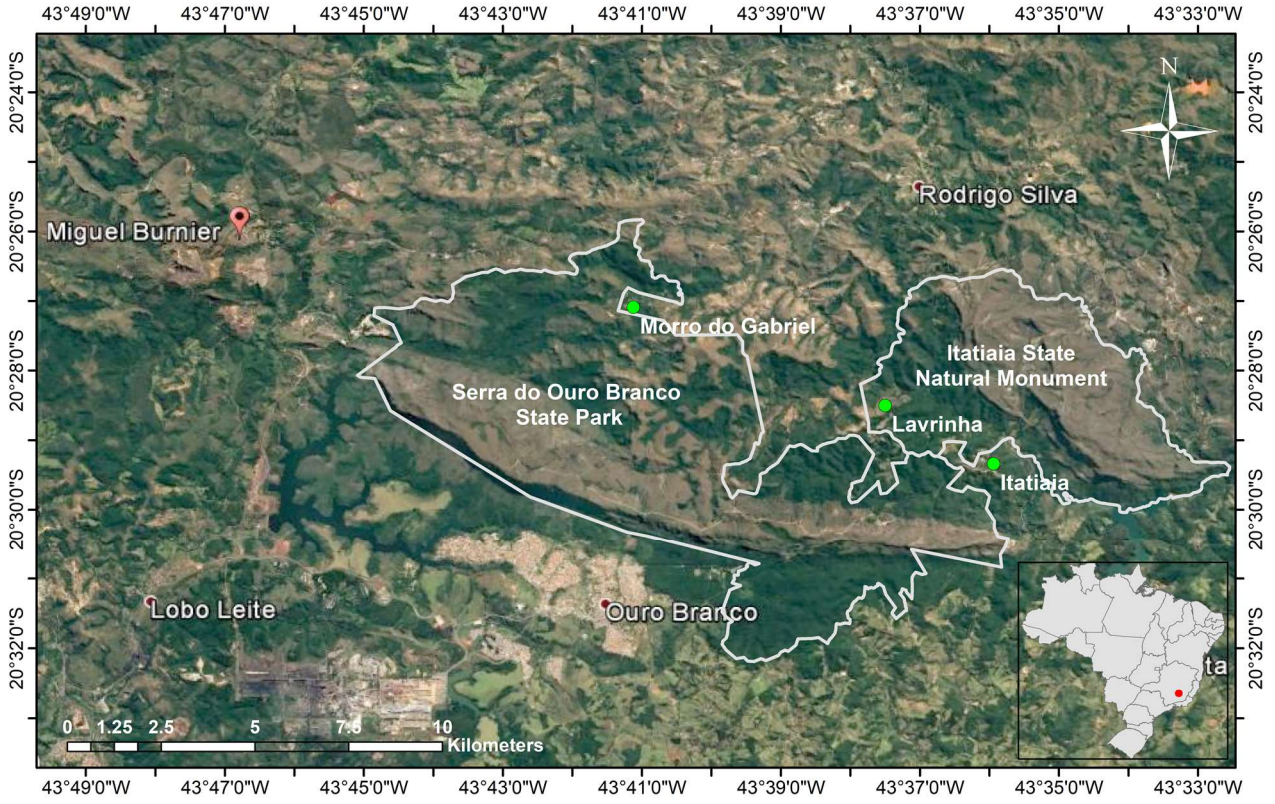


**Figure 1.** Limits of both conservation units of Serra do Ouro Branco, Minas Gerais, and human communities found in this "Serra" where the present study was conducted.

***Data collection and analysis***

In the three rural communities in the surroundings of the SOBSP and ISNM, we performed the mammal inventory monthly between January and December, 2010. We selected the environments sampled to represent different vegetation physiognomies found in the SOB. Nocturnal census was done in an automobile at a speed of 20 km/h, along dirt roads for visual observation or acoustic recording, and three researchers also performed nocturnal hikes of two hours twice every month. Therefore, the sampling effort based in nocturnal sampling totalized 144 hours during 24 days (3 researches × 2 days × 2 hours × 12 months). Diurnal sampling was opportunistic and consisted of active search, including diurnal searching for mammals and signs of their activities such as paw prints, feces, fur, carcasses and dens (or shelters), in places that favored the paw printing: along dirt roads, trails, rivers, lakes, and creeks. Diurnal sampling comprehended at least one hour of active search by at least 2 researchers two days per month, every month, totalizing a sample effort of 48 hours (2 researches × 2 days × 1 hour × 12 months). Total sampling effort in SOB was 192 hours (144 of nocturnal sampling plus 48 hours of nocturnal sampling).

In January 2011, two campaigns of a survey of medium and large-bodied mammals were

performed in Miguel Burnier. In this area, diurnal and nocturnal census were performed for six days, from 7:00 h to 11:00 h and from 15:00 h to 20:00 h by two researchers, totaling a sampling effort of 216 hours (2 researches × 6 days × 9 hours × 2 campaigns). Although the sampling effort varied in number of hours along 2010 (SOB) and between 2010 (SOB – 192 hours) and 2011 (Miguel Burnier – 216 hours), all samplings included day and night searches and at least 3 hours of sampling a day. Since the main goal of this study is a regional inventory and comparison with information obtained from ethnozoology methods, which also varies greatly among the interviewees because of their life experience and age, we decided to group the sampling and consider the day as sampling unit.

We also visited the scientific mammal collections of Federal University of Ouro Preto, Federal University of Minas Gerais and Museu Nacional (Federal University of Rio de Janeiro), but there was no specimen of medium or large-bodied mammals collected in Ouro Branco municipality in these collections.

We conducted the ethnozoological research through semi-structured interviews with local habitants (Bernard 2011), based on a list of topics previously chosen to obtain information on the medium and large-bodied mammals from the SOB region (Supplementary Material 1). To obtain detailed information about the species mentioned in interviews, we selected key informants through snowball method (Albuquerque et al. 2014). We addressed topics related to local nomenclature, habitat, identification criteria, and perception of the residents regarding alterations in the faunal composition. The survey was conducted with 107 residents of the SOB region, 45 men and 62 women, of which two women and four men were key informants (Table 1). Interviews were done between October 2009 and February 2011. As selection criteria, at least one resident older than 18 per residence was interviewed, therefore the sampling was non-probabilistic and intentional (Albuquerque et al. 2014). We considered as resident the interviewees that had already being living in the town for at least one year. After an explanation regarding the study's objectives, each participant signed a term of voluntary and informed consent. This research was authorized by the Ethical Committee of Federal University of Ouro Preto, under the registration number n° 033/2010.

We used the free listing technique to obtain the common names of the mammals that occur in SOB (Albuquerque et al. 2014). In this method, we ask the name of all mammals, described to them as "the animals with fur and/or carapace". With key informants, we used also the projective test, which consists in showing a board with pictures of the mammals that probably occur in the region to evaluate the correspondence between the common names and the species. This technique improves description of the common morphological and ecological criteria used to differentiate the species (Albuquerque et al. 2014). We analyzed the interviews' data following the analysis of diverse individual skills, in which all

**Table 1**. Number of interviewees per age class and sex of each village of Serra do Ouro Branco, Minas Gerais state, Brazil.

| Sex | Age Class | Itatiaia | Lavrinha | Morro Gabriel | Total |
|---|---|---|---|---|---|
| Men | 18–28 | 6 | 1 | - | 7 |
| | 29–38 | 4 | 2 | 1 | 7 |
| | 39–48 | 5 | 2 | 1 | 8 |
| | 49–58 | 6 | 3 | 2 | 11 |
| | > 58 | 9 | | 3 | 12 |
| Women | 18–28 | 13 | 1 | 4 | 18 |
| | 29–38 | 6 | - | 3 | 9 |
| | 39–48 | 8 | - | - | 8 |
| | 49–58 | 13 | 1 | 2 | 16 |
| | > 58 | 11 | - | - | 11 |
| Total | | **81** | **10** | **16** | **107** |

information regarding the theme is taken into consideration (Marques 1995). Along the text we will refer to results from interview method as ethnozoological methods (EtM), and to results from the other methods employed in the field (excluding interview results) as conventional methods (CvM).

We evaluated the variation in number of species cited by age and gender of the interviewee with a general linear model (GLM) based in the analysis of covariance (ANCOVA). The number of species was transformed by square root to fit the assumptions of the ANCOVA (normality and homogeneity of variance). Posteriorly, to evaluate the efficiency of the interviews and of CvM, we generated a rarefaction curve for each method based on Jackknife I estimator with 1000 randomizations. We used the interviews as samples for the EtM, and aiming to analyze the regional richness, we grouped the samples by day for the second method (including only CvM records), totaling 36 sampling days (24 days along 12 months in 2010 and 12 days in January 2011). Jackknife I analysis was performed in the program EstimateS version 9.1.0 (Colwell 2013) and ANCOVA in the program Statistica version 10 (StatSoft. Inc. 2011). The taxonomic classification of the species followed (Patton et al. 2015) for the order Rodentia, and Wilson & Reeder (2005) for species of other orders of mammals. Species conservation status were evaluated at state (COPAM 2010), national (MMA 2014) and global level (IUCN 2017).

## RESULTS

We registered 20 species medium and large-bodied mammals in the studied region through CvM and 28 species with EtM (Table 2). The interviewees cited all species recorded by conventional methods. We did not consider *Tolypeutes* sp. ("tatu-bola"; Cingulata, Dasypodidae), cited by two interviewees as a valid record because this region is out of its known distributional range. Furthermore, the name "tatu-bola" is commonly used in Brazil and no characteristic that would differentiate this species from other armadillos were mentioned.

The interviewees named some species differently of literature's common names. The species *Guerlinguetus brasiliensis* (Rodentia, Sciuridae) was called "miquinho" instead of "caxinguelê" and the species *Coendou spinosus* (Rodentia, Erethizontidae) was called "luiz-caxeiro" instead of "ouriço-caxeiro". The identification of what species they were referring to was based in photos and morphology/color description.

Jackknife estimator for EtM start stabilization amongst 30 interviews, with a confidence interval (CI) of less than one species for 70 interviewees (Figure 2). Estimation with CvM tended to stabilization around sampling 26, but CI in the last sample remained higher (1.64) than for interviews estimation, indicating that the traditional sampling was not sufficient considering the effort employed.

There was high convergence in the composition of species obtained in the three villages, except for *Didelphis albiventris* (Didelphimorphia, Didelphidae) that was cited only in Lavrinha, *Cavia aperea* (Rodentia, Cavidae) and *Pecari tajacu* (Artiodactyla, Tayassuidae) were not cited in Lavrinha, and *Conepatus semistriatus* (Carnivora, Mephitidae) was not cited in Itatiaia. The number of species known by the interviewees varied per age and gender ($F_{2, 104} = 17.26$; $p < 0.001$; Figure 3), with a smaller number by young women compared to known by young men, but the values converged with increase of age (Figure 3).

Local population considered twelve species as rarely sighted nowadays, pointing deforestation (33%), hunting (38%), wildfires (25%) and predation by wild and domestic animals (4%) as reasons for this. Four of those species are included in at least one list of threatened species (Table 2). However, three vulnerable and one near threatened species were not mentioned in this sense. Comments about the way we recorded the species are presented below.

Artiodactyla: *Mazama* sp. (Cervidae) seems to be in low abundance in SOB. We found paw prints only once and interviewees do not see them often, but they describe two different types of deer for the region based on the presence of antlers.

Carnivora: The richest order, with 11 species recorded. *Cerdocyon thous* (Canidae) was registered through interviews and paw prints in SOB. In Miguel Burnier, we visualized a couple in

most of the nocturnal censuses. The species has a relatively large home range, so it is possible that the same couple were viewed several times. *Chrysocyon brachyurus* (Canidae) was registered through paw prints and a single subadult was viewed in Miguel Burnier. Interviewees cited that the species reproduce in August, which seems compatible with the age of the individual found alone in January in this study. A young *C. semistriatus* was captured by pitfall trap during a survey of small mammals in March. It was named "gambá" (opossum) by all interviewees, but they differentiated it from Didelphis by the white dorsal stripes and by the releasing of odor when threatened. We could confirm which species they were referring to through the projective test. *Leopardus pardalis* (Felidae) was registered in Miguel Burnier through paw prints and feces in two campaigns and in SOB only by interviews. *Puma concolor* (Felidae) was recorded twice in Miguel Burnier through paw prints. *Panthera onca* was described as rarely seem in SOB in the past and no longer seen nowadays.

Cingulata: We recorded three species of armadillos through carcasses found during the census. The interviewees knew morphological and behavior characteristics of the species.

Didelphimorphia: *Didelphis albiventris* was visualized during nocturnal census. It seems to be very common in SOB, and people described those carrying pups in their pouch. This information allowed inferring which species they were referring to, separating it from *C. semistriatus*.

Lagomorpha: *Sylvilagus brasiliensis* (Leporidae) was abundant and frequently recorded during the nocturnal census in tracks and in the roadside in SOB and Miguel Burnier. Some interviewees said that they do not see this species nowadays, but we recorded it in almost all sampling days.

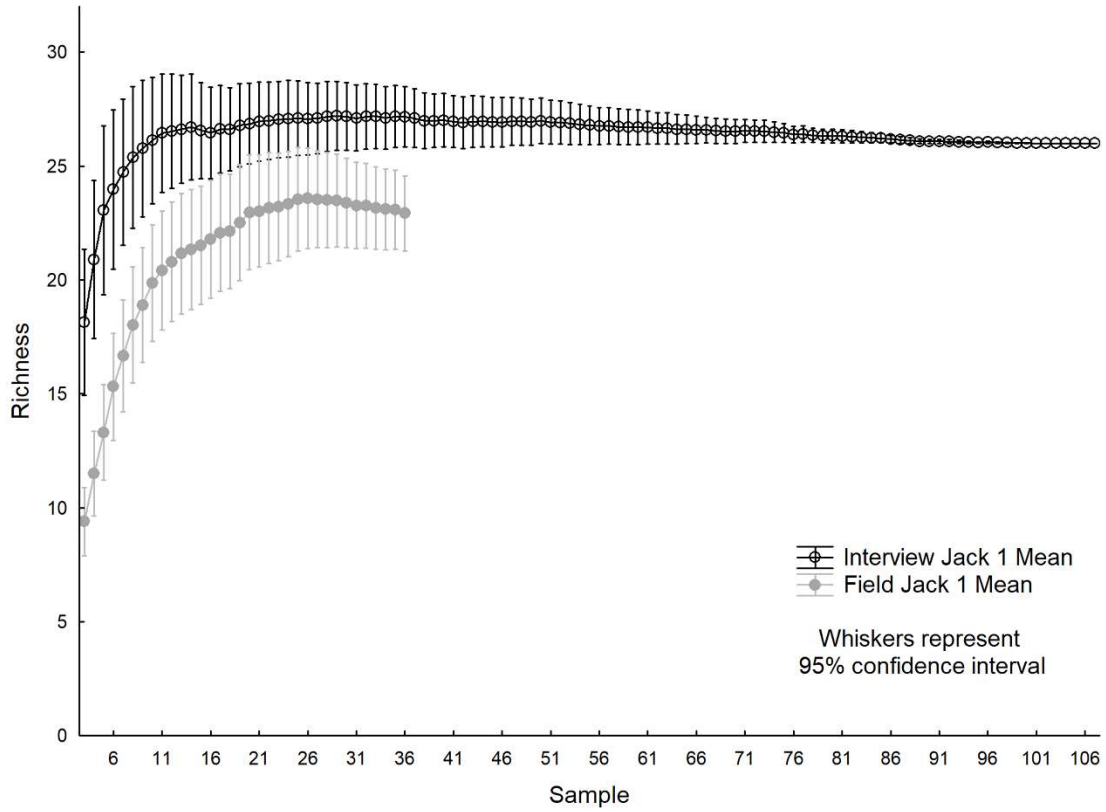


**Figure 2.** Rarefaction curve based on Jackknife 1 richness estimator with 1000 randomizations for the sampling method through interviews and through conventional mammals sampling methods (CvM). Samples for interview method is each interview (107) and sample for Field survey is each day (36) and does not include interview. Bars denote interval of confidence of 0.95.

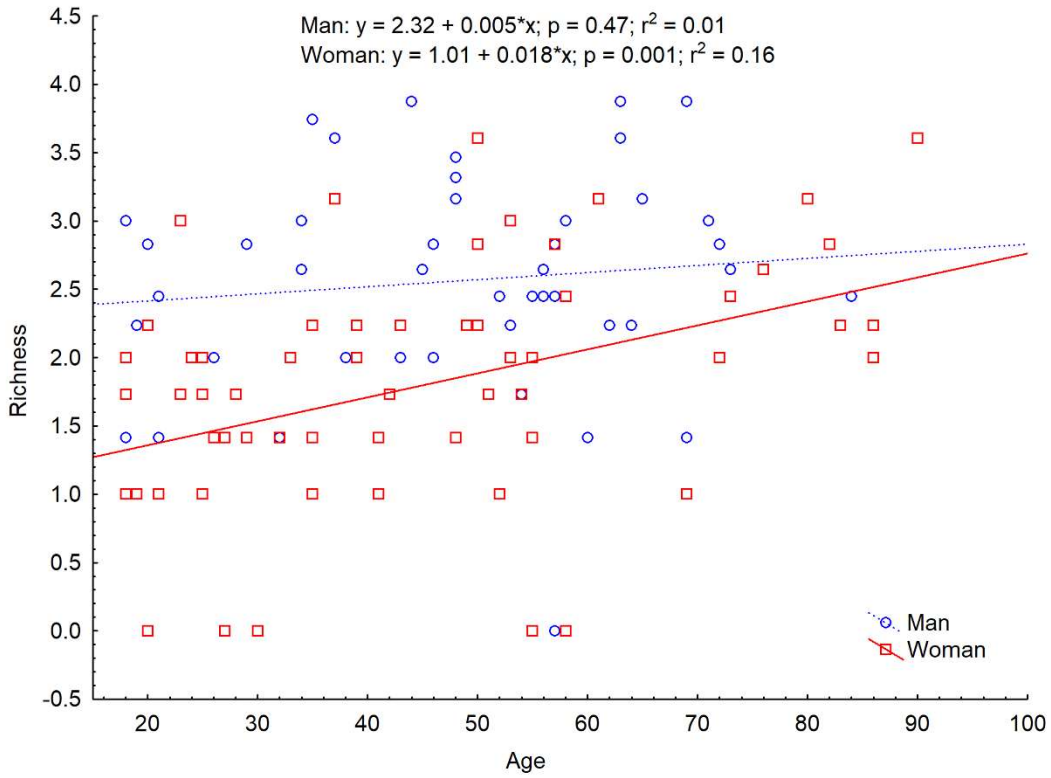


**Figure 3.** General linear model based in the analysis of covariance to evaluate number of species cited by age and gender of the interviewee ($F_{(2, 104)} = 17.26$; $p < 0.001$).

Pilosa: The anteater *Tamandua tetradactyla* (Myrmecophagidae) was recorded through paw prints once and through interviews. *Mirmecophaga tridactyla* (Myrmecophagidae) was only cited in interviews and considered rare nowadays.

Primates: We registered two species in both study areas. *Callithrix penicillata* (Callithrichidae) was frequently sighted in the forest and also in the villages. The interviewees show affection and offers food to them. *Callicebus personatus* (Pithecidae) does not approach people. They tend to remain inside the forest, but the interviewees often hear their vocalization. We recorded the species through vocalization and visualization.

Rodentia: We recorded eight species of large rodents, three of them only through interviews. *Cavia* sp. known as "piriá" by the locals was not classified in specific level because the differentiation of the species is possible only with cranial or genetic characteristics. *Cuniculus paca* (Cuniculidae) and *Dasyprocta* sp. (Dasyproctidae) were recognized by all interviewees as "varieties" of "paca", but they knew how to differentiate the species and they use to hunt them. *Coendou spinosus* was registered through paw prints and interviews and it is known as "luiz-caxeiro" which sounds like "ouriço-caxeiro", the most common name used in Brazil. *Hydrochoerus hydrochaeris* (Caviidae) was registered only through interviews in SOB and through paw prints and feces in Miguel Burnier. Locals in SOB use to hunt it to eat and to use its fat as medicine. All records of *Guerlinguetus brasiliensis* were inside the villages in trees near the houses. It is named "miquinho" (small marmoset) by the locals; people interact with it offering food.

Domestic mammals were not quantified in this mammal inventory, but some species may cause impacts on native species, so we present some information about them. Domestic dogs (*Canis lupus familiaris*, Carnivora, Canidae) were very common in all sampled areas (SOB and Miguel Burnier), inside the forests and in the villages. Domestic cats (*Felis catus*, Carnivora, Felidae) were less frequent, being visualized only in the villages. Other domestic mammals (e.g., cows, pigs, horses, and donks) are maintained locked inside the properties.

## DISCUSSION

This first inventory of medium and large-bodied mammals of SOB and Miguel Burnier revealed a richness corresponding to 90% of the 31 medium and large-bodied mammal species known in the Espinhaço Range (Lessa *et al.* 2008). This richness emphasizes the importance of the UCs for mammals' conservation, although some potential impacts were detected. The interviews revealed that some species are hunted by the locals, which may impact their populations. The high abundance of dogs, especially in the SOB where are located the CUs, is also a negative factor. Studies in protected areas in Brazil listed 37 mammal native species negatively affected by the presence of dogs due to competition, predation, or pathogen transmission (Lessa *et al.* 2016).

**Table 2**. List of mammalian species recorded in Serra do Ouro Branco (SOB) and Miguel Burnier (MB), Minas Gerais state, Brazil. Common names in Portuguese are those used by the population of SOB. Type of record: PP - Paw print; Fe - Feces; Vi - visualization; DA - Dead animal; De - Den; Int-Interview. Category of threat: VU – vulnerable; DD – Data deficient; NT – Near threatened; CR – Critically endangered; RS - Rarely seeing by population (just from etnozoology results). The overwritten letter represents the list of endangered species: W - world list (IUCN 2017), N - national list (MMA 2014), S - State list (COPAM 2010), Et- Etnozoology result (species detected as rare by the interviewees).

| Order/Family | Species | Common name | SOB | Miguel Burnier | Threat Category |
|---|---|---|---|---|---|
| **ARTIODACTYLA** | | | | | |
| Cervidae | *Mazama* sp. | Red brocket deer, "Veado" | PP/Int | 0 | $RS^{Et}$ |
| Tayassuidae | *Pecari tajacu* (Linnaeus, 1758) | Collared peccary, "Porco-do-mato" | Int | 0 | $VU^{N}$, $RS^{Et}$ |
| **CARNIVORA** | | | | | |
| Canidae | *Cerdocyon thous* (Linnaeus, 1766) | Crab-eating Fox, "Raposão, "Cachorro-do-mato" | PP/Int | Pa/Vi | $RS^{Et}$ |
| | *Chrysocyon brachyurus* (Illiger, 1815) | Maned wolf, "Lobo-guará" | Int | Pa/Fe/Vi | $NT^{W}$, $VU^{N}$, $VU^{s}$, RS |
| Felidae | *Leopardus pardalis* (Linnaeus, 1758) | Ocelot, "Jaguatirica", "Gato-do-mato" | Int | Pa/Fe | $VU^{S}$ |
| | *Puma concolor* (Linnaeus, 1771) | Cougar, "Onça-parda" | Int | Pa | $VU^{N}$, $VU^{S}$ |
| | *Panthera onca* (Linnaeus, 1758) | Jaguar, "Onça-pintada" | Int | 0 | $NT^{W}$, $VU^{N}$, $CR^{S}$, $RS^{Et}$ |
| Mephitidae | *Conepatus semistriatus* (Boddaert, 1785) | Striped hog-nosed skunk, "Gambá", "Jaritataca" | Vi/Int | 0 | - |
| Mustelidae | *Eira barbara* (Linnaeus, 1758) | Tayra, "Irara" | DA / Int | Vi/Pa | - |
| | *Galictis cuja* (Molina, 1782) | Lesser grison, "Furão" | Int | 0 | - |
| | *Lontra longicaudis* (Olfers, 1818) | Otter, "Lontra", "Ariranha" | Int | 0 | $NT^{W}$, $VU^{S}$ |
| Procyonidae | *Nasua nasua* (Linnaeus, 1766) | Coati, "Quati" | PP/Int | Pa | $RS^{Et}$ |
| | *Procyon cancrivorus* (G. Cuvier, 1798) | Racoon, "Mão-pelada", "Guaxinim" | PP/Int | Pa | - |

**Table 2.** Continued on next page…

**Table 2.** ...continued

| | | | | | |
|---|---|---|---|---|---|
| **CINGULATA** | | | | | |
| Dasypodidae | *Cabassous tatuouay* (Desmarest, 1804) | Greater Naked-tailed Armadillo, "Tatu-do-rabo-mole", "Tatu-rabo-de-chicote" | DA/Int | DA | - |
| | *Dasypus novemcinctus* Linnaeus, 1758 | Nine-banded Armadillo, "Tatu-galinha" | DA /Int | De | - |
| | *Euphractus sexcinctus* (Linnaeus, 1758) | Armadillo, "Tatu" | DA /Int | 0 | - |
| **DIDELPHIMORPHIA** | | | | | |
| Didelphidae | *Didelphis albiventris* Lund, 1840 | Opossum; "Gambá" | Vi/Int | Pa | |
| **LAGOMORPHA** | | | | | |
| Leporidae | *Sylvilagus brasiliensis* (Linnaeus, 1758) | Tapeti, "Coelho-selvagem" | PP/ DA /Int | Pa/Fe | $RS^{Et}$ |
| **PILOSA** | | | | | |
| Myrmecophagidae | *Tamandua tetradactyla* (Linnaeus, 1758) | Collared anteater, "Tamanduá-mirim" | PP/Int | 0 | |
| | *Myrmecophaga tridactyla* Linnaeus, 1758 | Giant anteater, "Tamanduá-bandeira" | Int | 0 | $VU^{W}$, $VU^{S}$, $RS^{Et}$ |
| **PRIMATES** | | | | | |
| Callithrichidae | *Callithrix penicillata* (É. Geoffroy, 1812) | Black-tufted marmoset, "Miquinho" | Vi/Vo/Int | Vo | |
| Pithecidae | *Callicebus nigrifrons* (Spix, 1823) | Black-fronted titi, "Macaco" | Vi/Vo/Int | Vo | $NT^{W}$ |
| **RODENTIA** | | | | | |
| Cuniculidae | *Cuniculus paca* (Linnaeus, 1766) | Paca, "Paca" | Int | 0 | $RS^{Et}$ |
| Caviidae | *Hydrochoerus hydrochaeris* (Linnaeus, 1766) | Capybara, "Capivara" | Int | Pa | $RS^{Et}$ |
| | *Cavia aperea* Erxleben, 1777 | Brazilian guinea pig, "Preá", "Piriá" | Int | 0 | $RS^{Et}$ |
| Dasyproctidae | *Dasyprocta* sp. Illiger, 1811 | Common agouti, "Paca" | Int | 0 | |
| Sciuridae | *Guerlinguetus brasiliensis* (Thomas, 1901) | Ingram's squirrel, "Caxinguelê", "Miquinho" | Vi/Int | 0 | |
| Erethizontidae | *Coendou spinosus* F. Cuvier, 1823 | Brazilian porcupine, "Luiz-caxeiro", "porco-espinho" | Int | Pa | |

Rarefaction curves showed that interviews were more efficient to record species than conventional methods and the congruency between both methods guarantees accuracy, although cases of overdifferentiation were observed, indicating that it is necessary to be careful in interpreting common names, as the case of the deer. The interviewees described two types of deer in the SOB and differentiated them only by the presence of antlers. This may be a case of overdifferenciation, since adult males of all species present antlers and may lose them annually (Eisenberg & Redford 1992).

In our study, the interviews contributed with 10 additional species not recorded with conventional methods (Table 2). This result was expected, considering the long coexistence of the residents with the fauna and the temporal and seasonal limitations of conventional methods. However, it is important to notice that some names cited in the interviews were identified to species level only due to the record in the field and some remained unidentified. This information demonstrated that the knowledge of the population regarding mammals can only be complementary to the surveys, as it has been suggested in other studies (Rocha-Mendes *et al.* 2005, Rocha-Mendes & Kuczach 2007, Alves *et al.* 2012), but it cannot be a substitute for traditional methods.

The use of the projective test was essential to confirm the species' popular names and to avoid under and overdifferentiation and as well as to increase confidence to identify species. For example, it was also useful in some cases that would result in underdifferentiation due to the use of the same common name for two or more species (e.g., "paca" for both *Dasyprocta* sp. and *C. paca*; "gambá" for both *C. semistriatus* and *D. albiventris*; "miquinho" for both *G. brasiliensis* and *C. penicillata*).

The use of ethnozoological methods provided additional information, other than species records, like which species are hunted, which are commonly sighted, if the species are reproducing in the area. Through the interviews and previous studies in the region we noticed that the local knowledge about armadillos was high in comparison to their knowledge about other animals, which is probably due to the local use of armadillos as food resource and medicine, uses cited in the interviews. Studies in Brazilian semiarid region indicate that *D. novencinctus* and *E. sexcinctus* are more frequently hunted than other vertebrate species (Alves et al. 2012). Thus, this indicates a potential local impact and highlights the importance of evaluating the impact of hunt in those armadillo populations, particularly inside the protected areas. The same was observed for the capybaras, cited by interviews as hunted to be used as food resource and medicine.

Ethnozoological methods can contribute to knowledge about life history of the species, information that may be important for scientific and conservation purposes. In this study, interviewees cited that the species *C. brachyurus* reproduce in August, which seems compatible with the subadult age of the individual visualized alone in January in this study. Information obtained from interviewees is reliable according to literature that describes the peak of the breeding activity for this species occurring from April through July with the births in June-July, which seems compatible with the description of adults sighted with pups in August (Silveira 1968, Brady & Ditton 1979, Carvalho & Vasconcellos 1995).

This study may contribute to understand the conservation status of the species locally and to elaborate conservation strategies. The ethnozoological methods contributed with conventional sampling offering strategic direction in data collection and also with information about alterations in the stability of populations. All species considered threatened in two or more lists were classified as rarely sighted nowadays, except by *P. concolor*, which may not be rare locally, since it was recorded during samplings. Resident information about reduction of encounters might indicate population declines, as suggested by Bergallo *et al.* (2000). However, it may also be result of changes in socioeconomic aspects of the local community life as reported by Rocha-Mendes *et al.* (2005). In 2002, the road that connects the studied communities to the cities of Ouro Preto and Ouro Branco were paved, providing access to regular bus lines allowing locals to work outside the villages, resulting in less opportunities to encounter with native fauna.

Residents obtain the knowledge about animals with observations and interactions during their common activities such as incursions in the woods to work on agriculture, collecting plants, firewood, and hunting. The differences in the activities of men and women may be the reason for the difference in knowledge between them at young age. Since women remain in the interior of the villages, they have contact with a smaller diversity of wild animals. Then they take longer to know the same number of species as men.

In conclusion, we detected a high richness of mammals in the SOB region and reinforce the importance of the CUs for the conservation of this group and biodiversity. Likewise, we recognized the importance of ethnozoological studies about medium and large-bodied mammal as an useful complementary method to inventory species and as a pilot essay to detect local impacts and indications of local population declines.

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**Supplementary material 1.** Question form used in the interviews in the three rural communities (Lavrinha, Itatiaia and Morro do Gabriel) of the Serra do Ouro Branco (Minas Gerais State, Brazil).

***Material suplementar 1.*** *Questionário usado nas entrevistas em três comunidades rurais (Lavrinha, Itatiaia and Morro do Gabriel) da Serra do Ouro Branco (Minas Gerais, Brasil).*

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