

World News of Natural Sciences

An International Scientific Journal

WNOFNS 55 (2024) 33-49

EISSN 2543-5426

Jaguar, cultural keystone species for the Indigenous people of Brazilian territory

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ABSTRACT

A cultural keystone species has great significance to a particular culture or a people, who influence the social systems and culture of a community's identity. The objective of this study was to carry out a survey on the importance of the jaguar in the way of life of indigenous people of Brazilian territory. The studies were carried out with Indigenous people living in the Brazilian Amazon, from the Juruna, Arara, Tenharim, and Mura ethnic groups, and in the Savannah biome, from the Bororo, Xavante, Guarani Kaiowá and Guarani Nandeva ethnic groups. The approach used in this study was qualitative because the data were obtained through semi-structured interviews, following free dialogues in obtaining descriptive data from the reports of the target audience. There are many narratives about aspects of the jaguar because this feline is one of the most important animals in the cosmology of the people who inhabit the Brazilian forests and savannas.

Keywords: indigenous, keystone species, biocultural heritage

1. INTRODUCTION

The jaguar (*Panthera onca*) is a species of carnivorous mammal in the Felidae family. It is currently found in Latin America, from Mexico to Northern Argentina, mainly in tropical forest environments. It is the third largest feline in the world, after the tiger and the lion, and the largest feline on the American continent [1].

Species description:

The weight of the jaguar varies from approximately 50 to 90 kg and its length is from 1 to 1.80 meters. It is physically very similar to the leopard, differing from it due to the pattern of spots on its skin and its larger size. There are completely black individuals [2, 3]. Black jaguars, when seen under the light and up close, it is possible to observe the characteristic spots on their skin, yellowish with black rosettes. Despite being popularly known as the “onça-preta”, it is just a natural variation and is not a species in the strict sense. The black jaguar is rarer than the yellow-brown jaguar, representing around 6% of the population [4].

Ecology and behavior:

The jaguar is generally described as a nocturnal animal, but it is a crepuscular animal. However, hunting during the day can be observed, and the choice of being more active at night or during the day depends on the activity pattern of its usual prey in the place it lives. It is an apex predator, which means it is at the top of the food chain. It is considered a key species in the environments in which it lives, as it is important in controlling populations of herbivorous and mesopredator mammals, contributing to stabilizing ecosystems. It hunts through ambushes and prefers large herbivores like the tapir (*Tapirus terrestris*). It acts slowly, listening and spying on its prey, before setting up an ambush or attacking it. It attacks from the top, with a quick jump. The jaguar's stalking and ambushing abilities are unparalleled by indigenous people and researchers [1].

Diet and hunting:

Like all felines, the jaguar is a carnivore, that is, it feeds only on meat. It is an opportunistic hunter, and its diet includes up to 85 species of animals. The jaguar can theoretically prey on any terrestrial or semi-aquatic vertebrate in Central and South America, with a preference for larger prey. It regularly preys on alligators, deer, capybaras, tapirs, wild pigs, anteaters, and even anacondas. However, it can eat any small species that it can hunt, such as rats, frogs, birds, fish, turtles, sloths, wild dogs, maned wolves, wildcats, monkeys, armadillos, coatis, pacas and agoutis [1, 5-7].

The jaguar has exceptionally strong jaws, delivering the most powerful bites of any big cat. It rarely kills with a bite to the neck, suffocating the prey, as is typical among members of the genus *Panthera*, preferring to kill by a technique unique among felines: it bites the temporal bone in the skull, between the prey's ears with its canines, hitting the brain. The head bite is mainly used in mammals, while in reptiles, such as alligators, the jaguar attacks the animal's back, hitting the cervical spine, and immobilizing the prey. Although it can crack the shell of turtles, the jaguar can simply crush the shell with its paw and remove the meat [3, 8].

After killing the prey, the jaguar drags the carcass to some forest or other safe place and can drag it for up to more than a kilometer. Then, it starts eating through the neck and chest.

The heart and lungs are consumed, followed by the shoulders and she often leaves the rear parts of the carcass intact [9]. Unlike other species in the genus *Panthera*, the jaguar rarely attacks humans. There are no cases of man-eating jaguars as reported for leopards [10].

In more populated areas or with a large number of livestock farmers, the jaguar preys on domestic cattle. Some studies have been conclusive that the jaguar attacks domestic cattle when its usual prey, such as the peccary (*Tayassu pecari*), becomes rarer, that is, predation on cattle by jaguars would be an opportunistic event, with cattle constituting an alternative source of prey for this feline [11, 12].

Territory and social behavior:

Like many felines, the jaguar is solitary. Adults are found only during the courtship and mating period and maintain large territories for themselves. The females' territories may overlap, but the animals generally avoid each other in these locations. Male territories often encompass those of two or three females, varying in size according to the availability of resources, and their territories rarely overlap. Jaguar territories can vary in size in different areas where they are studied and can vary according to the seasons. The jaguar's home range can be more than 100 km² [1, 13]. The jaguar is strongly associated with the presence of water and is notable as a feline that likes to swim [14, 15].

The jaguar uses scratch marks on tree trunks, urine, and feces to mark its territory and uses a series of vocalizations to communicate. Its roar resembles a repetitive cough, and vocalizations can also consist of grunts [16]. Copulation fights between males can occur but are rare. Males and females hunt, but males travel further than females daily, which is consistent with their large territories. The jaguar can hunt during the day if there is a game available. It is a relatively energetic feline, remaining active around 50 to 60% of the time. The remote nature and inaccessibility of its preferred habitats make the jaguar a difficult animal to see and study [17].

Reproduction and life cycle:

Jaguar females reach sexual maturity at around two years of age, and males between three and four years of age. Females generally give birth to two cubs at a time. In the wild, the jaguar lives between 12 and 15 years of age [1]. The couple separates after sex and the females provide all parental care. Gestation lasts between 93 and 105 days and the most common is two chicks being born at a time, which are weaned after three months but can remain in the nest for up to 6 months, when they start to accompany their mother on hunts. After twenty months of age, they disperse from their natal territory and males rarely return, while females may return a few times [18, 19].

Conservation and threats:

Jaguar has been assessed for the IUCN Red List of Threatened Species in 2016. *Panthera onca* is listed as Near Threatened [20]. The jaguar is regulated by Appendix I of CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora [21]: all international trade in jaguars is prohibited.

It is estimated that the jaguar currently occupies less than 50% of its historical distribution area. The species became extinct in much of the extreme north and south of its geographic range, as well as in some regions of Central America and the northeast, east, and south of Brazil.

Encouragingly for the conservation of the species, the probability of long-term survival is considered to be 70% of its current habitat, notably in the Amazon, Gran Chaco, and Pantanal regions [22]. However, only in these regions does the jaguar still have a chance of long-term survival, while in the rest of its range, including Mexico, Central America, the Cerrado, the Caatinga, and the Atlantic Forest, in Brazil; it is at some degree of threat of extinction in the short and medium term [23].

The biggest threats to the jaguar are the fragmentation of its habitat and hunting. The decrease in the density of their usual prey also negatively impacts jaguar populations. In areas most altered by man, road accidents that cross conservation areas are factors that significantly reduce populations [24-26]. Hunting for the fur trade was once a major problem in the conservation of the species: in the 1960s there was a significant decrease in the number of individuals, where annually more than 15 thousand skins were illegally exported from the Brazilian Amazon [27]. However, hunting by farmers, who consider the animal a threat to livestock, is one of the activities that has contributed most to local extinctions of the species. However, the magnitude of cattle predation by the jaguars ranges from 0.2% to 2%. On extensive ranches where cattle roam freely, disease, accidents, and theft cause more deaths annually than depredation events [28-30].

In the Pantanal, jaguar hunting is an activity that is part of the local culture. Most hunting occurs because of subsequent retaliation for jaguar attacks on livestock. But "sport" hunting is also common, even though it is illegal in many of the countries it inhabits, especially Brazil [31]. Because of this type of relationship, the jaguar is considered a problem animal for many of the inhabitants of its distribution area. On the other hand, it is an important flagship species for the scientific community, which can be a source of conflicts between these two "cultures" and can hinder conservation strategies that seek to avoid hunting. There have been situations in which ecology studies had to be interrupted because the animals studied were killed by hunters [32]. Brazil has around 50% of jaguar populations in the wild, most of them in the Amazon [22]. It occurs in all Brazilian biomes, except in the Pampas, where it was extinct, with different conservation states in each of these biomes [15]. It is estimated that there are up to 55 thousand individuals throughout Brazil, but with an effective population of less than 10 thousand [33]. Demographic studies have concluded that a population of more than 200 individuals in a conservation unit is adequate for the long-term survival of the species, but most of these protected areas are in the Amazon and Pantanal. In the Atlantic Forest, no population is viable for more than 100 years [34], as the total population does not exceed estimates between 156 and 180 individuals, and the effective population is not more than 50 individuals, being classified as "critically endangered", which warns of extinction of the species in these states very shortly [35].

Cultural aspects:

The jaguar is part of the mythology of several indigenous American cultures, including those of the Mayans, Aztecs, and Guaraní. In the pre-Columbian cultures of Central and South America, the jaguar was a symbol of strength and power. Among Andean cultures, the cult of the jaguar was disseminated by the Chavín culture, which developed from 1500 to 500 BC, that is, for a millennium its hegemony prevailed throughout the Andean region and its area of influence. It was a theocratic society. They worshiped the jaguar god and their ceramics and sculptures have feline features [36]. In Mesoamerica, the Olmec culture, early and influential in the Gulf of Mexico coast region, roughly contemporary with the Chavín Culture,

developed a distinctive "jaguar-man" motif of sculptures and figures showing stylized jaguars or humans with jaguar features [37]. In the Mayan civilization, it was believed that the jaguar facilitated communication between the living and the dead. The Mayans saw these powerful felines as their companions in the spiritual world. Some Mayan rulers had names that incorporated the Mayan word for jaguar, b'alam. The Aztec civilization shared this image of the jaguar as a representative of the governor and as a warrior. The Aztecs formed an elite warrior class known as jaguar warriors. In Aztec mythology, the jaguar was considered the totemic animal of the powerful god Tezcatlipoca [38]. For contemporary South American indigenous people, the jaguar is part of mythology and folklore, being an animal that can give men power over fire [39]. The Guarani consider it a dangerous animal and is often considered an enemy of all humanity, capable of destroying it entirely. Therefore, among the Guarani, killing a jaguar is a way of showing that one is no longer a child, and this confers a high social status in the community [40].

For some people in the Amazon Basin, the jaguar symbolizes sex, reproduction, and escape from death, being an enemy of the giant anteater, considered a trickster. In a tale from the Shipibo-conibo people, an ethnic group from the Peruvian Amazon, the jaguar was challenged by the anteater to stay underwater longer without breathing, and after she accepted and submerged, the anteater stole her skin as a prank and left his to the big cat: from then on, the jaguar and the anteater became enemies [41].

Despite the rare records of humans attacked by the jaguar, it is considered a dangerous animal and is often blamed for any death of a domestic animal, even if it is not responsible. Given this "danger", being a "jaguar hunter" in some places is a status symbol among Indigenous peoples and farmers. Knowing how to hunt a jaguar demonstrates cunning and courage, given the difficulties associated with these hunts. These values related to the jaguar, among indigenous peoples and people of European descent, are related to a mixture of fear, respect, and admiration for the animal. In this way, hunting a jaguar is an activity full of symbolism, often representing a confrontation between "man and nature" [42].

Cultural keystone species:

A cultural keystone species has great significance to a particular culture or a people. These species can be identified by their prevalence in language, traditions, cultural practices, diet, medicines, and histories of a community. These species exert an influence social systems and culture of these people and are a key feature of a community's identity [43, 44].

The identification and characterization of cultural key species is quite complex because the cultural relationship between people and biological species is affected by several factors, such as economic systems, social organizations, access to land and resources, and cultural transmission [43]. These cultural keystone species should not be confused with key cultural ecological species, which are species that interact strongly with the structure of a food web. As it is a predator at the top of the food chain, it is considered a key species in the ecosystems where it occurs [45].

2. MATERIALS AND METHODS

The studies were carried out with Indigenous people living in the Brazilian Amazon, from the Juruna (recognize themselves as Yudjá), Arara, Tenharim (recognize themselves as

Kagwahiva), and Mura ethnic groups, and in the Savannah biome, from the Bororo, Xavante, Guarani Kaiowá and Guarani Nãndeva ethnic groups. The studies were carried out after authorization by the Indigenous communities and the National Indigenous People Foundation (FUNAI is a Brazilian governmental protection agency for Amerindian interests and their culture). Interviews with Bororo were conducted in August 2010, with the Kagwahiva in November 2014; with the Guarani Kaiowá and Guarani Nãndeva, throughout 2014 and 2015; with the Mura in January and February 2016 and March 2018; with the Juruna and Arara throughout 2019; with Xavante in February 2023.

One of the study regions is known as “Volta Grande do Xingu” (Xingu River’s Big Bend), situated in the State of the Pará, Brazil, located at latitude 03°23' S to 03°38' S and longitude 51°33' W to 52°00' W, a 130 km stretch of rapids and braided channels on the Xingu River, which is an important tributary of the Amazon River and where the Indigenous people of the Juruna and Arara ethnic groups live [46].

Indigenous people of the Kagwahiva ethnic group live in the Tenharim Marmelos Indigenous Land, located entirely in the State of Amazonas, in the municipalities of Humaitá and Manicoré, between geographic coordinates 7°48' and 8°53' south latitude and 61°35' and 62°10' west longitude [47]. In the past, before the opening of the Trans-Amazonian Highway, these Indigenous lived together in a single village on the banks of the Marmelos River, in the area where the Trans-Amazonian Highway currently crosses the river [48].

Indigenous people of the Mura ethnic group live in the Rio Urubu Indigenous Territory, located in the Itacoatiara municipality, Amazonas State, at the left margin of the Amazon River. It lies between 02°59'S to 03°12'S latitude and 58°04'W to 59°48'W longitude [49].

The indigenous Bororo studied live in the Meruri village, located in the Mato Grosso State. It lies between 15°23'S to 15°44'S latitude and 52°51'W to 53°13'W longitude [50-52].

The indigenous Xavante studied live in the Ubawawe Indigenous Territory, located in the Mato Grosso State. It lies between 14°23'S to 14°42'S latitude and 53°20'W to 53°38'W longitude.

The indigenous Guarani Kaiowá and Guarani Nãndeva studied live in live in different villages, located in the Mato Grosso do Sul State, close to the BR-163 highway, between 21°45'S to 23°12'S latitude and 53°55'W to 54°58'W longitude. As a method for collecting the data was used open and semi-structured interviews [53]. This type of interview allows greater flexibility and plasticity in the interviewee-interviewer interaction, favoring a more spontaneous dialogue and the exploration of more private and complex subjects [54].

Indigenous were interviewed, with both genres and different ages. The interviewees were chosen through the indication of the communities themselves, based on the knowledge of these people on the entities.

The basis of this approach encompasses a socio-affective construction of knowledge since such knowledge is an integral part of the history and reality of the subjects.

The approach used in this study was qualitative because the data were obtained through semi-structured interviews, following free dialogues in obtaining descriptive data from the reports of the target audience [55]. The rationale for approaching this work, with the qualitative methodology, encompasses a socio-affective construction of knowledge since such knowledge is part of the subjects' history and reality [56].

In this way, qualitative research aims to expand knowledge about the phenomena in question through analysis carried out from the collection of information originating from the participants' own reports [57].

3. RESULTS AND DISCUSSION

There are many narratives about aspects of the jaguar in the Amazon region. This feline is one of the most important animals in the cosmology of the people who inhabit the forests, including the Tenharim. There are several stories, from his birth myth to chases and chance encounters in the forest. It was the shamans who supported the existence of entities and myths, but now, in their absence, the indigenous people feel unprotected. In the myth of the creation of the jaguar, the shaman transformed cotton and sororoca (Amazonian plant from the Strelitziaceae family) into jaguars and sent them to Earth intending to fight against other ethnicities. As there is no longer a shaman in the Tenharim community, these indigenous people feel unprotected by the constant presence of the jaguar.

“The shaman transformed the sororoca and the cotton into a jaguar, the cotton roll became the jaguar's head and the sororoca leaves became the body. He threw this mixture three times and rotated in space until it transformed into a jaguar. So, the jaguar came to Earth to fight with other ethnicities [...]. Now we no longer have the shaman. How will the jaguar know that it is not us that he must fight against?” (M. Tenharim, 53 years old, ♂, Kagwahiva ethnic group, Bela Vista village, Tenharim Marmelos Indigenous Land, November 15, 2014).

There is an incredible story Tenharim, about the jaguar and a tree known as *apeyba* (*Apeiba echinata*):

“This tree here [*apeyba*] gave life to every jaguar. It is a friend of the jaguar. It saved the jaguar when the jaguar challenged the first giant anteater. It is the owner of the jungle. It defied the lightning, and she couldn't fight the lightning and the lightning almost killed it [...]. Sometimes this tree [*apeyba*] has a hollow inside it. So, the jaguar went inside the tree, to save itself from the lightning, because the lightning wanted to kill it. It challenged the lightning, saying that it was the owner of the jungle and that she was superior to the lightning. When the lightning struck, it couldn't catch her and destroyed the tree, which protected it. That's where the jaguar was saved [...]. What saved it was also a bird, which provided the jaguar with food while it was hiding [...]. The bird is called *urukurea'ia* [it's probably a species of owl], it's a yellowish bird that whistles at night.” (J.C. Tenharim, 33 years old, ♂, Kagwahiva ethnic group, Taboka village, Tenharim Marmelos Indigenous Land, November 9, 2014).”

The integration between animals and humans is a prominent feature of indigenous cosmologies and, in many creation myths, there are men with the ability to transform into jaguars, an archetypal feline of power. Some Indigenous people, when very old, go deep into the forest and, in isolation, transform into some kind of animal, like the description for Miratu of the Juruna people [58]:

"Mīratu was a healer, witch doctor, and shaman. He knew everything bad on Earth. The old people say that he had two bad people on Earth, one of them was Mīratu" (O.P. Juruna, 50 years old, ♂, Juruna ethnic group, Lakariká village, Paquiçamba Indigenous Land, August 7, 2019).

"The Mīratu, they say he didn't die. People say he died, but he didn't die, he turned into a jaguar. He got old and turned into a wild animal. This is a long story. His island is over there in Jericoá [Jericoá is a complex of waterfalls of cosmological importance for the Yudjá, where Xingu River's Big Bend begins]. He turned into a jaguar and was buried there. There is his grave, but his body, they say, didn't stay there. That's what elders say. He went on to roam the forest, protecting the forest. He is the kinsman of all of us Juruna. He's the oldest Indian, he's the oldest, our first, he's one of the first Juruna. He protects the forest; he watches over everything. He's not against anyone, of course, if you don't disturb him... You just ask for permission to enter the forest. Many people have seen him in the village walking at night. We only see him when he is in human form. But they say he is half human and half jaguar." (M. Vieira, 46 years old, ♀, Juruna ethnic group, Lakariká village, Paquiçamba Indigenous Land, April 28, 2019).

For the Tenharim, one-eyed jaguars are shamans of enemy tribes:

"The jaguars that have only one eye are shamans from other villages, other ethnic groups, who are ready for war. So, you have to kill these jaguars. Other animals are also dangerous shamans, which are large bats that come and take people's hair and take them back to the village. Then the person starts to have a headache and dies quickly" (M. Tenharim, 29 years old, ♂, Kagwahiva ethnic group, Trakuá village, Tenharim Marmelos Indigenous Land, November 13, 2014).

In people's perception, jaguars (*Panthera onca*) are animals that have maximum aggressiveness, which can be associated with the fictitious condition of other beings. Therefore, for some people in the Amazon, there are two beings, one represented by the jaguar animal, a figure from the earthly plane, which is inserted in a natural context, interacting with other beings in the same dimension of the forest and the other, represented by a monstrous, mythological being, which often uses the form of earthly beings to take revenge and devour people.

This relationship between humans and non-humans has usually been studied for years by several researchers, not only among Indigenous communities but riverside and extractive peoples, among others, who recurrently mention "enchanted" beings that metamorphose into other beings, both in both men and animals, which can cause disturbances in people and directly interfere in their lives. In this way, there would be no strict boundaries between humanity and animality, nature and culture, which would explain the transformation of people into animals [59, 60]. According to the Tenharim Indigenous people, the way human beings see animals and other entities is different from the way these beings see humans:

“When we see a bunch of pigs, they don’t see us as people, they see us as jaguars. That’s why they’re afraid, because everyone is afraid of jaguars, especially if it’s a pyuhu jaguar [black jaguar] [...]. But it’s also dangerous because then they’ll want to defend themselves, and then they attack us. But if we meet a jaguar, we’re going to have a problem, because it sees us as pigs. And then she attacks us [...]. If she saw us as people, she wouldn’t attack us, because we are not jaguar food” (E. Tenharim, 31 years old, ♂, Kagwahiva ethnic group, Marmelos village, Tenharim Marmelos Indigenous Land, November 17, 2014).

This worldview presented by the Indigenous people is approached as “Amerindian perspectivism” [61], which consists of a concept formulated on an ethnographic basis, which synthesizes Indigenous views on interactions between human and non-human beings as relationships sociocosmological, where beings of other species are seen by them as both predators and prey [62].

The narratives of the Tenharim are full of human perspectives in animal bodies, and of events that mix humanity and animality. These perceptions are generally observed for animals considered predators, such as jaguars (*Panthera onca*), and those considered prey, such as peccary (*Tayassu pecari*) and tapirs (*Tapirus terrestris*).

Humans, under normal conditions, see humans as humans, animals as animals, and spirits as spirits. Predatory animals and spirits see humans as prey animals, while prey animals see humans as spirits or as predatory animals. In return, animals and spirits see themselves as humans: they apprehend themselves as or become anthropomorphs when they are in their own homes or villages and experience their own habits and characteristics under the species of culture [62].

The forest is an environment made up of infinite places, in different shapes and dimensions, and habitats for different entities. There are beings and intermediate zones that make the connection between nature and human beings, and that support the enchantment of both domains. Different spaces are perceived as the domain of entities and certain animals, which mediate man’s relationship with the environment. These are the “owners”, spiritualized beings, who value other beings and places, which the Kaiowá Indigenous people call *jára*. They are endowed with powers to regulate the balance of the forest and river, guiding us on the use of the natural resources they contain.

“When there’s no forest, there’s no *jagaretê* [jaguar], there’s nothing. When you take away the forest, the *jára* leaves. The plants of the forest have a *jára*: *ka’aguy poty* [*jára* of the forest]. *Ka’aguy*, when there’s a big forest, there’s your *jára*” (G.J. Oliveira, ♂, Guarani Kaiowá ethnic group, Dourados Indigenous Reserve, July 25, 2014).

“All Kaiowá villages have sorcerers. Today, nowadays, to do evil, people take objects from people to do evil, that is, underwear, food, bones, candy wrappers that you sucked, something [...]. When this happens, in the indigenous community, someone comes to take care of it [...] let’s assume that this is the body of one of our relatives [grave in a cemetery in the Panambizinho Indigenous Land]. We stay on the side,

hiding there, with the arrow or a gun. Nowadays it's a weapon. The person who did the evil, he or she will come here to take the body. When he arrives here, he turns into a jaguar and two punches he makes it here he takes out the body, the head mainly, takes it out, and throws it away [...] I already have testimony from six people who had the courage to come to the cemetery to take care of the body and that they saw [...]. They didn't dare to shoot because they saw a very large jaguar digging [...]. And they are related people: own aunt, own brother, own nephew, and they are not strangers, all related [...] so when they put this plant [*Sansevieria sp*] placed next to the cross it is to protect [...]. A lot of death and suicide happens because of the spell” (R.A. Silva, ♂, Guarani Kaiowá ethnic group, Panambizinho Indigenous Land, July 30, 2014).

For the Juruna indigenous people, hunting is not just the search for food in the forest, but an evident satisfaction in the preparation and execution of the hunts that remain in their memories. In interviews with some hunters one can feel this satisfaction in the stories told with great detail and emotion, especially when the jaguar is involved in these experiences:

“I have already killed two black [black jaguar, *Panthera onca*]. One time I was hunting; I was very young. I took the shotgun and went hunting. I had already seen one time when I went hunting for a jaguar with my father, but it was trapped in the trap. Release I had never seen before. I went chasing a nhambu, which here we call azulona [game bird, *Tinamus tao*]. It flew into a deep cave and was on the other side. I stopped like that and looked at where the "bicha" had walked and then I saw, a "paia" [palm tree] moved like this, so that an animal was leaning against the "paia". I looked and walked a little and remembered that there was a trapdoor there, which was a trap that I had made a while ago. Then I saw the tapir's footprint and went close to the trap and whistled three times imitating the tapir's whistle and then I saw the "bicha" [black jaguar] nearby as well as in that paxiúba [species of palm tree, *Socratea exorrhiza*], which also came from behind, behind the tapir. It came with the idea of eating the tapir. I looked and saw those two big jaguar eyes. Those yellow eyes. I watched... I shot it in the face, and she fell. So, I went back to where I had left the trap and my things, I took another cartridge, I put it in the shotgun and I took two more in my hand and I went slowly, very slowly, because once they told me that it falls just to pretend it's dead and when the caboclo gets close and attacks. I looked at its face and saw that it was blinking. It was just blood, but it was blinking. Wow! [imitates gunshot sound]. I fired one more shot right next to its ear. Then it turned the other way and its tail hit. I put in another cartridge, poked the thing with the barrel of the shotgun, and saw that it was already dead. I left it there, in the woods, I didn't even pick it up. Skinny, it must have been starving. If I didn't shoot it, it would stare at me. So, I walked home and when I saw an agouti [*Dasyprocta sp*] running ahead I thought it was another jaguar.

When I got home, I remembered the "bicha", I kept thinking, I'm never going to go to the forest again. Three days later I went back to the forest because I liked the forest all my life. I've already killed one, I'll kill ten that appear. I went to a side that was covered in paca [*Cuniculus paca*] and some tapir paths went to eat embaúba [*Cecropia sp*] in the "roça" [swidden]. I set up the "mutá" [hunting place] and waited, waiting. It was already midnight, and nothing was waiting. I stayed quiet, I was already sleepy. I lay down on the hammock to take a nap. Then I heard a snore and I thought, it's the jaguar, I had killed that jaguar three days ago and it was in the same place. It hit very close by and the sleep I was at that time went away. It passed very close, it was a jaguar, she passed close and went away and when I thought she had gone away she came again with a loud roar, a loud and ugly snort. She followed the path where the other one went and when she got close, I lit up, the forest was all clear, I saw the animal and whistled, and she didn't even care. When she passed under the net I whistled loudly, she looked at me and I threw it, right in the middle of her forehead" (F.P. Ribeiro, 58 years old, ♂, Juruna ethnic group, Furo Seco village, Paquiçamba Indigenous Land, April 4, 2019).

"I was carrying a basket of chestnuts and stopped to drink water at the edge of a cave and sat there resting. After a while I felt a movement to my side, running and further ahead I felt a scream like a sheep. It must be white-lipped peccary or pork [peccary], I thought. I looked up and saw it [jaguar] with her tail wagging and walking backwards, pulling a deer until she got under some sticks, in an old antler. I think it noticed I was there in the cave and then came towards me. I didn't wait, I shouted in its face, and it jumped up and ran away. I grabbed this deer faster, tied it on top of the bag and went home without looking back, afraid that it would come after me and take the deer back [did you kill the jaguar?] I didn't kill it, it ran away. I shot more to scare it away, it was a little far away [did you steal the deer from the jaguar? [laughs] I saw its trail every day when I went to collect nuts. I would pass by and see its trail and think: I'm going to meet this jaguar at some point. It was on the trail of the deer [when you arrived in the village, you didn't say that you were the one who hunted the deer, right?] No, I told the story, because I was braver, because I stole the deer from its!" (C.R.S. Santos, 46 years old, ♂, Paquiçamba village, Paquiçamba Indigenous Land, April 26, 2019).

The Arara indigenous people mentioned the two species of jaguars present in the Amazon: the red jaguar (*Puma concolor*) and the jaguar species (*Panthera onca*), both considered vulnerable to extinction [63]. The variation in placement of the *Panthera onca* species is considered a distinct species for some indigenous people (black jaguar).

“The jaguar [*Panthera onca*] is the bravest, the red [*Puma concolor*] is the most courageous and the black jaguar [*Panthera onca* melanic variety] is the most treacherous” (F.P. Arara, 46 years old, ♂, Arara ethnic group, Terrawangã village, Arara's Big Bend of Xingu Indigenous Land, January 25, 2019), comment referenced by almost all the hunters present at the interview.

“The black jaguar is the most dangerous, but it is scarcer, it is very difficult to see one in our region. The “pintada” [jaguar] has a lot [...]. I haven't seen much of the black jaguar; I only know the jaguar and the red jaguar. The jaguar chases the deer and the capybara, which it hunts in the water” (E.P. Arara, 21 years old, ♂, Arara ethnic group, Itkoum village, Arara's Big Bend of Xingu Indigenous Land, January 26, 2019).

For the Arara indigenous people, hunting is not just an alternative practice to fishing, as it defines the social status of the hunter. Arara hunters, in interviews, demonstrated that they enjoy hunting that goes far beyond just getting food. There seems to be a symbiotic relationship between the hunter and the nature that welcomes him, and a very evident satisfaction among the hunters when they comment on the hunts, some kept forever in their memory, regardless of the “success”, translated into prose, with a lot of richness of details and emotion:

“When you are in the forest, in the darkness of the forest, you are not seeing anything if you do not focus, but with good hearing you are attentive to everything, you are attentive just to listen, there you hear the cricket, you hear the bat that flies by, an animal that sings far away, a stick that falls, an animal that walks close by, you hear the cricket jumping, you hear a snake that passes by and approaches you and you hear the hunt. And you know the footsteps of a deer, the footsteps of a tapir, an armadillo and you know the paca when it is close. The jaguar is smart, but you know its footsteps too, and you must pay attention but it's on it” (E.P. Arara, 21 years old, ♂, Arara ethnic group, Itkoum village, Arara's Big Bend of Xingu Indigenous Land, January 26, 2019).

In addition to these two species of jaguars, three others that do not fit into physical categories were mentioned among the Tenharim. They are mythological beings that inhabit rivers:

“There are several types of jaguars here! There are land jaguars and water jaguars. Do you know the difference? There are three main types of jaguars, the jaguar, the black jaguar, and the red jaguar. Water jaguars also have three types, but different ones. They are different because we see the ones on earth, we meet them in the forest. But these water jaguars, they are much more dangerous, much more, because they are in the water to protect the fish too, they are bigger than the others, they are much braver, they take care of the fish in rivers and lakes, and they

eat people who bathe or go fishing in these places. They live at the bottom of the river but eat game from the forest. So, for them to get out of the river, there is a tunnel that goes from the river to the middle of the forest, and they go out into the forest to hunt for their food. We can't see these, but there are three different types: there's the *Jaguarunu'hua*, and it's all black with a reddish spot on its face and chest. There is also *Takapé*, who fools people by chirping like a bird, this one looks like a person, but she is a jaguar. She has no hair on her chest, she is all black with four white spots on her forehead. The other is the *Kutiranu'hua*, its snout is pointed and looks like a coati and its tail is also striped, the color is that of a red coati” (A. Tenharim, 62 years old, ♂, Kagwahiva ethnic group, Marmelos village, Tenharim Marmelos Indigenous Land, November 26, 2014).

According to those interviewed, jaguars generally roam the forests at night and eat “almost every animal they come across, even the tortoise”. The occurrence of these big cats in indigenous territory can be considered a good bioindicator of the quality of these environments, as they are predators at the top of the food chain, requiring healthy environments with a large stock of resources, in addition to roaming large areas. Although they are terrestrial animals, “jaguars can climb the treetops and even catch monkeys.” The jaguar essentially feeds on other animals, especially medium-sized animals, such as wild pigs and capybaras, and throughout the interviews this predator's menu was presented, illustrated in Figure 1.

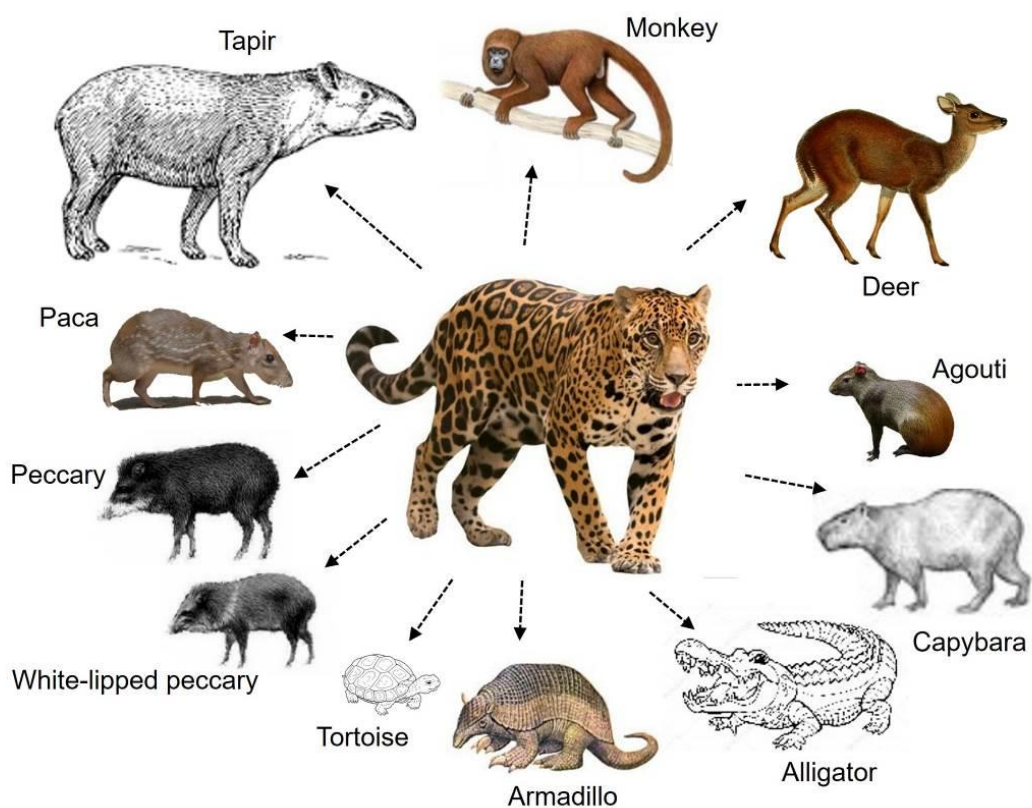


Figure 1. Jaguar menu, according to information from hunters Juruna and Arara.

4. CONCLUSION

There are many narratives about aspects of the jaguar, because this feline is one of the most important animals in the cosmology of the people who inhabit the Brazilian forests and savannas. The values related to the jaguar are related to a mixture of fear, respect, and admiration for the animal, and hunting this animal is an activity full of symbolism. The jaguar is a predator at the top of the food chain, and it is considered a key species in the environments in which it lives, as it is important to the stabilization of ecosystems. The presence of the jaguar in the culture of Brazilian indigenous peoples is constant, through stories always narrated with great detail and emotion. Therefore, it can be considered a cultural keystone species, of great significance for these indigenous peoples.

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