



World News of Natural Sciences

An International Scientific Journal

WNOFNS 20 (2018) 85-102

EISSN 2543-5426

Diversity of birds and their ecological interactions in the Mura Indigenous Territory, Brazilian Amazon Rainforest

Natalia Livramento da Silva de Oliveira¹ & Fabio Rossano Dario^{1,2,*}

¹Ethnobiological Researcher, Brasil

²Instituto de Pesquisas e Estudos da Vida Silvestre
Rua Leonardo Mota, 66 - São Paulo - SP, ZIP 05586-090, Brazil

*E-mail address: fabiorossano@hotmail.com

*Phone: +5511981541925

ABSTRACT

The objective of this study was to accomplish a knowledge survey of the Mura indigenous on the birds of natural occurrence in their territory, who is located in the Amazonas State, Brazilian Amazon Rainforest. As method for collect the data were used open and semi-structured interviews. Twenty four indigenous were interviewed, with both genders and different ages. The interviewees mentioned 118 different species of birds, counting about 60% of the records, which in addition to the interviews was completed by surveying the bird by direct field observations with sighting and vocalization in different natural environments of the indigenous territory. The indigenous showed wide ecological knowledge regarding these birds. The oral transmission of knowledge occurs across generations.

Keywords: birds, ecological interactions, indigenous, Amazon Rainforest

1. INTRODUCTION

The Amazon Rainforest is one of the main Brazilian biomes and is formed by dense tropical forests and associated ecosystems, and represents over half of the planet's remaining rainforests, and comprises the largest and most biodiverse tract of tropical rainforest in the world [1]. The region is home to about 2.5 million insect species, at least 40,000 plant

species, around 1,300 bird's species, hundreds of species of mammals, reptiles and amphibians and around 3,000 fish's species [2].

There are more than 200 indigenous groups in the Amazon Rainforest, speaking 180 different languages and each with its own cultural heritage. This shows that, just like the flora and fauna, the cultural diversity in the region is also very high, making it an even more interesting and rich place [3].

Traditional ecological knowledge is a system of knowledge that reflects the adaptation of human populations to their environment. Ethnobiology is the scientific study of dynamic relationships among peoples, biota, and environments. As a multidisciplinary field, ethnobiology integrates archaeology, geography, systematics, population biology, ecology, cultural anthropology, ethnography, pharmacology, nutrition, conservation, and sustainable development [4]. The diversity of perspectives in ethnobiology allows us to examine complex, dynamic interactions between human and natural systems [5].

The main purpose of this study was to carry out a survey of the knowledge that Mura natives have about the mammals of natural occurrence in territory, located in the Brazilian Amazon Rainforest. A broader conception of non-formal ornithological knowledge of different societies may help formal observers to value local or popular knowledge and relativize the utilitarian and nominal view [6].

2. MATERIALS AND METHODS

The studies were carried out in the Mura Indigenous Territory, in January and February 2016 and March 2018. The studied territory is located in the Amazonas State, Brazilian Amazon Rainforest, at the left margin of Amazon River, in the Itacoatiara municipality, Amazonas, Brazil. It lies between 02°59'S to 03°12'S latitude and 58°04'W to 59°48'W longitude, covering an area of 275 km². The region climate is tropical humid of the Aw type according to Köppen's classification. The annual medium temperature ranges is 27 °C, with average maximum annual temperature of 33.8 °C and annual minimum of 22.8 °C. The annual average rainfall is over 2,500 mm.

This Mura Indigenous Territory, known as “Terra Indígena Rio Urubu”, comprises upland *terra firme forests* (dry land forests) and *várzeas* (seasonally flooded lands) along the margins of the Urubu River and its tributaries, rivers and *igarapés* (small creeks). In accord with recent data 378 peoples living in this indigenous land.

As method for collect the data were used open and semi-structured interviews [7]. Twenty four indigenous were interviewed, with both genres and different ages. The interviewees were chosen through the own indigenous' indications, based on the knowledge of these people on birds. However, not only those who apparently possess such knowledge were interviewed, such as hunters and extractivists who spend much of their time in foray into the forest. The basis of this approach, with the qualitative methodology, encompasses a socio-affective construction of knowledge, since such knowledge is an integral part of the history and reality of the subjects.

For the identification of the species was showed to the interviewees photographs and drawings of birds taken from illustrated guides of Amazonian birds. The interviewees indicated the species of their knowledge, as well as their ecological, mythological and behavioral characteristics. The study was completed by surveying the bird by surveying the

bird by direct field observations. The birds' identification was visual and mainly through the bird vocalization in different natural environments of the indigenous territory such as edge and deep the *terra firme forests*, *igapó forests*, swamps, marshes and flooded areas.

The *terra firme forests* are not subject to periodic floods [8]. These forests are well preserved in the Mura Indigenous Territory, usually in advanced stage of secondary regeneration, with three vertical strata of the vegetation: herbaceous stratum, understory and canopy stratum. The canopy stratum is composed of the crowns of large sized trees, with trees varying in average height between 20 and 30 meters, and high plant species richness. There are also emergent trees, frequently reaching a height up to 60 meters. The understory is characterized by the dominance of shrubs between 0.80 and 5 meters tall and the outstanding species in this stratum are of the families Melastomataceae, Rubiaceae, Fabaceae, Euphorbiaceae and Myrtaceae being these the most important families to the fruits production to the fauna. The herbaceous stratum (generally until 0.80 meters tall) is predominated by ferns, terrestrial bromeliads and herbs as heliconias.

The *igapó forests* are permanently flooded on lowlands [9], and on areas near the Urubu and Amazonas rivers and *igarapés*. The trees reach up to 20 meters in height, and they are profusely covered by epiphytes, like orchids, bromeliads, mosses and vines.

To the scientific nomenclature and taxonomic order was used the new systematic list of CBRO [10]. The classification of the species in agreement with the respective ecological groups was based on that proposed for Amazon Rainforest bird communities by Willis [11].

3. RESULTS AND DISCUSSION

Throughout the study, through interviews and direct field observations were recorded 198 bird species from 14 different guilds (Table 1). The indigenous interviewees mentioned 118 birds' species of natural occurrence in their territory, about 60% of the total of birds registered (Table 2), and they showed wide ecological knowledge regarding these birds. Insectivorous species represented 36% of the total; frugivorous species 19%, just as carnivorous species; omnivorous species represented 17%; nectarivorous 4%, just as granivorous birds and detritivores only 1%.

Hunting is a key component of subsistence strategies of many Amazonians [12]. The subsistence hunting for Mura is directed to some mammal species and some of the birds registered in this study, as the ducks *Cairina moschata* and *Amazonetta brasiliensis*, the pigeons *Patagioenas spp*, the tinamous *Tinamus major* and *Tinamus guttatus*, the cracids *Ortalis motmot* and mainly the Black Curassow *Crax alector*, specie considered vulnerable to extinction [13].

The tinamous have gallinaceous features and their species are small, medium and large size. Many tinamous species live in the countryside or semi-open areas, but the majority of them have forest habits [14]. The cracids comprise essentially forest birds, from medium to large sizes [15, 16]. The populations of these birds' species seem not to be affected for the activities of subsistence hunting that it is realized by Mura in a sustainable way.

The Mura have lot of knowledge about the ecological importance of the birds, mainly in the dispersion of seeds of plants. Fruit-eating birds, often related to seed dispersion, are fundamental for the maintenance of the high diversity of tropical plant species [17], and many of these fruits are important in the Mura diet. Of the plant species of the Amazon Forest, the

majority of plant species very important as fruit producers, and are eaten by diversity of birds species. The Annonaceae family is one of the most important in the Amazon Forest, and the main genera of it that produce fruit for birds are *Annona*, *Rollinia*, and *Xylopia*. The *Annona* genus contains various species that produce eatable fruit, like berries, with a large number of seeds, slightly sweet pulp, and a pleasant smell [18].

The Myrtaceae is one of the main botanic families of the Amazon Forest, both in number of species and density of trees and shrubs. Among the main seed dispersers of native species of Myrtaceae in the Amazon (especially the genera *Campomanesia*, *Eugenia*, *Gomidesia*, *Myrcia*, *Myrcianthes*, *Myrciaria*, and *Psidium*), are dozens of species of birds of the Cracidae, Pipridae and Thraupidae families [19].

A great diversity of bird species eats fruit from Melastomataceae species besides manakins (Pipridae family), and in general these plants are recognized as one of the most important food sources of small frugivorous birds. In tropical forests, where manakins are one of the most numerous birds, they seem to be the most important dispersers of Melastomataceae species. However, the tanagers (Thraupidae family) are also important dispersers and, in medium high forests, substitute manakins as the most important dispersers of Melastomataceae species [20].

Other very important plant families for frugivores abundant in the Amazon Forest and in the Mura indigenous territory are Arecaceae, Burseraceae, Euphorbiaceae, Fabaceae, Flacourtiaceae, Lauraceae, Lecythidaceae, Moraceae, Myristicaceae, Myrsinaceae, Sapindaceae and Sapotaceae, with species that produce large quantities of seeds dispersed by birds [21, 22].

Birds from the Tinamidae, Cracidae, Psittacidae and Ramphastidae families like tinamous, guans, curassows, macaws, parrots, parakeets and toucans were recorded with high frequency and diversity of species in forests with dense vegetation. Some families of birds are highly dependent on fruit, e.g. Cotingidae and Cracidae [23], essentially forest-dwelling families. Among the cotingids recorded in this study, there was an emphasis on Screaming Piha (*Lipaugus vociferans*). This bird is possibly the one which draws more the indigenous' attention by vocalizing constantly in the dense forests in the indigenous territory.

The knowledge of the abundance of the avifauna among the Mura is surprising not only for the great number of birds species identified for the indigenous, but also in the high degree of these people's observation, to the point of they indicate taxonomics details that individualize species taxonomically similar, besides they contain certain species in system of trophic guilds.

In the first case, we can mention the different species of tinamous, guans and curassows, of macaws, parrots and parakeets, toucans, hummingbirds, tyrant flycatchers (species of the genera *Tolmomyias*, *Elaenia*, *Myiarchus*, *Pitangus*, *Megarynchus*, and *Tyrannus*), doves (*Patagioenas spp*, *Columbina talpacoti* and *Leptotila verreauxi*) and thrushes (*Turdus spp*) that were identified in the interviews, a lot of times through small taxonomic details. In the second case, the grouping of species of woodpeckers (Picidae family) and woodcreepers (Dendrocolaptidae family) in the guild eaters of insects and larvae of insects in poor trunks of the trees.

Also are important the birds' species that are used in the indigenous feather art, as the macaws, parrots, toucans, curassows and hawks. The feathers are used for the Mura to the confection of bracelets and diadems.

Some species of birds were mentioned in 100% of the interviews, such as the Wood Stork (*Mycteria americana*) and the Musician Wren (*Cyphorhinus arada*). The *Mycteria americana* is typically found at the borders of rivers with vegetation around, in gallery forests and islanded capons um swamps, generally gathered in social groups, they can walk among floating plants in deep waters, turning them upside down to search for aquatic prey especially fishes [24]. The Musician Wren (*Cyphorhinus arada*) is one of the birds that has the most impressive and melodic song in the Amazon Rainforest. It inhabits in the dark understory in *terra firme forest* and meadow forests and its diet consists mostly of invertebrates such as insects and spiders [25].

Early man likened birds to the gods, believing them messengers. Thanks to this divine comparison, as well as their ability to soar, the birds have gained a near-mythical reputation, with some species starring role in superstitions related to death, life and luck. The Mura believe that the hawk *Busarellus nigricollis* is a lazy bird. According to some interviewees, when the hunter sees this bird before entering in the forest, it means bad luck in the hunt. On the other hand, the Musician Wren (*Cyphorhinus arada*) is associated the success in the hunt. The *Tyrannus melancholicus* has two types of singing, one that indicates when the hunt will be good and other when it will be poor. Owls, generally, are surrounded by legends and superstitions. The American Barn Owl (*Tyto furcata*) is seen as an animal that symbolizes bad luck. The Mura believe that when it lands on someone's roof and vocalizes, a resident of that house will die.

Table 1. Number of bird species in different guilds.

Guilds	Number of species
Aerial insectivores	05
Canopy frugivores	16
Canopy omnivores	04
Carnivores	22
Detritivores	02
Edge insectivores	25
Edge omnivores	22
Edge seed-eater	08
Nectar and insect eaters	07
Riparian carnivores	16
Swamp omnivores	07

Trunk and twig insectivores	14
Understory frugivores	22
Understory insectivores	28
Total	198

Table 2. List of the bird species grouped into trophic guilds.
(I = interviews; DFO = direct field observations).

GUILDS/Family/Taxon names	English name	Type of register
AERIAL INSECTIVORES		
Apodidae		
<i>Tachornis squamata</i>	Fork-tailed Palm-Swift	DFO
Hirundinidae		
<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Swallow	I, DFO
<i>Progne tapera</i>	Brown-chested Martin	DFO
<i>Progne chalybea</i>	Gray-breasted Martin	I, DFO
<i>Tachycineta albiventer</i>	White-winged Swallow	I, DFO
CANOPY FRUGIVORES		
Cracidae		
<i>Penelope jacquacu</i>	Spix's Guan	DFO
<i>Ortalis motmot</i>	Variable Chachalaca	I, DFO
<i>Crax alector</i>	Black Curassow	I, DFO
Psittacidae		
<i>Ara ararauna</i>	Blue-and-yellow Macaw	I, DFO
<i>Ara chloropterus</i>	Red-and-green Macaw	I, DFO
<i>Psittacara leucophthalmus</i>	White-eyed Parakeet	DFO
<i>Eupsittula aurea</i>	Peach-fronted Parakeet	DFO
<i>Brotogeris versicolurus</i>	White-winged Parakeet	I

<i>Brotogeris sanctithomae</i>	Tui Parakeet	I, DFO
<i>Graydidascalus brachyurus</i>	Short-tailed Parrot	I, DFO
<i>Pionus menstruus</i>	Blue-headed Parrot	I, DFO
<i>Pionus fuscus</i>	Dusky Parrot	I
<i>Amazona festiva</i>	Festive Parrot	I, DFO
<i>Amazona farinosa</i>	Mealy Parrot	I, DFO
Icteridae		
<i>Psarocolius decumanus</i>	Crested Oropendola	DFO
<i>Psarocolius viridis</i>	Green Oropendola	I, DFO
CANOPY OMNIVORES		
Ramphastidae		
<i>Ramphastos tucanus</i>	White-throated Toucan	I
<i>Ramphastos vitellinus</i>	Channel-billed Toucan	I, DFO
<i>Pteroglossus aracari</i>	Black-necked Aracari	I
Corvidae		
<i>Cyanocorax cayanus</i>	Cayenne Jay	I
CARNIVORES		
Pandionidae		
<i>Pandion haliaetus</i>	Osprey	I, DFO
Accipitridae		
<i>Leptodon cayanensis</i>	Gray-headed Kite	I, DFO
<i>Elanoides forficatus</i>	Swallow-tailed Kite	I
<i>Gampsonyx swainsonii</i>	Pearl Kite	DFO
<i>Ictinia plumbea</i>	Plumbeous Kite	DFO
<i>Heterospizias meridionalis</i>	Savanna Hawk	I, DFO
<i>Busarellus nigricollis</i>	Black-collared Hawk	I, DFO
<i>Urubitinga urubitinga</i>	Great Black Hawk	I

<i>Rupornis magnirostris</i>	Roadside Hawk	I, DFO
<i>Pseudastur albicollis</i>	White Hawk	I
<i>Buteo nitidus</i>	Gray-lined Hawk	I
<i>Buteo brachyurus</i>	Short-tailed Hawk	DFO
<i>Spizaetus tyrannus</i>	Black Hawk-Eagle	I, DFO
Tytonidae		
<i>Tyto furcata</i>	American Barn Owl	I
Strigidae		
<i>Megascops choliba</i>	Tropical Screech-Owl	DFO
<i>Megascops watsonii</i>	Tawny-bellied Screech-Owl	I
<i>Athene cunicularia</i>	Burrowing Owl	DFO
Falconidae		
<i>Daptrius ater</i>	Black Caracara	DFO
<i>Caracara cheriway</i>	Crested Caracara	I, DFO
<i>Milvago chimachima</i>	Yellow-headed Caracara	DFO
<i>Herpetotheres cachinnans</i>	Laughing Falcon	DFO
<i>Falco rufigularis</i>	Bat Falcon	DFO
DETRITIVORES		
Cathartidae		
<i>Cathartes aura</i>	Turkey Vulture	I, DFO
<i>Coragyps atratus</i>	Black Vulture	I, DFO
EDGE INSECTIVORES		
Ardeidae		
<i>Bubulcus ibis</i>	Cattle Egret	I, DFO
Cuculidae		
<i>Crotophaga major</i>	Greater Ani	I
<i>Crotophaga ani</i>	Smooth-billed Ani	I, DFO

Nyctibiidae		
<i>Nyctibius griseus</i>	Common Potoo	I
Caprimulgidae		
<i>Nyctidromus albicollis</i>	Common Pauraque	DFO
Momotidae		
<i>Momotus momota</i>	Amazonian Motmot	I, DFO
Galbulidae		
<i>Galbula galbula</i>	Green-tailed Jacamar	DFO
Bucconidae		
<i>Monasa atra</i>	Black Nunbird	DFO
<i>Monasa nigrifrons</i>	Black-fronted Nunbird	DFO
Furnariidae		
<i>Furnarius figulus</i>	Wing-banded Hornero	I, DFO
<i>Furnarius minor</i>	Lesser Hornero	DFO
Tyrannidae		
<i>Legatus leucophaeus</i>	Piratic Flycatcher	DFO
<i>Myiarchus tuberculifer</i>	Dusky-capped Flycatcher	I, DFO
<i>Myiarchus ferox</i>	Short-crested Flycatcher	DFO
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher	DFO
<i>Pitangus sulphuratus</i>	Great Kiskadee	I, DFO
<i>Philohydor lictor</i>	Lesser Kiskadee	DFO
<i>Myiodynastes maculatus</i>	Streaked Flycatcher	I, DFO
<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	I, DFO
<i>Myiozetetes cayanensis</i>	Rusty-margined Flycatcher	DFO
<i>Tyrannus albogularis</i>	White-throated Kingbird	DFO
<i>Tyrannus melancholicus</i>	Tropical Kingbird	I, DFO
<i>Tyrannus savana</i>	Fork-tailed Flycatcher	I, DFO

<i>Empidonomus varius</i>	Variegated Flycatcher	I, DFO
Icteridae		
<i>Sturnella militaris</i>	Red-breasted Meadowlark	DFO
EDGE OMNIVORES		
Tityridae		
<i>Pachyramphus rufus</i>	Cinereous Becard	DFO
<i>Pachyramphus castaneus</i>	Chestnut-crowned Becard	I
Rhynchocyclidae		
<i>Tolmomyias sulphurescens</i>	Yellow-olive Flycatcher	DFO
Tyrannidae		
<i>Camptostoma obsoletum</i>	Southern Beardless-Tyrannulet	I, DFO
<i>Elaenia flavogaster</i>	Yellow-bellied Elaenia	I, DFO
Vireonidae		
<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike	I, DFO
<i>Hylophilus semicinereus</i>	Gray-chested Greenlet	I
<i>Vireo olivaceus</i>	Red-eyed Vireo	I
<i>Vireo chivi</i>	Chivi Vireo	DFO
Turdidae		
<i>Turdus albicollis</i>	White-necked Thrush	I, DFO
Icteridae		
<i>Cacicus cela</i>	Yellow-rumped Cacique	I, DFO
<i>Icterus cayanensis</i>	Epaulet Oriole	DFO
<i>Icterus croconotus</i>	Orange-backed Troupial	I, DFO
<i>Molothrus bonariensis</i>	Shiny Cowbird	I, DFO
Thraupidae		
<i>Paroaria gularis</i>	Red-capped Cardinal	I, DFO
<i>Tangara episcopus</i>	Blue-gray Tanager	I, DFO

<i>Tangara palmarum</i>	Palm Tanager	DFO
<i>Ramphocelus carbo</i>	Silver-beaked Tanager	I, DFO
<i>Dacnis cayana</i>	Blue Dacnis	I
<i>Saltator maximus</i>	Buff-throated Saltator	I, DFO
<i>Saltator grossus</i>	Slate-colored Grosbeak	DFO
Fringillidae		
<i>Euphonia chlorotica</i>	Purple-throated Euphonia	DFO
EDGE SEED-EATER		
Columbidae		
<i>Columbina talpacoti</i>	Ruddy Ground-Dove	DFO
Passerellidae		
<i>Ammodramus aurifrons</i>	Yellow-browed Sparrow	I, DFO
Thraupidae		
<i>Sicalis columbiana</i>	Orange-fronted Yellow-Finch	I, DFO
<i>Volatinia jacarina</i>	Blue-black Grassquit	DFO
<i>Sporophila lineola</i>	Lined Seedeater	DFO
<i>Sporophila americana</i>	Wing-barred Seedeater	DFO
<i>Sporophila castaneiventris</i>	Chestnut-bellied Seedeater	I, DFO
<i>Sporophila angolensis</i>	Chestnut-bellied Seed-Finch	I, DFO
NECTAR AND INSECT EATERS		
Trochilidae		
<i>Phaethornis ruber</i>	Reddish Hermit	DFO
<i>Anthracothorax nigricollis</i>	Black-throated Mango	DFO
<i>Chlorestes notata</i>	Blue-chinned Sapphire	I
<i>Thalurania furcata</i>	Fork-tailed Woodnymph	DFO
<i>Amazilia versicolor</i>	Versicolored Emerald	I, DFO
<i>Amazilia fimbriata</i>	Glittering-throated Emerald	DFO

Thraupidae		
<i>Coereba flaveola</i>	Bananaquit	DFO
RIPARIAN CARNIVORES		
Ciconiidae		
<i>Mycteria americana</i>	Wood Stork	I, DFO
Threskiornithidae		
<i>Theristicus caudatus</i>	Buff-necked Ibis	I
Anhingidae		
<i>Anhinga anhinga</i>	Anhinga	DFO
Ardeidae		
<i>Tigrisoma lineatum</i>	Rufescent Tiger-Heron	I, DFO
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	DFO
<i>Butorides striata</i>	Striated Heron	I, DFO
<i>Ardea cocoi</i>	Cocoi Heron	I, DFO
<i>Ardea alba</i>	Great Egret	I, DFO
<i>Pilherodius pileatus</i>	Capped Heron	I, DFO
<i>Egretta thula</i>	Snowy Egret	I, DFO
Phalacrocoracidae		
<i>Nannopterum brasilianus</i>	Neotropic Cormorant	I, DFO
Sternidae		
<i>Phaetusa simplex</i>	Large-billed Tern	I, DFO
Rynchopidae		
<i>Rynchops niger</i>	Black Skimmer	DFO
Alcedinidae		
<i>Megaceryle torquata</i>	Ringed Kingfisher	I, DFO
<i>Chloroceryle amazona</i>	Amazon Kingfisher	I
<i>Chloroceryle americana</i>	Green Kingfisher	I, DFO

SWAMP OMNIVORES		
Anatidae		
<i>Dendrocygna autumnalis</i>	Black-bellied Whistling-Duck	I, DFO
<i>Cairina moschata</i>	Muscovy Duck	I, DFO
<i>Amazonetta brasiliensis</i>	Brazilian Teal	I, DFO
Rallidae		
<i>Aramides cajaneus</i>	Gray-necked Wood-Rail	DFO
Charadriidae		
<i>Vanellus chilensis</i>	Southern Lapwing	I, DFO
<i>Charadrius collaris</i>	Collared Plover	I, DFO
Jacanidae		
<i>Jacana jacana</i>	Wattled Jacana	I, DFO
TRUNK AND TWIG INSECTIVORES		
Picidae		
<i>Picumnus cirratus</i>	White-barred Piculet	DFO
<i>Melanerpes cruentatus</i>	Yellow-tufted Woodpecker	DFO
<i>Celeus flavescens</i>	Blond-crested Woodpecker	DFO
<i>Dryocopus lineatus</i>	Lineated Woodpecker	I, DFO
<i>Campephilus rubricollis</i>	Red-necked Woodpecker	I
Dendrocolaptidae		
<i>Dendrocincla fuliginosa</i>	Plain-brown Woodcreeper	I, DFO
<i>Dendrocincla merula</i>	White-chinned Woodcreeper	DFO
<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper	I, DFO
<i>Xiphorhynchus pardalotus</i>	Chestnut-rumped Woodcreeper	I, DFO
<i>Xiphorhynchus guttatus</i>	Buff-throated Woodcreeper	DFO
<i>Dendroplex picus</i>	Straight-billed Woodcreeper	I
<i>Lepidocolaptes albolineatus</i>	Guianan Woodcreeper	I

<i>Dendrocolaptes certhia</i>	Amazonian Barred Woodcreeper	I
Xenopidae		
<i>Xenops minutus</i>	Plain Xenops	I
UNDERSTORY FRUGIVORES		
Tinamidae		
<i>Tinamus major</i>	Great Tinamou	I
<i>Tinamus guttatus</i>	White-throated Tinamou	I, DFO
<i>Crypturellus soui</i>	Little Tinamou	DFO
Cracidae		
<i>Crax alector</i>	Black Curassow	I
Columbidae		
<i>Patagioenas cayennensis</i>	Pale-vented Pigeon	I, DFO
<i>Patagioenas plumbea</i>	Plumbeous Pigeon	DFO
<i>Leptotila verreauxi</i>	White-tipped Dove	I, DFO
Trogonidae		
<i>Trogon viridis</i>	Green-backed Trogon	I
<i>Trogon violaceus</i>	Guianan Trogon	DFO
Pipridae		
<i>Tyrannneutes virescens</i>	Tiny Tyrant-Manakin	I
<i>Pipra aureola</i>	Crimson-hooded Manakin	I
<i>Ceratopipra rubrocapilla</i>	Red-headed Manakin	I
<i>Manacus manacus</i>	White-bearded Manakin	I, DFO
Tityridae		
<i>Schiffornis turdina</i>	Thrush-like Schiffornis	I
<i>Tityra cayana</i>	Black-tailed Tityra	DFO
<i>Tityra semifasciata</i>	Masked Tityra	I, DFO

Cotingidae		
<i>Querula purpurata</i>	Purple-throated Fruitcrow	DFO
<i>Lipaugus vociferans</i>	Screaming Piha	I, DFO
Tyrannidae		
<i>Lathrotriccus euleri</i>	Euler's Flycatcher	DFO
Turdidae		
<i>Turdus fumigatus</i>	Cocoa Thrush	DFO
Thraupidae		
<i>Lanio cristatus</i>	Flame-crested Tanager	DFO
Cardinalidae		
<i>Cyanoloxia rothschildii</i>	Rothschild's Blue Grosbeak	DFO
UNDERSTORY INSECTIVORES		
Cuculidae		
<i>Coccyzus euleri</i>	Pearly-breasted Cuckoo	DFO
<i>Piaya cayana</i>	Squirrel Cuckoo	I, DFO
Nyctibiidae		
<i>Nyctibius aethereus</i>	Long-tailed Potoo	DFO
Bucconidae		
<i>Malacoptila rufa</i>	Rufous-necked Puffbird	DFO
Thamnophilidae		
<i>Myrmotherula brachyura</i>	Pygmy Antwren	DFO
<i>Formicivora grisea</i>	White-fringed Antwren	DFO
<i>Thamnomanes ardesiacus</i>	Dusky-throated Antshrike	I
<i>Thamnophilus punctatus</i>	Northern Slaty-Antshrike	I, DFO
<i>Taraba major</i>	Great Antshrike	DFO
<i>Sclateria naevia</i>	Silvered Antbird	DFO
<i>Cercomacra cinerascens</i>	Gray Ant	I

Conopophagidae		
<i>Conopophaga aurita</i>	Chestnut-belted Gnateater	DFO
Furnariidae		
<i>Automolus rufipileatus</i>	Chestnut-crowned Foliagegleaner	DFO
<i>Synallaxis albescens</i>	Pale-breasted Spinetail	DFO
<i>Synallaxis gujanensis</i>	Plain-crowned Spinetail	DFO
Onychorhynchidae		
<i>Onychorhynchus coronatus</i>	Royal Flycatcher	I
<i>Terenotriccus erythrurus</i>	Ruddy-tailed Flycatcher	DFO
Platyrrhynchidae		
<i>Platyrrhynchus saturatus</i>	Cinnamon-crested Spadebill	DFO
Rhynchocyclidae		
<i>Leptopogon amaurocephalus</i>	Sepia-capped Flycatcher	DFO
<i>Rhynchocyclus olivaceus</i>	Olivaceous Flatbill	DFO
<i>Todirostrum maculatum</i>	Spotted Tody-Flycatcher	I, DFO
<i>Todirostrum cinereum</i>	Common Tody-Flycatcher	DFO
<i>Lophotriccus galeatus</i>	Helmeted Pygmy-Tyrant	DFO
Troglodytidae		
<i>Troglodytes musculus</i>	Southern House Wren	I, DFO
<i>Cantorchilus leucotis</i>	Buff-breasted Wren	DFO
<i>Cyphorhinus arada</i>	Musician Wren	I
Donacobiidae		
<i>Donacobius atricapilla</i>	Black-capped Donacobius	I, DFO
Parulidae		
<i>Setophaga pitiayumi</i>	Tropical Parula	DFO

4. CONCLUSIONS

The diversity of birds presented by Mura of natural occurrence in the indigenous territory was considered large. Mura have lot of knowledge about the ecological importance of the fauna. The indigenous knowledge about the ecological interactions between animals and plants travels through generations from older to younger ones in oral transmission.

References

- [1] F.R. Dario. Interactions between vegetation and avifauna in Amazon forest. *Asian Journal of Biological and Life Sciences* 3(3) (2013) 190-195.
- [2] T.M. Lewinsohn, P.I. Prado. How many species are there in Brazil? *Conservation Biology* 19(3) (2005) 619.
- [3] H. Pagliaro, C. Junqueira C. Recuperação demográfica e fecundidade dos Kamaiurá, povo Tupi do Parque Indígena do Xingu, Brasil Central, 1970-2003. *Saúde e Sociedade* 16(2) (2007) 37-47.
- [4] E.S. Hunn. Ethnobiology in four phases. *Journal of Ethnobiology* 27 (2007) 1-10.
- [5] P. Sillitoe. Ethnobiology and applied anthropology: rapprochement of the academic with the practical. *Journal of the Royal Anthropological Institute* 12 (2006) 119-142.
- [6] G.B. Farias, A.G.C. Alves. Aspectos históricos e conceituais da etnoornitologia. *Biotemas* 20 (2007) 91-100.
- [7] S.E. Rabionet. How I learned to design and conduct semistructured interviews: an ongoing and continuous journey. *The Qualitative Report* 16 (2011) 563-566.
- [8] D.G. Campbell, D.C. Daly, G.T. Prance, U.N. Maciel. Quantitative ecological inventory of terra-firme and várzea tropical forest on the Rio Xingu, Brazilian Amazon. *Brittonia* 38(4) (1986.) 369-393.
- [9] T. Haugaasen, Peres, C.A. Floristic, edaphic and structural characteristics of flooded and unflooded forests in the lower Rio Purus region of central Amazonia, Brazil. *Acta Amazonica* 36(1) (2006) 25-36.
- [10] CBRO. Brazilian Ornithological Records Committee. Checklist of the birds of Brazil. *Revista Brasileira de Ornitologia* 23(2) (2015) 91-298.
- [11] E.O. Willis. The compositions of avian communities in remanescents woodlots in southern Brazil. *Papéis Avulsos de Zoologia* 33 (1979) 1-25.
- [12] C.A. Shaffer, M.S. Milstein, C. Yukuma, E. Marawanaru, P. Suse. Sustainability and comanagement of subsistence hunting in an indigenous reserve in Guyana. *Conservation Biology* 31(5) (2017) 1.119-1.131.
- [13] B.S. Soares-Filho, D.C. Nepstad, L.M. Curran, G.C. Cerqueira, R.A. Garcia, C.A. Ramos, E. Voll, A. McDonald, P. Lefebvre, P. Schlesinger, Modelling conservation in the Amazon basin. *Nature* 440(7083) (2006) 520-523.

- [14] P.L.R. Brennan. Techniques for studying the behavioral ecology of forest-dwelling tinamous (Tinamidae). *Ornitologia Neotropical* 15 (2004) 329-337.
- [15] G.A. Leite, I.P. Farias, A.L.S. Gonçalves, J.E. Hawes, C.A. Peres. Coarse- and fine-scale patterns of distribution and habitat selection places an Amazonian floodplain curassow in double jeopardy. *PeerJ* 6 (2018) 1-18.
- [16] S.H. Borges. Relative use of secondary forests by cracids in Central Amazonia. *Ornitologia Neotropical* 10 (1999) 77-80.
- [17] D.H. Janzen. Herbivores and the number of tree species in a tropical forest. *American Naturalist* 104 (1970) 501-528.
- [18] R.V. Naves, J.X. Almeida Neto, M. Rocha, J.D. Borges, G.C. Carvalho, L.J. Chaves, V.A. Silva. Determinação de características físicas em frutos e teor de nutrientes, em folha e no solo, de três espécies frutíferas de ocorrência natural nos cerrados de Goiás. *Anais das Escolas de Agronomia e Veterinária* 25 (1995) 107-114.
- [19] E. Gressler, M.A. Pizo, P.C. Morellato, P.C. Polinização e dispersão de sementes em Myrtaceae do Brasil. *Revista Brasileira de Botânica* 29 (2006) 509-530.
- [20] F.G. Stiles, L. Rosselli. Consumption of fruits of the Melastomataceae by birds - How diffuse is coevolution? *Vegetatio* 108 (1993) 57-73.
- [21] F.R. Dario. Diversity of frugivorous and omnivorous birds in different stages of ecological succession in Amazon Rainforest fragments. *World News of Natural Sciences* 15 (2017) 37-48.
- [22] F.R. Dario, A. Almeida, F.H. Muniz. Diversity and trophic structure of bird's community in Amazon Rainforest fragments in different stages of ecological succession. *Asian Journal of Biological and Life Sciences* 6(1) (2017) 381-393.
- [23] R.F. Fadini, M. De Marco Jr. Interações entre aves frugívoras e plantas em um fragmento de mata atlântica em Minas Gerais. *Ararajuba* 12 (2004) 97-103.
- [24] J.C. Ogden, D.A. McCrimmon Jr, G.T. Bancroft, B.W. Patty. Breeding population of wood stork (*Mycteria americana*) in southeastern United States. *Condor* 89 (1987) 752-759.
- [25] D.E. Kroodsma, D. Brewer, D. Family Troglodytidae (wrens). *Handbook of the birds of the world* 10 (2005) 356-447.