

# MAMMALS SURVEY AT TAMBOPATA RESEARCH CENTER

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## INTRODUCTION

Peru is one of the most megadiverse countries of the world (McNeely *et al.*, 1990), and its amazonian region had been proposed as one with the richest and most diverse mammalian fauna (Pacheco *et al.*, 1993).

In the southeastern peruvian amazon the most intensive inventory work have been carried out at the Manu National Park, followed by a study in the Cusco Amazonico Tourism Lodge (Woodman *et al.*, 199 ). In the Tambopata area the scarce mammals inventory had been updated by Galves-Durand (1994) and Emmons and Romo (*in* Foster, Carr and Forsyth, 1994) by rapid assessments.

During this before and during a field course we carried out a study on the mammal community of the Tambopata Research and Education Center, focused in day/night censusing and brief populational studies of small mammals.

## STUDY SITE

The Tambopata Research and Education Center (13°08'30" S; 69°36'15" W) is a field station operated by the ecotourism enterprise Rainforest Expeditions S.R.L., located in the left margin of the Tambopata river, about 40 km upstream from Puerto Maldonado in the department of Madre de Dios, Region Inka, Peru.

Although Foster, Carr and Forsyth (1994), gave a more detailed description of the vegetation site, the following physiographic units can be easily recognized:

- Low terrace or low floodplain forest which is seasonally flooded each rainy season;
- Medium terrace or high floodplain forest which is flooded only during exceptional inundations; the physiography is flat with different degrees of dissection, alluvial in its origin.
- Hills, found south or south-west from the camp, of about 20° of slope and probably a tectonic origin, with a predominant bamboo vegetation;
- Palm swamps, with solifluxion, a depression on bad drained areas, permanently flooded by the with rainfall and the run-off.
- Black water swamp, a depression with an impermeable layer of soil, with acid waters.

## MATERIAL AND METHODS

### *Day-night transect censuses*

At the study site, we carried out diurnal and nocturnal censuses, by walking trails at rates of 1-1.5 km/hour, and recording mammals or evidences of their presences (tracks, vocalizations, scats, etc.). When mammals were seen, the distance to transect and the number of individuals was noted. km.

### *Small mammals live-trapping*

In order to record small terrestrial mammals, two plots (a 0.5 ha and a 0.25 ha) were established in non flooded forest 600 m and 300 m north from the camp-base, respectively. At the first plot a grid of 100 x 50 m were settled (Fig 1) having three lines 25 m apart, with 5 traps stations each. At any station two traps, a Sherman collapsible aluminum trap and a Havahart or a Tomahawk trap were placed at suitable sites. Traps were baited with a mix of rolled oats with peanut butter and vanilla essence and pieces of manihot. Trapping at each site was preceded by a pre-baiting period to allow animal to get in use of the traps. Animals captured were identified, sexed, measured (Head and body, tail lengths), weighted, marked and released. Some animals were dusted with fluorescent pigments before released and tracked at night with a portable Ultraviolet lamp in order to know their daily movements, home range and dens.

Data gathered from captures and recaptures allowed us to estimate the population size (N) by means of the Lincoln-Peterson's method:

$$N = \frac{Mn}{m}$$

where M= number marked and released, n= number of marked and no-marked captured later, and m= number of marked in that capture.

The 95% confidence limits were calculated with the formula:

$$S.E. = \sqrt{M^2n(n-m)/m^3}$$

and confronted with the estimates obtained with the Schnable's method.

#### *Mistnetting for bats*

Three nylon mistnets were set for bats ground level in probable flyways within the forest near the station. Nets were opened from 1800 to 2200 h for 25 nights between April 10 to May 11, 1995, accounting for 300 net-hours. Bats captured were identified, sexed, measured (forearm length), weighted, marked and released.

## RESULTS AND DISCUSSION

During our study we recorded 69 species of mammals: 8 marsupials, 1 xenarthran, 21 bats, 8 monkeys, 9 carnivores, 1 tapir, 2 peccaries, 2 deer, 15 rodents and 1 rabbit. Twenty two species (5 marsupials, 10 bats, 2 carnivores, 1 deer and 5 rodents) are new records to the site and update the total mammal fauna to 105 species (see Appendix).

The current known mammal fauna of the Tambopata Research and Education Center is composed in about 60% of small mammals ( $\leq 0.25$  kg), being bats and rodents the main component of the mammal community of the site. Larger mammals such Xenarthrans, Primates, Carnivores and Ungulates (Perissodactyla and Artiodactyla), accounts together just for the 30% of the species of the site (Table 1).

**Table 1.** Comparative Number of species per large mammals groups recorded at the Tambopata Research and Education Center (TREC) and at the Cocha Cashu Biological Station (Manu National Park).

Group of Mammals	Sites	
	TRC	Cocha Cashu*
Marsupials	10	8
Xenarthrans	6	7
Bats	36	57
Monkeys	8	13
Carnivores	11	10
Ungulates	5	5
Rodents	21	24
Rabbits	1	10
<b>TOTAL</b>	<b>105</b>	<b>140</b>

\*from Emmons, 1984, and Janson and Emmons, 1990.

Although the studies on mammals have not received the same effort than in other areas such the Cocha Cashu Biological Station in Southeastern Peru, the mammalian fauna of the Tambopata Research and Education Center, despite the unequal and quite recent sampling effort, seems to be as rich and diverse than the recorded for Cocha Cashu (Table 3). It is very probable than its nearby to the andean foothills might have an important influence on the faunal composition of the area.

**Table 2.** Small rodents population size according Lincoln-Peterson's and Schnabel's methods in the study places (C-600= study plot, trail C, 600 m N of camp; C-300= study plot, trail C, 150 m N of camp; Beach= line transect 80 m E of camp) N= population, S.E.= Standard error.

Site	Species	Lincoln-Peterson's				Schnabel's	
		N	S.E.	Confidence limit		N	±95% conf. interv.
				95% upper	95% lower		
C-600	<i>Oecomys</i>	21	15.80	52	0	12	12
	<i>Oligoryzomys</i>	13	2.00	17	9	4	3
	<i>Oryzomys</i>	59	9.90	78	40	27	24
	<i>Proechymis</i>	23	3.10	29	17	8	6
C-300	<i>Oryzomys</i>	25	8.20	41	9	17	12
	<i>Oroechymis</i>	11	3.60	18	4	13	24
Beach	<i>Oryzomys</i>	22	4.90	32	12	9	8

From the trapping session performed at the plots and the beach transect we estimated the populational densities for each place with the Lincoln-Peterson's method which seems to overestimate the population size (Table 1). However those values obtained with the Schnabel's method seems to be more reliable in their estimates (Table 2).

Despite the lowest -and perhaps more confident- population size values obtained with the latest method, the small mammals densities obtained at the study site are higher than those reported for any other amazonian site (Ascorra, 1995; Emmons, 1982 and 1984). Biomass values obtained from the estimates of density are shown in Table 3.

**Table 3.** Densities and Biomass of small rodents recorded at the study places (C-600= study plot, trail C, 600 mN of camp; C-300= study plot, trail C, 150 m N of camp; Beach= line transect 80 m E of camp).

Site	Species	Density (ind/ha)	Biomass (kg/km <sup>2</sup> )
C-600	<i>Oecomys sp.</i>	9	45
	<i>Oligoryzomys sp.</i>	8	40
	<i>Oryzomys sp.</i>	54	378
	<i>Proechymis sp.</i>	16	400
C-300	<i>Oryzomys sp.</i>	34	170
	<i>Proechymis sp.</i>	26	650
Beach	<i>Oryzomys sp.</i>	18	126

The captures at the study plots does not have a random distribution but shows an aggregated pattern. The concentration of captures occurs in those plots with good plant coverage, closed canopy, fallen logs, Bignoniacea and Palmae roots, suitable for mice and rats roots (Emmons, 1982). No capture are evident on quadrants with bamboo or seasonally flooded areas See

The fluorescent tracking of the small mice (*Oryzomys*, *Oligoryzomys*) trapped and released show that these animals had been captured very closed to their dens (5-10 m), and probably have very small home ranges than medium sized rodents such as *Proechimys* (Emmons, 1982 and 1984).

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**MAMMAL FAUNA RECORDED AT THE TAMBOPATA RESEARCH CENTER**  
(by Cesar Ascorra, May 1995; x=recorded in previous studies; X= recorded in this study)

**DIDELPHIMORPHIA (=MARSUPIALIA)**

DIDELPHIDAE (10)

<i>Caluromys philander</i>		X
<i>Caluromystops irrupta</i>		X
<i>Didelphis marsupialis</i>	x	
<i>Marmosa lepida</i>	x	X
<i>Marmosa rubra</i>		X
<i>Marmosops noctivagus</i>	x	X
<i>Marmosops parvidens</i>		X
<i>Metachirus nudicaudatus</i>	x	
<i>Micoureus cinereus</i>		X
<i>Philander opossum</i>	x	X

**XENARTRA**

BRADYPODIDAE (1)

<i>Bradypus variegatus</i>	x	
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DASYPODIDAE (2)

<i>Dasypus kappleri</i>	x	X
<i>Priodontes maximus</i>	x	

MYRMECOPHAGIDAE (3)

<i>Cyclopes didactylus</i>	x	
<i>Myrmecophaga tridactyla</i>	x	
<i>Tamandua tetradactyla</i>	x	

**CHIROPTERA**

EMBALLONURIDAE (2)

<i>Rhynchonycteris naso</i>		X
<i>Saccopteryx bilineata</i>	x	X

PHYLLOSTOMIDAE (31)

<i>Chrotopterus auritus</i>		X
<i>Micronycteris minuta</i>	x	
<i>Micronycteris schmidtorum</i>		X
<i>Phyllostomus elongatus</i>	x	X
<i>Phyllostomus hastatus</i>	x	X
<i>Phyllostomus stenops</i>		X
<i>Tonatia bidens</i>	x	X
<i>Trachops cirrhosus</i>	x	
<i>Lonchophylla thomasi</i>	x	
<i>Choeroniscus intermedius</i>	x	
<i>Choeroniscus minor</i>		X
<i>Glossophaga soricina</i>	x	
<i>Carollia brevicauda</i>	x	X
<i>Carollia castanea</i>	x	X
<i>Carollia perspicillata</i>	x	X
<i>Rhinophylla pumilio</i>	x	X
<i>Artibeus anderseni</i>	x	
<i>Artibeus jamaicensis</i>	x	X
<i>Artibeus obscurus</i>	x	X
<i>Chiroderma villosum</i>	x	
<i>Mesophylla macconnelli</i>	x	
<i>Platyrrhinus helleri</i>	x	
<i>Platyrrhinus infuscus</i>		X
<i>Sturnira lilium</i>	x	X
<i>Sturnira magna</i>		X
<i>Sturnira tildae</i>	x	
<i>Uroderma magnirostrum</i>	x	
<i>Vampyressa melissa</i>	x	
<i>Vampyrodes caraccioli</i>		X
<i>Desmodus rotundus</i>		X
<i>Diphylla ecaudata</i>	x	

VESPERTILIONIDAE (3)

<i>Lasiurus ega</i>	x	
<i>Myotis riparius</i>	x	
<i>Myotis simus</i>		X

**PRIMATES**

CALLITRICHIDAE (1)

<i>Saguinus fuscicollis</i>	x	X
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<b>CEBIDAE (7)</b>		
<i>Alouatta seniculus</i>	x	X
<i>Aotus trivirgatus</i>	x	X
<i>Ateles paniscus</i>	x	X
<i>Callicebus moloch</i>	x	X
<i>Cebus albifrons</i>	x	X
<i>Cebus apella</i>	x	X
<i>Saimiri sciureus</i>	x	X
<b>CARNIVORA</b>		
<b>CANIDAE (1)</b>		
<i>Atelocynus microtis</i>		X
<b>PROCYONIDAE (3)</b>		
<i>Nasua nasua</i>	x	X
<i>Bassaricyon alleni</i>		X
<i>Potos flavus</i>	x	X
<b>MUSTELIDAE (3)</b>		
<i>Eira barbara</i>	x	X
<i>Lutra longicaudis</i>	x	
<i>Pteronura brasiliensis</i>	x	
<b>FELIDAE (4)</b>		
<i>Leopardus pardalis</i>	x	X
<i>Leopardus wiedii</i>	x	X
<i>Panthera onca</i>	x	X
<i>Puma concolor</i>	x	X
<b>PERISSODACTYLA</b>		
<b>TAPIRIDAE (1)</b>		
<i>Tapirus terrestris</i>	x	X
<b>ARTIODACTYLA</b>		
<b>TAYASSUIDAE (2)</b>		
<i>Tayassu tajacu</i>	x	X
<i>Tayassu pecari</i>	x	X
<b>CERVIDAE (2)</b>		
<i>Mazama americana</i>	x	X
<i>Mazama gouazoubira</i>		X
<b>RODENTIA</b>		
<b>SCIURIDAE (4)</b>		
<i>Microsciurus sp.</i>		X
<i>Sciurus ignitus</i>	x	X
<i>Sciurus spadiceus</i>	x	X
<b>MURIDAE (5)</b>		
<i>Neacomys spinosus</i>		X
<i>Oecomys bicolor</i>	x	
<i>Oecomys sp</i>	x	
<i>Oligoryzomys microtis</i>	x	
<i>Oryzomys capito</i>	x	X
<i>Rhipidomys couesi</i>	x	X
<b>ERETHIZONTIDAE (1)</b>		
<i>Coendu bicolor</i>	x	
<b>HYDROCHAERIDAE (1)</b>		
<i>Hydrochaeris hydrochaeris</i>	x	X
<b>AGOUTIDAE (3)</b>		
<i>Agouti paca</i>	x	X
<i>Dasyprocta variegata</i>	x	X
<i>Myoprocta pratti</i>	x	X
<b>ECHIMYIDAE (6)</b>		
<i>Dactylomys dactylinus</i>	x	X
<i>Isothrix bistrata</i>		X
<i>Mesomys hispidus</i>	x	
<i>Proechimys brevicauda</i>		X
<i>Proechimys simonsi</i>	x	X
<i>Proechimys sp.</i>		X
<b>LAGOMORPHA</b>		
<b>LEPORIDAE (1)</b>		
<i>Sylvilagus brasiliensis</i>	x	X