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Chiroptera of Junín, with the first record of *Vampyrum spectrum* (Linnaeus, 1758) for the Province of Imbabura – Ecuador

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ABSTRACT

In this article we describe the bat fauna of the area surrounding the town of Junin in the province of Imbabura, Ecuador. The study site contains remnant Evergreen Lower Montane Forest and Montane Cloud-forest, and constitutes an area of conservation importance in northwestern Ecuador. Thirty eight bats belonging to two families, seven genera and eleven species were captured following a monitoring effort of 108 hours using mist nets distributed across three different forest types. There was no statistical difference in abundance and diversity between the forest types sampled. *Myotis riparius* was the most widespread and abundant species. We report the first record of *Vampyrum spectrum* in the province of Imbabura, and the third record of this species at an altitude higher than 1 300 meters within Ecuadorean cloud-forest. This work extends the current knowledge on chiropteran fauna in the area, which previously consisted of rapid ecological assessment only.

Key words.- Bats, Cloud-forest, Diversity, New report.

RESUMEN

QUIROPTEROFAUNA DE JUNÍN, CON EL PRIMER REGISTRO DE *Vampyrum spectrum* (LINNAEUS, 1758) PARA LA PROVINCIA DE IMBABURA – ECUADOR. El presente artículo da a conocer la diversidad quiropterológica de la localidad de Junín en la Provincia de Imbabura, Ecuador. El sitio constituye un remanente boscoso de las formaciones Bosque Siempreverde Montano Bajo y Bosque Montano Nublado por lo que se constituye en una importante zona para la conservación biológica en el noroccidente ecuatoriano. Mediante la ayuda de redes de neblina, colocadas en tres tipos de formaciones boscosas, y un esfuerzo de monitoreo de 108 h, se capturaron treinta y ocho murciélagos agrupados en dos familias, siete

géneros y 11 especies. No se encontró diferencias estadísticas en la diversidad y abundancia de quirópteros entre los tipos de bosque estudiados. *Myotis riparius* fue la especie más ampliamente distribuida y abundante. Se reporta por primera ocasión a *Vampyrum spectrum* en la provincia de Imbabura, este es el 3er registro para un bosque nublado ecuatoriano a una altitud mayor a 1 300 metros. Se discute la importancia en la conservación de quirópteros de los bosques riparios y se amplía el conocimiento de la fauna de murciélagos para la zona el cual estuvo basado anteriormente en evaluaciones ecológicas rápidas.

Palabras clave.- Murciélagos**,** Bosque nublado, Diversidad, Nuevo reporte.
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INTRODUCTION

For more than a decade Junín has faced serious environmental threats, the most serious one has been the pressure of mining companies exploiting copper followed by deforestation and expansion of the agricultural frontier (Ramírez, pers. comm.). The presence of copper mines contrasts with the presence of an extremely diverse forest (Paredes, 2010), part of the Chocó bioregion (biodiversity hotspot), which has not yet been fully studied. The rapid and indiscriminate loss of American forests seriously threatens the persistence of bat populations, with a large percentage of them listed as less common or rare (Tirira, 1998a).

Thanks to their evolutionary adaptations, bats provide several benefits to the ecosystem such as acting as biological controls, pollinators and dispersers of seeds (Tirira, 1998a). Sadly the significance that the only winged mammals had in many ancestral cultures has been lost due to the current lack of knowledge of their ecological importance, but also because of the dissemination of false myths that in many cases unfairly lead to the extermination of several individuals and even entire colonies (Tirira, 1998a).

In the Junín Community Reserve (JCR) there is still no information on the conservation status, demography, genetics, ecology, behaviour or natural history of species of bats. Currently the only information available is based on rapid ecological assessments carried out by mining companies; JCR covers an extension of 1 175 ha and is located 10 km from the town centre (Assendant Copper & Terrambiente, 2005); Additionally, it is surrounded by around 7 000 ha corresponding to the Protected Forest Chontal, which connects with the Cotacachi Cayapas Ecological Reserve. The community has a cabin that provides accommodation for tourists and researchers, which is surrounded by four ha of primary cloud forest. The Junín River goes through a part of this area as well (Ramirez, com. pers.).

This article provides information on the abundance and diversity of chiropterans in JCR with the objective of highlighting the importance of

protected areas for the conservation of endangered species who suffer intense anthropogenic pressure. We also report the presence of *Vampirum spectrum* in the area, which is the first record of this species for the Imbabura Province (Ecuador). This is the largest flying mammal in America.

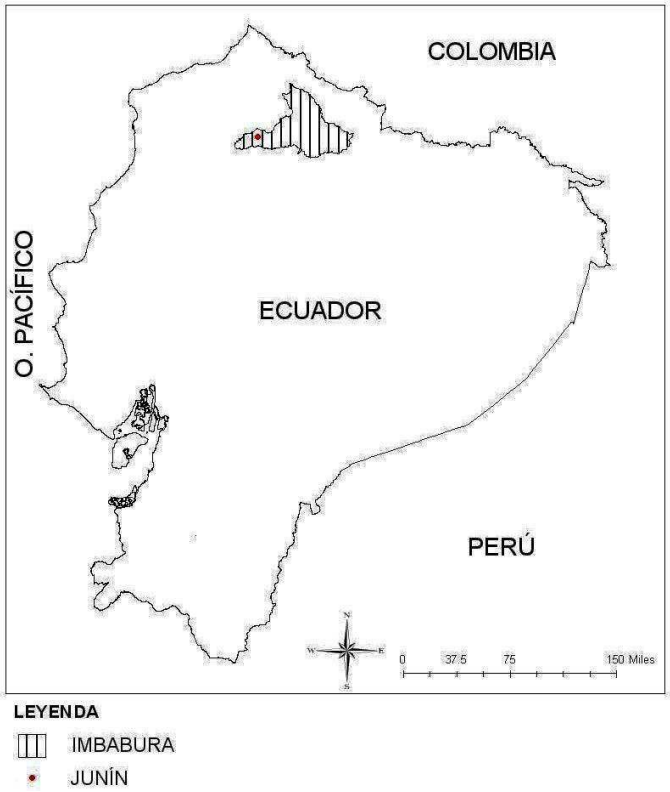

Figure 1: Location of study area in Ecuador.

METHODS

Study Area. - RCJ is located 180 km northwest of Quito. Politically it belongs to Garcia Moreno Parish of Cotacachi City, Imbabura Province (00 º 16 'N 78 º 40' W). The community lies in the valley of Intag occupying a space along the foothills of the Andes mountain range in western Toisán within the Chocó bioregion (Figure 1). According to Cañadas (1993) the RCJ corresponds to the Pre-Montane Rain Forest life zone, whose average annual temperature is 14.7 °C (INAMHI, 2005) with rainfall exceeding 3 000 mm per year. RCJ has a humid subtropical climate and shows slopes ranging from moderate to profound. According to the classification of the vegetation for continental Ecuador (Sierra et al., 1999), RCJ is part of the northern region of the western Andes with an Evergreen Montane Forest and Lower Montane Rain vegetation. The most important plant species in the area are: *Triplinervis alchornea* (Euphorbiaceae), *Carapa guianensis* (Meliaceae) and *Infrafaveolata ocotea* (Lauraceae) (Terrambiente, 2005). The fauna of the western foothills'

forests of the Ecuadorian Andes corresponds to the Western Subtropical Zoogeographic Level (Albuja et al., 1980).

Sampling of bats. - In November 2010 we established three sampling points located between 1300 and 1400 metres above sea level (masl). Each point corresponds to a different forest type:

a) Mature Cloud Forest (BNM, which is in relatively good condition. It is crossed by a path of about 2m wide, which allows access to the cabins of the EcoJunín Association. It presents *Faramea* sp. (Rubiaceae) as the most abundant plant species (Mariscal, pers. comm.) b) Riparian Cloud Forest (BNR, corresponding to a remnant of forest crossed by the river Junín. It is going through a process of natural regeneration, where "condorcillo shrubs" (*Piper* sp.) are the most abundant species (Ceron, 2003) and c) Altered Cloud Forest (BNA, small banana-*Musa paradisiaca* plantation - near the huts of the Association EcoJunín adjacent to the forest).

At each sampling point we laid a 200m transect, four mist nets of 2.6m high and 6m long were placed in each transect with 50m of space between them. The nets were active three hours per night, from 06.00 to 21:00 during three days, which accounts to an effort of capture of 12 hours per night for nine nights giving a total sampling effort of 108 h. Each transect covered an area of approximately 1 200 m^2, covering a total area of 3 600 m^2.

Most captured individuals were recorded and preliminarily identified in the field and later they were identified in the Zoological Research Museum of the Instituto Agropecuario Superior Andino of the ESPE (MIZI) with the help of taxonomic keys for Ecuadorian bats (Albuja, 1999; Tirira, 2007). They were also compared with specimens deposited in the MIZI, QCAZ (Museum of Zoology, Catholic University of Quito), MEPN (Institute of Biological Sciences, National Polytechnic School), MECN (Ecuadorian Museum of Natural Sciences) and MGOUC (Museum Gustavo Orcés Central University of Ecuador). The animals that were easily identified were photographed, sexed and measurements of the tibia length were taken as well as data of reproductive status after which they were released. A few specimens belonging to stable populations (according to Tirira (2007)) were collected, measured and deposited in the MIZI following proper protocols for the preservation of specimens (Tirira, 1998b).

Mathematical Analysis. - We calculated 1/D, H 'and E' (Hill) to infer the difference in terms of diversity of the three forest types monitored. The similarity of species by forest type was analyzed using Bray-Curtis cluster analysis (Mc Aleence et al., 1997). The specific abundance of forest types was analyzed with the Friedman statistical analysis (Ayres et al., 2007) with a significance level of 0.05.

Table 1.- Diversity and frequency of capture of bats in RCJ. For explanation of acronyms refer to the Methods section

Family	Species	Global	BNM	BNR	BNA
Phyllostomidae	*Artibeus rosenbergii*	5	2	3	-
	Carollia brevicauda	6	2	2	2
	Carollia castanea	2	-	1	1
	Carollia perspicillata	4	1	2	1
	Micronycteris megalotis	2	-	-	2
	Sturnira ludovici	2	1	1	-
	Vampyrum spectrum	1	-	-	1
Vespertilionidae	*Eptesicus andinus*	3	2	1	-
	Myotis keaysi	3	-	3	-
	Myotis nigricans	1	1	-	-
	Myotis riparius	9	4	2	3
Abundance		**38**	13	15	10
Richness		**11**	7	8	6
Shannon H´Log_{10}		**0.953**	0.790	0.865	0.736
Simpson (1/D)		**9.250**	8.667	11.667	9.000
E' (Hill)		**34.169**	19.886	25.519	16.659

Table 2.- Morphometric measurements of the specimens collected, the length is in mm and weight in g (TL = total length, CC = head-body length, LC = tail length, LP = length of right leg, LO = ear length, AB = length of right forearm, P = weight).

Species	Nº voucher	LT	CC	LC	LP	LO	AB	P
Artibeus rosenbergi	MIZI2010221	53.80	53.80	0	8.88	12.66	39.08	16.00
Artibeus rosenbergi	MIZI2010222	50.08	50.08	0	8.81	13.82	39.74	13.00
Artibeus rosenbergii	MIZI2010244	51.57	51.57	0	9.17	14.13	38.84	14.00
Carollia brevicauda	MIZI2010213	63.94	54.52	9.42	10.67	14.1	37.26	14.00
Carollia brevicauda	MIZI2010214	64.12	55.11	9.01	11.27	13.04	37.5	15.00
Carollia perspicillata	MIZI2010212	67.39	57.90	9.49	12.07	14.29	42.74	20.50
Carollia perspicillata	MIZI2010229	68.07	56.93	11.14	13.48	15.5	43.33	18.50
Micronycteris megalotys	MIZI2010253	53.63	41.44	12.19	9.07	19.77	34.39	7.50
Sturnira ludovici	MIZI2010228	64.13	64.13	0	11.35	16.54	45.44	24.00
Vampyrum spectrum	MIZI2010252	128.85	128.85	0	29.07	40.01	103.69	---
Eptesicus andinus	MIZI2010220	75.71	46.78	28.93	6.04	10.96	36.83	7.00
Myotis keaysi	MIZI2010230	67.70	36.77	30.93	6.92	11.64	33.97	5.00
Myotys riparius	MIZI2010215	70.60	40.94	29.66	6.32	12.28	34.71	5.50
Myotys riparius	MIZI2010216	67.16	38.8	28.36	7.46	11.66	33.95	6.00
Myotis riparius	MIZI2010200	66.00	43.00	23.00	6.00	9.00	32.00	23.00
Myotis nigricans	MIZI2010201	86.00	51.00	35.00	6.50	11.00	37.00	35.00

RESULTS

We captured thirty eight bats grouped into two families, seven genera and 11 species (Table 1) from which *Myotis riparius*, *Carollia brevicauda* and *Artibeus rosenbergii*, were the most abundant with nine, six and five individuals respectively (Table 1). In BNM we captured 13 individuals belonging to 7 species. 15 individuals were recorded in BNR belonging to 8 species, while in

BNA 10 individuals of 6 species were collected, one of which was *Vampyrum spectrum*, being the first report of this species for the province of Imbabura.

According to Bray-Curtis Cluster Analysis, based on the percentage of similarity, BNR and BNM were more similar between them with 62.3 %. They both formed a group that is similar to the BNA in 52% (Figure 2). BNR has higher richness, abundance and diversity than the other types of forest formation studied (Table 1). The Friedman Test showed no significant differences in the specific abundance per forest types (Fr_2= 0.591, p= 0.7442).

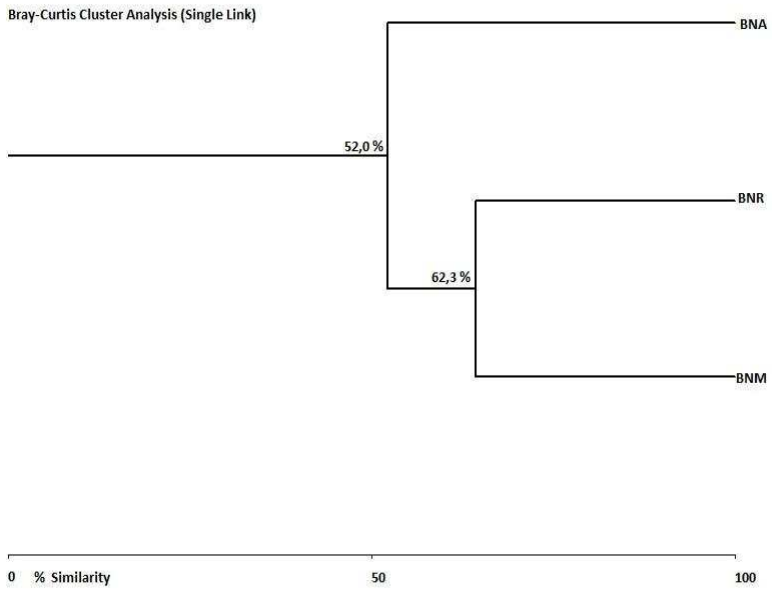

Figure 2. Cluster analysis of Bray-Curtis between mature cloud forest (BNM), riparian forest in regeneration (BNR) and altered cloud forest (BNA).

The following are the species recorded in Junín, they are presented in phylogenetic order; measures of species caught are shown in Table 2.

Phyllostomidae

Micronycteris megalotis (Gray, 1842)
English name: Litte Big-eared bat (Alonso-M & Medellín, 1991)
Spanish name: Murciélago orejudo pequeño común (Tirira, 2007)
Two individuals were captured in the BNA in a mist net placed near the cabin of the Association EcoJunín, one of which was collected under the number XC104 and deposited in MIZI as wet specimen in alcohol (MIZI2010253), the individual was an adult male, and presented spiderweb residues in its legs.

Vampyrum spectrum (Linnaeus, 1758)
English name: Linnaeus´ false vampire bat (Navarro & Wilson, 1982)
Spanish name: Gran falso murciélago vampiro (Tirira, 2007)

The collected animal (Fig. 3) corresponds to the first record of this species for the province of Imbabura (No. Collector XC103, No. Voucher MIZI2010252), the collection site, ecologically corresponds to BNA lying close to a banana plantation and also to BNM. Altitude was 1360m and according to the Red *Noctilio* (Tirira, 2005-2011). This finding is the third report with the highest altitude for this within the Ecuadorian territory (Table 3). The adult male was captured in a net located exactly on the edge of the forest flying towards the inside. Stomach analysis of the collected individual showed the presence of beetles, fish epipleural bones and a species of endoparasite nematode.

Figure 3.- *Vampyrum spectrum* (MIZI2010252, XC103), Junín 2010, Photo by X. Cueva.

Carollia brevicauda (Schinz, 1821)
English name: Silky Short-tailed Bat (Gardner, 2007)
Spanish name: Murciélago sedoso de cola corta (Tirira, 2007)
A total of six individuals were captured in the study: an adult female with a tibia lenght of 16.44 mm and an adult male with a tibia lenght of 16.35mm from the BNP at 1 381 masl, both were collected under XC065 and XC066 numbers and deposited in MIZI with the voucher numbers MIZI2010214 and MIZI2010213, preserved as dry skin and in alcohol respectively; an adult male (tibia: 17.9mm) and an adult female (tibia: 16.15mm), were captured in the NBR at 1 316 masl and two adult males (one with a tibia length of 18.0 mm and the other 16.5 mm) which were taken from the BNA at 1 376 masl. The latter four individuals were photographed, sexed, and their tibia was measured (since this measurement is determinant to differentiate from other *Carollia* species [Tirira, 2008]) and then they were released.

Carollia castanea (H. Allen, 1890)
English name: Chestnut short-tailed Bat (Gardnerd, 2007)
Spanish name: Murciélago castaño de cola corta (Tirira, 2007)
Two individuals with a tibia length of less than 14.5 mm were captured, sexed, photographed and released, an adult male at 1 316 masl in the NBR

and an adult female in the BNA at 1 376 m. These individuals had a shorter tibia, consistent morphological parameter as explained by Tirira (2007).

Table 3.- Records of *Vampyrum spectrum* in Ecuador (based from EPN, QCAZ, MECN, MGO UC, MIZI & Red *Noctilio* 1995-2011).

Nº de Voucher	**Year**	**Altitude ***	**Province, Locality**
AMNH 066815	1923	53	Guayas, Isla Puná, San Ramón
FMNH 053505	1939	1 500	Pichincha, Canchacoto
MEPN 002019	1958	300	Pastaza, Río Corrientes
USNM 528490	1979	220	Los Ríos, Río Palenque
MGO UC 0012	1987	220	Los Ríos, Patricia Pilar, 20 km N de Quevedo
MEPN 005501	1989	1 200	Napo, Archidona, Cotundo, Challuayacu
MEPN 009067	1991	200	Orellana, Aguarico, Zancudococha, Iripari
QCAZ 01072	1992	250	Esmeraldas, Salto del Bravo, Río Bravo
MECN 48	1992	188	Orellana, Yasuní, Indillama
Mena-V, 1997**	1993	650	Sucumbíos, Cayambe-Coca, Sinangüé
Mena-V & Ruiz, 1997**	1994	1 250	Esmeraldas, Río Negro Chico, cordillera Lita
EPN 005109	1996	400	Orellana, Loreto, Río Cotapino
Albuja, 1999**	1996	165	Manabí, Vueltas Largas
QCAZ 2167	1996	35	Esmeraldas, Viruela, Río Cayapas
Albuja, 1997**	1996	800	Manabí, Machalilla, San Sebastián
ROM 451	1996	220	Orellana, Yasuní, Onkone Gare
MECN 1636	1998	80	Esmeraldas, La Mayoranga
MECN 2104	2000	120	Esmeraldas, Muisne, Río Chipa, San Antonio
EPN 009775	2003	1 481	Pichincha, Río Pachijal, Cooperativa Rumiñahui
MGMC 1	2003	761	Cañar, Ocaña, vía a La Troncal
QCAZ 09247	2004	3	Guayas, La Pólvora
QCAZ 09248	2004	3	Guayas, La Pólvora
QCAZ 09772	2004	3	Guayas, La Pólvora
TTU 103447	2004	10	Guayas, Isla Puná
TTU 103448	2004	10	Guayas, Isla Puná
TTU 103456	2004	10	Guayas, Isla Puná
TTU 103463	2004	10	Guayas, Isla Puná
TTU 103464	2004	10	Guayas, Isla Puná
TTU 103465	2004	10	Guayas, Isla Puná
QCAZ 07946	2005	200	Orellana, Chiruisla, a orillas de Río Napo
EPN 011418	2009	293	Manabí, Manta, El Aromo, Río de los Napos
MIZI 2010252	**2010**	**1 360**	**Imbabura, Cotacachi, García Moreno, Junín**

*expressed in meter over sea level, ** visual records by authors, see References.

Carollia perspicillata (Linnaeus, 1758)
English name: Short-tailed fruit bat (Cloutier & Thomas, 1992)
Spanish name: Murciélago común de cola corta (Tirira, 2007)
We captured a total of four individuals: an adult male with a tibia length greater than 21mm at the BNP at 1 388 m of altitude, which was preserved and deposited in MIZI as dry skin with collector number XC064 and voucher No. MIZI2010212; a male and female, both adults in the NBR at 1 307 masl. The male (tibia length 23.1mm) was photographed and released whereas the female was collected (XC080) and deposited in MIZI as dry skin (MIZI2010229), both individuals were carrying a spadix of *Piper* sp. when captured, and an adult female in the BNA at 1 360 m altitude, who was released after tibia measurement (22 mm).

Sturnira ludovici (H.E. Anthony, 1924)
English name: Highland yellow-shouldered bat (Simons, 2005)
Spanish name: Murciélago de hombros amarillos de occidente (Tirira, 2007)
Two adult females were captured, one in the BNP at 1 388 m above sea level, it was released, and one in the NBR at 1307 m altitude, which was collected (XC079) and preserved as dry skin (MIZI2010228). These specimens showed the central upper incisors projected forward and separated at the tip, which coincides with a previous report by Tirira (2007).

Artibeus (Dermanura) rosenbergii (Thomas, 1897)
English name: Rosenberg`s fruit-eating bat
Spanish name: Murciélago frutero de Rosenberg (Tirira, 2007)
We captured a total of five individuals, a female and a male both adults who were collected in BNP at 1 381 m altitude with numbers XC073 and XC074 , deposited in the MIZI, preserved as dry skin (MIZI2010221) and in alcohol at 96 % (MIZI 2010222) respectively, as well as three individuals in BNR at 1 316 masl of which an adult male (MIZI2010244) was deposited in MIZI in the form of dry skin, while an adult female and an adult male were photographed and released.

Vespertilionidae

Eptesicus andinus (J.A. Allen, 1914)
English name: Andean Brown Bat (Gardner, 2007)
Spanish name: Murciélago marrón andino (Tirira, 2007)
Three adult males were recorded, two in the BNP at 1 381m above sea level one of which was photographed and released and the other one was collected (XC072) and preserved in the MIZI as dry skin (MIZI2010220). The remaining individual caught in the NBR (1 307 m altitude) was then photographed and released.

Myotis keaysi (Allen, 1914)
English name: Hairy-legged Myotis (Hernandez-M et al., 2005)

Spanish name: Murciélago vespertino de patas peludas (Tirira, 2007)
Three individuals were captured in the NBR at 1 316 m altitude, an adult female and an adult male were released, while another adult female was collected with the number XC081 and deposited in the MIZI preserved as dry skin (MIZI 2010230). These specimens had their membrane tail covered with hairs that all the way to the tibia, which matches the description of this species available in Tirira (2007).

Myotis nigricans (Schinz, 1821)
English name: Black Myotis (Gardner, 2007)
Spanish name: Murciélago vespertino negro (Tirira, 2007)
An adult male was collected with the collector number XC063 in the primary cloud forest at 1 400 m above sea level and deposited in MIZI with the voucher number MIZI2010201 in 75% alcohol. In early April a male in reproductive status was registered.

Myotis riparius (Handley, 1960)
English name: Riparian Myotis (Gardner, 2007)
Spanish name: Murciélago vespertino ripario (Tirira, 2007)
A total of nine individuals were registered of this species during this study including four adult males that were captured in the BNP at 1 381 masl. Three of them were collected (XC061, XC067, XC068) and were preserved in 96% alcohol and deposited in the MIZI (MIZI2010200, MIZI2010215, MIZI2010216), while the remaining male was released. Two adult females were captured, photographed and released at 1 307 m altitude in the NBR, and finally, two males and a female, both adults were caught and released at 1 360 masl in the altered cloud forest. In late March there was a male with scrotal testes.

DISCUSSION

According to Terrambiente (2005), RCJ hosts 19 species of mammals, from which eight are bats. However, during this study we found in the area at least 32 different species of mammals of which 11 are bats. Mammal richness along with the relative number of individuals of each of these species allowed us to estimate that RCJ maintains a high diversity of mammals. These results imply that the forest where this sampling was carried out is in good condition since it is maintaining a representative sample of the western subtropical mastofauna (Cueva, pers. obs.), which would be seriously threatened in the case of a mining incursion in the sector.

The Phyllostomid *Rhinophylla alethina*, *Platyrrhinus dorsalis*, *Sturnira bidens*, *S. erytromus* and Vespertilionid *Myotis oxyotus*, collected in 2005 by Terrambiente, were not recorded in the present study, however we do not rule out the presence of these species in Junin since we can find vouchers of these species in Ecuadorian museums which come from ecologically similar sites in the RCJ. The presence of these species would further increase the bat diversity on the site. It should be emphasized that these species constitute 62.5% of all bats recorded by Terrambiente (2005). *Carollia brevicauda*, *C.*

castanea and *Sturnira ludovici* were registered both in the present study and in the one by Terrambiente.

By indirect recording techniques and direct observation we confirmed the presence of *Desmodus rotundus* and a small colony of Molossidae (unidentified species), respectively. Although these records increase the diversity of bats in the area, they were not included because these species were not captured.

This study found no significant differences in the specific abundance in the three forest types studied (Mature, Riparian and Altered), similarly, Pozo & Eras (2012) found no differences when comparing the diversity and abundance of bats between riparian forests present in two types of productive farms (agricultural and livestock). However, bat diversity in riparian forests (Eras, 2008) was higher when compared to scattered trees and hedges (Aguilar & Lascano, 2009). The same phenomenon occurs in this study where riparian forests yielded higher diversity and evenness rates (Table 1) than mature forests and even than altered forests, demonstrating that increased likelihood of collection of bats occurs in sites near water bodies (Albuja, 1999). It also emphasises the importance of riparian forests in the conservation of chiropterofauna (Pozo & Eras, 2012).

Frugivores *Artibeus* (*Dermanura*) *rosenbergii*, *Sturnira ludovici* and *Carollia* spp., feed on plants which are characteristic of forests in a state of regeneration such as *Piper* spp., *Cecropia* spp. and *Ficus* spp. These species are used for shelter or as feeding plants typical of disturbed areas (*Musa* spp. and *Heliconia* spp.). We also collected "short-tailed bats" (Tirira, 2004) that are considered important elements in the dispersal of seeds and thus in forest regeneration processes which are altered (Tirira, 2007). The insectivores' species *Micronycteris megalotis*, *Eptesicus andinus* and *Myotis* spp. may use ceiling cracks of abandoned or inhabited houses as shelters or they may even be present in plantations, gardens and near urban centres (Tirira, 2007). These records of species that tolerate some degree of alteration in the environment indicate that within the study area there are regeneration sites and even disturbed sites. The fact that 91% of the species recorded in this study tolerate some degree of disturbance of the environment contrasts with the presence of *Vampyrum spectrum* (Figure 3). As it happens with large carnivores, the presence of this big bat states that the forest is in good condition, since this species is the top predator of its order occupying the top of the trophic pyramid. This finding provides evidence that the food chain is complete, indicating that RCJ still retains important areas for conservation of this species in the western side of the Ecuadorian Andes.

V. spectrum is distributed from Mexico to Bolivia and Brazil (Emmons & Feer, 1999), this species appears to be restricted to neotropical forest regions with a range altitude ranging from sea level up to 1 650 masl (Peterson & Kirmse, 1969 in Navarro & Wilson, 1982). In Ecuador it inhabits tropical and subtropical forests, 50 to 1 500 masl, in tropical regions and foothills of the

Andes from east and west (Tirira, 2007). Due in large part to the loss of habitat the species is considered locally vulnerable (Tirira 2011), and globally Near Threatened (IUCN, 2008). It is noteworthy that recording this species in cloud forests is even less frequent than in other forest types inhabited (Tirira, 2007).

According to the bats' collections of MEPN, MECN and QCAZ and, according to Red *Noctilio* (Tirira, 1995-2011), there are 31 specimens of *V. spectrum* for Ecuador currently registered, from which only 59% of individuals collected remain in the country, the oldest record was the one by the American Museum of Natural History in New York in 1923 in the coastal province of Guayas. To date no data of this species in the province of Imbabura had been reported and only two records in the altitude reported here have been mentioned for cloud forests of the Province of Pichincha (Table 3), so the presence of the species in cloud forests in the South West' Imbabura was expected.

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