



Preliminary Report on the Distribution of *Callicebus oenanthe* on the Eastern Feet of the Andes

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Abstract In 2007 we conducted a field study of almost 6 mo to determine the distribution of *Callicebus oenanthe*, formerly known as the Andean titi monkey. There previously has been no extensive study on the distribution and status by other fieldworkers. We visited a total of 96 localities within or around the presumed distribution of this rare primate species to determine the distribution of *Callicebus oenanthe*. We collected additional information on group size and threats to the species. Our expeditions revealed that the species is not endemic to the Alto Mayo Valley, as earlier authors suggested, but that its distribution extends into the Bajo Mayo and Huallaga Central. The study area is heavily deforested, and to date only one area was found where a viable population might live, although further research is needed to confirm this. The species lives in the southern part of its distribution in sympatry with another, undescribed species of *Callicebus*. We will continue the study to determine more precisely the distribution and conservation status of the *Callicebus oenanthe*, to determine if conservation measures are necessary for this species. This is the first activity of a long-term project for the conservation of *Callicebus oenanthe* initiated by La Vallée des Singes Primate park.

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Introduction

Callicebus oenanthe was first described by Thomas in 1924, from a specimen collected at Moyobamba at 823 m altitude. This specimen is housed at the British Museum. The only other localities from which the species was known until 2003 were Yuracyacu and Rio Seco, at approximately the same altitude (Hershkovitz 1990).

Hill (1960) recognized the taxon as a subspecies of *Callicebus gigot*, grouping it together with other forms of the same color: *melanochir* (*gigot*), *pallescens*, and *donacophilus*. Hershkovitz (1963) recognized it first as a color morph of *Callicebus (moloche) discolor*, but later gave it species status (Hershkovitz 1990). Hershkovitz, Groves, and van Roosmalen grouped it all in the *donacophilus* group (Groves 2001; Hershkovitz 1990; Van Roosmalen *et al.* 2002). The species was given a variety of vernacular names. Hill (1960) used the name Isabelline titi monkey; later authors called the species the Rio Mayo titi monkey or the Andean titi monkey (Aldrich 2006; DeLuycker 2006; Rowe and Martinez 2003).

In 2003, Mark conducted the first short survey on the distribution of *Callicebus oenanthe* (Mark 2003). During a 2-mo period Mark visited 5 sites in the Alto Mayo valley. She observed *Callicebus oenanthe* at only 3 sites and heard their vocalization at another locality. Interviews with residents of native communities revealed the probable presence of *Callicebus oenanthe* at 7 other sites, on both sides of the Rio Mayo. Rowe and Martinez (2003) did not observe *Callicebus oenanthe* during their 4-d survey of the area. Interestingly, they heard titi monkeys near the confluence of the Rio Mayo and the Rio Huallaga (06°38.109'S, 76°22.574'W), *ca.* 80 km southeast of the Alto Mayo valley. Unfortunately, the species could not be determined, and the local guides gave contradicting information. Finally, 2 researchers conducted behavioral studies in the Alto Mayo Valley. DeLuycker (2006) studied the behavior of an isolated family of *Callicebus oenanthe* in a remnant of forest near the town of Moyobamba, while Aldrich (2006) conducted a vocalization-based survey at Tarangue, a private reserve 2 km north of Moyobamba. The reserve is owned by Ikamaperou, a French charity that operates here a sanctuary for *Lagothrix poeppigii* and *Ateles chamek*. Aldrich (2006) reported that ≥ 29 families of *Callicebus oenanthe* are living in and around the 74-ha reserve that is being connected by artificial corridors with surrounding remnants of forest to make contact between isolated populations possible. Ikamaperou was until the start of our project the only organization that works toward the conservation of *Callicebus oenanthe*.

The general impression of all recent authors is that *Callicebus oenanthe* is seriously threatened owing to massive deforestation of the region. Hunting for food or the pet trade is another serious threat. One of the main reasons for the absence of effective conservation measures is probably the lack of detailed information on the distribution and the densities of the species. Therefore we commenced an extensive study in May 2007, with the main goals of determining the distribution of *Callicebus oenanthe* and identifying conservation actions that should be initiated to protect a sustainable population of the species.

Methods

Study Site

The Alto Mayo valley is situated in the Department of San Martín in northern Perú. The valley is surrounded by the Cordillera Oriental to the southwest and the Cahuapanas to the northeast. The Alto Mayo valley covers an area of *ca.* 630,700 ha (DeLuycker 2006).

The Rio Mayo runs through the Alto Mayo valley from the high-altitude forest of the Bosque de Protección in the northwest to the town of Moyobamba in the southeast. We started our study in the area southwest of the Rio Mayo. As our goal was to determine the distribution of *Callicebus oenanthe*, we focussed on the possible borders of its range. Several authors had suggested that the upper limit for the species could be an altitude of 1000 m asl (DeLuycker 2006; Rowe and Martínez 2003). We therefore focussed a part of our study on the area between 900 and 1100 m asl. Once we thought we had found the northwestern limit of the range of *Callicebus oenanthe*, we continued in southeastern direction, until we found no further evidence of the species.

Survey

We conducted the survey between May and December 2007. Our team of researchers consisted of 3 persons. Bóveda-Penalba was assisted by Rodrigo and Guerra-Vásquez. Vermeer accompanied the team for 5 wk of the study.

Titi monkeys are discrete individuals that are difficult to find in the forest. However, in the morning, and occasionally at the end of the day, the individuals advertise their presence by very loud vocalizations that probably serve to define the boundaries of their territory. According to Aldrich (2006), vocalizations start around 0630 h, and can last on rare occasions until 0930 h. During our study, the titi monkeys indeed start around 0630 h, but continue to do so until it grows warm and the individuals look for shelter in the vegetation. Once at rest, they are extremely difficult to find. The individuals sometimes also vocalize at dusk when they travel to their sleeping tree. At that moment they seem to be very calm and easier to observe. The experiences with the activity rhythms of the subjects resulted in 2 daily study periods, one at dawn and the other at dusk.

To determine the presence of *Callicebus oenanthe*, we applied 3 different methods: interviews with locals, listening to the vocalizations, and direct visual observations. Once we arrived at the study area, and heard titi monkeys, we tried to approach them to make visual contact. If possible, we filmed and photographed the individuals to compare specimens of different localities easier. We also recorded the vocalizations of as many groups as possible because we intend to analyze at a later stage the differences in vocalizations between different groups and (sub-)species. At each locality where local people were present, we conducted interviews. We used a series of pictures of 15 primate species that occur in Perú. We asked the interviewee to name all primates that he recognized, to determine his knowledge of the primates that lived in the region and to see if he recognized *Callicebus oenanthe*. We also asked them to listen to a recording of the vocalization of *Callicebus oenanthe*, to see

Table 1 Results of the study – observations of *Callicebus*

Locality ^a	Species	Interview	Vocalization	Observation	No. individuals (no. groups)	Altitude	Coordinates
Venceremos	None	–	–	–	0	1782	5°39'32S–77°44'41W
Aguas Verdes	None	–	–	–	0	1149	5°41'03S–77°37'56W
Alto Mayo	None	–	–	–	0	879	5°41'17S–77°27'51W
Pioneros Bajo	None	–	–	–	0	1065	5°42'22S–77°30'41W
Aguas Claras	None	–	–	–	0	997	5°43'26S–77°33'35W
Bejo Tumbaro	None	–	–	–	0	859	5°44'57S–77°22'50W
Tres de Mayo	<i>oenanthe</i>	+	–	–	0	970	5°44'57S–77°29'02W
San Francisco	<i>oenanthe</i>	+	+	–	0	821	5°47'11S–77°18'13W
Alto Tumbaro	None	–	–	–	0	900	5°47'17S–77°27'52W
Oriente Nuevo	None	–	–	–	0	1191	5°48'21S–77°31'02W
Ponazapa	<i>oenanthe</i>	+	–	+	1(1)	820	5°49'55S–77°14'57W
San Miguel	None	–	–	–	0	923	5°50'00S–77°23'24W
El Inca	<i>oenanthe</i>	+	–	–	0	916	5°50'19S–77°07'15W
Betania	<i>oenanthe</i>	+	+	+	4(1)	832	5°50'51S–77°19'01W
San Carlos	None	–	–	–	0	1059	5°51'55S–77°25'56W
Valle de la Conquista	<i>oenanthe</i>	+	–	–	0	829	5°53'51S–77°09'57W
Tingana	None	–	–	–	0	829	5°54'58S–77°06'56W
Atumplaya	<i>oenanthe</i>	+	+	–	0	823	5°56'23S–77°19'17W
Yantaló	<i>oenanthe</i>	+	+	+	3(1)	806	5°56'59S–77°01'53W
El Eden	<i>oenanthe</i>	+	–	–	0	750	5°56'21S–77°06'47W
Florida	None	–	–	–	0	1006	5°57'15S–77°20'29W
Valle Grande	<i>oenanthe</i>	+	–	+	3(1)	823	5°58'02S–77°14'25W
Moyobamba	<i>oenanthe</i>	+	–	–	0	839	6°01'35S–76°59'28W

Calzada	<i>oenanthe</i>	+	+	-	0	859	6°02'01S-77°03'21W
Pabloyacu	<i>oenanthe</i>	+	+	+	2 (1)	895	6°03'32S-76°56'30W
Wakanki	<i>oenanthe</i>	+	+	+	1 (1)	1053	6°04'44S-76°58'42W
Cascayunca	<i>oenanthe</i>	+	+	+	1 (1)	844	6°05'11S-77°14'42W
La Libertad	<i>oenanthe</i>	+	+	-	0	859	6°06'01S-76°49'58W
Los Claveles	<i>oenanthe</i>	+	+	+	3 (1)	904	6°07'40S-77°03'59W
Ramirez	<i>oenanthe</i>	+	-	-	0	986	6°10'17S-76°50'31W
San Luis	<i>oenanthe</i>	+	-	-	0	899	6°12'14S-76°43'14W
La Huarpia	<i>oenanthe</i>	+	-	-	0	1127	6°13'34S-76°49'52W
Nuevo Horizonte	<i>oenanthe</i>	+	+	-	0	974	6°14'39S-77°06'31W
Lejía	<i>oenanthe</i>	+	-	-	0	1129	6°16'01S-76°43'31W
La Florida	<i>oenanthe</i>	+	-	-	0	1043	6°16'23S-76°44'48W
Almendrillo	<i>oenanthe</i>	+	-	-	0	858	6°17'40S-76°41'36W
Manchingao	<i>oenanthe</i>	+	-	-	0	791	6°19'48S-76°40'10W
Roque	None	-	-	-	0	1178	6°19'50S-76°46'40W
Chumuzapa	<i>oenanthe</i>	+	-	-	0	479	6°21'20S-76°37'22W
Pinto Recodo	<i>oenanthe</i>	+	-	-	0	287	6°22'55S-76°35'42W
San Antonio Cumbaza	<i>oenanthe</i>	+	-	-	0	885	6°24'18S-76°24'05W
Lamas	None	-	-	-	0	592	6°24'54S-76°29'57W
Cacatachi	None	-	-	-	0	543	6°26'21S-76°27'27W
Rumizapa	None	-	-	-	0	313	6°27'01S-76°28'18W
San Miguel	<i>oenanthe</i>	+	-	-	0	372	6°27'46S-76°35'20W
Tununtunumba	None	-	-	-	0	207	6°32'55S-76°05'56W
San Fernando - Las Flores	None	-	-	-	0	265	6°33'39S-76°20'41W
Chazuta	None	-	-	-	0	195	6°34'36S-76°08'21W
Shapaja	<i>oenanthe</i>	+	+	-	0	225	6°35'00S-76°16'52W
San Fernando	<i>oenanthe</i>	+	+	+	4 (1)	342	6°36'10S-76°27'29W

Table 1 (continued)

Locality ^a	Species	Interview	Vocalization	Observation	No. individuals (no. groups)	Altitude	Coordinates
Chumio	<i>oenanthe</i>	+	-	-	0	216	6°37'03S-76°12'07W
Celendin	<i>oenanthe</i>	+	-	-	0	789	6°37'28S-76°33'38W
Mamonaquihua	<i>oenanthe</i>	+	-	-	0	216	6°37'59S-76°21'01W
Mamonaquihua	<i>spec.nov.</i>	+	-	-	0	216	6°37'59S-76°21'01W
Yacuatina	<i>oenanthe</i>	+	-	+	1 (1)	331	6°42'26S-76°18'12W
Puerto Sauce	<i>oenanthe</i>	+	+	-	0	216	6°42'09S-76°16'52W
Nuevo Trujillo	<i>spec.nov.</i>	+	+	-	0	287	6°43'38S-76°22'42W
Nuevo Trujillo	<i>oenanthe</i>	+	+	+	7 (3)	287	6°43'38S-76°22'42W
Sedasisa	<i>oenanthe</i>	+	+	+	5 (3)	436	6°48'13S-76°27'52W
Yacusisa	<i>spec.nov.</i>	+	+	+	1 (1)	396	6°48'16S-76°48'06W
Yacusisa	<i>spec.nov.</i>	+	-	+	5 (2)	370	6°48'30S-76°48'19W
Yacusisa	<i>spec.nov.</i>	+	-	+	6 (3)	373	6°49'28S-76°47'13W
Huingoyacu	<i>oenanthe</i>	+	+	+	4 (2) ^b	447	6°50'52S-76°39'08W
La Esperanza	<i>oenanthe</i>	+	-	-	0	286	6°54'26S-76°21'12W
Picota	<i>oenanthe</i>	+	-	-	0	340	6°54'29S-76°20'39W
Peruaté	<i>oenanthe</i>	+	-	+	6 (2)	295	6°55'02S-76°34'43W
El Dorado	<i>spec.nov.</i>	+	+	+	1 (1) ^b	701	6°55'13S-76°52'24W
Saposa	<i>oenanthe</i>	+	+	-	0	352	6°55'45S-76°47'46W
Caspizapa	<i>oenanthe</i>	+	+	+	9 (4)	254	6°56'56S-76°26'03W
Quimillal-Peruaté	<i>spec.nov.</i>	-	+	+	2 (1)	305	6°57'41S-76°34'05W
Quimillal-Peruaté	<i>oenanthe</i>	+	+	+	1 (1)	305	6°57'41S-76°34'05W
Quimillal-Peruaté	<i>spec.nov.</i>	-	+	+	4 (1)	317	6°58'16S-76°33'40W
Quimillal	<i>spec.nov.</i>	-	-	+	8 (2)	321	7°00'08S-76°34'35W

Mishquiayacu	<i>oenanthe</i>	?	-	+	4 (1)	395	7°00'40S–76°36'17W
La Libertad	<i>oenanthe</i>	+	+	+	6 (2)	236	7°00'49S–76°29'49W
Santa Rosa	<i>oenanthe</i>	+	+	+	1 (1)	447	7°02'09S–76°39'50W
Santa Rosa	<i>spec.nov.</i>	+	+	+	1 (1)	447	7°02'09S–76°39'50W
El Porvenir	<i>oenanthe</i>	+	+	+	4 (1)	263	7°02'41S–76°34'12W
El Porvenir	<i>spec.nov.</i>	+	+	+	4 (1)	263	7°02'41S–76°34'12W
El Porvenir	<i>oenanthe</i>	+	+	+	3 (1)	252	7°02'41S–76°33'56W
Intiyacu	<i>oenanthe</i>	+	+	+	3 (1)	298	7°02'58S–76°37'38W
Intiyacu	<i>spec.nov.</i>	+	+	+	1 (1)	298	7°02'58S–76°37'38W
Sacanche	<i>oenanthe</i>	+	+	-	0	266	7°04'39S–76°41'31W
Sacanche	<i>spec.nov.</i>	+	+	-	0	266	7°04'39S–76°41'31W
Tingo Saposoa	<i>oenanthe</i>	+	+	+	11 (5) ^b	350	7°05'56S–76°40'35W
Tingo Saposoa	<i>spec.nov.</i>	+	+	+	11 (5) ^b	350	7°05'56S–76°40'35W
Tingo Saposoa	<i>spec.nov.</i>	+	+	+	8 (4)	343	7°06'00S–76°40'33W
Tingo Saposoa	<i>spec.nov.</i>	+	+	+	3 (1)	343	7°06'00S–76°40'33W
Tingo Saposoa	<i>oenanthe</i>	+	-	+	2 (1) ^b	347	7°06'09S–76°40'45W
Tingo Saposoa	<i>spec.nov.</i>	+	-	+	2 (1) ^b	347	7°06'09S–76°40'45W
Miraflores	<i>spec.nov.</i>	+	+	+	3 (1) ^b	492	7°07'03S–76°46'22W
Miraflores	<i>spec.nov.</i>	+	+	-	0	630	7°07'05S–76°46'57W
Cunchuillo	<i>spec.nov.</i>	+	+	-	0	402	7°14'21S–76°47'06W
Atahualpa	<i>spec.nov.</i>	+	-	+	3 (1) ^b	480	7°18'40S–76°49'19W
Atahualpa	<i>spec.nov.</i>	+	+	-	0	303	7°18'43S–76°49'35W
El Triunfo	None	-	-	-	0	330	7°23'52S–76°40'51W
Tununtunumba ^a	<i>cf. cupreus</i>	+	-	-	0	207	6°32'55S–76°05'56W
Shapaja ^c	<i>cf. cupreus</i>	+	+	+	7 (?) ^b	225	6°35'00S–76°16'52W
Sauce ^c	<i>cf. cupreus</i>	+	-	-	0	674	6°43'40S–76°14'45W
El Paraiso ^c	<i>cf. cupreus</i>	+	-	-	0	676	6°50'28S–76°08'48W

Table 1 (continued)

Locality ^a	Species	Interview	Vocalization	Observation	No. individuals (no. groups)	Altitude	Coordinates
Shamboyacú ^c	<i>cf. cupreus</i>	+	-	-	0	309	7°00'27S-76°10'15W
Pacasmayo ^c	<i>cf. cupreus</i>	+	+	+	1 (1) ^b	251	7°05'55S-76°32'29W
Ledoy ^c	<i>cf. cupreus</i>	+	+	-	0	319	7°08'27S-76°37'21W
La Perla ^c	<i>cf. cupreus</i>	+	-	-	0	310	7°12'16S-76°17'47W
Hangasiyacú ^c	<i>cf. cupreus</i>	+	+	-	0	341	7°13'07S-76°40'23W
Campanilla ^c	<i>cf. cupreus</i>	+	+	-	0	313	7°26'08S-76°40'35W
96 localities	<i>C. oenanthe</i>	53		19	67 (27)		
	<i>C. cf. cupreus</i>	10		0	0		
	<i>C. spec. nov.</i>	18		8	35 (15)		
	<i>Callicebus</i> sp.	-		10	37 (12)		
	Total	74	40	35	139 (54)		

^a Name of nearest village^b Individuals difficult to identify^c Species reported or observed on eastern side of Rio Huallaga

if they recognized the sounds. After the interview we judged together the reliability of the information supplied. Independently of the results of the interviews, we visited localities where no titi monkeys were observed several times to confirm their absence or presence.

Because our main goal was to determine the distribution of *Callicebus oenanthe*, we conducted no detailed research on the densities and behavior of the species. However, we recorded some basic information on group size, habitat, and behavior during encounters with titi monkeys.

Results

Distribution

The results of the study are summarized in Table I. We surveyed a total of 96 localities, some of them more than once. At 74 of the localities we obtained from local people a reliable report of the presence of a *Callicebus* sp. We never observed titi monkeys at a locality where local people had reported their absence. At 40 localities we heard ≥ 1 groups vocalizing. Once we detected a group of titi monkeys, we tried to approach them to make better observations. However, most titi monkeys were extremely afraid of human presence, and they often disappeared after sighting us. We succeeded in observing the monkeys at 35 localities. At some localities we observed >1 group, and at some localities we performed multiple observations to identify the observed individuals.

Our survey showed that the distribution of *Callicebus oenanthe* is much larger than other authors suggested (Aldrich 2006; DeLuycker 2006; Rowe and Martinez 2003). The species is not restricted to the Alto Mayo valley, but occurs much further to the south, as far as the Rio Saposoa. The most southern locality where we observed with certainty *Callicebus oenanthe* is near Intiyacu ($7^{\circ}02'58''\text{S}$ – $76^{\circ}37'38''\text{E}$), while it was also reported to live at Tingo de Saposoa ($7^{\circ}06'00''\text{S}$ – $76^{\circ}40'33''\text{E}$). We discovered that in the region just north of the Rio Huayabamba *Callicebus oenanthe* is replaced by another, as yet undescribed species of *Callicebus*, which is lacking the white face-mask and has more orange-reddish underparts (Vermeer *et al.* in prep.). There is an area where both species live in sympatry, as we observed both species at several localities between $6^{\circ}48'06''\text{S}$ and $7^{\circ}06'09''\text{S}$. At 2 localities we observed both species sharing the same habitat. However, the individuals of the different species were living separately in different groups.

It was difficult to observe titi monkeys between Moyobamba and Tarapoto (Fig. 1), probably because of the massive deforestation in this area and the high rates of human disturbance. We nevertheless confirmed the presence of *Callicebus oenanthe* by hearing vocalizations at Nuevo Horizonte ($6^{\circ}14'39''\text{S}$ – $77^{\circ}06'31''\text{W}$), reliable interviews, and the encounter of a captive individual at Nueva Esperanza ($06^{\circ}19'11''\text{S}$ – $76^{\circ}40'29''\text{W}$).

We encountered *Callicebus oenanthe* only once at an altitude >1000 m asl, but the individuals were probably forced to live at the higher altitude owing to the deforestation at the lower level. Locals reported that *Callicebus* does not occur in the mountains, but only in the lowlands.

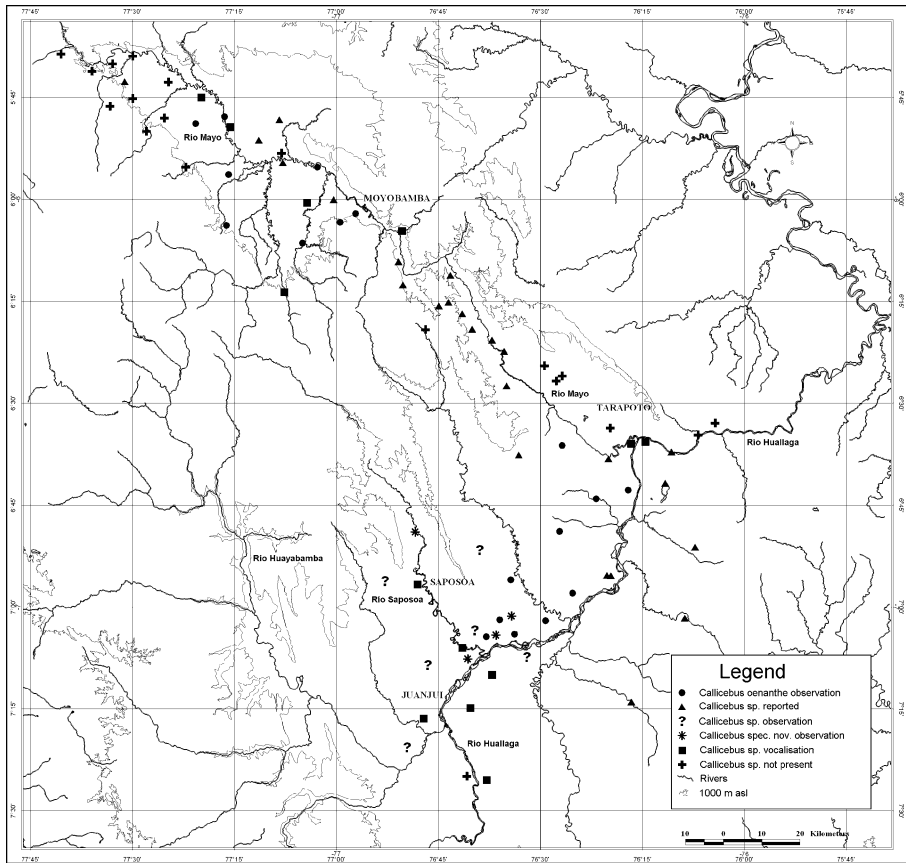


Fig. 1 Distribution of *Callicebus* in San Martín

We observed individuals of a *Callicebus* sp. with red underparts on the eastern side of the Rio Huallaga. As the individuals were at a considerable distance, it was not possible to see them in detail. Several authors reported that *Callicebus cupreus* occurs here (Groves 2001; Hershkovitz 1990; Van Roosmalen *et al.* 2002). We encountered at Juanjui a captive individual that was reported to come from Pajarillo ($7^{\circ}13'07\text{S}$ – $76^{\circ}40'23\text{W}$), on the eastern side of the Rio Huallaga. The individual was without any doubt a *Callicebus cupreus* (resembling the morph originally known as *discolor*, but with little white on the eyebrows). We have only 1 report of the presence of *Callicebus oenanthe* on the same side, and in the absence of more detailed observations we consider at this stage the Rio Huallaga as a possible geographic boundary for both *Callicebus oenanthe* and *C. cupreus*. Additional observations on the eastern site of the Rio Huallaga are needed to determine the taxonomic status of the titi monkeys in that region.

We detected no audible differences in vocalizations of different populations of *Callicebus oenanthe* and of different species.

As we know now that the species can occur at some distance from the Rio Mayo and almost entirely at the foot of the Andes, we propose to replace the earlier

vernacular names of Rio Mayo titi monkey and Andean titi monkey by the San Martin titi monkey. To our knowledge, *Callicebus oenanthe* is endemic to the San Martin Department of Peru. The species is locally known as the mono Tocón.

Quality of Data

The information collected through interviews was very variable. The main problem was that most people were not used to interpreting pictures. They often had difficulty differentiating between species, especially between *Callicebus* and *Aotus* and between different species of *Callicebus*. In many cases, they confirmed the presence of *Callicebus* when we let them hear a recording of the vocalization. Fortunately, in almost every village there was a hunter or someone else with good knowledge of the individuals living around the village. Only reliable data from interviews is included in Table I. It is interesting that in the area of sympatry, the local people were very well aware of the existence of 2 different species. One reported specifically that the 2 morphs were never found together in the same group, and we also never observed this.

Identification of the species in the region where both species (*Callicebus oenanthe* and *Callicebus* spec. nov.) occurred was at times problematic. The amount of sunlight and the direction from which the light was falling on the individuals sometimes made it difficult to determine the coloration. We could not always even determine if the individual had a white mask or not. Whenever possible, we made video images and photographs of the individuals, to verify afterwards our observations in the field. As indicated in Table I, we had doubts about the identification of the species at 3 localities. At 2 of these, local people reported the presence of both species.

Habitat

The climate of San Martin department is influenced by the Rio Mayo and the Rio Huallaga and the differences in altitude (from 80 to 3800 m asl.). Through these geographical features, there is a large variety of climates, with some very dry and hot regions on the lower regions and humid and cold zones in the mountains. *Callicebus oenanthe* does not seem to be bound to a specific habitat, as we encountered the species in inundated areas with aguajales (*Mauritia flexuosa*) and renacales (*Ficus trigona*), but also drier zones with ojés (*Ficus anthelmintica*), tangaranas (*Triplaris* sp.), zapotes (*Ponteria mimoso*), and ceticos (*Cecropia* sp.).

The habitat is extremely fragmented as a result of human activities. Most forest has been transformed into farmland for the cultivation of crops like rice, coffee, banana, papaya, yucca, and corn. We observed all titi monkeys in fragments, which were often very small and close to human settlements. *Callicebus oenanthe* may have a preference for forest close to rivers or (seasonally) inundated forest (Mark 2003), but we did not confirm this. We encountered titi monkeys in all types of forest, sometimes at large distances from rivers. It should be noted that because of the fragmentation of the forest, titi monkeys rarely had the possibility to move to other types of forest.

Other Primates

We also collected information on the other species of primates that could live in the region. The only other species that we often encountered was the saddleback tamarin (*Saguinus fuscicollis*), probably the subspecies *leucogenys*, although the reddish arms of the individuals that we observed do not completely match the description of the subspecies. Local people reported the presence of the species in 96% of our interviews and at every locality where they also reported the presence of titi monkeys. The tamarins seem to be more common than the titi monkeys. *Saguinus fuscicollis* was the only species of primate that we observed together with *Callicebus* individuals; in 31% of our observations of titi monkeys we observed a group of tamarins in their company. Many people had knowledge of *Cebus albifrons*, but we never encountered the species, which indicates how rare the species is becoming in this region. The reserve of Tingana (5°54'58S, 77°06'56W) is relatively well preserved and has a population *Cebus apella* and *Saimiri sciureus*, but well-informed locals reported that *Callicebus oenanthe* do not occur here. Some people reported the presence of *Aotus* in the study area. We did not see a specimen during this visit, but in 2006 Vermeer observed 2 rescued individuals at the sanctuary of Ikamaperou, which were assumed to come from the region of Moyobamba. These individuals had a grayish back without the brownish tint that researchers have described for *Aotus miconax*, the species that is assumed to live in this region (Groves 2001).

Discussion

The most important result of our study is that the distribution of *Callicebus oenanthe* is much larger than reported by other authors. The species occurs not only in the Alto Mayo valley, but also in the lower Rio Mayo valley (Bajo Mayo) and even much further south (Huallaga Central). We have strong evidence that the northwestern border of its distribution is east of Naranjillo. There is no evidence that titi monkeys occur east of this village, and none of the people interviewed in that area seems to know the species. It is also very possible that the species does not occur at higher altitudes. We observed the species only once in a forest fragment *ca.* 1000 m asl, but all forest below that altitude had been chopped down. It is possible that the range of the species is restricted outside the areas where the clouds of the surrounding mountains cause a very humid and cold climate, especially in the morning.

The second important result is the discovery of a new species of *Callicebus* in southern San Martín. The species is probably related to *Callicebus Oenanthe* because it shares some features of its coloration. However, it is clearly different, and both species even live in sympatry. No mixed groups have been observed, and local people also report that the species live in separate groups. A full description of the new species is in preparation (Vermeer *et al.* in prep.).

The southern boundary of both species is still unknown, but both our observations and reports from local people indicate that there are no titi monkeys south of the Rio Huayabamba. Further observations are needed to determine if the Rio Huallaga is the southeastern boundary of both species, as there is a report of the presence of *Callicebus oenanthe* on the eastern side of the river.

Several authors have observed some differences in coloration of *Callicebus oenanthe* (Aldrich 2006; DeLuycker 2006; Mark 2003). In the Alto Mayo valley, individuals north of the Rio Mayo are supposed to be darker than those south of the Rio Mayo. We surveyed only south of the Rio Mayo, and did not detect any geographical differences in the coloration of *Callicebus oenanthe*. There is some individual difference in individuals of the same population, but we wish to emphasize the effect of light-fall on the coloration of *Callicebus oenanthe*. Coloration of individuals can appear to change enormously when they move from a dark spot to a sunny part of the tree, or when they jump into another tree with different foliage. Other researchers studying Bolivian titi monkeys observed the same difficulties (Martinez and Wallace 2007). Most groups encountered were observed by ≥ 2 persons and were photographed and filmed, making the identification of the species highly reliable.

The fact that the range of *Callicebus oenanthe* is much larger than expected does not mean that there is less need for conservation measures. The entire distribution area is heavily deforested, and in most areas only small fragments of secondary forest remain. All groups encountered live in small highly degraded remnants of forest, isolated from other populations. The species is being hunted for its meat, and we have encountered several titi monkeys kept as pets, one of which was transferred to Huachipa Zoo in Lima, which has offered to house this rare species. Local people donated 1 skull and a mounted specimen to us, which we deposited at the natural history museum of Lima for use by other researchers. *Callicebus oenanthe* is currently listed as Vulnerable on the IUCN Red List of Threatened Species. The results of our study indicate that its status should be upgraded to at least Endangered.

The range of the newly discovered species is very restricted, possibly only 270,000 ha, and all forest has been cut in this region. There are only some small fragments of secondary forest, and we can assume that the species is Endangered or even Critically Endangered.

The study will continue its surveys on the northern side of the Rio Mayo. We already confirmed earlier reports (DeLuycker 2006; Mark 2003) that *Callicebus oenanthe* can be found here, but its exact distribution is unknown. We will also need to determine if all individuals on the northern site are different in color, as Mark (2003) suggested, and if they could represent a different subspecies.

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