**First record of the Peruvian yellow-tailed woolly monkey *Lagothrix flavicauda* in the Región Junín, Peru**

Sean M. McHugh, Fanny M. Cornejo, Jasmina McKibben, Melissa Zarate, Carlos Tello, Carlos F. Jiménez and Christopher A. Schmitt

Supplementary material 1 Other primates observed in the forests around San Antonio.

In addition to Lagothrix *flavicauda*, we observed the black-faced black spider monkey *Ateles chamek*, the Marañón white-fronted capuchin *Cebus yuracus*, the large-headed capuchin *Sapajus macrocephalus* and an unknown uakari species (resembling *Cacajao calvus*, which we only observed once (Supplementary Table 1, Supplementary Fig. 1). All species were observed between 1,437 and 1,746 m, with an average elevation of 1,622 m between all troops detected. It would be advantageous to conduct additional surveys in this area across different seasons, to further study primate seasonal habitat usage and abundances in comparison to our initial observations between September and December. The two individuals of *C. calvus* were initially seen foraging alongside a group of *C. yuracus* on a high ridge. When the troops became aware of our presence each troop fled in the opposite direction from each other. The *C. yuracus* troop went down slope towards a tributary of the Pampa Hermosa River and the troop of *C. calvus* fled upslope. Based on the tree movement upon fleeing, we recognised that there were more individuals of *C. calvus* than we could accurately count. Due to the docked tail, thick reddish-blond pelage, and baldhead it was easy to distinguish the *C. calvus* from *C. yuracus.* *C. calvus* has never been documented in the montane forests of Junín, but has been recorded in San Martín at roughly 1,400 m (Vermeer et al., 2013), creating additional research questions regarding its presence in this area.

Although the presence of yellow-tailed woolly monkeys in the forests surrounding San Antonio is certainly the most surprising aspect of this survey, our observations suggest that further studies of the larger primate community are warranted. The discovery of *C. calvus* is intriguing, as this species is typically associated with lowland rainforest (Bowler et al., 2009), but has been recorded as high as 1,421 m in the montane forests of northern Peru (Vermeer et al. 2013). It is crucial to document this relatively unique uakari population through photographs and behavioural observations to compare it to lowland populations. Collection of fecal samples can allow for comparative genetics research between the montane population in Junín versus other more lowland Peruvian uakari species, which could yield interesting results. Given the geographic range and altitude of the site at San Antonio, it is possible that an Andean night monkey (*Aotus* sp.) could be present. Uncertainty still remains regarding the presence of grey woolly monkeys (*Lagothrix lagotricha tschudii*) in this region. Grey woolly monkeys have been observed in key habitats between our current observations and northern populations of *L. flavicauda*, such as the Yanachaga Chemillen National Park (Luna Celino, 2014) and the Pampa Hermosa National Sanctuary (Cervantes-Zeballos, personal communication), and Aquino et al. (2019) recently expanded their range into areas that might clearly overlap with southern populations of *L. flavicauda*. More surveys in the area could help clarify the biogeography and potential range overlap and competitive exclusion of *L. flavicauda* with *L. l. tschudii*.

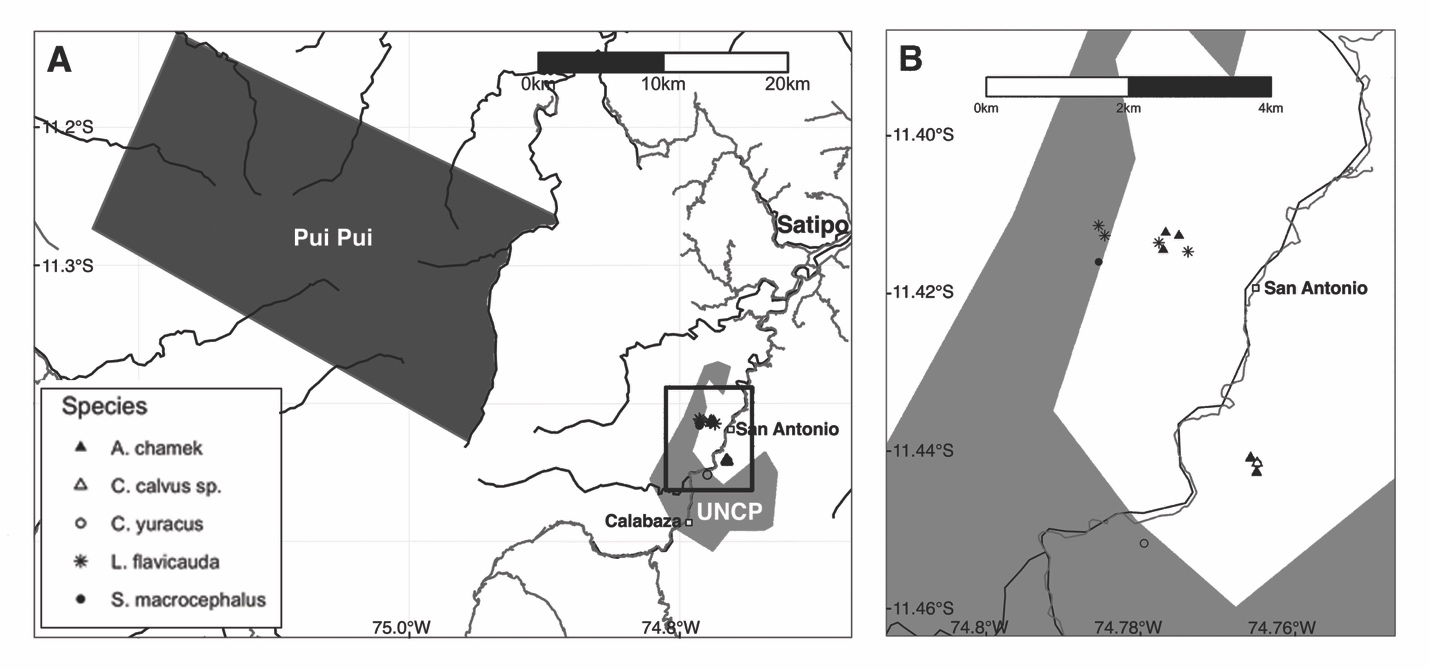
Supplementary Table 1 Troops of sympatric primates observed in the forests around San Antonio.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Elevation (m) | | Date | | | Time | | | Individuals | | Latitude | | Longitude | |
| *Ateles chamek* | 1450 |  | | 9/27/18 |  | | 08:06 | 1 | | -74.7750468 | | -11.4126455 | |  |
| *A. chamek* | 1460 |  | | 10/16/18 |  | | 09:08 | 5 | | -74.7767612 | | -11.412267 | |  |
| *A. chamek* | 1647 |  | | 10/11/18 |  | | 10:31 | 1 | | -74.765811 | | -11.4409269 | |  |
| *A. chamek* | 1651 |  | | 10/11/18 |  | | 10:35 | 12 | | -74.7657653 | | -11.4407641 | |  |
| *A. chamek* | 1717 |  | | 11/2/18 |  | | 10:54 | 4 | | -74.7649936 | | -11.4426174 | |  |
| *A. chamek* | 1739 |  | | 11/10/18 |  | | 10:45 | 1 | | -74.7649844 | | -11.4427712 | |  |
| *A. chamek* | 1604 |  | | 12/28/18 |  | | 11:51 | 4+ | | -74.7770822 | | -11.4144414 | |  |
| *Cacajao calvus* | 1668 |  | | 10/3/18 |  | | 12:18 | 2+ | | -74.7649212 | | -11.4415231 | |  |
| *Cebus yuracus* | 1548 |  | | 11/1/18 |  | | 10:11 | 3+ | | -74.7795633 | | -11.4517086 | |  |
| *C. yuracus* | 1669 |  | | 10/3/18 |  | | 12:20 | 2+ | | -74.7648937 | | -11.4415864 | |  |
| *Sapajus macrocephalus* | 1722 |  | | 12/28/18 |  | | 12:15 | 1 | | -74.7854568 | | -11.4159859 | |  |

Supplementary Table 2 Published records of *Lagothrix flavicauda* in the wild, with sources.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site | Region | Latitude | Longitude | Elevation | Citation |
| San Antonio | Junin | -11.4113691 | -74.7854612 | 1746 | This paper. |
| Playa Azul, BPAM | San Martin | -5.659611 | -77.676972 | 1545 | DeLuycker et al., 2007 |
| Gocta Waterfalls | Amazonas | -6.039306 | -77.888278 | 1800 | DeLuycker et al., 2007 |
| Tingo de Uchiza | San Martin | -8.479733 | -76.59025 | 1084 | Allgas et al., 2014 |
| Shunte | San Martin | -8.411306 | -76.718639 | 1560 | Shanee, 2011 |
| Ongon | La Libertad | -8.196761 | -77.094227 | 2400 | Parker & Barkley, 1981 |
| Bardeles Forest | Huanuco | -8.608222021 | -76.67684435 | 1485 | Aquino et al., 2015 |
| Yanajanca Forest | Huanuco | -8.608222021 | -76.67684435 | 1620 | Aquino et al., 2015 |
| Santa Rosa del Oso | Huanuco | -8.61307694 | -76.69548046 | 1705 | Aquino et al., 2016a |
| San Antonio de Padua | Huanuco | -8.61558932 | -76.50007745 | 1650 | Aquino et al., 2016a |
| Alto Azul | Huanuco | -8.925323389 | -76.3236612 | 1223 | Aquino et al., 2016a |
| Oso Mayo | Huanuco | -9.757773201 | -75.67887732 | 2079 | Aquino et al., 2016b |
| Palizada | Huanuco | -9.729971449 | -75.67895787 | 1705 | Aquino et al., 2016b |
| Hoja Grande | San Martin | -8.161667 | -76.873611 | 1833 | Aquino et al. 2017 |
| Shunte | San Martin | -8.441389 | -76.831667 | 1843 | Aquino et al. 2017 |
| Tingo de Uchiza | San Martin | -8.476944 | -76.581667 | 1061 | Aquino et al. 2017 |
| San Antonio | Huanuco | -8.615556 | -76.500278 | 1633 | Aquino et al. 2017 |
| Libertad | Huanuco | -9.738333 | -75.671389 | 1673 | Aquino et al. 2017 |
| Peroles | Amazonas | -5.665806 | -77.91 | 2140 | Shanee, 2011 |
| Berlin | Amazonas | -5.919083 | -78.4125 | 2500 | Shanee, 2011 |
| Comboca | Amazonas | -5.064 | -78.067833 | 2000 | Shanee, 2011 |
| Santo Tomas | Amazonas | -6.342972 | -77.519222 | 2650 | Shanee, 2011 |
| Guayacil | Amazonas | -5.669 | -78.265028 | 1840 | Shanee, 2011 |
| Hierba Buena | Amazonas | -5.795444 | -77.786861 | 2530 | Shanee, 2011 |
| San Geronimo | Amazonas | -5.993917 | -78.000417 | 2200 | Shanee, 2011 |
| Vilcaniza | Amazonas | -5.811028 | -77.873194 | 2420 | Shanee, 2011 |
| Arenal | Amazonas | -5.977861 | -77.732778 | 2440 | Shanee, 2011 |
| Shipasbamba | Amazonas | -5.909806 | -77.980639 | 2300 | Shanee, 2011 |
| Abra Patricia | Amazonas | -5.697861 | -77.810722 | 2100 | Shanee, 2011 |
| Copallin | Amazonas | -5.641667 | -78.251 | 2320 | Shanee, 2011 |
| Rio Blanco | Amazonas | -5.575667 | -77.9 | 1830 | Shanee, 2011 |
| El Toro | Amazonas | -5.637139 | -77.908917 | 2110 | Shanee, 2011 |
| Agua Dulce | Amazonas | -5.66525 | -77.902111 | 2270 | Shanee, 2011 |
| El Gato | Amazonas | -5.690861 | -77.900028 | 2230 | Shanee, 2011 |
| La Esperanza | Amazonas | -5.689139 | -77.906194 | 2150 | Shanee, 2011 |
| San Isidro | Amazonas | -5.72825 | -77.912667 | 1830 | Shanee, 2011 |
| Wilca | Amazonas | -5.923917 | -77.741 | 2480 | Shanee, 2011 |
| Nuevo Bolivar/Alto Huyabamba | San Martin | -7.320639 | -77.460972 | 2400 | Shanee, 2011 |
| Colca | San Martin | -5.894694 | -77.387556 | 1800 | Shanee, 2011 |
| Vista Alegre | San Martin | -6.124583 | -77.289528 | 1610 | Shanee, 2011 |
| Paitoja | San Martin | -6.361667 | -77.081139 | 1790 | Shanee, 2011 |
| Nuevo Mendoza | San Martin | -6.451861 | -77.096194 | 1800 | Shanee, 2011 |
| Cueva/Alto Huyabamba | San Martin | -7.351528 | -77.454139 | 1500 | Shanee, 2011 |
| La Victoria | San Martin | -8.38075 | -76.751333 | 1650 | Shanee, 2011 |
| Chofersito | San Martin | -5.671806 | -77.764528 | 1950 | Shanee, 2011 |
| El Afluente | San Martin | -5.668 | -77.746528 | 1760 | Shanee, 2011 |
| Olleros | San Martin | -5.962083 | -77.593917 | 2610 | Shanee, 2011 |
| San Pedro de Chonta | Huanuco | -8.656389 | -76.874972 | 2450 | Shanee, 2011 |
| Ajenco | Huanuco | -8.651778 | -76.791111 | 2020 | Shanee, 2011 |
| Poroto | La Libertad | -8.11725 | -77.141167 | 1840 | Shanee, 2011 |
| Puerto de Monte | La Libertad | -8.141889 | -77.184722 | 2800 | Shanee, 2011 |
| La Grama | San Martin | -6.724917 | -77.672361 | NA | Shanee, 2011 |
| Metal | San Martin | -8.492083 | -76.62575 | NA | Shanee, 2011 |
| Uchiza | San Martin | -8.379806 | -76.848694 | NA | Shanee, 2011 |
| Laguna de los Condores | San Martin | -6.846806 | -77.614389 | NA | Shanee, 2011 |
| Bosque Javier Tello | Amazonas | -6.716556 | -77.658056 | NA | Shanee, 2011 |
| Leimebamba | Amazonas | -6.44075 | -77.405472 | NA | Shanee, 2011 |
| Corosha | Amazonas | -5.8309456 | -77.821897 | NA | Cornejo, pers. comm. |

Supplementary Figure 1 Locations where each species of primate was encountered, along with (A) Bosque de Protección Pui Pui in dark grey, and UNCP ACC in light grey, with rivers in black and roads in dark grey; and (B) close-up of primate sightings (species legend in lower left corner), with the Pampa Hermosa River and Road 24A.



**References**

Allgas, N., Shanee, S., Peralta, A. & Shanee, N. (2014) Yellow-tailed woolly monkey (*Oreonax flavicauda*: Humboldt 1812) altitudinal range extension, Uchiza, Perú. *Neotropical Primates*, 21(2), 206–209.

Aquino, R., Zárate, R., López, L., García, G. and Charpentier, E. (2015) Current status and threats to *Lagothrix flavicauda* and other primates in montane forest of the Región Huánuco. *Primate* *Conservation*, 29, 31–41.

Aquino, R., García, G. & Charpentier, E. (2016a) Distribution and current status of the Peruvian yellow-tailed woolly monkey (*Lagothrix flavicauda*) in montane forests of the Región Huánuco, Peru. *Primate Conservation*, 30, 31–37.

Aquino, R., Charpentier, E.,  García G. & López, L. (2016b) First Record of *Lagothrix flavicauda* on the Eastern Side of the Río Huallaga: An Expansion of Its Known Geographic Distribution. *Primate* *Conservation*, 30, 15–20.

Aquino, R., García, G., Charpentier, R., & López, L. (2017) Estado de conservación de *Lagothrix flavicauda* y otros primates en bosques montanos de San Martín y Huánuco, Perú. *Revista peruana de biología*, 24(1), 24–34.

Aquino, R., López, L., Falcón, R., Díaz, S., & Gálvez, H. (2019). First Inventory of Primates in the Montane Forests of the Pasco and Ucayali Regions, Peruvian Amazon. *Primate Conservation*, 33, 1–11.

Bowler, M., Murrieta, J., Recharte, M., Puertas P. & Bodmer, R. (2009) Peruvian Red Uakari Monkeys (Cacajao calvus ucayalii) in the Pacaya-Samiria National Reserve — A Range Extension Across a Major River Barrier. *Neotropical Primates*, 16(1), 34–38.

Boubli, J. P., Di Fiore, A., Rylands, A.B. & Wallace, A.B. (2008) “Lagothrix Cana (Peruvian Woolly Monkey).” The IUCN Red List of Threatened Species 2008,

DeLuycker, A. M. (2007) Notes on the yellow-tailed woolly monkey (*Oreonax flavicauda*) and its status in the Protected Forest of Alto Mayo, Northern Peru. *Primate Conservation*, 22, 41–47.

Luna Celino, D.V. (2014) Variación Mensual del uso del Territorio por el Mono Choro *Lagothrix Cana* en el Parque Nacional Yanachaga Chemillen, Peru. *Neotropical Primates*, 20(1), 44–49.

Parker, T.A. & Barkley, L.J. (1981) New locality for the yellow-tailed woolly monkey. *Oryx,* 16(1), 71–72.

Vermeer, J., Tello-Alvarado, J.C., Villacis Del Castillo, J.T. & Bóveda-Penalba, A.J. (2013) A New Population of Red Uakaris (Cacajao Calvus ssp.) in the Mountains of North-Eastern Peru. *Neotropical Primates*, 20(1), 12–17.

Shanee, S. (2011) Distribution survey and threat assessment of the yellow-tailed woolly monkey (*Oreonax flavicauda*; Humboldt, 1812), northeastern Peru. *International Journal of Primatology*, 32, 691–707.