Articles

TAXONOMIC NOTES ON *ATELES GEOFFROYI*

In their review on the current status of New World monkey classification at the species and subspecies level, Mittermeier and Coimbra-Filho (1981) discussed the taxonomic problems of each genus and pointed out weaknesses and the need for further research. They indicated that *Ateles geoffroyi* is one of the species in need of a major taxonomic revision, which in our opinion is becoming an important problem in terms of its conservation status. In this note, we comment this and other authors' (e.g., Konstant *et al.*, 1985; Mittermeier *et al.*, 1988) notes on the taxonomic status of *Ateles geoffroyi vellerosus, A. g. yucatanensis* and *A. g. pan*, and compare them to the observations we have made and recorded in study sites from three countries; Mexico, Belize, and Guatemala.

Mittermeier and Coimbra-Filho (1988) referred to *Ateles* as a "variable genus" and suggested that "...some rearrangement and perhaps reduction of the species and subspecies recognized by Kellogg and Goldman is probably necessary." Roosmalen and Klein (1988), referring to Hernández-Camacho and Cooper (1976), noted that "Differences between species and subspecies are based almost entirely upon the pelage characteristics. These are, to some extent, variable within populations and may intergrade between populations over large parts of their range...". However, considering the subspecies *vellerosus, yucatanensis,* and *pan*, to what extent are the pelage characteristics "variable" within populations, and how much may they "intergrade" between populations over large parts of the species' range? In our experience, the species' pelage characteristics are widely variable and therefore not sufficiently reliable to be considered as one of the major traits supporting subspecies' distinctions in the cases of *vellerosus, yucatanensis*, and *pan*. In other words, we believe the pelage characteristics of *Ateles geoffroyi* should not be regarded as the measure of distinctive taxonomic traits among the three subspecies. The following observations are summarized to support our statement.

A. geoffroyi vellerosus

In their assessment of *Ateles geoffroyi*'s current taxonomic situation, Konstant *et al.* (1985) described *A. g. vellerosus* as a subspecies in which "...dorsal surfaces...range from black to dark brown, except for a light band across the lumbar region, and contrast strongly with its lighter abdomen and inner limbs. Exposed flesh-colored skin is often present about the eyes." This description is compatible with the field observations of Gilberto Silva-López, Joaquín Jiménez-Huerta, María Rebeca Toledo-Cárdenas, and Jorge Benítez-Rodríguez on *A. g. vellerosus* at Sierra de Santa Marta, Veracruz, Mexico, except for the fact that these researchers also found several adult individuals in which: (a) the dorsal surfaces were not as dark, (b) the allegedly lighter band across the lumbar region was not very marked, and (c) the contrast between the color and tones of the dorsal surfaces and the inner limbs was not at all clear. Konstant *et al.* (1985.) also pointed out that the "...subspecies can apparently be distinguished from *A. b. belzebuth* and the darker variety of *A. belzebuth hybridus* by the absence or marked reduction of a white triangular forehead patch and sideburns", but observations at Santa Marta suggest that the white triangular forehead patch may be very common in *A. g. vellerosus*. Biologists J. Jiménez-Huerta and J. Benítez-Rodríguez (pers. comm.), for example, observed several individuals with this characteristic, and even came to the point of distinguishing one of the female dominated subgroups by the presence of "Blanca", an adult female with a large white triangular forehead patch, a trait which was shared with two of the infant females that were forming part of Blanca's subgroup.

These observations suggest that the *vellerosus* subspecies has a wide variety of pelage colors and tones which, according to *campesinos* of the Sierra, may vary between "muy negro a muy blanco" (very black to very white). Mexican researcher Alvar González Christen (pers. comm.) had the chance to observe the "dirty white" coloration of an adult spider monkey in the crater of the Santa Marta volcano, and Hall and Dalquest (1963, p.262) noted that "One man reported an albino spider monkey in the hills west of Jimbal (Veracruz)." Our team also observed a whitish *vellerosus* spider monkey while at the National Park of Tikal, Guatemala, with a darker distal third of the tail. Both A. González-Christen in Veracruz, and our team in Guatemala, found no evidence to conclude these monkeys were albinos, but merely individuals with a markedly whitish coloration.

A. geoffroyi yucatanensis

Konstant *et al.* (1985) described *A. g. yucatanensis* as "... brownish-black on its head, neck and shoulders, becoming lighter brown on the lower back and hips and contrasting with its silvery white underside, inner limbs and sideburns..." They also noted that the subspecies "...may be confused with lighter individuals of *A. geoffroyi vellerosus*." None of the papers by Elizabeth Watts and Victor Rico-Gray (e.g., Watts *et al.*, 1986; Watts and Rico-Gray, 1987), who studied spider monkeys in the Yucatan Peninsula, provide evidence

Cover photograph by Russell A. Mittermeier: *Alouatta pigra* from the Bermuda Landing, Belize.

on the subject and only note that "The taxonomic status of (*Ateles geoffroyi yucatanensis*) is controversial and little is known of (its) natural history and ecology". The general description of the subspecies by both Dr. Damián Rumiz and Gilberto Silva-López at the Río Bravo Conservation and Management Area of Belize (Fragoso *et al.*, 1990; Silva-López and Rumiz, 1995) is quite similar to that of William Konstant, Russell Mittermeier and Stephen Nash, but D. Rumiz and G. Silva-López also noted that "The pattern of color observed in the spider monkeys more closely resembled that of the Mexican subspecies (*A. g. vellerosus*) than the Yucatan subspecies (*A. g. yucatanensis*), contrary to what was previously reported for Belize (Kellogg and Goldman, 1944)", and continue "We might say there was certain inter-individual variation in the color, which made it difficult to assign individuals to a particular subspecies. In fact, some individuals showed patterns of color that are intermediate between the subspecies' descriptions and color representations made by Konstant *et al.* (1985)".

A. geoffroyi pan

The Guatemalan spider monkey, *Ateles geoffroyi pan,* was reported by Konstant *et al.* (1985) as "...very similar to the darker colored individuals of *A. geoffroyi vellerosus*", and described it as "...having a thick black coat, and is said to occur at high altitudes. It differs from *A. g. vellerosus* in that its dorsal coloration does not contrast as markedly with that of its ventral surface, and it does not possess a lighter-colored saddle on its lumbar region." However, the description of the subspecies, which is "...supposed to occur in the central mountains of Guatemala..." was based "...on only 3 animals of unknown geographic origin (Kellogg and Goldman, 1944)...", which encouraged Konstant and coworkers to conclude *pan* "...may not be a valid taxon."

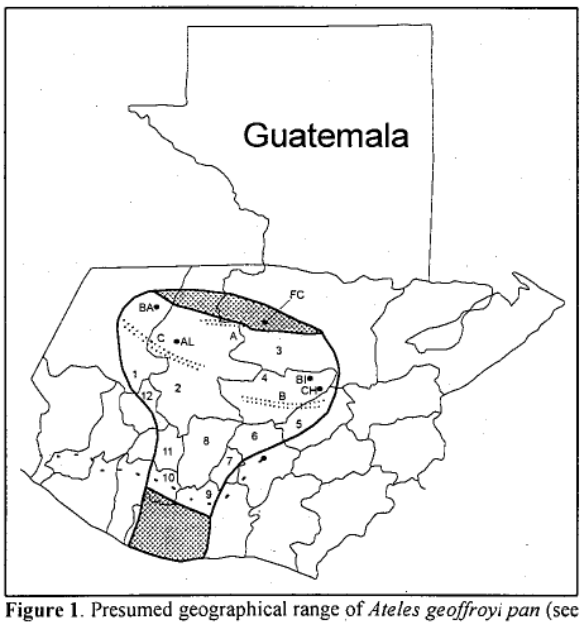

Figure 1. Presumed geographical range of *Ateles geoffroyi pan* (see Konstant *et al.*, 1985). The figure has been modified for this report (see text). Legend: BA: Barillas; AL: Aldea Juil; FC: Finca Chelemhá; BI: Biotopo Mario Dary Rivera; CH: Chilascó. The thick line delimits the geographical range proposed for *A. g. vellerosus*; diagonal lines indicate tropical forest, the dotted line is the Panamerican Highway, the dashed lines show the Sierras of Chamá (A), Chuacús (B), and Cuchumatanes (C). The numbers indicate the Departments within the range: 1. Huehuetenango, 2. Quiché. 3. Alta Verpaz, 4. Baja Verapaz, 5. El Progreso, 6. Guatemala, 7. Sacatepéquez, 8. Chimaltenango, 9. Escuintla, 10. Suchitepéquez, 11. Sololá, 12. Totonicapan.

Our study of the subspecies' geographical range, as proposed by Kellogg and Goldman (1944, in Konstant *et al.*, 1985), seems to support the remark by Konstant *et al.* regarding the validity of *pan* as a distinct subspecies. The area of reference appears in more detail in Figure 1. As can be seen, the area includes important portions of several Guatemalan departments. The main vegetation type in the area is coniferous forest, with *Pinus, Quercus,* and *Liquidambar* among the dominant genera. Some remnants of tropical forest can be found in the lowlands of Alta Verapaz and Quiché (including the locality of Barillas), to the north; near Chilascó and in the Biotopo Mario Dary Rivera, in the east; and in Escuintla and Retalhuleu, in the south. The latter, however, is a very disturbed area surrounding a segment of the Panamerican Highway, with extensive cultivation of maize, rice, banana, and beans.

Portions of three important sierras form part of the area, including: the Sierra de Chamá (in Alta Verapaz and Quiché), with elevations ranging from 300 to 1,500 m; the Sierra de Chuacús (in Baja Verapaz and Quiché), with elevations ranging from 600 to 2100 m; and the Sierra de los Cuchumatanes (in Huehuetenango and Quiché), with elevations between 1,500 and 2,700 m. Barillas is located on the northern slope of the Cuchumatanes, but *Alouatta palliata* is the only monkey species reported for the area. The same species was reported by Villar (1994) in the Biotopo Mario Dary Rivera, which is located in the highlands of the Sierra de Chuacús (a zone also known as the highlands of the interior). In Chilascó, another locality included in our records, the only species reported is *Alouatta pigra.* Chilascó forms part of the Sierra de las Minas. The literature and field reports we have indicate spider monkeys have not been recorded in this area.

Captive monkeys have also been studied. In 1990-1991, Johanna Motta carried out a detailed survey of captive spider monkeys in four Guatemalan zoos (three individuals from La Aurora Zoo, 11 individuals from The Jungle Zoo [IRTRA], nine individuals from the Minerva Zoo, and three individuals from the Petencito

Zoo), one safari park (Autosafari Chapin, 19 individuals), and two private collections (one individual from Finca Nacional Santo Tomás, and four individuals from the Finca Enrique Ponce), taking footprints, pictures, measuring and weighing every single individual, as well as obtaining blood samples of the monkeys and inquiring about their history. Her purpose was to conduct a chromosome study of the monkeys, supported by accurate records from the sampled individuals. Dr. Anne Baker, then of the Brookfield Zoo, Chicago, helped in the analyses of the blood samples in 1991, but unfortunately the results were not conclusive. However, the interviews, observations, and analyses of photographs of the 50 individuals led her to conclude that: (a) no single color pattern was dominant among the individuals studied, (b) the individual range of patterns of color and tone varied remarkably, from very dark-colored to very whitish-colored animals, and (c) the study provided insufficient evidence to conclude that *pan* and *yucatanensis*, if considered valid taxa, are among Guatemala's captive spider monkeys.

The spider monkeys at La Aurora Zoo, Guatemala City, provide an example of the wide spectrum of colors and tones in *Ateles geoffroyi*. We had the chance to observe La Aurora's spiders and are in agreement with the researcher Lorena Calvo (see Konstant *et al.*, 1985) that the subspecies kept at the zoo is *A. g. vellerosus*.

All these observations and records have led us to conclude that:

1. The coloration pattern of *A. g. vellerosus* includes a broader spectrum of color and tones than the previously considered;
2. *A. g. yucatanensis* may be considered a valid taxon, but only after more evidence (photographs, morphological studies, caryological studies, and field observations) can be obtained from several localities in the known geographical range of the subspecies;
3. based on the available evidence (maps, vegetation types, and existing records) and supporting the observations of Konstant *et al.* (1985) on the subject, we conclude that *A. g. pan* should not be considered a valid taxon.

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Sistemática de los Platirrinos: Una Perspectiva Filogenética

La clasificación taxonómica de los monos del Nuevo Mundo ha sufrido constantes reordenamientos desde el pasado siglo. Sin embargo, se arribó a un consenso más o menos generalizado al separarlos en 2 familias: Callitrichidae (*Callithrix*, *Cebuella*, *Leontopithecus*, *Saguinus*), y Cebidae, agrupando a todos los géneros restantes (Simpson, 1945; Cabrera, 1958; Simons, 1972); esto se transformó en la clasificación tradicional que en muchos casos continúa vigente, con el objetivo principal de distinguir a los "Callitrichidae", aquellos platirrinos de pequeño tamaño corporal, poseedores de garras en lugar de uñas planas, que han perdido el tercer molar y que dan a luz dos crías. No obstante, todos estos caracteres fueron observados como adquisiciones derivadas (Ford, 1980) en contraste con la hipótesis de que son caracteres primitivos retenidos desde los platirrinos ancestrales (Hershkovitz, 1977). Pero es obvio que la gran diversidad del Infraorden Platyrrhini va más allá de esta dicotomía familiar.

Rosenberger (1981) consideró que los Cebidae reúnen sólo a *Cebus* y *Saimiri* (Cebinae) con *Callithrix*, *Cebuella*, *Leontopithecus*, *Saguinus* y *Callimico* (Callitrichinae), mientras que los restantes se agrupan en la Familia Atelidae, subdividida en Atelinae (*Ateles*, *Lagothrix*, *Brachyteles* y *Alouatta*) y Pitheciinae (*Pithecia*, *Chiropotes*, *Cacajao*, y *Callicebus* y *Aotus* como taxones hermanos más distantes). El esquema de Ford (1986) difiere en la exclusión de *Callicebus* y *Aotus* fuera de los Pitheciinae, agrupándolos con *Cebus* y *Saimiri* en la Familia Cebidae, aunque sólo a los efectos de preservar el amplio uso de "Cebidae" y la contraposición histórica con Callitrichidae (*Callithrix*, *Cebuella*, *Leontopithecus*, *Saguinus* y *Callimico*, *sensu* Ford). No obstante, Ford aclara la escasa sustentación de su Familia "Cebidae", en especial la posición de *Cebus* en relación a los restantes platirrinos. Kay (1990) establece que *Aotus* representa el taxón hermano de los Atelinae (*Ateles*, *Brachyteles*, *Lagothrix* y *Alouatta*), en tanto *Saimiri* se relacionaría con los Callitrichinae; *Cebus* se considera aquí una forma más primitiva que divergió antiguamente de los restantes grupos.

De estos esquemas, podemos ver que existe consenso en algunos clados, pero la problemática se centra en los géneros *Aotus*, *Callicebus*, *Cebus* y *Saimiri*. Thorington y Anderson (1984), en respuesta a las diferentes hipótesis, reunieron a todos los platirrinos en la única Familia Cebidae, subdividida en subfamilias; aquí *Aotus*, *Callicebus*, *Cebus* y *Saimiri* son separados en las subfamilias monotípicas Aotinae, Callicebinae, Cebinae y Saimiriinae, respectivamente. Los restantes clados se conservan como fue señalado más arriba, a excepción de *Alouatta*, también separado en Alouattinae; pese a que comúnmente se lo agrupa con los Atelinae, aún no es clara la posición de *Alouatta*, puesto que conserva ciertos caracteres de la dentición cuya polaridad es dudosa.

Al parecer no existen sinapomorfías dentarias exclusivas de todos los platirrinos (Szalay y Delson, 1979; Kay, 1980; Rosenberger, 1981); por el contrario, hallamos la que posiblemente sea la única sinapomorfía craneal, consistente en el contacto entre parietal y yugal, evitando la conexión entre frontal y aliesfenoides, en la región ptérica (Ashley-Montague, 1933; Le Gros Clark, 1959; Rosenberger, 1977; Delson y Rosenberger, 1980; Ford, 1986). También existirían al menos tres caracteres postcraneales únicos para todos los platirrinos, a excepción de su posible presencia en ciertos especímenes del Oligoceno de Egipto (Ford, 1986). Es decir que en principio no poseemos suficiente información confiable para reunir a todos los platirrinos en un clado

Tabla 1. Clasificación de los Platyrrhini.

Familia Atelidae		
	Subfamilia Atelinae	
		Ateles
		Brachyteles
		Lagothrix
	Subfamilia Alouattinae	
		Alouatta
	Subfamilia Pitheciinae	
		Pithecia
		Chiropotes
		Cacajao
	Subfamilia Callitrichinae	
		Callithrix
		Cebuella
		Leontopithecus
		Saguinus
		Callimico
	Subfamilia Cebinae	
		Cebus
	Subfamilia Saimiriinae	
		Saimiri
	Subfamilia Aotinae	
		Aotus
	Subfamilia Callicebinae	
		Callicebus