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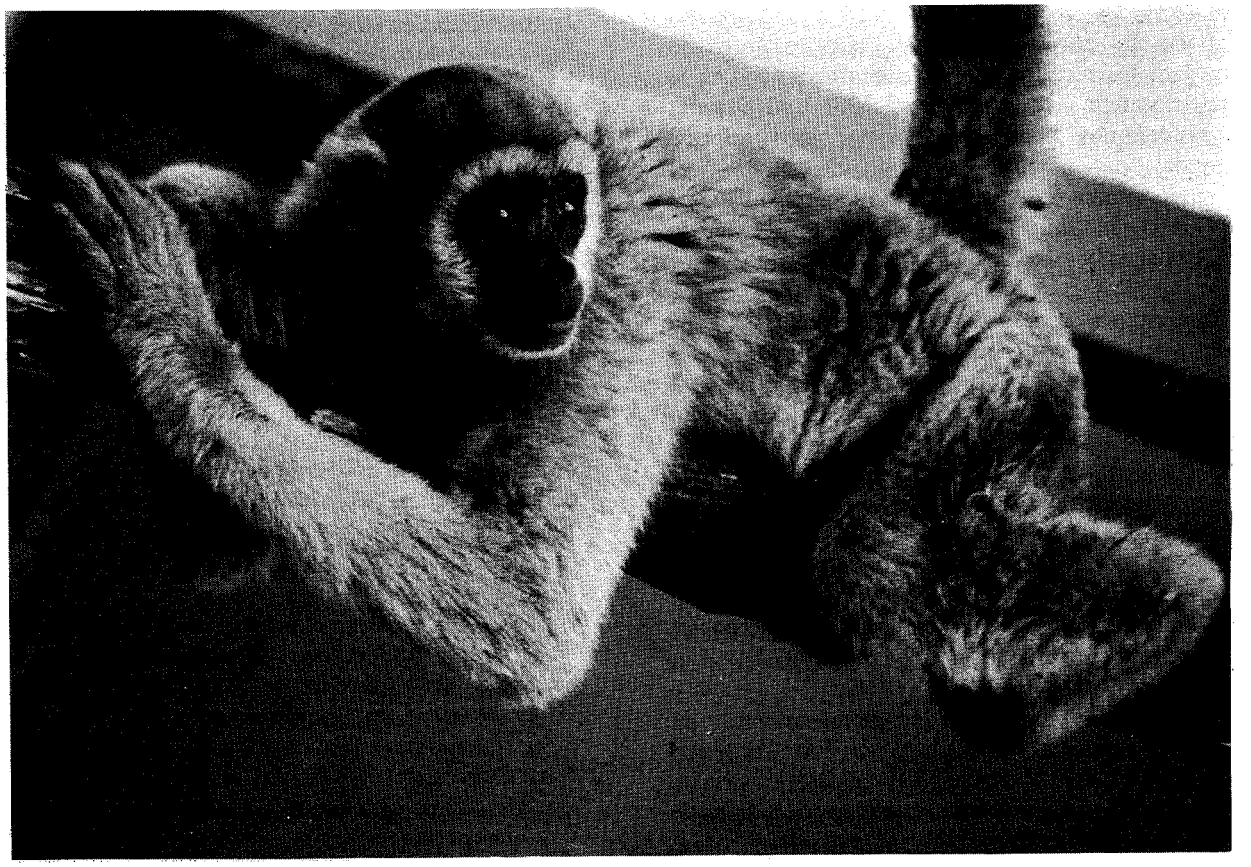

CONSERVATION INTERNATIONAL

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Articles

TRANSLOCACION Y SEGUIMIENTO DE UN GRUPO DE MONOS *ALOUATTA PALLIATA* LIBERADO EN UNA ISLA (1988-1994)

Introducción: Frente a la fragmentación del hábitat de las especies de primates se propone, como una medida conservacionista, la translocación de poblaciones de un área natural amenazada a otra donde los animales puedan ser preservados. Esta táctica conservacionista ha venido cobrando mayor importancia y un número creciente de instituciones se interesa por realizar reintroducciones de organismos, preferentemente cuando se trata de especies cuyo estado en la naturaleza es crítico (Rodríguez-Luna y Cortés-Ortiz, 1993). Sin embargo, es preciso advertir los riesgos inherentes al uso de esta táctica, y para ello, es necesario evaluar los resultados hasta ahora obtenidos en la translocación de animales. Por tal razón, consideramos oportuno presentar este informe donde, de manera sumaria, describimos el comportamiento de un grupo de monos aulladores (*Alouatta palliata*) liberados en una isla del lago de Catemaco (Los Tuxtlas), Veracruz, México.

En términos generales, la translocación ha sido definida como el movimiento de organismos silvestres (individuos o poblaciones) de un área a otra donde son liberados. Dependiendo del destino último de estos animales, podemos hablar de una "reintroducción", cuando se liberan dentro de lo que originalmente fue el rango de distribución natural de la especie, pero donde ya no existen individuos conespecíficos; o bien de una "introducción", cuando la liberación ocurre en un sitio ajeno a dicho rango (Konstant y Mittermeier, 1982; Mackinnon *et al.*, 1986; IUCN, 1987).

A pesar de tan sencillo planteamiento, un programa de este tipo requiere una serie de etapas de trabajo antes y después del manejo técnico de los animales, que son importantes para el éxito de la maniobra.

El objetivo general de nuestro programa fue evaluar las diversas técnicas empleadas en cada una de las fases de la translocación. Para tal fin se propusieron los siguientes objetivos particulares:

- Conducir estudios que permitieran la identificación de poblaciones candidatas para translocación.
- Capturar poblaciones con bajas expectativas de sobrevivencia.
- Analizar el comportamiento de grupos de monos translocados bajo condiciones de cautiverio.
- Realizar estudios clínicos con los monos de los grupos capturados.
- Integrar grupos de animales aptos para introducción y/o reintroducción.
- Seleccionar áreas apropriadas para introducción y/o reintroducción.
- Introducir y/o reintroducir poblaciones translocadas de monos.
- Analizar el uso del nuevo ámbito hogareño por los animales translocados.
- Estimar el impacto de las poblaciones translocadas en su nuevo ámbito hogareño.
- Desarrollar diversos estudios sobre las poblaciones transferidas.
- Diseñar un modelo básico para translocación de especies de mamíferos amenazadas de extinción.

Desarrollo del Programa: Este programa inició desde 1986, con un estudio demográfico de las poblaciones de monos aulladores existentes en algunos municipios del sur del Estado de Veracruz (Los Tuxtlas), para determinar la situación de estos primates en la fragmentada región boscosa que ahí se encuentra (Rodríguez-Luna *et al.*, 1987). Durante este estudio se identificaron varios grupos de monos que se encontraban en situación crítica debido a la gran perturbación a la que había sido sujeto su hábitat y al consecuente aislamiento de esas poblaciones.

En 1987 fue capturado el primer grupo de animales en el ejido Mirador Pilapa (Los Tuxtlas). En esa ocasión se capturaron seis individuos. Posteriormente, en el mismo año, se atraparon otros 18 animales en un rancho próximo al río San Juan Evangelista (Rodríguez-Luna *et al.*, 1993). De los animales capturados se tomaron datos morfométricos y muestras para análisis clínicos (biometría hemática, frotis de orificios naturales, análisis coproparasitoscópicos). En general, el estado de salud de los monos fue considerado malo, acusando síntomas de desnutrición y altas cargas parasitarias (Villanueva-Jiménez, 1988; Canales-Espinosa, 1992).

El proceso de captura fue mejorando con la experiencia (* existe información técnica en videotape). El equipo utilizado consistió en un rifle Cap-

chur que proyecta dardos de aluminio mediante los que se inyectó un tranquilizante (Clorhidrato de Ketamina). Alternativamente se utilizó una pistola de aire, de fabricación doméstica, que impulsa dardos elaborados a partir de jeringas desechables, conteniendo la misma droga. El fármaco permitió la inmovilización de los animales, quienes en la mayoría de los casos se sujetaban firmemente a las ramas con la cola. En algunas ocasiones fue necesario subir a los árboles por ellos, en otras, caían y eran detenidos con una lona antes de tocar el suelo. La utilización del fármaco fue satisfactoria y el manejo de los animales no tuvo complicaciones (Canales-Espinosa, 1992).

El transporte se realizó mediante jaulas individuales sin contratiempos; sin embargo, es preciso advertir que existen riesgos por mantener prolongadamente a los animales en este tipo de jaulas. Es recomendable reducir el tiempo y el manejo para evitar el estrés excesivo causado por el confinamiento y extremar precauciones en situaciones que pongan en riesgo la vida de los individuos.

Los monos fueron transladados a dos jaulas colectivas de mayores dimensiones (4 m de largo x 2 m de ancho x 2 m de alto y 4 m de largo x 2 m de ancho x 1.8 m de alto) ubicadas en una de las islas del lago de Catemaco (Totogochillo), a fin de realizar estudios preliminares sobre comportamiento y preferencias alimenticias (Domínguez-Domínguez, en revisión). Al mismo tiempo se intentó mejorar el estado de salud de los animales.

De los animales capturados se constituyeron dos grupos confinados en sendas jaulas: un macho y cuatro hembras en el primero y un macho y seis hembras en el segundo. Estos fueron aprovisionados con ramas de seis especies de árboles que constituyen recursos alimenticios importantes para *A. palliata* en estado silvestre: *Ficus pertusa, F. insipida, F. obtusifolia, Inga vera, Bursera simaruba* y *Cecropia obtusifolia.* Adicionalmente se les aprovisionó con frutas cultivadas, a fin de contar con un medio alternativo para la alimentación en su nuevo ámbito. La permanencia en cautiverio se prolongó por 17 meses para ambos grupos. Dos hembras del segundo grupo perecieron durante el cautiverio, probablemente a causa de un severo grado de parasitosis.

Paralelamente a la captura, se realizó un estudio botánico del área candidata para la liberación de los animales (isla de Agaltepec en el lago de Catemaco). En esta área se realizó un programa piloto que permitió probar las técnicas relativas a la liberación y seguimiento de los animales bajo condiciones de semilibertad. Antes de la liberación fue necesario establecer medidas precautorias para que los animales pudieran ser recapturados con facilidad en caso de que se suscitara algún problema.

La isla de aproximadamente 10 ha estaba poblada por 1605 árboles que tenían un diámetro superior a los 30 cm a la altura del pecho. Con el propósito de analizar la estrategia de forrajeo de los animales, se elaboró un mapa vegetacional de la isla y cada árbol fue marcado con un número. Los árboles pertenecían a 63 especies, de las cuales 18 habían sido reportadas como fuente alimenticia para *Alouatta palliata* y otras 18 especies pertenecían a géneros que eran consumidos por monos aulladores en otros sitios de estudio, por lo que esperábamos que los animales utilizaran un alto porcentaje de esos árboles con fines alimenticios (Rodríguez-Luna *et al.*, 1993). Diversas consideraciones ecológicas nos hicieron pensar que la isla podría tener suficiente capacidad de carga para un grupo inicial de 10 adultos.

Antes de la liberación del primer grupo se hizo una nueva evaluación del estado de salud de los animales, la mayoría de los cuales mostraron mejoría en diversos parámetros clínicos (Canales-Espinosa, 1992).

El primer grupo se liberó el 26 de octubre de 1988 y a partir de ese momento se inició su monitoreo. El macho adulto desapareció a los pocos días de la liberación y una hembra parió al primer mono en la isla el 31 de octubre de ese año. El segundo grupo ingresó a la isla el 17 de abril de 1989. Al poco tiempo los dos grupos se integraron en uno solo (8 hembras adultas, 1 macho adulto y 1 infante).

De 1988 a la fecha se han realizado diversos estudios sobre esta tropa de monos en la isla: desplazamiento (Costello, 1991); hábitos alimenticios y patrón diario de actividades (Serio-Silva, 1992); distancia social (Serio-Silva y Rodríguez-Luna, 1992); conducta durante los primeras semanas de vida (Serio-Silva y Rodríguez-Luna, 1992); repertorio conductual (Carrera-Sánchez, 1993); socialización y relación madre-infante (Cabrera-Rojas,1993). Actualmente se encuentran en curso estudios sobre estrategias de forrajeo, preferencias alimenticias y análisis bromatológicos, y comportamiento sexual.

El patrón diario de actividades y los hábitos alimenticios manifestados en este grupo son similares a los reportados para otras poblaciones en estado silvestre (Chivers, 1969; Mittermeier, 1973; Milton, 1980; Glander, 1981; Estrada, 1984). La alimentación consiste principalmente de hojas y frutos, explotando de manera predominante algunos árboles de un número reducido de especies (Serio-Silva, 1992). De acuerdo a la proporción estacional de hojas, flores y frutos, las rutas de los animales a lo largo de la isla varían durante el año.

Al principio, todo el grupo (10 animales) se movía de manera cohesiva. Actualmente los animales (36) tienden a forrajear en subgrupos que se fusionan y fisionan eventualmente, explotanto distintas partes de la isla. El número y composición de estos subgrupos no siempre es constante. Es posible apreciar sincronización de los animales adultos para la alimentación, descanso y locomoción.

Desde su liberación, los monos no han sido manipulados y todos los estudios que se han desarrollado han sido de carácter observacional. No obstante, dichos estudios revelan que su comportamiento general es similar al de conespecíficos en estado silvestre y que, en apariencia, los monos en la isla gozan de buena salud.

En el aspecto reproductivo, el grupo ha manifestado una evolución favorable a partir de su liberación en la isla. De octubre de 1988 a abril de 1994 han ocurrido 31 nacimientos, de los cuales sólo dos infantes perecieron. Las 8 hembras adultas iniciales han sido reproductivamente activas y una de las hembras nacida en la isla ya parió a su primera cría (diciembre, 1993). En relación a los machos, el que se liberó en el segundo grupo murió en diciembre de 1992. A la fecha (abril, 1994) existen 5 machos (nacidos en la isla) que ya han sido observados en interacciones sexuales completas (cópulas).

Actualmente la tropa consta de 36 animales de los cuales, siguiendo el criterio de clasificación por edades de Glander (1980) 1 es "infante 2" (2-21 dias), 2 son "infante 3" (21-90 dias), 3 son "juvenil 1" (3-6 meses), 8 son "juvenil 2" (6-30 meses), 7 son "subadultos" (30-48 meses) (2 machos y 5 hembras) y 15 son "adultos" (más de 48 meses) (4 machos y 11 hembras).

Podemos considerar exitoso el programa piloto de translocación, debido a que los objetivos planteados para este proyecto se han cumplido hasta el momento. Creemos que, con la experiencia y conocimientos obtenidos, somos capaces de desarrollar un programa de translocación efectivo a mayor escala, reduciendo al mínimo los riesgos inherentes al manejo de poblaciones silvestres de animales.

Discusión: El desarrollo de este programa nos ha permitido valorar la translocación como una táctica conservacionista de gran utilidad. El rescate de poblaciones silvestres en situación de riesgo y su posterior liberación en áreas ecológicamente apropiadas puede parecer un proyecto interesante para muchos conservacionistas; sin embargo, es necesario definir con claridad los objectivos de la translocación, así como los indicadores de éxito de la operación, antes de someter a los animales a un plan de manejo. Cada una de las fases del programa opone diferentes dificuldades y riesgos que es indispensable anticipar y así evitar el sacrificio involuntario de animales.

De acuerdo a los lineamientos propuestos en un primer borrador, por los miembros del Grupo Especialista en Reintroducción de la Comisión para la Supervivencia de Especies de la Unión Mundial de la Naturaleza (IUCN/SSC Reintroduction Specialist Group, 1993), una reintroducción deberá tener como meta establecer una población viable y libre en la naturaleza, tratándose de especies y subespecies que han sido previamente extintas o extirpadas.

Estas reintroducciones pueden tener diferentes fines:

1. Incrementar la sobrevivencia a largo término de una especie.
2. Restablecer una especie clave (en un sentido ecológico o cultural) dentro de un ecosistema.
3. Incrementar la biodiversidad.
4. Brindar beneficios económicos a largo plazo a la economía local y/o nacional.
5. Promover la conciencia conservacionista.

Los objetivos 1, 2 y 5 aquí planteados, definitivamente se corresponden con el espíritu de nuestro programa, aunque nuestros objetivos se dirigen principalmente hacia diversos aspectos técnicos y de conocimiento, para evaluar la táctica. Cabe recordar que el trabajo que nosotros realizamos inició en 1986, cuando todavía existían muchas dudas acerca de la viabilidad de este tipo de maniobras y sólo unos cuantos programas se estaban desarrollando. Consideramos que nuestra experiencia contribuye al perfeccionamiento de la

táctica en cuanto al incremento de la sobrevivencia a largo término de una especie, puesto que permite el establecimiento de pautas de manejo para poblaciones en hábitat fragmentado, cuando no hay alternativas para la manipulación de la especie en grandes extensiones de hábitat continuo.

Los resultados de este programa piloto nos hacen optimistas para iniciar una operación a gran escala de rescate y preservación de poblaciones actualmente bajo peligro, siendo necesario planear un siguiente paso en el que un conjunto de poblaciones de monos pueda ser manejado en un sistema de fragmentos de selva para asegurar la permanencia de una metapoblación representativa de la especie; ante la inevitable fragmentación de las selvas y la imposibilidad local para manejar grandes extensiones de hábitat.

En este momento, el desarrollo de nuestro programa nos plantea dos cuestiones cruciales: 1) en qué momento la capacidad de carga de la isla está siendo vencida por la población de monos, 2) en caso de que el número de animales sea excesivo, qué individuos deberán ser removidos.

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*Video-Tape: Capture, management and reintroduction of howler monkeys (*Alouatta palliata*), 1987. Material depositado en la colección "Audiovisual Resources in Primatology", Wisconsin Regional Primate Research Centre, University of Wisconsin, 1223 Capitol Court, Madison, WI 53715-1299, USA. Septiembre, 1990.

CONSERVACION DEL MONO CAPUCHINO DE MARGARITA *(CEBUS APELLA MARGARITAE)* EN LA ISLA DE MARGARITA, VENEZUELA

Venezuela cuenta con una rica diversidad de primates, con al menos 13 especies, todas pertenecientes a la Familia Cebidae. Las investigaciones dedicadas al estudio de este grupo han sido escasas y aisladas, careciéndose de una evaluación seria sobre el estado actual de las poblaciones de primates en este país. A pesar de

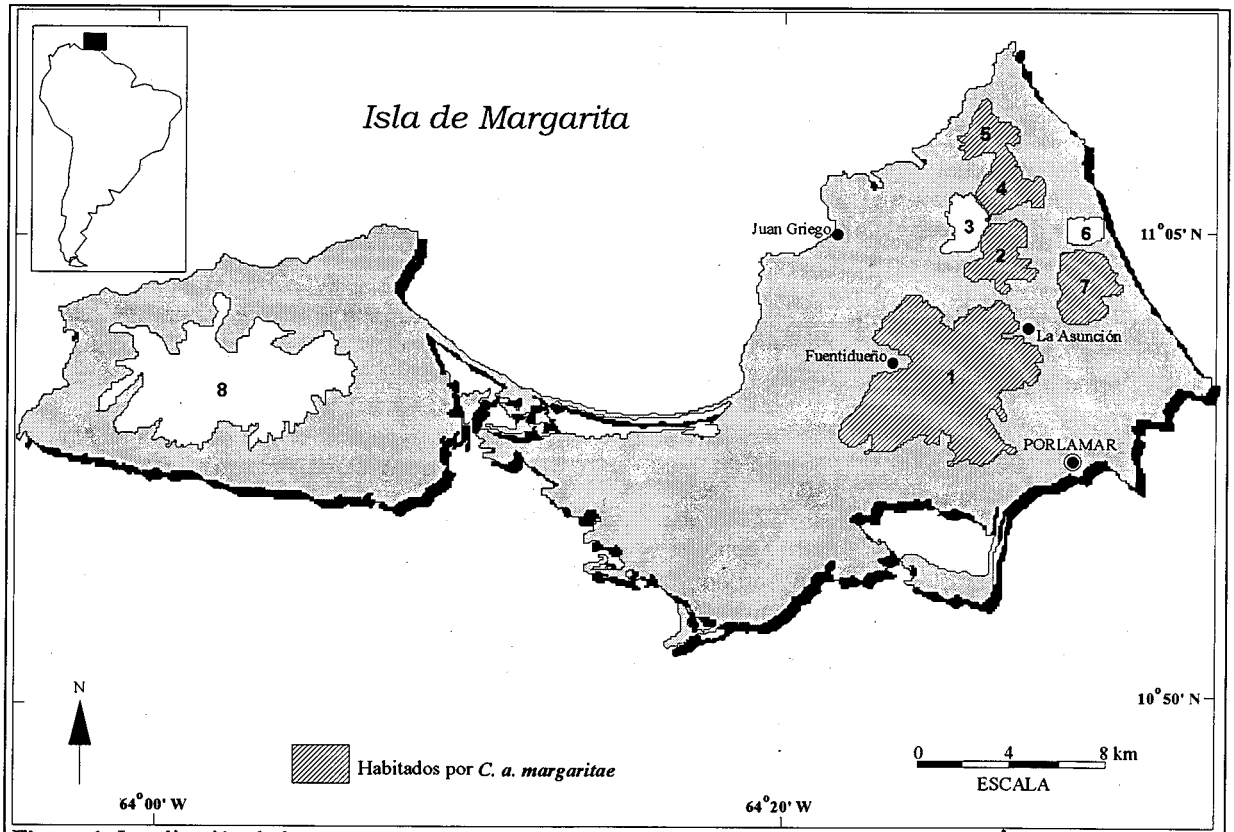

Figura 1. Localización de las zonas montañosas en la Isla de Margarita. 1=Parque Nacional Cerro El Copey, 2=Cerro El Tamoco y Cerro Los Micos, 3=Cerro Santa Elena, 4=Cerro Taragaplata, 5=Cerro La Valla, 6=Monumento Natural Cerro Matasiete, 7=Monumento Natural Cerro Guayamurí, 8=Cerros de Macanao.

esta situación se puede asegurar que el primate más amenazado de Venezuela es *Cebus apella margaritae*. En este país la especie *Cebus apella* está representada por dos subespecies: *C. a. apella*, restringida al Estado Amazonas y *C. a. margaritae*, endémica de la Isla de Margarita (920 km^2), la mayor de las islas caribeñas venezolanas (Bodini y Pérez-Hernández, 1987). La distancia entre ambas localidades es de más de 800 km; esta discontinuidad tan grande en su distribución aún no ha sido debidamente aclarada.

Entre julio de 1989 y marzo de 1990 se realizó la única investigación existente hasta la fecha relacionada con la subespecie insular con el fin de evaluar su estado en la isla. El proyecto en cuestión contó con el apoyo financiero de World Wildlife Fund.

A través de trabajos de campo y entrevistas a lugareños se pudo conocer que el mono capuchino de Margarita habita en todos los cerros de más de 500 m de altura de la parte este de la isla (Fig. 1). Podría decirse que ha sufrido extinciones locales ya que anteriormente ocupaban el cerro Los Micos pero desde hace aproximadamente 15 a 20 años los campesinos no los ven por la zona.

En relación al tipo de hábitat utilizado, los capuchinos margariteños son bastante generalistas, encontrándose desde bosques secos hasta húmedos, bosques de la palma *Coccothrinax barbadensis* (endémica de la isla) y en zonas intervenidas por el hombre.

Si bien no fue posible hacer una estimación ajustada del tamaño poblacional, se comprobó que efectivamente estos monos son muy escasos y

Tabla 1. Lista de las especies y partes vegetales más importantes consumidas por *C.apella margaritae*. O = observaciones directas, R = rastros, I = información de los lugareños, CD = contenido digestivo.

Especie	Familia	Parte Consumida
Mangifera indica (O,R.I)	Anacardiaceae	Frutos maduros e inmaduros, médulas de los pecíolos
Anthurium huegelii (O,R)	Araceae	Base foliar
Philodendron acutatum (R)	Araceae	Médula, inflorescencias maduras
Aechmea fendleri (R)	Bromeliaceae	Base foliar
Yriesea splendens (R,I)	Bromeliaceae	Base foliar, inflorescencia madura
Bursera simaruba (R)	Burseraceae	Médula
Protium neglectum (O,R)	Burseraceae	Médula
Cereus hexagonus (R)	Cactaceae	Frutos maduros
Maytenus karsteni (R)	Celastraceae	Frutos inmaduros
Olyra sp. (CD)	Graminae	Frutos
Saccharum officinarum (I)	Graminae	Médula
Zea mays (O,R,I)	Graminae	Semillas
Mammea americana (R,I)	Guttiferae	Frutos maduros
Clusia sp. (I,CD)	Gutifferae	Frutos maduros
Ocotea sp. (O)	Lauraceae	Médula
Persea americana (R,I)	Lauraceae	Frutos maduros e inmaduros
Calliandra laxa (O,R)	Mimosoidea	Semillas
Cecropia peltata (O,R)	Moraceae	Médulla de los pecíolos
Ficus nimphiifolia (R)	Moraceae	Frutos maduros
Ficus sp. (O,R,I)	Moraceae	Frutos maduros e inmaduros
Ficus sp. (R)	Moraceae	Frutos maduros
Heliconia bilhai (R,I)	Musaceae	Médula
Psidium guajava (R,I)	Myrtaceae	Frutos maduros e inmaduros
Acrocomia aculeata (R)	Palmae	Frutos maduros
Bactris setulosa (R)	Palmae	Médula
Coccothrynax barbadensis (O,I)	Palmae	Frutos maduros, inflorescencia
Passiflora laurifolia (R)	Passifloraceae	Frutos maduros e inmaduros
Coccoloba latifolia (O)	Polygonaceae	Médula
Guettarda divaricata (O)	Rubiaceae	Frutos maduros
Guettarda scabra (R)	Rubiaceae	Médula
Cupania americana (R)	Sapindaceae	Médula
Manilkara zapota (R,I)	Sapotaceae	Frutos maduros e inmaduros

Tabla 2. Registro de insectos consumidos por *C. apella margaritae*.

Orden	Familia	Item
Hymenoptera	Formiciidae	Adultos, ninfas, huevos
Hymenoptera	Vespidae	Larvas, adultos
Hymenoptera	Anthophoridae	Adultos
Orthoptera	Acridiidae	Adultos
Coleoptera	Scolytidae	Larvas, adultos
Coleoptera	Scarabeidae	Larvas, adultos
Lepidoptera	?	Orugas
Hemiptera	Ligaeidae	Adultos
Hemiptera	Reduviidae	Adultos
Isoptera	?	Ninfas, adultos

posiblemente la especie pueda considerarse en estado "crítico" de extinción, con un estimado de solamente 250 a 300 individuos en toda la isla. Todos los lugareños entrevistados conincidieron en señalar que el tamaño poblacional ha disminuído en las últimas décadas y lo atribuyen a la elevada presión de cacería a la que están sujetos. El tamaño de grupo varió entre tres a seis individuos con un promedio de 4,5 ind/grupo. Este valor está muy por debajo de lo reportado para la especie en otras localidades, donde el tamaño de la manada comunmente oscila entre seis y quince individuos, pudiendo llegar hasta viente en bosques lluviosos primarios (Klein y Klein, 1976; Izawa, 1980; Defler, 1982; Soini, 1986). Esto puede ser consecuencia de la existencia de hábitats más bien secos en la isla y/o de la cacería.

La dieta está basada principalmente en frutas e insectos y como complemento médulas de ramas jóvenes o pecíolos, bases foliares, semillas y flores (Tablas 1 y 2). Durante el periodo de estudio utilizaron 45 especies de plantas pertenecientes a 24 familias. De éstas, Moraceae (4), Palmae (3) y Bromeliaceae (3) presentaron el mayor número de especies consumidas, incluyendo principalmente los frutos de las dos primeras y las bases foliares de la última. Es muy interesante resaltar que el uso de bromeliáceas en *C. apella* sólo había sido reportado por Brown *et al.* (1986) en el norte de Argentina y Soini (1986) en bosques húmedos del Perú. Brown *et al.* lo consideran como una consecuencia de la deficiencia de frutos carnosos en los bosques. El clima predominante en Margarita genera precipitaciones impredecibles, escasas y muy variables de año a año, por lo que la cantidad de frutos disponibles varía. Esta razón, sumada a la disponibilidad continua de médulas foliares y bromelias en el bosque húmedo y su sabor más bien dulce, podría haber inducido a la utilización de dichos recursos.

Los principales factores que amenazan la supervivencia de *C. a. margaritae* son la cacería y el hábitat reducido y fragmentado. En Margarita, por tratarse de una isla, la población total de la subespecie se encuentra geográficamente aislada y limitada en el número máximo que puede alcanzar. La distribución actual de *C. a. margaritae* está altamente fraccionada. Se puede considerar que cada cerro mantiene una subpoblación aislada de las restantes, donde no hay intercambio genético entre las poblaciones que habitan en cada cerro. Esto es consecuencia de que los cerros están separados entre sí por valles donde hoy en día hay pueblos, zonas agrícolas o carreteras altamente transitadas debido al acelerado crecimiento económico y urbanístico experimentado por la Isla de Margarita a partir de la década de los 70.

La cacería es consecuencia de la interacción de los monos con los cultivos, y los primates son eliminados porque son considerados plagas agrícolas por los campesinos. Los cultivos preferidos por los monos son los de maíz, caña de azúcar y frutales como mangos (*Mangifera indica*), nísperos (*Manilkara zapota*) y mamey (*Mammea americana*). La presión de cacería no es constante a lo largo del año, acentuándose con el periodo de fructificación de las plantas cultivadas, especialmente maíz.

También se les captura para mantenerlos como mascotas. Afortunadamente esta práctica no está muy extendida y en ningún caso comparable a la cacería en cuanto al efecto de merma que produce en las poblaciones naturales de monos. La elevada presión de cacería podría conducir a la extinción de la especie en pocos años. En un periodo de nueve meses se registraron un total de 28 animales extraídos de su hábitat natural. De éstos, sólo cuatro infantes fueron capturados para mantenerlos como mascotas.

La disminución de los niveles poblacionales se mantiene a pesar de que la disponibilidad de hábitat se ha incrementado en relación con unas cinco a seis décadas atrás, debido al abandono de los cultivos en las montañas y la subsecuente recuperación natural de los bosques. Incluso es posible que la capacidad de carga del ambiente se haya elevado porque perduran gran cantidad de árboles frutales cultivados que son consumidos por los monos.

La convivencia entre *C. a. margaritae* y el hombre blanco es la más antigua entre todos los primates sudamericanos, ya que la Isla de Margarita fue uno de los primeros asentamientos establecidos en América. Tomando en cuenta que aproximadamente desde el año 1520 comenzó la

intervención de los ecosistemas de la isla con las actividades agrícolas, la subespecie ha demostrado que, dada su versatilidad en el uso de los recursos y adaptabilidad a distintos hábitats, puede resistir por mucho tiempo condiciones que no son las más apropiadas. Esto permite ser optimista en cuanto a la posibilidad de recuperar su tamaño poblacional a niveles aceptables y asegurar su supervivencia.

Aunque dos de los cerros en los que habitan los capuchinos, la serranía del Copey y el cerro Matasiete, son Parque Nacional y Monumento Natural respectivamente desde el año 1974, existen algunos factores que impiden que estas áreas protegidas cumplan su función de protección a la fauna y flora en forma efectiva. La existencia de actividad agrícola dentro del Parque Nacional El Copey, sumado a la escasa vigilancia, son obstáculos para la eliminación de la cacería. Si se quiere tener éxito en evitar la extinción de este primate es necesario concebir un programa de conservación integral que incluya trabajo con los campesinos, información y educación ambiental, reforzamiento de la guardería ambiental, ampliación de las áreas con protección legal, realizar trabajos de investigación y si se logran buenos resultados con los planteamientos anteriores incluso considerar la cría en cautiverio con fines de repoblación y estricto manejo de las poblaciones silvestres.

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NUEVOS REGISTROS DE *SAGUINUS TRIPARTITUS* EN LA AMAZONIA ECUATORIANA

En el bosque húmedo tropical de la amazonía ecuatoriana quince especies de primates han sido registradas, de este número por lo menos 12, habitan el Parque Nacional Yasuní, situado al este de los Andes, en la baja amazonía ecuatoriana, al sur del río Napo (Albuja *et al.*, 1988).

Algunas especies de primates amazónicos son muy poco conocidas, en lo referente a la distribución y a otros aspectos biológicos, inclusive la taxonomía no está bien determinada, persistiendo los problemas de validez de las especies. Una de ellas es el chichico de manto anaranjado, *S. tripartitus*, considerado por unos autores (Hershkovitz, 1977) como subespecie de *S. fuscicollis* y por otros (Emmons y Feer, 1992; Thorington, 1988), especie válida. Este pequeño calitrichido es uno de los primates ecuatorianos más hermosos; la coloración del pelaje, de la cual se deriva su nombre específico, se halla dividida en tres zonas bien marcadas: la de la cabeza, negra; detrás de la cabeza, los miembros anteriores y las partes ventrales, anaranjado brillante; y la posterior grisáceo anaranjada.

En lo referente a la distribución en la literatura consultada también existen varias discrepancias, causadas principalmente, por la falta de precisión y confusión de las localidades de colección, originadas por la costumbre que tiene la gente de colectar estos animales y trasladarlos de un luger a otro para mantenerlos o venderlos como mascotas. A este particular hace referencia la publicación de Thorington (1988).

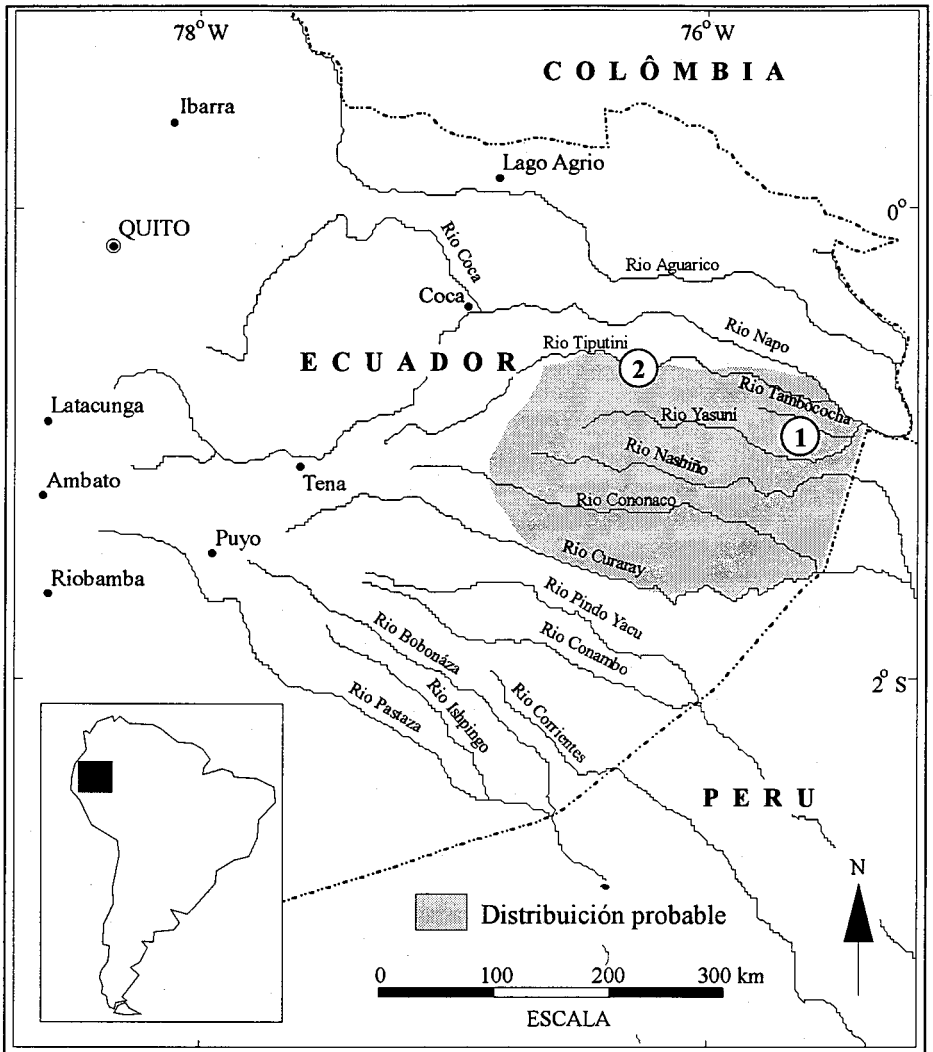

Figura 1. Distribuición de *Saguinus tripartitus* en el Ecuador. Localidades con registros: 1=Tambococha, 2=Río Tivacuno.

Durante un estudio faunístico realizado por el autor en el mes de noviembre de 1991, en varias localidades dentro del Parque Nacional Yasuní (Albuja, 1992), se registró la presencia de nueve especies de primates, una de éstas fue el chichico de manto anaranjado, que fue observado en la localidad de Tambococha y que el cual es objeto de estudio en el presente artículo.

En las colecciones del Museo de Historia Natural de la Escuela Politécnica Nacional de Quito existen dos ejemplares de esta especie: E-219 o adulto, margen derecha del río Napo, col. T.Mena; E-220 o joven, sin otros datos.

La localidad Tambococha (75° 35' 58" W y 00° 54' 12" S, alt.187 m, Fig.1) se encuentra situada en la margen derecha del río Napo, 5 km al sur de la desembocadura del río Tiputini en el Napo; la localidad se halla atravesada por el río del mismo nombre, tributario del río Jatuncocha que a su vez, desemboca en el Napo. El tipo de bosque es el húmedo tropical, el relieve está formado por colinas bajas y depresiones pantanosas dando lugar a dos tipos de formaciones vegetales: "terra firme" y los bosques inundados. La vegetación es densa con árboles que pasan los 20 m de altura, en las áreas inundadas la vegetación está dominada por las palmas llamadas moretes (*Mauritia flexuosa*).

En los cinco días que duró el estudio, se observó un total de 38 individuos pertenecientes a seis grupos, con un promedio de 6.3 por cada grupo y un rango de 4 a 10 individuos. Las horas de observación fueron en su mayor parte por la mañana y tan solo un grupo fue observado en la tarde. Algunos individuos, al momento de las observaciones se encontraban comiendo frutos. En el área este primate es el más común de todas las especies que allí habitan. Otros primates con los que comparten el hábitat son: *Cebus albifrons*, *Pithecia monachus*, *Lagothrix lagotricha*, *Alouatta seniculus*, *Saimiri sciureus* y *Cebuella pygmaea*.

En base a los estudios realizados en varias zonas de la amazonía ecuatoriana por investigadores de la Universidad Católica del Ecuador y por el autor de este artículo (de Vries et al., 1993; Albuja, 1988, 1989, 1989, 1992), se puede afirmar que esta especie en la actualidad habita al sur del río Napo, probablemente en los bosques situados entre este río y el Curaray, área perteneciente al Parque Nacional Yasuní.

Ultimamente (marzo de 1994), Richard Muñoz (com.per.), biólogo de la Universidad Central dle Ecuador, observó tres grupos de esta especie (6 a 8

individuos cada uno) en el bosque situado cerca de la desembocadura del río Tivacuno en el Tiputini, es decir, al occidente de Tambococha.

En base a los estudios realizados en varias zonas de la amazonía ecuatoriana por investigadores de la Universidad Católoca del Ecuador y por el autor de este artículo (de Vries *et al.*, 1993; Albuja *et al.*, 1988; Albuja, 1992a, 1992b) se puede afirmar que esta especie en la actualidad habita al sur del río Napo, probablemente en los bosques situados entre este río y el Curaray, área perteneciente al Parque Nacional Yasuní. No existen registros de esta especie al norte del río Napo, por lo que concuerdo con la opinión de Thorington y además comparto el criterio sobre la validez de esta especie, porque considero que se trata de monos de mayor tamaño y muy diferentes de *S.f.lagonotus*; por la coloración son fácilmente diferenciables. Todos los individuos de *S.tripartitus* observados en el medio natural y dados a conocer en este trabajo poseían una coloración y forma muy similar entre sí. Cabe recalcar que las dos localidades estudiadas se encontraron ejemplares de *S.f.lagonotus*.

La población de este primate aparentemente se halla en buen estado de conservación, los animales no se muestran huidizos y soportan la presencia humana sin presentar mayor alteración en su comportamiento. La localidad Tambococha, por hallarse a varios kilómetros de distancia de los poblados de los ríos Napo y Yasuní y por las dificultades de acceso que presenta el área debido a las inundaciones del bosque, la caeería por parte de los nativos quichuas y colonos es muy escasa y afecta principalmente a los primates más grandes (*Alouatta* y *Lagothrix*).

El bosque del área donde habitan estos primates se presenta casi inalterado, existen pocos rastros de intervención humana, tales como las trochas y campamentos realizados en los estudios de sísmica para la prospección petrolera. Sin embargo, debido al hallazgo de petróleo en varias zonas de este sector amazónico, existe una inminente amenaza a la vida y estabilidad de las poblaciones de esta interesante especie, así como también al resto de especies de este ecosistema, por efecto de los impactos que ocasiona la explotación petrolera, especialmente por la construcción de la carretera Pompeya-Iro, en plena ejecución.

Se recomienda efectuar estudios más profundos para complementar y actualizar la información existente relacionada con la distribución; puesto que, si su distribución se restringe a una pequeña área de bosque de la amazonía ecuatoriana, esta especie estaria gravemente amenazada.

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PARASITIC INFECTION IN RED HOWLING MONKEYS IN FOREST FRAGMENTS

Red howling monkeys, *Alouatta seniculus*, in the central Amazonian basin persist in forest fragments resulting from deforestation which can be as small as 10 ha. The highly arboreal howler monkeys stay in the mid- to upper levels of the forest and rarely travel out of the fragments into secondary growth. Thus, they remain functionally isolated in the fragments, unlike the sympatric golden-handed tamarins, *Saguinus midas*, which travel through low secondary growth.

In a study of the effects of habitat fragmentation on red howling monkeys, I focused on the relationship between primate density and endoparasitic infection. Stuart *et al.* (1990) showed that the prevalence of endoparasitic infections was higher in *Alouatta palliata* populations occurring at higher densities. With crowding in a restricted

area, there are greater opportunities for transmission of infectious ova and larvae. I predicted that the prevalence of infection would be higher in groups in smaller forest fragments, since the probability of infection and reinfection and that of coming into contact with contaminated fecal material would be greater due to increased host density.

I carried out this study for fourteen months in upland *terra firme* forest in the reserves of the "Projeto Dinâmica Biológica de Fragmentos Florestais" (Instituto Nacional de Pesquisas da Amazônia/Smithsonian Institution), about 80 km north of Manaus, Brazil. I worked with thirteen red howling monkey groups in three isolated 10 ha fragments, two isolated 100 ha fragments and in continuous forest. Group size was found to be similar between reserves of different sizes (mean = 6.07, range 4-8 individuals). However, the overall density of howlers and other primate species was considerably higher in the 10 ha reserves than in the 100 ha fragments or continuous forest (Table 1).

To determine the prevalence of parasitic infection, I collected fecal samples (N=217) from identified individuals and examined them for the presence of parasites. Overall, 37% of the samples contained parasitic ova of eight helminth species. The parasites found also included four nematodes, two trematodes, one cestode and one acanthocephalan. This is the first finding of an acanthocephalan in a wild howling monkey. The most frequently recorded ova were those of nematodes and trematodes.

Parasitic infection and primate density were positively correlated. The number of samples with parasites present per reserve increased with the density of red howling monkeys ($r=0.79$, $p<0.05$). Samples from the 10 ha reserve monkeys had the greatest number of parasites, followed by the continuous forest, and those from the 100 ha reserves had the lowest (Table 1). An even stronger positive correlation existed between the percentage of samples with parasites present and the total primate density per reserve ($r=0.88$, $p<0.01$). Again, the 10 ha reserves with the highest number of primates had the highest number of samples with parasites, while the 100 ha reserves, with the lowest primate densities, had the lowest number of samples with parasites. The same pattern resulted when primate density excluding howling monkeys was considered ($r=0.09$, $p<0.005$).

These results indicate that the higher the number of red howling monkeys, and of all primates, in a small isolated reserve, the greater the incidence of endoparasitic infection. However, Stuart *et al.* (1993), working with wild muriquis (*Brachyteles arachnoides*), in the highly fragmented southeastern Atlantic forest of Brazil, found that the prevalence of endoparasitic infection was not positively related to muriqui density. Fecal samples from brown howling monkeys occurring sympatrically with the muriquis contained no ova or larvae. They suggest that differences in vegetation, climate, and the level of disturbance among sites may explain their results. The smaller isolated reserves of the present study, resulting in inflated host densities, crowding, and the use and reuse of areas contaminated with infectious ova and larvae may contribute to the higher prevalence of endoparasitic infection in red howling monkeys in 10 ha fragments.

I am grateful to the Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, for permission to carry out this research, and to the "Projeto Dinâmica Biológica de Fragmentos Florestais" (Smithsonian Institution/INPA) for logistical support.

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Table 1. Primate density and percentage of red howling monkey fecal samples with parasites present. N = No. of fecal samples analyzed.

Reserve Size ha	Howler Density ind/km^2	Total Primate Density ind/km^2	No.Sympatric Species	N	% with Parasites
10	120	270	3	33	60.0
10	50	120	3	22	42.9
10	70	130	2	26	29.2
100	18	42	3	42	29.6
100	20	36	3	28	21.2
10000+	23	61	6	66	38.1

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FOURTEEN NEW LOCALITIES FOR THE MURIQUI *BRACHYTELES ARACHNOIDES*

The woolly spider-monkey or muriqui, *Brachyteles arachnoides*, is an endangered species endemic to the Atlantic forest of southeastern Brazil. Its biology and distribution have been reviewed by Strier (1992), Mittermeier *et al.* (1987), and Mendes and Chiarello (1993). According to Coimbra-Filho *et al.* (1993), fewer than 2,000 individuals are believed to exist, distributed among 15 widely scattered localities. However, in this paper we report the discovery of another 14 localities where muriquis, locally known as "mono-carvoeiro", are known to occur in the states of São Paulo, Paraná and Rio de Janeiro. This work is the result of several years of biological inventories, and part of a broader effort by the Instituto Florestal de São Paulo to gain a better knowledge of the native fauna and to elaborate sound strategies for its conservation.

São Paulo

The *Ilha do Cardoso State Park (PEIC)* is located on the southern coast (around 25° 03'S, 47° 53'W). This 14,000 ha park is covered by Atlantic forest from see level to 950 m. In April 1989, four adult muriquis were observed in tall (25-30 m) forest (altitude 180 m) near the Pico dos Três Irmãos. Later, in January 1991, two individuals were seen sunning themselves on a large emergent tree by the side of the Pico do Cardoso (altitude 600 m). This record represents the first population to be found on an island. The known population is four individuals in one group. A systematic study of the island's fauna was conducted over four years, starting in 1989, and this small troop was the only one known to exist. Since 1991 no further record or sign of these monkeys has been found, and it is known that at least two of them were killed by local inhabitants. This population is probably extinct.

The *Alto Ribeira State Park (PETAR)* of 35,000 ha is located in the karst region of the Serra de Paranapiacaba massif (around 24° 25'S, 48° 35'W), and is mostly covered by middle (from 100 m altitude) to high (up to 1,000 m altitude) elevation Atlantic forest. In November 1989, two muriquis, an adult female and a three-month old male, were captured by poachers at Bairro da Serra, municipality of Iporanga. The male was sent to the Rio de Janeiro Primate Center (CPRJ/FEEMA) (see Coimbra-Filho *et al.*, 1993). In April 1990, 12 muriquis, including at least one infant and two juveniles, were observed at Caboclos valley, at an altitude of 400 m. The forest there is dominated by 20-30 m tall trees with few emergents, and a dense undergrowth with many lianas and epiphytes. Local people informed us of other groups, and it seems likely that there are at least three, or about 25 individuals, in the Park.

The *Serra do Mar State Park (Núcleo Mongaguá)* is located on the coast of São Paulo (around 23° 55'S, 4° 00'W). It has an area of 30,000 ha with altitudes ranging from 100 to 800 m. In May 1982, two adult monkeys were observed at 200 m at Morro do Chapéu. According to locals, three individuals were killed in 1980 at the same site. We also found a purse which had been made from the skin of a muriqui. The minimum estimated population for this Park is one group, with two individuals.

The *Serra do Mar State Park (Núcleo Curucutu)* is located in the Serra do Mar massif (around 23° 47'S, 46° 25'W). This Park has an area of 23,697 ha, with altitudes ranging from 200 to 800 m above sea level. In 1991, two muriquis were observed by C. Coelho Jr, a biologist carrying out a faunal inventory in the area. The animals were seen in a forest at 600 m altitude, near the source of the Rio Cubatão. The minimum estimated population is one group with two individuals.

The *Serra do Mar State Park (Núcleo Pedro de Toledo/Itariri)*, on the central coast of São Paulo (24° 10'S, 47° 07'W), has an area of 10,323 ha, with altitudes from 100 to 500 m above sea level. In July 1988, four *Brachyteles* were observed in dense Atlantic forest at an altitude of 400 m near Engenheiro Ferraz, a railway station between São Vicente and Paralheiros. The Guarani indians who live in the reserve are known to hunt monkeys in this locality as well as the nearby indian settlement of Bananal. Minimum estimated population is one group with five individuals.

The *Jurupará State Park* is located in the Serra de Paranapiacaba massif. This 26,300 ha reserve is covered by middle to high elevation Atlantic forest.

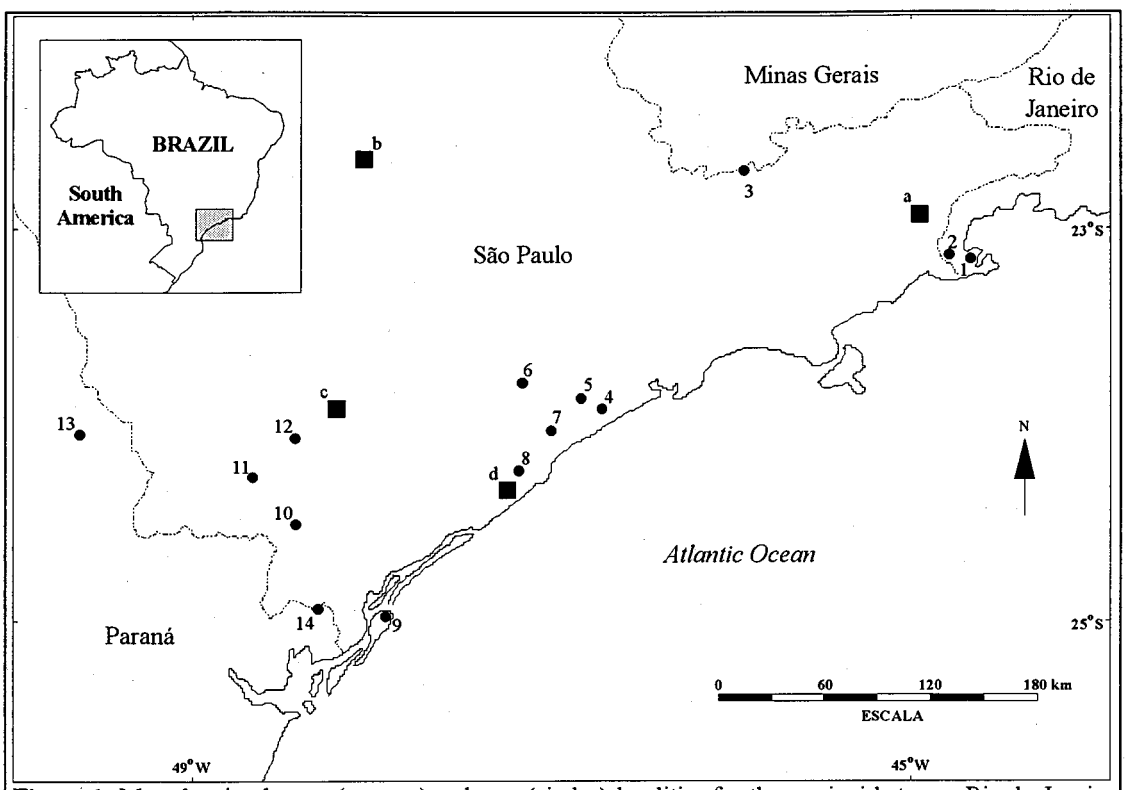

Figure 1. Map showing known (squares) and new (circles) localities for the muriqui between Rio de Janeiro and Paraná. 1=APA Cairuçu, 2=Bocaina, 3=São Francisco Xavier, 4=Mongaguá, 5=Curucutu, 6=Jurupará, 7=Pedro de Toledo/Itariri, 8=Itatins, 9=Ilha do Cardoso, 10=Jacupiranga, 11=Alto Ribeira, 12=Fazenda Intervales, 13=Jaguariaiva, 14=Guaraqueçaba, a= Cunha, b=Barreiro Rico, c=Carlos Botelho, d=Juréia.

In July 1990, five adult monkeys were observed at an altitude of 400 m at Morro dos Souzas. Minimum estimated population is one group with five individuals.

São Francisco Xavier, in the Serra da Mantiqueira massif (around 22° 57'S, 45° 30'W), on the border with the state of Minas Gerais, is a privately-owned forest of about 5,500 ha, with altitudes ranging from 800 to 2,000 m. A group of 12 muriquis, including two infants, was photographed by Luiz Alberto Antonietto in April 1991. Later, on May 28 1994, one adult female and a subadult were seen feeding on *Inga* fruits (altitude 1,100 m). The minimum population is 12 individuals.

The *Juréia-Itatins Ecological Station (Juréia massif)*. This area, with mountain ranges reaching altitudes of 800 m, is located on the southern coast of São Paulo (24° 30'S, 47° 15'W). The first records of muriquis from the massif were made by Carlos Eduardo Dias Camargo in 1982, and Cecília Torres de Assumpção in 1985. In January 1986, eight individuals were observed in the Rio Verde valley at an altitude of 100 m. After 1989, several further sightings were made by the Reserve's staff, and the numbers seen varied from four to eight (Fausto Pires de Campos, pers. comm.). The estimated population is one group with eight individuals.

Juréia-Itatins Ecological Station (Itatins massif). This mountain range is isolated both from the Serra do Mar and the Juréia ranges by about 40 km of lowland, swampy forest. Its highest peak reaches 1,350 m. In September 1990 two infant muriquis were captured by poachers in the area, and were subsequently sent to São Paulo Zoo. During a survey in this area in December 1993, we saw signs indicating the presence of muriquis, such as ripped-off palm leaves.

Fazenda Intervales. This well-known reserve in a ranch in the Serra de Paranapiacaba massif (24° 11'S, 48° 23'W), has an area of 38,000 ha comprised principally of low (60 m altitude) to high (1,100 m) elevation Atlantic forest. A systematic study of the ecology and behavior of a group of 24 muriquis in the Carmo valley (altitude 600m) has been underway since July 1989 (Petroni, 1993). The forest is dominated by 20-25 m tall trees with few emergents and a dense undergrowth of giant bamboo and lianas. Surveys conducted

throughout the reserve have indicated a minimum of ten groups, with a total of 240 individuals.

Jacupiranga State Park. This large 150,000 ha reserve is located in southern São Paulo (25° 00'S, 48° 20'W). Altitudes range from sea level to 1,250 m. In March 1992, three adult muriquis were observed in tall (20 m) forest at 250 m altitude near Caverna do Diabo. At Barra do Turvo, near the Paraná border, muriquis are systematically killed by local inhabitants. In February 1994, a young female was captured by poachers and was being held as a pet near Caverna do Diabo. A minimum of three groups are known to occur in the Park.

Rio de Janeiro

The *Bocaina National Park (PNB)* is located on the southern coast of Rio de Janeiro (22° 50'S, 44° 15'W). It has an area 120,000 ha, with altitudes ranging from sea level to 2,132 m. The forested region is mainly along the coast. In July 1991 we found some bones and one skull of *Brachyteles* in the home of a poacher in the village of Patrimônio, around 400 m above sea level. According to locals, two muriquis were killed in the forest near Ponta da Trindade. These two localities are close to the southern border of the Park, at the limits between Rio de Janeiro and São Paulo.

The *Cairuçu Environmental Protection Area (APA Cairuçu)* is close to the border between Rio de Janeiro and São Paulo, and only 30 km from the Serra da Bocaina. It includes a 10,000 ha forest reserve ranging from sea level to an altitude of 600 m. Local inhabitants claim that the area holds a sizeable population of muriquis. Five monkeys were killed by local people in October 1990 near the Cairuçu peak. In Indian language "cairuçu" means "large monkey".

Paraná

Jaguariaiva. This locality is on private land, on the northern coast of Paraná (near 24° 15'S, 49° 30'W). A partial skeleton and a broken skull were found in a poacher's home in September 1993. According to local people, two young muriquis were sold to animal traffickers in January 1993. Monkeys are systematically hunted for food in this area.

The *Guaraqueçaba Environmental Protection Area (APA Guaraqueçaba).* On the Serra do Mar massif of Paraná (25° 05'S, 48° 10'W) near the border with São Paulo, this 80,000 ha reserve ranges from sea-level to 1,100 m. In August 1992, 15 km from the Jacupiranga State Park, we observed two muriquis at an altitude of 800 m, close to the Morro Três Pontões, in the Serra da Virgem Maria. Minimum estimated population is one group with two individuals.

All the muriquis reported here were black-faced, belonging to the subspecies *B.a.arachnoides* (see Coimbra-Filho *et al.*, 1993). The records from Paraná represent the first for the state and extend the species' known distribution to the south. The Rio de Janeiro records are important in that they represent the only confirmed existing populations for the state. However, interviews with locals in the areas of Mambucaba and Paratí, near Angra dos Reis, also indicate that the species is well-known, and further research is required. An individual in the colony of the Rio de Janeiro Primate Center (CPRJ/FEEMA) may have come from Paratí (Coimbra-Filho *et al.*, 1993). Records from São Paulo are interesting for a number of reasons. Most come from areas which are already protected by law (although this has meant little for some of them). Some of the areas are very close to each other and may hold continuous populations. The large forest tract represented by the Alto Ribeira Park, Fazenda Intervales, and the Carlos Botelho State Park (see Mittermeier *et al.*, 1987) probably hold the largest extant population of the species, and is the most promising area for its long-term survival. There is the possibility of enlarging this already large protected area through the addition of privately-owned areas: the Aliperti Ranch, with 35,000 ha of mostly low to medium altitude primary forest adjacent to the southern border of Intervales, and a pool of eight ranches in the municipalities of Pilar do Sul and São Miguel Arcanjo, close to Carlos Botelho, and totalling 20,000 ha. This could result in a continuous reserved area of 180,000 ha.

The São Francisco Xavier population deserves further study being the only one known from the southern Serra da Mantiqueira, an area of different climate and vegetation, including as it does *Araucaria* forest, to the coastal massifs. The muriquis observed at this locality evidently belong to the nominal subspecies (black-faced), as is so for others collected along the Serra da Mantiqueira north to the Serra dos Órgãos (Rio de Janeiro) (Coimbra-Filho *et al.*, 1993; Lemos de Sá *et al.*, 1993). If the Serra da Mantiqueira is a barrier between the southern (nominal) and northern (*B.a.hypoxanthus*) subspecies, it is probably due to vegetational changes at higher elevations and on the western side of the mountains. Muriquis are well-known at São Francisco Xavier on the eastern

side, but reportedly absent on the western side where *Araucaria* and *Podocarpus* forest occur.

The state of São Paulo holds the largest remaining area of Atlantic forest, and by far the largest population of muriquis, with 60% of the known localities. Most existing reserves are larger than 15,000-20,000 ha, and theoretically large enough to hold viable populations of the species. Nevertheless, habitat fragmentation is leading to the isolation of these populations, due to the building of roads crossing the reserves, large areas degraded by human activities, and natural barriers. Today, there are few reserves with continuous forest larger than 10,000 ha. With the protection of biodiversity as a priority, the Instituto Florestal de São Paulo (IF) has begun efforts to protect their long-neglected reserves, and to create new ones in areas with significant species diversity.

The fourteen localities almost double the number of area where *Brachyteles* is known to survive. A minimum of 23 groups and 303 individuals must be added to the estimate of Mittermeier *et al.* (1987). Although we have more than doubled the known population, the situation has proved to be alarming. Most parks have serious problems with poachers and squatters. For example, Jacupiranga has had its forest area largely destroyed, with less than 30,000 ha remaining of its original 150,000 ha, with an estimated 5,000 families living inside the Park, even in close to proximity to the headquarters. In the short-term, poaching is the single most important factor contributing to the species' decline, as can be seen in the accounts of the localities reported here. *Brachyteles* is a "k-strategist", a slow-growing and slow-maturing species (Milton, 1986; Petroni, 1993), and easily overexploited by hunters. Coupling this with the fact that muriqui meat is a favored food for "traditional" inhabitants (locally called "caboclos" and "caiçaras") living in or around the reserves, it is easy to see that the problems are serious (most of our records are of animals killed for food). The monkeys from the Ilha do Cardoso were eaten to extinction by the local caiçaras, one of whom reported killing 15 muriquis in the Juréia Ecological Station over the last few years.

The recent trend, widely adopted by anthropologists, sociologists, and politicians, that views "traditional" communities as living in harmony with the natural environment, that they are an integral part of it, and therefore, should be allowed to live in parks and reserves, has taken a hold even within official agencies. Such an unfortunate policy has already produced disastrous results in several reserves and is one of the greatest threats for the conservation not only of muriquis, but of all that remains of the Atlantic forest.

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JAGUAR PREDATION ON MURIQUI *BRACHYTELES ARACHNOIDES*

So far, no natural enemy, apart from man, has been recorded for the muriqui, *Brachyteles arachnoides.* However, the species' defensive behavior suggests it is not free from predation, the lack of records being due to a lack of studies in areas where both muriquis and predators, such as big cats and raptors, co-exist (Galetti, in press). One such area is the Fazenda Intervales (for a site description see Olmos, 1991), where there is both a sizeable muriqui population (Martuscelli and Petroni, 1994) and some of the last living jaguars (*Panthera onca*) in the Atlantic forest domain.

On 1 November 1989, while conducting a bird survey near the Saibadela research base in an area of primary forest at an altitude of 65 m, I found a dried jaguar scat (recognizable by general appearance and size) composed almost entirely of the soft, pale golden hairs of a muriqui, along with a few bone fragments. This is the first record of a jaguar feeding on a muriqui.

Although the monkey could have been scavenged, I believe that predation is more likely. Wardens at Intervales report that jaguars feed on muriquis, and the marked mobbing behavior displayed by the monkeys in the presence of a jaguar suggest that they recognize it as a threat, and predation may even occur during such encounters (Galetti, in press, pers. comm.), or when the monkeys descend to the ground for drinking.

Popular tradition has it that the jaguar is fond of monkey flesh (Santos, 1984) but the only accounts qualifying this are given by Schaller (1983), who reported predation on *Aotus* and *Alouatta caraya* in the Brazilian Pantanal, and Emmons (1987) who found one *Ateles paniscus* among 40 prey items in the diet of jaguars in the Peruvian Amazon. The paucity of data on neotropical big cats does not permit speculation on their impact on primate populations.

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MURIQUI CONSERVATION: THE URGENT NEED OF AN INTEGRATED MANAGEMENT PLAN

The Need of a Plan: In previous numbers of this newsletter, Sérgio Mendes and Adriano Chiarello (vol. 1, no. 2) and Karen Strier (vol. 1, no.3) revived an important issue: the necessity of human interference for the long term conservation of the muriqui (*Brachyteles arachnoides*). Two conflicting considerations can be drawn from the two articles. The first is the urgent need of action. The species is known to occur today in a few fragments of the once widespread Brazilian Atlantic Forest. Many of these fragments are located within privately owned areas, or in official reserves that are in need of better protection. Mendes & Chiarello suggested that, at least in the case of the state of Espírito Santo, muriquis from small private forests should be translocated to larger protected reserves with low population densities.

The second consideration is the need of scientific data to diminish costs and risks of conservation measures. For Mendes and Chiarello, translocations should be preceded by the confirmation of the size and composition of remaining groups, and accompanied by the acquisition of genetic and morphological data. Strier suggested that systematic studies on the ecology and demography of the involved populations should also be conducted for three years before and after translocations.

The suggested accompanying studies illustrate how measures cannot to be taken in isolation, and in both articles it is implicit that translocations would help us develop a long term management plan for *Brachyteles*. I agree on the urgent necessity of both translocations and a management plan, but in my opinion the latter should be our most immediate goal at the moment. There are many management

options to be considered, each one representing different interrelated problems, and requiring different sets of data (Strier, 1992). An efficient plan should integrate how much we already know about muriquis and the different management options, and also what relevant data are still unavailable. Option priorities could then be established, and isolated measures could be put in a more comprehensive and pragmatic perspective.

The idea of an integrated plan for muriqui management is not new. Célio Valle, pioneer muriqui researcher and conservationist, has been informally proposing it for a few years now. In part, Célio's ideas never took off because muriqui ecology and behavior has only been the subject of intensive field research within the past decade. Decisions depending on the knowledge of the natural habits of the species were hindered by lack of data. On the other hand, *Brachyteles* has quickly become one of the most studied Brazilian primates (Bernardes *et al.*, 1988).

Integrating Available Information: Decisions concerning translocations of muriquis to new areas illustrate the need of an integrated plan. The success of such measures will depend on the impact they have on both source and target populations, and on the chances translocated individuals will have to survive and reproduce. Accompanying studies (Mendes & Chiarello, 1994; Strier, 1994) can help in our attempts to predict and measure this success, but only if their results are evaluated in a comparative perspective.

Previous research on muriqui feeding behavior and socioecology (i.e., Milton, 1984; Fonseca, 1985; Strier, 1991; Rimoli, 1994), and on demography (i.e., Milton & de Lucca, 1984; Lemos de Sá, 1991; Paccagnella, 1991; Strier *et al.*, 1993) are therefore of great importance. This research can indicate relevant parameters to be quantified during accompanying studies, and serve as sources of comparative data. In this way, we can better evaluate the proximate causes of different population densities at different sites, and their suitability as source and target areas for translocation.

Muriquis subjected to management action will not only face new ecological constraints, but new social environments as well. Data on muriqui social relationships (i.e., Mendes, 1990; Strier, 1992b; Rimoli, 1993) should also be considered whenever we are to form or break social groups. Males, for instance, remain in their natal group throughout their life, and establish hierarchical relationships based on strong affiliative bonds, rather than dominance hierarchies based on agonistic interactions (Mendes, 1990). They are otherwise intolerant of males from other groups. Intergroup male interactions are generally restricted to disputes associated with the monopolization of estrous females and large food sources (Strier *et al.*, 1993). Males left with little or no allies of the same sex may reach very low rates of reproductive success, depending on the level of intrasexual competition they will face. Likewise, the establishment of captive groups containing unfamiliar males may be hindered by their lack of predisposition to form affiliative bonds.

Results of previous muriqui research can provide scientific support for decisions on how to conduct specific measures for conservation. Other decisions will require further data, since there are many aspects of muriqui ecology and behavior that are still poorly understood. Assessing how much we know, and what we should learn through field research is an immediate necessity.

Priorities: As Mendes and Chiarello and Strier point out, capturing and moving individuals will represent costs as well as risks. Acquired funds should therefore be carefully allocated so that areas and populations in greater need of action are not given low priorities. The necessity, risks, and costs of translocations should also be weighted in relation to those of other measures, such as the creation and development of captive breeding programs, and the protection of legal and private reserves.

Setting priorities immediately is hindered by the lack of at least two relevant sets of data: the exact number and location of muriquis remaining in the wild; and the extent of deleterious effects of inbreeding in present populations. New muriqui groups are still being discovered, as illustrated by Mendes and Chiarello's survey of *Brachyteles* in the state of Espírito Santo, and the report by Martuscelli and Petroni (1994) for São Paulo, Rio de Janeiro, and Paraná. Estimates of the total population and the degree of inbreeding at known sites remain largely speculative. At the Caratinga Biological Station, for example, earlier suggestions of inbreeding depression were offset by the observed high rate of population growth and low rates of infant mortality in the past 11 years (Strier *et al.*, 1993).

A better picture of the current distribution of *Brachyteles*, and the degree of inbreeding depression at different sites, will certainly help us

to decide on priorities, and to evaluate the role different types of reserves could play. Protecting large official reserves is of obvious importance. Besides their overall greater biodiversity, they may hold large viable muriqui populations that may need little or no human interference in the short term.

Small private reserves may have, on the other hand, a complementary role in the preservation of *Brachyteles*. There are very few large areas of Atlantic Forest that are both demarcated as official reserves and efficiently protected, and each has a limited carrying capacity. Despite the recent progress at the Rio de Janeiro Primate Center, captive individuals have yet to reach the two digits mark. Each privately owned forest currently containing muriquis thus represents a valuable summation of genetic material, which can be stocked now for future action. Besides, measures may be used to enhance genetic diversity at relatively small sites as well as larger ones (Strier, 1992), augmenting the total number of viable populations and individuals.

Most of what we know of muriqui natural habits comes from one private reserve, the Caratinga Biological Station. This site, along with larger areas now being studied (e.g., Carlos Botelho State Park and Fazenda Intervales, both in São Paulo) are also important for the continuation of research and the acquisition of comparative data. In Carlos Botelho, for instance, two years of trail cutting and habituation were necessary before systematic data began to be collected (Oswaldo Carvalho Jr., pers. comm.). Establishing further field sites for muriqui research is important but also time consuming, and the already productive field sites should be respected for their potential as guaranteed sources of rapid data acquisition.

Perspectives: Other plans for preserving wild primate populations demonstrate the complexity of management action. The reintroduction program of the golden lion tamarin, for instance, was accompanied by prior and follow-up studies of the behavior and ecology of captive and wild groups, a carefully designed environmental awareness campaign, and the reinforcement of the protection of the Poço das Antas Biological Reserve (Dietz *et al.*, 1986). Even then, unpredicted factors, such as the need to train groups to locomote on flexible supports and to search for food through micromanipulation, prior to release into the wild, delayed the success of the project. For *Leontopithecus*, the effect of this delay was counterbalanced by an extensive and successful captive breeding program.

Muriquis have slow rates of infant development, take approximately six years to mature, and mothers give birth to a single infant every two years at best (Strier, 1992). Success in captive breeding is beginning to be achieved for the first time at the Rio de Janeiro Primate Center (Coimbra-Filho *et al.*, 1993, 1994), but the establishment of a viable captive genetic bank could be a matter of many years. There is little room for trial and error, or the misplacement of priorities. Saving *Brachyteles* requires a thoughtful and scientifically sound plan.

Karen Strier is currently organizing a symposium on field studies of muriqui ecology and behavior, to be held at the VIth Congress of the Brazilian Primatological Society in July, 1994. Each researcher will summarize his/her objectives and results, and their significance to the conservation and management of *Brachyteles*. Likewise, the IUCN/SSC Captive Breeding Specialist Group is planning a Population and Habitat Viability Analysis (PHVA) workshop for early 1995. The symposium and workshop will tell us how much we know and what we should learn in the immediate future, and help us establish our priorities. It will represent the first opportunity for Célio Valle's old idea of a truly comprehensive plan to take off.

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News

PROJECT KEYSTONE PLANTS FOR LARGE FRUGIVORES IN THE ATLANTIC FOREST OF BRAZIL

The importance of fruits for the community of large frugivores (including birds and mammals) has been studied since 1986 by Mauro Galetti in a semideciduous forest near Campinas, in the state of São Paulo. In this study the diets of tufted capuchins (*Cebus apella*) (see Galetti and Pedroni, 1994) and brown howling monkeys (*Alouatta fusca*) (see Galetti *et al.*, 1994) were compared with the whole community. The study was presented as a master's thesis at the State University of Campinas (Unicamp) under the supervision of Dr. Patrícia Morellato (Galetti, 1992; Galetti, 1993). In contrast to studies in the Amazon region, keystone plant species were not evident. Primates shift their diets during the periods of fleshy fruit scarcity (dry season), whereas birds usually migrate or eat fruits of low nutritional value. During the dry season capuchins became seed and flower predators while howlers increased the amount of leaves in the diet (Galetti and Peres, 1993).

To determine if this pattern is a general trend in the Atlantic forest, Mauro Galetti is continuing his studies as a Ph.D. candidate at the University of Cambridge, England, under the supervision of Dr. David J. Chivers. His field work started in October 1993 at Fazenda Intervales, Sete Barras, São Paulo, where he is studying the population density and

diet of muriquis (*Brachyteles arachnoides*), capuchin monkeys, tapirs, agoutis and large frugivorous birds, such as guans, cotingas and toucans, together with the plant phenology. This 2-year project has the logistical support of the State University of São Paulo (UNESP) at Rio Claro and the Fundação Florestal do Estado de São Paulo. Financial support is being provided by the Brazilian Science Council (CNPq), NYZS The Wildlife Conservation Society, Fundação O Boticário de Proteção a Natureza, The John D.and Catherine T.MacArthur Foundation and The World Wide Fund for Nature (Brazil).

The project has two phases. The first involves the determination of the phenology, floristic communities, and the structure of the forest, together with the seasonality of occurrence of birds and mammals. The second phase will determine the importance of fruits in the diets of the various large frugivores throughout the year. The results of this study will be important not only to understand the role of large frugivores on seed dispersal, but also in the determination of the diet of several poorly known and endangered species, such as muriquis, jacutingas and toucans, and principally to estimate the impact of logging (or harvesting) of key plants on the community of large frugivores in the Atlantic forest of Brazil. Preliminary results have shown that palms, fig trees and Lauraceae trees which are usually considered important for large frugivores are absent or rare in the logged forest.

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ECOLOGY AND SOCIAL RELATIONS OF THE BLACK-CHINNED EMPEROR TAMARIN

A study of the ecology and social relations of *Saguinus imperator imperator* in the Zoobotanical Park of the Federal University of Acre (9^{o}-10^{o} S, 68^{o} W; 155 m, above sea level, area 100 ha) has been underway since August, 1993. The vegetation of the study site is composed mainly of secondary forest in different successional stages. The most frequent plant species are: "aricuri" *Attalaea excelsa,* "castanheira" *Bertolletia excelsa*, "cumarú-ferro" *Coumarouma speciosa*, "embaúba" *Cecropia* sp., "murumuru" *Astrocaryum murumuru*, "sapé" *Imperata brasiliensis*, "seringueira" *Hevea brasiliensis*, "sumaúma" *Ceiba pentandra*, and "taboca" *Olyra cordifolia* (see Deus and Forneck, 1992). Troops of saddleback tamarins (*Saguinus fuscicollis weddelli*), titi monkeys (*Callicebus cupreus cupreus*), and night monkeys (*Aotus nigriceps*) also inhabit the area (Bicca-Marques *et al.*, 1993). The first step of the study, a survey of the population by the transect method, used a pre-existing trail of 2.7 km. During this period one study group was selected. This group, composed of seven individuals (one adult male, one adult female, two subadult males, one subadult female, and two infant females), was captured in a so-called "*Saguinus* trap" (Encarnación *et al.*, 1990). All individuals (except infants) were anesthetized, fitted with collars of different colors, weighed and measured. The next steps involve opening up a trail system, habituating the group, and a systematic botanical survey. After the conclusion of these steps the study of the ecology (feeding, ranging, daily activity patterns) and social relations will begin.

The importance of this research is related to the endangered status of this subspecies (Rylands *et al.*, 1993) and the lack of field studies within its small geographic distribution; the region between the Rios Purus and Acre in the eastern and southeastern part of the states of Acre and Amazonas, respectively (Hershkovitz, 1979) - an area that has been increasingly altered by human activities, such as cattle ranching. The study is supported by a Regional Scientific Development Fellowship of the Brazil Science Council (CNPq).

Cláudia Calegaro-Marques and **Júlio César Bicca-Marques**, Parque Zoobotânico and Departamento de Ciências da Natureza, Universidade Federal do Acre, 69908-210 Rio Branco, Acre, Brazil.

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QUANTIFICAÇÃO MORFOLÓGICA EM PRIMATAS NEOTROPICAIS

Hershkovitz (1977) abordou amplamente diversos aspectos da morfologia dos calitriquídeos, mas outras análises ainda podem ser propostas com o uso de técnicas de quantificação morfológica, atualmente recomendadas. Este tem sido o escopo dos estudos que realizamos no acervo do Museu Primatológico do Centro de Primatologia do Rio de Janeiro (CPRJ-FEEMA). Os dados amostrados nesta coleção são do tipo "cross-sectional", isto é, vários indivíduos estudados em diversas idades.

As técnicas que empregamos seguem os pressupostos da alometria (Gould, 1966) e análises multivariadas como as análises discriminante (AD) e dos componentes principais (ACP). O primeiro estudo que realizamos na coleção do CPRJ investigou o relacionamento alométrico do peso cardíaco (g) com o peso corporal (g) e o comprimento cabeça-corpo (mm) em *Callithrix jacchus* (n=17) e *Callithrix penicillata* (n=14). Encontramos alometria positiva para a relação do peso cardíaco com o peso corporal para ambas espécies (exceto para fêmeas de *C. penicillata* que foi isométrico) e comparado com o comprimento cabeça-corpo em fêmeas de *C. jacchus* e machos de *C. penicillata*. Os machos de *C. jacchus* foram isométricos enquanto as fêmeas de *C. penicillata* mostraram-se alométrico-negativas, A hipótese nula não pode ser rejeitada para o dimorfismo sexual nas elevações dos gráficos.

Em estudo subsequente, analisamos a variação do peso corporal e comprimento cabeça-corpo em três espécies do gênero *Callithrix* (*C. kuhli*, n=90; *C. geoffroyi*, n=76; e *C. aurita*, n=25) nas diversas faixas etárias. Os resultados sugerem que todas as espécies estudadas são monomórficas quanto aos parâmetros corporais estudados. *C. aurita* mostrou-se maior que *C. geoffroyi* e *C. kuhli*, apesar das diferenças interespecíficas não serem significativas ($p > 0,05$).

O estudo morfométrico da cabeça nas mesmas espécies de *Callithrix* mencionadas acima constou da terceira etapa de estudos na coleção do CPRJ. Constatamos dimorfismo sexual na largura da cabeça (mm) em *C. kuhli* (análise univariada) e no relacionamento alométrico (análise bivariada) nas três espécies na largura inter-orbitária (mm). A análise discriminante (análise multivariada) falhou em discriminar as três espécies.

Estes estudos, assim como outros que realizaremos na coleção de primatas do CPRJ, contribuem para um maior conhecimento de aspectos morfológicos destes primatas ameaçados de extinção. Agradeço a toda equipe do CPRJ-FEEMA pelo apoio, bem como aos Drs. Adelmar F. Coimbra-Filho e Alcides Pissinatti pelas críticas e sugestões.

Carlos Henrique de F. Burity, Departamento de Anatomia. Instituto de Biologia, Universidade do Estado do Rio de Janeiro, Av. 28 de Setembro, 87 fundos, 20551-030 Rio de Janeiro, Rio de Janeiro, Brasil.

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1993 INTERNATIONAL STUDBOOK FOR THE GOLDEN-HEADED LION TAMARIN

The international studbook for the golden-headed lion tamarin, *Leontopithecus chrysomelas*, is developed and maintained under the auspices of the International Recovery and Management Committee (IRMC) for the species, chaired by Jeremy J.C.Mallinson (Jersey Wildife Preservation Trust) and Adelmar F.Coimbra-Filho (Centro de Primatologia do Rio de Janeiro). This sixth edition was organized by the new keeper, Helga de Bois (Royal Zoological Society of Antwerp), and its publication by the Antwerp Zoo was financed by the Jersey Wildlife Preservation Trust. Jon Ballou (National Zoological Park, Washington, D.C.) and Helga de Bois are the Regional Coordinators for North America and Europe, respectively. The Studbook covers the period 1st September 1992 to the 31st December 1993, and is maintained in the SPARKS studbook program developed by the International Species Information System (ISIS). Following an introduction, it gives a listing of recent bibliography and the institutions involved in the program, and the studbook proper includes the living animals by institution, deaths (1 September 1992 to 31 December 1993), and the complete studbook listing to 31 December 1993. It records 575 living animals (293.232.50) in South America (235 in 11 institutions), North America (101 in 18 institutions), Europe (208 in 18 institutions) and Asia/Australia (31 in two institutions), with 49 participating institutions in all. Overall, the growth of the captive population since 1 September 1992 was 22%, but was not even between the regions maintaining the species. North American populations remained stable from 31 August 1992, while in Europe and Brazil the population increased by nearly 30%, and in Asia/Australia by more than 50%. In a progress report to the IRMC, Helga de Bois argued that considering space availability, and taking into account minimum requirements to ensure long-term demographic and genetic health of the captive population, the most important management action at present is to aim for zero population growth, achieved at present only in North America thanks to the intensive management of the coordinator Jon Ballou and the cooperation of the participating institutions. Concerning the genetic status of the population, the report recorded 154 founders, of which only a small part is not yet represented (lacking living descendants). However, despite this relatively large number of founders it will be important to continue management for more equal representation, illustrated by a comparison of the genetic situation between North America and Europe. Although Europe has twice as many founders, genetic analysis showed that both regions have lost about equal amounts of genetic diversity (North America 4.4% and Europe 4%). This is because the variation in genetic representation of the individual founders is much higher in Europe, resulting in a relatively higher loss due to random drift, compared to North America. A free copy of the 6th International Studbook for the golden-headed lion tamarin is available on request from the studbook keeper.

Helga de Bois, Royal Zoological Society of Antwerp, Koningin Astridplein 26, 2018 Antwerpen, Belgium. Fax: (03) 231 0018.

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1993 U. S. REGIONAL COTTON-TOP TAMARIN STUDBOOK

The North American Regional Cotton-top tamarin studbook for 1993 (data accurate to 31 December 1993) was published in March 1994 by Gerald D.Aquilina, N.A.Regional Studbook Keeper, with the help of Jean Miller, Buffalo Zoo Registrar. It reports live animals only and the data is presented in three ways: living animals by studbook number, living animals by location, and living animals in work sheet form (including sibling and offspring counts and founder representation). 238 animals were registered (113.112.13) in 49 institutions. The total number of founders represented in the population is 81, with a Founder Representation Parity of 1.23. The 1993 Studbook used SMS, provided and supported by the Houston and Toledo Zoological Gardens and Andrew Odum, and is now

also in the SPARKS format. It was produced with the support and financial backing of the Zoological Society of Buffalo, Inc., Executive Director, Minot H.Ortolani.

Gerald D. Aquilina, Buffalo Zoological Gardens, 300 Parkside Avenue, Buffalo, NY 14214, USA.

Reference

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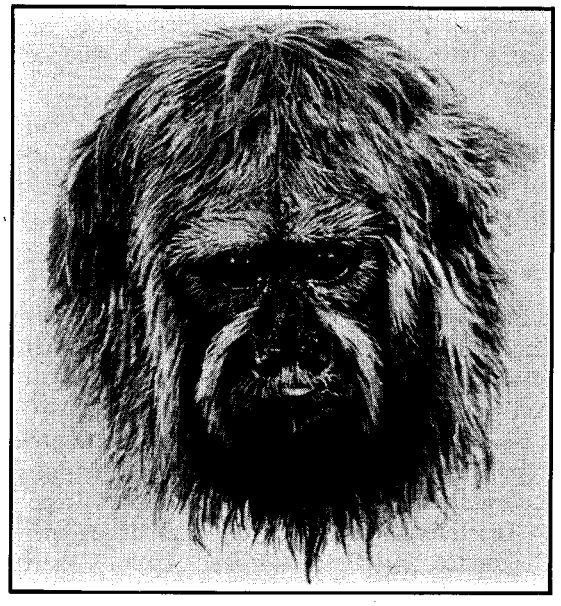
ILLUSTRATED MONOGRAPHS OF LIVING PRIMATES



This is an entirely new and completely up-to-date series of reviews, which will eventually cover all of the 200 or so living species, and many more subspecies, of primates. They are edited by Jan B.Kaiser, Marc van Roosmalen and Russell A.Mittermeier. Profits raised by sales of this important new work will be used to purchase key areas of natural habitat or to otherwise assist in the protection of some of the world's most threatened species. Each publication deals with one species, including subspecies. Since the amount of information available varies between species, the size and price will also vary. The Monographs, limited editions of 1500, will not look like ordinary books, they will be looseleaf, enabling the addition of new information from time to time, and the size of each page will be approximately 70 x 50 cm. The text and color illustrations will be printed on 250 g paper, lacquered to protect from fingermarks.

The first Monograph deals with the white-faced saki, *Pithecia pithecia pithecia*, from the Guianas and northern Brazil, and the gold-faced saki, *P.p.chrysocephala* from the Brazilian Amazon. It has many exquisite full-color plates by the late Italian artist Piero Cozzaglio and the German artist/zoologist Arnd Knijnenberg, along with original contributions by Roberta Bodini, Warren Kinzey, Anthony Rylands, Eleonore Setz, Ingo Homburg, Angela Peetz, Jean-Christophe Vié and others. In addition to four large drawings of the two subspecies, this monograph comprises some 60 pages of text, with more than 25 smaller color illustrations and a wealth of previously unpublished material on the appearance, behavior, and lifestyle of these small monkeys, including a new subspecies, the Manacapurú gold-faced saki. In addition, for the academic reader, there are detailed distribution maps (with a gazetteer), transcripts of previously published texts which make reference to the animal from the time of Linnaeus to the present day, a chapter on food plants (with color drawings) and forest types, and an extensive bibliography.

Because we believe that the publication of a special work such as these monographs should contribute to the preservation of primates, the profits will be dedicated to supporting conservation projects especially with regard to the maintenance and improvement of existing nature reserves. More detailed information can be obtained on request. In practice, it means that after production expenses have been covered, half of the additional revenue will be spent on nature conservation, while the other half will be used to fund the publication of the second and third monographs, resulting in approximately one-third of the price going to primate conservation projects. Two projects have been chosen as beneficiaries of the first monograph: the Mamirauá Project on the upper Amazon, and the Wildlife Rescue Program and proposed wildlife reserve at Petit-Saut in French Guiana. The price for the first Monograph will be £170 or US$250 (shipping and tax not included). Subscriptions received before publication date (by 1st October 1994) will be entitled to a 20% discount: the pre-publication price is therefore £135 or US$195. Pre-publication subscribers will be mentioned by name in the Monograph, and they will also be eligible for a discount on future Monographs. Subscriptions or inquiries to the address below.

There are 14 different plates by Piero Cozzaglio (posters of 20" x 27") of a number of primates (including mountain gorilla, ring-tailed lemur,

black lemur, black spider monkey, muriqui, gold-faced saki and buffy-headed marmoset). These, along with 11 postcard sized illustrations, are available separately at a special offer price (contact address below for further details).

Jan B. Kaiser, (Foundation) Illustrated Monographs of Living Primates, P.O.Box 160, 8091 PA Wezep, The Netherlands. Fax: +31 (for Holland) 5253.3123.

PRIMATE PREDATORS

Dr Robert W. Sussman and Donna L.Hart of the Primate Biology Program, Department of Anthropology, Washington University, St. Louis, are carrying out a survey dealing with predation on primates. They are requesting information on predation or mobbing by means of a simple questionnaire. Information collected from the questionnaire will form part of a Ph.D dissertation by Donna Hart. In addition, they would welcome information on unanalyzed fecal samples or nest debris of carnivores or raptors, and would be prepared to study the material to determine the presence of primate remains. Please contact: Prof. R. W. Sussman or Donna L. Hart, Primate Biology Program, Department of Anthropology, Washington University, Campus Box 1114, One Brookings Drive, St Louis, Missouri 63130-4899, USA. E-mail:dhart@artsci.wustl.edu.

COMMUNITY CONSERVATION CONSULTANTS

CATALYSTS FOR RURAL CONSERVATION

Community Conservation Consultants (CCC) is an organization designed to meet the emerging new challenges facing both local and global conservation by stimulating localized community conservation activism. CCC strives to establish community sanctuaries based on voluntary participation and respect for the capacity, ability, and desire of rural people and landowners to be stewards of their own lands. CCC provides local groups appropriate approaches regarding the conservation of target species and/or habitats. Our goal is to empower local people to manage their own lands with minimal outside interference. Its programs strive to leave a local organization or group in charge of managing and perpetuating the newly formed community-based sanctuary. Community conservation demands creative solutions to individual situations. Each project or conservation situation is unique and requires unique solutions often revolving around flagship species, specific habitats or natural landmarks, areas surrounding protected core areas, and species which are endangered or have small distributions, or which are locally prominent or historically important.

CCC began as Howlers Forever, Inc. in 1989 to aid the Community Baboon Sanctuary (CBS), Belize; an experimental grassroots conservation effort by rural Belizean subsistence farmers to protect the black howler monkey (*Alouatta pigra*). By approaching landowners from a position of respecting their autonomy, decision-making capacity, and way of life, while underscoring the benefits of proper management on their own lands, the CBS has succeeded in placing control of the stewardship of lands with the individual landowner. The CBS has become a successful model spawning a new wave of conservation projects in Belize and internationally.

CCC was formed under Howlers Forever, Inc. to broaden its functions to meet the growing interest in community conservation. Since the concept has the potential to be used commonly by local conservation groups, it thus has wide ramifications for protecting private and public lands throughout the world. Stimulated by the success of the CBS methods, other community projects are in various stages of planning or development. Presently, they center on Wisconsin and Central America, but CCC has answered inquiries from a wide variety of international conservationists interested in community sanctuaries.

CCC is currently involved in four main community projects as well as consultations on others and a number of research and publishing projects. *The Community Baboon Sanctuary*, initiated in 1985, involves seven villages and over 100 landowners to protect approximately 18 square miles of private lands. There is a tourism and education program centered on a small natural history museum at Bermudian Landing. The sanctuary is managed by a local committee with representatives of each village. Financial administration is currently by the Belize Audubon Society. CCC is working with participants to expand tourism to other villages, and in the creation of a history/forest use museum in St.Paul's Bank.

The Gales Point, Manatee project involves helping the community of Gales Point to create a protected area of the 170,000 acres surrounding the village

and encompassing a large river and lagoon system. The area extends through a cross section of varied ecosystems including: cayes, ocean tidal areas, coastal beach and mangrove forests, pine forests, lagoon mangrove forests, brackish lagoons, broadleaf semi-deciduous tropical rain forests, cohune palm forests, and riverine rain forests. The area also includes many limestone caves within the karst hills in which are found pot chards and bones, indicating ancient Mayan burial grounds. The Government of Belize has created two Special Development Areas for the region as interim protected areas. CCC volunteers have created a zoning plan for the area as well as specifically for the village which resides on a long narrow peninsula extending into the Southern Lagoon. Additional work includes carrying out a biodiversity assessment with a USAID grant, including a general survey of howlers (*Alouatta pigra*) and spider monkeys (*Ateles geoffroyi*) within the area. Village development work included installing better sewage systems, planting virus resistant coconuts, and creating a buoy system for manatee protection. Research work with the participation of villagers includes gathering data on tree phenology, hunting and fishing yields, monitoring and protecting sea turtle nests, as well as creating vegetation and wildlife GIS maps. CCC works with Belize Enterprises for Sustainable Ecology and the Gales Point Progressive Cooperative in these projects.

The *Kickapoo River Community Reserve* was initiated by CCC to bring local control to lands in Wisconsin along the Kickapoo River which have been under the control of the US Army Corps of Engineers as part of a failed dam project. The 9,500 acres, which were purchased under eminent domain by the Federal Government, have been a source of local conflict for 30 years. CCC initiated a proposal to create a community sanctuary and a rural education center for the area. Despite historical problems, the proposal was approved by the local ommunity with little dissent. Recently, the Wisconsin State Government passed legislation, written by a local committee, for the management of the lands. According to this legislation, the area will be managed by a nine-person Kickapoo Authority, six of whom will be local residents. CCC is helping to plan a museum of sustainability as well as creating a multi-use design for the protection of endangered species and for limited recreation.

Another project with primates as its focus involves CCC working with Pronatura of Yucatan to help the village of Punta Laguna in Mexico to protect their local population of spider monkeys (*Ateles geoffroyi*). The area is an archeological site which the Mayan community hopes to develop for additional tourism. There is also a rain forest honey project to develop income. Future CCC plans include gathering basic information on spider monkey ecology, creating a conservation plan for both *Alouatta* and *Ateles*, initiating tree phenology studies, and helping to create an area guidebook. The conservation plan will entail attempting to connect spider and monkey populations or habitats through expanding the protected areas or through corridors.

CCC has always valued and stimulated educational materials at all levels. Under the Orang-utan Press name, it has recently reprinted "A Belizean Rain Forest - the Community Baboon Sanctuary" by Robert Horwich and Jon Lyon. Other educational material projects include writing a book on Creole uses of rain forest plants, a guide to the Cockscomb Basin Wildlife Sanctuary, a guide to community tourism in Belize, and a booklet on converting farming practices to organic methods in Wisconsin.

A variety of research projects are also being carried out by CCC volunteers. These include studies on the ecology, social behavior, and population changes of the black howler monkey, and the phenology of trees in the Community Baboon Sanctuary, Cockscomb Basin Widlife Sanctuary, and the Manatee Special Development Area of Belize. Another primate research project involves reestablishing a population of howlers at the Cockscomb Basin Wildlife Sanctuary. This project is being carried out with the Wildlife Conservation Society and the Belize Audubon Society. Animals have been translocated from the Community Baboon Sanctuary to the Cockscomb Basin and are being monitored using radio transmitters. In addition to the study of animal movements, there is a study of the ecology of the translocated animals before movement and later while in their new environment. Translocations of 63 animals have been carried out in 1992, 1993, and 1994. Thus far, survival rate of the translocated animals has been over 85% for 1-2 years with 11 new infants born to the new location. Approximately 65 animals now comprise the new population.

CCC is interested in providing a service to help communities to protect their forests and wildlife. If any groups or individuals would like to help toward these goals or want additional information on any of the CCC projects or wish to receive the

CCC newsletter, please contact the following address.

Robert H. Horwich, Community Conservation Consultants, RD 1, Box 96, Gays Mills, WI 54631, USA. Tel: (608) 735-4717.

ROGER O. AND BARBARA E. BROWN PRIMATE RESEARCH FACILITY - CHICAGO FIELD MUSEUM

In 1991, the Chicago Field Museum of Natural History received $25,537 from the U.S.National Science Foundation to enhance the usefulness of a new storage area for its collections of New World and Old World primates. Formerly, these extensive collections had been installed with other mammals in "compact storage", which limited research access by the many resident and visiting scientists who study primates. Newly allocated space solved the access problem by trebling the number of access aisles. However, the new area lacked adequate lighting, electrical outlets, and counters to permit all desired research functions. NSF support and significant matching commitments by the Field Museum were used to: 1) paint and seal the floor; 2) add work counters equipped with electrical outlets for computers, microscope lights, and other devices; 3) add flourescent lighting throughout the collection area and over work counters; and 4) open shutters on exterior windows to permit the specimens to be examined under natural light. The facility is now fully equipped and is one of the most accessible worldwide for the study of non-human primates. It has been named the "Roger O. and Barbara E.Brown Primate Research Facility" in honor of two of the Museum's most active and dedicated benefactors.

Bruce D. Patterson, Curator of Mammals, Chicago Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605-2496, USA. E-mail: patterson@ fmnh785.fmnh.org.

ADELMAR COIMBRA-FILHO RETIRES AS DIRECTOR OF THE RIO DE JANEIRO PRIMATE CENTER (CPRJ/FEEMA)

This year saw the official retirement of Adelmar F.Coimbra-Filho as Director of the Rio de Janeiro Primate Center. The leading Brazilian primatologist over the last thirty years, just one of many of Coimbra's remarkable achievements in favor of the conservation of the Brazilian Atlantic forest and its primates was the founding of the Center in the late 1970's (inaugurated in November 1979). CPRJ (*Centro de Primatologia do Rio de Janeiro*) is roughly 100 km north of Rio de Janeiro, in a beautiful setting in the Serra dos Órgãos. With the help of his colleagues, Alcides Pissinatti, Roberto da Rocha e Silva, and Reginaldo A.Queiroz Ferreira, Coimbra's determination and foresight has made it today the most important breeding center worldwide for Atlantic forest primates, and most especially the lion tamarins and other callitrichids. The Center has more than 75 enclosures for breeding programs for endangered species, a headquarters, museum, library, acclimatization laboratory, a management and nutrition laboratory, and accomodation for visiting scientists. The endangered species held and bred at the Center include *Leontopithecus rosalia*, *L.chrysomelas*, *L.chrysopygus*, *Callithrix aurita* (subspecies *aurita* and *flaviceps*), *C.geoffroyi*, *C.kuhli*, *Saguinus bicolor* (subspecies *bicolor* and *martinsi*), *S.mystax*, *Cebus apella xanthosternos*, and *Brachyteles arachnoides*. The Directorship has been passed to Alcides Pissinatti. Although retiring as Director, Adelmar Coimbra-Filho is still active in his research, and campaigning and writing about the endangered Atlantic forest and its primates.

PROJETO DINÂMICA BIOLÓGICA DE FRAGMENTOS FLORESTAIS - CHAMADA PARA PROPOSTAS

O projeto multidisciplinar "Dinâmica Biológica de Fragmentos Florestais" do Instituto Nacional de Pesquisas da Amazônia (INPA) em convênio com o Smithsonian Institution, localizada aproximadamente 80 km ao norte de Manaus, Amazonas, iniciou-se em 1979. O objetivo central é estudar os efeitos ecológicos da fragmentação do hábitat de floresta tropical contínua. Outros estudos incluem pesquisas sobre a biologia da extinção, os efeitos de bordas de florestas, os processos de regeneração de florestas e a genética de espécies tropicais em relação à fragmentação. Existe também um programa de treinamento intensivo de alunos de pós-graduação e de difusão de informações para a área de conservação, tanto dentro do Brasil como no cenário internacional. Os resultados da pesquisa têm implicações importantes no manejo de reservas de floresta que permanecem em áreas desmatadas para a manutenção da maior diversidade de espécies possível. Além disto, informações sobre o funcionamento do ecossistema intacto podem ser obtidas através de comparações de florestas perturbadas com áreas de controle não perturbadas.

Através de uma chamada, de maio de 1994, o DBFF está propondo um orçamento limitado para financiamento de propostas de pesquisa que devem tratar de um dos seguintes tópicos: 1) efeitos bióticos e abióticos da fragmentação da floresta; 2) os mecanismos biológicos que resultam em extinção; 3) o processo de regeneração da floresta; 4) os processos ecológicos afetados pela fragmentação; e 5) a estrutura genética de populações em áreas isoladas (fragmentos). Somente propostas de pesquisadores qualificados (Ph.D ou equivalente) serão aceitas. Caso o projeto represente o trabalho de pós-graduação de um aluno, a proposta deve se acompanhada de uma carta do pesquisador principal (orientador) indicando o progresso do aluno no programa. Propostas acompanhadas de CVs atualizados devem ser enviadas até o dia 1° de agosto de 1994 para o endereço abaixo. Maiores informações sobre o Projeto DBFF: Dr. Claude Gascon, Coordenador Científico, PDBFF, Departamento de Ecologia, Instituto Nacional de Pesquisas da Amazônia (INPA), Caixa Postal 478, 69011-000 Manaus, Amazonas, Brasil. Tel: (092) 642-1148, Fax: (092) 642-2050.

PROGRAMA DE PÓS-GRADUAÇÃO EM ECOLOGIA, CONSERVAÇÃO E MANEJO

O curso de pós-graduação em Ecologia, Conservação e Manejo de Vida Silvestre (ECMVS), iniciado em 1989, é um curso em nível de mestrado dos departamentos de Biologia Geral, Botânica e Zoologia do Instituto de Ciências Biológicas da Universidade Federal de Minas Gerais (UFMG), Brasil. São objetivos centrais a formação de especialistas na área de ecologia e conservação da diversidade biológica, e cuja ênfase é o manejo de espécies para uso sustentável e os mecanismos ecológicos geradores e mantenedores da biodiversidade. Os egressos deste curso terão as bases ecológicas necessárias para atuar em ensino, pesquisa, conservação e manejo ambiental, em universidades, institutos de pesquisa, agências governamentais e entidades privadas. As atuais linhas de pesquisa incluem, entre outras: avaliação de impactos em ecossistemas aquáticos e terrestres, biologia reprodutiva de peixes, ecofisiologia vegetal, ecologia de comunidades e comportamento de abelhas e vespas, ecologia de parasitos, ecologia e comportamento de mamíferos, especialmente primatas, ecologia e dinâmica populacional de pequenos mamíferos, ecologia e sistemática de anfíbios anuros, ecologia evolutiva de herbívoros tropicais, ecologia quantitativa, fitossociologia, herbivoria e produção primaria em ecossistemas aquáticos. Em 1991, juntamente com a Faculdade de Ciências Econômicas da UFMG, foi iniciado um projeto (PADCT/CIAMB) que visa criar uma nova linha de ensino e pesquisa, enfocando as interfaces entre ecologia, demografia e economia, oferecendo disciplinas integradas nestas áreas e o desenvolvimento de pesquisas conjuntas na região do médio rio Doce, Minas Gerais. O curso mantém convênios e acordos de colaboração com várias instituições nacionas e internacionais, como a Fundação Biodiversitas, WWF e a Universidade de Flórida, Gainesville, entre outros. Notável é o apoio significante do U. S. Fish and Wildlife Service, Washington, D.C.

As inscriçõoes para as 12 vagas oferecidas este ano estarrão abertas de 1° de agosto a 30 de setembro de 1994. Informações e maiores detalhes podem ser obtidos com o Coordenador, Dr. Rógerio P. Martins, ou com o Sub-Coordenador, Dr. G. Wilson Fernandes, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Minas Gerais, Brasil. Fax: (031) 441-1412.

THE LINCOLN PARK ZOO SCOTT NEOTROPIC FUND

In 1986, the Lincoln Park Zoo Scott Neotropic Fund was initiated by the Lincoln Park Zoological Society and Zoological Gardens in support of *in situ* conservation efforts throughout Latin America and the Caribbean. By emphasizing support for young conservation biologists working in their own countries, the fund assists a new generation of researchers in becoming the environmental decision-makers of tomorrow and strengthens the core of conservation leadership throughout the Americas. The emphasis of the fund is to support new conservation initiatives with special consideration to projects which have: direct impact on wildlife conservation or conservation biology; direct participation by graduate and/or undergraduate students; involvement by students and/or field assistants from Latin America; or links to either the Lincoln Park Zoo animal collection or conservation interests of the zoo curatorial staff.

Since its establishment, the Fund has awarded nearly 45 grants in 13 Latin American and Caribbean nations. Each year it typically supports between five and 15 projects, including project renewals for a second year. Awards are seldom greater than US$7,500, and most fall into the range of US$3,000-US$5,000. Initial support is for

up to 12 months from the date of the award. Maximum duration is two years. Some of the projects supported during 1992-93 include: Protection of riverine forest habitat for howler monkeys (Belize); Survey of the non-flying mammals of the Caetetus Ecological Station in São Paulo (Brazil); Habitat use by mammalian carnivores in Iguaçu National Park (Brazil); Evaluation of community-based education programs in support of the golden-headed lion tamarin (Brazil); Assessment of large mammal and habitat distributions in the Lacandon Forest (Mexico); and Long-term studies of forest fragmentation in Veracruz (Mexico). For more information: Lincoln Park Zoo Scott Neotropic Fund, Director of Conservation and Science, 2200 North Cannon Drive, Chicago, Illinois 60614-3895, USA.

Primate Societies

PRIMATE FIELD STUDIES SUPPLEMENT - *PRIMATE EYE*

Each year the Primate Society of Great Britain (PSGB), Dr Hilary Box (University of Reading) - President, publishes a supplement to their journal *Primate Eye* which lists current field studies on primates throughout the world. It includes information on the location, species involved, aims, starting date, duration, and personnel and addresses. The most recent (15th) list was published as a supplement to number 52 of the journal. It is compiled through the analysis of questionnaires sent to field researchers.

The number of field studies listed (307) is double that recorded for 1991. The increase is due in part to a general geographic expansion in the number of countries involved in primate research, especially in Africa and the Americas, but also to the enthusiastic response to an exhuastive mail shot in October 1993. This has resulted in a four-fold increase in the Americas section and a doubling in the number of Asian studies since 1991. According to the listing the Ceboidea (86) are currently the second most studied group, second to the Cercopithecoidea (162) and followed closely by the Hominoidea (68). The number of projects focussing on Pongidae and cercopithecines in Africa has remained largely stable, whilst in Asia they have increased. More specifically, studies of orang-utans have doubled and studies on cercopithecines have quadrupled since the last supplement. It appears that the focus on colobines has faded slightly in Africa over the last two years, but intensified in Asia, whereas studies of prosimians and Hylobatidae have remained much the same.

For the Americas, field studies are listed for the following countries: Argentina (4); Barbados (1); Belize (1); Bolivia (6); Brazil (28); Colombia (4); Costa Rica (7); Ecuador (2); Frnch Guiana (1); Guatemala (2); Mexico (16); Panama (2); Peru (3); Puerto Rico (4); St.Kitts (1); Venezuela (6). The aims listed for the studies are dominated by aspects of conservation, although the study of psychological issues in free-ranging and feral primates has become more popular, as has a more general biological and ecological orientation.

The *Field Studies Supplement* is available from the PSGB Treasurer (£4.00): Dr Robin Crompton, Department of Human Anatomy and Cell Biology, PO Box 147, Liverpool L69 3BX, UK. Please send information about your current field studies for the next issue of the Supplement, and those who did not contribute to the 1994 supplement are strongly encouraged to get in touch at the address below so that the listing can be as complete as possible and furnish accurate data on the trends regarding studies of primates in the wild.

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Recent Publications

BOOKS

Marmosets and Tamarins in Captivity, edited by R.Colley, 72pp., 1992. Association of British Wild Animal Keepers (ABWAK). Price £9.50. Proceedings of Symposium 17 of ABWAK, Chester Zoo. Available from: Natural History Book Service Ltd., 2-3 Wills Road, Totnes, Devon TQ9 5XN, UK. Fax: +44 803 865280.

Mata Atlântica: Evolução dos Remanescentes Florestais e Ecossistemas Associados do Domínio da Mata Atlântica no Período 1985-1990 - Relatório, by the Fundação SOS Mata Atlântica and Instituto Nacional de Pesquisas Espaciais (INPE), São Paulo, 46pp., 1993. An analysis of the destruction of the Brazilian Atlantic forest between 1985 and 1990, based on maps scale 1:250,000, in the following states: Bahia, Minas Gerais, Goiás, Mato

Grosso do Sul, São Paulo, Rio de Janeiro, Espírito Santo, Paraná, Santa Catarina and Rio Grande do Sul (the north-east Brazilian states will be the subject of a subsequent publication). Contact: Fundação SOS Mata Atlântica, Rua Manoel de Nobrega 456, 04001-001 São Paulo, São Paulo, Brazil. Tel: (011) 887-1195, Fax: (011) 885-1680.

Utilización de la Fauna Silvestre en América Latina: Situación y Perspectivas para un Manejo Sostenible, by Juhani Ojasti, 248pp., 1993. *Guia FAO Conservación 25*, Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO), Roma. In Spanish. ISBN 92-5-303316-9. Contents: Introduction; Patterns of Use; Principal Species and Groups (turtles, lizards and snakes, caimans, ducks, cracids, armadillos, primates, carnivores, manatees, tapir, peccaries, camelids, deer, rodents, hares and rabbits); Administrative, Socioeconomic and Environmental Aspects; General Discussion and Conclusions; Recommendations; Bibliography; Appendices. Available from: United Nations, Food and Agriculture Organisation (FAO), Viale delle Terme di Caracalla, 00100 Rome, Italy. Fax: 52253152, 5782610, or 52255155.

Directorio de Centros de Capacitación y de Investigación de la Pan-Amazonia Miembros de la UNAMAZ, by Bernard Pirson, 503pp., 1993. Asociación de Universidades Amazónicas (UNAMAZ), Universidade Federal do Pará, Belém. This book is number 3 of the *Serie Información Amazónica* of UNAMAZ. It is a detailed catalogue of research institutions, training centers, and universities in the Amazonian regions of the nine Amazonian countries: Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, and Venezuela. Contact: Coordenadoria de Divulgação, UNAMAZ, Caixa Postal 558, Belém, Pará, Brazil. Fax: 010 55 (91) 224-2055.

Reframing the Green Window: An Analysis of the GEF Pilot Phase Approach to Biodiversity and Global Warming and Recommendations for the Operation Phase, by Ian A.Bowles and Glenn T.Prickett, 133pp., 1994. Conservation International (CI) and Natural Resources Defence Council (NRDC), Washington, D.C. Foreword by Russell A.Mittermeier, President of Conservation International, and John H. Adams, Executive Director of the Natural Resources Defence Council. This report looks at six GEF projects with a focus on four themes: 1) the ability of GEF projects to leverage policy and institutional changes; 2) whether the GEF was addressing "priorities" at the national or international level; 3) ownership - who in a wide range of stakeholders owns a given GEF initiative; and 4) the nettlesome concept of "incremental costs". Includes an Executive Summary, and the following chapters: Global Life Support Systems at Risk (discussions of global climate change and biodiversity); GEF: The Pilot Approach (What is the GEF?, Climate Change Portfolio, and Biodiversity Portfolio); CI/NRDC Analysis (methodology and case studies for Brazil - Wood Brazilian Power Demonstration Project; Mexico - ILUMEX; Nigeria - Escravos Flared Gas Reduction; Bolivia - Biodiversity Conservation Project; Colombia - Biopacific Project; and Indonesia - Biodiversity Conservation Project); Recommendations for Reform; Conclusion; Appendices (case studies); and Terms of Reference. Available from: Legislative Programs, Conservation International, 1015 18th Street NW, Washington, D.C. 20036, USA, or Natural Resources Defence Council, 1350 New York Avenue NW, Washington, D.C. 20005, USA.

Systematics and Conservation Evaluation, edited by P.L.Forey, C.J.Humphries and R.I.Vane-Wright, 350pp., 1994. Clarendon Press, Oxford. Price £50.00. This collection of essays reflects the wide range of views that are held of what constitutes biodiversity; from its perception in terms of species numbers, categorization of landforms, or different ecological levels, to a dynamic and socio-political need for our own survival. The problems of matching species numbers, variety and the systematic hierarchy to geographic areas which may wish to be saved are also addressed. Given the need to set priorities for conservation, it is suggested that the preservation of the systematic hierarchy - as the most complete representation of the evolutionary legacy - should be the goal of conservation, and ways are proffered by which this may be accomplished. Features: Provides a synthesis of systematics and conservation; Outlines methods for selecting priority areas for conservation; Challenges the concepts of 'megadiversity' and 'hotspots'; Discusses the problems of monitoring and establishing databases. Available from: Oxford University Press Distribution Services, Saxon Way West, Corby, Northants NN18 9ES, England, UK. Fax: 536 746 337.

Rainforest Remedies: One Hundred Healing Herbs of Belize, by Rosita Arvigo and Michael Balick, 255pp., 1993. Lotus Press, Twin Lakes. Price US$9.95 (+$1.50 shipping). A

document on the ethnobotany of the rain forest medicinal plants as well as the little-known practices of healers. Available from: Lotus Press, PO Box 325, Twin Lakes, WI 53181, USA. Fax: (414) 889-8591.

The View from Airlie: Community Based Conservation in Perspective, edited and published by the Liz Claiborne and Art Ortenberg Foundation, New York. 33pp., 1994. A brief narrative sampling of the discussions that occurred during the "Community Based Conservation Workshop" held at Airlie, Virginia, in October 1993. The Workshop was sponsored by the Liz Claiborne and Art Ortenberg Foundation. The document is intended to convey the Foundation's perceptions of the event. The full proceedings (in press) have been edited by David Western (Wildlife Conservation Society, Kenya), Michael Wright (The Nature Conservancy, USA) and Shirley Strum (WCS, Kenya). Available from: Liz Claiborne and Art Ortenberg Foundation, 650 Fifth Avenue, New York, NY 10019, USA.

The Digestive System in Mammals: Food, Form, and Function, edited by David J.Chivers and Peter Langer, 400pp., 1994. Cambridge University Press, Cambridge. Price £55.00. Covers a wide range of topics including gut function, foraging and digestion, and nutritional ecology. Available from: Natural History Book Service Ltd., 2-3 Wills Road, Totnes, Devon TQ9 5XN, UK. Fax: +44 803 865280.

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Meetings

1994

CHEMICAL SIGNALS IN VERTEBRATES VII, 18-22 July 1994, University of Tübingen, Tübingen, Germany. A symposium on the multidisciplinary study of chemical signals (olfaction and taste) in all vertebrates including humans. Contact: Prof.Dr R.Apfelbach, University of Tübingen, Dept. of Zoology, Auf der Morgenstelle 28, 72076

Tübingen, Germany. Tel: 49-7071-292624, Fax: 49-7071-294634.

I Encontro Científico da Reserva da Biosfera da Mata Atlântica, 19 e 20 de julho de 1994, Universidade Federal do Espírito Santo, Vitória, Brasil. Organizado pelo Conselho Nacional da Reserva da Biosfera da Mata Atlântica (RBMA) e o Instituto de Pesquisas da Mata Atlântica (Ipema). Contact: Sérgio Lucena Mendes, Museu de Biologia Mello Leitão, Santa Teresa, 29650-000 Espírito Santo, Brasil. Tel/Fax: (027) 259-1182.

Joint Annual Meeting - Animal Behavior Society (ABS) and American Society of Primatologists (APS), ABS - 23-28 July 1994, ASP - 27-31 July 1994, Regional Primate Research Center, University of Washington, Seattle. A joint meeting will be held on 28 July. Contact: James C. Ha (jcha@u.washington.edu) or Carolyn Crockett (crocket@u.washington.edu), Primate Center SJ-50, University of Washington, Seattle, WA 98195, USA. Tel: (206) 543-1440.

XX Congresso Brasileiro de Zoologia, 24-29 de julho de 1994, Universidade Federal do Rio de Janeiro, Rio de Janeiro. A tematica a ser abordada está baseada na questão: "Os Rumos da Zoologia", incluindo aspectos referentes a Sistemática, pesquisa básica e aplicada, filosofia e historia de zoologia, coleções, publicações e a ética de zoologia. As políticas referentes as legislações ambientais, áreas de proteção e espécies ameaçadas de extinção, terão espaços em mesas redondas e/ou conferências. Envio de resumos até 30 de novembro de 1993. Informações: Secretaria do XX CBZ, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21949-900 Rio de Janeiro, Rio de Janeiro, Brasil. Tel: (021) 280-7993, 590-9522 r. 343 ou 340, Fax: (021) 280-7993.

VI Congresso Brasileiro de Primatologia, 24-29 de julho de 1994, Universidade Federal do Rio de Janeiro, Rio de Janeiro. Será realizado como parte das atividades do XX Congresso Brasileiro de Zoologia. Programação: Horácio Schneider/ Stephen F. Ferrari, Departamento de Genética, Universidade Federal do Pará, Caixa Postal 8607, 66075-150 Belém, Pará, Brasil. Fax: (091) 229-9785, e-mail: ferrari@saci.ufpa.br. Outras informações: Secretaria do XX CBZ, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21949-900 Rio de Janeiro, Rio de Janeiro, Brasil.

4th International Congress of Vertebrate Morphology, 31 July-4 August 1994, Chicago. Contact: Dr Susan Herring, Chair, ICVM Organizing Committee, Department of Orthodontics SM-46, University of Washington, Seattle, Washington 98195, USA, Tel: (206) 543-3203, Fax: (206) 685-8163, e-mail: HERRING@u.washington.edu.

XVth Congress of the International Primatological Society, 3-8 August 1994, Kuta, Bali, Indonesia. Organizers: Directorate General of Forest Protection and Nature Conservation (PHPA), the Indonesian Wildlife Society (IWS) and the International Primatological Society (IPS). The theme of the Congress will be "Biodiversity Conservation to Enrich Life and Option for Progress". Contacts: Secretariat, 15th IPS Congress, c/o M.I.C.E. Division, PT Bayu Buana Gelar Pariwicara, Wisma Bank Dharmala 19th Floor, Jl.Jend.Sudirman, Kav. 28, Jakarta 12910, Indonesia, or Dr Linda Prasetyo, c/o Perth Zoo, 20 Labouchere Road, Western Australia 6151, Australia, Tel: 09 368-1916, Fax: 09 367-3921, or Dr Soegardjito , WWF/US Asia-Pacific Program, 1250 Twenty-fourth Street, N.W., Washington, D.C. 20037, USA, Tel: (202) 861-8300, Fax: (202) 223-6971.

Vth International Behavioral Ecology Congress, 14-20 August 1994, University of Nottingham, England. Contact: ISBE 1994, Conference Nottingham, The Business Information Centre, 309 Haydn Road, Nottingham NG5 1DC, UK.

VIth International Congress of Ecology: Ecological Progress to Meet the Challenge of Environmental Change, 20-26 August 1994, University of Manchester, England. Symposia include: Learning from the Past (org. A.G.Hildrew, R.M.May); Predicting Outside our Experience (org. J.Grace, R.M.May); Managing Change and Uncertainty (org. M.V.Angel, P.J.Grubb). Symposia + related poster sessions will be organized around the following titles: General Ecology; Applied Ecology; Geographical Regions and Ecosystems; Ecological Affairs. Deadline for abstracts: 15 September 1993. Registration deadline: 1 May 1994. Contact: The Secretary, VI International Congress of Ecology, The Manchester Conference Centre, U.M.I.S.T., P.O.Box 88, Manchester M60 1QD, England.

1994 Annual Meeting of the Captive Breeding Specialist Group (CBSG), 26-28 August 1994, hosted by the Fundação Parque

Zoológico de São Paulo, São Paulo. To be held in the São Paulo Hilton. Contact: CBSG Conference Coordinator, Marsans International, Rua Sete de Abril 404. 11º Andar, 01044-000 São Paulo, São Paulo, Brazil. Tel: 55 11 255-5744, Fax: 55 11 255-2478.

VI Congresso Latinoamericano de Botánica y XXIV Jornadas Argentinas de Botánica, 2-8 October 1994, Mar del Plata, Argentina. Organizers: Asociación Latinoamericana de Botánica y Sociedade Argentino de Botánica. Contact: Secretaria Ejecutiva, Renée H.Fortunato, Instituto de Recursos Biológicos, C.C.R.N., I.N.T.A., 1712 Castelar, Provincia de Buenos Aires, Argentina. Tel: 54 1 621-0840, 621-1819, 624-6903. Fax: 54 1 481-2360.

Resources and Environmental Monitoring, 3-7 October 1994, Niterói, Brazil. Contact: Roberto Pereira da Cunha, INPE, Caixa Postal 12201, São José dos Campos, São Paulo, Brazil.

Forest Canopies - Ecology, Biodiversity and Conservation, 10-13 November 1994, Marie Selby Botanical Gardens, Sarasota, Florida, USA. Contact: Dr Meg Lowman, Director of Research, Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida 34236, USA.

European Marmoset Research Group, 1st General Assembly, November 1994, Paris. Includes the inaugural workshop of the European Marmoset Research Group (EMRG) with the theme "Fundamental and Applied Aspects of Marmoset Science", including spoken review papers and specialist spoken posters in six broad fields of fundamental and applied science. Topics include: Housing and Husbandry; Nutrition and Health; Social and Reproductive Biology; Learning and the Central Nervous System; and Physiology. Anthony B.Rylands will present the special guest lecture on "The Callitrichidae: a Biological Overview". The edited proceedings will be published as a "EMRG Laboratory Handbook of Marmoset Science". Contact: Christopher Pryce, Anthropologisches Institut, Universitat Zürich-Irchel, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland.

II Congresso Brasileiro de Ecologia, 5-9 December 1994, Londrina State University, Paraná, Brazil. Contact: Dr Nélio Roberto dos Reis, Coordenador Científico do II CBE, Departamento de Biologia Animal e Vegetal, Centro de Ciências Biológicas, Campus Universitário, Universidade Estadual de Londrina, Caixa Postal 6001, Londrina 86051, Paraná, Brazil, Tel: (0432) 21-2000, Fax: (0432) 27-6932.

Contributions

We would be most grateful if you could send us information on projects, research groups, events (congresses, symposia, and workshops), recent publications, activities of primatological societies and NGOs, news items or opinions of recent events and suchlike, either in the form of manuscripts (double-spaced) or in diskettes for PC compatible text-editors (MS-Word, Wordperfect, Wordstar). Articles, not exceeding six pages, can include small black-and-white photographs, figures, maps, tables and references, but please keep them to a minimum.

Please send contributions to the editors: **Anthony Rylands**, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Brazil, Fax: (031) 441-1412, or c/o Conservation International, Avenida Antônio Abrahão Caram 820/302, Pampulha, 31275-000 Belo Horizonte, Minas Gerais, Brazil, Fax: (031)441-2582 or **Ernesto Rodríguez Luna**, Parque de La Flora y Fauna Silvestre Tropical, Universidad Veracruzana, Apartado Postal 566, Xalapa, Veracruz 91000, México, Fax: (281) 8-77-30.

Liliana Cortés-Ortiz (Universidad Veracruzana) and Miriam Menezes Lima (Conservation International, Belo Horizonte) provide invaluable editorial assistance. Ludmilla Aguiar, Conservation International - Brazil Program, Belo Horizonte (address above), is responsible for the distribution of *Neotropical Primates*. Please keep us informed of any address changes.

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Recognizing the outstanding contribution of the IUCN/SSC volunteer networks of biodiversity experts worldwide for the conservation of endangered species, Earthkind (The Humane Society's international arm) has joined us in supporting this newsletter. The chairman and the editors extend their thanks and welcome Earthkind in this initiative.

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