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Howler monkeys: Who coordinates their displacements when there is no hierarchy?

A CONICET fellow studied which factors influence the social organization and the use of territory for *carayas* monkeys. The key: competence for reproduction.

The black and Golden howler monkey, whose scientific name is *Alouatta caraya*, belongs to the *Alouatta* genus and it is found further south in the distribution of this species. It inhabits in Paraguay, south of Brasil, north and east of Bolivia and north of Argentina, where it inhabits in jungles and in forest galleries on the banks of rivers and streams.

Since 2003, Vanina Fernández, biologist and CONICET Fellow, has studied the behaviour of howler monkeys from the “Isla Brasileira” in the Province of Chaco and the Corrientes Biological Station both in Argentina. The aim is to determine who coordinates the displacements of these groups and why. The first results of their work were published in the scientific magazine *Primates*.

All animals of the *Alouatta* genus are sociable, that is to say that they live in groups. They can gather up to 21 individuals, with groups of about one or four males, up to five adult females, then male and female juveniles and the small ones.

During the day they climb trees for different reasons. In some cases they climb in search of food -mainly leaves and fruits-, or they leave to monitor their territory or rest. In fact, they rest 60 percent of their time.

Decisions about when or where to move influence feeding strategies, the source of food selection, defence of territory and the probability of encountering predators and other howlers' group. The objective of Fernández's investigation was to analyse how sex, age, the females' reproductive state and dominance affect patterns and displacement coordination. All these happen in the context of possible meetings with other howlers that could compete for the same resources.

“An interesting point regarding this species is that these groups do not have a hierarchical structure marked with a dominant monkey; they have a central male though,” Fernández comments and adds “This is important because the one that leads the movements is who decides what to do. During our fieldwork we could observe that suddenly one of the monkeys gets up and starts to move and although we did not register a level of voice communications within the group associated to this event, the rest followed this monkey. So the question is: why?”

The results of Fernández study show that although any member of the group could lead displacements, even the juveniles, and the factor of higher incidence is the age. From the 262 reported displacements, almost 95 per cent were led by the adults.

According to the classical models of Primatology, the social structure and the displacements are determined mainly by the resources' availability: while the female are limited by the quantity of

food, because they need to be physically fit to have offsprings, male just find themselves limited by the number of females because they have to copulate with most of them in order to produce a greater number of offsprings.

However, the biologist comments that there are cases in which these models do not apply: "We observed groups that move to eat something they had in the same place where they were, and we wonder why. My hypothesis is that they take advantage of these displacements to monitor the trees located in their territories and to check which available food they can eat on another day. These movements are coordinated by the adults because they know the land", she explains.

The study shows that in the *caraya* groups that were studied, the availability of food is not the only key factor in the structuring of social relationships of the primates. Evidence shows that another important factor would be the competence for reproduction. This would be the reason why males guide more frequently the displacement when they meet other group of howlers.

"Since males lead and decide when and where to go to fight, they make decisions to try to restrict the possibility that the females copulate with other groups", the fellow comments and explains that these observations substantiate the hypothesis related to leadership with attempts to monopolize copulations within the same group.

When the females are receptive, that is to say, ready to conceive, they try to copulate with all the males available. In fact, 53% of the copulations with other groups take place during fights among groups. "So for the males, it is not a good strategy to meet other groups when the females are receptive. However, when women from other groups are receptive, it is a good chance for them because they can copulate", Fernandez explains.

Thus, the biologist explains that this capacity of *caraya* female to copulate with several males would be related to two causes: on the one hand, it could be a way to keep Bonds which are essential in social animals like the monkeys or it could be a strategy to avoid infanticide. This tends to happen when there is exchange of males between two groups and the females are not receptive because they are breastfeeding or conceiving. Consequently, the male enters the group and kills the baby so that the female would be receptive again.

"When the female copulates with all possible male of her same group or others, she eliminates the possibility of certainty of parenthood and so the male would not be able to recognize if an offspring is his or not and he would let it live", Fernández concludes.

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Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

Con 55 años de existencia, el CONICET trabaja junto al Ministerio de Ciencia, Tecnología e Innovación Productiva de la Nación en la transferencia de conocimientos y de tecnología a los diferentes actores que componen la sociedad y que se expresan en ella.

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Presupuesto: con un crecimiento de 12 veces para el período 2003 - 2013, pasó de \$236.000.000 a \$2.889.000.000.

Obras: el Plan de Obras para la Ciencia y la Tecnología contempla la construcción de 90 mil m² en nuevos institutos, laboratorios y la modernización de instalaciones en diferentes puntos del país.

Crecimiento: en poco más de 5 años se duplicó el número de investigadores y cuadruplicó el de becarios, con una marcada mejoría de los estipendios de las becas y los niveles salariales del personal científico y técnico, en sus diferentes categorías.

Carrera de Investigador: actualmente cuenta con 7.485 investigadores, donde el 49% son mujeres y el 51% hombres. Este crecimiento favoreció el retorno de científicos argentinos radicados en el exterior.

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Para más información de prensa comuníquese con:

prensa@conicet.gov.ar
(+ 54 11) 5983-1214/16

Contacto de prensa
prensa@conicet.gov.ar
+ 54 11 5983-1214/16

Estemos en contacto
www.conicet.gov.ar
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Consejo Nacional de Investigaciones Científicas y Técnicas
Av. Rivadavia 1917 (C1033AAJ) República Argentina Tel. + 54 115983 1420