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AGGRESSION AND DOMINANCE REVERSAL IN A CAPTIVE ALL-MALE GROUP OF *CEBUS APPELLA*

Antonio Christian de A. Moura

Capuchin monkeys, *Cebus*, live in multimale-multifemale societies, with a dominant male and a dominant female (Fedigan, 1993; Izawa, 1980; Janson, 1984; Perry, 1996). Hierarchies are based mainly on age, size and sex, and older and larger individuals usually have higher rank (Freese and Oppenheimer, 1981). In the brown capuchin monkey, *C. apella*, the dominance order among males is directly related to age (Izawa, 1980, 1990). Aggressive interactions within the group are rather infrequent (Izar and Sato, 1997; Izawa, 1980), and dominance reversal events are rare (Robinson and Janson, 1987). However, Santini (1984), studying a captive *C. apella* group that had been split into three sub-groups, observed aggression among males when the group was re-united. After reunion the males skirmished among themselves in order to attain the alpha position. Byrne et al. (1996) reported on a dominance reversal and aggression among males in a captive *C. apella* group, but the reasons for the initial fight between the higher-ranking males were unknown. Izawa (1990) related two cases of dominance reversal in a wild group of *C. apella*. In one case a younger animal was supplanted by an older animal that had entered the group and in the other, reversal occurred between animals of the same age, but one was larger than the other. Moreover, neither of the dominance reversals involved the alpha male. In this note I relate a case of aggression and dominance reversal in a captive all-male group of *C. apella* apparently due to the increase in size of a juvenile.

The group was composed of three unrelated males: Chico, more than 20 years old, the dominant male; Tadeu, more

than eight years old; and Paulinho about five years old, a juvenile-subadult. They were maintained at the Laboratório Tropical de Primatologia (LTP) at the Federal University of Paraíba, in a large wire mesh enclosure (3.8 m x 4.2 m x 2.6 m), containing natural branches and platforms. They received three meals a day. The enclosure was subject to normal environmental and climatic conditions, since the LTP is located in a 5 ha remnant of coastal Atlantic forest. The animals had lived together, for at least two years.

The dominance order in the group was related to age, and the relationships between the group members was generally peaceful. In spite of this, Tadeu occasionally bullied Paulinho, mounting him, and sometimes barring his access to food. On 27 October 1996, there was a fight involving Paulinho, Tadeu and Chico. Paulinho and Chico attacked Tadeu, whose face was injured as a result. It was not possible to determine who started the fight nor who was more aggressive. However, most of Chico's attacks against Tadeu were prevented by the keepers using a hose to direct water at him, and likewise to stop Paulinho's attack. Due to the injuries suffered, Tadeu was isolated for medical treatment. About one week later he returned to the group. After that, on several occasions Tadeu avoided Paulinho, he became frightened of him, and usually screamed when Paulinho approached him. Tadeu, as such, became subordinate to Paulinho. Interestingly, after this event, when a person approached the cage only Chico and Paulinho would go to the netting to "greet" them.

On one occasion, the keepers observed Paulinho blocking Chico's access to food. On 19 May 1997, Paulinho attacked the dominant Chico. The fight was serious, and Chico was wounded on the right hand and suffered a perforation on the right leg and some injuries on the face. Externally Paulinho showed no sign of injury. Following this event Paulinho was isolated and transferred to another facility.

In the two events reported here the severity of aggression was unusual. The *C. apella* males typically use aggressive vocalizations and facial intimidation in agonistic interactions, physical injury is rather infrequent (Santini, 1984). Izawa (1980, p.453), for example, never found any injuries in the animals he studied in wild (but see Byrne et al., 1996).

Although the reasons for the aggression and dominance reversal reported here are unknown, I believe that it was favored by Paulinho increasing his body size. The captive conditions may also have contributed, but hormonal changes due to puberty (increasing testosterone levels) may have been responsible for Paulinho's aggressiveness, and his increase in body size could have made him more self-confident. However, his aggressiveness may be explained merely by a more aggressive personality.

Interesting was the active participation of the alpha male during the first aggressive outbreak. Janson (1984) observed a dominant male intervening to support juveniles, although an older unrelated juvenile was never defended by the alpha male. A primate male's rank may change many times

over the course of his lifetime (Walters and Seyfarth, 1987), but in *C. apella* reports on dominance reversal events involving the alpha male, are rare.

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A TWIN BIRTH IN *CEBUS XANTHOSTERNOS* (WIED, 1820) (CEBIDAE, PRIMATES)

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Cebus is a very wide ranging genus but the taxonomy of the four to five species recognized today is still poorly understood. The tufted brown capuchin, *C. apella*, especially has resisted a modern systematic evaluation mainly due to extreme individual variation (Hill 1960; Torres, 1988). For many years, the nominate subspecies has been ascribed to the entire Amazon, although at least four *C. apella* subspecies were recognized from the Atlantic forest, in Brazil, Paraguay and Argentina (*C. a. xanthosternos*, *C. a. robustus* and *C. a. nigrinus*) and the central savanna (*cerrado*) of Brazil (*C. a. libidinosus*) (Mittermeier *et al.*, 1988, Rylands *et al.*, 1995). Of these, the form *xanthosternos* formerly occurred in a large area extending from the Rio Jequitinhonha in the south, and throughout the Atlantic forest of the state of Bahia, probably north and inland to the Rio São Francisco (Hill, 1960; Coimbra-Filho *et al.*, 1992a, 1992b). The karyotype of the form *xanthosternos* is well differentiated from other forms of tufted capuchin (Seuáñez *et al.*, 1986; Matayoshi *et al.*, 1987) and Mittermeier *et al.* (1988) and Rylands *et al.* (1995) listed it as a full species. Today hunting and habitat loss have resulted in a severe decline in their populations and geographic range, and they are disappearing rapidly even in their last stronghold, the cocoa growing region of southern Bahia (Mittermeier *et al.*, 1982; Coimbra-Filho, 1990; Oliver and Santos, 1991; Coimbra-Filho *et al.*, 1992a, 1992b; Rylands *et al.*, 1993). Its status is recognized as "Critically endangered" by the World Conservation Union (IUCN) (IUCN, 1996).

A small colony of *C. xanthosternos* was begun at the Rio de Janeiro Primate Center (CPRJ-FEEMA) in 1984, in collaboration with the World Wildlife Fund -US (WWF-US) and Wildlife Preservation Trust International (WPTI), and Fauna and Flora International (FFI). Its critical status, and the large number found being maintained as pets in southern Bahia, however, argued for the expansion of this colony and the establishment of breeding colonies for its conservation *ex situ* elsewhere (Santos and Oliver, 1991; Oliver and Santos, 1991; Santos and Lernould, 1993a). The Brazilian Institute for the Environment (Ibama) established an International Recovery and Management Committee for the species in 1992 (Santos and Lernould, 1993a, 1993b).

The first specimens of *C. xanthosternos* arrived at CPRJ in 1980, and the first birth was registered in October 1984 (a female CPRJ 596). Two groups were then established and the beginning of the Center's colony as such. The founder population was comprised of six young and subadult individuals, and 24 births have been registered since then, from two males and ten females between 1984 and 1997. There was a problem with the first birth, to a primiparous female