

MOUNTAIN LION *Puma concolor* ATTACKS ON A MANED WOLF *Chrysocyon brachyurus* AND A DOMESTIC DOG IN A FORESTRY SYSTEM

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ABSTRACT: Two independent attacks of mountain lions *Puma concolor* (Linnaeus, 1771) on different canid species are reported in this note. One of the canids was a sub-adult captive maned wolf *Chrysocyon brachyurus* (Illiger, 1815), revealing skull damaged by canine tooth perforation and several bruises along the body. Examination of the wounds and the killing site provided reasonable details on how the attack was conducted. The mountain lion grabbed the maned wolf from behind with both forepaws, and killed it with a bite at the nape of the neck and at the back of the skull. From the low disturbance of the site, the killing must have been accomplished fast and without much struggle. The second attack was on a domestic dog, in a house yard. It was carried out by a sub-adult, abnormal female mountain lion, which was killed with a club by the property owner while charging. The inability to hunt wild prey, due to physical impairment, was certainly what motivated the mountain lion to attack the domestic dog. The aim of this article is to provide information on mountain lion interactions with non-prey species, and to discuss the implications of the proximity of mountain lions to human dwellings.

RESUMO: Ataque de onça-parda *Puma concolor* a um lobo-guará *Chrysocyon brachyurus* e a um cachorro doméstico em um sistema florestal. Dois ataques independentes de onça-parda *Puma concolor* (Linnaeus, 1771) a duas espécies de canídeos são descritas neste artigo. O lobo-guará *Chrysocyon brachyurus* (Illiger, 1815), semi-adulto e criado em cativeiro, revelou danos no crânio por perfuração de caninos e vários ferimentos no corpo depois de necrópsia. O exame de ferimentos e do local do ataque permitiram reconstituir o ocorrido com detalhe aproximado. A onça-parda agarrou o lobo-guará pela parte anterior usando as duas patas dianteiras, em seguida mordendo o pescoço e a parte posterior do crânio do canídeo. Pelo baixo distúrbio provocado no local, o ataque deve ter transcorrido rápido e sem muita luta. O segundo ataque foi a um cachorro doméstico, ocorrido no jardim de uma casa. Foi provocado por uma onça-parda fêmea e com deformidades, morta pelo proprietário com repetidas batidas de bastão no momento do ataque. A impossibilidade de caçar presas silvestres devido a problemas físicos foi certamente o que provocou a investida da onça. O objetivo deste artigo é o de fornecer informação sobre a interação de onças-parda com espécies que não fazem parte de sua dieta alimentar, e discutir as implicações da proximidade de onças-parda a habitações humanas.

Key words: Attack. Brazil. *Chrysocyon brachyurus*. *Puma concolor*.

Palavras chave: Ataque. Brasil. *Chrysocyon brachyurus*. *Puma concolor*.

The proximity of mountain lions *Puma concolor* to human dwellings has resulted in incidents such as attacks on pets, livestock, and humans themselves (Beier, 1991). These incidents are widely reported in North America, but there is virtually no published information on interactions with mountain lions near human dwellings, other than livestock attacks, in South and Central America.

Such information is valuable as it helps to understand the trends of mountain lion behaviour near humans. As mountain lions are rarely seen after or during an attack, it follows that published reports of detailed incidents with mountain lions that identify the attacker and the reasons it may have had to attack are important. Usually predators are not willing to take high risks near human dwellings, and when they do it may be a sign that something is wrong, either with the predator, which may be injured, or with the resources, which may be scarce.

In the current note, two attacks by mountain lions on canids are reported. A captive maned wolf was attacked, and we sought to identify the cause of the attack based on available evidence. The second attack was on a domestic dog, but in this case the victim was the attacker, killed in a house yard by the owner of the dog. In this case, we sought to determine why the mountain lion launched the attack.

The attacks took place within 110 000 ha of private forests located in Telêmaco Borba, State of Paraná, southern Brazil, at co-ordinates 24°12' S and 50°33' W. Forty percent of the forest was composed of native vegetation, dominated by *Araucaria angustifolia* (Bertol., 1898) and *Ocotea porosa* (Mez., 1949). Plantations of *Pinus* spp. covered the remaining area, along with scattered fragments of planted stands of *Eucalyptus* spp. and *Araucaria angustifolia*.

Although actively explored and highly productive in terms of commercial forest products derived from timber, the area provides suitable habitat for a number of mammal species that are often rare or occur at low densities elsewhere in southern Brazil, such as the

white-lipped peccary (*Pecari tajacu*) (Link, 1795), the mountain lion (*Puma concolor*), and the maned wolf (*Chrysocyon brachyurus*). Mountain lions are believed to be relatively common, as company employees, who live in villages surrounded by forests, frequently see them wandering near households.

The information gathered on mountain lion attacks was opportunistic, gathered while conducting an intensive field study in the area. The attack on the dog was investigated by interviewing the house owner, checking the dog's wounds, and inspecting the mountain lion carcass. A necropsy was conducted, and internal organs checked for signs of abnormality. The mountain lion was weighed, the skin and bones removed and preserved for a scientific collection. Later, the skull and mandible were examined for abnormality by checking jaw occlusion. Physical attributes such as size, body weight, and the size and proportions of skull and mandible were then compared with those of healthy mountain lions of the same sex and approximately the same age.

The maned wolf attack was investigated by inspecting the wolf's carcass externally, and removing the skin and checking for haematomas. The skull was further inspected after cleaning by soaking and cooking in water. The surrounding area of the kill site was examined for fresh mountain lion signs.

Measurements were taken of both the mountain lion and maned wolf skulls and mandibles, according to procedures used by Ximenez (1973) and Mazzolli and Ryan (1997).

In April 1998 a sub-adult, female mountain lion was killed with a club while attacking a dog within a house yard located at the boundary of the 'Lagoa' village. A necropsy of the cat revealed internal organs with fibrosis and dark colored spots. Examinations of the mandible bone revealed a prominent PM1, which certainly impaired correct occlusion. There was a visible disproportion between the size of teeth and the size of the mandible and skull (**Table 1**).

The abnormal cat had larger PM3 (16.6 mm) when compared to other female specimens from the vicinities ($n=5$, range 15.3-16.5 mm,

Table 1

Table with skull and body measurements of female mountain lions from the study area and vicinities. Average (\bar{X}) and standard deviation (SD) are calculated for all but the female that killed the dog, whose measurements are in the first row. Units used are millimeters for measurements and kilograms for weight. * a=adult, s=subadult. NR - No record number SANTA CATARINA, **Rio dos Cedros**: 2 females, 1998, M. Mazzolli col. (UFSC, 0352, 320), **Urupema**: 1 female, 1984, M. Mazzolli col. (UFSC, 0351), **Curitibanos**: 1 female, 1991, M. Mazzolli col. (UFSC 866).

Animal ID	Origin	Date	Age*	Body			Skull			
				Body length	Weight	TL	Coronoid Process	Length of Mandible	PM3 inferior	Inferior tooth row
NR	PR	1998	s	750	12	158	43.2	106.5	16.6	57.6
NR	PR	1990	a	1060	23	166	54.0	111.7	16.3	59.0
UFSC-0352	SC	1988	s	980	22	167	49.0	112.0	16.0	61.0
UFSC-0351	SC	1984	a	-	-	175	55.0	115.0	16.5	62.0
UFSC-0320	SC	1988	a	-	-	176	57.0	120.0	15.3	61.0
UFSC-0866	SC	1991	a	-	-	177	58.0	120.0	16.3	63.5
\bar{X}						172	54.6	115.7	16.1	61.3
SD						5.3	3.5	4.1	0.5	1.6

\bar{X} =16.1, SD=0.5), but smaller mandible and skull size, particularly smaller Coronoid Process (43.2 mm) than the other females ($n=5$, 49-58 mm, =54.6, SD=3.5) (**Fig. 1**).

External evidence also revealed the abnormal condition of the felid. The animal was underweight and had a necrosis at the tip of the tale. It measured 124 cm including the tail 49 cm long, and weighted 12 kg. As a basis for comparison, a female from the same locality measured 166 cm including a tail 60 cm long, and weighted 23 kg. Another sub-adult female from the locality of ‘Rio dos Cedros’, State of Santa Catarina, measured 156 cm including a tail measuring 58 cm, and weighed 22,3 kg (ref. UFSC-0352, 1988).

The maned wolf was in a breeding center, located near villages, but not inhabited permanently. The breeding center was open to the public, and used as a recreational area, receiving visitors from the local villages and nearby cities.

In addition to the maned wolf, large mammals, such as capybaras (*Hydrochaeris hydrochaeris*) (Linnaeus, 1766), peccaries (*Tayassu tajacu*) (Linnaeus, 1758) and (*Tayassu pecari*) (Link, 1795), and brocket-deer (*Mazama gouazoubira*) (G. Fisher, 1814)

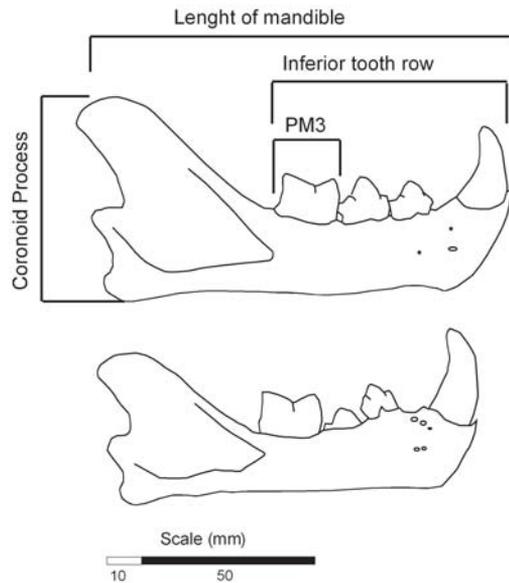


Fig. 1. Mandible of two female mountain lions, 50% actual size. The drawing on top represents the mandible of a healthy female, and the drawing below, the mandible of the female killed while attacking the dog. Among other abnormalities, note the prominent PM1 and smaller size of the coronoid process of the latter.

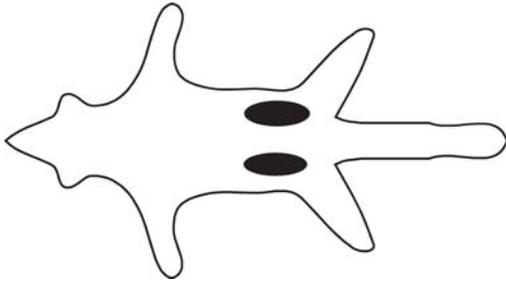


Fig. 2. Skinning the maned wolf, two large symmetrical haematomas were revealed at each side of the back of the animal toward the posterior end, as if it had been held or hit strongly by its killer. Other smaller haematomas were scattered along the back and sides of the wolf.

were kept in chain-link fence enclosures 1.5 to 1.8 meters high, with two electric wires running in the top. Electric wires had kept predators away from the potential prey for several years, but during the attack the system was not operating properly.

In one of the pens of the breeding center a female maned wolf was found dead early in the morning with no signs of fighting. External analysis of the body showed perforations around the neck and skull, but no apparent body wounds. By skinning the animal, two large symmetrical haematomas were revealed at each side of the posterior end of the back (**Fig. 2**), as if it had been held or hit strongly by its killer. Other smaller haematomas were scattered along the back and sides of the wolf.

The back of the skull had two small and two large perforations. One of the larger (16 mm diameter) perforations began at the posterior end of the left Temporal and extended into a large hole at the Occipital above the Occipital Condyle. The other large perforation (31 mm diameter) damaged the right side of the Occipital bone at about the same height of the Occipital Condyle and destroyed both the Jugular Process and the Tympanic Bulla. One of the smaller perforations was located at the posterior end of the left side of the Parietal near the Interparietal Process. The other was located at the left side of the Occipital near the larger perforation at the same bone, and

both may be the consequence of the same bite (**Fig. 3**). The Occipital Condyle was desarticulated from the Atlas vertebra as a result of these bites. Measurements (in millimeters) of the maned wolf skull were: Greatest length 212.4; Basal length 197.5; Condylbasal length 198.3; Length of palate 30.3; Nasal length 87.8; Zygomatic breadth 112.8; Breadth of rostrum 33.9; Interorbital breadth 43.7; Postorbital breadth 40.3; Cranium width 58; Superior tooth row, alveolar distance 85.4; Inferior tooth row 98.6; Upper carnassial crown length 16; Length of mandible 154.5.

The maned wolf was clearly killed by a mountain lion. The large haematomas on the sides of the body were a result of punches by strong forepaws, and the skull perforations were the result of canine perforations. Mountain lions were frequently seen near the breeding center where the killing occurred, and previous incidents involving mortality of prey animals within the pens have been recorded, including deer (*Mazama gouazoubira*) and capybara.

Interspecific killing among mammalian carnivores is not uncommon in nature, and may account for up to 68% of known mortality in some species (Palomares and Caro, 1999). In

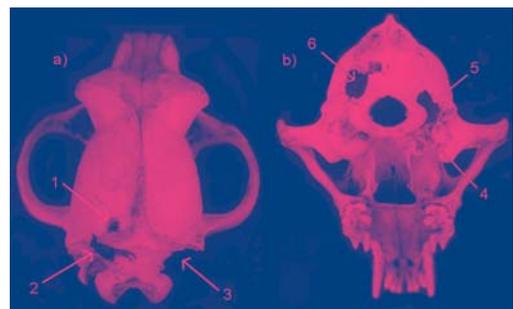


Fig. 3. Top (a) and bottom (b) view of the maned wolf skull damaged by mountain lion attack. Perforations two (2) and six (6) and perforations three (3) and five (5) are, respectively, different views of the same bite. a) Left parietal bone (1), left temporal and occipital bones (2), right occipital bone (3), b) right tympanic bulla (4), right occipital condyle and jugular process (5), left temporal and occipital bones (6)

North America, coyotes (*Canis latrans*) (Say, 1823) have been reported as victims of mountain lions (Boyd and O'Gara, 1985; Koehler and Hornocker, 1991), which may or may not be eaten (Boyd and O'Gara, 1985). Canids may also kill felids, and wolves (*Canis lupus*) (Linnaeus, 1758) have been reported to kill mountain lions in the Glacier National Park, Montana (Boyd and Neale, 1992; White and Boyd, 1989). Interspecific killing is explained as an action to remove a mortality source for the killer, to free up food resources, or to gain energetic benefits from consuming the victim (Palomares and Caro, 1999).

The maned wolf was not consumed, thus the reason for the killing was not food acquisition, and it cannot be considered a competitor for food resources because it feeds mainly on fruits and small rodents (Dietz, 1984), while the bulk of prey biomass of mountain lions in the Neotropics is obtained from armadillos, larger rodents, and ungulates (e.g. Emmons, 1987; Aranda and Sánchez-Cordero, 1996; Oliveira, 2002). It is likely that mountain lions are either removing a source of mortality for its kittens, or instinctively reacting to a potential threat posed by the presence of a large carnivore.

Aggressive encounters of mountain lions with other predators in the wild seem expected. In this case, however, the killer deliberately jumped a fence surrounded by an electric wire, albeit not fully functional, to kill an animal that it did not intend to feed upon, while several capybaras remained unmolested in a neighboring fence.

The other attack, on a domestic dog, occurred within the boundaries of a village, in a house yard. The attack was carried out by an abnormal juvenile mountain lion, weighing just 12 kg. The proximity to households may bring certain risk to human beings. An underweight, hungry mountain lion such as the one reported here will presumably attack a child as much as it would attack a dog. In the study site, children have spotted mountain lions while playing near the village-forest boundaries.

There have been few reports of mountain lions attacking people in Brazil, but at least

one child and one adult were killed in the past decade near households. In North America, however, such incidents have recently become more frequent, considered to be a result of mountain lion population increase, decreased persecution, and habituation to humans as a non-threatening part of their environment (Beier, 1991). The general profile of the attacker was that of underweight yearlings (Beier, 1991).

The situation in this area of Brazil thus mirrors the one found in some areas of North America where mountain lion populations have increased. Sightings of mountain lions have become more frequent and although prey is abundant, less capable individuals unable to compete for territory or food may become a threat to households. Given this situation, it is important for public safety that people living near mountain lion habitat learn how to avoid potential and undesirable incidents.

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