



## REPORTS OF FEEDING INCIDENTS OF CATTLE BY ANDEAN BEAR (*Tremarctos ornatus*) IN CENTRAL PERU

### REPORTES DE INCIDENTES DE ALIMENTACIÓN DE GANADO POR OSO ANDINO (*Tremarctos ornatus*) EN EL CENTRO DEL PERÚ

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#### ABSTRACT

In 2015, the Ministry of Agriculture of Peru received complaints about Andean bears' livestock attacks in central Peru. The ministry contacted our Andean bear research group to confirm these events. Already in the area, traces of the presence of Andean bear (e.g., as hair and feces) were found within grazing areas, and 13 cattle carcasses, some of them with evidence of consumption by bear. Although not conclusive, the condition of a corpse also suggested predation by bear. Even though we could not confirm bear attacks, we did confirm that they were involved in livestock feeding incidents (e.g., scavenging). Finally, we point out the importance of quick responses to reduce human-bear conflicts.

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#### RELEVANCIA

El conflicto ganado-depredador es uno de los problemas fundamentales para la conservación de los grandes depredadores como el oso andino. Entender la dinámica de los incidentes de depredación es fundamental para determinar estrategias que reduzcan estos incidentes, y por lo tanto contribuyan a la conservación de estas especies.

**Key words:** Andean bear predation, human-predator conflicts, natural protected area, Peruvian Andes.

#### RESUMEN

En 2015 el Ministerio de Agricultura de Perú recibió denuncias sobre ataques a ganado por parte de oso andino en el centro del Perú. El ministerio contactó con nuestro grupo de investigación de oso andino para confirmar estos sucesos. Ya en el área encontramos rastros (ej. pelos y heces) de la presencia de oso andino dentro de zonas de pastoreo, así como 13 cadáveres de ganado, algunos de ellos con evidencias de consumo por oso. Aunque no fue concluyente, la condición de un cadáver también sugería depredación por

oso. A pesar de que no pudimos confirmar los ataques por oso, sí confirmamos que estaban involucrados en incidentes de alimentación con el ganado (ej. carroñeo). Por último, destacamos la importancia de una respuesta rápida para reducir los conflictos humano-oso.

**Palabras clave:** Andes peruanos, área natural protegida, conflictos humano-depredadores, depredación del oso andino.

The Andean bear (*Tremarctos ornatus*) belongs to the order Carnivora, which has omnivorous habits, but it is predominantly herbivorous (García-Rangel, 2012; Peyton, 1980). Although they mainly feed on plants (i.e. succulent vegetative parts and fruits; Figueroa, 2013a; García-Rangel, 2012; Peyton, 1980), there are several records that Andean bears also feed on flesh (e.g. Goldstein *et al.*, 2006; Laguna, 2018; Márquez and Goldstein, 2014; Parra-Romero *et al.*, 2019; van Horn *et al.*, 2014). Literature referring to Andean bears feeding on other animals can be dated back to historical chronicles during Spanish colonialism, which mentioned bear predation on guanacos, vicunas, deer, and even cattle (Figueroa, 2013b). Currently, in some areas of its distribution range, there is a strong perception that Andean bears hunt cattle to feed on (Figueroa, 2015; Goldstein, 1991; Peyton, 1980; Poveda, 1999). This can cause conflicts and hinders the conservation of this endangered species. However, conclusive evidence are usually missing as some reported events might be related to bear scavenging on already dead cattle and not necessarily involved bear attacks (Paisley, 2001). At the moment, there is only a limited number of publications confirming Andean bear attacks on cattle, which were based on carcass inspection, such as from Venezuela (Goldstein, 1991), Colombia (Márquez and Goldstein, 2014; Poveda, 1999), Ecuador (Castellanos, 2002; Castellanos *et al.*, 2011; Laguna, 2018), and Bolivia (Nallar *et al.*, 2008).

In Peru, it is widely accepted by rural settlers that bears attack cattle to feed on (Figueroa, 2015; Peyton, 1980). There are several studies reporting cattle consumption by bears in diverse Peruvian location; however, most of them are solely based on interviews (e.g. Amanzo *et al.*, 2007; Figueroa, 2013b; Figueroa, 2015; Terán *et al.*, 2020), and only Vargas (2016) and Rojas-VeraPinto and Cruz (unpublished data) con-

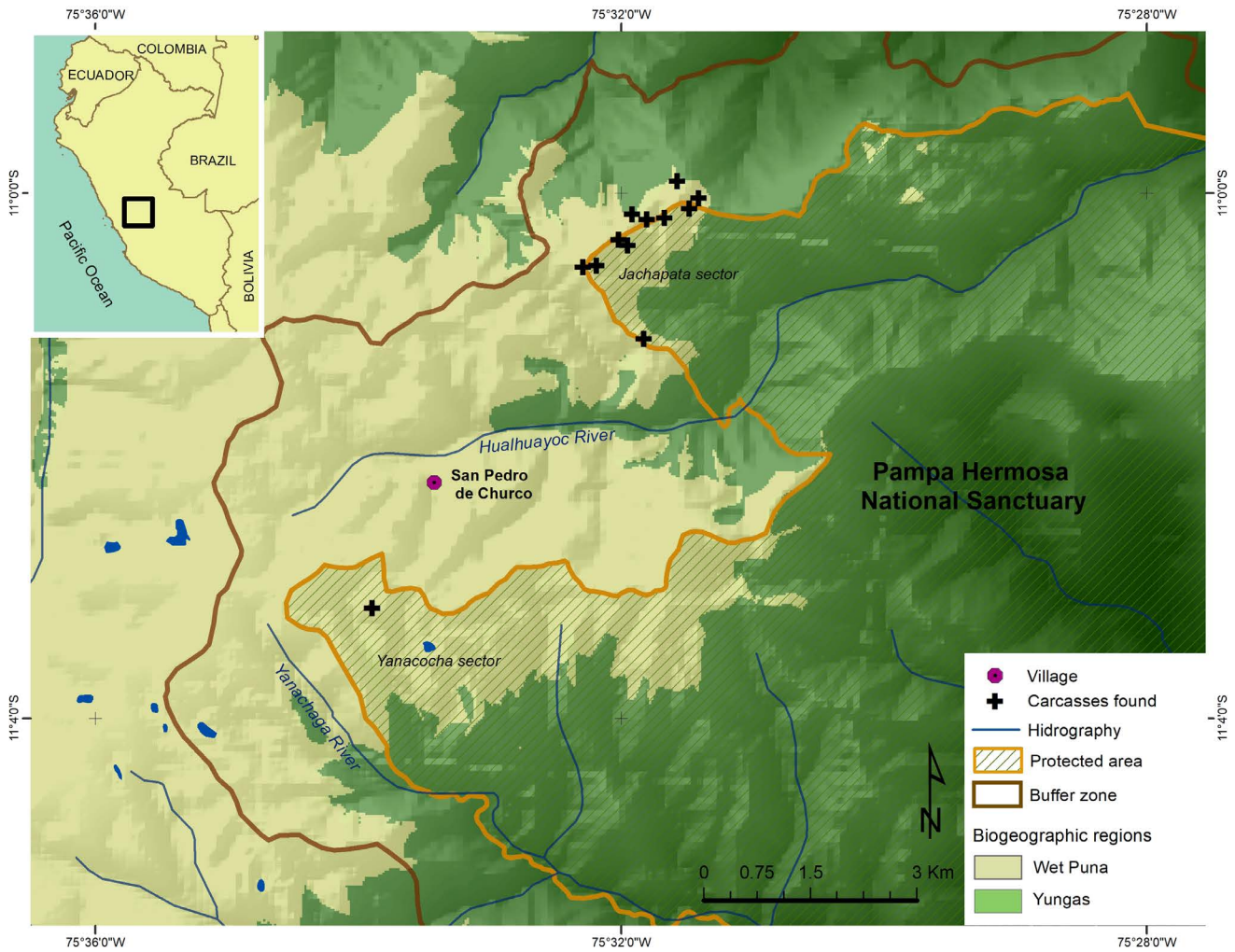
firmed scavenging after inspecting cattle carcasses in southern Peru. Although Peyton (1980) also examined carcasses, he did not find enough evidence to prove consumption by bears. Nevertheless, cattle consumption by bears might not be uncommon as they have been reported along the Andean bear distributional range (e.g. Goldstein, 1991; Laguna, 2015, 2018; Parra-Romero, 2019; Paisley, 2001; Poveda, 1999).

Pampa Hermosa National Sanctuary is a natural protected area located in the central Peruvian Andes (Department of Junín; Figure 1) between 1,900 and 4,200 m over the sea level. It predominantly includes cloud forest (Yungas) and Andean grassland (Wet Puna). Along its boundaries (i.e., the buffer zone of the protected area), some villages are found such as San Pedro de Churco (S 11°02'14.1", W 75°33'24.9"; Figure 1). This village has only 15 permanent residents, who cultivate potatoes and raise cattle, in open grasslands, for subsistence.

In 2015, villagers of San Pedro de Churco sent complaining letters to SERFOR (Peruvian National Institute of Forestry and Wildlife Service) requesting economic compensation due to cattle attacks by Andean bear. SERFOR staff contacted two of the authors (RR-VP and RB), as we are part of a Peruvian research group working on the Andean bear, to inspect the area and confirm these potential events. Therefore, we proceeded to carry out fieldwork in the protected area and its buffer zone.

Initially, to identify overlapping of Andean bear territory and cattle grazing areas in the region, we searched for signs of their presence within the forests and grasslands. Thus, cattle were recorded in grasslands as well as in the forest boundaries, whereas bear signs (e.g. marks on trees, feeding signs, scats and nests) were restricted to the forest and grassland boundaries. Within the forest, we also recorded plants recurrently consumed by bears as part of the diet (e.g., *Pitcairnia* sp., *Puya* sp., *Guzmania* sp., *Clusia* sp., *Cyathea* sp., *Pernettya prostrata*, *Gaultheria* sp., *Chusquea* sp., *Rubus* sp.; Figueroa, 2013a). Recorded signs confirmed that Andean bear and cattle overlap their distribution, which may facilitate potential interactions.

Then, we visited areas where attacks were reported, and we searched for bear predation signs on cattle carcasses as well as inspected



**Figure 1.** Study area in the vicinity of the Pampa Hermosa Natural Sanctuary, department of Junín, Peru. Locations of the evaluated cattle carcasses (black cross) are shown.

the surroundings of the potential attack places. It is known that Andean bears use their strength to dominate their prey with their forelegs and mouth, occasioning injuries (i.e. bites, scratches and bleeding) on the back, hips and even neck of the cow (Laguna, 2011, 2018; Márquez and Goldstein, 2014; Nallar *et al.*, 2008; Paisley, 2001); during this process, bears can start to eat the prey when is still alive. In total, we found 13 cattle carcasses, whose locality, estimate date of the event, cattle characteristics (gender and age), forest distance and state of carcass decomposition were recorded (Table 1). According to local people, the cattle deaths occurred between May 2014 and November 2015.

From the 13 carcasses found, eight were too decomposed to make any diagnosis as only bones and pieces of skin were left. The remaining five carcasses still had their skins, stomach content and almost complete skeleton; among them, one was relatively fresh (i.e. the owner pointed out the death corpse was not older than 2 weeks) and only slightly consumed by some animals. This fresh cow carcass was found in an abnormal position (i.e. dorsal decubitus; Figure 2A). It also showed some evidence of having been eaten alive as it had clotted blood on the back, withers and over the scapula, which was almost completely out of its place (Figure 2B). The carcass also had deep bites, ripped flesh, the skin was open from the neck to the sacrum,

Table 1. Characteristics of the cattle carcasses evaluated.

N°	Estimated date of death	Cattle characteristics (gender, age)	Forest distance (meters)	Carcass situation	Event
1	Jan/2015	Female, 6 years	0.5	Skin and bones remains	Undetermined
2	Apr/2015	Female, 6 years	0.5	Skin and bones remains	Undetermined
3	May/2015	Male, 1.5 years	3	Skin and bones remains	Undetermined
4	Jun/2015	Female, 6 years	70	Skin and bones almost complete, and ruminal content out.	Scavenging
5	Jul/2015	Female, 4 years	5	Skin and bones remains	Undetermined
6	Jul/2015	Female, 3 years	8	Skin and bones remains	Undetermined
7	Aug/2015	Female, 4 years	7	Skin and bones remains	Undetermined
8	Sep/2015	Female, 0.6 years	24	Skin and bones remains	Undetermined
9	Oct/2015	Female, 6 years	46	Skin and bones remains	Undetermined
10	Nov/2015	Female, 3 years	26	Skin and bones almost complete, and ruminal content out.	Scavenging
11	Nov/2015	Female, 5 years	27	Dorsal decubitus position. Apart from organs, almost complete carcass.	Potential predation
12	May/2014	Female, adult	0	Bones and skin remains in a bear nest.	Scavenging
13	2014	Undefined, 0.8 years	0	Bones and skin remains in a bear nest.	Scavenging



and bones crushed at the edges of the scapula and vertebrae (Figure 2B). Flesh from diverse areas and organs, such as guts, heart and lungs, were consumed (Figure 2C). We also identified signs that the cow was dragged 7 m from the potential attack place as the grass was flattened and there were cow stomach contents along the dragging trail. Unfortunately, we did not find more bear signs around this area (i.e., 10-meter diameter around carcass), as previous days were raining, and this could erase footprints and further blood signs. However, we also recorded bear marks on surrounding trees (Figure 2D) and one feeding place between 130 and 160 m of distance from the carcass. Although we did not record some characteristics of bear predation as cited in the literature (e.g., extremities dispersed in the forest and nests, evidence of struggle), other evidences (e.g., absence of internal organs, clotted blood on the back and withers, crushed bones) suggest that the cow was under predatory attack of an Andean bear (see Laguna, 2011, 2018; Márquez and Goldstein, 2014; Paisley, 2001).

In spite the fact that other carnivorous can occur in the area such as puma (*Puma concolor*) and feral dogs (*Canis lupus familiaris*), their attack signs are very different from those produced by bears (see Márquez and Goldstein, 2014). For instance, bite placements do not match the pattern of attack of cougars and dogs, which are located mostly in the neck and the legs, respectively; however, they do match with those reported for bears, which are located on the back (Laguna, 2018; Márquez and Goldstein, 2014). Furthermore, the intestine was consumed, and the contents of the stomach were dispersed, as well as the body was not buried or hidden, which are not signs of cougar involvement (Márquez and Goldstein, 2014).

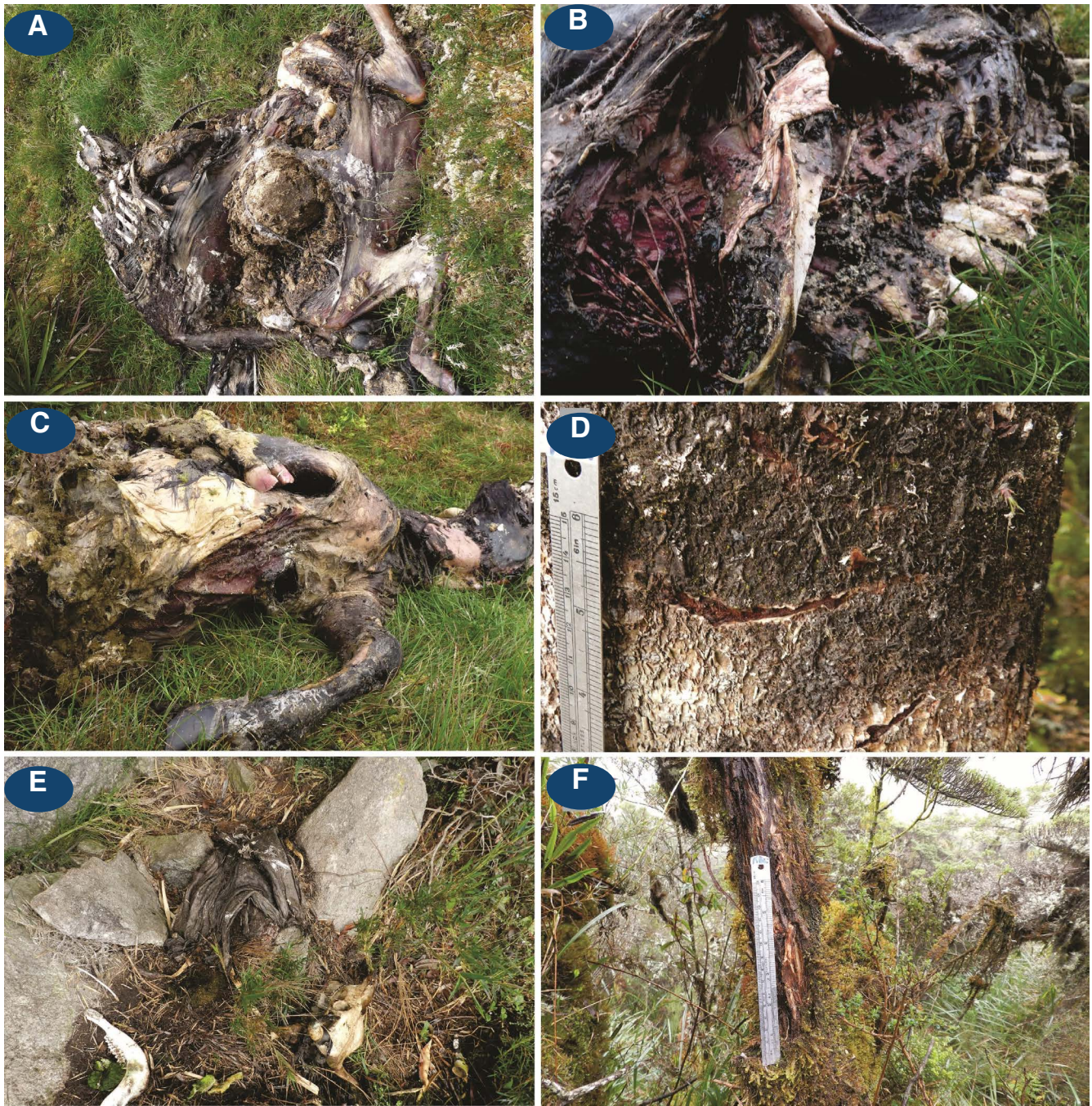
Although the other four carcasses still had their skins on, they did not have flesh left; therefore, we could not determine whether the cattle were attacked by some predator or not. Still it was clear that they had been consumed by some animals: Two carcasses were found in a single bear nest, which was a platform made of plants (e.g., *Pitcairnia* sp., *Puya* sp.) on a rockery (Figure 2E) where bear scats and hairs were found as well as bear marks on trees (Figure 2F) and scats with flesh remnants. None of these two carcasses presented characteristics of bear attacks reported by diverse authors (e.g., hemorr-

hage and tooth punctures, evidence of struggle, broken neck, horns, and other bones; Laguna, 2011, 2018; Márquez and Goldstein, 2014; Paisley, 2001); therefore, we did not find any evidence of bear predation in those two carcasses but scavenging. Thus, we conclude that the Andean bear consumed these two carcasses. The other two carcasses were found in open grasslands; they had scratches on their backs, legs and above the zygomatic arch. These scratches could be made by diverse animals when the cow was alive or already death. Therefore, we cannot assert that the bear was involved in the death or consumption of the animals.

Even though the degree of decomposition was a limiting factor, among the 13 carcasses found we identified at least one cow that was consumed and probably attacked by Andean bear, whereas other two were consumed by bears during scavenging events. However, we did not rule out that some of the other cattle deaths were caused by bears as some of the local people (n=10) informed us that 183 were killed by bears between 2010 and 2015. We interviewed all the local people present during our study (n=10); some of them (40%) have directly observed bear attacks and most (80%) can recognize attack signs, which include bites on the cow back. As mitigation strategies against potential bear attacks, some people started monitoring on a more frequent basis their cattle or avoided leaving their animals far from the village. After the date of our inspection, reports of predation events were not communicated anymore; one possibility is that local people carried out retaliatory killing against the bear(s) as it is a frequent action by affected people (Goldstein, 1991; Paisley, 2001) and not due to better raising strategies as most cattle were still free in the grasslands.

Although local people from Pampa Hermosa reported to peruvian authorities about potential bear attacks, this is an unusual response in Peru, where affected people do not usually inform about it as there is no economic compensation from the peruvian government. Hence, affected people try to stop potential attacks on their own (e.g., retaliatory killing; Figueroa, 2015). Studies on cattle-bear interactions and environmental education can help to improve cattle raising and would benefit the conservation of Andean bears and their habitats. Studies like this one are necessary to support, or not, the claims of





**Figure 2.** Inspected bear signs and cattle carcasses: Carcass in decubitus position; note it has the stomachs content (A). Dorsal view; note the signs with flesh ripped around the scapula and the clotted blood (B). Ventral view; note the cavities left around the heart and lungs (C). Bear marks on tree 140m from freshest carcass (D). Two cattle skull and skin remains in a bear nest (E). Bear marks on tree 5m from bear nest (F).



the affected people and to reduce the negative effects of human-bear conflicts. We hope that our report helps to understand this problem in Peru and the importance of adequate and fast responses to reduce human-bear conflicts.

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