SPECTACLED BEAR-CATTLE INTERACTIONS AND TREE NEST USE IN BOLIVIA AND VENEZUELA

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Spectacled bears (*Tremarctos ornatus*) have been reported as livestock predators throughout their range (Peyton 1980; Suarez 1988, Mondolfi 1989; Goldstein 1991b). In Peru, Peyton (1980) reported that in order to kill cattle, bears pursue the animals on steep slopes or near cliffs to make them fall. Peyton (1980) also acknowledged reports that a bear may carry livestock kills up a tree in order to consume it in seclusion and protect the kill from other animals. Even though cattle remains were found in spectacled bear scats in Peru (Peyton 1980) and Ecuador (Suarez 1988), no field evidence was gathered to discriminate between predation and consumption of carrion by spectacled bears.

The use of tree nests (nest-like platforms) by spectacled bears has been reported by several authors (Osgood 1914; Tate 1931; Bridges 1948; Mondolfi 1989; Goldstein 1991a). They described tree nests as ordered assemblages of bent or broken branches positioned on top of forked branches, resembling large nests and used as resting places. Peyton (1980) found 5 tree nests in Peru associated with fruit feeding. Based on his observations in Peru, Peyton (1980) suggested that the resting use reported by prior works was misunderstood, and the platforms were used for feeding purposes. Although the use of tree nests in relation to fruit feeding is widely reported in the anecdotal information given by locals in Venezuela, field investigations have found that tree nests were strongly associated with cattle carcass feeding sites (Goldstein 1991a).

Although the signs of struggle (deep and long hoof marks on the ground, uprooted vegetation, cattle with claw marks), the number of cattle lost at each site, the absence of signs from other possible predators, and the cessation of cattle losses after the killing of bears is a strong indication of cattle predation by spectacled bears (Goldstein 1991b), no direct evidence of predation on cattle by spectacled bears could be gathered during the spectacled bear surveys done between 1985 and 1987 in Venezuela.

This work reports new information on spectacled bear-livestock predation claims, carcass feeding behavior and tree nest use by spectacled bear gathered from 1996 to 2000 in the Venezuelan Andes and in August 2000 at the Apolobamba National Park and surrounding areas in Bolivia.

METHODS

From August 1996 to December 2000, I surveyed settlements surrounding the wilderness areas present in the Venezuelan Andes, with the exception of the Perija region. I defined wilderness area as any tract of forest or páramo (high altitude treeless ecosystems, characteristic of the tropical areas of the Andes) bigger than 5000 ha with no human disturbance. Reports on bear-cattle interactions occurring within 2 months of the visit were investigated. I documented the history of prior spectacled bear–cattle interactions, number of cattle lost and location of each event. At each reported bear-cattle interaction site, the carcass remains, and predator/scavenger activity signs (beds, tree nests, scats, trails, etc.) were described and mapped. The state of the carcass was noted and divided into 2 categories: fresh carcass (little or no feeding, no decomposition) and decomposing carcass (from partially eaten kill to bones and hide). The above methodology was also used in Bolivia at the Apolobamba National Park and surrounding areas during a spectacled bear survey done in August 2000.

RESULTS

Venezuela

Spectacled bear-cattle conflicts in Venezuela were reported at 7 locations within the states of Mérida, Táchira, Trujillo, Barinas and Lara. All but 1 location (Quebrada El Molino) were inside national parks. Five of the 7 locations (Páramo La Fiera; Quebrada El Molino, Páramo Los Angelitos; La Cienaga and Santa Ana) reported predation events within the last year. Cattle predation was reported within the 2 months prior to my arrival at four of these five locations (excepting La Cienaga). A total of 47 cattle from all locations were reportedly lost to bear predation during the last 2 years (1999-2000).

Quebrada El Molino—. Of the 9 cattle reported dead

or missing, the remains of 5 decomposing carcasses were located. No fresh kills were found. Seven tree nests and 3 ground beds were associated with 4 of the carcass remains found. All the tree nests were found in very steep terrain (>70% slope) with extremely difficult access. Skin remains, bone fragments, leg bones, vertebrae and a skull were found inside 5 of the tree nests. On a later visit, 1 of the tree nests was found newly used. A cattle skull and a partially eaten leg were found inside the nest, and a trail leading from a páramo area to the tree nest was clearly visible.

At 1 site, the bone remains of cattle were found below a rocky cliff in an open páramo area. At 3 spots on ledges at the cliff I found bone and skin remains as well as several bear scats. One site contained a ground bed supported on one side by a small shrub. At this particular site, the bear had evidently brought branches to build the nest (there were no other shrubs or trees within 50 m of the site).

Páramo Los Angelitos —. One animal was reported missing, whose decomposing carcass was easily found. The carcass was dragged downhill, leaving a clear trail through the páramo vegetation leading to 3 feeding sites and 3 ground beds. The ground beds were within 2 m of each other and I found cattle bone remains and cattle and bear hair. Two old scats containing cattle bone fragments were found just outside 1 of the beds. The beds were built on the highest portion of a very steep slope overlooking the creek bed.

Páramo La Fiera —. Sixteen cattle were reported lost during the 6 months prior to my visit at this location. Although I found much sign of spectacled bear activity (e.g., trails, scats and claw marks on trees) in the forest below the páramo not a single cattle carcass was found. The only signs encountered related to cattle carcass feeding were 4 bear scats containing cattle remains found bellow a recently made tree nest (the branches and leaves that made up the nest interior were still green).

Santa Ana and La Cienaga —. These locations were visited after a landowner reported repeated attacks on his cattle by bears. At both locations, the landowner recalled yearly losses of cattle to bear predation for the past 30 years. Cattle losses occurred during October and September. Losses varied between years with up to 14 cattle lost annually. However, during 2000, cattle losses started at the end of June and continue through August. He reported a total of 21 animals lost during year 2000. During my visit, we located 18 ground nests and 4 tree nests associated with 4 decomposing carcasses. All ground nests were found in steep terrain (70 % slope) at the edges of a ravine. The tree and ground nests had easy access from the paramo above and from the creek below. All the nests were connected by trails that in most cases ran perpendicular to the slope. The entire area, consisting of 22 tree and ground nests, trails and terrestrial bromeliad feeding sites covered an approximately area 200 m². Most of the ground nests were adjacent to a shrub and were neatly arranged with branches, fern leaves and other plant debris.

Although mountain lion (Felis concolor) scats were a common sign at all the wilderness areas visited, particularly at rocky outcrops and along human trails, Quebrada El Molino was the only site where mountain lion scat was found in the vicinity of a cattle carcass visited by bears. Only bear sign was found associated with cattle carcasses at all the other locations.

Tree nests associated with fruit feeding were observed at El Carrizal, Mérida. Although many fruit-bearing trees at El Carrizal showed bear climbing signs, I was only able to distinguish tree nest type platforms on 2 occasions. Both were observed on forked branches high in the canopy of fruiting trees 12 to 15 m above ground.

Bolivia

Cattle predation by spectacled bears was widely reported at locations where extensive herding practices take place around the town of Pelechuco in the Apolobamba National Park. On my visit I attended a meeting where the cattle owners asked national park representatives for compensation for more than 70 cattle reported lost to bear predation in the last 3 years. Cattle losses within the last 2 months were reported at Uyuni, Pasto Grande and Tojoloque.

Although recent bear sign was found at all these sites, inspections failed to document evidence of carcass feeding or predation by bears within the last year. Only a very old and deteriorated scat with bone remains was found beside a very old ground nest at Pasto Grande, indicating a cattle carcass feeding event by bears.

Bear-cattle conflicts in Cerro Toana occurred 2 months prior to my visit. Several cattle were reported missing. Cattle owners found the remains of 1 cow associated with bear sign. A bear was shot a week before my visit. At an open páramo 15 m above the forest edge an area on the ground with cattle hide remains could be seen and a clear track on the páramo vegetation could be followed down slope towards the forest edge into a ravine. The bear track continued along and sometimes in a stream. Along the bear trail I found scattered cattle ribs, 3 sites with bone fragments, 5 tree nests, 8 terrestrial bromeliad (Gregia sp.) feeding sites, 2 epiphytic bromeliad (Tillandsia superba) feeding sites, and 3 bear scats (1 with bone fragments found inside a tree nest, and the other 2 with bromeliad remains). Although cattle owners reported permanent presence of spectacled bears in the area, predation events were reported as uncommon.

Tree nests in Bolivia were found at Pasto Grande, Pajan

and Cerro Toana. The Cerro Toana nests were clearly associated with cattle carcass feeding. Six tree nests and 1 ground bed were found at Pajan in a small forest patch (about 4 ha), 200 m from the Pajan cornfields on the opposite bank of the Disiyakha river. Two nests were observed at Pasto Grande on a Prunus sp. tree at 5 and 7 m above the ground.

DISCUSSION

Bear-cattle conflicts in Bolivia and Venezuela occur at remote cattle herding grounds in open grassland areas, near large tracks of cloud forest. In Venezuela, all but 1 location with bear-cattle conflicts were inside national parks. The paucity of information on bear-cattle conflicts is due to the lack of monitoring by national park authorities. Livestock owners take it upon themselves to deal with any incident of bear predation without notifying the authorities, and usually the "problem" bears and all other bears that happen to be in the area are hunted.

Conflicts in Venezuela were localized at certain sites with a long history of bear-cattle interactions, where they seem to happen at intervals of up to 10 years. Five of the 12 Venezuelan locations reported by Goldstein (1991b) as having bear-cattle conflicts had conflicts during our survey. At the 2 newly reported locations, investigation revealed that both had a long history of cattle predation by bears. Santa Ana was the only location where bear-cattle conflicts were reported annually. The concentration of conflicts in relatively few locations will allow close monitoring and aid in the development of a program aimed at cattle loss prevention and bear conservation.

As reported for brown bears (Ursus arctos) in Spain (Clevenger et al. 1994) and Norway (Mysterud 1973), spectacled bears leave many signs around carcass sites. At carcass sites encountered in Venezuela, the bears usually used ground resting sites as well as ground and tree nests while spending several days feeding on a single carcass.

In Bolivia and Venezuela, cattle carcasses were dragged down slope from open paramo areas towards forested creek beds. Once at the creek, the carcass was dragged from 1 feeding site to a new one several times, confirming the reported general feeding behavior on cattle carcasses (Goldstein 1991b). The only difference encountered during the latest cattle carcass feeding episodes was that a proportion of tree and ground nests were clearly used as feeding sites. All ground and tree nests found in and around carcass areas were found on strategic ledges or hillsides with steep slopes, difficult access and a panoramic view of the whole area, a perfect site for observation and defense purposes.

Tree nests found associated with fruit feeding at El Carrizal correspond to Peyton´s (1980) description of tree nests associated with fruit feeding. However, there are differences in the tree nests described in this study and those described by Peyton (1980) as feeding sites. First, platforms encountered in Venezuela were located at the highest part of the canopy with no other branches above, indicating that the purpose of the platforms was not to reach other branches further up. Second, there were many trees that exhibited fruit feeding sign, such as pruning of branches, in the same area where the tree nests were encountered, but that had no signs of tree nests in their canopies. This suggests that platforms are neither necessary nor habitually used in fruit feeding situations in Venezuela.

The pruning of branches and the building of tree nests appear to be a common spectacled bear behavior, not necessarily associated with feeding higher up in the trees. A bear cub (approximately 7 kg) captured in the wild and brought to the Badarida Zoological Park in Barquisimeto, Venezuela, was released in a new open enclosure with natural trees. The cub immediately climbed up the highest branch, pruned several branches and made a rustic nest in which he spent 1 week, only climbing down at night to feed. The other zoo bears were later released in the same enclosure, where they also climbed up the highest and thinnest branches and pruned all the trees in the exhibition (Jose Pernalete, Badarida Zoological Park, per. comm.).

This supports the concept that there are multiple behavioral purposes of spectacled bear platforms, such as feeding, resting or guarding posts at feeding sites (Goldstein 1991a).

We noted that spectacled bears hauled parts of carcasses up trees, and not the whole carcass as commonly reported (Peyton 1980). At Quebrada El Molino, the bear or bears that fed on cattle carcasses used the same general area while feeding on the carcasses, and even used the same tree nest to cache remains from different cattle carcass.

Based on circumstantial evidence such as the ending of predatory events after the killing of 1 bear and on anecdotal information given by the cattle owners, I had assumed only 1 bear was predating on cattle at each location (Goldstein 1991b). However, considering the evidence gathered at Santa Ana where 2 carcasses were consumed simultaneously and considering the number of beds or nests found at feeding site, I suspect the presence of more than 1 bear feeding on the carcasses.

The information gathered at bear-cattle conflict areas in Bolivia and Venezuela demonstrate that most cattle disappearance is blamed on bear predation, an assumption that is not always true as the experiences at Páramo La Fiera, Venezuela and Pasto Grande in Bolivia have shown. At all the sites with spectacled bear-livestock predator

claims visited both in Bolivia and Venezuela during the present study, we found only very old decomposing cattle carcasses associated with bear activity signs; we found no field evidence to discriminate between predation and consumption of carrion. For that reason, I have used the term cattle carcass feeding instead of cattle predation.

The knowledge about how many individual bears are involved in a carcass feeding event and the predatory capacities and intensity is of key importance to the future plans of management of bears in conflict areas. Bear-cattle conflicts continue to be a problem throughout the distribution of the spectacled bear in Venezuela and are important issues where extensive highland herding practices take place in Bolivia.

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