

# Biological Research

## Maternal Behavior of a Female Andean Bear in the Paramo of Cayambe Coca National Park, Ecuador

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On February 15, 2014, while conducting an expedition to monitor the interactions between Andean bears and Mountain tapirs in the Cayambe Coca National Park, Ecuador, my assistant, Felipe Fernández, observed 4 male bears following a female bear named Delia, who was equipped with a GPS-Iridium satellite collar (Castellanos 2014). The next day she was accompanied by a single large bear, who we suspected bred with her.

Afterwards, data from Delia's collar indicated movements of up to 5 km per day. However, on June 11, 2014, collar data showed that she travelled an atypical distance of 9 km, and then suddenly settled into a place where she moved only a few meters. This behavioral change led me to suspect Delia had denned, maybe at a site that she was familiar with.

After 16 days, during which Delia remained in a relatively static location, my assistants, Melchor Ascanta and Felipe Fernández, and I decided to attempt to find Delia to determine if she was, indeed, in a maternity den. After 2 days of walking, we reached the vicinity of her GPS position, keeping a 300-m distance. That she did not move suggested that she may have had newborn cubs, so we decided not to risk disturbing her and opted instead to return at a later date.

We monitored Delia's status from data downloaded from the satellite. After 21 days of relative inactivity she began moving again, venturing farther from the focal position each day. On day 60 she left the area overnight, so we decided it was an appropriate time to return and investigate further. We arrived on day 62, when the VHF signal indicated she was away. We climbed through a patch of high Andean forest on a small hill in the paramo (at 3,800 masl) that ended at a rock wall next to a rocky platform. The platform had two apparent entry points, one of which was readily visible and the other almost imperceptible. We noted that, although it was the wet season, the location was dry. We searched for something similar to a bear nest that I had previously identified in the cloud forest of the Intag region (Castellanos 2010). Instead, we discovered a large entanglement of vines, branches, and orchids from which sounds were emanating.

Being careful not to disturb anything, we observed a seemingly lone cub, weighing approximately 1.5 kg, inside the den. The cub issued a series of screams and blows, but it was clearly uncoordinated (barely able to climb the small pit that formed the nest). Based on the date the mother denned, and on the size of the cub (compared to captive-born cubs), we estimated that the cub was 55–60 days old. We quickly obtained photographs and recorded a short video ([https://www.youtube.com/watch?v=8CMB9l\\_aoUA&list=UUA9lgDbJTUEWb4hbl\\_16TXQ](https://www.youtube.com/watch?v=8CMB9l_aoUA&list=UUA9lgDbJTUEWb4hbl_16TXQ)), but opted not to take measurements or to attempt to assess the cub's gender so as to avoid disturbing the cub or the nest, and so as not to risk the mother returning while we were there.

The nest was constructed much like the nest of an Andean bird known as the Northern mountain cacique (Cacicus



(left) Structure of Andean bear maternity nest found in the paramo of Ecuador (Aug 13, 2014). (right) Andean bear cub inside natal nest after mother had left on an extended feeding excursion. Photos: Armando Castellanos



leucoramphus), a design which effectively blocks wind while retaining heat. The primary component of the nest was *Fuchsia* (*Fuchsia* spp) which, along with some other vegetation, appeared to have been raked from within an area of several square meters surrounding the nest. The slope of the hillside was ~60-70°.

The nights before and after our encounter with the cub, Delia slept away from the nest, having "temporarily abandoned" it for 48 hours. After 81 days of denning, she again stayed away from the nest; that, in combination with her GPS coordinates, led us to suspect that she built a second nest 3 km away, a suspicion we hope to confirm on our next monitoring expedition.

The nest is the first reported den in the paramo habitat of Ecuador. Previously we did not know that bears would den in this habitat. The complex structure of the nest suggests that it would have taken a few days to construct. A similar behavior was observed 3 times by a captive female bear, Palmira, at a rescue facility in the south of Ecuador (Teresa Clare, personal communication), and has been reported in other captive Andean bears by Thieme and Kolter (1995). In the case of Palmira, the bear collected straw and twigs for 15 days prior to each birth.

The discovery of Delia's cub confirms a gestation (breeding to birth) period of 120–125 days (estimated birth date ~June 13, 2014), which is the shortest reported gestation period for the species. Previous studies indicated a typical gestation period of 160–257 days (Garcia-Rangel 2012), although according to Lydia Kolter (Co-chair of the Captive Bear Expert Team), the full range of observed gestation is 133–272 days. Shorter gestation periods (<110 days) have been reported for the sun bear (*Helarctos malayanus*) (Frederick 2012). Differences in timing of estrus, mating, and parturition within a species can be considered an adaptation to wide geographic distribution across latitudes, altitudes, and habitats, and accompanying variation in food availability and other environmental factors (Spady et al. 2007).

Vacating the primary nest to feed and the possible use of multiple dens to avoid detection are behaviors similar to those of the giant panda (*Ailuropoda melanoleuca*) (Zhu et al. 2001). Long trips made by the nursing Andean bear mother can be explained by the variability of food resources such as bromeliads (*Puya* spp, *Greigia* spp), the main dietary source, which are concentrated in very scattered patches in the paramo, as Troya et al. (2004) found in the study area.

Delia's temporary abandonment of her cub for several days, a behavior also observed in some Andean bears in the dry forest of Peru (José Vallejos, Spectacled Bear Conservation Society Peru, personal communication), suggests that this is more widespread amongst the species than heretofore known, and may be unique to this species of bear.

Our documenting of this "temporarily abandonment" has prompted the authorities of the Ministry of Environment of Colombia to pledge to require rescuers of presumed abandoned bear cubs to observe a waiting period of up to 3 days to ensure that the cubs are truly abandoned before taking them to rescue centers. We intend to ask the Ministry of Environment of Ecuador to emulate the actions of their Colombian colleagues and hope that the practice will become the commonly-accepted procedure throughout the range countries of the Andean bear.

Intensive studies of more female bears, with the help of GPS-Iridium satellite technology, are apt to bring further understanding of the fascinating maternal behavior of this species.

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