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Short article:

The threat of road-kill to Andean tapirs: the case of 'Jorgito', the Andean tapir that lived beside the Quito-Amazon highway, Ecuador

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Road kill is an increasingly significant threat to wildlife (Laurence *et al.*, 2009; Medrano-Vizcaino, 2015), and has been shown to be a significant threat to certain lowland and bairdii tapir populations (Medici & Debiez, 2012, Contreras-Moreno *et al.*, 2013). Here, I report on the case of a male Andean tapir found in the ditch of the Via Interoceanica highway that connects the capital Quito to the Amazon basin, and suggests that road kill is also becoming a significant threat to Andean tapirs.

On September 8, 2013, the tapir nicknamed 'Jorgito', was found by police officers at the side of the highway close to 'El Chalpi', in the Province of Napo, Ecuador (0°22'0.80"S - 78° 5'22.38"W; 2,800 m asl). The animal appeared to be distressed and exhausted, yet was in healthy condition (approximate weight 180 kg) despite having what appeared to be fresh Andean bear (*Tremarctos ornatus*) claw marks on his rump. This suggests that Andean bear predation of tapir might be common (Castellanos, 2014). Before his release, Jorgito was allowed to rest and recover, and was fitted with a radio collar to study his movements in the cloud forest.

Initially, I hypothesized that the tapir had been pursued over a long distance by a bear predator before descending to the highway. However, the radio collar allowed us to determine that 'Jorgito' did not move far from the highway. Radio collar localizations suggested that he spent most of his time at nearby cattle pastures and salt licks; whilst he appeared to find shade and shelter in patches of cloud forest (Sierra & López, 1999) close to the highway section where we first found him.

My field assistant, Felipe Fernández, and I recaptured Jorgito and deployed him with an Iridium/GPS satellite collar (Figure 1). We were able to collect data for 6 months before the device malfunctioned; it showed that the tapir crossed the highway 20 times, slept and rested within 30 m of the highway and moved away between 15-120 m from the road. Using the Minimum Convex Polygon method, Jorgito´s home range was estimated to be approximately 250 hectares. The closest inhabited houses were 225 m outside his home range and a pump station for heavy crude oil (from the Ecuador-based pipeline operator OCP) was 550 m outside the home range polygon (Figure 2).

Figure 1. The Andean tapir 'Jorgito' wearing an Iridium/GPS satellite collar traversing pastureland. Photograph by Lynn Freeman.

Figure 2. Satellite image showing the home range of Jorgito, traversed by the Interoceanica highway. The left corner of the image shows the pump station for heavy crude oil. Legend: Red polygon: Jorgito's home range, Yellow Line: Interoceanica Highway.

A brief 40-minute survey of vehicle movement at the highway section where Jorgito was found, revealed that 74 vehicles passed by between 1200 hours and 1240 hours (mean 1.82/minute): 42 cars, 18 trucks, 7 buses, 6 trailers, and a motorcycle. In light of this, and the observation that 'Jorgito' frequently crossed the highway, I reported the issue to the authorities of the Ministry of Environment of Ecuador (MAE). With the help of a private enterprise, I offered to place road signage to warn drivers to slow down at corridors I had identified to be used by the tapir. Unfortunately, my request was not heard and the tapir was hit on March 18, 2015 (Figure 3); my observation is in agreement with the finding of Medrano-Vizcaíno (2015) that most fatal incidents in the region occurred in neighboring grazing areas.

Figure 3. The Andean tapir 'Jorgito' found dead after being hit on the Interoceanica highway. Photograph by Giovanny Ascanta.

The movements and behavior of 'Jorgito' were not the only ones observed. After his death, another tapir was reported crossing the road at the same site (April 6, 2015). Additionally, farmers in the communities of Sigsipamba (Province of Imbabura, northern Ecuador), and 'Imbana' (Province of Morona Santiago, southern Ecuador), confirmed sightings of Andean tapirs and cattle grazing and salting together. Reports indicate that tapirs in these areas are encroaching closer to populated areas in recent years.

Previous research indicates that this species live in remote areas, far from anthropogenic activities that could potentially become serious barriers to their movements (Downer, 1996; Tapia *et al.*, 2011; Castellanos *et al.*, 2012; Ortega *et al.*, 2015). However, recent, more extensive telemetry studies in Ecuador, including that of Jorgito, have demonstrated the encroachment of Andean tapirs towards areas of human activity such as busy highways.

Areas adjacent to the road possess large and diverse patches of wild and domestic plants, such as *Lachemilla orbiculata*, that are preferred foodstuffs of the Andean tapir. The presence of these comestible plants at the roadside is inadvertently attracting wild herbivores, which have consequently become adapted to inhabiting in these new and dangerous foraging areas.

Eliminating the presence of hunters whilst implementing effective mitigation measures to avoid collisions would reduce mortality and maintain the connectivity of populations of this species of tapir. Methods such as those reported by Medici & Desbiez (2012) in which local government and NGO's worked together to install speed cameras in areas of frequent wildlife crossing appear to be successful, and could be employed to prevent wildlife mortalities in Ecuador.

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