

FIELD NOTE

Tayra (*Eira barbara*) predation of a brown-throated three-toed sloth (*Bradypus variegatus*) in Costa Rica

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Abstract Being strictly arboreal, sloths become more vulnerable to predation when on the ground. Records of such predation, however, are rare. Here we present video documentation of a tayra (*Eira barbara*) preying on a juvenile brown-throated three-toed sloth (*Bradypus variegatus*) in Barbilla National Park, Costa Rica. Tayras and other ground predators, plus human activities such as habitat fragmentation, are probably major factors influencing sloth life history and permanence in the ecosystem. Predation by tayras might be more common than we think, particularly in disturbed forests.

Keywords: arboreal, Barbilla National Park, behavior, diet, prey

Depredación de perezoso de tres dedos (*Bradypus variegatus*) por tolomuco (*Eira barbara*) en Costa Rica

Resumen Al ser estrictamente arbóreos, los perezosos se vuelven más vulnerables a la depredación cuando están en el suelo. Sin embargo, los registros de dicha depredación son raros. Aquí presentamos la documentación en video de un tolomuco (*Eira barbara*) que caza un juvenil de perezoso de tres dedos (*Bradypus variegatus*) en el Parque Nacional Barbilla, Costa Rica. Tolomucos y otros depredadores terrestres, además de actividades humanas como la fragmentación del hábitat, son posiblemente los principales factores que influyen en la historia de vida de los perezosos y su permanencia en los ecosistemas. La depredación por tolomucos podría ser más común de lo que pensamos, particularmente en bosques perturbados.

Palabras clave: arbóreos, comportamiento, dieta, Parque Nacional Barbilla, presa

Of the many anti-predator options available to mammals (Caro, 2005), flight (*i.e.*, “running away”) is not one employed by sloths, often noted as being among the slowest of all living mammals (Britton, 1941b). Even though highly adapted for an arboreal lifestyle (Britton, 1941b), the slow movements and cryptic pelage of sloths do not fully protect them from canopy predators, whether avian (Beebe, 1926; Retting, 1978; Galetti & Carvalho, 2000; Touchton *et al.*, 2002; Voirin *et al.*, 2009; Aguiar-Silva *et al.*, 2017) or mammalian (Bezerra *et al.*, 2009; Sobroza *et al.*, 2016).

Even greater helplessness and vulnerability to predation of sloths on the ground (Mendel, 1985;

Wainwright, 2002) is likely because “...progression is very slow [even for the sloth] and difficult” (Britton, 1941a:24). Beebe (1926:16) reported that “a mother sloth on the ground, speeded up by the calls of her infant, made 14 feet in one minute.” It is not surprising, then, that sloths spend little time on the ground. Unintended “ground-time” may result from fights resulting in falls from trees (Ingles, 1953), but sloths also come to the ground to defecate at an average interval of 8 days, with each visit lasting just a few minutes (Montgomery & Sunquist, 1975). More importantly, sloths move on the ground to get to other trees, sometimes crossing pastures (Vaughan *et al.*, 2007), roads (Britton, 1941a), and



FIGURE 1. Photos (from a 30-sec video) of a tayra (*Eira barbara*) preying on a juvenile brown-throated three-toed sloth (*Bradypus variegatus*) in Barbilla National Park, Costa Rica.

rivers (Beebe, 1926), thus exposing themselves to possible predation for longer periods of time.

The brown-throated three-toed sloth (*Bradypus variegatus*) and Hoffmann's two-toed sloth (*Choloepus hoffmanni*) have been reported as prey of several felids, including jaguars (*Panthera onca*), pumas (*Puma concolor*), and ocelots (*Leopardus pardalis*; Beebe, 1926; Garla *et al.*, 2001; Moreno *et al.*, 2006), and canids such as coyotes (*Canis latrans*) and domestic dogs (Vaughan *et al.*, 2007; Peery & Pauli, 2014). However, these observations have come mostly from studies of stomach contents, scats, or other signs; there is just a single published report of an actual predation event, specifically by a coyote of a Hoffmann's two-toed sloth on the ground (Sibaja-Morales & Cartín Núñez, 2017). Here we report the predation of a juvenile brown-throated three-toed sloth by a tayra (*Eira barbara*), known locally as the toloomuco, as documented by a video recorded by a remote camera.

During 2009–2016, we set cameras in Barbilla National Park (9°58'19"N, 83°28'51"W), located in the northern Talamanca Mountains of Costa Rica, to document the distribution and relative abundance

of jaguars and other wildlife (*cf.* Sáenz-Bolaños *et al.*, 2015). At 21 locations in the park, we placed cameras (Trophy Cam models 119436, 119446, 119456, Bushnell, Overland Park, USA) on trees 0.5 m above the ground and near a human trail or animal path where we thought a jaguar might pass, and recorded either three individual photos taken 1 sec apart or a 30-sec video, with a minimum interval of 1 min between consecutive recordings.

In total, we accumulated 8,450 trap nights at the 21 camera stations. Tayras were photographed a total of 56 times at 12 (57%) of the stations; at the one station that recorded the single brown-throated three-toed sloth photographed and reported here, 14 (25%) of the tayra photos were taken. This camera trap station was located at the end of a steep area in primary forest close to the Danta River. Forest disturbance was very low at this location; trees were big and tall with nice canopy overlap. Thus, the absence of tall trees likely was not the reason the sloth came to the ground. Moreover, the only human activity recorded in more than seven years at this station was just one video of two indigenous people with a rifle.

The video of the sloth (as best we could tell, a juvenile male) was recorded at 05:29 hr on 3 May 2013. The video begins with the tayra in the foreground walking away from the camera on a line 1 m to the left of and 2 m away from a lone sloth in the background (which the tayra is walking toward). The sloth is 0.3 m off the ground and moving down a tree perhaps 12 cm in diameter. The tayra lifts its nose, seemingly sniffing the air, walking slowly and pausing briefly. When about 1 m from the sloth, it continues sniffing but orients to the sloth (3 sec after the video begins) and then approaches it, touching it with its nose (at 8 sec; **FIG. 1**; <https://youtu.be/7WhLYIhgdeU>). The tayra sniffs both sides and underneath the sloth, the sloth moves slightly, then the tayra noses higher, swipes at the sloth briefly with its left front paw (at 17 sec), and then grabs it by its head (at 20 sec), bites around its neck and then, placing its right paw on the body, pulls it down from the tree (at 24 sec). It then appears to bite around the sloth's head and neck while the sloth weakly reaches its right arm toward the body of the tayra. The video ends at 29 sec; we believe that the sloth was killed. The next videos taken at this camera station were recorded 23 min later; they were of a tayra of the same size, apparently searching for something, sniffing all around and climbing the tree where the sloth had been. However, no sloth carcass subsequently could be found, nor could any evidence of blood, hair or something else related to the attack.

Tayras forage on the ground and in the trees of tropical and subtropical forests, and are considered opportunistic omnivores, consuming a variety of fruits, small vertebrates, insects, carrion, and honey (Presley, 2000). Tayra prey also includes medium-sized ground mammals such as rabbits (*Sylvilagus floridanus*, *S. brasiliensis*), opossums (*Didelphis marsupialis*), agoutis (*Dasyprocta punctata*), and pacas (*Agouti paca*; Galef *et al.*, 1976; Janzen, 1983; Calouro, 2000; Wainwright, 2002), and their excellent climbing skills allow them to prey on arboreal woolly opossums (*Caluromys derbianus*; Ceballos, 2016), primates such as common marmosets (*Callithrix jacchus*; Bezerra *et al.*, 2009) and red-handed howlers (*Alouatta belzebul*; Camargo & Ferrari, 2007), and sloths (Bezerra *et al.*, 2009; So-broza *et al.*, 2016).

Sloths descend to the ground either when they are obliged to move to another tree that is not possible to reach via the canopy, or weekly to defecate. Being on the ground is a risky and energetically costly activity (Pauli *et al.*, 2014) that exposes sloths to potentially high and population-limiting predation, the latter being particularly important given the species' long lifespan and low fecundity (Peery & Pauli, 2014). Thus, abundant predators such as tayras, but including many other mesopredators, could be major factors influencing sloth

life history and permanence. In addition, human activities might increase the importance of mesopredator predation on sloths. For example, habitat fragmentation could eliminate canopy connections between trees and also remove apex predators. The former might force sloths to go to the ground more frequently, while the latter might result in an increase in mesopredator abundance (Ritchie & Johnson, 2009). If so, then predation by tayras (and other mesopredators) of sloths could be more common than is currently appreciated.

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