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DEATH OF A TAPIR (*Tapirus terrestris*) AND ITS CONSUMPTION BY SCAVENGERS IN YASUNÍ NATIONAL PARK, ECUADOR

MUERTE DE TAPIR (Tapirus terrestris) Y SU CONSUMO POR CARROÑEROS EN EL PARQUE NACIONAL YASUNÍ, ECUADOR

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Abstract

We describe the death of a tapir (*Tapirus terrestris*) in a mineral lick, captured by a camera trap. We narrate the *ante mortem* event and the scavengers associated with the *post mortem* event. Seven mammal species (*Mazama zamora, Pecari tajacu, Dasyprocta fuliginosa, Cuniculus paca, Hydrochoerus hydrochaeris, Dasypus novemcinctus* and *Desmodus rotundus*) and two species of birds (*Ortalis guttata* and *Pipile cumanensis*) were registered in the *ante mortem* event. Three species of scavenging birds (*Coragyps atratus, Cathartes melambrotus* and *Sarcoramphus papa*) and one species of reptile (*Chelonoidis denticulatus*) were registered in the *post mortem* event. The decomposition process of *T. terrestris* took 13 days from its death until the body completely disappeared.

Key words: descomposition, interactions, necrophages, neotropical mammals, photo-trapping.

Relevancia

Esta nota proporciona información detallada sobre la descomposición y la ecología trófica de un tapir amazónico y los carroñeros asociados con eventos *ante mortem* y *post mortem*, para ser utilizados en estudios veterinarios y ciencias forenses de mamíferos neotropicales.

Resumen

En esta nota se describe la muerte de un tapir (*Tapirus terrestris*) captada por una cámara trampa en un saladero. En ella narramos el momento *ante mortem* y a los carroñeros asociados con el suceso *post mortem*. En el acontecimiento *ante mortem* se registraron siete especie de mamíferos (*Mazama zamora*, *Pecari tajacu*, *Dasyprocta fuliginosa*, *Cuniculus paca*, *Hydrochoerus hydrochaeris, Dasypus novemcinctus* y *Desmodus rotundus*) y dos especies de aves (*Ortalis guttata*, *Pipile cumanensis*). En el hecho *post mortem* se registraron tres especies de aves carroñeras (*Coragyps atratus*, *Cathartes melambrotus* and *Sarcoramphus papa*) y una especie de reptil (*Chelonoidis denticulatus*). El proceso de descomposición de *T. terrestris* tomó 13 días desde su muerte hasta que el cuerpo quedó totalmente desecho.

Palabras clave: descomposición, foto trampeo, interacciones, mamíferos neotropicales, necrófagos.

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Natural death events of wildlife are associated with different circumstances, including debilitating factors that vulnerate organism defenses, like ecosystem alterations of antropic and natural origin, presence of pathogens or vectors, lack of food, extreme weather conditions, injuries, or old age (Williams *et al*., 2002). In case of the presence of parasites or diseases, they can be shared between wild and domestic species, as well as a possible manifestation of viral or bacterial agents in a new region, and a potential generation of epizootics, these are debilitating factors that allow latent pathogens to potentiate their virulence or pathogenicity, often causing death (Cañizales and Guerrero, 2010). Moreover, scavengers play an important role in the natural dynamics of ecosystems by consuming and eliminating the remains of animals that have been killed or die (Huang *et al*., 2014). Recent studies in food-web theory have recognized that scavenging plays a critical role in stabilizing food webs in ecosystems and suggesting that the previous models may underestimate the importance of scavenging in food web research (DeVault *et al*., 2016).

The Amazon tapir (*Tapirus terrestris*) is an endangered species, cataloged as Vulnerable globally (Varela *et al*., 2019) and Endangered in Ecuador (Ministerio del Ambiente del Ecuador, 2017). In Ecuador, it is present in the Amazon's tropical and subtropical humid forests (Tirira, 2017). It frequents mineral licks, inside of the Amazon forest, that have a high level of mineral deposits to supplement their diet, or to experience a detoxification process (García, 2009). This note describes the death of a tapir (*Tapirus terrestris*) in a mineral lick, captured by a camera trap. We narrate the *ante mortem* event and the scavengers associated with the *post mortem* event.

The event occurred in the mineral lick named "Las Dantas" (0°31'14.68"S, 76°21'4.46"W), approximately 80 m² with an altitude of 261 m.a.s.l. within the Yasuni National Park, Orellana province, Ecuador (Figure 1). The area is characterized by a climate warm-wet with temperatures of 24 °C to 26 °C and annual precipitation of 3,000 mm, with a humidity of 94% (Ministerio del Ambiente del Ecuador, 2011).

From February 21 to April 15 in 2012 a camera trap RECONIX HC600 was installed 60 cm above the ground. It was set to take three continuous shots with high sensitivity, and without waiting interval between activation. The camera trap had remained active for 55 days and we obtained 9,353 photographs that recorded the decease event, of which 6,258 belong to the *ante mortem* event and 3,095 belong to the *post mortem* event.

In the *ante mortem* event, the salt flat was visited frequently by animals such as mammals: three individuals of Amazon tapir (*T. terrestris*)

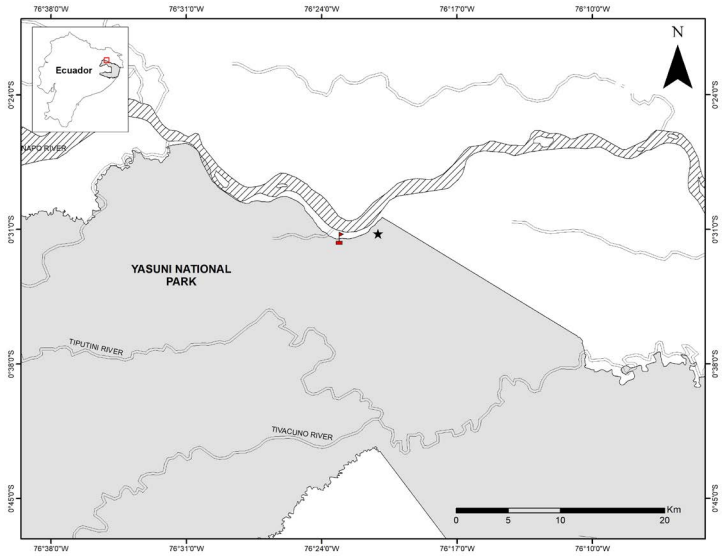

Figure 1. Location of the mineral lick "Las Dantas", where the singhting was recorded. Star: Site of decease of *Tapirus terrestris* recorded in the camera trap, mineral lick "Las Dantas"; red flag: "Añangu" rangers house of Yasuni National Park.

were identified, a male, a female, and another adult male with a poor physical condition that was notorious; it died afterward (18 visits, which of 11 correspond to the individual who died), red brocket deer (*Mazama zamora*; 11 visits), collared peccary (*Pecari tajacu*; 15 visits), black agouti (*Dasyprocta fuliginosa*; 28 visits), lowland paca (*Cuniculus paca*; 27 visits), capybara (*Hydrochoerus hydrochaeris*; 1 visits), and nine-banded armadillo (*Dasypus novemcinctus*; 1 visit); birds: speckled chachalaca (*Ortalis guttata*; 5 visits) and blue-throated piping-guan (*Pipile cumanensis*; 1 visits). The corpse was only visited, in the *post mortem* event, by birds like: black vultures (*Coragyps atratus*; 8 visits), greater yellow-headed vultures (*Cathartes melambrotus*; 5 visits), and the king vulture (*Sarcoramphus papa*; 1 visit) also a reptile: yellow-footed tortoise (*Chelonoidis denticulatus*; 2 visits).

Ante mortem event

We started our observation on March 2, 2012. The male who died was registered in the camera trap for the first time at 8:42 am. After this date, it was recorded on 11 occasions between March 19 and April 1, 2012. During that period, the presence of a vampire bat feeding on the tapir was recorded (Figure 2A). Based on the proposed assessment of the body condition (Pérez-Flores *et al*., 2016), it showed the corporal decrease in its head, neck, shoulders, ribs, besides it presented other corporal signs such as whitish fur on its face and lower neck, and hair loss on pelvis and ribs (Figures 2B, 2C). The individual visited the mineral lick almost every day, during day and night, probably to ingest minerals (Castellanos and Vallejo, 2017).

On March 22 and 26 the tapir stayed in the mineral lick for a period of 33 and 37 minutes respectively; on March 27, 29, and 30, he remained lying for 3 hours 10 minutes, 2 hours 30 minutes, and 1 hour 30 minutes respectively, always in the same place (Figure 2D). The tapir appeared on April 1st in the the mineral lick at 11:44 am. It leaned on and stayed shaking his head side to side. It remained in that position until April 02 at 00:04 am, last date and time of the movement register of the *T. terrestris* stated.

Figure 2. A) First record of the presence of bats perched on this individual, **B)** body condition; right flank without injuries, wounds or scars, but a body decrease is seen in areas of the head, neck and fall of fur in the area of the ribs, **C)** left flank this condition can be observed in the areas of the shoulder and pelvis and **D)** this behavior was recorded for prolonged periods of time.

Post mortem event

On April 2, 4:14 pm, the body had one slight swelling (25 % of total observed), there were flies and ants; at the same time, a *M. zamora* was registered a few meters from the tapir (Figure 3A). The next day the body had a greater swelling (50 % of the total observed) and a big number of flies and ants, also a noticeable hair loss. At 1:25 pm a *D. fuliginous* was recorded a few meters from the corpse. On the 5th, the body was fully inflated (100 % observed), with lots of flies and ants surrounded it; the hairless areas of the body increased. At 10:56 am the presence of the first scavengers was recorded; three individuals of *C. atratus* approached and pecked the areas of spine and pelvis. At 1:55 pm, an individual of *C. melambrotus* appeared to peck and rummage through the body. At 3:12 pm a total of four individuals of *C. atratus* were registered at the place (Figure 3B). The next day, the body appeared a little bit flaccid, and the skin had the absence of hair because of the decomposition process. At 6:39 am, showed up an individual of *C. melambrotus*, and subsequently four *C. atratus*. Both species pecked and rummaged through the decomposing body. A small hole in the back of the tapir near the tail turned up (Figure 3C).

By April 7th, the body was seen less bloated but more expanded, and many maggots were present, the skin turned dark green. At 7:35 am, the presence of three *C. atratus* was recorded in the place, feeding on small pieces of the corpse that they obtained from a small hole in the back, above described. At 10:05 am appeared two *C. melambrotus*. Both species together pecked the body and burrowed into its cavities such as eyes and nose (Figure 3D). The next day the volume body of the carcass was halved compared to the previous day and fly larvaes proliferated on the surface. Four *C. atratus* were recorded throughout the day while they were removing small pieces of the corpse. Although they were feeding, the scavengers did not present their bulky crops (ingluvies; Figure 3E). At 5:57 pm, a yellow-footed tortoise (*C. denticulatus*) was detected, feeding on the front part of the body (Figure 3F). On April 9th the body was completely covered with maggots and skin is overly attached to the bones, the bones of the hip were very evident, only one *C. atratus* was recorded. The following day the bones of the left hind limb were exposed in its entirety. Four *C. atratus* and one *C. melambrotus* were recorded feeding on the residues that remained. At the end of the day, the hip bone was fully exposed (Figure 3G). By April 13th, the tapir had all the bones exposed and detached from the flesh. Four individuals of *C. atratus*, one *C. melambrotus*, one *S. papa*, and one *C. denticulatus* were recorded continuing feeding on pieces of meat, that were attached to the skin and bones (Figure 3H).

After 13 days several pieces of the skeleton had disappeared, probably dragged by the scavengers while they were trying to tear off pieces of meat. Three individuals of *C. atratus*, remained in the place looking for some leftovers of carrion in the mud. After thirteen days, the body was completely consumed.

Due to the rapid decomposition of the *T. terrestris* body, tissue samples could not be taken to determine a reliable cause of death. However, Castellanos and Banegas (2015), reported the presence of *Desmodus rotundus* perched and feeding on the mentioned tapir's spine on March 19, 21, 26, 29, and April 1st. This species of hematophagous bat can host the rabies virus (Corrêa *et al*., 2014), which could be a cause of death.

The camera caught flies in the individual's body 12 hours before his death, a sign that could indicate a poor health condition due to non-infectious diseases, infections, viral agents, endoparasites, and ectoparasites that are present in tapirs (Bernal, 2008), which potentiate their pathogenicity and could have led to the death of this individual. It was not possible to confirm that it was a senile individual due to the lack of evaluation of the dental attrition and nails corrosion (Medici, 2010), since no remains were found at the time of removing the camera; however, this is not ruled out as the cause of his death. By day 12 after death, the leftovers that remained were just the bones and small pieces of meat attached to the skin. The seasonality and competition with other decomposer organisms as fungi, bacteria, and insects, among others, can affect the presence of various scavengers (Ballejo, 2016). Besides, we observed rapid changes in the postmortem process due to the environmental conditions of the site (Brooks, 2016), a factor that influences the interactions of several species of scavenger fauna (Beck *et al*., 2014).

Figure 3. A) After the first *post-mortem* day, the presence of black flies can be noticed and the visit of *M. zamora* to the saladero is recorded, **B)** fourth *post-mortem* day and presence of the first scavengers *C. atratus*, **C)** interaction of two species of scavengers, peck rummage the corpse without tearing it apart, **D)** the corpse has a small hole, **E)** the scavengers do not show an obvious consumption of carrion based on the proportion of their snaps, **F)** presence of the land turtle *C. denticulata* rummaging the body, **G)** on the ninth day the body exposes some hip bones and fly larvae emerge from the abdominal area and **H)** nests between scavengers *S. papa* and *C. atratus* and presence of *C. denticulata* feeding.

C. atratus and *C. melambrotus* exhibit a threatening behavior between them by spreading the wings and perching on the corpse, however, there were no attacks even though the former double in number to the second species. Upon the arrival of *S. papa*, was it observed a dominant behavior over both cited species, because *S. papa* approached to the body while others receded, allowing it to be the first to peck the bone and feed on the few existing remains, behavior also reported by Wallace and Temple (1987).

The morphology of the beak of *S. papa* is proportionally longer and thinner than the other species of Cathartidae, it also has a narrow skull that facilitates, together with the characteristics of the beak, remove small pieces of meat from the skin and skeleton, including small mammals and fish, also allows it to catch insects, worms, and ectoparasites for nourishment (Sazima, 2007). Buzzards may also have been eating larvae that proliferate in the body because they have been adapted to take small pieces of meat, it was very difficult to have evidence of what they were swallowing: bits of carrion or larvae. In Ecuador, do not exist reports of the times of consumption by scavengers in different ecosystems. Understanding the dynamic presented in this trophic group allows us to comprehend how energy turnover works, and how important is its role in the environment (Donázar and Cortés-Avisanda, 2012).

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