

## Short Note

Thamírís Christina Karlovic de Abreu\*, Clarissa Alves da Rosa, Izar Aximoff  
and Marcelo Passamani

# New record of feeding behavior by the porcupine *Coendou spinosus* (F. Cuvier, 1823) in high-altitude grassland of the Brazilian Atlantic Forest

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**Abstract:** *Coendou spinosus* is a rodent from the Brazilian Atlantic Forest with a cryptic behavior that hinders collection of information regarding its ecology. On October 2014, we observed an individual of *C. spinosus* above 2100 m of altitude, on the high-altitude grasslands of the Itatiaia National Park, feeding on the flowers of *Camptosema scarlatinum*. This is the highest altitude ever recorded and the first registration of vine species consumption and ground feeding behavior by the *C. spinosus*. Therefore, we recommend the undertaking of new studies to understand its ecological requirements and interspecific interactions.

**Keywords:** diet; Erethizontidae; florivory; herbivory; Itatiaia National Park.

The Erethizontidae family forms two ecological groups of New World porcupines, the North American porcupine *Erethizon dorsatum* (C. Linnaeus, 1758), who's weight exceeds 10 kg and is both tree and ground-dwelling (Woods 1973, Roze 2012, Voss 2015); and the South American porcupines (*Chaetomys subspinosus* I. Olfers, 1818 and *Coendou sp.*), that weigh up to 5 kg, and are known

for their prehensile-tail, conducting their daily activities mainly in trees (Chiarello et al. 1997, Giné et al. 2010, Souto-Lima et al. 2010, Voss 2015). All the species of Erethizontidae feed mainly on leaves, fruit and bark (Roze 2012). The studies of South American porcupines focus on *C. subspinosus*, an endangered species with high ecological requirements (Chiarello et al. 1997, Giné et al. 2010, 2012, 2015, Souto-Lima et al. 2010, Zortéa and Brito 2010, Oliveira et al. 2012), but little is known about the *Coendou* species because of their cryptic habits that hinder acquisition of knowledge about their ecological aspects.

The porcupine *Coendou spinosus* (F. Cuvier, 1823) is a nocturnal species which occupies areas up to 900 m of altitude in subtropical forests (Voss 2011). In a recovering forest fragment surrounded by anthropogenic habitats, Passamani (2010) studied a single individual that showed a diet basically folivore and feeding in trees. In this paper we provide new information about the *C. spinosus* feeding behavior and habitat based on a single observation in the Itatiaia National Park (INP), Brazil.

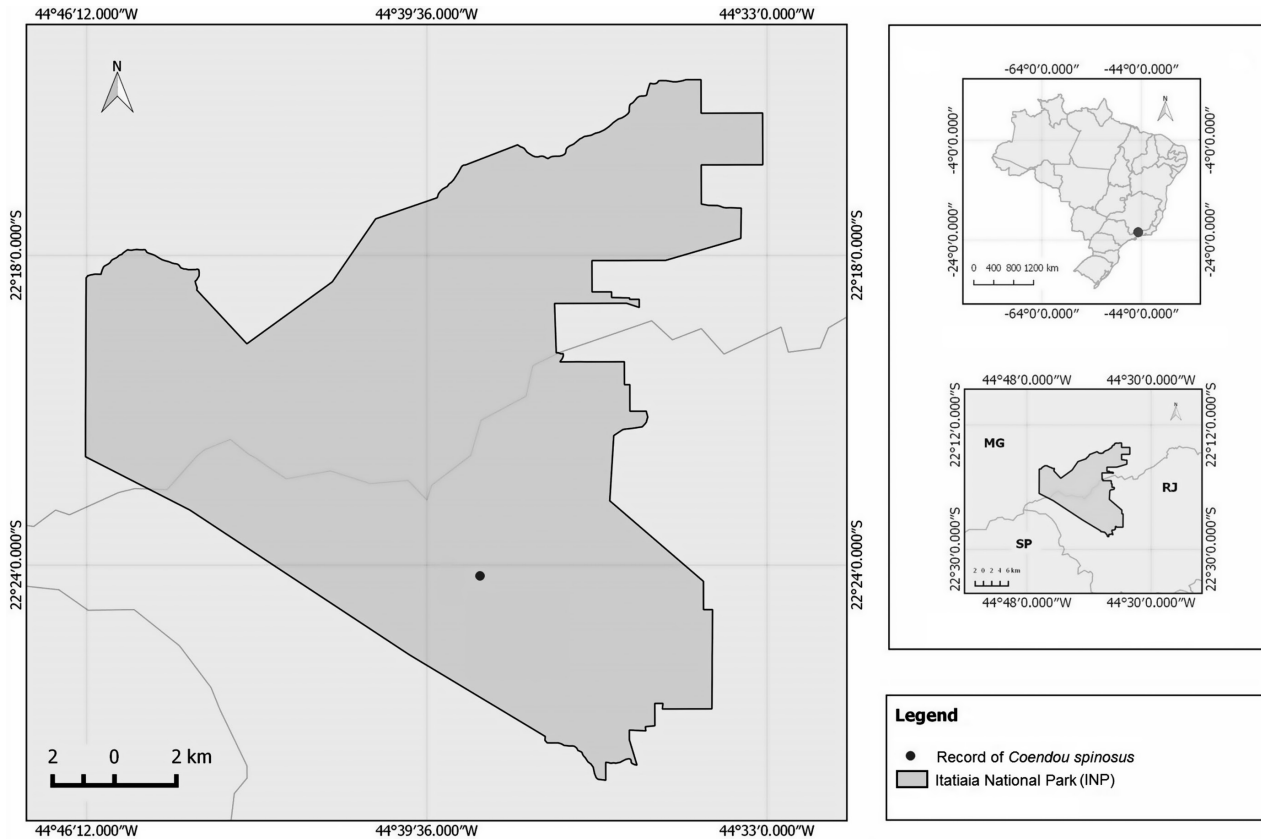
Located in the states of Minas Gerais and Rio de Janeiro, the INP has 28,084 ha of Brazilian Atlantic Forest (Barreto et al. 2013) and is considered irreplaceable for biodiversity conservation (Le Saout et al. 2013). The INP has three vegetation types: montane forest (from 500 to 1500 m); upper montane forest (from 1500 to 2000 m); and high-altitude grasslands (from 1800 to 2791 m) (Segadas-Vianna and Dau 1965). With a mesothermic climate (Köppen 1936), mean annual temperature and precipitation of around 11.5°C and 2150 mm, respectively (Barreto et al. 2013), the high-altitude grasslands dominate the landscape above 2000 m and have a predominance of herbaceous plants, shrubs and small trees that can reach 4 m high (Martinelli 1996, Aximoff 2011). On October 8th, 2014, at 2137 m, on high-altitude grasslands of INP (22°24'12"S and 44°38'34"W, WGS 84) (Figure 1), around 8:00 am, we observed an individual of *Coendou*

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\*Corresponding author: Thamírís Christina Karlovic de Abreu, Laboratório de Ecologia e Conservação de Mamíferos, Setor de Ecologia, Departamento de Biologia, Universidade Federal de Lavras, Campus Universitário, Lavras, Minas Gerais, 37200-000, Brazil, e-mail: thamycka@hotmail.com

Clarissa Alves da Rosa and Marcelo Passamani: Laboratório de Ecologia e Conservação de Mamíferos, Setor de Ecologia, Departamento de Biologia, Universidade Federal de Lavras, Campus Universitário, Lavras, Minas Gerais, 37200-000, Brazil

Izar Aximoff: Instituto de Pesquisas do Jardim Botânico do Rio de Janeiro, Escola Nacional de Botânica Tropical, Pós-Graduação em Botânica. Rua Pacheco Leão 2040 – Solar da Imperatriz, Horto – Rio de Janeiro, RJ, 22460-036, Brazil



**Figure 1:** Study area showing the Itatiaia National Park area and the registration point of *Coendou spinosus* feeding on *Camptosema scarlatinum*.

*spinus* feeding on flowers of *Camptosema scarlatinum* (Mart. ex Benth.) Burkart (Fabaceae) (Figure 2C and D). The porcupine was on the ground using both forefeet to bring the flowers into its mouth. After our presence was noticed, it started an escape behavior and climbed a shrub (approx. 2 m high) next to the feeding site (Figure 2A and B).

The South American porcupines are known to feed in trees (Giné et al. 2010, Souto-Lima et al. 2010) and our record demonstrates a new feeding behavior in these species. However, the *Coendou* species, including *C. spinosus*, are frequently killed on Brazilian roads (e.g. Freitas et al. 2013), showing that they descend to the ground more than initially expected. Usually, this ground exposure is most observed when the porcupine descends to the ground to defecate or urinate (Chiarello et al. 1997, Passamani 2010, Oliveira et al. 2012) and even then, it is undertaken with caution because of the greater exposure to predation (Oliveira et al. 2012).

Also, our record is the first consumption of vine species by *Coendou spinosus*, since only six species of trees are known to be feed on by the species (Passamani 2010). *Camptosema scarlatinum* is a terrestrial liana that

can be found on grasslands and at forest edges of Brazilian savannah and Atlantic forest (Burkart 1970). Considering that our registration was made in an open grassland, *C. scarlatinum* can be an alternative food item that is not important in forested habitats where other tree products are available (Roze 2012).

*Coendou spinosus* occurs in forest fragments of different conservation levels. Although, previous registrations in INP showed only *C. insidiosus* (I. Olfers, 1818) in Montane forest of up to 1200 m (Ávila-Pires and Gouvêa 1977, Geise et al. 2004). Our registration in an open grassland habitat above 2100 m of altitude is the highest altitude of occurrence at which *C. spinosus* has ever been recorded. The high altitude grasslands concentrate most of the endemic species and receives the lowest human pressure of the INP (Geise et al. 2004, Cunha 2010, Barreto et al. 2013), including recent records of primates and carnivore species (Rosa et al. 2015, Aximoff and Vaz 2016). We do not know the habitat use and behavior of the porcupines in those environments, but some authors suggest that food resources in high-altitude environments may be more abundant than previously thought (Raboy et al. 2013, Aximoff 2015). Perhaps *C. spinosus*



**Figure 2:** *Coendou spinosus* on a shrub next to the feeding site (A and B); *Camptosema scarlatinum* flourishing in the high altitude grassland of the Itatiaia National Park (C); and *Camptosema scarlatinum* flower (D).

use the forest patches that are immersed in the grassland matrix or, because of high altitude, even change the food items preferences during winter, as occurs with *Erethizon dorsatum* at high latitudes (Roze 2012). To answer these questions we need the development of systematic studies regarding habitat use, diet and food resources availability for *C. spinosus*. Considering that other species of the South American porcupines (e.g. *C. subspinosus*) are highly selective in terms of species consumed (e.g. Giné et al. 2010) we also need studies about the plant-animal interaction in order to understand ecological needs and interspecific interactions of the *Coendou* species.

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