

**The highest elevation record of *Mustela frenata*
(Carnivora: Mustelidae) and distribution in Caldas
department, Andean region of Colombia**

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The long-tailed weasel *Mustela frenata* Lichtenstein, 1831 has the greatest geographical range among mustelids in the western hemisphere (Harding & Drago 2012). The range of *M. frenata* extends from the north of the United States, near the Canadian border, to northern South America (Sheffield & Thomas 1997), from sea level to 3800 masl (Sheffield & Thomas 1997, Reid & Helgen 2008). In South America it is known from Bolivia, Peru, Ecuador, Venezuela and Colombia (Eisenberg 1989, Reid & Helgen 2008, Solari et al. 2013). In Colombia, it is widely distributed in the Andes, the Caribbean region, Orinoquia, the Pacific region and the Sierra Nevada de Santa Marta (Solari et al. 2013). From the six species of mustelids reported for Colombia (Ramírez-Chaves & Mantilla-Meluk 2009, Solari et al. 2013), four have been recorded within Caldas department (*Eira barbara*, *Galictis vittata*, *Lontra longicaudis* and *Mustela frenata*; Castaño et al. 2003, Castaño 2012, Castaño & Corrales 2010, Escobar-Lasso et al. 2013). However, little is known about the current distribution of these species in the department (Escobar-Lasso et al. 2013). Knowing the distribution of a species, including its elevational range, is of great importance to understand its ecology and natural history (Richter & Schaubert 2006). Therefore, the aim of this paper is to enrich the knowledge about *M. frenata* by reporting the highest elevation record for the species throughout its distribution range and by providing a review about its presence in the Caldas department.

The Caldas department is located in the West-central part of the Andean region of Colombia (Fig. 1), bordering with the Magdalena and the Cauca river basins, both slopes of

the Central Andes mountain range and the Eastern slopes of the Western Andes range (Instituto Geográfico Agustín Codazzi 1990, Castaño et al. 2003). The department includes 12 basins and 27 municipalities (Fig. 1), with an extension of 7457 km² and an elevation range from 200 to 5423 masl (Instituto Geográfico Agustín Codazzi 1990, Castaño 2012).

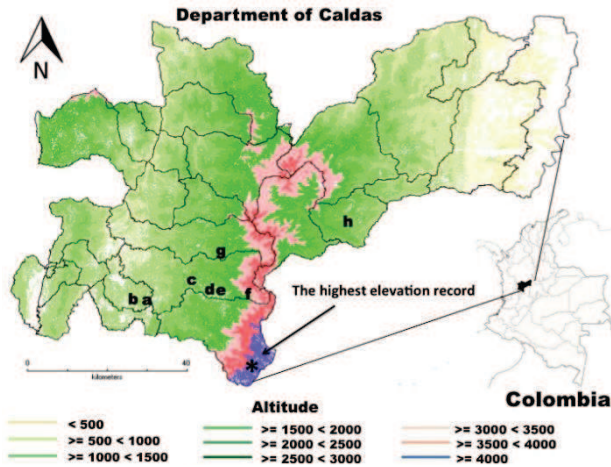


Figura 1. Records of the long-tailed weasel *Mustela frenata* at Caldas department, Central mountain chain of Colombia. The nine confirmed records are shown, including the highest altitude record for *M. frenata* (*). Most of the records are gathered in the Southwest of the department. Details in table 1.

To evaluate the presence of *M. frenata* at Caldas department a research was conducted in the mammal collection of the Natural History Museum of Caldas University, Manizales-Colombia (MHN-UC). Additionally, a literature review was conducted in order to find historical records for the department (e.g. Sánchez 2000, Castaño et al. 2003, Sánchez & Alvear 2003, Sánchez et al. 2004, Castaño & Corrales 2010, Castaño 2012, Escobar-Lasso et al. 2013). In the course of the research, the highest altitude record was found at the mammal collection of the MNH-UC (Fig. 2), confirmed by a meticulous literature examination to discard any higher records throughout the distribution of the species (e.g. Sheffield & Thomas 1997, Ceballos & Oliva 2005, McCain 2005, Harding & Dragoo 2012, Solari et al. 2013).



Figura 2. Individual of the long-tailed weasel *Mustela frenata* (MHN-UC 1105) collected at 4220 masl, at Paramo ecosystem, nearby the Nevado Santa Isabel, Caldas department, Central Andes range of Colombia. This is the highest elevation record for the species.

We found nine localities with confirmed records for the department from Chinchiná, Manizales, Neira, Manzanares and Villamaria municipalities, between 1400 and 4220 masl (Table 1, Fig. 1). Most of the records are located at the south-central part of the department, which corresponds to the Chinchiná river basin. In this region, carnivore-human conflict has been registered between *M. frenata* and some farmers because of predation on poultry (Sánchez & Alvear 2003).

Table 1. Records of long-tailed weasel *Mustela frenata* at Caldas department, Central mountain chain of Colombia.

Map code	Place	Coordinates
	Adult male collected on October 1 st 2011, at Paramo ecosystem between Nevado del Ruiz and Nevado Santa Isabel, Villamaria municipality (MHN-UC 1105).	04°50'32.5"N, 75°21'55.5"W; 4220 masl.
a	Individual recorded at the experimental station La Romelia, Chinchina municipality (CASTAÑO et al. 2003).	04°59'N, 75°40'W; 1400 masl.
b	Individual recorded at experimental station Naranjal, Chinchina municipality (CASTAÑO et al. 2003).	04°59'N, 75°39'W; 1400 masl.
c	Individual recorded at Cerro Sancancio, Manizales municipality (ESCOBAR-LASSO et al. 2013).	05°03'26"N, 75°30'01"W; 2150 masl.
d	Individual recorded at Manizales municipality, Rio Blanco reserve, Viveros station sector (ESCOBAR-LASSO et al. 2013).	5°04'13.52"N, 75°27'19.24"W; 2300 masl.
e	Individual recorded at Manizales municipality, Rio Blanco reserve, Bocatoma sector (ESCOBAR-LASSO et al. 2013).	5°4'13.52"N, 75°27'19.24"W; 2350 masl.
f	Individual recorded at Manizales municipality, Rio Blanco reserve, Finca Martinica sector (ESCOBAR-LASSO et al. 2013).	5°04'08"N, 75°22'42"W; 3500 masl.
g	Individual collected at the aqueduct of Neira municipality (MHN-UC 247).	05°10'04.95"N, 75°29'07.69"W; 2138 masl.
h	Individual collected at Manzanares municipality (MHN-UC 1093).	05°16'06.94"N, 75°09'04.85"W; 2116 masl.

The specimen with the highest elevation record was an adult male (MNH-UC 1105) collected by J. Harold Castaño on October 1st 2011 at Paramo ecosystem between Nevado del Ruiz and Nevado Santa Isabel, Villamaria municipality, Caldas, Colombia at 4220 masl (04°50'32.5"N, 75°21'55.5"W). This record extends the altitudinal range of *M. frenata* in 420 m. The second highest elevation record for the species comes from Cofre de Perote volcano, Veracruz, Mexico at 3800 masl (Hall 1936 in Sheffield & Thomas 1997).

Understanding the altitudinal range of mustelids in the Colombian Andes is of great important since altitude is a variable that is frequently related to changes in species richness and composition of assemblages (Escobar et al. 2005). Also it is relevant to understand climate change effects on these assemblages (Rodríguez-Eraso et al. 2010), mostly since mountains and their unique biota are disproportionately exposed to climate change (Nogués-Bravo et al. 2007, Viviroli & Weingartner 2004). A widest altitudinal range is related to adaptation to single factors, such as rainfall, temperature, productivity, competition, resource abundance, habitat complexity (McCain 2005). Our record provides new tools for understanding the altitudinal range of Andean fauna of Colombia, and as

potential basis for conservation of this species in the department.

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