

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

Sergio Escobar-Lasso – Fundación R.A.N.A (Restauración de Ambientes Neotropicales Alterados), Colombia. - Programa de Posgrado en Conservación y Manejo de Vida Silvestre, Instituto Internacional de Conservación y Manejo de Vida Silvestre. ICOMVIS. Heredia, Costa Rica.

Margarita Gil-Fernández – Programa de Posgrado en Conservación y Manejo de Vida Silvestre, Instituto Internacional de Conservación y Manejo de Vida Silvestre. ICOMVIS. Heredia, Costa Rica. – mgilfedz@gmail.com

The long-tailed weasel *Mustela frenata* Lichtenstein, 1831 has the greatest geographical range among mustelids in the western hemisphere (Harding & Dragoo 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 & Schauber 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).

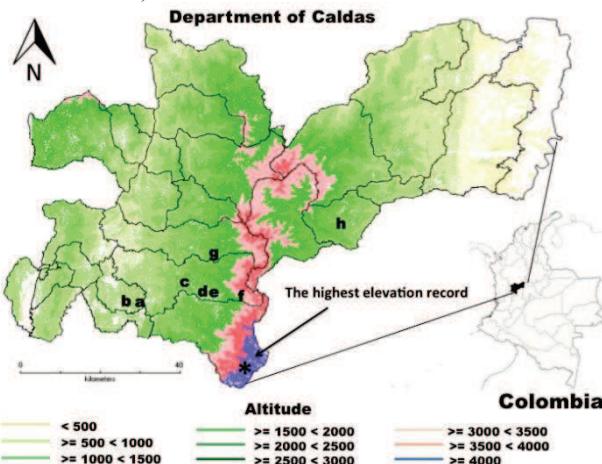


Figura 1. Records of the long-tailed weasel *Mustela frenata* at Caldas department, Central mountain chain of Colombia. The nine confirmed records are showed, including the highest altitude record for *M. frenata* (*). Most of the records are gathered in the Southwest of the department. Details in table 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 MHN-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 Sancionio, Manizales municipality (ESCOBAR-LASSO et al. 2013).	05°03'26"N, 75°30'01"W; 2150 masl.
d	Individual recorded at Manizales municipality, Río 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, Río 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, Río Blanco reserve, Finca Martimica 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 (MHN-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 importance 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.

References

- CASTAÑO, J. H. & J. D. CORRALES. 2010. Mamíferos de la cuenca del río La Miel (Caldas): diversidad y uso cultural. Boletín Científico Museo de Historia Natural 14:56-75.
- CASTAÑO, J. H. 2012. Mamíferos de Caldas: un análisis de vacíos de información. Boletín Científico Museo de Historia Natural 16:101-119.
- CASTAÑO, J. H., et al. 2003. Mamíferos del departamento de Caldas-Colombia. Biota Colombiana 4:247-259.
- CEBALLOS, G. & G. OLIVA. 2005. *Mustela frenata*. Pp. 380-381. In: Los mamíferos silvestres de México (CEBALLOS, G. & OLIVA, G). CONABIO – UNAM – Fondo de Cultura Económica, México D.F.
- EISENBERG, J.F. 1989. Mammals of the Neotropics: The Northern Neotropics. University of Chicago Press, Chicago, EEUU 449.
- ESCOBAR-LASSO, S., et al. 2013. Los mamíferos de la cuenca del río Chinchiná, en la región andina de Colombia. *Therya* 4:139-155.
- ESCOBAR, F., et al. 2005. Altitudinal variation of dung beetle (Scarabaeidae: Scarabaeinae) assemblages in the Colombian Andes. *Global Ecology and Biogeography* 14:327-337.
- HALL, E. R. 1936. Mustelid Mammals from the Pleistocene of North America: With Systematic Notes on Some Recent Members of the Genera *Mustela*, *Taxidea* and *Mephitis*. Carnegie Institute of Washington Publication 473:41-119.
- HARDING, L. E. & J. W. DRAGOON. 2012. Out of the tropics: a phylogeographic history of the long-tailed weasel, *Mustela frenata*. *Journal of Mammalogy* 93:1178-1194.
- IZOR, R. J. & de la TORRE, L. 1978. A new species of Weasel (*Mustela*) from the highlands of Colombia, with comments on the evolution and distribution of South American Weasels. *Journal of Mammalogy* 59:92-102.
- MCCAIN, C. M. 2005. Elevational gradients in diversity of small mammals. *Ecology* 86:366-372.
- NOGUÉS-BRAVO, D., et al. 2007. Exposure of global mountain systems to climate warming during the 21st century. *Global Environmental Change* 17:420-428.
- RAMÍREZ-CHAVES, H. E. & H. MANTILLA-MELUK. 2009. Nuevo registro de la Comadreja Colombiana *Mustela felipei* (Carnivora: Mustelidae), con notas sobre su distribución y conservación. *Mastozoología Neotropical* 16:379-388.
- REID, F. & K. HELGEN. 2008. IUCN Red List of Threatened Species. *Mustela frenata* 2012 (Acceso 28 junio) URL <http://www.iucnredlist.org/apps/redlist/details/41654/0>.
- RICHTER, S. M. & E. M. SCHAUER. 2006. Distribution of the Long-tailed Weasel (*Mustela frenata*) in Illinois. *Transactions of the Illinois State Academy of Science* 99:153-160.
- RODRÍGUEZ-ERASO, N., et al. 2010. Cambio climático y su relación con el uso del suelo en los Andes colombianos. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Universidad Nacional de Colombia y Departamento Administrativo de Ciencia, Tecnología e Innovación, Bogotá, D. C., Colombia 80.
- SÁNCHEZ, F. 2000. Inventario de mamíferos en un bosque andino del departamento de Caldas, Colombia. *Boletín Científico Museo de Historia Natural* 4:17-25.
- SÁNCHEZ, F., & M. ALVEAR. 2003. Comentarios sobre el uso de hábitat, dieta y conocimiento popular de los mamíferos en un bosque andino en el departamento de Caldas. *Boletín Científico Museo de Historia Natural* 7:121-144.
- SÁNCHEZ, F., et al. 2004. Inventario de mamíferos en un bosque de los andes centrales de Colombia. *Caldasia* 26:291-309.
- SHEFFIELD, S. R. & H. H. THOMAS. 1997. Mammalian species *Mustela frenata*. American Society of Mammalogists 570:1-9.
- SOLARI, S., et al. 2013. Riqueza, Endemismo y Conservación de los Mamíferos de Colombia. *Mastozoología Neotropical* 20:301-365.
- VIVIROLI, D. & R. WEINGARTNER. 2004. Hydrological significance of mountains: from regional to global scale. *Hydrological earth systems. Science* 8:1016-1029.