

Research note

Distribution, status and conservation needs of the white-sided jackrabbit, *Lepus callotis* (Lagomorpha)

Distribución, estado y necesidades de conservación de la liebre de costados blancos Lepus callotis (Lagomorpha)

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Abstract

Although an important game animal and a species of wide distribution, little is known about the natural history of the white-sided jackrabbit (*Lepus callotis*), its ecological requirements, and limiting factors. The information available suggests that this species may have undergone a reduction in both population numbers and distribution, and may be endangered due to habitat changes. The information presented herein should facilitate proposals for future research, and conservation and management actions.

Keywords: Conservation; Distribution; *Lepus callotis*

Resumen

Aunque se considera un animal de caza importante y una especie de amplia distribución, poco se conoce sobre la historia natural de la liebre torda (*Lepus callotis*), sus requerimientos ecológicos y factores limitantes. La información disponible sugiere que esta especie pudo haber sufrido una reducción del tamaño poblacional y de su distribución y puede estar en peligro debido a los cambios de hábitat. La información aquí presentada debe facilitar las propuestas para investigaciones futuras y acciones de conservación y manejo.

Palabras clave: Conservación; Distribución; *Lepus callotis*

Despite having been described by scientists as early as 1830, and being a popular game animal throughout much of Mexico, the natural history and ecological requirements of the white-sided jackrabbit, *Lepus callotis* are almost unknown (Nelson, 1909). Presently divided into 2 subspecies along parallel 25 N, the nominate species, *L.*

c. callotis occurs in tropic-subtropic savannas, encinales, warm-temperate roseto scrub, juniper woodland, and halophytic vegetation south of the Nazas River from central Durango, through to the northwestern half of Oaxaca, and the northern half of Guerrero (Delgadillo-Quezada, 2011; Leopold, 1972). North of the Nazas River, *L. c. gaillardii*

is found in temperate grasslands in northern Durango, Chihuahua, and extreme southern New Mexico in the United States (Anderson & Gaunt, 1962; Bednarz, 1977; Cook, 1986; Desmond, 2004), and is positively correlated with buffalograss (*Buchloe dactyloides*) in New Mexico and Chihuahua (Traphagen, 2002, 2011). The Nazas River has been considered a significant geographical barrier between the separations of subspecies of *L. callotis* (Petersen, 1976).

Lepus c. gaillardi differs from *L. c. callotis* in having paler and buffier pelage including a paler rump and an ochraceous throat patch. The white flanks of *L. c. gaillardi* also show less contrast with the upper body fur of *L. c. callotis*, while the skulls are typically larger and have a more elevated supraorbital process. *Lepus c. gaillardi* also has a brown rather than black nape markings and measures larger for body, foot and ear length (Anderson & Gaunt, 1962).

Most of the information available on *L. callotis* comes from anecdotal observations made by museum collectors and scientists conducting general zoological inventories (e.g., Nelson, 1909). Although a few life history studies of *L. c. gaillardi* have been conducted (e.g., Bednarz, 1977; Bednarz & Cook, 1984; Desmond, 2004; Traphagen, 2011) only one study has investigated the status of *L. c. callotis* (Delgadillo-Quezada, 2011). All of the information available suggests that *L. c. gaillardi* is in serious decline due to environmental changes resulting from overgrazing, shrub invasion and other habitat changes (Dalquest, 1953; Matson & Baker, 1986; Traphagen, 2011). Traphagen (2011) suggested that road kills from US Border Patrol activities may be a significant factor contributing to declining numbers in New Mexico, USA (Fig. 1). The status of *L. c. callotis* is less clear, but the limited

information available for this subspecies indicates that it may also be in trouble due to destruction of its habitat, hunting, disturbance by herders and their dogs, as well as vehicle collisions (Bello-Sánchez, 2010). Additionally, a study that modeled the effects of climate change on grassland mammals in Mexico predicted an 80% reduction in range and habitat of *L. callotis* by 2050 (Trejo et al., 2011).

Several investigators (Bogan & Jones, 1975; Dalquest, 1953; Davis & Lukens, 1958; Davis & Russell, 1954; Findley et al., 1975; Hall & Villa, 1949; Leopold, 1972; Matson & Baker, 1986; Sánchez et al., 2014) reported *L. callotis* to be uncommon in both New Mexico and Mexico (Chihuahua, Guanajuato, Guerrero, Michoacán, southeastern Morelos, San Luis Potosí, Zacatecas). We fear that populations of *L. callotis* have been diminishing for years, and in some areas are now rare where formerly common. In other areas the species has been or is being replaced by the highly adaptable black-tailed jackrabbit (*L. californicus*; Baker & Greer, 1962; Desmond, 2004; Hall, 1981). In the Chihuahuan Desert region, *L. c. gaillardi* has been considered a “mammal in distress” (Baker, 1977). In the United States it has been classified as “threatened” by the State of New Mexico since 1975; however, it is not afforded any protection by the United States federal government under the Endangered Species Act (ESA). In 2009 the United States Fish and Wildlife was petitioned to list the species under the ESA, but it was rejected after a 12-month review due to only limited information being available on the status of the species in Mexico (United States Fish and Wildlife Service, 2009, 2010). This decision runs counter to the overwhelming number of publications and proceedings which have recommended the species to be considered as endangered throughout its range and in need of research and protection (Baker, 1977; Conway, 1976; Dunn et al., 1982; Findley & Caire, 1977; Wilson & Reeder, 1993). In Mexico, however, the species is not considered to be in “at risk” category (Semarnat, 2010).

In this paper we summarize the distributional records and few studies pertaining to *L. callotis*. Our purpose is to encourage future field surveys to document current and future threats to the animal’s existence, and to alert governments, academic institutions, and wildlife management agencies as to how little is known of the general occurrence, life history, habitat affiliations, and general welfare of this species.

Using Google Scholar, we reviewed scientific literature about *L. callotis*, abstracted pertinent information, and plotted collection locales on Google Earth. Collection locations for 281 specimens of *L. callotis* were obtained from databases in the Mammal Networked Information System (MaNIS; <http://www.manisnet.org>) and the



Figure 1. Photo of a pair of *Lepus callotis gaillardi* killed by a vehicle in New Mexico, USA. The larger specimen is a female.

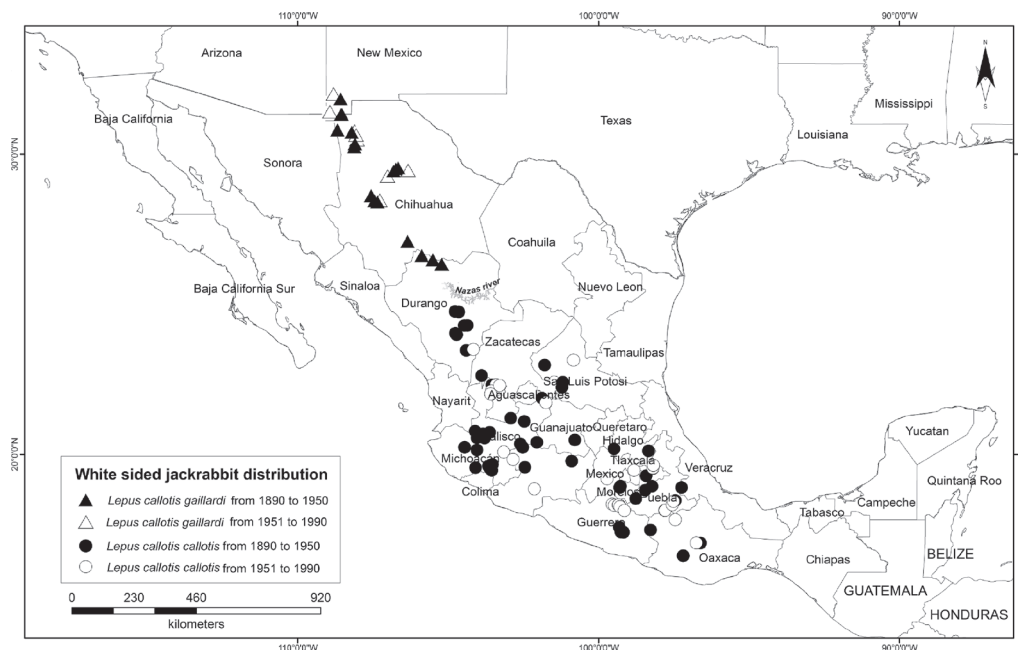


Figure 2. Collection records for *Lepus callotis gaillardi* (triangles) and *L. c. callotis* (circles) from 1890 to 1990.

Global Biodiversity Information Facility (GBIF; <http://www.gbif.org>). The latitude, longitude, and elevation of these locations were recorded and plotted on a map.

We located 202 specimens of *L. c. callotis* from 84 localities, and 79 specimens of *L. c. gaillardi* from 28 locations in museum collections (Table 1; Fig. 2). The collections with the most specimens are in the U.S. National Museum (Smithsonian) and American Museum of Natural History. Museum specimens were collected from the Mexican states of Aguascalientes, Chihuahua, Distrito Federal, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Michoacán, Morelos, Oaxaca, Puebla, San Luis Potosí, Mexico, Tlaxcala, and Zacatecas. States less well represented were Michoacán and Guerrero. All of the United States specimens are from southwestern New Mexico. Elevations ranged from 660 to 2,600 m. The proportion of males to females was 54:58, which was not significantly different than 1:1. Localities plotted on Google Earth suggest that most sites are in open grassland.

Lepus c. callotis was originally described as a species in 1830 by Wagler from specimens collected at the southern end of “Mexican tableland”, *Lepus c. gaillardi* was originally described as a species in 1895 by E. A. Mearns from a series of specimens collected on the USA Boundary Survey including a holotype specimen from Chihuahua. After 1904, there is a gap of 27 years without any collected specimens of either subspecies due to armed

conflicts initiated in 1910 with the Mexican Revolution. It was not until 1931 that *L. c. gaillardi* and *L. c. callotis* were again collected. We found no records of the species in collections dated after 1999 when the animal was completely protected in New Mexico and after the onset of the current period of insecurity in rural Mexico.

Lepus callotis is considered as “near threatened” in the IUCN red list (IUCN 2017), however, biological information is scarce, and the actual distribution and status of *L. callotis* are unknown, particularly in Mexico where most of its distribution occurs. We propose a detailed, long term study of the mortality factors effecting *L. callotis*, and an investigation into the taxonomy of this species, since the subspecies have morphologic and ecological differences that may influence conservation actions.

We assembled a table of museum collection locales (Table 1) so that biologists might better understand the status of *L. callotis* and alert governments, academic institutions, and wildlife management agencies of how little is known about general occurrence, life history and habitat affiliations of this animal. Hopefully, this information will encourage further study into the animal’s ecological affiliations, habitat requirements, and general welfare lest it disappear without its natural history being understood.

We thank D. Navarrete for her help drawing Figure 2. Comments from two anonymous reviewers improved this research note.

Table 1

Summary of *Lepus callootis* specimens (number in parenthesis) and locations in North American collections.

Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ga	USNM	72279	USA	New Mexico			M	Hidalgo County: Playas Valley, W fork		1892	VertNet
ga	MVZ (2)	50925-26	USA	New Mexico	31.842	-108.577	2F, M	Hidalgo County: S end W side of Playas Valley	1400	1931	Anderson and Gaunt 1962, Kelly and Alexander, Kellogg
ga	MSB, NMMNH (2)	60687, 6036	USA	New Mexico	31.416	-108.878	F, M	2.5 mi E Cloverdale Jct.	1580	1976	VertNet, Bednarz
ga	MSB	36148	USA	New Mexico	32.006	-108.809	M	Hidalgo County: 4 mi N Animas Valley		1976	VertNet, Bednarz and Sopyn 1976
ga	USNM	20525	USA	New Mexico			M	Hidalgo County: Playas Valley, W fork, near.		1892	
ga	MSB (2)	36147-48	USA	New Mexico	32.007	-108.809	F, M	Hidalgo Co.	1360	1976	VertNet, Bednarz
ga	MSB (2)	42526-27	USA	New Mexico	31.332	-108.82	F, M	Hidalgo Co.	1576	1980	VertNet, Bednarz
ga	MSB (3)	48484-85, 48597	USA	New Mexico	31.452	-108.865	F, M	Hidalgo County: Animas Valley, 1 1/2 mi N Jct. NM79 & 338	1573	1982	Cook 1986, Nelson and Goldman, Sánchez et al. 2014, Dugés 1890
ga	MSB (2)	75700, 91734	USA	New Mexico	31.56	-108.875	F, M	Hidalgo Co.	1555	1992	VertNet, Balch
ga	MSB	92674	USA	New Mexico	31.495	-108.871	F	Hidalgo Co.	1682	1994	VertNet
ga	MSB	96184	USA	New Mexico	31.474	-108.867	F	Gray Ranch, Hwy 388, mi 58.7	1580	1997	VertNet, Runyan
ga	MSB	85574	USA	New Mexico	31.449	-108.861	F	County Rd. CO, 32 mi S Animas	1575	1997	VertNet, Brown
ga	USNM	506267	USA	New Mexico	31.418	-108.93	F	0.5 km N Cloverdale	1609	1975	VertNet, Bogan and Jones 1975
ga	USNM (5)	20522, 25, 27, 30, 31	México	Chihuahua	31.323	-108.567	4F, 1M	Boundary Line: White Water, Near, Chihuahua	1433	1892	Mearns 1895, Mearns and Holzer (includes holotype specimen for <i>L. c. gaillardii</i>)
ga	USNM	36342	México	Chihuahua	31.33	-108.531	F	East Fork of Playas Valley near Intern. boundary Line	1390	1893	Mearns 1895, Mearns and Merton
ga	USNM	58914	México	Chihuahua			F	Mexican Boundary Line: Playas Valley		1893	VertNet
ga	USNM (2)	98484-85	México	Chihuahua	30.348	-108.095	F, M	Colonia Juárez	1652	1899	Nelson and Goldman, Anderson 1972

Table 1
Continue.

Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ga	USNM	250848	México	Chihuahua	30.24	-108.12	M	Dapasitas Ranch	1700	1932	Bailey and Winthrop, Anderson 1972
ga	MVZ	76200	México	Chihuahua	30.806	-108.682	M	Llano de Carretas; 27 mi W El Cuervo	1433	1936	VerNet, Anderson 1972, Benson
ga	MCZ	5456	México	Chihuahua	30.81	-108.68		S. U.S. border	1433	1936	Arctos
ga	KU (5)	74154, 57-60	México	Chihuahua	28.62	-107.56	3F, 1M	4 mi S, 1 mi W Santo Tomas on Rancho San Ignacio	2027	1957	Anderson 1972, Wimer and Nunex
ga	KU	76311	México	Chihuahua	29.546	-106.664	M	30 mi W El Gallego, Arroyo El Nido	2012	1957	Anderson 1972
ga	UA, MVZ	25366, 121725	México	Chihuahua	29.51	-106.738	F, M	27 mi W El Gallego, Arroyo El Nido	2134	1957	Blodel, Lewin Jr.
ga	MVZ (4)	124788-91	México	Chihuahua	29.443	-106.816	2F, 2M	Cañón del Álamo, Sierra de El Nido	1890	1959	VerNet, Leopold 1959, Taylor 1959, Lidicker Jr.
ga	KU (9)	82363-71	México	Chihuahua	30.772	-108.109	2M	35 mi NW Dublán	1524	1960	Anderson 1972
ga	KU (7)	82354, 65-70	México	Chihuahua	30.64	-108.056	3F, 3M	18 mi NW Dublán	1455	1960	Anderson 1972
ga	KU	82372	México	Chihuahua	28.46	-107.27	F	4 mi ESE La Junta	2112	1960	Anderson 1972
ga	MVZ (3)	128253-55	México	Chihuahua	29.274	-107.012	F, M	1 mi S, 0.5 mi E Santa Clara	1860	1961	VerNet, Pontrelli, Lidicker Jr.
ga	MVZ	132195	México	Chihuahua	29.462	-106.330	F	Ojo Laguna	1540	1963	VerNet, Borell
ga	USNM	36342	México	Chihuahua	31.33	-108.531	F	East Fork of Playas Valley near Intern. boundary Line	1390	1893	Mearns 1895, Mearns and Merton
ga	KU (9)	81063-71	México	Chihuahua	28.45	-107.45	4F, 4M	2 mi W Miñaca	2103	1959	Anderson 1972
ga	CONABIO	39718	México	Chihuahua	30.49	-108.025	F	6.7 km N, 15 km W Casas Grandes	1623	1996	González, Moreno
ga	KU	66519	México	Durango	26.29	-105.19	F	7.5 mi SE Torreón de Canas	1830	1955	VertNet
ca	USNM	95577	México	Durango	24.039	-104.754	F	Durango City	2076	1898	Nelson and Goldman
ca	KU (2)	48412-13	México	Durango	26.48	-106	2F	1 mi N El Chorro	1950	1952	VertNet
ca	KU (6)	62387-92	México	Durango	24.86	-104.86	3F, 2M	SE end of Laguna de Santiaquillo (Santa Cruz)	1945	1954	VertNet
ca	KU (3)	62393-95	México	Durango	24.76	-104.77	F, M	2 mi S Sauz	1950	1954	VertNet

Table 1
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Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ca	MSU	934	México	Durango	24.3	-104.36		Rancho Las Margaritas, 28 mi S and 17 mi W Vicente Guerrero	2545	1957	Baker and Greer 1962
ca	CRD (3)	331-333	México	Durango	23.5	-104.16		SSW Vicente Guerrero	2600	1986	
ca	AMNH (4)	21254-57	México	Durango	26.62	-105.88	3M	Rancho Santuario	2110	1903	Allen 1905
ca	AMNH (4)	21578-81	México	Durango	26.481	-105.51		Rio Campo	1815	1904	Baker and Greer 1962
ca	USNM	90968	México	Zacatecas	22.316	-103.546	F	Near Monte Escobedo	2220	1897	Nelson 1909
ca	MSU (2)	26414-15	México	Zacatecas	22.12	-103.56	F, M	20 km S of Monte Escobedo	1920	1978	VerNet, Matson 1978
ca	USNM (2)	560058-59	México	Zacatecas	22.325	-103.405	F, M	7 mi E Monte Escobedo	2064	1984	Fisher
ca	USNM (2)	36871-72	México	San Luis Potosí	22.409	-101.189	F, M	W of Arenal, 42 km NW San Luis Potosí	2316	1892	Nelson 1909, Dalquest 1953
ca	KU (2)	58020-21	México	San Luis Potosí	22.98	-101.79	F, M	4.5 mi SW Herradura	2179	1954	VertNet
ca	MCZ (11)	5926-36	México	San Luis Potosí			3F, 8M	No specific locality data			
ca	CONABIO (4)	18718-19, 16733-34	México	San Luis Potosí	23.143	-100.83	2F, 2M	4 km E Cabeza del Rondo Guadalupe, Salinas de Ramos	1943	1981	López, Hernández Barrios
ca	ENCB (2)	22197, 99	México	Aguascalientes	21.88	-101.88		Aguascalientes	2152	1957	Unk.
ca	CNMA	30815	México	Guanajuato	18.3	-99.33		Ciudad de Huitzoco de los Figueroa	953		Martínez, Vargas
ca	USNM	78467	México	Guanajuato	20.483	-100.786	M	Celaya	1737	1896	Nelson and Goldman
ca	TCWC (3)	5388-89, 5842	México	Guanajuato	18.3	-99.3	M	General	1024	1954	VertNet
ca	CNMA	8892	México	Guanajuato	18.132	-99.141	F	Cerro de las Mesas, 3 km S Apanguito, Atenango del Rio	732	1964	López, Vargas
ca	MHNG-Geneva (2)	510, 555	México	Guanajuato	21.43	-101.48		No description	2290	Unk	Specimen
ca	USNM (2)	20457-58	México	Jalisco	20.55	-103.79	F, M	Guadalajara	1372	1892	Jovy
ca	USNM (2)	82181-82	México	Jalisco	20.56	-104.04	F, M	Ameca	1372	1897	
ca	USNM (2)	34474-75	México	Jalisco	20.78	-104.1	2M	EtZatlan	1417	1892	Nelson
ca	USNM	34486	México	Jalisco	20.69	-103.84	F	Teuchitlán	1280	1892	Nelson
ca	USNM	34110	México	Jalisco	19.67	-103.53	M	Zapotlán	1667	1892	Nelson
ca	USNM	46433	México	Jalisco	20.24	-102.52	M	La Barca	1524	1892	VertNet

Table 1
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Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ca	USNM	78975	México	Jalisco	21.4	-101.98	F	Lagos (de Moreno)	1875	1896	Nelson and Goldman
ca	USNM	90904	México	Jalisco	22.63	-103.89	M	Huejuquilla	1768	1897	Nelson and Goldman
ca	AMNH (7)	25864-67, 25952, 35131, 35152	México	Jalisco	19.615	-103.663		La Laja in Sierra Espiritu Santo	2240	1903	Allen 1906
ca	AMNH (3)	26143-44, 26152	México	Jalisco	19.562	-104.087		Las Canoas, 40 mi W Tuxpan	2134	1903	Allen 1906
ca	AMNH (9)	25023, 279-83,85- 86, 25997	México	Jalisco	19.473	-103.553		Arroyo de Gavillan, 20 mi W San Marcos	1608	1903	Allen 1906
ca	USNM	127870	México	Jalisco	20.354	-102.604	F	Ocotlán	1555	1903	VertNet
ca	AMNH (4)	26143-45, 26152	México	Jalisco	19.535	-103.612	3F, 1M	Ciudad Guzmán: Arroyo Las Canoas, Ateniqui (Nevada de Colima)		1904	Allen 1906
ca	AMNH (7)	25864-67, 25952, 35151-52	México	Jalisco			4F, 2M	Encarnación de Díaz: La Laja		1905	
ca	KU	31842	México	Jalisco	20.15	-104.04	F	3.5 mi S Tecolotan	1220	1949	VertNet
ca	KU (2)	38661-62	México	Jalisco	21.21	-102.92	F, M	3 mi NW Yahualica	1914	1950	VertNet
ca	KU (2)	39738-39	México	Jalisco	21.1	-102.47	F, M	14 mi SW San Juan de Los Lagos	1828	1950	VertNet
ca	KU	38663	México	Jalisco	20.87	-102.77	F	4 mi N, 1 mi W Tepatitlan	2003	1950	VertNet
ca	KU	36920	México	Jalisco	20.74	-103.62	M	5 mi N, 18 mi W Guadalaajara	1372	1950	VertNet
ca	KU	38664	México	Jalisco	20.24	-104.45	M	11 mi NW Ayutla	1870	1950	VertNet
ca	KU (2)	38557, 38667	México	Jalisco	20.554	-103.229	F	7 mi SE Guadalaajara	1615	1950	VertNet
ca	KU (2)	38665-66	México	Jalisco	21.17	-102.96	2M	5 mi W Yahualica		1950	
ca	KU (4)	107512-15	México	Jalisco	22.3	-103.29	2F	La Mesa Maria de Leon	2207	1966	VertNet
ca	KU	105585	México	Jalisco	22.02	-103.59	F	Villa Guerrero	1687	1966	VertNet
ca	KU	107516	México	Jalisco	21.73	-101.75	M	10 mi NW Matanzas	2250	1966	VertNet
ca	UNAM (3)	29034-36	México	Jalisco	19.987	-102.965	2F, 1M	5 km N, 6.5 km E Mazamitla, Mazamitla	2100	1990	González, Moreno Almeraya

Table 1
 Continue.

Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ca	CONABIO	29787	México	Jalisco	19.837	-102.844	M	8 km N, 6 km E Buena Vista, Valley de Juárez	2100	1991	González, Moreno
ca	CONABIO (6)	34340, 34846-50	México	Jalisco	19.988	-102.96	5F, 1M	Buena Vista, Valle de Juárez, 8 km N, 6.5 km E Mazamitla, Mazamitla	2100	1992	González
ca	UNAM-CONABIO	35221	México	Jalisco	20.084	-103.152	F	8 km N, 6.5 km E Mazamitla, La Mazamitla La Paz	2050	1993	Cervantes
ca	UNAM (4)	27650-52, 35221	México	Jalisco	19.99	-102.96	2F	Valle de Juárez, 8 km N, 6.5 km E Mazamitla	2100	1990-93	Lorenzo, Moreno
ca	KU	109100	México	Jalisco	19.59	-103.91	F	Tolimán	2710		VertNet
ca	AMNH	35158	México	Jalisco	19.77	-62.7		Jalisco			
ca	UNAM-CONABIO (9)	27655-58, 29033, 35217-20	México	Jalisco	20.084	-103.152	5F, 4M	10 km NW, 2 km E La Rosa Amarilla, La Manzanilla de la Paz	2050	1990-93	González, Cervantes, Moreno
ca	USNM	36865	México	Michoacán	19.781	-100.892	M	Querendaro	2135	1892	VertNet
ca	USNM	125687	México	Michoacán	19.576	-102.448	M	Los Reyes	1372	1903	Nelson and Goldman
ca	KU (3)	39740, 41, 43	México	Michoacán	20.404	-102.052	F, 2M	19 mi S Apatzingan, 5 mi N Las Cruces	1738	1950	VertNet
ca	KU	39742	México	Michoacán	18.78	-102.24	M	21 mi S Apatzingan; 3 mi N Las Cruces		1950	
ca	USNM (3)	560036, 560056-57	México	Michoacán	18.857	-102.133	1F, 2M	Capirio, 1 mi SW Hwy 37; 1.1 mi SW Capirio SW 37	1660	1984	Reynolds
ca	CONABIO (2)	27653-54	México	Michoacán	20.024	-102.968	2F	11 km E, 1.5 km N San Miguel el Alto, San José de Gracia	1904	1990	González, Moreno, Castellanos
ca	CONABIO	29790	México	Michoacán	19.991	-102.979	1F	11 km E, 2 km N El Alto, San José de Gracia, Marcos Castellanos	2100	1991	González, Moreno
ca	USNM	55596	México	Hidalgo	20.12	-98.34	M	Tulancingo	2590	1893	Nelson
ca	USNM	78482	México	Hidalgo	20.19	-99.49	F	Marques	2378	1896	Nelson and Goldman
ca	CNMA	40787	México	Tlaxcala	19.551	-98.192	M	2.8 km NNE Loma San Jose, Atlangatepec	2536	1999	Montiel-R

Table 1
Continue.

Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ca	CNMA	40790	México	Tlaxcala	19.637	-98.181	F	3.6 km SE Atlangatepec	2506	1999	Montiel-R., Hortelano
ca	CNMA (2)	40788-89	México	Tlaxcala	19.539	-98.193	F, M	1.8 km NE San Antonio Zacatelco, Atlangatepec	2509	1999	Montiel-R., Hortelano
ca	CONABIO	17038	México	Estado de México	19.192	-99.717	M	Santiago Miltepec, Municipio Toluca		1979	Galindo
ca	CNMA (2)	19592-93	México	Mexico City	19.477	-98.823	2F	Tequesquimahuac, Texcoco	2487	1982	Cervantes, Vargas
ca	USNM (6)	51113-16, 18-19	México	Morelos	18.531	-98.764	4F, 2M	Cuernavaca	1524	1905	Nelson 1909
ca	TCWC	4948	México	Morelos	18.9	-99.3	M	General	1690	1950	VertNet
ca	USNM	55586	México	Puebla	19.29	-98.42	M	San Martin	2256	1893	Nelson
ca	USNM (4)	55329-32	México	Puebla	18.812	-98.45	1F, 3M	Atlixco	1646	1893	Nelson
ca	USNM	53639	México	Puebla	18.468	-97.451	F	Tehuacán	1759	1893	Nelson
ca	TCPB	412	México	Puebla	18.33	-97.55		SW Tehuacan	1656	1977	TCPB
ca	USNM	8561	México	Veracruz	18.9	-97.24		Orizaba	2548	1910	Sumichrist
ca	CNMA (2)	8894	México	Guerrero	18.264	-99.288	M	0.5 km NW Amatitlan Grande, Huitzoco	1141	1964	Martínez, Vargas
ca	CNMA	8893	México	Guerrero	18.323	-99.335	F	2 km N Huitzoco	1030	1964	Martínez, Vargas
ca	TCWC (3)	5314-16	México	Guerrero			2F, 1M	Guerrero		1953	
ca	TCWC	5388	México	Guerrero			F	Guerrero		1954	
ca	TCWC (2)	5843-44	México	Guerrero			F, M	Guerrero		1956	
ca	CNMA	40122	México	Guerrero	18.347	-99.55		1 km E Tuxpan, Iguala de la Independencia	992	1997	Cervantes
ca	CNMA	40424	México	Guerrero	18.307	-99.479	M	On camino a Tlaxmalac 4.5 km Tuxpan, Iguala	1040	1997	Cervantes, Hortelano
ca	TCWC	5842	México	Guerrero			M	Guerrero			
ca	ROM	870	México	Oaxaca	17.808	-97.458		3 km NE Jicotalan	2160		VertNet
ca	USNM (4)	55329-32	México	Oaxaca	17.484	-98.275	F	Tlapamcingo	1585	1894	Nelson and Goldman
ca	USNM	68216	México	Oaxaca	17.051	-96.615	M	Ciudad Oaxaca	1585	1894	Nelson and Goldman
ca	ENCB (3)	4088-90	México	Oaxaca	17.83	-97.45		NW Oaxaca	2286	1969	
ca	CNMA	45259	México	Oaxaca	18.141	-97.784		0.125 km S, 0.5 km SE Coseltepec	1931	1997	Cervantes, Hortelano

Table 1
 Continue.

Ssp.	Museum	Catalogue number	Country	State	Lat.	Long.	Sex	Location description	Elev. m	Year	Sources and collectors
ca	CNMA	45258	México	Oaxaca	18.14	-97.804	M	2.25 km S, 1 km W Loma de Tres Cruces, Cosoltepec	1920	1997	Cervantes, Hortelano

ssp = subspecies, ga = *Lepus callotis gaillardii*, ca = *Lepus callotis callotis*. Museums acronyms: AMNH = American Museum of Natural History; CNMA = Colección Nacional de Mamíferos-Universidad Nacional Autónoma de México; Conabio = Comisión Nacional para el Conocimiento y Uso de la Biodiversidad; CRD = Centre for Reviews and Dissemination; KU = University of Kansas; MCZ = Museum of Comparative Zoology- Harvard University; MHNG-Geneva = Natural History Museum of Geneva; MSB = Museum of Southwestern Biology; MSU = Michigan State University; MVZ = Museum of Vertebrate Zoology; NMMNH = New Mexico Museum of Natural History and Science; ROM = Royal Ontario Museum; TCPB = Texas Corn Producers Board; TCWC = Texas Cooperative Wildlife Collection; UA = Alabama Museum of Natural History; USNM = United States National Museum. Lat. = latitude; Long. = longitude; Elev. = elevation in meters above sea level; M = males; F = females.

References

- Anderson, S., & Gaunt, A. S. (1962). A classification of the white-sided jackrabbits of Mexico. *American Museum Novitates*, 2088, 1–16.
- Baker, R. H. (1977). Mammals of the Chihuahuan Desert region – future prospects. In H. Wauer, & D. H. Riskind (Eds.), *Transactions of the symposium on the biological resources of the Chihuahuan Desert region, United States and Mexico. United States National Park Service Transactions and Proceedings Series*, 3, 221–225.
- Baker, R. H., & Greer, J. K. (1962). Mammals of the Mexican state of Durango. *Publications of Museum Michigan State University Biology, Series*, 35, 25–154.
- Bednarz, J. (1977). *The white-sided jackrabbit in New Mexico: distribution, numbers, and biology in the grasslands of Hidalgo County*. Santa Fe, New Mexico: New Mexico Game and Fish Department.
- Bednarz, J., & Cook, J. (1984). Distribution and numbers of the white-sided jackrabbit (*Lepus callotis gaillardii*) in New Mexico. *The Southwestern Naturalist*, 29, 358–360.
- Bello-Sánchez, R. A. (2010). *Distribución y abundancia de la liebre torda Lepus callotis (Wagler, 1830) en el valle de Perote, Veracruz (Ph.D. Thesis)*. Universidad Veracruzana. Veracruz, Mexico.
- Bogan, M. A., & Jones, C. (1975). Observations on *Lepus callotis* in New Mexico. *Proceedings of the Biological Society of Washington*, 88, 45–50.
- Conway, M. C. (1976). A rare hare. *New Mexico Wildlife*, 21, 21–23.
- Cook, J. A. (1986). The mammals of the Animas Mountains and adjacent areas, Hidalgo County, New Mexico. *Occasional Papers of the Museum of Southwestern Biology*, 4, 1–45.
- Dalquest, W. W. (1953). *Mammals of the Mexican state of San Luis Potosí*. Louisiana State University Studies Biological Science Series 1. Baton Rouge, Louisiana: Louisiana State University Press.
- Davis, W. B., & Lukens Jr., P. W. (1958). Mammals of the Mexican state of Guerrero exclusive of Chiroptera and Rodentia. *Journal of Mammalogy*, 39, 347–367.
- Davis, W. B., & Russell, R. J. (1954). Mammals of the Mexican state of Morelos. *Journal of Mammalogy*, 35, 63–80.
- Delgadillo-Quezada, G. (2011). *Distribución, selección de hábitat y densidad de la liebre torda (Lepus callotis, Wagler, 1830) en el Valle de Perote (Ph.D. Thesis)*. Instituto de Ecología, A.C., Xalapa, Veracruz, Mexico.
- Desmond, M. J. (2004). Habitat associations and co-occurrence of Chihuahuan Desert hares (*Lepus californicus* and *L. callotis*). *The American Midland Naturalist*, 151, 414–419.
- Dunn, J. P., Chapman, J. A., & Marsh, R. E. (1982). Jackrabbits: *Lepus californicus* and allies. In A. Chapman, & G. A. Feldhamer (Eds.), *Wild mammals of North America: biology, management, and economics* (pp. 124–145). Baltimore, Maryland: John Hopkins University Press.
- Findley, J. S., & Caire, W. (1977). The status of mammals in

- the northern region of the Chihuahuan Desert. In H. Wauer, & D. H. Riskind (Eds.), *Transactions of the symposium on the biological resources of the Chihuahuan Desert region United States and Mexico. United States National Park Service Transactions and Proceedings Series*, 3, 127–139.
- Findley, J. S., Harris, A. H., Wilson, D. E., & Jones, C. (1975). *Mammals of New Mexico*. Albuquerque: University of New Mexico Press.
- Hall, E. R. (1981). *The mammals of North America. 2nd Ed.* New York: John Wiley & Sons.
- Hall, E. R., & Villa, B. (1949). An annotated check list of the mammals of Michoacán, Mexico. *University of Kansas Publications Museum Natural History*, 1, 431–472.
- IUCN (International Union for Conservation of Nature). (2017). *IUCN Red List of Threatened Species*. Version 2017.3. Disponible en: www.iucnredlist.org
- Leopold, A. S. (1972). *Wildlife of Mexico: the game birds and mammals*. Berkeley, California: University of California Press.
- Matson, J. O. & Baker, R. H. (1986). Mammals of Zacatecas. *Special Publication Museum Texas Tech Univerisy*, 24, 1–88.
- Mearns, E. A. (1895). Preliminary description of a new subgenus and six species and subspecies of hares, from the Mexican border of the United States. *Proceedings of the United States National Museum*, 18, 551–565.
- Nelson, E. W. (1909). The rabbits of North America. *North American Fauna*, 29, 1–314.
- Petersen, M. K. (1976). The Rio Nazas as a factor in mammalian distribution in Durango, Mexico. *The Southwestern Naturalist*, 20, 495–502.
- Sánchez, Ó., Magaña-Cota, G., Téllez-Girón, G., López-Forment, W., & Urbano Vidales, G. (2014). Mamíferos no voladores de Guanajuato, México: revisión histórica y lista taxonómica actualizada. *Universidad de Guanajuato Acta Universitaria*, 24, 1–37.
- Semarnat (Secretaría de Medio Ambiente y Recursos Naturales). (2010). *Norma Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres- Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio- Lista de especies en riesgo*. Diario Oficial de la Federación, 30 de diciembre de 2010, Segunda Sección, México.
- Traphagen, M. B. (2002). *Buffalograss (Büchloe dactyloides): an important grass species for predicting the presence of the white-sided jackrabbit (Lepus callotis) in southern New Mexico*. Albuquerque: New Mexico Game and Fish Contract Report #02-515-43.
- Traphagen, M. B. (2011). *Final report on the status of the white-sided jackrabbit (Lepus callotis gaillardi) in New Mexico*. Santa Fe, New Mexico: New Mexico Department of Game and Fish.
- Trejo, I., Martínez-Meyer, E., Calixto-Pérez, E., Sánchez-Colón, S., Vásquez-de la Torre, R., & Villers-Ruiz, L. (2011). Analysis of the effects of climate change on plant communities and mammals in Mexico. *Atmósfera*, 24, 1–14.
- United States Fish and Wildlife Service. (2009). 90-Day finding on a petition to list the white-sided jackrabbit (*Lepus callotis*) as threatened or endangered. *Federal Register*, 74, 36152–36158.
- United States Fish and Wildlife Service. (2010). 12-month finding on a petition to list the white-sided jackrabbit as threatened or endangered. *Federal Register*, 75, 53615–53629.
- Wagler, J. (1830). *Natürliches system der amphibian, mit vorangehender Classification der Säugthiere und Vögel*. Munich, Germany: J. G. Cottahehen Buchhandlung.
- Wilson, D. E., & Reeder, D. M. (1993). *Mammal species of the world: a taxonomic and geographic reference. 2nd ed.* Washington and London: Smithsonian Institution Press, American Society of Mammalogists.