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STATUS OF THE NORTH AMERICAN PORCUPINE (*ERETHIZON DORSATUM*) IN MEXICO

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Mexico contains one of the richest mammalian faunas in the world. However, at least 30% (approximately 129 species) of the land mammals are considered at risk of extinction (Ceballos and Navarro, 1991; SEDESOL, 1994). A considerable number of species facing conservation problems are either endemic to Mexico or reach their distribution limits in the country (Arita et al., 1997; Ceballos et al., 1998). That is the case of the North American porcupine (*Erethizon dorsatum*). There are very few recent records of this species in Mexico (Jones and Genoways, 1968), which is currently classified as endangered in the country (SEDESOL, 1994). In 1988 we discovered a small population of North American porcupine in Chihuahua that prompted us to evaluate the distribution and conservation status of the species in Mexico.

The present distribution was compiled from records in the literature (Gilmore, 1947; Benson, 1953; Baker, 1956; Dickerman, 1962; Jones and Genoways, 1968; Anderson, 1972; Hall, 1981; Jiménez-G and Zuñiga-R, 1992; Aragón, 1996), interviews with colleagues, and field work. For all localities where the species has been recorded, we documented the coordinates and vegetation type. The record from Ceballos, Durango, was obtained in 1978 by G. Ceballos. Observations on natural history were conducted in prairies and scrubs of northwestern Chihuahua, in the Janos-Nuevo Casas Grandes region, between December 1994 and February 1998.

The North American porcupine is known from only 15 sparsely distributed localities in six states of northern Mexico (Fig. 1; Table 1). The species is found from near sea level in Sonora to 1,500 m in Chihuahua. Most records (37.5%) are from the state of Chihuahua. There are single records in both the states of Sinaloa and Nuevo León. There are no records from higher elevations in the Sierra Madre Occidental, despite intensive fieldwork carried out in the past few years.

In Mexico, *E. dorsatum* has been recorded in temperate forests and arid lands, but most (92%) records are from riparian forests, mes-

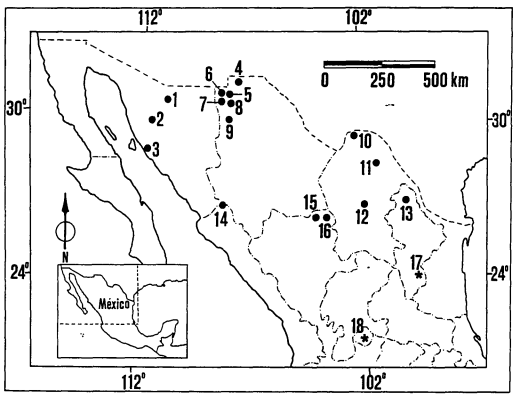

FIG. 1—Distributional records of the North American porcupine (*Erethizon dorsatum*) in Mexico. Pleistocene records are marked with a star.

quite scrubs, grasslands, and thorn forests in arid regions, including habitats with very sparse tree cover (Table 1). These unusual habitat associations also were noted by Jones and Genoways (1968). They and other authors (e.g., Benson, 1953) suggested that specimens found in arid areas probably were dispersing from temperate forests. Because records from forested mountains are lacking and there are several records from arid lands, however, we believe that in Mexico there are resident breeding populations of *E. dorsatum* in arid ecosystems. These remnant populations may have survived in these areas since the late Pleistocene.

North American porcupines had a larger distribution in Mexico during the Pleistocene (Fig. 1). There are fossil records from San Josecito Cave in Nuevo León (Jackway, 1958), and Arroyo Cedazo in Aguascalientes (Hibbard and Mooser, 1963; Jones and Genoways, 1968). After the Wisconsian glacial maximum (18,000 YBP), fluctuations in climate caused severe environmental changes including modification of the distribution of vegetation zones (Van Devender, 1977; Toledo, 1982). Additionally, there is evidence of historical impacts of humans on porcupines, based on fragmentary remains associated with human occupancy of a cave in Cuatro Ciénegas (Gilmore, 1947). These factors probably caused contraction in the geographic range of porcupines, with the result that the species disappeared from Central Mexico.

The most extensive data on *E. dorsatum* in Mexico are from the Janos-Nuevo Casas Grandes region, located ca. 75 km south of the Mexico-United States border, and includes the largest continuous prairie dog complex (55,000 ha) left in North America (Ceballos et al., 1992). The area is an extended plain with some hills, limited to the south and the west by the mountain of the Sierra Madre Occidental, and the north and east by arid scrub. The dominant vegetation types are grasslands characterized by several species of grasses (*Bouteloa gracilis, B. curtipendula,* and *B. hirsuta*), isolated patches of riparian vegetation, and annual herbs. Riparian forest is found along an intermittent stream where the foothills of the Sierra Madre Occidental grade into the plain. Vegetation along the stream is an open forest with Arizona sycamore (*Platanus wrightii*), Arizona walnut (*Juglans major*), Emory oak (*Quercus emoryi*), Alligator juniper (*Juniperus deppeana*), mesquite (*Prosopis glandulosa*), and choyas (*Opuntia choya*—Brockman, 1986). The forest extends along a strip 400 to 800 m wide and about 6 km long surrounded by mesquite scrub and mixed short-grass prairie occupied by black-tailed prairie dogs (*Cynomys ludovicianus*). The climate is extremely arid characterized by hot summers, a rainy season during summer, and cold winters. Average annual temperature is 15.7°C. Average annual precipitation is 306.7 mm, most of which falls during July and August (García, 1981).

North American porcupines were discovered in the region in October 1988, when tracks were seen in a patch of trees within a mesquite scrub. In our fieldwork we have observed porcupines on 12 one-day visits in January, February, June, July, October, November, and December. Porcupines were found within a riparian area in a locality know as Los Novillos and one porcupine was found on a prairie dog town known as Los Bejucos, some 400 m from a riparian area. The number of individuals observed ranged from three to six per visit. Although individuals were not marked, the minimum number of live porcupines observed in this area was seven, because on one occasion six adults were counted and in the following visit a young porcupine was recorded. All porcupines were found in trees, five were recorded in Arizona sycamore, nine on Arizona walnut, and two in Emory oak. All were observed during the day. In three of the trees with por-

TABLE 1—Distribution of the North American porcupine (*Erethizon dorsatum*) in Mexico by state, locality, vegetation type, and habitat. Each locality is identified by a number in parenthesis, that shows its location in Fig. 1.

State Locality (Coordinates)	Vegetation type	Habitat	Source
	Recent records		
Sonora			
1) 13 mi N Imuris (30°52′N, 111°57W)	Arid scrub	Riparian vegetation	1
2) Rancho Santa Ana, 45 mi W Hermosillo (29°05′N, 111°42′W)	Arid scrub	Riparian vegetation	2
3) 6 mi N Puerto Kino (28°54′N, 111°55′W)	Arid scrub	—	2
Chihuahua			
4) Ojo Palomo (31°43′N, 107°37′W)	Arid scrub	Mesquite scrub	1
5) Rancho El Uno (30°51′N, 108°27′W)	Arid scrub	Mesquite scrub	3
6) Los Bejucos (30°50′N, 108°35′W)	Arid grassland	Grassland	3
7) Los Novillos (30°46′N, 108°34′W)	Arid scrub	Riparian vegetation	3
8) Rancho Ojitos (30°46′N, 108°32′W)	Arid grassland	Riparian vegetation	3
9) 5 mi SE Colonia Juarez (30°20′N, 108°07′W)	Arid grassland	Grassland and scrub	1
Coahuila			
10) Maderas del Carmen (29°02′N, 102°35′W, approximate)	Temperate forest	Pine-oak forest	4
11) Hacienda Las Margaritas (28°42′N, 101°12′W)	Temperate forest	Pine forest	5
12) E of Cuatro Ciénegas (26°59′N, 102°04′W)	Arid scrub	—	6
Nuevo León			
13) Río Salado, Anáhuac (27°14′N, 100°08′W)	Arid scrub	Riparian vegetation	7
Sinaloa			
14) 16 km NNE Choix (26°48′N, 108°11′W)	Arid scrub	Thorn forest	1
Durango			
15) 7 km E of Ceballos (26°31′N, 104°03′W)	Arid scrub	Mesquite scrub	3
16) Mapimí biosphere reserve, Ejido de La Flor (16) (26°35′N, 103°42′W)	Arid scrub	Mesquite scrub	8
	Pleistocene records		
Nuevo León			
17) San Josecito Cave (24°06′N, 99°48′W)	Temperate forest	Pine-oak forest	9
Aguascalientes			
18) Arroyo Cedazo (21°52′N, 102°17′W)	Arid scrub	—	10

Source: 1 = Jones and Genoways (1968); 2 = Benson (1953); 3 = This study; 4 = A. Jiménez, pers. comm.; 5 = Dickerman (1962); 6 = Gilmore (1947); 7 = Jimenéz-G and Zuñiga-R (1992); 8 = Aragón (1996); 9 = Jackway (1958); 10 = Hibbard and Mooser (1963).

cupines, and in three additional Emory oaks, recent and old pellets were found in abundance, suggesting a prolonged use of the same tree. In one of these trees, a porcupine was feeding on a mistletoe (*Plantago patagonica*). On all but one occasion, single individuals were found in a tree. The only juvenile was recorded in February. These data suggest that porcupines have a resident, breeding population found throughout the year in the area.

The North American porcupine is considered at risk of extinction in Mexico, mainly because of its scarcity (Ceballos and Navarro, 1991; SEDESOL, 1994). Our data suggest that the species should be considered endangered, using the new IUCN (1996) classification. Factors that are probably related to its scarcity in Mexico include habitat destruction and hunting. In general, riparian and other forested habitats have been highly impacted, because of human activities; forestry, wood harvesting, and overgrazing are the leading causes of habitat perturbation. Such activities have profound impacts on the structure and composition of natural vegetation. For example, in the Janos-Nuevo Casas Grandes region, overgrazing has lead to the lack of tree regeneration in the riparian zone, leaving only old trees. Hunting is another important factor leading to the decline of the species. For example, all records previous to this study were based on remains (e.g., quills) or single individuals found dead. The Janos-Nuevo Casas Grandes region is the only area where more than one individual has been reported. Porcupines are usually killed on sight, because they are considered to be vermin, especially because of their danger to domestic dogs. In most of the ranches in the region, cowboys told us that they kill any porcupine they find. Porcupines are easy prey for hunters because they are slow and very conspicuous, especially during the winter, when there is little or no foliage on trees (see also Roze, 1989).

Although the long-term conservation of North American porcupines in Mexico is uncertain, two positive steps have been taken to give them some protection. *Erethizon dorsatum* has been included in the National Endangered Species List, which gives it complete protection against hunting, trade, and other human activities (SEDESOL, 1994). Populations also are protected in the Mapimí biosphere reserve in Durango (Aragón, 1996), the Maderas del Carmen (Coahuila) Wildlife Refuge, and the proposed Janos-Casas Grandes biosphere reserve (Ceballos, 1997).

The North American porcupine is one of approximately 61 species with similar distribution patterns in Mexico (Ceballos et al., 1998). An appropriate strategy for the conservation of the mammalian diversity of Mexico must explicitly consider these species.

Resumen—El puercoespín norteño (*Erethizon dorsatum*) es conocido en sólo 15 localidades dispersas en seis estados del norte de México, desde el nivel del mar hasta 1,500 msnm. La mayoría de los registros son de Chihuahua. Se le ha encontrado en bosques templados y en zonas áridas, pero la mayoría de los registros son de bosques riparios, matorrales de mesquite, pastizales y selvas espinosas, incluyendo hábitats con poca vegetación arborea. En la región de Janos-Nuevo Casas Grandes, Chihuahua, localizada aproximadamente a 75 km al sur de la frontera con los Estados Unidos, descubrimos una población residente. Encontramos en doce ocasiones a por lo menos doce individuos, incluyendo a un juvenil, a los que observamos en cinco ocasiones en plátanos (*Platanus wrightii*), nueve en nogales (*Juglans major*) y dos en encinos (*Quercus emoryi*). La especie esta considerada en peligro de extinción, principalmente por la destrucción del hábitat y la cacería. Al igual que alrededor de otras 61 especies de mamíferos con un patrón de distribución similar, *E. dorsatum* debe ser considerada explícitamente en las estrategias de conservación.

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THE FRINGED MYOTIS, *MYOTIS THYSANODES* (CHIROPTERA: VESPERTILIONIDAE), IN TAMAULIPAS, MEXICO

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The known distribution for the temperate bat species, *Myotis thysanodes,* extends from British Columbia, southward through the western United States and México to Chiapas (Hall, 1981). This species has been reported from the northern tier of states in México with the exception of Tamaulipas. On 17 September 1987 two males and one female (with no embryos) of *M. thysanodes* were collected at Ejido Conrrado Castillo (23°27′N, 99°28′W), mu-