

## REDISCOVERY OF THE *NEOTOMA* POPULATION ON DATIL [TURNER] ISLAND, SONORA, MÉXICO

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**ABSTRACT.**—On Datil [Turner] Island in the Gulf of California, we rediscovered a population of *Neotoma varia*, previously thought to be extinct. We captured 5 specimens: 1 was kept as a voucher, and 4 were examined and released. Analysis of previous surveys indicates that *N. varia* is not common on the island and occupies a very restricted range.

*Key words:* endemic species, island populations, threatened species, extinction.

**RESUMEN.**—Recolectamos especímenes de *Neotoma varia* de la Isla Dátil en el Golfo de California, una población anteriormente considerada ya extinta. De los cinco especímenes que recolectamos, cuatro se pusieron en libertad. El análisis de muestreos previos indica que *N. varia* no es común en la isla y que tiene una distribución muy limitada.

*Neotoma varia* is an endemic woodrat of Datil [Turner] Island (28.7204°N, 112.2934°W) in the Gulf of California (Hall 1981). *Neotoma varia* was described in 1932 (Burt 1932). Although there have been several collecting efforts on Datil Island, only 5 specimens of *N. varia* are known from the island.

*Neotoma varia* has been considered likely to be extinct (Álvarez-Castañeda and Ortega-Rubio 2003); but no long-term surveys targeting this species have been conducted on the island (Álvarez-Castañeda and Ortega-Rubio 2003, Álvarez-Castañeda et al. 2006). To determine the status of *N. varia*, a team from Centro de Investigaciones Biológicas del Noroeste (CIBNOR) and personnel who manage the protected area of the island conducted a directed and intensive survey in May 2008.

### METHODS

Datil Island, also known as Turner Island, has an area of 4 km<sup>2</sup> and is 1.7 km south of Tiburón Island off the coast of Sonora, México. Because our survey targeted *N. varia*, Sherman live-traps were not set in transects but in particular habitats on the island that are known to be suitable for *Neotoma* species, specifically species in the *albigula* group. The field team worked in 2 areas.

The first site was on the largest sand beach of the island (28.72823°N, 112.292973°W; Fig.

1, point A) near the mouth of a canyon; the canyon was composed of sedimentary stones, had a pronounced upward slope to its head, and ended in a cliff on the western side of the island. The main plant species in the area were limberbush (*Jatropha cuneata*), candlewood (*Fouquieria splendens*), agave (*Agave subsimplex*), organ pipe (*Stenocereus thurberi*), elephant cactus (*Pachycereus pringlei*; not abundant), sunflower (*Hofmeisteria* sp.), strawberry cactus (*Mammillaria dioica*), elephant tree (*Bursera* sp.), and rock fig trees (*Ficus petiolaris*; 2 individuals). This site did not include all the plant species noted by Burt (1932) for the places at which *N. varia* was collected (*P. pringlei*, *Opuntia bigelovii*, *Opuntia thurberi*, *Hofmeisteria* sp., and *M. dioica*). For that reason, we set 160 Sherman traps in places where our field experience indicated possible habitats for murid rodents, with emphasis in areas with agave and brush.

The second site was in a cliff area with a canyon and a small beach (28.728644°N, 112.296110°W; Fig. 1, point B) of sedimentary stones and pebbles. The vegetation was composed mostly of limberbush (*J. cuneata*), candlewood (*Fouquieria splendens*), elephant cactus (*P. pringlei*), sunflower (*Hofmeisteria* sp.), pitahaya (*Stenocereus gumosus*), jumping cholla and Thurber's spineflower (*Cylindropuntia bigelovii* and *Cylindropuntia thurberi*), elephant

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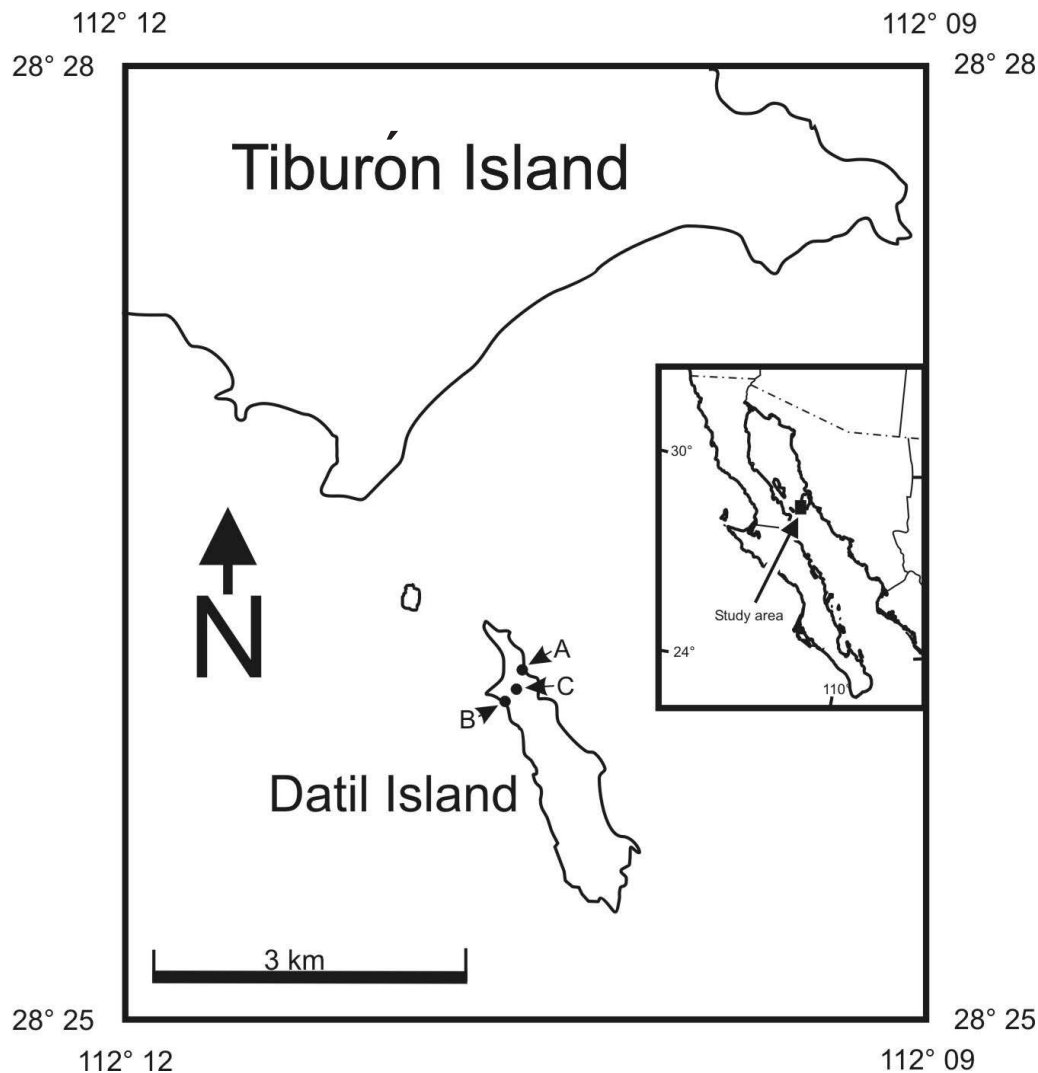


Fig. 1. Tiburón and Datil [Turner] islands in the Sea of Cortez, México: A, landing area of the first survey group; B, landing area of the second survey group; and C, area where specimens of *Neotoma varia* were collected.

tree (*Bursera hindsiana* and *Bursera microphylla*), strawberry cactus (*M. dioica*), and agave (*A. subsimplex*). In the canyon where the traps were set, the dominant plant species were *P. pringlei*, *Hofmeisteria* sp., dry bushes of *J. cuneata*, and *F. splendens*. As we did in the first canyon, we intentionally set traps in suitable areas. *Neotoma* feces were found from the middle to the top of the canyon, where the presence of *Cylindropuntia* spp. and *M. dioica* was associated with small groups of *J. cuneata*. In this area, 60 Sherman traps were spaced between 40 and 50 m apart.

## RESULTS

In the low areas of the first canyon (0–35 m elevation), we collected multiple specimens of *Chaetodipus intermedius minimus* and *Peromyscus eremicus collatus*, and one specimen of *P. e. collatus* at 65 m. Evidence of *Neotoma* activity was not found in the first canyon. In the second area, we captured *Chaetodipus* and *Peromyscus* and 5 live specimens of *N. varia* (the number of specimens that the permit allowed; 3 males and 2 females). Only the oldest male was removed from the island and curated as a

voucher specimen in the mammal collection of the Centro de Investigaciones Biológicas del Noreste (CIB 14472). Its measurements were as follows: total length 320 (mm), tail length 140, ear length 35, hind foot length 30, and weight 240 g. Skull: basilar length 36.74 (mm), zygomatic breadth 22.85, interorbital breadth 5.92, length of nasals 17.37, alveolar length of upper molar series 8.29.

#### DISCUSSION

Bogan's (1997) analysis shows that there are few specimens of *N. varia* in mammal collections. Only 4 surveys have been successful in collecting *Neotoma* on Datil Island: (1) 1931, William H. Burt (type specimen); (2) 1957, Richard Van Gelder (a jaw); (3) 1975, Edward Roth (2 adults, 1 juvenile); and (4) 2008, the CIBNOR team (5 adults). Two other surveys on the island were unsuccessful in capturing *Neotoma*: one in 1976 (1 night, 80 trap-nights [a mix of Museum Specials and Victor traps]; Bogan 1997) and one in 1997 (2 nights, 456 trap-nights; *Peromyscus collatus* and *Chaetodipus intermedius* collected; Álvarez-Castañeda and Cortés-Calva 1999).

To learn if there were more surveys of Datil Island, we reviewed the specimens of *N. varia* in the Mammals Network Information System (MaNIS, www.manisnet.org), which includes 33 mammal collections worldwide. We did not find any matches for *N. varia* or *N. albigula varia*; though specimens of *Peromyscus* and *Chaetodipus* from Datil Island were found in some collections. We found 2 specimens of *Peromyscus collatus* at the Universidad Nacional Autónoma de México (33583, 25 April 1966; 33584, 28 June 1968), and we found a combined 42 specimens of *Peromyscus eremicus collatus* at the University of Kansas Biodiversity Research Center ( $n = 6$ ; 95452–95457, 30 June and 1 July 1963), the National Museum of Natural History, Smithsonian Institution ( $n = 12$ ; 514176–514183, 7 October 1976), and the University of Michigan Museum of Zoology ( $n = 24$ ; 116421, 25 April 1968; 116434–116442, 116542–116544, and 117356–117365 from 27 June to 28 June 1968). A search of the MaNIS database for *Chaetodipus intermedius minimus* yielded a combined 31 specimens at the University of Kansas Biodiversity Research Center ( $n = 11$ ; 95333–95341, 95361, and 95363 on 26, 29, and 30 June and 1 July 1963); the Museum of

Vertebrate Zoology, University of California, Berkeley ( $n = 2$ ; 175961–175962, 4 December 1965); the National Museum of Natural History, Smithsonian Institution ( $n = 7$ ; 514155–514161, 7 October 1976); and the Universidad Nacional Autónoma de México ( $n = 11$ ; 32722–32731 on 12, 22, and 27 September 1976 and 32732 on 25 April 1966 [probably a mistake in the year, as the previous 10 specimens of the series are from 1976]).

The analysis of specimens of *Chaetodipus* and *Peromyscus* collected on Datil Island shows another 5 surveys in which no specimens of *N. varia* were collected. Those are (1) 1963, University of Kansas; (2) 1965, University of California; (3) 1968, University of Michigan Museum of Zoology; (4) 1968, Universidad Nacional Autónoma de México; and (5) 1976, Universidad Nacional Autónoma de México.

Current information indicates that specimens of *Neotoma* are not common on Datil Island; in 7 of the 12 recorded surveys, collectors failed in obtaining a voucher specimen. From the description of *N. varia* (Burt 1932), recent colonization of the island is not possible. In that period of time (1932–2008), 58% of the surveys failed to collect specimens of *N. varia*; however, specimens of *Chaetodipus* and *Peromyscus* were collected. *Neotoma* specimens were found in only one canyon between the 1997 and 2008 surveys of 10 different sites on the island (4 km<sup>2</sup>). Considering all other surveys and their success rates, the *Neotoma* population present on Datil Island must be concentrated in a small area of the island.

In the 1997 Tiburón–Datil Island survey by CIBNOR, trap efficiency for capture of *N. albigula* was 10% on Tiburón Island, indicating that *N. albigula* is very common there. Additionally, nests of *N. albigula* are abundant and easy to locate on Tiburón Island. Conditions on Datil Island, however, are different. Our analysis indicates that *N. varia* is present—not extinct as believed by Álvarez-Castañeda and Ortega (2003). However, *N. varia* on Datil Island is restricted by its narrow habitat requirements to a very small part of the island, and no nests have been found. For these reasons, we think that the *Neotoma* population on Datil Island needs to be considered “critically endangered,” following the International Union for Conservation of Nature (IUCN) criteria (SEMAR-NAT 2001, IUCN 2008).

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## LITERATURE CITED

- ÁLVAREZ-CASTAÑEDA, S.T., AND P. CORTÉS-CALVA. 1999. Familia Muridae. Pages 445–566 in S.T. Álvarez-Castañeda and J. Patton, editors, Mamíferos del Noroeste Mexicano. (Centro de Investigaciones Biológicas del Noroeste, La Paz, B.C.S., México).
- ÁLVAREZ-CASTAÑEDA, S.T., P. CORTÉS-CALVA, L. MÉNDEZ, AND A. ORTEGA-RUBIO. 2006. Development in the Sea of Cortés calls for mitigation. *BioScience* 56:825–829.
- ÁLVAREZ-CASTAÑEDA, S.T., AND A. ORTEGA-RUBIO. 2003. Current status of rodents on islands in the Gulf of California. *Biological Conservation* 109:157–163.
- BOGAN, M.A. 1997. On the status on *Neotoma varia* from Isla Datil, Sonora. Pages 81–87 in T.L. Yates, W.L. Gannon, and D.E. Wilson, editors, *Life among the muses: papers in honor of James S. Findley*. Special publication, The Museum of Southwestern Biology, Albuquerque, NM.
- BURT, W.H. 1932. Descriptions of heretofore unknown mammals from islands in the Gulf of California, Mexico. *Transactions of the San Diego Society of Natural History* 7:161–182.
- HALL, E.R. 1981. *The mammals of North America*. 2nd edition. John Wiley & Sons, New York, NY.
- [IUCN] INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES. 2008. *The IUCN Red List of Threatened Species: Categories and Criteria* [online]. [Cited November 2008]. Available from: [http://www.iucnredlist.org/static/categories\\_criteria](http://www.iucnredlist.org/static/categories_criteria)
- SEMARNAT. 2001. Proyecto de Norma Oficial Mexicana Proy-NOM-059-Ecol-2001. 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. 6 March 2002. *Diario Oficial de la Federación*, México Distrito Federal, México.

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