Western North American Naturalist

Volume 70 | Number 1 Article 15

4-13-2010

Hispid pocket mouse (*Chaetodipus hispidus*) in east-central and northeastern Nebraska

Keith Geluso
University of Nebraska–Kearney, gelusok1@unk.edu

Greg D. Wright
University of Nebraska–Kearney, wrightgd@nmsu.edu

Western North American Naturalist 70(1), © 2010, pp. 126–129

HISPID POCKET MOUSE (*CHAETODIPUS HISPIDUS*) IN EAST-CENTRAL AND NORTHEASTERN NEBRASKA

Keith Geluso[1,2] and Greg D. Wright[1]

ABSTRACT.—The hispid pocket mouse (*Chaetodipus hispidus*) occurs throughout the Great Plains, mainly west of the Missouri River. In Nebraska, this species likely occurs throughout the state, but records of occurrence were lacking for east-central and northeastern counties. During a survey in 2008 for the plains pocket mouse (*Perognathus flavescens*) in eastern Nebraska, we documented *C. hispidus* in 10 new counties, including a modest range expansion into northeastern Nebraska. Many individuals were captured on moderately compact soils consisting of silt, but some also were captured on sandy and other friable soils. Most individuals were captured in areas containing some exposed ground, but this may reflect our trap placement for *P. flavescens.* Individuals from northeastern and east-central Nebraska best resembled *C. h. spilotus* from southeastern Nebraska, with black coloration suffused on the dorsum, head, and dorsal side of the tail; however, our individuals generally lacked the characteristic bright ochraceous coloration along lateral lines and on the dorsum. Limited evidence supports a recent expansion in distribution within the region.

Key words: Chaetodipus hispidus, *hispid pocket mouse, Nebraska, distribution, habitat, reproduction.*

The hispid pocket mouse (*Chaetodipus hispidus*) is the largest of 4 species of pocket mice in the Great Plains. This large species resides throughout much of the region but generally does not occur east of the Missouri River (Jones et al. 1983, Paulson 1988, Higgins et al. 2002). In Nebraska, *C. hispidus* likely occurs throughout the state, but records are lacking from east-central and northeastern Nebraska (Jones 1964, Hall 1981, Genoways et al. 2008). During a survey for the plains pocket mouse (*Perognathus flavescens perniger*) in eastern Nebraska, we documented *C. hispidus* in regions of the state without prior records. Here we comment on distribution, taxonomic status, habitat, abundance, and reproduction of *C. hispidus* from eastern Nebraska.

From 6 June to 2 August 2008, we mainly set Sherman live traps (H.B. Sherman Traps, Inc., Tallahassee, FL), baited with a mixture of seeds, in 35 counties in eastern Nebraska. Traps were set in roadside right-of-ways, on private lands, and at state wildlife management areas. Habitats consisted of grasslands (including grazed and ungrazed areas) dominated by grasses and forbs. We set traps in the evening and checked them the following morning. Most traps were set for a single night, but we occasionally left them in place for 2 or 3 consecutive nights. For small mammals captured in traps, we recorded species, sex, age (adult or juvenile), and reproductive condition (nonreproductive, scrotal, lactating, or pregnant). Most individuals were released at capture sites, but some were kept as voucher specimens. Our voucher specimens and associated field notes are archived in the natural history collections of the Division of Zoology, University of Nebraska State Museum (UNSM), Lincoln, Nebraska, USA. Coordinates of localities were determined with handheld global positioning units using North American Datum 1983. We compared our voucher specimens to other voucher specimens housed at the UNSM and at the Natural History Museum, University of Kansas, Lawrence.

Distribution and Taxonomic Remarks

We captured 75 *C. hispidus* in 16 counties in eastern Nebraska, including 10 counties without previous published records (Antelope, Butler, Cedar, Colfax, Dixon, Holt, Nuckolls, Saunders, Wayne, and Wheeler) and 6 counties with previously published records (Boyd, Knox, Seward, Thayer, Valley, and Webster) (Fig. 1, Appendix; Jones 1964). Our most northeastern record in Dixon County represents a modest range expansion of *C. hispidus* in

[1]Department of Biology, University of Nebraska–Kearney, Kearney, NE 68849.
[2]E-mail: gelusok1@unk.edu

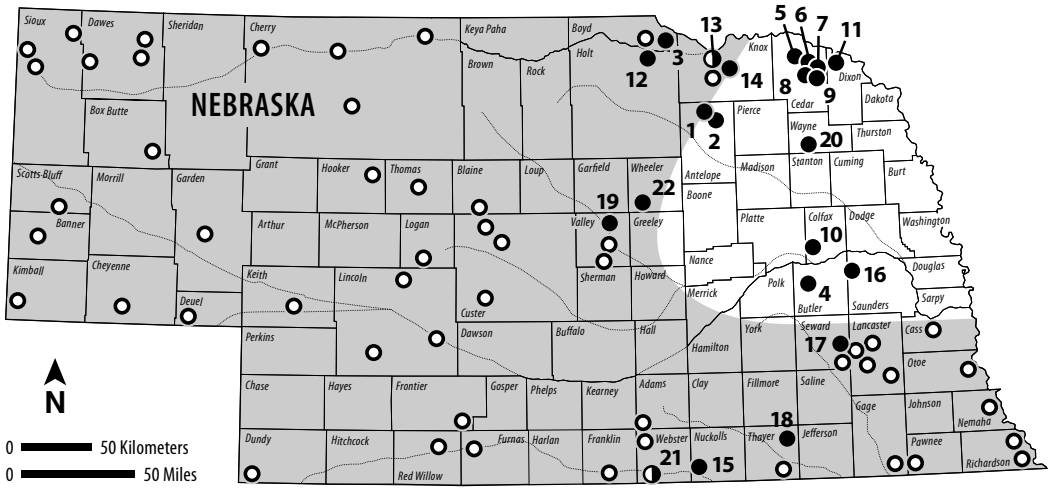

Fig. 1. Distribution of the hispid pocket mouse (*Chaetodipus hispidus*) in Nebraska. Open and half-closed circles represent records published in Jones (1964) and Genoways and Choate (1970); half-closed circles also represent localities where we captured individuals near records of Jones (1964); and closed circles represent new records based on our trapping in 2008. The shaded region represents the distribution of *C. hispidus* in Nebraska reported by Hall (1981).

Nebraska, 90 km east from prior records in Knox County and 190 km north of prior records from Lancaster County (Fig. 1; Jones 1964). Although Jones (1964) predicted that *C. hispidus* occurred in northeastern parts of the state, Hall (1981) and Genoways et al. (2008) reported no evidence of its occurrence in northeastern Nebraska. Our records represent either a recent expansion in its distribution or an overlooked area of occurrence (see Frey 2009). Limited support for a recent distributional expansion is based on former records of small mammals in some of the same northeastern counties (Jones 1964). In Wayne, Dixon, or both counties, Jones reported captures of western harvest mice (*Reithrodontomys megalotis*), North American deermice (*Peromyscus maniculatus*), and northern grasshopper mice (*Onychomys leucogaster*). We captured these same species at sites with *C. hispidus* in northeastern Nebraska. Additionally, *C. hispidus* was moderately common in that region of the state during our trapping efforts in 2008, and it was the third most abundant species captured throughout eastern Nebraska, exceeded in capture rates by only *P. maniculatus* and the prairie vole (*Microtus ochrogaster*).

Jones (1964) showed that 2 subspecies of *C. hispidus* occur in Nebraska—*C. h. spilotus* in southeastern Nebraska and *C. h. paradoxus* in the western two-thirds of the state. His map also indicated that both subspecies might also occur in northeastern and east-central Nebraska (Jones 1964:173). After comparing coloration of our specimens to coloration of other museum specimens from Nebraska, we concluded that individuals of *C. hispidus* from northeastern and east-central Nebraska are best referred to as *C. h. spilotus*. Our specimens from these regions were visually darker in appearance than specimens of *C. h. paradoxus* from central and western Nebraska. More specifically, our specimens had more black coloration suffused on the dorsum, head, and dorsal side of the tail; however, our specimens did not exactly match those of *C. h. spilotus* from southeastern Nebraska because ours had paler ochraceous colorations along lateral lines and on the dorsum. Jones (1964) noted intergrades from Adams, Knox, Valley, and Webster counties, with specimens from Knox and Adams counties being almost exactly intermediate in color between the 2 subspecies. We find evidence that the subspecific line is best depicted farther west in Nebraska, from Knox to Webster counties, than Jones (1964:173) originally depicted, although evidence of a zone of intergradation also is present along this boundary.

Habitat and Abundance

Most of our *C. hispidus* were captured in unmowed roadside right-of-ways, but this likely

reflected our trap placement. A few individuals were captured in grazed and ungrazed grasslands. Vegetation at most capture sites in northeastern Nebraska included some combination of the following species: brome (*Bromus*), cheatgrass (*Bromus tectorum*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), leadplant (*Amorpha canescens*), sunflower (*Helianthus*), ragweed (*Ambrosia*), plantain (*Plantago*), as well as lesser amounts of other forbs and grasses.

Four patterns emerged as we captured *C. hispidus* during our survey for *P. flavescens* in eastern Nebraska. First, relatively few *C. hispidus* were captured at sites that also contained *P. flavescens.* We trapped both species at 8 sites, *C. hispidus* at 14 sites without *P. flavescens,* and *P. flavescens* at 20 sites without *C. hispidus.* Second, *C. hispidus* most often inhabited compacted soils composed mainly of silt, but some were captured on more friable soils composed mainly of sand. Third, *C. hispidus* was captured consistently in areas with at least some exposed ground that lacked a litter layer, perhaps reflecting our selective placement of traps for capturing *P. flavescens.* And fourth, burrow entrances of *C. hispidus* were smaller than those made by Ord's kangaroo rats (*Dipodomys ordii*) and larger than those of *P. flavescens* and *P. maniculatus.* Many entrances of *C. hispidus* had small mounds of soil deposited near openings. Other researchers have made similar observations of *C. hispidus* occurring on various types of soils, using habitats with sparse ground cover, and placing mounds near burrow entrances (Bee et al. 1981, Jones et al. 1983, Paulson 1988).

The relatively large number of *C. hispidus* at some sites was unexpected because our prior trapping efforts in Nebraska usually yielded few individuals, if any, per trapline. For example, we captured 19 individuals in 120 traps in a single evening at a site in Wayne County (Appendix). Jones et al. (1983) reported that populations of *C. hispidus* generally are sparse in the Northern Great Plains, but Jones (1964) observed them to be common in some places along the Missouri River in southeastern Nebraska.

Reproduction

Little information is available on reproduction for *C. hispidus* in Nebraska (Jones 1964). Most reproductive information from our study is based on the occurrence of juveniles, which were noticeably smaller in body size and had a more grayish appearance to their pelage than adults. We captured juveniles on 4, 5, 11, 13, 15–17, 21–24, 27, and 29–31 July and 2 August. A single pregnant individual was captured and released on 13 July in Wayne County. We did not capture any lactating females, but 1 postlactating female was captured on 13 July in Wayne County. Scrotal males were captured on 6, 13, 15, 16, 22, and 31 July and 2 August. Testicular lengths of the 3 heaviest males kept as voucher specimens were 16 × 6 mm (80 g, 13 July), 15 × 7 mm (70 g, 16 July), and 15 × 11 mm (60 g, 22 July), whereas a juvenile male that weighed 26.5 g on 30 July had testes that measured 6 × 3 mm.

Conclusions

Our records of *C. hispidus* in eastern Nebraska add to the collective knowledge of a species for which there is limited information on its natural history in the Great Plains (Jones et al. 1983).

Field work associated with this project was funded by the Nebraska Game and Parks Commission to survey eastern Nebraska for the plains pocket mouse and plains harvest mouse. We thank Mike Fritz (Nebraska Game and Parks Commission) for his assistance with grant-related matters. We thank Trish Freeman and Tom Labedz (University of Nebraska State Museum, University of Nebraska–Lincoln) and Robert Timm (Natural History Museum, University of Kansas) for assistance with museum matters associated with this project. We thank K.N. Geluso and 2 anonymous reviewers for comments on an earlier version of this paper. Angie Fox (University of Nebraska State Museum, University of Nebraska–Lincoln) prepared Fig. 1.

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Received 1 March 2009
Accepted 7 August 2009

APPENDIX. Localities of capture sites for the hispid pocket mouse (*Chaetodipus hispidus*) in eastern Nebraska from 6 June to 2 August 2008. We also report date of capture, number of trap-nights, number of individuals captured, sex of individuals, and museum number (given as ZM#, University of Nebraska State Museum) if any individuals were kept as voucher specimens. Numbers in bold preceding each locality correspond to those in Fig. 1.

NEBRASKA: *Antelope County:* (**1**) 5.2 mi N Royal, 42°24.652′N, 98°02.247′W (11 July, 60 trap-nights, 2 ♂♂ [ZM#29386], 1 ♀) and (**2**) 3 mi N, 1.9 mi E Royal, 42°22.722′N, 98°05.310′W (11 July, 40 trap-nights, 1 ♀). *Boyd County:* (**3**) 1 mi S Monowi, 42°48.986′N, 98°19.790′W (1 August, 80 trap-nights, 1 ♀). *Butler County:* (**4**) 2.6 mi S Bellwood, 41°17.969′N, 97°14.074′W (17 and 30 July, 120 trap-nights, 1 ♂, 4 ♀♀ [ZM#29326]). *Cedar County:* (**5**) 6.3 mi N, 3.8 mi E Hartington, 42°42.601′N, 97°11.659′W (15 July, 30 trap-nights, 1 ♀ [ZM#29403]); (**6**) 7.7 mi E, 2.5 mi N Hartington, 42°39.346′N, 97°06.989′W (15 July, 40 trap-nights, 1 ♂); (**7**) 8.9 mi E, 1.5 mi N Hartington, 42°38.478′N, 97°05.631′W (15 July, 50 trap-nights, 1 ♂ [ZM#29402]); (**8**) 5.5 mi E, 0.5 mi S Hartington, Hwy. 84, 42°36.739′N, 97°09.848′W (16 July, 20 trap-nights, 2 ♂♂ [ZM#29405]); and (**9**) 9 mi E, 0.6 mi S Hartington, Hwy. 15, 42°36.563′N, 97°05.651′W (16 July, 20 trap-nights, 3 ♂♂ [ZM#29406], 1 ♀). *Colfax County:* (**10**) 4 mi N, 3 mi W Schuyler, 41°30.701′N, 97°07.052′W (29 July, 40 trap-nights, 1 ♀ [ZM#29325]). *Dixon County:* (**11**) 3 mi W, 1 mi N Newcastle, 42°39.855′N, 96°56.149′W (16 July, 40 trap-nights, 1 ♂ [ZM#29407]). *Holt County:* (**12**) Redbird State Wildlife Management Area, 42°45.372′N, 98°26.096′W (5 and 6 July, 160 trap-nights; 6 July, 1 ♂). *Knox County:* (**13**) Hwy. 14, 1.4 mi S Hwy. 12, 42°43.838′N, 98°02.919′W (4 and 5 July, 240 trap-nights, 5 ♂♂, 1 ♀) and (**14**) 3 mi S, 4 mi E Niobrara, 42°42.624′N, 97°57.279′W (31 July, 80 trap-nights, 4 ♂♂, 1 ♀). *Nuckolls County:* (**15**) 5 mi N, 8.4 mi W Superior, 40°05.375′N, 98°13.681′W (25 July, 120 trap-nights, 1 ♂, 3 ♀♀). *Saunders County:* (**16**) 2 mi E Abie, 41°20.155′N, 96°54.484′W (30 July, 20 trap-nights, 1 ♂ [ZM#29327]). *Seward County:* (**17**) 1.5 mi N, 1 mi W Pleasant Dale, 40°48.839′N, 96°56.931′W (27 and 28 July, 320 trap-nights, 1 ♀). *Thayer County:* (**18**) 2 mi S, 1 mi W Alexandria, 40°13.008′N, 97°24.326′W (21, 22, and 23 June, 480 trap-nights, 2 ♀♀). *Valley County:* (**19**) 10 mi N, 5 mi E Ord, 41°44.426′N, 98°49.121′W (2 August, 40 trap-nights, 2 ♂♂, 1 ♀). *Wayne County:* (**20**) Intersection of Hwy. 35 and Avenue 566, 4.8 mi E, 0.5 mi S Hoskins (13 July, 120 trap-nights, 13 ♂♂ [ZM#29392], 6 ♀♀). *Webster County:* (**21**) 5.0 mi S Red Cloud, Hwy. 281, 40°01.021′N, 98°31.137′W (21, 22, and 23 July, 585 trap-nights, 9 ♂♂ [ZM#29413], 2 ♀♀). *Wheeler County:* (**22**) 3 mi S, 1 mi E Ericson, 41°44.598′N, 98°39.756′W (2 August, 20 trap-nights, 1 ♀).