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NEW RECORDS OF THE MOGOLLON VOLE, *MICROTUS MOGOLLONENSIS* (MEARNS 1890), IN SOUTHWESTERN COLORADO

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Key words: *Microtus mogollonensis*, *Microtus mexicanus*, *Mogollon vole*, *Mexican vole*, *distribution*, *Colorado*.

Little is known about the biology of the Mogollon vole, *Microtus mogollonensis* (Mearns 1890), in Colorado (Fitzgerald et al. 1994). This species was originally described from the Mogollon Mountains in central Arizona (Mearns 1890). Despite previous work indicating its distinctiveness (e.g., Bailey 1900), Bailey (1931 [=1932]) subsequently recognized *mogollonensis* as a subspecies of the Mexican vole, *Microtus mexicanus* (de Saussure 1861), although he provided no justification for this classification. Consequently, all subsequent reports of this form from Colorado (and other states in the U.S.) have applied the name *Microtus mexicanus*. Recent studies, however, reaffirm that members of this species group from the U.S. are distinct from those in Mexico (Judd 1980, Modi 1987, Frey 1989). Thus, the name *Microtus mogollonensis* has been reapplied to populations in the U.S. (e.g., Frey and LaRue 1993, Frey 1999), while the name *Microtus mexicanus* refers only to populations in Mexico.

In Colorado the Mogollon vole was first reported from Mesa Verde National Park, Montezuma County, in the southwestern corner of the state (Rodeck and Anderson 1956, Anderson 1961). Subsequently, it was documented from Las Animas County in southeastern Colorado at Spanish Peaks State Wildlife Area (Mellott and Choate 1984 [erroneously reported as *Microtus montanus*, see Finley et al. 1986], Mellott et al. 1987), in the vicinity of Raton Pass (Finley et al. 1986) and, in 1996, at Lake Dorothea State Wildlife Area (C.A. Jones unpublished data). At present these represent the only 2 counties from which this species has been documented in Colorado (Saldaña-

DeLeon and Jones 1998). Herein we report new records of *Microtus mogollonensis* from La Plata County in southwestern Colorado (Fig. 1).

During the initial investigation of hantaviruses in the southwestern U.S., the U.S. Centers for Disease Control and Prevention collected a specimen of *Microtus mogollonensis* of undetermined sex near Hesperus in La Plata County, Colorado, on 1 June 1993, and 3 additional specimens (2 females, 1 male) from this locality on 7 and 8 July 1993. These specimens were deposited in the Museum of Southwestern Biology at the University of New Mexico (catalog numbers MSB 68633–68635, MSB 68838). Identification to species was made by Frey on the basis of external, cranial, and dental features.

In June 1994 a study of small mammal ecology and hantaviruses was initiated at the 6300-acre Colorado State University San Juan Basin Research Center (SJBRC), located approximately 7 km south of Hesperus (La Plata County, Colorado; 37°13'30.9"N, 108°10'51.1"W, elev. = 2438 m). At the SJBRC, *Microtus mogollonensis* was first encountered 18–20 August 1998, during which time 3 females and 2 males were captured. One of the females was a juvenile, suggesting that breeding had occurred on or near the study plots. However, none of the specimens appeared to be reproductively active at time of capture. The remaining specimens were considered to be adults or young adults. An additional adult female was captured on 1 October 1998.

Field identification of *M. mogollonensis* was determined based on characteristics in

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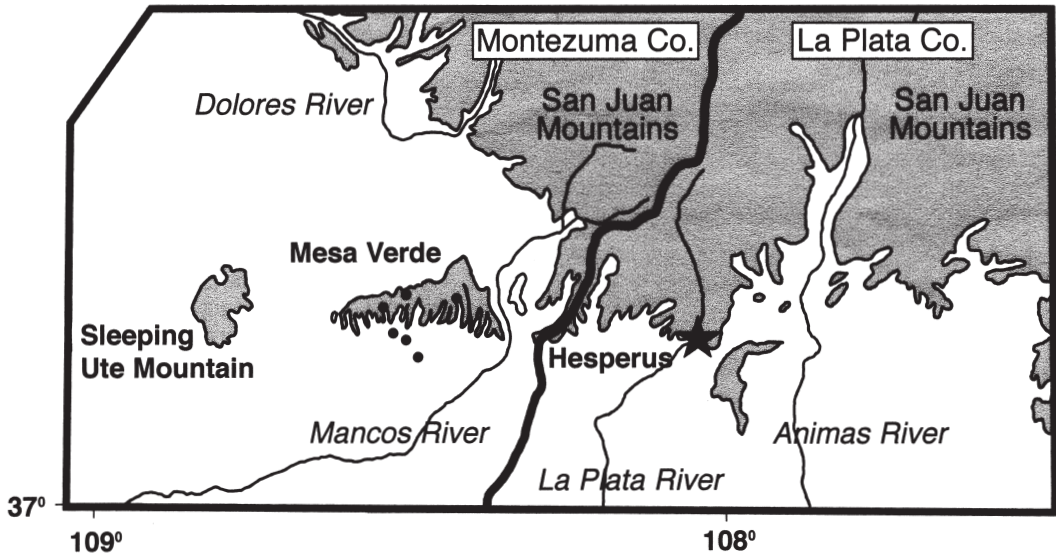


Fig. 1. Distribution of *Microtus mogollonensis* in southwestern Colorado. Dots indicate previous localities of record on Mesa Verde, Montezuma Co., while the star indicates new localities in the vicinity of Hesperus, La Plata Co. Shaded areas are above the 2286-m contour interval.

Fitzgerald et al. (1994). Females, which we examined in fresh condition, had only 2 pairs of mammae; other arvicolines in Colorado typically have 2 or more pairs (Fitzgerald et al. 1994). Measurements of the SJBRC specimens (Table 1) are consistent with the ranges provided by Fitzgerald et al. (1994). Two inadvertent trap mortalities (1 adult male and 1 adult female) were collected and deposited at the Denver Museum of Natural History (DMNH 9622 and DMNH 9623, respectively), and Jones confirmed species identifications based on external and dental characteristics. On the basis of geographic range, specimens from southwestern Colorado are referable to the subspecies *Microtus mogollonensis navaho* Benson 1934. This follows the arrangements of Hoffmann and Koepple (1985) and Frey (1989).

Calisher et al. (1999) provided a detailed summary of the natural history of the SJBRC. Briefly, the biotic community of the study site is a Great Basin montane shrubland dominated by Gambel oak (*Quercus gambeli*), an occasional ponderosa pine (*Pinus ponderosa*), western wheatgrass (*Agropyron smithii*), Idaho fescue (*Festuca idahoensis*), and timothy (*Phleum pratense*). Groundcover of grass and forbs is seasonally variable, but during the time of capture grass cover was nearly 30%. This habi-

tat association is consistent with other observations that *M. mogollonensis* is primarily associated with grassy areas within the ponderosa pine zone (Findley et al. 1975, Hoffmeister 1986, Frey and LaRue 1993). For example, Meaney (1990) determined that the dominant vegetation type associated with other localities of record of *M. mogollonensis* in Colorado is ponderosa pine with junipers (*Juniperus* spp.), antelope bitterbrush (*Purshia tridentata*), mountain mahogany (*Cercocarpus* spp.), common snowberry (*Symphoricarpos albus*), fescues (*Festuca* spp.), and side-oats grama (*Bouteloua curtipendula*). Consistent with the biotic community at the study site, the small mammal community is dominated by the deer mouse (*Peromyscus maniculatus*), least chipmunk (*Tamias minimus*), Mogollon vole, and montane vole (*Microtus montanus*) in order of decreasing abundance. Sympatry between *M. montanus* and *M. mogollonensis* was previously known only from the vicinity of the White Mountains complex in east central Arizona and adjacent New Mexico (Hubbard et al. 1983, Hoffmeister 1986, Frey et al. 1995) and at Mesa Verde in southwestern Colorado (Anderson 1961).

Records of *M. mogollonensis* in southern Colorado mark the known northern extent of the species range. It has been suggested that

TABLE 1. Measurements of 6 *Microtus mogollonensis* captured at the San Juan Basin Research Center, La Plata Co., Colorado.

Deposition	Age	Sex	Total	Tail	Hindfoot	Ear	Mass
DMNH ^a 9622	Adult	Male	130	29	17	12	24
DMNH ^a 9623	Adult	Female	127	25	16	14	31
Released	Adult	Male	136	26	18	13	26
Released	Adult	Female	134	22	18	14	30
Released	Adult	Female	142	27	18	13	30
Released	Juvenile	Female	111	25	16	11	14

^aTrap mortalities were deposited in the Denver Museum of Nature and Science (DMNH).

other recently discovered populations of this species in northern Arizona, northeastern New Mexico, and southeastern Colorado represent recent northward range expansions through natural dispersal (Davis and Callahan 1992, Brown and Davis 1994). This scenario could apply to the new localities reported herein if one accepts the hypothesis of recent dispersal and range expansion. The new localities are from upland habitats associated with the La Plata River valley (Fig. 1). This drainage abuts the Mancos River basin that drains Mesa Verde. In addition to proximity of the 2 localities of occurrence, the level valleys in the region are heavily utilized for irrigated production of alfalfa and other agricultural crops. Mellott et al. (1987) suggested that forest-meadow ecotonal areas adjacent to alfalfa fields might be optimal habitat for this species at the Spanish Peaks Wildlife Area in southeast Colorado. Thus, these habitats could have favored the Mogollon vole and facilitated its dispersal to the La Plata River valley. It is also possible, however, that the Mogollon vole had historically occupied the La Plata River valley but had not been detected. With the exception of Mesa Verde, there has been very little systematic survey work of small mammals in the relatively arid, lower-elevation region south of the San Juan Mountains in southwestern Colorado. For example, studies of small mammals had not been conducted on the SJBRC prior to the initiation of the study in 1994. Thus, despite the possibility of a recent range expansion, the most parsimonious explanation is that the Mogollon vole is a historic component of the small mammal fauna of the La Plata River drainage. Morphologic and genetic data indicate that other populations that were suggested to have resulted from recent range expansion are highly diverged (Frey 1989, Frey unpublished data). These data support the hypothesis that many of the northern populations are

historic components of the local faunas (although they remained undetected until recently) and did not result from recent dispersal.

Although *Microtus mogollonensis* may represent a historical (but previously undetected) member of the small mammal community in the vicinity of the La Plata Valley, August 1998 was the first time it was captured in more than 4 years and 17,980 trap-nights of effort at the SJBRC. Periodic population fluctuations are common among most arvicoline rodents (Krebs 1966). However, little is known about population fluctuations in *M. mogollonensis*. The only published population study of this species occurred over a 2-year period in optimal habitat in the Sacramento Mountains, New Mexico, and resulted in population densities ranging from 10 to 50 ha⁻¹ (Conley 1976). In contrast, at SJBRC, population densities ranged from 0 to 0.86 ha⁻¹. Although specific studies of source-sink dynamics have not been investigated for this species, it has been observed to frequently appear and disappear at specific sites, particularly in marginal habitat (J.K. Frey personal observation). Thus, the initial failure to capture this species may not have been due to low population densities on the study site, but to the use of this study site as a sink during population peaks.

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