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GEOGRAPHIC RACES OF THE KANGAROO RAT,
*DIPODOMYS MICROPS*¹

By E. RAYMOND HALL and FREDERICK H. DALE

Dipodomys microps is a medium-sized, five-toed kangaroo rat of a color slightly darker than average for the genus. The species was named in 1904 by C. Hart Merriam, who at the same time named the race *levipes*. Subsequently, six other races were named, five by Goldman and one by Willet. Three new names are proposed in the present paper making a total of eleven named forms, all of which are here recognized as valid subspecies.

D. microps is typically a Great Basin species. Its range is sharply limited on the west by the Cascade-Sierra Nevada Mountain Chain, and on the east by the Wasatch Range and by mountains and elevated plateaus which extend on southward to the Colorado River. From about 43° north latitude in eastern Oregon and extreme western Idaho, and from a little south of the northern boundary of Nevada and Utah, it occurs southward to between 36° and 37° north. The Upper Sonoran Life-zone is the home of *microps*. In this zone it is to be looked for from the sagebrush belt down through the shadscale into the greasewood belt, rather than in the more elevated, timbered belt where pinyons and junipers grow. In these shrub-supporting areas, *microps*, although widely distributed, does not live as far out on alkaline lands

¹ Read at the 21st annual meeting of the American Society of Mammalogists held at the Louisiana State University and Agricultural and Mechanical College, University, Louisiana, April 3-7, 1939. This paper is a contribution from the University of California Museum of Vertebrate Zoology.

toward, for example, a true salt flat devoid of vegetation, as does *Dipodomys merriami*. Despite the zonal preference just noted, *microps* does occur in the Lower Sonoran Life-zone, as in Death Valley, California, and near Las Vegas, Nevada. At the other extreme we have found it just entering the pinyon-juniper belt. This was at Breen Creek in the Kawich Mountains of Nye County, Nevada. The elevation there is 7000 feet. Our only record of a higher occurrence is 7700 feet in Mazourka Canyon on the western side of the White Mountains in Inyo County, California. The opposite extreme is 91 feet below sea level at Salt Creek in Death Valley. Ninety per cent or more of the specimens available to us come from elevations of between 3500 and 6500 feet.

The southwestern part of the range of *microps* is shared with *Dipodomys deserti*, a much larger, lighter-colored animal with only four toes on the hind foot. In this same area and also entirely across the southern part of the range of *microps* one finds *Dipodomys merriami*, an animal smaller than *microps* and with only four toes on the hind foot. Along the western margin of its range, *microps* is sometimes taken in the same place as *Dipodomys leucogenys*, also a five-toed species of similar color. Most of the populations of *leucogenys* occur at elevations higher than those of *microps*. *D. leucogenys* is larger, and in our experience can always be distinguished from *microps* of the same region by its larger hind foot, which is more than 44 millimeters long. We have repeatedly taken together, on the same ground, *D. microps*, *D. merriami*, *D. deserti*, and *D. ordii*. The last-mentioned species occurs over all but the southwestern part of the range of *microps*. There *microps* is able to tolerate slightly lower zonal territory and pushes a few miles farther south than does *ordii*.

Compared with *ordii*, *microps* generally has the color darker, the dark ventral stripe on the tail extended all the way to the tip rather than terminated short of the tip, black stripes on tail wider than white stripes, lining of cheek pouches dusky rather than white, hind foot longer, interparietal and zygomatic arm of maxilla narrower, and upper incisors subequally, rather than equally grooved. Nevertheless, no one of these characters can be relied upon to distinguish between the two species at all localities. The similarity of the two animals probably explains why *microps* was unrecognized until as late as 1904. The difficulty of correctly identifying specimens is illustrated by the fact that several specimens, taken in recent years, were misidentified by mammalogists having special knowledge of the genus. In 1937, however, Mr. Lee W.

Arnold, when with a field party from the Museum of Vertebrate Zoology, found that he could readily distinguish the two species by the shape of the incisors in the lower jaw. In *microps* these teeth are flat on the anterior face and chisel-like, whereas in *ordii* they are rounded and awl-like (see fig. 1.).

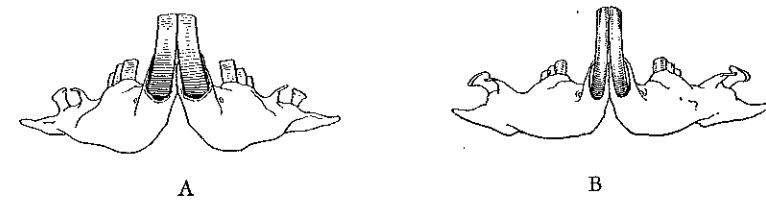


Fig. 1. Lower jaws, showing difference in shape of lower incisor teeth in two species of *Dipodomys*. A. *Dipodomys microps bonnevilliei*, ♀, adult, no. 45286, Mus. Vert. Zool., Kelton, Box Elder County, Utah. B. *Dipodomys ordii celeripes*, ♀, adult, no. 68062, Mus. Vert. Zool., Tecoma, Elko County, Nevada. Note the flat-faced, chisel-like incisors of *microps* as contrasted with the rounded, awl-like incisors in *ordii*. X 2.

When drafting statements about geographic variation, we took exceptional pains to compare only animals of like age, sex, and seasonal condition of pelage. We find evidence of only one molt a year, occurring in July, although in the extreme southern part of the range it may begin as early as the first week in June. We have no specimens taken earlier than May or later than October. Fresh, unworn pelage is superior to worn pelage for study of geographic variation in coat-color and color-pattern. Females are on the average smaller than males, but in any given population the average secondary sexual difference (males average about 69 grams and females 64 grams in *centralis*) is less than the difference ascribable to individual variation within one age-group of either sex. The measurements in table 1 indicate the degree of variation, both secondary sexual and individual.

Variation correlated with age is less, in the later stages of growth, than in many other genera of rodents. Even so, the shape of the skull changes somewhat after the adult pelage is acquired; for example, the oldest animals are wider across the maxillary processes of the zygomatic arches than are younger animals. Recognition of these changes led us to select for mensuration and comparison, from animals in adult pelage, only those which had reached, or passed, an advanced stage of growth, as determined by the following mentioned criteria: Bone firm and of

fine texture; cheek teeth worn generally to the enamel of the lingual side (young appear to have enamel-breaks at the sides, and the crown surfaces are angular rather than oval). It is to these animals and not to any of a lesser stage of development that we have applied the term adult. Sexual maturity is reached at an earlier stage of development, as is shown by pregnant females that retain part of the immature pelage.

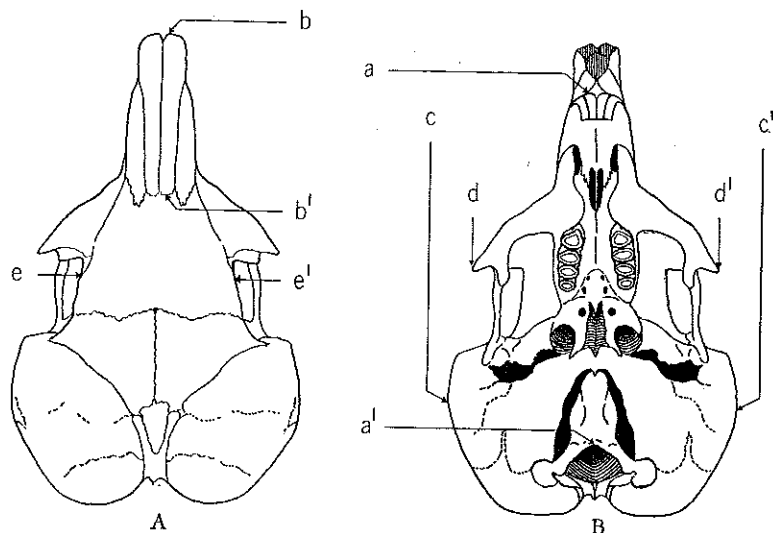


Fig. 2. A. Dorsal view and, B. ventral view, of the skull of *Dipodomys microps alfredi*, ♂, adult, no. 3002, Colo. Mus. Nat. Hist., from Gunnison Island, Box Elder County, Utah, to show points between which cranial measurements were taken. X 1-1/2.

Basal length, a-a'.

Length of nasal, b-b'.

Greatest breadth, c-c'.

Maxillary breadth, d-d'.

Interorbital breadth, e-e'.

The differences mentioned in the paragraph of comparisons for each subspecies, were determined by contrasting topotypes except where the races *aquilonius*, *occidentalis* and *bonnevillei* were involved, for which there were so few adult topotypes as to make the computed mean unreliable. For *aquilonius* the larger series of specimens from Hausen was used, the series from Sulphur for *occidentalis*, and the series from 13 miles north of Montello for *bonnevillei* when estimating the average size of the animal, or when comparing the shape of its skull with that of some other subspecies. For *preblei* so few adults were available that those from Narrows, Buena Vista, and Summer Lake were employed as

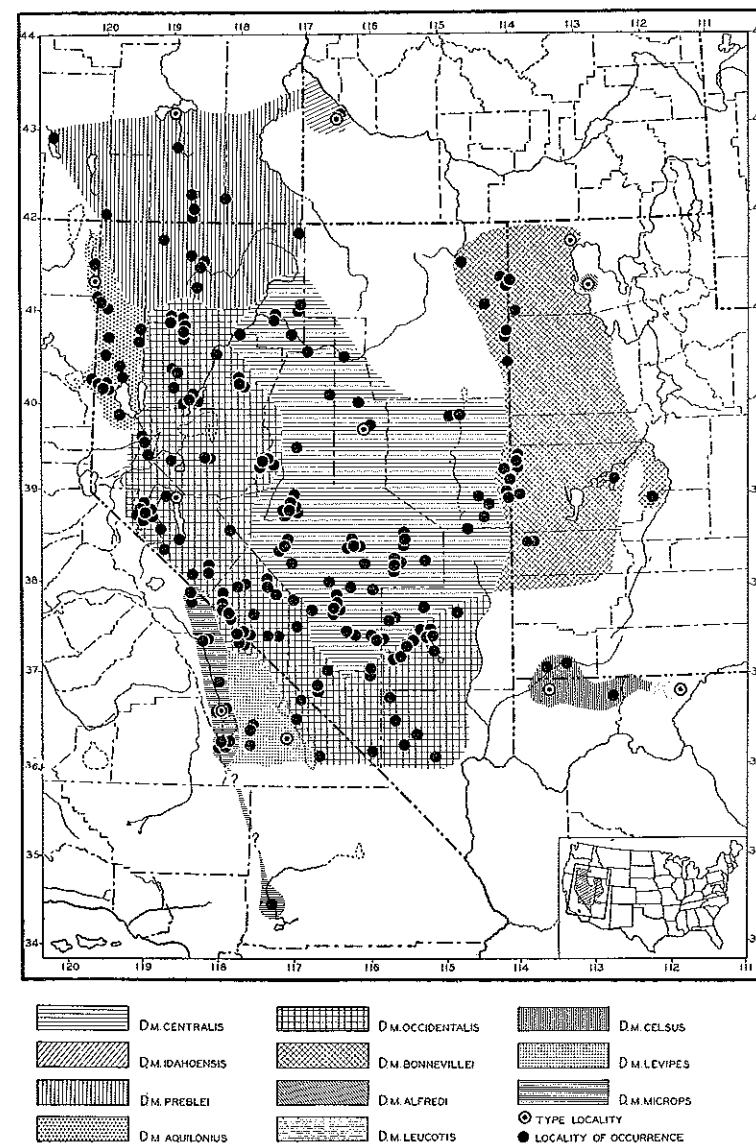


Fig. 3. Map to show the geographic distribution of subspecies of *Dipodomys microps*.

one series. In the mentioned comparisons, *larger*, *smaller*, *longer*, *shorter*, and similar terms refer to the average or mean. Two races are said to differ uniformly in a given measurement or other feature, when there is no overlap of individuals between the two series compared, but specimens from near the margin of the range of a subspecies often show resemblance to the next adjacent subspecies. Type specimens are skulls with skins.

Localities of occurrence in each state are listed by counties from north to south and in similar order within a county. Unless otherwise indicated, specimens are in the Museum of Vertebrate Zoology.

A total of 1149 specimens has been available for study. A few more than 900 of these are in the Museum of Vertebrate Zoology. For the opportunity to examine the remainder we are indebted to: Ray Alcorn, Fallon, Nevada; Alfred M. Bailey, Colorado Museum of Natural History; Stephen D. Durrant, University of Utah; Lynn C. Hayward, Brigham Young University; Hartley H. T. Jackson, United States Bureau of Biological Survey; Stanley G. Jewett, Portland, Oregon; and Adriaan J. van Rossem, Donald R. Dickey collections. Assistance with the preparation of materials used in this study is acknowledged to the Works Progress Administration (Official Project no. 465-03-3-192).

Dipodomys microps centralis new subspecies

Type.—Male, adult, no. 70817, Mus. Vert. Zool.; 4 mi. SE Romano, Diamond Valley, Eureka County, Nevada; June 3, 1936; collected by William B. Richardson; original no. 1621.

Range.—Central Nevada from the Humboldt River Valley south to Pahute Mesa; east from northeastern Pershing County, Reese River Valley, Great Smoky and Ralston valleys to Steptoe and Spring valleys.

Diagnosis.—Size: Medium (see measurements). Color: Dark; upper parts nearest (16" c) Cinnamon-Buff (capitalized color terms after Ridgway, Color Standards and Color Nomenclature, 1912), mixed with blackish; underparts, inside of hind legs and hind feet (soles excepted), fore legs and feet, upper lips, hip stripes, lateral stripes of tail and its superior base white; supraorbital spots and postauricular patches white with a few black hairs; vibrissae, arietiform facial markings, soles of hind feet, dorsal and ventral stripes of tail, and sometimes inside of cheek pouches, blackish. Skull: Medium sized, and of a shape "average" for the species (see measurements).

Comparisons.—Comparisons with the ten other races are made in the accounts of those forms.

Remarks.—In the southern part of its range *centralis* approaches *occidentalis* in color but otherwise agrees with topotypes. Specimens of *centralis* have long been referred to the race *levipes*. The two are similar, and differ, insofar as we

can see, only in the features mentioned under *comparisons* in the account of *levipes*. However, the ranges of these two races are separated by that of *occidentalis*, a light-colored animal. *D. m. centralis* occupies a central position geographically in the species, and its position as regards structure is similar. For example, it is neither the lightest nor darkest, and in size is larger than some races and smaller than others.

Specimens examined.—Total number 303, all from Nevada, as follows: *Humboldt County*: 18 mi. NE Iron Point, 4600 ft., 5; 16 mi. NE Iron Point, 4500 ft., 4; 5 mi. NE Golconda, 4; 2 mi. E Golconda, 2; 23 mi. NW Battle Mountain, 2. *Pershing County*: 15 mi. SW Winnemucca, 1. *Lander County*: 1 mi. E Battle Mountain, 2; 1-1/2 mi. NW Cortez, Cortez Mts., 4; Reese River Valley, 7 mi. N Austin, 2. *Eureka County*: 1/2 mi. S Beowawe, 3; Winzell, 1; 4 mi. S Romano, Diamond Valley, 3; 4 mi. SE Romano, Diamond Valley, 6. *Nye County*: 4 mi. N Millett, 5500 ft., 1; 2 mi. S Millett P. O., 5500 ft., 6; Ophir Creek, 6500 ft., 1; 4 mi. S Millett, 5500 ft., 2; 4 mi. SE Millett, 5500 ft., 3; 5 mi. S Millett, 5500-5700 ft., 3; South Twin River, 6500 ft., 28; 5 mi. SE Millett P. O., 5500 ft., 6; 11-1/2 mi. NE San Antonio, 5700 ft., 3; 4 to 5 3/4 mi. NE San Antonio, 5650-5700 ft., 4; San Antonio, 5400 ft., 1; Ralston Valley, 15-1/2 mi. NE Tonopah, 5800 ft., 18; Hot Creek Valley, 6-1/2 mi. N Hot Creek, 5900 ft., 2; Hot Creek Valley, 1/4 mi. W Hot Creek, 5900 ft., 3; Hot Creek Valley, 4/5 mi. E Hot Creek, 6000 ft., 3; Hot Creek Valley, 3-1/2 mi. E Hot Creek, 5650 ft., 9; S end Hot Creek Valley, 2-1/2 mi. E X N Twin Spring, 5400 ft., 5; Ralston Valley, 34 mi. E and 1 mi. N Tonopah, 5650 ft., 15; N end Reveille Valley, Old Mill, 6200 ft., 14; Railroad Valley, 2-1/2 mi. S Lock's Ranch, 5000 ft., 9; Railroad Valley, 3-1/4 mi. S Lock's Ranch, 5000 ft., 1; Railroad Valley, 9 mi. S Lock's Ranch, 5000 ft., 4; Railroad Valley, 12-1/2 mi. S Lock's Ranch, Able Spring, 5000 ft., 1; Railroad Valley, 2 mi. N Nyala, 5100 ft., 3; Railroad Valley, 2 mi. NE Nyala, 5100 ft., 9; Railroad Valley, Nyala, 5100 ft., 6; Railroad Valley, 3 mi. S Nyala, 5600 ft., 1; White River Valley, 15 mi. WSW Sunnyside, 5500 ft., 2; Railroad Valley, 9-1/2 mi. E New Reveille, 5100 ft., 3; 1 mi. SW Cactus Spring, Cactus Range, 1; Breen Creek, 7000 ft., Kawich Range, 8; 1-1/2 mi. S Silverbow, 6450 ft., Kawich Mts., 2; 2 mi. S Silverbow, 6400 ft., Kawich Mts., 3; 3-2/5 mi. S Silverbow, 6200 ft., Kawich Mts., 1; 5-1/2 mi. SW Silverbow, 6000 ft., Kawich Mts., 7; Cactus Flat, 6000 ft., 5 mi. SW Silverbow, 1; Cactus Flat, 5750 ft., 6-1/2 mi. SW Silverbow, 2; Gold Flat, 5200 ft., 5 mi. W Kawich P. O., 1; Gold Flat, 5100 ft., 6 mi. SW Kawich P. O., 3; 4-1/2 mi. NW Indian Spring, 5700 ft., Kawich Valley, 3; Kawich Valley, 5400 ft., 5 mi. SE Kawich P. O., 4; 2-1/2 mi. NW Indian Spring, 6200 ft., Belted Range, 1; 8 mi. NE Wheelbarrow Peak, 1; 9 mi. E Wheelbarrow Peak, 2. *White Pine County*: Cherry Creek, 6600 ft., 2; 5 mi. SE Greens Ranch, Steptoe Valley, 5900 ft., 2; 7 mi. SW Osceola, Spring Valley, 6100 ft., 9; R. 67 E, T. 12 N, 5-1/2 mi. NW Shoshone P. O., 6100 ft., 2; Spring Valley, 4 mi. S Shoshone, 5900 ft., 1. *Lincoln County*: Duck Valley, 3 mi. S Geyser, 6050 ft., 1; Coal Valley, 10 mi. N Seeman Pass, 4650 ft., 5; Penoyer Valley, 17 mi. N Groom Baldy, 10; Penoyer Valley, 14 mi. NNW Groom Baldy, 2; 9 mi. W Groom Baldy, 5500 ft., 22.

Dipodomys microps idahoensis new subspecies

Type.—Male, adult, no. 67568, Mus. Vert. Zool.; 5 mi. SE Murphy, Owyhee County, Idaho; May 26, 1935; collected by Howard Twining; original no. 39.

Range.—Known only from northern Owyhee County, Idaho.

Diagnosis.—Size: Medium (see measurements); body short, tail long. Color: About as in *centralis* but less blackish with dark ventral tail stripe brownish rather than blackish. Skull: Medium sized; actually, and especially relatively,

broad in interorbital region and across maxillary processes; maxillary breadth averaging 85 (84-87) per cent of breadth across bullae.

Comparisons.—Compared with *centralis*, *idaboensis* differs as follows: Body shorter, and total length less; skull broader, relatively as well as actually, especially in the maxillary region. Compared with *bonnevillei* from eastern Elko County, *idaboensis* differs in: Body shorter; tail actually and relatively longer; color darker; skull broader interorbitally and across maxillary processes, especially relative to length of skull and to width across bullae. From *preblei*, *idaboensis* differs in: Body slightly shorter; color darker; skull larger in all measurements taken, and relatively as well as actually broader. From *aquilonius*, *idaboensis* differs as follows: Body shorter; color lighter; skull larger in every measurement taken except breadth of nasals distally; relatively broader in maxillary region (maxillary breadth 85.4 per cent as opposed to only 80 per cent of greatest breadth across bullae).

Remarks.—The range of this relatively dark-colored, short-bodied, broad-skulled form probably is more extensive than our records of occurrence show. Actual intergrades are lacking, but the intermediate nature of *preblei*, in length of body and breadth of skull, as between *idaboensis* and *aquilonius*, indicates for *idaboensis* only subspecific rank.

Specimens examined.—Total number, 6, all from Idaho. Owyhee County: 5 mi. SE Murphy, 4; 10 mi. E Murphy, Quintana Ranch, Sinker Creek, 2 (coll. S. G. Jewett).

Dipodomys microps preblei (Goldman)

1921. *Perodipus microps preblei* Goldman, Jour. Mammalogy, vol. 2, p. 233. November 29, 1921.

Type.—Female, adult, no. 79340, U. S. Nat. Mus., Biol. Surv. coll.; Narrows, Malheur Lake, Harney County, Oregon; July 23, 1896; collected by E. A. Preble; original no. 1201 (after Goldman, orig. descr.; type not seen by us).

Range.—Southeastern Oregon and northern Humboldt County, Nevada; south from Narrows, Oregon, to 17 miles south of Quinn River Crossing, Nevada; east from Summer Lake, Oregon, to Owyhee River, Oregon.

Diagnosis.—Size: Medium, except that body is short (see measurements). Color: About as in *centralis* but less blackish and more cinnamon on sides with dark tail stripes brownish rather than blackish. Skull: Small, but relatively broad interorbitally.

Comparisons.—From *centralis*, *preblei* differs as follows: Body shorter; color darker; skull smaller in all measurements taken except interorbital breadth and breadth of nasals. For comparison with *idaboensis*, see account of that form. From *aquilonius*, *preblei* differs as follows: Color lighter; body and hind foot shorter; nasals relatively longer; maxillary breadth actually greater and especially greater relative to greatest breadth of skull and to basal length. From *occidentalis*, *preblei* differs as follows: Color darker; skull relatively narrower across bullae but relatively as well as actually broader interorbitally; relative to greatest breadth, maxillary breadth greater.

Remarks.—There are still too few adult specimens of *preblei* to give an accurate measure of its characters. Evidences of intergradation with more southern races

are furnished by specimens from Lake Alvord. In these, the breadth across the maxillary processes of the zygomatic arches amounts to only 80.6 per cent of the greatest breadth across the auditory bullae. In this character the specimens are more nearly like *aquilonius* and *occidentalis*. Specimens from Quinn River Crossing, although referable to *preblei*, resemble *aquilonius* and *centralis* in longer hind foot, greater basal length of skull and greater breadth across tympanic bullae.

The single specimen from 36 miles northeast of Paradise Valley, Nevada, is too young to display fully the characters relied upon in differentiating *preblei*. Adult specimens from there might prove to be referable to some other subspecies.

Specimens examined.—Total number, 45, as follows:

Oregon. *Lake County:* Summer Lake, 1 (U. S. Nat. Mus., Biol. Surv. coll.); 8 mi. S Adel, E of mouth of Twenty Mile Creek, 1. *Harney County:* Narrows, 6 (U. S. Nat. Mus., Biol. Surv. coll.); Buena Vista [=Blitzen Valley, 25 mi. S Narrows, 4300 ft.], 1 (S. G. Jewett Jr. coll.); Lake Alvord, 2; 2 mi. S Borax Spring, 4300 ft., S end Lake Alvord, 6; White Horse Sink, 1 (U. S. Nat. Mus., Biol. Surv. coll.); White Horse Creek, 1 (U. S. Nat. Mus., Biol. Surv. coll.); Tum Tum Lake, 2 (U. S. Nat. Mus., Biol. Surv. coll.); ½ mi. E Denio, 4200 ft., 2.

Nevada. *Humboldt County:* Virgin Valley, 1; Big Creek Ranch, base of Pine Forest Mts., 1; 1-½ mi. N Quinn River Crossing, 4100 ft., 6; Quinn River Crossing, 7; 2 mi. SW Quinn River Crossing, 4000 ft., 1; 2-½ mi. SW Quinn River Crossing, 4100 ft., 1; Jackson Creek Ranch, 4000 ft., 17-½ mi. S and 5 mi. W Quinn River Crossing, 4; 36 mi. NE Paradise Valley, 5500 ft., 1.

Dipodomys microps aquilonius Willett

1935. *Dipodomys microps aquilonius* Willett, Jour. Mammalogy, vol. 16, p. 63. February 14, 1935.

Type.—Female, adult, no. 3935, Los Angeles Mus.; 3 mi. E Eagleville, Modoc County, California; June 4, 1934; collected by G. Willett (after Willett, orig. descr.; type not seen by us).

Range.—Washoe County, Nevada, and extreme eastern California from Surprise Valley south to near the south end of Pyramid Lake, Nevada.

Diagnosis.—Size: Medium (see measurements). Color: Dark; upper parts heavily mixed with blackish, which is present in maximum degree for the species throughout the dark-colored areas. Skull: Medium sized; relatively narrow across the maxillary processes and broad interorbitally.

Comparisons.—From *centralis*, *aquilonius* differs in darker color and narrower skull. For comparisons with *idaboensis* and *preblei* see accounts of those forms. From *occidentalis*, *aquilonius* differs in: Color darker; body averages longer; weight greater; skull broader interorbitally.

Remarks.—*D. m. aquilonius* is a long-bodied form but its range is separated from those of the other long-bodied forms by the ranges of the shorter-bodied *occidentalis* and *preblei*. The dark color of *aquilonius* is especially distinctive in comparison with the adjoining light-colored race, *occidentalis*. *D. m. aquilonius* is darker also than *preblei*. Cotypes of *aquilonius* are paler than other specimens, possibly as a result of preservation for a time in a salt-alum-pickle solution.

Specimens examined.—Total number, 49, as follows:

California. *Modoc County*: 6 mi. E Cedarville, 4500 ft., 1; 4 mi. E Eagleville, 6. *Lassen County*: Warm Spring, 4000 ft., 9 mi. E Amedee, 4; 1 mi. SW Warm Spring, 4000 ft., 1.

Nevada. *Washoe County*: 1 mi. W Hausen, 5650 ft., 2; Hausen, 4800 ft., 1; 2-1/2 mi. SE Hausen, 5200 ft., 3; 10 mi. SE Hausen, 4675 ft., 2; 3 mi. E and 10 mi. N Gerlach, 4000 ft., 2; Granite Creek, 1 (U. S. Nat. Mus., Biol. Surv. coll.); 17-1/2 mi. W Deephole, 4750 ft., 1; 1 mi. NE Gerlach, 4000 ft., 2; Smoke Creek, 9 mi. E Calif. Line, 3900 ft., 7; 4 mi. NW Pahrum Peak, 4200 ft., 2; Fox Canyon, 6 mi. S Pahrum Peak, 4800 ft., 5; 3-1/2 mi. NW Flanigan, 4200 ft., 1; 3-1/2 mi. NE Flanigan, 4200 ft., 1; 1/2 mi. NW Flanigan, 4200 ft., 1; 2-1/2 mi. E Flanigan, 4200 ft., 2; 3-1/2 mi. E Flanigan, 4200 ft., 2; 2-3/4 mi. SW Pyramid, 4300 ft., 2.

Dipodomys microps occidentalis new subspecies

Type.—Female, adult, no. 64119, Mus. Vert. Zool.; 3 mi. S Schurz, 4100 ft., Mineral County, Nevada; July 8, 1934; collected by E. Raymond Hall; original no. 4158.

Range.—Western and southern Nevada, and eastern California in Mono and Inyo counties; south from southern Humboldt County, Nevada, to Death Valley, California, and Las Vegas, Nevada; east from the Black Rock Desert, Sierra Nevada, White Mountains and Death Valley, to Smiths Creek Valley, Lander County, Mud Lake, Nye County, thence east (south of Pahute Mesa) to a point 21 miles west of Panaca, in Desert Valley.

Diagnosis.—Size: Small (see measurements); body short. Color: Pale, less blackish in upper parts and arietiform facial markings more restricted than in *centralis*; darkest areas brownish as opposed to blackish. Skull: Small.

Comparisons.—Compared with *centralis*, *occidentalis* differs as follows: External measurements less; color lighter; skull smaller, and relatively narrower across bullae and maxillary processes. For comparisons with *preblei*, *aquilinus*, *levipes* and *microps* see accounts of those forms. From *bonnevillei*, *occidentalis* differs as follows: Body shorter; all cranial measurements less except breadth of nasals in females and interorbital breadth in both sexes, which last averages relatively greater. From *celsus*, *occidentalis* differs in: External measurements smaller; weight a fourth (24 per cent) less in males and a fifth (18 per cent) less in females; color lighter; skull smaller in all measurements taken, with uniformly shorter nasals; nasals relatively as well as actually shorter.

Remarks.—In the northern part of its range specimens of *occidentalis* average larger and darker than in the vicinity of the type locality. Intergradation with *centralis* is shown by the animals from Smiths Creek Valley, which in the sum total of their characters are only a little nearer *occidentalis* than *centralis*. This was surprising to us because on geographic grounds we had expected they would agree with *centralis*.

The animals from Greenwater may be regarded as intergrades with *levipes* because of the long nasals and great total length. In certain proportions, namely, long tail and interorbital breadth, these specimens are even larger than *levipes* and are suggestive of *celsus*. These and most of the other specimens referred to *occidentalis* from southern Nevada, south of the range of *centralis*, though light in color, have long bodies suggestive of *celsus*, *bonnevillei* and *centralis*.

Specimens examined.—Total number, 425, as follows:

California. *Mono County*: 1/2 mi. W Oasis, 5100 ft., 2 (D. R. Dickey coll.); 1/2 to 4 mi. SE Oasis, 5035 to 5200 ft., 25 (D. R. Dickey coll.); 4-1/2 mi. SE Oasis, 5300 ft., 1. *Inyo County*: Northern end Deep Spring Valley, 5300 ft., 13 (D. R. Dickey coll.); middle of Deep Spring Valley, 5100 ft., 12 (D. R. Dickey coll.); E side Spring Valley, 5000 ft., 13 (D. R. Dickey coll.); Daylight Spring, Grapevine Mts., 4300 ft., 1; Salt Creek, NW arm Death Valley, 91 ft. below sea level, 1 (D. R. Dickey coll.); 2 mi. E Greenwater, 3900 ft., 17 (D. R. Dickey coll.).

Nevada. *Washoe County*: 1-1/2 mi. N Wadsworth, 4100 ft., 2. *Lyon County*: 1/2 mi. SE Wadsworth, 4200 ft., 1; 3-1/2 mi. W Hazen, 4200-4250 ft., 9; 4 mi. W Hazen, 4250 ft., 6; West Walker River, 6 mi. S Yerington, 4500 ft., 1; West Walker River, Smiths Valley, 4700 ft., 1; 11-3/4 mi. S and 2-3/4 mi. E Yerington, 4650 ft., Mason Valley, 2; 12 mi. S Yerington, 4600 ft., W Walker River, 2; Smiths Valley, 7-1/2 mi. NE Wellington, 4900 ft., 1; Mason Valley, 12 mi. E Wellington, 5000 ft., 2. *Humboldt County*: 9-1/2 mi. N Sulphur, 4050 ft., 2; 1-1/4 mi. N Sulphur, 4050 ft., 2; 1 mi. W Sulphur, 4040 ft., 3; 3/4 mi. S Sulphur, 4050 ft., 1. *Pershing County*: 10 mi. W and 6 mi. N Sulphur, 4000 ft., 1; 8 mi. S Sulphur, 4350 ft., 8; 1 mi. W Humboldt, 4180 ft., 7; 3 mi. SW Vernon, 4300 ft., 3; 2-1/2 mi. S Vernon, 4250 ft., 1; 3 mi. S Vernon, 4250 ft., 12; 21 mi. W and 2 mi. N Lovelock, 4000 ft., 9; 3 mi. NNE Toulon, 3900 ft., 3; 1-1/2 mi. NE Toulon, 3900 ft., 2; 3-1/2 mi. NE Toulon, 3950 ft., 6; 3-1/2 mi. W Toulon, 4500 ft., 3; 2 mi. W Toulon, 4300 ft., 12; 1 mi. W Toulon, 4000 ft., 1; Toulon, 3930 ft., 1; 3 mi. E Toulon, 3900 ft., 1; 9 mi. E Fanning, 4100 ft., 7; 9-1/2 mi. E and 1 mi. S Fanning, 4100 ft., 7; 10 mi. E and 3 mi. S Fanning, 4100 ft., 2; S slope Granite Peak, East Range, 1. *Churchill County*: 7 and 8 mi. SW Fallon, 2 (coll. Ray Alcorn); 1 mi. W Mountain Well, 5350 ft., 1; Mountain Well, 5600 ft., 1. *Mineral County*: 7 mi. NW Schurz, 4500 ft., 3; 3 mi. S Schurz, 4100 ft., 11; Mason Valley, 5 mi. N Pine Grove, 5300 ft., 3; E Walker River, 5100 ft., 2 mi. NW Morgans Ranch, 1; Cat Creek, 4500 ft., 4 mi. W Hawthorne, 3; Fletcher, 6098 ft., 1; Fingerrock Wash, 5400 ft., Stewart Valley, 1; Marietta, 4900 ft., 2; S side Teals Marsh, 4900 ft., 2; Huntton Valley, 5700 ft., 6. *Esmeralda County*: 7 mi. N Arlemont, 5500 ft., 5; 1-1/2 mi. N Chiatovich Ranch, 4900 ft., 2; 2-1/2 mi. N Dyer, 4850 ft., 6; Fish Lake, 4900 ft., 1; 2 mi. SE Dyer, 4800 ft., 3; 2-1/2 mi. SE Dyer, 4950 ft., 3; 2-1/2 mi. NW Blair Junction, 4950 ft., 1; 4 mi. SE Coaldale, 4850 ft., 1; 5 mi. SE Silver Peak, 4500 ft., 1; R. 38 E, T. 6 S, 5300 ft., 3; 1 mi. NW Palmetto, 5 (D. R. Dickey coll.); 2 mi. E Lida, 1 (D. R. Dickey coll.); 4-1/2 mi. E Lida, 2 (D. R. Dickey coll.); 8 mi. E Lida, 2 (D. R. Dickey coll.); 10 mi. E Lida, 5 (D. R. Dickey coll.); 1-1/2 mi. W Millers Wells, 4800 ft., 1; Lone Mt., 12-1/2 mi. W and 2-1/2 mi. S Tonopah, 6600 ft., 1; 13-1/2 mi. NW Goldfield, 4850 ft., 3. *Lander County*: 6 mi. ENE Smiths Creek Ranch, 5500 ft., 2; 2-1/2 mi. NE Smiths Creek Ranch, 5800 ft., 2; Smiths Creek Valley, 5550 ft., 2 mi. W Railroad Pass, 10; Smiths Creek Valley, 5550 ft., 3 mi. W Railroad Pass, 1; Smiths Creek, 5800 ft., 1. *Nye County*: N shore Mud Lake, 5300 ft., S end Ralston Valley, 4; Stonewall Flat, 4700 ft., 14 mi. SE Goldfield, 2; 8-1/2 mi. NE Springdale, 4250 ft., 1; Amargosa River, 3-1/2 mi. NE Beatty, 3400 ft., 2; 1 mi. N Beatty, 23 (D. R. Dickey coll.); 4-1/2 mi. SE Oak Spring, 4500-4750 ft., 3; Emigrant Valley, 9-1/2 mi. S Oak Spring, 4400 ft., 5; 1-1/2 mi. N Pahrum, 3 (D. R. Dickey coll.). *Lincoln County*: Desert Valley, 5300 ft., 21 mi. W Panaca, 3; 9-1/5 mi. NW Crystal Spring, 4800 ft., Pahranaagat Valley, 1; 3 mi. N Crystal Spring, 4000 ft., Pahranaagat Valley, 1; 1-2/5 mi. W Crystal Spring, Pahranaagat Valley, 6; Crystal Spring, 4000 ft., Pahranaagat Valley, 6; 1/4 mi. E Crystal Spring, 4000 ft., Pahranaagat Valley, 5; 1/2 mi. E Crystal Spring, 4000 ft., Pahranaagat Valley, 1; 16 mi. E Groom Baldy, 4600 ft., 5; Desert Valley, 8 mi. SW Hancock Summit, 5200-5300 ft., 10; Alamo, 3570 ft., 3; 5-1/2 mi. N Summit Spring, 4700 ft., 1; 5 mi. N Summit Spring, 4700 ft., 1; 14-1/2 mi. S Groom Baldy, 3; 15 mi. S Groom Baldy, 3. *Clark County*: Indian Spring Valley, 14 mi. N Indian Springs, 3100 ft., 1; Indian Springs, 9 (D. R.

Dickey coll.); Corn Creek Station, 23 mi. NW Las Vegas, 6 (D. R. Dickey coll.); Kyle Canyon, 4500 ft., Charleston Mts., 8 (D. R. Dickey coll.); 4 mi. NW Las Vegas, 3 (D. R. Dickey coll.).

Dipodomys microps bonnevilliei Goldman

1937. *Dipodomys microps bonnevilliei* Goldman, Proc. Biol. Soc. Washington, vol. 50, p. 222. December 28, 1937.

Type.—Female, adult, no. 31894/43755, U. S. Nat. Mus., Biol. Surv. coll.; Kelton, about 4300 ft., Box Elder County, Utah; November 7, 1891; collected by Vernon Bailey; original no. 3490 (after Goldman, orig. descr.; type not seen by us).

Range.—Western Utah and eastern Nevada; south from Kelton, Box Elder County, to Pine Valley, Millard County, Utah.

Diagnosis.—Size: Medium (see measurements) but hind foot short. Color: Pale, less blackish in upper parts and arietiform facial markings less extensive than in *centralis*; darkest areas brownish as opposed to blackish. Skull: Large and of a shape average for the species (see measurements).

Comparisons.—From *centralis*, *bonnevilliei* differs as follows: Hind foot shorter; color lighter; interorbital region narrower. From *celsus*, *bonnevilliei* differs in: External measurements less; color lighter; skull smaller in all parts measured; nasals relatively as well as actually shorter; upper incisors wider at tips. For comparisons with *idahoensis*, *occidentalis*, *alfredi* and *leucotis* see accounts of those forms.

Remarks.—This light-colored race is best known from large series of specimens along the northern half of the Nevada-Utah border. Animals from the type locality, which place is the northeasternmost record-station of occurrence for the whole species, are darker than average for the race. The same is true of the single specimen seen from Aurora. Its color, nevertheless, is nearer that of *bonnevilliei* than that of *celsus* or *leucotis*, to which it shows no approach in other features. *D. m. bonnevilliei* contrasts sharply in color with the darker, especially more reddish races, *celsus* and *leucotis*. The range of *bonnevilliei* corresponds closely to the former outline of the Pleistocene Lake Bonneville.

Specimens examined.—Total number, 140, as follows:

Nevada. *Elko County*: 15 mi. S Contact, 5800 ft., 7; 13 mi. N Montello, 5000 ft., 16; 1-1/2 mi. NE Tecoma, 4900 ft., 2; Tecoma, 4900 ft., 7; Cobre, 6100 ft., 4; 3 mi. S Wendover, Utah, 4250 ft., 4; 8 mi. S Wendover, Utah, 4700 ft., 16; Salt Springs, 4200 ft., 1. *White Pine County*: 2 mi. W Smith Creek Cave, Mt. Moriah, 6300 ft., 1; near Smith Creek Cave, Mt. Moriah, 5500 ft., 1; Hendry Creek, 8 mi. SE Mt. Moriah, 6200 ft., 1; 1 mi. N Baker, 15; 2-1/2 mi. E Baker, 5700 ft., 1.

Utah. *Box Elder County*: Kelton, 4225 ft., 10 (3 U. S. Nat. Mus.); Utah-Nevada Line, E side Ta[=e]coma Range [= 1/4 mi. N Pilot Peak], 1 (Univ. Utah Dept. Zool.). *Millard County*: 1 mi. SE Gandy, 5000 ft., 2; 4 mi. S Gandy, 5000 ft., 2; Smith Creek, 5400 ft., 6 mi. S Gandy, 7; 5 mi. S Garrison, 5400 ft., 1; 2 mi. E Clear Lake, 4600 ft., 1 (Univ. Utah Dept. Zool.); Warm Cove, 5500 ft., 55 mi. W Milford [= Sec. 35, T. 25 S, R. 18 W, Salt Lake Base Meridian] 6 (Univ. Utah Dept. Zool.); Pine Valley, 5000 ft., 50 mi. W Milford [= Sec. 33, T. 25 S, R. 17 W, Salt Lake Base Meridian], 11 (7 Univ. Utah Dept. Zool.; 4 B.Y.U. Dept. Zool.). *Sevier County*: Aurora, 1 (B.Y.U. Dept. Zool.).

Dipodomys microps alfredi Goldman

1937. *Dipodomys microps alfredi* Goldman, Proc. Biol. Soc. Washington, vol. 50, p. 221. December 28, 1937.

Type.—Female, adult, no. 262846, U. S. Nat. Mus., Biol. Surv. coll.; Gunnison Island, 4300 ft., Great Salt Lake, Box Elder County, Utah; June 1, 1937; collected by Alfred M. Bailey and Robert J. Niedrach; original no. in Colorado Mus. Nat. Hist., 2994 (after Goldman, orig. descr.; type not seen by us).

Range.—Confined to Gunnison Island, Great Salt Lake, Utah.

Diagnosis.—Size: Large (see measurements); hind foot large. Color: Pale; upper parts less blackish than in *centralis* and dark brownish as opposed to blackish. Skull: Large; straight or dorsally convex in the nasofrontal region; upper incisors extremely broad; broad across maxillary processes.

Comparisons.—Compared with *centralis*, *bonnevilliei* and *leucotis*, *alfredi* is larger in all external and cranial measurements taken, and the breadth across the maxillary processes is greater, relative to the breadth across the bullae. The color is darker than in *bonnevilliei* and lighter than in *centralis* and *leucotis*. Also, the nasals, relative to the basal length, are shorter than in *leucotis*. From *celsus*, *alfredi* differs as follows: External measurements larger, especially hind foot; color lighter; length of nasals and breadth across bullae actually less; and also less relative to length of skull; other cranial measurements, especially basal length, greater; breadth across maxillary processes 87 per cent rather than 83 per cent of greatest breadth across bullae.

Remarks.—Individuals of this insular race are the largest in the species. The orbit is relatively short. This is correlated with the marked extension anteriorly of the auditory bullae.

Specimens examined.—Total number, 11, all from the type locality, and preserved in the Colorado Museum of Natural History.

Dipodomys microps leucotis Goldman

1931. *Dipodomys microps leucotis* Goldman, Proc. Biol. Soc. Washington, vol. 44, p. 135. October 17, 1931.

Type.—Male, adult, no. 250036, U. S. Nat. Mus., Biol. Surv. coll.; 6 mi. W Colorado River Bridge, Houserock Valley, about 3700 ft., N side of Marble Canyon of Colorado River, Coconino County, Arizona; June 8, 1931; collected by E. A. Goldman; original no. 23570 (after Goldman, orig. descr.; type not seen by us).

Range.—Known only from the type locality.

Diagnosis.—Size: Large (see measurements). Color: Upper parts with more reddish or cinnamon and less blackish than in *centralis*. Skull: Medium sized.

Comparisons.—From *centralis*, *leucotis* differs in the more reddish or cinnamon color of the upper parts and relatively narrower skull, especially as measured across the auditory bullae. In comparison with *bonnevilliei* the same narrowness of skull is evident, and *leucotis* is darker colored. From *celsus*, *leucotis* differs in that every external and cranial measurement taken averages slightly less, and that the skull is relatively narrower across the bullae.

Remarks.—This southeasternmost population of the species resembles *celsus*

in color but approaches Pinkish Cinnamon rather than Cinnamon.

Specimens examined.—Total number, 24, all from the type locality.

Dipodomys microps celsus Goldman

1924. *Dipodomys microps celsus* Goldman, Jour. Washington Acad. Sci., vol. 14, p. 373. September 19, 1924.

Type.—Male, adult, no. 243093, U. S. Nat. Mus., Biol. Surv. coll.; 6 mi. N Wolf Hole, 3500 ft., Mohave County, Arizona; October 16, 1922; collected by E. A. Goldman; original no. 23384 (after Goldman, orig. descr.; type not seen by us).

Range.—Southwestern Utah from along the Virgin River and northwestern Arizona north of the Colorado River; east to Kanab Creek.

Diagnosis.—Size: Large (see measurements). Color: Dark; in upper parts blackish about as in *centralis* with admixture of more reddish or cinnamon. Skull: Large.

Comparisons.—From *centralis*, *celsus* differs in: External measurements greater; weight one fifth more; color of upper parts with more reddish or cinnamon; larger in all cranial measurements taken, but skull narrower relative to basal length. For comparison with *occidentalis*, *bonnevillei*, *alfredi*, and *leucotis* see accounts of those forms.

Remarks.—This large, strongly reddish race probably has a relatively small range; rats of this species have been sought in vain nearby in Nevada along the Meadow Valley Wash and the Virgin River.

Specimens examined.—Total number, 30, as follows:

Utah. Washington County: Gould's Ranch, Hurricane, 1; St. George, 2850 to 3300 ft., 6.

Arizona. Mohave County: 10 mi. N Wolf Hole, 3800 ft., 18; Kanab Wash, S Boundary Kaibab Indian Reservation, 2; near S Boundary Kaibab Indian Reservation, 3.

Dipodomys microps levipes (Merriam)

1904. *Perodipus microps levipes* Merriam, Proc. Biol. Soc. Washington, vol. 17, p. 145. July 14, 1904.

Type.—Male, adult, no. 27176/34575, U. S. Nat. Mus., Biol. Surv. coll.; "Perognathus Flat, Emigrant Gap" [according to Grinnell, Univ. Calif. Publ. Zool., vol. 24, p. 105, 1922, this place is "near B. M. 4899, two miles northwest of Harrisburg, on U. S. G. S. Ballarat Quadrangle, edition of March, 1913"], Panamint Mountains, [Inyo County], California; April 16, 1891; collected by Vernon Bailey, original no. 2668 (after Merriam, orig. descr.; type not seen by us).

Range.—In Inyo County, California, from the Panamint Mountains west to Darwin.

Diagnosis.—Size: Medium (see measurements); body long. Color: More reddish or cinnamon than *centralis* with arietiform markings lighter over nose. Skull: Medium sized but narrow.

Comparisons.—Compared with topotypes of *centralis*, *levipes* differs as follows: Color more reddish (see under diagnosis); skull slightly longer but actually and relatively narrower in all measurements taken of its breadth. From *occiden-*

talis, *levipes* differs in: External measurements greater, especially length of body; weight a fourth more in males and a fifth more in females; skull larger in all measurements taken, except breadth of nasals and interorbital breadth which are about the same in the two forms, but skull relatively narrower. For comparison with *microps* see account of that form.

Remarks.—The name *levipes* has been widely applied to animals of the species *microps*. Its application was restricted by the naming of marginal races along the northern and eastern borders of the range of the species, and now with the recognition of the races *centralis* and *occidentalis* the name *levipes* is restricted to populations in central Inyo County, California, between Owens and Death valleys.

Specimens examined.—Total number, 53, all from Inyo County, California, as follows: 15 mi. N Darwin, 5200 to 5300 ft., 25; near Lee Mine, 12 mi. N Darwin, 5200 ft., 1; Darwin, 4800 ft., 5; Emigrant Canyon, 4900 ft., 22.

Dipodomys microps microps (Merriam)

1904. *Perodipus microps* Merriam, Proc. Biol. Soc. Washington, vol. 17, p. 145. July 14, 1904.

Type.—Male, adult, no. 25288/32701, U. S. Nat. Mus., Biol. Surv. coll., Lone Pine, Owens Valley, Inyo County, California; December 22, 1890; collected by E. W. Nelson, original no. 138 (after Merriam, orig. descr.; type not seen by us).

Range.—Owens Valley, California, from 5 miles north of Benton Station south to vicinity of Olancho; occurs also at Victorville, California.

Diagnosis.—Size: Small (see measurements). Color: Pale, extreme for the species in this respect; dark markings brown rather than blackish; dark arietiform facial markings brown rather than blackish. Skull: Small, relatively narrow with relatively long nasals.

Comparisons.—Selected differences, in comparison with *centralis*, are: Size less; color paler, with area of light markings increased at expense of dark markings; dark markings brownish rather than blackish; skull actually smaller throughout and relatively narrower across bullae; relatively broader interorbitally and across maxillary processes. Differences from *levipes*, additional to those indicated in the diagnoses, include: Size less throughout; area of dark arietiform facial markings less; lateral white tail-stripes actually broader, and area of other white markings increased at expense of dark markings; upper incisors more recurved and with relatively smaller occlusal areas. From *occidentalis*, *microps* differs in: Size slightly less; color slightly paler; skull smaller, relatively as well as actually narrower; nasals relatively longer; maxillary breadth 86 per cent as opposed to 81 per cent of breadth across bullae.

Remarks.—*D. m. microps* is a strongly marked race. Its differential characters are maintained over a long distance, from Olancho, Inyo County, northward up Owens Valley, about 100 miles to a point 5 miles north of Benton Station. It is true that the skulls of the animals from near Benton Station average slightly larger than those of topotypes, but the light color and small size otherwise are essentially as in the more southern populations of *microps*.

We doubt that intergradation occurs between *microps* and *occidentalis* at the head of Owens Valley; territory there may not support rats of the species *microps* but only *Dipodomys leucogenys*. At the southeastern part of the range, intergradation with *levipes* is indicated by specimens from the vicinity of Olancha, and from Darwin. Those from Darwin are referred to *levipes* and the others to *microps*. Six of the specimens from Victorville are in juvenile pelage. The reference of this population to the subspecies *microps* is made on the basis of small size and light color of the one adult, which has a broken skull.

Specimens examined.—Total number, 63, all from California, as follows: *Mono County*: Pellisier Ranch, 5600 ft., 5 mi. N Benton Station, 15 (D. R. Dickey coll.); McKeever's Ranch, 2 mi. S Benton Station, 5200 and 5500 ft., 3. *Inyo County*: Hill near mouth of Silver Canyon, 4800-4900 ft., 3; Silver Canyon, 5100 ft., 1; Mazourka Canyon, 7700 ft., Inyo Mts., 1; 2-1/2 mi. NE Lone Pine, 5; 1 mi. NW Lone Pine, 15; 3-7/10 mi. NE Olancha, 3600 ft., 1; 1/2 mi. W Olancha, 3650 ft., 1; Olancha, 3600 ft., 8 (D. R. Dickey coll.); 1/8 mi. SW Olancha, 3650 ft., 2; 1-1/2 mi. SW Olancha, 3900 ft., 1. *San Bernardino County*: Victorville, 7.

After this paper was in press, two additional subspecific names were proposed for kangaroo rats of the species *Dipodomys microps*. We have not examined any specimens referable to these two new races, from islands in Great Salt Lake, but to provide here a complete record to date (September 15, 1939) of the races named, list these two newly proposed races below:

Dipodomys microps russeolus Goldman (Jour. Mammalogy, vol. 20, p. 353, August 14, 1939). *Type Locality*.—Dolphin Island, 4250 ft., Great Salt Lake, Utah. Known from only one specimen.

Dipodomys microps subtennis Goldman (Jour. Mammalogy, vol. 20, p. 354, August 14, 1939). *Type Locality*.—Carrington Island, 4250 ft., Great Salt Lake, Utah. *Range*.—Known from Badger, Carrington and Stansbury islands, Great Salt Lake.

Transmitted April 28, 1939.

AVERAGE AND EXTREME MEASUREMENTS, IN MILLIMETERS, OF ADULTS OF ELEVEN SUBSPECIES OF *DIPODOMYS MICRIPS*

	BODY LENGTH	LENGTH OF TAIL	LENGTH OF HIND FOOT	BASEAL LENGTH	LENGTH OF NASAL	GREATEST BREADTH	MAXILLARY BREADTH	INTERORBITAL BREADTH
MALES								
<i>centralis</i> —3; nr. Romano.....	119 (118-120)	162 (164-168)	43.3 (43.0-44.0)	27.3 (27.1-27.5)	13.0 (12.7-13.1)	23.9 (23.4-24.2)	19.3 (19.0-19.5)	12.1 (12.0-12.2)
<i>idahoensis</i> —3; Owyhee County 108 (106-109)	133 (155-175)	163 (155-175)	42.0 (41.0-43.0)	26.9 (26.8-27.0)	12.6 (12.3-12.8)	23.7 (23.4-24.0)	20.2 (19.6-20.8)	12.5 (12.3-12.7)
<i>preblei</i> —3; Malheur County.....	113 (111-115)	162 (158-167)	41.6 (41.0-42.0)	26.3 (26.5-26.7)	12.5 (12.1-13.1)	22.7 (22.6-22.8)	19.0 (18.5-19.6)	12.1 (12.0-12.2)
<i>aquilonius</i> —4; nr. Hausen.....	120 (118-122)	156 (142-170)	42.8 (41.0-44.0)	26.7 (26.0-27.4)	12.2 (11.9-12.7)	23.3 (22.8-24.1)	18.6 (18.1-19.3)	12.2 (12.0-12.4)
<i>occidentalis</i> —4; nr. Schurz.....	112 (110-114)	143 (140-156)	40.8 (40.0-42.0)	25.9 (25.5-26.3)	12.1 (11.8-12.4)	22.6 (21.7-23.1)	18.5 (17.9-19.1)	11.7 (11.1-12.0)
<i>occidentalis</i> —8; nr. Sulphur.....	116 (113-118)	155 (134-166)	41.8 (39.0-44.0)	26.2 (25.1-27.1)	12.3 (11.6-12.8)	23.3 (22.4-24.3)	18.9 (17.9-19.9)	11.8 (11.3-12.3)
<i>bonnevillei</i> —8; nr. Montello.....	122 (118-129)	156 (142-174)	41.6 (40.0-43.0)	26.8 (26.1-27.1)	12.7 (12.1-13.3)	23.8 (23.3-24.6)	19.5 (19.0-20.1)	11.9 (11.4-12.6)
<i>alfredi</i> —3; topotypes.....	123 (118-130)	168 (158-175)	45.5 (44.5-46.4)	29.2 (29.1-29.3)	13.7 (13.2-14.0)	24.5 (23.9-24.8)	21.2 (20.8-21.5)	12.7 (12.4-12.9)
<i>leucotis</i> —5; topotypes.....	118 (114-122)	161 (153-165)	43.0 (41.0-45.0)	27.0 (26.6-27.5)	13.3 (13.0-13.6)	23.3 (22.9-23.8)	19.8 (19.6-20.0)	11.9 (11.6-12.5)
<i>celus</i> —7; topotypes.....	121 (113-127)	164 (155-171)	43.4 (41.0-45.0)	28.1 (27.2-28.9)	13.9 (13.1-14.7)	24.6 (23.9-25.3)	20.5 (19.6-21.4)	12.4 (12.0-12.9)
<i>levipes</i> —4; topotypes.....	121 (115-126)	157 (155-160)	42.3 (42.0-43.0)	27.2 (26.1-27.7)	13.4 (13.4-13.4)	23.4 (22.7-24.0)	19.2 (18.9-19.4)	11.7 (11.5-11.9)
<i>microps</i> —4; near topotypes.....	112 (109-113)	157 (150-168)	40.8 (40.0-41.0)	25.4 (24.9-25.9)	12.5 (12.3-12.7)	22.0 (21.7-22.5)	18.8 (18.3-19.3)	11.6 (11.5-11.8)
FEMALES								
<i>centralis</i> —3; nr. Battle Mt., and Cortez.....	116 (115-117)	156 (151-161)	41.3 (41.0-42.0)	26.5 (26.3-26.8)	12.9 (12.6-13.3)	23.9 (23.4-24.5)	19.8 (19.3-19.8)	12.4 (12.3-12.5)
<i>idahoensis</i> —1; Owyhee County 109	109	150	40.0	13.3	23.0	20.1	11.9
<i>preblei</i> —1; Narrows (Yr.).....	113	155	40.0	25.2	11.7	18.6	11.6
<i>aquilonius</i> —2; nr. Hausen.....	113 (114-122)	156 (152-159)	41.8 (41.0-42.5)	26.3 (26.2-26.3)	12.1 (12.1-12.1)	23.0 (22.6-23.3)	18.6 (18.6-18.6)	11.9 (11.7-12.1)
<i>occidentalis</i> —7; nr. Schurz.....	111 (109-114)	160 (146-168)	41.5 (40.0-43.0)	25.8 (25.1-26.6)	12.4 (11.9-13.1)	23.0 (22.7-23.4)	18.4 (18.0-18.8)	11.7 (11.2-12.0)
<i>occidentalis</i> —7; nr. Sulphur.....	116 (112-123)	153 (140-174)	41.1 (40.0-42.5)	26.2 (26.5-27.1)	12.2 (11.6-12.7)	23.2 (22.5-23.7)	18.9 (18.1-19.6)	11.9 (11.5-12.4)
<i>bonnevillei</i> —10; nr. Montello.....	119 (112-122)	154 (145-173)	40.6 (40.0-43.0)	27.1 (26.4-27.9)	12.8 (12.2-13.1)	23.5 (22.9-24.5)	19.2 (18.4-20.0)	11.6 (10.9-12.1)
<i>alfredi</i> —3; topotypes.....	120 (116-122)	158 (150-170)	45.2 (44.6-45.7)	27.8 (.....27.8)	13.2 (13.1-13.2)	24.0 (23.4-24.5)	21.1 (.....21.1)	12.6 (12.2-12.9)
<i>leucotis</i> —5; topotypes.....	115 (110-117)	158 (143-169)	42.4 (42.0-43.0)	26.7 (25.6-27.4)	13.0 (12.2-13.5)	23.1 (22.5-23.6)	19.4 (19.0-20.1)	11.6 (11.2-11.9)
<i>celus</i> —10; topotypes.....	119 (114-127)	162 (157-170)	42.5 (41.0-43.0)	27.4 (27.2-27.6)	13.5 (12.9-14.1)	24.1 (23.6-24.8)	20.0 (19.1-20.5)	12.4 (11.2-12.8)
<i>levipes</i> —8; topotypes.....	122 (112-126)	155 (150-162)	41.9 (40.0-43.0)	27.0 (26.0-27.4)	13.0 (12.7-13.5)	23.1 (22.6-24.5)	19.4 (18.7-20.2)	11.8 (11.2-12.3)
<i>microps</i> —6; nr. topotypes.....	111 (101-118)	150 (142-162)	40.1 (39.0-41.5)	25.2 (24.7-25.4)	12.0 (11.7-12.3)	21.7 (21.3-22.3)	18.7 (18.0-19.2)	11.7 (11.3-12.4)