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POCKET MOUSE, PEROGNATHUS FASCIATUS \*\*\*

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Mouse,  
*Perognathus fasciatus***

BY

**J. KNOX JONES, JR.**

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# Geographic Distribution of the Pocket Mouse, *Perognathus fasciatus*

BY

J. KNOX JONES, JR.

In his "Revision of the pocket mice of the genus *Perognathus*," Osgood (1900:18-20) reviewed the distribution, as then known, of *Perognathus fasciatus* and recognized two geographic races—*Perognathus fasciatus* [*fasciatus*] Wied-Neuwied in eastern Montana and Wyoming and adjacent parts of North and South Dakota, and *Perognathus fasciatus infraluteus* Thomas, known only from the type locality at Loveland, Larimer County, Colorado. Later, Cary (1911:61) described *Perognathus fasciatus litus* as a pale subspecies occurring in the lower Sweetwater Valley and adjacent parts of the Red Desert of south-central Wyoming. After 1911 no important taxonomic contributions dealing with *Perognathus fasciatus* appeared.

In studying the kinds of pocket mice known from Nebraska, I examined thirteen specimens of *P. fasciatus* from the northwestern part of the state which did not agree satisfactorily with the descriptions of any known subspecies of *fasciatus*. This impelled me to examine material from the entire range of *P. fasciatus*. This examination revealed that: (1) *Perognathus callistus* Osgood, heretofore considered to be a full species, should be reduced to subspecific rank under *P. fasciatus*; and (2) specimens from eastern Wyoming and adjacent parts of Montana, South Dakota and Nebraska represent an heretofore unrecognized subspecies. Further investigation, however, revealed that *Perognathus flavescens olivaceogriseus* Swenk, described from northwestern Nebraska (Swenk, 1940:6), is not *flavescens* but actually *fasciatus*. Since the specimens on which Swenk's description was based were taken within the range of this newly recognized subspecies, and since my examination of the holotype shows it to be of the species *Perognathus fasciatus*, the subspecific name *olivaceogriseus* is available.

The subspecies of *P. fasciatus* are most easily distinguished by color of pelage, in which there is a general cline from northeast (dark) to southwest (pale). Cranially, the subspecies are less distinct. The skulls of *P. f. callistus* can be distinguished from those of the other subspecies by several differences; however, among the other four subspecies, only minor cranial differences are evident. Individual variation was found to be greater than secondary sexual variation.

[Pg 518]

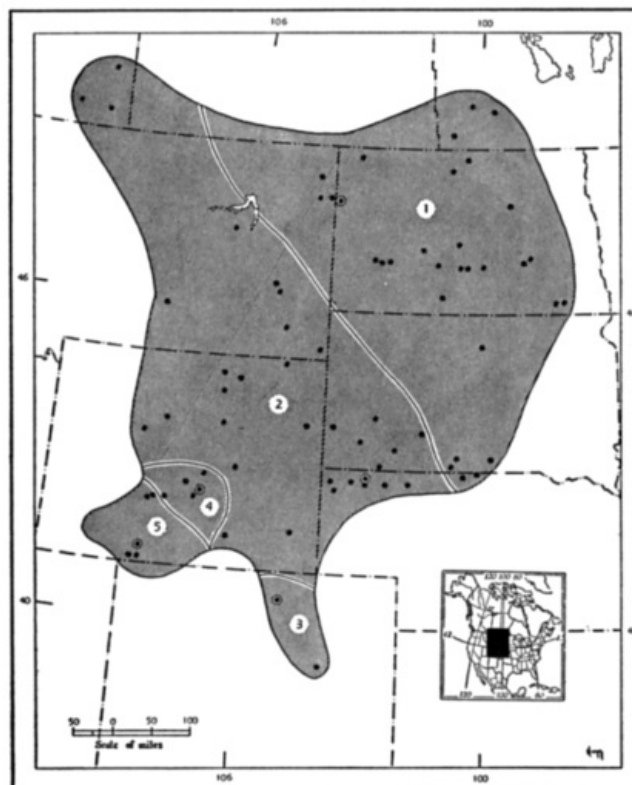


FIG. 1. Distribution of the five subspecies of *Perognathus fasciatus*. Solid symbols represent specimens examined; circled symbols represent type localities.

#### Guide to subspecies

1. *P. f. fasciatus*
2. *P. f. olivaceogriseus*

3. *P. f. infraluteus*

4. *P. f. litus*

5. *P. f. callistus*

In connection with this study, grateful acknowledgment is made to the following persons for the loan of specimens in their care: Dr. H. E. Anthony, American Museum of Natural History (AMNH); Mr. Colin C. Sanborn, Chicago Natural History Museum (CNHM); Mr. Austin W. Cameron, National Museum of Canada (NMC); Miss Viola S. Schantz, Biological Surveys Collection, U. S. National Museum (USBS); Dr. Seth B. Benson, University of California Museum of Vertebrate Zoology (MVZ); Mr. J. E. Moore, Department of Zoology, University of Alberta (UADZ); Dr. William H. Burt, University of Michigan Museum of Zoology (MZ); Dr. Otis Wade, University of Nebraska Department of Zoology (UNDZ); Dr. C. Bertrand Schultz, University of Nebraska State Museum (NSM); and to those in charge of the collections of the Nebraska Game, Forestation and Parks Commission (NGFPC). Specimens from the Museum of Natural History, University of Kansas (KU), also have been used.

[Pg 519]

Capitalized color terms are those of Ridgway, Color Standards and Color Nomenclature, Washington, D. C., 1912. Assistance with field work to obtain specimens for the University of Kansas Museum of Natural History is acknowledged from the Kansas University Endowment Association and the National Science Foundation.

***Perognathus fasciatus fasciatus* Wied-Neuwied**

*Perognathus fasciatus* Wied-Neuwied, Nova Acta Phys.-Med. Acad. Caesar. Leop.-Carol., 19:369, 1839, type from Upper Missouri River near its junction with the Yellowstone, near Buford, Williams County, North Dakota.

*Geographic distribution.*—Southwestern Manitoba, extreme northeastern Montana and all of North Dakota except extreme eastern part, south through central South Dakota to the northeastern part of Cherry County, Nebraska (see Figure 1).

*Remarks.*—For comparisons with *Perognathus fasciatus olivaceogriseus*, geographically adjacent to the southwest, see account of that subspecies.

Specimens from the eastern part of the range of *P. f. fasciatus* are somewhat smaller and slightly darker than topotypes from Buford, North Dakota. Specimens from 9 mi. SE Bainville, Johnson Lake and 3 mi. S Medicine Lake, Montana, and from Crosby, North Dakota, are also paler than those from farther east. At the southern limit of the range of the subspecies, specimens from the Rosebud Agency and Minichaduzza River, South Dakota, approach *olivaceogriseus* in pale dorsal coloration.

*Specimens examined.*—Total number, 83, as follows: MANITOBA: Aweme, 3 (USBS 2, NMC 1). Junction of Antler and Souris rivers, 1 (NMC). Oak Lake, 2 (NMC). MONTANA: *Roosevelt County*: 9 mi. SE Bainville, 4 (MZ); Johnson Lake, 2 (USBS). *Sheridan County*: 3 mi. S Medicine Lake, 1880 ft., 1 (KU). NEBRASKA: *Cherry County*: Ft. Niobrara Game Reserve, 1 (NSM); Sparks, 1 (MZ); Valentine, 2 (UNDZ). NORTH DAKOTA: *Benson County*: 2 mi. W Fort Totten, 1400 ft., 3 (KU). *Bottineau County*: Bottineau, 1 (CNHM). *Burleigh County*: 9 mi. E Bismark, 7 (MZ). *Dickey County*: Oakes, 2 (CNHM 1, USBS 1). *Divide County*: Crosby, 1 (USBS). *Kidder County*: Dawson, 1 (USBS); 6 mi. W Steele, 6 (MZ). *McHenry County*: 1/2 mi. E Upham, 1 (USBS). *Morton County*: 12 mi. W Mandan, 2 (MZ). *Oliver County*: Ft. Clark, 8 (USBS). *Sargent County*: 7-2/10 mi. E, 1-2/10 mi. S Oakes, 1200 ft., 1 (KU). *Sioux County*: Cannon Ball, 6 (USBS). *Stark County*: 1 mi. S Dickinson, 1 (MZ); 9 mi. W Dickinson, 3 (MZ); 2 mi. W Taylor, 4 (MZ). *Stutsman County*: 7 mi. N Jamestown, 1 (MZ); 14 mi. W Jamestown, 1 (MZ). *Wells County*: Bowdon, 1 (USBS). *Williams County*: Buford, 9 (USBS). SOUTH DAKOTA: *Todd County*: Minichaduzza River, 2 (USBS); Rosebud Agency, 1 (USBS). *Tripp County*: Colome, 3 (MZ). *Walworth County*: Swan Creek, 13 mi. S Shelby, 1600 ft., 1 (KU).

[Pg 520]

***Perognathus fasciatus olivaceogriseus* Swenk**

*Perognathus flavescens olivaceogriseus* Swenk, Missouri Valley Fauna, 3:6, June 5, 1940, type from [Little Bordeaux Creek, sec. 14, T. 33 N, R. 48 W, 3 mi. E] Chadron, Dawes County, Nebraska.

*Geographic distribution.*—Southeastern Alberta, southeast to eastern Wyoming and adjacent parts of South Dakota and Nebraska.

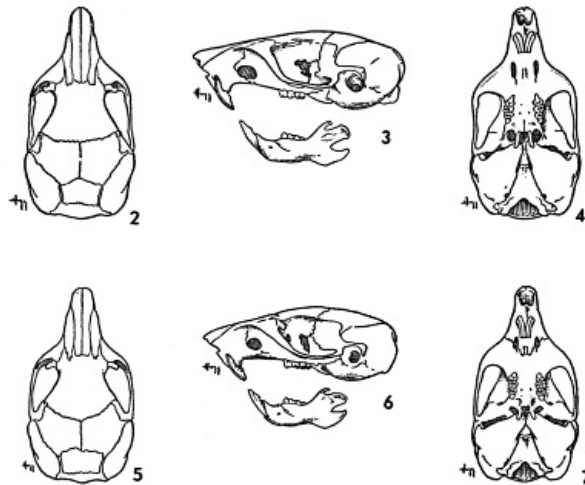
*Diagnosis.*—External measurements of the holotype and average and extreme external measurements of six adults (five males and one female) from several localities in eastern Wyoming are, respectively, as follows: Total length, 124, 132 (125-140); length of tail-vertebrae, 53, 63 (59-68); length of hind foot, 16.5, 17 (17-18); length of ear, 6.5, 6.6 (6.0-7.0). Color: Upper parts Cream Buff, lined with black and giving a pale olivaceous appearance; lateral line near (16'd) Light Ochraceous-Buff; postauricular patches Cream Buff; subauricular patches and underparts white; tail indistinctly bicolor, dusky above, whitish below. Skull: Size

medium for species (see Table 1); braincase and auditory bullae moderately inflated; interorbital region narrow; mastoidal region broad.

*Remarks.*—From topotypes of *Perognathus fasciatus fasciatus*, geographically adjacent to the northeast, *P. f. olivaceogriseus* differs in: Upper parts paler, especially face which is heavily washed with buff; hind foot smaller; skull averaging slightly smaller in all measurements taken (especially least interorbital breadth and cranial depth), except mastoidal breadth which is slightly more and interparietal breadth, length of tympanic bulla and length of maxillary tooth-row which are approximately the same. From topotypes of *Perognathus fasciatus infraluteus*, geographically adjacent to the south, *P. f. olivaceogriseus* differs in: Upper parts paler and less drab; lateral line brighter and more ochraceous; underparts never buffy; skull averaging larger in all measurements taken except interparietal breadth and length of maxillary tooth-row which are smaller. From topotypes of *Perognathus fasciatus litus*, geographically adjacent to the southwest, *P. f. olivaceogriseus* differs in: Upper parts darker; skull, when specimens of equal age are compared, averaging larger in mastoidal breadth, interparietal breadth and basal length. From topotypes of *Perognathus fasciatus callistus*, *P. f. olivaceogriseus* differs in: Upper parts slightly darker, pelage not silky, coarser in appearance; hind foot shorter; skull averaging smaller in all measurements taken (especially mastoidal breadth), except interparietal breadth which is more.

Swenk (*loc. cit.*) originally described *P. f. olivaceogriseus* as a subspecies of *Perognathus flavescens*. I have examined the holotype, kindly made available to me by Dr. Seth B. Benson of the Museum of Vertebrate Zoology, University of California, and the paratype, in the collection of the University of Nebraska State Museum. Neither is *P. flavescens*, but both are clearly specimens of *P. Fasciatus* on the basis of olive-gray dorsal coloration, larger over-all dimensions of the skull, and in that the tympanic bullae do not meet anteriorly. In addition, a third specimen from Glen, Nebraska, purported by Swenk to be intermediate between *flavescens* and *olivaceogriseus*, has been examined and found to be an immature *fasciatus*.

[Pg 521]



**FIGS. 2-7. Skulls of two species of pocket mice. All  $\times 1\frac{1}{2}$ . In comparison with *P. flavescens* note that *P. fasciatus* has the tympanic bullae separated anteriorly and that the skull is slightly larger in over-all dimensions.**

**FIGS. 2-4. *Perognathus fasciatus fasciatus*. Buford, Williams County, North Dakota, May 6, 1910, [\*\* Male], No. 168599 USBS.**

**FIGS. 5-7. *Perognathus flavescens flavescens*, Kennedy, Cherry County, Nebraska, July 9, 1935, [\*\* Female], No. 66883 MVZ.]**

In the original description Swenk indicated the type locality as Chadron, Dawes County, Nebraska. The locality given on the specimen label of the holotype, however, is 5 mi. E Chadron. In addition, Swenk (*loc. cit.*), in the paragraph preceding the description of *olivaceogriseus*, states that the holotype was actually taken on Little Bordeaux Creek, sec. 14, T. 33 N, R. 48 W, 3 mi. E Chadron, on the farm of L. M. Gates, who obtained the holotype. It seems best to restrict the type locality to the place last mentioned.

[Pg 522]

Four specimens from southeastern Alberta recently reported by Moore (1953:143) have been examined and seem best referred, among known subspecies of *fasciatus*, to *P. f. olivaceogriseus*. They differ from the latter in several minor cranial features and more drab back, sides and lateral line. When adequate material is available they may prove to be subspecifically different from *olivaceogriseus*. Moore referred these specimens to *P. f. fasciatus*.

Specimens from extreme northwestern Nebraska, including the holotype, are slightly darker than specimens from eastern Wyoming. A specimen from Ft. Steele, Wyoming, shows approach to *P. f. litus* in pale dorsal coloration.

*Specimens examined*.—Total number, 59, as follows: ALBERTA: Foremost, 2 (UADZ). Manyberries, 1 (Alberta Dept. Pub. Health). Medicine Hat, 1 (Alberta Dept. Pub. Health). MONTANA: *Carter County*: Little Missouri River, 8 mi. NE Albion, 1 (USBS). *Custer County*: Calf Creek, 2 (AMNH); 13 mi. E Miles City, 1 (MZ). *Garfield County*: Piney Buttes, 1 (USBS). *Powder River County*: Powderville, 2 (USBS). *Yellowstone County*: Lake Basin, 1 (USBS). *County undesignated*: Wolf's Creek, 1 (AMNH). NEBRASKA: *Cherry County*: 10 mi. E Gordon, 1 (CNHM); 12 mi. ESE Gordon, 2 (CNHM). *Dawes County*: Chadron State Park, 1 (NGFPC); 1 mi. SW Chadron, 1 (NSM); Little Bordeaux Creek, 3 mi. E Chadron, 1 (MVZ); 10 mi. S Chadron, 3 (MZ); 3 mi. SW Crawford, 1 (KU). *Sheridan County*: Mirage Township, 1 (MZ). *Sioux County*: Glen, 1 (NSM); Monroe Canyon, 1 (NGFPC). SOUTH DAKOTA: *Custer County*: Cheyenne River, 1 (AMNH); Elk Mountain, 4800 ft., 4 (USBS). *Meade County*: Smithville, 1 (USBS). *Shannon County*: Corral Draw, 3 (AMNH); Pine Ridge, 3 (CNHM 1, USBS 2). *Washabaugh County*: White River flood plain, 7 mi. S Kadoka, 1 (MZ). WYOMING: *Campbell County*: 1-1/4 mi. N, 1/2 mi. E Rockypoint, 3850 ft., 1 (KU). *Carbon County*: Ft. Steele, 1 (USBS). *Fremont County*: 40 mi. E Dubois, 1 (MZ). *Hot Springs County*: Kirby Creek, 5000 ft., 1 (USBS). *Johnson County*: 6-1/2 mi. W, 2 mi. S Buffalo, 5620 ft., 4 (KU); 1 mi. WSW Kaycee, 4700 ft., 1 (KU). *Natrona County*: Casper, 1 (USBS); 1 mi. NE Casper, 5150 ft., 1 (KU). *Platte County*: 2-1/2 mi. S Chugwater, 1 (KU). *Sheridan County*: Arvada, 2 (USBS); 5 mi. NE Clearmont, 3900 ft., 1 (KU). *Weston County*: Newcastle, 1 (USBS); 23 mi. SW Newcastle, 4500 ft., 4 (KU).

### ***Perognathus fasciatus infraluteus* Thomas**

*Perognathus infraluteus* Thomas, Ann. Mag. Nat. Hist., ser. 6, 11:406, May, 1893, type from Loveland, Larimer County, Colorado.

*Perognathus fasciatus infraluteus*, Osgood, N. Amer. Fauna, 18:19, September 20, 1900.

*Geographic distribution*.—Known only from the type locality and from 7 mi. N Ramah, Colorado. Probably in other parts of northeastern Colorado (see Figure 1).

*Remarks*.—For comparisons with *Perognathus fasciatus olivaceogriseus* Swenk, geographically adjacent to the north, see the preceding account of that subspecies on page 520.

Of the seven topotypes available to me, six show various degrees of encroachment of the color of the lateral line upon the underparts, giving the ventral surface a buffy appearance, the "distinguishing character" of the subspecies according to Osgood (*op. cit.*:20). When additional specimens are available, this character may be found to be one of individual variation, although no specimens from other parts of the range of the species have been found to exhibit it. Of the subspecies *P. f. infraluteus*, each of the eight specimens examined by me possesses buffy subauricular patches.

[Pg 523]

The specimen from 7 mi. N Ramah, Colorado, is slightly darker and less drab than the topotypes and does not possess buffy underparts. The skull of the specimen is broken but on the basis of characters of the pelage it seems to be intermediate between *infraluteus* and *olivaceogriseus* and is referred to the former on geographic grounds.

*Specimens examined*.—Total number, 8, as follows: COLORADO: *Elbert County*: 7 mi. N Ramah, 1 (MZ). *Larimer County*: Loveland, 7 (USBS).

### ***Perognathus fasciatus litus* Cary**

*Perognathus fasciatus litus* Cary, Proc. Biol. Soc. Wash., 24:61, March 22, 1911, type from Sun, Sweetwater Valley, Natrona County, Wyoming.

*Geographic distribution*.—Lower Sweetwater Valley and adjacent parts of Red Desert in Carbon, Fremont, Natrona and Sweetwater counties, Wyoming (see Figure 1).

*Remarks*.—For comparisons with *Perognathus fasciatus olivaceogriseus*, geographically adjacent to the northeast, see account of that subspecies. From *Perognathus fasciatus callistus*, geographically adjacent to the southwest, *P. f. litus* differs in: Upper parts paler with no trace of olivaceous; hind foot shorter; skull, when specimens of equal age are compared, averaging smaller in all measurements taken (especially occipitonasal length, mastoidal breadth, length of tympanic bulla and cranial depth), except interparietal breadth which is more.

No fully adult specimens of *P. f. litus* have been available to me for this study. Two of the three specimens mentioned by Cary in the original description (holotype not seen) have been examined and found to possess adult pelage, but cranially they must be classed as young adults. These specimens are paler than those of any other subspecies of *fasciatus* and do not have the olivaceous dorsal coloration present in other subspecies.

*P. f. litus* is seemingly an endemic race in the lower Sweetwater Valley and adjacent parts of the Red Desert, Wyoming. The type locality, recorded by Cary in the original description as "Sun, Sweetwater Valley, Wyoming," is here placed in Natrona County on the basis of the map (frontispiece) in Cary's (1917) "Life Zone Investigations in Wyoming."

[Pg 524]

*Specimens examined.*—Total number, 9, as follows: WYOMING: *Carbon County*: 8 mi. SE Lost Soldier, 6700 ft., 1 (USBS). *Fremont County*: Granite Mts., 1 (MZ). *Natrona County*: 5 mi. W Independence Rock, 6000 ft., 4 (KU); Sun, 1 (USBS); 16 mi. S, 11 mi. W Waltman, 6950 ft., 1 (KU). *Sweetwater County*: 27 mi. N Table Rock, 1 (MZ).

**Perognathus fasciatus callistus** Osgood

*Perognathus callistus* Osgood, N. Amer. Fauna, 18:28, September 20, 1900, type from Kinney Ranch, near Bitter Creek, Sweetwater County, Wyoming.

*Geographic distribution.*—East of the Green River in central and southern parts of Sweetwater County, Wyoming, and adjacent parts of Moffat County, Colorado (see Figure 1).

*Remarks.*—For comparisons with *Perognathus fasciatus litus*, geographically adjacent to the north, see account of that subspecies.

When Osgood (*loc. cit.*) described *P. f. callistus* as a full species, he characterized it as having " ... the attractive coloration of *fasciatus*, but softer and more delicate. Its position is evidently between *fasciatus* and *apache*, and its nearest relations are clearly with the latter." He further remarked that, "Its large size immediately separates it from *fasciatus* which it resembles externally, especially before maturity."

Comparison of the average and extreme external measurements of ten adult *P. f. callistus* from Sweetwater County, Wyoming, with adult individuals of other subspecies of *P. fasciatus* shows that *callistus* does not average larger than *P. f. olivaceogriseus* except in length of hind foot and that it averages slightly smaller in all external measurements than topotypes of *P. f. fasciatus*. Moreover, judging from the accounts of Goldman (1918:24) and Durrant (1952:235), *Perognathus apache caryi* (the subspecies of *P. apache* nearest to the range of *P. f. callistus*) is significantly larger externally and has no trace of olivaceous in the dorsal pelage.

Comparison of the skulls of *callistus* with a skull of *Perognathus apache apache* from Wingate, New Mexico (USBS 137388), reveals the following differences: Interparietal bone wider in *callistus*, averaging 4.5 (as opposed to 4.0) and more pentagonal; lacrimal bone shorter and stouter in *callistus*; tympanic bullae more inflated in *callistus*; interorbital foramina larger in *callistus*; lower premolar approximately the same size as the last lower molar in *callistus*, approximately half the size of the last lower molar in *apache*. Conversely, comparison of skulls of *callistus* with those of *P. fasciatus* as concerns the above mentioned features reveals that they closely resemble each other. In view of this resemblance it seems best to arrange *callistus* as a subspecies of *P. fasciatus*.

*P. f. callistus* is distinct cranially from all other subspecies of *P. fasciatus* in the narrowness of the interparietal, the greater length of the tympanic bulla and the greater mastoidal breadth. The fine, silky nature of the pelage is shared, to some extent, with *P. f. litus*.

[Pg 525]

A specimen from 27 mi. N, 37 mi. E Rock Springs, Wyoming, referred to *callistus* resembles *litus* in pale dorsal coloration and slightly wider interparietal. Four immature specimens from 25 mi. N, 38 mi. E Rock Springs, also referred to *callistus*, have extremely pale juvenal pelage and also are judged to be intergrades with *litus*.

*Specimens examined.*—Total number, 23, as follows: WYOMING: *Sweetwater County*: 18 mi. S Bitter Creek, 6800 ft., 3 (KU); Kinney Ranch, 21 mi. S Bitter Creek, 6800 ft., 9 (KU 7, USBS 2); 30 mi. S Bitter Creek, 2 (KU); 33 mi. S Bitter Creek, 6900 ft., 2 (KU); 32 mi. S, 22 mi. E Rock Springs, 7025 ft., 2 (KU); 25 mi. N, 38 mi. E Rock Springs, 6700 ft., 4 (KU); 27 mi. N, 37 mi. E Rock Springs, 6700 ft., 1 (KU).

TABLE LEGEND:

- Column A: Sex and number of individuals averaged or catalog number
- Column B: Occipitonasal length
- Column C: Frontonasal length
- Column D: Basal length<sup>[1]</sup>
- Column E: Mastoidal breadth
- Column G: Interorbital breadth
- Column H: Interparietal breadth
- Column I: Cranial depth
- Column J: Length of tym. bulla
- Column K: Length of maxillary tooth-row

Symbols:  
♂: Male  
♀: Female

TABLE 1.—CRANIAL MEASUREMENTS OF PEROGNATHUS FASCIATUS

[A] [B] [C] [D] [E] [G] [H] [I] [J] [K]

<i>P. f. fasciatus</i> , topotypes										
6, 4 ♂ and 2 ♀	23.3 <sup>5</sup>	15.5 <sup>5</sup>	18.4	12.3	5.3	4.9	8.7	7.3	3.3	
min.	22.9	14.9	17.8	12.1	5.1	4.8	8.6	7.0	3.2	
max.	24.2	16.5	18.9	12.8	5.5	5.1	9.1	7.6	3.4	
<i>P. f. olivaceogriseus</i> , holotype										
♂ 97941 MVZ	22.1	14.5	17.4	12.0	5.2	4.6	8.3	7.3	3.5	
Various localities in eastern Wyoming										
6, 5 ♂ and 1 ♀	22.8	15.0	18.0	12.4 <sup>5</sup>	5.0	4.9	8.4 <sup>5</sup>	7.3	3.3	
min.	22.2	14.5	17.5	12.2	4.9	4.7	8.1	7.1	3.3	
max.	23.7	15.7	18.6	13.0	5.1	5.2	8.6	7.6	3.5	
<i>P. f. infraluteus</i> , topotypes										
4, 3 ♂ and 1 ♀	21.9	14.4	17.3	12.2	4.9	5.2	8.2	6.9	3.4	
min.	21.4	14.0	17.1	11.8	4.9	4.9	8.0	6.7	3.3	
max.	22.4	14.9	17.4	12.6	5.0	5.4	8.5	7.1	3.5	
<i>P. f. litus</i> , topotype										
♀ 160599 USBS	22.2	14.7	17.4	11.9	5.0	5.0	8.7	7.0	3.3	
8 mi. SE Lost Soldier, 6700 ft., Wyoming										
♀ 166866 USBS	22.1	14.6	17.4	12.0	5.2	4.5	8.4	7.1	3.3	
<i>P. f. callistus</i> , Sweetwater County, Wyoming										
10, 6 ♂ and 4 ♀	23.1	15.1	18.0 <sup>8</sup>	12.9 <sup>8</sup>	5.2	4.5	8.7	7.6	3.4	
min.	22.7	14.7	17.5	12.7	5.0	4.1	8.5	7.3	3.3	
max.	24.4	15.9	18.9	13.1	5.4	4.9	8.9	7.8	3.5	

- [1] Basal length was taken from the anteriormost inferior border of the foramen magnum to the anteriormost projections of the incisors.

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*University of Kansas Museum of Natural History, Lawrence, Kansas. Transmitted, April 20, 1953.*

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