*Geomyoeus thomomys* Complex  
(Malophaga: Trichodectidae) from Pocket Gophers of the  
*Thomomys talpoides* Complex (Rodentia: Geomyidae)  
of the United States and Canada

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*Abstract*  
Eight species of Geomyoeus from pocket gophers of the *Thomomys talpoides* complex are described and illustrated: *G. thomomys* (McGregor) from 24 *T. talpoides* spp. (type host, *T. t. convictus* Hall and Montgomery); *G. convivus* n. sp. from *T. monticola* J. A. Allen and 9 *T. talpoides* spp. (type host, *T. t. levis* Goldman); *G. l琵gus* n. sp. from 9 *T. talpoides* spp. (type host, *T. t. columbianus* Bailey); *G. betleri* n. sp. from *T. monticola*, 2 *T. mazama* Merriam spp. and 2 *T. talpoides* spp. (type host, *T. m. mazama*); *G. thomomys* n. sp. from 11 *T. mazama* spp. and 1 *T. talpoides* sp. (type host, *T. m. gladiator* Dall and Specker); *G. daceotherianus* Price and Emerson from *T. t. rufescens* and *G. fuchsi* n. sp. from 5 *T. talpoides* spp. (type host, *T. t. fuchsi* Merriam); and *G. daceotherianus* Price and Emerson from 4 *T. talpoides* spp. (type host, *T. t. uinta* Merriam). A key is provided for the identification of these eight taxa.

**Key Words:** Insecta, Malophaga, Geomyoeus, *Thomomys*

Price & Emerson (1971) redescribed *Geomyoeus thomomys* (McGregor); they based their re-description on material from 18 species and subspecies within the *Thomomys talpoides* (Richardson) group. This group consists of the gopher species *T. talpoides*, *T. mazama* Merriam, and *T. monticola* J. A. Allen. Additionally, they described as new G. daceotherianus from *T. rufescens* Wieland-Neuwied and *T. t. convictus* Davis and *G. daceotherianus* from *T. t. uinta* Merriam. Nothing further has been done on the taxonomy of this *thomomys* complex of lice.

Our studies of the complexes of pocket gopher lice have been continuing since 1973. During this time we have collected and studied about 2,800 adult lice removed from over 600 host individuals. These hosts represent more than 400 localities from all 47 of the 58 subspecies of *T. talpoides* and 13 of the 16 subspecies of *T. mazama* recognized by Hall (1981) and from *T. monticola*. Examination and analysis of these lice have made it obvious that the earlier recognition of the three louse species was too conservative, a consequence of the limited material available at that time. We now believe the *thomomys* complex consists of eight species of *Geomyoeus*. It is our purpose here to describe and illustrate all eight of these taxa, including the three previously known and five new species, and to provide a key for their separation.

Quantitative data for the lice of the *thomomys* complex combined with their host and locality information are included as part of a computerized pocket gopher-louse data base maintained at the University of Notre Dame. The retrieval and analysis of these data were performed with an integrated group of computer programs that we have developed and called the HGDC system. A description and explanation of our data handling and analysis procedures is set forth in Hellenthal & Price (1980).

In the following descriptions, counted or measured characters are followed by the minimum and maximum observed values and the sample size, mean, and standard deviation in parentheses. Measurements are in millimeters. Illustrations are for specimens from the type host. In evaluating the usefulness of characters for specific discrimination, critical values for each character were calculated at the point where the likelihood of single character misidentification of the two compared taxa was equal, given normality and equal variance and ignoring the probability of collection. For characters offering moderately good discriminating ability, these critical values and the corresponding probabilities of misidentification are given. In an abbreviated comparative description for a species, quantitative data are given only for those characters whose means differ at a significance level of $P < 0.01$. Detailed descriptions of the characters used for *Geomyoeus* lice are included in Hellenthal & Price (1980).

In the "Material Examined" sections, a number in parentheses following a locality represents the total number of gophers from which lice were taken. The map of host distribution was produced by a computer from a pocket gopher-louse association data base (Hellenthal & Price 1984). The map projection is rectangular to facilitate determination of the latitude and longitude of individual collection sites. Original locality data expressed in miles are

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followed parenthetically by the metric equivalent to 0.1 km; the English figure, rather than the metric, expresses the precision of the location estimate. In some cases, we have changed the original host identifications to reflect the current distribution and classification of the Gymnodiidae as given by Hall (1981). Full locality information, including latitude, longitude, and in many cases elevation, for any host collection is available from the authors. The designation of the type specimen includes the location and accession number of the host skin; abbreviations used for these host accession numbers are UC (University of California, Berkeley), KU (University of Kansas), and NMS (New Mexico State University). Unless stated to the contrary, holotypes are in the collection of the University of Minnesota. Although most paratypes will be retained at the University of Minnesota, representatives will be deposited at the U.S. National Museum of Natural History, Washington, D.C.; the Field Museum of Natural History, Chicago; and Oklahoma State University, Stillwater.

The following five species form a morphologically close-knit group, the males recognized by their genital sac, which has two long spines and one or two short spines (Fig. 10-12, and 14), and the females with genital sacs as in Fig. 2, 3, 5, or 8. Each of these species has a relatively large range in number of host taxa and in geographical extent.

Geomydocoecus thomsonyus (McGregor) (Fig. 1, 2, and 9-11)

Trichodectes thomsonyus McGregor 1917. 169.

Type Host. Thomypus sp. (=Thomypus natrix) Hall and Montgomery.

Male. As in Fig. 9. Temple width 0.345-0.425 (122. 0.377 ± 0.0155); head length 0.270-0.325 (124. 0.296 ± 0.0108); submarginal and inner marginal temple setae 0.095-0.135 (117. 0.115 ± 0.0085) and 0.010-0.015 (124. 0.013 ± 0.0025) long, respectively; marginal setae fine, not spiniform. Antenna with scape length 0.115-0.160 (125. 0.142 ± 0.0092); scape mediocval width 0.075-0.105 (124. 0.089 ± 0.0065); scape distal width 0.075-0.105 (124. 0.089 ± 0.0065). Prothorax width 0.250-0.305 (139. 0.272 ± 0.0135). Abdominal terminal setae: 1, 2, 2; 10-10-19 (142. 13.2 ± 1.47); HI, 15-26 (139. 20.4 ± 2.08); IV, 13-20 (136. 17.2 ± 1.70); V, 16-20 (138. 15.5 ± 2.00); VI, 10-17 (139. 13.1 ± 1.66); tergol and pleural setae on VII, 16-27 (140. 20.6 ± 1.81). Abdominal setal setae: H, 8-16 (143. 10.9 ± 1.19); III, 8-14 (142. 10.9 ± 1.26); IV, 8-12 (142. 10.7 ± 0.83); VI, 7-12 (142. 10.2 ± 0.88); VII, 7-11 (138. 9.4 ± 0.69); VIII, 5-9 (5.4 ± 0.83). Total length 1.05-1.385 (118. 1.211 ± 0.0775). Genitalia as in Fig. 16; sac usually with 2 long, 1 short spine (Fig. 11), rarely (4 of 272 flies) with 2 long, 2 short spines (much as in Fig. 12); parameral arch width 0.130-0.175 (131. 0.154 ± 0.0101); endopodal margin width 0.080-0.105 (135. 0.093 ± 0.0052), length 0.052-0.125 (91. 0.070 ± 0.004).

Female. As in Fig. 1. Temple width 0.360-0.440 (152. 0.401 ± 0.0155); head length 0.295-0.320 (152. 0.299 ± 0.0104); submarginal and inner marginal temple setae 0.096-0.160 (129. 0.168 ± 0.0092) and 0.010-0.015 (148. 0.015 ± 0.0025) long, respectively. Prothorax width 0.265-0.335 (156. 0.297 ± 0.0142). Abdominal terminal setae: 1, 2, 2; 13-24 (156. 19.0 ± 2.00); III, 22-24 (157. 27.2 ± 2.74); IV, 12-23 (155. 17.1 ± 1.18); V, 10-21 (157. 14.8 ± 1.78); VI, 11-23 (158. 15.2 ± 2.67); tergol and pleural setae of VII, 25-41 (157. 32.1 ± 2.92).

Longest seta of medial on tergite VI, 0.070-0.110 (155. 0.089 ± 0.0070); on tergite VII, 0.070-0.110 (152. 0.091 ± 0.0072), with 0-1 (152. 0.05 ± 0.01), of these longer than 0.100. Longer seta of medial pair on tergite VIII, 0.090-0.110 (151. 0.090 ± 0.0094). Each side of last tergite with outer setae 0.100-0.140 (114. 0.121 ± 0.0080); middle setae 0.075-0.135 (118. 0.107 ± 0.0100); inner seta 0.065-0.135 (119. 0.105 ± 0.0110) long. Abdominal sternal setae H, 8-14 (159. 11.1 ± 1.14); HI, 8-14 (151. 10.8 ± 1.32); IV, 8-14 (146. 10.2 ± 0.91); V, 7-12 (157. 10.2 ± 0.94); VI, 7-13 (158. 10.5 ± 0.86); VII, 6-12 (159. 9.7 ± 1.05); Subgenital plate with 17-26 (153. 21.0 ± 1.78) setae. Total length 0.935-1.315 (145. 1.171 ± 0.0655). Genital sac as in Fig. 2, width 0.160-0.305 (151. 0.199 ± 0.0475), length 0.055-0.115 (145. 0.083 ± 0.0108); with innermost lateral lines curving anteriorly toward midline and posteriorly stalked.

Material Examined: 37.48, 44.8 ex T. t. agrestis Merriman; Colorado: Alamosa Co.: 0.5 mi (0.8 km) S Uracca (2), 1.4 mi (2.0 km) E 0.5 mi (0.8 km) (N), 12.5 mi (19.8 km) E 0.9 mi (1.4 km) N (2), 11.4 mi (18.4 km) E 0.9 mi (1.4 km) N (1), 11.3 mi (18.2 km) E 0.8 mi (1.3 km) (N) (1), and 15 mi (24.1 km) E (1) (Moscov, Gostilla Co.: Blanca (1), Saguache Co.: 1.5 mi (2.4 km) W 1.0 mi (1.6 km) S 1 and 3.5 mi (5.6 km) W, 1.0 mi (1.6 km) S (2) Crestone: 0.3 mi (0.5 km) N 0.1 mi (0.2 km) (E) (1), 0.5 mi (0.8 km) N 0.1 mi (0.2 km) E (1), 0.5 mi (0.8 km) N 0.2 mi (0.3 km) E (1), 0.5 mi (0.8 km) N 0.6 mi (1.0 km) N (1), 0.5 mi (0.8 km) N 1.0 mi (1.6 km) W (1), 0.5 mi (0.8 km) N 0.8 mi (1.3 km) W (1), and 7.0 mi (11.3 km) N 1.4 mi (2.3 km) E (2) Moffat, 2.5 mi (4.0 km) N 1.7 mi (2.8 km) E (1), 0.8 mi (1.3 km) W Saguache (2), 16.4 mi, 14.6 mi, ex T. t. attenuatus Hall and Montgomery; Colorado: Weld Co.: Horsetail Creek (1) Wyoming: Albany Co.: 7.6 mi (12.2 km) E, 4.8 mi (7.7 km) S Laramie (1), Converse Co.: 2.4 mi (3.9 km) W 0.8 mi (1.3 km) N 1 and 5.1 mi (8.2 km) W 0.1 mi (0.2 km) (N) (1) Warbonnet Peak, 21 mi (33.5 km) S, 24 mi (38.6 km) W Douglas (1), Natrona Co.: 10 mi (16.1 km) S Casper (2), 27 mi (43.5 km) N, 2 mi (3.2 km) E Powder River (2) 28 mi, 26 mi, ex T. t. bridgeri Merriman; Idaho: Bear Lake Co.: 8 mi (13.7 km) W (2), 2.5 mi (4.0 km) W (1), and at (1) Bloomington, 5.3 mi (8.5
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Anthony Lake (1), Walla Walla Co.: 16 mi (25.8 km) S 5 (4.5 km) E Lostine (1); Washington. Walla Walla Co.: 7 mi (11.3 km) E, 5 mi (8.0 km) S Dixie (2).

21, ex. t. i. yakimensis Hall and Dalquest; Washington. Benton Co.: 3 mi (4.8 km) E, 1 mi (1.6 km) N Kennewick (22), 2 mi (3.2 km) SE Richland, S side Yakima River (3); Klickitat Co.: 1 mi (1.6 km) S Salmon (1); Yakima Co.: Trouton (1).

Remarks. Geoecides yakimensis represents the first of two parthenogenetic species of the thomonyx complex; we have collected 199 females and no males of this taxon. The features of the genital sac in Fig. 25 are closest to those of G. thomonyx, but the inner lateral lines of G. biagiae are directed predominantly forward, not tending toward the midline. G. biagiae is distributed in the eastern half of Washington and Oregon. See Thompson and Hall (1966) for more details on the original description of this species.

Etymology. This species is named in honor of Caroline C. Willig, who developed the computerized geographic mapping system and developed or adapted many of the other computer programs used in our house-pocket gopher studies.

Geoecides biagiae

Hellenthal and Price, n. sp.


Female. Close to G. thomonyx, except as follows. Each side of last tergite with both setae 0.0009-0.0012 mm (235: 0.101 ± 0.009); inner setae 0.0008-0.0012 mm (235: 0.095 ± 0.007); long. Sternal setae on tergite III: 3-16 (35: 11.5 ± 1.76); genital sac as much as in Fig. 3, lacking any pronounced lines and with only a few posterior spines.

Type Material. HOLOTYPE, v. ex. t. m. magnum (UC-8478), Siskiyou Co., California, 5 mi (8 km) SW Weed, S 90° 19′ W 130° 19′, D. H. Johnson. PARATYPES. 109, ex. t. m. magnum, California. Siskiyou Co.: 1.5 mi (2.4 km) NW Mt Shasta PO (4); 1.2 mi (1.9 km) NW Mt Shasta (1), head Rush Creek (1), 2 mi (3.2 km) SE Edgewood; same data as holotype (1); 0.2 mi (0.3 km) W, 0.4 mi (0.6 km) S Big Spring (1); Trinity Co.: head Rush Creek (1); Oregon. Deschutes Co.: 2.7 mi (4.3 km) W, 0.3 mi (0.5 km) S McKay Butte (1), 1 mi (1.6 km) N Three Creek Lake (1); Jefferson Co.: Cadiz Creek (3).

Other Material Examined. 22, ex. t. m. magnum, Oregon. Deschutes Co.: 15 mi (24.1 km) W Bend (2); 1.9 mi (3.1 km) S 90° W 130° (1); Wasco Co.: Tygh Valley (1); Wheeler Co.: 11 mi (17.7 km) W, 7 mi (11.3 km) S Mitchell (1).

27, ex. t. i. yakimensis Hall and Dalquest; Oregon. Grant Co.: 5.1 mi (8.2 km) N, 1.7 mi (2.7 km) E Silver Lake, 8 mi (12.9 km) E Audits (1), Union Co.: Starkey Experimental Forest, Bear Creek (1), 1 mi (1.6 km) E Jet Snake & Columbia Rivers, 21-1940, J. R. Alcorn. PARATYPES. 55, ex. t. i. yakimensis Hall and Dalquest; Washington. Benton Co.: 3 mi (4.8 km) E, 1 mi (1.6 km) N Kennewick (22), 2 mi (3.2 km) SE Richland, S side Yakima River (3); Klickitat Co.: 1 mi (1.6 km) S Salmon (1); Yakima Co.: Trouton (1).

Remarks. This species represents the second of the parthenogenetic line of the thomonyx complex. For Geoecides, we have collected 200 females and only a single questionably male from T. yakimensis. The distinct female genital sac, although similar to that found in G. thomonyx, lacks any pronounced lines and has the posterior stalk clearly off center (much as in Fig. 3), thereby differing from G. thomonyx. In addition, several quantitative features support this separation. Geoecides has shorter inner and middle setae on the last tergite and a tendency for more setae on the anterior III; the critical values for discrimination and probabilities of misidentification are 0.014 (0.074), 0.107 (0.160), and 0.059 (0.155), respectively.

Geoecides yakimensis is found in T. yakimensis and two subspecies each of T. m. magnum and T. m. triton. This gopher species ranges from northern California through central Washington (Fig. 16). The distributions of these species are essentially allopatric, although our locality (Dotty Bench, Siskiyou Pass, D. H. Johnson) yielded a single host with six specimens of each species.

Etymology. This species is named in honor of Monika Belka in recognition of her contribution to our understanding of geographic and evolutionary relationships between pocket gophers and their hosts.
Geomyoides fuscus

Hendell and Price, n. sp.

(Fig. 6 and 15)

Type Host. Thomomys talpoides fuscus

Mammal. Close to G. dakotensis, except as follows:

Width of temple 0.315 - 0.405 (0.315 ± 0.0198)

Lateral length of snout 0.250 - 0.305 (0.252 ± 0.0088), inner

marginal teeth of the premolars (0.11 ± 0.01) provide a

0.0016 long. Antenna with scale length 0.115 -

0.135 (0.133 ± 0.0089), scale mediad length 0.0070 -

0.0072 (0.0062 ± 0.0048). Prothorax width 0.255 - 0.290 (0.252 ± 0.0048). Abdominal tergal

setae: I, 7 (1.24 - 1.14 ± 0.150); II, 12 - 14 (1.22 ±

0.228); IV, 12 - 21 (1.63 ± 0.213); V, 12 -

17 (2.24 ± 1.16 ± 1.76); VI, 10 - 16 (12.6 ± 1.47);

17 - 22 (1.47 ± 1.76); VII, 6 - 7 (12.0 ± 1.33). Total

length 1.035 - 1.283 (0.114 ± 0.0620). Genital sac often

11 of 21 specimens) with 2 long, 4 short spines (Fig.

13), less often (7 specimens) 2 long, 3 short spines (much as in Fig. 15) or 3 spines (5)

5 short spines, parameral arm width 0.125 - 0.265 (0.145 ± 0.0115); terminal plate width 0.0070 -

0.0072 (0.0065 ± 0.0059), length 0.065 - 0.115 (0.105 ± 0.020). Femoral setae of the

2nd, 3rd, 4th, and 5th legs are 0.135 - 0.140 (0.137 ± 0.007).

G. dakotensis: terminal plate width 0.265 - 0.286 (0.260 ±

0.0066). Abdominal terminal setae: I, 2, II, 12 - 17 (2.14 ± 1.17); III, 16 - 28 (2.53 ± 0.021); IV, 17 - 22 (4.21 ±

1.91 ± 0.75); V, 10 - 12 (2.14 ± 0.095); VI, 10 - 12 (2.105 ± 0.45); VII, 9 - 11 (2.99 ± 0.40); VIII, 5-

2.14 ± 0.095); VII, 10 - 12 (2.14 ± 0.095); VI, 10 - 12 (2.14 ± 0.095); VII, 9 - 11 (2.99 ± 0.40); VIII, 5-

2.14 ± 0.095); VII, 10 - 12 (2.14 ± 0.095); VI, 10 - 12 (2.14 ± 0.095); VII, 9 - 11 (2.99 ± 0.40); VIII, 5-

1.89 ± 0.80). Total length 1.125 - 1.455 (26.1 -

1.95 ± 0.0760). Genitalia much as in Fig. 10, but

sac usually (26 of 30 specimens at holotype) with 2 long, 4 short

spines (Fig. 13), much less often 5 short spines (3

specimens) or 3 short spines (1 specimen), para-

marginal teeth on the third (5). Abdominal plate

width 0.090 - 0.125 (20.0 ± 0.100 ± 0.0077),

head length 0.290 - 0.315 (21.25 ± 0.0098),

11 and 0.75. Each of these species has a relatively

restricted range in the number of host taxa and

geographical extent.

Geomyoides dakotakensis

Price and Emerson

(Fig. 7 and 13)


Type Host. Thomomys talpoides rufescens

West of Fillmore, Co., Lake Media
globe (1); Burleigh: 4.5 (7.2) mm N, 7.16
mm E Bismarck (2); Pembina Co. K.G. Weeks
(2); 7.5 (9.5) mm, E Dakota (1); St. James Town;
Walsh Co., Grafton (1); South Dakota.
Buffalo Co.: 2 mm [3] (48.16 (0.0065],
7.10 ± 0.75. Each of these species has a relatively
restricted range in the number of host taxa and

geographical extent.

Geomyoides dakotakensis


Type Host. Thomomys talpoides rufescens

West of Fillmore, Co., Lake Media
globe (1); Burleigh: 4.5 (7.2) mm N, 7.16
mm E Bismarck (2); Pembina Co. K.G. Weeks
(2); 7.5 (9.5) mm, E Dakota (1); St. James Town;
Walsh Co., Grafton (1); South Dakota.
Buffalo Co.: 2 mm [3] (48.16 (0.0065],
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Walsh Co., Grafton (1); South Dakota.
Buffalo Co.: 2 mm [3] (48.16 (0.0065],
7.10 ± 0.75. Each of these species has a relatively
restricted range in the number of host taxa and

geographical extent.

Geomyoides dakotakensis


Type Host. Thomomys talpoides rufescens

West of Fillmore, Co., Lake Media
(1), and 3.5 mi (5.6 km) N, 6 mi (9.7 km) E (1) Steevenson.

6 mi, 5.9 mi, ex T. td. iodaeus Merriam, Idaho: Bonneville Co. 5.5 mi (8.5 km) N, 1 mi (1.6 km) W, Shellie (1), 1 mi (1.6 km) W, 1 mi (1.6 km) W SHiley (1), 0.4 mi (0.6 km) S Navajo Co., Butte Co., Cottonwood Canyon, Coconino Nat. Monument (1), (1), (1), Coconino Co. 4 mi (6 km) N Lone Pine (1).

2 mi, ex T. p. ponderosa Merriam, Wyoming: Uinta Co. 1 mi (1.6 km) S, 3.5 mi (5.6 km) W Evanston (1), 3 mi (5.8 km) W, 0.8 mi (1.3 km) S Nort Bridge (1).

1.5 mi, ex T. t. temeleis Goldman, Wyoming: Teton Co., Galena, Matilda Lake (1), 7 mi (11.5 km) S Moran (1).

Remarks. Because the male of G. fuchsi has a genital sac typically (11, or 52.4% of specimen) with a total of six spines (much as in Fig. 13), less often (7, or 33%) live (much as in Fig. 15) or seven (5, or 21%) this species resembles G. dakotasensis. However, the female of G. fuchsi has a highly distinctly genital sac (Fig. 6), with the lines of one side extending across the posterior portion of the sac to near the midline and only short lateral lines on the other side. Males of G. fuchsi are consistently smaller than those of G. dakotasensis; the critical values for discrimation and probabilities of misidentification are: for prothorax width 0.272 (0.021), antenoptic scarpal width 0.090 (0.041), total length 0.605 (0.041), and head length 0.296 (0.052). Likewise, females of G. fuchsi are smaller, with the values for the best characters being total width 0.422 (0.065), head length 0.288 (0.104), and prothorax width 0.072 (0.018).

Geomyopus fuchsi, found on five subspecies of T. talpoides, is distributed in Idaho, western Montana, and Wyoming (Fig. 16).

Eymology. This species is named in honor of Morton S. Fuchs, Chairman, Department of Biological Sciences, University of Notre Dame, in appreciation of his interest in and support of our lance-pocketer golpher studies.

Geomyopus duchesnayensis Price and Emerson (Fig. 4)

Geomyopus duchesnayensis Price and Emerson 1971: 245

Type Host. Thomomys talpoides utah Merriam. Male. Close to G. dakotasensis, except as follows. Temple width 0.575–0.595 (S, 0.875 ± 0.0048); head length 0.295–0.305 (S, 0.299 ± 0.0042); submarginal temple seta 0.105–0.125 (S, 0.110 ± 0.0168); length of antennae 0.110–0.145 (S, 0.135 ± 0.0057); scape length 0.069–0.090 (S, 0.080 ± 0.0055); prothorax width 0.260–0.285 (S, 0.275 ± 0.0132). Abdominal tergal seta 11, 12–14 (S, 13.4 ± 0.69); 13, 15–16 (S, 17.1 ± 0.27); 14–20 (S, 16.1 ± 0.27); 15–20 (S, 1.46 ± 0.28); 15–20 (12.6 ± 1.62); tergal and pleural setae on VII, 17–21 (17.9 ± 1.38); abdominal pleural setae on VII, 7–10 (7.8 ± 1.27). Total length 1.140–1.260 (S, 1.172 ± 0.0050). Genital sac with any prominent spines (8 specimens) or with only 1 short spine (3 specimens); parameral arch width 0.120–0.135 (S, 0.127 ± 0.0056); endoneral plate width 0.075–0.090 (S, 0.082 ± 0.0056); length 0.090–0.105 (S, 0.099 ± 0.0057).

Female. Close to G. dakotasensis, except as follows. Temple width 0.375–0.420 (S, 0.400 ± 0.044); submarginal temple seta 0.085–0.120 (S, 0.100 ± 0.005); antennal scarpal width 0.090–0.105 (S, 0.090 ± 0.045); head length 0.296 (0.052). Likewise, females of G. fuchsi are smaller, with the values for the best characters being temple width 0.052–0.065, head length 0.288 (0.104), and prothorax width 0.072 (0.018).

Material Examined. 10 mi, 19 mi, ex T. tu. utah. Utah: Duchesne Co. 13.6 mi (21.9 km) N, 4.2 mi (6.7 km) W, Fish Lake (6 mi, 9.6 km) W (S, 0.272 ± 0.021), Kitty Desert (1 mi, 1.6 km) S, 1 mi (1.6 km) E (10); University Co. 2 mi, 2 mi, ex T. e. moureti Goldman, Utah: Utah Co. 25 mi (40.2 km) SE Payson (1), 5 mi (8 km) SE (1), 1 mi (1.6 km) E (10); 13.8 mi, 19 mi, ex T. t. arquataensis Durrant, Utah: Salt Lake Co., Buttefield Canyon (4), Tooele Co.: Settlement Creek, Oquirrh Mtn. (1), 6 mi (10 km) S, 3 mi (5 km) S, 5 mi (8 km) S (10), 6 mi, 6 mi, ex T. t. waatavensis Utzinger: Utah Co. 0.5 mi (0.8 km) S, 1 mi (1.6 km) E (10), 1 mi (1.6 km) E (10).

Remarks. Geomyopus duchesnayensis is one of the most distinctive of the taxa of the thermomys complex. The male has a genital sac without any prominent spines or with only a single short spine; the female has a small genital sac (Fig. 4) lacking evidence of a distinct posterior stalk. The males of the other taxa, where they are known, invariably have the two long genital sac spines with variation in the number limited to the shorter spines. Only G. fuchsi among the phylogenetically related taxa in the Geomyopus complex lack lines on the female genital sac, but their sac is larger and with an off-center posterior stalk (Fig. 3).

The known geographical distribution of G. duchesnayensis (Fig. 16) is limited to four subspecies of T. talpoides that occur in central Utah.

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1. Male

2. Female

3. With total of 5 or more prominent genital sac spines (Fig. 13 and 15)

4. With total of not more than 4 such spines (Fig. 10–12 and 14)

5. Prothorax width more than 0.272; templetwidth more than 0.376; only on T. f. fuchsi


8. With accessory transverse sclerite on genital sac in addition to spines (Fig. 14); usually on T. marzuoi


10. With total of 5 genital sac spines

11. Dakotasensis Price and Emerson, 1971: 245


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Poster stain of genital sac centered (Fig. 2 and 5)

13. Genital sac with inner lines tending to curve toward midline anteriorly (Fig. 2); on T. talpoides east of Oregon and Washington...