

## A REVISION OF THE GENUS *GEOMYDOECUS* (MALLOPHAGA: TRICHODECTIDAE) OF THE NEW WORLD POCKET GOPHERS (RODENTIA: GEOMYIDAE)

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*Abstract:* A study of over 3800 adult specimens of *Geomydoecus*, representing material from over 3/4 of the recognized species of pocket gophers, has resulted in the redescription of the 11 previously-described *Geomydoecus* species as well as the description of 31 new species and 3 new subspecies. Keys are provided for the identification of these forms.

The genus *Geomydoecus* Ewing, 1929 represents a group of trichodectid mallophagans restricted in its distribution to pocket gophers, a family of rodents limited to areas of North and Central America. To date, 11 specific names have been applied to these lice, with a number of these poorly-defined and host-limits nebulous at best. Through the cooperation of various individuals, we have been able to examine over 3800 adult *Geomydoecus* from 29 of the 36 species, and many subspecies, of pocket gophers recognized by Russell (1968). This undoubtedly represents the most extensive collection of *Geomydoecus* assembled for study. It soon became apparent to us that we would not only be able to redescribe the existing recognized species but that we were in possession of a large number of undescribed species and subspecies. It is our intent here to present the results of this work.

In the following descriptions, measurements are in millimeters. Host nomenclature follows that of Russell (1968), Hall & Kelson (1959), or Miller & Kellogg (1955). All illustrations of similar parts are at the same magnification, so that obvious size differences are observable; unless stated to the contrary, figures represent material from the type-host. To keep descriptions as brief as possible, figures are often referred to, with a minimum of amplification; a discussion of pertinent characters precedes the descriptions to make this brevity meaningful. A number in parentheses following a locality in the materials examined section refers to total different collections. Designation of paratypes is restricted to specimens from the type-host. The species and subspecies are numbered from 1-18 to indicate a grouping, so that those with the same number followed by a letter are presumed

to belong to the same group and those with a number and no letter remain ungrouped.

Data on questionable records are given even though we doubt the accuracy of the data. Inaccuracies probably resulted from one or more of the following reasons: (1) host identifications were made by many individuals, and it is doubtful that they all agree on interpretation of the classification; (2) some of the material was collected off museum skins, thus leading to suspected contamination; (3) more than one species of pocket gopher may be found in some localities, especially in Mexico, and this offers the opportunity for mixing of specimens in the field during preparation of the skins; and (4) during preparation of the material for study, there was opportunity for mixing of louse specimens or for the erroneous transfer of data to the slides. The percentage of questionable records is about what we have experienced in other studies.

The accompanying figures give the geographical distributions of the 45 recognized *Geomydoecus* taxa. The number in parentheses after each name corresponds to the group number associated with each description. In most instances, the distribution shown for the *Geomydoecus* is roughly equivalent to the range of the known host species or subspecies based on maps of Hall & Kelson (1959). TABLE 1 summarizes the occurrence of *Geomydoecus* on the various hosts; vertical lines with arrows indicate the presence of a single *Geomydoecus* taxon on more than one host taxon; a bracket is used to indicate the occurrence of usually only one, less often 2, *Geomydoecus* on the same host taxon. Questionable records have been omitted from both the maps and table.

### Genus *GEOMYDOECUS* Ewing, 1929

*Geomydoecus* Ewing, 1929, Man. Ext. Parasites: 121, 193. Type-species: *Trichodectes geomydis* Osborn.

♂. Much as in FIG. 1. Head with medioanterior indentation; preantennal region as broad as or broader than temples. Antenna with scape very large, remaining 2 segments slender. Pterothorax with varying number of medium to long setae; prothoracic legs smallest, usually beneath head; legs with single claw. Abdomen broadly rounded, without evident spiracles. Single row of setae on tergites I-VIII and sternites II-VII.

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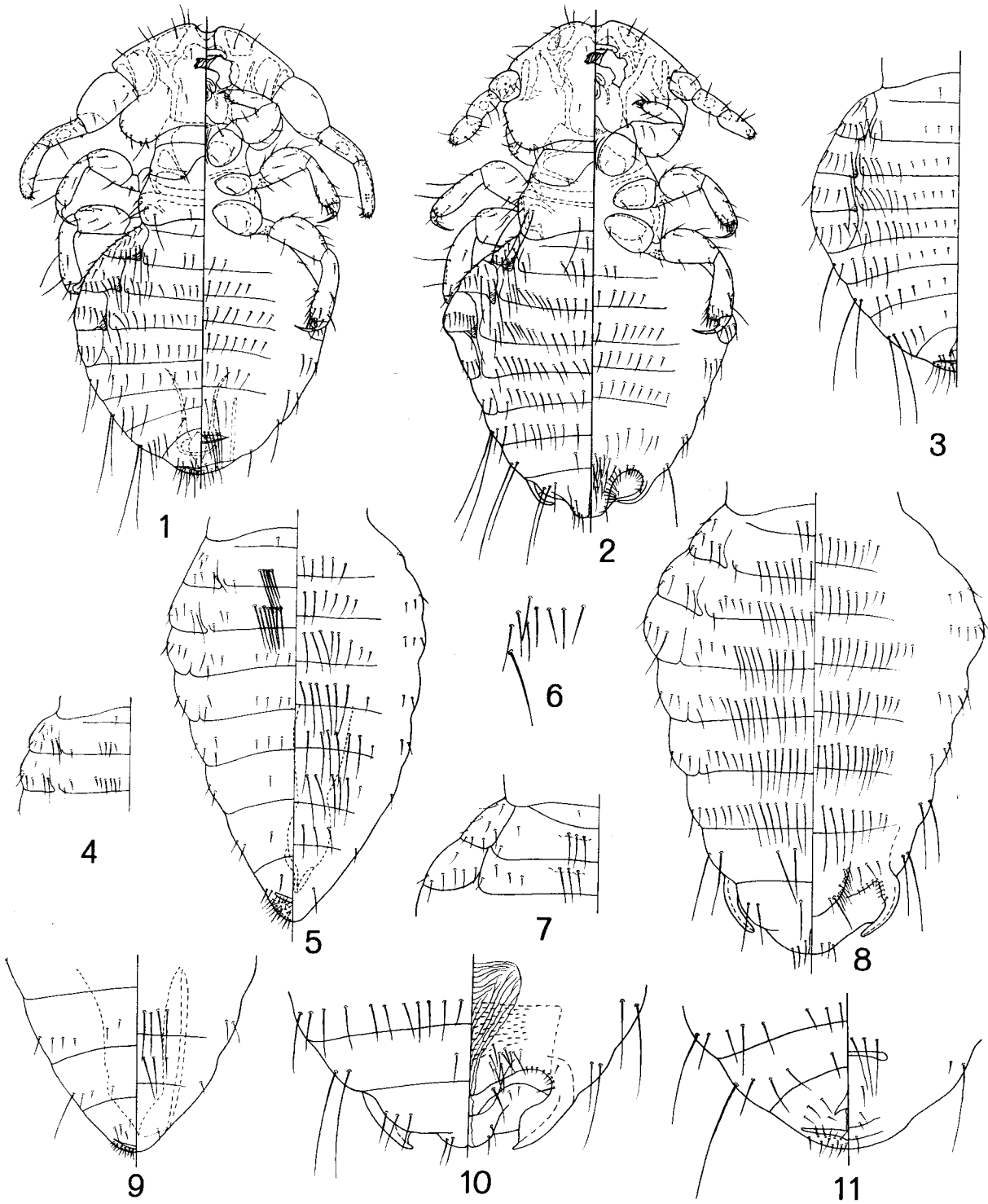


FIG. 1-11. *Geomydoecus mexicanus*: (1) ♂; (2) ♀. *G. p. perotensis*: (3) ♂ dorsal abdomen. *G. minor*: (4) ♂ tergites I-III (ex *Thomomys* sp., Arizona). *G. neopei*: (5) ♂ abdomen. *G. veracruzensis*: (6) ♀ subgenital plate setae. *G. copei*: (7) ♂ tergites I-III. *G. neopei*: (8) ♀ abdomen. *G. wardi*: (9) ♂ terminalia (ex *T. t. fossor*). *G. o. oregonus* terminalia: (10) ♀; (11) ♂.

TABLE 1. Host-parasite associations of pocket gophers and *Geomydoecus*.

POCKET GOPHERS	<i>Geomydoecus</i> sp.			
Family Geomyidae				
Tribe Thomomyini				
Genus <i>Thomomys</i>				
<i>umbrinus</i>	umbrini (3b)		<i>scleritus</i> (1)	
<i>atrovarius</i>				
<i>crassidens</i>				
<i>durangi</i>				
<i>eximius</i>				
<i>parviceps</i>	{ tolucae (7c) neocopei (8b)			
<i>zacatecae</i>				
<i>tolucae</i>				
<i>bottae</i>	californicus (3a)			
<i>analogus</i>				
<i>anitae</i>				
<i>aureus</i>				
<i>bottae</i>				
<i>chrysonotus</i>				
<i>robustus</i>				
<i>sinaloae</i>				
<i>pervagus</i>		↓ minor (8d)		
[ <i>baileyi</i> ] <i>tularosae</i>		↓ subcalifornicus (3d)		
<i>simulus</i>				
<i>perditus</i>				
<i>bulbivorus</i>	{ oregonus (7a)			
<i>townsendii</i>	↑ idahoensis (7b)			
<i>elkoensis</i>				
<i>nevadensis</i>				
<i>townsendii</i>				
<i>talpoides</i>	↑ dakotensis (6b)			
<i>confinis</i>				
<i>rufescens</i>	{ duchesnensis (6c)			
<i>uinta</i> (?)				
<i>nebulosus</i>	↑ wardi (8c)			
<i>bullatus</i>				
<i>clusius</i>				
<i>fossor</i>				
<i>macrotis</i>				
<i>ocius</i>				
<i>agrestis</i>				
<i>devexus</i>				
<i>douglasii</i>				
<i>fuscus</i>				
<i>pygmaeus</i>		thomomys (6a)		
<i>quadratus</i>				
<i>ravus</i>				
<i>talpoides</i>				
<i>wasatchensis</i>				
<i>monticola</i>				
<i>hesperus</i>				
<i>mazama</i>				
<i>glacialis</i>				
<i>tumuli</i>				
Tribe Geomyini				
Genus <i>Zygogeomys</i>	{ trichopi (14)			
<i>trichopus</i>				
Genus <i>Geomys</i>				
<i>tropicalis</i>	↑ texanus (4)			
<i>personatus</i>				
<i>fallax</i>	{ truncatus (5)			
<i>megapotamus</i>				
<i>personatus</i>				
<i>streckeri</i>	↑ quadridentatus (3c)			
<i>arenarius</i>				
<i>arenarius</i>	↑ ewingi (2d)			
<i>brevirostris</i>				
<i>bursarius</i>		↑ oklahomensis (3e)		
<i>breviceps</i>				
<i>pratincola</i>		{ subgeomydis (2b)		
<i>dutcheri</i>				
<i>major</i>				
<i>atwateri</i>	↑ geomydis (2a)			
<i>industriis</i>				
<i>brazensis</i>	{ illinoensis (2c)			
<i>bursarius</i>				
<i>lutescens</i>				
<i>majusculus</i>				
<i>illinoensis</i>				

<i>pinetis</i>	scleritus (1)
<i>austrinus</i>	
<i>floridanus</i>	
<i>goffi</i>	
<i>mobilensis</i>	
<i>pinetis</i>	
<i>colonus</i>	Genus <i>Orthogeomys</i>
<i>cumberlandicus</i>	
<i>fontanelus</i>	
<i>grandis</i>	{ alleni (10b)
<i>alleni</i>	{ jonesi (10a)
<i>felipensis</i>	{ chiapensis (11)
<i>hispidus</i>	{ chapini (9a)
<i>chiapensis</i>	{ copei (8a)
<i>torridus</i>	{ yucatanensis (9b)
<i>yucatanensis</i>	
<i>heterodus</i>	Genus <i>Macrogeomys</i>
<i>cartagoensis</i>	{ costaricensis (13)
<i>cavator</i>	{ panamensis (12a)
<i>dariensis</i>	{ dariensis (12b)
<i>alcorni</i>	Genus <i>Pappogeomys</i>
<i>alcorni</i>	{ alcorni (16c)
<i>bulleri</i>	↑ bulleri (15)
<i>burti</i>	
<i>bulleri</i>	↑ mcgregori (16a)
<i>melanurus</i>	
<i>nelsoni</i>	
<i>fumosus</i>	↑ gynnurus
<i>gynnurus</i>	
<i>russelli</i>	↑ expansus (17a)
<i>castanops</i>	
<i>castanops</i>	
<i>lacrimalis</i>	↑ perotensis (18b)
<i>rubellus</i>	
<i>merriami</i>	↑ coronadoi (17b)
<i>estor</i>	
<i>perotensis</i>	{ mexicanus (18a)
<i>saccharalis</i>	{ merriami (17c)
<i>merriami</i>	
<i>traubi</i>	{ traubi (18e)
<i>irolonis</i>	{ irolonis (18c)
<i>fulvescens</i>	{ vexacruzensis (17d)
	{ fulvescens (18d)
	{ polydentatus (17c)
<i>zinseri</i>	{ wernecki (16b)

Pleurites II-IV or II-V well-developed, with setae. Genitalia (FIG. 100) consisting of a medioposterior endomerale plate, a fused parameral arch, a sac, and basal apodemes.

♀. Much as in FIG. 2. Close to ♂, except as follows. Head broadest across temples. Antenna 3-segmented (FIG. 146), with basal and terminal segments small, second segment often with process, although often obscured by angle of mount. Pterothorax with varying number of long setae. Ventral terminalia variable, with subgenital plate and conspicuous gonapophyses.

CHARACTERS

♂. (1) The scape occurs in 3 types: (a) with a distinct protuberance on the posterior margin (FIG. 143), (b) with a tendency for a much less developed convexity on the posterior margin (FIG. 144), and (c) with the posterior margin essentially straight (FIG. 145). The first is clearly separable from the others, but the position of the antenna and variability in mounting sometimes makes decisions between types (b) and (c) difficult. Type (b) is restricted to certain specimens from *Geomys bursarius* (Shaw), and a note to this effect is inserted in the

key.

(2) The posterior margin of the temple has setae that have proven valuable in ♂ identification. All specimens have 3 setae associated with the lateroposterior corner, one of these usually submarginal and the other 2 marginal. Of particular significance are whether the 2 marginal setae are stout and spiniform (FIG. 41-47) or slender (FIG. 48-51), and the position and length of the submarginal seta in relation to the 2 marginal setae. The various types observed are shown in FIG. 41-51.

(3) Certain general impressions are associated with the shape and chaetotaxy of the abdomen, especially of the terminalia. The tergoventral setae may be short (not extending over halfway from their alveoli to those on the following tergite), long (extending to or beyond alveoli on following tergite), or medium (intermediate between these). Also, certain peculiarities are present involving unusual chaetotaxy (FIG. 5) or unusual gross abdominal shape (FIG. 5, 17).

(4) Probably the single most useful feature for species recognition involves the details of the genitalia. Medioposteriorly there is a single plate, here referred to as the endomerale plate, that assumes a wide variety of shapes, from being widely bifurcate (FIG. 134), narrowly divided (FIG. 133), pointed and undivided (FIG. 120), to elongate and undivided (FIG. 124). Passing laterally across the endomerale plate area is another sclerite of uncertain origin, possibly representing the fused parameres, and here termed the parameral arch; this may assume an evenly rounded shape (FIG. 142), an expanded truncate shape (FIG. 121), a flared posterior portion with a nipple-like projection (FIG. 122), a medio-posterior projection (FIG. 100), to having an elongate attenuate shape (FIG. 127). The genital sac may be small and possess no obvious large pigmented spines (FIG. 127), may be somewhat larger and have 2 spines (FIG. 138), may be well-developed and have 4 spines (FIG. 100), 6 spines (FIG. 119), or 10-11 spines (FIG. 137), or may even have a more exotic spination (FIG. 114, 117, 118).

(5) Useful dimensions are those of head width (HW) across the temples, total body length (TBL) at the midline, and genitalia width (GW) measured as the broadest area across the parameral arch.

♀. (1) The gross shape and relative size of the head are given in a series of head outlines (FIG. 29-40), useful more for comparative purposes than for identification of an individual species.

(2) The posterior margin of the temple has 3 setae in a position comparable to the ♂. No ♀

possesses marginal spiniform setae, but the relative lengths and positions of these 3 setae do enable a degree of grouping and may also allow ♀♀ to be correctly associated with ♂♂ in instances in which 2 species of *Geomydoecus* occur on the same host.

(3) The last tergite typically has 3 setae each side, either grouped together at the lateroposterior corner (FIG. 73) or with one seta displaced toward the midline (FIG. 76). This positioning, along with the lengths of these setae, has been found most useful in classification of the ♀♀.

(4) The chaetotaxy of the subgenital plate has also proven to be of significance for species identification. It may have a medioanterior patch of long setae (FIG. 16), a sparse number of long medioanterior setae (FIG. 24), or only a lateral patch (FIG. 26). This lateral patch of setae may consist of 1 seta longer and stouter than the others (FIG. 6, 10) or of a number of subequally long setae (FIG. 24, 25). The plate itself may be rather long and lobate, reaching the end of the abdomen (FIG. 2, 16), or it may be broad and U-shaped with short setae ending far from end of abdomen (FIG. 8), or it may be broad with transversely aligned setae (FIG. 12), or it may be the more conventional plate (FIG. 10, 13, 19, 21, 26, 28).

(5) A particulation is evident in the genital chamber of virtually all specimens, this being especially pertinent in the lateral region. These particles may be (a) regularly narrow and oblong (FIG. 62), (b) oblong but with a series of definite dark dots on each (FIG. 63), (c) rather large with a posterior fringe of spinules (FIG. 64), (d) slender anteriorly and broader posteriorly, without fringes (FIG. 65), or (e) as in type of FIG. 65, but with a fringe of spinules on posterior particles (FIG. 66). Differentiation between types (d) and (e) is subject to some difficulties, but the other types are excellent for rapid recognition of species groups.

(6) One of the most valuable and consistent features for ♀ identification concerns the structure of what appears to be the dorsal wall of the genital chamber. This membrane, or sac, has a series of lines associated with it, assuming various configurations (FIG. 80-99). The overall size of this sac, along with the location and direction of the lines, is of importance. There may be (a) a number of anterior loops (FIG. 93), (b) only a few anterior loops (FIG. 94), (c) all converging lines (FIG. 91), (d) only lateral lines (FIG. 83), (e) anterior papillosity (FIG. 89), (f) a medioanterior indentation (FIG. 99), and so on, all of which have proven to be quite consistent and reliable.

(7) The only dimensions of use for the ♀ are

those of head width (HW) across the temples, total body length (TBL) at the midline, and genital chamber width (GCW) measured anteriorly between bases of lateral constrictions.

KEY TO THE KNOWN SPECIES AND SUBSPECIES  
OF *Geomydoecus*



1. Scape with definite process on posterior margin (FIG. 143).....2  
Scape without such process (FIG. 144, 145).....5
2. Genital sac with only 4 large spines (FIG. 106).....3  
Genital sac with 6 large spines (FIG. 101).....4
3. Temple with submarginal seta about 2 × length of longer corner marginal spiniform seta; head width 0.39 or less .....**quadridentatus** (p. 240)  
Temple with submarginal seta well over 2 × length of longer corner marginal spiniform seta (FIG. 41); head width 0.39 or more.....**subcalifornicus** (p. 240)
4. Temple with submarginal seta 2 × or more length of longer corner marginal spiniform seta.....  
.....**oklahomensis** (in part) (p. 242)  
.....**californicus** (p. 238)  
Temple with submarginal seta less than 2 × length of longer corner marginal spiniform seta.....  
.....**oklahomensis** (in part) (p. 242)  
.....**umbrini** (p. 240)
5. Temple without marginal spiniform setae each side (FIG. 48–51).....6  
Temple with 1–2 marginal spiniform setae each side (FIG. 41–47).....14
6. Temple margin with very long seta (FIG. 51); genitalia of type in FIG. 114.....7  
Temple margin with only short setae (FIG. 48–50); genitalia otherwise (FIG. 100, 102, 124, 130–132).....9
7. Genitalia (FIG. 112) with not more than single spinous piece in sac and width only 0.11–0.12.....  
.....**duchesnensis** (p. 243)  
Genitalia (FIG. 114) with at least 3 spinous pieces in sac (FIG. 114, 117, 118) and width 0.13 or more.....8
8. Genital sac with 4–5 short spinous pieces in addition to 2 elongate pieces (FIG. 117, 118).....**dakotensis** (p. 243)  
Genital sac with only 1–2 short spinous pieces in addition to 2 elongate pieces (FIG. 114).....  
.....**thomomyus** (p. 242)
9. Head width over 0.50.....10  
Head width under 0.45.....12
10. Genitalia (FIG. 130) very narrow, 0.06–0.07 wide; head width approximately 0.55.....**copei** (p. 245)  
Genitalia (FIG. 100, 102) large, over 0.20 wide; head width over 0.60.....11
11. Genitalia (FIG. 100) 0.25–0.26 wide, with endomeral plate as shown.....**jonesi** (p. 249)  
Genitalia (FIG. 102) only 0.21 wide, with endomeral plate as shown.....**alleni** (p. 249)
12. Setae of tergites II–III short and widely spaced (FIG. 4); genitalia as in FIG. 132.....**minor** (p. 249)  
Setae of tergites II–III long and clustered (FIG. 5); genitalia as in FIG. 124 or 131.....13
13. Genitalia (FIG. 124) with large sac, sharply tapered endomeral plate, and broadly pointed parameral arch.....**wardi** (p. 248)  
Genitalia (FIG. 131) with small sac, expanded endomeral plate, and narrowly pointed parameral arch.....  
.....**neocopei** (p. 248)
14. Genitalia with flattened medioposterior margin of parameral arch (FIG. 121).....**truncatus** (p. 242)  
Genitalia with medioposterior margin of parameral arch pointed or evenly rounded.....15
15. Genitalia (FIG. 140, 142) with evenly rounded parameral arch, endomeral plate as in FIG. 140–142, and sac without large spines.....16  
Genitalia otherwise, with pointed medioposterior elongation of parameral arch, and sac usually with large spines.....18
16. Median setae of tergites II–VII not ending more than own length from margin of respective tergite (FIG. 1); genitalia (FIG. 142) 0.11 wide, with variable endomeral plate (FIG. 141, 142).....**mexicanus** (p. 256)  
Median setae of tergites II–VII shorter (FIG. 3), extending not over halfway from alveoli to posterior margin of respective tergite; genitalia (FIG. 140) 0.09–0.10 wide.....17
17. Head width 0.44 or less...**perotensis perotensis** (p. 256)  
Head width 0.45 or more ...**perotensis irolonis** (p. 256)
18. Genitalia (FIG. 127, 138, 139) not over 0.14 wide, and sac either small without large spines or with 2 spines (FIG. 138).....19  
Genitalia otherwise, often over 0.14 wide and/or sac with at least 4 well-developed spines.....22
19. Head width over 0.49; genitalia close to FIG. 127, with strongly attenuate parameral arch (FIG. 126).....20  
Head width under 0.49; genitalia (FIG. 138, 139) with parameral arch not so strongly attenuate.....21
20. Genitalia with broad endomeral plate having convex sides (FIG. 125); head width under 0.52.....  
.....**yucatanensis** (p. 249)  
Genitalia with narrow endomeral plate having relatively straight sides (FIG. 128, 129); head width over 0.52.....**chapini** (p. 249)
21. Genitalia (FIG. 139) up to 0.10 wide, sac without large spines, and posterior sclerites as shown.....  
.....**fulvescens** (p. 256)  
Genitalia (FIG. 138) 0.13 or more wide, sac with 2 anterior spines, and posterior sclerites as shown.....  
.....**traubi** (p. 257)
22. Head width over 0.57; genitalia (FIG. 107, 119) over 0.21 wide.....23  
Head width under 0.55; genitalia otherwise, under 0.21 wide.....25
23. Genitalia (FIG. 107) with endomeral plate having tip narrowly elongate and divided.....**chiapensis** (p. 251)  
Genitalia (FIG. 119) with endomeral plate subtriangular and undivided at tip.....24
24. Medioanterior head margin deeply indented (FIG. 30).....**panamensis** (p. 251)  
Medioanterior head margin shallowly indented (FIG. 31).....**dariensis** (p. 251)
25. Genitalia (FIG. 134) with broadly bifurcate endomeral plate and sac with 4 large spines...**costaricensis** (p. 251)  
Genitalia otherwise, with narrowly bifurcate or undivided endomeral plate of various other shapes, and often with 6 or more prominent spines on sac.....26
26. Genitalia with elongate endomeral plate much as in FIG. 109–111, usually with short apical division.....27  
Genitalia with shorter endomeral plate shaped otherwise, either apically undivided or with deeper division .....29
27. Head width 0.46 or less; genitalia much as in FIG. 110, except only about 0.16 wide, endomeral plate usually without distinct apical shoulders, and parameral arch with deeply notched anterior border (FIG. 111).....  
.....**alcorni** (p. 254)

- Head width 0.47 or more; genitalia as above, except 0.18–0.20 wide, endomerale plate with distinct apical shoulders, and parameral arch with evenly concave anterior border (FIG. 109, 110).....28
- 28. Genital sac with 6 prominent spines; endomerale plate usually appearing undivided (FIG. 109).....  
.....**wernecki** (p. 253)  
Genital sac with only 5 prominent spines; endomerale plate apically divided (FIG. 110).....**mcgregori** (p. 253)
- 29. Genital sac with only 4 large spines (FIG. 103, 106).....30  
Genital sac with 6 or more large spines.....31
- 30. Head width 0.42 or more; genitalia width 0.16 or more (FIG. 103); temple close to FIG. 45, with submarginal seta occasionally extending slightly beyond apices of marginal spiniform setae.....**texanus** (p. 242)  
Head width 0.41 or less; genitalia close to FIG. 135, only 0.15 or less wide; temple close to FIG. 42, with submarginal seta extending well beyond apices of marginal spiniform setae.....**ewingi** (p. 238)
- 31. Endomerale plate of genitalia without evidence of apical division (FIG. 120, 123).....32  
Endomerale plate of genitalia with evident apical division .....33
- 32. Endomerale plate subtriangular, with apical point (FIG. 120).....**trichopi** (p. 253)  
Endomerale plate with blunt narrow apical prolongation (FIG. 123).....**bulleri** (p. 253)
- 33. Genital sac with 10–11 large spines (FIG. 137).....  
.....**polydentatus** (p. 255)  
Genital sac with only 6 large spines.....34
- 34. Scape often as in FIG. 144, with definite posterior subapical convexity; on *Geomys bursarius*.....35  
Scape (FIG. 145) with posterior margin essentially straight; on *Thomomys* or *Pappogeomys* .....36
- 35. Head width 0.39 or less; genitalia width 0.14 or less; total body length 1.20 or less .....  
.....**geomydis subgeomydis** (p. 236)  
Head width 0.40 or more; genitalia width 0.15 or more; total body length 1.25 or more.....  
.....**geomydis geomydis** (p. 236)  
.....**illinoensis** (p. 238)
- 36. Endomerale plate of genitalia with distinctly narrowed apical portion (FIG. 135), total body length under 1.35, and genitalia width 0.15 or less..**coronadoi** (p. 254)  
Endomerale plate of genitalia usually without such narrowed apical portion (FIG. 105, 108, 133) or total body length over 1.35 or genitalia width 0.16 or more.....37
- 37. Genitalia as in FIG. 122 or 133; temple (FIG. 42) with long submarginal corner seta.....38  
Genitalia closer to FIG. 105, 108, or 136; temple (FIG. 43) with shorter submarginal corner seta.....40
- 38. Genitalia (FIG. 122) with broadly flared posterior portion of parameral arch and with narrow parallel-sided apical portion of endomerale plate..**tolucae** (p. 245)  
Genitalia much as in FIG. 133, with narrower posterior portion of parameral arch and without such narrow apical portion of endomerale plate.....39
- 39. Head width 0.43 or more; genitalia width 0.16 or more .....  
.....**oregonus oregonus** (p. 243)  
Head width 0.42 or less; genitalia width 0.16 or less.....  
.....**oregonus idahoensis** (p. 245)
- 40. Genitalia close to FIG. 108, width 0.15 or less.....  
.....**expansus** (p. 254)  
Genitalia close to FIG. 105 or 136, width 0.16 or more...41
- 41. Total body length more than 1.35; genitalia close to FIG. 136, but with parameral arch not always so evenly rounded as shown.....**merriami** (p. 255)

- Total body length less than 1.35; genitalia close to FIG. 105.....**veracruzensis** (p. 255)
- ♀♀
1. Last tergite with pair of medioanterior setae, separated from paired lateroposterior setae each side (FIG. 74–77) .....2  
Last tergite without medioanterior setae, with 3 fairly evenly-spaced lateroposterior setae each side (FIG. 67–73) .....12
  2. Medioanterior setae of last tergite much shorter and finer than lateroposterior setae (FIG. 75)..**traubi** (p. 257)  
Medioanterior setae of last tergite nearer to same size as lateroposterior setae (FIG. 74, 76, 77).....3
  3. Genital chamber sac large, with papillose anterior portion (FIG. 88, 89).....4  
Genital chamber sac variable, but without papillose anterior portion.....5
  4. Head width more than 0.50; genital chamber sac (FIG. 89) with medial lines directed more or less posteriorly.....**mcgregori** (p. 253)  
.....**wernecki** (p. 253)  
Head width less than 0.50; genital chamber sac (FIG. 88) with number of loops or lines transversely across median portion.....**alcorni** (p. 254)
  5. Temple margin (FIG. 56) with submarginal seta not extending beyond apex of longer corner marginal seta.....6  
Temple margin (FIG. 53) with long submarginal seta or (FIG. 61) with very long marginal to slightly submarginal seta.....7
  6. Genital chamber sac (FIG. 85) apparently with paired parallel lines.....**wardi** (p. 248)  
Genital chamber sac without evident lines.....  
.....**neocopei** (p. 248)  
.....**minor** (p. 249)
  7. Head width 0.43 or less and temple margin with very long seta (FIG. 61).....8  
Head width usually more than 0.43 and temple margin with shorter corner setae (FIG. 52, 53).....9
  8. Genital chamber sac with lines (FIG. 83).....  
.....**dakotensis** (p. 243)  
.....**thomomyus** (p. 242)  
Genital chamber sac without evident lines.....  
.....**duchesnensis** (p. 243)
  9. Subgenital plate without long medioanterior setae (FIG. 10); genital chamber sac as in FIG. 86 or 98...10  
Subgenital plate with long medioanterior setae (FIG. 24); genital chamber sac as in FIG. 87.....11
  10. Genital chamber sac (FIG. 86) with lines only on anterior 1/2 and most directed posteriorly; medioanterior setae of last tergite not extending near tip of abdomen (FIG. 77).....**trichopi** (p. 253)  
Genital chamber sac (FIG. 98) with lines extending to posterior portion and many laterally across median area; medioanterior setae of last tergite extending near tip of abdomen (FIG. 76).....**bulleri** (p. 253)
  11. Head width 0.48 or less..**perotensis perotensis** (p. 256)  
.....**fulvescens** (in part) (p. 256)  
Head width 0.49 or more..**perotensis irolonis** (p. 256)  
.....**fulvescens** (in part) (p. 256)
  12. Genital chamber sac very large, usually at least 0.30 wide anteriorly, and with predominantly posteriorly converging lines, with few, if any, complete anterior loops (FIG. 82, 90, 95, 97, 99).....13  
Genital chamber sac smaller, under 0.30 wide anteriorly, and/or with number of complete anterior loops .....20

13. Anterior margin of genital chamber sac with definite median indentation or concavity (FIG. 92, 99).....14  
Anterior margin of genital chamber sac evenly flat to rounded .....16
14. Head width less than 0.61 and genital chamber sac as in FIG. 92.....**costaricensis** (in part) (p. 251)  
Head width more than 0.61 and genital chamber sac as in FIG. 99.....15
15. Medioanterior head margin deeply indented (FIG. 30).....**panamensis** (p. 251)  
Medioanterior head margin shallowly indented (FIG. 31).....**dariensis** (p. 251)
16. Genital chamber sac as in FIG. 95; last tergite with variable short and medium setae close to FIG. 70 or 72.....**polydentatus** (p. 255)  
Genital chamber sac as in FIG. 82, 90, or 97; last tergite with lateroposterior setae of fairly uniform length intermediate between FIG. 67 and 73.....17
17. Head width less than 0.50.....18  
Head width more than 0.60.....19
18. Genital chamber sac (FIG. 82) with irregular lines in central area forming at most 3-5 coarse loops.....**illinoensis** (in part) (p. 238)  
Genital chamber sac (FIG. 97) with all lines fairly regular and directed posteriorly.....**tolucae** (in part) (p. 245)
19. Temple setae (FIG. 60) with distance between submarginal seta and innermost short marginal corner seta greater than that between 2 short marginal corner setae.....**chiapensis** (in part) (p. 251)  
**alleni** (p. 249)  
Temple setae (FIG. 49) with submarginal seta usually closer to innermost short marginal corner seta than distance between 2 short marginal corner setae.....**jonesi** (p. 249)
20. Lateroposterior setae of last tergite all short, none extending close to posterior margin of abdomen (FIG. 70, 71).....21  
Some to all lateroposterior setae of last tergite longer, extending at least to posterior margin of abdomen...23
21. Genital chamber sac close to FIG. 94, with few complete anterior loops; subgenital plate with medioanterior patch of long setae (FIG. 16)..**coronadoi** (p. 254)  
Genital chamber sac close to FIG. 93, with numerous complete anterior loops; subgenital plate with few to no long medioanterior setae (FIG. 10, 24).....22
22. Lateroposterior setae of last tergite with outer seta shortest (FIG. 70); subgenital plate setae (FIG. 6) with 1 seta each side longer and stouter than others...**veracruzensis** (p. 255)  
Lateroposterior setae of last tergite variably subequal and short (FIG. 71); subgenital plate setae (FIG. 25) with number of subequal long setae each side.....**merriami** (p. 255)
23. Temple setae (FIG. 60) with submarginal seta of both sides distinctly mediad to innermost short marginal corner seta.....24  
Temple setae with submarginal seta on either or both sides not distinctly mediad to innermost marginal corner seta.....27
24. Head width over 0.65; genital chamber sac (FIG. 90) over 0.25 wide anteriorly..**chiapensis** (in part) (p. 251)  
Head width 0.64 or less; genital chamber sac (FIG. 91, 96) not over 0.25 wide anteriorly.....25
25. No central setae on tergite VII extending entirely across tergite VIII; median pair of setae on tergite VIII long, extending beyond margin of tergite VIII; genital chamber sac as in FIG. 91.....**copei** (p. 245)  
Some central setae on tergite VII long, extending entirely across tergite VIII; median pair of setae on tergite VIII short, not extending beyond margin of tergite VIII; genital chamber sac as in FIG. 96.....26
26. Head width 0.60 or more.....**chapini** (p. 249)  
Head width 0.59 or less.....**yucatanensis** (p. 249)
27. Setae across central 1/3 of tergite VII distinctly longer than comparable setae on tergite VI and subgenital plate lacking medioanterior patch of long setae.....28  
Setae across center of tergite VII either not distinctly longer than comparable setae on tergite VI, or, if longer, then subgenital plate with medioanterior patch of long setae.....32
28. Lateroposterior setae of last tergite with outer seta much shorter than others (FIG. 69) and genital chamber sac as in FIG. 93.....**expansus** (p. 254)  
Lateroposterior setae of last tergite all essentially of same length (FIG. 67, 73) or outer slightly shorter, or, if much shorter, then genital chamber sac as in FIG. 92 and head width over 0.50.....29
29. Head width 0.56 or more..**costaricensis** (in part) (p. 251)  
Head width 0.52 or less.....30
30. Head width 0.45 or more; genital chamber sac as in FIG. 94.....**texanus** (p. 242)  
Head width 0.44 or less; genital chamber sac (FIG. 81, 84) often faintly lined.....31
31. Temple with submarginal seta from midway between corner marginal setae (FIG. 59) to being closer to inner seta (FIG. 58); genital chamber sac as in FIG. 81, but with faint lines.....**scleritus** (p. 236)  
Temple with submarginal seta closer to outer corner marginal seta (FIG. 57); genital chamber sac as in FIG. 84, with distinct diagonal lines.....**truncatus** (p. 242)
32. Lateroposterior setae of last tergite with inner seta much shorter than others (FIG. 68); genital chamber sac as in FIG. 87, with faint lines..**mexicanus** (p. 256)  
Lateroposterior setae of last tergite with inner seta essentially same length as adjacent seta (FIG. 69, 73); genital chamber sac nearer to FIG. 82, 93, 94, 97...33
33. Genital chamber sac (FIG. 82, 97) with either irregular lines and at most 3-5 coarse loops or regular lines all directed posteriorly.....34  
Genital chamber sac close to FIG. 93 or 94, with fairly smooth lines and regular loops.....35
34. Genital chamber sac (FIG. 82) with irregular lines in central area forming at most 3-5 coarse loops.....**illinoensis** (in part) (p. 238)  
Genital chamber sac (FIG. 97) with all lines fairly regular and directed posteriorly.....**tolucae** (in part) (p. 245)
35. Genital chamber sac (FIG. 94) with only up to 4 anterior loops .....36  
Genital chamber sac (FIG. 93) with 5 or more anterior loops.....38
36. Temple with submarginal seta extending beyond apex of longer adjacent corner marginal seta (FIG. 52).....**ewingi** (in part) (p. 238)  
**geomydis subgeomydis** (in part) (p. 236)  
Temple with submarginal seta not extending beyond apex of longer adjacent corner marginal seta (FIG. 54) .....37
37. Head width 0.41 or less.....**geomydis subgeomydis** (in part) (p. 236)  
Head width 0.42 or more.....**quadridentatus** (p. 240)  
**oklahomensis** (p. 242)
38. Temple with submarginal seta not longer than longest adjacent corner marginal seta (FIG. 54).....39  
Temple with submarginal seta longer than longest

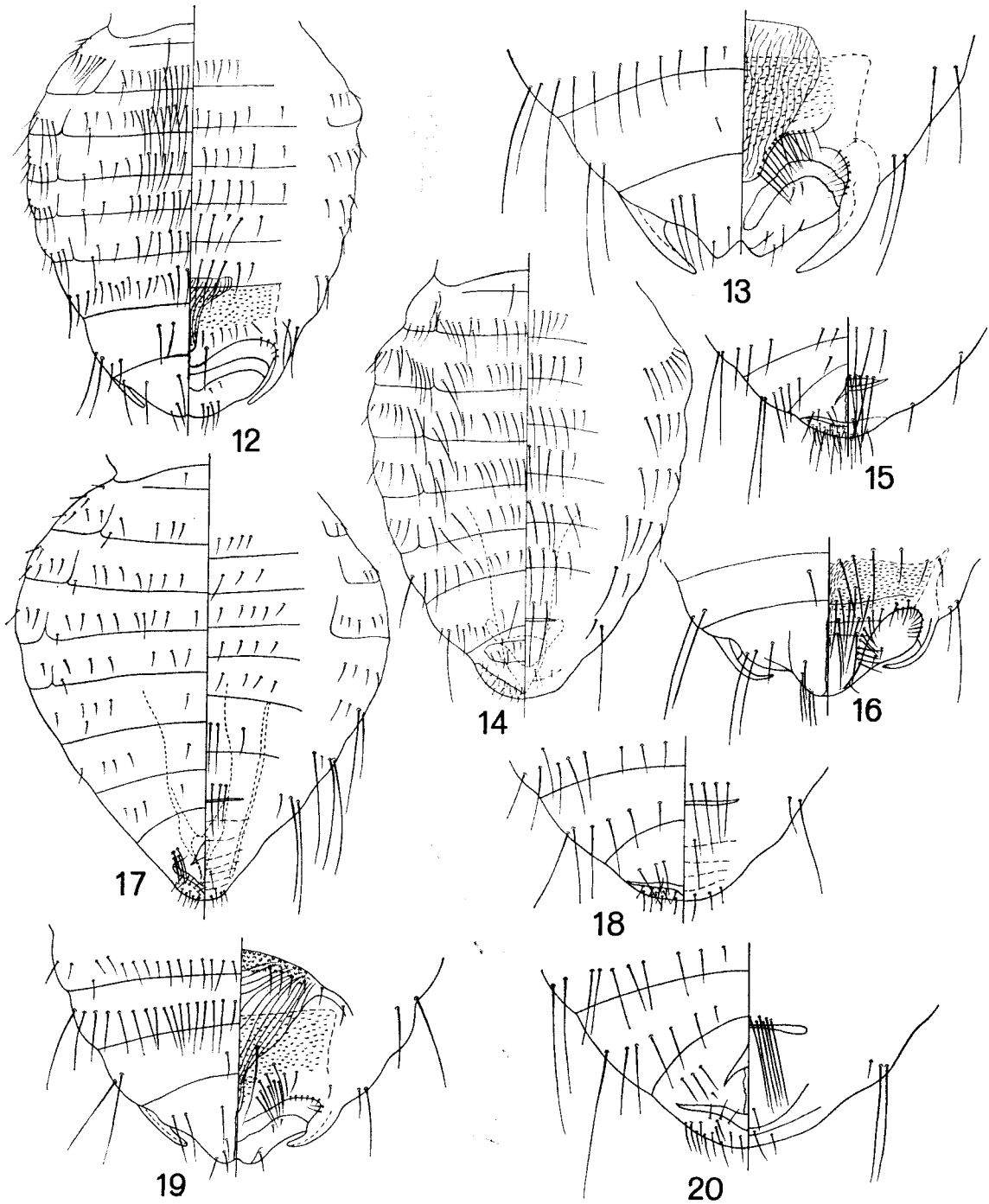


FIG. 12-20. *Geomydoecus thomomyus*: (12) ♀ abdomen. *G. jonesi*: (13) ♀ terminalia. *G. thomomyus*: (14) ♂ abdomen. *G. mexicanus* terminalia: (15) ♂; (16) ♀. *G. chapini*: (17) ♂ abdomen (ex *O. h. chiapensis*). *G. mcgregori* terminalia (ex *P. g. gymnurus*): (18) ♂; (19) ♀. *G. jonesi*: (20) ♂ terminalia.



- adjacent corner marginal seta (FIG. 52).....40
- 39. Head width 0.42 or more; genital chamber sac with 5-12 or more anterior loops.....
  - .....**geomydis geomydis** (in part) (p. 236)
  - .....**umbrini** (p. 240)
- Head width 0.41 or less; genital chamber sac with only up to 6 or so anterior loops.....
  - .....**geomydis subgeomydis** (in part) (p. 236)
- 40. Head width 0.47 or more.....
  - .....**geomydis geomydis** (in part) (p. 236)
  - .....**oregonus oregonus** (p. 243)
- Head width 0.46 or less.....41
- 41. Head width 0.43 or less.....
  - .....**geomydis subgeomydis** (in part) (p. 236)
  - .....**oregonus idahoensis** (in part) (p. 245)
  - .....**californicus** (p. 238)
  - .....**ewingi** (in part) (p. 238)
- Head width 0.44-0.46.....
  - .....**geomydis geomydis** (in part) (p. 236)
  - .....**oregonus idahoensis** (in part) (p. 245)
  - .....**subcalifornicus** (p. 240)
  - .....**ewingi** (in part) (p. 238)

**1. Geomydoecus scleritus** (McGregor) FIG. 38, 58, 81

*Trichodectes scleritus* McGregor, 1917, Ann. Ent. Soc. Amer. **10**: 172. Type-host: *Geomys pinetis floridanus* (Audubon & Bachman).

♂. Unknown.  
 ♀. HW 0.40-0.44, usually as in FIG. 38, less often 37; temple usually as in FIG. 58, with short submarginal seta near inner marginal corner seta, but occasionally submarginal seta more laterad (FIG. 59). Last tergite as in FIG. 73. Subgenital plate close to FIG. 10; tergo-central setae on VII longer than those on VI. TBL 1.06-1.20. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 81) often with faint lines.

To our knowledge, this species is unique in that no ♂♂ have ever been collected. They either do not exist and the ♀♀ reproduce by parthenogenesis or else the ♂♂ exist in such a small percentage as to have escaped capture thus far; we have seen over 300 ♀♀ and many nymphs representing collections from all 4 species and all subspecies of southeastern U.S.A. pocket gophers (FIG. 147), but no ♂♂. The ♀ appears closest to *G. truncatus* Werneck, but the positioning of the submarginal temple seta, the lines of the genital chamber sac, and the small size distinguish it from this as well as other species. The absence of ♂♂ handicaps further speculation on relationships.

*Material Examined*: 82 ♀♀, *Geomys pinetis austrinus* Bangs, U.S.A., Florida (22); 114 ♀♀, *G. p. floridanus*, U.S.A., Florida (13) [includes McGregor type-slide of *T. scleritus* containing 4 ♀♀, USNM Cotype No. 53293, from which we designate a ♀ (circled on slide) as lectotype]; 14 ♀♀, *G. p. goffi* Sherman, U.S.A., Florida (3), Georgia (4); 49 ♀♀, *G. p. mobilensis* Merriam, U.S.A., Florida (5), Alabama (2); 5 ♀♀, *G. p. pinetis* Rafinesque, U.S.A., Georgia (2); 6 ♀♀, *G. colonus* Bangs, U.S.A., Georgia (2); 25 ♀♀, *G.*

*cumberlandicus* Bangs, U.S.A., Georgia (3); 5 ♀♀, *G. fontanelus* Sherman, U.S.A., Georgia.

**2a. Geomydoecus geomydis geomydis** (Osborn) FIG. 144

*Trichodectes geomydis* Osborn, 1891, Bull. U. S. Bur. Ent. **7**: 54. Type-host: *Geomys bursarius* (Shaw).

♂. HW 0.40-0.44; temple as in FIG. 42; scape as in FIG. 144. Abdomen with medium tergo-central setae; terminalia as in FIG. 11. TBL 1.25-1.41. Genitalia (FIG. 101, 105) with endomeral plate triangular and apically divided, parameral arch as shown, and sac with 6 large spines; GW 0.15-0.17.

♀. HW 0.44-0.49, as in FIG. 37, less often 36 or 38; temple as in FIG. 52 or 54. Last tergite variably as in FIG. 69 or 73. Subgenital plate as in FIG. 10; tergo-central setae on VII equal to those on VI. TBL 1.24-1.38. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 93) with numerous anterior loops.

The ♂, with the scape type, marginal spiniform temple setae, dimensions, and genitalic features, including 6 spines in the sac, is close to those of *G. g. subgeomydis* n. subsp. and *G. illinoensis* n. sp.; it is apparently inseparable from the latter and separable from the former on differences in several dimensions. The ♀ is either inseparable or tenuously separable from those of a number of other species for which the ♂ is diagnostically characteristic; *G. g. geomydis* has a different genital chamber sac than *G. illinoensis* and differs in dimensions and occasional slight differences in genital chamber sac structure from *G. g. subgeomydis*.

The distribution of *G. g. geomydis* appears to be essentially on subspecies of *Geomys bursarius* occurring from Kansas northward (FIG. 147).

*Material Examined*: 29 ♂♂, 38 ♀♀, *Geomys bursarius bursarius*, U.S.A., Minnesota (3), North Dakota, South Dakota; 5 ♂♂, 12 ♀♀, *G. b. lutescens* Merriam, U.S.A., Nebraska (4); 9 ♂♂, 10 ♀♀, *G. b. majusculus* Swenk, U.S.A., Nebraska, Kansas; 24 ♂♂, 21 ♀♀, *G. bursarius*, U.S.A., Nebraska (6), Kansas, Iowa (2). Questionable record: 1 ♂, 1 ♀, *G. b. major* Davis, U.S.A., Texas.

**2b. Geomydoecus geomydis subgeomydis** Price & Emerson, n. subsp.

Type-host: *Geomys bursarius brazensis* Davis.

♂. HW 0.35-0.37. TBL 1.11-1.15. GW 0.13-0.14 (FIG. 135). Otherwise, as for *G. g. geomydis*.

♀. HW 0.39-0.41 (FIG. 40). TBL 0.99-1.05. Genital chamber sac intermediate between FIG. 93 and 94, typically with 4-6 anterior loops. Otherwise, as for *G. g. geomydis*.

The separation of both sexes from *G. g. geomydis* is based essentially on consistent differences in dimensions. This subspecies, from the 2 collections to date, is limited to southeastern Texas (FIG. 147).

*Material Examined*: Holotype ♂, allotype ♀, *Geomys bursarius brazensis*, Huntsville, Walker Co., Texas, 12.V.1957, R. D. Hodgins, RW 2320; in

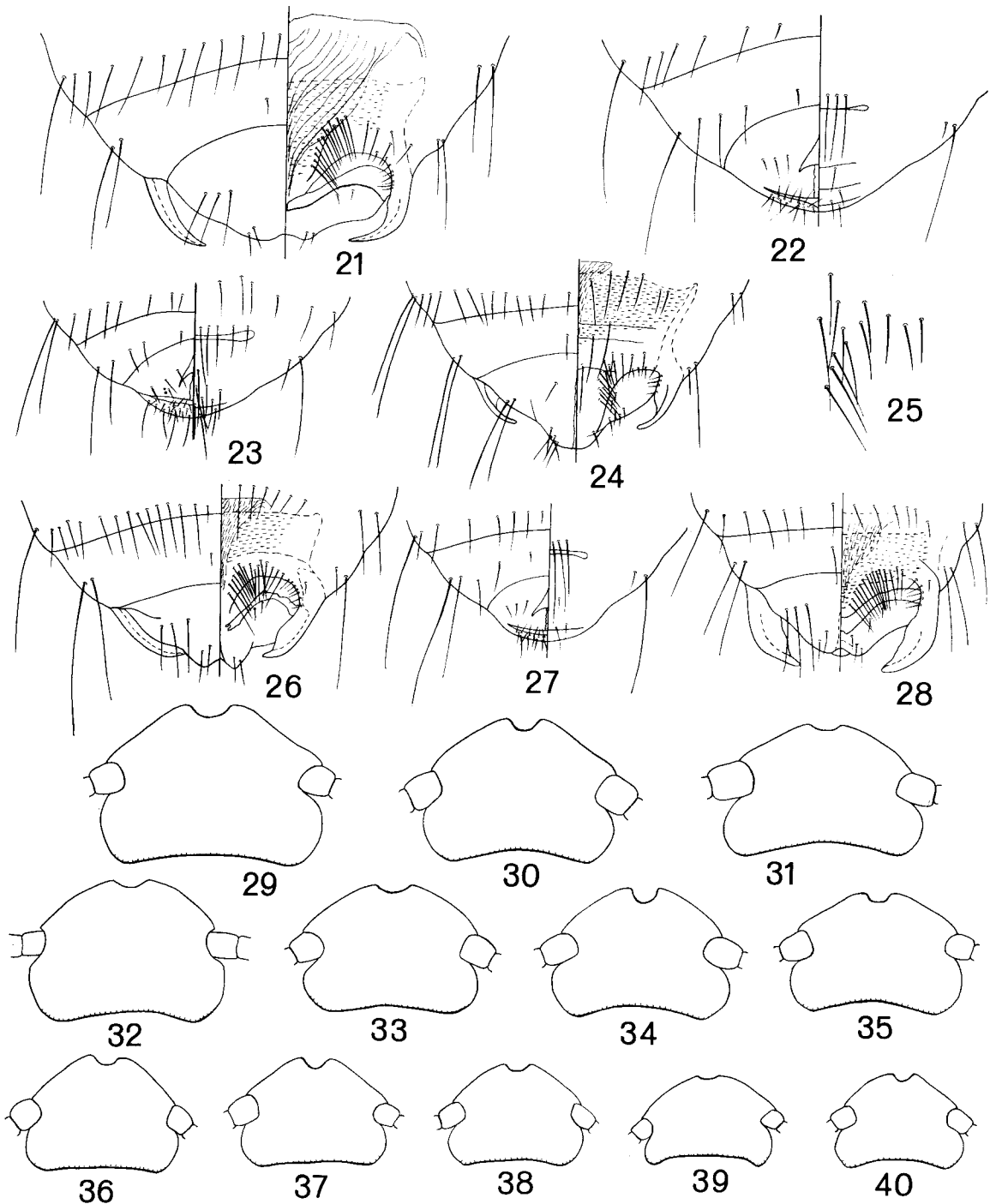


FIG. 21-40. *Geomydoecus panamensis* terminalia: (21) ♀; (22) ♂. *G. traubi* terminalia: (23) ♂; (24) ♀. *G. polydentatus*: (25) ♀ subgenital plate setae. *G. costaricensis* terminalia: (26) ♀; (27) ♂. *G. copei*: (28) ♀ terminalia. ♀ head outline: (29) *G. jonesi*; (30) *G. panamensis*; (31) *G. dariensis*; (32) *G. copei*; (33) *G. mcgregori* (ex *P. g. gymnurus*); (34) *G. costaricensis*; (35) *G. yucatanensis*; (36) *G. o. oregonus*; (37) *G. expansus* (ex *P. castanops*); (38) *G. scleritus* (ex *G. p. pinetis*); (39) *G. neocopei*; (40) *G. thomyus* (ex *T. mazama glacialis*).

collection of United States National Museum. Paratypes: 5 ♂♂, 8 ♀♀, same data as holotype; 2 ♂♂, 1 ♀, same, except RW 2321.

2c. **Geomydoecus illinoensis** Price & Emerson,  
n. sp. FIG. 82

Type-host: *Geomys bursarius illinoensis* Komarek & Spencer.

♂. As for *G. g. geomydis*.

♀. As for *G. g. geomydis*, except for distinct difference in genital chamber sac (FIG. 82), with its having irregular lines forming not over 3-5 highly irregular loops, sometimes none.

The gross difference in the lines of the genital chamber sac of the ♀ is the feature distinguishing this species. Were it not for the excellent series at hand and for the consistency of this character for all specimens, we would not consider it of specific importance, especially in the absence of any apparent differences between the ♂♂. However, we feel this separation is justified. The type-host of *G. illinoensis* represents an isolated easternmost subspecies of *Geomys bursarius* that has followed the Illinois River up from where it joins the Mississippi River near St. Louis (FIG. 147).

*Material Examined:* Holotype ♀, allotype ♂, *Geomys bursarius illinoensis*, Tippecanoe Co., Indiana, 24.II.1947, B. E. Montgomery, Lot 47-3066; in collection of United States National Museum. Paratypes: 4 ♂♂, 4 ♀♀, same data as holotype; 17 ♂♂, 13 ♀♀, Pembroke Township, Kankakee Co., Illinois, 26.V.1936, C. C. Sanborn & K. P. Schmidt, RW 2041; 1 ♂, 9 ♀♀, Custer Park, Illinois, 17.III.1953, A. J. Franzen, RW 2040; 3 ♂♂, 6 ♀♀, Benfield, Illinois, 12.VI.1941, R. L. Wenzel, RW 2039; 4 ♂♂, 4 ♀♀, Hopkins Park, Illinois, 15.IV.1935, A. J. Franzen, RW 2038; 1 ♂, 1 ♀, Momence, Illinois, 1.VI.1935, R. Komarek, Bish. 27006.

2d. **Geomydoecus ewingi** Price & Emerson,  
n. sp.

Type-host: *Geomys bursarius major* Davis.

♂. HW 0.37-0.39; temple margin as in FIG. 42; scape as in FIG. 144. Abdomen with medium tergoventral setae; terminalia as in FIG. 11. TBL 1.11-1.24. Genitalia as in FIG. 135, but with only 4 large spines in sac; GW 0.13-0.14.

♀. HW 0.40-0.45 (FIG. 40, less often 38); temple as in FIG. 52. Last tergite as in FIG. 69 or 73. Subgenital plate as in FIG. 10; tergoventral setae on VII equal to or slightly longer than those on VI. TBL 1.00-1.26. Genital chamber particles as in FIG. 66; genital chamber sac intermediate between FIG. 93 and 94, with 4-7 irregular loops.

The ♂ is easily separated from other members of this group by the presence of only 4 spines on the genital sac; it is separated from *G. texanus* Ewing, which has a similar genital sac spination, by its smaller dimensions and differences in temple setae. The ♀ is apparently inseparable from those

of several other species. The distribution is shown in FIG. 147.

*Material Examined:* Holotype ♂, allotype ♀, *Geomys bursarius major*, Stillwater, Oklahoma, 10.X.1948, K. C. Emerson; in collection of United States National Museum. Paratypes: 2 ♂♂, 1 ♀, same data as holotype; 1 ♂, 5 ♀♀, same, but 3.XI.1938. Other specimens: 3 ♂♂, 3 ♀♀, *G. b. breviceps* Baird, U.S.A., Arkansas; 3 ♂♂, 5 ♀♀, *G. b. dutcheri* Davis, U.S.A., Oklahoma; 20 ♂♂, 21 ♀♀, *G. b. pratincola* Davis, U.S.A., Texas (3).

3a. **Geomydoecus californicus** (Chapman)  
FIG. 105

*Trichodectes californicus* Chapman, 1897, Ent. News 8: 186. Type-host: *Perognathus* sp. (pocket mouse)—error. Probably *Thomomys bottae bottae* (Eydoux & Gervais).

♂. HW 0.37-0.44; temple (FIG. 41) with submarginal seta more than 2× length of longer marginal spiniform seta; scape as in FIG. 143. Abdomen with medium to long tergoventral setae; terminalia near FIG. 11. TBL 1.20-1.36. Genitalia variably as in FIG. 101, 105, or 135; GW 0.14-0.16.

♀. HW 0.41-0.43 (FIG. 38 or 40); temple (FIG. 52) with submarginal seta always extending beyond apices of marginal setae. Last tergite usually as in FIG. 73, occasionally near 69. Subgenital plate as in FIG. 10; tergoventral setae on VII approximately equal to those on VI. TBL 1.08-1.17. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 93) with 5 or more anterior loops.

The ♂ with the posterior marginal process on the scape, both sexes with the long submarginal seta on the temple, and the ♀ with the genital chamber sac with 5-12 or more anterior loops and the last tergite with 3 subequal lateroposterior setae grouped together each side, distinguish this species. The ♀ is not readily separable from *G. geomydis*, *G. ewingi*, or *G. oregonus* n. sp., other than by host association; the ♂ is apparently indistinguishable from some ♂♂ of *G. oklahomensis* n. sp.

*Geomydoecus californicus* is widely distributed throughout the southwestern U.S.A. and in isolated pockets in Mexico (FIG. 150). This species was described by Chapman (1897) from a single ♀ which obviously was taken from an incorrect host, a pocket mouse from Baja California. Werneck (1945) identified specimens from *T. bottae bottae* as this species, thereby fixing the type-host.

*Material Examined:* 29 ♂♂, 18 ♀♀, *Thomomys bottae analogus* Goldman, Mexico, Coahuila, Nuevo Leon; 20 ♂♂, 20 ♀♀, *T. b. anitae* J. A. Allen, Mexico, Baja California (2); 4 ♂♂, 5 ♀♀, *T. b. aureus* J. A. Allen, U.S.A., Utah (2); 9 ♂♂, 11 ♀♀, *T. b. bottae*, U.S.A., California (7); 1 ♂, 3 ♀♀, *T. b. chrysonotus* Grinnell, U.S.A., Arizona; 9 ♂♂, 8 ♀♀, *T. b. pervagus* Merriam, U.S.A., New Mexico (2); 1 ♂, 1 ♀, *T. b. robustus* Durrant, U.S.A., Utah; 4 ♂♂, 4 ♀♀,

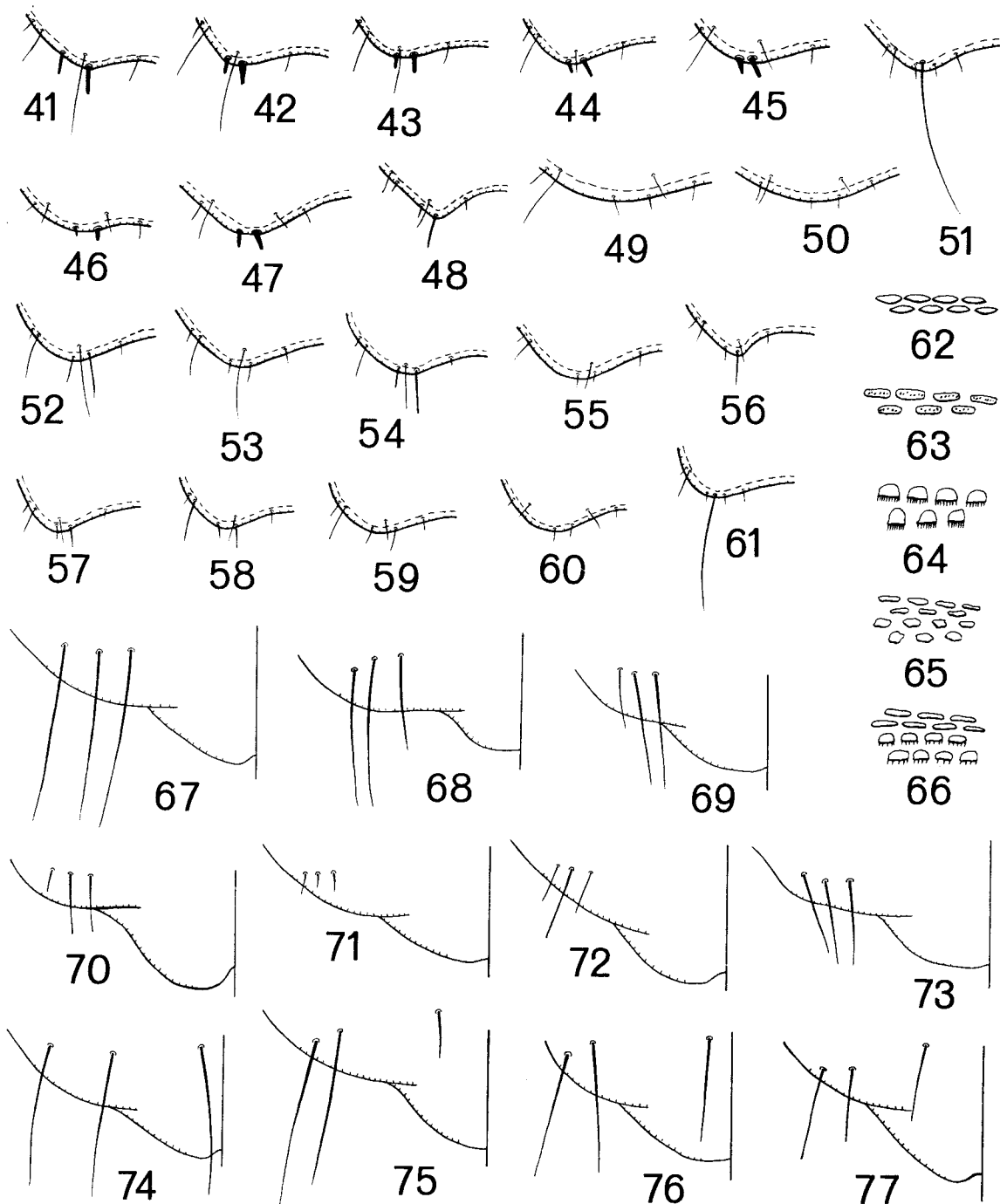


FIG. 41-77. ♂ temple margin: (41) *Geomydoecus mexicanus*; (42) *G. o. oregonus*; (43) *G. expansus* (ex *P. c. castanops*); (44) *G. truncatus*; (45) *G. costaricensis*; (46) *G. yucatanensis*; (47) *G. dariensis*; (48) *G. neocopei*; (49) *G. jonesi*; (50) *G. copei*; (51) *G. thomomyus* (ex *T. mazama glacialis*). ♀ temple margin: (52) *G. o. oregonus*; (53) *G. mexicanus*; (54) *G. umbrini* (ex *T. u. crassidens*); (55) *G. costaricensis*; (56) *G. neocopei*; (57) *G. truncatus*; (58) *G. scleritus* (ex *G. p. pinetis*); (59) *G. expansus* (ex *P. c. castanops*); (60) *G. yucatanensis*; (61) *G. thomomyus* (ex *T. mazama glacialis*). ♀ genital chamber particles: (62) *G. thomomyus* (ex *T. monticola*); (63) *G. traubi*; (64) *G. panamensis*; (65) *G. mcgregori* (ex *P. g. gymmurus*); (66) *G. jonesi*. ♀ last tergite: (67) *G. chapini* (ex *O. h. chiapensis*); (68) *G. mexicanus*; (69) *G. umbrini* (ex *T. u. crassidens*); (70) *G. veracruzensis*; (71) *G. coronadoi*; (72) *G. polydentatus*; (73) *G. truncatus*; (74) *G. dakotensis*; (75) *G. traubi*; (76) *G. neocopei*; (77) *G. p. perotensis*.

*T. b. simulus* Nelson & Goldman, Mexico, Sinaloa (4); 27 ♂♂, 23 ♀♀, *T. b. sinaloae* Merriam, Mexico, Sinaloa (8); 33 ♂♂, 39 ♀♀, *T. bottae*, U.S.A., Utah, Arizona, California (6), New Mexico (3), and Mexico, Sinaloa (2); 4 ♂♂, 1 ♀, *T. umbrinus* (Richardson), U.S.A., Utah, California; 11 ♂♂, 11 ♀♀, *T. umbrinus* n. subsp., Mexico, Sinaloa, Chihuahua; 1 ♂, 1 ♀, *T. [baileyi] tularosae* Hall, U.S.A., New Mexico; 12 ♂♂, 12 ♀♀, "*T. victor*," U.S.A., Arizona; 47 ♂♂, 51 ♀♀, *Thomomys* sp. (or "gopher"), U.S.A., Arizona (5), California (5), and Mexico, Sinaloa (5), Nuevo Leon.

3b. ***Geomydoecus umbrini*** Price & Emerson, n. sp. FIG. 54, 69, 93, 101, 135, 143

Type-host: *Thomomys umbrinus parviceps* Nelson & Goldman.

♂. Essentially as for *G. californicus*, but with temple margin (FIG. 41) having submarginal seta not more than 2× length of longer marginal spiniform seta.

♀. Close to *G. californicus*, differing only by temple margin (FIG. 54) with submarginal seta not extending beyond apices of marginal setae, and TBL 1.18–1.24.

This species is very close to *G. californicus* in both sexes, but the use of the length of the submarginal temple seta has proven consistently reliable in separating these species. It would appear as if this difference supports the separation of what was considered by Hall & Kelson (1959) as *Thomomys umbrinus* into what Russell (1968) considers as *T. umbrinus* and *T. bottae*. The distribution of *G. umbrini* lies in northwestern Mexico (FIG. 148).

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys umbrinus parviceps*, San Lorenzo, Sinaloa, Mexico, 1.V.1965, 97136; in collection of University of Kansas. Paratypes: 5 ♂♂, 8 ♀♀, same data as holotype; 6 ♂♂, 15 ♀♀, Aguacaliente, Sinaloa, Mexico, 1.V.1965, 97132, 97133; 10 ♂♂, 4 ♀♀, San Lorenzo, Sinaloa, Mexico, 1.V.1965, 97139. Other specimens: 29 ♂♂, 25 ♀♀, *T. u. atrovarius* J. A. Allen, Mexico, Sinaloa (4); 2 ♂♂, 2 ♀♀, *T. u. crassidens* Nelson & Goldman, Mexico, Zacatecas; 8 ♂♂, 11 ♀♀, *T. u. durangi* Nelson & Goldman, Mexico, Durango (3); 9 ♂♂, 8 ♀♀, *T. u. eximius* Nelson & Goldman, Mexico, Sinaloa; 2 ♂♂, 2 ♀♀, *T. u. zacatecae* Nelson & Goldman, Mexico, Zacatecas; 4 ♂♂, 9 ♀♀, *T. umbrinus* n. subsp., Mexico, Sinaloa; 2 ♀♀, *Thomomys* sp., Mexico, Sinaloa.

3c. ***Geomydoecus quadridentatus*** Price & Emerson, n. sp. FIG. 94, 106, 146

Type-host: *Geomys arenarius arenarius* Merriam.

♂. HW 0.37–0.39; temple margin (FIG. 41) with submarginal seta about 2× length of longer marginal spiniform seta;

scape as in FIG. 143. Abdomen and TBL as for *G. californicus*. Genitalia (FIG. 106) with only 4 large spines on sac; GW 0.14–0.15.

♀. HW 0.42–0.43 (FIG. 38 or 40); temple margin (FIG. 54) with submarginal seta not extending beyond apex of longer adjacent marginal seta. Last tergite as in FIG. 73. Subgenital plate as in FIG. 10; tergoventral setae on VII about equal to those on VI. TBL 1.15–1.23. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 94) with only 1–4 anterior loops.

The ♂, with the scape as for *G. californicus* and *G. umbrini*, is separated from those species on the basis of the genital sac having only 4 large spines instead of 6. The ♀, also close to those 2 species, may be distinguished by its smaller number of anterior loops in the genital chamber sac. The distribution of *G. quadridentatus* is apparently restricted to that of the 2 subspecies of *Geomys arenarius* (FIG. 148).

*Material Examined*: Holotype ♂, allotype ♀, *Geomys arenarius arenarius*, Hudspeth Co., Texas, 16.I.1953, KU-51998; in collection of University of Kansas. Paratypes: 8 ♂♂, 3 ♀♀, same data as holotype; 1 ♂, 1 ♀, Porvenir, Chihuahua, Mexico, 13.XI.1960, KU-85943; 2 ♂♂, 3 ♀♀, El Paso Co., Texas, 26.VII.1960, KU-84439, KU-84441; 2 ♂♂, 2 ♀♀, El Paso, Texas, USNM Sk. 20102. Other material: 9 ♂♂, 10 ♀♀, *G. a. brevirostris* Hall, U.S.A., New Mexico (2).

3d. ***Geomydoecus subcalifornicus*** Price & Emerson, n. sp.

Type-host: *Thomomys bottae* (Eydoux & Gervais).

♂. HW 0.39–0.40; temple margin (FIG. 41) with submarginal seta more than 2× length of longer marginal spiniform seta; scape as in FIG. 143. Abdomen with medium to long tergoventral setae; terminalia near to FIG. 11. TBL 1.32–1.36. Genitalia (FIG. 106) with only 4 large spines on sac; GW 0.15–0.16.

♀. HW 0.44–0.45 (FIG. 37 or 40); temple margin (FIG. 52) with submarginal seta extending well beyond apices of marginal setae. Last tergite as in FIG. 69 or 73. Subgenital plate as in FIG. 10; tergoventral setae on VII about equal to those on VI. TBL 1.27–1.32. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 93) with 5 or more anterior loops.

The ♂, with the process on the scape and only 4 spines on the genital sac, is close to that of *G. quadridentatus*, but may be separated by differences in length of the submarginal temple seta and often by head size. The ♀, while apparently morphologically inseparable from those of *G. geomydis geomydis*, *G. oregonus idahoensis* n. subsp., and *G. ewingi*, is separated from *G. quadridentatus* by having more loops in the genital chamber sac. This species has an odd discontinuous distribution from southern California to 2 widely-spaced locations in Mexico (FIG. 147).

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys bottae*, Colorado Desert, California, 17.II.

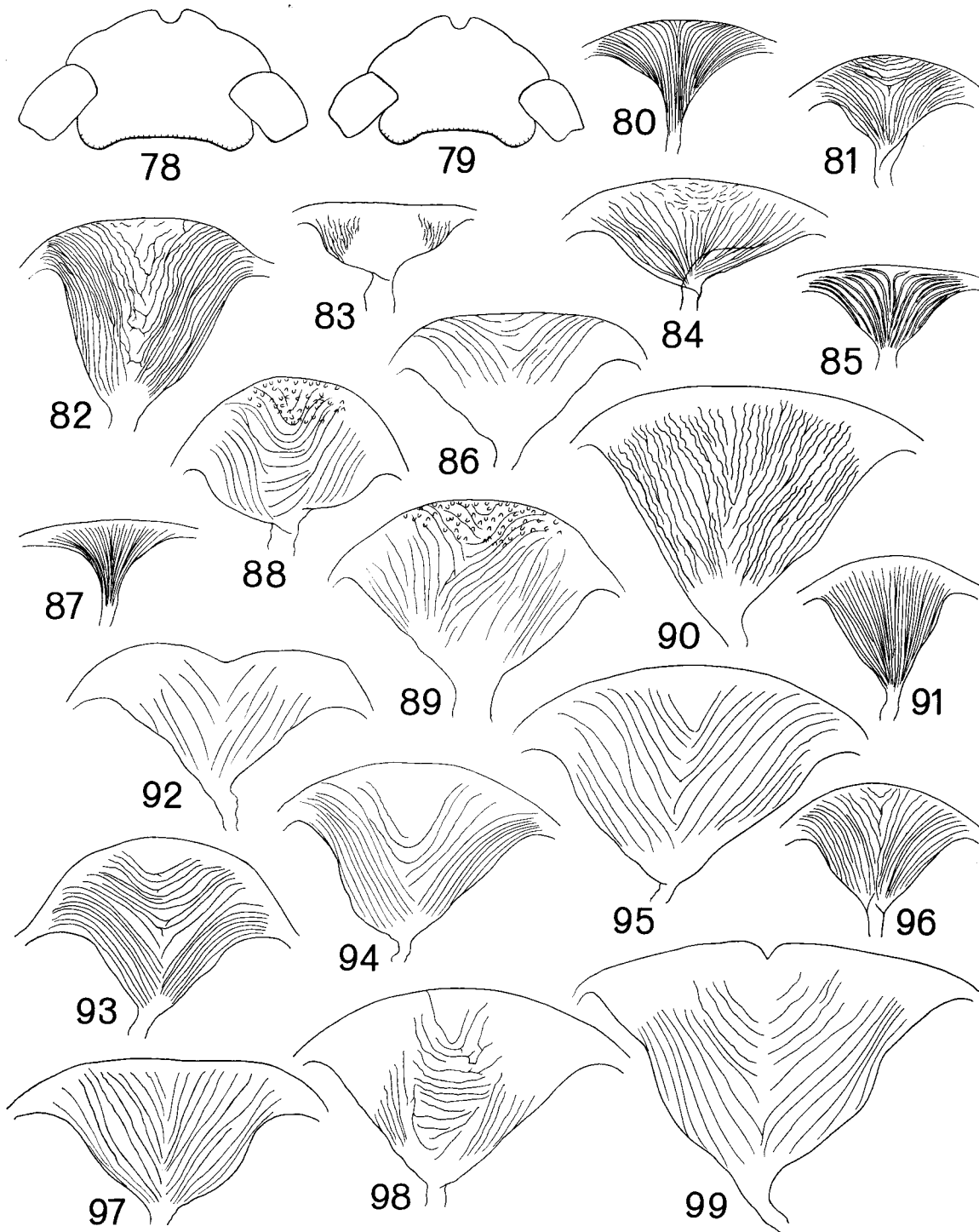


FIG. 78-99. ♂ head outline: (78) *Geomydoecus wernecki*; (79) *G. expansus* (ex *P. zinseri*). ♀ genital chamber sac: (80) *G. traubi*; (81) *G. scleritus* (ex *G. p. pinetis*); (82) *G. illinoensis*; (83) *G. thomomyus* (ex *T. monticola*); (84) *G. truncatus*; (85) *G. wardi*; (86) *G. trichopi*; (87) *G. mexicanus*; (88) *G. alcorni*; (89) *G. mcgregori*; (90) *G. jonesi*; (91) *G. copei*; (92) *G. costaricensis*; (93) *G. umbrini*; (94) *G. quadridentatus*; (95) *G. polydentatus*; (96) *G. chapini* (ex *O. h. chiapensis*); (97) *G. tolucae*; (98) *G. bulleri* (ex *P. b. burti*); (99) *G. panamensis*.

1934, H. S. Gentry, Bish. No. 22407; in collection of United States National Museum. Paratypes: 3 ♂♂, 4 ♀♀, same data as holotype. Other material: 2 ♂♂, 2 ♀♀, *T. b. simulus*, Mexico, Sonora; 1 ♂, 1 ♀, *T. b. perditus* Merriam, Mexico, Coahuila.

3e. **Geomydoecus oklahomensis** Price & Emerson, n. sp.

Type-host: *Geomys bursarius* (Shaw)—probably *G. b. dutcheri* Davis.

♂. Much as for *G. californicus*, with variable submarginal temple seta from less than to more than 2× length of longer marginal spiniform seta, and GW only 0.14–0.15 (FIG. 135).

♀. As for *G. quadridentatus*.

This is a situation in which the ♂ of *G. oklahomensis* is quite close to, and inseparable from in some cases, that of *G. californicus*, while the ♀ is apparently similar to that of *G. quadridentatus*. Identification of *G. oklahomensis* is therefore possible only in combination of both sexes and should be suspect for specimens from *Geomys bursarius* occurring from southern Kansas through Texas (FIG. 150) and having the ♂ with a well-developed process on the scape and the ♀ with the small number of anterior loops in the genital chamber sac.

*Material Examined:* Holotype ♂, allotype ♀, *Geomys bursarius*, Cleveland Co., Oklahoma, XII. 1956, RW 2096; in collection of United States National Museum. Paratypes: 43 ♂♂, 55 ♀♀, same data as holotype. Other material: 4 ♂♂, 3 ♀♀, *G. b. attwateri* Merriam, U.S.A., Texas; 27 ♂♂, 19 ♀♀, *G. b. brazensis*, U.S.A., Texas (4); 2 ♂♂, 5 ♀♀, *G. b. industris* Villa & Hall, U.S.A., Kansas; 5 ♂♂, 6 ♀♀, *G. b. major*, U.S.A., Oklahoma (2), Texas.

4. **Geomydoecus texanus** Ewing FIG. 103, 104  
*Geomydoecus texanus* Ewing, 1936, J. Parasitol. 22: 241. Type-host: *Geomys personatus fallax* Merriam.

♂. HW 0.44–0.45; temple margin (FIG. 45) with submarginal seta occasionally slightly beyond apex of longer spiniform seta; scape as in FIG. 145. Abdomen with medium to long tergocentral setae; terminalia as in FIG. 11. TBL 1.30–1.42. Genitalia (FIG. 103) with triangular endomeral plate showing suggestion of apical division, parameral arch as shown, and sac with only 4 large spines; GW 0.17–0.18; endomeral plate for specimens from *Pappogeomys castanops* (Baird) more as in FIG. 104, with apical division, but otherwise similar.

♀. HW 0.45–0.51 (FIG. 36 or 37); temple margin (FIG. 58) with submarginal seta on 1 side occasionally variably more mediad to inner marginal seta than shown. Last tergite intermediate between FIG. 67 and 73. Subgenital plate as in FIG. 10; tergocentral setae on VII longer than those on VI. TBL 1.13–1.32. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 94) with only few anterior loops.

The ♂, by having a scape without a distinct process, spiniform setae on the temple margin, genitalia with endomeral plate and parameral

arch as in FIG. 103, and only 4 large spines on the genital sac, is close to that of *G. ewingi*; these 2 species may be separated by the dimensions of the head and genitalia and by the length of the submarginal temple seta. Dimensions, details of the genital chamber sac, and chaetotaxy of the temple and terminalia enable separation of *G. texanus* from ♀♀ of other species. The distribution of *G. texanus* (FIG. 148) would appear to support Hall & Kelson (1959) in the placement of *Geomys tropicalis* Goldman as a subspecies of *G. personatus* than maintaining it to be a separate species.

*Material Examined:* 1 ♂ (holotype of *G. texanus*, USNM 50062), 1 ♀, *Geomys personatus fallax*, U.S.A., Texas; 3 ♂♂, 4 ♀♀, *G. p. megapotamus* Davis, U.S.A., Texas; 4 ♂♂, 14 ♀♀, *G. p. personatus* True, U.S.A., Texas (5) and Mexico, Tamaulipas (2); 20 ♂♂, 32 ♀♀, *G. tropicalis*, Mexico, Tamaulipas (3). Questionable records: 1 ♂, 1 ♀, *Pappogeomys castanops jucundus* (Russell & Baker), Mexico, Coahuila; 1 ♂, *P. c. rubellus* (Nelson & Goldman), Mexico, Zacatecas.

5. **Geomydoecus truncatus** Werneck FIG. 44, 57, 73, 84, 121

*Geomydoecus truncatus* Werneck, 1950, Os Malofagos de Mamiferos, Part II: 13. Type-host: *Geomys personatus* True.

♂. HW 0.41–0.42; temple margin (FIG. 44) with short submarginal seta; scape as in FIG. 145. Abdomen with medium tergocentral setae; terminalia near to FIG. 15. TBL 1.15–1.26. Genitalia (FIG. 121) with broad bifurcate endomeral plate, parameral arch with broad flattened apical portion, and sac with 6 large spines; GW 0.14.

♀. HW 0.43–0.44 (FIG. 37); temple margin (FIG. 57) with short submarginal seta. Last tergite as in FIG. 73. Subgenital plate as in FIG. 10; tergocentral setae on VII longer than those on VI. TBL 1.22–1.25. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 84) wide, with posteriorly converging lines and few incomplete anterior loops.

This species is unique among the *Geomydoecus* by the shape of the parameral arch of the ♂ genitalia; the ♀ is more difficult to recognize, but should be separable by the combination of dimensions, genital chamber sac structure, and temple setae.

The type-locality of *G. truncatus* is given by Werneck (1950) as Padre Island, which would make the type-host *G. p. personatus*. We have seen *G. truncatus* only from *G. p. streckeri* Davis, a subspecies isolated inland from the subspecies that have yielded thus far only *G. texanus* (FIG. 148).

*Material Examined:* 15 ♂♂, 15 ♀♀, *Geomys personatus streckeri*, U.S.A., Texas (2).

6a. **Geomydoecus thomomyus** (McGregor)  
FIG. 12, 14, 40, 51, 61, 62, 83, 114–116  
*Trichodectes thomomyus* McGregor, 1917, Ann. Ent.

Soc. Amer. **10**: 169. Type-host: *Thomomys*  
sp. = *Thomomys talpoides fossor* J. A. Allen.

♂. HW 0.37–0.41; temple margin (FIG. 51) with very long seta; scape as in FIG. 145. Abdomen with medium to long tergo-central setae (FIG. 14); terminalia near FIG. 14. TBL 1.22–1.37. Genitalia (FIG. 114) with endomer-plate varying in size from FIG. 115 to 116; GW 0.15–0.16.

♀. HW 0.37–0.42 (FIG. 40); temple margin (FIG. 61) with very long seta. Last tergite as in FIG. 74. Subgenital plate as in FIG. 12; tergo-central setae (FIG. 12) with those on VII long medially, short laterally. TBL 1.05–1.15. Genital chamber particles as in FIG. 62; genital chamber sac (FIG. 83) small, with lines only laterally.

Both sexes with the very long temple seta, the ♂ with the genitalia having the unique 2 elongate sclerites and 1–2 shorter sclerites on the sac as well as having the parameral arch and endomer-plate as in FIG. 114, and the ♀ with the small genital chamber sac lined only laterally, enable easy separation from species of other groups. *Geomydoecus thomomyus* is widely distributed on 3 species of *Thomomys* occurring in the western and northwestern areas of the U.S. and southern Canada (FIG. 148).

*Material Examined*: 1 ♂, 1 ♀, *Thomomys talpoides agrestis* Merriam, U.S.A., Colorado; 6 ♂♂, 4 ♀♀, *T. t. bullatus* V. Bailey, U.S.A., North Dakota (3), South Dakota; 1 ♂, *T. t. clusius* Coues, U.S.A., Colorado; 1 ♂, 14 ♀♀, *T. t. devexus* Hall & Dalquest, U.S.A., Washington (3); 1 ♂, 2 ♀♀, *T. t. douglasii* (Richardson), U.S.A., Washington; 7 ♂♂, 6 ♀♀, *T. t. fossor*, U.S.A., New Mexico (2); 9 ♀♀, *T. t. fuscus* Merriam, U.S.A., Washington (2), Idaho (3); 5 ♂♂, 3 ♀♀, *T. t. macrotis* F. W. Miller, U.S.A., Colorado (5); 1 ♂, *T. t. ocius* Merriam, U.S.A., Colorado; 1 ♀, *T. t. pygmaeus* Merriam, U.S.A., Idaho; 4 ♂♂, 1 ♀, *T. t. quadratus* Merriam, U.S.A., Idaho; 1 ♂, *T. t. rarus* Durrant, U.S.A., Colorado; 3 ♂♂, 5 ♀♀, *T. t. talpoides* (Richardson), Canada, Alberta (2); 7 ♂♂, 22 ♀♀, *T. t. wasatchensis* Durrant, U.S.A., Utah (3); 30 ♂♂, 91 ♀♀, *T. talpoides*, U.S.A., Utah (12), Oregon (2), Washington (2); 10 ♂♂, 5 ♀♀, *T. mazama glacialis* Dalquest & Scheffer, U.S.A., Washington; 6 ♂♂, 1 ♀, *T. m. tumuli* Dalquest & Scheffer, U.S.A., Washington; 5 ♂♂, 3 ♀♀, *T. monticola hesperus* Merriam, U.S.A., Oregon; 2 ♂♂, 15 ♀♀, *T. monticola*, U.S.A., California, Nevada; 8 ♂♂, 22 ♀♀, *Thomomys* sp., U.S.A., Oregon (2), New Mexico (2), Washington, Colorado (those from Colorado were 1 ♂, 3 ♀♀ cotypes, USNM 53234, on 2 slides, #2604 and #2606; we designate as lectotype of *G. thomomyus* the ♂ on slide #2604), Utah.

6b. ***Geomydoecus dakotensis*** Price & Emerson, **n. sp.** FIG. 74, 117, 118

Type-host: *Thomomys talpoides rufescens* Wied-

Neuwied.

♂. Close to *G. thomomyus*, but with sclerites of genital sac as in FIG. 117 or 118, having 4–5 short sclerites in addition to 2 elongate ones; GW 0.13–0.16.

♀. As for *G. thomomyus*.

The consistent possession by *G. dakotensis* of 4–5 short sclerites on the ♂ genital sac, while *G. thomomyus* has only 1–2 of these, necessitates the recognition of these as distinct taxa, even though there is no apparent way to distinguish the ♀♀. The specimens from Montana are not in optimum condition, but we have tentatively placed them as conspecific with *G. dakotensis*; the wide discontinuity between these 2 *Thomomys* subspecies with *G. dakotensis* is somewhat unexpected (FIG. 148), with the intervening subspecies having the more typical *G. thomomyus*.

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys talpoides rufescens*, Lake Metigoshe, Bottineau Co., North Dakota, 5.V.1961, J. Beer; in collection of University of Minnesota. Paratypes: 17 ♂♂, 34 ♀♀, same data as holotype. Other material: 13 ♂♂, 15 ♀♀, *T. t. confinis* Davis, U.S.A., Montana (6).

6c. ***Geomydoecus duchesnensis*** Price & Emerson, **n. sp.** FIG. 112, 113

Type-host: *Thomomys talpoides* (Richardson)—probably *T. t. uinta* Merriam.

♂. Much as for *G. thomomyus*, but with genitalia (FIG. 112) smaller, GW 0.11–0.12, endomer-plate as in FIG. 113, and genital sac lacking elongate sclerites and with at most 1 short sclerite. TBL 1.08–1.19.

♀. Close to *G. thomomyus*, but apparently without evident genital sac and accompanying lines.

The ♂ is easily separated from that of both *G. thomomyus* and *G. dakotensis* by the essential absence of sclerites associated with the genital sac; the ♀ is tenuously recognizable by the absence of a genital chamber sac. *Geomydoecus duchesnensis* most likely represents a population along one of the tributaries of the Strawberry River (FIG. 148) that has had the ♂♂ undergo sufficient change to make them differ significantly from those of the surrounding populations.

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys talpoides*, Strawberry River, Duchesne Co., Utah, 18.VI.1957, D. M. Allred, RW 2326; in collection of United States National Museum. Paratypes: 8 ♂♂, 18 ♀♀, same data as holotype.

7a. ***Geomydoecus oregonus oregonus*** Price & Emerson, **n. sp.** FIG. 10, 11, 36, 42, 52, 133

Type-host: *Thomomys bulbivorus* (Richardson).

♂. HW 0.44–0.45; temple margin (FIG. 42) with long submarginal and 2 spiniform marginal setae; scape as in FIG. 145. Abdomen with medium to long tergo-central setae; terminalia



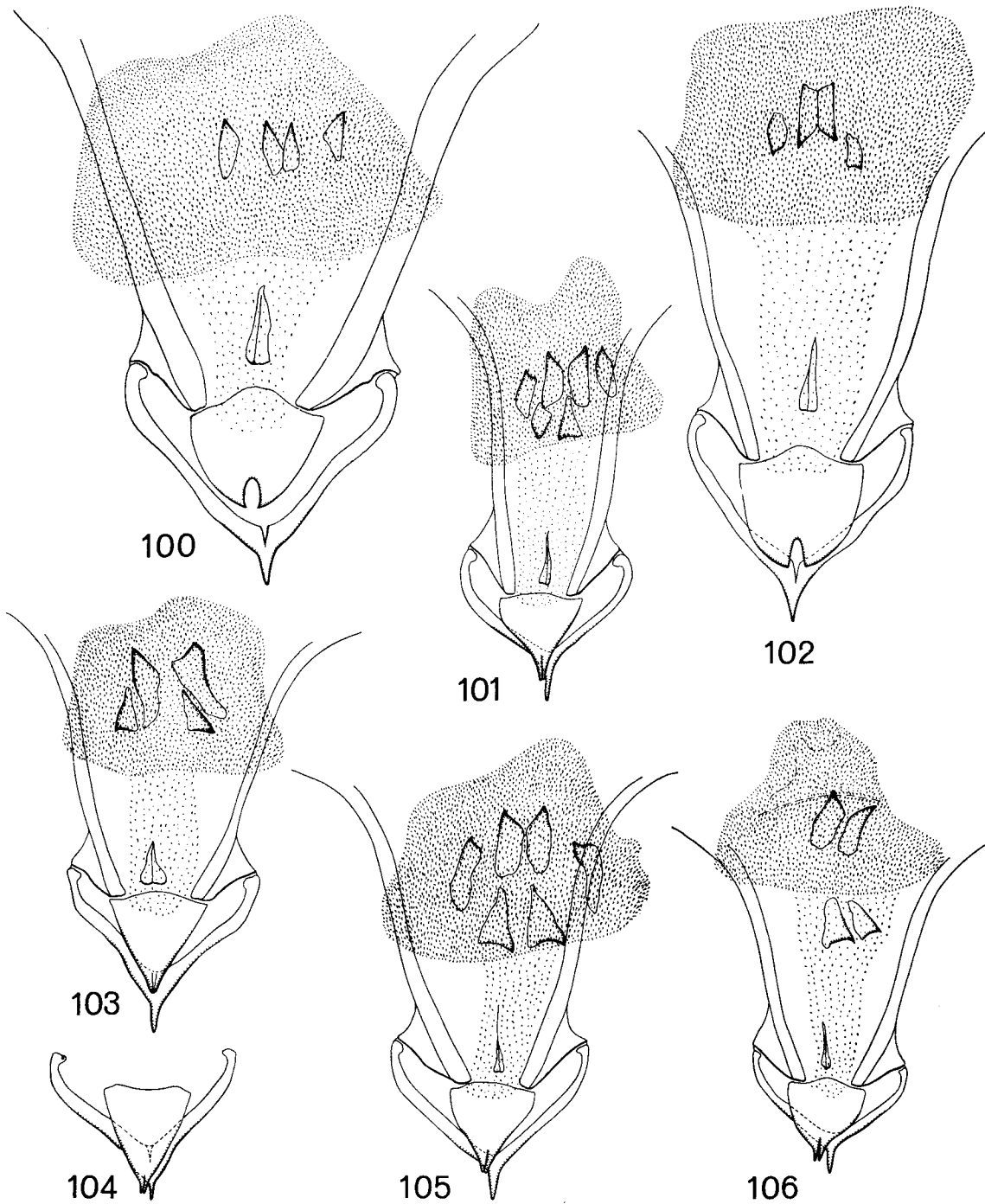


FIG. 100-106. ♂ genitalia: (100) *Geomydoecus jonesi*; (101) *G. umbrini* (ex *T. u. atrovarius*); (102) *G. alleni*; (103) *G. texanus* (ex *G. tropicalis*); (104) *G. texanus* (terminal portion only, ex *P. c. rubellus*); (105) *G. californicus* (ex *T. b. anitae*); (106) *G. quadridentatus*.

as in FIG. 11. TBL 1.36–1.40. Genitalia usually close to FIG. 133, less often near to FIG. 101 or 105, with subtriangular endomeral plate divided apically, parameral arch as shown, and sac with 6 large spines; GW 0.16–0.17.

♀. HW 0.47–0.50 (FIG. 36); temple margin (FIG. 52) with submarginal seta usually extending beyond apex of longer marginal seta. Last tergite as in FIG. 73. Subgenital plate as in FIG. 10; tergo-central setae on VII approximately equal to those on VI. TBL 1.22–1.31. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 93) with 5 or more loops in anterior portion.

The ♂ is recognized by its combination of scape without posterior projection, the temple with a long submarginal and 2 spiniform marginal setae, genitalia with parameral arch, endomeral plate, and sac essentially as in FIG. 133, and size. The ♀ is separated on the basis of the combination of setae of last tergite evenly spaced lateroposteriorly and relatively long, the genital sac with number of anterior loops, the dimensions, the placement and length of the submarginal temple seta, and length of tergal setae of VII; it is apparently inseparable from some individuals of *G. geomydis geomydis*, but geographical and host separation should enable proper placement (FIG. 147, 149).

*Material Examined:* Holotype ♂, allotype ♀, *Thomomys bulbivorus*, Portland, Multnomah Co., Oregon, 10.IV.1932, KU-10083; in collection of University of Kansas. Paratypes: 25 ♂♂, 10 ♀♀, same data as holotype; 11 ♂♂, 4 ♀♀, Portland, Oregon, 2.V.1932, C. M. Gjullin, Bish. 19000; 1 ♂, 10 ♀♀, Portland, Oregon, 9.IV.1932, S. G. Jewett, Bish. 19058; 13 ♂♂, 8 ♀♀, Granger, Benton Co., Oregon, 15.II.1963, KU-94625; 3 ♂♂, 6 ♀♀, Portland, Oregon, 15.IX.1933, S. G. Jewett, Bish. 16948; 20 ♂♂, 4 ♀♀, Hillsboro, Oregon, 8.XI.1930, L. K. Couch, Bish. 15544; 12 ♂♂, 7 ♀♀, Hillsboro, Washington Co., Oregon, 1.IV.1929, G. M. Gardner, SCW 575, RW 2008; 10 ♂♂, same, but P. G. Putnam, SCW 1011, RW 2009; 1 ♀, same, but SCW 1010, RW 2011; 4 ♂♂, 1 ♀, Corvallis, Benton Co., Oregon, 10.IV.1951, G. Staley, SCW 53-7, RW 2007; 6 ♂♂, 8 ♀♀, Corvallis, Oregon, 23.IV.1932, M. F. Conova, Bish. 19002; 5 ♂♂, 1 ♀, Corvallis, Benton Co., Oregon, 15.IV.1952, D. Crane, SCW 53-8, RW 2010; 4 ♀♀, Corvallis, Oregon, 23.III.1912, Flint; 1 ♂, 4 ♀♀, Portland, Oregon, 10.V.1935, H. H. Stage, Bish. 17119; 3 ♂♂, 7 ♀♀, Monroe, Oregon, 23.V.1932, M. F. Conova, Bish. 16901. Questionable record: 1 ♀, *T. mazama glacialis*, U.S.A., Washington (known to be off museum skin).

7b. ***Geomydoecus oregonus idahoensis*** Price & Emerson, **n. subsp.**

Type-host: *Thomomys townsendii townsendii* (Bachman).

♂. As for *G. o. oregonus*, except for HW 0.39–0.41, TBL 1.18–1.41, and GW 0.14–0.16.

♀. As for *G. o. oregonus*, except for HW 0.42–0.45 and TBL 1.16–1.32.

The lice from *T. townsendii* have proven to be consistently smaller in head width than those from *T. bulbivorus*. In view of this and their occurrence on different host species (FIG. 149), we feel it appropriate to recognize these populations as representing different subspecies.

*Material Examined:* Holotype ♂, allotype ♀, *Thomomys townsendii townsendii*, Parma, Canyon Co., Idaho, 2.XI.1940, KU-18721; in collection of University of Kansas. Paratypes: 2 ♂♂, 3 ♀♀, same data as holotype; 4 ♂♂, 14 ♀♀, Boise, Ada Co., Idaho, 31.XII.1953, G. M. Gardner, SCW 53-333, RW 2012; 22 ♂♂, 24 ♀♀, same, except 27.XII.1953, SCW 53-332, RW 2013; 6 ♂♂, 4 ♀♀, same, except 12.V.1954, SCW 54-101, RW 2014; 14 ♂♂, 9 ♀♀, same, except 12.V.1954, SCW 54-102, RW 2015. Other material: 202 ♂♂, 133 ♀♀, *T. townsendii*, U.S.A., Idaho (16); 7 ♂♂, 4 ♀♀, *T. t. elkoensis* Davis, U.S.A., Nevada; 7 ♂♂, 4 ♀♀, *T. t. nevadensis* Merriam, U.S.A., Nevada. Questionable record: 2 ♂♂, 2 ♀♀, *T. bottae*, U.S.A., California (from museum skin).

7c. ***Geomydoecus tolucae*** Price & Emerson, **n. sp.** FIG. 97, 122

Type-host: *Thomomys umbrinus tolucae* Nelson & Goldman.

♂. HW 0.39–0.40; temple margin, scape, and abdominal chaetotaxy as for *G. o. oregonus*. TBL 1.28–1.39. Genitalia (FIG. 122) much as for *G. o. oregonus*, but with definite expansion of posterior portion of parameral arch and with endomeral plate as shown; GW 0.16–0.17.

♀. HW 0.44 (FIG. 37). Genital chamber sac (FIG. 97) with all lines posteriorly directed. Otherwise, much as for *G. o. oregonus*.

The expansion of the parameral arch of the ♂ genitalia sets *G. tolucae* apart from all other known species of the genus. The ♀ genital chamber sac has a configuration of lines quite different from that of *G. oregonus*.

*Material Examined:* Holotype ♂, allotype ♀, *Thomomys umbrinus tolucae*, Nevado de Toluca, Raices, Mexico, 14.III.1963, B-64564; in collection of United States National Museum. Paratypes: 1 ♂, same data as holotype; 1 ♂, Toluca, Mexico, 5.III.1963, B-64286. Other material: 6 ♂♂, *T. umbrinus*, Mexico, Nevado de Toluca (2); 1 ♂, 1 ♀, *Thomomys* sp., Mexico, Nevado de Toluca (we have been unable to verify the identity of these hosts since the skins are not available).

8a. ***Geomydoecus copei*** Werneck FIG. 7, 28, 32, 50, 91, 130

*Geomydoecus copei* Werneck, 1945, Mem. Inst. Osw.

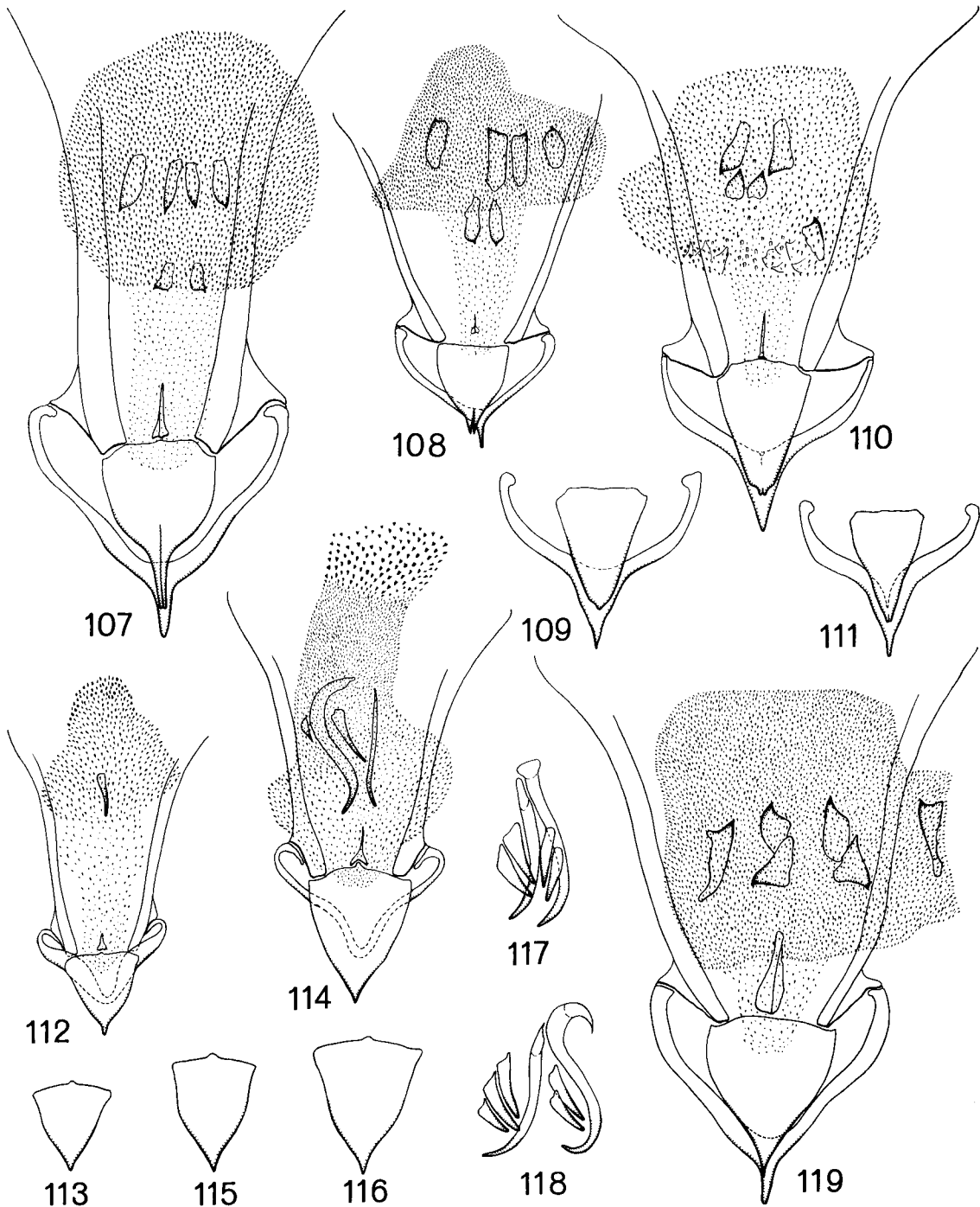


FIG. 107-119. ♂ genitalia: (107) *Geomydoecus chiapensis*; (108) *G. expansus* (ex *P. c. castanops*); (109) *G. wernecki* (terminal portion only); (110) *G. mcgregori* (ex *P. g. gymnurus*); (111) *G. alcorni* (terminal portion only); (112) *G. duchesnensis*; (113) *G. duchesnensis* (endomeral plate only); (114) *G. thomomyus* (ex *T. mazama glacialis*); (115) *G. thomomyus* (endomeral plate only, ex *T. talpoides*, Utah); (116) *G. thomomyus* (endomeral plate only, ex *T. talpoides*, Canada); (117, 118) *G. dakotensis* (genital sac sclerites only); (119) *G. panamensis*.

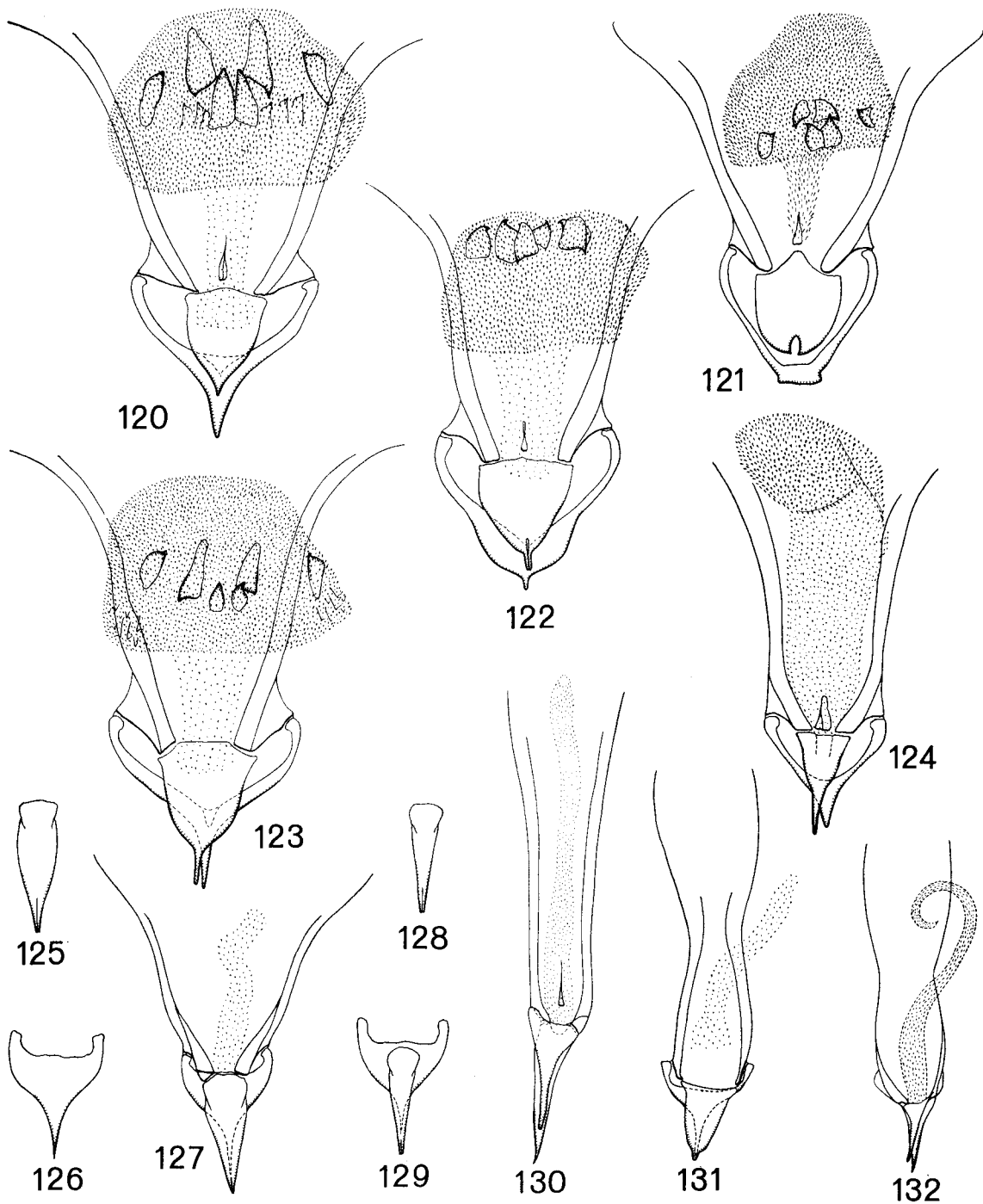


FIG. 120-132. ♂ genitalia: (120) *Geomydoecus trichopi*; (121) *G. truncatus*; (122) *G. tolucae*; (123) *G. bulleri* (ex *P. b. melanurus*); (124) *G. wardi*; (125) *G. yucatanensis* (endomeral plate only); (126) *G. yucatanensis* (parameral arch only); (127) *G. yucatanensis*; (128, 129) *G. chapini* (terminal plates only, ex *O. h. chapensis*); (130) *G. copei*; (131) *G. neopei*; (132) *G. minor* (ex *Thomomys* sp., Arizona).

Cruz 42: 114. Type-host: "*Geomys mexicanus*" from Misantla = *Orthogeomys hispidus torridus* (Merriam).

♂. HW 0.55–0.56; temple margin (FIG. 50) with short submarginal seta and short fine marginal setae; scape as in FIG. 145. Abdomen with setae much as in FIG. 5, but with anterior tergal setae as in FIG. 7; terminalia essentially as in FIG. 5. TBL 1.41–1.53. Genitalia (FIG. 130) with both endomeral plate and parameral arch attenuated and narrow, sac small and without spines; GW 0.06–0.07.

♀. HW 0.60–0.62 (FIG. 32), large in proportion to body size and with scape unusually small for such large head; temple margin as in FIG. 50. Last tergite as in FIG. 67. Subgenital plate as in FIG. 28; tergoventral setae on VII longer than those on VI. TBL 1.34–1.59. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 91) with all lines posteriorly converging.

The ♂ genitalia and abdominal chaetotaxy are so uniquely different from those of species in other groups that there should be no problem recognizing *G. copei*. The ♀ is separated on the basis of the grouping and length of the lateroposterior setae on the last tergite, the large dimensions, and the chaetotaxy of the terminalia and temple.

Since *O. hispidus torridus* is the only species of pocket gopher found in Misantla, Mexico, we have concluded that this is most likely the correct type-host for *G. copei* (FIG. 149).

*Material Examined*: 4 ♂♂, 4 ♀♀ paratypes of *G. copei*, "*Geomys mexicanus*," Mexico, Misantla (2).

8b. ***Geomydoecus neocopei*** Price & Emerson, n. sp. FIG. 5, 8, 39, 48, 56, 76, 131

Type-host: *Thomomys umbrinus tolucae* Nelson & Goldman.

♂. HW 0.36–0.38; temple margin (FIG. 48) with short submarginal seta and short to medium fine marginal setae; scape as in FIG. 145. Abdomen and terminalia as in FIG. 5. TBL 1.18–1.20. Genitalia (FIG. 131) with irregularly broadened endomeral plate, sharply attenuate parameral arch, and small sac without large spines; GW 0.08–0.09.

♀. HW 0.40–0.41 (FIG. 39); temple margin (FIG. 56) much as for ♂. Last tergite as in FIG. 76. Subgenital plate as in FIG. 8; tergoventral setae (FIG. 8) long, those on VII equal to those on VI. Genital chamber particles and sac weak to inconspicuous.

The ♂ of *G. neocopei* may be separated from the other species by the details of the genitalia, such as small sac without large spines, expanded endomeral plate, and small size, along with the absence of spiniform setae on the temple margin and the clustering of setae on tergites II–III. The ♀ is recognized by the length and distribution of the setae on the last tergite, the inconspicuous genital chamber sac, and the marginal temple setae; there is no apparent way to separate ♀♀ of *G. neocopei* and *G. minor* Werneck. *Geomydoecus neocopei* has been collected from the same individuals that have also yielded specimens of *G. tolucae* (FIG. 150).

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys umbrinus tolucae*, Nevado de Toluca, Toluca, Mexico, 5.III.1963, B-64285; in collection of United States National Museum. Paratypes: 6 ♂♂, 8 ♀♀, same data as holotype; 1 ♂, 1 ♀, same, except B-64286; 1 ♂, 6 ♀♀, Nevado de Toluca, Raices, Mexico, 14.III.1963, B-64564. Other material: 3 ♂♂, 7 ♀♀, *T. umbrinus*, Mexico, Nevado de Toluca; 1 ♀, *Thomomys* sp., Mexico, Nevado de Toluca (we have been unable to verify the identity of these hosts since the skins are not available).

8c. ***Geomydoecus wardi*** Price & Emerson, n. sp. FIG. 9, 85, 124

Type-host: *Thomomys talpoides macrotis* F. W. Miller.

♂. Much as for *G. neocopei*, except for TBL 1.05–1.18; terminalia as in FIG. 9; and genitalia (FIG. 124) larger, GW 0.10–0.11, with larger sac but without spines, and with apically narrower endomeral plate.

♀. HW 0.36–0.40 (FIG. 39). Genital chamber sac as in FIG. 85. Otherwise, as for *G. neocopei*.

The ♂ of *G. wardi* is very close to that of *G. neocopei*, but may be separated by differences in the genitalia associated with gross size, the development of the sac, and the shape of the endomeral plate and parameral arch. The ♀ of *G. wardi* is likewise close to that of *G. neocopei*, being tenuously separable only on the basis of the development of the genital chamber sac. The known distribution of *G. wardi* is on various subspecies of *T. talpoides* occurring in the west-central U.S. (FIG. 149); a number of individuals with *G. wardi* also had *G. thomomyus*, but this cohabitation is apparently limited to *T. talpoides* in the eastern portion of the range of this host species.

*Material Examined*: Holotype ♂, allotype ♀, *Thomomys talpoides macrotis*, D'Arcy Ranch, Cherry Creek, Douglas Co., Colorado, 10.IV.1932, R. L. Landberg, Colo. Mus. Skin #4433, RW 2381; in collection of United States National Museum. Paratypes: 5 ♂♂, 7 ♀♀, same data as holotype; 11 ♂♂, 9 ♀♀, same, except Colo. Mus. Skin #4434, RW 2380; 2 ♂♂, 2 ♀♀, same, except Colo. Mus. Skin #4431, RW 2374; 4 ♂♂, 1 ♀, same, except 4.IV.1931, Colo. Mus. Skin #4423, RW 2379; 2 ♀♀, same, except 27.IV.1931, Colo. Mus. Skin #4428, RW 2376; 1 ♂, same, except 27.IV.1931, Colo. Mus. Skin #4429, RW 2377. Other material: 1 ♂, 2 ♀♀, *T. t. bullatus*, U.S.A., South Dakota; 2 ♂♂, *T. t. clusius*, U.S.A., Colorado; 1 ♂, 6 ♀♀, *T. t. fossor*, U.S.A., Colorado (2), New Mexico (2); 2 ♂♂, 5 ♀♀, *T. t. nebulosus* V. Bailey, U.S.A., Wyoming, South Dakota; 2 ♂♂, 4 ♀♀, *T. t. ocius*, U.S.A., Colorado (2); 1 ♂, *T. talpoides*, U.S.A., Utah; 3 ♂♂, *Thomomys* sp., U.S.A., New

Mexico (2).

8d. **Geomydoecus minor** Werneck FIG. 4,  
132

*Geomydoecus chapini minor* Werneck, 1950, Os Malofagos de Mamiferos, Part II: 16. Type-host: *Thomomys [baileyi] tularosae* Hall.

♂. HW 0.35–0.37; temple, scape, and terminalia essentially as for *G. neocopei*. Abdominal setae much as in FIG. 5, but with setae on tergites II–III widely separated and short (FIG. 4). TBL 1.12–1.16. Genitalia (FIG. 132) with both endomeral plate and parameral arch sharply tapered and with small sac without large spines; GW 0.06.

♀. As for *G. neocopei*.

The recognition of *G. minor* as a species distinct from *G. neocopei* and *G. wardi* is based primarily on the chaetotaxy of ♂ tergites II–III and on features of the ♂ genitalia. Agreement with the description by Werneck (1950) is excellent. The geographical distribution of known material is given in FIG. 149.

*Material Examined*: 9 ♂♂, 10 ♀♀, *Thomomys bottae pervagus*, U.S.A., New Mexico (2); 2 ♂♂, 1 ♀, *T. bottae*, U.S.A., New Mexico; 2 ♂♂, “*T. rufous rufous*,” U.S.A., New Mexico; 7 ♂♂, 4 ♀♀, *Thomomys* sp., U.S.A., Arizona (2), New Mexico.

9a. **Geomydoecus chapini** Werneck FIG. 17,  
67, 96, 128, 129

*Geomydoecus chapini* Werneck, 1945, Mem. Inst. Osw. Cruz 42: 117. Type-host: *Geomys (personatus) tropicalis* Goldman—questionable host. More likely *Orthogeomys hispidus chiapensis* (Nelson & Goldman).

♂. HW 0.53–0.55; temple margin (FIG. 46) with 2 short spiniform setae and short submarginal seta medioanterior to these; scape as in FIG. 145. Abdomen with short tergoventral setae (FIG. 17); terminalia as in FIG. 17. TBL 1.28–1.41. Genitalia grossly as in FIG. 127, but with endomeral plate and parameral arch as in FIG. 128 and 129; GW 0.08–0.09.

♀. HW 0.60–0.63 (FIG. 34); temple margin (FIG. 60) with short submarginal seta mediat to 2 short marginal setae. Last tergite as in FIG. 67. Subgenital plate as in FIG. 26; tergoventral setae on VII longer than those on VI. TBL 1.45–1.64. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 96) with most lines converging posteriorly.

The ♂ is recognizable on the basis of its antennal type, the development of the temple setae, the large dimensions, and the details of the genitalia involving no spines on the genital sac and an endomeral plate and parameral arch shaped as illustrated. The ♀ is separated from other species on the basis of its abdominal chaetotaxy, especially of the last tergite, the genital chamber sac structure, the temple setae, and the large dimensions. All material we have seen from *Geomys tropicalis* has been of *Geomydoecus texanus*, and we seriously doubt if that is the correct type-host for *G. chapini*.

*Material Examined*: 1 ♂, *Geomys personatus*

*tropicalis*, Mexico, Tabasco (holotype of *G. chapini*, USNM 57834); 3 ♂♂, 9 ♀♀, *Orthogeomys hispidus chiapensis*, Mexico, Chiapas (2).

9b. **Geomydoecus yucatanensis** Price & Emerson, n. sp. FIG. 35, 46, 60, 125–127

Type-host: *Orthogeomys hispidus yucatanensis* (Nelson & Goldman).

♂. HW 0.51. Genitalia (FIG. 127) with endomeral plate relatively broad (FIG. 125) and sharply attenuate parameral arch (FIG. 126). Otherwise, as for *G. chapini*.

♀. HW 0.56–0.59 (FIG. 34). TBL 1.35–1.49. Otherwise, as for *G. chapini*.

Although both sexes of *G. yucatanensis* are very much like *G. chapini*, the shape of the endomeral plate of the ♂ genitalia, along with the apparently smaller dimensions of both ♀ and ♂ *G. yucatanensis*, offers a means for separating these 2 species.

*Material Examined*: Holotype ♂, allotype ♀, *Orthogeomys hispidus yucatanensis*, Escarcega, Campeche, Mexico, 26.XII.1962, PLC-3436; in collection of University of Kansas. Paratypes: 1 ♂, 4 ♀♀, same data as holotype; 2 ♂♂, 1 ♀, Tizimin, Yucatan, Mexico, 29.IV.1963, PLC-4235; 4 ♂♂, 8 ♀♀, Campoton, Campeche, Yucatan, Mexico, 11.VII.1962, JKJ-3712.

10a. **Geomydoecus jonesi** Price & Emerson, n. sp. FIG. 13, 20, 29, 49, 66, 90, 100

Type-host: *Orthogeomys grandis felipensis* Nelson & Goldman.

♂. HW 0.63–0.68; temple margin (FIG. 49) without spiniform setae; scape as in FIG. 145. Abdomen with short tergoventral setae; terminalia as in FIG. 20. TBL 1.75–1.86. Genitalia (FIG. 100) with endomeral plate and parameral arch as shown, and with sac having 4 large spines; GW 0.25–0.26.

♀. HW 0.67–0.70 (FIG. 29); temple as in FIG. 49. Last tergite much as in FIG. 73, but with setae somewhat longer than shown. Subgenital plate as in FIG. 13; tergoventral setae on VII longer than those on VI. TBL 1.72–1.75. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 90) with posteriorly converging lines.

The ♂ is recognized by lacking the process on the scape, lacking spiniform or long setae on the temple, and having very large dimensions as well as distinctive genitalia. The ♀ is separated from other species by the chaetotaxy of the last tergite, the very large dimensions, the large distinctive genital chamber development, and details of the temple setae.

*Material Examined*: Holotype ♂, allotype ♀, *Orthogeomys grandis felipensis*, Tilapa, Puebla, Mexico, 15.VIII.1954, KU-62523; in collection of University of Kansas. Paratypes: 3 ♂♂, 2 ♀♀, same data as holotype; 2 ♂♂, 5 ♀♀, same, except 13.VIII.1954, KU-62522.

10b. **Geomydoecus alleni** Price & Emerson, n. sp. FIG. 102

Type-host: *Orthogeomys grandis alleni* Nelson &

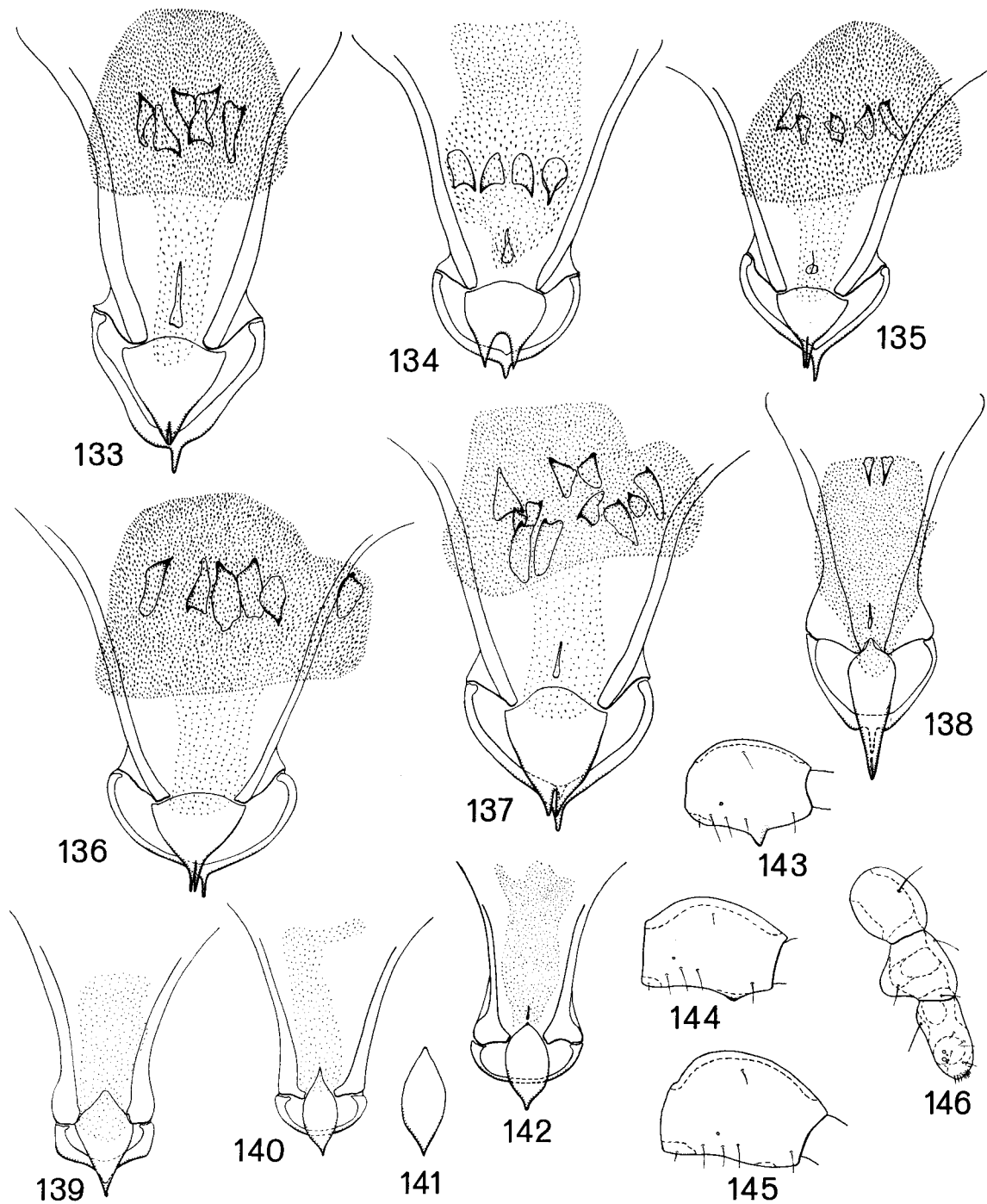


FIG. 133-146. ♂ genitalia: (133) *Geomydoecus o. oregonus*; (134) *G. costaricensis*; (135) *G. umbrini* (ex *T. u. crassidens*); (136) *G. merriami*; (137) *G. polydentatus*; (138) *G. traubi*; (139) *G. fulvescens*; (140) *G. p. perotensis*; (141) *G. mexicanus* (endomerteral plate only); (142) *G. mexicanus*. ♂ scape: (143) *G. umbrini* (ex *T. u. crassidens*); (144) *G. g. geomydis*; (145) *G. expansus* (ex *P. c. castanops*). ♀ antenna: (146) *G. quadridentatus*.

**Goldman.**

♂. TBL 1.65. Genitalia (FIG. 102) with endomeral plate broad and with notch as shown; GW 0.21. Otherwise, as for *G. jonesi*.

♀. HW 0.65–0.68; temple margin (FIG. 60) with submarginal seta removed from inner marginal seta by more than distance between 2 marginal setae. Otherwise, as for *G. jonesi*.

The ♂, although very close to that of *G. jonesi*, is separated by the smaller genitalia and by a difference associated with the shape of the endomeral plate of the genitalia. The ♀ is apparently inseparable from *G. chiapensis* n. sp., and is close to *G. jonesi*, being differentiated from the latter by the positioning of the submarginal seta in relation to the marginal temple setae.

*Material Examined*: Holotype ♂, allotype ♀, *Orthogeomys grandis alleni*, Soledad, Oaxaca, Mexico, 25.VIII.1954, KU-62524; in collection of University of Kansas. Paratypes: 2 ♂♂, 4 ♀♀, same data as holotype.

11. ***Geomydoecus chiapensis*** Price & Emerson, n. sp. FIG. 107

Type-host: *Orthogeomys hispidus chiapensis* (Nelson & Goldman).

♂. HW 0.66; temple margin as in FIG. 45; scape as in FIG. 145. Abdomen with short tergoventral setae; terminalia as in FIG. 27. TBL 1.82. Genitalia (FIG. 107) with endomeral plate strongly attenuate and deeply divided apically, parameral arch as shown, and sac with 6 large spines; GW 0.24.

♀. HW 0.67–0.68 (FIG. 29); temple margin (FIG. 60) with submarginal seta distinctly mediad to inner marginal seta. Last tergite near to FIG. 67. Subgenital plate as in FIG. 13; tergoventral setae on VII longer than those on VI. TBL 1.75–1.80. Genital chamber particles as in FIG. 66; genital chamber sac (FIG. 90) large, with posteriorly converging lines.

The very large size of the ♂, along with the highly distinctive genitalic endomeral plate, separates it from all other known ♂♂. The ♀, also quite large and with a large distinctive genital chamber sac, may identify along with *G. alleni* and *G. jonesi*; differences in temple setae will separate out *G. jonesi*, but it is possible that some specimens of *G. alleni* and *G. chiapensis* are not separable as ♀♀. *Geomydoecus chapini* and *G. chiapensis* are both found on the same host subspecies (FIG. 147), the former from Mexico and the latter from Guatemala; further collecting may reveal both to occur on the same individuals.

*Material Examined*: Holotype ♂, allotype ♀, *Orthogeomys hispidus chiapensis*, Escuintla, Dept. Escuintla, Guatemala, 1.II.1952, L. de la Torre, CNHM 73335; in collection of Field Museum of Natural History. Paratypes: 1 immature ♂, 1 ♀, same data as holotype.

12a. ***Geomydoecus panamensis*** Price & Emerson, n. sp. FIG. 21, 22, 30, 64, 99, 119

Type-host: *Macrogeomys cavator* Bangs.

♂. HW 0.59–0.60, with deep medioanterior indentation (FIG. 30); temple margin as in FIG. 45 or 47; scape as in FIG. 145. Abdomen with short to medium tergoventral setae; terminalia as in FIG. 22. TBL 1.65–1.74. Genitalia as in FIG. 119; GW 0.22–0.23.

♀. HW 0.62–0.64, with deep medioanterior indentation (FIG. 30); temple margin as in FIG. 55, but with submarginal seta occasionally more mediad. Last tergite as in FIG. 73. Subgenital plate as in FIG. 21; tergoventral setae on VII longer than those on VI. TBL 1.68–1.73. Genital chamber particles as in FIG. 64; genital chamber sac as in FIG. 99.

This species is characterized by its large size in both sexes; the ♂ genitalia with the subtriangular endomeral plate having a pointed undivided apical end, the parameral arch with a medioposterior process, and sac with 6 large spines; both sexes with a deep medioanterior head indentation; the ♀ with a large genital chamber sac with diagonal lines and median indentation or notch in the anterior margin; and the ♀ with 3 lateroposterior setae grouped together each side, more or less of equal length extending to end of abdomen.

*Material Examined*: Holotype ♂, allotype ♀, *Macrogeomys cavator*, Cerro Punta, Chiriqui, Panama, 28.I.1960, No. 5801; in collection of United States National Museum. Paratypes: 49 ♂♂, 53 ♀♀, same data as holotype; 16 ♂♂, 17 ♀♀, same, but 29.I.1960, No. 5805; 2 ♂♂, 5 ♀♀, Casa Pitty, Chiriqui, Panama, 7.I.1961, Tipton 6817; 68 ♂♂, 78 ♀♀, Boquete Trail, Chiriqui, Panama, 11, 13, III.1962, V. E. Tipton, MC-10318, MC-10396, MC-10457.

12b. ***Geomydoecus dariensis*** Price & Emerson, n. sp. FIG. 31, 47

Type-host: *Macrogeomys dariensis* Goldman.

♂. HW 0.61–0.62, with shallow medioanterior indentation (FIG. 31). Otherwise, much as for *G. panamensis*.

♀. As for *G. panamensis*, except for head with shallow medioanterior indentation (FIG. 31).

Both sexes are close to *G. panamensis*, but *G. dariensis* is consistently separable by having a very shallow medioanterior head indentation. These 2 species are the only ones known from Panama (FIG. 148).

*Material Examined*: Holotype ♂, allotype ♀, *Macrogeomys dariensis*, Jaqué, Darien Prov., Panama, 1.III.1966, F. M. Greenwell & T. H. Fleming, 000875; in collection of United States National Museum. Paratypes: 4 ♂♂, 2 ♀♀, same data as holotype; 1 ♂, 5 ♀♀, Darien, Panama, 3.VII.1965, KU-104318.

13. ***Geomydoecus costaricensis*** Price & Emerson, n. sp. FIG. 26, 27, 34, 45, 55, 92, 134

Type-host: *Macrogeomys heterodus cartagoensis* (Goodwin).

♂. HW 0.52–0.53; temple margin (FIG. 45) with short sub-



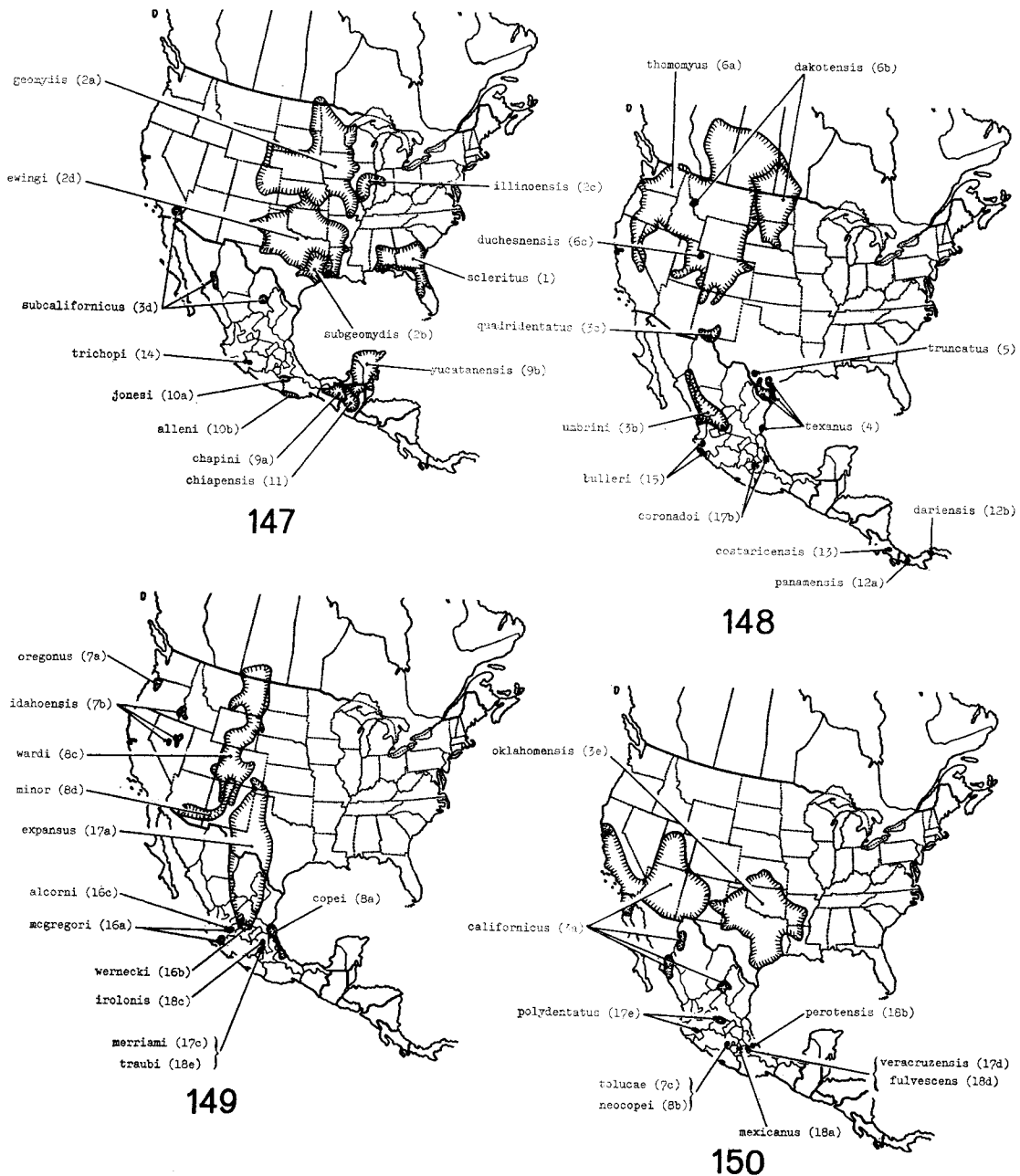


FIG. 147-150. Geographical distribution of pocket gopher lice.

marginal seta on line with or somewhat mediad to inner of 2 marginal spiniform setae; scape as in FIG. 145. Abdomen with short to medium tergo-central setae; terminalia as in FIG. 27. TBL 1.29-1.40. Genitalia (FIG. 134) with widely bifurcate endomeral plate, parameral arch as shown, and sac with 4 large spines; GW 0.14.

♀. HW 0.57-0.60 (FIG. 34); temple margin (FIG. 55) with short fine marginal setae, but otherwise as for ♂. Last tergite as in FIG. 69, less often FIG. 73. Subgenital plate as in FIG. 26; tergo-central setae on VII longer than those on VI. TBL 1.38-1.45. Genital chamber particles as in FIG. 64, but faint; genital chamber sac (FIG. 92) with sparse posteriorly directed lines and often concavity in anterior margin.

The broadly bifurcate endomeral plate of the genitalia and the genital sac with only 4 large spines enable the ♂ of *G. costaricensis* to be readily recognized. The ♀ is separable primarily on the basis of its chaetotaxy of the last tergites, the structure of the genital chamber sac, and the head width. This species is the only one known from Costa Rica (FIG. 148).

*Material Examined:* Holotype ♂, allotype ♀, *Macrogeomyis heterodus cartagoensis*, San Jose, Costa

Rica, 2.VI.1954, KU-60663; in collection of University of Kansas. Paratypes: 12 ♂♂, 9 ♀♀, same data as holotype; 9 ♂♂, 4 ♀♀, same, but 3.VI.1954, KU-60664.

14. ***Geomydoecus trichopi* Price & Emerson, n. sp.** FIG. 86, 120

Type-host: *Zygogeomys trichopus trichopus* Merriam.

♂. HW 0.44–0.46; temple margin (FIG. 42) with long submarginal and 2 spiniform marginal setae; scape as in FIG. 145. Abdomen with medium tergoventral setae; terminalia as in FIG. 18. TBL 1.32–1.40. Genitalia (FIG. 120) with endomeral plate pointed and undivided apically, parameral arch as shown, and sac with 6 large spines and smaller adjacent spines; GW 0.16–0.17.

♀. HW 0.45–0.47 (FIG. 37); temple margin (FIG. 53) with long submarginal and 2 short marginal setae. Last tergite as in FIG. 77. Subgenital plate as in FIG. 10; tergoventral setae on VII longer than those on VI. TBL 1.23–1.28. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 86) with lines only anteriorly.

The nature of the antenna, temple margin, dimensions, and genitalic features, especially with the undivided endomeral plate, makes the ♂ identify with that of *G. bulleri* n. sp.; however, these species are readily separated by the gross difference in the shape of the endomeral plate. The ♀ of *G. trichopi* is likewise close to that of *G. bulleri*, but they are separated by differences in the genital chamber sac lines and in the length of the medioanterior setae on the last tergite.

*Material Examined:* Holotype ♂, allotype ♀, *Zygogeomys trichopus trichopus*, Sierra Patamba, Michoacan, Mexico, 29.VI.1954, KU-62520; in collection of University of Kansas. Paratypes: 15 ♂♂, 6 ♀♀, same data as holotype; 2 ♂♂, same, but 30.VI.1954, KU-62519; 2 ♂♂, 2 ♀♀, same, but No. 3840, Lot 56-8149, R. W. Dickerman.

15. ***Geomydoecus bulleri* Price & Emerson, n. sp.** FIG. 98, 123

Type-host: *Pappogeomys bulleri bulleri* (Thomas).

♂. HW 0.41–0.48; temple margin (FIG. 43) with long submarginal and 2 spiniform marginal setae; scape as in FIG. 145. Abdomen with short to medium tergoventral setae; terminalia as in FIG. 18. TBL 1.19–1.39. Genitalia (FIG. 123) with endomeral plate having elongate narrow undivided apical process, parameral arch as shown, and sac with 6 large spines; GW 0.15–0.17.

♀. HW 0.46–0.52 (FIG. 36); temple margin (FIG. 53) with long submarginal and 2 short marginal setae. Last tergite as in FIG. 76. Subgenital plate as in FIG. 10; tergoventral setae on VII equal to or somewhat longer than those on VI. TBL 1.26–1.38. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 98) with numerous transverse lines across middle portion.

The shape and undivided nature of the ♂ endomeral plate is different from that possessed by any other known species. The ♀ is recognized by the

chaetotaxy of the terminalia, including the displacement toward the midline of a pair of setae on the last tergite, by the temple setae, and by the lines of the genital chamber sac.

*Material Examined:* Holotype ♂, allotype ♀, *Pappogeomys bulleri bulleri*, Mascota, Jalisco, Mexico, 28.II.1967, PLC-12349; in collection of University of Kansas. Paratypes: 1 ♂, 1 ♀, same data as holotype; 1 ♂, 1 ♀, Jazmin, Jalisco, Mexico, 19.X.1966, PLC-11697; 1 ♂, 1 ♀, Autlan, Jalisco, Mexico, 2.V.1967, PLC-12653; 1 ♂, 1 ♀, La Cuesta, Jalisco, Mexico, 4.IV.1967, PLC-12475. Other material: 2 ♂♂, 2 ♀♀, *P. b. melanurus* Genoways & Jones, Mexico, Jalisco; 1 ♂, 1 ♀, *P. b. burti* Goldman, Mexico, Jalisco.

16a. ***Geomydoecus mcgregori* Price & Emerson, n. sp.** FIG. 18, 19, 33, 65, 89, 110

Type-host: *Pappogeomys fumosus* (Merriam).

♂. HW 0.48–0.52 (FIG. 78); temple margin as in FIG. 41–43; scape as in FIG. 145. Abdomen with short to medium tergoventral setae; terminalia as in FIG. 18. TBL 1.52–1.61. Genitalia (FIG. 110) with elongate endomeral plate having distinct apical division and shoulders, parameral arch with evenly concave anterior margin, and sac with only 5 large spines; GW 0.18–0.20.

♀. HW 0.51–0.56 (FIG. 33 or 35); temple margin as in FIG. 53. Last tergite as in FIG. 76. Subgenital plate (FIG. 19) usually with 1–4 long medioanterior setae; tergoventral setae on VII longer than those on VI. TBL 1.45–1.65. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 89) large, with papillose anterior portion and medial lines directed more or less posteriorly.

The gross details of the ♂ genitalia and the structure of the ♀ genital chamber sac enable both sexes of this species to be separated from those of all other groups.

*Material Examined:* Holotype ♂, allotype ♀, *Pappogeomys fumosus*, Colima, Mexico, 25.XI.1950, J. R. Alcorn, KU-39819; in collection of University of Kansas. Paratypes: 14 ♂♂, 33 ♀♀, same data as holotype; 2 ♂♂, 1 ♀, same, except KU-39818; 1 ♀, Colima, Mexico, 14.III.1892, E. W. Nelson, KU-33209; 1 ♂, 1 ♀, Colima, Colima, Mexico, 25.XI.1950, JRA-13524. Other material: 24 ♂♂, 17 ♀♀, *P. bulleri nelsoni* (Merriam), Mexico, Jalisco (2); 15 ♂♂, 10 ♀♀, *P. gymnurus gymnurus* (Merriam), Mexico, Jalisco (4); 1 ♂, 1 ♀, *P. g. russelli* Genoways & Jones, Mexico, Jalisco; 3 ♂♂, 7 ♀♀, *Pappogeomys* sp., Mexico, Michoacan. Questionable record: 2 ♂♂, 2 ♀♀, *P. tylosinus atratus* Russell, Mexico, Jalisco.

16b. ***Geomydoecus wernecki* Price & Emerson, n. sp.** FIG. 78, 109

Type-host: *Pappogeomys zinseri* (Goldman).

♂. As for *G. mcgregori*, except genital sac always with 6 prominent spines and endomeral plate either apically un-

divided or with division difficult to discern (FIG. 109).

♀. As for *G. mcgregori*.

The consistent presence of only 5 prominent spines on the ♂ genital sac of *G. mcgregori* and 6 on that of *G. wernecki*, along with a possible difference in the apical division of the endomeral plate of the ♂ genitalia, justifies the recognition of these as 2 distinct taxa, even in the absence of characters for separating the ♀♀.

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys zinseri*, Lagos de Moreno, Jalisco, Mexico, 15.X.1965, KU-103348; in collection of University of Kansas. Paratypes: 4 ♂♂, 2 ♀♀, same data as holotype; 5 ♂♂, 9 ♀♀, same, except KU-103347. Questionable records: 3 ♂♂, 1 ♀, *P. tylosrhinus brevisrostris* Russell, Mexico, Guanajuato; 1 ♂, 1 ♀, *P. t. angustirostris* (Merriam), Mexico, Jalisco; 1 ♀, *P. alcorni* Russell, Mexico, Jalisco.

16c. **Geomydoecus alcorni** Price & Emerson, n. sp. FIG. 88, 111

Type-host: *Pappogeomys alcorni* Russell.

♂. HW 0.43–0.45. TBL 1.28–1.40. Genitalia much as in FIG. 110, except endomeral plate usually lacking apical shoulders and parameral arch with deep indentation in anterior margin (FIG. 111); apparently with 6 large spines in sac, but difficult to discern due to patch of smaller pigmented spines around 4 grouped spines; GW 0.16. Otherwise, as for *G. mcgregori*.

♀. HW 0.46–0.49 (FIG. 36 or 37). TBL 1.24–1.30. Genital chamber sac (FIG. 88) with number of lines transversely across median area. Otherwise, as for *G. mcgregori*.

The ♂, on the basis of its smaller dimensions and differences in the posterior plates of the genitalia, is separable from both *G. mcgregori* and *G. wernecki*. The ♀ of *G. alcorni* is separated from these 2 species by its smaller size and different configuration of the lines of the genital chamber sac.

The 3 species of this group—*G. mcgregori*, *G. wernecki*, and *G. alcorni*—are known from at least 5 species of *Pappogeomys* fairly compactly distributed across central Mexico (FIG. 149).

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys alcorni*, Mazamitla, Jalisco, Mexico, 18.X.1950, KU-39806; in collection of University of Kansas. Paratypes: 3 ♂♂, 4 ♀♀, same data as holotype; 3 ♂♂, 2 ♀♀, same, except KU-39805; 3 ♂♂, 4 ♀♀, same, except 2.VII.1954, KU-61328.

17a. **Geomydoecus expansus** (Duges) FIG. 37, 43, 59, 79, 108, 145

*Trichodectes geomydis* var. *expansus* Duges, 1902, Mem. Soc. Cien. "Ant. Alzate" 18: 185. Type-host: "Tuza (*Geomys mexicanus*; *Platygeomys gymnurus*)"—probably *Pappogeomys castanops* (Baird).

♂. HW 0.41–0.43 (FIG. 79); temple margin (FIG. 43) with submarginal seta long and situated near outer spiniform

marginal seta; scape as in FIG. 145. Abdomen with short to medium tergo-central setae; terminalia as in FIG. 22. TBL 1.24–1.29. Genitalia (FIG. 108) with subtriangular endomeral plate apically bifurcate, parameral arch evenly rounded laterally, and sac with 6 large spines; GW 0.14–0.15.

♀. HW 0.44–0.47 (FIG. 36 or 37); temple margin (FIG. 59) with short submarginal seta. Last tergite as in FIG. 69. Subgenital plate (FIG. 10) with setae as in FIG. 6; tergo-central setae on VII longer than those on VI. TBL 1.21–1.27. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 93) with numerous anterior loops.

The ♂ is recognized by the antennal type, the temple setae, the dimensions, and the details of the genitalia, including specifically the shape of the endomeral plate and parameral arch, the number of spines in the sac, and the width. The ♀ is identified by the placement and length of the setae on the last tergite, the type of genital chamber sac, the longer tergo-central setae on VII, and the temple setae.

The type-host of *G. expansus* is a matter of conjecture, since "*Geomys mexicanus*" is not an identifiable name and since both hosts mentioned with the description were given most probably as examples of species belonging to the group to which "Tuza" belongs (Hopkins & Clay 1952). With the type-materials unknown, we have selected *P. castanops* as the host most likely to represent the true type-host of this louse, because it is the most common species of pocket gopher found in the northern region of Mexico. This distribution and the general shape of the louse are the only clues provided by Duges (1902) in the description. Even though we have seen material of *G. expansus* from only 3 subspecies of *P. castanops*, ranging from Kansas to Zacatecas, the distribution shown in FIG. 149 encompasses the range of all subspecies, acknowledging that this may be somewhat presumptive.

*Material Examined*: 10 ♂♂, 25 ♀♀, *Pappogeomys castanops castanops*, U.S.A., Kansas (3); 5 ♂♂, 5 ♀♀, *P. c. lacrimalis* (Nelson & Goldman), U.S.A., Texas (3), New Mexico; 1 ♂, 2 ♀♀, *P. c. rubellus*, Mexico, Zacatecas. Questionable record: 11 ♂♂, 9 ♀♀, *P. zinseri*, Mexico, Jalisco (2).

17b. **Geomydoecus coronadoi** Barrera FIG. 71

*Geomydoecus geomydis coronadoi* Barrera, 1961, An. Escuela Nac. Cien. Biol. 10: 116. Type-host: *Cratogeomys perotensis estor* = *Pappogeomys merriami estor* (Merriam).

♂. Much as for *G. expansus*, but terminalia as in FIG. 23; TBL 1.20–1.34; and genitalia (FIG. 135) with endomeral plate narrowed apically.

♀. HW 0.45–0.52 (FIG. 37); temple margin (FIG. 54) with submarginal seta extending near apex of longer marginal seta. Last tergite (FIG. 71) occasionally with 1 seta slightly longer than shown. Subgenital plate as in FIG. 16; tergo-central setae

on VII approximately equal to those on VI. TBL 1.21–1.34. Genital chamber particles apparently as in FIG. 65, possibly as in FIG. 66; genital chamber sac (FIG. 94) with few weak anterior loops.

The ♂ is separated from that of *G. expansus* on the basis of the distinctly narrowed apical portion of the endomerale plate. The ♀ is more easily separated, being differentiated from *G. expansus* by having a genital chamber sac with fewer anterior loops, much shorter setae on the last tergite, and tergo-central setae on VII equal to those on VI.

The description of *G. coronadoi* clearly represents a composite, the holotype ♂ being as described here and from the host, *P. m. estor*. The ♀ allotype, however, is obviously that of another species, represented here by *G. perotensis* n. sp., also from *P. m. estor*. Apparently, Barrera (1961) was unaware of the occurrence of 2 different species on the same individual for a number of pocket gophers and had an incorrect association.

*Material Examined:* 2 ♂♂, 2 ♀♀, *Pappogeomys merriami estor*, Mexico, Veracruz (2); 1 ♀, *P. m. perotensis* (Merriam), Mexico, Veracruz; 14 ♂♂, 15 ♀♀, *P. m. saccharalis* (Nelson & Goldman), Mexico, Puebla (2); 1 ♂, 1 ♀, *P. merriami*, Mexico, Puebla. Questionable record: 3 ♂♂, 1 ♀, *P. m. merriami* (Thomas), Mexico, Rio Frio.

17c. ***Geomydoecus merriami*** Price & Emerson, n. sp. FIG. 136

Type-host: *Pappogeomys merriami merriami* (Thomas).

♂. As for *G. expansus*, except TBL 1.39–1.40 and GW 0.16–0.17 (FIG. 136).

♀. As for *G. coronadoi*, but with subgenital plate (FIG. 24) with setae as in FIG. 25; TBL 1.34–1.37; and genital chamber sac (FIG. 93) with numerous anterior loops.

The ♂ is quite close to those of *G. expansus*, *G. coronadoi*, and *G. veracruzensis* n. sp.; it is separable from the first 2 on the basis of the larger genitalia size and possibly on the shape of the genital endomerale plate, and tenuously from the last on larger body size and shape of the endomerale plate. The ♀, with the very short lateroposterior setae on the last tergite, is closest to *G. coronadoi*, *G. polydentatus* n. sp., and *G. veracruzensis*; the numerous anterior loops of the genital chamber sac and the absence of a patch of long medioanterior setae on the subgenital plate separate it from the first 2; differences in lengths of the setae on the last tergite and subgenital plate separate it from the last species.

*Material Examined:* Holotype ♀, allotype ♂, *Pappogeomys merriami merriami*, Raices, Nevado de Toluca, Mexico, 22.III.1963, B-64691; in collection of United States National Museum. Paratypes: 8 ♂♂, 11 ♀♀, same data as holotype; 10 ♂♂, 14 ♀♀,

Toluca, Nevado de Toluca, Mexico, 10.III.1963, B-64451; 2 ♂♂, 2 ♀♀, La Piedra, Lagunas de Zempoala, Mexico, 26.III.1963, B-64793.

17d. ***Geomydoecus veracruzensis*** Price & Emerson, n. sp. FIG. 6, 70

Type-host: *Pappogeomys merriami fulvescens* (Merriam).

♂. Close to *G. expansus*, except for TBL 1.28–1.31, and GW 0.17–0.18 (FIG. 105).

♀. Close to *G. coronadoi*, but with last tergite (FIG. 70) with outer seta distinctly shorter than other 2; subgenital plate (FIG. 10) with setae as in FIG. 6; and genital chamber sac (FIG. 93) with numerous anterior loops.

The ♂ of *G. veracruzensis* is separated from that of *G. merriami* only on the basis of differences in total body length and possible differences in genitalic structure. The ♀ is likewise close to *G. merriami*, but with differences in chaetotaxy of the subgenital plate (FIG. 6 vs 25) and of the last tergite (FIG. 70 vs 71).

*Material Examined:* Holotype ♀, allotype ♂, *Pappogeomys merriami fulvescens*, Limon, Veracruz, Mexico, 19.XI.1946, KU-19351; in collection of University of Kansas. Paratypes: 2 ♂♂, same data as holotype.

17e. ***Geomydoecus polydentatus*** Price & Emerson, n. sp. FIG. 25, 72, 95, 137

Type-host: *Pappogeomys zinseri* (Goldman).

♂. As for *G. expansus*, except for HW 0.45–0.47 (FIG. 78); TBL 1.39–1.46; and genitalia (FIG. 137) with 10–11 large spines on sac and GW 0.17–0.18.

♀. HW 0.51–0.53 (FIG. 35, 36); temple margin as in FIG. 54. Last tergite often as in FIG. 72, with middle seta longest, but variably as in FIG. 70. Subgenital plate much as in FIG. 10, but with setae as in FIG. 25; tergo-central setae on VII longer than those on VI. TBL 1.42–1.50. Genital chamber particles as in FIG. 65; genital chamber sac (FIG. 95) large, with lines as shown.

The large number of prominent spines on the genital sac easily separates the ♂ of *G. polydentatus* from all other species, with the possible exception of *G. trichopi*; however, these 2 species have distinctly different endomerale plates of the genitalia, as well as other differentiating features. The ♀, with the very short lateroposterior setae on the last tergite, is close to the preceding 3 species, but the large genital chamber sac and distinctive lines, the greater body length, and the longer tergo-central setae on VII, will characterize *G. polydentatus*.

*Material Examined:* Holotype ♂, allotype ♀, *Pappogeomys zinseri*, Lagos de Moreno, Jalisco, Mexico, 15.X.1965, KU-103348; in collection of University of Kansas. Paratypes: 6 ♂♂, 10 ♀♀, same data as holotype; 12 ♂♂, 7 ♀♀, same, except KU-103347. Questionable records: 2 ♂♂, 3 ♀♀,

*P. tylorhinus brevisrostris*, Mexico, Guanajuato; 1 ♂, *P. alcorni*, Mexico, Jalisco.

18a. **Geomydoecus mexicanus** Price & Emerson, **n. sp.** FIG. 1, 2, 15, 16, 41, 53, 68, 87, 141, 142

Type-host: *Pappogeomys merriami saccharalis* (Nelson & Goldman).

♂. HW 0.42–0.44; temple margin as in FIG. 41–43; scape as in FIG. 145. Abdomen (FIG. 1) with short tergoventral setae; terminalia as in FIG. 15. TBL 1.13–1.18. Genitalia (FIG. 142) with evenly rounded parameral arch, endomerale plate varying from FIG. 141 to 142, and sac without large spines; GW 0.11.

♀. HW 0.46–0.47 (FIG. 37); temple margin (FIG. 53) with long submarginal seta. Last tergite (FIG. 68) with inner seta shortest. Subgenital plate (FIG. 16) with patch of medioanterior long setae; tergoventral setae (FIG. 2) on VII equal to or slightly longer than those on VI. TBL 1.22–1.26. Genital chamber particles as in FIG. 63; genital chamber sac (FIG. 87) with faint posteriorly converging lines.

The ♂ genitalia are most distinctive, separating *G. mexicanus* from all other known species but *G. perotensis* n. sp.; these 2 species are distinguished by the length of the tergoventral setae and by the size of the genitalia. The ♀, with the unusual type of genital chamber particles (FIG. 63) coupled with the type of lateroposterior setae on the last tergite, the small genital chamber sac as in FIG. 87, and the subgenital plate with a patch of medioanterior long setae, may be separated from related species.

Two specimens of *P. m. saccharalis* from which *G. mexicanus* was collected also yielded specimens of *G. coronadoi*, as another example of the occurrence of 2 *Geomydoecus* species on the same individual.

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys merriami saccharalis*, Atlixco, Puebla, Mexico, 9.VIII.1954, R. W. Dickerman, No. 4248; in collection of University of Kansas. Paratypes: 3 ♂♂, 2 ♀♀, same data as holotype; 1 ♂, 1 ♀, same, but no collector and KU-62513; 16 ♂♂, 15 ♀♀, same, but no collector and KU-62518.

18b. **Geomydoecus perotensis perotensis** Price & Emerson, **n. sp.** FIG. 3, 77, 140

Type-host: *Pappogeomys merriami estor* (Merriam).

♂. HW 0.40–0.43. Abdomen (FIG. 3) with very short tergoventral setae. TBL 1.09–1.18. Genitalia as in FIG. 140; GW 0.09. Otherwise, as for *G. mexicanus*.

♀. HW 0.43–0.48. Last tergite (FIG. 77) with medioanterior seta displaced from remaining 2 lateroposterior setae. TBL 1.14–1.37. Otherwise, as for *G. mexicanus*.

The recognition of *G. perotensis* as distinct from *G. mexicanus* is based on the ♂ having tergoventral setae much shorter and on the last tergite of the ♀ having longer setae, with 1 displaced medioanteriorly from the others. The ♀ is apparently inseparable from *G. fulvescens* n. sp., but the ♂♂ of these

2 species have distinctly different genitalia.

This louse species is named *G. p. perotensis* on the basis of Hall & Kelson (1959) placing *P. m. estor* and *P. m. perotensis* together as subspecies of *Cratogeomys perotensis*, apart from *C. merriami*. All 3 specimens from which *G. p. perotensis* was taken also had specimens of *G. coronadoi*.

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys merriami estor*, Las Vigas, Veracruz, Mexico, 4.XI.1946, KU-19338; in collection of University of Kansas. Paratypes: 8 ♂♂, 7 ♀♀, same data as holotype; 3 ♂♂, 3 ♀♀, Altotonga, Veracruz, Mexico, 11.XI.1946, KU-19329. Other material: 8 ♂♂, 1 ♀, *P. m. perotensis* (Merriam), Mexico, Veracruz.

18c. **Geomydoecus perotensis irolonis** Price & Emerson, **n. subsp.**

Type-host: *Pappogeomys merriami irolonis* (Nelson & Goldman).

♂. As for *G. p. perotensis*, except for HW 0.45–0.46, TBL 1.19–1.24, and GW 0.09–0.10.

♀. As for *G. p. perotensis*, except for HW 0.53 and TBL 1.39–1.42.

The specimens from *P. m. irolonis* are recognized to represent a subspecies of *G. perotensis*, differing from *G. p. perotensis* on the consistent difference in head width for both sexes.

*Material Examined*: Holotype ♀, allotype ♂, *Pappogeomys merriami irolonis*, Apam, Hidalgo, Mexico, 24.VII.1952, KU-48539; in collection of University of Kansas. Paratypes: 1 ♂, 2 ♀♀, same data as holotype.

18d. **Geomydoecus fulvescens** Price & Emerson, **n. sp.** FIG. 139

Type-host: *Pappogeomys merriami fulvescens* (Merriam).

♂. HW 0.43–0.46; temple margin as in FIG. 41; scape as in FIG. 145. Abdomen with medium tergoventral setae on II–IV, short on V–VII; terminalia as in FIG. 15. TBL 1.11–1.12. Genitalia (FIG. 139) with diamond-shaped endomerale plate apically undivided, parameral arch as shown, and small sac without large spines; GW 0.09–0.10.

♀. HW 0.48–0.52 (FIG. 36); temple margin as in FIG. 53. Last tergite as in FIG. 77. Subgenital plate (FIG. 24) with some long medioanterior setae; tergoventral setae on VII about equal to those on VI. TBL 1.29–1.36. Genital chamber particles as in FIG. 63; genital chamber sac as in FIG. 87.

The ♂ genitalia are distinctively different from those of all other known species. The ♀, however, is apparently indistinguishable from those of *G. p. perotensis* and *G. p. irolonis*.

The single host specimen from which material of *G. fulvescens* was taken also was the source of the material for *G. veracruzensis*.

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys merriami fulvescens*, Limon, Veracruz,

Mexico, 19.XI.1946, KU-19351; in collection of University of Kansas. Paratypes: 9 ♂♂, 12 ♀♀, same data as holotype.

18e. ***Geomydoecus traubi*** Price & Emerson, n. sp. FIG. 23, 24, 63, 75, 80, 138

Type-host: *Pappogeomys merriami merriami* (Thomas).

♂. HW 0.44–0.46; temple margin as in FIG. 41–43; scape as in FIG. 145. Abdomen (FIG. 1) with short tergoventral setae; terminalia as in FIG. 23. TBL 1.19–1.29. Genitalia (FIG. 138) with elongate tapered endomeral plate with evidence of apical division, parameral arch as shown, and sac with 2 spines; GW 0.13–0.14.

♀. HW 0.49–0.54 (FIG. 35); temple margin as in FIG. 53. Last tergite (FIG. 75) with medioanterior seta displaced toward midline and much shorter than lateroposterior setae. Subgenital plate (FIG. 24) with number of long medioanterior setae; tergoventral setae on VII slightly longer than those on VI (FIG. 2). TBL 1.36–1.39. Genital chamber particles as in FIG. 63; genital chamber sac (FIG. 80) with lines anteriorly bending laterally.

The ♂ genitalia, with the shape of the endomeral plate and parameral arch and sac with only 2 spines, separate *G. traubi* from all other known species. The ♀ likewise is easily separated from the other species by having the medioanterior setae of the last tergite so much shorter and finer than the lateroposterior setae.

Three of the same host individuals had specimens of both *G. merriami* and *G. traubi* on them.

*Material Examined*: Holotype ♂, allotype ♀, *Pappogeomys merriami merriami*, Rio Frio, Mexico, 23.IX.1946, KU-19327; in collection of University of Kansas. Paratypes: 17 ♂♂, 18 ♀♀, same data as holotype; 11 ♂♂, 10 ♀♀, La Piedra, Lagunas de Zempoala, Mexico, 26.III.1963, B-64793; 9 ♂♂, 1 ♀, Toluca, Nevado de Toluca, Mexico, 10.III.

1963, B-64451; 4 ♂♂, 1 ♀, Raices, Nevado de Toluca, Mexico, 22.III.1963, B-64691.

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#### LITERATURE CITED

- Barrera, A.** 1961. Sobre *Geomydoecus* Ewing, con referencia especial a *G. geomydis* (Osborn) (Mallophaga, Trichodectidae). *An. Escuela Nac. Cien. Biol.* **10**: 113–20.
- Chapman, B. L.** 1897. Two new species of *Trichodectes* (Mallophaga). *Ent. News* **8**: 185–87.
- Duges, A.** 1902. *Trichodectes geomydis*, Osborn, var *expansus*, Alf. Dug. *Mem. Soc. Cien. "Ant. Alzate"* **18**: 185–87.
- Hall, E. R. & K. R. Kelson.** 1959. The mammals of North America. Vol. I. The Ronald Press Co., New York, xxx + 546 + 79 p.
- Hopkins, G. H. E. & T. Clay.** 1952. A check list of the genera & species of Mallophaga. *Brit. Mus. (Natur. Hist.)*, London, 362 p.
- Miller, G. S., Jr. & R. Kellogg.** 1955. List of North American recent mammals. U. S. Nat. Mus. Bull. 205, xii + 954 p.
- Russell, R. J.** 1968. Evolution and classification of the pocket gophers of the subfamily Geomyinae. *Univ. Kansas Publ., Mus. Natur. His.* **16**: 473–579.
- Werneck, F. L.** 1945. Os Tricodectídeos dos Roedores (Mallophaga). *Mem. Inst. Osw. Cruz* **42**: 85–150.
1950. Os Malofagos de Mamíferos. Parte II; Ischnocera (continuação de Trichodectidae) e Rhyncophthirina. Ed. do Inst. Osw. Cruz, Rio de Janeiro, 207 p.