

NOTES ON THE GENUS *GEOMYLICHUS* FAIN, 1970 (ASTIGMATA: LISTROPHORIDAE) AND DESCRIPTIONS OF SIX NEW SPECIES

A. Fain¹, J. O. Whitaker Jr.², T. G. Schwan³ and F. S. Lukoschus⁴

----- **ABSTRACT**—Six new species are described in the genus *Geomylichus* Fain, 1970: *G. texanus* sp. n., *G. brevispinosus* sp. n., *G. inaequalis* sp. n., *G. thomomys* sp. n., *G. nectomys* sp. n. and *G. neacomys* sp. n.. The species *G. geomydis* Coffman & McDaniel is placed in synonymy with *G. floridamus* (Radford, 1949). A key to the genus is given. -----

Fain (1973) and Fain & Hyland (1974) revised the seven genera forming the family Listrophoridae in America. Among them the genus *Geomylichus* Fain, 1970, was represented by 4 species: *G. dipodomius* (Radford, 1953) (type species), *G. floridamus* (Radford, 1949), *G. klebergi* (McDaniel, 1965) and *G. sylvilagus* Fain, 1973. Since this paper appeared, 3 new species have been described in this genus: *G. geomydis* Coffman & McDaniel, 1975, *G. mexicanus* Fain, 1976, and *G. postscutatus* Fain, 1976.

Recently new series of mites belonging to this genus have been collected from several new hosts. Among them we have recognized 6 new species as described here. Moreover, through the courtesy of Mr. R. Smiley we were able to examine the type specimens of *G. geomydis* and we find them inseparable from *G. floridamus*.

Genus *Geomylichus* Fain, 1970

This genus differs from the other genera of Listrophoridae, in both sexes by the modified *sc e* seta, which forms a strong, short spine. Moreover in nearly all species there is a rather well-developed paired striated membrane on the coxae II (coxal membrane) serving for clasping the hair of the host. Males are distinguished by the shape of the posterior extremity being deeply incised into two well-developed lobes, the *d 5* setae bear a triangular membrane and the *l 5* setae are strongly developed.

Type species—*Listrophorus dipodomius* Radford, 1953.

KEY TO THE GENUS *Geomylichus*

(N. B. The adults of *G. sylvilagus* Fain and the male of *G. mexicanus* are unknown. The characters given for *G. klebergi* are those of the original description).

FEMALES

1. Posterior extremity with only very thin and short setae (maximum 35 μ long). Striated membranes of coxae II 50-60 μ long 2
- Posterior extremity with either one or two pairs of strong and long setae. Coxal membranes II variable 3
2. Prescapular shield subequal in length to postscapular shield (ratio 1,06:1), the latter presenting transverse striations only in its anterior half and laterally. There are about 20 striations on the shield along a line joining the *sc i* and *d l* setae. Cuticle of hysteronotum with 10 transverse poorly distinct striations in the midline. *G. dipodomius* (Radford, 1953)

1. Institute of Tropical Medicine, 155 Nationalestraat, B-2000 Antwerp, Belgium.
2. Indiana State University, Terre Haute, Indiana 47809, U. S. A.
3. University of California, Berkeley, California 94720.
4. Katholieke Universiteit Nijmegen, Toernooiveld, Nijmegen, Nederland.

- Prescapular shield distinctly longer than postscapular shield (ratio 1.15-1.3:1), the latter completely striated with 29 to 37 striations along a line joining *sc i* and *d l*. Hysteronotum with 20 to 37 striations in midline *G. texanus* sp. n.
- 3. Hysteronotum with a punctate median shield 4
- Hysteronotum without a median shield 5
- 4. Dorsal shield situated in posterior half of hysterosoma and longer than wide. Striated membranes of coxae II 86 μ long. Postscapular shield much longer than prescapular shield *G. postscutatus* Fain, 1976
- Dorsal shield situated in anterior half of hysterosoma and wider than long. Striated membranes of coxae II 70-72 μ long. Postscapular shield slightly shorter than prescapular shield *G. floridamus* (Radford, 1949) (= *G. geomydis* Coffman & McDaniel, 1976)
- 5. Postscapular shield with 45 to 60 striations along a line joining the *sc i* and *d l* setae. Striated membranes on coxae I-II with serrated edges. Striated membranes of coxae II 105-110 μ long 6
- Postscapular shield with not more than 25 striations along a line joining the *sc i* and *d l* setae. Striated membranes of coxae I-II without serration along their edges. Striated membranes of coxae II much shorter 8
- 6. Posterior extremity with 2 pairs of strong and long setae *G. nectomys* sp. n.
- Posterior extremity with 1 pair of strong and long setae 7
- 7. Striated membranes of coxae I-II with conspicuous serration along their edges. Setae *sc e* 26 μ long and 7 μ wide. Hysteronotum with 14 transverse striations *G. neacomys* sp.
- Striated membranes of coxae I-II with unobvious serrations along their edges. *Sc e* 18 μ long and 6 μ wide. Hysteronotum with 42 transverse striations *G. mexicanus* Fain, 1976.
- 8. Opisthogaster with transverse striations. Postscapular shield completely striated. Hysteronotum with 42-50 transverse striations. Striated membranes on coxae II 75 μ long. Setae *sc e* 26 μ long. Prescapular shield 105 μ , postscapular shield 126 μ long (in midline), the latter with 25 striations along a line joining *sc e* and *d l*... *G. thomomys* sp. n.
- Opisthogaster with longitudinal striations. Postscapular shield only striated in its anterior half or not striated. Other characters variable 9
- 9. Setae *sc e* expanded in their apical half. Postscapular shield not striated. Hysteronotum finely striated *G. klebergi* (McDaniel, 1965)
- Setae *sc e* expanded in their basal half. Postscapular shield partly striated. Hysteronotum with striation poorly developed 10
- 10. Striated membranes on coxae II narrow, 30-35 μ long. Setae *sc e* 13-16 μ long, 3-4 μ wide. Prescapular shield 116 μ , postscapular shield 105 μ long, the latter striated only in anterior half of its median part. Hysteronotum with rare superficial and incomplete striations *G. brevispinosus* sp. n.
- Striated membranes on coxae II wider, 60 μ long. Setae *sc e* 27-30 μ x 6-7 μ . Prescapular shield 142 μ , postscapular 135 μ long, the latter striated in its anterior half *G. inaequalis* sp. n.

MALES

- 1. Hysteronotal shield very long, extending forwards far beyond the *d 2* setae 2
- Hysteronotal shield much shorter, completely situated behind the *d 2* setae 3

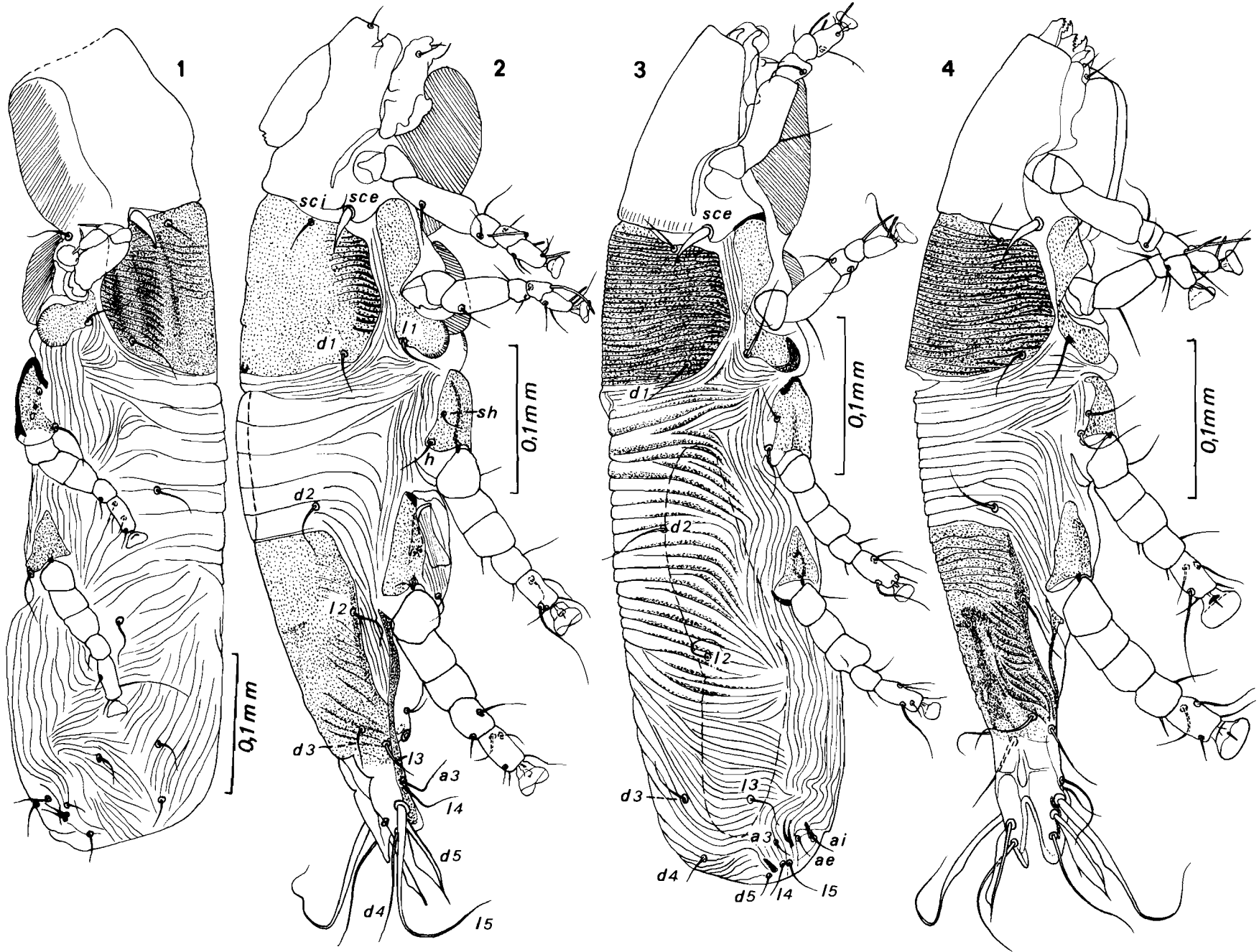
2. Postscapular shield 1.5 times longer (150μ) than prescapular shield (99μ). Internal region of coxae I-II with very thick longitudinal striations. Penis flanked by two narrow and long cuticular prolongations directed posteriorly. Seta *sc e* 15μ long *G. postscutatus* Fain, 1976
- Postscapular shield a little longer (117μ) than prescapular shield (114μ). Absence of thick striations on coxae I-II and of parapenial prolongations. Seta *sc e* 25μ long *G. floridanus* (Radford, 1949) (= *G. geomydis* Coffman & McDaniel, 1975)
3. Striated membranes on coxae I-II with serrated edges. Penis flanked at both sides by a thick longitudinal sclerite as long as the penis. Postscapular shield $152-155\mu$ long (in midline) and much longer than prescapular shield 4
- Striated membranes on coxae I-II not serrated. Penis not flanked by two lateral sclerites. Postscapular shield $90\mu-123\mu$ long (in midline) and either subequal or shorter than prescapular shield 5
4. Setae *sc e* 12μ long and $5\mu-6\mu$ wide. Opisthosoma 140μ long and 75μ wide at base. There are approximately 50-60 poorly distinct striations on postscapular shield along a line joining *sc i* and *dl* setae *G. nectomys* sp. n.
- Setae *sc e* 26μ long and 5, 5μ wide. Opisthosoma 120μ long and 90μ wide at base. Postscapular shield with approximately 50-55 distinct striations along a line joining *sc i* and *dl* setae *G. neacomys* sp. n.
5. Lateral margins of hysteronotal shield with a strongly sclerotized longitudinal strip. Postscapular shield slightly shorter than prescapular shield 6
- Lateral margins of hysteronotal shield without a strongly sclerotized strip. Lengths of anterior shields variable 8
6. Setae *sc e* expanded in their apical half. Setae *l 5* only slightly longer than foliate *d 5* setae *G. klebergi* (McDaniel, 1965)
- Setae *sc e* expanded in their basal half. Setae *l 5* much longer than *d 5* setae 7
7. Postscapular shield not striated, hysteronotal shield with indistinct striations. Seta *sc e* $13\mu \times 3-4\mu$. Inflated base of *l 5* setae 75μ long. Subapical seta of tarsi III 45μ long. Striated membranes on coxae II 25μ long *G. brevispinosus* sp. n.
- Postscapular and hysteronotal shields striated, the striations are less distinct in postero-median part of the first shield. Seta *sc e* $30\mu \times 6\mu$. Inflated base of *l 5* setae 120μ long. Subapical seta of tarsi III 75μ long. Striated membranes on coxae II 50μ long *G. inaequalis* sp. n.
8. Foliate setae (*d 5*) 25μ wide and overlapping in the midline. Hysteronotal shield short, beginning at 39μ behind *d 2* setae. Postscapular shield completely striated and longer (102μ) than prescapular shield (90μ) *G. thomomys* sp. n.
- Foliate setae (*d 5*) narrower (maximum 12μ wide), not overlapping in the midline. Hysteronotal shield longer, arriving at 15μ from the *d 2* setae. Postscapular shield shorter than prescapular shield 9
9. Postscapular shield completely striated transversally and much shorter (100μ) than prescapular shield (129μ long) (in the midline) *G. texanus* sp. n.
- Postscapular shield slightly shorter (123μ) than prescapular shield (132μ) and bearing short striations only along the lateral margins of the shield *G. dipodomius* (Radford, 1953)

1. ***Geomylichus dipodomius*** (Radford, 1953)

Listrophorus dipodomius Radford, 1953: 214

Geomylichus dipodomius, Fain, 1970: 282; Fain & Hyland, 1974: 52

The type host of this species is *Dipodomys spectabilis*, from Santa Fe, New Mexico. Fain and Hyland (1974) have given new drawings of the type female from *Dipodomys spectabilis*



Geomylichus dipodomius (Radford, 1953): Fig. 1, lectotype female; Fig. 2, paralectotype male; *Geomylichus*

the typical host and of a male collected in Santa Fe but from *Dipodomys ordii* (fig. 1).

Recently the senior author had opportunity to examine a male of the typical series collected on *D. spectabilis* from Santa Fe. This male resembles more closely the typical female figured by Fain and Hyland than the male from *Dipodomys ordii*, in having the same structure of the postscapular shield which is lined only in its lateral parts. As Radford did not select a holotype for this species we designate as lectotype the female specimen figured by Fain and Hyland (1974) and we give here a figure of the paralectotype male of that species from the typical host (fig. 2).

The male specimen from *Dipodomys ordii* that Fain and Hyland (1974, fig. 55) have figured as belonging to *G. dipodomius* is actually a new species *G. texanus* that we describe below.

HOST AND LOCALITY — (1) The lectotype female was collected on *Dipodomys spectabilis*, Santa Fe, New Mexico, 11 October 1951. Coll. H. B. Morlan. Paralectotype male from the same host and locality but on 2 October 1951. Both in U. S. National Museum, Washington. (2) *Dipodomys philippsi*, Catorce, San Luis, Potosi, Mexico (Rodent n° 90. 8. 15. 9 in the British Museum) (2 females and 1 nymph) (Coll. A. Fain).

2. *Geomylichus floridanus* (Radford, 1949)

Listrophorus floridanus Radford, 1949: 936

Geomylichus floridanus, Fain & Hyland, 1974: 54

Geomylichus geomydis Coffman & McDaniel, 1975: 183 *Syn. Nov.*

We have examined the holotype male and the allotype female of *G. geomydis*. These specimens agree in all characteristics with the types of *G. floridanus* redescribed by Fain and Hyland (1974) and we consider these species as synonyms.

Tarsi III and IV in the female and the tarsi III in the male of *G. geomydis* bear a very thin and long (60-75 μ) seta. These setae are also present in the specimens of *G. floridanus* from the typical host (these are incomplete in the type female in poor condition). In both sexes the anterior region of hysteronotum bears a median shield as in *G. floridanus*. These shields have been overlooked by Coffman and McDaniel. In the male of *G. geomydis* the chaetotaxy is the same as in *G. floridanus*. In both species the pilicolous striated membranes on coxae II are 70-72 μ long in the females and 69-70 μ in the males.

The typical host of *G. geomydis* (= *G. floridanus*) is *Geomys b. bursarius* from South Dakota. This species was also recorded by Coffman and McDaniel in two other species or subspecies of *Geomys* (see below) as well as in *Thomomys umbrinus agricolaris* from California. We think that the specimens from this last host do not belong to *G. floridanus* but to a new species, *G. thomomys*, that we describe herein. The scanning electron microscope photographs given by the authors of these specimens show clearly the long postscapular shield and in the male the very broad and overlapping foliate setae *d* 5 which are characteristic of that species.

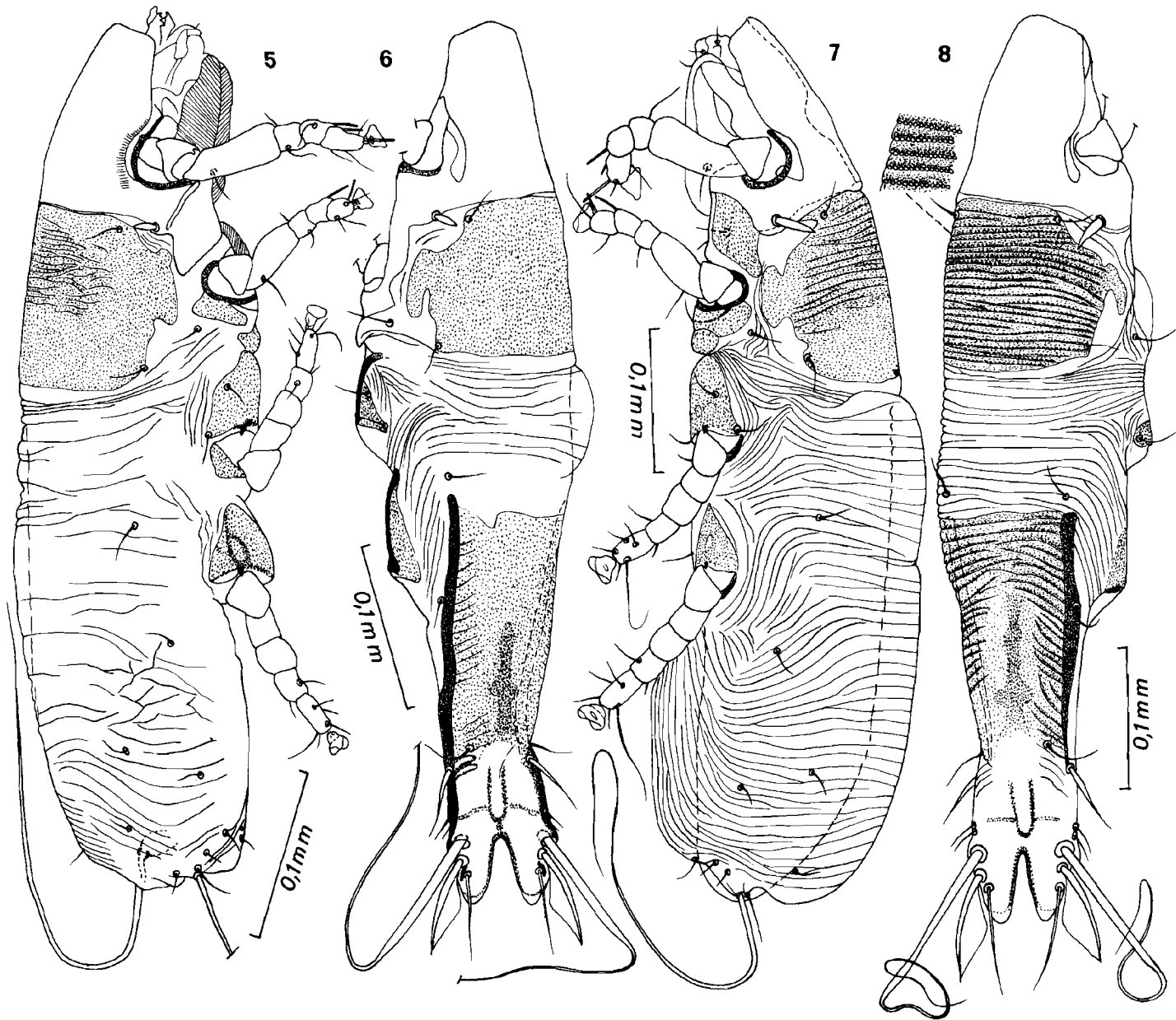
Host and locality of *G. floridanus* (see also Fain & Hyland, 1974) (1) *Geomys tuza tuza*, from Florida and Georgia (typical host). (2) *Geomys floridanus austrinus*, from Florida. (3) *Geomys f. floridanus*, from Florida. (4) *Geomys personatus megapotamus*, from Texas. (5) *Geomys bursarius illinoensis*, Indiana. (6) *Geomys bursarius bursarius*, from S. Dakota and Minnesota (host of the holotype of *G. geomydis*). (7) Pocket gopher, Florida (8) *Pappogeomys bulleri*, Mexico.

3. *Geomylichus klebergi* (McDaniel, 1965)

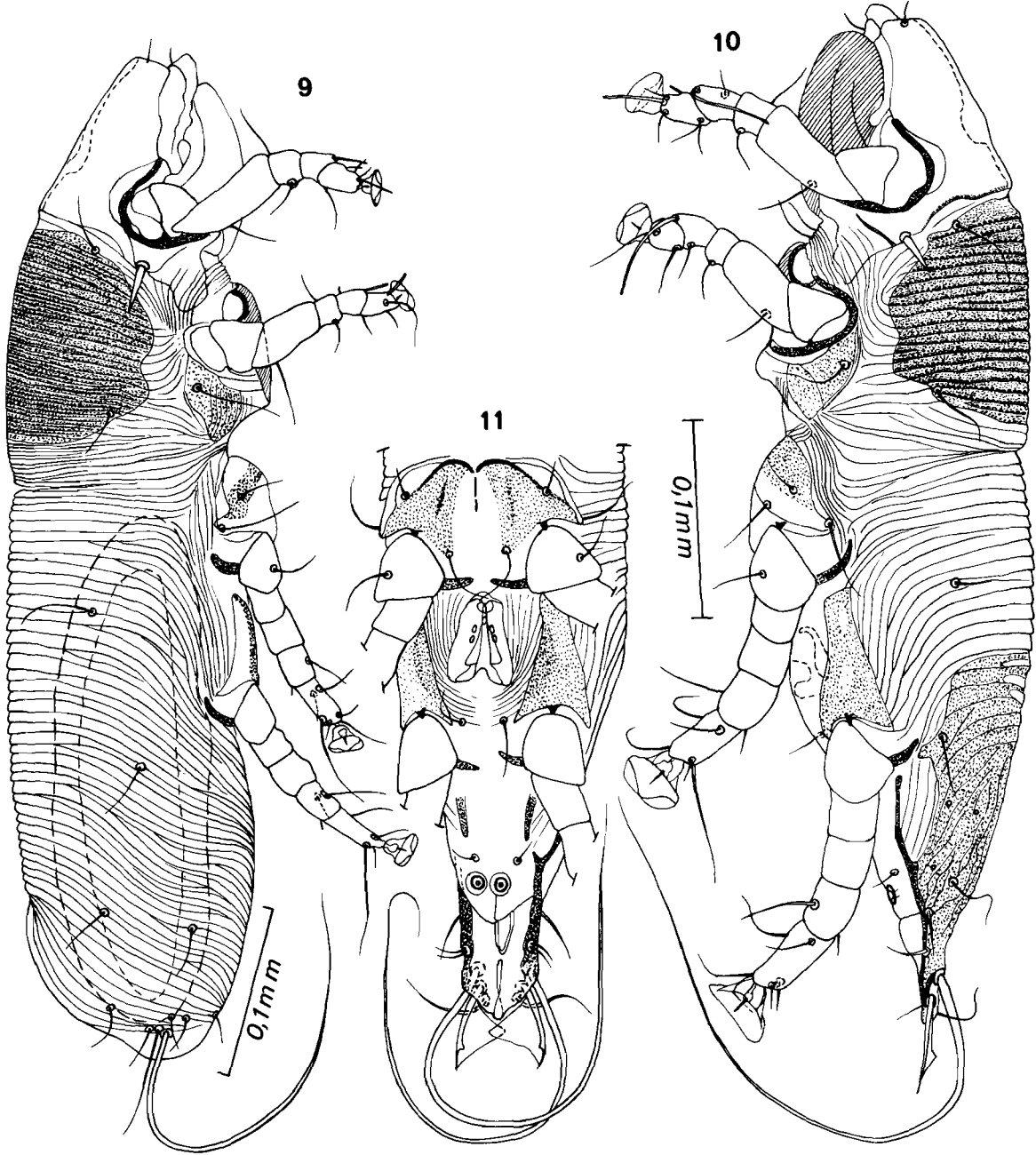
Listrophorus klebergi McDaniel, 1965: 706

Geomylichus klebergi, Fain & Hyland, 1974: 56

We were not able to locate the types of *G. klebergi*. There are no representatives of that species in the following Institutions where types were presumably deposited: U. S. National



Geomylichus brevispinosus sp. n. : Fig. 5. holotype female; Fig. 6. allotype male; *Geomylichus inaequalis* sp. n. :



Geomylichus thomomys sp. n. : Fig. 9, holotype female; Fig. 10-11, allotype male laterally (10) and opisthogaster (11).

Museum Washington, Institute of Acarology Wooster, Museum national d'Histoire naturelle Paris, collections of Dr. McDaniel. We believe therefore that all the specimens of that species are lost.

According to the original description and drawings this species presents the following characteristics: in both sexes setae *sc e* are inflated in their apical half and there is no punctate shield in the anterior part of hysteronotum; female has one pair of very long terminal setae (*l5*) and the postscapular shield is apparently not striated; in the male the setae *l5* are only slightly longer than the foliate setae (*d5*) and the hysteronotal shield is edged at each side by a strongly sclerotized strip. The measurements of these specimens were omitted by McDaniel. The host, is *Sigmodon hispidus texianus*, from Texas.

By this combination of characters *G. klebergi* is clearly distinguished from the other known species of *Geomylichus* as well as from the new species described herein.

One of us (F. L.) has collected from the typical host *Sigmodon hispidus* in Venezuela, one larva which probably belongs to *G. klebergi*. In this larva the striated pilicolous membranes on coxae II are very long and their edges are distinctly serrated as in the nymphs of *G. sylvilagus* and in the adults of *G. neacomys* and *G. nectomys*.

4. *Geomylichus texanus* spec. nov.

FEMALE (fig. 3)—Idiosoma in the holotype 530 μ long and 129 μ wide in lateral view. Prescapular and postscapular shields 135 μ and 105 μ long respectively (in the midline), the latter being completely striated, with 29-34 striations along a line joining the setae *sc i* and *d l*. Striated membranes of coxae II 55 μ long. Hysterosoma soft, without punctate shield, and with 18 striations in the midline. All setae of posterior extremity very thin, not longer than 30 μ . The *sc e* setae are curved and 30 μ long and 5 μ wide, with pointed apex. The *sc i* and *h* setae are very thin and 35 μ and 40 μ long respectively. Tarsi III and IV 30 μ long, with setae not longer than 40 μ long. In specimens from *Dipodomys merriami* from Van Horn, Texas, the postscapular shield is shorter (123 μ), the striations of postscapular shield are more numerous (36-38) and there are 30-32 cuticular striations on the hysteronotum. Specimens from this host but from Nevada are intermediate between those from the typical host and the latter.

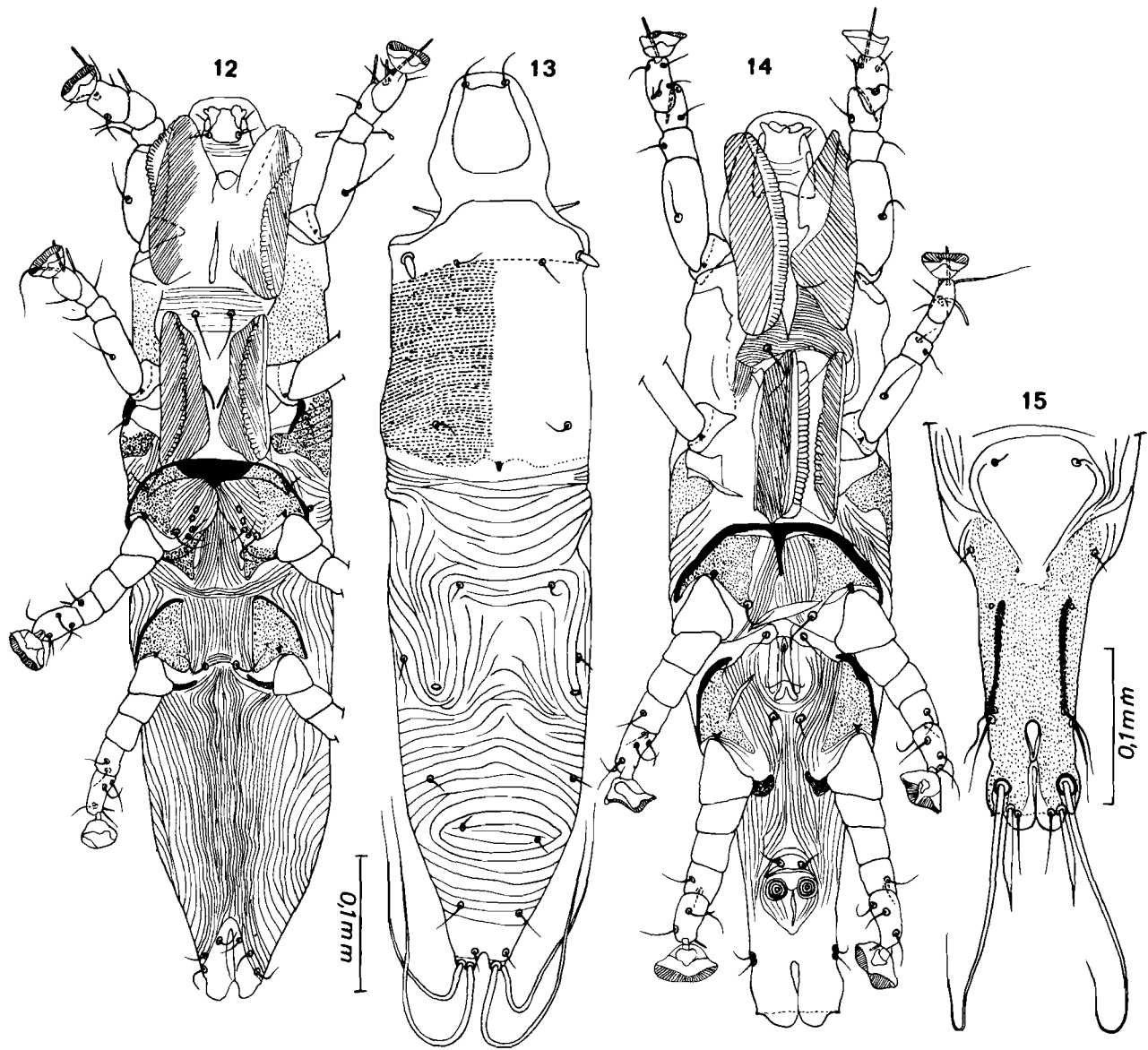
MALE (fig. 4)—Idiosoma in the allotype 525 μ long and 123 μ wide in lateral view. Prescapular and postscapular shields 129 μ and 100 μ long respectively (in midline), the latter being completely striated and bearing 23 striations along a line joining *sc i* and *d l* setae. Striated membranes of coxae II 54 μ long. Posterior region of hysteronotum with a punctate shield beginning at 15 μ behind the *d2* setae, and not edged laterally by sclerotized strips. The *l5* is 125 μ long, its basal inflated part is 75 μ long.

HOST AND LOCALITY — (1) *Dipodomys ordii*, Winkler Co. 10 m. E. Kermit, Texas, 20 June 1976 (Jow 9792) (holotype and 1 paratype female, allotype and one paratype male, three paratype nymphs. (Coll. J. Whitaker). From the same host but from Santa Fe, New Mexico, n° 1320 (1 male of the Radford collection and labelled "*Listrophorus dipodomius*" Radford. Coll. H. B. Morlan n° 274). (2) *Dipodomys merriami*, Culberson Co. 8 m. N. Van Horn, Texas, 19 June 1976 (Jow 9782 and 9779) 4 females, 3 males, 1 nymphs, all paratypes (Coll. J. Whitaker); other specimens (2 females, 1 male and 1 nymph, paratypes) were found on the same host from Ash Meadow, Nevada (4 March 1891) (Coll. F. Lukoschus). (3) *Perognathus penicillatus*, Arizona. Animal in Leiden Museum, 1 male and 1 female paratypes (Coll. F. Lukoschus).

Types in U. S. National Museum Washington.

5. *Geomylichus brevispinosus* spec. nov.

FEMALE (fig. 5)—Idiosoma in holotype 510 μ long and 138 μ wide (in lateral view). Prescapular and postscapular shields 116 μ and 105 μ long respectively (in midline), the latter striated



Geomylichus nectomys sp. n. : Fig. 12-13, holotype female; Fig. 14-15, allotype male.

only in the anterior half of its median third. The *sc e* seta is 16μ long and 4μ wide. The *sc i*, *d l* and *h* short (less than 20μ). Hysteronotum without shield but with a few irregular and incomplete superficial striations. Striated pilicolous membranes on coxae II narrow, $30-35\mu$ long. The *l 5* setae 240μ long, the *l 4* very thin, about 25μ long; other perianal setae very short and thin. Legs rather thin. Tarsi III-IV 25μ long and $10-12\mu$ wide, with a preapical seta not longer than 20μ .

MALE (fig. 6)—Idiosoma 509μ long 120μ wide in ventral view. Prescapular and postscapular shields 100μ and 90μ long respectively (in midline), the latter completely devoid of striations. Seta *sc e* 13μ long and $3-4\mu$ wide. Hysteronotum with a posterior shield reinforced laterally by two longitudinal sclerotized strips. This shield begins 12μ behind the *d 2* setae, it bears in its posterior part a few very indistinct and incomplete striations. Striated membranes on coxae II 25μ long. Penis 36μ long. Setae *d 5* foliate, 57μ long and 12μ wide. Setae *l 5* approximately 200μ long, with a basal part, 75μ long, distinctly enlarged.

HOST AND LOCALITY — On *Perognathus penicillatus*, from Culberson Co, 9 m. N. Van Horn, Texas (Jow 9787), 19 June 1976 (Coll. J. Whitaker) (holotype and 5 paratype females, allotype and 1 paratype male). Types in U. S. National Museum, Washington.

6. *Geomylichus inaequalis* spec. nov.

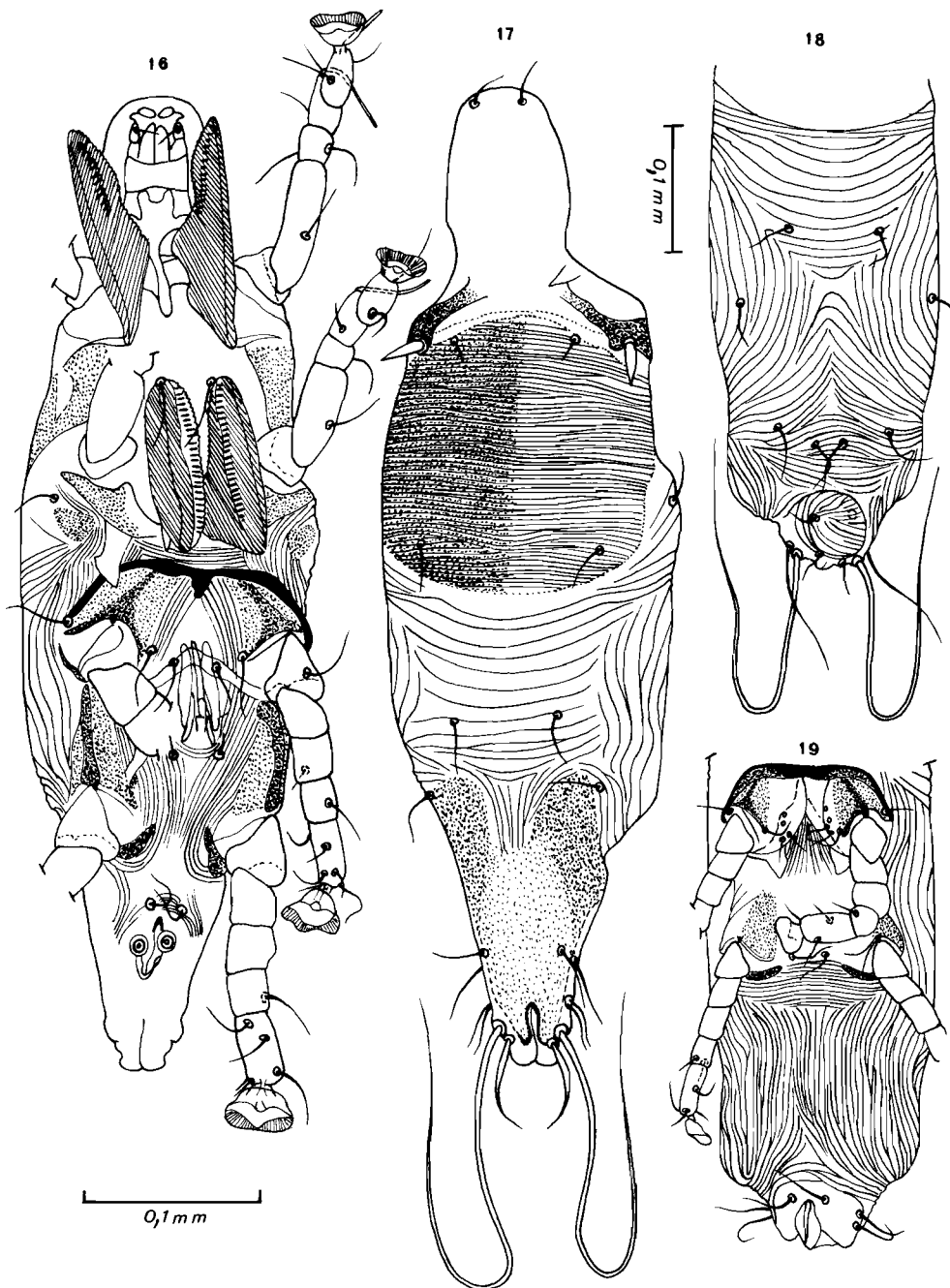
FEMALE (fig. 7)—Idiosoma 600μ long and 135μ wide (in lateral view). Prescapular and postscapular shields 142μ and 135μ long respectively (in midline), the latter is striated in its anterior half; the striations are poorly distinct laterally. The *sc e* is 27μ long and 6μ wide (in basal third). Hysteronotal striations poorly developed. Striated pilicolous membranes on coxae II wider and longer (60μ long) than in *G. brevispinosus*. The *l 5* setae are 300μ long, *l 4* are very thin and 25μ long, other perianal setae very short and thin. Tarsi III-IV 30μ long, bearing a subapical seta 60μ long.

MALE (fig. 8)—Idiosoma 625μ long and 143μ wide. Prescapular and postscapular shields 134μ and 120μ long respectively (in midline), the latter with numerous transverse striations, which are better marked in the anterior part of the shield. Striated membranes of coxae II 50μ long. Seta *sc e* $30\mu \times 6\mu$. Hysteronotum with one posterior distinctly striated shield, which is edged by two longitudinal sclerotized strips. Penis 45μ long. Setae *d 5* 75μ long with a foliate internal triangular lobe 20μ wide. The setae *l 5* are 300μ long, their basal part, 120μ long, inflated.

HOST AND LOCALITY — On *Perognathus hispidus*, from Jeff Davis Co., 2 m. N. Fort Davis, Texas, 18 June 1976 (Jow 9748) (Coll. J. Whitaker) (Holotype and 2 paratype females, allotype and 1 paratype male, 1 nymph). From the same host from Tom Green Co., 8 m. W. San Angelo, Texas, 13 June 1970 (Jow n° 5879) (3 females and 1 male, paratypes. Coll. J. W.). Types in U. S. National Museum, Washington.

7. *Geomylichus thomomys* spec. nov.

FEMALE (fig. 9)—Holotype 570μ long and 140μ wide (laterally). Prescapular and postscapular shields 105μ and 126μ long respectively, the latter with about 25 striations along a line joining the *d l* and *sc i* setae. Hysteronotum devoid of a shield but with approximately 50 narrow striations on the midline. Opisthogaster striated transversely. In all the other species of the genus the opisthogaster is striated longitudinally. The *sc e* is $25-27\mu$ long and $4,5\mu$ wide in basal third. Striated membranes on coxae II well developed and 75μ long. Setae *sc i*, *d l*, *d 2* and *h* $35-40\mu$ long. Setae *l 4* and *l 5* are 60μ and 270μ long respectively. Tarsi III-IV 30μ long, with a fine and long (60μ) subapical seta, and a large sucker.



Geomylichus neacomys sp. n. : Fig. 16-17, allotype male; Fig. 18-19, holotype female.

MALE (fig. 10-11)—Allotype 486μ long and 120μ wide (in ventral view). Prescapular and postscapular shields 90μ and 102μ long respectively, the latter with 18 striations along a line joining *d l* and *sc i*. Setae *sc e* 21μ long and 4μ wide. Striated membranes on coxae II 69μ long. Hysteronotum with a posterior partly striated shield which begins at 39μ behind the *d 2* setae. Penis 36μ long. Foliate setae *d 5* are 39μ long and with an internal triangular membrane 25μ wide. Seta *l 5* is 300μ long. Tarsi III shorter (30μ) than tarsi IV (41μ), both bearing a very large sucker, tarsi III bear a subapical thin seta $45-50\mu$ long.

HOST AND LOCALITY — (1) On *Thomomys bottae*, from Albany, California, January 1977 (Coll. T. Schwan) (Holotype and 12 paratypes female, allotype and 4 paratypes male). (2) On *Thomomys* sp., 6 m. N. Yarnell, Arizona, 30 May 1937 (Coll. Roy Komarek) (1 male and 1 female, paratypes) (Collection of U. S. N. Museum). (3) The specimens from *Thomomys umbrinus agricolaris* and attributed by Coffman and McDaniel to *G. geomydis* (= *G. floridanus*) probably belongs to *G. thomomys*. (4) *Thomomys umbrinus*, from California, 1 September 1965. (animal of Museum of Hamburg) (8 females paratypes (Coll. F. Lukoschus).

8. *Geomylichus nectomys* spec. nov.

FEMALE (fig. 12-13)—Idiosoma in holotype 660μ long and 150μ wide (in ventral view). Prescapular and postscapular shields partly fused, 135μ and 155μ long respectively (in midline), the latter with very numerous and poorly distinct striations (approximately 50-60). Hysteronotum without shield, bearing irregular striations. Striated pilicolous membranes on coxa I and II with serrated edges and 129μ and 110μ long respectively. Posterior extremity with two pairs of strong and subequal setae (*l 5* = 200μ and *l 4* = 170μ). Setae *sc e* 15μ long and 6μ wide.

MALE (fig. 14-15)—Idiosoma in allotype 579μ long and 135μ wide in ventral view. Prescapular and postscapular shields partly fused and 120μ and 155μ long respectively (in midline); the latter with numerous striations as in the female. Posterior half of hysteronotum with punctate shield with anterior margin deeply incised. Striated membranes on coxae I and II with serrated edges and 123μ and 108μ long respectively. Penis 40μ long, flanked with two sclerotized longitudinal parallel bands. Setae *sc e* 12μ long and $5-6\mu$ wide. The *d 5* are 60μ long with a very narrow membrane on inner edge. Setae *l 5* are only slightly inflated basally, 200μ long.

HOST AND LOCALITY — On *Nectomys* sp. from Palmar Sur, Costa Rica, 8 May 1967. Rodent in the collection of Smithsonian Museum. Holotype and 1 paratype female, allotype and 1 paratype male. (Coll. F. Lukoschus) Types in U. S. Museum, Washington.

9. *Geomylichus neacomys* spec. n

FEMALE (fig. 18-19)—Idiosoma in holotype 615μ long and 165μ wide (in ventral view). Prescapular and postscapular shields 125μ and 152μ long respectively (in midline), the latter with 50-60 very fine transverse striations along a line joining *sc i* and *d l* setae. Hysteronotum with 14 transverse striations and devoid of a shield. Coxal membranes I and II with serrated edges, the membranes of coxae II are $105-110\mu$ long. Posterior extremity with one pair (*l 5*) of long and strong setae 300μ long. The *l 4* are 70μ long. Setae *sc e* 26μ long and 7μ wide.

MALE (fig. 16-17)—Idiosoma in allotype 549μ long and 164μ wide. Prescapular and postscapular shields 129μ and 152μ long respectively (in midline), the latter with 50-55 striations along a line joining *sc i* and *d l* setae. Coxal membranes I-II with serrated edges. The membranes on coxae II are 105μ long. Opisthosoma 120μ long and 90μ wide at its base. Setae *sc e* 26μ long and 5.5μ wide. Genital sclerite 45μ long flanked with two parallel longitudinal sclerite. The *l 5* are very progressively attenuated apically and 300μ long.

HOST AND LOCALITY — On *Neacomys tenuipes*, Antioquia, Colombia, 8 April 1971. (Animal in Smithsonian Museum, n° 499.958) (Holotype female and allotype male) (Coll. F. Lukoschus). Types in U. S. National Museum, Washington.

HOSTS OF *GEOMYLICHUS* SPECIES

(N. B. * = type host of the parasite; (?) specimens from this host have not been seen by the authors)

Host	Order, superfamily, family and subfamily of host	Parasitic mite	Locality
	RODENTIA, GEOMYOIDEA		
* <i>Dipodomys</i> sp.	Heteromyidae, Dipodomysinae	<i>G. postscutatus</i> Fain, 1976	Nebraska
* <i>Dipodomys spectabilis</i> Merriam	Heteromyidae, Dipodomysinae	<i>G. dipodomius</i> (Radford, 1953)	Santa Fe, New Mexico
<i>Dipodomys phillipsi</i> Gray	Heteromyidae, Dipodomysinae	<i>G. dipodomius</i> (Radford, 1953)	San Luis, Potosi, Mexico
? <i>Dipodomys microps</i> Merriam	Heteromyidae, Dipodomysinae	<i>G. dipodomius</i> (Radford, 1953)	Utah
* <i>Dipodomys ordii</i> Woodhouse	Heteromyidae, Dipodomysinae	<i>G. texanus</i> sp. n.	Kermit, Texas. Santa Fe, Mexico
<i>Dipodomys merriami</i> Mearns	Heteromyidae, Dipodomysinae	<i>G. texanus</i> sp. n.	Van Horn, Texas. Ash Meadow, Nevada
<i>Perognathus penicillatus</i> Woodhouse	Heteromyidae, Dipodomysinae	<i>G. texanus</i> sp. n.	Arizona
* <i>Perognathus penicillatus</i> Woodhouse	Heteromyidae, Dipodomysinae	<i>G. brevispinosus</i> sp. n.	Van Horn, Texas
* <i>Perognathus hispidus</i> Baird	Heteromyidae, Dipodomysinae	<i>G. inaequalis</i> sp. n.	Fort Davis and San Angelo, Texas
<i>Liomys irroratus</i> Gray	Heteromyidae, Heteromyinae	<i>G. postscutatus</i> Fain, 1976	El Cabano, Colima, Mexico
* <i>Geomys t. tuza</i> Barton	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Folkston, Georgia and Florida
<i>Geomys floridanus austrinus</i> Bangs	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Florida
<i>Geomys f. floridanus</i> Audubon & Bachman	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Florida
<i>Geomys b. bursarius</i> Shaw	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Kansas, South Dakota
? <i>Geomys personatus megapotamus</i> Davis	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Riviera, Texas
? <i>Geomys bursarius illinoensis</i> Komarek & Spencer	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Indiana
<i>Pappogeomys bulleri</i> Thomas	Geomyidae	<i>G. floridanus</i> (Radford, 1949)	Jalisco, Mexico
* <i>Thomomys bottae</i> Eydoux & Gervais	Geomyidae	<i>G. thomomys</i> sp. n.	Albany, California
<i>Thomomys</i> sp.	Geomyidae	<i>G. thomomys</i> sp. n.	Arizona
<i>Thomomys umbrinus</i> Richardson	Geomyidae	<i>G. thomomys</i> sp. n.	California
? <i>Thomomys umbrinus agriculturalis</i> Grinnel	Geomyidae	<i>G. thomomys</i> sp. n.	California
	RODENTIA, MUROIDEA		
? * <i>Sigmodon hispidus texianus</i> Audubon & Bachman	Cricetidae, Hesperomyinae	<i>G. klebergi</i> (McDaniel, 1965)	Kingsville, Texas
* <i>Nectomys</i> sp.	Cricetidae, Hesperomyinae	<i>G. nectomys</i> sp. n.	Palmar Sur, Costa Rica
* <i>Neacomys tenuipes</i> Thomas	Cricetidae, Hesperomyinae	<i>G. neacomys</i> sp. n.	Antioquia, Colombia
* <i>Teanopus phenax</i> Merriam	Cricetidae, Hesperomyinae	<i>G. mexicanus</i> Fain, 1976	Camoá, Rio Mayo Mexico
	LAGOMORPHA		
* <i>Sylvilagus floridanus yucatanensis</i> (Miller)	Leporidae, Leporinae	<i>G. sylvilagus</i> Fain, 1973	Yucatan, Mexico

GEOGRAPHIC DISTRIBUTION, SPECIFICITY AND EVOLUTION OF THE GENUS
Geomylichus

The twelve species known so far in the genus *Geomylichus* are endemic for the New World. Amongst them, one was found on a rabbit (order Lagomorpha), all the others were collected on rodents (order Rodentia). It is possible that the parasitism of the rabbit was accidental and that the true host of that species was also a rodent.

Amongst the species from Rodentia 7 live on Geomyoidea (5 in Heteromyidae and 2 in Geomyidae) and 4 on Muroidea, only Cricetidae, Hesperomyinae.

The specificity at the family level is strict, each species parasitizing only one family of rodents. The specificity is also well marked at the genus level: the 4 species living on Cricetidae, 3 species from Heteromyidae and 1 species from Geomyidae have been found on only one genus of host. Only 3 species (2 from Heteromyidae and 1 from Geomyidae) have been found on 2 different host-genera. One may consider therefore that the specificity of the species is well marked.

Fain (1972) assumed that in the Listrophoroidea the most primitive species are those with the most fully developed body shields. If we accept this view the 2 most primitive species in *Geomylichus* are *G. floridanus*, from Geomyidae and *G. postscutatus* from Heteromyidae.

The genus *Geomylichus* is more primitive than the New World genus *Prolistrophorus* and the cosmopolitan genus *Listrophorus*, both parasitic on various rodents in the New World, mainly Cricetidae (Cricetinae) and Microtidae.

REFERENCES

- Coffman, C. C., and B. McDaniel. (1975). The description of a new species of *Geomylichus* Fain and rates of infestations on one of its hosts *Geomys bursarius bursarius* in South Dakota. *Acarologia* 17: 183-184.
- Fain, A. (1970). Diagnoses de nouveaux Lobalgides et Listrophorides (Acarina: Sarcoptiformes). *Rev. Zool. Bot. Afr.*, LXXXI (3-4): 271-300.
- _____. (1972). Les Listrophorides d'Australie et de Nouvelle-Guinée. (Acarina: Sarcoptiformes) *Bull. Inst. r. Sc. nat. Belg.* 48, (5): 1-196.
- _____. (1973). Les Listrophorides d'Amérique Neotropicale (Acarina: Sarcoptiformes). I. Familles Listrophoridae et Chirodiscidae. *Bull. Inst. r. Sci. nat. Belg.* 49 (6): 1-149.
- _____. (1976). Nouveaux acariens parasites de la superfamille Listrophoroidea (Astigmates). *Acata Zool. Path. Antwerp.*, 64: 37-67.
- _____. and K. Hyland. (1974). The Listrophoroid Mites in North America. II. The Family Listrophoridae. *Bull. Inst. r. Sci. nat. Belg.* 50 (1): 1-69.
- McDaniel, B. (1965). The subfamily Listrophorinae Gunther with a description of a new species of the genus *Listrophorus* Pagenstecher from Texas (Acarina: Listrophoridae). *Acarologia* 7: 704-712.
- Radford, C. (1949). New parasitic mites (Acarina: Myialgesidae and Listrophoridae). *Proc. Zool. Soc. London* 118 (4): 933-937.
- _____. (1953). Four new species of "harvest mite" or "chigger" and a new fur mite. *Parasitology* 43: 210-214.