

TWO NEW FUR-MITES OF THE GENUS *GEOMYLICHUS* FAIN, 1970 (ACARI, LISTROPHORIDAE) FROM KANGAROO RATS, *DIPODOMYS* SPP., FROM THE U.S.A.

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ABSTRACT - Two new species of *Geomylichus* Fain, 1970 (Acari, Listrophoridae) are described from kangaroo rats from the U.S.A., *Geomylichus intercalatus* sp.n. from *Dipodomys compactus* from Texas and *G. quasinudus* sp.n. from *Dipodomys ingens* from California. New hosts and localities are recorded for *G. dipodomius* (Radford), *G. microdipodops* Fain et al. and *G. texanus* Fain et al. A key is given to the subgenus *Geomylichus* (*Geomylichus*).

INTRODUCTION

Two new species of the genus *Geomylichus*, subgenus *Geomylichus* Fain, 1970, are described from Kangaroo rats (*Dipodomys* spp.) from the U.S.A. A key is proposed for females of the subgenus *Geomylichus*. All measurements are in micrometers. Striations of the postscapular shield are counted along a line joining setae *sc i* and *dl*. Hysteronotal striations are counted in the median area of the dorsum. The three to five anterior striations of the hysteronotum are very close to each other and are not counted in the total of hysteronotal striations. Leg IV length includes only the four terminal segments.

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

This species was described from *Dipodomys spectabilis* Merriam, from Santa Fe, New Mexico, and the holotype female was redescribed by Fain and Hyland (1974). A new description and figures of the female and male, based on well-preserved specimens from the typical host and locality, was given by Fain and Whitaker (1987).

This species is also known from *Dipodomys philippsi*, Mexico (Fain et al. 1978) and *D. elator*, Texas, U.S.A. (Fain et al. 1988).

The present collection included 10 females and 5 males from *Dipodomys nelsoni* from Coahuila, 5.4 miles

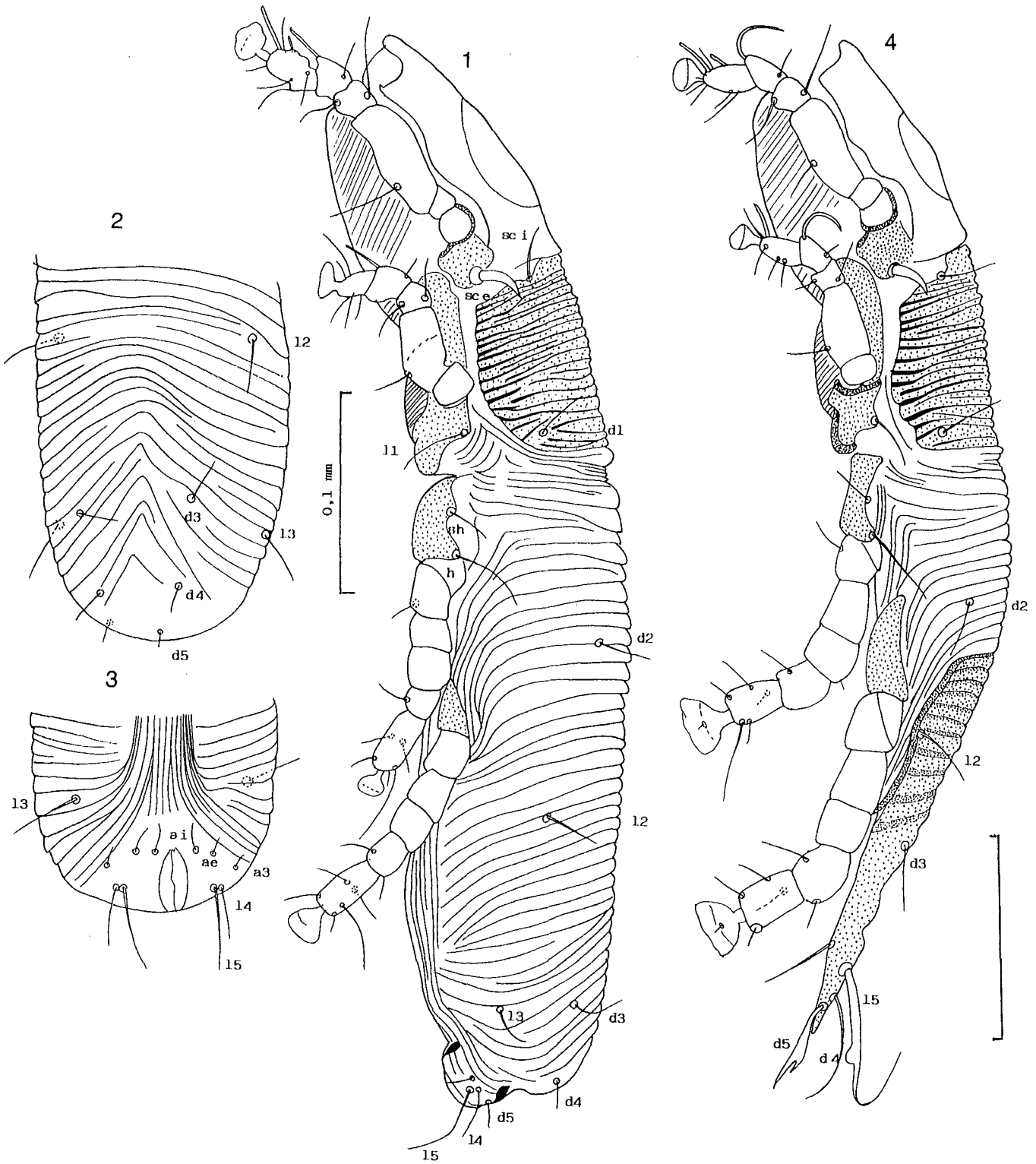
W General Cepeda, Mexico (Coll. H.H. Thomas, 4 July 1986).

2. *Geomylichus* (*Geomylichus*) *microdipodops* Fain & Whitaker, 1987

The typical host of this species is *Microdipodops megacephala*, and the type locality is Lander Co., Nevada, U.S.A. Two specimens (one female, one male) were also found on the same host from south of the Desert Research Station, Beaver Co., Utah. We have now found six new specimens of that species (5 females and 1 male) on *Dipodomys agilis* from Baja California Sur, Ejido Rodriguez, 1.5 miles E San Carlos, Mexico (coll. H.H. Thomas, 12 July 1986). These specimens differ slightly from the typical series by the following characters: smaller size, opisthosoma shorter (170 long), and smaller number of transverse hysteronotal striations. They are probably a small race of *G. microdipodops*.

3. *Geomylichus* (*Geomylichus*) *texanus* Fain, Whitaker, Schwan and Lukoschus, 1978

This species was described from *Dipodomys ordii* from Winkler Co., Texas. Another male was collected from the same host from Santa Fe, New Mexico. Other hosts are *Dipodomys merriami*, Texas and Nevada, *Perognathus penicillatus*, Arizona (Fain et al., 1978), *Dipodomys venustus* and *Dipodomys elephantinus*,



Figs. 1-4. *Geomylichus (Geomylichus) intercalatus* sp.n. - 1, paratype female in lateral view; 2 and 3, holotype female in dorsal (2) and ventral view (3); 4, male in lateral view.

California (Fain et al., 1988). In the present collection were 8 females and 8 males from *Dipodomys philippsi*, from San Luis Potosi, Las Cabras, 4.6 miles NW Bledos, Mexico (Coll. H.H. Thomas, 7 July 1986). One female was collected from *D. agilis*, Baja California, Mexico.

4. *Geomylichus (Geomylichus) californicus* Fain, Whitaker, and Thomas, 1988

This species was known from several *Dipodomys* spp., all from California, *D. venustus* (typical host), *D. californicus*, *D. heermanni* and *D. elephantinus*. We have now found 13 females and 4 males from *D. heermanni*, from San Benito County, California.

5. *Geomylichus (Geomylichus) intercalatus* spec. nov. (Figs. 1 - 4)

Female (Holotype: Figs. 2-3; paratype: Fig. 1)

Body length 540, body width 120 (in lateral view). Prescapular and postscapular shields 132 and 94 long respectively. Prescapular shield completely striated with 22-23 striations distinctly thicker in the lateral area of the shield. These striations become less distinct in the anterior part of the shield near setae *sc i*. Opisthogaster striated longitudinally. Hysteronotum bearing in its anterior two thirds 24 well marked transverse striations either straight (the majority) or slightly convex, followed by 6 strongly convex and then by 7 very oblique striations angular in the midline. The total number of striations is 37. Length of the setae: *sc e* 30 long and 6 wide; *sc i* 33; *d1* and *d2* 30; *d3* 24; *d4* 15; *d5* 15; *l1* 42; *l2* 33; *l3* 33; *l4* 25; *l5* 34 and 48; *h* 45; *sh* 18; *a1*, *a2* and *a3* 10-15. Opisthosoma 172 long. Leg IV 86 and 96 long. Striated membrane of coxae II 60 long.

Measurements of 4 female paratypes: Body length 501 to 540 long; 95 to 105 wide; length of prescapular shield 128 to 133, of postscapular shield 97 to 100; number of postscapular striations 18 to 23, number of hysteronotal striations 33 to 41; opisthosoma 163 to 168 long; setae *l5* 33 to 40 long; leg IV 86 to 96 long.

Male paratype (Fig. 4): Length (posterior lobes included) 478, width 90. Prescapular and postscapular shields 117 and 100 long respectively, the latter with 17-18 rather thick transverse striations especially those close to the lateral margins of the shield. There are 14 transverse striations between the postscapular and the hysteronotal shields, these extending over the hysteronotal shield. Seta *l5* 90 long, with inflated basal part 50 long. The inflated part bears a small rounded membranous process at 45 from the base. Seta *d5* with a triangular membrane. Leg IV thick, 108 long.

Host and locality Holotype, 8 female paratypes and 2 male paratypes from *Dipodomys compactus* (no. RAC 85), from Nueces Co., Padre Island, Texas (Coll. 16 November 1984 by R.A. Cobb). Holotype and one paratype male in the US National Museum, Washington, D.C., U.S.A. Paratypes in the collections of the authors.

Remarks: This new species is intermediate between both *G. perognathi* Fain & Whitaker, 1980, and *G. microdipodops* (hence the name "intercalatus"). It is closer to the first species, in the females by having the hysteronotum transversely striated over more than its anterior two thirds, the very oblique striations being confined to a short area in front of the posterior extremity. Females of this species differ from *G. perognathi* by the much shorter seta *l5*, the smaller number of hysteronotal striations, the much shorter opisthosoma, and the inequality in the lengths of pre- and postscapular shields (these shields are equal in *G. perognathi*).

Geomylichus intercalatus differs from *G. microdipodops* by the greater extension (anterior two thirds) of the transverse striations on the hysteronotum, the smaller number of transverse striations of the postscapular shield (18-23, instead of 28 to 42 as in the *microdipodops* group), and shorter setae *l5* (60 to 80 long in the *microdipodops* group). Females differ from *G. texanus* by the smaller number of striations on the postscapular shield, the greater number of transverse hysteronotal striations and the very short area with posterior oblique hysteronotal striations. In males, the body length is much shorter and setae *l5* is much shorter.

6. *Geomylichus (Geomylichus) quasimudus* spec. nov. (Fig. 5)

Female (Holotype: Fig. 5).

Idiosoma 590 long, 140 wide. Posterior extremity with 3 large lobes. Prescapular and postscapular shields 135 and 121 long respectively. Postscapular shield punctate, with striations very poorly developed and confined to a narrow longitudinal band, 15 wide, along the lateral margins of the shield. This area bears in its anterior two thirds very narrow and faint striations very difficult to count. Anterior half of hysteronotum with 8 superficial, poorly marked and widely separated transverse striations; the dorsum behind this area bears only very oblique or longitudinal striations. Striated membranes of coxae II 60 long. Length of setae: *sc e* 30 long and 6 wide; *sc i* 35; *d1* 30; *d2* 30; *d3* 25; *h* 35; *sh* 21; *l1* 40; *l2* 25; *l5* 15-20; opisthogaster striated longitudinally, 205 long. Leg IV 105 long.

Measurements of 4 paratypes: Body length 540-573; width 120-126; length of prescapular shield 126-

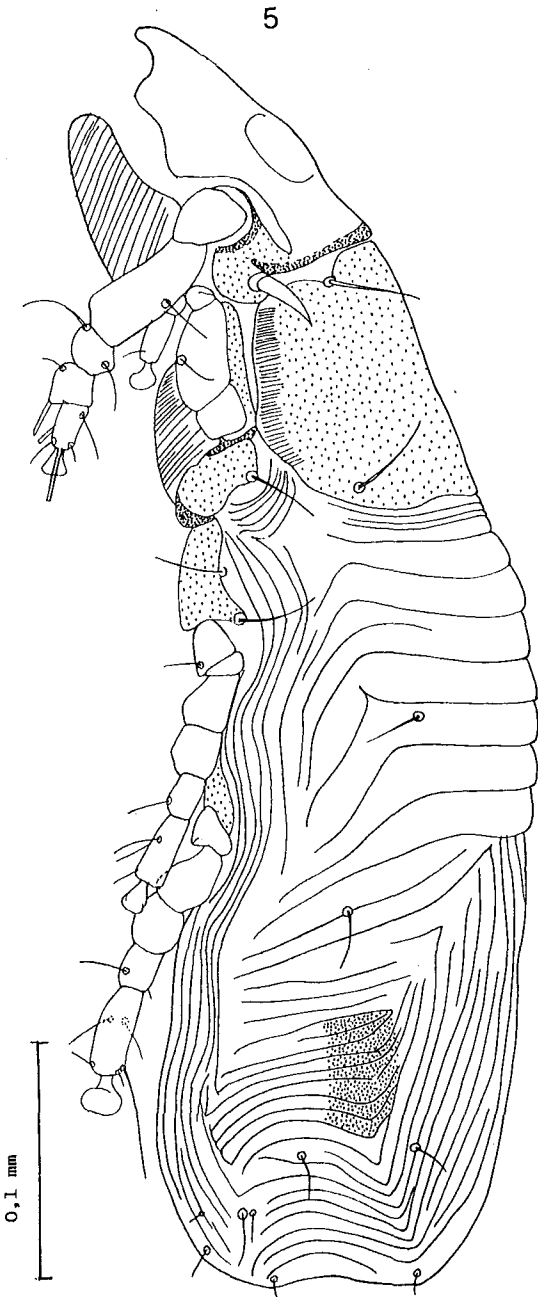


Fig. 5. *Geomylichus (Geomylichus) quasinudus* sp.n. - holotype female in lateral view.

131, of postscapular shield 116-120; of opisthosoma 160-190; number of transverse striations on hysteronotum 6 to 8; legs IV 96-102 long; seta *sc e* 28-33; *sc i* 30-38; *l 5* 15-22.

Male: The only specimen is in poor condition. Body 490 long and 108 wide. Prescapular and postscapular shields 110 and 105 long respectively, the latter with striations as in the female. Striations on the

hysteronotum not observable. Hysteronotal shield with indistinct striations, the lateral margins of this shield with slightly sclerotized margins. Leg IV 100 long. Setae *sc e* 25 long; *dl* 30; *l 1* 33; *l 5* 122, without membranous projections, its basal inflated part 60 long, its apical part very thin.

Host and locality: Holotype, 7 female paratypes and 1 male paratype from 3 *Dipodomys ingens* (no. TLB 10825-27; the holotype was taken from no. 10827); from Kern Co., Naval Petroleum District no. 2, California, U.S.A. (Coll. 16 March 1987 by T.L. Best and C. Schuster). Holotype in the U.S. National Museum, Washington; paratypes in the collections of the authors.

Remarks: *Geomylichus quasinudus* differs in both sexes from the two other species of the *dipodomys* group by the great reduction of striations on the postscapular shield which are confined to a narrow lateral band. Fig. 2 (Fain et al. 1978), representing the male of *G. dipodomys*, does not give an accurate aspect of the male of this species. Since the original description we were able to examine a series of good specimens from the typical host and locality. In all these the postscapular shield is similar in both sexes and appears as in Fain et al. (1987), fig. 1.

Key to the species of the subgenus *Geomylichus* (Females)

1. Opisthogaster striated transversely. Setae *l 5* very long (*thomomys* group).....2
 Opisthogaster striated longitudinally. Setae *l 5* variable.....3
2. Setae *sc e* conical. Postscapular shield completely striated transversely.....
 *G. thomomys* Fain et al., 1978.
 Setae *sc e* expanded in their apical half. Postscapular shield without striations.....
 *G. klebergi* MacDaniel, 1965.
3. Setae *l 5* 230-300 long. Lateral margins of postscapular shield with a large pedunculate lobe. Postscapular shield striated only in its anterior half (*inaequalis* group).....4
 Setae *l 5* not exceeding 130 long. Lateral margins of postscapular shield not lobed. Striations of postscapular shield different.....6
4. Setae *sc e* small (13-16 long and 3-4 wide). Striated membranes of coxae II narrow and short (30-35). Prescapular shield 106, postscapular shield 105 long, the latter striated only in its anterior half. Striations of hysteronotum poorly developed.
 *G. brevispinosus* Fain et al., 1978.
 Setae *sc e* thick (27-30 long, 4-7 wide). Striated membranes of coxae II wider and longer (55-60). Hysteronotum with 35-40 well-developed striations.....5
5. Prescapular and postscapular shields 142 and 135 long respectively, the latter striated medially and

- laterally in its anterior half or anterior two thirds. Setae *l 5* 300 long.....
*G. inaequalis* Fain & Whitaker, 1978.
- Prescapular and postscapular shields 150 and 120 long respectively, the latter with striations only in the median part of the anterior two thirds. Setae *l 5* 230 long.....
*G. formosus* Fain & Whitaker, 1987.
6. Hysteronotum with transverse striations extending either throughout its length or only over its anterior two thirds or three quarters and in this case the posterior part of the hysteronotum bears oblique striations angulate in midline. Setae *l 5* 30 to 130 long (*perognathi* group).....7
 Hysteronotum with transverse striations in its anterior half and with oblique or longitudinal striations in its posterior half. Setae *l 5* 15 to 80 long.....8
7. Hysteronotum completely striated transversely, bearing 60-70 striations, all straight except the 5 or 10 last striations which are slightly convex. Prescapular and postscapular shields equal or subequal in length (115-116), the latter with 18-22 transverse striations. Setae *l 5* 90-130 long. Opisthosoma 210 long.....
*G. perognathi* Fain & Whitaker, 1980.
 Hysteronotum with 24 transverse striations in its anterior two thirds, either straight (most of them) or slightly convex, followed by 5-6 strongly convex striations, then by 7 oblique striations angulate in midline. Prescapular and postscapular shields 128-133 and 93-100 long respectively, the latter with 18-23 transverse striations. Setae *l 5* 33-48 long. Opisthosoma 175 long.....
*G. intercalatus* sp.n.
8. Postscapular shield either with 20-30 transverse striations completely or incompletely interrupted along 5 longitudinal slightly depressed areas or with transverse striations confined to a narrow longitudinal area along the lateral margin of the shield. Anterior half of hysteronotum with 10-20 transverse relatively indistinct striations and widely separated from each other. Setae *l 5* 15-40 long, (*dipodomius* group).....9
 Postscapular shield with 28 to 42 regular transverse striations not interrupted along longitudinal areas. Anterior half of hysteronotum with 16 to 45 well-formed transverse striations close together. Setae *l 5* 20-80 long.....11
9. Striations of postscapular shield confined to a narrow longitudinal area along the lateral margins of the shield. Anterior half of hysteronotum with 10-15 transverse striations, most of them widely spaced. Prescapular shield longer (135) than postscapular shield (125). Setae *l 5* 15-22 long.....
*G. quasinudus* sp.n.
- Striations of postscapular shield much more developed and also present in other parts of the shield.....10
10. Pre- and postscapular shields 126-129 and 117-118 long respectively, the latter with 20-25 interrupted striations. Anterior half of hysteronotum with 9-12 superficial striations widely separated from each other. Posterior half of hysteronotum with 8-10 incomplete, strongly oblique or longitudinal striations. Setae *l 5* 15-20 long. Opisthosoma 180-190 long. Leg IV 120 long.
*G. dipodomius* (Radford, 1953).
 Pre- and postscapular shields equal or subequal in length (120 long), the latter bearing 25-30 transverse interrupted striations. Anterior half of hysteronotum with 14-17 well-formed transverse striations; posterior half with 18-25 well-formed oblique or longitudinal striations. Setae *l 5* 40 long. Opisthosoma 170 long. Leg IV 95 long.
*G. utahensis* Fain & Whitaker, 1987.
11. Setae *l 5* 20-30 long. Anterior half of hysteronotum with 15-20 transverse striations. Prescapular shield distinctly longer (135) than postscapular shield (105), the latter bearing 29-34 transverse striations (*texanus* group).....
 One species: *G. texanus* Fain et al., 1978.
 Setae *l 5* 40-80 long. Anterior half of hysteronotum with 25-45 transverse striations. Lengths of pre- and postscapular shields less unequal (*microdipodops* group).....12
12. Anterior half of hysteronotum with 45 transverse striations. Opisthosoma 250 long. Prescapular shield longer (123) than postscapular shield (102), the latter bearing 30 transverse striations. Setae *l 5* 60-80 long. (NB: in the male setae *l 5* are not toothed.).....
 *G. microdipodops* Fain & Whitaker, 1987.
 Anterior half of hysteronotum with 25-40 transverse striations. Opisthosoma 180-200 long. Postscapular shield with 28-42 transverse striations.....13
13. Anterior half of hysteronotum with 25-32 transverse striations. Pre- and postscapular shields 116-123 and 106-114 long respectively, the latter with 28-32 striations. Setae *l 5* 69-80 long. (NB: in the male setae *l 5* bear a strong tooth.).....
*G. californicus* Fain et al., 1988.
 Anterior half of hysteronotum with 35-39 transverse striations. Pre- and postscapular shields 117-126 and 94-108 long respectively, the latter bearing 34-42 striations. Setae *l 5* 40-60 long. (NB: in the male setae *l 5* bear a short rounded membranous process.).....
*G. multistriatus* Fain et al., 1988.

REFERENCES

- Fain, A. 1970. Diagnoses de nouveaux Lobalgides et Listrophorides (Acarina: Sarcoptiformes). *Rev. Zool. Bot. afr.* 81: 271-300.
- Fain, A. and K. Hyland. 1974. The listrophoroid mites in North America. II. The family Listrophoridae. *Bull. Inst. r. Sci. nat. Belg.* 50: 1-69.
- Fain, A., J.O. Whitaker, Jr., T.G. Schwan and F.S. Lukoschus. 1978. Notes on the genus *Geomylichus* Fain, 1970 (Astigmata: Listrophoridae) and descriptions of six new species. *Internat. J. Acarol.* 4: 101-114.
- Fain, A. and J.O. Whitaker, Jr. 1980. *Geomylichus perognathi* sp.n. (Acari: Listrophoridae) from *Perognathus* spp. in the United States. *J. Parasitol.* 66: 839-840.
- Fain, A. and J.O. Whitaker, Jr. 1987. New observations of the genus *Geomylichus* Fain, 1970 (Acari: Listrophoridae) with description of four new species and a new subgenus. *Internat. J. Acarol.* 13: 15-28.
- Fain, A., J.O. Whitaker, Jr. and H.H. Thomas. 1988. Two new species of *Geomylichus* Fain, 1970 (Acari, Listrophoridae) from California, U.S.A. *Internat. J. Acarol.* 14: 121-125.
- Radford, C. 1953. Four new species of "harvest mite" or "chigger" and a new fur mite. *Parasitology* 43: 210-214.
