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A NEW SPECIES OF *EUTARSOPOLIPUS* (ACARI: PODAPOLIPIDAE)  
FROM *HARPALUS PENNSYLVANICUS* (COLEOPTERA: CARABIDAE)  
FROM EAST LANSING, MICHIGAN

Robert W. Husband<sup>1</sup>

ABSTRACT

*Eutarsopolipus fischeri* n.sp. (Acari: Podapolipidae) is described from the carabid beetle, *Harpalus pennsylvanicus* (DeGeer) and compared with the other species in the *pterostichi* group of *Eutarsopolipus*. Keys to groups of *Eutarsopolipus* and to species in the *pterostichi* group are provided.

Mites in the family Podapolipidae (Acari: Heterostigmata) are all parasites of insects. The genus *Eutarsopolipus* is restricted to Carabidae (Coleoptera) and occurs worldwide. The genus was erected for *E. lagenaeformis* Berlese 1913. More than 30 species have been discovered and most of them are described by Regenfuss (1968, 1974). Previous species recorded from Michigan carabid beetles include *E. regenfussi* Husband and Swihart 1984, *E. porteri* Husband 1993 and *E. crassisetus* Regenfuss 1968. A closely related species in the *pterostichi* group is *E. inermis* Regenfuss 1974, collected in Georgia, U. S. A.

The purpose of this paper is to describe *Eutarsopolipus fischeri*, new species, collected from *Harpalus pennsylvanicus* (DeGeer), compare *E. fischeri* with species in the *pterostichi* group of *Eutarsopolipus* as defined by Regenfuss 1968 and provide a key to distinguish the *pterostichi* group from 7 other groups of *Eutarsopolipus*. Species in the *pterostichi* group are: *Eutarsopolipus pterostichi* Regenfuss 1968 from Germany and Ukraine, *E. vernalis* Regenfuss 1968 from Germany, *E. inermis* Regenfuss 1974 from Georgia, U.S.A. and *E. diunculosus* Eidelberg 1994 from Ukraine.

Measurements were taken with the aid of a Zeiss microscope with a stage micrometer and drawing tube. All measurements are in micrometers ( $\mu\text{m}$ ). Terminology is based on Lindquist (1986).

***Eutarsopolipus fischeri* Husband, new species**

Female (Figs. 1,2)- Gnathosoma length 45–48 width 42–46. Palp length 10–17; cheliceral stylets 33–34, dorsal gnathosomal setae 17–19, ventral setae 5–6. Stigmata not evident.

Idiosoma- Length 332–450, width 240–350. Prodorsal plate setae  $v_1$  5–6  $v_2$  6–7,  $sc_2$  32–42, setae situated near the posterior margin of prodorsal plate. Distance between setae  $v_1$  33–38;  $v_2$  slightly lateral to a line connecting  $v_1$

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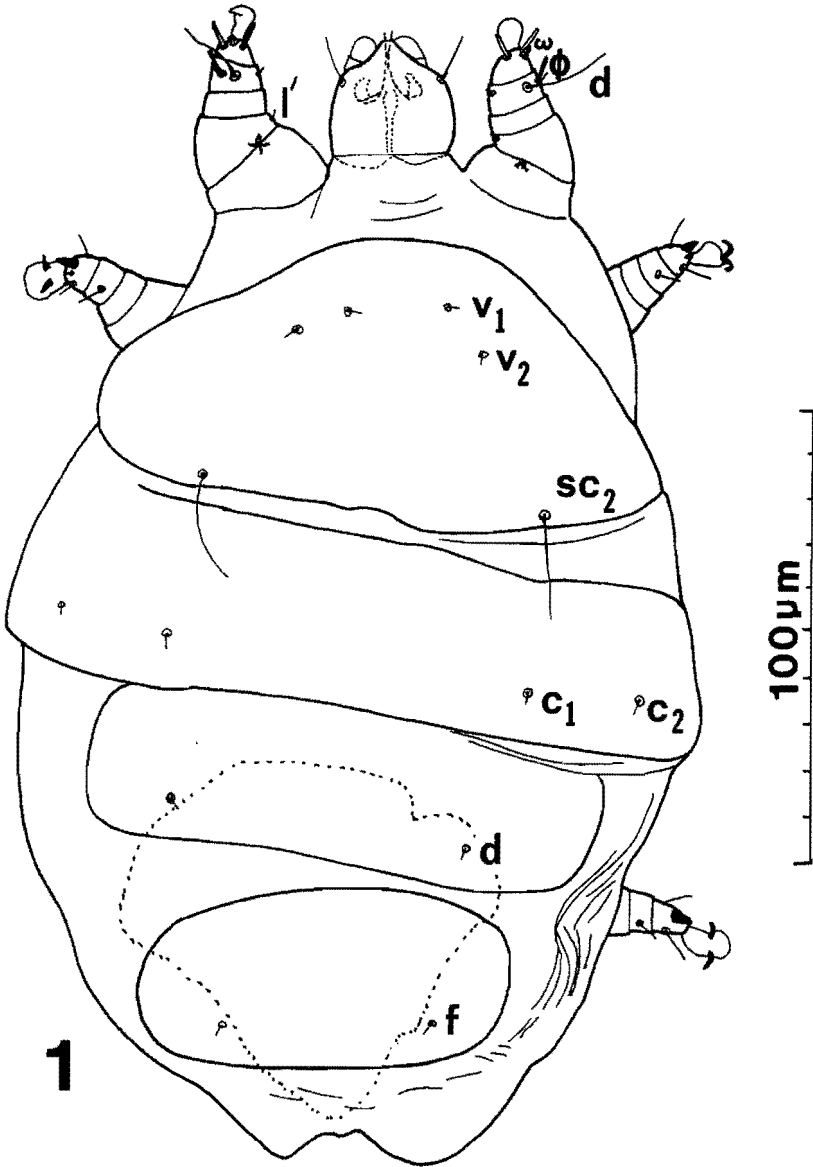


Figure 1. *Eutarsopolipus fischeri* n. sp., adult female, dorsal aspect.

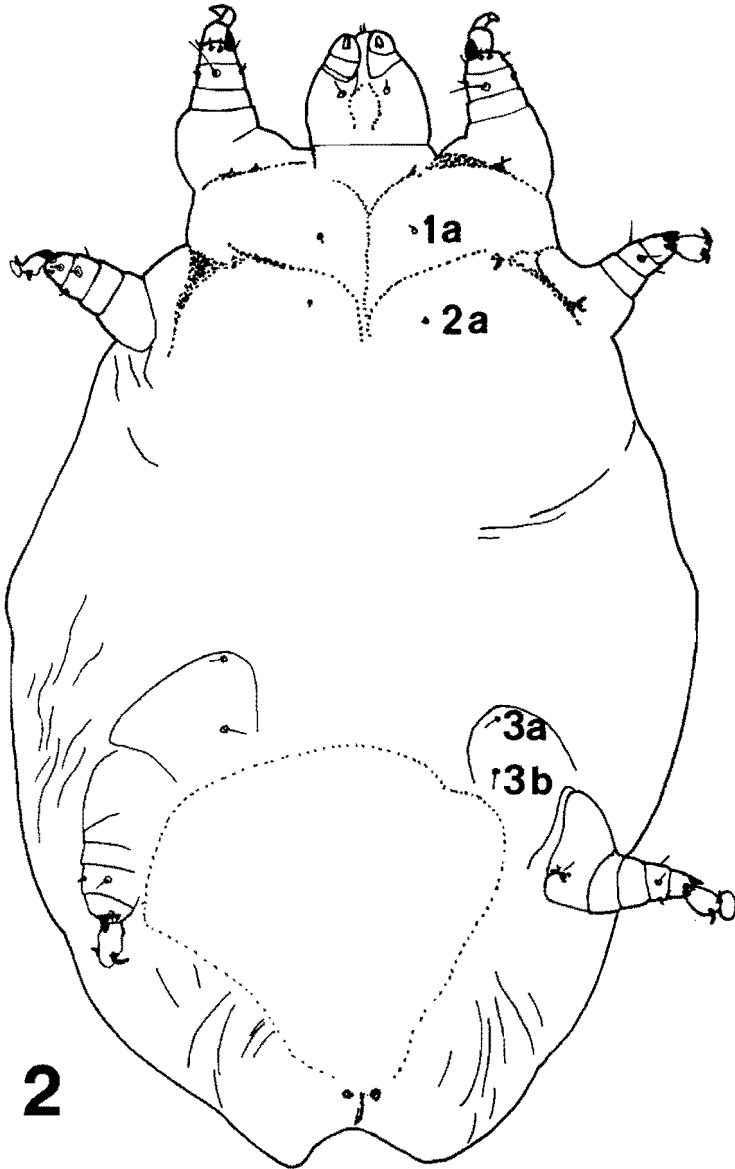


Figure 2. *Eutarsopolipus fischeri* n. sp., adult female, ventral aspect.

Table 1. Leg setation for femur, genu, tibia, tarsus for *E. fischeri* and other species in the *pterostichi* group. Solenidia are included.

	Leg I				Leg II				Leg III			
	F	G	Ti	Ta	F	G	Ti	Ta	F	G	Ti	Ta
<i>E. pterostichi</i>	3	2	6	8	0	0	4	7	0	0	4	6
<i>E. vernalis</i>	3	2	6	8	0	0	4	7	0	0	4	6
<i>E. inermis</i>	2	0	6	8	0	0	4	6	0	0	4	5
<i>E. diunculosus</i>	3	0	5	9	0	0	4	6	0	0	4	4
<i>E. fischeri</i>	2	0	7	8	0	0	4	6	0	0	4	6

and  $sc_2$ . Plate C length 50–58, width 210, setae  $c_1$  3–5,  $c_2$  5–6. Plate D length 47–65, width 178–188, setae  $d$  3–5. Plate EF length 47–57, width 130–150, setae  $f$  5.

Venter with apodemes 1,2 well developed, meeting sternal apodeme medially; sternal apodeme not extending beyond junction with apodemes 2. Coxal setae  $1a$  2,  $2a$  3; setae  $1a$  situated equidistant to apodemes 1, 2 and sternal apodeme. Distance between setae  $1a$  22–34,  $3a$  and  $3b$  18–23. Coxal setae  $3a$  4–5,  $3b$  7.

Legs- Leg setation as in Table 1. Ambulacrum I with a terminal stout claw, ambulacra II, III with 2 strong claws. Tarsus I subunguinal seta spine-like, 2 terminal spines on each of tarsi II, III. Tarsus I solenidion  $\omega$  3; tarsus II solenidion  $\omega$  not evident. Tibia I solenidion  $\phi$  8–10, 1/2 to 2/3 width of base of tarsus I. Tibial I, II, III setae  $d$  22–30, 7–10 and 6–8 respectively.

Male (Figs. 3,4)- Gnathosoma length 26–29, width 27. Palps 13; cheliceral stylets 19–22; dorsal gnathosomal setae 2–4, ventral setae 2.

Idiosoma- Length 161–162, width 104–112. Prodorsal setae  $v_1$  2,  $v_2$  2, setae  $sc_2$  48. Distance between setae  $v_1$  25–26, distance between setae  $v_2$  42–43; setae  $v_2$  lateral to a line connecting setae  $v_1$  and  $sc_2$ . Plates C and D fused, setae  $c_1$ ,  $v_2$  2, setae  $d$ , and  $f$  obscured.

Genital capsule length 25–38, width 27–30.

Venter- Apodemes 1,2 and sternal apodeme conspicuous; coxae III separated medially. Setae  $1a$ ,  $2a$ , and  $3a$  vestigial,  $3b$  obscured.

Legs- Leg setation as in Table 1. Ambulacrum with 1 straight claw, ambulacra II, III with minute claws. Single tarsal I ventroterminal spine, 2 terminal spines on each of tarsi II, III. Tarsus I solenidion  $\omega$  3, tarsus II solenidion  $\omega$  2–3; tibia I solenidion  $\phi$  7–8, about 3/4 width of base of tarsus I.

Larva (Fig. 5)- Gnathosoma length 31, width 31. Palps 10, cheliceral stylets 25, dorsal setae 17, ventral setae 3.

Idiosoma- Length 200, width 100. Prodorsal plate bluntly rectangular, setae  $v_1$  5,  $v_2$  3,  $sc_2$  74. Distance between setae  $v_2$  greater than the distance between setae  $v_1$ ; setae  $v_2$  lateral to a line connecting setae  $v_1$  and setae  $sc_2$ . Plates C,D fused anteromedially, setae  $c$ , 3,  $c_2$  4, setae  $d$  4: distance between setae  $d$  34. Setae  $c_2$  anterior to setae  $c_1$ . Plate EF oval, setae  $f$  4. Plate H oval, setae  $h_1$  43,  $h_2$  16, distance between setae  $h_1$  7.

Venter- Apodemes 1,2 and sternal apodeme conspicuous but weakly sclerotized. Setae  $1a$  m,  $2a$  m,  $3a$  3 and  $3b$  4. Distance between setae  $3a$  and  $3b$  14.

Legs- Leg setation as in Table 1. Ambulacrum I with 2 slender claws. Ambulacra II, III with minute claws. Single tarsus I spine short and stout 5,

Two terminal tarsi II, III spines 5–7. Tarsus I solenidia  $\omega$  3 tarsus II solenidion  $\omega$  2. Tibia I solenidion  $\phi$  6, seta k 3. Setae tc' 8, tc'' 11.

Eggs- Length 192–217, width 100–119.

Type data- **Holotype female:** from East Lansing, Michigan, U.S.A. from under elytra of *Harpalus pennsylvanicus* (DeGeer) (Carabidae) collected by Roland L. Fischer, 26 July 1947 (RWH 22798–1). **Allotype** (RWH 22798–2) with same data as holotype and both deposited in the Museum of Entomology, Michigan State University, East Lansing, MI, U.S.A. **Paratypes:** 2 females without larval exoskeletons, 4 females with partial exoskeletons of larvae, 4 males and 2 larvae on slides and females, males and eggs with the same data as the holotype stored in 70% ethanol. One female and one male deposited in the collection to the Museum of Zoology, University of Michigan. Balance of paratypes in the collection of the author.

Diagnosis- *Eutarsopolipus fischeri* and *E. inermis* lack ventral femur I setae in all stages. Larval female and male *E. fischeri* have minute but well sclerotized ambulacral II, II claws. Four related species in Europe and the United States lack claws in male and larval stages. Female *E. fischeri* have ambulacral I claws while female *E. inermis* lack ambulacral I claws. Length of cheliceral stylets in female *E. fischeri* are 34 versus 48 in *E. inermis*. Cheliceral stylets of male *E. fischeri* are 19 versus 27 in *E. inermis*. Larval *E. fischeri* have cheliceral stylets, 25, versus 49 in *E. inermis*. Dorsal gnathosomal setae are 17 in *E. fischeri* versus 30 in *E. inermis*. Setae  $h_2$  are 16 in *E. fischeri* versus 51 in *E. inermis*.

Regenfuss (1968) proposed 7 groups of *Eutarsopolipus* based on 11 female characters, 2 larval female characters and 1 male character. The *Ochoai* group was added by Husband (1995). The following key uses characters of only adult females for simplicity. Some species do not have all of the characters of the group as noted by Regenfuss (1974). However, all of the species will fit in groups listed in the keys below.

**Key To Groups of *Eutarsopolipus* Based on Adult Females**

- 1. Without leg II, III claws ..... 2  
    With leg II, III claws ..... 4
- 2. Stigmata and trachea evident, plates, C, D present ..... 3  
    Stigmata and trachea not evident, plates C, D not present ..... *Stammeri*
- 3. Strong claw on leg I, with genu III seta, femur I I' long (15  $\mu$ m or longer) .  
    *Acanthomus*  
    No strong claw on leg I, without genu III seta, femur I I' short (1–5  $\mu$ m) . .  
    *Biunguis*
- 4. Without genu III seta ..... 5  
    With genu III seta ..... *Ochoai*
- 5. Femur I seta I' short, less than 10  $\mu$ m ..... 6  
    Femur I seta I' long, 11–21  $\mu$ m ..... *Myzus*
- 6. Stigmata and trachea prominent ..... 7  
    Stigmata and trachea not prominent ..... *Pterostichi*
- 7. Setae  $h$  present, cheliceral stylets shorter than 75  $\mu$ m ..... *Desani*  
    Setae  $h$  not present, stylets longer than 140  $\mu$ m ..... *Lagenaeformis*

**Key To Species in the *Pterostichi* Group Based on Adult Females**

- 1. Femur I v'' seta short but evident ..... 3  
    Femur I v'' seta not present ..... 2

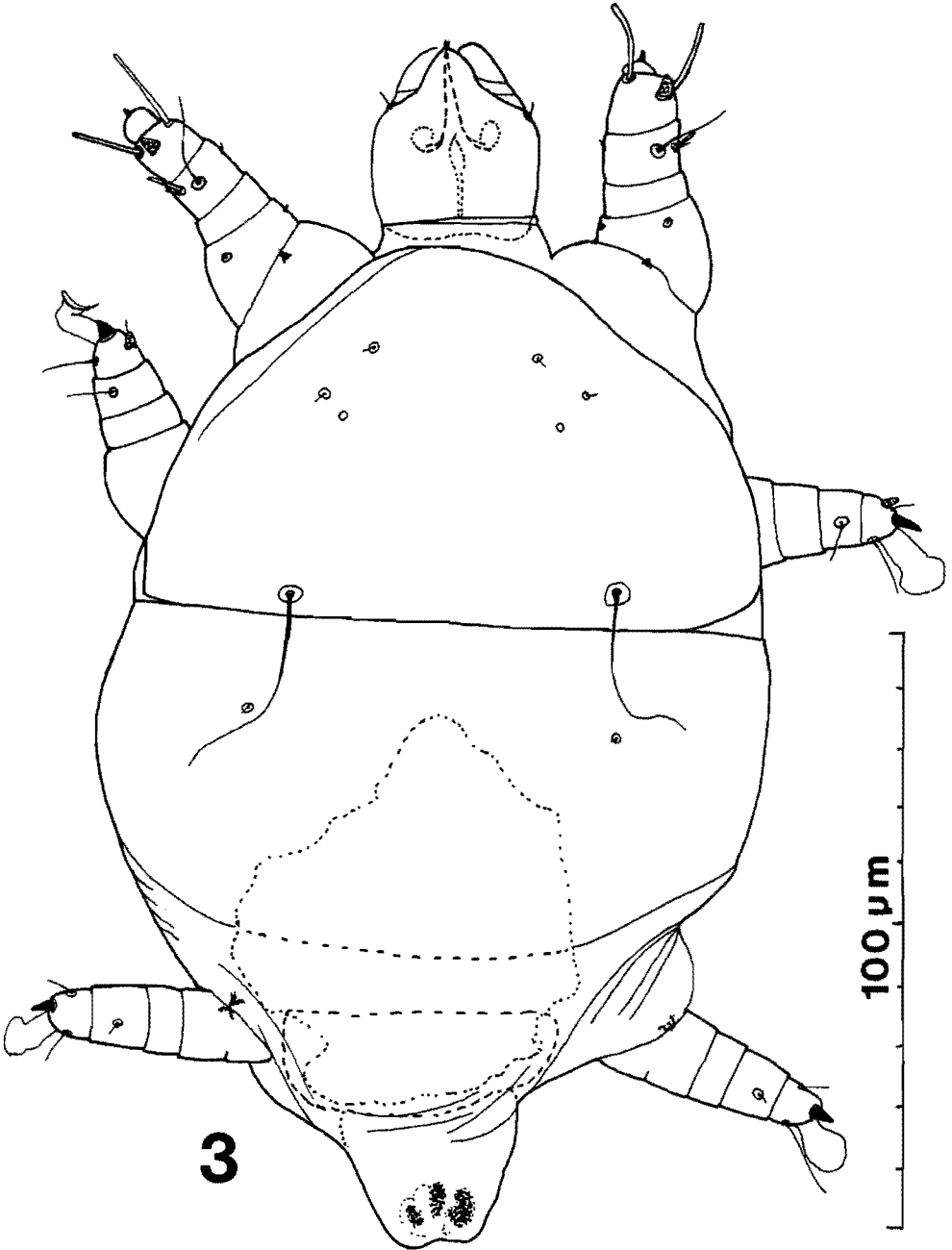


Figure 3. *Eutarsopolipus fischeri* n. sp., male, dorsal aspect.

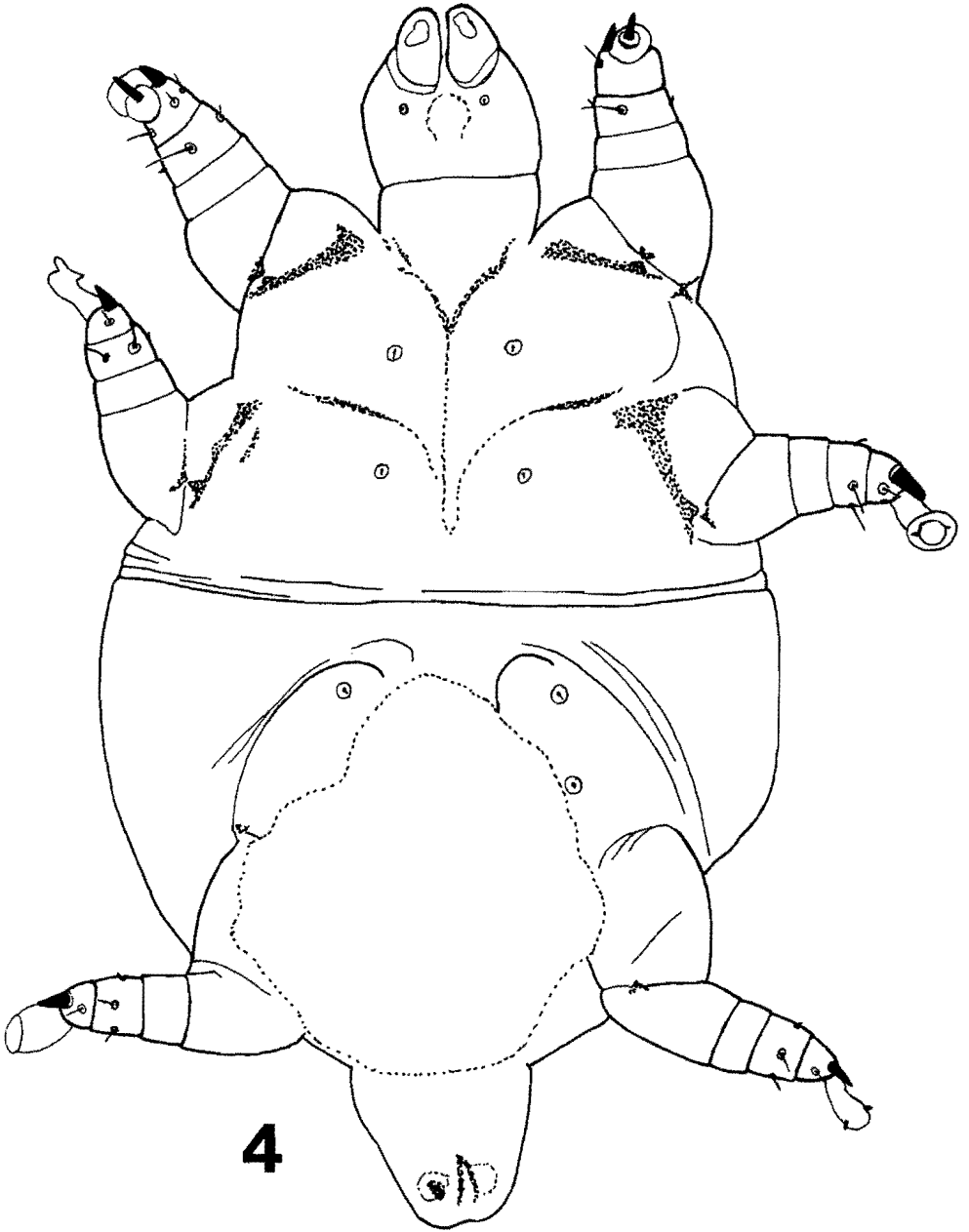


Figure 4. *Eutarsopolipus fischeri* n. sp., male, ventral aspect.



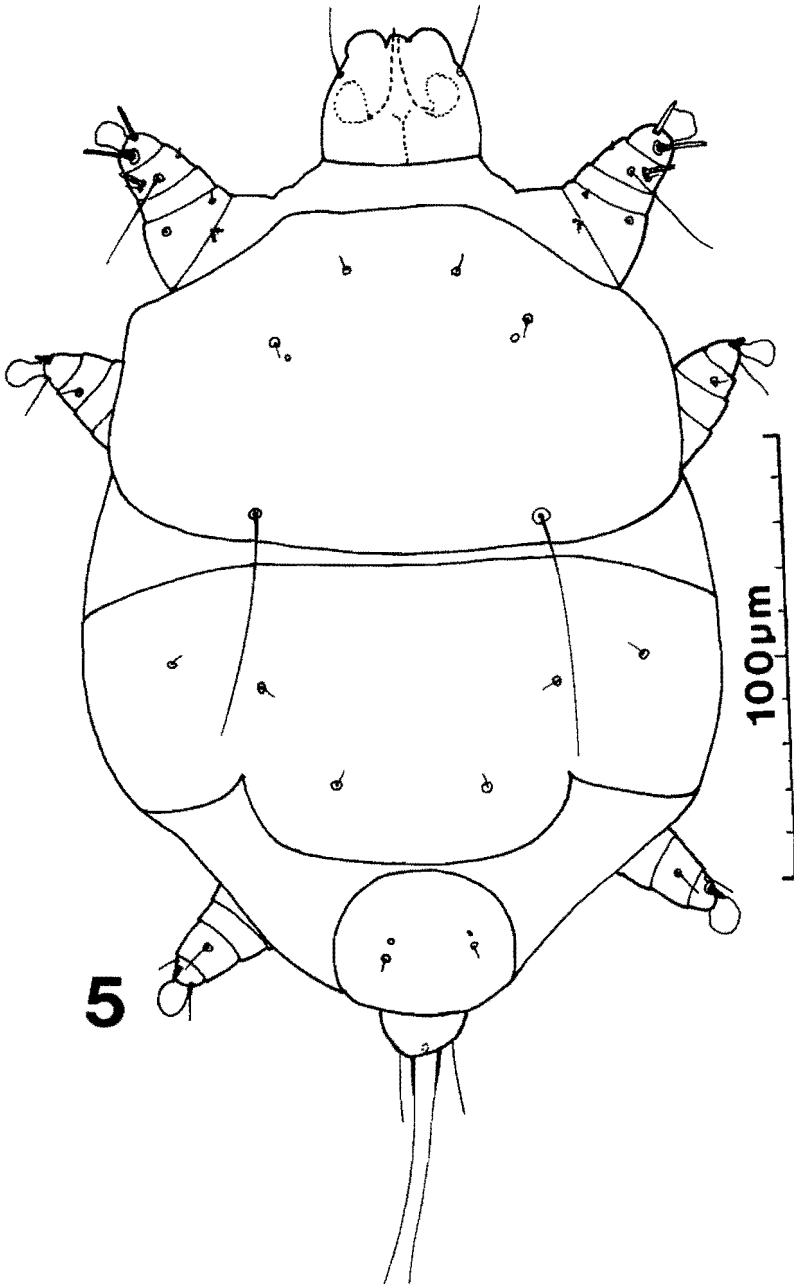


Figure 5. *Eutarsopolipus fischeri* n. sp., larval female, dorsal aspect.

- 2. No claw on leg I. . . . . *Eutarsopolipus inermis* Regenfuss
- Prominent claw on leg I . . . . . *Eutarsopolipus fischeri* n. sp.
- 3. Leg I with 1 claw . . . . . 4
- Leg I with two claws. . . . . *Eutarsopolipus diunculosus* Eidelberg
- 4. Setae  $v_2$  on or medial to a line connecting setae  $v_1$  and  $sc_2$  . . . . .
- . . . . . *Eutarsopolipus pterostichi* Regenfuss
- Setae  $v_2$  distinctly lateral to a line connecting setae  $v_1$  and  $sc_2$  . . . . .
- . . . . . *Eutarsopolipus vernalis* Regenfuss

DISCUSSION

Synapomorphies shared by species in the *pterostichi* group are no stigmata, no setae on genua II and III, males and larvae with either no ambulacral II and III claws or much reduced claws, and femur I seta  $v''$  short or absent. Other characters shared include genital plates which are about as long as wide, females with leg II, III claws (except *E. inermis*), strong claw on leg I (except *E. inermis*), and setae  $v_1$  and  $v_2$  evident (Regenfuss, 1968, 1974). American species and *E. diunculosus* lack setae on genu I. Eidelberg (1994) noted ambulacrum I with 2 claws in female *E. diunculosus* instead of 1 claw as in all other adult female *Eutarsopolipus*. As more species are discovered, it will be interesting to note whether the lack of ventral femur I setae and reduced or absent claws will continue to be characteristic of species in the *pterostichi* group of American versus European *Eutarsopolipus*.

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