

## ALGOPHAGUS PENNSYLVANICUS—A NEW SPECIES OF HYADESIDAE FROM WATER-FILLED TREEHOLES

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----- ABSTRACT—A new species of Hyadesidae, *Algophagus pennsylvanicus*, is established based on specimens collected from water-filled treeholes in Pennsylvania. A key to the species of the subfamily Algophaginae is provided. -----

In 1955 Hughes described a new genus and species of mite, *Algophagus antarcticus*, collected from a fresh water pool in the Subantarctic (Heard Island), and placed it in the family Hyadesidae. In 1974, Fain described another species of *Algophagus* (*A. semicollaris*), also from the Subantarctic, and divided the family Hyadesidae into two subfamilies, Hyadesinae and Algophaginae. The present paper describes a new species of the genus which inhabits water-filled treeholes in the north-eastern United States.

*Algophagus pennsylvanicus* n. sp.

The specific name refers to the state of Pennsylvania, the locality in which the new species was found.

**GENERAL FEATURES**—Relative position of setae and other structures as in figures. All measurements in micrometers with a sample size of ten. Idiosoma filled with guanine crystals necessitating the use of Keifer's clearing agent (Keifer, 1954) prior to mounting.

Structure of chelicerae and gnathosoma similar to that of *A. antarcticus* (Hughes, 1955). Idiosoma pear-shaped in outline, although more so in male than female. Dorsal propodosomal shield present, widest at anterior margin and narrowest in region between legs I. Midway on lateral margins of propodosomal shield are a pair of small unsclerotized areas representing the vestigial sockets of setae *ve*. An elevated sclerotized band can be found on propodosoma extending dorsally and ventrally between legs I and II (Fig. 1A). A pair of lateroabdominal glands (oil glands) present, their openings located midway between setae *l*<sub>2</sub> and *l*<sub>3</sub>. Apodemes of legs I meet at midline to form a "Y-shaped" sternum. Apodemes of legs II, III and IV free.

**DESCRIPTION OF MALE** (Fig. 2)—Mean length of idiosoma 472 $\mu$ m (400-520); mean width at level of coxae III 292 $\mu$ m (279-323). Idiosomal dorsum with 15 pairs of setae: *vi* 70 $\mu$ m (65-80), *sc e* 160 $\mu$ m (136-184), *sc i* 32 $\mu$ m (25-39), *h* 52 $\mu$ m (44-60), *sh* 120 $\mu$ m (94-144), *l*<sub>1</sub> 33 $\mu$ m (28-36), *l*<sub>2</sub> 56 $\mu$ m (49-64), *l*<sub>3</sub> 110 $\mu$ m (81-135), *l*<sub>4</sub> 83 $\mu$ m (72-98), *l*<sub>5</sub> 57 $\mu$ m (50-64), *d*<sub>1</sub> 30 $\mu$ m (25-38), *d*<sub>2</sub> 28 $\mu$ m (24-35), *d*<sub>3</sub> 28 $\mu$ m (25-31), *d*<sub>4</sub> 24 $\mu$ m (20-31), and *d*<sub>5</sub> 28 $\mu$ m (24-32). Idiosomal venter with three pairs of hairlike coxal setae located on coxal fields I, III and IV: *cx 1* 54 $\mu$ m (50-65), *cx 3* 40 $\mu$ m (34-50), and *cx 4* 38 $\mu$ m (31-44). On one of 20 males examined, a seta was found unilaterally on coxal fields II. Two pairs of short, hairlike genital setae: one pair, *g*<sub>1</sub> 25 $\mu$ m (21-29), located close together and in a sclerotized patch just anterior to genital apparatus; and the second pair, *g*<sub>2</sub> 34 $\mu$ m (29-42), located laterad the genital suckers on coxal fields IV. Three pairs of anal setae: *a*<sub>2</sub> 46 $\mu$ m (38-56), *a*<sub>3</sub> 304 $\mu$ m (266-338) and *a*<sub>4</sub> 86 $\mu$ m (66-92). Genital apparatus located centrally just posterior to coxal fields IV; heavily sclerotized and somewhat triangular in shape. Two pair of small genital suckers located lateral to and at anterior end of genital apparatus. Anal opening a longitudinal slit at posterior margin of idiosoma.

**LEGS** (Fig. 3)—Relative position, size and shape of setae and solenidia as indicated in figures. On Tarsi I and II, setae *s* and *q* are highly modified and flaplike in appearance with

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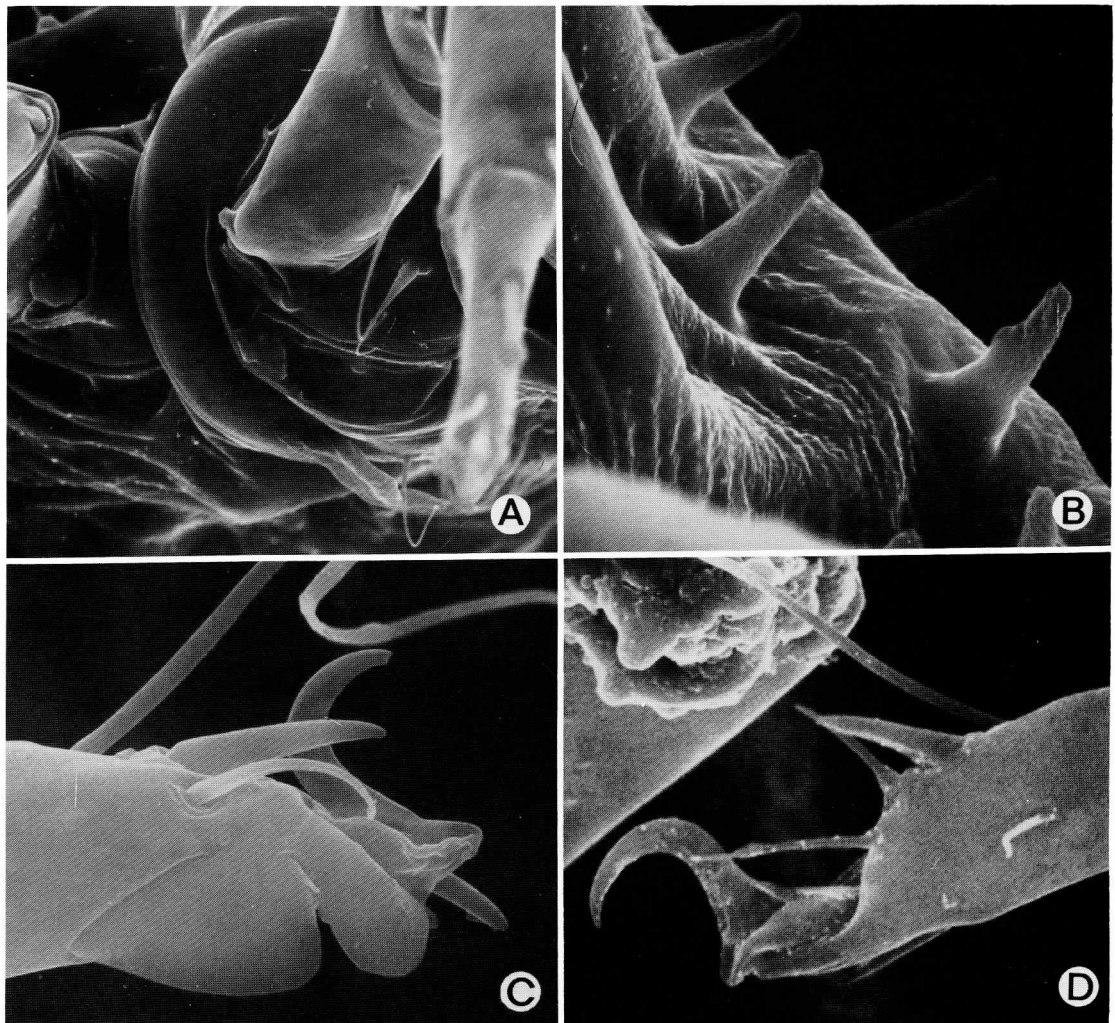


Fig. 1: Scanning electron micrographs of *Algodhagus pennsylvanicus*—A, Sclerotized band between legs I and II (860X); B, Papillae above bursa copulatrix of female (5550X); C, Modified setae on mesial side of tarsus I of male (2900X); D, Mesial view of apical portion of tarsus I of female (2000X).

seta *s* much wider than seta *q*. Together they form a "clasperlike" structure (Figs. 1C). On tarsi III and IV seta *q* is flaplike and similar to that found on legs I and II, however seta *s* is normal. CHAETOTAXY—Tarsi (I to IV) 9-9-7-8, tibiae 2-2-1-1, genua 2-2-1-0, femora 1-1-0-1, and trochanters 1-1-1-0. SOLENIDIOTAXY—Tarsi 3 + famulus -1-0-0, tibiae 1-1-1-1, and genua 2-1-1-0.

DESCRIPTION OF FEMALE (Fig. 4)—Mean length of idiosoma 548 $\mu$ m (481-600); mean width at level of coxae III 352 $\mu$ m (301-397). Idiosomal dorsum with 15 pairs of setae: *vi* 73 $\mu$ m (61-85), *sc e* 165 $\mu$ m (144-181), *sc i* 30 $\mu$ m (20-44), *h* 57 $\mu$ m (38-66), *sh* 113 $\mu$ m (100-129), *l<sub>1</sub>* 31 $\mu$ m (24-39), *l<sub>2</sub>* 50 $\mu$ m (31-65), *l<sub>3</sub>* 105 $\mu$ m (75-138), *l<sub>4</sub>* 75 $\mu$ m (61-88), *l<sub>5</sub>* 54 $\mu$ m (44-62), *d<sub>1</sub>* 28 $\mu$ m (25-38), *d<sub>2</sub>* 26 $\mu$ m (19-38), *d<sub>3</sub>* 27 $\mu$ m (18-38), *d<sub>4</sub>* 23 $\mu$ m (16-31), and *d<sub>5</sub>* 28 $\mu$ m (22-38). A short, tubular bursa copulatrix located on posterior margin of idiosoma between setae *a<sub>3</sub>*. A patch of wartlike papillae directly above bursa copulatrix (Fig. 1B). Three pairs of coxal setae: *cx 1* 57 $\mu$ m (50-62), *cx 3* 46 $\mu$ m (38-66), and *cx 4* 40 $\mu$ m (34-50). On one of 28 females examined, a seta was found unilaterally on coxal fields II. Genital aperture shaped as an inverted "V" and located centrally

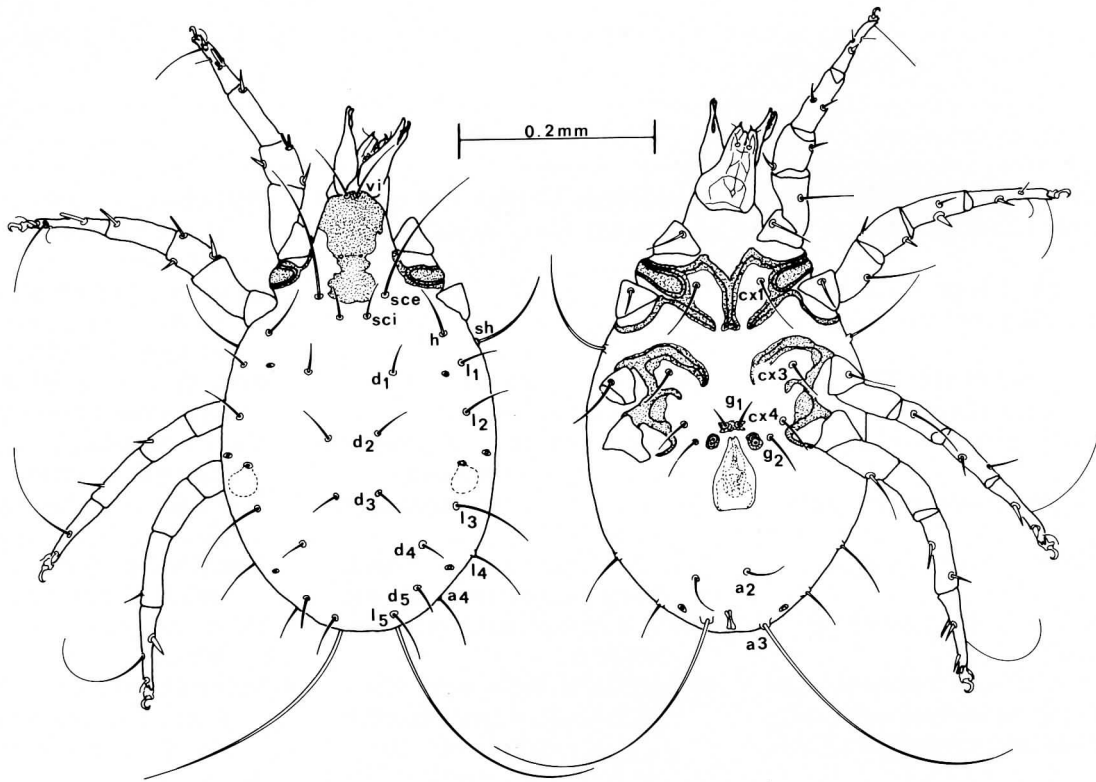


Fig. 2: Male dorsal and ventral view.

between coxae III and IV. Above genital apparatus is a slightly curved epigynum. Two pairs of small genital suckers located at outside margin of genital folds. Two pairs of genital setae:  $g_1$   $23\mu\text{m}$  (14-30), located on genital folds just below and at outer margin of epigynum, and  $g_2$   $25\mu\text{m}$  (14-31) located posterior to genital folds and on coxal fields IV just mesiad setae  $cx\ 4$ . Anal opening a longitudinal slit located at posterior margin of idiosoma. Four pairs of anal setae:  $a_1$   $26\mu\text{m}$  (20-31) and  $a_2$   $44\mu\text{m}$  (39-50), both located next to anus;  $a_3$  quite long,  $322\mu\text{m}$  (288-400), and located on posterior margin of idiosoma; and  $a_4$   $86\mu\text{m}$  (75-116) located on lateral margin of idiosoma between setae  $l_4$  and  $a_3$ .

**LEGS**—Similar in chaetotaxy and solenidiotaxy to male. Segments of legs narrower in diameter than found in male, however difference between male and female not nearly as great as described for *A. antarcticus*. Legs also differ from male in that setae *s* and *q* are not modified into "clasperlike" structures on legs I and II (Fig 1D). Instead they are present as asymmetrical spines fused with the tip of the tarsi. On legs III and IV, seta *s* is normal and seta *q* is similar to that found on legs I and II.

**SYSTEMATIC POSITION**—*Algophagus pennsylvanicus* differs from the other two known species of the genus (*A. antarcticus* and *A. semicollaris*) by the characteristics given in Table 1.

**HABITAT, COLLECTION LOCALITY AND LOCATION OF TYPES**—*Algophagus pennsylvanicus* inhabits water-filled treeholes where it feeds on decaying organic matter (leaves, insects, etc.). Specimens used in this study were collected in Cook Forest State Park, Forest County, Pennsylvania.

Holotype (male), allotype (female), and male and female paratypes will be deposited in the U.S. National Museum, Washington, D.C. Paratypes will be deposited with the following: Acarology Laboratory, Ohio State University, Columbus, Ohio; Canadian National Collection, Ottawa; British Museum (Natural History), London; and the Laboratoire de Zoologie Medicale, Institute de Médecine Tropicale, Anvers, Belgium.

TABLE 1.—Characters which distinguish the three known species of the genus *Algophagus*.

<i>A. antarcticus</i>	<i>A. semicollaris</i>	<i>A. pennsylvanicus</i>
Apodemes of legs I of female barely meet at midline	Apodemes of legs I of female barely meet at midline	Apodemes of legs I of female join to form a Y-shaped sternum
Apodemes of legs I and II of male all meet in midline	?	Apodemes of legs I of male form a sternum; apodemes of legs II free
Seta <i>sc e</i> short (17-20% of idiosomal length)	Seta <i>sc e</i> short (14% of idiosomal length)	Seta <i>sc e</i> long (30-34% of idiosomal length)
Bursa copulatrix dorsal	Bursa copulatrix on posterior margin of idiosoma	Bursa copulatrix on posterior margin of idiosoma
Area above bursa copulatrix smooth	Area above bursa copulatrix smooth	Wartlike papillae on area above bursa copulatrix
Four pairs of coxal setae	Usually four pairs of coxal setae (sometimes three)	Usually three pairs of coxal setae (sometimes four)
Five pairs of anal setae in female	Four pairs of anal setae in female	Four pairs of anal setae in female.
Sclerotized band between legs I and II extending both on dorsal and ventral surface.	Sclerotized band between legs I and II prolonged on dorsal surface but not extending on ventral side.	Sclerotized band between legs I and II extending both on dorsal and ventral surface.
No small scutellar pits on hysterosoma	Series of small scutellar pits on hysterosoma.	No small scutellar pits on hysterosoma.
Seta <i>g</i> <sub>2</sub> short (40-45 μm)	Seta <i>g</i> <sub>2</sub> long (75 μm)	Seta <i>g</i> <sub>2</sub> short (25-42 m)
Solenidia omega 1 and omega 2 of tarsus I approximately same size	Solenidian omega 2 approximately three fourths as long as omega 1	Solenidian omega 2 about one fourths as long as omega 1
Seta <i>r</i> absent on tarsus IV of female	Seta <i>r</i> absent on tarsus IV of female	Seta <i>r</i> present on tarsus IV of female

Key to the species of *Algophaginae* based on adults

1. Tarsi usually short and with long, stalklike pretarsus; sclerotized, elevated band not present between legs I and II ..... Subfamily Hyadesinae
- Tarsi of normal length, pretarsus not stalklike; sclerotized, elevated band present on lateral surface between legs I and II ..... Subfamily Algophaginae ..... 2
2. Setae *ve* and supracoxal setae present; genital suckers absent .....  
..... *Neohyadesia signyi* Hughes and Goodman, 1969
- Setae *ve* and supracoxal setae absent; genital suckers present ..... 3
3. Large dorsal sclerotized and sculptured shield present; pair of lenslike eyes situated along posterior margin of propodosomal shield ... *Algophagopsis pneumatica* Fain & Johnston, 1975
- Sclerotized and sculptured dorsal shield absent; lenslike eyes not present .....  
..... *Algophagus* ..... 4
4. Sclerotized band between legs I and II prolonged on dorsal surface but not extending on ventral surface; hysterosoma with series of small scutellar pits .....  
..... *Algophagus semicollaris* Fain, 1974
- Sclerotized band between legs I and II extending on ventral as well as dorsal surface; hysterosoma without scutellar pits ..... 5

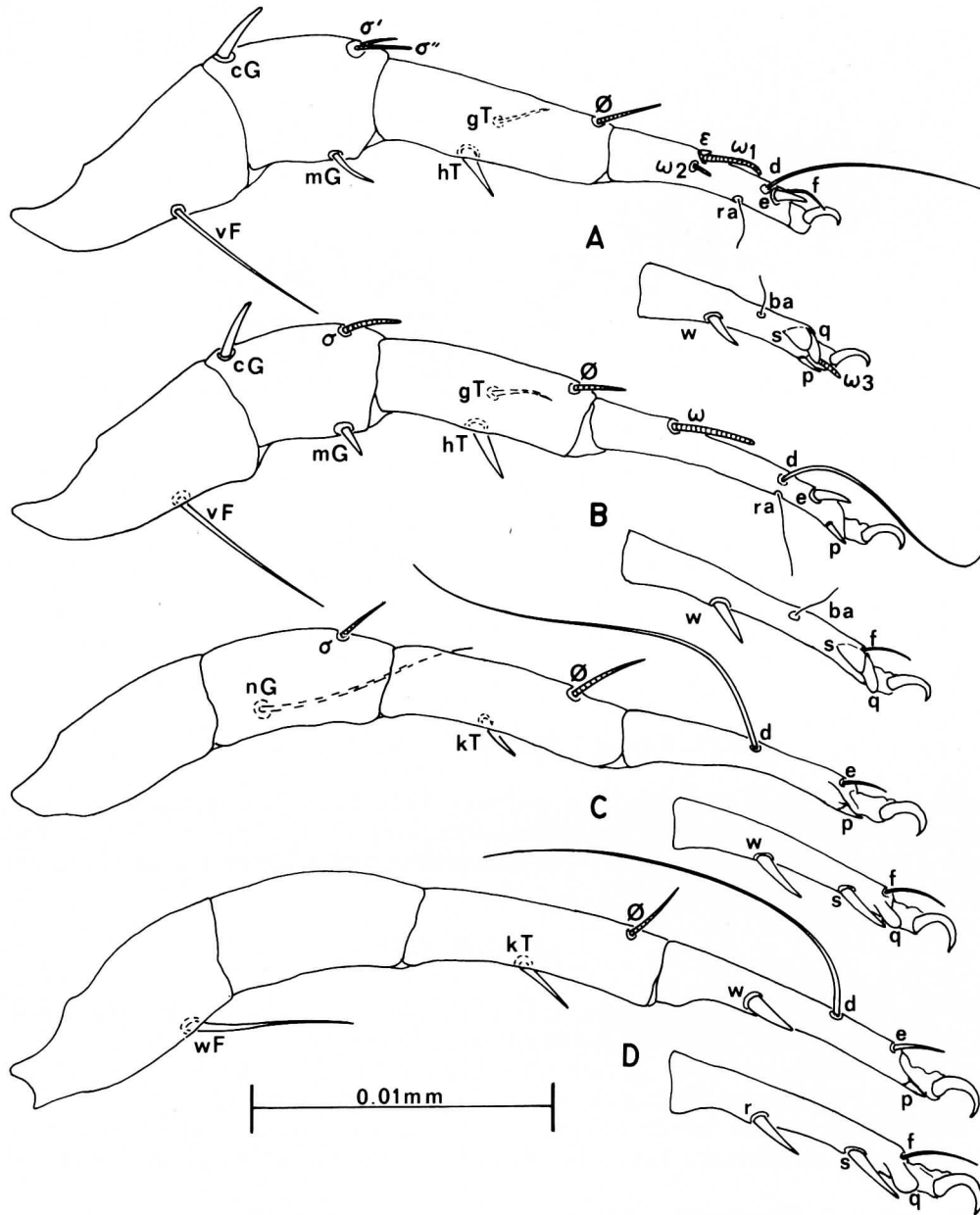


Fig. 3: Legs of male—A, Leg I; B, Leg II; C, Leg III; D, Leg IV.

- 5. Coxal setae usually present on coxal fields II; five pairs of anal setae present in female; bursa copulatrix dorsal; male with setae *e* of tarsi III and IV spinelike and adjacent to setae *d* ..... *Algophagus antarcticus* Hughes, 1955
- Coxal setae usually absent on coxal fields II; four pairs of anal setae present in female; bursa copulatrix on posterior margin of idiosoma; male with setae *e* of tarsi III and IV filiform, apical in position and far removed from setae *d* ..... *Algophagus pennsylvanicus* n. sp.

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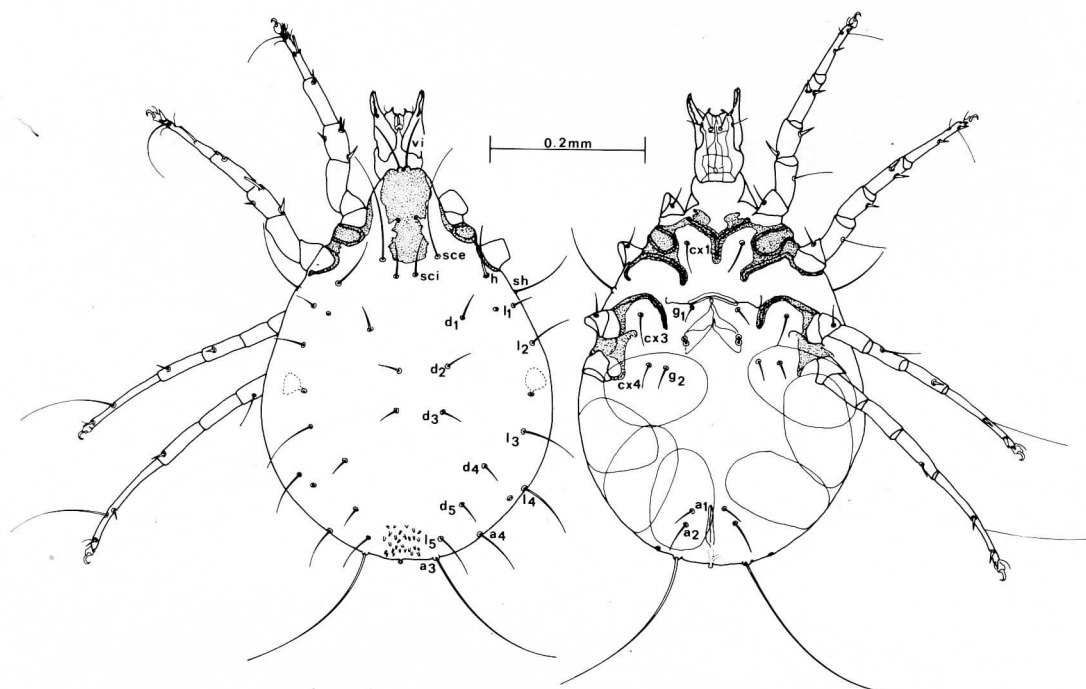


Fig. 4: Female, dorsal and ventral view.

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