



Some new armascirine cunaxids (Acari: Prostigmata: Cunaxidae) from the Eastern United States

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Abstract

Four species of the family Cunaxidae (Acari: Acariformes), i.e. *Armascirus ozarkensis* **sp. nov.**, *A. pennsylvanicus* **sp. nov.**, *A. primigenius* **sp. nov.**, and *Dactyloscirus pseudophilippinensis* **sp. nov.** are described and illustrated from the Ozark Highlands, Mississippi, and Appalachian Plateau. In addition, three described species, *Armascirus gimplei*, *A. harrisoni*, and *Dactyloscirus dolichosetosus* are reported from these areas. All new and previously described species have been registered with Zoobank. A list of species, including citations of their original description and Zoobank LSID numbers, and keys to world species of both genera have been included.

Key words: Armascirini, Arkansas, key, Cunaxidae, Pennsylvania, taxonomy

Introduction

Cunaxidae Thor, 1902 are small (300–1000 µm), predatory mites found in a variety of habitats including leaf litter and soil, open rocks, agriculture fields, and stored products (Den Heyer 1977; Den Heyer & Ryke 1966; Quilici *et al.* 1997; Sepasgosarian 1984; Smiley 1992; Walter 1999; Zaher *et al.* 1975). They play an important role in the biological control of small insects, scales, mites, and nematodes (Chaudhri *et al.* 1979; Ewing & Webster 1912; Walter & Kaplan 1991) and are easily recognized by their spined palpi (except Bonzinae) and diamond-shaped body (Krantz & Walter 2009).

Armascirus and *Dactyloscirus* belong to the subfamily Cunaxinae Thor, 1902, which is characterized by possessing five-jointed palpi with at least the distal two segments reaching beyond the subcapitulum (Den Heyer & Castro 2008). Seven genera are currently included in Cunaxinae: *Cunaxa* Von Heyden, 1826, *Dactyloscirus* Ber-

lese, 1916, *Armascirus* Den Heyer, 1978, *Rubroscirus* Den Heyer, 1979, *Riscus*, Den Heyer, 2006, *Cunaxatricha*, Castro & Den Heyer, 2008, and *Allocunaxa* Den Heyer & Castro, 2008. *Armascirus* and *Dactyloscirus* together comprise Armascirini Den Heyer, 1980, which is distinguished from the rest of Cunaxinae by the palp telofemora possessing a spine-like seta instead of a simple seta, and the presence of the dorsal setae h_2 ventrally near the anal region (Den Heyer 1980; Den Heyer & Castro 2008).

Important structures have been labeled to aid researchers unfamiliar with the group (Fig. 1). The most recent keys to the subfamilies of Cunaxidae and the genera of Cunaxinae are given by Den Heyer & Castro (2008).

This study marks the first records of Armascirini from the Ozark Highlands and the first record of Cunaxidae from Pennsylvania and the unglaciated region of the Allegheny Plateau.

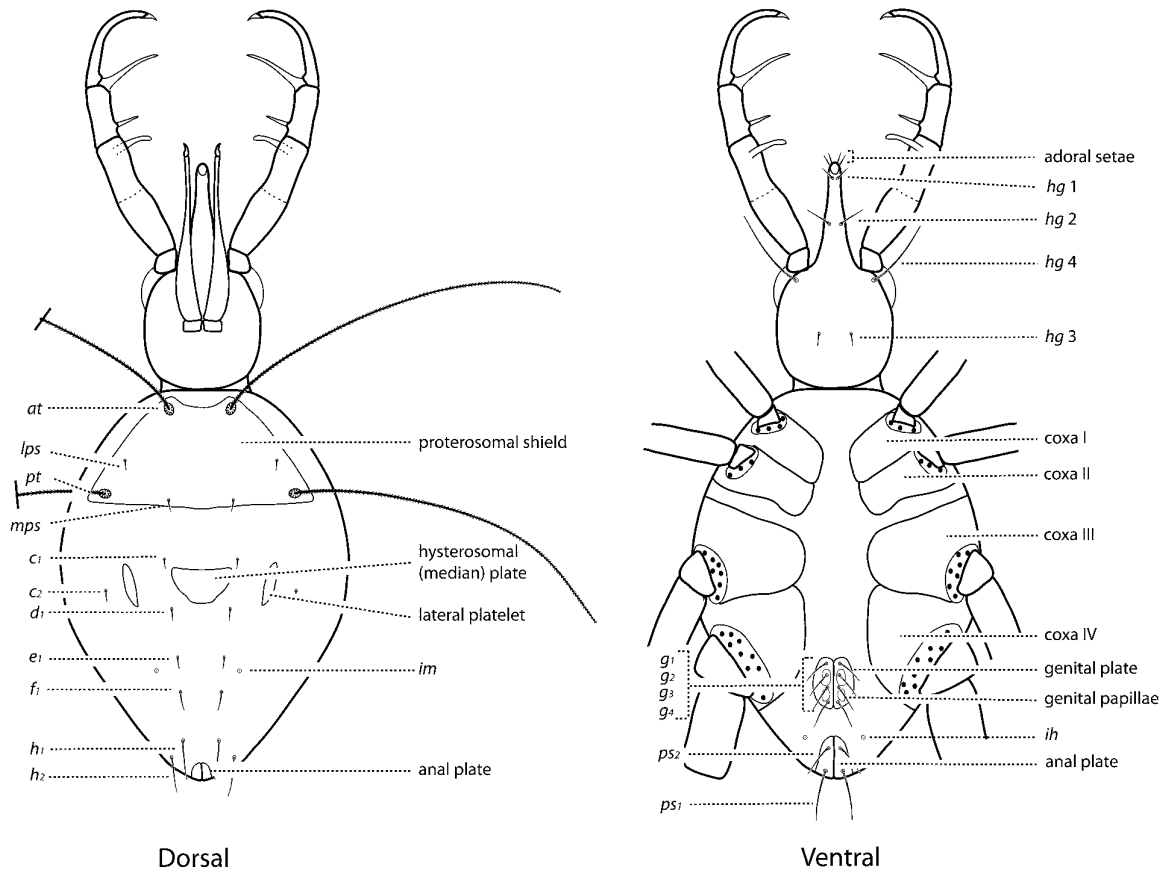


FIGURE 1. Generalized armascirine with named setae and important structures labeled.

Material and methods

Leaf litter was collected at multiple sites throughout the Ozark Mountains, one site in Mississippi, and two sites in Pennsylvania; some samples were concentrated with a litter reducer. Samples were processed using modified Berlese-Tullgren funnels for three to seven days. All specimens are mounted in Hoyer's medium.

In accordance with recent taxonomic efforts, all species described herein, and all previously described *Armascirus* and *Dactyloscirus* have been registered with Zoobank (<http://www.zoobank.org/>). A list of species, LSID numbers, and corresponding descriptions is given in Table 1. All illustrations have been submitted to MorphBank (<http://www.morphbank.net>). The illustration methods outlined by Fisher and Dowling (2010) were followed. Ventral leg setae have not been included in the illustrations as doing so makes differentiating dorsal setae and solenidia difficult. Setae are indicated by a closed base and solenidia are indicated by an open base (see Mejía-Recamier and Palacios-Vargas [2007] for additional examples).

TABLE 1. Known species of *Armascirus* and *Dactyloscirus*, associated descriptions, and ZooBank LSID numbers.

| | | | |
|-------------------|-----------------------|-----------------------------|--|
| <i>Armascirus</i> | | Den Heyer, 1978 | urn:lsid:zoobank.org:pub:40708968-F5AF-4D7F-8814-2038FA9D2D04 |
| <i>Armascirus</i> | <i>Akhtari</i> | Bashir, Afzal & Khan, 2008 | urn:lsid:zoobank.org:act:42FADDD0-7D9D-469B-A53C-7BBDDE3FC9BE |
| <i>Armascirus</i> | <i>Albitziae</i> | Den Heyer, 1978 | urn:lsid:zoobank.org:act:5B11C30F-30D3-4EF8-98F2-9473D6F7555E |
| <i>Armascirus</i> | <i>Anastosi</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:A6219101-C0AE-40DD-A655-C0782336CC93 |
| <i>Armascirus</i> | <i>Apoensis</i> | Corpuz-Raros, 2008 | urn:lsid:zoobank.org:act:52AC8F79-A679-4411-8A6C-1207D1307F6A |
| <i>Armascirus</i> | <i>Asghari</i> | Bashir & Afzal, 2005 | urn:lsid:zoobank.org:act:5E2B83A5-B0F9-445E-9106-96A63B0ECBC6 |
| <i>Armascirus</i> | <i>Bakeri</i> | (Smiley, 1992) | urn:lsid:zoobank.org:act:7F57D6AF-0A3D-408C-93AD-9687B840CEA8 |
| <i>Armascirus</i> | <i>bison</i> | (Bertese, 1888) | urn:lsid:zoobank.org:act:AF72A81D-0A3A-43CA-ABB1-EBB0C58383DE |
| <i>Armascirus</i> | <i>campbelli</i> | (Smiley, 1992) | urn:lsid:zoobank.org:act:83D04039-5588-4390-88A0-E1CBE01FE121 |
| <i>Armascirus</i> | <i>cervis</i> | Kalutz, 2009 | urn:lsid:zoobank.org:act:F89711A2-C1F1-4C27-B907-6AB7F97DE557 |
| <i>Armascirus</i> | <i>cyaneus</i> | Kalutz, 2009 | urn:lsid:zoobank.org:act:CC63BE1B-5185-46E4-85B1-6E5719A38DDBB |
| <i>Armascirus</i> | <i>ebrius</i> | (Chaudhri, 1977) | urn:lsid:zoobank.org:pub:269E6582-3389-446D-856A-E3DDDF49DA0A5 |
| <i>Armascirus</i> | <i>fixus</i> | (Chaudhri, 1980) | urn:lsid:zoobank.org:act:1C1A4C5B-FDA2-4DDD-A8DF-A2D82F183429 |
| <i>Armascirus</i> | <i>fuscus</i> | Chaudhri, 1977 | urn:lsid:zoobank.org:act:7D0AE03E-62D9-4E50-97EA-818703C79944 |
| <i>Armascirus</i> | <i>garcial</i> | Corpuz-Raros, 1995 | urn:lsid:zoobank.org:act:1EC31FEE-013C-4E1F-92C9-D3361B272CD1 |
| <i>Armascirus</i> | <i>gimpeli</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:FC67E72E-7857-460E-9D23-BE8222665252 |
| <i>Armascirus</i> | <i>gojraensis</i> | Bashir, Afzal & Khan, 2008 | urn:lsid:zoobank.org:act:F02442C0-8717-4376-93D7-0F1F40469EDC |
| <i>Armascirus</i> | <i>harrisoni</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:6CBACC30-597F-4BAA-9C4F-6F0A99E79C48 |
| <i>Armascirus</i> | <i>heryfordi</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:31EC7876-A4CA-4EC3-BFBE-F74456B8F7E0 |
| <i>Armascirus</i> | <i>huysssteeni</i> | Den Heyer, 1978 | urn:lsid:zoobank.org:act:E5A6FFFD-6BC8-4391-8E09-E992BAF4C13D |
| <i>Armascirus</i> | <i>jasmina</i> | Bashir, Afzal & Khan, 2008 | urn:lsid:zoobank.org:act:8FF887EA-8852-47F6-8F15-D1698846D331 |
| <i>Armascirus</i> | <i>javanus</i> | Corpuz-Raros & Gruèzo, 2007 | urn:lsid:zoobank.org:pub:485FEE5D-A4E2-4D6F-BC65-6F01BD810195 |
| <i>Armascirus</i> | <i>lebowensis</i> | Den Heyer, 1978 | urn:lsid:zoobank.org:act:853941B7-941D-47FC-8FBE-8472DD494CD6 |
| <i>Armascirus</i> | <i>limpopoensis</i> | Den Heyer, 1978 | urn:lsid:zoobank.org:act:AD8525DF-9202-4F73-88F1-5BE31B2F013F |
| <i>Armascirus</i> | <i>mactator</i> | Muhammad & Chaudhri, 1991 | urn:lsid:zoobank.org:act:80F26596-A26F-47DC-B39A-A497CFA71AAA |
| <i>Armascirus</i> | <i>makilingensis</i> | Corpuz-Raros, 1995 | urn:lsid:zoobank.org:act:1EC31FEE-013C-4E1F-92C9-D3361B272CD1 |
| <i>Armascirus</i> | <i>ozarkensis</i> | sp. nov. | urn:lsid:zoobank.org:act:0419BADA-FBD8-42C4-9A3A-80F011806A58 |
| <i>Armascirus</i> | <i>pennsylvanicus</i> | sp. nov. | urn:lsid:zoobank.org:act:9421EA1A-770C-4FD8-953D-7FF28418D1A0 |
| <i>Armascirus</i> | <i>pluri</i> | Muhammad & Chaudhri, 1991 | urn:lsid:zoobank.org:act:C87AF607-C862-4E5E-8775-B46FC45ACCDD5 |

continued next page

TABLE 1. (continued)

| | | |
|---|----------------------------|--|
| <i>Armascirus primigenius</i> | sp. nov. | urn:lsid:zoobank.org:act:94657813-5374-44BB-A227-29783484C9A |
| <i>Armascirus rafalskii</i> | (Michocka, 1982) | urn:lsid:zoobank.org:act:12307F9B-A639-41ED-922E-9CADACDEF1FF3 |
| <i>Armascirus sabrii</i> | Bashir, Afzal & Khan, 2008 | urn:lsid:zoobank.org:act:1B782D45-0E16-453E-ABF0-7B8F414EF8DB |
| <i>Armascirus satianaensis</i> | Bashir & Afzal, 2005 | urn:lsid:zoobank.org:act:A0546423-5EBE-473E-A6D5-8352A316DE50 |
| <i>Armascirus taurus</i> | Kramer, 1881 | urn:lsid:zoobank.org:act:EA1095DA-173F-4F4A-88B6-0B1A643D9B8F |
| <i>Armascirus virginensis</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:8E39A96A-1C7F-4B00-B910-48871E946CB2 |
| <i>Dactyloscirus agricolus</i> | Berlese, 1916 | urn:lsid:zoobank.org:act:AC0C66F7-B7C9-48E9-8359-21788D603B16 |
| <i>Dactyloscirus bifidus</i> | Corpuz-Raros, 1995 | urn:lsid:zoobank.org:act:817D160E-C511-47D8-843D-D121F586EF36 |
| <i>Dactyloscirus condylus</i> | Corpuz-Raros, 2008 | urn:lsid:zoobank.org:act:84F69D62-D429-4B3F-BA5A-926D15C1458 |
| <i>Dactyloscirus discocondylus</i> | Den Heyer, 1979 | urn:lsid:zoobank.org:act:3F5C8F6D-429B-48A5-BB6F-282E811B2A14 |
| <i>Dactyloscirus eupaloides</i> | Corpuz-Raros, 2008 | urn:lsid:zoobank.org:act:B9C5FC06-404D-4710-BE24-FEA8DFF9E4D2 |
| <i>Dactyloscirus hoffmannae</i> | (Berlese, 1916) | urn:lsid:zoobank.org:act:8E2DCED1-0D35-4279-A7C8-DFBFA86ABE3C |
| <i>Dactyloscirus humuli</i> | Swift, 1996 | urn:lsid:zoobank.org:pub:DA82BFEF-26FF-4E08-93B8-12778B7A43B5 |
| <i>Dactyloscirus illutus</i> | Liang, 1987 | urn:lsid:zoobank.org:act:164BCA6E-6CF3-47CF-B1CB-2F0B7867B2A8 |
| <i>Dactyloscirus inermis</i> | Inayatullah, 1996 | urn:lsid:zoobank.org:act:782001B3-D4FE-47ED-ADCF-694A367B88CD |
| <i>Dactyloscirus johnstoni</i> | (Trägårdh, 1905) | urn:lsid:zoobank.org:act:DDF85C07-509F-48EB-A6E0-F17450AE8B79 |
| <i>Dactyloscirus machairodus</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:3EBE757A-E3DE-49FD-A3F2-BDC873793973 |
| <i>Dactyloscirus mansoni</i> | (Oudemans, 1922) | urn:lsid:zoobank.org:act:BF7C5179-3727-44CD-BB78-7AB8AB0F532C |
| <i>Dactyloscirus minys</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:15588D76-BC7D-447D-A538-7A1D619DED96 |
| <i>Dactyloscirus nicobarensis</i> | Inayatullah, 1996 | urn:lsid:zoobank.org:act:A7B40305-C4F5-4945-9C5B-5114BB611134 |
| <i>Dactyloscirus orsi</i> | (Gupta & Ghosh, 1980) | urn:lsid:zoobank.org:act:B35FC99D-241E-48E3-8148-ADD3094331F0 |
| <i>Dactyloscirus pataliputraensis</i> | Inayatullah, 1996 | urn:lsid:zoobank.org:act:DAF788FD-D4EA-487F-8B35-6E219240C5AA |
| <i>Dactyloscirus philippinensis</i> | Gupta, 1981 | urn:lsid:zoobank.org:act:A49B50F3-8DE2-4889-AB52-2CF35FBBFAD9 |
| <i>Dactyloscirus poppi</i> | Corpuz-Raros, 1995 | urn:lsid:zoobank.org:act:057F270D-C5B1-4383-AF56-C038F36F27FC |
| <i>Dactyloscirus pseudophilippinensis</i> | Smiley, 1992 | urn:lsid:zoobank.org:act:3939541A-205E-4AA1-B6AF-57944AE29CC9 |
| <i>Dactyloscirus rosarioae</i> | sp. nov. | urn:lsid:zoobank.org:act:B6526396-1668-4F02-B84B-21A8327ED40E |
| <i>Dactyloscirus smileyi</i> | Corpuz-Raros, 1995 | urn:lsid:zoobank.org:act:FEE987AD-117A-4CE1-9BF9-C175D2E8680E |
| <i>Dactyloscirus trifidus</i> | Swift, 1996 | urn:lsid:zoobank.org:act:041CCF7D-6B39-4271-BD93-E2D1C896D692 |
| | Corpuz-Raros, 2008 | urn:lsid:zoobank.org:act:93E91D46-2414-443A-8488-766D1114F3FA |

All measurements are from type specimens and given in micrometers (μm). Setal notation follows Kethley (1990) as applied by Swift (1996) and modified by Fisher *et al.* (2011), who suggested renaming the proterosomal setae in response to Den Heyer and Castro (2008a). The term subcapitulum is used in place of hypognathum, which has been preferred by cunaxid workers in the past, as they are synonymous and subcapitulum is more widely accepted (Krantz & Walter 2009). The following abbreviations are used and illustrated by Mejía-Recamier and Palacios-Vargas (2007): attenuate solenidion (asl), blunt rod-like solenidion (bsl), dorsodistal solenidion (dtsl), famulus (fam)(= peg organ), microseta (mst), spine-like seta (spl), simple tactile seta (sts), terminal solenidion (tsl), trichobothria (T).

Specimen depositories are cited using the following abbreviations: Acarology Collection at the University of Arkansas (ACUA); United States National Museum (USNM); The Ohio State University Acarology Collection (OSAL).

***Armascirus* Den Heyer, 1978**

Historical review. The first *Armascirus* was described by Kramer (1881) as *Scirus taurus*. Berlese (1888) described *S. taurus* var. *bison*. Banks (1894) described *S. quadripilus*. Thor (1902) transferred *S. taurus* to *Cunaxa*. Banks (1914) described *C. armata*. Womersley (1933) reported *C. taurus* from Australia. Thor and Willmann (1941) transferred *S. taurus* var. *bison* to *Cunaxa* and raised it to full species status, viz. *C. bison* and transferred *S. quadripilus* to *Cunaxa*; they also redescribed and figured *C. armata*, *C. bison*, *C. quadripilus*, and *C. taurus*. Baker and Hoffmann (1948) synonymized *S. quadripilus* and *C. armata* with *C. taurus*; they followed Thor and Willmann (1941) in placing *C. taurus* var. *bison* in *Cunaxa* but declined to recognize it as a species and instead kept it as a variety or subspecies of *C. taurus*. Zaher *et al.* (1975) collected *C. taurus* in Egypt. Chaudhri (1977) described *Dactyloscirus ebrius* and *D. fuscus* from Pakistan. Den Heyer (1978) split *Armascirus* from *Dactyloscirus* and *Cunaxa* and raised the subfamily Cunaxinae to accommodate them, thus refining the definitions of all three genera; he transferred *C. taurus* and *C. bison* to the new; and described *A. huyssteeni*, *A. lebowensis*, *A. limpopoensis*, and *A. albiziae*. Kuznetsov and Livshitz (1979) redescribed and figured *C. taurus* and *C. bison* from Russia, either disagreeing with or being unaware of Den Heyer's 1978 publication. Tseng (1980) reported *A. taurus* from Taiwan. Chaudhri (1980) described *D. fixus* from Pakistan. Den Heyer (1980) erected the tribe *Armascirini* and made *Dactyloscirus* and *Armascirus* the sole representatives. Gupta and Ghosh (1980) erected *Indocunaxa*, a monotypic genus with *I. smileyi* as the type species. Liang (1983) reported *A. taurus* from China. Michocka (1987) described *D. rafalskii* from Poland. *A. mactator* and *A. pluri* were described by Muhammad and Chaudhri (1991). Smiley (1992) described *A. gimplei*, *A. anastosi*, *A. harrisoni*, *A. heryfordi*, *A. virginienensis*, *D. bakeri*, and *D. campbelli* and transferred *A. bison* to *Dactyloscirus*. He also synonymized *I. smileyi* with *A. taurus*, though did not include *Indocunaxa* as a synonymy of *Armascirus*; this is confusing as *Indocunaxa* is monobasic and synonymizing the only species with *A. taurus* functionally synonymized the genus with *Armascirus*. Corpuz-Raros (1995) described *A. garciai* and *A. makilingensis* from the Philippines. Hu (1997) reported *A. bison* and *A. taurus* from China. *Armascirus satianaensis* and *A. asghari* were described by Bashir and Afzal (2005). Corpuz-Raros and Gruèzo described *A. javanus*. Corpuz-Raros (2008) described *A. bifidus*. Bashir, Afzal, and Khan described four species from Pakistan, *A. akhtari*, *A. jasmina*, *A. sabrii*, and *A. gojraensis*. Den Heyer and Castro (2008b) reaffirmed the synonymization of *Indocunaxa* with *Armascirus*. Kalúz (2009) described *A. cyaneus* and *A. cerris* from Central Europe and transferred *D. bison*, *D. campbelli*, *D. ebrius*, *D. fixus*, *D. fuscus*, and *D. rafalskii* to *Armascirus*.

Generic diagnosis. Den Heyer (1978) gives a detailed diagnosis of this genus. The following description highlights those features that are prominent or are regarded as being diagnostic.

Palpi five segmented and end in strong claw. They extend beyond the subcapitulum by at least the last segment and are often adorned with an apophysis between the genua and tibiotarsi that tapers to a point; this apophysis shorter in males than in females. Basifemora complemented with a simple seta; telofemora complemented with a spine-like seta. These two segments fused though a dark line remains visible to differentiate them.

Subcapitulum complemented with six pairs of setae (hg_{1-4} and two pairs of adoral setae). It can be covered by integumental papillae which are either randomly distributed or form a polygonal, reticulated pattern.

Female dorsal idiosoma with at least one sclerotized plate that bears two pairs of setose trichobothria (*at* and *pt*) and two pairs of simple setae (*lps* and *mpps*). 0–4 other major plates and platelets may also be present. All

plates, if present, covered by integumental papillae that form a reticulated pattern. Integument between plates striated. Seven pairs of setae, c_{1-2} , d_1 , e_1 , f_1 and h_1 , present. Each seta, when not on a major plate or platelet, surrounded by a minute platelet only slightly larger than the setal socket. Cupule *im* present, usually laterad or in the proximity of e_1 . Dorsal idiosoma of males similar except a single large plate complemented with c_{1-2} , d_1 , e_1 and f_1 present.

Female ventral idiosoma complemented by the coxal, genital, and anal plates. Coxal plates reticulated in the same manner as the dorsal plates. Coxae I and II often fused; coxae III and IV often fused. Coxae I–IV setal formula usually: males 3-1-3-3 or females 3-2-3-3. Genital plates each bear four setae; two pairs of genital papillae are visible underneath the plates. Anal plates bear one pair of setae (ps_1). Two pairs of setae (ps_2 and h_2) associated with but do not occur on the anal plates. Cupule *ih* present in close proximity to h_2 . Integument between plates striated and bears 5–7 pairs of additional setae. Ventral idiosoma of males similar except the coxal plates are much more extensive. Sclerotized aedeagus is often visible in association with the genital plates.

Legs comparatively long, at least $\frac{3}{4}$ the length and often longer than the body. Famulus on tarsi I normally shaped, not large and tri-pronged as in *Dactyloscirus*. Tarsi are constricted apically, resulting in large tarsal lobes.

***Armscirus ozarkensis* Skvarla and Dowling sp. nov.**

(Figs. 2–4)

Diagnosis. *Armscirus ozarkensis* resembles *A. gimpelli* and *A. cerris* by having a small hysterosomal (median) shield that is not complemented with dorsal setae and has lateral platelets. It can be distinguished from *A. gimpelli* by the lateral platelets being as long as the median shield and from *A. cerris* by the 6 pairs of ventral setae after coxae II (not including coxal, genital and anal setae).

Female. Idiosoma 388–575 (471, n=6) long, 313–475 (371) wide.

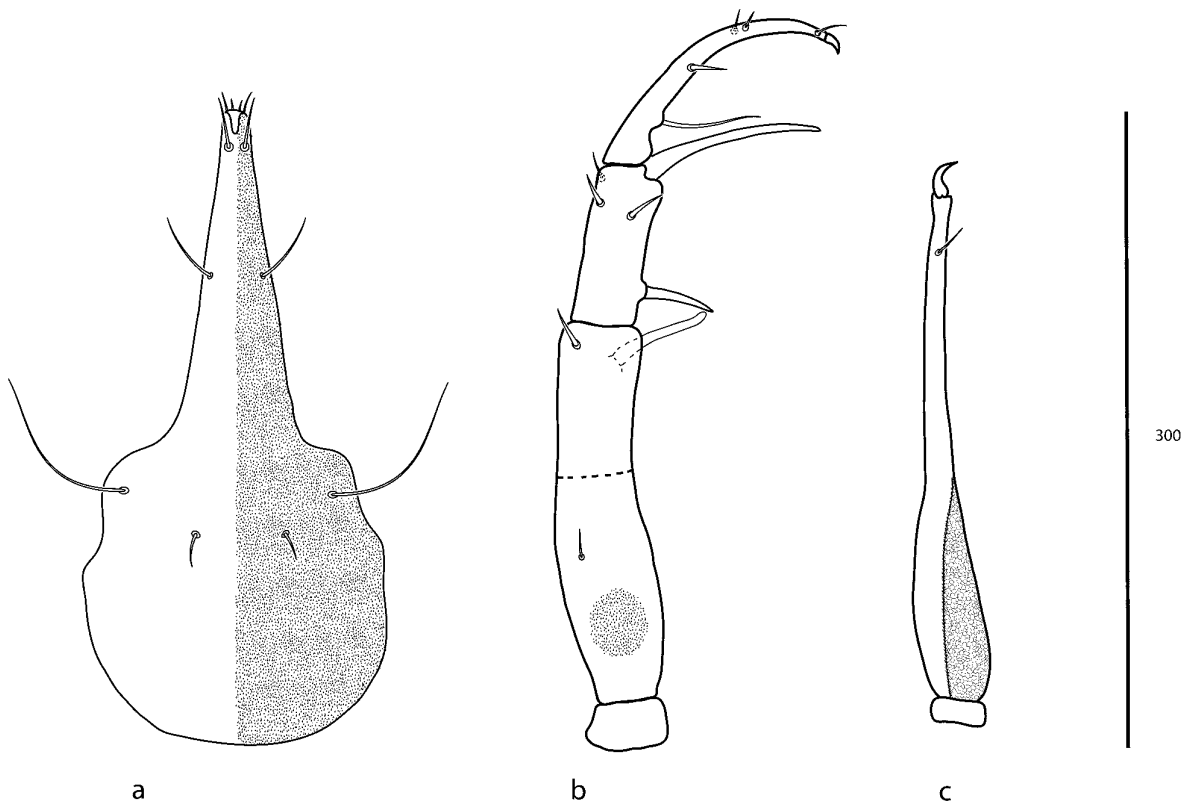


FIGURE 2. *Armscirus ozarkensis* sp. nov. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal. Polygonal sculpturing illustrated on basifemur present on all segments.

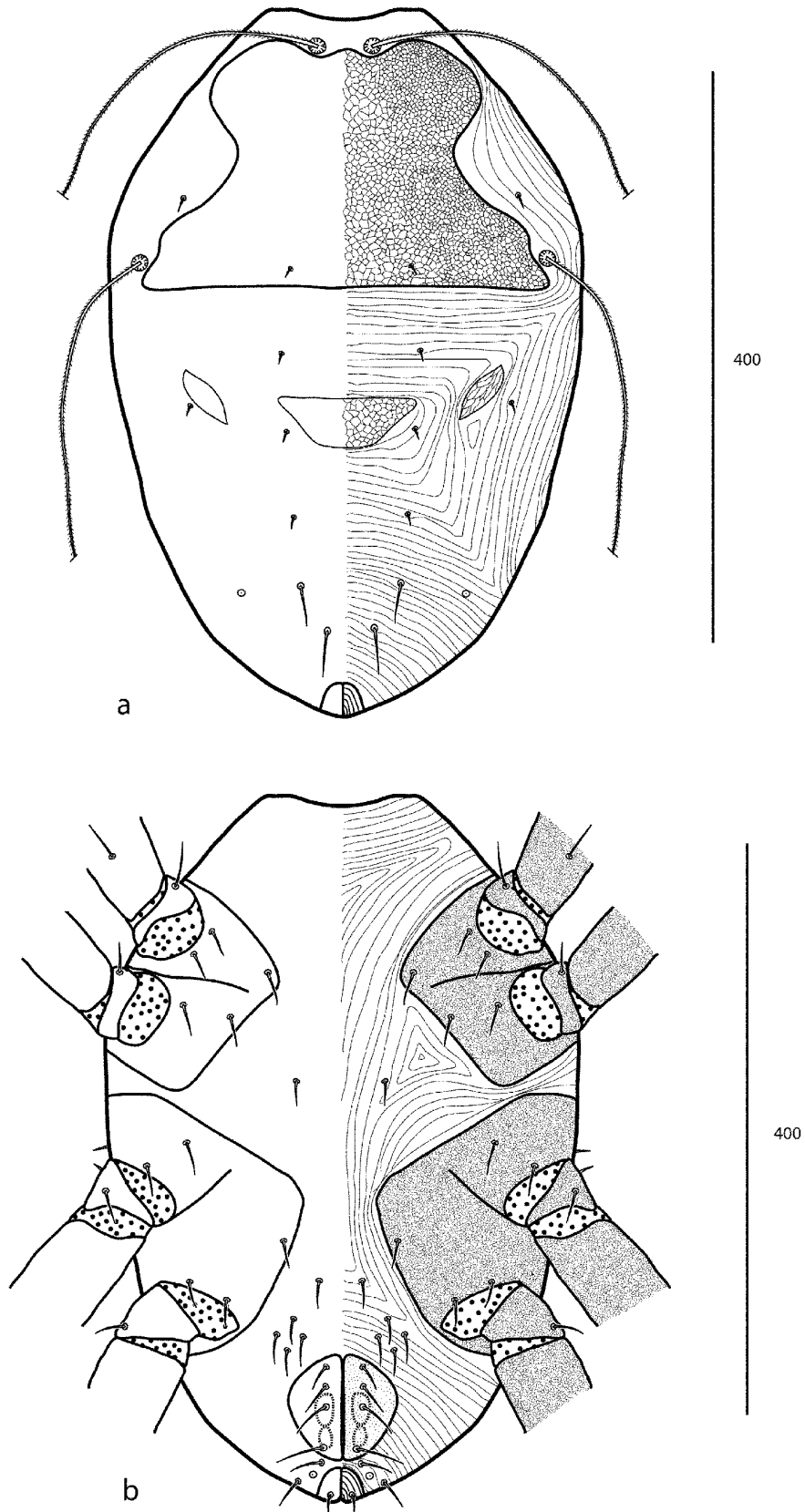


FIGURE 3. *Armascirus ozarkensis* sp. nov. Idiosoma. **a**—Dorsal. **b**—Ventral.

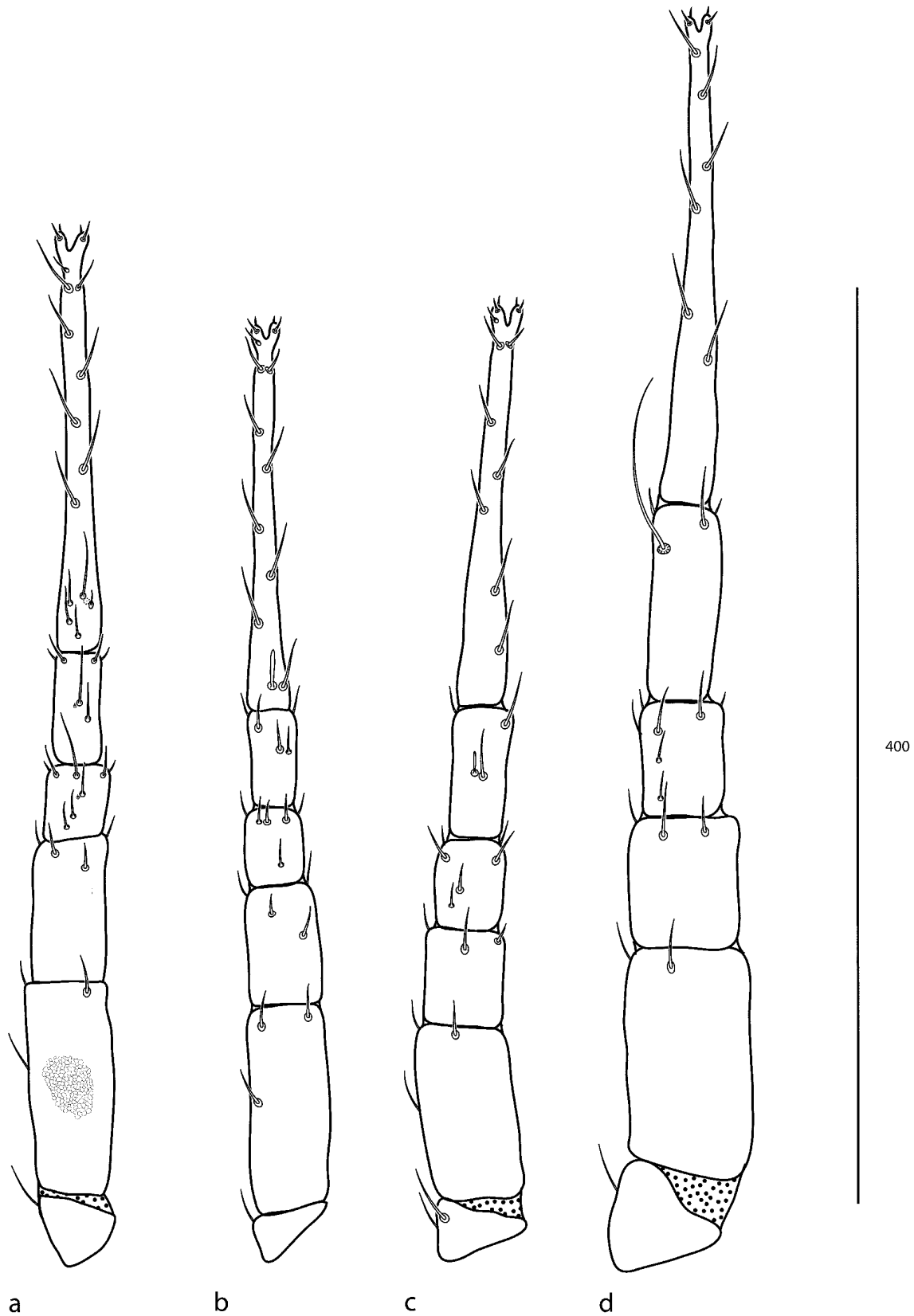


FIGURE 4. *Armascirus ozarkensis* sp. nov. Legs, dorsal. Polygonal sculpturing illustrated on leg I basifemur present on all segments of all legs. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

Gnathasoma. Subcapitulum (Fig. 2a) longer than $\frac{1}{2}$ the length of the idiosoma, 270–330 (307). Two pairs of adoral setae present. Four pairs of setae (hg_{1-4}); $hg_{1,2,3}$ longer than hg_4 and increasing in size (27, 37, 75, 14). **Palp** (Fig. 2b) 380–473 (410). Chaetotaxy: trochanter, 0; basifemur- 1 sts; telofemur- 1 spls, 1 apophysis; genu- 1 sts, 3 spls, 1 apophysis adjoining genu and tibiotarsus; tibiotarsus- 1 spls, 1 dtsl, 3 sts. The tibiotarsus ends in a claw. **Chelicera** (Fig. 2c) 228–295 (267), elongate, base 4 times width of apex.

Dorsum (Fig. 3a). Proterosomal shield present, reticulate. Two setose trichobothria (*ap* and *pt*) present on shield; 358–478 (414) and 488–623 (554), respectively. Two setae (*lps* and *mps*) also present on shield; 11–15 (12) and 7–15 (11), respectively. Hysterosomal (median) shield present but small, lateral platelets present; all plates reticulate. Setae c_1 – h_1 , c_2 on minute sclerotized plates barely larger than setal socket; 11, 14, 18, 33, 38, and 12 respectively. Cupule *im* present, laterad to e_1 . Integument striated.

Venter (Fig. 3b). Coxal plates I and II fused but retaining suture; coxal plates III and IV fused but retaining suture. Coxal plates reticulate. Coxae I–IV setal formula 3-2-3-3. Six pairs of dorsal setae after coxae II (not including coxal, genital and anal setae). Genital plates weakly sclerotized with four pairs of setae (g_{1-4}) and 2 pairs of papillae. Three pairs of setae on or adjacent to anal plates: Two pseudanal setae (ps_{1-2}) and h_2 . Cupule *ih* present laterad to ps_2 .

Legs (Fig. 4a–d). Legs I, III and IV longer than body, leg II shorter. Leg I 400–563 (494), leg II 373–525 (453), leg III 455–593 (453), leg IV 480–650 (567). Chaetotaxy: trochanters I–IV, 1-1-2-1; basifemora I–IV, 5-5-4-2; telofemora I–IV, 4-4-4-4; genua I with 1 mst, 4 asl, 4 sts; genua II with 2 asl, 5 sts; genua III with 1 bsl, 5 sts; genua IV with 2 asl, 5 sts; tibiae I with 1 mst, 2 asl, 4 sts; tibiae II with 1 asl, 5 sts; tibiae III with 1 asl, 5 sts; tibiae IV with 1 T, 4 sts; tarsi I with 4 asl, 2 tsl, 1 mst, 1 fam, 21 sts; tarsi II with 1 bsl, 1 tsl, 21 sts; tarsi III with 1 tsl, 21 sts; tarsi IV with 20 sts.

Male and developmental stages. Unknown.

Etymology. This species is named after the Ozark Highlands, the area in which it was collected.

Material examined (6 individuals on slides). Female holotype (APGD 10-0528-008), ex. wet cedar and oak litter in rock crevice, USA, Arkansas, Newton Co, Buffalo National River, Steel Creek (36°01.924 N, 093°20.040 W), 28 May 2010, coll. J. R. Fisher and M. J. Skvarla • 1 female paratype (APGD 10-0528-007), same data • 1 female paratype (APGD 10-0730-005), ex. mixed cedar and deciduous litter, same locality, 30 July 2010, coll. M. J. Skvarla • 1 female paratype (APGD 09-0829-002), same locality, 29 August 2009, coll. J. R. Fisher • 1 female paratype (APGD 10-0730-006), ex. moist mixed deciduous litter drifted against slope in creek bottom, same locality (36°02.016 N, 093°20.137 W), 30 July 2010, coll. M. J. Skvarla • 1 female paratype (APGD 09-0830-006), ex. mixed deciduous litter, USA, Arkansas, Washington Co, Devil's Den State Park (35°46.817 N, 094°14.750 W), 30 August 2009, coll. J. R. Fisher.

Type deposition. Holotype and 3 female paratypes —ACUA; 1 female paratype—USNM; 1 female paratype—OSAL.

***Armscirus pennsylvanicus* Skvarla and Dowling sp. nov.**

(Figs. 5–7)

Diagnosis. *Armscirus pennsylvanicus* most closely resembles *A. virginensis* as it lacks a hysterosomal (median) shield and the apical palp telofemoral apophysis does not reach the apical palp genual apophysis. It can be distinguished from *A. virginensis* by the chaetotaxy of the palp tibiotarsi (1 spls + 4 sts instead of 1 spls + 3 sts).

Female. Idiosoma 500 (n=1) long, 375 wide.

Gnathasoma (Fig. 5). **Subcapitulum** (Fig. 5a) nearly $\frac{1}{2}$ the length of idiosoma, 265. Two pairs of adoral setae present. Four pairs of setae (hg_{1-4}); $hg_{1,2,4}$ subequal, hg_3 longer by more than three times (20, 26, 73, 20). **Palp** (Fig. 5b) 238. Chaetotaxy: trochanter - 0; basifemur - 1 sts; telofemur - 2 spls, 1 apophysis; genu - 2 spls, 2 sts, 1 apophysis adjoining genu and tibiotarsus; tibiotarsus - 1 spls, 1 dtsl, 3 sts. Tibiotarsus ends in a claw. **Chelicera** (Fig. 5c) 238, elongate, base 4 times width of apex.

Dorsum (Fig. 6a). Proterosomal shield present and weakly reticulate. Two setose trichobothria (*ap* and *pt*) present on shield; 335 and 488, respectively. Two setae (*lps* and *mps*) also present on shield; 11 and 10, respectively. Hysterosomal (median) shield absent, lateral platelets present and reticulate. Setae c_1 – h_1 , c_2 on minute scler-

rotized plates barely larger than the setal socket; 11, 10, 10, 15, 26 and 35, respectively. Cupule *im* present, laterad to *e₇*. Integument striated.

Venter (Fig. 6b). Coxal plates I and II fused but retaining suture; coxal plates III and IV fused but retaining suture. Coxal plates weakly reticulate. Coxae I–IV setal formula 3-1-3-2. Genital plates weakly sclerotized with four pairs of setae (*g₁–g₄*); two pairs of papillae visible under genital plates. Three pairs of setae on or adjacent to anal plates: two pseudanal setae (*ps₁₋₂*) and *h₂*. Cupule *ih* present laterad to *ps₂*.

Legs (Fig. 7a–d). Legs I and II shorter than body, 475 and 455; legs III and IV longer than body, 528 and 513. Chaetotaxy: trochanters I–IV, 1-1-2-1; basifemora I–IV, 5-5-4-2; telofemora I–IV, 4-4-4-4; genua I with 4 asl, 1 mst, 4 sts; genua II with 2 asl, 5 sts; genua III with 1 asl, 5 sts; genua IV with 2 asl, 5 sts; tibiae I with 1 asl, 1 mst, 4 sts; tibiae II with 1 asl, 5 sts; tibiae III with 1 bsf, 5 sts; tibiae IV with 1 T, 4 sts; tarsi I with 4 asl, 1 mst, 2 tsl, 1 fam, 19 sts; tarsi II with 1 bsf, 1 tsl, 19 sts; tarsi III with 1 tsl, 18 sts; tarsi IV- with 17 sts.

Male and developmental stages. Unknown.

Etymology. This species is named after the state in which it was collected.

Material examined (1 individual on a slide). Female holotype (APGD 10-0826-010), ex. maple and oak litter under mountain laurel along creek edge, USA, Pennsylvania, Somerset Co, Laurel Hill State Park, nr. Ebery Scout Reservation (40°01.182 N, 079°14.548 W). 26 August 2010, coll. M. J. Skvarla.

Type deposition. Holotype—ACUA

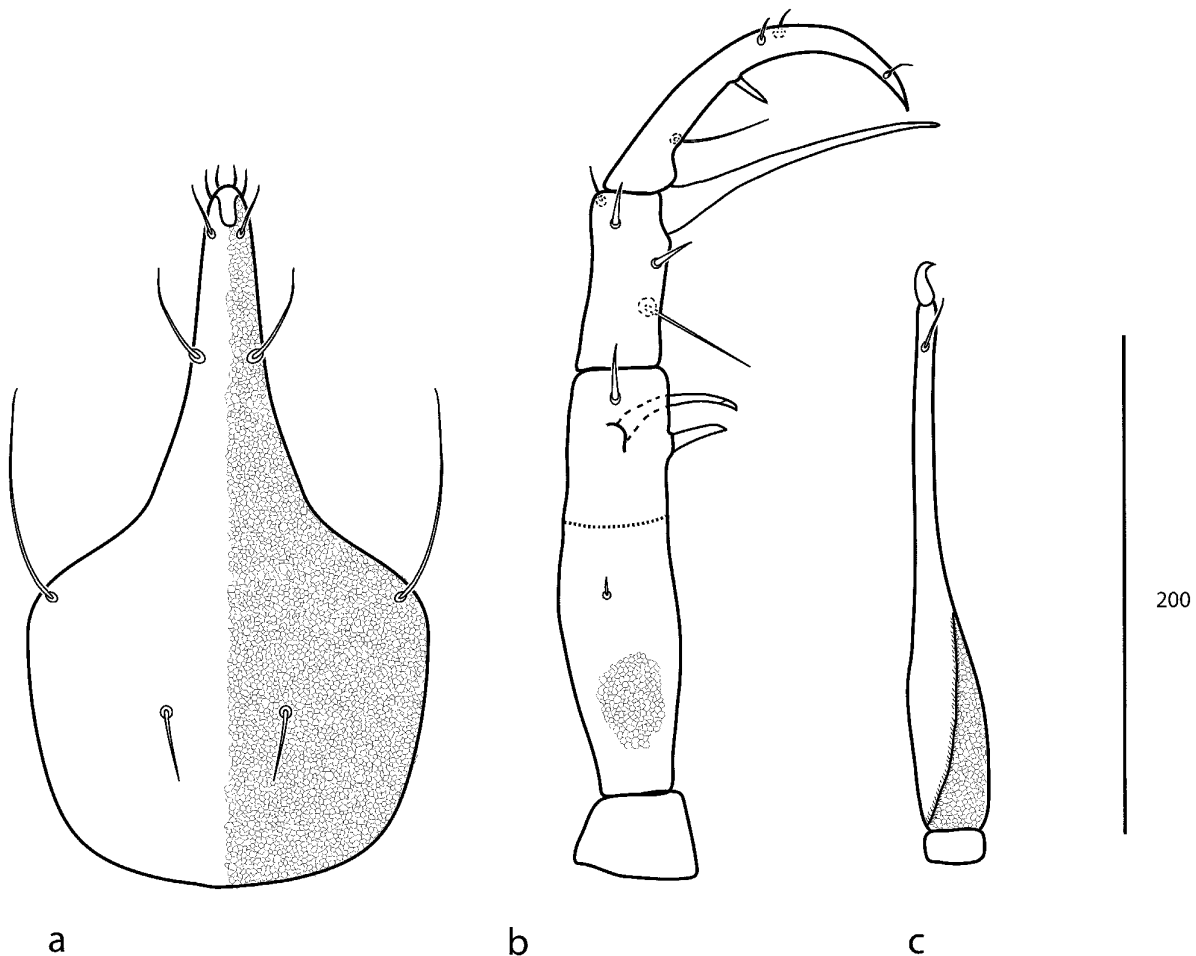


FIGURE 5. *Armascirus pennsylvanicus* sp. nov. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal. Polygonal sculpturing illustrated on basifemur present on all segments.

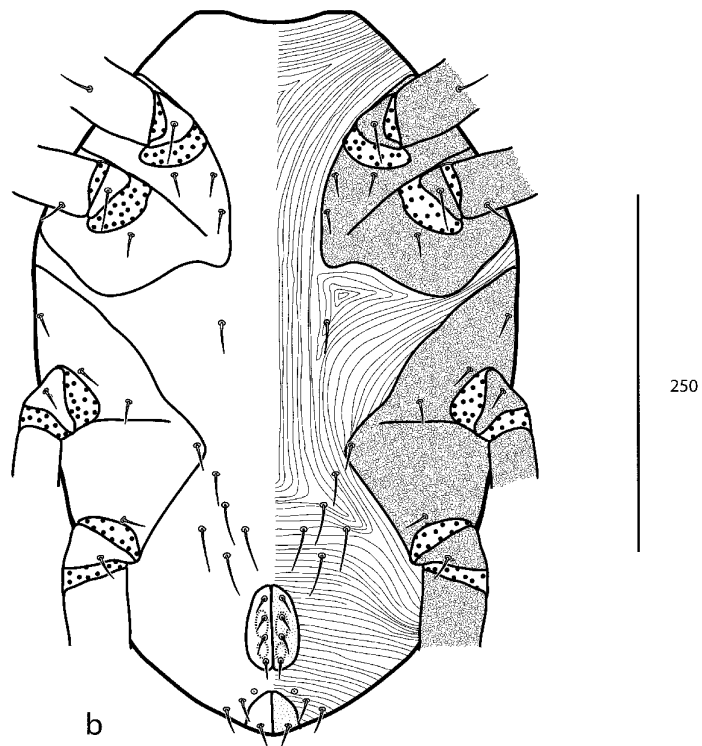
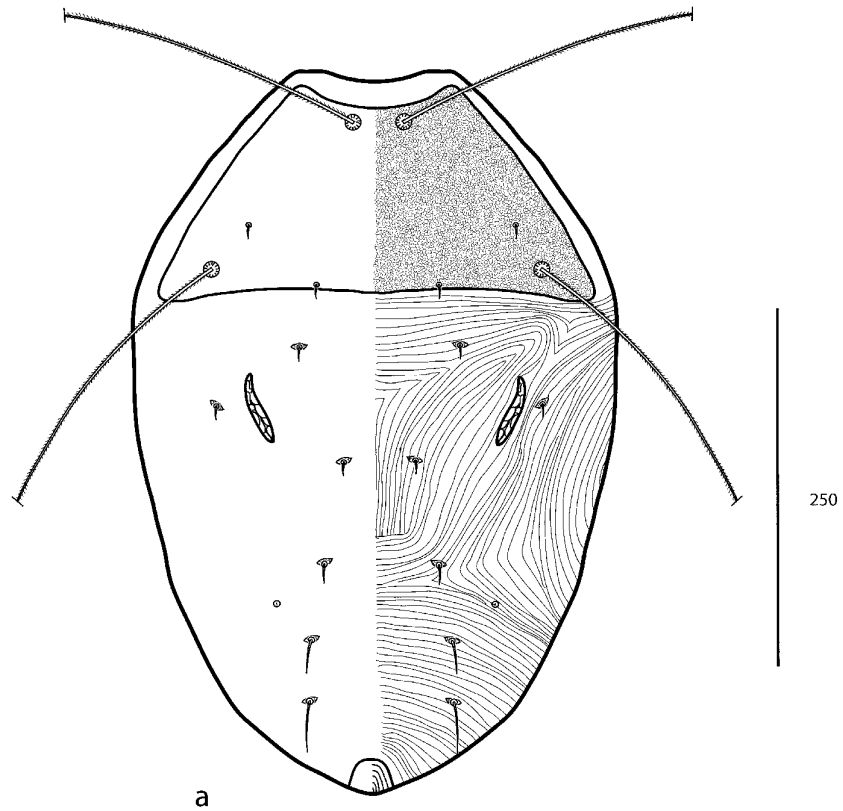


FIGURE 6. *Armascirus pennsylvanicus* sp. nov. Idiosoma. a—Dorsal. b—Ventral.

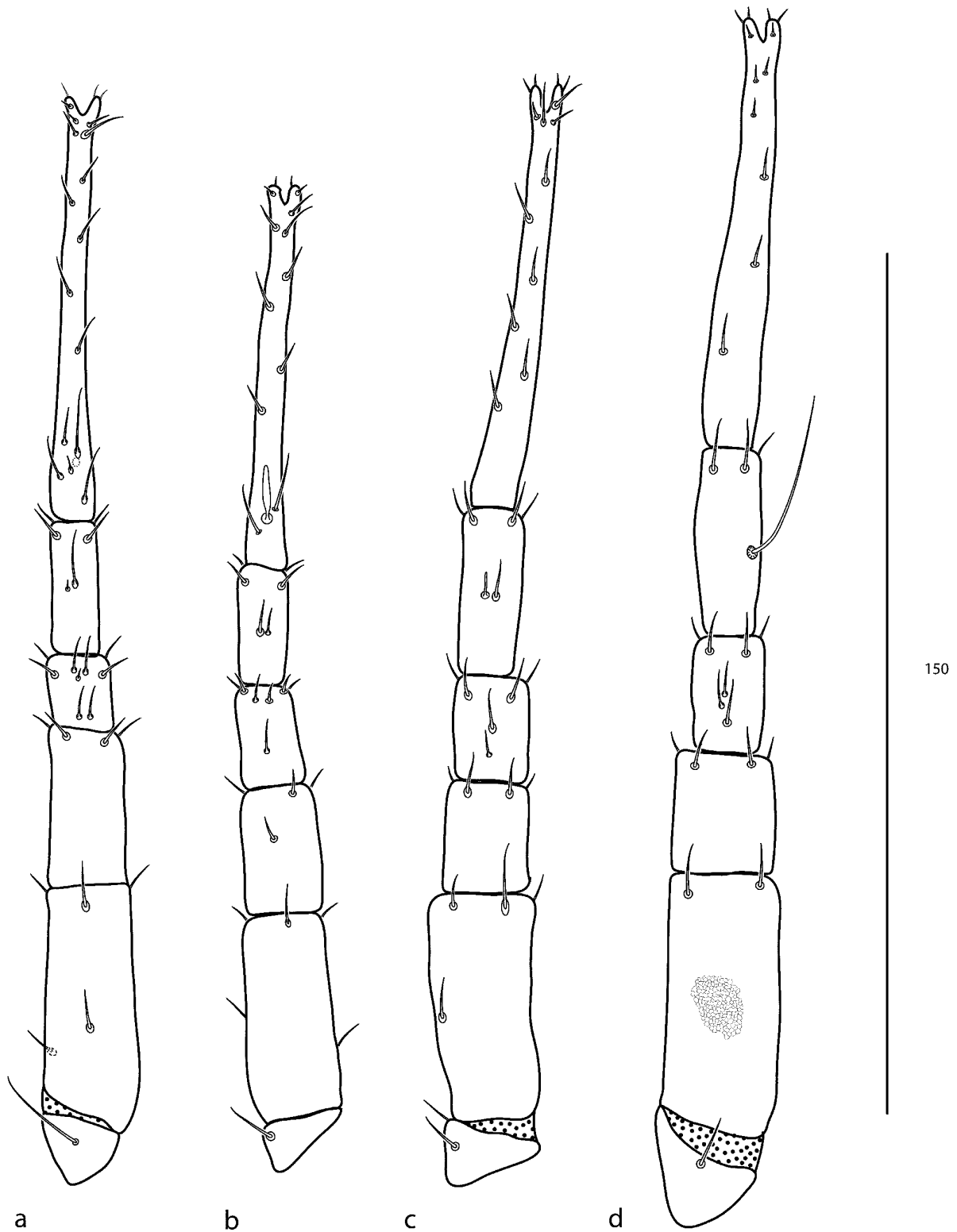


FIGURE 7. *Armascirus pennsylvanicus* **sp. nov.** Legs, dorsal. Polygonal sculpturing illustrated on leg I telofemur present on all segments of all legs. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

Armascirus primigenius Skvarla and Dowling sp. nov.

(Figs. 8–10)

Diagnosis. *Armascirus prigimeus* most closely resembles *A. taurus* in that it has a small hysterosomal (median) shield that is complemented with a single pair of setae (d_1), has lateral platelets and 6 pairs of ventral setae caudally from coxae II (excluding coxal, genital and anal setae). It can be distinguished from *A. taurus* by differences in leg chaetotaxy, specifically genua II with 2 asl + 5 sts instead of 1 asl + 5 sts, and genua IV with 1 asl + 4 sts instead of 2 asl + 5 sts.

Female. Idiosoma 400–725 (556, n=15) long, 290–500 (394) wide.

Gnathosoma (Fig. 8). **Subcapitulum** (Fig. 8a) approximately $\frac{1}{2}$ the length of the idiosoma, 250–295 (274). Two pairs of adoral setae present. Four pairs of setae (hg_{1-4}); $hg_{1,2,3}$ longer than hg_4 and increasing in size (19, 28, 75, 12). **Palp** (Fig. 8b) 325–475 (381). Chaetotaxy: trochanter - 0; basifemur - 1 sts; telofemur - 1 spls, 1 apophysis; genu - 1 sts, 3 spls, 1 apophysis adjoining genu and tibiotarsus; tibiotarsus - 1 spls, 1 dtsl, 3 sts. Tibiotarsus ends in a claw. **Chelicera** (Fig. 8c) 210–255 (227), elongate and base three times width of apex.

Dorsum (Fig. 9a). Proterosomal shield present, with reticulate sculpturing. Two setose trichobothria (ap and pt) present on shield; 310–425 (357) and 410–550 (486), respectively. Two setae (lps and mps) also present on shield; 10–20 (16) and 10–18 (15), respectively. Hysterosomal (median) shield present, with reticulate sculpturing. Lateral platelets present, also with reticulate sculpturing. Setae c_p , e_1-h_1 , c_2 on minute sclerotized plates barely larger than the setal socket; seta d_1 present on the hysterosomal shield. Setae c_1-h_1 , c_2 11, 14, 18, 33, 38, and 12 respectively. Cupule im present and laterad to e_1 . Integument striated.

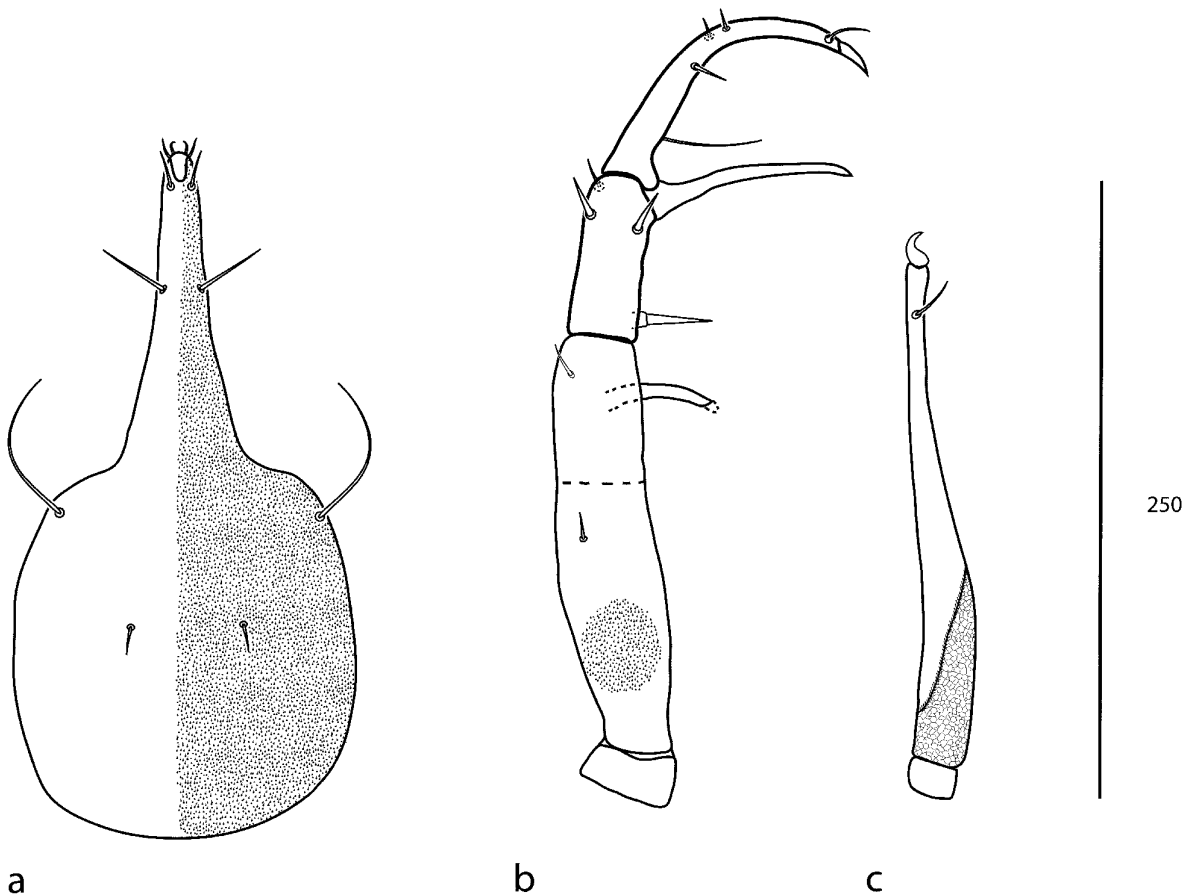


FIGURE 8. *Armascirus primigenius* sp. nov. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal. Polygonal sculpturing illustrated on basifemur present on all segments.

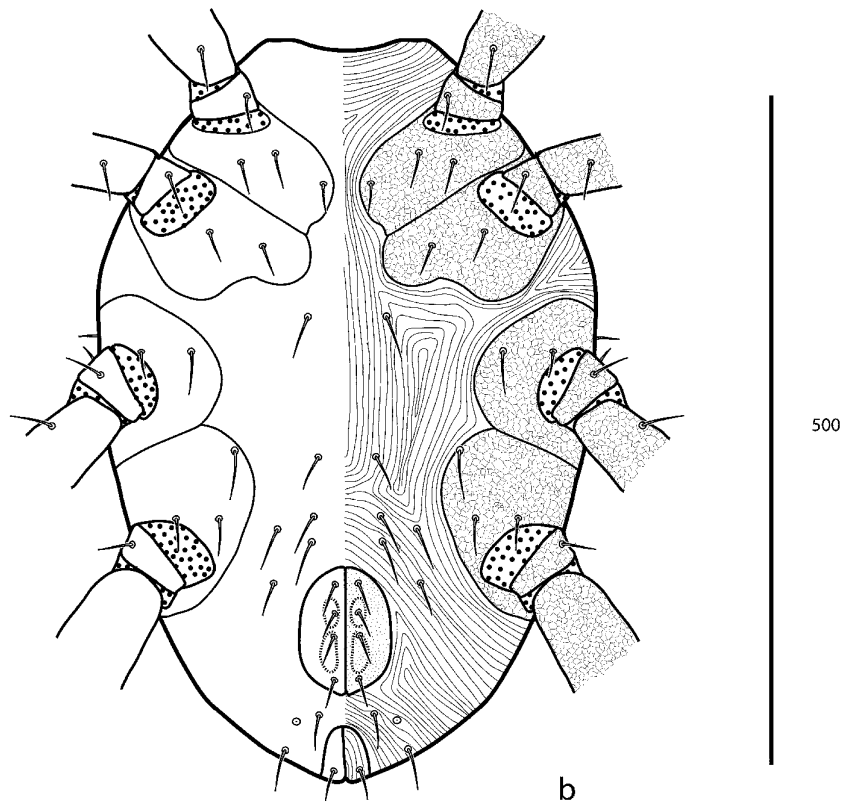
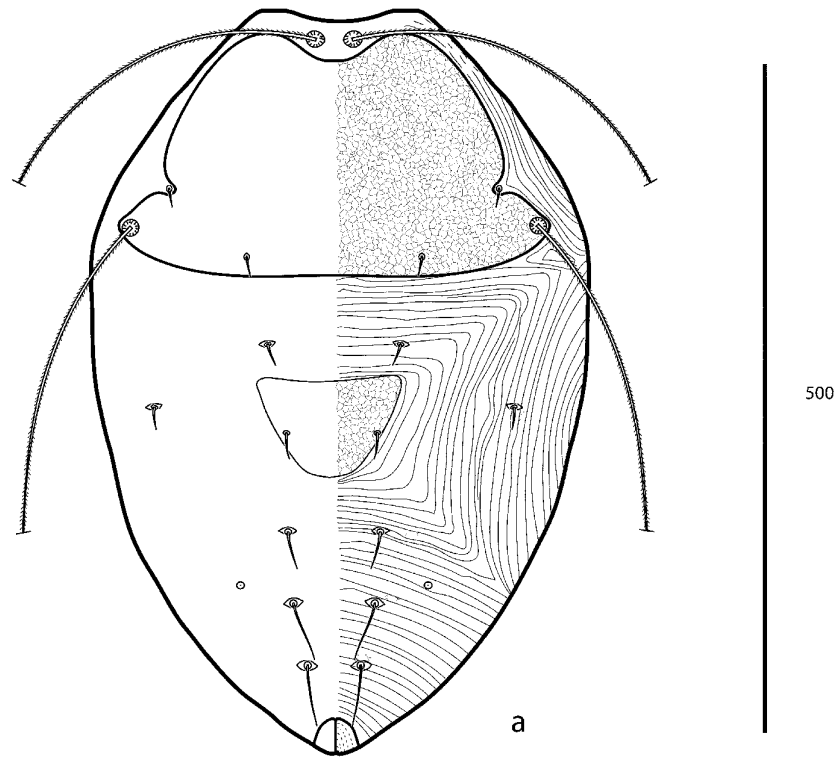


FIGURE 9. *Armascirus primigenius* sp. nov. Idiosoma. a—Dorsal. b—Ventral.

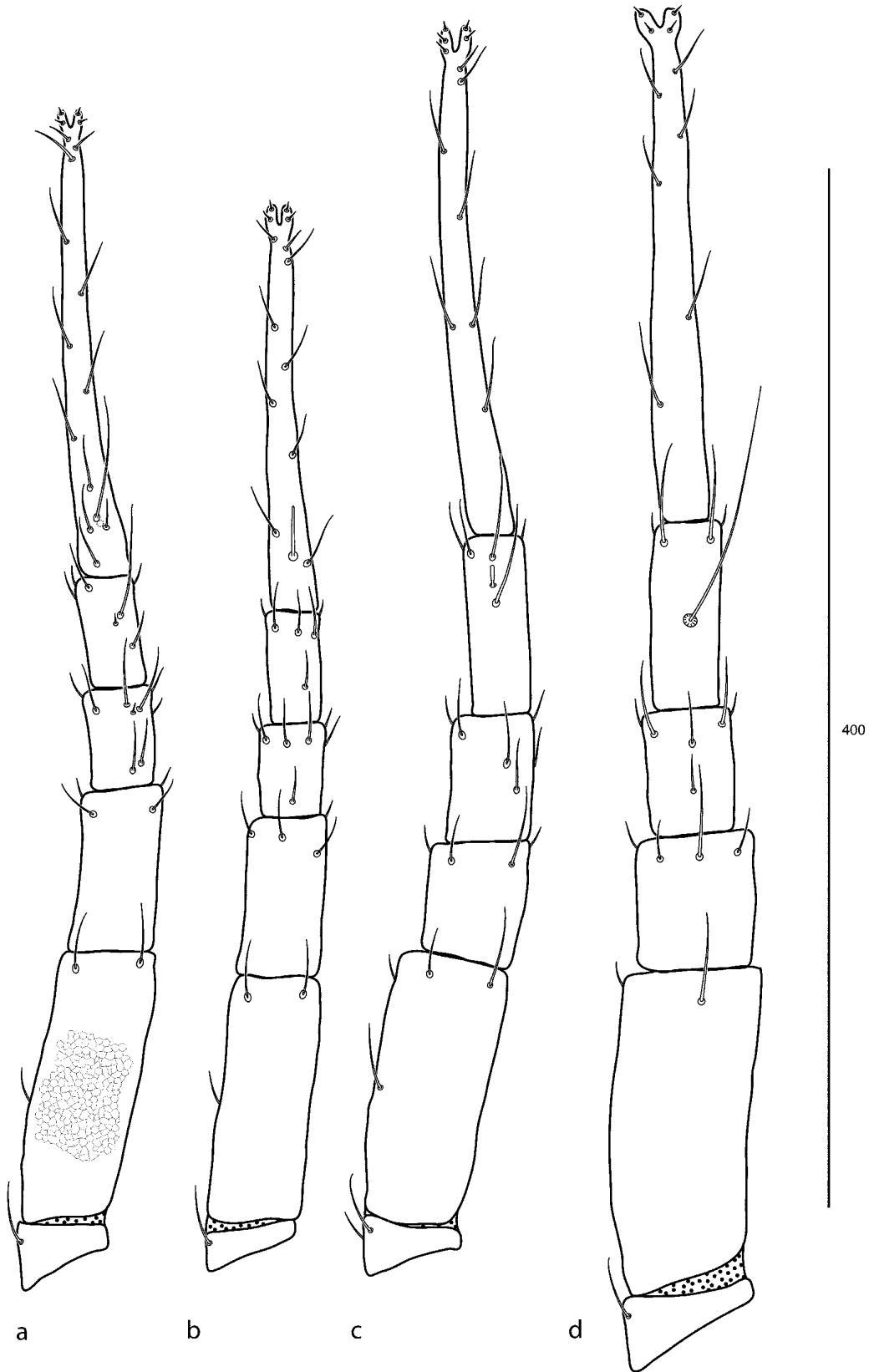


FIGURE 10. *Armascirus primigenius* sp. nov. Legs, dorsal. Polygonal sculpturing illustrated on leg I basifemur present on all segments of all legs. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

Venter (Fig. 9b). Coxal plates I and II fused but retaining suture, with reticulate sculpturing. Coxal plates III and IV also fused but retaining suture, with reticulate sculpturing. Coxae I-IV setal formula 3-2-3-3. 6 pairs of dorsal setae after coxae II (not including coxal, genital and anal setae). Genital plates weakly sclerotized, with 4 pairs of setae (g_{1-4}) and two pairs of papillae. Three pairs of setae on or adjacent to anal plates: two pseudanal setae (ps_{1-2}) and h_2 . Cupule ih present laterad to ps_2 .

Legs (Fig. 10a-d). Legs I, II and III shorter than body; leg IV subequal. Leg I 375–500 (448), leg II 365–515 (431), leg III 430–525 (495), leg IV 485–650 (559). Chaetotaxy: trochanters I–IV, 1-1-2-1; basifemora I–IV, 5-5-4-2; telofemora I–IV, 4-4-4-4; genua I with 1 mst, 4 asl, 4 sts; genua II with 2 asl, 5 sts; genua III with 1 asl, 5 sts; genua IV with 1 asl, 4 sts; tibiae I with 1 mst, 2 asl, 4 sts; tibiae II with 1 asl, 5 sts; tibiae III with 1 asl, 5 sts; tibiae IV with 1 T, 4 sts; tarsi I with 4 asl, 2 tsl, 1 fam, 1 mst, 17 sts; tarsi II with 1 bsl, 1 tsl, 17 sts; tarsi III with 1 tsl, 16 sts; tarsi IV with 18 sts.

Male and developmental stages. Unknown.

Etymology. Two *Armscirus*, *A. taurus* and *A. bison*, are named after bovines. As this new species appears closely related to *A. taurus* the authors thought it appropriate to borrow the name of another bovid, specifically the aurochs, *Bos primigenius*.

Material examined (15 individuals on slides). Female holotype, ex. cedar litter in rocky area, USA, Missouri, Taney Co, Mark Twain National Forest (36°41.199 N, 092° 58.274 W), 23 May 2010, coll. J. R. Fisher and D. M. Keeler. APGD 10-0523-010 • 1 female paratype (APGD 10-0523-011), ex. leaf litter under chinkapin oak, same locality, 23 May 2010, coll. J. R. Fisher and D. M. Keeler • 5 female paratypes (APGD 09-1016-001), ex. old growth leaf litter, USA, Arkansas, Washington Co., Ozark National Forest, Weddington, 16 October 2009, coll. J. R. Fisher • 1 female paratype (APGD 09-0830-003), ex. leaf litter, USA, Arkansas, Washington Co., Devil's Den State Park (35°46.835 N, 094° 14.765W), 30 August 2009, coll. J. R. Fisher • 1 female paratype (APGD 09-0830-004), same data • 1 female paratype (APGD 10-0919-010), ex. mixed cedar and deciduous litter drifted against logs and rocks, USA, Arkansas, Newton Co., Buffalo National River, Boen Gulf (36°02.381 N, 093° 20.394 W), 19 September 2010, coll. M. J. Skvarla • 1 female paratype (APGD 09-0821-010), ex. cedar litter, same locality (36°01.924 N, 093° 20.040 W), 21 August 2009, coll. J. R. Fisher and M. J. Skvarla • 1 female paratype (APGD 09-0829-004), ex. dense litter drift by log, same locality, 29 August 2009, coll. J. R. Fisher and M. J. Skvarla • 1 female paratype (APGD 09-0918-004), ex. mixed cedar and deciduous litter by log, same locality, 18 September 2009, by J. R. Fisher and M. J. Skvarla • 1 female paratype (APGD 10-0730-004), same locality, 30 July 2010, coll. M. J. Skvarla • 1 female paratype (APGD 09-0821-004), ex. low bush blueberry litter on top of bluff, same locality, 21 August 2009, coll. J. R. Fisher.

Type deposition. Holotype and 12 female paratypes —ACUA; 1 female paratype—USNM; 1 female paratype—OSAL.

Armscirus gimplei Smiley, 1992

(Figs. 11–13)

Armscirus gimplei Smiley, 1992: 139, fig. 70A, B; Kalúz 2009: 37.

Diagnosis. *Armscirus gimplei* most closely resembles *A. ozarkensis* and *A. cerris* in that it has a small hysterosomal (median) shield that is not complemented with dorsal setae and has lateral platelets. It can be differentiated from *A. cerris* because it has 6 setae after coxae II (not including coxal, genital and anal setae) instead of 7. It can be differentiated from *A. ozarkensis* based on the lateral platelets, which are conspicuous and as long as the median shield in *A. ozarkensis* and inconspicuous and only as long as or slightly longer than c_2 in *A. gimplei*.

Remarks. After examining both the holotype and the newly collected specimen, differences between the original description and the specimens were found. Smiley (1992) states that the lateral hysterosomal platelets of *A. gimplei* are small and that c_2 is located on the platelets. In reality the platelets are small and inconspicuous, but occur on the integument between d_1 and c_2 much as they do in other *Armscirus*. The structures previously reported as the lateral platelets are the same tiny platelets that occur at the base of all dorsal setae that are situated in the integument away from larger plates and shields.

The integument around the setae laterad of coxae III appears to be more sclerotized than the surrounding cuti-

cle. This area does not bear the reticulated pattern of the coxal or dorsal plates. The structure is not visible in the holotype so we were unable to determine if it is present across the species or an anomaly of the specimen examined.

In addition, differences between the new specimen and the published leg setal formulae were found as follows: tibiae I with 2 asl, 1 mst, 4 sts; tibiae III with 1 bsl, 5 sts. Unfortunately the holotype is in a poor condition that does not allow these leg segments to be viewed, and therefore these differences cannot be corroborated with the type. Subcapitulum (Fig. 11a), palp (Fig. 11b), chelicera (Fig. 11c). The idiosoma (12a, b) and legs (Fig. 13a–d) have been illustrated based on the Ozark specimen to aid in identification.

Material examined (2 individuals on slides). Female holotype, ex. *Tillandsia* sp., Mexico, Vera Cruz. 6 April 1966, coll. J. T. Watt. • 1 female (APGD 10-0730-005), ex. mixed cedar and deciduous litter, USA, Arkansas, Newton Co., Buffalo National River, Steel Creek (36°01.924 N, 093° 20.040 W), 30 July 2010, by M. J. Skvarla.

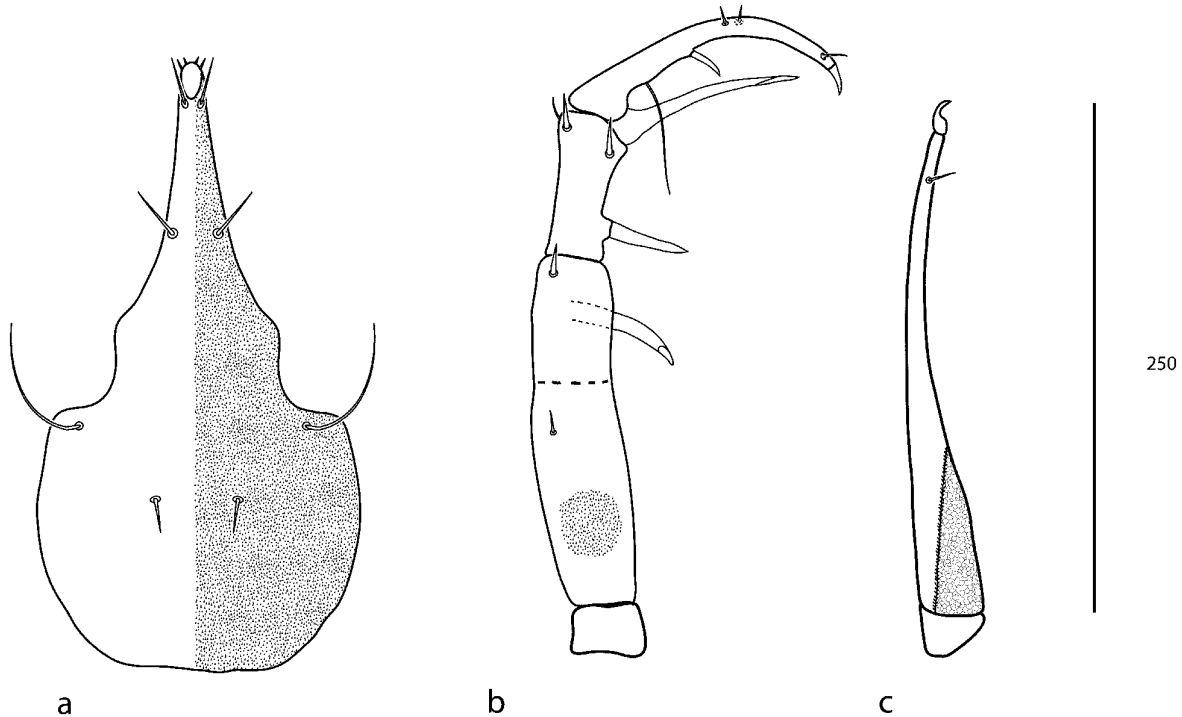


FIGURE 11. *Armascirus gimplei* Smiley. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal. Palp, dorsal. Polygonal sculpturing illustrated on basifemur present on all segments.

Armascirus harrisoni Smiley, 1992

(Figs. 14–16)

Armascirus harrisoni Smiley, 1992: 141, fig. 71A, B; Kalúz 2009: 37.

Diagnosis. *Armascirus harrisoni* most closely resembles *A. bakeri* in that they possess a small median shield that is not complemented with dorsal setae and lacks lateral platelets (Fig. 15a). They can be distinguished from *A. bakeri* based on the palp tibiotarsal formula, which is 1 spls and 4 sts instead of 1 spls and 3 sts. *Armascirus harrisoni* may also resemble *A. makilingensis*, but lacks thickened, spiculate ventral setae (Fig. 15b), or *A. limpopoensis*, but has 1 apophysis and 1 spls on the palpal telofemora instead of 2 apophyses and 1 spls (Fig. 14b).

Remarks. After examining the type specimens (two individuals) and newly collected specimens (23 individuals), discrepancies between the original description and the specimens concerning the leg setal formula were found.

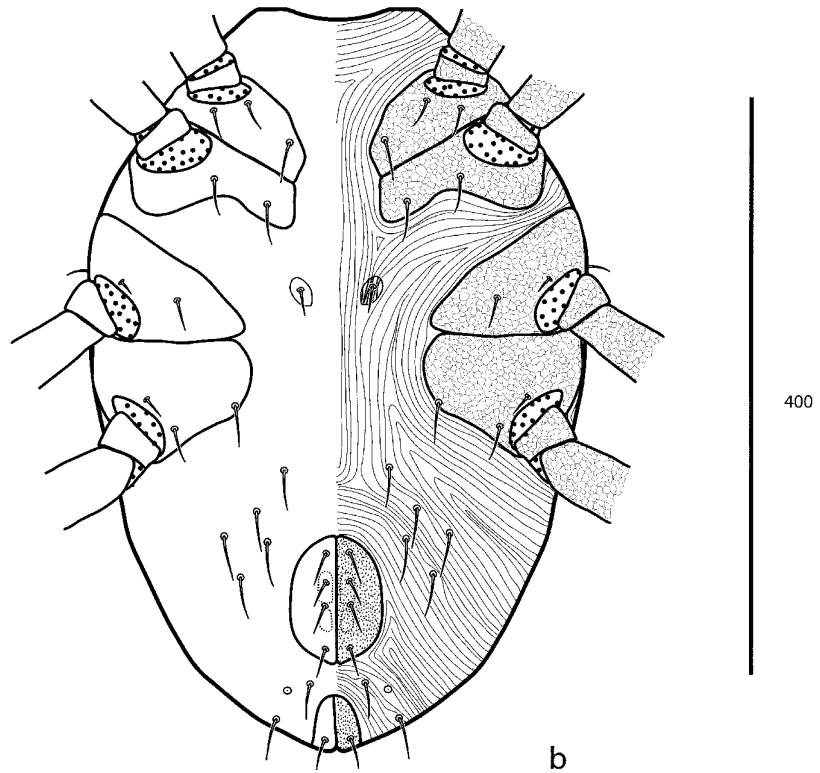
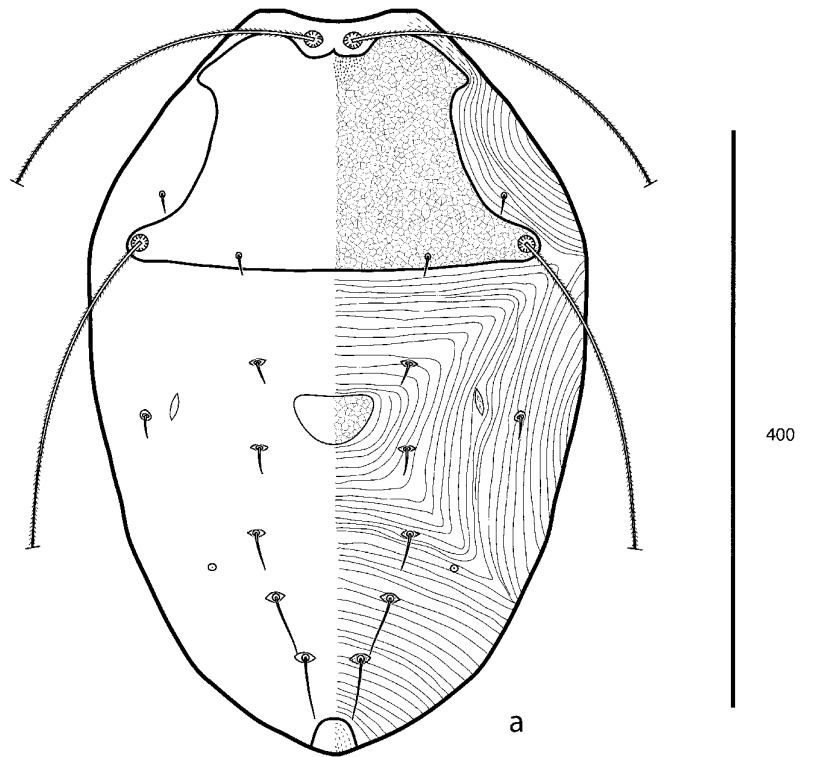


FIGURE 12. *Armascirus gimplei* Smiley. Idiosoma. **a**—Dorsal. **b**—Ventral.

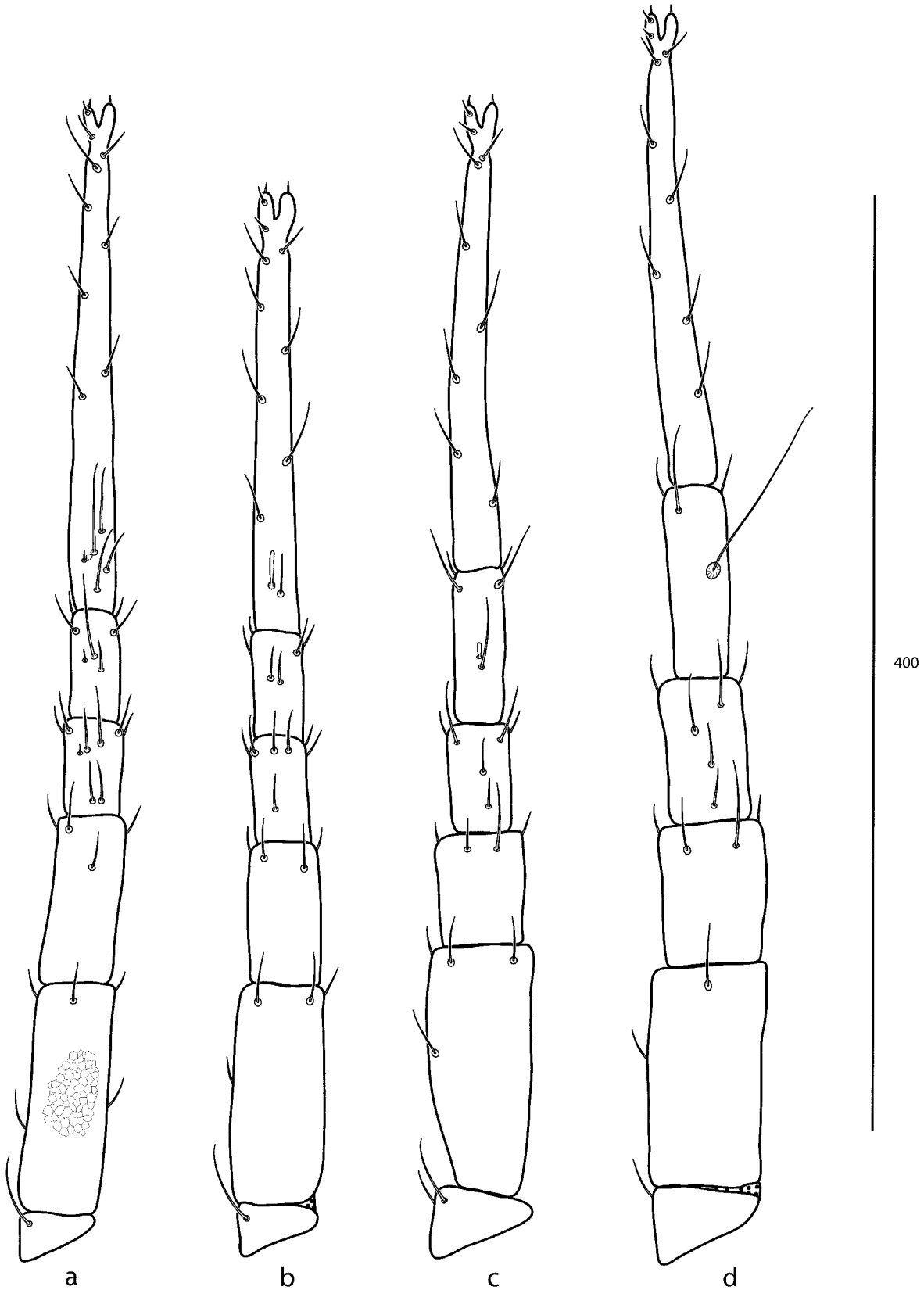


FIGURE 13. *Armascirus gimplei* Smiley. Legs, dorsal. Polygonal sculpturing illustrated on leg I basifemur present on all segments of all legs. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

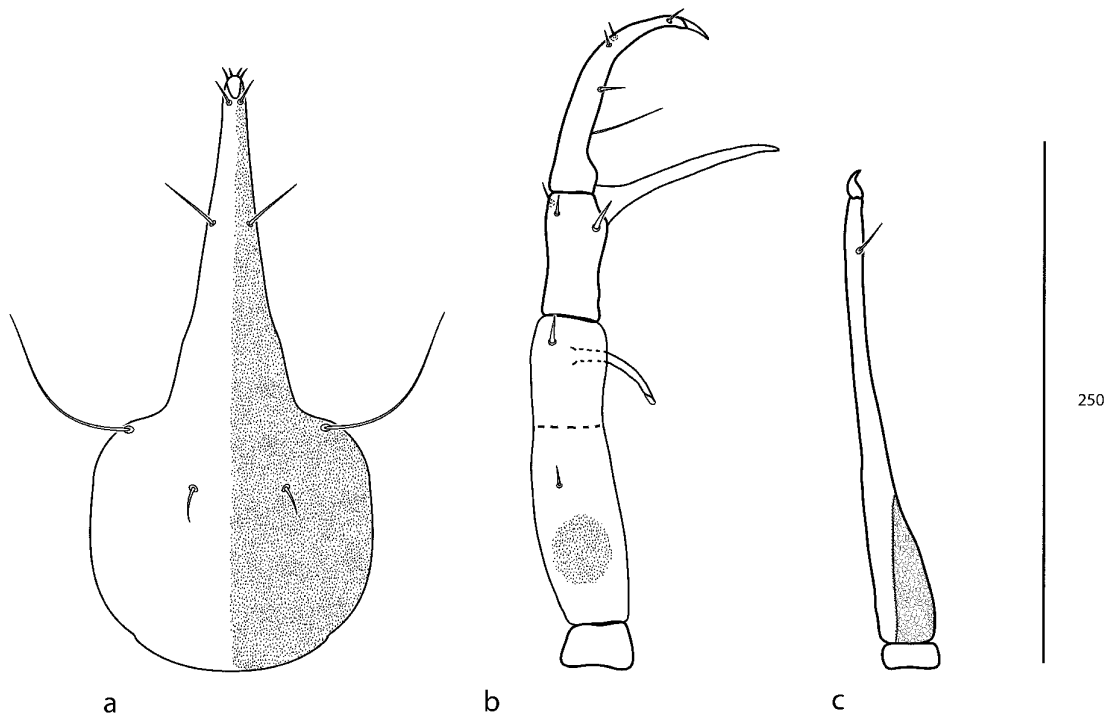
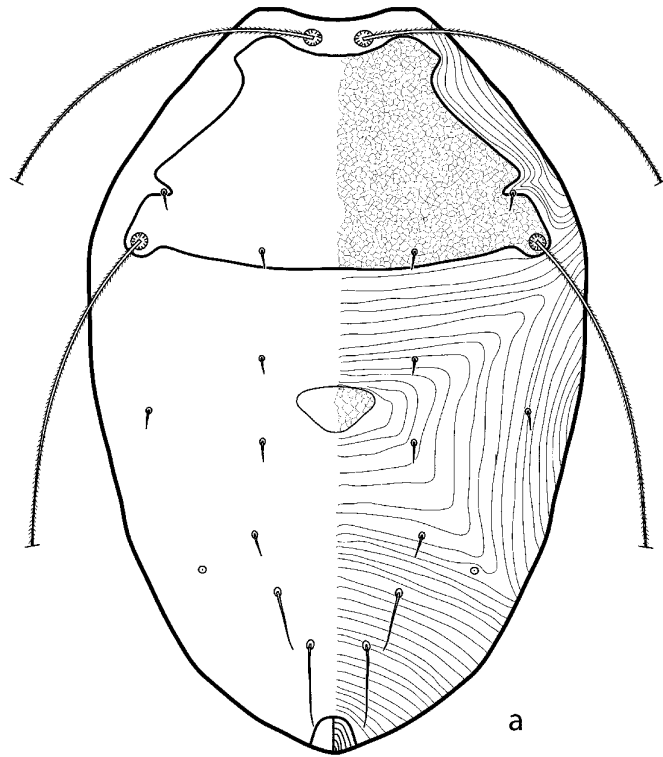


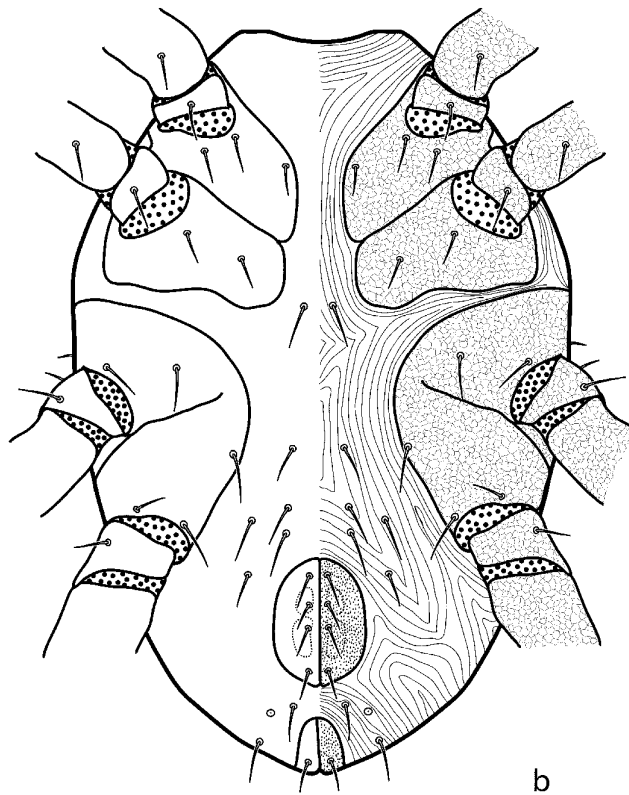
FIGURE 14. *Armascirus harrisoni* Smiley. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal. Polygonal sculpturing illustrated on basifemur present on all segments.

The following setal formula was observed in the type specimens and specimens collected in the Ozark Highlands: trochanters I–IV, 1-1-2-1; basifemora I–IV, 5-5-4-2; telofemora I–IV, 4-4-4-4; genua I with 4 asl, 1 mst, 4 sts; genua IV with 2 asl, 5 sts; tibiae I with 2 asl, 1 mst, 4 sts; tibiae III with 1 bsl, 5 sts; tarsi I with 4 asl, 1 fam, 2 tsl, 16 sts; tarsi II with 1 bsl, 1 tsl, 18 sts; tarsi III with 1 tsl, 18 sts; tarsi IV with 19 sts. The subcapitulum (Fig. 14a), palp (Fig. 14b), chelicera (Fig. 14c), idiosoma (Fig. 15a, b), and legs (Fig. 16a–d) have been illustrated to aid in identification.

Material examined (25 individuals on slides). 1 female holotype, ex. outer bark of Loblolly Pine, USA, Louisiana, Livingston Parish, Maurepas, 19 September 1963, coll. J. C. Moser • 1 female paratype, same data • 1 female (APGD 09-0821-004), ex. low bush blueberry litter on top of bluff, USA, Arkansas, Newton Co., Buffalo National River, Steel Creek, 21 August 2009, coll. J. R. Fisher • 2 females (APGD 09-0821-010), ex cedar litter, same data • 1 female (09-0829-002), ex cedar litter, same locality, 29 August 2009, coll. J. R. Fisher • 1 female (APGD 09-0907-005), ex leaf litter around boulders, same locality, 07 September 2009, coll. J. R. Fisher • 1 female (APGD 09-0918-003), same locality, 18 September 2009, coll. J. R. Fisher and M. J. Skvarla • 2 females (APGD 10-0528-008), ex wet mixed cedar and oak litter in rock crevice, same locality, 28 May 2010, coll. J. R. Fisher and M. J. Skvarla • 1 female (APGD 10-0730-004), ex mixed cedar and deciduous litter, same locality, 30 July 2010, coll. M. J. Skvarla • 1 female (APGD 10-0730-005), same data • 1 female (APGD 10-1009-003), ex deciduous litter in tall grass near pond, same locality (36°02.289 N, 093° 20.455 W), 09 October 2010, coll. M. J. Skvarla • 1 female (APGD 10-1010-003), ex deciduous litter drifted along bank of creek flood basin, same locality (36°02.016 N, 093° 20.137 W), 10 October 2010, coll. M. J. Skvarla • 1 female (APGD 10-0426-024), ex thin litter layer in secondary forest next to pulloff, USA, Arkansas, Newton Co., Buffalo National River, Boen Gulf, 26 April 2010, coll. M. J. Skvarla • 1 female (APGD 10-0919-006), same locality, 19 September 2010, by M. J. Skvarla • 1 female (APGD 10-0531-003), caught in malaise trap, USA, Arkansas, Washington Co., Ozark National Forest, Weddington (36°06.477 N, 093° 23.446 W), 31 May 2010, coll. J. R. Fisher and M. J. Skvarla • 1 female (APGD 10-0523-009), ex cedar litter in rocky area, USA, Missouri, Taney Co. (36°41.199 N, 092°58.274 W), 23 May 2010, coll. J. R. Fisher and D. M. Keeler • 2 females (APGD 10-0523-007), ex litter in rocky area, USA, Missouri, Taney Co. (36°41.199 N, 092°58.274 W), 23 May 2010, coll. J. R. Fisher and D. M. Keeler. • 5 females (APGD 10-0701-001), collected in pitfalls in open rocky area with reindeer moss, USA, Missouri, Madison Co., Rockpile Mountain Wilderness, 1 July 2010, coll. J. R. Fisher and D. M. Keeler.



500



500

FIGURE 15. *Armascirus harrisoni* Smiley. Idiosoma. **a**—Dorsal. **b**—Ventral.

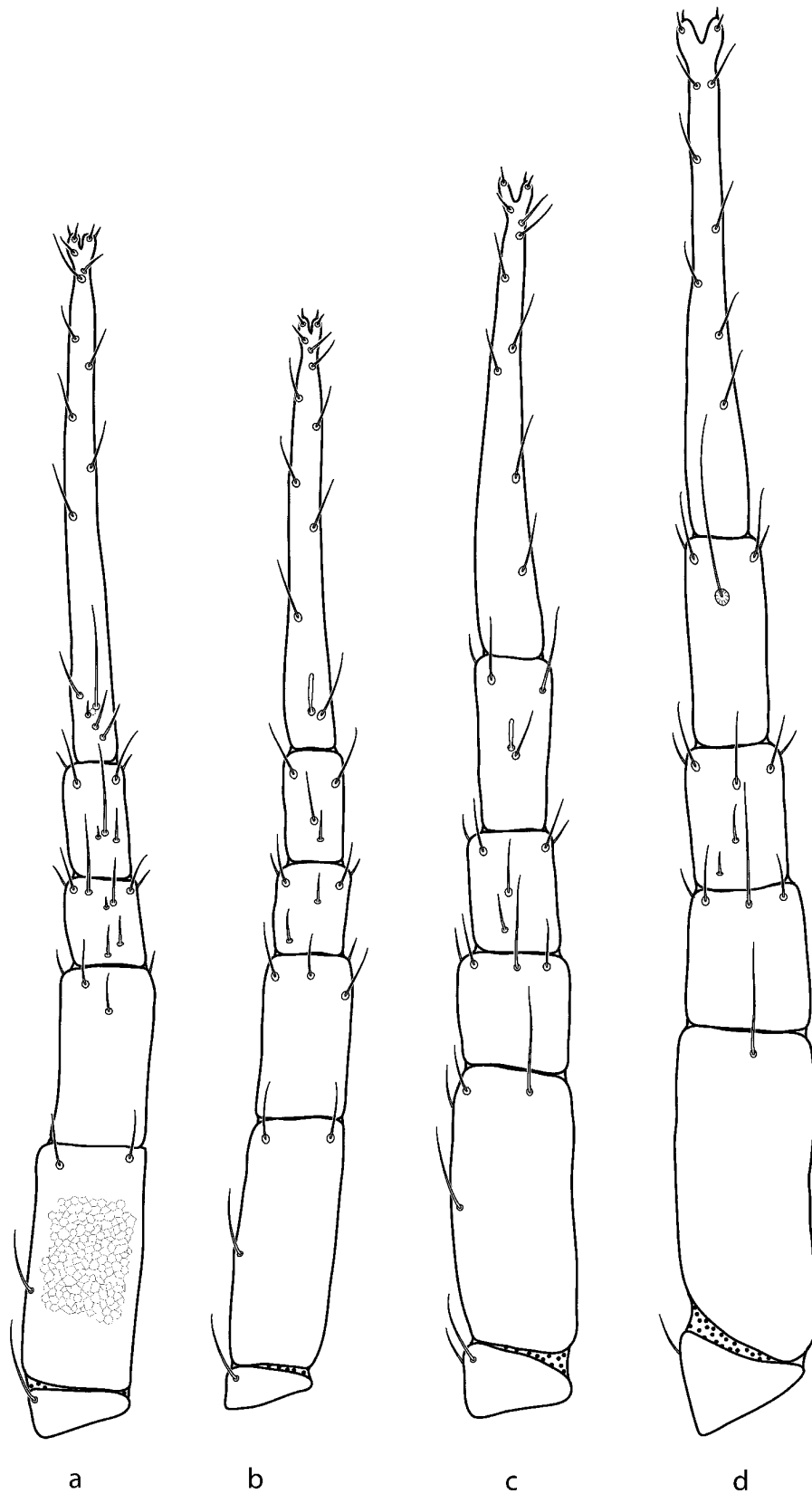


FIGURE 16. *Armascirus harrisoni* Smiley. Legs, dorsal. Polygonal sculpturing illustrated on leg I basifemur present on all segments of all legs. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

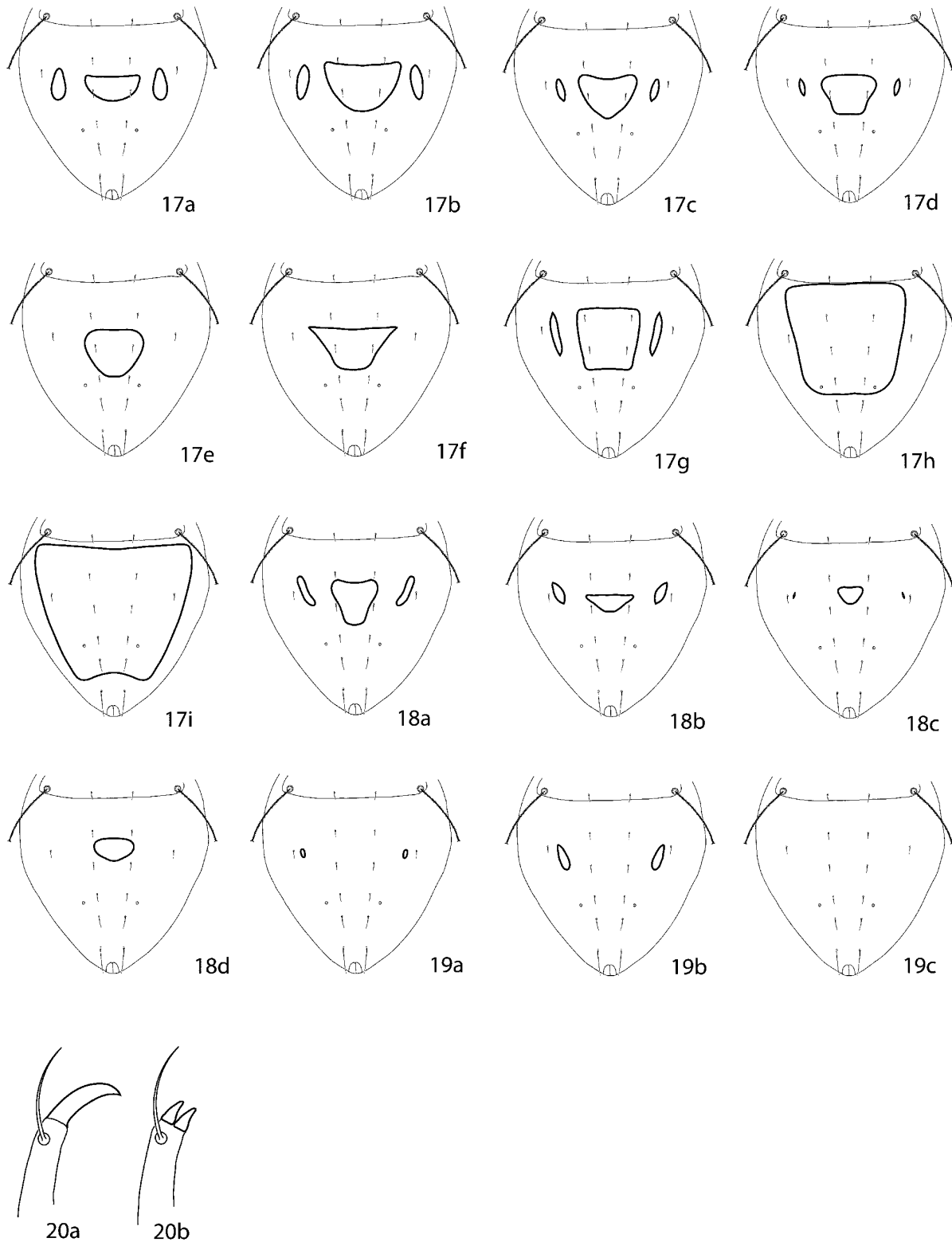


FIGURE 17. Examples in which the median shield is present and complemented with at least one pair of setae.

FIGURE 18. Examples in which the median present but not complemented with setae.

FIGURE 19. Examples in which the median shield is absent.

FIGURE 20. Examples of palp claws. **20a**—Palp claw whole, not bifid. **20b**—Palp claw bifid.

Key to adult female *Armascirus*

The following key, based on one presented by Kaluz (2009), has been modified and illustrated. The following species, in addition to those newly described in this work, have been included: *Armascirus javanus*, *A. garciai*, *A. makilingensis* and *A. apoensis*. In addition, *A. bakeri* (Smiley, 1992), which possesses a palpal basifemoral simple seta and has a leg I–IV telofemoral chaetotaxy of 4-4-4-4 sts, is moved from *Dactyloscirus* to *Armascirus* based on the generic diagnosis given in this work and by Den Heyer and Castro (2008).

Armascirus ebrius possesses a holodorsal shield complemented with c_1-f_1, c_2 . This condition is reported in the few male Armascirines that have been described (see for example Corpuz-Raros 1995; Den Heyer 1978) but never in females. The authors are of the opinion that *A. ebrius* may be a male mistakenly described as a female. Not having seen the type specimen we can neither confirm nor deny this and so have included in in the following key.

| | | |
|----|---|---------------------------------------|
| 1 | Hysterosomal median shield present (Figs. 17a–i, 18a–d) | 2 |
| - | Hysterosomal median shield absent (Fig. 19a–c) | 28 |
| 2 | Median shield small or large, complemented with setae (Fig. 17a–i) | 3 |
| - | Median shield small, not complemented with setae, (Fig. 18a–d) | 22 |
| 3 | One pair of setae (d_1) on hysterosomal median shield (Fig. 17a–f) | 4 |
| - | Two or more pairs of setae on hysterosomal median shield (Fig. 17g–i) | 18 |
| 4 | Lateral hysterosomal platelets present (Fig. 17a–d) | 5 |
| - | Lateral hysterosomal platelets absent (Fig. 17e, f) | 15 |
| 5 | Setae c_1 very short, the distance between the bases of c_1-c_1 20 times the length of c_1 ; venter caudally from coxae II with 5 pairs of simple setae (excluding genital, coxal, and anal setae) | <i>A. rafalskii</i> |
| - | Setae c_1 longer, the distance between the bases of c_1-c_1 less than 10 times the length of c_1 ; venter caudally from coxae II with 6 or more pairs of simple setae (excluding genital, coxal, and anal setae) | 6 |
| 6 | The distance between caudal parts of hysterosomal lateral platelets wider than the distance between their frontal parts (Fig. 17a, b) | 7 |
| - | The distance between caudal parts of hysterosomal lateral platelets shorter than the distance between their frontal parts (Figs. 11a, 17c,d) | 9 |
| 7 | Lateral hysterosomal platelets equal to or longer than hysterosomal median shield (Fig. 17a); venter caudally from coxae II with 6 pairs of simple setae (excluding genital, coxal, and anal setae) | <i>A. jasminea</i> |
| - | Lateral hysterosomal platelets shorter than hysterosomal median shield (Fig. 17b); venter caudally from coxae II with 7 pairs of simple setae (excluding genital, coxal, and anal setae) | 8 |
| 8 | Palpal genua with 3 spls, 1 sts | <i>A. akhtari</i> |
| - | Palpal genua with 3 spls | <i>A. satianaensis</i> |
| 9 | Venter caudally from coxae II with 7–8 pairs of simple setae (excluding genital, coxal, and anal setae) | 10 |
| - | Venter caudally from coxae II with 6 pairs of simple setae (excluding genital, coxal, and anal setae) | 11 |
| 10 | Apophyses adjoining palpal genua longer than genu; median shield pointed caudally (Fig. 17c); venter caudally from coxae II with 7 pairs of setae (excluding genital, coxal, and anal setae); tarsal sts chaetotaxy I–IV 18-15-13-12 | <i>A. asghari</i> |
| - | Apophyses adjoining palpal genua shorter than genu; median shield truncated caudally (Fig. 17d); venter caudally from coxae II with 8 pairs of setae (excluding genital, coxal, and anal setae); tarsal sts chaetotaxy I–IV 25-23-23-21 | <i>A. albiziae</i> |
| 11 | Tarsus I with more than 27 setae; tarsus II with at least 24 setae | 12 |
| - | Tarsus I with less than 25 setae; tarsus II with less than 23 setae | 13 |
| 12 | Genital valve with random dot-like lobes; tarsal sts chaetotaxy I–IV 29-25-23-22 | <i>A. pluri</i> |
| - | Genital valve longitudinal rows of dot-like lobes; tarsal sts chaetotaxy I–IV 29-24-22-21 | <i>A. mactator</i> |
| 13 | Palpal telofemora with 1 apophysis, 2 spls; palpal genua with 1 ap, 2 spls, 2 sts | <i>A. huyssteeni</i> |
| - | Palpal telofemora with 1 apophysis, 1 spls; palpal genua with 1 ap, 3 spls, 1 sts | 14 |
| 14 | Genua II with 1 asl, 5 sts; genua IV with 2 asl, 5 sts | <i>A. taurus</i> |
| - | Genua II with 2 asl, 5 sts; genua IV with 1 asl, 4 sts | <i>A. primigenius</i> sp. nov. |
| 15 | Hysterosomal median shield with a straight or concave frontal margin and with very acute anterior lateral corners (angle less than 45°) (Fig. 17e) | 16 |
| - | Hysterosomal median shield with convex frontal margin and with rounded anterior lateral corners (Fig. 17f) | 17 |
| 16 | Palpal genua with 1 ap, 2 spls, 1 sts; legs I–IV sts formulae (excluding solenida): basifemora 1-2-1-0; telofemora 4-4-4-4; genua 6-7-5-6; h_1 4 times the length of c_1 ; hysterosomal shield width: length = 2.2:1 | <i>A. sabrii</i> |
| - | Palpal genua with 1 ap, 3 spls, 1 sts; legs I–IV sts formulae (excluding solenida): basifemora 2-2-1-1; telofemora 4-4-4-3; genua 8-6-6-6; h_1 3 times the length of c_1 ; hysterosomal shield width: length 1.5:1 | <i>A. gorjaensis</i> |
| 17 | Apophysis adjoining genu and tibiotarsus shorter than palpal tibiotarsus; palpal atelofemoral apophyses three times longer than spine-like seta; distance between the bases of $mps-mps$ 9 times the length of mps | <i>A. bison</i> |
| - | Apophysis adjoining genu and tibiotarsus longer than palpal tibiotarsus; palpal telofemoral apophyses three times longer than spine-like seta; distance between the bases of $mps-mps$ 5 times the length of mps | <i>A. fixus</i> |
| 18 | Hysterosomal median shield with 2 pairs of setae (c_1, d_1) (Fig. 17g) | 19 |
| - | Hysterosomal median shield with more than 2 pairs of setae (Fig. 17h, i) | 20 |

| | | |
|----|---|--|
| 19 | Palpal telofemora with 2 ap, 1 spls; palpal genua with 2 spls, 2 sts; venter caudally from coxae II with 6 pairs of simple setae (excluding genital, coxal, and anal setae); tarsi I-IV with 21-20-15-13 sts (excluding solenida); the distance between bases of c_1-c_1 , 4 times the distance of h_1-h_1 ; distance between c_1-c_1 , 5 times the length of c_1 | <i>A. anastosi</i> |
| - | Palpal telofemora with 1 ap, 1 spls; palpal genua with 3 spls, 1 sts; venter caudally from coxae II with 5 pairs of simple setae (excluding genital, coxal, and anal setae); tarsi I-IV with 19-13-13-13 sts (excluding solenida); the distance between c_1-c_1 , 2 times the distance between h_1-h_1 ; the distance between c_1-c_1 , 4 times the length of c_1 | <i>A. heryfordi</i> |
| 20 | Hysterosomal shield bearing 3 pairs of setae (c_1, d_1, e_1) (Fig. 17h); apophysis adjacent to palpal genua and tibiotarsi absent | 21 |
| - | Hysterosomal shield bearing 5 pairs of setae (c_1, f_1, c_2) (Fig. 17i); apophysis adjacent to palpal genua and tibiotarsi present | <i>A. ebruius</i> |
| 21 | 5 pairs of genital setae; palp claw bifid (Fig. 20a); hysterosomal setae not serrate | <i>A. apoensis</i> |
| - | 4 pairs of genital setae; palp claw entire, not bifid (Fig. 20b); hysterosomal setae serrate | <i>A. fuscus</i> |
| 22 | Lateral hysterosomal platelets present (Fig. 18a-c) | 23 |
| - | Lateral hysterosomal platelets absent (Fig. 18d) | 25 |
| 23 | Hysterosomal platelets large, as long as median shield (Fig. 18a); width: length of hysterosomal median shield 1:1; venter caudally from coxae II with 7 pairs of sts (excluding genital and anal setae); genital setae g_1-g_1 equal in length | <i>A. cerris</i> |
| - | Hysterosomal platelets large or small (Fig. 18b,c); width: length of hysterosomal median shield 2:1; venter caudally from coxae II with 6 pairs of sts (excluding genital and anal setae); genital setae g_3 & g_4 ca 1.3 times longer than g_1 & g_2 | 24 |
| 24 | Hysterosomal platelets as long as median shield (Figs. 3a, 18b) | <i>A. ozarkensis</i> sp. nov. |
| - | Hysterosomal platelets $\frac{1}{2}$ as long as median shield (Figs. 11a, 18c) | <i>A. gimplei</i> |
| 25 | Apophysis on palp telofemur extends to distal margin of segment; 2 pairs of ventral pregenital setae thickened and spiculate; f_1 $\frac{1}{3}$ length of h_1 | <i>A. makilingensis</i> |
| - | Apophysis on palp telofemur extends well beyond distal margin of segment; ventral pregenital setae not thickened and spiculate; f_1 subequal to h_1 | 26 |
| 26 | Palpal telofemora with 2 ap, 1 spls; the distance between the bases of c_1-c_1 two times the distance of d_1-d_1 | <i>A. limpopoensis</i> |
| - | Palp telofemora with 1 ap, 1 spls; the distances between the bases of $c_1-c_1 = d_1-d_1$ | 27 |
| 27 | Palp tibiotarsus with 1 spls, 4 sts | <i>A. harrisoni</i> |
| - | Palp tibiotarsus with 1 spls, 3 sts | <i>A. bakeri</i> |
| 28 | Palpal telofemoral apophyses long, reaching apical apophysis on palpal genu; lateral platelets present | 29 |
| - | Palpal telofemoral apophyses short, not reaching apical apophysis on palpal genu; lateral platelets present or absent | 30 |
| 29 | Palpal basifemora with 1 subrectangular apophysis; palp tibiotarsal spls 3 times the length of terminal claw; hysterosomal platelets small, equal in length to c_2 (Fig. 19a); coxal chaetotaxy I-IV 3-2-3-3 | <i>A. lebowensis</i> |
| - | Palpal basifemora without subrectangular apophysis; palp tibiotarsal spls equal in length to terminal claw; hysterosomal platelets long, 2-3 times the length of c_2 (Fig. 19b); coxal chaetotaxy I-V 3-1-3-1 | <i>A. campbelli</i> |
| 30 | Coxal chaetotaxy I-IV 3-2-3-3 | 31 |
| - | Coxal chaetotaxy I-IV 3-2-3-2 | 33 |
| 31 | Palpal telofemora with 1 apophysis, 2 spls, 1 sts; the distance between d_1-d_1 9 times the length of d_1 ; palpal genua with 2 spls, 1 sts | <i>A. cyaneus</i> |
| - | Palpal telofemora with 1 apophysis, 2 spls; the distance between d_1-d_1 4 times the length of d_1 ; palpal genua chaetotaxy not as above | 32 |
| 32 | Hysterosomal platelets present (Fig. 19b); palpal genua with 2 spls, 2 sts; basifemora with 5-5-4-2 sts | <i>A. virginianensis</i> |
| - | Hysterosomal platelets absent (Fig. 19c); palpal genua with 1 spls, 1 sts; basifemora with 6-6-4-2 sts | <i>A. javanus</i> |
| 33 | Palpal telofemoral apophyses as long as width of telofemora; palpal genu with 1 apophysis, 2 spls, 2 sts | <i>A. pennsylvanicus</i> sp. nov. |
| - | Palpal telofemoral apophyses only $\frac{1}{3}$ width of telofemora; palpal genu with 1 apophysis, 3 spls, 1 sts | <i>A. garciai</i> |

***Dactyloscirus* Berlese, 1916**

Historical review. Trägårdh (1905) described *Scirus inermis*. Berlese (1916) erected *Dactyloscirus* as a subgenus of *Scirus* to accommodate *Scirus (Dactyloscirus) eupaloides*. He also described *Scirus dorcas* but failed to recognize that they were congeneric. Oudemans (1922) described *Rosenhofia machairodus*. Halbert (1923) redescribed and figured *S. inermis* from Ireland. Sellnick (1926) transferred *S. inermis* to *Cunaxa*. Vitzthum (1931) raised *Dactyloscirus* to full generic status but later (1940-43) treated it as a subgenus. Thor & Willmann (1941) again elevated *Dactyloscirus* to generic status and designated *Dactyloscirus eupaloides* as the type specimen; they also transferred *C. inermis* and *S. dorcas* to *Dactyloscirus*. Baker & Hoffmann (1948) regarded *Dactyloscirus* as a senior synonym of *Cunaxa*. Smiley (1975) synonymized *Rosenhofia* with *Dactyloscirus*. Zaher *et al.* (1975) reported *D. inermis* from Egypt (though they called it *Cunaxa inermis*). Chaudhri (1977) described *D. fuscus*. Den Heyer (1978b) split *Armascirus* from *Dactyloscirus* and *Cunaxa* and raised the subfamily Cunaxinae to accommodate them, thus refining the definitions of all three genera. Den Heyer (1979a) described *D. condylus* and *D.*

dolichosetosus. Den Heyer (1980) erected the tribe *Armascirini* and made *Dactyloscirus* and *Armascirus* the sole representatives. Gupta and Ghosh (1980) described *Cunaxoides nicobarensis*. *Dactyloscirus pataliputraensis* was described by Gupta (1981). Goff (1983) recorded *D. inermis* from Hawaii. Liang (1986) described *D. humuli* from China. Michocka (1987) reported *D. inermis* from Poland. Smiley (1992) transferred *Cunaxoides nicobarensis* to *Dactyloscirus* and described *D. masoni*, *D. johnstoni*, and *D. poppi*. Corpuz-Raros (1995) described *D. philippinensis*, *D. rosarioae*, and *D. agricolus*. Inayatullah and Shahid (1996) described *D. illutus*, *D. minys*, and *D. orsi*. Swift (1996) described *D. hoffmannae* and *D. smileyi* from the Hawaiian Islands. Hu (1997) reported *D. inermis* and *D. humuli* from China. Corpuz-Raros (2008) described *D. apoensis*, *D. discocondylus*, and *D. trifidus*.

Generic diagnosis. Palpi five segmented, extend beyond the subcapitulum by at least the last segment. They end in a strong claw, though the claw may be bifid or trifid. The palps are often adorned with an apophysis between the genua and tibiotarsi. Palp genual apophysis can be long or short and generally ends in a bulbous, hyaline tip; it can however end in a tapering point as in *Armascirus*. This apophysis can be approximately equal between males and females or can be shorter in males. Basifemora and telofemora are complemented with spine-like setae; these two segments are fused though a line remains visible and they can thus be differentiated.

Subcapitulum is complemented with six pairs of setae (hg_{1-4} and two pairs of adoral setae). It can be covered by integumental papillae that are either randomly distributed or form a polygonal, reticulated pattern.

Female dorsal idiosoma has at least one sclerotized plate that bears two pairs of setose sensillae (*ap* and *pt*) and two pairs of simple setae (*lps* and *mps*). 0–4 other major plates and platelets may also be present. All plates, if present, are covered by integumental papillae that form a reticulated pattern. The integument between the plates is striated. Seven pairs of setae (c_{1-2} , d_1-h_1) are present. Each seta, when not on a major plate or platelet, is born by a minute platelet that is only slightly larger than the setal socket. Cupule *im* is present, laterad or in the proximity of e_1 . Dorsal idiosoma of males is similar except a single large plate usually complemented with c_{1-2} , d_1-e_1 present (male *D. inermis* do not have c_2 on the plate).

Female ventral idiosoma complemented by coxal, genital and anal plates. Coxal plates reticulated in the same manner as the dorsal plates. Coxae I and II often fused; coxae III and IV often fused. Setal formula for coxae I–IV usually 3-3-3-3. Genital plates each bear four setae; two pairs of genital papillae visible underneath the plates. Anal plates bear one pair of setae (ps_1). Two pairs of setae (ps_2 and h_2) associated with, but do not occur on, the anal plates. Cupule *ih* present in close proximity to h_2 . Integument between plates striated and bears 5–7 pairs of additional setae. Ventral idiosoma of males similar, except coxal plates much more extensive. Sclerotized aedeagus sometimes visible in association with the genital plates.

Legs comparatively short, generally not exceeding $\frac{3}{4}$ the length of the body. Famulus on tarsi I enlarged and ends in a tri-tipped prong. Tarsi constricted apically, resulting in large tarsal lobes.

***Dactyloscirus pseudophilippinensis* Skvarla & Dowling sp. nov.**

(Figs. 21–23)

Diagnosis. *Dactyloscirus pseudophilippinensis* most closely resembles *D. philippinensis* in possessing a median shield and lateral platelets and having a single distally pointed apophysis adjoining the palpal genu and tibiotarsus. The apophysis on the palp basifemur is also very short and inconspicuous and blunted distally. *Dactyloscirus pseudophilippinensis* can be distinguished from *D. philippinensis* based on the following setal formulae: palp tibiotarsi with 5 sts instead of 4 sts; leg basifemora 5-5-3-2 sts instead of 5-5-3-1 sts.

Female. Idiosoma 388–513 (433, n=4) long, 263–375 (320) wide.

Gnathasoma (Fig. 21). **Subcapitulum** (Fig. 21a) longer than $\frac{1}{2}$ the length of the idiosoma, 260–298 (278). 2 pairs of adoral setae present, the basal pair short and inconspicuous. Four pairs of setae (hg_{1-4}); hg_2 and hg_4 short, hg_1 2 times and hg_3 6 times as long as hg_2 and hg_4 (15, 7, 40, 8). **Palp** (Fig. 21b) 200–300 (269). Chaetotaxy: trochanter, absent; basifemur with 1 spls; telofemur with 1 spls and 1 apophysis which is short and blunt distally; genu with 4 sts and apophysis adjoining genu and tibiotarsus long and blunted distally, apically hyaline; tibiotarsus with 1 spls (small and inconspicuous), 1 dtsl and 3 sts (1 long, basal; 2 short on apical half). The tibiotarsus ends in a claw. **Chelicera** (Fig. 21c) 205–225 (216), elongate, slightly curved and reticulate basally.

Dorsum (Fig. 22a). Proterosomal shield present and reticulate. Two setose trichobothria (*ap* and *pt*) present on shield; 213–263 (229) and 233 (n=1), respectively. Two setae (*lps* and *mps*) also present on shield; 6–10 (8) and

12–17 (15), respectively. Hysterosomal (median) shield and lateral platelets present, reticulate. Setae c_1 , d_1 and e_1 on median shield; 11, 12 and 15, respectively. Setae c_2 , f_1 , h_1 born on minute sclerotized plates barely larger than setal socket; 9, 27 and 29, respectively. Cupule im present and laterad to e_1 . Integument striated.

Venter (Fig. 22b). Coxal plates I and II fused but retaining suture, without polygonal pattern. Coxal plates III and IV fused but retaining suture, with reticulate pattern. Coxae I–IV setal formula 3-3-3-3. 5 pairs of dorsal setae after coxae II (not including genital and anal setae). Genital plates weakly sclerotized and bearing four pairs of setae (g_{1-4}); $g_{1,2,3}$ arranged longitudinally, g_4 moved laterad of g_3 to distal edge of the plate. Two pairs of papillae visible under genital plates. Three pairs of setae on or adjacent to anal plates: 2 pseudanal setae (ps_{1-2}) and h_2 . Cupule ih present and laterad to ps_2 .

Legs (Fig. 23a–d). Legs I–IV shorter than body: 338–385 (364), 290–343 (311), 290–340 (322) and 338–388 (363), respectively. Chaetotaxy: trochanters I–IV, 1-1-2-1; basifemora I–IV, 5-5-3-2; telofemora I–IV, 5-5-4-4; genua I with 4 asl, 1 mst, 4 sts; genua II with 2 asl, 5 sts; genua III with 1 asl, 5 sts; genua IV with 2 asl, 5 sts; tibiae I with 2 asl, 1 mst, 4 sts; tibiae II with 1 asl, 5 sts; tibiae III with 1 bsl, 5 sts; tibiae IV with 1 T, 4 sts; tarsi I with 4 asl, 1 fam, 2 tsl, 15 sts; tarsi II with 1 asl, 1 tsl, 13 sts; tarsi III with 1 tsl, 17 sts; tarsi IV with 17 sts.

Male and developmental stages. Unknown

Etymology. This species is so named because it closely resembles *D. philippinensis*.

Material examined (3 individuals on slides). Female holotype (APGD 10-0726-006), ex. deciduous litter in grass on top of ridge, USA, Arkansas, Washington Co, Ozark National Forest, Weddington (36°06.322 N, 094°23.390 W), 26 July 2010, coll. M. J. Skvarla • 1 female paratype (APGD 10-0915-001), same locality, 15 Sept. 2010, coll. M. J. Skvarla • 1 female paratype (APGD 10-0730-006), ex. moist deciduous litter drifted against slope in creek bottom, USA, Arkansas, Newton Co, Buffalo National River, Steel Creek (36°02.016 N, 093°20.137 W), 30 July 2010, coll. M. J. Skvarla • 1 female paratype (APGD 11-0124-002), ex litter in creek/ bottomland, USA, Mississippi, Okitibbeha Co, Noxubee National Wildlife Refuge. 6 October 2008, coll. J. G. Hill.

Type deposition. Holotype and 2 female paratypes —ACUA; 1 female paratype—USNM; 1 female paratype—OSAL.

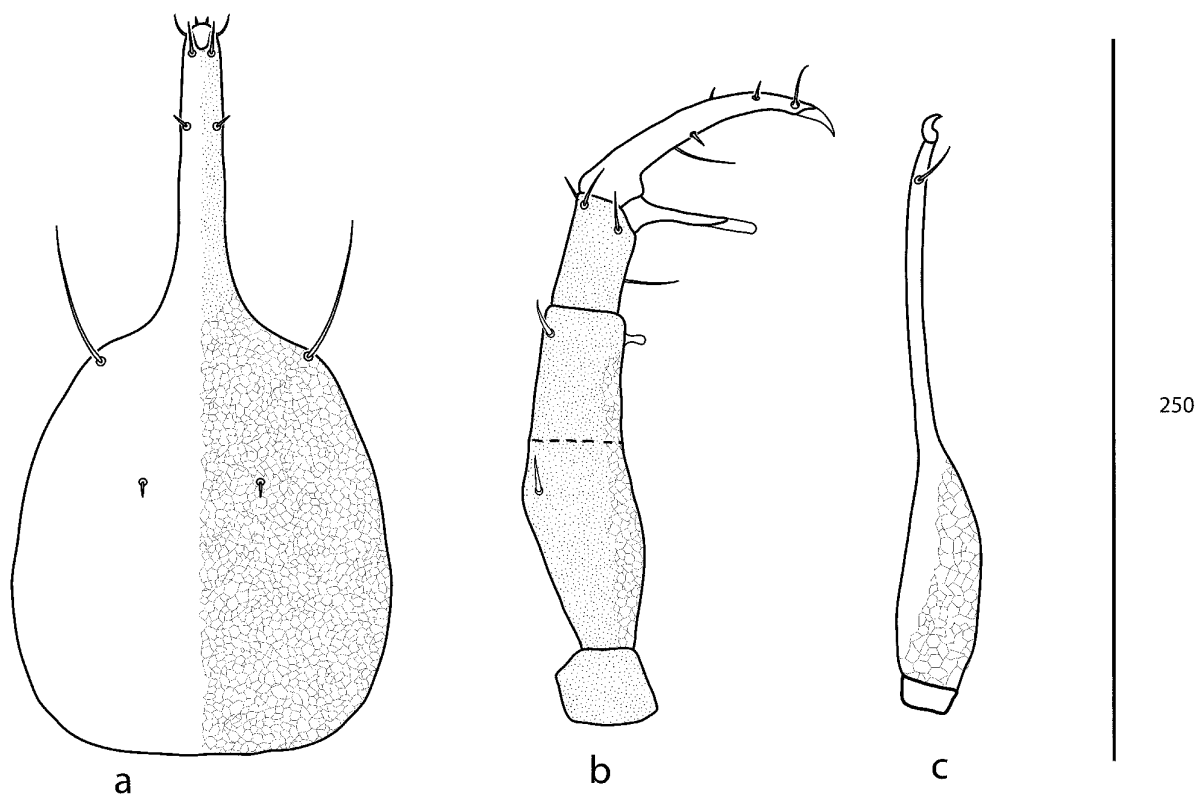


FIGURE 21. *Dactyloscirus pseudophilippinensis* sp. nov. Gnathosoma. **a**—Subcapitulum. **b**—Chelicera, dorsal. **c**—Palp, dorsal.

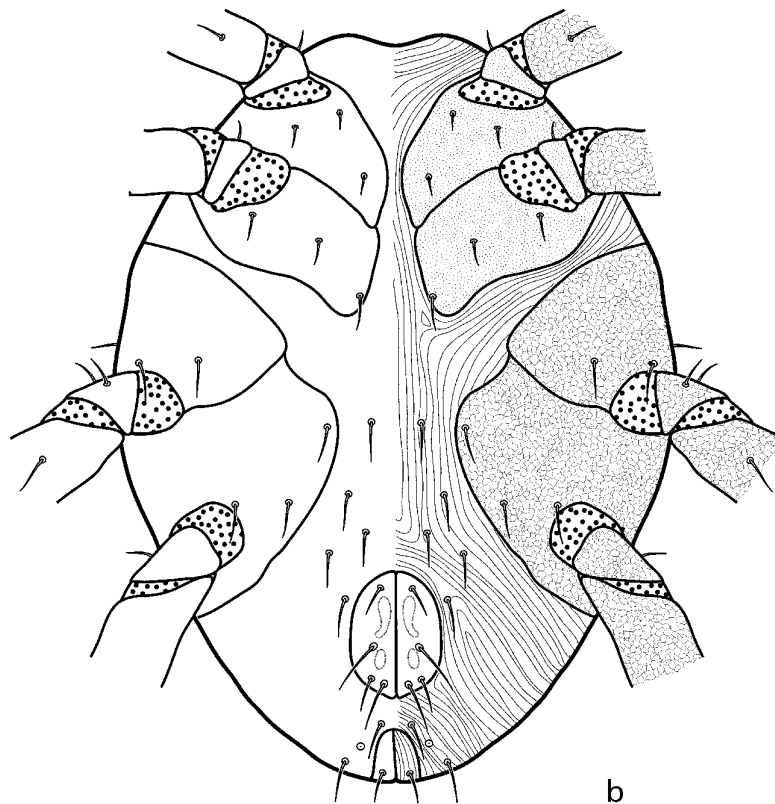
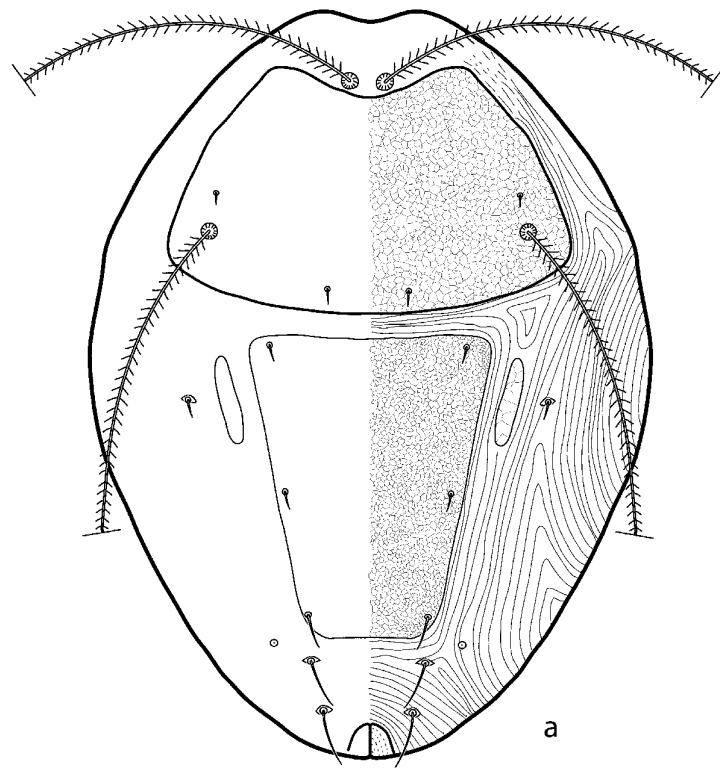


FIGURE 22. *Dactyloscirus pseudophilippinensis* sp. nov. Idiosoma. a—Dorsal. b—Ventral.

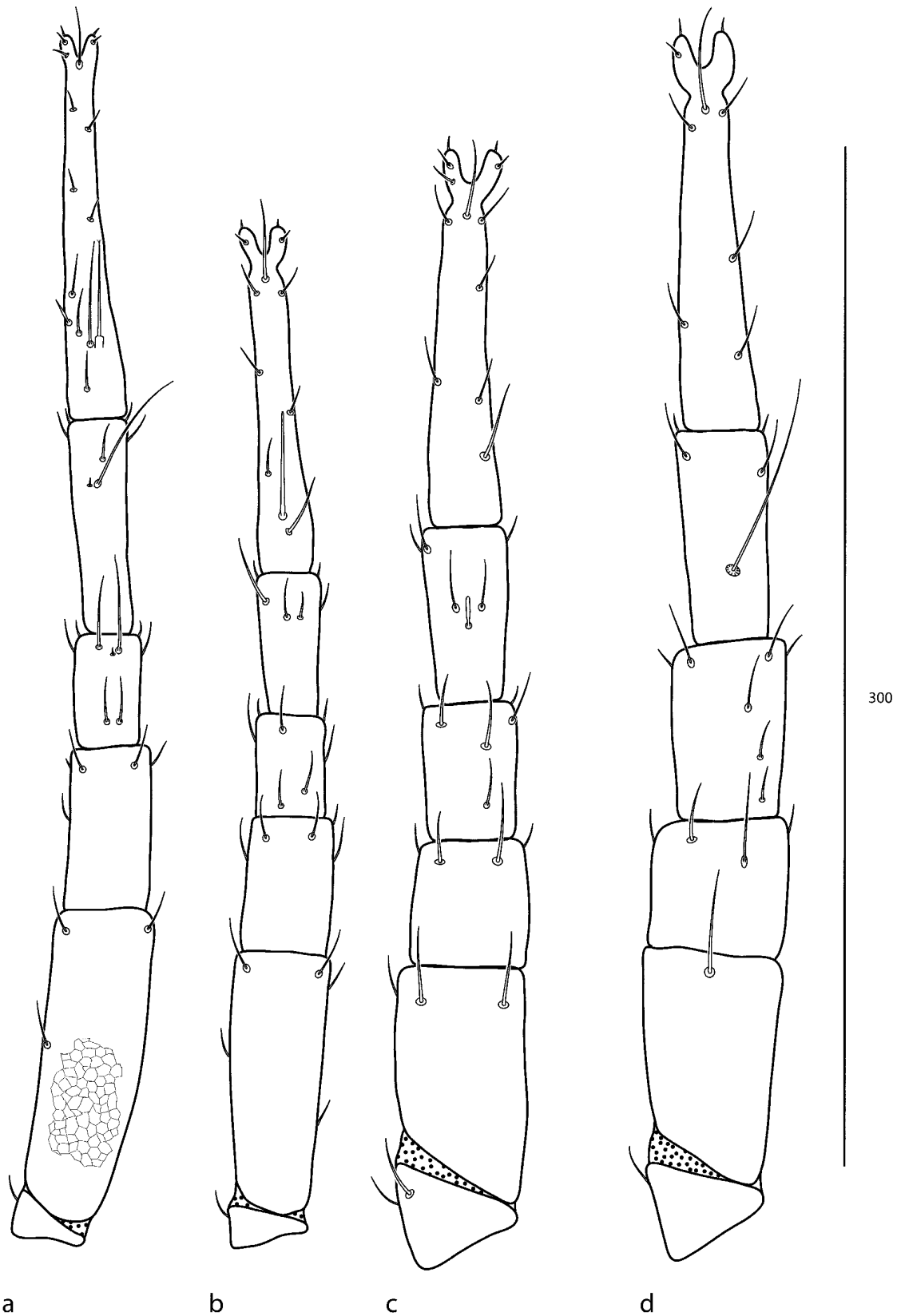


FIGURE 23. *Dactyloscirus pseudophilippinensis* sp. nov. Legs, dorsal. **a**—Leg I. **b**—Leg II. **c**—Leg III. **d**—Leg IV.

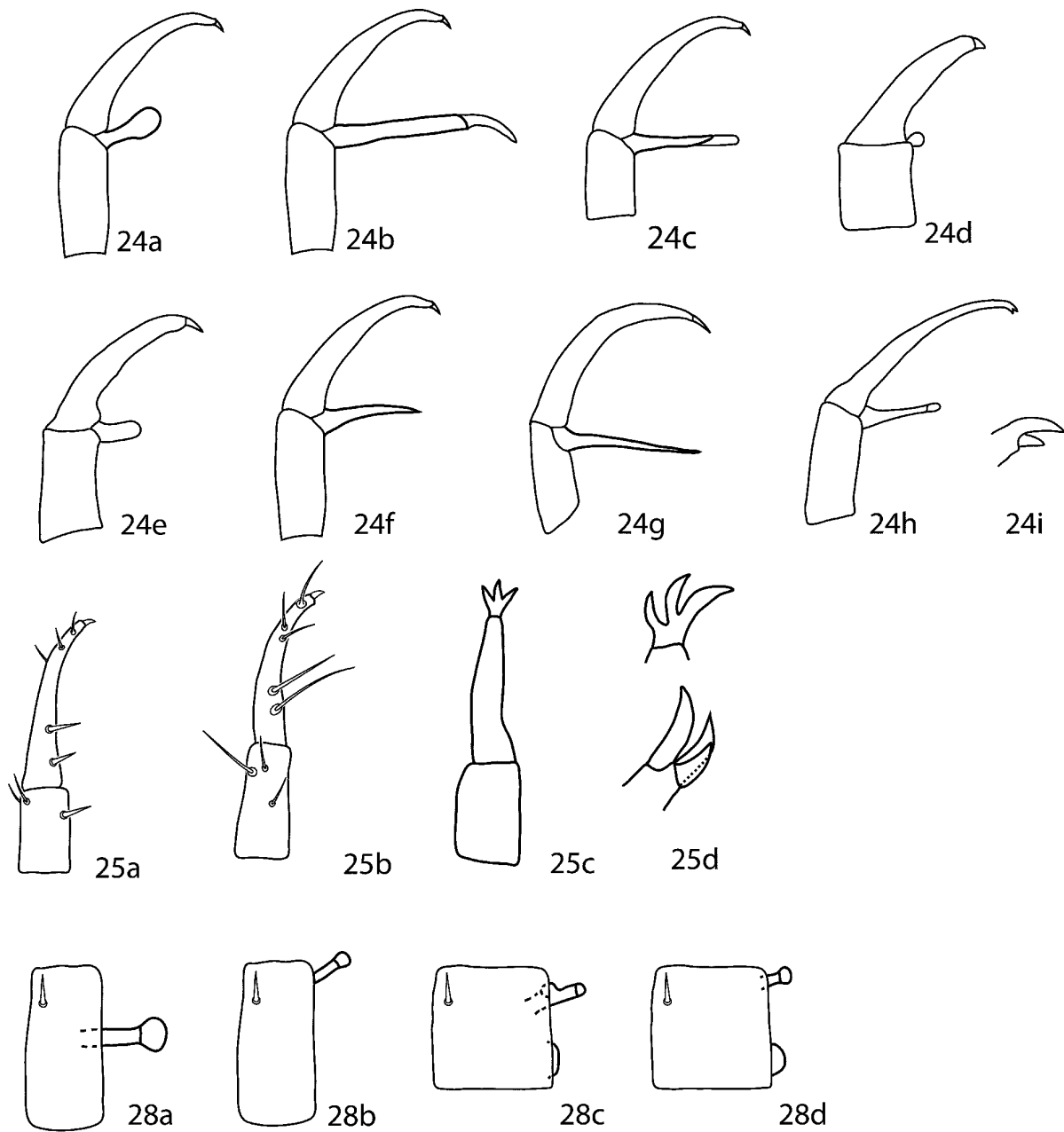


FIGURE 24. Examples of the variation in the apophysis adjacent to the palpal genua and tibiotarsi. **24h**—Palp with a bifid claw. **24i**—Close up of a bifid palp claw.

FIGURE 25. Examples of palps in which the apophysis adjacent to the genua and tibiotarsi is absent. **25a**—*D. orsi*. **25b**—*D. nicobarensis*. **25c**—*D. trifidus*. **25d**—*D. trifidus*, close up of trifid claw.

FIGURE 26. Examples in which the lateral platelets are present.

FIGURE 27. Examples in which the lateral platelets are absent. **27c**—Redrawn from Gupta (1981), in which setae c_2 appear to be missing.

FIGURE 28. Examples of the apophysis/apophyses that occur on the palpal telofemora.

Dactyloscirus dolichosetosus Den Heyer, 1979

Dactyloscirus dolichosetosus Den Heyer, 1979b: 96, figs. 71–77; Sepasgosarian 1984: 141; Smiley 1992: 223, figs. 117A, B. Castro 2008: 91.

Dactyloscirus dolichosetosies Den Heyer 1979b: 96

Diagnosis. *Dactyloscirus dolichosetosus* resembles *D. humuli*, *D. smileyi* and *D. condylus* in that it possesses long lateral platelets but lacks a median shield. It can be distinguished from *D. humuli* and *D. smileyi* by the length of setae f_1 and h_1 ; f_1 is shorter than h_1 in *D. humuli* and *D. smileyi* but equal in length in *D. dolichosetosus*. *Dactyloscirus dolichosetosus* possesses one telofemoral apophysis whereas *D. condylus* possesses a second flattened apophysis basally.

Remarks. Until recently this species was reported only from South Africa by Den Heyer (1979). The range expansion presented here, combined with Castro (2008) who reported it from Brazil, suggest it may have a much wider, possibly cosmopolitan, range. Den Heyer (1979) provides an abundance of illustrations and SEM images.

Material examined (17 individuals on slides). 2 females, ex litter, USA, Mississippi, Lee Co, Natchez Trace mi 260 (34°08.083 N, 068°50.250 W), 16 June 2009, coll. J. G. Hill. APGD 10-0119-001 • 1 female (APGD 10-0205-002), ex litter, USA, Mississippi, Lee Co, Natchez Trace mi 260 (34°07.800 N, 068°50.300 W), 16 June 2009, coll. J. G. Hill • 1 female (Chickasaw VIII B), same data • 3 females (APGD 10-1008-001), ex sycamore (*Platanus occidentalis*) litter on stable island in creek, USA, Arkansas, Newton Co, Buffalo National River, Steel Creek (36°02.259 N, 093°20.880 W), 8 October 2010, coll. M. J. Skvarla • 1 female (APGD 10-1008-005), ex saturated moss along creek bank, same data • 1 female (APGD 10-1010-001), ex moss along creek bank, same locality, (36°02.016 N, 093°20.137 W), 10 October 2010, coll. M. J. Skvarla • 5 females (APGD 10-0725-003), ex maple (*Acer* sp.) litter drift against small log in secondary forest, USA, Pennsylvania, Westmoreland Co, Irwin, Paintertown (40°22.183 N, 079°41.917 W), 19 July 2010, coll. M. J. Skvarla • 1 female (APGD 10-1002-003), same data, 2 October 2010, coll. M. J. Skvarla • 1 female (APGD 10-0826-003), USA, Pennsylvania, Somerset Co, Laurel Hill State Park, nr. Eberly Scout Reservation (40°00.963 N, 079°14.233 W), 26 August 2010, coll. M. J. Skvarla • 1 tritonymph (APGD 10-0609-004), pitfall in oak and juniper scrub, Missouri, Taney Co, Mark Twain National Forest, Hercules Glades (36°41.196 N, 092°58.263), 09 June 2010, coll. J. R. Fisher and M. J. Skvarla.

Key to female *Dactyloscirus*

The following key, based on one presented by Smiley (1992), has been modified and illustrated to reduce ambiguous characters. The following species, in addition to those newly described in this work, have been included for completeness: *Dactyloscirus philippinensis*, *D. trifidus*, *D. orsi*, *D. minys*, *D. dicondylus*, *D. agricolus*, *D. rosarioae*, *D. bifidus*, *D. illutus*, *D. smileyi* and *D. hoffmannae*.

| | | |
|----|--|--|
| 1 | Palpal tibiotarsi and genua with adjoining apophyses (Fig. 24a–h) | 2 |
| - | Palpal tibiotarsi and genua without adjoining apophyses (Fig. 28a–d) | 19 |
| 2 | Dorsal hysterosomal lateral platelets present (Fig. 26a–d) | 3 |
| - | Dorsal hysterosomal lateral platelets absent (Fig. 27a–f) | 11 |
| 3 | Palp telofemora with one or two apophyses (Fig. 28a–d) | 4 |
| - | Palp telofemora without an apophysis | <i>D. poppi</i> |
| 4 | Palpal telofemora with 1 apophysis (Fig. 28a, b) | 5 |
| - | Palpal telofemora with 2 apophyses: 1 basal, flattened and disc-shaped, 1 apical, short, thick and bulbous (Fig. 28c) | <i>D. condylus</i> |
| 5 | Lateral platelets inconspicuous, length less than 2 times the length of c_1 or c_2 ; cosmopolitan (Fig. 26a) | <i>D. inermis</i> |
| - | Lateral platelets large, length greater than 2 times the length of c_1 or c_2 (Fig. 26b–d) | 6 |
| 6 | Setae f_1 and h_1 equal in length; median shield present (Fig. 26b, c) or absent (Fig. 26d) | 7 |
| - | Setae f_1 shorter than h_1 ; median shield absent (Fig. 26d) | 9 |
| 7 | Apophysis adjoining palpal genua and telofemora as long or longer than length of genu, blunt or pointed distally (Fig. 24b,c); median shield present (Fig. 26b, c) | 8 |
| - | Apophysis adjoining palpal genua and telofemora shorter than length of genu, blunt distally (Fig. 24a); median shield absent (Fig. 26d) | <i>D. dolichosetosus</i> |
| 8 | Apophysis adjoining palpal genua and telofemora pointed distally (Fig. 24b); palp tibiotarsi with 4 sts; median shield complemented with setae $c_1, d_1; e_1$ on small platelets (Fig. 26b); leg basifemora IV with 1 sts | <i>D. philippinensis</i> |
| - | Apophysis adjoining palpal genua and telofemora blunted distally (Fig. 24c); setae c_1-e_1 on median shield (Fig. 26c); palp tibiotarsi with 5 sts; leg basifemora IV with 2 sts | <i>D. pseudophilippinensis</i> sp. nov |
| 9 | Apophysis adjoining palpal genua and telofemora inconspicuous: circular, minute and hyaline (Fig. 24d) | <i>D. hoffmannae</i> |
| - | Apophysis adjoining palpal genua and telofemora conspicuous: short, blunt apically (Fig. 24e) | 10 |
| 10 | Genital setae g_3 longest, 1.5–1.7 times the length of g_2 and g_4 , more than 2 times the length of g_1 | <i>D. smileyi</i> |
| - | Genital setae g_4 longest, 2 times the length of g_{1-3} | <i>D. humuli</i> |

| | | |
|----|---|----------------------------|
| 11 | Dorsal hysterosomal median shield present (Fig. 27a–e) | 12 |
| - | Dorsal hysterosomal median shield absent (Fig. 27f) | 15 |
| 12 | Median shield complemented with d_1 only (Fig. 27a) | <i>D. fixus</i> |
| - | Median shield complemented with 2 or more pairs of setae (Fig. 27b–e) | 13 |
| 13 | Median shield complemented with c_1, d_1 (Fig. 27b); apophysis adjacent to palpal genua and tibiotarsi blunt distally (Fig. 24c) | <i>D. mansoni</i> |
| - | Median shield complemented with c_1-e_1 (Fig. 27c, d); apophysis adjacent to palpal genua and tibiotarsi blunt or pointed distally | 14 |
| - | Median shield complemented with c_1-e_1, c_2 (Fig. 27e); apophysis adjacent to palpal genua and tibiotarsi pointed distally (Fig. 24f) | <i>D. illutus</i> |
| 14 | Apophysis adjacent to palpal genua and tibiotarsi blunt distally (Fig. 24e); median shield triangular and nearly as wide as proterosomal shield (Fig. 27c) | <i>D. pataliputraensis</i> |
| - | Apophysis adjacent to palpal genua and tibiotarsi tapering and pointed distally (Fig. 24f); median shield subrectangular and not as wide as proterosomal shield (Fig. 27d) | <i>D. johnstoni</i> |
| 15 | Palp tibiotarsal claw entire, not branched (Fig. 24a–g) | 16 |
| - | Palp tibiotarsal claw bifid (Fig. 24h, i) | <i>D. bifidus</i> |
| 16 | Palpal telofemora without apophysis (Fig. 24g); apophysis adjoining palpal genua and telofemora longer than telofemora and tapering to a point | <i>D. machairodus</i> |
| - | Palpal telofemora with 1 or 2 apophyses (Fig. 28a–d); apophysis adjoining palpal genu and telofemur shorter than telofemora and with a bulbus tip (Fig. 25a, d) | 17 |
| 17 | Palpal telofemora with 1 apical apophysis (Fig. 28a, b); apophysis adjoining genua and tibiotarsi larger (Fig. 24a) | 18 |
| - | Palpal telofemora inner surface with 2 apophyses: 1 basal, flattened and disc-shaped, 1 apical, short, thick and bulbus (Fig. 28d); apophysis adjoining genua and tibiotarsi small, inconspicuous (Fig. 24d) | <i>D. discondylus</i> |
| 18 | Basal pair of adoral setae on hypostome very long, more than 4 times the distal pair; palp telofemoral apophysis about as long as width of segment (Fig. 28a); genital setae g_4 twice as long as g_1-g_3 | <i>D. rosarioae</i> |
| - | Basal pair of adoral setae not unusually long, subequal to distal pair; palp telofemoral apophysis short, less than width of segment (Fig. 28b); genital setae g_4 only slightly longer than g_1-g_3 | <i>D. agricolus</i> |
| 19 | Median shield present (Fig. 27d, e) | 20 |
| - | Median shield absent (Fig. 27f) | 21 |
| 20 | Median shield complimented with c_1-e_1 (Fig. 27d) | <i>D. eupaloides</i> |
| - | Median shield complimented with with c_1-e_1, c_2 (Fig. 27e) | <i>D. minys</i> |
| 20 | Palp tibiotarsal claw entire, unbranched (Fig. 25a, b); coxal setal formula 3-1-3-2 sts or 3-2-2-1 sts | 21 |
| - | Palp tibiotarsal claw trifid (Fig. 25c, d); coxal setal formula 3-3-3-3 sts | <i>D. trifidus</i> |
| 21 | Palp setal formulae: genua, 1 spls, 2 sts; tibiotarsi, 1 spls, 1 spur-like setae, 1 dtsl, 3 sts (Fig. 25a); coxal setal formula 3-1-3-2 sts | <i>D. orsi</i> |
| - | Palp setal formulae: genua, 3 sts; tibiotarsi, 1 dtsl, 4 sts (Fig. 25b); coxal setal formula 3-2-2-1 | <i>D. nicobarensis</i> |

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