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New records of the genus *Bryobia* (Acari: Tetranychidae) from Syria with description of a new species

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Original research

ABSTRACT

Three species of Tetranychidae belonging to the genus *Bryobia* were collected from Latakia governorate, Syria in 2019: *Bryobia* (*Allobia*) *syriensis* **n. sp.** collected from *Salvia verbenaca* L., is described; *Bryobia* (*Allobia*) *nikitensis* and *Bryobia* (*Bryobia*) *gigas* collected from *S. verbenaca* and from soil litter, respectively, are reported. New observations of *Bryobia* specimens previously reported from the same governorate during 2014-2016 revealed that specimens of *Bryobia* (*Bryobia*) *watersi* were misidentified as *Bryobia* (*Bryobia*) *graminum* and *Bryobia* (*Bryobia*) *kissophila*. Among them, we found two aberrant females bearing three propodosomal lobes. By analogy, we discussed the cases of the trilobed species, *Bryobia bakeri* and *Bryobia aegyptiacus*, and concluded that they could be teratological forms of quadrilobed *Bryobia* species rather than species with a particular pattern of propodosomal lobes.

Keywords Tetranychid mite; bryobiine mite; new species; new records
Zoobank http://zoobank.org/26A372EC-4BD0-40AB-AA7C-F98BF94299FA

Introduction

Among the spider mite family, the genus *Bryobia* is the fourth largest genus in terms of species (Migeon and Dorkeld, 2019) and since the revision of the genus *Pseudobryobia* by Arabuli *et al*. (2019), it contains 143 taxa.

Several species belonging to this genus are worldwide distributed, polyphagous, and could be distinctly economically injurious to crops (Vacante, 2010). To date, seven species of the genus *Bryobia* are known from Syria: *Bryobia* (*Allobia*) *nikitensis* (Livshits and Mitrofanov), *Bryobia* (*Bryobia*) *gigas* Auger *et al*., *B*. (*B*.) *graminum* (Schrank), *B*. (*B*.) *kissophila* Eyndhoven, *B*. (*B*.) *praetiosa* Koch, *B*. (*B*.) *vasiljevi* Reck and *B*. (*Lyobia*) *rubrioculus* (Scheuten) (El-Hariri, 1968; Barbar, 2014, 2018; Zeity, 2017; Zeity and Srinivasa, 2019; Zriki *et al*., 2015). However, some specimens of this genus collected during 2014–2016 still remained unidentified (of which two specimens bearing only three propodosomal lobes each with one seta) and those of *B*. (*B*.) *graminum* and *B*. (*B*.) *kissophila* seem to be misidentified as the identification was based only on morphological characteristics of adult females (Barbar, 2014, 2018).

The aims of the current paper are to present the results of some field samplings of *Bryobia* species undertaken in Latakia governorate in 2019 and to re-examine all specimens of this genus collected in the same governorate over the period 2014–2016 and reported by Barbar (2014, 2018).

The description of a new species of *Bryobia* is provided. A new record, new host plants and the cases of misidentifications are reported. Finally, the observation of unusual *Bryobia* specimens' prodorsal lobes lead us to discuss the identity of *Bryobia bakeri* (Zaher, Gomaa and El-Enany, 1982) and *Bryobia aegyptiacus* (Zaher, Gomaa and El-Enany, 1982).

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Materials and methods

Field sampling

Samplings of tetranychid fauna were conducted in Latakia governorate in April and June, 2019. Mites were collected from soil litter and from leaves of common weed species within a small forest (about six hectares, 57 m above the sea level) of *Pinus halepensis* Mill. located at Attabiyyat (35°30'24" N, 35°46'49" E) in the south-western Latakia city, Syria. Mites were removed from leaves using the "dipping-checking-washing-filtering" method (Boller, 1984). For collecting mites from litter, materials were placed on a sieve (25 cm Ø x 10 cm; its screen with 5 mesh/cm) and shaken over a black plastic sheet (1.5 m^2). Collected mites were cleared in lactic acid for 48 hours, mounted on slides in Hoyer's medium, and then dried in an oven at 40 °C for three days.

Mite observation and description

The specimens were examined using an Olympus® CH20 microscope. Measurements were realized using the scale of a reticle installed on the eyepiece lens. Mite body parts of specimens were pictured using a mobile phone camera (13 megapixels) fixed on the eyepiece lens and images were transferred to the professional quality vector graphics software Inkscape ® 0.92 installed on a computer for drawing with the aid of the computer's mouse.

All measurements are given in micrometers (µm) and the setal nomenclature used in the description follows Lindquist (1985). The holotype measurements are followed by measurements of the range of paratypes in parentheses. In addition to the key body measurements such as the distance between setae v_2 and setae h_1 and members of setae sc_2 (Saito *et al*., 1999), body length representing the distance between the tip of palps to the end of idiosoma and body width representing the widest transverse part of the hysterosoma, are also provided. The distance between two setae was measured as the distance from the center of one setal base to the other. Legs were measured from coxae to the distal margin of tarsi (excluding claws and empodia). Leg setal counts are given in the order: coxa-trochanter-femur-genu-tibia-tarsus. Numbers of setae refer to tactile setae, solenidia are given in parentheses and alternative counts are given in brackets. When asymmetry in number of setae on a leg segment was present, only the maximal number was considered.

Systematics

Family Tetranychidae Donnadieu, 1875

Subfamily Bryobiinae Berlese, 1913

Tribe Bryobiini Reck, 1952

Genus *Bryobia* Koch, 1836

Bryobia (*Allobia*) *nikitensis* Livshits and Mitrofanov, 1969

Two female specimens of this species were recorded on a new host plant: it was found on *Salvia verbenaca* L., Attabiyyat, south-west of Latakia city, Syria (35°30'24" N, 35°46'49" E, 23 April 2019). This species has been previously collected from *Sarcopoterium spinosum* (L.) in Syria (Barbar, 2018; Zeity and Srinivasa, 2019).

Bryobia (*Allobia*) *syriensis* n. sp.

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Figures 1–10

Type material — Holotype (female), 23 female and 2 male paratypes on 10 microscopic preparations, from *S. verbenaca*, Attabiyyat, south-west of Latakia city, Syria (35°30'24"

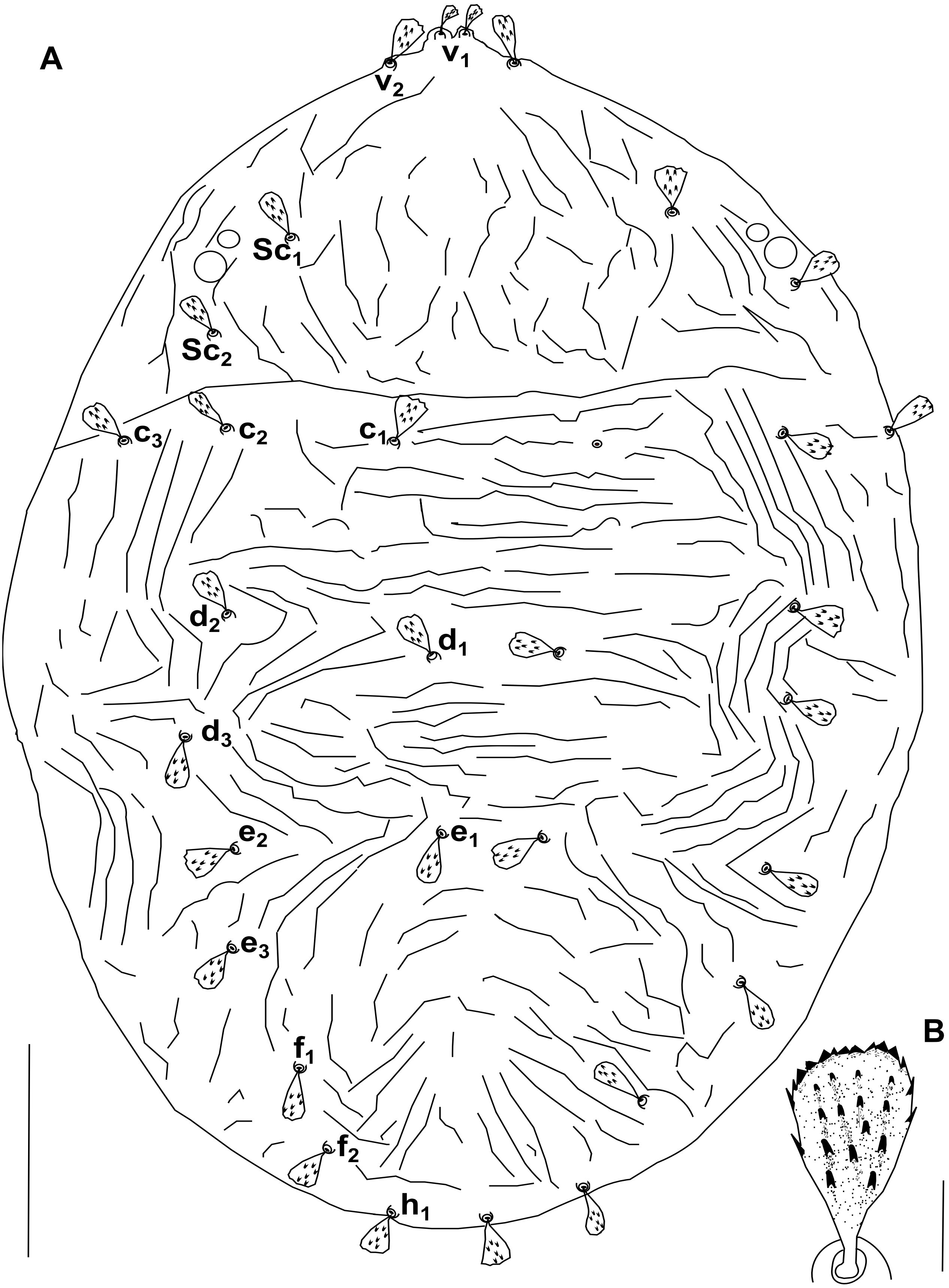

Figure 1 *Bryobia syriensis* **n. sp.**, female: A – dorsal aspect; B – dorsal seta c_1. Scale bars = 100 μm (A), 10 μm (B).

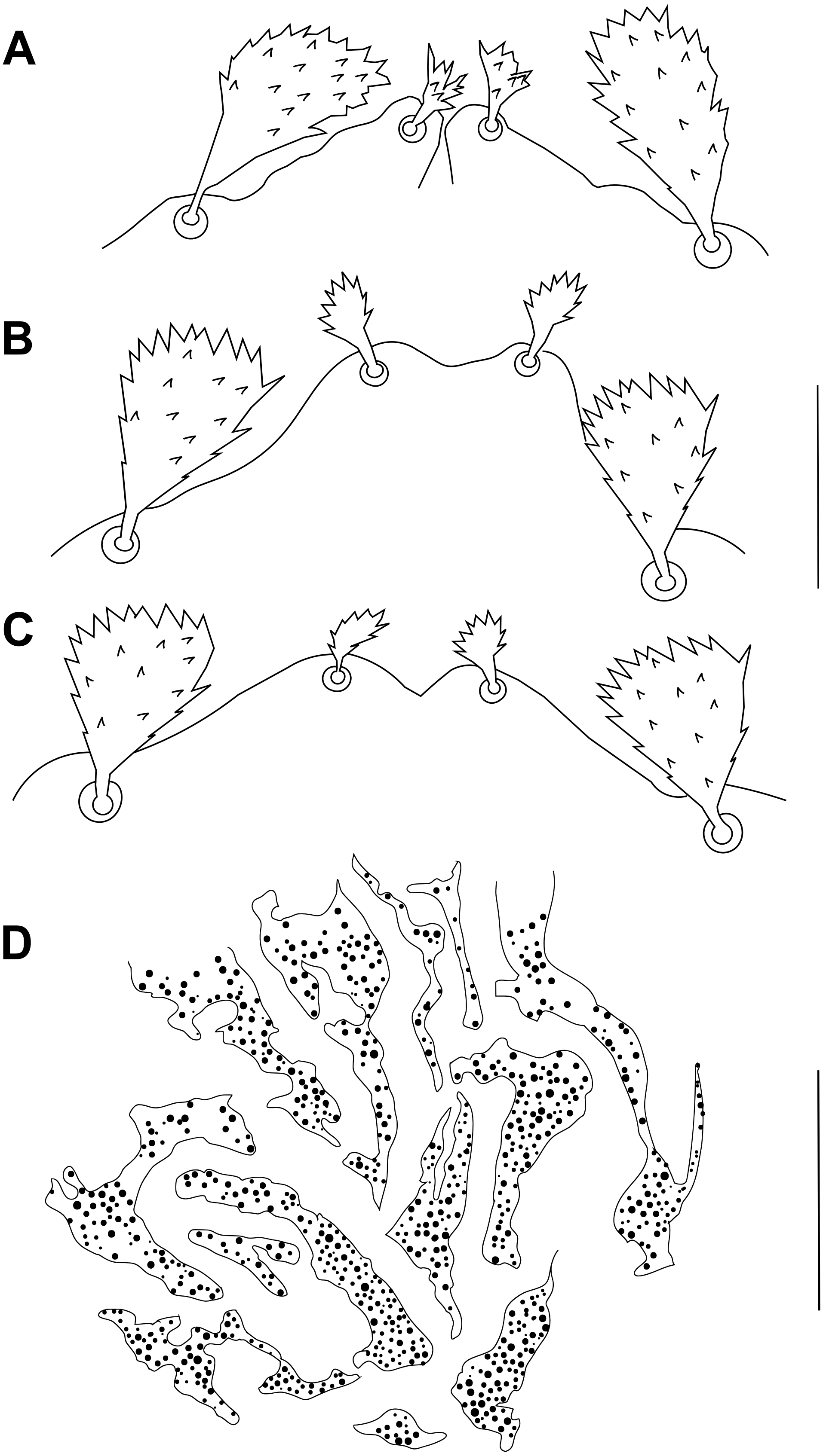

Figure 2 *Bryobia syriensis* **n. sp.**, female: A, B, C – variation in propodosomal lobes; D – detail of the prodorsal striation of the area immediately anterior to setae c_1. Scale bars = 20 µm (A, B, C), 30 µm (D).

N, 35°46’49” E), 23 April and 2 June, 2019, coll. Z. Barbar. The holotype and paratypes are deposited in the Arthropod Collection of the Department of Plant Protection, Faculty of Agriculture, Albaath University, Homs, Syria.

Diagnosis — This species belongs to *Bryobia* (*Allobia*) Livshitz and Mitrofanov (1971) which is characterized by the following: propodosomal lobes absent or poorly developed, if present, outer and inner lobes not separated by deep incision; distance between f_1 members longer than distance between f_2 members; f_1 and f_2 well separated laterally. It can be distinguished from others *Byrobia* species by a combination of the following characteristics: females with weakly developed median propodosomal lobes with small and shallow incision, outer lobes reduced to very small tubercles; setae v_2 about twice as long as setae v_1; dorsal body setae short, spatulate, serrate and inserted in small tubercles; peritreme ends in a tiny anastomosis consisting of 3–4 loges; tarsus III with tactile seta and solenidion subequal in length forming duplex; tarsus IV with solenidion well-separated from tactile, proximal, about 3/4 the length of tactile; leg I shorter than body length, empodial claws I-IV uncinate, each with one pair of tenent hairs; empodium I with one pair of tenent hairs and empodia II-IV with two rows of tenent hairs.

Female description — (n = 24). Relatively small, 548 (488–548) long excluding gnathosoma, 663 (575–663) including gnathosoma, and 384 (327–384) wide.

Dorsum – Prodorsum with four pairs of setae (Figure 1A); median propodosomal lobes weakly developed with fused base (variations in propodosomal lobes due to mounting are presented in Figure 2A-C); outer propodosomal lobes reduced to small tubercles; setae v_2 about twice as long as setae v_1 (Figure 2). Distance between members of first (v_1) and second (v_2) pair of propodosomal setae insertions 10 (8–12) and 47 (45–50), respectively. Dorsal body setae short, spatulate and serrate, 12–17 width, subequal in length except for v_1 far smaller, inserted on small tubercles (Figure 1B). Measurements of dorsal setae: v_1 11 (10–11); v_2 23 (22–26); sc_1 21 (21–25); sc_2 23 (21–25); c_1 25 (23–29); c_2 23 (21–26); c_3 23 (21–25); d_1 23 (21–25); d_2 23 (21–25); d_3 23 (21–23); e_1 23 (21–23); e_2 23 (21–23); e_3 23 (21–23); f_1 23 (21–25); f_2 21 (21–23); h_1 18 (18–23). Distances between setae: sc_2–sc_2 237 (202–237), c_1–c_1 83 (64–83), d_1–d_1 60 (55–64), e_1–e_1 51 (41–51), f_1–f_1 148 (126–148), f_2–f_2 115 (110–115), h_1–h_1 46 (40–50), c_1–d_1 101 (81–101), d_1–e_1 81 (69–81), v_2–h_1 535 (470–535). Setae f_1 and f_2 lateral, distance between f_1 members larger than between f_2 members. Dorsal body surface granulated with longitudinal and irregular folds on propodosoma (Figure 2D) and with transverse spaced granulate striae on medial hysterosoma irregularly arched posteriorly (Figure 1).

Gnathosoma – Stylophore slightly notched anteriorly, longer than wide (Figure 3A). Tibial claw of palpus bidentate. Palptarsus smaller than tibial claw, with three tactile setae, three eupathidia and one solenidion; eupathidia and solenidion subequal in length (Figure 3B). Peritreme ends in a tiny bulbous anastomosis (about 7 in diameter) consisting of 3–4 loges (Figure 3C).

Venter – Striation transverse, sparse and broken between *1a* and *3a* pairs of setae, irregularly longitudinal, sparse and broken between *3a* and *4a* pairs of setae, transverse and broken between *4a* and aggenital (*ag*) pairs of setae, irregular in the area anterior to genital flap and longitudinal between (*ag*) setae. Genitoanal region with two pairs of genitals ($g_{1\text{-}2}$), three pairs of pseudanal ($ps_{1\text{-}3}$) and two pairs of ventrocaudal ($h_{2\text{-}3}$) setae. Sacculus of spermatheca elongate, with smooth surface, seems constricted in its distal third, 15 (15–16) long, 7 (6–7) wide (Figure 3D).

Legs – (Figures 4, 5, 6). Leg I shorter than body length, 389 (381–391) long, leg II 290 (253–290), leg III 290 (255–290), leg IV 306 (299–322). Length of segments of leg I as follows: trochanter 18 (18–24), femur 115 (108–115), genu 64 (57–69), tibia 74 (64–78), tarsus 69 (60–69). Leg setal counts as follows:

I: 2 – 1 – 14[15] – 8 – 13 + (1) – 18 + (3) + 2 duplexes
II: 1 – 1 – 10 – 5 – 9 – 15 + (1) + 1 duplex
III: 1 − 1 − 6 – 6 – 9 –14 + 1 duplex
IV: 1 – 1 – 5 – 6 – 9 − 14 + (1)

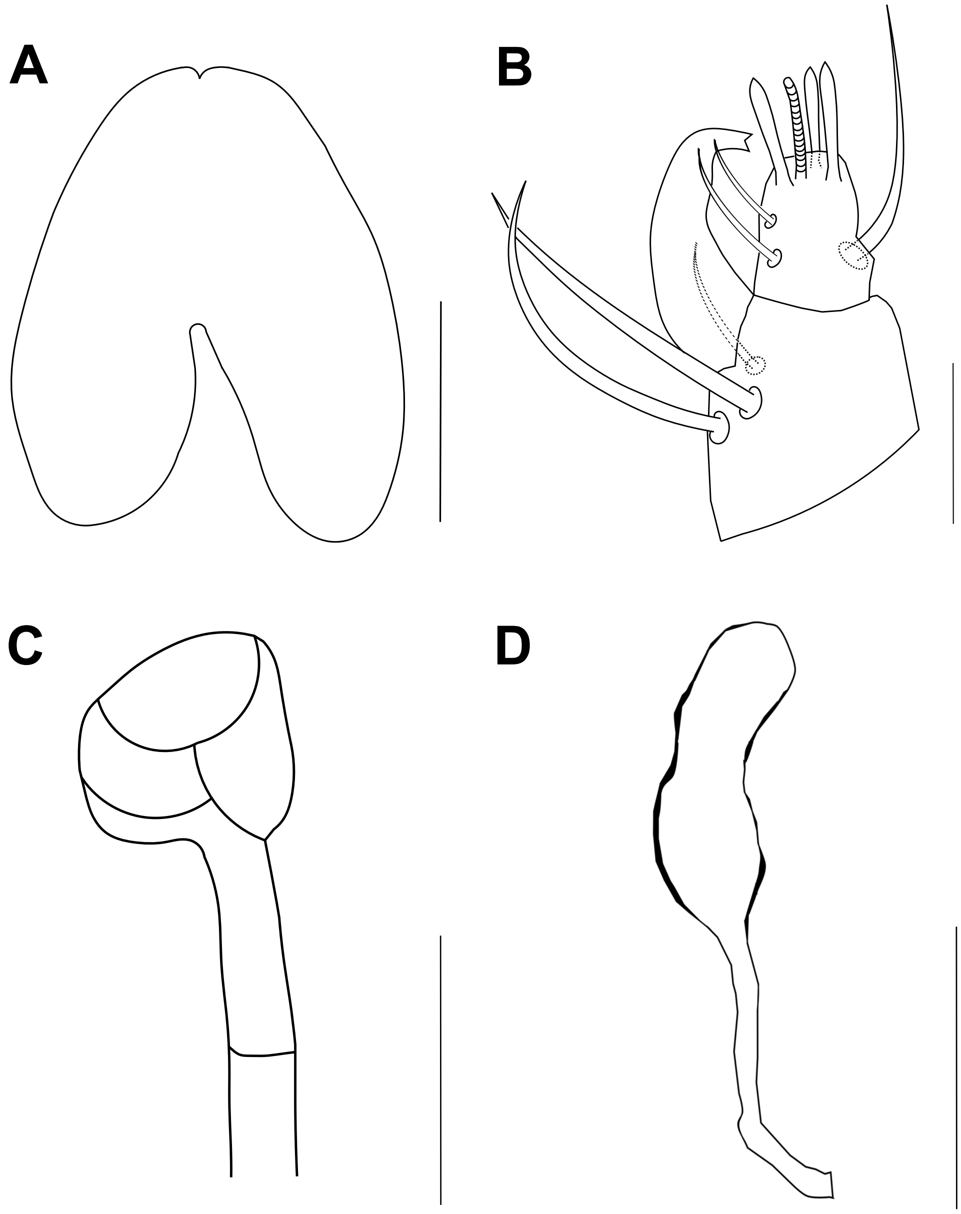

Figure 3 *Bryobia syriensis* **n. sp.**, female: A – stylophore; B – palpal tibia and tarsus; C – peritreme; D – spermatheca. Scale bars = 50 µm (A), 10 µm (B, C), 15 µm (D).

True claws uncinate, each with one pair of tenent hairs. Empodium I with one pair of tenent hairs, empodia II-IV each with two rows of tenent hairs (Figure 6A, B). Tarsus III associated tactile seta and solenidion forming duplex sub-equal in length (Figure 6C), on tarsus IV solenidion well-separated from tactile, proximal, about 3/4 the length of tactile (Figure 6D). Coxisternal setae *1b*, 44, smooth about twice as long as setae *1c*, 24, serrate (Figure 6E).

Male description — (n = 2). Small, 311–317 long excluding gnathosoma and 366–377 including gnathosoma, 207–210 wide.

Dorsum – Without prodorsal projections, setae v_1 and v_2 located on tiny tubercles (Figure 7A). Setae v_1 and v_2 short, subspatulate, serrate, v_2 twice as long as v_1 (Figure 8A). Distance between first (v_1) and second (v_2) pair of propodosomal setae insertions 14–18 and 54–56,

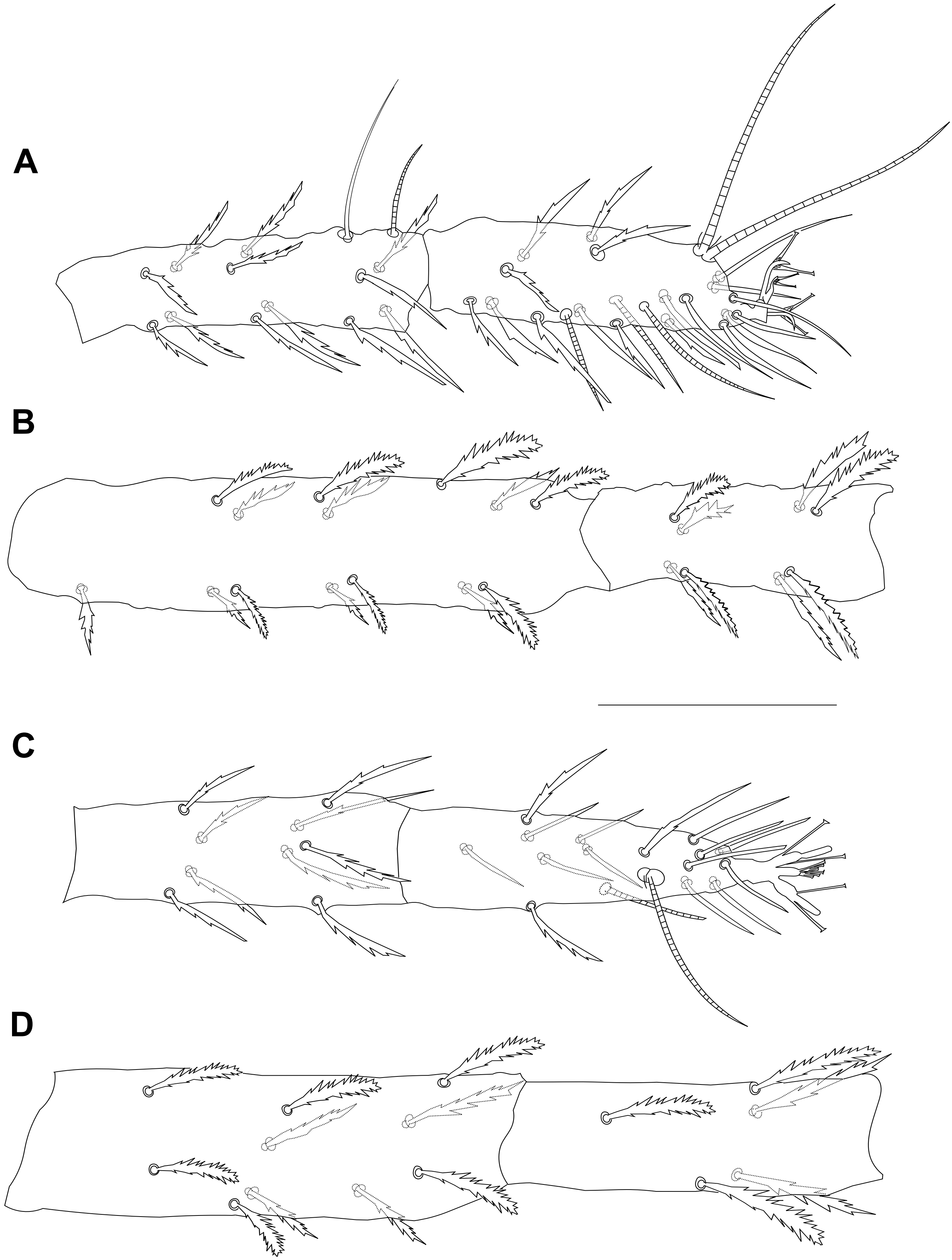

Figure 4 *Bryobia syriensis* **n. sp.**, female: A – tibia and tarsus I; B – femur and genu I; C – tibia and tarsus II; D – femur and genu II. Scale bar = 50 µm (A, B, C, D).

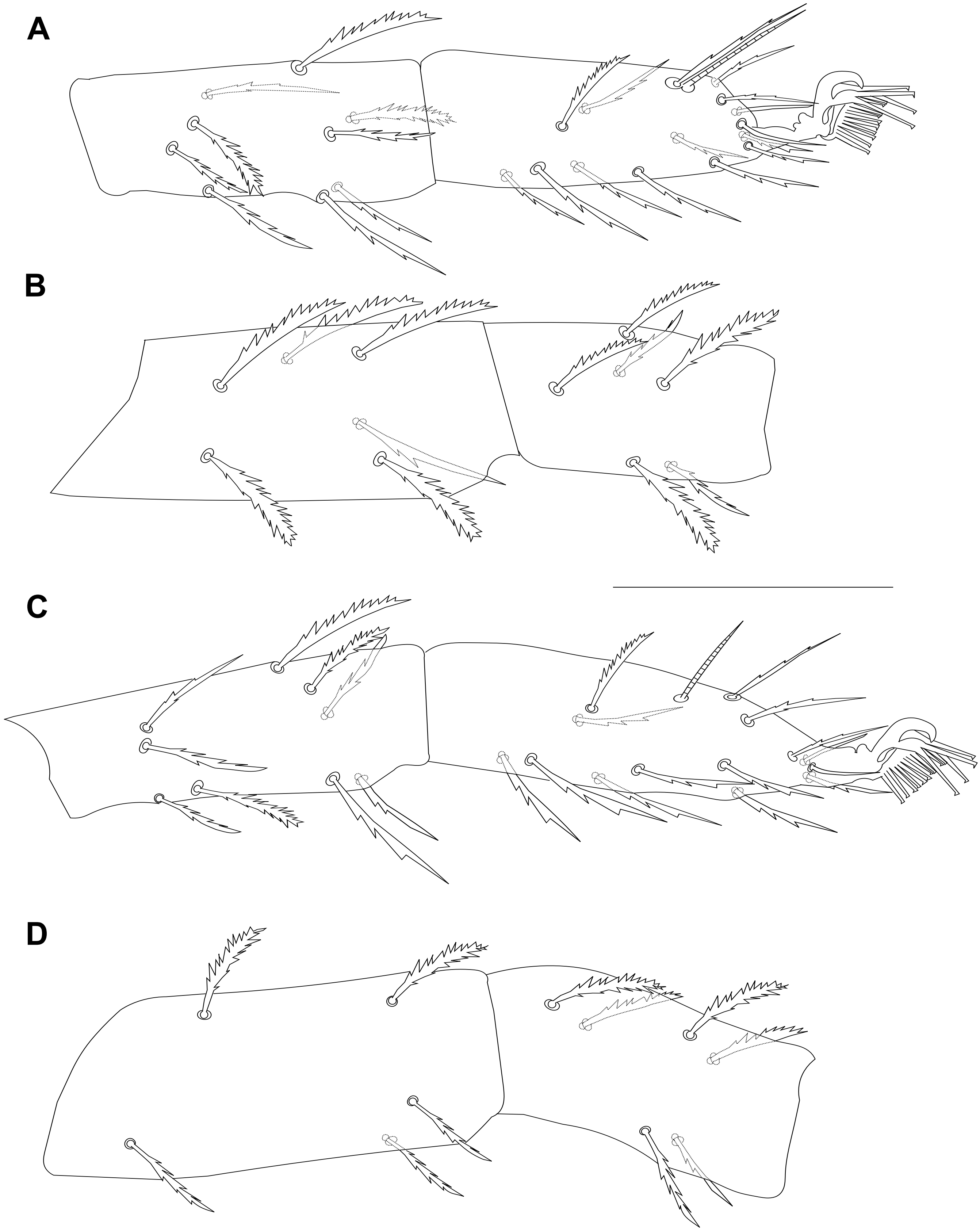

Figure 5 *Bryobia syriensis* **n. sp.**, female: A – tibia and tarsus III; B – femur and genu III; C – tibia and tarsus IV; D – femur and genu IV. Scale bar = 50 µm (A, B, C, D).

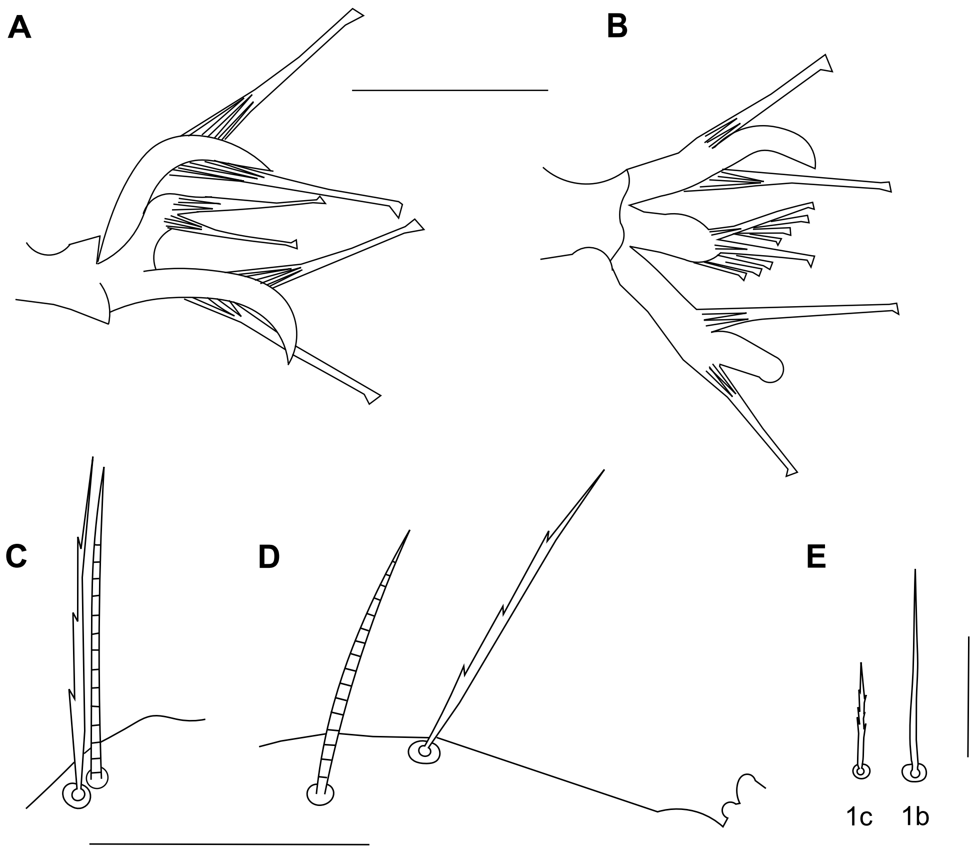

Figure 6 *Bryobia syriensis* **n. sp.**, female: A – claw and empodium I; B – claw and empodium II; C – duplex setae on tarsus III; D – solenidion and associated tactile seta on tarsus IV; E – coxisternal setae *1b* and *1c*. Scale bars = 10 µm (A, B), 20 µm (C, D), 25 µm (E).

respectively. Other dorsal body setae subequal in length, elongate subspatulate, enlarged distally (setae c_1 less enlarged), serrate, all inserted on tiny tubercles (Figure 7B, C). Dorsocentral setae (c_1, d_1 and e_1) shorter than distances between consecutive setae. Measurements of dorsal setae: v_1 7; v_2 14–15; sc_1 28; sc_2 28–32; c_1 30–35; c_2 30–35; c_3 28; d_1 28–30; d_2 28–30; d_3 28; e_1 30–32; e_2 30–32; e_3 28–30; f_1 25–30; f_2 30; h_1 23. Distances between setae: sc_2–sc_2 150–170, c_1–c_1 55–60, d_1–d_1 41–51, e_1–e_1 23–25, f_1–f_1 64–68, f_2–f_2 48–53, 64–68, h_1–h_1 20, c_1–d_1 44–48, d_1–e_1 39–46, v_2–h_1 274–304. Dorsal body surface granulate with few longitudinal and irregular folds on propodosoma, with transverse spaced striae on medial hysterosoma, and with arched striae on the surface between d_1–d_3 and e_1–e_3 (Figures 7A).

Gnathosoma – Stylophore slightly notched anteriorly, longer than wide, as in female. Tibial claw of palpus bidentate. Palptarsus as in female with solenidion shorter than eupathidia (Figure 8B). Peritreme ends in small bulb with four pointed denticles at its distal margin (Figure 8C).

Aeadeagus – Without knob, bent dorsad near at right angle, weakly sigmoid, with tapering distal part and acute tip pointing caudad, shaft dorsal margin curved (Figure 8D).

Legs – (Figures 9, 10). Leg I longer than body length 451 long, leg II 290–304, leg III 260–281, leg IV 288–304. Length of segments of leg I as follows: trochanter 18–23, femur 133–150, genu 69–76, tibia 81, tarsus 81. Leg setal counts as follows:

I: 2 – 1 – 14[15] – 8 – 13 + (1) – 18 + (8) + 2 duplexes

II: 1 – 1 – 10[11] – 6[5] – 9 – 15 + (1) + 1 duplex

III: 1 – 1 – 7 – 6 – 9 – 14 + 1 duplex

Figure 7 *Bryobia syriensis* **n. sp.**, male: A – dorsal aspect; B – dorsal seta c_1; C – dorsal seta e_1. Scale bars = 50 µm (A), 20 µm (B, C).

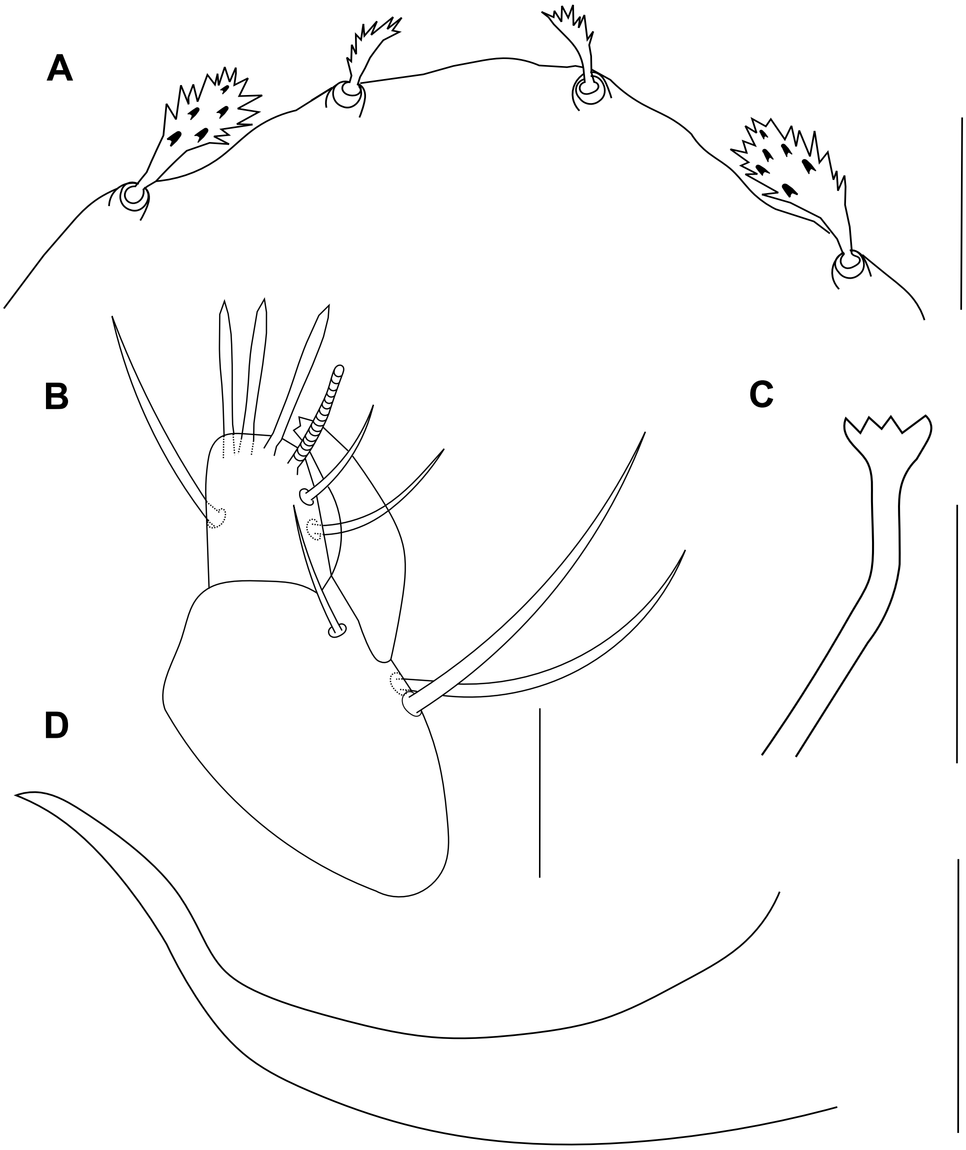

Figure 8 *Bryobia syriensis* **n. sp.**, male: A – propodosomal lobes; B – palpal tibia and tarsus; C – peritreme; D – aeadeagus. Scale bars = 20 µm (A), 10 µm (B, C, D).

IV: 1 − 1 − 5 – 6 – 9 – 14 + (1)

True claws uncinate. Claws I-IV each with one pair of tenent hairs. Empodia I-IV each with two rows of tenent hairs. Tarsus III associated tactile seta and solenidion forming duplex sub-equal in length; tarsus IV with solenidion well-separated from tactile, proximal, about 2/3 the length of tactile.

Etymology — This species was named after the country, Syria, where it was collected.

Remarks — Among the species that belong to the subgenus *Bryobia* (*Allobia*) (as defined by Livshitz and Mitrofanov, 1971) to which *B*. (*A*.) *syriensis* **n. sp.** also belongs, it is very close to *B*. (*A*.) *livschitzi* Mitrofanov and Strunkova, 1968 (Livshitz and Mitrofanov, 1971), *B*. (*A*.) *ziziphorae* Strunkova and Mitrofanov, 1983, *B*. (*A*.) *tuttlei* Smiley and Baker, 1995, *B*. (*A*.) *reckiana* Mitrofanov and Strunkova, 1968, *B*. (*A*.) *strunkovae* Mitrofanov, 1968 (Livshitz and Mitrofanov, 1971), *B*. (*A*.) *montana* Mitrofanov, 1973 and *B*. (*A*.) *giannitensis* Hatzinikolis and Panou, 1996. However *B*. (*A*.) *syriensis* differs from *B*. (*A*.) *livschitzi* by having dorsal body

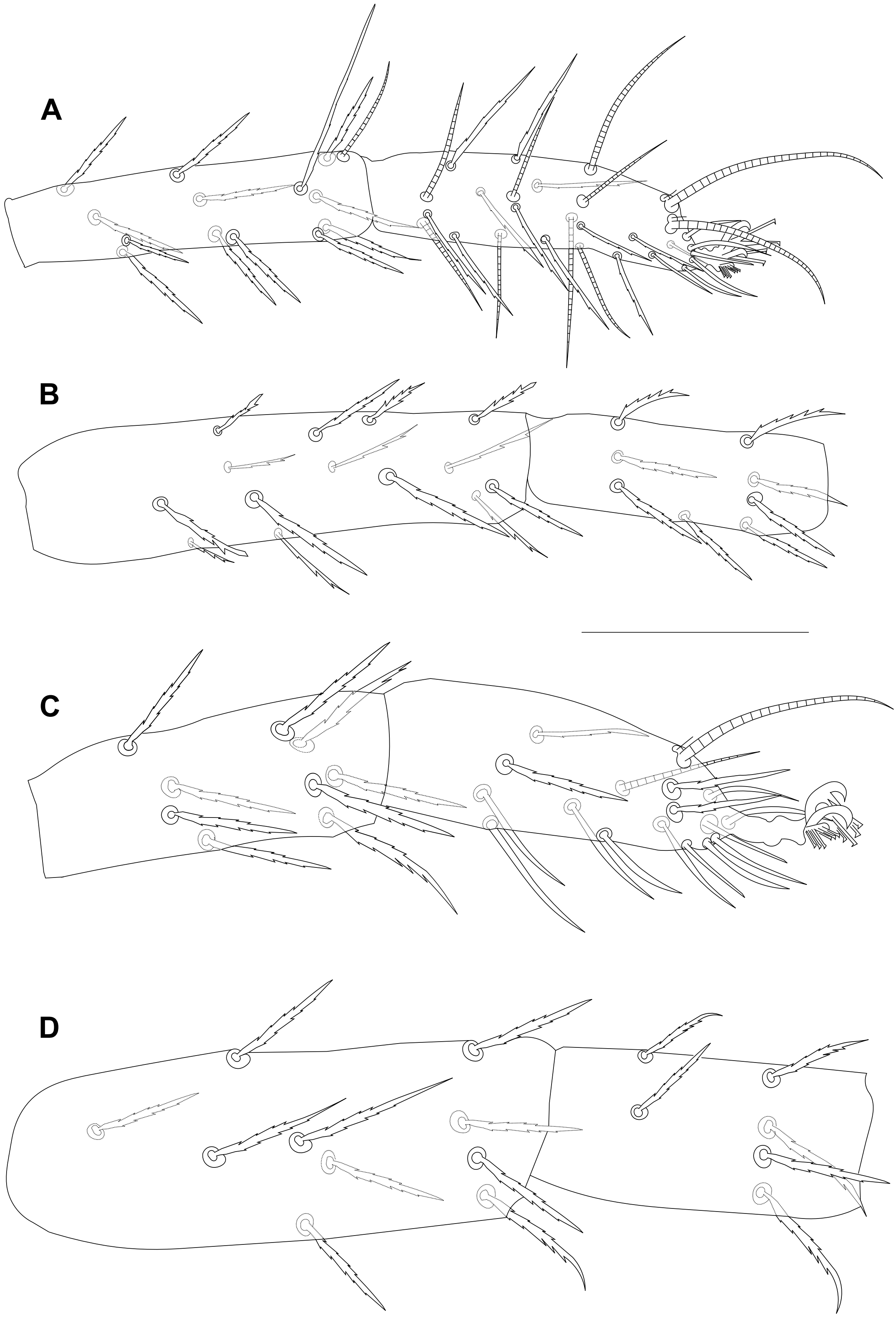

Figure 9 *Bryobia syriensis* **n. sp.**, male: A – tibia and tarsus I; B – femur and genu I; C – tibia and tarsus II; D – femur and genu II. Scale bar = 50 μm (A, B, C, D).

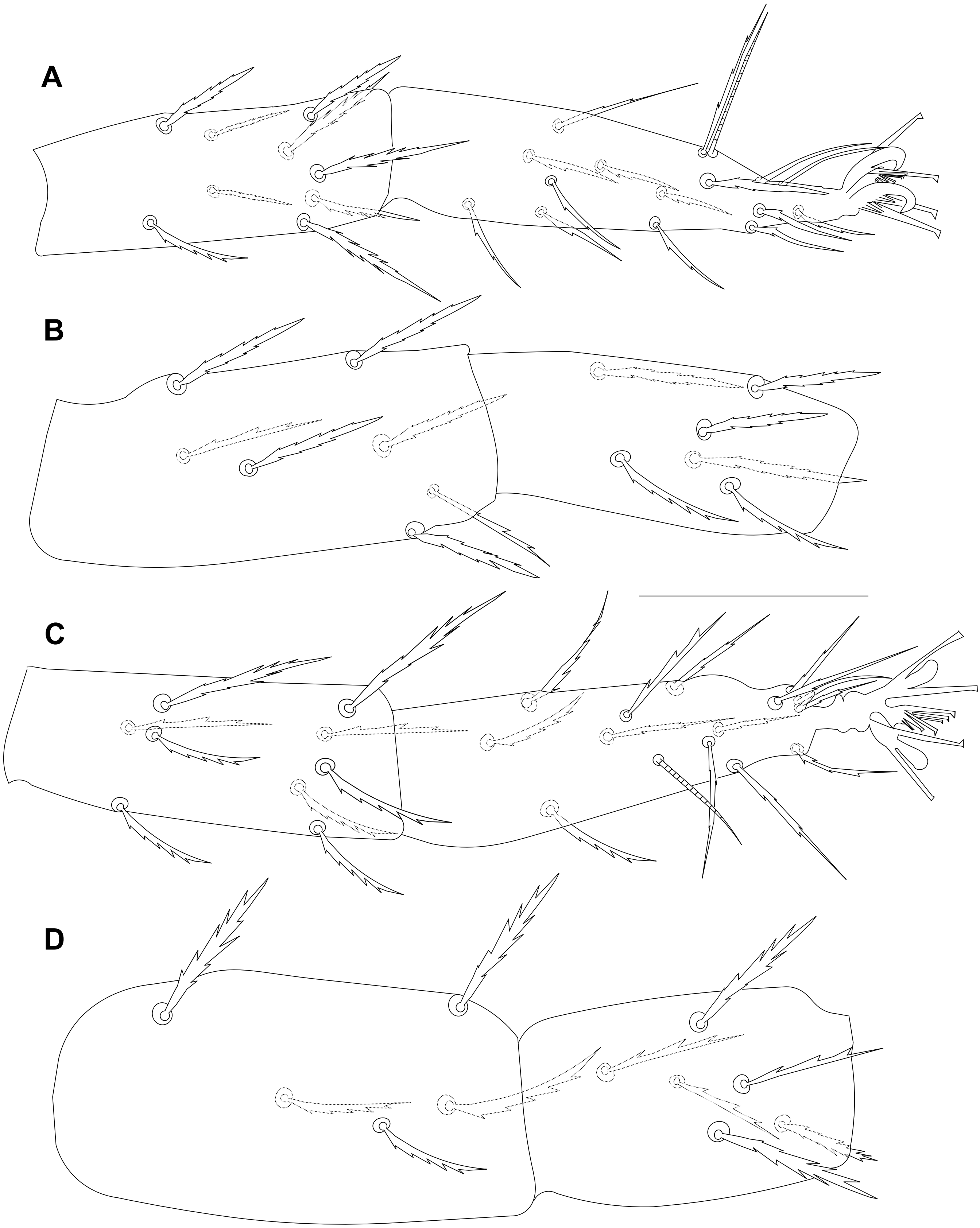

Figure 10 *Bryobia syriensis* **n. sp.**, male: A – tibia and tarsus III; B – femur and genu III; C – tibia and tarsus IV; D – femur and genu IV. Scale bar = 50 µm (A, B, C, D).

setae spatulate (*vs.* subsaptulate with pointed or rounded tip in *B.* (*A.*) *livschitzi*); by differences in femoral setal count 14[15] – 10 – 6 – 5 and 12 – (7-8) – 4 – 4 in *B.* (*A.*) *syriensis* and *B.* (*A.*) *livschitzi*, respectively; and by differences in tibial setal count on legs II-IV, 9 – 9 – 9 and 7 – 7 – 7 in *B.* (*A.*) *syriensis* and *B.* (*A.*) *livschitzi*, respectively.

Bryobia (*A.*) *syriensis* can be separated from *B.* (*A.*) *ziziphorae* by the following characters: the outer prodorsal lobes are more developed in *B.* (*A.*) *ziziphorae* and the shape of setae v_2 is also different; the distal end of the peritreme consists of a tiny anastomosis of 3–4 loges in *B.* (*A.*) *syriensis* whereas it is simple in *B.* (*A.*) *ziziphorae*; solenidion and tactile seta on tarsus IV are well–separated in *B.* (*A.*) *syriensis vs.* a duplex setae is present in *B.* (*A.*) *ziziphorae*; and the femoral, tibial and tarsal setal counts obviously differ between the two species.

The main differences between females of *B.* (*A.*) *syriensis and B.* (*A.*) *tuttlei* are the following: the outer propodosomal lobes are very reduced in *B.* (*A.*) *syriensis* but well developed in *B.* (*A.*) *tuttlei*; setae v_1 are about half the length of v_2 in *B.* (*A.*) *syriensis* whereas they are quite similar in size in *B.* (*A.*) *tuttlei*; the spermatheca has a smooth surface in *B.* (*A.*) *syriensis vs.* reticulate in *B.* (*A.*) *tuttlei*; obvious differences in leg setal counts are observed between the two species (with the exception of genu II and femur IV). In the male of *B.* (*A.*) *syriensis* dorsal body setae are elongated, subspatulate but in males of *B.* (*A.*) *tuttlei* they are spatulate (similar to those of female).

Bryobia (*A.*) *syriensis* clearly differs from *B.* (*A.*) *reckiana* by having spatulate, serrate and distally rounded dorsal body setae *vs.* lanceolate in *B.* (*A.*) *reckiana*; solenidion and tactile seta on tarsus IV are well-separated in *B.* (*A.*) *syriensis vs.* a duplex seta is present in *B.* (*A.*) *reckiana*; the empodium I of *B.* (*A.*) *syriensis* bears only one pair of tenent hairs whereas two rows of tenent hairs are present in *B.* (*A.*) *reckiana*; leg setal counts are very different between the two species.

Bryobia (*A.*) *syriensis* and *B.* (*A.*) *strunkovae* can be separated by: a smaller body width of *B.* (*A.*) *syriensis*, 327–384 *vs.* 572 in *B. strunkovae*; the leg I length that is far shorter (381–391) than the body length in *B.* (*A.*) *syriensis* whereas it is about as long as the body length (640) in *B.* (*A.*) *strunkovae*; the distal end of the peritreme is less developed in *B.* (*A.*) *syriensis* than in *B.* (*A.*) *strunkovae*; solenidion and tactile seta on tarsus IV are well-separated in *B.* (*A.*) *syriensis* but a duplex seta is present in *B.* (*A.*) *strunkovae*; finally, obvious differences between the setal counts of the two species are present.

Bryobia (*A.*) *syriensis* differs from *B.* (*A.*) *montana* by having one pair of tenent hairs on empodium I *vs.* two rows in *B.* (*A.*) *montana*; solenidion and tactile seta on tarsus IV are well–separated in *B.* (*A.*) *syriensis vs.* a duplex seta is present in *B.* (*A.*) *montana*; and by very different leg setal counts.

The main differences between *B.* (*A.*) *syriensis* and *B.* (*A.*) *giannitensis* are: a smaller body size of *B.* (*A.*) *syriensis*, 575–663 long and 327–384 wide *vs.* 789–809 and 650–559; a far shorter leg I in *B.* (*A.*) *syriensis* (381–391) compared to *B.* (*A.*) *giannitensis* (603–609); setae v_1 and v_2 are spatulate in *B.* (*A.*) *syriensis* but lanceolate in *B.* (*A.*) *giannitensis*; in *B.* (*A.*) *syriensis* one pair of tenent hairs is present on claws II-IV but each of them bears two pairs of tenent hairs in *B.* (*A.*) *giannitensis*; obvious differences in leg setal counts between the two species are also observed.

Bryobia (*Bryobia*) *gigas* Auger, Arabuli and Migeon, 2015

Four females of this species were collected from soil litter, Attabiyyat, south-west of Latakia city, Syria (35°30’24” N, 35°46’49” E), 23 April 2019. This species has been already collected from *Bituminaria bituminosa* (L.) in Syria (Zeity and Srinivasa, 2019) but this host plant was no present in the place where we collected these specimens.

Bryobia (*Bryobia*) *watersi* Manson, 1967

The specimens of this species were identified as *Bryobia* sp. and misidentified as *B.* (*B.*) *graminum* and/or *B.* (*B.*) *kissophila* in previous studies (Barbar, 2014, 2018). This was

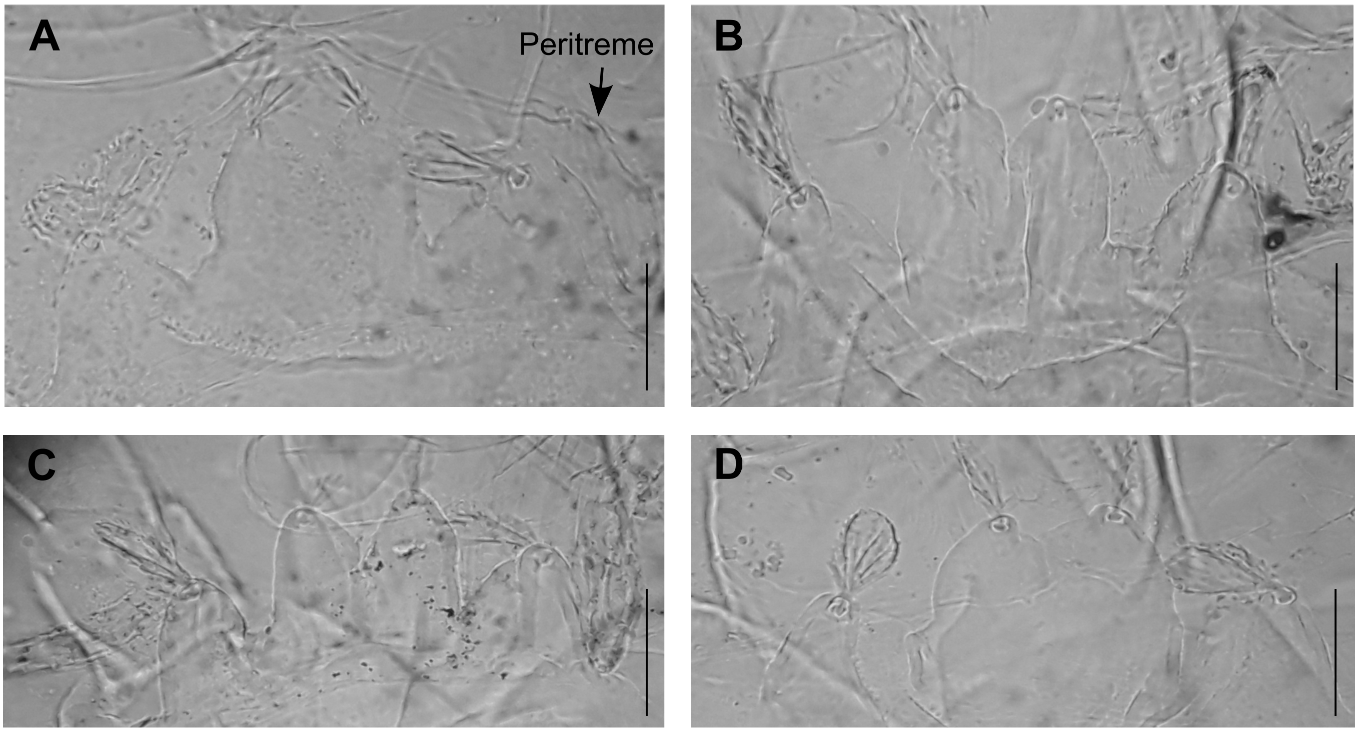

Figure 11 *Bryobia watersi*, female: A-D – variations in propodosomal lobes. Scale bars = 25 µm (A, B, C, D).

due to species identification only based on the morphological characteristics of females and particularly on variations in the shape of propodosomal lobes. In the present study, comparisons of all the specimens collected (including females, a male and juveniles, Figures 11-15) with the detailed redescriptions of *B*. (*B*.) *graminum*, *B*. (*B*.) *kissophila* and *B*. (*B*.) *praetiosa* by Mathys (1957) and the original description of *B*. (*B*.) *watersi* by Manson (1967) were undertaken. This led us to the conclusion that the morphological characteristics of the Syrian specimens fit well with those provided in the original description of *B*. (*B*.) *watersi* by Manson (1967) even if few morphological small differences were found: the dorsal body setae are slightly longer in Syrian females (there are no obvious differences in juveniles); genu II and tarsus IV of Syrian females with 6 and 14 setae respectively *vs*. 5 and 15 setae; genu II-III of Syrian male with 6 – 5 setae *vs*. 4[5] – 6; and tarsus III of Syrian deutonymphs with 10 setae *vs*. 11[12].

Remarks — This species was collected from several host plants surrounding a citrus orchard located at Al-ya'robiyah, Latakia governorate, Syria (35°30'24" N, 35°48'33" E) and was found on: *Amaranthus retroflexus* L., a new host plant (five females, 15 April 2014, previously identified as *Bryobia* sp.), *Malva sylvestris* L. (five females, two deutonymphs, three protonymphs and two larvae, 1 January 2014; four females, 15 February 2014; three females, 7 April 2015; two females, two protonymphs and one larva, 18 February 2016, previously misidentified as *B*. (*B*.) *graminum*; six females and one larva, 16 April 2016, previously misidentified as *B*. (*B*.) *kissophila*), *Urtica urens* L., a new host plant (three females and one protonymph, 15 April, 2014, previously identified as *Bryobia* sp.) and *Trifolium* sp., a new host plant (four females, three deutonymphs and one male, 14 April, 2015, previously identified as *Bryobia* sp.).

Among the specimens of *B*. (*B*.) *watersi* mentioned above, two females collected from *A*. *retroflexus* have only three propodosomal lobes each with a single seta (Figures 15 A-B). Initially, the specific identification of these specimens led to a result that they are either new specimens (or closely related species) of the two "trilobed" species *B. bakeri* Zaher *et al*. (1982)

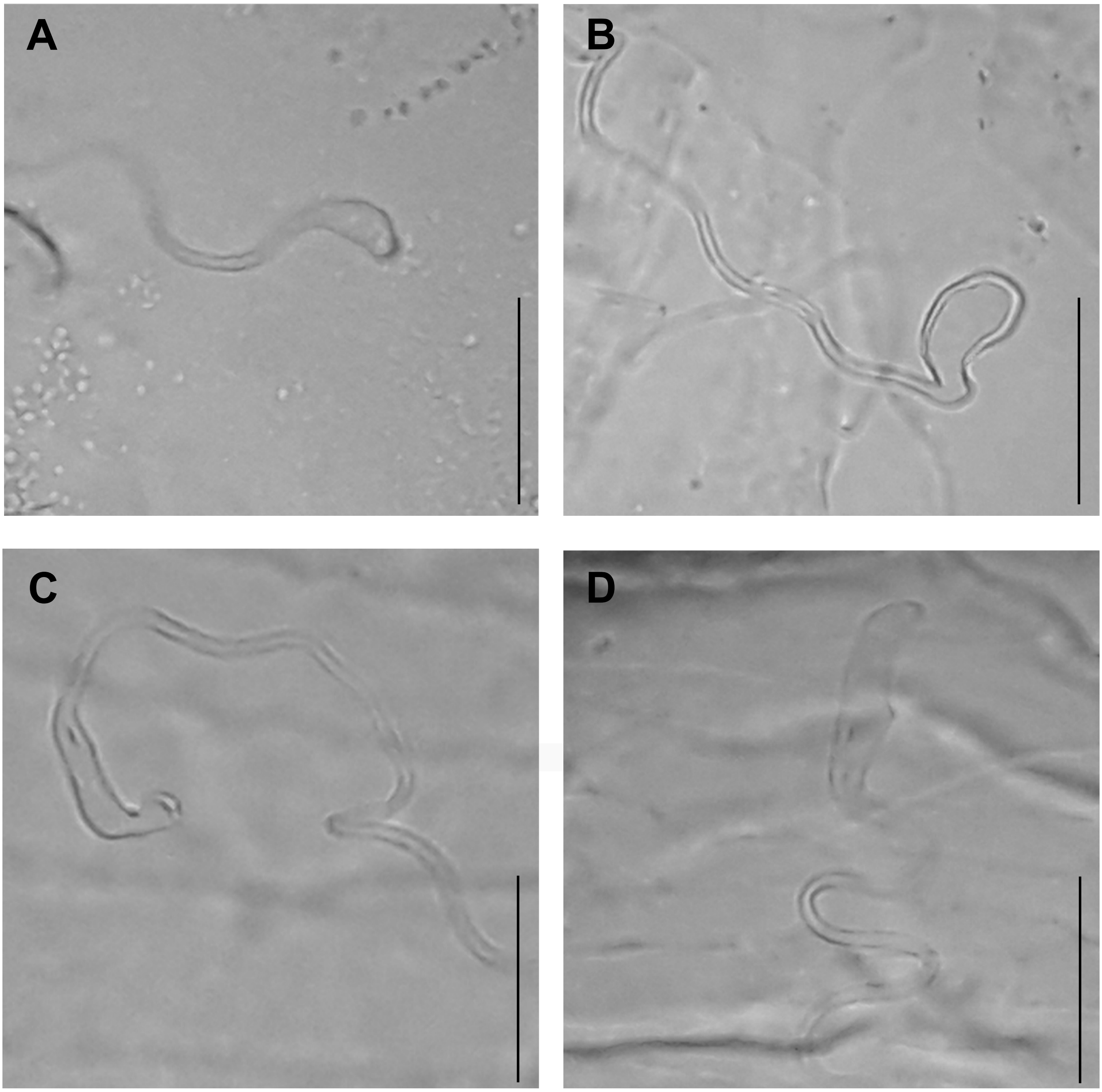

Figure 12 *Bryobia watersi*, female: A-D – variations in spermatheca. Scale bars = 20 µm (A, B, C, D).

and *B. aegyptiacus* Zaher *et al*. (1982) or they are aberrant *Bryobia* specimens. Actually, the overall propodosomal lobe shapes of the trilobed Syrian specimens are closer to those of *B. bakeri* (Figure 15A) than those of *B. aegyptiacus*. Nevertheless, the Syrian specimens differ from those two species by the palptarsus setal count [unusual counts are found in the two species described by Zaher *et al*. (1982)] and by small differences in the global leg setal counts. These results led to conclude that the Syrian trilobed specimens did not belong to *B. bakeri* nor to *B. aegyptiacus*.

Indeed, despite the differences between the propodosomal lobes of the specimen presented

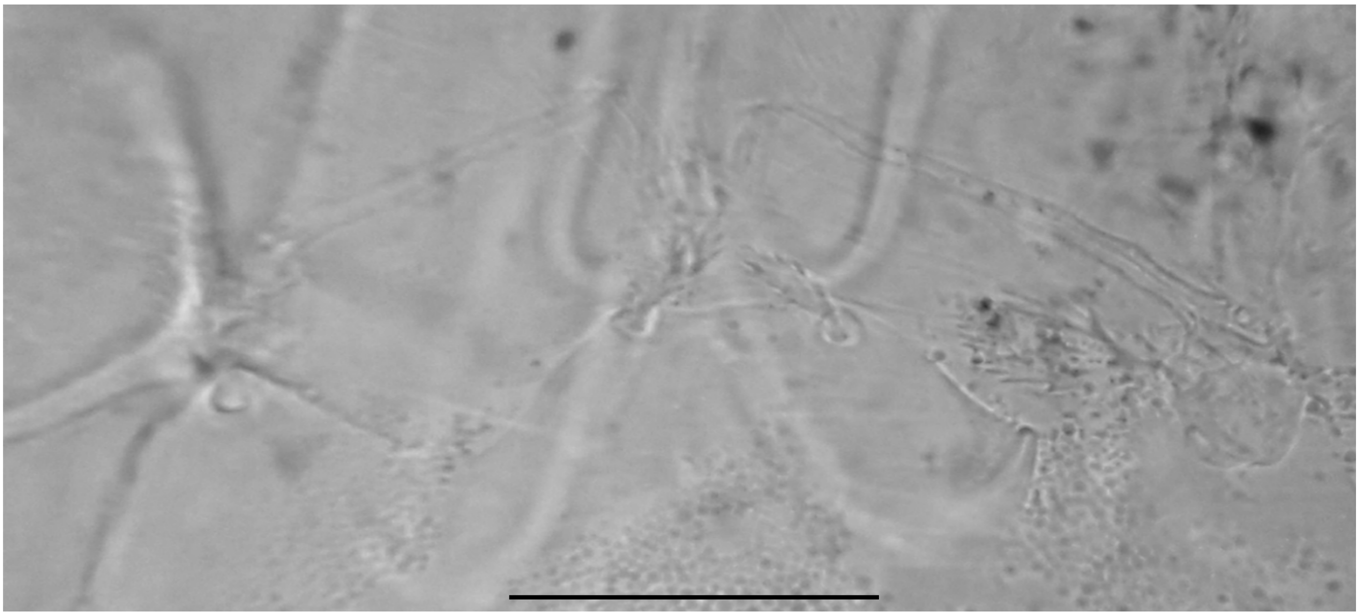

Figure 13 *Bryobia watersi*, male: propodosomal lobes. Scale bar = 25 µm.

in Figure 15B (typical of abnormal "asymmetrical" lobes; the outer lobe of the left side is obviously missing) and those of the specimen presented in Figure 15A (the axis of symmetry passes through the middle of the single inner lobe), we concluded that these females are abnormal individuals of *B.* (*B.*) *watersi* for several reasons:

(1) Both specimens are morphologically identical to *B.* (*B.*) *watersi* [i.e. having similar leg ambulacra, leg chaetotaxy and articles dimensions, same shape and length of dorsal body setae and peritreme etc.].
(2) Both specimens were collected together with specimens of *B.* (*B.*) *watersi* (same host plant, same date and place of collection).
(3) Several attempts carried out in 2015 and 2016 to re-collect additional trilobed individuals (in the same location where they were collected first) were unsuccessful and all re-collected individuals were *B.* (*B.*) *watersi*.
(4) Propodosomal lobe aberrations have already been reported in several *Bryobia* species (Arabuli and Auger, 2016; Fashing *et al.* 2016; Smiley and Baker, 1995).

This variability in the propodosomal lobe shape found in the two Syrian trilobed individuals of *B.* (*B.*) *watersi* guided us to question about the taxonomical value of the number of propodosomal lobes used to separate *B. bakeri* and *B. aegyptiacus* from other *Bryobia* species. Several arguments tend to show that these specimens could be teratological forms rather than species with a particular propodosomal lobes pattern:

(1) Specimens are rare: like the Syrian trilobed specimen of *B.* (*B.*) *watersi* of the Figure 15A, only one specimen of *B. bakeri* and one of *B. aegyptiacus* are known. Although Smiley and Baker (1995) reported a possible additional female of *B. bakeri*, it could belong to another species because its leg setal count is far different from that of the type specimen of *B. bakeri* (it shares the same setal count only on five leg articles; as a comparison, the Syrian trilobed *B.* (*B.*) *watersi* are closer to *B. bakeri* for the reason that they share the same setal count on 12 leg articles).
(2) Specimens with three propodosomal lobes (each bearing one seta) are known to occur in several species of *Bryobia*: Smiley and Baker (1995) mentioned that in a few species of

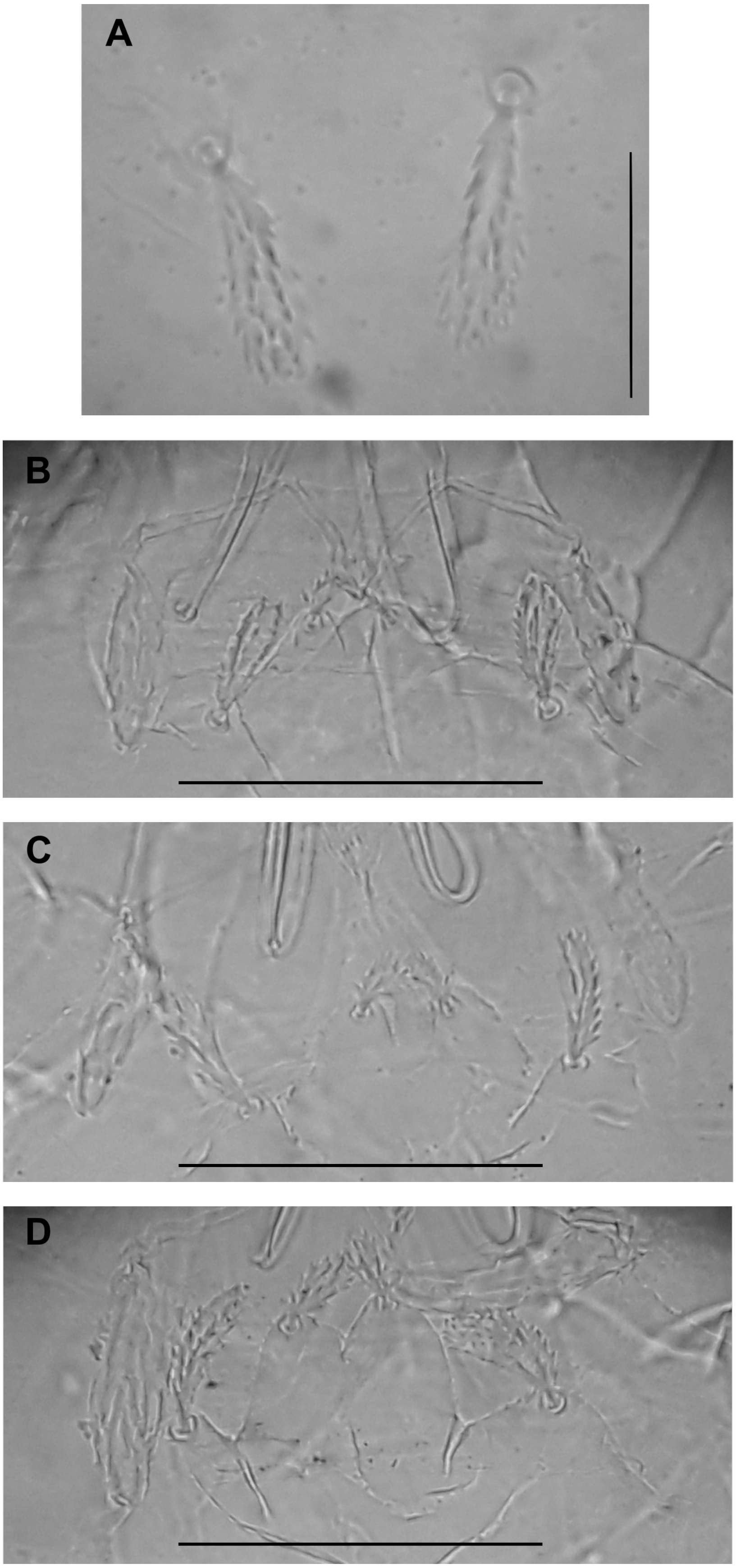

Figure 14 *Bryobia watersi*, immature stages: A – dorsal seta e_1 of larva; B-C – propodosomal lobes of protonymph; D – propodosomal lobes of deutonymph. Scale bars = 20 µm (A), 50 µm (B, C, D).

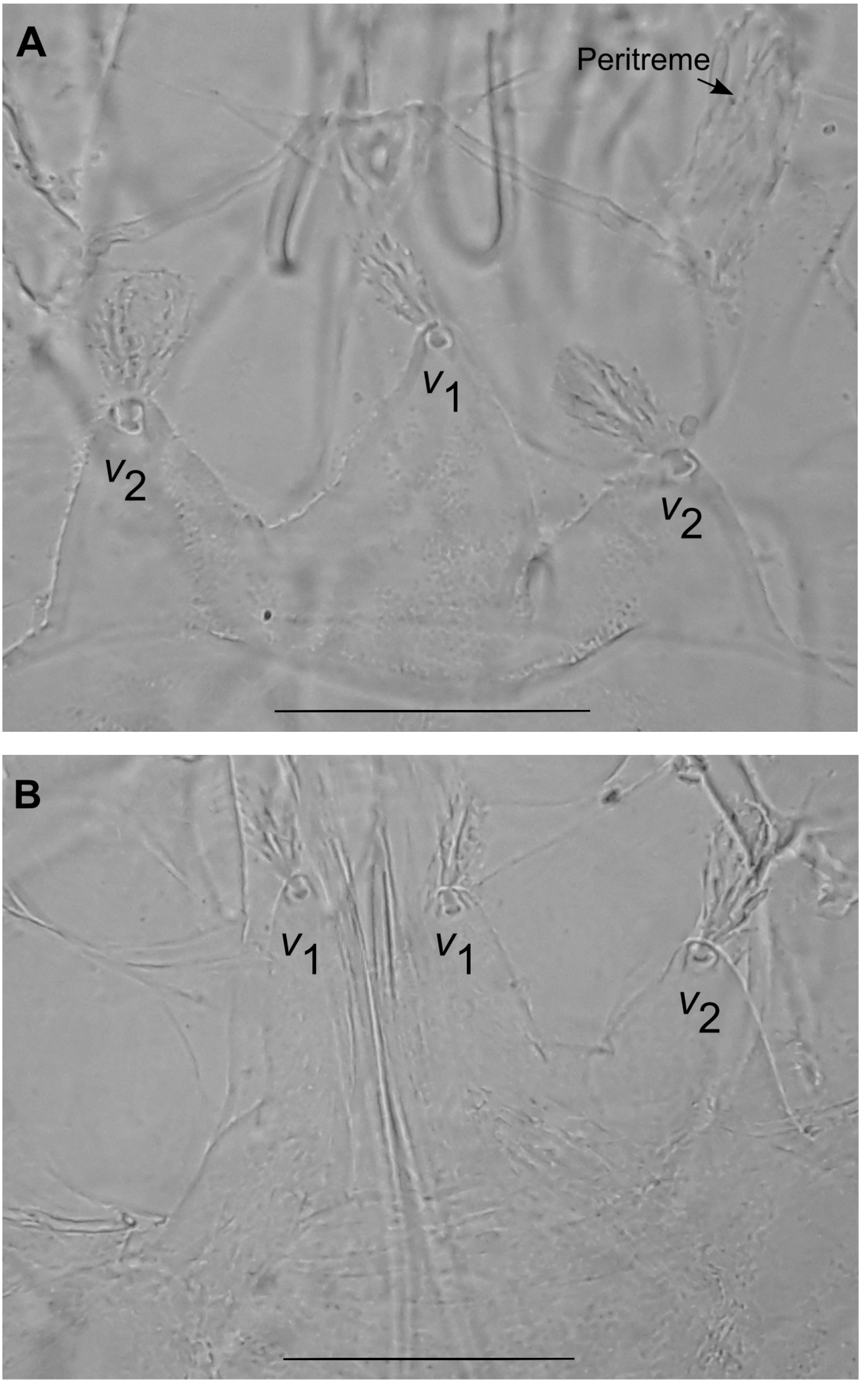

Figure 15 *Bryobia watersi*, female: A-B – trilobed propodosomal lobes. Scale bars = 50 µm (A, B).

Bryobia some aberrant females (with two or three propodosomal lobes) appear sometimes. Since that work, several cases of *Bryobia* species with three propodosomal lobes have been reported (Arabuli and Auger, 2016; Fashing *et al*. 2016). In the detailed study by Fashing *et al*. 2016, it was demonstrated that both morphotypes (with three or four propodosomal lobes) of *Bryobia abyssiniae* Fashing and Ueckermann, 2016 belong to the same species, and about 9.5% of observed specimens had a single propodosomal inner lobe (with a single seta v_1).

(3) The two Syrians trilobed specimens are conspecific despite the fact that one of them is obviously an aberrant form (asymmetry) and the other has a symmetrical propodosomal lobe pattern similar to that found in *B. bakeri*.

This tends to show that a bryobiine mite with an unpaired inner propodosomal lobe bearing a unique seta v_1, can be an aberrant specimen despite a symmetrical propodosomal trilobed lobe pattern.

In our opinion, all these elements together strongly suggest that *B. bakeri* and *B. aegyptiacus* would be more aberrant individuals of two species of *Bryobia* (four-lobed) than species characterized by unpaired inner propodosomal lobe. Even if the data are insufficient to assign these "trilobed" species to an existing four-lobed *Bryobia* species, the demonstration presented here is consistent with the synonymy of the genus *Septobia* with the genus *Bryobia* by Bolland *et al*. (1998).

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References

Arabuli T., Auger P. 2016. Intraspecific morphological variability in *Bryobia rubrioculus* (Scheuten, 1857) (Acari: Tetranychidae) from Georgia (Caucasus). 8th Symposium of the European Association of Acarologists. Valencia, Spain, 11th -15th July 2016. Oral presentation.
Arabuli T., Maric I., Auger P. 2019. Revision of the genus *Pseudobryobia* McGregor, 1950 (Acari, Tetranychidae), Acarologia, 59(3): 291-300. doi:10.24349/acarologia/20194331
Barbar Z. 2014. Occurrence, population dynamics and winter phenology of spider mites and their phytoseiid predators in a citrus orchard in Syria. Acarologia, 54: 409-423. doi:10.1051/acarologia/20142143
Barbar Z. 2018. New mite records (Acari: Mesostigmata, Trombidiformes) from soil and vegetation of some Syrian citrus agrosystems, Acarologia, 58(4): 919-927. doi:10.24349/acarologia/20184298
Bolland H.R., Gutierrez J., Flechtmann C.H.W. 1998. World catalogue of the spider mite family (Acari: Tetranychidae). Leiden: Brill Academic Publishers. pp. 392.
Boller E.F. 1984. Eine anfache Ausschwemm-Methode zur schellen Erfassung von Raumilben, Trips und anderen Kleinathropoden im Weinbau, Schweiz Zeitschrift für Obst-und Weinbau, 120: 249-255.
El-Hariri G. 1968. A list of recorded Syrian insect and Acari. Faculty of Agriculture, University of Aleppo. pp.160.
Fashing, N.J., Ueckermann, E.A., Fashing, P.J., Nguyen, N., Back, A.M. Allison L.A. 2016. *Bryobia abyssiniae* (Prostigmata: Tetranychidae), a new species from the highlands of Ethiopia. Int. J. Acarol., 42: 366-376. doi:10.1080/01647954.2016.1194891
Hatzinikolis E.N., Panou H.N. 1996. Three new species of *Bryobia* (Acari, Tetranychidae) from fruit trees in Greece. Acarologia, 37: 107-113.
Lindquist, E.E. 1985. External anatomy. In: Helle, W. & Sabelis, M.W. (Eds.), Spider mites. Their Biology, natural enemies and control. Amsterdam: Elsevier Science Publishing. p. 3-28.
Livshits I.Z., Mitrofanov V.I. 1971. The mites of the genus *Bryobia* C.L. Koch, 1836 (Acariformes,Bryobiidae). Trudy Gosudarstvennogo Nikitskogo Botanicheskogo Sada, 51: 1-112.
Manson D.C.M. 1967. The spider mite family Tetranychidae in New Zealand. I. The genus Bryobia. Acarologia, 9: 76-123.
Mathys G. 1957. Contribution à la connaissance de la systématique et de la biologie du genre Bryobia en Suisse romande. Mitteilungen der Schweizerischen Entomologischen Gesellschaft, 30: 189-284.
Migeon A., Dorkeld F. 2006-2019. Spider Mites Web: a comprehensive database for the Tetranychidae. Available from: http://www.montpellier.inra.fr/CBGP/spmweb (accessed July, 15, 2019).

Mitrofanov V.I. 1973. Three new species of mites of the genus *Bryobia* C.L. Koch, 1836 (Acariformes, Tetranychoidea) from the Pamir. Trudy Gosudarstvennogo Nikitskogo Botanicheskogo Sada, 51: 12-14.

Saito Y., Mori K., Chittenden A.R. 1999. Body characters reflecting the body size of spider mites in flattened specimens (Acari, Tetranychidae). Applied Entomology and Zoology, 34: 383-386. doi:10.1303/aez.34.383

Smiley R.L., Baker E.W. 1995. A report on some tetranychid mites (Acari: Prostigmata) from Yemen. Int. J. Acarol., 21: 135-164. doi:10.1080/01647959508684055

Strunkova Z.I., Mitrofanov V.I. 1983. New species of the family Bryobiidae (Acariformes) from Middle Asia. Zool. Zh., 62: 464-468.

Vacante V. 2010. Citrus mites, Identification, bionomy and control. CABI Head Office, Oxfordshire, UK. pp. 378. doi:10.1079/9781845934989.0000

Zaher M.A., Gomaa E.A., and El-Enany M.A. 1982. Spider mites of Egypt (Acari: Tetranychidae). Int. J. Acarol., 8: 91-114. doi:10.1080/01647958208683284

Zeity M. 2017. Some new records of spider mites (Acari, Tetranychidae) from Syria. Acarologia, 57(3): 651-654. doi:10.24349/acarologia/20174184

Zeity M., Srinivasa N. 2019. Updated contribution to the knowledge of Tetranychoidea (Acari: Tetranychidae, Tenuipalpidae) from Syria with reinstatement of genus *Nuciforaella* Vacante. Syst. Appl. Acarol., 24(4): 529-543. doi:10.11158/saa.24.4.1

Zriki G., Shaabo A., Boubou A. 2015. A preliminary survey of the spider mites (Acari: Tetranychidae) in Latakia Governorate of Syria. Acarologia, 55: 303-309. doi:10.1051/acarologia/20142173