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# Tenuipalpidae and Tetranychidae (Trombidiformes, Tetranychoida) from Syria with a description of a new species of *Bryobia*

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## Original research

### ABSTRACT

Surveys of Tenuipalpidae and Tetranychidae were conducted at three locations in Latakia governorate, Syria, in 2021. Eight species were collected; four flat mite species of which *Aegyptobia beglarovi*, *Cenopalpus lineola*, and *Pentamerismus juniperi* were new records for Syria; and four spider mite species among which *Petrobia (Mesotetranychus) tunisiae* represented a new record. A new tetranychid species, *Bryobia (Lyobia) hadizeni* sp. nov., collected from *Calicotome villosa*, is described and illustrated. The number of Tenuipalpidae species known from Syria increases to 16 and there are now 25 species of Tetranychidae.

**Keywords** flat mites; spider mites; new species; species diversity

**Zoobank** <http://zoobank.org/EA7035F1-F3AF-40FF-8CAA-22DBA9F0B5B5>

## Introduction

With about of 2400 species, the Tenuipalpidae and Tetranychidae are considered the largest and most diversified groups of the superfamily Tetranychoida. These two families comprise several species of major economic importance, which occur throughout the world and often cause severe injury to agricultural crops and ornamentals (Krantz and Walter, 2009; Castro *et al.*, 2021; Migeon and Dorkeld, 2021). Until 2015, data on Tetranychidae and Tenuipalpidae biodiversity were scarce in Syria and only six species were recorded: two tenuipalps and four tetranychids (El-Hariri, 1968). Recently, these records increased to 13 and 23 species of Tenuipalpidae and Tetranychidae, respectively, within a six year period (Zriki *et al.*, 2015; Barbar, 2016; Zeity, 2017; Barbar, 2018; Zeity and Negm, 2019; Zeity and Srinivasa, 2019; Barbar and Auger, 2020; Ebraheem *et al.*, 2022).

The research herein provides new data on phytophagous diversity by identifying flat mites and spider mites species occurring on randomly sampled vegetation in Latakia governorate in 2021. In this manuscript a new species of *Bryobia* is described and illustrated and new records of Tenuipalpidae and Tetranychidae are reported.

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## Material and methods

### Sampling

Tetranychoid mites were randomly taken in Latakia governorate, Syria, on 5 and 20 April 2021. They were collected from leaves of wild vegetation at three different sites: i) in a public garden located at the center of Latakia city (35°51'65" N, 35°78'18" E); ii) in Alhafah (35°60'21" N, 36°11'50" E); and iii) in Slanfeh (35°60'70" N, 36°22'17" E). Mites were removed from leaves using the “dipping-checking-washing-filtering” method (Boller, 1984). Collected mites were cleared in lactic acid for 48 hrs, mounted on slides in Hoyer’s medium, and dried in an oven at 40 °C for three days.

### Mite observation and description

The specimens were examined using an Olympus® CH20 microscope at 400 and 1000x magnification. Measurements were taken using the scale of a reticle installed on the eyepiece lens. Mite body parts were documented using a mobile phone camera (13 megapixels) fixed on the eyepiece lens and images were transferred to a professional quality vector graphics (software Inkscape ® 0.92) which was installed on a computer for actual drawing.

All measurements are given in micrometers ( $\mu\text{m}$ ) 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. Body length represents the distance between the base of setae  $v_1$  to the end of idiosoma and body width represents the widest transverse part of the hysterosoma. Distance between  $sc_2$  setae members and between  $v_2$  and  $h_1$  setae are also given (Saito *et al.*, 1999). 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.

## Systematics

### Family Tenuipalpidae Berlese, 1913

#### Genus *Aegyptobia* Sayed, 1950

##### *Aegyptobia beglarovi* Livschitz & Mitrofanov, 1967

Three females were collected on *Juniperus oxycedrus* L., Slanfeh (35°60'70" N, 36°22'17" E), Latakia governorate, Syria, 20 April 2021. This is the first record of this species from Syria. It has been mainly collected on several species of *Juniperus* sp. and found in Georgia, Iran, Turkey and Ukraine (Castro *et al.*, 2021).

#### Genus *Cenopalpus* Pritchard & Baker, 1958

##### *Cenopalpus lanceolatisetae* (Attiah, 1956)

Four females were collected on *Crataegus azarolus* L., Alhafah (35°60'21" N, 36°11'50" E), Latakia governorate, Syria, 20 April 2021. This is the second record of this species from Syria (Barbar, 2018). It has been mainly collected on Rosaceae and particularly found in Mediterranean countries (Castro *et al.*, 2021).

##### *Cenopalpus lineola* (Canestrini & Fanzago, 1876)

Twenty-one females of this species were collected: one female on *J. oxycedrus*, one on *Pinus halepensis* Mill., three on *Centaurea calcitrapa* L., six on *Cedrus libani* (A.Rich.), six on *Primula vulgaris* Huds., and four on *Lamium striatum* Sibth. & Sm., Slanfeh (35°60'70" N,

36°22'17" E), Latakia governorate, Syria, 20 April 2021. This is the first record of this species from Syria. It has been mainly collected on Pinaceae and particularly found in Europe and Asia (Castro *et al.*, 2021). The collecting of *C. lineola* on unusual host plants in this study (e.g. *C. calcitrapa*) could be due to the growing of these plants under several tree species belonging to Pinaceae or other families, which constitute a possible source of this mite in particular at the beginning of spring when the samples were taken.

## Genus *Pentamerismus* McGregor, 1949

### *Pentamerismus juniperi* (Reck, 1951)

One female of this species was collected on *J. oxycedrus*, Slanfah (35°60'70" N, 36°22'17" E), Latakia governorate, Syria, 20 April 2021. This is the first record of this species from Syria. It has been collected on *Juniperus* sp. and found in Armenia, China, Georgia, Greece, Hungary and Ukraine (Castro *et al.*, 2021).

## Family Tetranychidae Donnadieu, 1875

### Genus *Bryobia* Koch, 1836

#### *Bryobia* (*Bryobia*) *gigas* Auger, Arabuli & Migeon, 2015

One female of this species was collected on *C. calcitrapa*, Slanfah (35°60'70" N, 36°22'17" E), Latakia governorate, Syria, 20 April 2021. This species has been collected from *Bituminaria bituminosa* (L.) (Zeity and Srinivasa, 2019) and from soil litter in Syria (Barbar and Auger, 2020).

#### *Bryobia* (*Bryobia*) *vasiljevi* Reck, 1953

Two females were collected on *C. calcitrapa*, Slanfah (35°60'70" N, 36°22'17" E), Latakia governorate, Syria, 20 April 2021. This species has been collected from *Trifolium* sp. and *Taraxacum campyloides* in Syria (Zriki *et al.*, 2015).

#### *Bryobia* (*Lyobia*) *hadizeni* sp. nov.

Zoobank: [D3FFBD1F-B949-4193-AFC5-6C04222CCBOA](https://zoobank.org/D3FFBD1F-B949-4193-AFC5-6C04222CCBOA)

Figures 1–5

**Type material** — Holotype (female) and three female paratypes from *Calicotome villosa* (Poir.) Link. (Leguminosae), Alhafah (35°60'21" N, 36°11'50" E), Latakia governorate, Syria, 20 April 2021, coll. Z. Barbar. Material has been deposited in the Arthropod Collection of the Department of Plant Protection, Faculty of Agriculture, Albaath University, Homs, Syria.

**Diagnosis** — This species belongs to the *berlesei*-group due to prodorsal lobes well developed, no duplex setae on tarsus IV and femoral interior dorsal row with four long setae (Eyndhoven and Vacante, 1985). Prodorsum with two large oval-shaped lateral depressions. Opisthosoma bearing 6 large oval-shaped depressions with elongate ribbon-shaped pattern and one triangularly rounded depression caudally. Dorsal body setae serrate spatulate, except  $f_2$  and  $h_1$  elongate, acute distally,  $f_2$  and  $h_1$  longest. Dorsocentral setae of each row with members close to each other. Femora and genua II-IV with some flattened setae.

**Female description** — 625 (605–616  $\mu\text{m}$ ) long including lobes (base of setae  $v_1$ ) and 391 (381–383) wide, gnathosoma 95 (75–110) long. Distances between  $sc_2$ – $sc_2$  325 (294–320) and between  $v_2$ – $h_1$  614 (598–600).

**Dorsum** – Prodorsum with four pairs of setae, with rounded, oval and elongate reticulation medially surrounded by granulation, with two large oval-shaped lateral depressions containing irregular folds forming oval patterns (Figures 1 and 2A); well-developed anterior prodorsal lobes, inner lobes conical measuring 53 (50–52) high (excluding setae), separated by wide V-shaped incision 31 (15–21) in depth (measured from the bottom of the incision between the

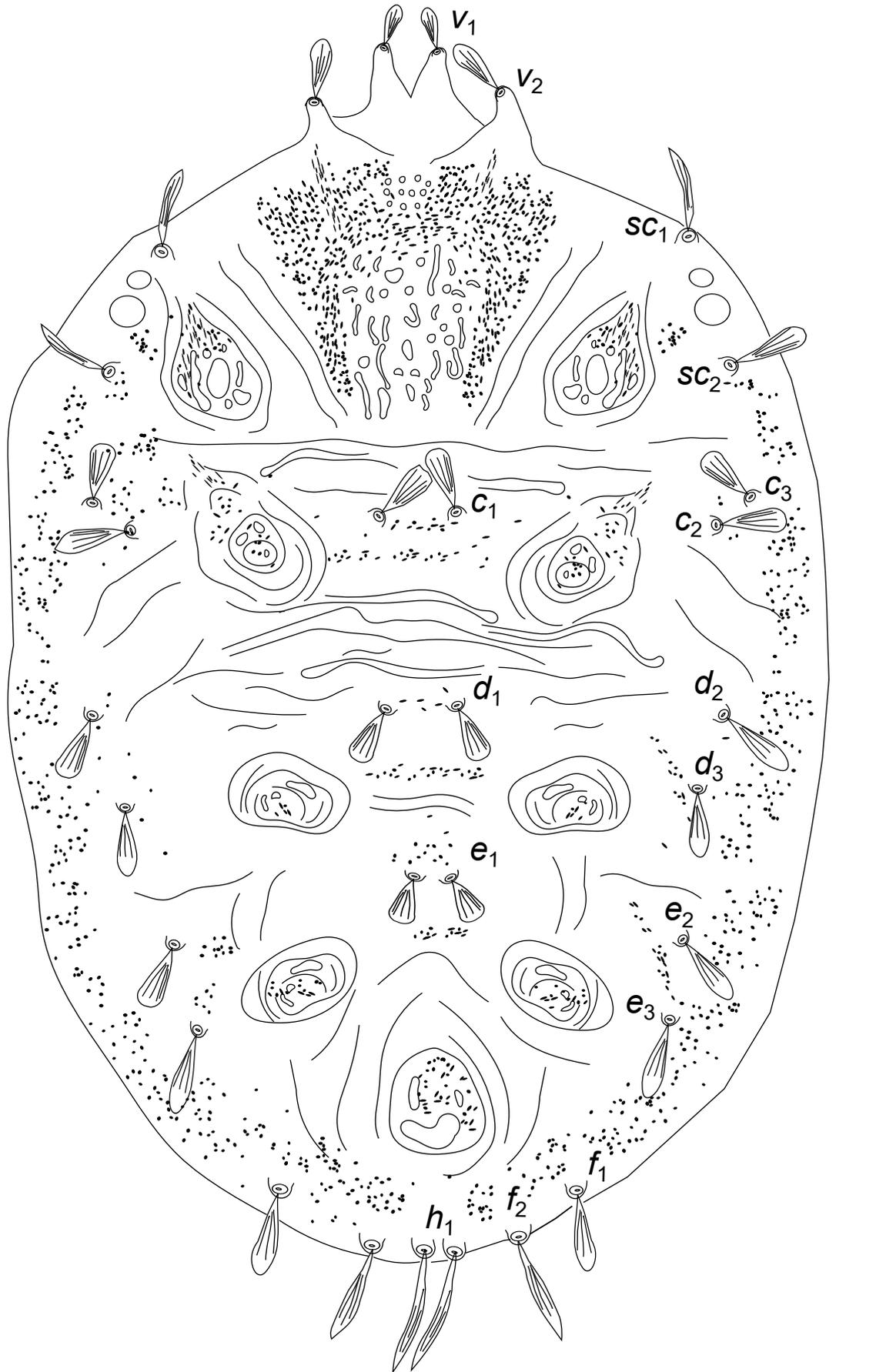
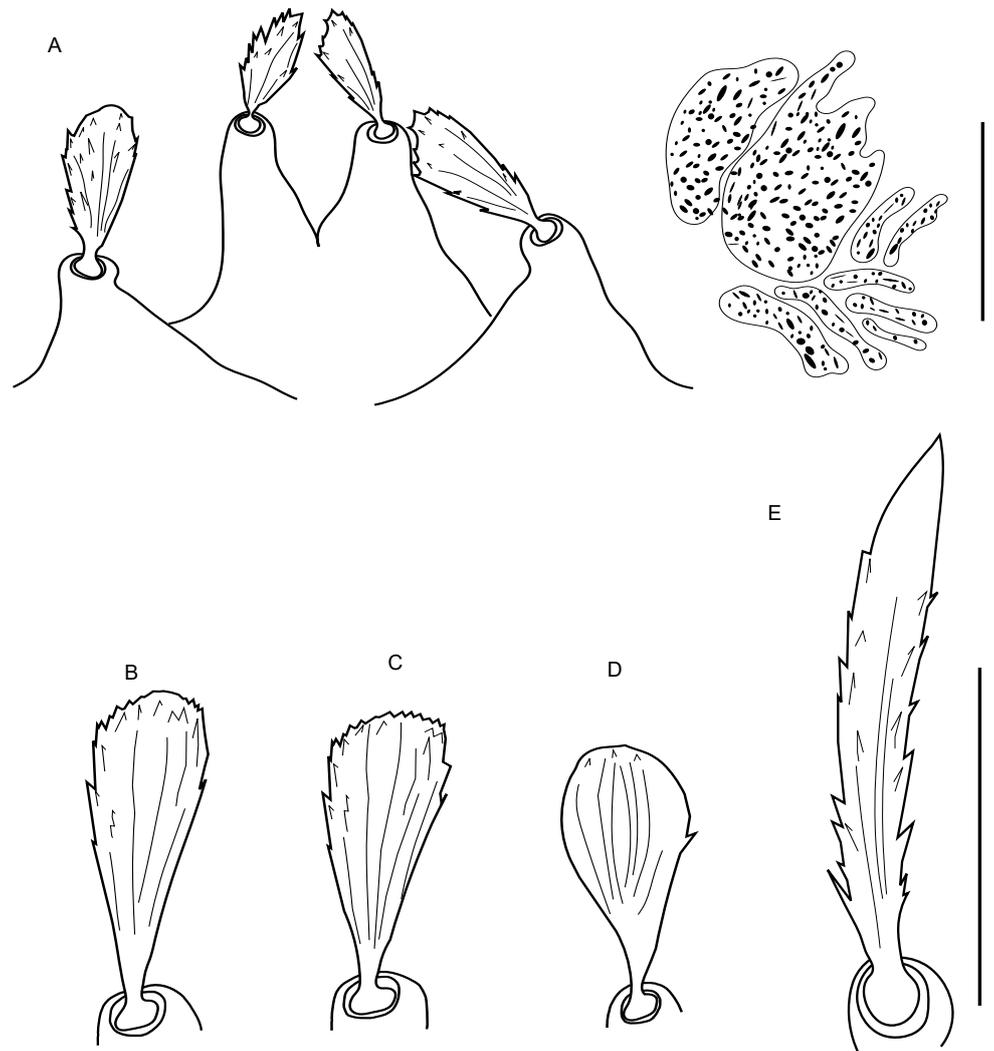


Figure 1 *Bryobia hadizeni* n. sp, female, dorsal aspect. Scale bar = 100  $\mu$ m.



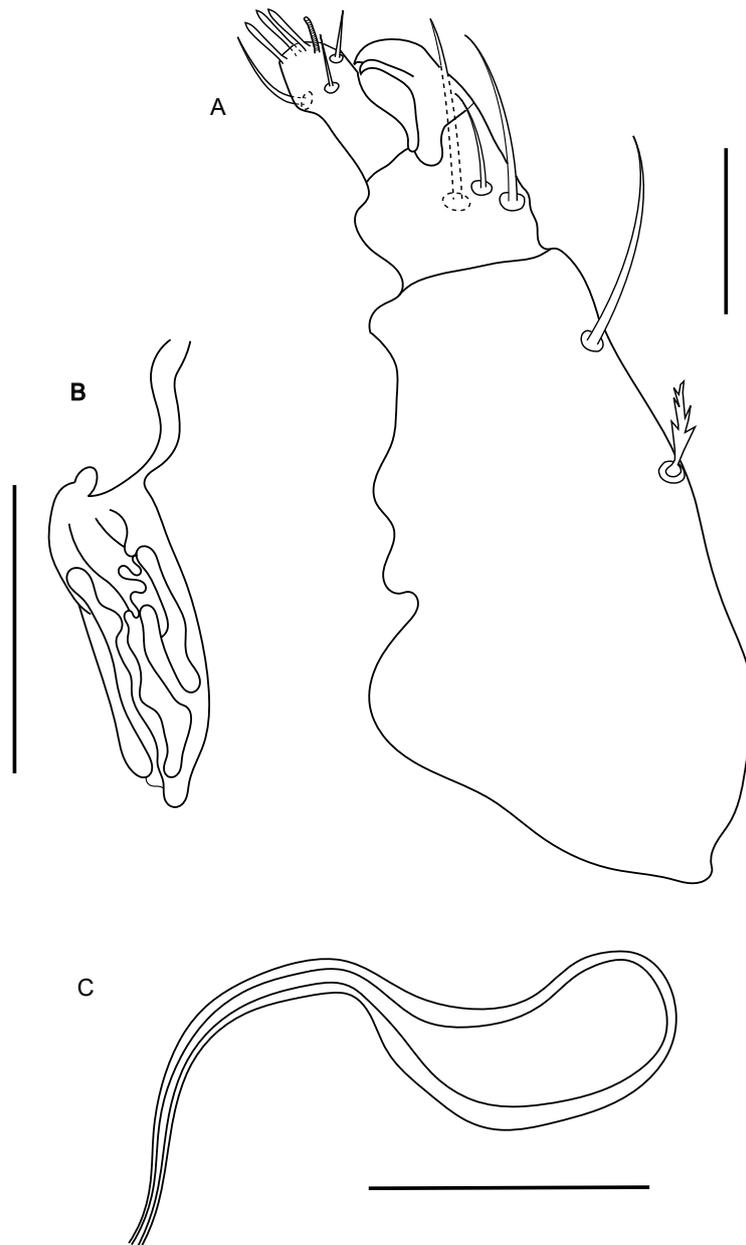
**Figure 2** *Bryobia hadizeni* n. sp, female: A – propodosomal lobes and detail of granulated integument of prodorsum; B and C – setae  $c_1$ ; D and E – setae  $e_1$  and  $h_1$ , respectively. Scale bar = 50  $\mu\text{m}$ .

inner lobes to their tip, excluding setae) (Figure 2A); outer propodosomal lobes subtriangular to conical 35 (32–33) high (excluding setae); tip of setae  $v_2$  slightly surpasses setae  $v_1$  insertions; setae  $v_1$  shorter than setae  $v_2$ . Distance between members of first ( $v_1$ ) and second ( $v_2$ ) pair of propodosomal setae insertions 28 (28) and 103 (98), respectively. Opisthosoma with six large oval-shaped depressions containing elongate ribbon-shaped reticulations (3 pairs posterolateral to setae  $c_1$ ,  $d_1$  and  $e_1$  and one triangularly rounded caudally; Figure 1) and with large mostly transverse folds medially. Dorsal body setae serrate spatulate, except  $e_3$  and  $f_1$  subspatulate,  $f_2$  and  $h_1$  elongate, narrower, acute distally; setae  $v_1$  the shortest,  $f_2$  and  $h_1$  the longest. Among dorsocentral setae,  $c_1$  larger and less spatulate than setae  $d_1$  and  $e_1$  (Figure 1 and 2B, D and E) except in one specimen (Figure 2C). All dorsal setae inserted on obvious tubercles (those of  $f_1$ ,  $f_2$  and  $h_1$  the biggest). Measurements of dorsal setae:  $v_1$  27 (25–26);  $v_2$  38 (32–34);  $sc_1$  50 (44–50);  $sc_2$  42 (40–46);  $c_1$  42 (35–40);  $c_2$  40 (34–44);  $c_3$  36 (34);  $d_1$  34 (27–33);  $d_2$  46 (37–42);  $d_3$  39 (37–41);  $e_1$  33 (25–39);  $e_2$  44 (44–45);  $e_3$  45 (45–52);  $f_1$  48 (51);  $f_2$  60 (67–69);  $h_1$  71 (64–72); dorsal setae width  $v_1$  9 (8–10);  $v_2$  14 (13–14);  $sc_1$  11 (15–18);  $sc_2$  11 (15–16),  $c_1$  15 (21–23),  $c_2$  15 (14–18),  $c_3$  14 (17–20),  $d_1$  13 (17–19),  $d_2$  13 (14–19),  $d_3$  14 (16),  $e_1$  15 (15–17),  $e_2$  12 (17–18),  $e_3$  13 (11–16),  $f_1$  12 (10–16),  $f_2$  10 (7–12) and  $h_1$  9 (8–11).

Distances between setae:  $c_1-c_1$  40 (40–45),  $d_1-d_1$  40 (33–42),  $e_1-e_1$  22 (22–30),  $f_1-f_1$  155 (135–140),  $f_2-f_2$  76 (75),  $h_1-h_1$  15 (18–20),  $c_1-d_1$  105 (98–104),  $d_1-e_1$  90 (85–92).

*Gnathosoma* – Stylophore slightly notched anteriorly, 92 (90–101) long and 73 (74–78) wide. Tibial claw of palpus bidentate (Figure 3A). Palptarsus slightly longer (excluding setae) 18 (19–18) than tibial claw 15 (15–16), with three tactile setae, three eupathidia and one solenidion, the shortest (Figure 3A). Tip of tibial claw reaches insertion of proximal tarsal tactile seta “a”. Peritreme anastomosed distally, elongate, 33 (27–32) long 7 (9–8) wide (Figure 3B).

*Venter* – Area immediately anterior to genital flap irregularly longitudinal. Three pairs of pseudanal setae ( $ps_{1-3}$ ) and two pairs of ventrocaudal setae ( $h_{2-3}$ ) present. Sacculus of



**Figure 3** *Bryobia hadizeni* n. sp, female: A – palpal tibia and tarsus; B – peritreme; C – spermatheca. Scale bars = 20  $\mu$ m (A and C), 30  $\mu$ m B.

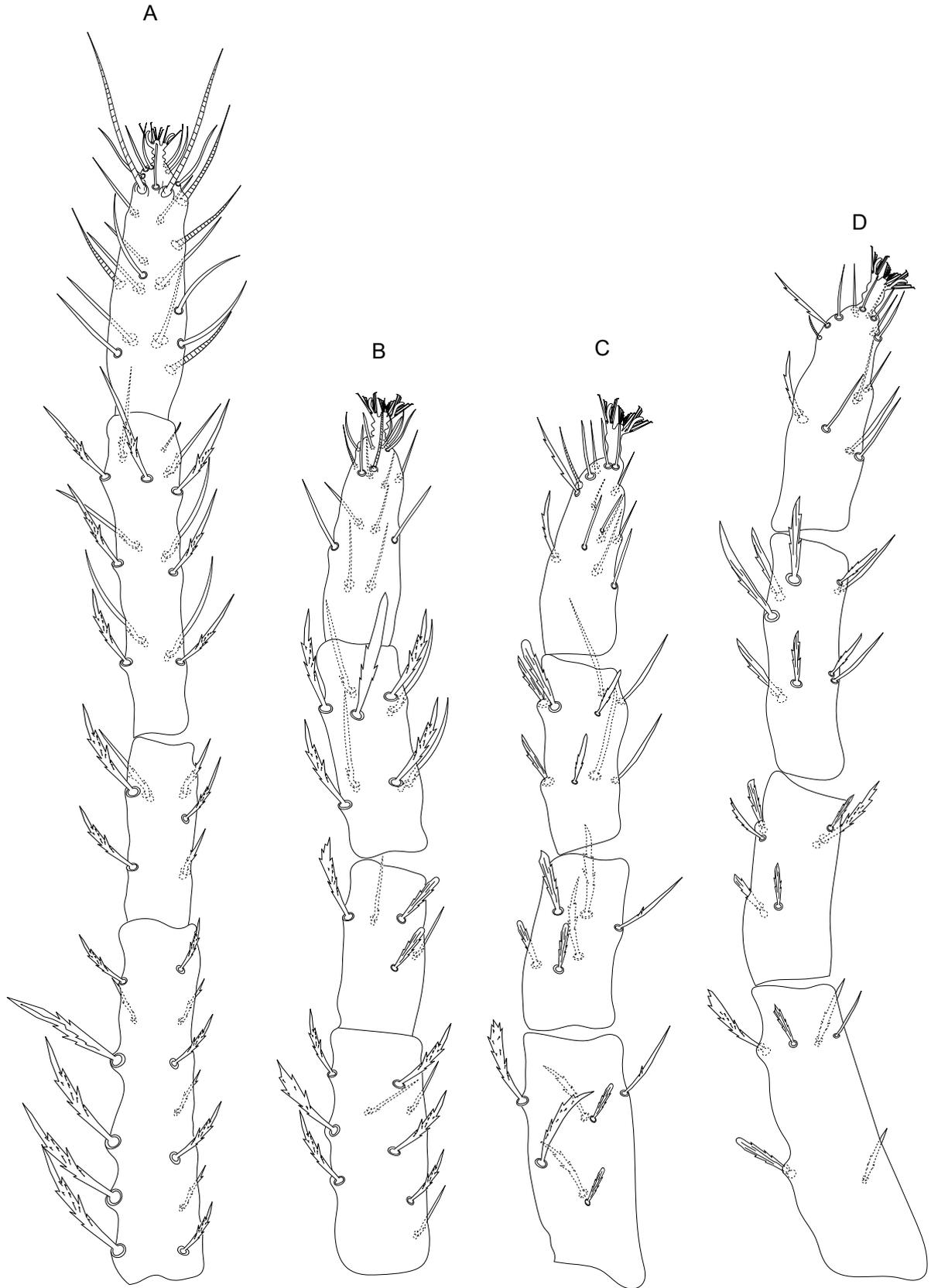
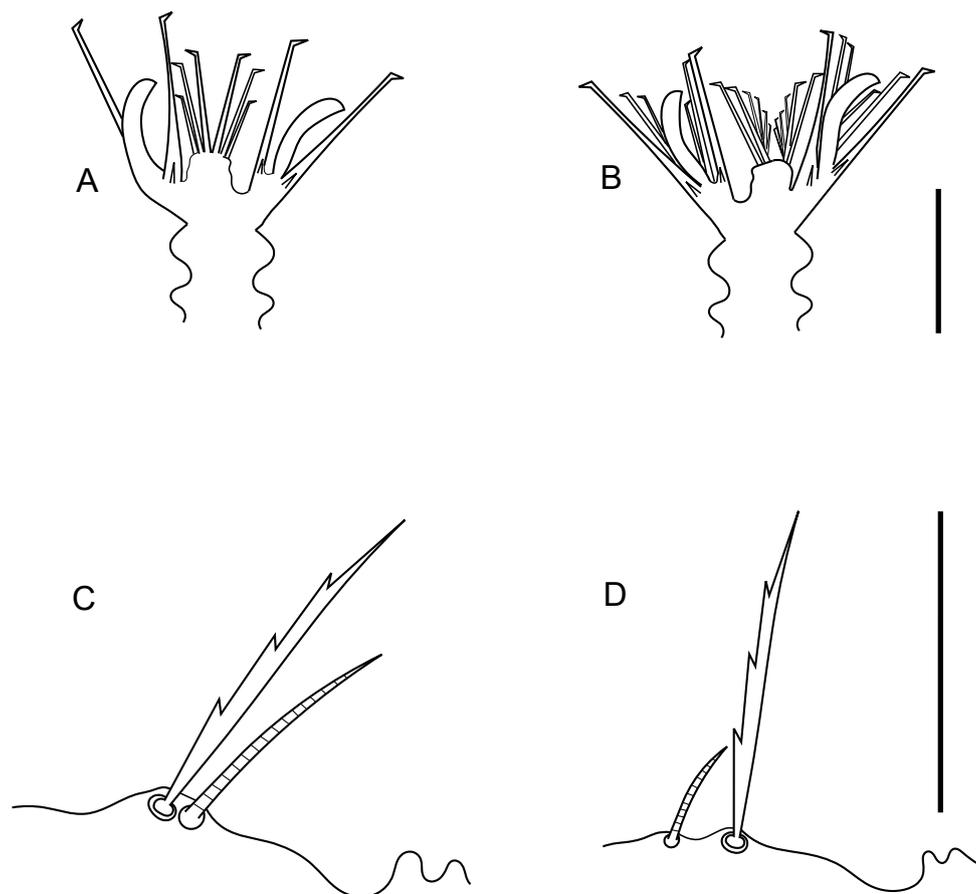


Figure 4 *Bryobia hadizeni* n. sp, female legs (from femur to tarsus): A, B, C, and D – legs I, II; III and IV, respectively. Scale bar = 100  $\mu$ m.



**Figure 5** *Bryobia hadizeni* 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. Scale bars = 10  $\mu$ m (A and B), 20  $\mu$ m C and D.

spermatheca elongate 23 (20) long 8 (10) wide (Figure 3C).

**Legs** – (Figures 4 and 5). Internal dorsal row of femur I with 4 long serrate setae 53 (50–55) and one normal seta 28 (27–30). Leg I 536 (528–541) long, leg II 340 (322–333), leg III 333 (315–322), leg IV 400 (396–430). Length of segments of leg I as follows: trochanter 45 (42–50), femur 156 (142–160), genu 75 (67–75), tibia 108 (104–112), tarsus 86 (83–86). Femora and genua II–IV with some flattened setae. Leg setal counts as follows (Figure 4):

I: 2 – 1 – 12[13] – 6 – 13 + (1) – 18 + (4) + 2 duplexes

II: 1 – 1 – 10[9] – 5 – 9 – 16 + (1) + 1 duplex

III: 1 – 1 – 7 – 6 – 9 – 13 + 1 duplex

IV: 1 – 1 – 6 – 5[6] – 9 – 14 + (1)

True claws unciniate. Claw and empodium I with one and three pairs of tenent hairs, respectively (Figure 5A). Claws II–IV each with three pairs of tenent hairs and empodia II–IV consist of two rows of tenent hairs (Figure 5B). Tarsus III associated tactile seta 21 (20–20) and solenidion 15 (15–20) forming duplex (Figure 5C); on tarsus IV solenidion 7 (8–10) shorter and proximal, well-separated (7) from tactile seta 22 (20–20) (Figure 5D). Coxisternal setae *Ib* and *Ic* smooth: *Ib*, 54 (53–60), longer than setae *Ic* 33 (33–40).

**Etymology** — The name of the new species “*hadizeni*” is composed of the first names of Hadi and Zen, sons of the first author, to whom the new species is dedicated.

**Remarks** — *Bryobia* (*L.*) *hadizeni* sp. nov. is very close to *B. (L.) cooremani* Eynndhoven and Vacante (1985), but this new species differs from it by (1) having obvious large dimples on

idiosoma vs. absent in *B. (L.) cooremani* **(2)** having setae  $f_2$  elongate, subspatulate and longer (60–69), and  $h_1$  elongate, narrow, acute distally and longer (64–72) vs. elongate spatulate:  $f_2$  30–50,  $h_1$  30–47 in *B. (L.) cooremani*; **(3)** having longer seta  $c_1$  35–42 vs. 22–33 in *B. (L.) cooremani*; **(4)** having distances between  $c_1$ – $c_1$  40–45,  $d_1$ – $d_1$  33–42,  $e_1$ – $e_1$  22–30 shorter vs.  $c_1$ – $c_1$  72–90,  $d_1$ – $d_1$  55–70,  $e_1$ – $e_1$  33–50 in *B. (L.) cooremani*; **(5)** having longer setae in the internal femoral upper row of leg I: 50–55 long vs. about 40 in *B. (L.) cooremani*; **(6)** having some flattened setae on femora and genua II–IV vs. all legs with normal setae in *B. (L.) cooremani*. *Bryobia (L.) hadizeni* **sp. nov.** is easily separated from *B. (L.) pelerepsi* Eyndhoven and Vacante (1985) previously recorded from *C. villosa* by: **(1)** the lack of obvious large dimples on idiosoma in *B. (L.) pelerepsi* which also have a narrower body (300–320  $\mu\text{m}$ ); **(2)** differences in the shape of several dorsal setae:  $c_1$  shell-like vs. spatulate elongate,  $f_1$  and  $f_2$  spatulate wide vs. elongate subspatulate and  $h_1$  elongate spatulate vs. elongate narrow and acute distally in *B. (L.) pelerepsi* and *B. (L.) hadizeni* **sp. nov.**, respectively; **(3)** a different ratio between palptarsus and thumbclaw about 1.5 in *B. (L.) pelerepsi* vs. subequal in length in *B. (L.) hadizeni* **sp. nov.**; **(4)** having three pairs of tenent hairs on empodium I vs. two pairs in *B. (L.) pelerepsi*.

## Genus *Petrobia* Murray, 1877

### *Petrobia (Mesotetranychus) tunisiae* Manson, 1964

Six females were recorded from *Hordeum* sp., in a public garden located at the center of Latakia city (35°51'65" N, 35°78'18" E). This is the first record of this species from Syria. It is widely found on several species of Poaceae in Palearctic region (Migeon and Dorkeld, 2021).

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