

False spider mites (Trombidiformes: Tenuipalpidae) from Saudi Arabia; a new species of the genus *Phytoptipalpus* Trägårdh, and first records of species in the genera *Obuloides* Baker & Tuttle and *Aegyptobia* Sayed

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Original research

ABSTRACT

A new false spider mite (Acari: Trombidiformes: Tenuipalpidae) species, *Phytoptipalpus jubailensis* n. sp., Khan, Kamran & Alatawi, is described and illustrated based on adult female, collected from *Capparis decidua* (Forssk.) Edgew. (Capparaceae). The genus *Obuloides* Baker & Tuttle is recorded for the first time from Saudi Arabia, with the record of *O. inquilinus* Ueckermann, Theron & Tiedt, from *Haloxylon salicornicum* (Moq.) Bunge ex Boiss (Amaranthaceae). In addition, two new records of species in the genus *Aegyptobia* Sayed, *A. hamus* Chaudhri and *A. abuzabiensis* Meyer & Van Dis, are presented from *Kaviria lachnantha* (Botsch.) Akhani (Amaranthaceae), and *H. salicornicum* (Moq.) Bunge ex Boiss. (Amaranthaceae), respectively.

Keywords Amaranthaceae; Capparaceae; Middle East; Taxonomy; Tetranychoidae

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Introduction

Tenuipalpidae (Acari: Trombidiformes) is one of the most important family of phytophagous mites, comprising 1013 valid species placed in 39 genera (Castro *et al.*, 2022). Several species are economically important pests of various agricultural plants and worldwide distributed (Jeppson *et al.*, 1975; Mesa *et al.*, 2009). Individuals of this family are commonly known as flat mites or false spider mites. False spider mites are poorly explored from Saudi Arabia (SA). Twenty-eight species belonging to 10 genera have been recorded till now from SA (Alatawi 2011; Alatawi and Kamran 2014; Alatawi *et al.*, 2015; Kamran *et al.*, 2016; Khan *et al.*, 2019).

Phytoptipalpus Trägårdh is a small genus of the family Tenuipalpidae, consisting of 23 nominal species distributed across the Afrotropical, Eastern Palearctic, Neotropical and Oriental regions (Mesa *et al.*, 2009; Ueckermann *et al.*, 2019; Bastani and Asadi, 2021; Castro *et al.*, 2022). Recently, Ueckermann *et al.* (2019) developed a key to species of the genus *Phytoptipalpus* which includes 22 species. *Phytoptipalpus occultuae* Ueckermann, Ochoa and Bauchan a unique species having a rudimentary leg four. Previously, only one species of *Phytoptipalpus* (*P. phoenicis* Alatawi & Kamran on date palm) have been reported from SA (Alatawi *et al.*, 2015). This genus is morphologically close to *Aegyptobia* Sayed, from which it differs by the number of anal setae, two vs. three in *Aegyptobia* (Mesa *et al.*, 2009). Kamran

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et al., 2016 and Khanjani *et al.*, 2012 transferred three species, *Aegyptobia eupharatica* Al-Gboory, *Aegyptobia populous* Papaioannou-Souliotis and *Aegyptobia salicicola* (Al-Gboory) from the genus *Aegyptobia* to *Phytoptipalpus* based on two pairs of anal setae.

Obuloides Baker & Tuttle is one of the smallest genera of flat mites, containing only eight known species (Maake and Ueckermann, 2018, Castro *et al.*, 2022). Most of the described species in this genus have been collected in Africa except for one species each from Phillipines and India in the 1970's (Baker and Tuttle, 1975; Corpuz-Raros, 1978; Ueckermann *et al.*, 2010). Most of the species in Africa have been associated with the galls and buds of the trees (Ueckermann *et al.*, 2010).

Aegyptobia is one of the largest genera in the family Tenuipalpidae with about 105 species (Kamran *et al.*, 2016; Kontschán and Ripka, 2018; Hasanvand *et al.*, 2019). Previously, only eight *Aegyptobia* species have been reported from SA (Alatawi and Kamran, 2014; Kamran *et al.*, 2016; Khan *et al.*, 2019).

In this study, a new species, *Phytoptipalpus jubailensis* n. sp., is described and illustrated based on adult female. Additionally, three species are recorded for the first time in SA: *Obuloides inquilinus* Ueckermann, Theron & Tiedt; *Aegyptobia hamus* Chaudhri and *Aegyptobia abuzabiensis* Meyer & Van Dis. Regarding to *O. inquilinus*, it is the first species of the genus recorded in SA.

Material and methods

Different provinces of SA were surveyed for the collection of Tenuipalpid mites during 2018–2022. Specimens were collected by shaking the plant foliage over a white sheet of paper and preserved in small vials containing 70% ethanol. The specimens were mounted on glass slides in Hoyer's medium under a stereomicroscope (SZX10, Olympus, Tokyo, Japan). After drying, the slide mounted specimens were examined under phase contrast microscope (BX51, Olympus®, Japan) by using diagnostic keys and available literatures. Key to the genera of Tenuipalpidae prepared by Mesa *et al.*, 2009 was used for identification. Different body parts were imaged by using an auto-montage software system (Syncroscopy, Cambridge, UK) attached to a phase contrast microscope (DM2500, Leica®, Germany), then drawn with Adobe Illustrator (Adobe System Inc., San Jose, CA, USA). All measurements are given in micro-meters (µm). The morphological terminology used in this study follows Lindquist (1985). Leg chaetotaxy is adapted from Lindquist, 1985, Xu and Fan, 2010, and Seeman and Beard, 2011. All collected specimens were deposited at Museum of Arthropods (KSMA, Acarology section), Department of Plant Protection, College of Food and Agriculture Sciences, King Saud University, Riyadh, Saudi Arabia.

Results

Family Tenuipalpidae Berlese

Genus *Phytoptipalpus* Trägårdh

Type species: *Phytoptipalpus paradoxus* Trägårdh, 1904

Diagnosis — Based on the Meyer and Van Dis, 1993 and Ueckermann *et al.*, 2019.

Phytoptipalpus jubailensis n. sp.

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(Fig. 1–4)

Diagnosis

Propodosoma postero-medially with coarse transverse, irregular broken striations and antero-medial parts is without striation; laterally longitudinal to oblique; hysterosoma with 13 pairs

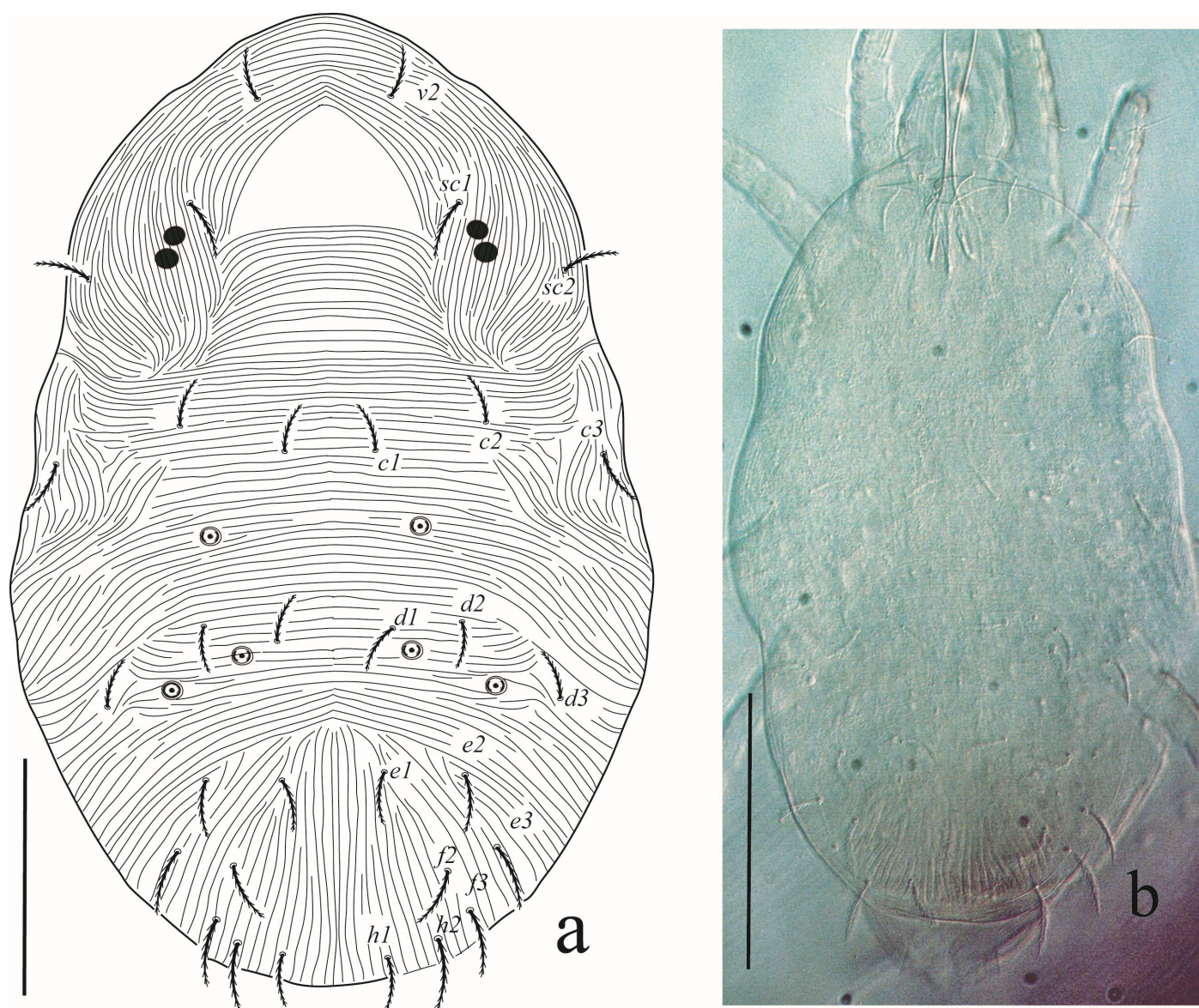


Figure 1 *Phytoptipalpus jubailensis* n. sp., adult female: **a, b** – Dorsum. Scale bars a, b = 100 μ m.

of setae (*f2* present); dorsal body setae simple, barbed and lanceolate; ventral idiosoma with coarse transverse striation; genital plate mostly smooth; palp five segmented; leg setal counts on leg I–IV trochanters, 1–1–2–1; femora, 3–3–2–1; genua, 1–1–0–0; tibiae, 4–4–3–3; tarsi 8(1 ω)–8(1 ω)–5–5.

Description of the adult Female (n=4)

Dorsum – (Fig. 1a–b). Colour in life red. Idiosoma oval. Measurements (measurements of 3 paratypes in parentheses): Length of body (excluding gnathosoma) 278 (270–285); (including gnathosoma) 346 (338–358); width 164 (158–170).

Anterior margin of prodorsum rounded (Fig. 1a). Propodosoma postero-medially with transverse broken coarse striations; antero-medial parts without striations; laterally longitudinal to oblique striations; with two pairs of small eyes, setae *v2*, *sc1*, *sc2* simple serrate, barbed and similar length. Opisthosoma medially with coarse transverse striations up to setae *e* and

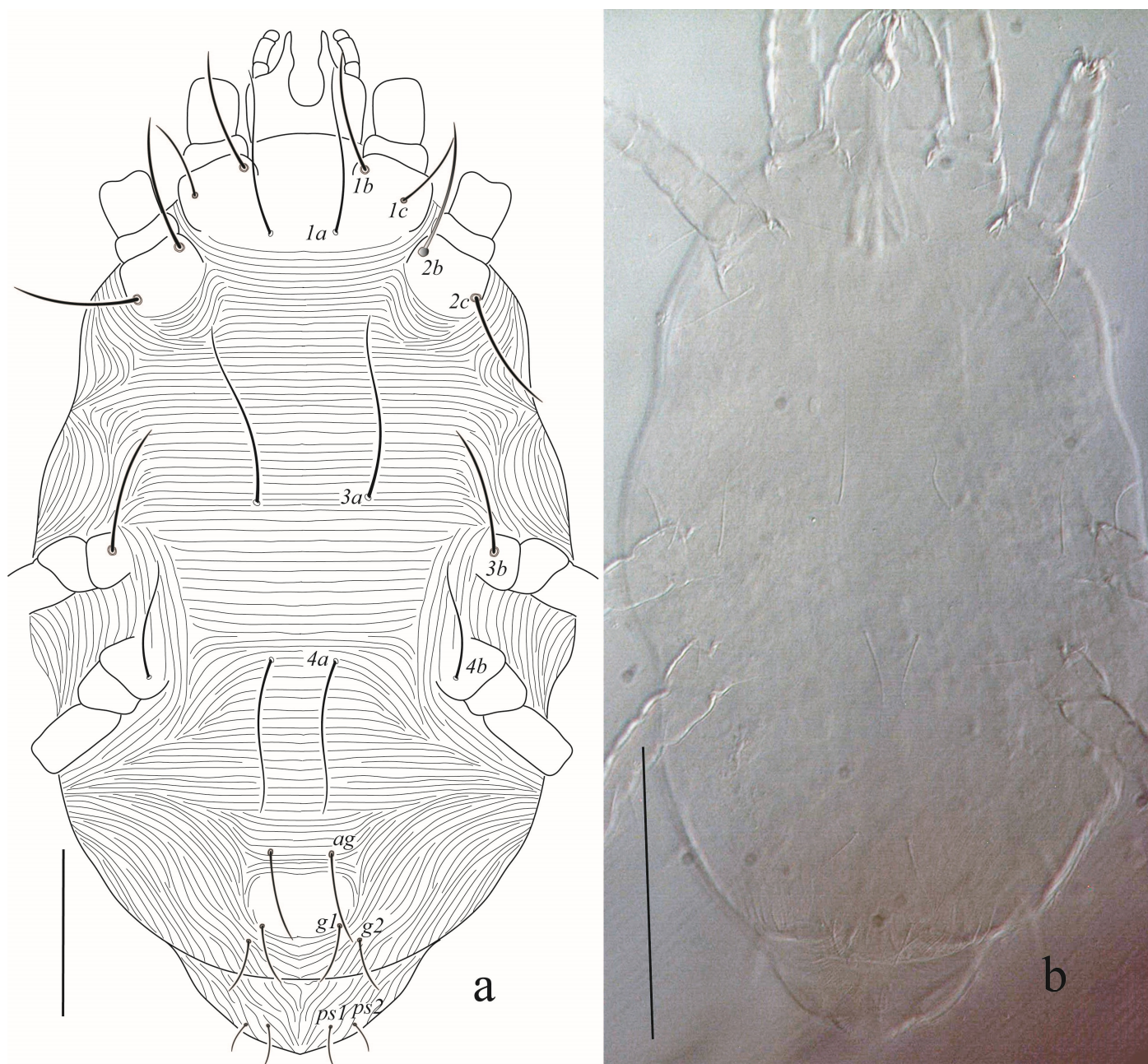


Figure 2 *Phytoptipalpus jubailensis* n. sp., adult female: **a, b** – Venter. Scale bars a, b = 100 μ m.

longitudinal laterally; hysterosoma with 13 pairs of narrowly lanceolate serrate setae, posterior hysterosoma setae (*e3*, *f2*, *f3*, *h2*) longer in length; seta *f2* present; three pairs of opisthosomal pores present between setae *c2* and *d2*; hysterosoma with inverse V-shaped and irregular striations laterally. Lengths of dorsal body setae: *v2* 19 (18–20), *sc1* 22 (20–22), *sc2* 23 (21–24), *c1* 16 (15–16), *c2* 17 (16–18), *c3* 21 (20–22), *d1* 18 (17–19), *d2* 17 (16–17), *d3* 19 (18–20), *e1* 17 (16–17), *e2* 22 (20–23), *e3* 23 (22–25), *f2* 23 (22–24), *f3* 28 (26–29), *h1* 22 (21–24), *h2* 27 (26–29); distances between dorsal setae: *v2*–*v2* 47 (45–50), *v2*–*sc1* 37 (35–39), *sc1*–*sc1* 99 (96–103), *sc2*–*sc2* 147 (143–151), *sc1*–*sc2* 32 (30–34), *sc2*–*c1* 75 (72–77), *sc2*–*c2* 52 (49–55), *sc2*–*c3* 47 (45–50), *c1*–*c1* 35 (33–37), *c1*–*c2* 36 (34–37), *c2*–*c3* 16 (14–17), *c3*–*c3* 153 (149–155), *d1*–*d1* 43 (41–45), *d2*–*d2* 84 (81–87), *d3*–*d3* 104

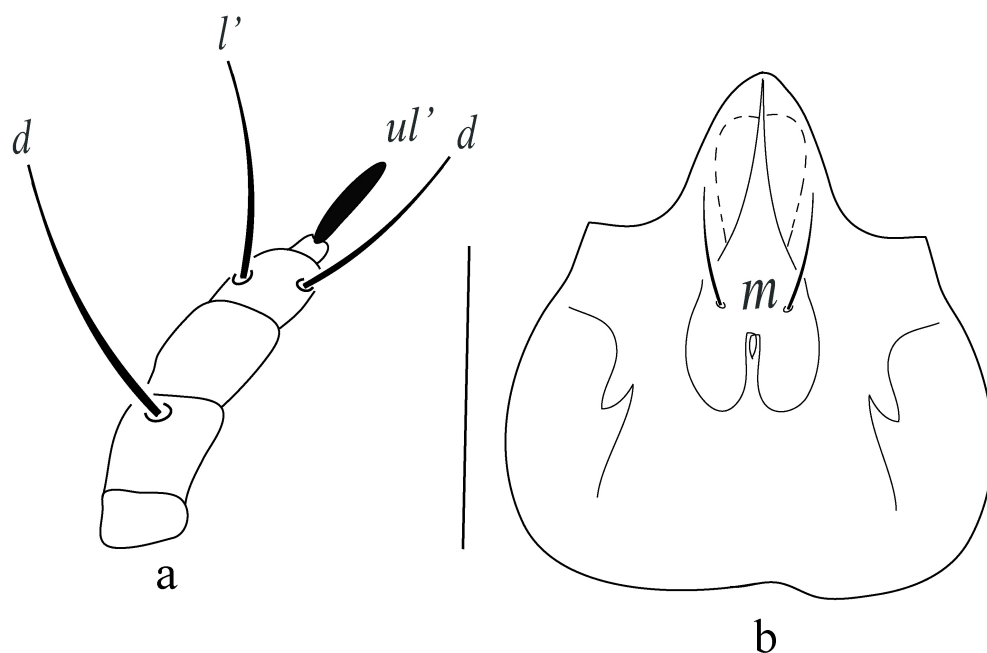


Figure 3 *Phytoptipalpus jubailensis* n. sp., adult female: **a** – Palp; **b** – Sub-capitulum. Scale bars a, b = 20 μ m.

(102–107), *d1*–*d2* 20 (19–21), *d2*–*d3* 26 (25–27), *e1*–*e1* 40 (38–43), *e2*–*e2* 89 (87–92), *e3*–*e3* 105 (99–108), *e1*–*e2* 25 (24–26), *e2*–*e3* 21 (20–23), *f2*–*f2* 80 (76–83), *f3*–*f3* 94 (92–96), *h1*–*h1* 36 (34–37), *h2*–*h2* 68 (66–70), *c1*–*d1* 53 (51–54), *d1*–*e1* 44 (42–45), *e1*–*f2* 38 (36–40), *c2*–*d2* 56 (54–58), *c3*–*d3* 65 (63–68), *d2*–*e2* 48 (46–49), *d3*–*e3* 55 (53–58), *e2*–*f2* 29 (28–30), *e3*–*f3* 13 (12–14), *f2*–*f3* 12 (11–13), *f2*–*h2* 22 (19–23), *f2*–*h1* 29 (27–30), *h1*–*h2* 17 (16–18).

Venter – (Fig. 2a–b). Ventral idiosoma with coarse transverse striations between setae *la* to *ag*; lateral opisthosomal cuticle with longitudinal striations; coxal and intercoxal setae very longer in length; genital area smooth; measurements of ventral setae; *la* 48 (46–50), *lb* 37 (35–39), *lc* 25 (23–27), *2b* 43 (40–45), *2c* 39 (37–41), *3a* 57 (54–60), *3b* 51 (49–53), *4a* 49 (46–51), *4b* 37 (35–38); one pair of aggenital setae *ag* 32 (30–33), *ag*–*ag* 19 (18–20); two pairs of genital setae, *g1* 21 (19–21), *g2* 18 (17–19), *g1*–*g1* 27 (26–27), *g2*–*g2* 39 (40–41); two pairs of pseudo-anal setae, *ps1* 13 (11–14), *ps2* 8 (7–9), *ps1*–*ps1* 40 (38–41), *ps2*–*ps2* 37 (35–38). Aggenital setae smooth and longer than genital setae; posterior ventral setae (*ps1*, *ps2*) always shorter than genital setae and finely serrate; distances between ventral setae: *la*–*la* 24 (23–25), *3a*–*3a* 38 (36–40), *4a*–*4a* 19 (18–20), *lb*–*lc* 17 (16–17), *2b*–*2c* 21 (20–22), *la*–*3a* 96 (94–99), *3a*–*4a* 48 (46–50), *4a*–*ag* 74 (73–78), *ag*–*g1* 32 (31–33), *g1*–*g2* 6 (5–6), *ag*–*g2* 35 (33–37), *g1*–*ps1* 30 (28–31), *g1*–*ps2* 32 (30–33), *g2*–*ps1* 31 (29–33), *g2*–*ps2* 34 (32–35).

Gnathosoma – (Fig. 3a–b). Rostrum reaching to the end of tibia I; palp five segmented; palp tarsus with one eupathidium, *ul* 6 (6–7); palp tibia with two setae; palp genu without seta; palp femur with a dorsal seta *d* 19 (17–20); ventral infracapitulum with setae *m* 12 (11–13), *m*–*m* 16 (15–17) (Fig. 3b).

Legs – (Fig. 4a–d). Length of legs I–IV (without coxae): 76 (73–79), 68 (65–70), 72 (69–74), 74 (72–78). Leg I–IV setal count as follows (solenidia in parenthesis): coxae 2–2–1–1; trochanters, 1–1–2–1; femora 3–3–2–1; genua 1–1–0–0; tibiae 4–4–3–3; tarsi 8 (1 ω)–8 (1 ω)–5–5; dorsal seta on femur I and II are narrowly lanceolate, similar to the dorsal body setae.

Males and immatures — Unknown

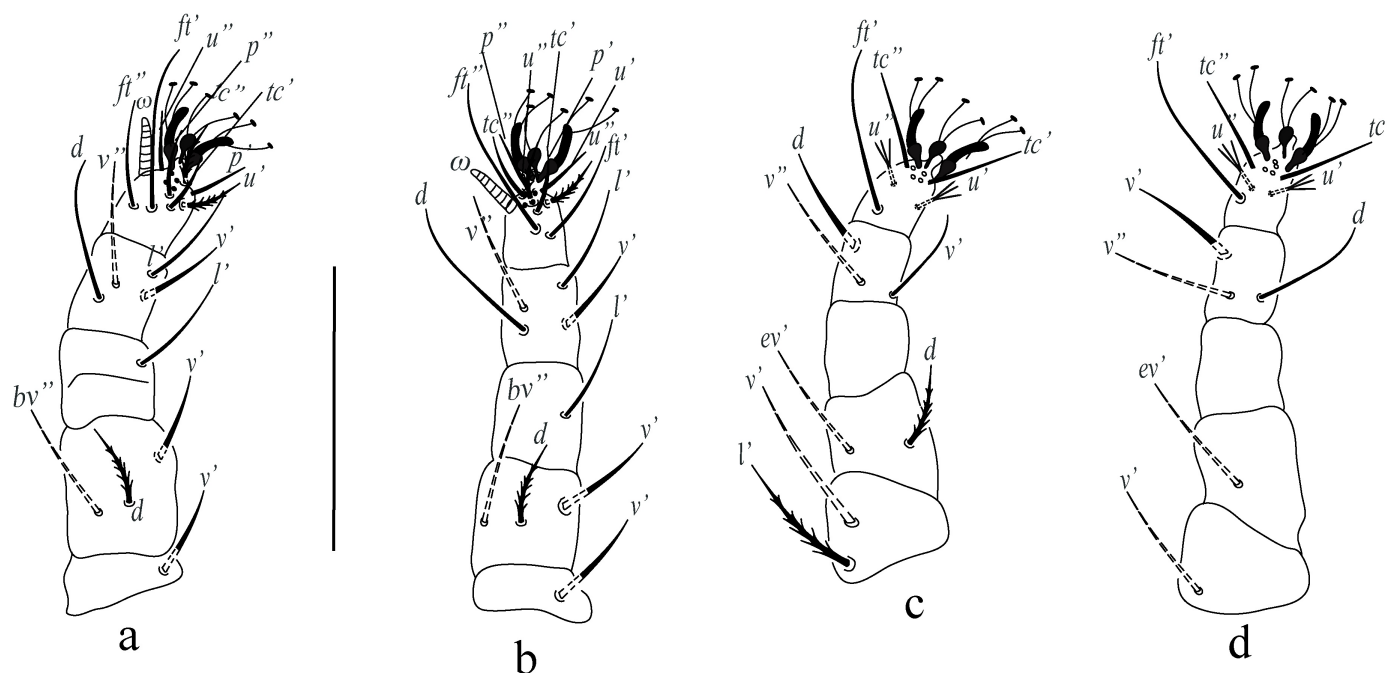


Figure 4 *Phytoptipalpus jubailensis* n. sp., adult female: **a** – Leg I; **b** – Leg II; **c** – Leg III; **d** – Leg IV. Scale bar a–d = 50 μ m.

Etymology

Name of the species is proposed on the name of the locality “Jubail” from where the type specimens were collected.

Type materials

Holotype female and three paratype females, *Capparis decidua* (Forssk.) Edgew. (Capparaceae), Jubail, Saudi Arabia, 27°4'16.15656"N, 49°35'13.4934"E, 19 October 2019, coll. M. Kamran and H. M. Saqib.

Remarks

Phytoptipalpus is small genus and include few species and there is no information on bioecological aspects, e.g. occurrence of diapause, dispersal strategies, host specificity and seasonality. Most of the species are diagnosed based only on female specimens found on different seasons and localities. *Phytoptipalpus jubailensis* n. sp., is varying from all other species in the genus *Phytoptipalpus* based on the dorsomedial striae. The striae on posterior half part of propodosoma dorsomedially with coarse transverse whereas anteriorly smooth (without striations). The new species closely resembles *P. eupharatica* (Al-Gboory, 1987) which has been reported from Iraq, geographically closes to Saudi Arabia. However, propodosoma dorsomedially posterior half in the new species has coarse transverse striations, whereas these striations are longitudinal to “v» shaped in *P. eupharatica*. Also, the area between the anterior and posterior medioventral metapodosomal setae is transverse in the new species vs. smooth in the *P. eupharatica*. These two species are also different in legs chaetotaxy on trochanter III; 2 vs. 1, tibiae I–II; 2 vs. 1 and 4–4 vs. 3–3 respectively, in *P. eupharatica* (Al-Gboory, 1987).

New records for Saudi Arabia

The collection data including distribution, host, and global positioning system (GPS) coordinates of some newly recorded tenuipalpid mites from Saudi Arabia.

Genus *Obuloides* Baker and Tuttle

Obuloides inquilinus Ueckermann, Theron & Tiedt

Obuloides inquilinus Ueckermann, Theron & Tiedt, 2010: 164.

Material examined — Five females, three males, two nymphs, *Haloxylon salicornicum* (Moq.) Bunge ex Boiss. (Amaranthaceae), Faifa, Jazan, 17°15'.643"N, 43°07'.06"E, 08 October 2020, coll. Eid M. Khan, J. H. Mirza and H. M. Saqib.

Distribution — South Africa (Ueckermann *et al.*, 2010).

Known hosts — Gall of *Grewia flava* DC (Malvaceae) (Ueckermann *et al.*, 2010).

Genus *Aegyptobia* Sayed

Aegyptobia hamus Chaudhri

Aegyptobia hamus Chaudhri, 1972: 20.

Material examined — Two females, *Kaviria lachnantha* (Botsch.) Akhani (Amaranthaceae), Khobar, 26°14'26.18016"N, 49°59'44.0574"E, 17 October 2019, coll. M. Kamran and H. M. Saqib; two females, *Fagonia boveana* (Hadidi) El Karemy and El Naggat (Zygophyllaceae), near Dhahran Beach, 25°46'43.482"N, 49°35'13.4934"E, 17 October 2019, coll. M. Kamran and H. M. Saqib; seven females, *Kaviria lachnantha*, Khobar, 26°24'25.7508"N, 50°8'24.8477"E, 18 October 2019, coll. M. Kamran and H. M. Saqib; two females, *Heliotropium bacciferum* Forssk. (Boraginaceae), Jubail, 26°58'16.320"N, 49°40'13.231"E, 19 October 2019, coll. M. Kamran and H. M. Saqib.

Distribution — Pakistan and Iran (Chaudhri, 1972; Farzan and Asadi, 2015).

Known hosts — *Heliotropium* sp. (Boraginaceae), *Thuja orientalis* (Cupressaceae), *Cassia fistula* (Leguminosae), *Fallopia convolvulus* (Polygonaceae) (Chaudhri, 1972; Chaudhri and Akbar, 1985; Farzan and Asadi, 2015; Castro *et al.*, 2022).

Aegyptobia abuzabiensis Meyer & Van Dis

Aegyptobia abuzabiensis Meyer & Van Dis, 1993: 314.

Material examined — Two females, *H. salicornicum* (Moq.) Bunge ex Boiss. (Amaranthaceae), Khobar, 25°54'13.853"N, 49°39'22.644"E, 17 October 2019, coll. M. Kamran and H. M. Saqib.

Distribution — Abu-Zabi (Abu-Dhabi), United Arab Emirates (Meyer and Van Dis, 1993; Castro *et al.*, 2022).

Known hosts — *Cornulaca monacantha* Delile (Amaranthaceae) (Meyer and Van Dis, 1993; Castro *et al.*, 2022).

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