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First record of the mite family Teneriffiidae (Prostigmata: Anystoidea) from Saudi Arabia with the description of a new species

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Original research

ABSTRACT

The family Teneriffiidae Thor is reported for the first time from Saudi Arabia, with the description of a new species of the genus *Parateneriffia* Thor, *P. abhaensis* n. sp. The specimens of new species were found in soil litter and leaf debris collected from Southwestern Region (Abha) of Saudi Arabia.

Keywords diversity; morphology; predatory mites; soil litter; leaf debris**Zoobank** <http://zoobank.org/7A794B2D-18CC-4BF1-B2CC-ECE159D430D1>

Introduction

The mites of the family Teneriffiidae Thor (Acari: Prostigmata: Anystoidea) are moderately sized (about 800 ~ 1000 µm), fast moving predators (Walter *et al.* 2009; Zmudzinski *et al.* 2021; Beron 2022). The species have been reported to inhabit both the terrestrial (trees, rocks, caves, mountains, etc.) and marine habitats (Bernardi *et al.* 2012; Beron 2022). The biology and ecology of teneriffids are poorly known, except for a single observation of an immobile pre larva enclosed in an eggshell (Otto 1997).

The taxonomy of the family Teneriffiidae has been recently revised where only two genera i.e., *Teneriffia* Thor (10 species) and *Parateneriffia* Thor (14 species) were recognized (Mirza *et al.* 2023). The species of both the genera have been reported from different countries over the globe including Austria, Australia, Brazil, China, Egypt, Ethiopia, France, India, Iran, Japan, Malaysia, Mexico, Namibia, Paraguay, Spain, Switzerland, Tadjikistan, Turkey, USA, and Yemen (Beron 2022).

Previously, from Saudi Arabia, the superfamily Anystoidea was represented by only the family Anystidae Oudemans, with three genera and four species (Alatawi and Kamran 2017). The present research reports the family Teneriffiidae Thor (Prostigmata: Anystoidea) for the first time from Saudi Arabia, with the genus, *Parateneriffia*, and a new species, *P. abhaensis* n. sp. The specimens of the new species were found in soil litter from Southwestern (Abha), Saudi Arabia.

Material and Methods


The specimens were collected from soil debris and leaf litter through Berlese's funnel. The collected mite specimens were directly mounted on slides in Hoyer's medium under a stereomicroscope (SZX10, Olympus, Tokyo, Japan), and identified under a phase contrast microscope (DM2500, Leica, Wetzlar, Germany). Different mite body parts were pictured using an

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auto-montage software system (Syncroscopy, Cambridge, UK) and then drawn with Adobe Illustrator (Adobe System Inc., San Jose, CA, USA). The notation of the idiosomal setae follows that of Kethley (1990) and the notation of the cupules and female and male genitalia that of Judson (1995). All measurements of the holotype and paratypes (as ranges in parenthesis) are given in micrometers (μm). All specimens of new species have been deposited in KSMA (King Saud University Museum of Arthropods, Acarology section), Department of Plant Protection, College of Food and Agriculture Sciences, King Saud University, Riyadh, Saudi Arabia.

Results

Family Teneriffiidae Thor 1911

Genus *Parateneriffia* Thor 1911

Type species — *Parateneriffia bipectinata* Thor 1911

Genus Diagnosis — As emended by Mirza *et al.* (2023)

Parateneriffia abhaensis n. sp.

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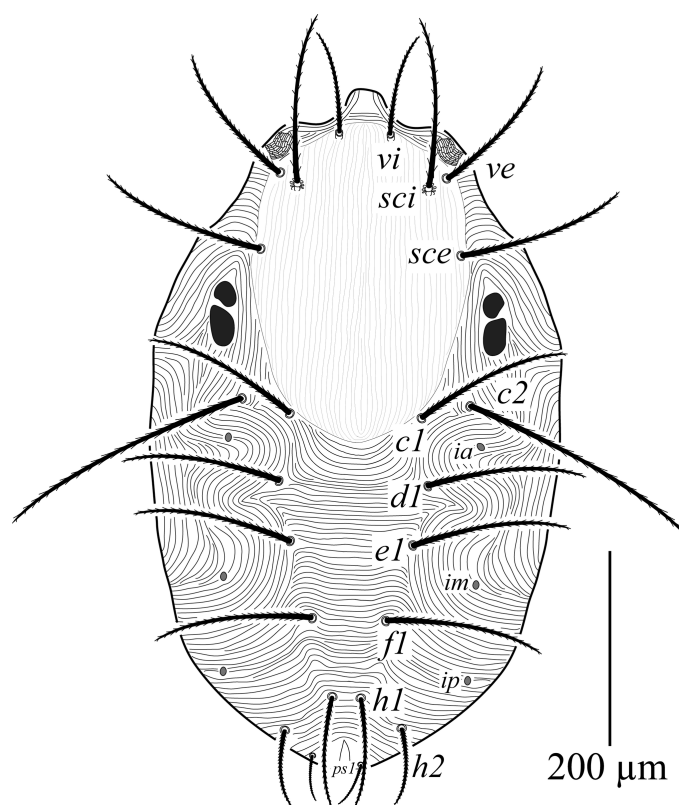


Figure 1 *Parateneriffia abhaensis* n. sp., female, dorsum.

Diagnosis

Females with prodorsal shield, oncophysis on palpgenu present, dorsal setae c_2 setae reaching f_1 , five setae on each telofemur III IV, genu II with 8 setae, a solenidion on each tibiae IV and tarsus III, subcapitular setae barbed, and number of setae on trochanter IV.

Female (n = 3)

Idiosoma oval. Body length (base of palp tibial claw to caudal margin) 882 (871–893), excluding gnathosoma 702 (695–712); width 435 (428–440) at level of seta c_2 .

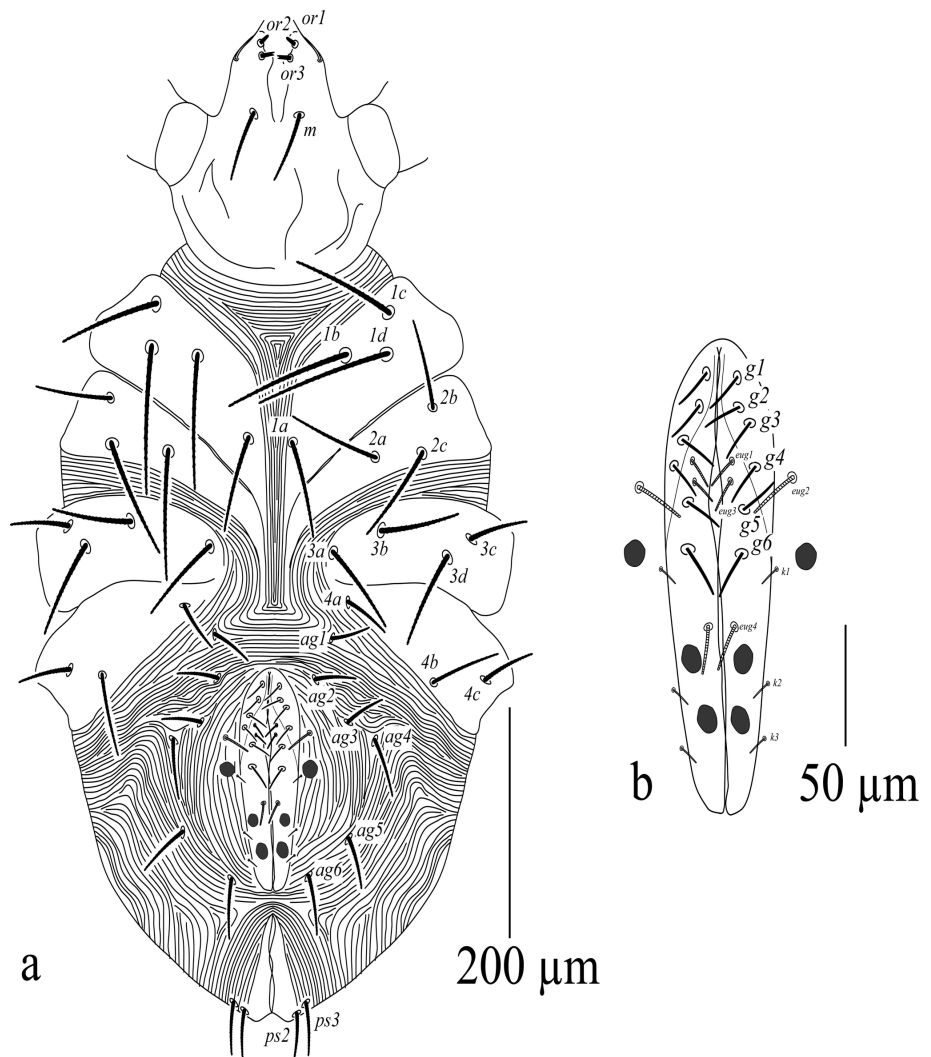


Figure 2 *Parateneriffia abhaensis* n. sp., female, a – venter; b – genital region.

Dorsum — (Figure 1) Prodorsal shield almost oval, 313 (310–318) long, 210 (210–217) wide at level of setae sce , apparently without pores and with weak regular longitudinal striations, two pairs of eyes adjacent to setae sce on body integument, anterior and posterior pairs 32 (30–31) and 41 (40–42) in diameter, respectively. Hysterosoma with three pairs of cupules (ia , im and ip) near setae d_1 , f_1 and h_1 . Prodorsal shield with four pairs of setae of which two pairs trichobothria (sci and vi); opisthosoma striated, bearing seven pairs of barbed setae (c_1 , c_2 , d_1 , e_1 , f_1 , h_1 , h_2). Stigmatic opening anterior to setae vi and near to base of chelicera, with about 13 rows of elongate alveoli at opening of peritremes. Lengths of dorsal setae as follows: vi 102 (103–105), ve 140 (138–141), sci 151 (150–153), sce 185 (180–197), c_1 175 (172–179), c_2 292 (288–298), d_1 175 (168–177), e_1 165 (162–167), f_1 150 (148–156), h_1 126 (124–128), h_2 80 (75–86). Distances between dorsal setae: vi – vi 45 (40–45), ve – ve 162 (160–167), sci – sci 131 (129–132), sce – sce 203 (196–202), vi – ve 75 (72–74), sci – ve 19 (15–20), sce – sci 74 (70–73), sce – c_1 175 (174–175), c_1 – c_1 125 (122–127), c_1 – c_2 55 (53–56), c_2 – c_2 232 (228–237), c_1 – d_1 73

(70–75), d_1-d_1 153 (150–152), d_1-e_1 65 (63–66), e_1-e_1 125 (120–124), e_1-f_1 80 (79–82), f_1-f_1 78 (75–76), f_1-h_1 85 (82–85), h_1-h_1 35 (32–34), h_2-h_2 121 (118–123). Ratios between $vi/vivi$ 2.26 (2.3–2.57); $ve/ve-ve$ 0.86 (0.84–0.86), $sci/sci-sci$ 1.15 (1.15–1.16), c_1/c_1-c_1 1.4 (1.41); c_2/c_2c_2 1.26 (1.24–1.26); d_1/d_1-d_1 1.14 (1.12–1.16); e_1/e_1-e_1 1.32 (1.31–1.35); f_1/f_1-f_1 1.92 (1.97–2.05); h_1/h_1-h_1 3.65 (2.76–3.8); h_2/h_2-h_2 0.66 (0.67).

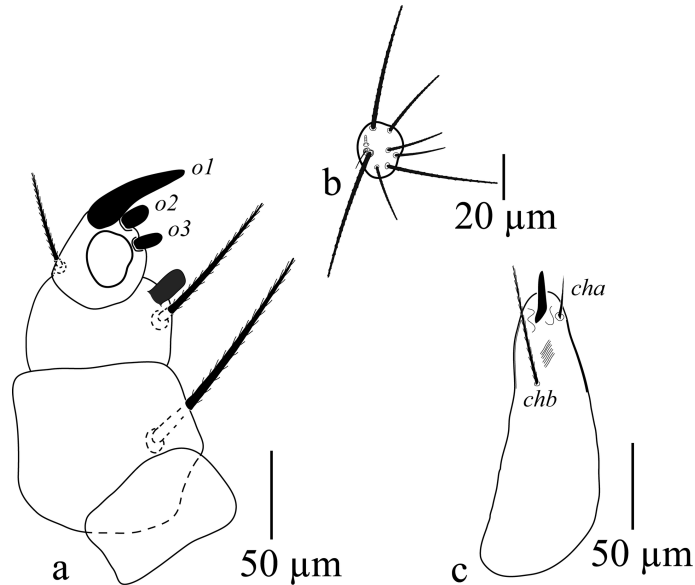


Figure 3 *Parateneriffia abhaensis* n. sp., female, a – palp; b – palp tarsus enlarged; c – chelicerae.

Venter — (Figure 2) Ventral cuticle striated. Coxisternal shields smooth, bearing 14 pairs of setae (*la, lb, lc, ld, 2a, 2b, 2c, 3a, 3b, 3c, 3d, 4a, 4b* and *4c*); coxisternal shields of legs I and II is fused, separated from those of legs III and IV. Aggential area with six pairs of setae (ag_{1-6}), genital valves with six pairs of genital setae (g_{1-6}), four pairs of eugenital setae (eug_{1-4}), three pairs of papillae associated setae (k_{1-3}), and three pairs of genital papillae; anal valves with three pairs of pseudanal setae (ps_{1-3}). Measurements of setae: g_1 18 (16–20), g_2 17 (16–18), g_3 18 (17–18), g_4 19 (17–19), g_5 15 (14–16), g_6 21 (20–21); ag_1 42 (41–44), ag_2 41 (38–40), ag_3 38 (36–37), ag_4 48 (47–49), ag_5 53 (52–55), ag_6 46 (44–45), k_1 6 (5–7), k_2 8 (7–8), k_3 7(8), eug_1 18 (17–20), eug_2 22 (21–22), eug_3 15 (14–15), eug_4 11(10–11), ps_1 42 (40–44), ps_2 40 (38–40), ps_3 42 (41–42). Distances between setae: g_1-g_1 15 (11–14), g_2-g_2 20 (17–19), g_3-g_3 28 (27–29), g_4-g_4 33 (32–33), g_5-g_5 29 (28–30), g_6-g_6 23 (21–22); g_1-g_2 8 (7–8), g_2-g_3 10 (9–10), g_3-g_4 15 (13–15), g_4-g_5 13 (12–13), g_5-g_6 16 (15–17); ag_1-ag_1 95 (93–96), ag_2-ag_2 95 (94–95), ag_3-ag_3 121 (120–122), ag_4-ag_4 190 (188–190), ag_5-ag_5 170 (165–168), ag_6-ag_6 65 (62–65), ag_1-ag_2 31 (29–33), ag_2-ag_3 38 (37–38), ag_3-ag_4 33 (31–33), ag_4-ag_5 77 (75–77), ag_5-ag_6 62 (62–64), ps_1-ps_1 50 (49–50), ps_2-ps_2 65 (65–68), ps_3-ps_3 63 (62–64). Setae ps_{1-3} fine and barbed.

Gnathosoma — (Figure 3) Palp five segmented, palptarsus reduced, with eight setae including a solenidion 3 (4) long; palptibia with one robust terminal spur (*o1*) 50 (50–51), two subterminal spurs (*o2-3*), 17 (16–18) and 14 (15) long, respectively, plus one serrated seta; palp femur and genu each with one seta, 123 (121–122) and 70 (70–71) long, respectively; oncophysis on distal end of genu 11 (11–12) long. Chelicerae 175 (176), movable digit 30 (29–31), with setae *cha* 38 (38–39) and *chb* 72 (71–72); with one pair serrated subcapitular setae (*m*) and three pairs of adoral setae: *m* 65 (62–65); *or1* 46 (45–46), *or2* 10 (9–10) and *or3* 13 (12–13), *or3* distinctly forked; distances between setae: *m-m* 44 (43–43), *or1-or1* 80 (80–81), *or2-or2* 32 (30–32), *or3-or3* 30 (29–30).

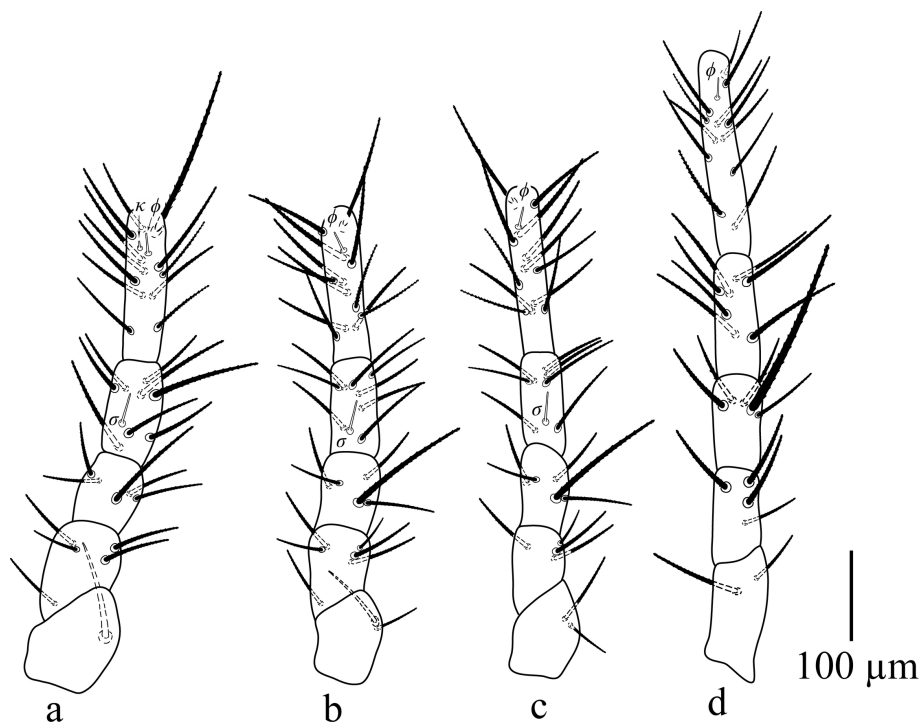


Figure 4 *Parateneriffia abhaensis* n. sp., female, a – trochanter-tibia I; b – trochanter-tibia II; c – trochanter-tibia III; d – trochanter-tibia IV.

Legs — (Figures 4-5) Leg IV much longer than total length of body; each side of claws on tarsi I II with 12 strong pectinations without empodial claw; tarsi III IV claws with weak pectinations and each with one median pectinate empodium. Measurements of legs from trochanter to tip of true claws as follows: leg I 775 (770–776); leg II 780 (775–779); leg III 875 (869–873); leg IV 1075 (1072–1081). Setal formulae of leg (I IV) segments as follows (solenidia in parenthesis): coxae 4 3 4 3; trochanters 1 2 2 2; basifemora 5 6 4 4; telofemora 5 5 5 5, genua 8(1 σ) 8(1 σ) 7(1 σ) 7; tibiae 12(1 ϕ)(1 κ) 12(1 ϕ) 12(1 ϕ) 12(1 ϕ); tarsi 27(3 ω) 27(3 ω) 23(1 ω)+1tric 23(2 ω)+1tric; ω I 16(16), ω II 20 (18–19), ω 3I 10 (9–10), ω 1II 20 (19–20), ω 2II 17 (16), ω 3II 10 (11), ω 1III 15 (16), ω 1IV 18 (17–18), ω 2IV 17 (16–17), κ TiI 7 (8), ϕ I 21 (19–20), ϕ II 22 (22–24), ϕ III 23 (22–23), ϕ IV 21 (20–21); σ I 31 (30–31), σ II 28 (27–29), σ III 33 (32–33). Tarsi III IV with one long bothridial seta each, 118 (115–120) and 135 (135–136) long, respectively.

Etymology

The specific epithet (*abhaensis*) is derived from the name of region, Abha, where the type specimens of the new species were collected.

Type Material

One holotype (KSMAAS-19-Ten-Par-01) and two paratype females (KSMAAS-19-Ten-Par-02, KSMAAS-19-Ten-Par-03), soil litter and leaf debris, Wadi Al Gharr, Abha, 19.02250°N, 42.12192°E, October 29, 2019, coll. M. Kamran & H.M.S. Mushtaq.

Remarks

The new species, *P. abhaensis* n. sp., is morphologically close to *P. khorrambadiensis* (Khanjani *et al.* 2014) and *P. shiraziensis* (Khanjani *et al.* 2013) based on the presence of

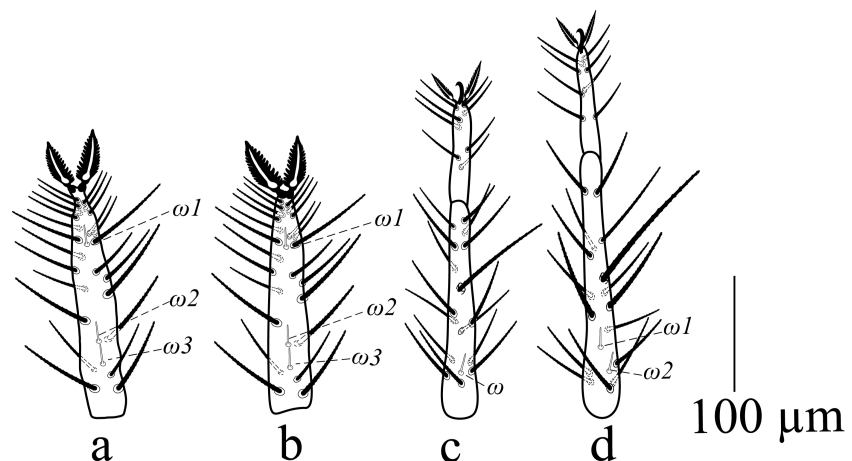


Figure 5 *Parateneriffia abhaensis* n. sp., female, a – tarsus I; b – tarsus II; c – basi and telotarsus III; d – basi and telotarsus IV.

prodorsal shield, oncofysis on palpgenu, leg genu IV without solenidion and number of setae on leg basifemora I-IV. However, *P. abhaensis* n. sp. is distinct from both of the species based on number of setae on telofemora III-IV (5-5 in new species vs 4-4 in both species), genu II excluding solenidion (8 in new species vs 7 in both species) and number of solenidion on tibiae IV (one in new species vs three in both species), tarsus III (one in new species vs two in *P. shiraziensis* and absent in *P. khorramabadiensis*). Further, *P. abhaensis* n. sp., can be differentiated from *P. khorramabadiensis* due to subcapitular setae barbed vs simple; *Parateneriffia abhaensis* n. sp., can also be distinguished from *P. shiraziensis* based on length of setae *c*₂ setae (reaching *f*₁ vs reaching *h*₁) and number of setae on trochanter IV (2 vs 3).

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