

Article

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A new species of *Stigmaeus* (Acari: Trombidiformes: Stigmaeidae) from Brazil

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Abstract

A new species of the genus *Stigmaeus*, *S. brasiliensis* **sp. nov.** is described based on females, males and deutonymphs, collected from the São Paulo state, Brazil.

Key words: Female; predatory mites; Prostigmata; Raphignathoidea; São Paulo state.

Introduction

The family Stigmaeidae has a worldwide range of distribution. These mites are found in various ecosystems such as soil, moss and lichen, foliage, branches, trunks, litter, etc. (Fan and Zhang 2005). Many of Stigmaeidae are generalist predators mainly feeding on gall and rust mites (Eriophyoidea), spider mites (Tetranychidae), false spider mites (Tenuipalpidae), broad mites (Tarsonemidae) and other mites in the field and greenhouses (Fan and Flechtmann 2015). *Stigmaeus* is one of the oldest and most diverse genera in the Stigmaeidae. Although 141 species of *Stigmaeus* are known worldwide (Doğan *et al.* 2015; Khaustov 2015), before this study, only one species had been reported from the Brazil, namely *Stigmaeus constrictus* Summers, 1962 by Flechtmann (1981). In this paper, we describe *Stigmaeus brasiliensis* **sp. nov.**, as the first new species of *Stigmaeus* from Brazil.

Material and methods

Mites were extracted from leaves by using a Berlese-Tullgren funnel. Specimens were cleared in Nesbitt's fluid, mounted in Hoyer's medium (Walter and Krantz 2009) and were examined under a phase contrast microscope (Olympus, BX41). Illustrations were done with a drawing tube attached to the phase contrast microscope. The length of the gnathosoma was measured from the base to the tip of the subcapitulum, the length of the idiosoma from the suture between the gnathosoma and idiosoma to the posterior

margin of the idiosoma, the width of the idiosoma at its broadest level, and the legs from the ventral insertion of coxae to the base of the pretarsi. The terminology and abbreviations are based on Grandjean (1944) and Kethley (1990). All measurements are given in micrometers (μm) for the holotype and paratypes (in parentheses).

Results

Genus *Stigmaeus* Koch, 1836

Type species: *Stigmaeus cruentus* Koch, 1836.

Stigmaeus brasiliensis sp. nov. (Figs. 1–16)

Description

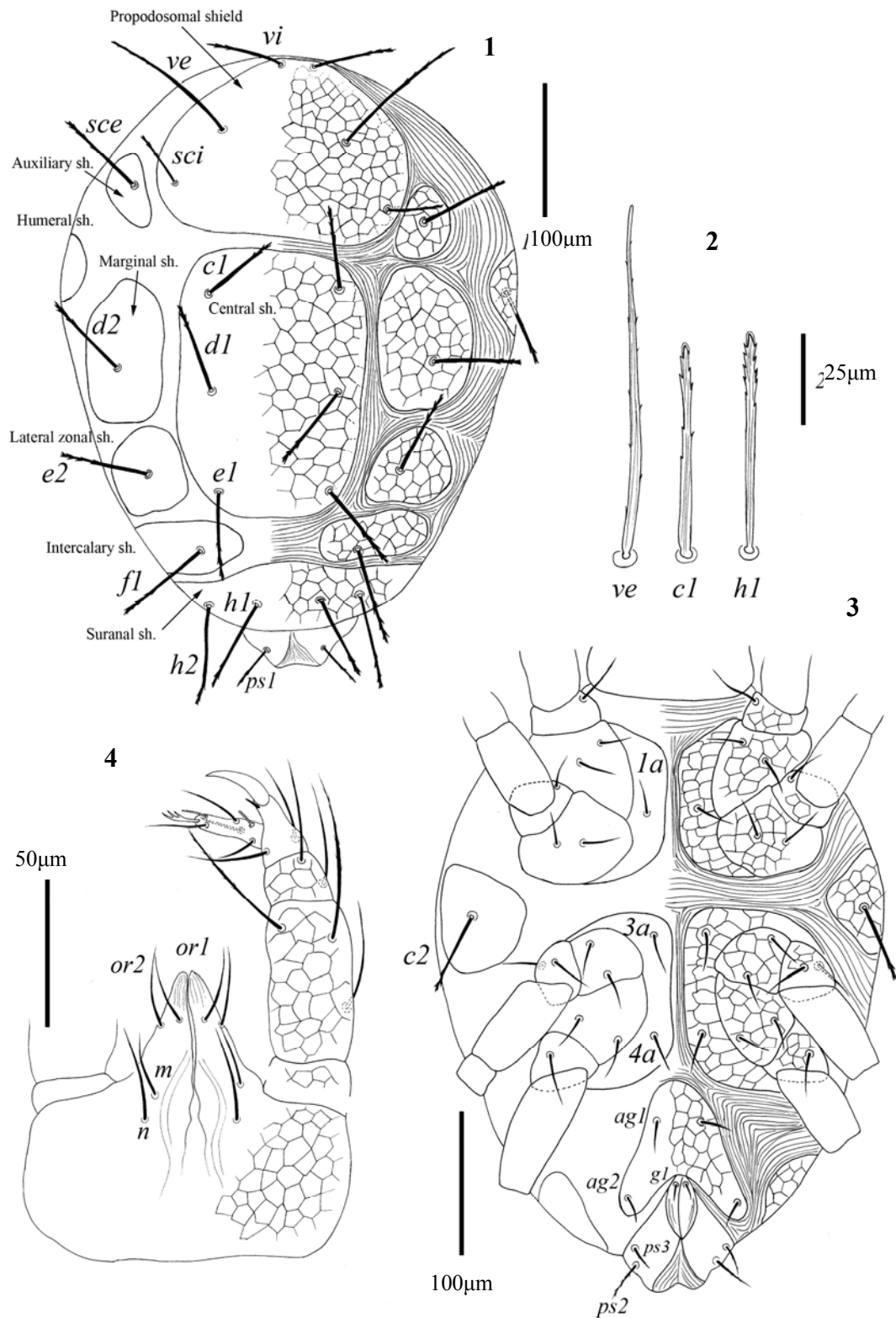
Female (n = 4) – Length of idiosoma 411 (348–487); length of gnathosoma with palp 163 (145–165); width of idiosoma 313 (286–384). Length of legs I–IV (from base of coxa to tip of tarsal claw): 312 (246–317); 248 (202–255); 221 (203–243); 275 (236–296).

Dorsum (Figs. 1, 2) – Dorsum with 13 pairs of setae (setae h_3 absent). All dorsal shields reticulated; propodosomal shield with three pairs of setae (vi , ve and sci); eyes and postocular bodies (pob) absent; setae sce located on auxiliary shields; central hysterosomal shield with three pairs of setae (c_1 , d_1 , e_1); setae d_2 located on marginal hysterosomal shields; humeral shields situated latero-ventrally and bearing setae c_2 ; intercalary shields divided and with setae f_1 ; e_2 situated on lateral zonal shields; suranal shield entire and with two pairs of setae (h_1 and h_2); all dorsal setae (except setae ve) distinctly barbed in distal half, with a small membrane or hyaline sheath (some paratypes without a small membrane); setae ve (Fig. 2) pointed distally and with so few faint serrations although at first glance to appear smooth. Lengths of dorsal setae: vi 53 (48–61); ve 99 (75–110); sci 43 (37–44); sce 62 (55–67); c_1 61 (47–64); c_2 59 (50–65); d_1 64 (50–68); d_2 62 (48–71); e_1 63 (48–68); e_2 62 (51–67); f_1 69 (52–74); h_1 61 (54–65); h_2 72 (58–75). Distances between dorsal setae: vi – vi 20 (22–24); ve – ve 85 (73–96); vi – ve 71 (47–67); ve – sci 53 (43–62); sci – sci 149 (126–170); sce – sce 208 (172–230); sci – sce 28 (23–34); c_1 – c_1 91 (67–100); c_1 – d_1 69 (56–78); c_1 – c_2 125 (78–114); c_2 – c_2 291 (232–331); d_1 – d_1 88 (82–103); d_1 – d_2 71 (58–95); d_1 – e_1 72 (53–82); d_2 – e_2 78 (75–102); e_1 – e_1 80 (62–84); e_1 – e_2 51 (55–74); e_1 – f_1 42 (39–63); f_1 – f_1 110 (102–128); f_1 – h_1 42 (46–63); f_1 – h_2 30 (33–52); h_1 – h_1 45 (42–47); h_2 – h_2 108 (86–110); h_1 – h_2 30 (23–31).

Venter (Fig. 3) – Endopodal shields with reticulations, well divided by striae and with three pairs of ventral setae ($1a$, $3a$ and $4a$). Aggenital plate with two pairs of aggenital setae (ag_1 , ag_2); anogenital area with one pair of genital setae (g_1) and three pairs of pseudanal setae (ps_1 – ps_3); all ventral setae smooth and pointed, except for setae ps_1 – ps_3 which are barbed. Measurements of setae: $1a$ 28 (22–28); $3a$ 30 (23–28); $4a$ 28 (22–30); ag_1 27 (23–30); ag_2 24 (18–23); ps_1 33 (26–40); ps_2 28 (24–28); ps_3 24 (22–26); g_1 16 (14–19).

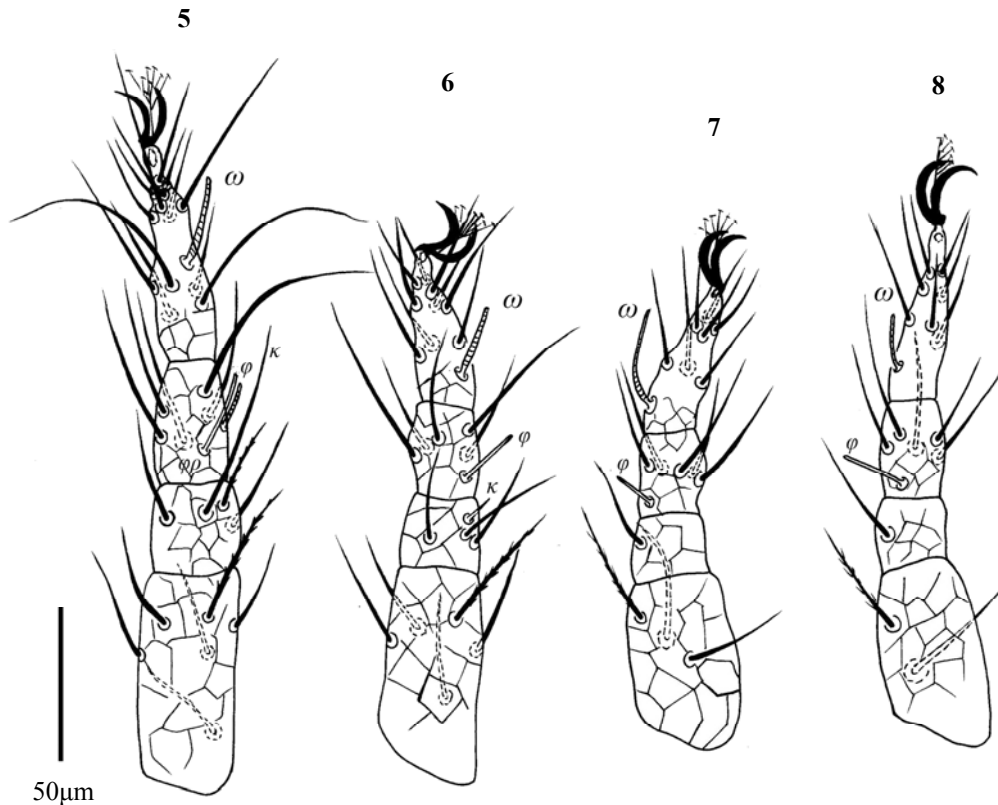
Gnathosoma (Fig. 4) – Subcapitulum 98 (72–92) (Fig. 4) with reticulations, bearing subcapitular setae m 25 (23–26) and n 23 (18–27), and adoral setae or_1 23 (18–22) and or_2 30 (22–30). Distance m – m 30 (26–34), n – n 30 (28–30), m – n 11 (12–15). Palpus 120 (102–123) long (Fig. 4), palptrochanter without setae; palpfemur with three setae; palpgenu with two setae; palptibia with two tactile setae + one well-developed claw + one spine-like accessory claw; palptarsus with four tactile setae + one solenidion (ω),

one subapical eupathidium and one distal trifold eupathidium.



Figures 1–4. *Stigmaeus brasiliensis* sp. nov. (female) – 1. Dorsal view of idiosoma; 2. Dorsal body setae; 3. Ventral view of idiosoma; 4. Subcapitulum (ventral view); Palp (dorsal view).

Legs (Figs. 1, 5–8) – All legs with reticulations. Setation: coxae (excluding *1a*, *3a* and *4a*) 2+*elcp*-2-2-2, trochanters 1-1-2-1, femora 6-5-3-2, genua 3(+1 κ)-3(+1 κ)-1-1, tibiae 5(+1 ϕ +1 $\phi\phi$)-5(+1 ϕ)-5(+1 ϕ)-5(+1 ϕ), tarsi 13(+1 ω)-9(+1 ω)-7(+1 ω)-7(+1 ω). Length of solenidia: ω I 28 (24–31); ω II 23 (22–27); ω III 35 (25–38); ω IV 20 (15–23); ϕ I 12 (13–14); $\phi\phi$ I 28 (21–30); ϕ II 20 (17–21); ϕ III 16 (13–18); ϕ IV 21 (15–20); κ I 55 (38–52); κ II 10 (8–9).

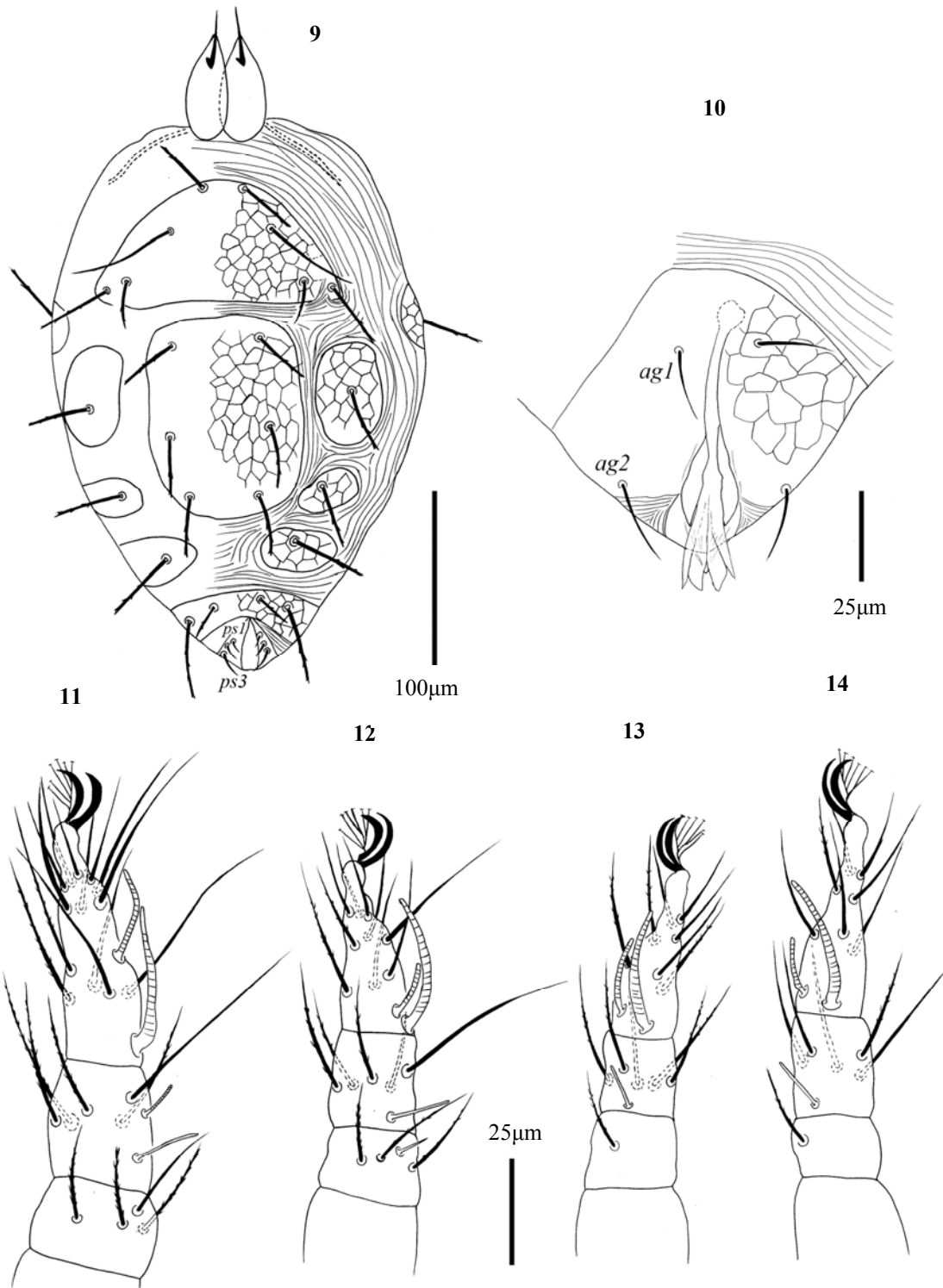


Figures 5–8. *Stigmaeus brasiliensis* sp. nov. (female) – 5. Leg I; 6. Leg II; 7. Leg III; 8. Leg IV.

Male (Figs. 9–14) – Dimensions (n = 2): Length of idiosoma 307–313; length of gnathosoma with palp 116–118; width of idiosoma 217–221; subcapitulum 62–63; palp 84–92. Length of legs I–IV (from base of coxa to tip of tarsal claw): 225–227; 180–182; 173–178; 198–203. Lengths of dorsal setae: *vi* 37–43; *ve* 63–70; *sci* 28–30; *sce* 43–44; *c1* 37–41; *c2* 40–43; *d1* 39–42; *d2* 42–45; *e1* 35–38; *e2* 42–44; *f1* 48–49; *h1* 23–24; *h2* 43–44. Distances between dorsal setae: *vi*–*vi* 19–22; *ve*–*ve* 57–60; *vi*–*ve* 28–33; *ve*–*sci* 37–40; *sci*–*sci* 102–104; *sce*–*sce* 127–130; *sci*–*sce* 13–15; *c1*–*c1* 43–52; *c1*–*d1* 45–51; *c1*–*c2* 91–92; *c2*–*c2* 203–211; *d1*–*d1* 54–62; *d1*–*d2* 48–50; *d1*–*e1* 41–42; *d2*–*e2* 58–63; *e1*–*e1* 38–43; *e1*–*e2* 32–35; *e1*–*f1* 32–36; *f1*–*f1* 70–73; *f1*–*h1* 31–37; *f1*–*h2* 32–37; *h1*–*h1* 27–30; *h2*–*h2* 57–62; *h1*–*h2* 15–17. Measurements of setae: *1a* 17–18; *3a* 17–19; *4a* 15–17; *ag1* 18–22; *ag2* 24–26; *ps1* 4–6; *ps2* 9–11; *ps3* 14–17.

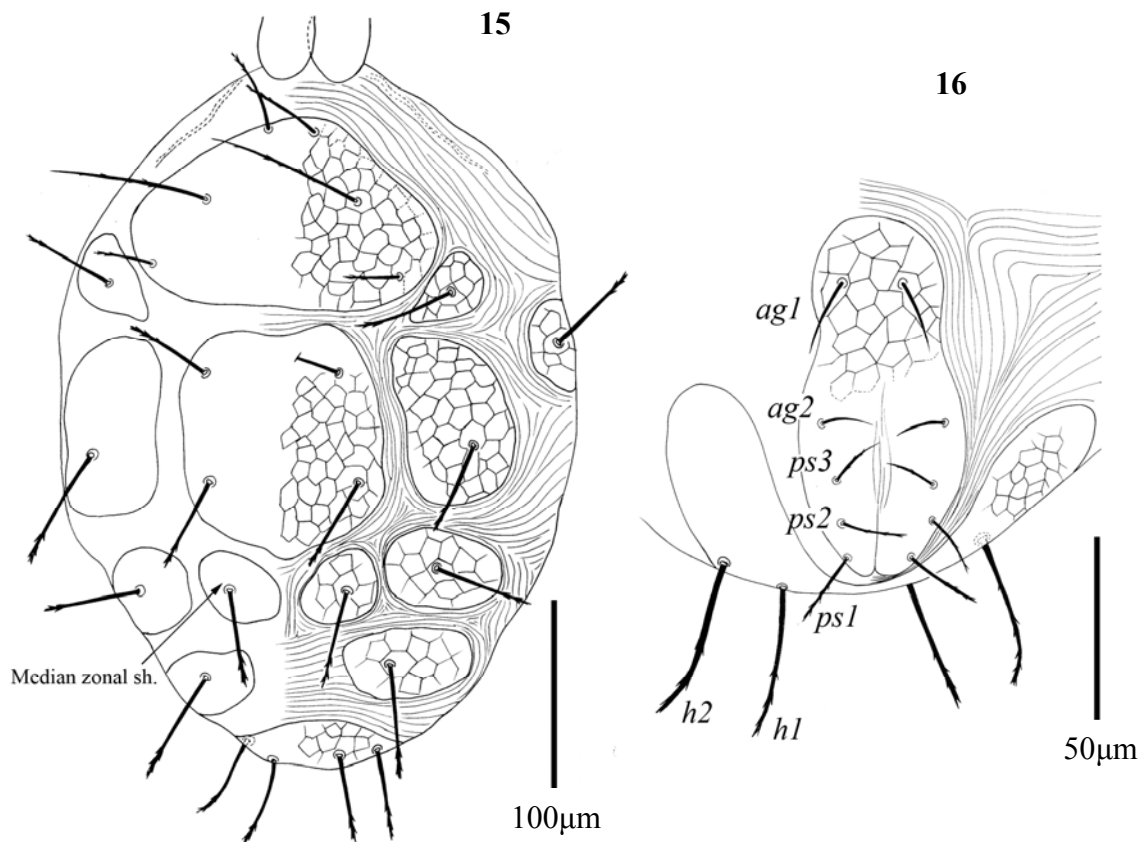
Male similar to female but differs in that setae *sce* are located on propodosomal shield (auxiliary shields partially fused to the propodosomal shield) (Fig. 9), aggenital area with two pairs of setae (*ag1*, *ag2*) (Fig. 10), anogenital area without genital setae

and with three pairs of pseudanal setae (ps_1 – ps_3); tarsi I–IV bear an extra solenidion (Figs. 11–14).



Figures 9–14. *Stigmaeus brasiliensis* sp. nov. (male) – 9. Dorsal view of idiosoma; 10. Ventral view of aggenital area; 11. Leg I; 12. Leg II; 13. Leg III; 14. Leg IV.

Deutonymph (Figs. 15–16) – Dimensions (n = 2): Length of idiosoma 320–373; length of gnathosoma with palp 131–143; width of idiosoma 246–283; subcapitulum 60–71; palp 88–107. Length of legs I–IV (from base of coxa to tip of tarsal claw): 214–261; 173–214; 186–196; 191–224. Lengths of dorsal setae: *vi* 40–44; *ve* 68–88; *sci* 27–32; *sce* 45–54; *c1* 38–49; *c2* 43–53; *d1* 43–54; *d2* 41–57; *e1* 41–54; *e2* 42–54; *f1* 52–61; *h1* 42–46; *h2* 42–51. Distances between dorsal setae: *vi*–*vi* 19–24; *ve*–*ve* 63–82; *vi*–*ve* 41–43; *ve*–*sci* 37–44; *sci*–*sci* 104–136; *sce*–*sce* 157–184; *sci*–*sce* 26–27; *c1*–*c1* 52–72; *c1*–*d1* 52–58; *c1*–*c2* 87–110; *c2*–*c2* 237–243; *d1*–*d1* 63–78; *d1*–*d2* 60–66; *d1*–*e1* 51–60; *d2*–*e2* 70–72; *e1*–*e1* 51–64; *e1*–*e2* 47–51; *e1*–*f1* 41–43; *f1*–*f1* 80–97; *f1*–*h1* 41–53; *f1*–*h2* 32–46; *h1*–*h1* 31–34; *h2*–*h2* 63–70; *h1*–*h2* 16–23. Measurements of setae: *1a* 17–20; *3a* 18–23; *4a* 18–22; *ag1* 17–22; *ag2* 15–19; *ps1* 17–24; *ps2* 15–20; *ps3* 13–17.



Figures 15–16. *Stigmaeus brasiliensis* sp. nov. (deutonymph) – 15. Dorsal view of idiosoma; 15. Ventral view of anogenital area.

Deutonymph similar to female but differs in that setae *e1* are located on two separated median zonal shields (Fig. 15), anogenital area with two pairs of aggenital setae (*ag1*, *ag2*), three pairs of pseudanal setae (*ps1*–*ps3*) and without genital setae (Fig. 16); trochanters I–IV 1-1-2-0, femora I–IV 6-4-3-2, genua I–IV 3(+1κ)-2(+1κ)-0-0.

Etymology

The specific epithet is derived from the country of origin “Brazil”.

Type material

Holotype and five paratype females, four paratype males and three paratype deutonymphs from samples of litter under semi-deciduous and xeromorphic plants collected at Valparaíso (21° 14' 13" S, 50° 46' 38" W) and Ipaussu (23° 05' 43" S, 49° 37' 27" W) cities, São Paulo state, Brazil on 12 Feb. 2015, by Jorge L. Muñoz Marticorena. The holotype and three paratype females, two paratype males and two paratype deutonymphs are deposited in the Acarological collection of Departamento de Entomologia e Acarologia, ESALQ-USP, Piracicaba, São Paulo State, Brazil, one paratype female and one paratype male are deposited in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, University of Maragheh, Maragheh, Iran and one paratype female, one paratype male and one paratype deutonymph are deposited in the Acarological Collection, Jalal Afshar Zoological Museum, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran.

Remarks

The new species closely resembles *Stigmaeus fissicomus* Ueckermann & Meyer, 1987 and *S. impressus* Wood, 1971 in having reticulated dorsal shields, three pairs setae on the central plate, the same leg chaetotaxy, two pairs of aggenital and one pair of genital setae; however, it can be distinguished by 1) lacking eyes (present in other species); 2) lacking postocular bodies (present in *S. fissicomus*); 3) lacking rosette-like areas (present in other species); 4) dorsal body setae d_1-f_1 and e_2 distinctly barbed in distal half (setae d_1-f_1 and e_2 asymmetrically forked distally in *S. fissicomus*); 5) dorsal body setae ve faintly barbed (smooth in *S. impressus*).

Stigmaeus brasiliensis **sp. nov.** also resembles *S. campbellensis* Wood, 1970, *S. clitellus* Summers, 1962, *S. comatus* Summers, 1962 and *S. scaber* Summers, 1962 in having reticulated dorsal shields, three pairs setae on the central plate and the same femora chaetotaxy; but differs from them by the following combination of characters: 1) two pairs of aggenital setae (three in *S. campbellensis* and *S. scaber* [based on Koç & Ayyeldiz (1997)]); 2) lacking eyes (present in *S. campbellensis* and *S. clitellus*); 3) intercalary plate divided (fused or single in *S. clitellus* and *S. comatus*); 4) genua I–IV with 4-4-1-1 setae, respectively (4-3-0-1 setae in *S. clitellus* and *S. comatus*); 5) lacking postocular bodies (present in other species).

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گونه جدیدی از *Stigmaeus* (Acari: Trombidiformes: Stigmaeidae) از برزیل

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چکیده

گونه جدیدی از جنس *Stigmaeus*، *S. brasiliensis* sp. nov. براساس نمونه‌های ماده، نر و پوره سن دوم جمع‌آوری شده از ایالت سائوپائولو برزیل، توصیف می‌شود. واژگان کلیدی: ماده؛ کنه‌های شکارگر؛ زیرراسته پیش‌استیگمایان؛ بالانواده Raphignathoidea؛ ایالت سائوپائولو.

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