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New Phytoseiidae (Acari: Mesostigmata) of Mascareignes and Comoros Archipelagos (Indian Ocean): one new record, three new species groups and description of six new species and of six unknown males

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Original research

ABSTRACT

Faunas of Phytoseiidae of the Mascareignes Archipelago (Réunion, Mauritius and Rodrigues Islands) and of the Comoros Archipelago (Mayotte, Anjouan, Mohéli and Grande Comore Islands) were recently investigated by authors of this paper and results were published in seven already published papers. We described in this eighth paper six species new to science and six unknown males collected during these surveys.

Keywords taxonomy; systematics; predatory mites; survey; *Paragigagnatus philippe* Kreiter **n. sp.**; *Amblyseius erici* Kreiter **n. sp.**; *Typhlodromalus baillodi* Kreiter **n. sp.**; *Ueckermannseius gutierrez* Kreiter **n. sp.**; *Ueckermannseius jean-marie* Kreiter **n. sp.**; *Ueckermannseius payetae* Kreiter **n. sp.**
Zoobank <http://zoobank.org/3D9E2C62-029D-48FD-AD63-210635DFF2FD>

Introduction


Mites of family Phytoseiidae are all predatory species on phytophagous mites and small insects like thrips and whiteflies, on commercial plants and the wild vegetation, many of these arthropods being important pests for agriculture. Several species are biological control agents for the control of these pest organisms in both open and protected crops all around the world (McMurtry and Croft 1997; McMurtry *et al.* 2013; Knapp *et al.* 2018).

This family is widespread around the world, present on all continents except Antarctica, and consists of about 2,521 valid species in 95 genera, 15 tribes and three subfamilies (Demite *et al.* 2021).

Despite several interests of this family and its large distribution, many areas of the world are very poorly investigated or not investigated, some areas remaining white spots concerning the fauna of Phytoseiidae.

Thus, biodiversity surveys in these poorly investigated areas are still an urgent need and might result in the discovery of additional species potentially useful for biological control as

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well as having more information on the biodiversity of these areas for biodiversity practical purposes.

In these perspectives, the more interesting areas are probably those with a high level of biodiversity. Most of the Indian Ocean constitutes one of the highest world biodiversity areas, those areas called hotspots, concept defined by Myers (1988) in order to identify the most immediately important areas for biodiversity conservation. The common characteristics of these hotspots are that they hold high endemism levels and have lost at least 70% of their original natural vegetation (Myers *et al.* 2000). Knowledge of the phytoseiid diversity in these high interest areas in the context of global climate changes may contribute to identify potential biological control agents (BCAs) and future establishment of conservation programs.

Several Islands are located in the Indian Ocean, especially in two archipelagos, Mascareignes and Comoros. The former is constituted of several small Islands and three main Islands: **La Réunion**, **Mauritius** and **Rodrigues**. The later is constituted of some small Islands and four main Islands: **Mayotte**, **Anjouan**, **Mohéli** and **Grande Comore**.

Although these Islands, especially Mascareignes Islands, are a top destination for tourism and attracted the interest of many European naturalists, the fauna of phytoseiid mites remains poorly known (Ferragut and Baumann 2019).

These main Islands of the two Archipelagos (except La Réunion which was investigated before, see Kreiter *et al.* 2020b) were investigated from October 25th to December 12th, 2018. Results of Phytoseiidae records were already published in six papers; Kreiter and Abo-Shnaf 2020a, b for **Rodrigues** and **Mauritius** (in addition to Mauritius, see Kreiter *et al.* 2018a; Kreiter *et al.* 2020a, 2021b, c, d for **Mayotte**, **Anjouan**, **Mohéli**, and **Grande Comore** (in addition to Grande Comore, see Kreiter *et al.* 2018b), respectively.

This paper aims to give the description of six species new to science and six unknown males along with one new record collected during this survey.

Material and Methods

The survey took place during 2018 in: **Mauritius** (October 27th – November 6th), **Rodrigues** (November 8th – November 16th), **Mayotte** (November 23rd – November 27th), **Anjouan** (November 28th – December 1st), **Mohéli** (December 1st – December 5th) and **Grande Comore** (December 5th – December 11th).

Mites were directly collected on leaves with a fine brush with or without a pocket lens or a stereo-microscope when available (large leaves and herbaceous plants) or by beating the plants (mainly shrubs and trees with very small or spiny leaves) and collecting the mites in a black plastic rectangular saucer 45 x 30 cm (Ref. STR 45, BHR, 71370 Saint-Germain-du-Plain, France). Collected mites were then transferred with a fine brush into small plastic vials containing 1.5 ml of 70% ethanol.

The mites were then all slide-mounted in Hoyer's medium (Walter and Krantz 2009), the slides were dried at 45-50°C for at least two weeks and then all examined and identified using a phase and interferential contrast microscope (DMLB, Leica Microsystems SAS, Nanterre, France). Characters of specimens were measured using a Leica graded eyepiece.

Chant and McMurtry's (1994, 2007) concepts of the taxonomy of the family Phytoseiidae for identification and the world catalogue database of Demite *et al.* (2014, 2021) for distribution and information on descriptions and re-descriptions were used. The setal nomenclature system adopted was that of Lindquist and Evans (1965) and Lindquist (1994) as adapted by Rowell *et al.* (1978) and Chant and Yoshida-Shaul (1989) for the dorsal surface and by Chant and Yoshida-Shaul (1991) for the ventral surface. Pore (= solenostome) and poroid (= lyrifissure) notations are that of Athias-Henriot (1975). Macrosetal notation (**Sge** = genual macroseta; **Sti** = tibial macroseta; **St** = tarsal macroseta) are that of Muma and Denmark (1970). Numbers of teeth on the fixed and movable cheliceral digits do not include the respective apical teeth. Setae not referred to in results section should be considered as absent. All measurements are given

in micrometres (μm) and presented with the mean in bold followed by the range in parenthesis. Type of spermatheca or insemination apparatus is that of Denmark and Evans (2011).

Classification of plants follows the APG IV classification of 2016 (ex. Byng *et al.* 2018).

Specimens of each species are deposited in the mite collections of Institut Agro (Montpellier SupAgro) conserved in UMR CBGP INRAE/IRD/CIRAD/SupAgro/University of Montpellier.

The following abbreviations are used in Tables (1–3) for morphological characters: **n** = number of individuals measured; **dsl** = dorsal shield length just above *J1* to just below *J5* in the mid line; **dsw** = dorsal shield width at the level of *s4*; **Peritreme** = level of the peritreme extension; **gd** = number of solenostomes; **gensl** = genital shield length; **gensw st5** = genital shield width at level of setae *st5*; **gensw post. cor.** = genital shield width at level of posterior corners; **lisl** = primary or largest inguinal sigilla (= “primary metapodal plate”) length; **lisw** = primary or largest inguinal sigilla (= “primary metapodal plate”) width; **sisl** = secondary or smallest inguinal sigilla (= “secondary metapodal plate”) length; **vs1** = ventrianal shield length; **gv3-gv3** = distance between centres of each solenostome *gv3* on the ventrianal shield; **vsw ZV2** & **vsw anus** = ventrianal shield width at *ZV2* level and at para-anal setae level; **scl**: largest calyx length; **scw** = calyx widest width; **Fdl** = fixed digit length; **Mdl** = movable digit length; **Nb teeth Fd** = number of teeth on the fixed digit; **Nb teeth Md** = number of teeth on the movable digit; **Shaft** = length of the shaft of spermatodactyl; **branch** = length of the branch; **BCA** = Biological Control Agent; **aasl** = altitude above sea level; **imm.** = immature.

The following abbreviations are used in this paper for institutions: **CBGP** = Centre de Biologie pour la Gestion des Populations; **CIRAD** = Centre International de Recherche Agronomique pour le Développement; **IA** = Institut Agro; **INRAE** = Institut National de Recherche pour l’Agriculture, l’Alimentation et l’Environnement; **IRD** = Institut de Recherche pour le Développement; **MSA** = Montpellier SupAgro, France; **UMR** = Unité Mixte de Recherche; **UR** = Unité de Recherche.

Results and Discussion

During the survey in Indian Ocean Islands, we found six new species to science and other six unknown males and one new record (in the chronological order of the survey: Mauritius, Rodrigues, Mayotte, Anjouan, Mohéli, and Grande Comore):

- One unknown male of *Amblyseius haleakalus* Prasad and one new record of *Typhlodromips culmulus* (van der Merwe) in **Mauritius** Island,
- One unknown male of *Typhlodromus* (*Anthoseius*) *lobatus* Zannou, Moraes and Oliveira in **Mauritius** and **Rodrigues** Islands,
- **One new species of *Ueckermannseius* n. sp. 3** (different from the one in Mohéli and the one in Grande Comore Islands, see below) in **Mayotte** Island,
- One unknown male of *Typhlodromus* (*Anthoseius*) *hartlandrowei* Evans in **Anjouan** Island,
- **One new species of *Typhlodromalus***, one unknown male of *Amblyseius parasundi* Blommers and one unknown male of *Typhlodromus* (*Anthoseius*) *grewiae* Zannou, Moraes & Oliveira in **Mayotte** and **Mohéli** Islands,
- **One new species of *Ueckermannseius* n. sp. 1** (different from the one in Mayotte and the one in Grande Comore Islands, see below) and **one new species of *Paragigagnathus*** in **Mohéli** Island,
- **One new species of each of *Amblyseius* and *Ueckermannseius* n. sp. 2** (different from the one in Mayotte and the one in Mohéli Islands, see below) in **Grande Comore** Island,

- One unknown male of *Amblyseius duplisesetus* Moraes & McMurtry in **Mayotte, Mohéli** and **Grande Comore** Islands.

These six **new species** and the six **unknown males** are all described and the new record mentioned thereafter.

Data follow the classification order of Chant and McMurtry (2007) and therefore the following taxonomical order: *Paragigagnathus* **n. sp.**, *Amblyseius* **n. sp. 1**, *Typhlodromips culmulus* new record, *Amblyseius* **n. sp. 2**, unknown males of three species of *Amblyseius*, *Typhlodromalus* **n. sp.**, **new species groups** of *Ueckermannseius*, *Ueckermannseius* **n. sp. 1**, *Ueckermannseius* **n. sp. 2**, *Ueckermannseius* **n. sp. 3**, unknown males of three species of *Typhlodromus* (*Anthoseius*).

Subfamily Amblyseiinae Muma

Amblyseiinae Muma 1961: 273.

Tribe Neoseiulini Chant & McMurtry

Neoseiulini Chant & McMurtry 2003: 6.

Genus *Paragigagnathus* Amitai & Grinberg

Paragigagnathus Amitai & Grinberg 1971: 327; Chant & McMurtry 2003: 39; Moraes *et al.* 2004b: 158.

Paragigagnathus philippeï Kreiter **n. sp.**

Zoobank: 752EFED1-2498-4470-96FB-68C530C2C10E

Classification. *Paragigagnathus philippeï* Kreiter **n. sp.** belongs to:

- the subfamily Amblyseiinae Muma (absence of dorsolateral setae *z3* and *s6* and the caudoventral seta *JV3*),
- to the tribe Neoseiulini Chant & McMurtry (seta *S4* present, ratio $s4/ZI < 3.0$, setae *s4*, *Z4* and *Z5* not greatly longer than other dorsal setae, usually slightly sclerotized, never with wide sternal shield, seta *J2* always present),
- to the genus *Paragigagnathus* Amitai & Grinberg (female ventrianal shield reduced and/or markedly wider at the level of anus, with a prominent waist, chelicerae with teeth only on apical region, fixed digit with one to three teeth, movable digit with a single tooth, primary metapodal plate or unguinal sigillum elongate (Chant and McMurtry 2007). There are 12 species within this genus,
- Seta *st3* is inserted off sternal shield of female on separate platelets (see below), which allows to classify this new species in the species group *strunkhovae* (Chant and McMurtry 2003). This species group contains four species (Chant and McMurtry 2003). The following list of characters of this new species is very different of all species of the genus and the species group. Despite the fact that we collected a single specimen, we consider this very original specimen as belonging to a new original species to science and we describe it thereafter.

Description of adult female (n = 1, Figs. 1 a-e)

Dorsum (Fig. 1a) – Dorsal shield **285** long and **158** wide at level of *s4*, totally ornamented and reticulate, except on the posterior lateral margin from level of *s4* to level of *Z5* with less ornamentations and reticulations, with **five** solenostomes difficult to ascertain because of ornamentations and reticulations (*gd1*, *gd2*, *gd4*, *gd8* and *gd9*), only **six** pairs of poroids

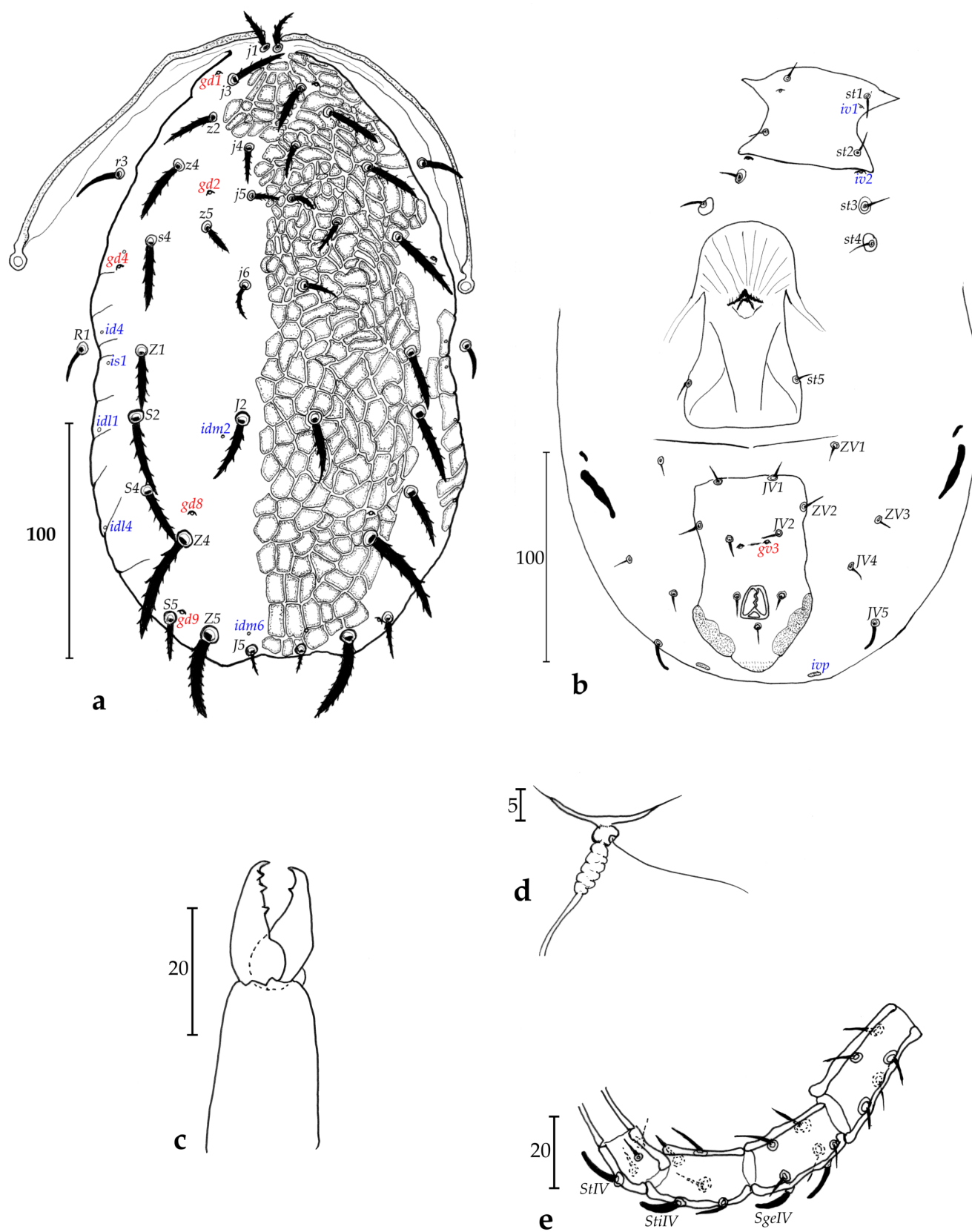


Figure 1 Holotype female of *Paragigagnathus philippeï* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.

difficult to see because of ornamentations and reticulations of the dorsal shield and possible to detect mainly on lateral sides, 17 pairs of dorsal setae and two pairs of sub-lateral setae on the membrane: *j1* 20, *j3* 28, *j4* 16, *j5* 14, *j6* 19, *J2* 30, *J5* 10, *z2* 28, *z4* 30, *z5* 15, *Z1* 28, *Z4* 45, *Z5* 40, *s4* 38, *S2* 33, *S4* 26, *S5* 18, *r3* 20, *R1* 15. All setae thick, plumose and serrate, except for *r3* and *R1* thick and smooth.

Peritreme and peritremal plate (Fig. 1a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level between *j1* and *j3*.

Venter (Fig. 1b) – All ventral shields smooth. Sternal shield with two pairs of setae (*st1* and *st2*) and a pair of poroids (*iv1*); two pairs of setae (*st3* and *st4*) on two separate metasternal plates (no discernible pores on both of them); posterior margin of the sternal shield apparently straight; a pair of poroids (*iv2*) off sternal shield. Distances *st1-st1* 40, *st2-st2* 46, *st3-st3* 64, *st1-st3* 53, *st4-st4* 82. Genital shield length 108, width at level of *st5* 58, width at level of posterior corners 58, distance *st5-st5* 54. Two pairs of metapodal plates, primary metapodal plate moderately long compared to some other species (Table 1), 29 long and 3 wide and secondary short, 6 long and 2 wide. Ventrianal shield 93 long, 55 wide at level of anterior corners (*ZV2*), and 56 wide at level of para-anal setae. Ventrianal shield with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of small crateriform *gv3*, 13 apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1* and *ZV3*), and apparently five pairs of round to oblong poroids difficult to see on our preparation, except for *ivp* on posterior part of the ventrianal shield. Seta *JV5* short, thick and probably smooth (impossible to confirm on the single specimen), 12 long.

Chelicerae (Fig. 1c) – Fixed digit 20 long, with three strong teeth; and movable digit 20 long, with one strong tooth. *Pilus dentilis* not visible.

Spermatheca (Fig. 1d) – Pocular, 4 in length, with strong atrium at the basis of the calyx.

Legs (Fig. 1e) – Macrosetae are present on all legs and thick. Pointed thick macrosetae on genua I-III, tibia III, basitarsus, tibia and genu IV. Measurements: *SgeI* 14, *SgeII* 10, *SgeIII* 9, *StiIII* 12, *SgeIV* 10, *StiIV* 10, *StIV* 12. Genua II and III with seven and six setae, respectively. Chaetotactic formula of genu II: 2-2/0, 2/0-1; genu III: 1-2/0, 2/0-1.

Male. Unknown.

Material examined. A single ♀ in total collected during this study. One ♀ as type material. **MOHELI ISLAND: Bangoma**, top of the village (42 m aasl, 12°17'15" S, 43°43'40" E), 1 ♀ on *Dendrocnide moroides* (Weddel) Chew (Urticaceae), 4/XII/2018.

Type material. The holotype female is deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Etymology. The name “*philippe*” refers to the first name of the senior author’s second brother, Philippe Luc Kreiter, Engineer-Researcher in INRAE and specialist of biological control of mealybugs. The species is named in his honour.

Differential diagnosis and remarks. This species is unique in the genus *Paragigagnathus* by a set of unique characters (Table 1) and especially the small size of the body, the setae all plumose, thick and serrate, the reduce size of metapodal plates, the reduce size of ventrianal shield and the occurrence of macrosetae on all legs, the sternal shield with only two setae, along with an assemblage of specific setae lengths. No other species are closed to the new species, especially within the *strunkovae* species group to which this new species belongs. For this reason, this species is described despite the single specimen collected. New surveys on Mohéli Island must occur in order to recover the species and to increase the description. *Paragigagnathus philippe* Kreiter **n. sp.** is the 13th species of the genus *Paragigagnathus* and the fifth species of the *strunkovae* species group (the eight other species belonging to the *desertorum* species group).

Tribe Typhlodromipsini Chant & McMurtry

Typhlodromipsini Chant & McMurtry 2005c: 318.

Genus *Typhlodromips* De Leon

Typhlodromips De Leon 1965: 23; Chant & McMurtry 2007: 61.

Typhlodromips culmulus (Van der Merwe)

Amblyseius (*Amblyseius*) *culmulus* van der Merwe 1968: 132; Ueckermann & Loots 1988: 157.

Typhlodromips culmulus, Moraes *et al.* 1986: 139, 2004b: 210; Chant & McMurtry 2005c: 327, 2007: 61.

Table 1 Comparison of characters of the 12 species of *Paragigagnathus* with those of *Paragigagnathus philippei* Kreiter n. sp.

	<i>amanis</i> Chaudhri, Akbar & Rasool Chaudhri <i>et al.</i> 1979	<i>bidentatus</i> (Kuznetsov) Kuznetsov 1994	<i>catractus</i> (Ueckermann & Loots) Ueckermann & Loots 1988	<i>desertorum</i> (Amata & Swirski) Amata & Swirski 1978	<i>desertorum</i> (Amata & Swirski) Alatawi <i>et al.</i> 2016	<i>insuetus</i> (Livshitz & Kuznetsov) Alatawi <i>et al.</i> 2016	<i>iranensis</i> Khanjani, Karimi, Asali Fayaz & Ueckermann Khanjani <i>et al.</i> 2016	<i>malinensis</i> Alatawi, Kamran & Basahih Alatawi <i>et al.</i> 2016	<i>molestus</i> (Kolodochka) Hajizadeh <i>et al.</i> 2010*	<i>nambiensis</i> (Ueckermann & Loots) Ueckermann & Loots 1988	<i>strunkovae</i> (Wainstein) Wainstein 1973 & Kolodochka 1989	<i>tamaritis</i> Amata & Grinberg Amata & Grinberg 1971	<i>tamaritis</i> (Amata & Grinberg) Swirski <i>et al.</i> 1998	<i>philippei</i> Kreiter n. sp. This study
n	16	1 ?	25	13	8	3	8	16	5	3	?	35	–	1
Dsl	357	335	385 (377–408)	325 (312–340)	288–302	338–345	370 (365–371)	339 (337–324)	343 (373)	312 (309–312)	390	299–332	–	265
Dsw	200	200	246 (234–262)	204–212	228–235	240 (240–245)	196 (185–210)	213 (224)	192 (189–195)	220	–	–	–	155
Peritreme	<i>jl</i>	<i>jl-j3</i>	<i>jl</i>	<i>jl-j3, close jl</i>	<i>jl-j3, close jl</i>	<i>jl-j3</i>	<i>jl-j3</i>	<i>jl-j3, close jl</i>	<i>jl-j3</i>	<i>jl</i>	<i>jl-j3</i>	<i>jl-j3, close jl</i>	<i>jl</i>	<i>jl</i>
gd	?	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 5, 8, 5	1, 2, 5, 6, 7, 8, 9	–	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 6, 8, 9	1, 2, 6, 8, 9	S
shape of setae	thick	thick, pointed	thick, serrate	thick, rounded	pointed	pointed	pointed	pointed	pointed	pointed	pointed	thick	blunt, pointed	plumose
j1	18	18–20	31 (23–39)	19 (18–21)	16–18	14–15	18 (17–19)	17 (16–18)	16 (16)	16	18–20	17 (17–18)	–	20
j3	18	30	39 (39–54)	37 (35–40)	26–31	15–16	26 (24–26)	27 (25–29)	17 (17)	16	32	22 (20–25)	–	28
j4	18	18–20	28 (23–31)	27 (21–33)	24–27	14–15	17 (16–18)	26 (22–30)	17 (16)	16	20–21	19 (17–22)	–	16
j5	18	18–20	23 (22–31)	33 (27–35)	29–30	14	15 (15–16)	26 (22–30)	17 (16)	19 (16)	17	19 (17–20)	–	13
j6	21	22	39 (39–54)	33 (27–35)	32–35	16–17	19 (18–20)	32 (31–32)	17 (16)	22 (19)	21–22	20 (18–22)	–	15
J2	23	33	39 (39–54)	38 (33–43)	38–40	16–17	23 (23–24)	34 (32–38)	19 (17)	22	25	21 (20–25)	–	18
J5	13	12	23 (22–31)	15 (13–20)	13–14	10–11	5 (15–16)	20 (18–25)	10 (9)	13	14	11 (8–12)	–	10
r3	13	18–20	31 (23–39)	27 (25–30)	23–24	16–17	24 (23–25)	18 (15–21)	18 (17)	19	20	20–25	–	20
R1	16	18–20	39 (39–54)	19 (18–20)	18–19	14–15	20 (20–21)	19 (16–22)	17 (16)	16	20	13–17	–	15
s4	23	33–34	62 (62–69)	47 (42–53)	39–42	16–18	34 (33–35)	37 (35–38)	21 (20)	23 (22)	33–34	26 (23–28)	–	38
S2	21	36–38	69 (62–77)	52 (45–58)	45–47	18–19	39 (39–40)	46 (41–50)	22 (21)	25	37–38	23 (20–27)	–	33
S4	26	36–38	54 (54–69)	53 (45–61)	45–48	22–23	40 (39–41)	48 (41–50)	23 (21)	28 (26–28)	42–43	26 (23–28)	–	25
S5	26	33–34	39 (39–54)	55 (46–66)	46–49	25–26	41 (40–41)	44 (39–48)	21 (21)	28 (26–28)	41	27 (23–28)	–	18
z2	18	33–34	42 (46–49)	37 (35–40)	35–37	16–17	25 (24–26)	34 (32–36)	19 (17)	19	26–27	23 (20–25)	–	28
z4	21	33–34	57 (54–62)	42 (35–50)	36–38	17–18	26 (25–27)	35 (34–37)	20 (19)	19	27–28	23 (20–25)	–	30
z5	18	18–20	23 (22–31)	27 (25–30)	24–26	14–15	18 (18–19)	25 (21–29)	18 (16)	19 (16)	20	18 (17–22)	–	15
Z1	21	27	46 (39–46)	47 (42–53)	36–39	16–18	23 (23–24)	41 (39–46)	22 (20)	23 (22)	31	23 (20–27)	–	28
Z4	23	36–38	54 (54–69)	50 (45–55)	46–49	17–19	30 (30–32)	43 (40–46)	22 (18)	25 (22–25)	34	23 (20–25)	–	45
Z5	31	36	54 (54–69)	52 (45–66)	45–47	25–27	41 (40–41)	38 (35–41)	24 (21)	35 (32)	41	27 (23–28)	–	40
st1-st1	–	–	–	–	–	–	42 (40–42)	–	–	–	–	–	–	40
st2-st2	53	–	72 (69–72)	–	57–59	65–67	47 (46–48)	52 (50–56)	55	66	–	–	–	46
st3 on/ off st. sh.	on	off	off	on	on	on	on	on	off	on	off	on	off	off
st3-st3	–	–	–	–	–	–	–	–	–	–	–	–	–	64
st1-st3	96	–	77 (69–77)	–	76–79	76–78	–	70 (67–75)	78	66	–	–	–	50
st4-st4	–	–	–	–	–	–	–	–	–	–	–	–	–	82
Gensl	–	–	77 (69–77)	–	–	–	110 (100–112)	–	–	–	–	–	–	108
Gensw st5	–	–	–	–	–	–	50 (48–50)	–	–	–	–	–	–	58
Gensw post. corn.	–	–	–	–	55–58	–	–	69	–	72	–	–	–	58
st5-st5	–	–	–	–	–	–	–	–	–	–	–	–	–	54
Lisl	44	–	–	–	36–39	45–46	47 (46–48)	50 (47–52)	51	–	–	–	–	29
Lisw	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Sisl	16	–	–	–	16–18	–	20 (20–21)	18 (17–19)	20	–	–	–	–	6
Vsl	117	–	131 (131–142)	96 (91–103)	99–105	106–109	110 (110–111)	106	111 (125)	107 (104–107)	–	83–91	–	93
vsw ZV2	65	–	69 (62–69)	62 (53–66)	36–37	45–48	46 (45–47)	28	38	–	–	43–50	–	60
Vsw anus	–	–	–	–	60–61	65–67	58 (58–60)	57	56 (65)	60	–	53–66	–	56
gv3-gv3	–	–	–	–	–	–	9 (9–10)	–	–	–	–	–	–	13
JV5	16	–	46 (39–46)	19 (18–20)	17–18	17–18	22 (21–23)	22 (22–24)	16	13 (13–16)	16–18	15–18	–	12
SgeI	–	–	–	–	–	–	–	–	–	–	–	–	–	14
SgeII	–	–	–	–	–	–	–	–	–	–	–	–	–	10
SgeIII	–	–	–	–	–	–	–	–	–	–	–	–	–	9
SstIII	–	–	–	–	–	–	–	–	–	–	–	–	–	12
SgeIV	–	–	–	–	–	–	–	–	–	–	–	–	–	10
SstIV	–	–	–	–	–	–	–	–	–	–	–	–	–	10
SstV	26	14	no MS	–	23–25	20–21	20 (19–22)	27 (26–27)	24 (23)	19	20	no MS	22, pointed	12
scl	–	–	5	–	–	–	5 (5–6)	–	–	–	–	–	–	4
scw	–	–	–	–	–	–	10 (10–11)	–	–	–	–	–	–	–
Fdl	26	–	–	–	–	–	–	–	–	–	–	–	–	20
No teeth Fdl	3	–	2	2	2	1	3	3	1	2–3	2	1	1 (+ 1 sometimes)	3
Mdl	26	–	–	–	–	–	20 (19–21)	–	–	–	–	–	–	20
No teeth Mdl	1	–	1	0	0	0	1	1	1	1	1	1	1	1

species of the *strunkovae* species group within the genus *Paragigagnathus*

In each upper boxes of the first line, the first name is the name of the species (for example *amanis*), the second line of name(s) is name(s) of describer(s) (for example Chaudhri, Akbar & Rasool for *amanis*) and the third line is the source of measurements (for example Chaudhri *et al.* 1979 for *amanis*)

This species belongs to the *culmulus* species group of the genus *Typhlodromips* with nine other species. It is also probably a type III species (McMurtry and Croft 1997; McMurtry *et al.* 2013), i.e., a polyphagous generalist predator. However, its biology remains totally unknown. It was already recorded on Mauritius Island, but only one record based on a single female and a single location (Kreiter *et al.* 2018a). It was also recorded in La Réunion Island, but with few specimens collected after intensive surveys (Kreiter *et al.* 2020b). This species seems rather rare.

Specimens examined. Two ♀♀ collected during this study. **MAURITIUS ISLAND:** **Mare aux Vacoas** (581 m aasl, 20°22'05" S, 57°29'31" E.), 2 ♀♀ on *Ludwigia octovalvis* (Jacquin) Raven (Onagraceae), 5/XI/2018.

Previous Records. Kenya, Lesotho, South Africa.

Remarks. Measurements of the two adult female specimens agree very well with measurements of the literature, with only very slight differences in the Mauritius specimen: smaller *Z4*, *JV5*, *SgeII* and *StiIV* setae.

Tribe Amblyseiini Muma

Amblyseiinae Muma 1961: 273 and Amblyseiini Muma, Wainstein 1962: 26.

Subtribe Amblyseiina Muma

Amblyseiina Muma, Chant & McMurtry 2004: 179.

Genus *Amblyseius* Berlese

Amblyseius Berlese 1914: 143.

Amblyseius erici Kreiter n. sp.

Zoobank: F011832D-AFE5-45B2-BA60-BB9DA7EA6A20

Classification. *Amblyseius erici* Kreiter n. sp. belongs to:

- the subfamily Amblyseiinae (absence of dorsolateral setae *z3* and *s6* and the caudoventral setae *JV3*),
- to the tribe Amblyseiini (setae *j3*, *s4*, *Z4* and *Z5* longer than other setae, ratio $s4/Z1 > 3.1$, many teeth on the fixed cheliceral digit and macrosetae on legs I, II and/or III in addition to macrosetae on leg IV),
- to the subtribe Amblyseiina (sternal shield as long as wide, ventrianal shield longer than wide, seta *J2* present, genital shield almost as wide as ventrianal shield, ventral shields generally smooth, macrosetae on all legs, setae *j5*, *J2*, *S2*, *S4*, *S5* and *Z1* present),
- to the genus *Amblyseius* (ratio $s4/S2 > 3.0$, chelicerae of normal size with fixed digit of the same size as movable digit, seta *JV2* present, without incision in lateral margin of dorsal shield at level of *s4*, ventrianal shield not reduced to a simple anal shield, Ge III and Ti III each generally with a macroseta) (Chant and McMurtry 2007),
- to the species group *obtusius* as setae *J2* and *Z1* are present, dorso-central setae and setae *z2*, *z4*, *Z1*, *S2*, *S4*, and *S5* are minute, setae *s4*, *Z4* and *Z5* are prominent, elongate and whip-like, female ventrianal shield usually pentagonal, as wide at level of anus than at level of *ZV2* or wider at this later level (Chant and McMurtry 2004),
- to the large species subgroup *andersoni* with the calyx bell- to glass-shaped. This subgroup contains 120 species (in Chant and McMurtry 2004). Many of those species are very different from the new species and we compare it thereafter with closer related species.

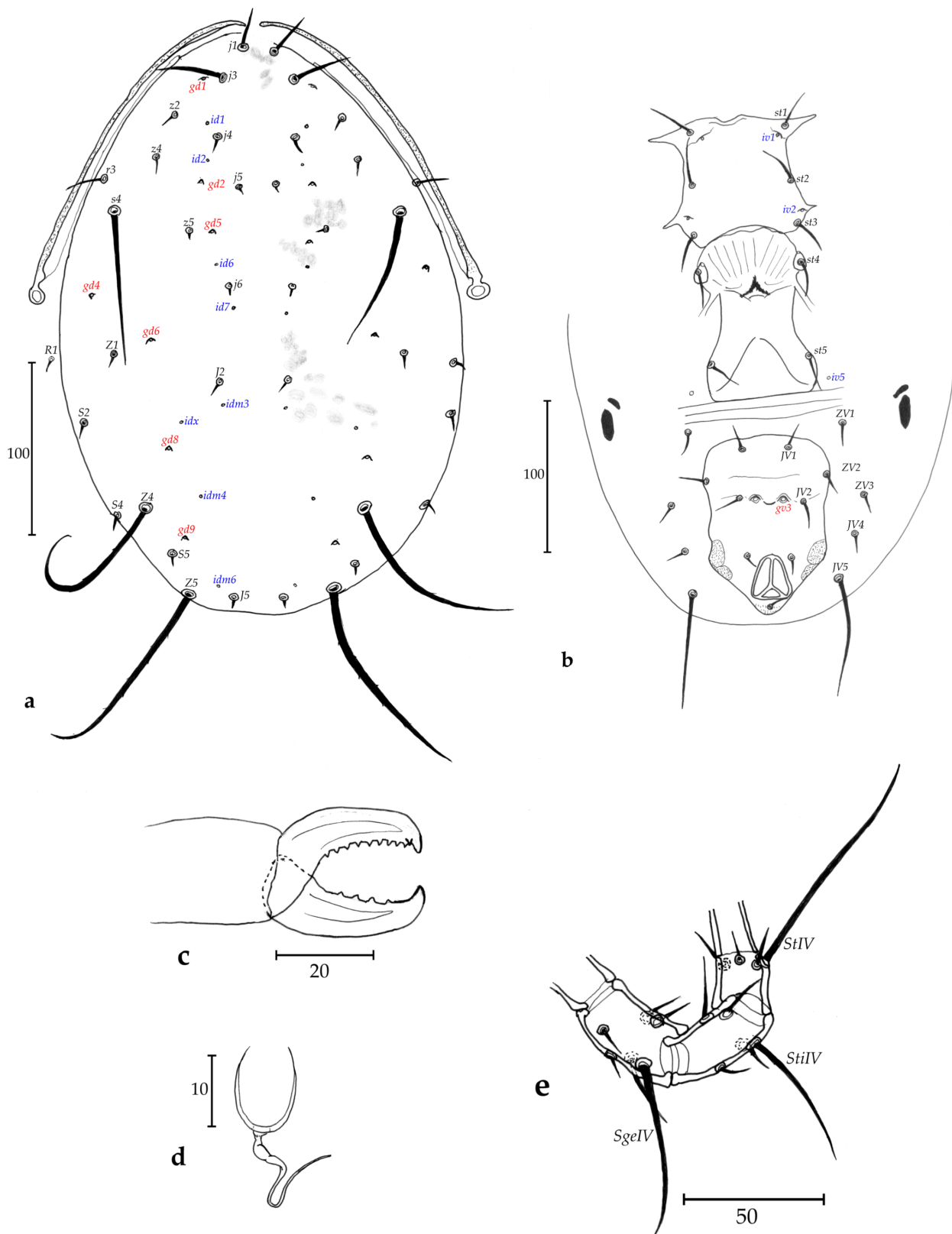


Figure 2 Holotype female of *Amblyseius erici* Kreiter **n. sp.** – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.

Description of adult female (n = 2, Figs. 2 a-e)

Dorsum (Fig. 2a) – Dorsal shield smooth, **330–338** long and **195–200** wide at level of *s4*, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **eight** pairs of poroids visible, lateral ones hidden, **17** pairs of dorsal setae and two pairs of sub-lateral setae on membranes: *j1* **22–28**, *j3* **38–39**, *j4* **7**, *j5* **4–5**, *j6* **7**, *J2* **6**, *J5* **6**, *z2* **9**, *z4* **10–11**, *z5* **4–5**, *Z1* **6–8**, *Z4* **108**, *Z5* **113–125**, *s4* **88–93**, *S2* **8**, *S4* **8**, *S5* **8**, *r3* **20–22**, *R1* **7–8**; *r3* and *R1* apparently on the dorsal shield, but actually off on the unsclerotized cuticle. All setae smooth, except for *Z4* and *Z5* lightly serrate.

Peritreme and peritremal plate (Fig. 2a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level of *j3*.

Venter (Fig. 2b) – All ventral shields smooth. Sternal shield with three pairs of setae (*st1-st3*) and two pairs of poroids (*iv1* and *iv2*); a pair of *st4* and a pair of pores on a small pear-shaped metasternal plate; posterior margin of the sternal shield concave. Distances *st1-st1* **58–59**, *st2-st2* **65–68**, *st3-st3* **68–70**, *st1-st3* **63–65**, *st4-st4* **65–66**. Genital shield length **118–120**, width at level of *st5* **70**, width at level of posterior corners **60–70**, distance *st5-st5* **63–65**. Two pairs of metapodal plates, the primary **20** long and **4–5** wide and the secondary **12–13** long and **2** wide. Ventrianal shield **110–120** long, **83** wide at level of anterior corners (*ZV2*), and **75–77** wide at level of para-anal setae. Ventrianal shield with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of large crateriform *gv3*, **20** apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1*, and *ZV3*), and five pairs of round to oblong poroids not well discernible. Seta *JV5* smooth, **73–75** long.

Chelicerae (Fig. 2c) – Fixed digit **30–31** long, with **ten** strong teeth; and movable digit **32–33** long, with **four** strong teeth. *Pilus dentilis* not visible.

Spermatheca (Fig. 2d) – Bell- to glass-shape, with a calyx swollen basally **12–13** long and **7–8** wide, an undifferentiated atrium and long major duct. Small minor duct not visible.

Legs (Fig. 2e) – Pointed strong and very visible whip-like macrosetae on gennae I–III, on tibia III, and on basitarsus, tibia and genu IV. Measurements: *SgeI* **45–53**, *SgeII* **35–38**, *SgeIII* **31–35**, *StiIII* **22–28**, *SgeIV* **70–75**, *StiIV* **50–55**, *StiIV* **80–84**. Gennae II and III both with **seven** setae. Chaetotactic formula of gennae II: **2-2/0, 2/0-1**; genu III: **1-2/1, 2/0-1**.

Description of adult male (n = 1) (Figs. 3 a-d)

Dorsum (Fig. 3a) – Dorsal shield smooth, **250** long and **158** wide, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **six** pairs of poroids, 19 pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **23**, *j3* **34**, *j4* **5**, *j5* **3**, *j6* **5**, *J2* **5**, *J5* **5**, *z2* **7**, *z4* **9**, *z5* **5**, *Z1* **5**, *Z4* **78**, *Z5* **108**, *s4* **65**, *S2* **8**, *S4* **7**, *S5* **6**, *r3* **15**, *R1* **8**. All setae similar to adult female.

Peritreme and peritremal plate (Fig. 3a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level of *j1*.

Venter (Fig. 3b) – Sternogenital shield smooth. Distances *st1-st1* **48**, *st2-st2* **53**, *st3-st3* **50**, *st1-st5* **105**, *st4-st4* **40**, *st5-st5* **30**, with three pairs of poroids (*iv1-iv3*). Ventrianal shield **105** long, **128** wide at anterior corners and **50** wide at level of para-anal setae. Ventrianal shield reticulate anteriad *JV1* with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*) and a pair of small crateriform *gv3*, between *JV2* bases, **14** apart. Two pairs of poroids *ivo* discernible. Unsclerotized cuticle around ventrianal shield with a pair of seta (*JV5*). Seta *JV5* smooth, **38** long.

Chelicerae (Fig. 3c) – Fixed digit **20** long, with **nine** teeth discernible; and movable digit **20** long, with **two** teeth discernible. Spermatodactyl shaft **19** and branch **5**.

Legs (Fig. 3d) – One macroseta on legs I and II, two macrosetae on leg III and three macrosetae on legs IV similar to adult female. All macrosetae sharp-tipped. Measurements: *SgeI* **33**, *SgeII* **30**, *SgeIII* **23**, *StiIII* **18**, *SgeIV* **50**, *StiIV* **43**, *StiIV* **78**. Chaetotactic formula of gennae II and III similar to adult female.

Specimens examined and measured. Two ♀♀ and one ♂ collected during this study measured and type material. **GRANDE COMORE ISLAND: Mvouni**, University of Comoros (434 m aasl, 11°43'11" S, 43°16'31" E), 1 ♀ and 1 ♂ on *Clidemia hirta* L. (Melastomataceae),

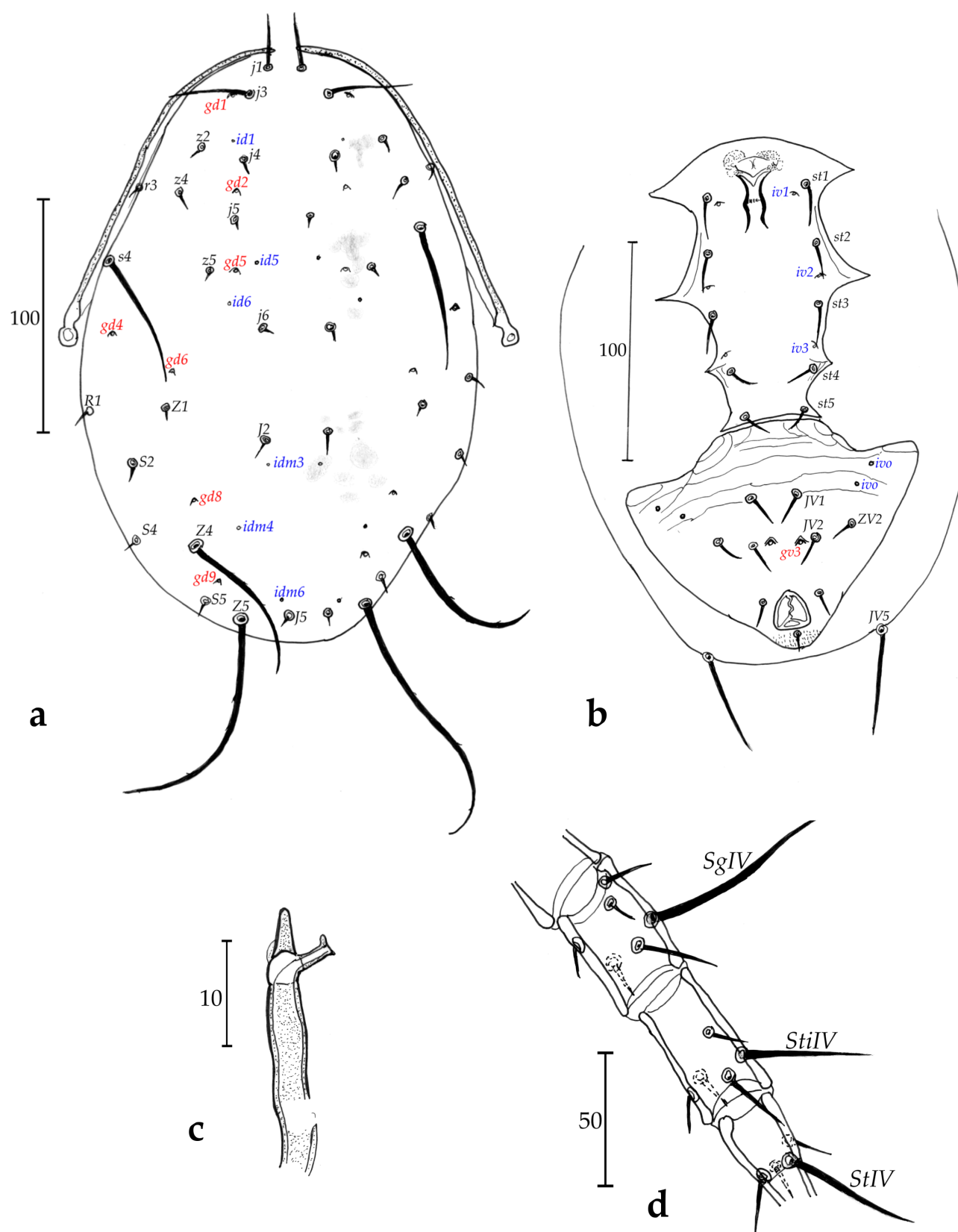


Figure 3 Paratype male of *Amblyseius erici* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

6/XII/2018; **Ivembeni**, Banda Samlini (791 m aasl, 11°29'22" S, 43°19'36" E), 1 ♀ on *Rubus rosifolius* Smith (Rosaceae), 7/XII/2018.

Type material. One holotype ♀ on one slide, one paratype ♀ and one paratype ♂ on another slide are deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Etymology. The name “*erici*” refers to the first name of the senior author’s youngest and third brother, Eric Kreiter. The species is named in his honour.

Differential diagnosis and remarks. None of the females of species of *Amblyseius* (of the *obtusus* species group and of the *andersoni* species subgroup) included in Table 2 share similar characters with females of *Amblyseius erici* Kreiter **n. sp.** The two closest species concerning setae length are *A. angulatus* Karg and *A. compositus* Denmark & Muma, but several other details are different: macrosetae lengths and number of teeth of these two species compared to the new species. But descriptions of these two new species are old and very poor and lacking information for a complete description. The shape of the spermatheca of the new species is unique and allows distinguishing this new species from all others in Table 2 and all species of the *andersoni* species subgroup. The following combination of characters, of the male indicated in the description of the male of this new species, is quite similar to that of the few described males of species of *Amblyseius* belonging to the *obtusus* species group and to the *andersoni* species subgroup.

Not many characters allow to distinguish it from all males of other species if no females are collected at the same time: the peritreme reaching the level of *j1*, an absence of reticulation of the dorsal shield, some dorsal setae lengths, especially *z2*, *z4*, *r3* and *S2* approximately of the same length (12–15), additional macrosetae on all other legs than leg IV, macrosetae of leg IV not subequal, a sternogenital shield smooth, ventrianal shield reticulate, only three pairs of pre-anal setae, a pair of crateriform *gv3* between *JV2*. All described males of the large species subgroup *andersoni* have similar ventrianal shield reticulate with three pairs of pre-anal setae. Only the shape of the spermatodactyl allows distinction of the male of the species (Figure 3c).

***Amblyseius duplicesetus* Moraes & McMurtry**

Amblyseius duplicesetus Moraes & McMurtry 1988: 13; Moraes *et al.* 2004a: 143, 2004b: 22; Zannou *et al.* 2007: 10; El-Banhawy & Knapp 2011: 25.

Amblyseius duplicisetus [sic], Chant & McMurtry 2004: 208, 2007: 78.

Description of adult male of *Amblyseius duplicesetus* Moraes & McMurtry (n = 10, five from Anjouan, three from Mohéli and two from Grande Comore Islands, Figs 4 a-d)

Dorsum (Fig. 4a) – Dorsal shield smooth, **271** (262–295) long and **174** (150–193) wide, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*) similar to adult female, **seven** pairs of poroids visible, but probably more present, **19** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **31** (29–33), *j3* **44** (43–45), *j4* **8** (6–8), *j5* **5** (5–6), *j6* **8** (7–8), *J2* **9** (8–10), *J5* **8** (8–9), *z2* **9** (8–10), *z4* **9** (8–10), *z5* **5** (5–6), *Z1* **9** (**8–11**), *Z4* **61** (56–70), *Z5* **218** (200–238), *s4* **68** (63–73), *S2* **11** (10–12), *S4* **10** (9–11), *S5* **8** (7–9), *r3* **10** (8–13), *R1* **11** (9–14). All setae sharp-tipped and smooth, except for *Z4* and *Z5* lightly serrate.

Peritreme and peritremal plate (Fig. 4a) – Extending to level of *j1* insertion; peritremal plate fused with dorsal shield at level between *j1* and *j3*.

Venter (Fig. 4b) – Sternogenital shield smooth with only few striae in the anterior part and lateral margins, with five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*). Distances *st1-st1* **52** (50–55), *st2-st2* **55** (50–58), *st3-st3* **55** (51–58), *st1-st5* **114** (112–118), *st4-st4* **36** (31–40), *st5-st5* **31** (30–34). Ventrianal shield **112** (108–118) long, **148** (138–158) wide at anterior corners and **59** (50–75) wide at level of para-anal setae. Ventrianal shield anteriorly reticulate (before the line constituted by *JV2*), with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*) and a pair of small crateriform *gv3*, between *JV2* just below the line between their bases, **22** (20–25) apart. Shield also with a pair of *iv5* and three pairs of poroids *ivo*. Unsclerotized cuticle around ventrianal shield with a pair of seta (*JV5*). Seta *JV5* smooth, **38** (34–45) long.

Table 2 Comparison of characters of females of nine species of the genus *Amblyseius* belonging to the *obtusus* species group and of the *andersoni* species subgroup in comparison with those of *Amblyseius erici* Kreiter **n. sp.**

	<i>andersoni</i> (Chant) Denmark & Muma 1989	<i>angulatus</i> Karg Denmark & Muma 1989	<i>charui</i> = <i>andersoni</i> Gupta Denmark & Muma 1989	<i>compositus</i> Denmark & Muma 1989	<i>daliensis</i> Liang & Ke 1984	<i>excebus</i> Chaudhri, Akbar & Rasool Denmark & Muma 1989	<i>mehritensis</i> Arutunjan Denmark & Muma 1989	<i>swirskii</i> Athias-Henriot Kreiter <i>et al.</i> 2016	<i>eric</i> Kreiter n. sp. This study
n	1	1	1	1	1	1	1	10	2
Dsl	361	369	315–330	330	350	361	348	384 (368–400)	330–338
Dsw	196	220	176	187	220	193	264	233 (205–245)	195–200
Peritreme	<i>j1-j3, close j1</i>	<i>j1</i>	<i>j1-j3, close j1</i>	<i>j1</i>	<i>j1</i>	<i>j1</i>	<i>j1-j3, close j1</i>	<i>j1</i>	<i>j1</i>
gd	4 ?	7 ?	4 ?	7 ?	7 ?	?	6 ?	7	7
j1	28	27	25	25	30	28	28	29 (25–31)	22–28
j3	52	39	40–45	35	38	50	50	53 (50–58)	38–39
j4	9	5	3	9	8	4	10	8 (8–10)	7
j5	8	5	3	5	8	4	8	8	4–5
j6	11	5	7	5	8	6	13	8 (8–10)	7
J2	8	6	5	5	9	6	13	8	6
J5	8	7	4	5	10	12	10	10 (8–10)	6
r3	25	18	16	19	33	19	–	24 (23–25)	20–22
R1	14	8	4	8	20	12	–	15 (13–17)	7–8
s4	75	68	62–72	83	85	78	75	83 (78–100)	88–93
S2	18	11	7	6	8	9	15	18 (17–22)	8
S4	10	8	5	6	9	9	10	11 (10–12)	8
S5	9	5	5	6	8	8	8	10 (10–11)	8
z2	13	10	9	11	8	20	15	15 (13–15)	9
z4	21	9	20	9	9	19	15	15 (15–17)	10–11
z5	6	5	6	5	6	4	8	8 (5–8)	4–5
Z1	11	7	11	6	8	6	13	10 (8–10)	6–8
Z4	68	95	68	86	83	90	78	76 (73–80)	108
Z5	134	113	85–90	104	115	157	150	113 (108–114)	113–125
st1-st1	–	–	–	–	–	–	–	61 (58–65)	58–59
st2-st2	–	–	–	–	–	–	–	71 (63–78)	65–68
st3-st3	–	–	–	–	–	–	–	85 (82–90)	68–70
st1-st3	–	–	–	–	–	–	–	64 (63–65)	63–65
st4-st4	–	–	–	–	–	–	–	86 (80–92)	65–66
Gensl	–	–	–	–	–	–	–	–	118–120
Gensw st5	–	–	–	–	–	–	–	–	70
Gensw post. corn.	–	–	–	–	–	–	–	–	60–70
st5-st5	–	–	–	–	–	–	–	68 (60–73)	63–65
Lisl	–	–	–	–	–	–	–	–	20
Lisw	–	–	–	–	–	–	–	–	4–5
Sisl	–	–	–	–	–	–	–	–	12–13
Vsl	–	–	–	–	–	–	–	131 (125–140)	108–110
vsw ZV2	–	–	–	–	–	–	–	87 (85–90)	83
Vsw anus	–	–	–	–	–	–	–	84 (83–85)	75–77
gv3-gv3	–	–	–	–	–	–	–	–	20
JV5	–	–	–	–	58	–	–	67 (63–70)	73–75
SgeI	–	–	–	–	–	–	–	25	45–53
SgeII	–	–	–	–	–	–	–	33 (30–38)	35–38
SgeIII	–	–	–	–	–	–	–	37 (33–48)	31–35
StiIII	–	–	–	–	–	–	–	26 (25–28)	22–28
SgeIV	70	80	47	58	68	66	65	64 (60–67)	70–75
StiIV	55	52	36	55	53	56	55	43 (40–45)	50–55
StIV	75	74	65	76	73	74	75	64 (63–65)	80–84
scl	7	8	8	5	–	11	–	10	12–13
scw	–	–	–	–	–	–	–	–	7–8
Fdl	–	–	–	–	–	–	–	33	30–31
No teeth Fdl	9	9	9	9–11	–	9	8	9	10
Mdl	–	–	–	–	–	–	–	33	32–33
No teeth Mdl	3	3	3	3	–	1	2	3	4

In each upper boxes of the first line, the first name is the name of the species (for example *andersoni*), the second line of name(s) is name(s) of describer(s) (for example Chant for *andersoni*) and the third line is the source of measurements (for example Denmark & Muma 1989 for *andersoni*).

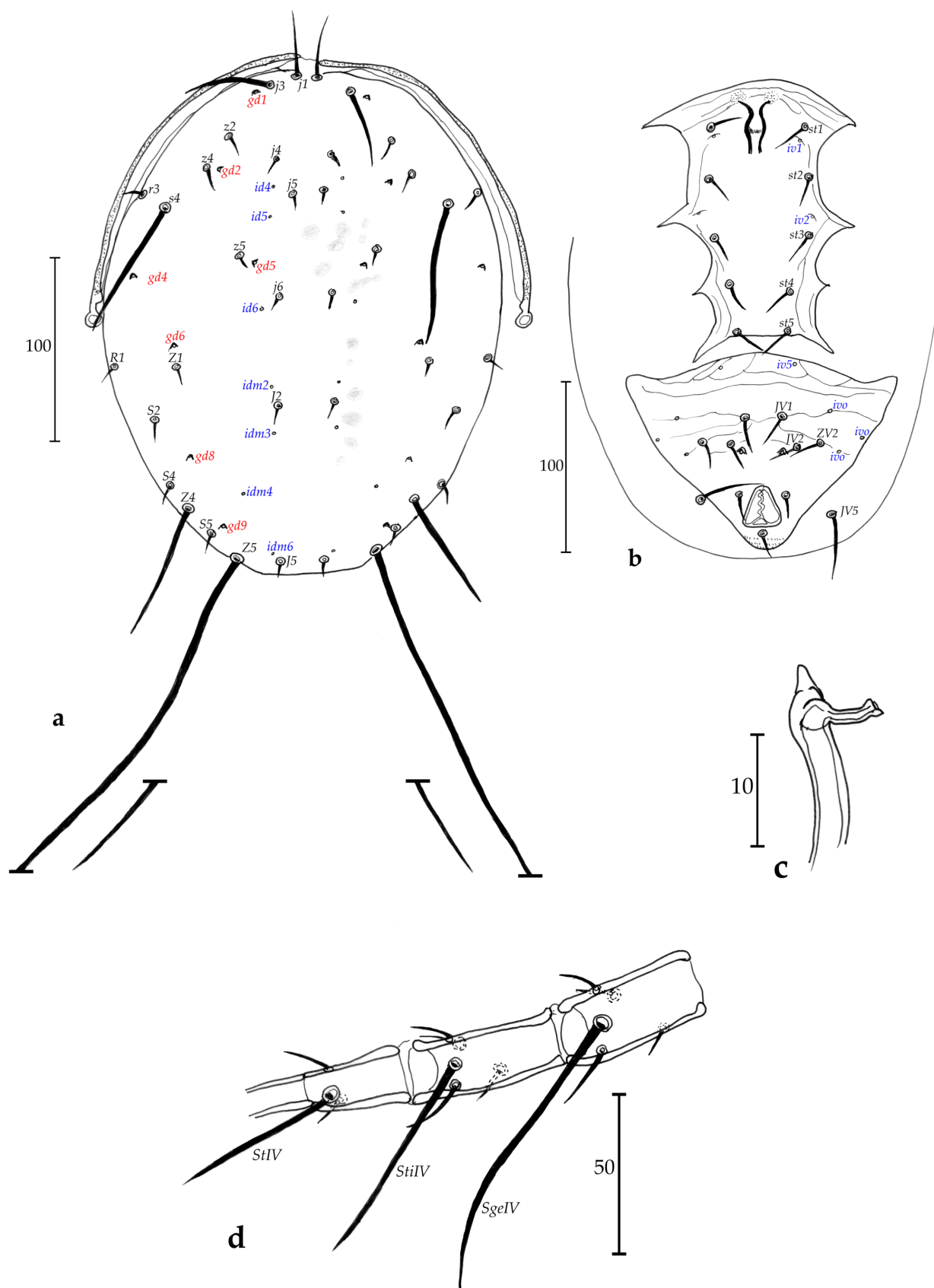


Figure 4 Paratype male of *Amblyseius duplicesetus* Moraes & McMurtry – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

Chelicerae (Fig. 4c) – Fixed digit **23** (21–24) long, with **eight** teeth; and movable digit **23** (21–25) long, with **one** tooth. Spermatodactyl shaft **18** (14–20) and branch **8** (8–9). *Pilus dentilis* not visible.

Legs (Fig. 4d) – All legs with macrosetae sharp-tipped. Measurements: *SgeI* **36** (33–40), *SgeII* **31** (28–33), *SgeIII* **38** (37–40), *StiIII* **33** (30–38), *SgeIV* **96** (90–100), *StiIV* **75** (68–85), *StIV* **55** (50–58). Chaetotactic formula of genua II and III similar to adult female.

Specimens examined. Twenty-three ♂♂ collected during this study, 10 ♂♂ measured, 13 ♂♂ as complementary voucher material. **ANJOUAN ISLAND** (5 ♂♂): **Chandra**, inside the village (436 m aasl, 12°12'36" S, 44°27'09" E), 1 ♂ on *Acalypha wilkesiana* Müller Argoviensis (Euphorbiaceae), 29/XI/2018; **Pomoni**, exit of the village (29 m aasl, 12°17'01" S, 44°34'37" E), 1 ♂ on *Artocarpus heterophyllus* Lamarck (Moraceae), 1 ♂ on *Artocarpus altilis* (Parkinson) Fosberg (Moraceae) and 2 ♂♂ on an unknown tree with alternate leaves, 30/XI/2018. **MOHELI ISLAND** (11 ♂♂): **Fomboni**, inside the town (15 m aasl, 12°17'29" S, 43°44'35" E), 1 ♂ on *Annona muricata* L. (Annonaceae), 2/XII/2018; **Fomboni**, Les-Hauts (60 m aasl, 12°17'29" S, 43°44'35" E), 2 ♂♂ on an unknown host plant, 2/XII/2018; **Hoani**, inside village (38 m aasl, 12°17'3" S, 43°44'34" E), 1 ♂ on the same unknown host plant than above, 1 ♂ on *A. muricata*, 2 ♂♂ on *Artocarpus altilis* J.R. Forster and G. Forster (Moraceae) and 1 ♂ on *Theobroma cacao* L. (Malvaceae), 3/XII/2018; **Bangoma**, Les Hauts (137 m aasl, 12°17'18" S, 43°43'41" E), 1 ♂ on *Cinnamomum odoratum* Schaffer (Lauraceae), 1 ♂ on *A. altilis* and 1 ♂ on *Persea americana* Miller (Lauraceae), 4/XII/2018. **GRANDE COMORE ISLAND** (7 ♂♂): **Mdé**, INRAPE (51 m aasl, 11°44'12" S, 43°14'59" E), 1 ♂ on *Mangifera indica* L. (Anacardiaceae), 6/XII/2018; **Mvouni**, University of Comoros (434 m aasl, 11°43'11" S, 43°16'31" E), 1 ♂ on *Myristica fragrans* Houttuyn (Myristicaceae) and 1 ♂ on *Citrus sinensis* (L.) Osbeck (Rutaceae), 6/XII/2018; **Dzahani**, village (209 m aasl, 11°46'32" S, 43°16'40" E), 1 ♂ on *Carica papaya* L. (Caricaceae), 1 ♂ on *Artocarpus altilis* Parkinson Fosberg (Moraceae), 7/XII/2018; **Mdjoizezi** (230 m aasl, 11°50'19" S, 43°18'29" E), 1 ♂ on *M. indica*, 10/XII/2018; **Mdé**, INRAPE (51 m aasl, 11°44'12" S, 43°14'59" E), 1 ♂ on *Spondias dulcis* Solander ex. Parkinson (Anacardiaceae), 11/XII/2018.

Voucher material. Twenty-three ♂♂ on 20 slides are deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Differential diagnosis and remarks. The male of this species was mentioned in El-Banhawy and Knapp (2011), but it is not indicated that this is the first mention of the male of this species, the male was illustrated, but the description lacks detail (El-Banhawy and Knapp 2011). We thus decide on a more detailed description of the male of this species.

This species belongs to the *largoensis* species group as setae *J2* and *Z1* are present, seta *s4* is minute and the ventrianal shield of the female is vase-shaped. It belongs to the *largoensis* species subgroup as seta *Z4* is long, spermatheca has the calyx elongate mostly tubular and the female ventrianal shield is entire (Chant and McMurtry 2004).

The following combination of characters, indicated in the description of the male of this species, is quite similar to the few described males of species of *Amblyseius* belonging to the *largoensis* species group and to the *largoensis* species subgroup.

Not many characters allow to distinguish it from all males of other species if no females are collected in the same time (all the males used for description were collected with females of this species): the peritreme reaching level of *j1*, absence of reticulation of the dorsal shield, all dorsal setae including *J5* length approximately of the same length (8–11), except for *j1*, *j3*, *s4*, *Z4*, *Z5* longer and *z5* shorter, additional macrosetae on all other legs than leg IV, macrosetae of leg IV not sub-equal, a sternogenital shield mostly smooth, a ventrianal shield reticulate, only three pairs of pre-anal setae, a pair of crateriform *gv3* between *JV2*.

All described males of the large species subgroup *largoensis* have very similar ventrianal shield reticulate with three pairs of pre-anal setae.

***Amblyseius haleakalus* Prasad**

Amblyseius haleakalus Prasad 1968: 1516; Moraes *et al.* 1986: 14, 2004b: 27; Denmark & Muma 1989: 97; Chant & McMurtry 2004: 199, 2007: 78.

Amblyseius (*Multiseius*) *haleakalus*, Denmark & Evans 2011: 75.

Description of adult male of *Amblyseius haleakalus* Prasad (n = 1, Figs 5 a-d)

Dorsum (Fig. 5a) – Dorsal shield smooth, **300** long and **193** wide, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **seven** pairs of poroids visible, **19** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **33**, *j3* **33**, *j4* **4**, *j5* **4**, *j6* **8**, *J2* **8**, *J5* **5**, *z2* **8**, *z4* **9**, *z5* **6**, *Z1* **8**, *Z4* **85**, *Z5* (**half-broken**), *s4* **80**, *S2* **10**, *S4* **9**, *S5* **8**, *r3* **8**, *R1* **8**. All setae smooth, except for *Z4* lightly serrate and *Z5* probably slightly serrate, but not all visible because both members of *Z5* are damaged.

Peritreme and peritremal plate (Fig. 5a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level of *z2*.

Venter (Fig. 5b) – Sternogenital shield smooth with only few striae, five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*). Distances *st1-st1* **54**, *st2-st2* **61**, *st3-st3* **60**, *st1-st5* **117**, *st4-st4* **48**, *st5-st5* **38**. Ventrianal shield **140** long, **148** wide at anterior corners and **75** wide at level of para-anal setae. Ventrianal shield reticulate with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of small crateriform *gv3*, between *JV2* bases, **16** apart. A pair of poroids *iv5* and three pairs of poroids *ivo* also discernible. Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth, **48** long.

Chelicerae (Fig. 5c) – Fixed digit **23** long, with at least **ten** teeth discernible; and movable digit **23** long, with no teeth discernible. Spermatodactyl shaft **21** and branch **7**. *Pilus dentilis* not visible.

Legs (Fig. 5d) – All legs with pointed macrosetae similar to adult female. Measurements: *SgeI* **not measured**, *SgeII* **24**, *SgeIII* **30**, *StiIII* **30**, *SgeIV* **60**, *StiIV* **55**, *StIV* **57**. Chaetotactic formula of genua II and III similar to adult female.

Specimens examined. One single ♂ collected during this study, measured and deposited as a complementary voucher specimen.

MAURITIUS ISLAND. **Curepipe**, Anderson Street (560 m aasl, 20°19'11" S, 57°31'52" E), one ♂ (along with eight ♀♀ on the same leaves of the same plant collected in the same time) on *Araucaria columnaris* (Forster) Hook (Araucariaceae), 4/XI/2018.

Voucher material. One male on one slide is deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Differential diagnosis and remarks. This species belongs to the *obtusus* species group as seta *z4* is minute and female ventral shield is not vase-shaped or divided. It belongs to the *andersoni* species subgroup as the spermatheca has a differentiated atrium, a calyx not dotted or annulated, not swollen basally and calyx dish-, cup-, bell- or V-shaped. The following combination of characters, indicated below in the description of the male of this species, is quite similar to the few described males of species of *Amblyseius* belonging to the *obtusus* species group and to the *andersoni* species subgroup.

Not many characters allow to distinguish it from all males of other species if no females are collected in the same time: the peritreme reaching level of *j1*, absence of reticulation of the dorsal shield, some dorsal setae lengths, especially *z2*, *z4*, *r3* and *S2* approximately of the same length (12–15), additional macrosetae on all other legs than leg IV, macrosetae of leg IV not subequal, a sternogenital shield smooth, ventrianal shield reticulate, only three pairs of pre-anal setae, a pair of crateriform *gv3* between *JV2*. All described males of the large species subgroup *andersoni* have similar ventrianal shield reticulate with three pairs of pre-anal setae.

Characters of males are very similar to that of adult females, except of course for length of setae and few other characters. The only difference is that ventrianal shield of the male is moderately reticulate, while the ventrianal shield of the female is not.

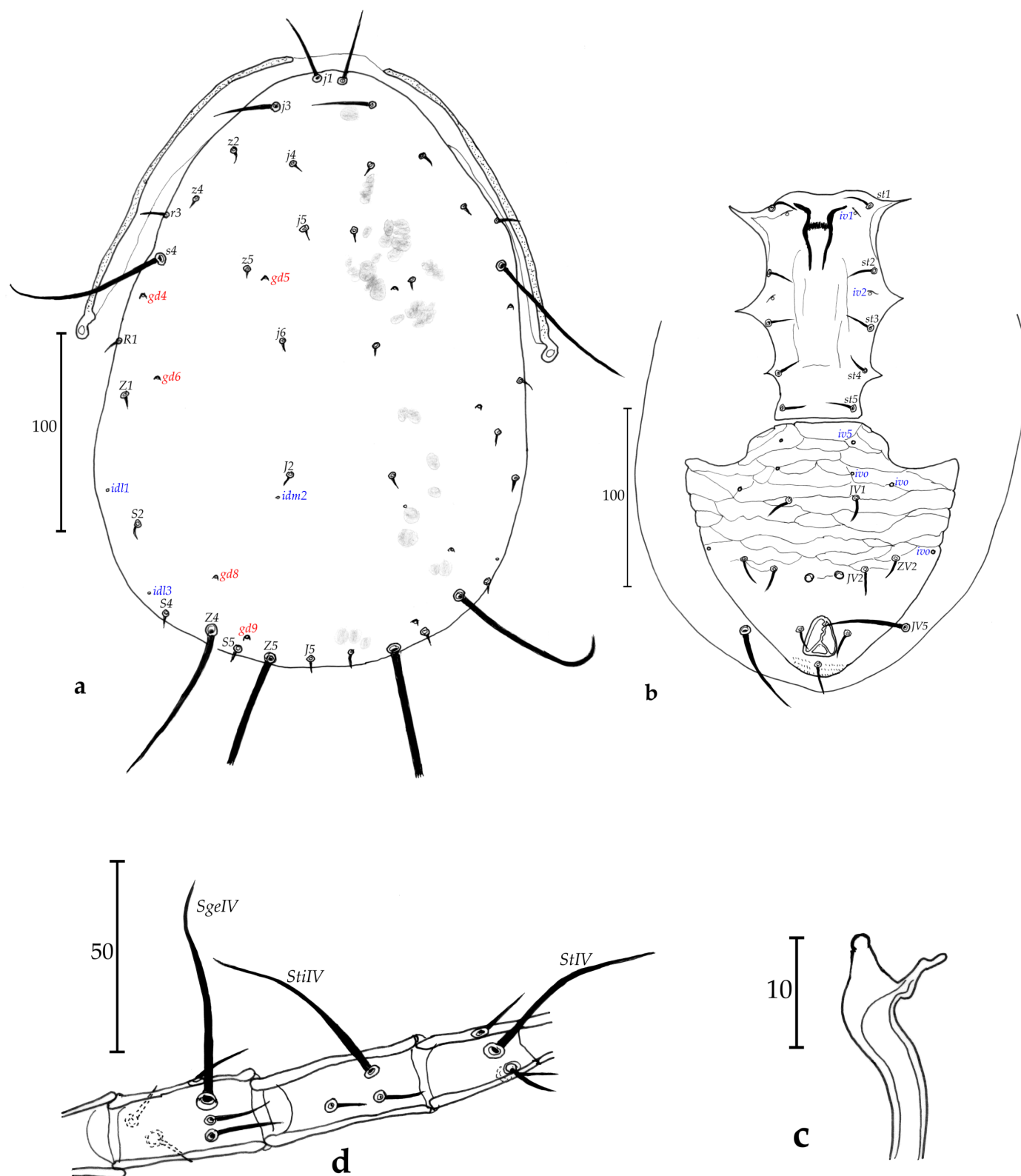


Figure 5 Paratype male of *Amblyseius haleakalus* Prasad – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

***Amblyseius parasundi* Blommers**

Amblyseius (*Proprioseiopsis*) *parasundi* Blommers 1974: 144.

Amblyseius (*Amblyseius*) *parasundi*, Denmark & Muma 1989: 19.

Amblyseius parasundi, Moraes *et al.* 1986: 27, 2004b: 46.

Description of adult male of *Amblyseius parasundi* Blommers (n = 8, Figs 6 a-d)

Dorsum (Fig. 6a) – Dorsal shield smooth, **265** (253–275) long and **179** (170–213) wide, with only **four** solenostomes difficult to distinguish (*gd2*, *gd4*, *gd8* and *gd9*), **four** pairs of poroids, **18** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **29** (26–33), *j3* **39** (38–41), *j4* **4** (4–5), *j5* **4**, *j6* **5** (4–5), *J2* **5** (5–6), *J5* **7** (5–8), *z2* **7** (6–8), *z4* **7** (7–8), *z5* **5** (4–5), *Z4* **142** (130–150), *Z5* **364** (350–383), *s4* **140** (133–146), *S2* **7** (6–8), *S4* **8** (6–8), *S5* **6** (5–7), *r3* **13** (11–15), *R1* **7** (6–8). All setae sharp-tipped and smooth, except for *Z4* and *Z5* lightly serrate.

Peritreme and peritremal plate (Fig. 6a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level between *z2* and *z4*.

Venter (Fig. 6b) – Sternogenital shield smooth with very few striae, five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*). Distances *st1-st1* **54** (49–58), *st2-st2* **62** (60–63), *st3-st3* **58** (50–59), *st1-st5* **117** (113–120), *st4-st4* **43** (40–45), *st5-st5* **38** (34–41). Ventrianal shield **119** (115–125) long, **153** (145–160) wide at anterior corners and **64** (58–70) wide at level of para-anal setae. Ventrianal shield striate, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*) and a pair of small rounded *gv3*, between *JV2* just below the line between their bases, **16** (13–20) apart. A pair of *iv5* and two pairs of poroids *ivo* also discernible. Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth, **65** (60–69) long.

Chelicerae (Fig. 6c) – Fixed digit **24** (22–25) long, with **11** teeth discernible; and movable digit **27** (25–28) long, with **three** teeth discernible. Spermatodactyl shaft **15** (13–18) long and branch **5** (4–5). *Pilus dentilis* not visible.

Legs (Fig. 6d) – All legs with sharp-tipped macrosetae similar to adult female. Measurements: *SgeI* **61** (55–65), *SgeII* **39** (37–40), *SgeIII* **56** (48–58), *StiIII* **46** (43–49), *SgeIV* **171** (160–180), *StiIV* **128** (122–138), *StIV* **94** (90–98). Chaetotactic formula of genua II and III similar to adult female. One erected seta on femur IV.

Specimens examined. Eight ♂♂ collected during this study, measured and deposited as complementary voucher material. **MAYOTTE ISLAND: Coconi**, Maison de l'Office National des Forêts (156 m aasl, 12°50'1" S, 45°8'5" E), 1 ♂ on *Terminalia catappa* L. (Combretaceae), 24/XI/2018; **Combani**, gîte du Mont-Combani (437 m aasl, 12°48'23" S, 45°9'17" E), 1 ♂ on *Cocos nucifera* L. (Arecaceae), and 1 ♂ on *Cananga odorata* L. (Annonaceae), 25/XI/2018; **L'Abattoir**, Dziani lake (23 m aasl, 12°46'14" S, 45°17'18" E), 1 ♂ on *Artocarpus altilis* (Parkinson) Fosberg (Moraceae), 27/XI/2018. **MOHELI ISLAND: Hoani**, inside village (38 m aasl, 12°17'3" S, 43°44'34" E), 1 ♂ on *Theobroma cacao* L. (Malvaceae), 3/XII/2018; **Bangoma**, Les Hauts (137 m aasl, 12°17'18" S, 43°43'41" E), 1 ♂ and 1 im. on *Cinnamomum odoratum* Schäffer (Lauraceae), 1 ♂ on *Annona muricata* L. (Annonaceae) and 1 ♂ on *Litchi chinensis* Sonnerat (Sapindaceae), 4/XII/2018.

Voucher material. Eight males on eight slides are deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Differential diagnosis and remarks. This species has no seta *Z1* and consequently belongs to the *sundi* species group and having the spermatheca elongate, tube-like, it belongs to the *sundi* species subgroup. The following combination of characters indicated below in the description of the male of this species is quite similar to the unique described males of species of *Amblyseius* belonging to the *sundi* species group and to the *sundi* species subgroup. Not many characters allow distinguishing it from the single described male of this *sundi* subgroup, the male of *A. sundi* Pritchard & Baker. If no females are collected in the same time, the identification will be impossible. These characters are: the peritreme reaching level of *j1*, absence of reticulation of the dorsal shield, some dorsal setae length, especially *j-J* serie starting to *j4*, *z2* to *z5*, *R1* and *S* series (after *s4*) approximately of the same length (4–8), additional macrosetae on all other legs than leg IV, macrosetae of leg IV not subequal and long, sternogenital shield smooth,



ventrianal shield reticulate, only three pairs of pre-anal setae, a pair of round *gv3* between *JV2*, a macroseta present also on genu II, only three teeth on the movable digit and 11 on the fixed digit of chelicera instead of one and six in the male chelicera of *A. sundi*, respectively.

Characters of males are very similar to adult females, except of course for lengths of setae and other few characters. The only difference is that the ventrianal shield of the male is lightly reticulate in the anterior part and the ventrianal shield of the female is not.

Blommers and Gutierrez (1975) found this species very abundant on fruit trees preying on several species of tetranychid mites. *Amblyseius sundi* is reported by Blommers (1974) as being a thelytokous species in mass-rearing and field collected specimens and similar information is also mentioned by Denmark and Muma (1989). In nature, reproduction of *A. parasundi* seems more complicated. Males were not so rare in fields of the two Islands where they were found (Mayotte and Mohéli). This suggests further fundamental studies on the biology of this species.

Tribe Euseiini Chant & McMurtry

Euseiini Chant & McMurtry 2005a: 191.

Subtribe Typhlodromalina Chant & McMurtry

Typhlodromalina Chant & McMurtry 2005a: 195.

Genus *Typhlodromalus* Muma

Amblyseius (*Typhlodromalus*) Muma 1961: 288;

Typhlodromalus De Leon 1966: 87.

Typhlodromalus baillodi Kreiter n. sp.

Zoobank: [7BDF4768-99F0-4CDE-A946-574CFB26D1A0](https://doi.org/10.24349/7BDF4768-99F0-4CDE-A946-574CFB26D1A0)

Classification. *Typhlodromalus baillodi* Kreiter n. sp. belongs to:

- the subfamily Amblyseiinae (absence of dorsolateral setae *z3* and *s6* and the caudoventral seta *JV3*),
- to the tribe Euseiini (sternal shield with median posterior projection, deutosternal groove > 5 µm in width, forward migration of pre-anal setae *JV2* and *ZV2*),
- to the subtribe Typhlodromalina (chelicera of normal size and shape, with prominent teeth evenly distributed along fixed digit, peritreme usually extending to level of *j1*, deutosternal groove narrow, 4–7 µm width),
- to the genus *Typhlodromalus* (female ventrianal shield with more than one pair of pre-anal setae, GeI usually with a macroseta, GeII and III with macrosetae, leg IV with three macrosetae usually stout, often knobbed or blunt, male ventrianal shield with three pairs of pre-anal setae, most dorsal setae either setiform or thickened, thorn like, tapering distally, without terminal knobs, fixed digit with 6–12 teeth evenly distributed along the digit, *BtI* without erected seta, female ventrianal shield with three pairs of pre-anal setae, ratio *s4/ZI* < 3.0 : 1.0, dorsal setae of medium length subequal, dorsal shield ornamented in addition to anterolateral striations, seta *Z4* longer than distance between its base and that of *S4*,
- to the *peregrinus* species group as seta *S5* is present (Chant and McMurtry 2007) which includes 16 species (Chant and McMurtry 2005a but incomplete): *T. araucariae* Gonçalves & Ferla, *T. aripo* De Leon, *T. clavicus* Denmark & Muma, *T. erigeronus* Denmark & Evans, *T. etiennei* (Kreiter & Ueckermann), *T. feresi* Lofego, Moraes & McMurtry, *T. feresisimilis* Moraes, Barbosa & Castro, *T. ingae* Moraes, Barbosa & Castro, *T. jucundus* (Chant), *T. marmoreus* (El-Banhawy), *T. olombo* (Pritchard & Baker), *T. peregrinus* (Muma), *T. planetarius* (De Leon), *T. pumilus* Denmark & Evans, *T. rosayroi* Denmark & Muma and *T. simus* Denmark & Muma.

Description of adult female (n = 15 of 44 collected during this study, Figs. 7 a-e)

Dorsum (Fig. 7a) – Dorsal shield strongly ornamented and reticulate, with margins of posterior part slightly indented at level of *S5* creating a slight “trilobite appearance”, with an expansion on each lateral side at level of *s4-Z1* and with a constriction at level of *R1*, **310** (283–333) long and **187** (165–210) wide at level of *s4*, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **14** pairs of poroids, **17** pairs of dorsal setae and **two** pairs of sub-lateral setae: *j1* **24** (23–25), *j3* **24** (20–30), *j4* **14** (13–15), *j5* **14** (12–15), *j6* **18** (15–20), *J2* **20** (18–23), *J5* **8** (7–10), *z2* **22** (20–25), *z4* **26** (23–28), *z5* **18** (15–20), *Z1* **21** (18–24), *Z4* **32** (29–38), *Z5* **60** (54–68), *s4* **33** (29–35), *S2* **29** (25–33), *S4* **24** (18–28), *S5* **15** (13–18), *r3* **21** (18–24), *R1* **19** (16–23). All setae thickened and smooth, except for *Z5* strongly serrate.

Peritreme and peritremal plate (Fig. 7a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level between *j1* and *j3*, much closer to the former.

Venter (Fig. 7b) – All shields smooth. Sternal shield with three pairs of setae (*st1-st3*) and two pairs of rounded poroids (*iv1* and *iv2*); a pair of *st4* and a pair of rounded pores (*iv3*) on a metasternal plate; posterior margin of the sternal shield convex, with a posterior projection. Distances *st1-st1* **52** (44–58), *st2-st2* **60** (55–65), *st3-st3* **69** (63–75), *st1-st3* **61** (53–65), *st4-st4* **69** (61–83). Genital shield length **107** (103–119), width at level of *st5* **70** (63–75), width at level of posterior corners **75** (68–80), distance *st5-st5* **66** (63–70). Two pairs of metapodal plates **16** (10–19) long and **4** (2–5) wide for the larger and **8** (5–10) long and **< 1** wide for the slender. Ventrianal shield **101** (90–113) long, **64** (58–70) wide at level of anterior corners (*ZV2*), and **65** (61–70) wide at level of para-anal setae. Ventrianal shield smooth, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of evolved and oblong crateriform *gv3*, **23** (19–25) apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1* and *ZV3*), and five pairs of round to oblong poroids *ivo* and *ivp*. Seta *JV5* thickened and smooth, **39** (30–43) long.

Chelicerae (Fig. 7c) – Fixed digit **26** (25–28) long, with **five** teeth in row and **one** subapical tooth; and movable digit **27** (25–28) long, with two teeth. *Pilus dentilis* not visible.

Spermatheca (Fig. 7d) – Resembles that of *Ueckermannseius payetae* Kreiter **n. sp.** in the **new species group havu** of the genus *Ueckermannseius*, with the atrium bulbous and elongate, the calyx basally swollen, bladder-like and then elongate and slender, **36** (30–45) long and **9** (8–11) wide at the widest of the calyx, small minor duct visible.

Legs (Fig. 7e) – Thickened blunt macrosetae on tibia III, tarsus III and tibia IV, thickened knobbed macrosetae on genua I–III, genu and basitarsus IV. Measurements: *SgeI* **10** (9–11), *SgeII* **11** (9–13), *SgeIII* **20** (16–22), *StiIII* **15** (13–15), *StiIII* **14** (13–16), *SgeIV* **29** (23–33), *StiIV* **18** (15–20), *StiIV* **50** (45–58). Genua II and III both with **seven** setae. Chaetotactic formula of genu II: **2-2/0, 2/0-1**; genu III: **1-2/1, 2/0-1**.

Description of adult male (n = 9, Figs. 8 a-d)

Dorsum (Fig. 8a) – Dorsal shield similar to adult female, **238** (218–275) long and **154** (140–173) wide, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*) similar to adult female, **14** pairs of poroids visible, **19** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **20** (18–23), *j3* **21** (18–23), *j4* **12** (10–14), *j5* **12** (11–13), *j6* **13** (12–15), *J2* **15** (13–16), *J5* **7** (7–8), *z2* **17** (15–19), *z4* **20** (18–22), *z5* **13** (13–15), *Z1* **16** (15–20), *Z4* **23** (21–25), *Z5* **40** (36–43), *s4* **25** (23–28), *S2* **21** (20–24), *S4* **16** (15–18), *S5* **12** (11–13), *r3* **16** (14–18), *R1* **14** (11–16). All setae thickened and smooth, except for *Z5* slightly serrate.

Peritreme and peritremal plate (Fig. 8a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level between *j3* and *z2*.

Venter (Fig. 8b) – Sternogenital shield smooth, except for edges that are very slightly striate, with five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*). Distances *st1-st1* **45** (43–46), *st2-st2* **53** (50–56), *st3-st3* **56** (53–59), *st1-st5* **100** (94–103), *st4-st4* **46** (43–49), *st5-st5* **36** (34–38). Ventrianal shield **96** (88–108) long, **132** (123–140) wide at anterior corners and **63** (55–75) wide at level of para-anal setae. Ventrianal shield with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of large crateriform solenostome *gv3*, between *JV2*, **18** (15–20) apart. A pair of *iv5* and four pairs of poroids *ivo* discernible. Unsclerotized cuticle

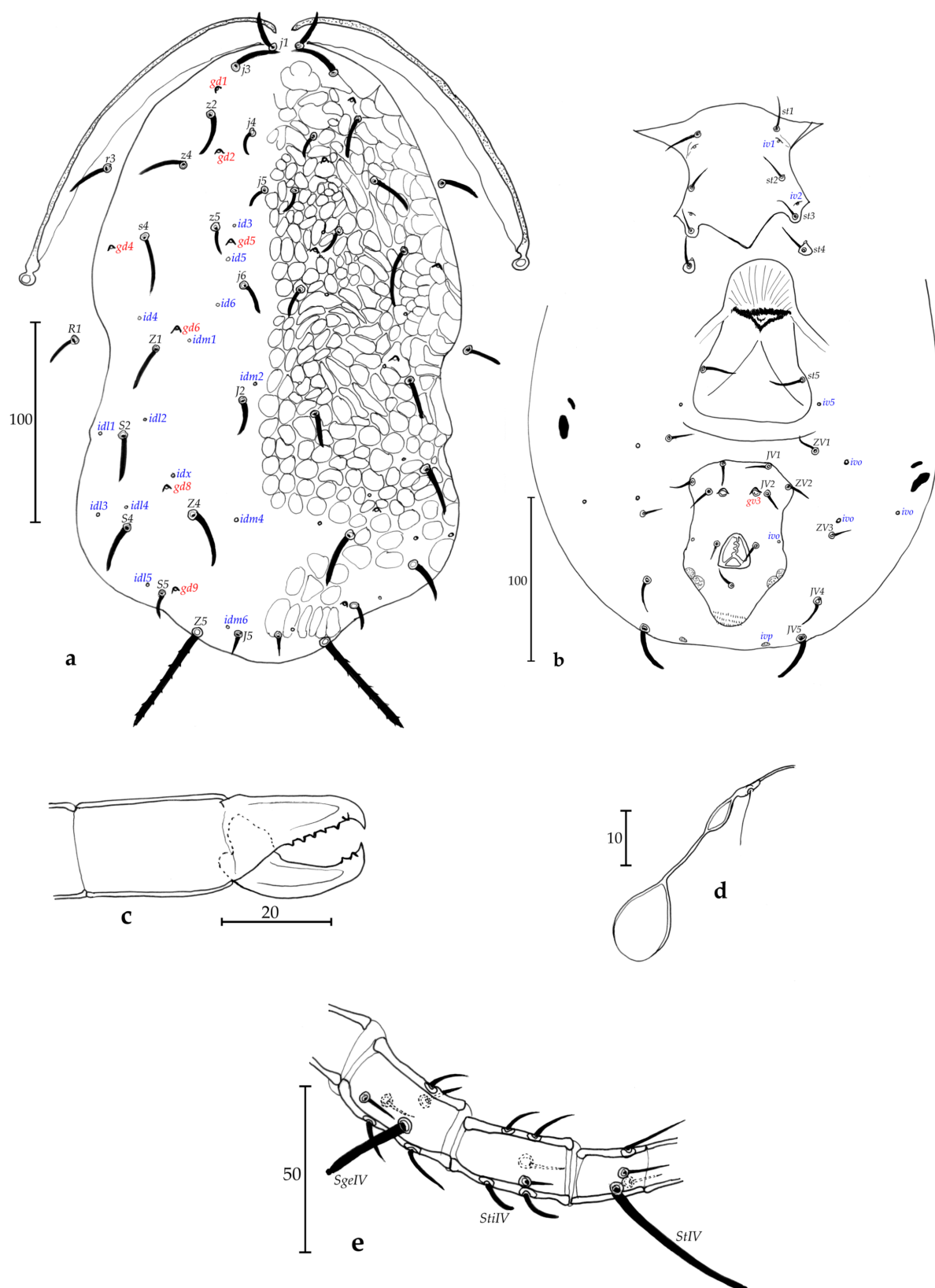


Figure 7 Holotype female of *Typhlodromalus baillodi* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.



around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* pointed and smooth, but not thickened as in adult female, **20** (19–22) long.

Chelicerae (Fig. 8c) – Fixed digit **20** (16–21) long, with **six** or **seven** teeth discernible; and movable digit **19** (18–21) long, apparently edentate. Spermatodactyl shaft **18** (14–20) and branch **5** (4–6).

Legs (Fig. 8d) – All legs with at least one macroseta similar to adult female, except that in male only genu III has a macroseta, not tibia III. Measurements: *SgeI* **9** (8–10), *SgeII* **10** (9–12), *SgeIII* **14** (13–16), *SgeIV* **20** (19–23), *StiIV* **14** (13–15), *StiV* **36** (34–38). Chaetotactic formula of genera II and III similar to adult female.

Material examined. Forty-four ♀♀, nine ♂♂ and two imm. collected during this study, fifteen ♀♀ and nine ♂♂ measured, 43 ♀♀, nine ♂♂ and two imm. as type material. **MAYOTTE ISLAND** (29 ♀♀ and 1 ♂): **Coconi**, Maison de l'Office National des Forêts (156 m aasl, 12°50'1" S, 45°8'5" E), 1 ♀ on *Terminalia catappa* L. (Combretaceae) and 1 ♀ on *Cananga odorata* L. (Annonaceae), 24/XI/2018; **Combani**, gîte du Mont-Combani (437 m aasl, 12°48'23" S, 45°9'17" E), 1 ♀ on *Psidium guajava* L. (Myrtaceae), 2 ♀♀ on *Hydrangea aspera* Buchanan-Hamilton ex D. Don (Hydrangeaceae) and 8 ♀♀ on *Bidens pilosa* L. (Asteraceae), 25/XI/2018; **Coconi**, Lycée Agricole (189 m aasl, 12°50'7" S, 45°8'11" E), 3 ♀♀ on *Solanum melongena* L. (Solanaceae), 2 ♀♀ on *Ageratum conizoides* L. (Asteraceae), 26/XI/2018; **L'Abattoir**, Dziani lake (23 m aasl, 12°46'14" S, 45°17'18" E), 11 ♀♀ and 1 ♂ on *Ricinus communis* L. (Euphorbiaceae), 27/XI/2018. **MOHELI ISLAND** (15 ♀♀, 8 ♂♂ and 2 imm.): **Fomboni**, University (25 m aasl, 12°17'3" S, 43°44'34" E), 2 ♀♀ on *Zyzyphus mauritiana* Lamarck (Malvaceae) and 12 ♀♀, 8 ♂♂ and 2 imm. on *Ricinus communis* L. (Euphorbiaceae), 3/XII/2018; **Hoani**, inside village (38 m aasl, 12°17'3" S, 43°44'34" E), 1 ♀ on *Amaranthus viridis* L. (Amaranthaceae), 3/XII/2018.

Type material. The holotype female, 43 paratype females, nine paratype males and two immatures are deposited in Institut Agro (MSA) – INRAE Acarology collection, Montpellier, France.

Etymology. The name “*baillodi*” refers to the family name of the researcher Dr Marc Baillod, who has worked during his career at the Station Fédérale de Recherche Agronomique de Changins in Switzerland (now called Agroscope) and has published many useful papers on plant inhabiting mites in agrosystems. He contributed towards the senior author's knowledge of the Phytoseiidae (taxonomy, biology, ecology, side effects of pesticides, etc.) more than 35 years ago. Marc Baillod was a real Master and deserves billions of billions of thanks! This new species is named in his honour.

Differential diagnosis and remarks. This species is very original by the set of characters described above. Lengths of most of the major setae are very similar to those obtained by Yoshida-Shaul and Chant (1991) for *T. fragosoi* Yoshida-Shaul & Chant and by Kreiter *et al.* (2002) for *T. etiennei* Kreiter & Ueckermann. However, the unique shape of the spermatheca not only distinguishes it from the latter two species, but also from all known species of the genus *Typhlodromalus*. The spermatodactyl also distinguishes it from that of *T. spinosus* Meyer and Rodrigues, allowing an easy distinction between the two species mentioned from this region.

Genus *Ueckermannseius* Chant & McMurtry

Ueckermannia Chant & McMurtry 2005a: 201. Preoccupied by *Ueckermannia* Kaźmierski, 1996 (Tydeidae).

Ueckermannseius Chant & McMurtry 2005b: 337, 2007: 115.

We describe here **three new species groups** within the genus *Ueckermannseius* and **three new species** belonging to the same species group.

***Ueckermannseius gutierrezii* Kreiter n. sp.**

Zoobank: A56A4712-1C00-4F5B-84BE-2B9592180D24

Classification. *Ueckermannseius gutierrezii* Kreiter n. sp. belongs to:

- the subfamily Amblyseinae (absence of dorsolateral setae *z3* and *s6* and the caudoventral seta *JV3*),
- to the tribe Euseiini (sternal shield with median posterior projection, deutosternal groove > 5 µm in width, forward migration of pre-anal setae *JV2* and *ZV2*),
- to the subtribe Typhlodromalina (chelicera of normal size and shape, with prominent teeth evenly distributed along fixed digit, peritreme usually extending to level of *j1*, deutosternal groove narrow, 4–7 µm width),
- to the genus *Ueckermannseius* (dorsal setae short/minute, shorter than distances between their bases, seta *Z4* not as long as distance between its base and that of *S4*, dorsal shield smooth, except for anterolateral striation) (Chant and McMurtry 2007),
- to the **new species-group *havu* Kreiter**, with spermatheca with the atrium bulbous, the calyx basally swollen, bladder-like and then elongate and slender. This kind of spermatheca is shared by **13** African species of *Ueckermannseius* we proposed to include in the **new species group *havu***: *U. bundibugyoensis* Moraes, Zannou & Oliveira, *U. east-africae* Moraes, Zannou & Oliveira, *U. havu* (Pritchard & Baker), *U. lugula* El-Banhawy & Irungu, *U. macrosetosus* (van der Merwe), *U. mangrovei* El-Banhawy & Knapp, *U. nesiotus* (Ueckermann & Kreiter), *U. neohavu* Moraes, Zannou & Oliveira, *U. parahavu* Moraes, Zannou & Oliveira, *U. quilicii* (Ueckermann & Kreiter), *U. sabatiae* El-Banhawy & Knapp, *U. saltus* (Denmark & Matthysse) and *U. ueckermanni* Moraes, Zannou & Oliveira.

The **two other new species groups** proposed are:

- **the species group *ultimus* Kreiter**, with spermatheca elongate, tubular, flared distally with an atrium prominent, but small. This kind of spermatheca is shared by **six** African species of *Ueckermannseius* we proposed to include in the *ultimus* species-group: *U. aequidens* Blommers, *U. bunyalae* El-Banhawy and Knapp, *U. kiminini* El-Banhawy and Knapp, *U. munsteriensis* (van der Merwe), *U. tenuiscutus* McMurtry and Moraes and *U. ultimus* (Chant and Baker),
- **the species group *danhomensis* Kreiter**, with spermatheca with calyx short, funnel-shaped, with an atrium distinctly bulbous. This kind of spermatheca is shared by only **two** species of *Ueckermannseius* we proposed to include in the *danhomensis* species-group: *U. danhomensis* Moraes, Zannou and Oliveira and *U. musoli* El-Banhawy and Knapp.

Description of adult female (n = 13, Figs. 9 a-e)

Dorsum (Fig. 9a) – Dorsal shield smooth with only few striae anterolaterally, **330** (318–353) long and **214** (170–240) wide at level of *s4*, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **12** pairs of poroids, **17** pairs of dorsal setae and **two** pairs of sub-lateral setae: *j1* **36** (34–40), *j3* **24** (22–25), *j4* **10** (8–10), *j5* **10** (8–10), *j6* **11** (9–13), *J2* **13** (10–14), *J5* **8** (6–9), *z2* **14** (13–15), *z4* **15** (13–16), *z5* **10** (9–11), *Z1* **12** (11–13), *Z4* **14** (13–16), *Z5* **42** (35–47), *s4* **23** (20–25), *S2* **14** (13–15), *S4* **13** (12–15), *S5* **14** (12–16), *r3* **18** (15–20), *R1* **13** (10–16). All setae smooth.

Peritreme and peritremal plate (Fig. 9a) – Extending to level between *j3* and *z2*; peritremal plate fused with dorsal shield at a level between *j3* and *z2*.

Venter (Fig. 9b) – Sternal shield smooth with few anterolateral striae, with three pairs of setae (*st1-st3*) and two pairs of poroids (*iv1* and *iv2*); a pair of setae (*st4*) and a pair of pores

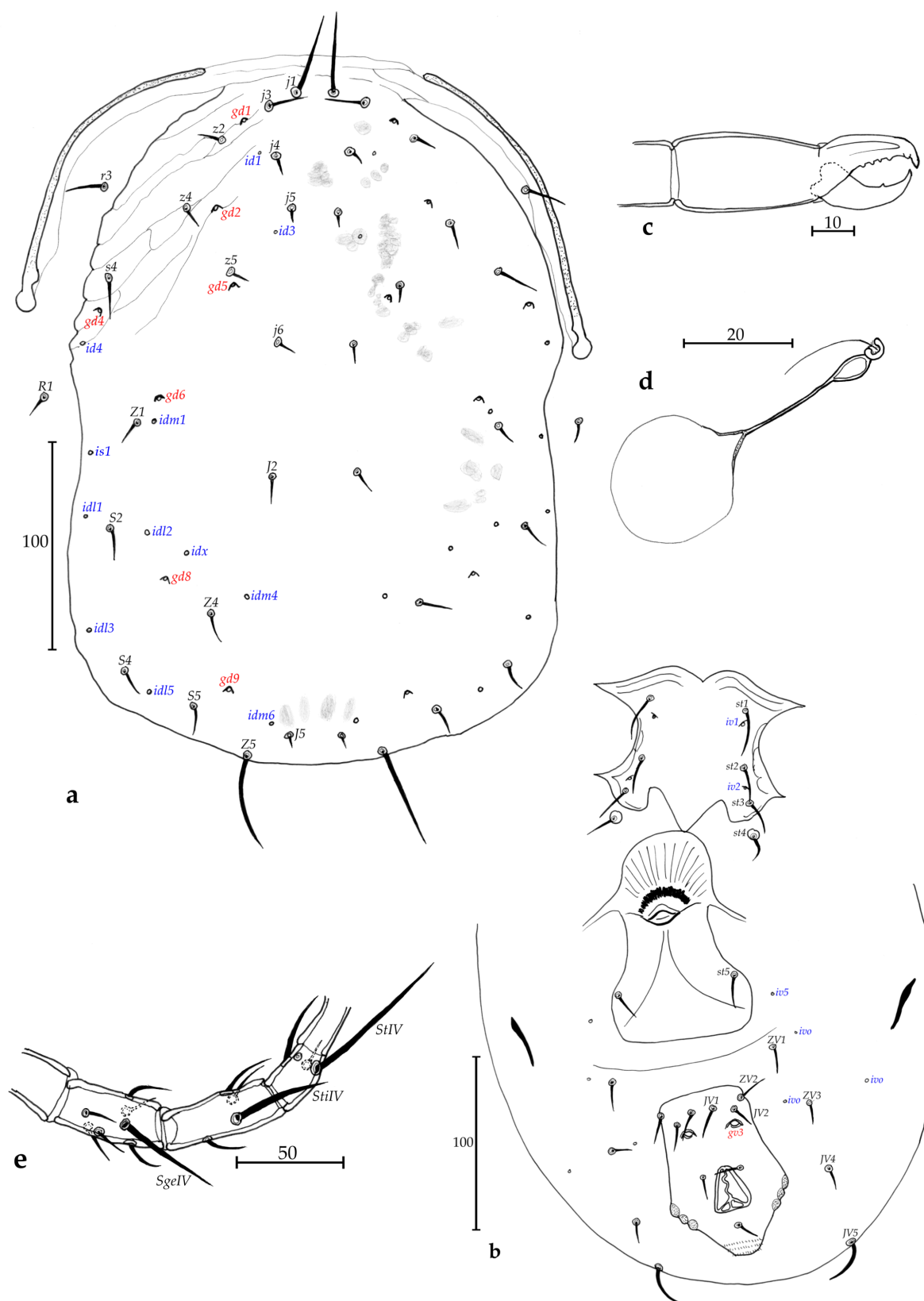


Figure 9 Holotype female of *Ueckermannseius gutierrezii* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.

(iv3) on a small metasternal shield; posterior margin of the sternal shield convex, with a central projection. Distances *st1-st1* **58** (55–60), *st2-st2* **66** (62–70), *st3-st3* **78** (75–84), *st1-st3* **60** (54–64), *st4-st4* **85** (75–90). Genital shield smooth, **133** (125–143) long, width at level of *st5* **82** (78–93), width at level of posterior corners **95** (85–105), distance *st5-st5* **76** (70–81). One pair of metapodal plate **25** (19–28) long and **2** (1–4) wide. Ventrianal shield **100** (88–118) long, **61** (55–70) wide at level of anterior corners (*ZV2*), and **74** (65–80) wide at level of para-anal setae. Ventrianal shield smooth, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of evolved and crateriform *gv3*, **34** (30–38) apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1* and *ZV3*), and four pairs of round to oblong poroids (*ivo*). Seta *JV5* smooth, **34** (28–40) long.

Chelicerae (Fig. 9c) – Fixed digit **24** (23–26) long, with **five** teeth visible; and movable digit **26** (25–28) long, with **one** tooth. *Pilus dentilis* not visible.

Spermatheca (Fig. 9d) – With the atrium c-shaped, calyx basally swollen, bladder-like and then elongate and slender **34** (30–37) long and **8** (6–8) wide in the wider part, a small atrium adjacent to the calyx, small minor duct visible.

Legs (Fig. 9e) – Pointed whip-like macrosetae on genua I–III, tibia III, and basitarsus, tibia and genu IV. Measurements: *SgeI* **21** (18–25), *SgeII* **24** (22–25), *SgeIII* **34** (30–43), *StiIII* **28** (28–30), *SgeIV* **51** (43–55), *StiIV* **43** (38–47), *StIV* **76** (70–80). Genua II and III both with **seven** setae. Chaetotactic formula of genua II: **2-2/0, 2/0-1**; genu III: **1-2/1, 2/0-1**.

Description of adult male (n = 1, Figs. 10 a-c)

Dorsum (Fig. 10a) – Dorsal shield similar to adult female, **248** long and **175** wide, with **seven** solenostome well visible (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), with only **five** poroids visible, **19** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **25**, *j3* **25**, *j4* **8**, *j5* **8**, *j6* **8**, *J2* **10**, *J5* **5**, *z2* **12**, *z4* **13**, *z5* **8**, *Z1* **10**, *Z4* **10**, *Z5* **38**, *s4* **20**, *S2* **13**, *S4* **12**, *S5* **12**, *r3* **17**, *R1* **10**. All setae smooth, except for *Z5* lightly serrate.

Peritreme and peritremal plate (Fig. 10a) – Extending to level between *j1* and *j3*; peritremal plate fused with dorsal shield at level between *j3* and *z2*.

Venter (Fig. 10b) – Sternogenital shield smooth, except for few striae posteriolaterally, with five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*). Distances *st1-st1* **47**, *st2-st2* **55**, *st3-st3* **53**, *st1-st5* **103**, *st4-st4* **48**, *st5-st5* **39**. Ventrianal shield **100** long, **145** wide at level of anterior corners, and **83** wide at level of para-anal setae. Ventrianal shield reticulate in the anterior part, above pores *gv3*, with three pairs of pre-anal setae (*JV1*, *JV2*, and *ZV2*), and a pair of evolved and crateriform *gv3* between *JV2*, **23** apart. A pair of poroids *iv5* and four pairs of poroids *ivo* on the ventrianal shield. Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth, **28** long.

Chelicerae – Fixed digit **20** long, no discernible teeth; and movable digit **20** long, with no discernible teeth. Spermatodactyl shaft renders measurement and illustration impossible.

Legs (Fig. 10c) – Pointed whip-like macrosetae on genua II and III and basitarsus, tibia and genu IV. Measurements: *SgeII* **13**, *SgeIII* **20**, *SgeIV* **35**, *StiIV* **30**, *StIV* **50**. Chaetotactic formula of genua II and III similar to adult female.

Material examined. Thirteen ♀♀ and one ♂ collected during this study, measured and type material. **ANJOUAN ISLAND: Pomoni**, exit of the village (29 m aasl, 12°17'01" S, 44°34'37" E), 1 ♀ on *Gliricidia sepium* (Jacquin), Kunth ex Walpers (Fabaceae) and 1 ♀ *Hibiscus tiliaceus* L. (Malvaceae), 30/XI/2018. **MOHELI ISLAND: Bandar-Es-Salam**, Les Abous Inn (23 m aasl, 12°17'37" S, 43°45'27" E), 11 ♀♀ and 1 ♂ on *Carica papaya* L. (Caricaceae), 2/XII/2018.

Type material. The holotype ♀, twelve paratype ♀♀ and one paratype ♂ are deposited in Institut Agro (MSA) – INRAE Acarology collection, Montpellier, France.

Etymology. The name “*gutierrezzi*” refers to the family name of the researcher Dr Jean Gutierrez, who has worked during his career at ORSTOM (= IRD for now) and have published many papers on plant inhabiting mites, mainly tetranychid mites, from Indian Ocean among many other sites. He has helped the senior author in many aspects at the beginning of his career, especially with exciting and stimulating scientific discussions on mites and many other subjects. This species is named in his honour.



leg IV.

Differential diagnosis and remarks. This species closely resembles *U. neohavu* concerning length of setae on dorsal shield. However, it differs from the latter in having: setae *j4-j6*, *R1*, *s4*, *z2*, *z4* and *Z5* shorter with *Z5* serrate, ventrianal shield and calyx of spermatheca shorter, cheliceral digits also shorter with less teeth (5/1 in the new species compared to 11/4 in *U. neohavu*) (Table 3). It is also close to *U. macrosetosus*, but differs in shorter dorsal setae especially *s4*, *z2*, *z4*, *Z5* and all macrosetae, except for *StIV* longer, by fewer teeth on both digits of chelicera and the shape of macrosetae that are all pointed and not knobbed as in *U. macrosetosus*.

Table 3 Comparison of characters of the 13 species of *Ueckermannseius* of the *havu* Kreiter new species group with those of the three new species of *Ueckermannseius* described in this paper.

	<i>bundibugyoensis</i> Moraes, Zannou, Oliveira Moraes et al. 2006	<i>entidiprae</i> Moraes, Zannou, Oliveira Moraes et al. 2006	<i>havu</i> Pritchard & Baker Moraes et al. 2006	<i>lagada</i> El-Banhouy & Irunga El-Banhouy & Knapp 2011	<i>macrosetosus</i> van der Merve Moraes et al. 2006	<i>mangrovei</i> El-Banhouy & Knapp 2011	<i>neidatus</i> Ueckermann & Kreiter Kreiter et al. 2002, 2020b	<i>neohavu</i> Moraes, Zannou, Oliveira Moraes et al. 2006	<i>parahavu</i> Moraes, Zannou, Oliveira Moraes et al. 2006	<i>quilei</i> Ueckermann & Kreiter Kreiter et al. 2002	<i>subuluae</i> El-Banhouy & Knapp 2011	<i>salinae</i> Dorval & Mulyase Moraes et al. 2006	<i>ueckermanni</i> Moraes, Zannou, Oliveira Moraes et al. 2006	<i>guterrei</i> Kreiter n. sp. This study	<i>para-muri</i> Kreiter n. sp. This study	<i>payatae</i> Kreiter n. sp. This study
n	1	7	1	1?	24	6	4	5	11	3	8	32	10	11	1	5
Dsl	341	390 (336–405)	374	350	376 (328–446)	325	350 (334–375)	416 (403–432)	356 (328–371)	365 (340–378)	347	344 (320–388)	394 (368–418)	330 (318–353)	325	325 (318–335)
Dsw	230	274 (258–291)	263	180	251 (214–294)	240	188 (170–225)	291 (278–301)	237 (221–253)	242 (221–256)	188	228 (188–263)	252 (240–261)	220 (200–240)	238	204 (193–215)
Dorsal shield ornamentation	few striae anteriorly	few striae anteriorly	few striae anteriorly	smooth	few striae anteriorly	smooth	few striae anteriorly	Reticulae lateral margins	few striae anteriorly	Reticulae lateral margins	smooth	few striae anteriorly	smooth	smooth	few striae anteriorly	few striae anteriorly
Peritreme	<i>jl-j3</i>	<i>jl-j3</i>	<i>z2-j3</i>	<i>z2</i>	<i>z2-j3</i>	<i>jl-j3</i> , close <i>jl</i>	<i>z2-z4</i> , close <i>z2</i>	<i>jl-j3</i>	<i>jl</i>	<i>jl-j3</i> , close <i>jl</i>	<i>z2-z4</i> , close <i>z4</i>	<i>jl-j3</i> , close <i>jl</i>	<i>jl-j3</i> , close <i>jl</i>	<i>z2-j3</i>	<i>jl-j3</i> , close <i>jl</i>	<i>jl</i>
gd	7?	7?	7?	5	5?	?	6	5?	7?	6	?	5?	7?	7	7	7
jl	32	34 (30–38)	39	32	37 (32–42)	18	21 (19–23)	40 (38–42)	33 (30–37)	27 (25–28)	29	25 (22–28)	40 (35–45)	37 (35–40)	28	26 (23–29)
j3	40	23 (19–27)	41	38	30 (24–38)	4–7	15 (13–16)	26 (24–28)	35 (32–42)	14 (13–16)	25	25 (19–28)	13 (11–16)	24 (23–25)	11	23
j4	26	15 (11–18)	27	25	19 (16–24)	4–7	9 (8–9)	19 (18–20)	12 (11–13)	9	16	8 (5–10)	8 (5–10)	10 (8–10)	8	8
j5	29	14 (10–19)	22	25	18 (14–24)	4–7	9 (8–9)	18 (16–18)	12 (10–14)	9	16	7 (5–10)	8 (5–10)	10 (8–10)	7	6
j6	26	12 (10–16)	22	28	18 (14–24)	4–7	9 (8–10)	15 (15–16)	12 (11–14)	10 (9–11)	17	11 (8–13)	9 (5–11)	11 (10–13)	9	10 (9–10)
j2	21	13 (10–16)	24	27	17 (14–21)	4–7	10 (9–11)	15 (14–15)	12 (10–14)	10 (9–11)	16	13 (10–16)	11 (10–13)	13 (10–14)	10	10 (9–11)
J5	6	5 (3–6)	5	5	5 (3–8)	4–7	6 (5–8)	7 (6–8)	8 (5–10)	6	5	9 (6–13)	9 (8–10)	8 (7–9)	7	9 (8–10)
r3	35	18 (16–21)	22	28	22 (16–27)	4–7	10 (9–11)	19 (18–20)	18 (16–22)	13	18	17 (14–20)	13 (11–15)	18 (15–20)	12	13 (10–13)
R1	21	18 (14–21)	24	23	19 (13–24)	4–7	17 (16–18)	14 (11–16)	12 (11–13)	18	17	17 (14–21)	12 (11–14)	13 (10–16)	11	16 (15–18)
s4	46	26 (19–35)	44	53	41 (32–56)	4–7	13	27 (25–28)	30 (26–35)	16 (13–19)	44	19 (16–25)	14 (13–15)	23 (20–25)	13	14 (13–16)
S2	32	18 (16–22)	36	32	24 (16–35)	4–7	12 (9–13)	15 (14–17)	15 (11–18)	13	24	18 (15–21)	15 (14–16)	14 (13–15)	11	15 (13–16)
S4	21	17 (14–21)	30	32	21 (16–35)	4–7	11 (9–13)	14 (13–15)	11 (10–14)	13 (13–14)	21	17 (14–20)	15 (14–16)	13 (12–15)	10	15 (13–16)
S5	21	16 (14–21)	30	32	21 (16–37)	4–7	10 (9–10)	14 (13–15)	12 (8–14)	11 (9–13)	16	17 (14–20)	15 (13–16)	14 (12–16)	10	16 (13–18)
z2	27	20 (16–24)	34	32	28 (22–35)	4–7	14 (13–15)	24 (22–25)	21 (19–24)	15 (13–16)	37	17 (14–20)	11 (10–13)	14 (13–15)	11	17 (16–18)
z4	43	21 (13–29)	39	46	34 (24–48)	4–7	13	25 (24–25)	23 (16–27)	14 (13–16)	37	16 (13–19)	11 (10–14)	15 (13–16)	12	13 (11–15)
z5	29	14 (13–16)	22	27	18 (13–24)	4–7	9 (8–10)	15 (14–16)	13 (10–16)	10 (9–11)	15	10 (6–13)	8 (5–10)	10 (9–11)	8	7 (5–8)
Z1	29	16 (13–21)	31	32	22 (16–34)	4–7	9 (8–10)	17 (16–18)	13 (11–16)	10 (9–13)	18	15 (11–18)	12 (10–13)	12 (11–13)	9	14 (12–17)
Z4	24	16 (11–19)	28	35	21 (16–32)	4–7	10 (9–11)	16 (14–17)	13 (10–14)	11 (9–13)	23	17 (15–21)	13 (10–16)	14 (13–16)	10	16 (13–18)
Z5	38	39 (32–53)	63	58	57 (46–67)	9	19 (18–20)	52 (48–58)	21 (18–26)	19	40	23 (20–26)	42 (37–48)	42 (35–47)	21	21 (20–23)
Shape Z5	smooth, pointed	smooth, pointed	smooth, pointed	blunt	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	knobbed	knobbed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed
st1-st1	–	–	–	–	–	–	52 (50–58)	–	–	–	–	–	–	58 (55–60)	59	55 (50–60)
st2-st2	64	72 (69–80)	77	69	73 (66–82)	58	53 (47–60)	74 (72–76)	62 (58–66)	59 (57–62)	64	66 (62–70)	76 (70–78)	66 (62–70)	63	63 (59–70)
st3-st3	–	–	–	–	–	–	66 (63–70)	–	–	–	–	–	–	79 (75–84)	73	71 (68–75)
st1-st3	72	71 (62–77)	71	69	68 (61–75)	58	66 (57–75)	69 (66–70)	70 (67–74)	62 (60–63)	70	62 (56–68)	75 (70–78)	60 (54–64)	59	58 (55–63)
st4-st4	–	–	–	–	–	–	70 (68–73)	–	–	–	–	–	–	86 (78–90)	83	73 (66–83)
Gensl	–	–	125	–	–	–	113 (100–123)	–	–	–	–	–	–	133 (125–143)	130	114 (108–125)
Gensw st5	–	–	–	–	–	–	71 (68–75)	–	–	–	–	–	–	82 (78–93)	78	70
Gensw post. corn.	–	–	–	–	–	80	76 (70–80)	–	–	–	76	–	–	98 (90–105)	84	88
st5-st5	67	80 (67–90)	78	–	75 (67–85)	–	60 (55–63)	78 (72–86)	70 (64–78)	66 (63–69)	–	69 (62–78)	83 (77–93)	76 (70–80)	70	68 (66–70)
Lisl	–	–	–	–	–	–	20	–	–	–	–	–	–	25 (19–28)	28	24 (21–28)
Lisw	–	–	–	–	–	–	5 (4–5)	–	–	–	–	–	–	2 (1–3)	3	3
Sisl	–	–	–	–	–	–	12 (11–13)	–	–	–	–	–	–	13 (11–15)	not present	11 (10–12)
Sisw	–	–	–	–	–	–	–	–	–	–	–	–	–	< 2	not present	< 2
Vsl	110	122 (96–130)	–	115	–	105	97 (85–113)	128 (122–134)	114 (96–128)	115 (113–117)	106	100 (88–108)	125 (120–130)	101 (98–118)	110	103 (100–105)
vsw ZV2	59	78 (67–85)	75	70	73 (62–90)	65	60 (54–63)	74 (71–75)	56 (51–64)	68 (63–72)	60	53 (48–58)	64 (59–72)	61 (55–70)	50	–
vsw anus	56	71 (62–75)	–	–	66 (61–78)	–	61 (57–63)	73 (71–74)	60 (58–67)	64 (63–65)	–	70 (61–75)	83 (67–90)	75 (70–80)	55	65
gv3-gv3	–	–	–	–	–	–	–	–	–	–	–	–	–	34 (30–38)	30	25
JV5	–	–	–	80	–	23	22 (19–30)	–	–	31 (30–32)	52	–	–	34 (30–40)	50	32 (26–40)
Shape JV5	smooth, pointed	blunt	knobbed	blunt	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	knobbed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed	smooth, pointed
SgeI	–	–	–	–	28 (27–29)	–	–	–	–	–	–	–	48 (40–53)	21 (18–25)	–	25 (23–27)
SgeII	29	28 (24–34)	38	32	31 (27–35)	18	–	30 (29–32)	25 (22–27)	17 (16–18)	25	16 (13–19)	43 (35–48)	24 (23–25)	25	17 (13–25)
SgeIII	24	39 (37–45)	47	32	42 (38–48)	20	–	46 (45–47)	33 (30–37)	22	35	24–32	50 (43–58)	34 (30–43)	35	31 (25–40)
StIII	30	31 (29–37)	39	32	34 (27–38)	–	–	38 (35–39)	27 (26–29)	–	–	32 (26–38)	46 (38–54)	28 (28–30)	28	34 (33–35)
StIII	–	–	–	–	–	–	–	–	–	–	–	–	–	not present	not present	24 (23–25)
StIV	46	57 (51–62)	68	58	63 (50–70)	32	21 (19–25)	74 (72–76)	50 (45–53)	24 (23–25)	48	35 (27–40)	83 (74–95)	52 (48–55)	62	30 (29–31)
StIV	48	44 (34–56)	55	52	49 (39–58)	28	24 (20–25)	58 (55–61)	42 (38–46)	26 (25–28)	39	51 (42–58)	72 (64–78)	44 (38–47)	45	50 (48–50)
StV	62	58 (51–69)	75	63	64 (53–80)	55	37 (35–40)	73 (70–77)	64 (58–70)	39 (38–41)	62	53 (48–61)	89 (82–95)	77 (74–80)	55	51 (50–53)
Shape MS	pointed	pointed II knobbed III, IV	pointed II knobbed III, IV	pointed II blunt III, IV	pointed I blunt II knobbed III, IV	All pointed	All pointed	All pointed	All pointed	All pointed	pointed II knobbed III, IV	All pointed	All pointed	All pointed	All pointed	All pointed
scl	47	35	56	42	45 (38–58)	45	29 (25–32)	49 (46–53)	32 (27–35)	28	58	34 (19–50)	44 (35–51)	34 (31–36)	30	21 (20–23)
scw	–	–	–	–	–	–	4	–	–	–	–	–	–	8 (6–8)	3	8 (7–8)
Fdl	35	34 (33–35)	–	–	30 (28–33)	–	31 (25–33)	36 (35–36)	30 (30–31)	36	–	30 (28–30)	37 (35–40)	24 (23–25)	25	26 (25–28)
No teeth Fdl	12	10	–	12	12	9–10	10–11	11	11	6–8	10	10	11	5	1	8
Mdl	35	38	–	–	37 (36–38)	–	28 (25–30)	46 (45–47)	35 (35–36)	32	–	31 (30–33)	39 (38–40)	26 (25–88)	26	29 (28–30)
No teeth Mdl	5	4	–	3	4	2	2–3	4	1+3	1	3	4	4–5	1	0	3

In each upper boxes of the first line, the first name is the name of the species (for example *bundibugyoensis*), the second line of name(s) is name(s) of descriptor(s) (for example Moraes, Zannou & Oliveira for *bundibugyoensis*) and the third line is the source of measurements (for example Moraes et al. 2006 for *bundibugyoensis*)

It also closely resembles *U. eastafricae* Moraes, Zannou & Oliveira, but differs by shorter setae *z2* and *z4* and a longer *Z5*, a longer *StIV*, by the fewer teeth on both digits of chelicera and the shape of macrosetae that are all pointed in the new species and not knobbed as in *U. eastafricae*, the shape of macrosetae being considered as a diagnostic character in all previous descriptions.

This species was identified as *U. eastafricae* in two previous papers (Kreiter *et al.* 2021a, c) for fauna of Anjouan and Mohéli Islands, but here it is considered a new species in the new *havu* species group Kreiter (Table 3) and named *U. gutierrezzi* Kreiter **n. sp.**

***Ueckermannseius jean-mariei* Kreiter n. sp.**

Zoobank: 4506C84E-D900-46A5-AAC3-1D9A9288EA06

Classification. *Ueckermannseius jean-mariei* Kreiter **n. sp.** belongs to:

- the subfamily Amblyseinae (absence of dorsolateral setae *z3* and *s6* and the caudoventral seta *JV3*),
- to the tribe Euseiini (sternal shield with median posterior projection, deutosternal groove > 5 µm in width, forward migration of pre-anal setae *JV2* and *ZV2*),
- to the subtribe Typhlodromalina (chelicera of normal size and shape, with prominent teeth evenly distributed along fixed digit, peritreme usually extending to level of *j1*, deutosternal groove narrow, 4–7 µm width),
- to the genus *Ueckermannseius* (dorsal setae short/minute, shorter than distances between their bases, seta *Z4* not as long as distance between its base and that of *S4*, dorsal shield smooth, except for anterolateral striation) (Chant and McMurtry 2007),
- Like the two previous species and for the same reasons, to the species-group *havu* **Kreiter new species group** (see text for *U. gutierrezzi* Kreiter **n. sp.**).

The following list of characters of this new species is very different from all other species of the genus and the species group. So, despite the fact that we collected a single specimen, we still consider to describe this very original specimen as belonging to a very original new species.

Description of adult female (n = 1, Figs. 11 a-e)

Dorsum (Fig. 11a) – Dorsal shield smooth with only very few anterior striae, **325** long and **238** wide at level of waist, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*, *gd6*, *gd8* and *gd9*), **eight** pairs of poroids visible, **17** pairs of dorsal setae and **two** pairs of sub-lateral setae; all setae subequal in length (7–13), except for *j1* which is the longest: *j1* **28**, *j3* **11**, *j4* **8**, *j5* **7**, *j6* **9**, *J2* **10**, *J5* **7**, *z2* **11**, *z4* **12**, *z5* **8**, *Z1* **9**, *Z4* **10**, *Z5* **21**, *s4* **13**, *S2* **11**, *S4* **10**, *S5* **10**, *r3* **12**, *R1* **11**. All setae smooth.

Peritreme and peritremal plate (Fig. 11a) – Extending to level between *j1* and *j3*, but much closer to *j1*; peritremal plate fused with dorsal shield at level of *j1*.

Venter (Fig. 11b) – Sternal shield smooth with few lateral striae, with three pairs of setae (*st1-st3*) and two pairs of poroids (*iv1* and *iv2*); a pair of seta (*st4*) and a pair of pores (*iv3*) on a small metasternal plate; posterior margin of the sternal shield with a central posterior projection. Distances *st1-st1* **59**, *st2-st2* **63**, *st3-st3* **73**, *st1-st3* **59**, *st4-st4* **83**. Genital shield smooth, **130** long, width at level of *st5* **78**, width at level of posterior corners **84**, distance *st5-st5* **70**. A pair of metapodal plates, **28** long and **3** wide. Ventrianal shield **110** long, **50** wide at level of anterior corners (*JV2*), and **55** wide at level of para-anal setae. Ventrianal shield smooth, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of evolved and crateriform *gv3* posteromesad *JV2*, **30** apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1* and *ZV3*) and four pairs of round to oblong poroids not well discernible. Seta *JV5* smooth, **50** long.

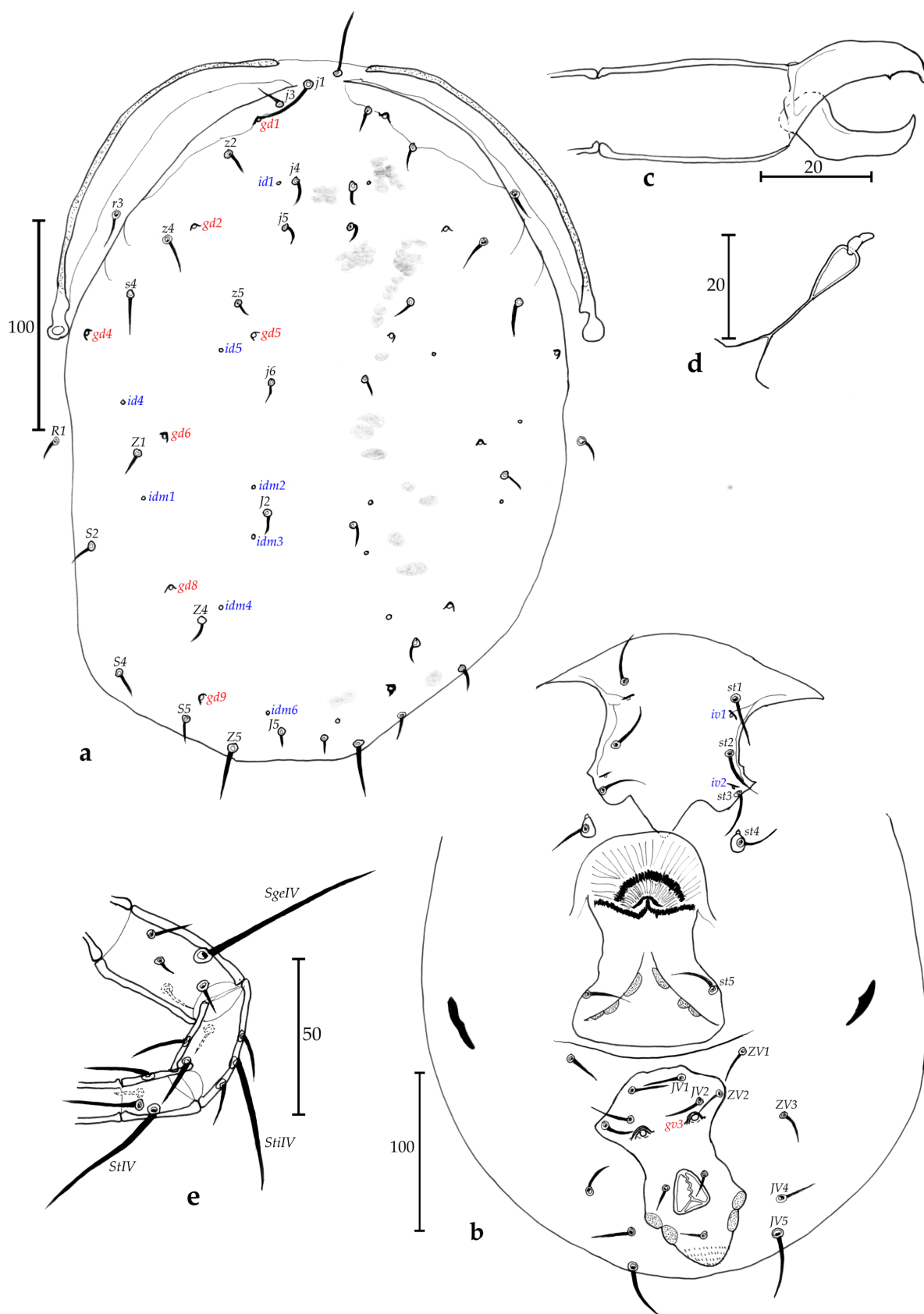


Figure 11 Holotype female of *Ueckermannseius jean-mariei* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.

Chelicerae (Fig. 11c) – Fixed digit **25** long, with **one** tooth not well visible because digit not well positioned; and movable digit **26** long, **edentate**, but digit also not well positioned. *Pilus dentilis* not visible.

Spermatheca (Fig. 11d) – Like the two other new species of *Ueckermannseius*, spermatheca is with the atrium bulbous, the calyx basally swollen, bladder-like and then elongate and slender, this shape of the spermatheca is shared by ten African species of *Ueckermannseius* of the species group *havu* Kreiter **new species group**. Spermatheca **30** long and **3** wide at the widest base of calyx.

Legs (Fig. 11e) – Pointed whip-like macrosetae on genua II and III, on tibia III, basitarsus, tibia and genu IV. Measurements: *SgeII* **25**, *SgeIII* **35**, *StiIII* **28**, *SgeIV* **62**, *StiIV* **45**, *StIV* **55**. Genua II and III both with **seven** setae. Chaetotactic formula of genu II: **1-2/1, 2/0-1**; genu III: **1-2/1, 2/0-1**.

Male. Unknown.

Material examined. One single female collected during this study, measured and type material. **GRANDE COMORE ISLAND: Ivembeni**, Banda Samlini (791 m aasl, 11°29'22" S, 43°19'36" E), 1 ♀ on *Rubus rosifolius* Smith (Rosaceae), 7/XII/2018.

Type material. The holotype female on one slide together with the holotype female of *Amblyseius erici* Kreiter **n. sp.**, two females of *Typhlodromalus spinosus* (Meyer & Rodrigues) and two females of *Amblyseius herbicolus* (Chant) (see above) are deposited in Institut Agro (Montpellier SupAgro) – INRA Acarology collection, Montpellier, France.

Etymology. The name “*jean-mariei*” refers to the first name of the eldest brother of the senior author after him, Jean-Marie Kreiter. The species is named in his honour.

Differential diagnosis and remarks. This species is very similar to *U. quilicii* concerning length of setae (Table 3). However, comparison with the available characters listed in Table (3) shows that the new species has: macrosetae all pointed (against knobbed in *U. quilicii*), a longer seta *JV5*, longer macrosetae on leg IV, both digits of chelicera longer and with less teeth (1/0 in the new species compared to 6–8/1 in *U. quilicii*). Other species of the species group *havu* Kreiter **new species group** are very different in many aspects concerning measurements and shape of characters (Table 3).

Ueckermannseius payetae Kreiter **n. sp.**

Zoobank: 467E989B-C03A-4997-8E25-823EECB3A126

Classification. *Ueckermannseius payetae* Kreiter **n. sp.** belongs to:

- the subfamily Amblyseiinae (absence of dorsolateral setae *z3* and *s6* and the caudoventral seta *JV3*),
- to the tribe Euseiini (sternal shield with median posterior projection, deutosternal groove > 5 µm in width, forward migration of pre-anal *JV2* and *ZV2*),
- to the subtribe Typhlodromalina (chelicera of normal size and shape, with prominent teeth evenly distributed along fixed digit, peritreme usually extending to level of *j1*, deutosternal groove narrow, 4–7 µm width),
- to the genus *Ueckermannseius* (dorsal setae short/minute, shorter than distances between their bases, seta *Z4* not as long as distance between its base and that of *S4*, dorsal shield smooth, except for anterolateral striation) (Chant and McMurtry 2007),
- it also belongs to the **species-group havu Kreiter new species group** for the same reasons as the previous species (see text for previous species).

Description of adult female (n = 5, Figs. 12 a-e)

Dorsum (Fig. 12a) – Dorsal shield smooth with only few striae in anterior part, **325** (318–335) long and **204** (193–215) wide at level of *s4*, with **seven** solenostomes (*gd1*, *gd2*, *gd4*, *gd5*,

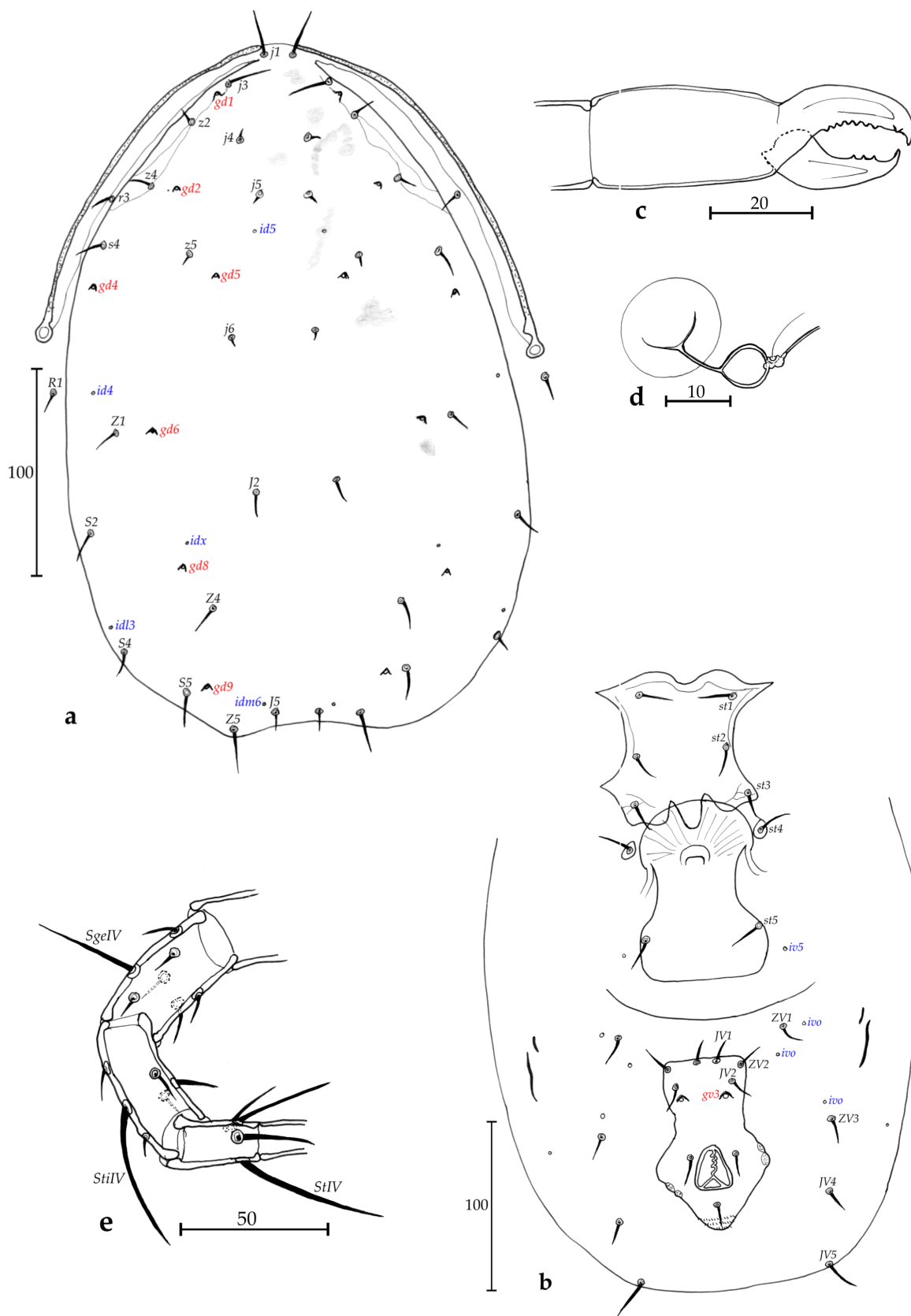


Figure 12 Holotype female of *Ueckermannseius payetae* Kreiter **n. sp.** – a. Dorsal shield, b. Ventral shields, c. Chelicera, d. Spermatheca, e. Genu, tibia and basitarsus of leg IV.

gd6, *gd8* and *gd9*), **five** visible poroids, **17** pairs of dorsal setae and **two** pairs of sub-lateral setae on the membrane: *j1* **26** (23–29), *j3* **23**, *j4* **8**, *j5* **6**, *j6* **10** (9–10), *J2* **10** (9–11), *J5* **9** (8–10), *z2* **17** (16–18), *z4* **13** (11–15), *z5* **7** (5–8), *Z1* **14** (12–17), *Z4* **16** (13–18), *Z5* **21** (20–23), *s4* **14** (13–16), *S2* **15** (13–16), *S4* **15** (13–16), *S5* **16** (13–18), *r3* **13** (10–13), *R1* **16** (15–18). All setae smooth.

Peritreme and peritremal plate (Fig. 12a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level between *j1* and *j3*.

Venter (Fig. 12b) – Sternal shield smooth with few anterolateral striae, with a posterior projection well visible, with three pairs of setae (*st1-st3*) and no visible pairs of poroids; a pair of setae (*st4*) on a pair of metasternal plate with no visible pores (*iv3*). Distances *st1-st1* **55** (50–60), *st2-st2* **63** (59–70), *st3-st3* **71** (68–75), *st1-st3* **58** (55–63), *st4-st4* **73** (66–83). Genital shield smooth, **114** (108–125) long, width at level of *st5* **70**, width at level of the posterior corners **88**, distance *st5-st5* **68** (66–70). Two pairs of metapodal plates **24** (21–28) long and **3** wide for the primary and **11** (10–12) long and **1** wide for the secondary plate. Ventrianal shield **103** (100–105) long, level at of anterior corners (*ZV2*) **not visible** because of eggs present in five female specimens collected and so, not measurable, and **65** wide at level of para-anal setae. Ventrianal shield smooth with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of crateriform *gv3*, **25** apart. Unsclerotized cuticle around ventrianal shield with four pairs of setae (*JV4*, *JV5*, *ZV1* and *ZV3*) and five pairs of round to oblong poroids (*ivo*). Seta *JV5* smooth and sharp-tipped, **32** (26–40) long.

Chelicerae (Fig. 12c) – Fixed digit **26** (25–28) long, with **eight** teeth; and movable digit **29** (28–30) long, with apparently **three** teeth. *Pilus dentilis* not visible.

Spermatheca (Fig. 12d) – With the atrium bulbous, the oblong calyx basally swollen, bladder-like and then elongate and slender, **21** (20–23) long and **8** (7–8) wide, atrium adjacent to calyx, small minor and slender major ducts visible.

Legs (Fig. 12e) – Pointed whip-like macrosetae on genua I–IV, tibia and basitarsus III and IV. Measurements: *SgeI* **25** (23–27), *SgeII* **17** (13–25), *SgeIII* **31** (25–40), *StiIII* **34** (33–35), *StIII* **24** (23–25), *SgeIV* **30** (29–31), *StiIV* **50** (48–50), *StIV* **51** (50–53). Genua II and III with **seven** and **six** setae, respectively. Chaetotactic formula of genu II: **2-2/0**, **2/0-1**; genu III: **1-2/0**, **2/0-1**.

Description of adult male (n = 2, Figs. 13 a-d)

Dorsum (Fig. 13a) – Dorsal shield smooth, **228–248** long and **155–160** wide at level of *s4*, with no solenostome visible, but probably with the same number as in adult female, no visible poroids either, **19** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **23–25**, *j3* **18**, *j4* **4–5**, *j5* **5**, *j6* **6–8**, *J2* **5–8**, *J5* **5–7**, *z2* **6–9**, *z4* **7–8**, *z5* **5–6**, *Z1* **8–10**, *Z4* **8–10**, *Z5* **25–30**, *s4* **10**, *S2* **8–10**, *S4* **6–9**, *S5* **5–8**, *r3* **10**, *R1* **8**. All setae smooth.

Peritreme and peritremal plate (Fig. 13a) – Extending almost to level of *j1*; peritremal plate fused with dorsal shield at level between *j1* and *j3*.

Venter (Fig. 13b) – Sternogenital shield smooth with five pairs of setae (*st1-st5*) and two pairs of poroids (*iv1* and *iv2*); distances *st1-st1* **45–49**, *st2-st2* **53**, *st3-st3* **53**, *st1-st5* **100–125**, *st4-st4* **41–45**, *st5-st5* **34–38**. Ventrianal shield **100** long, **120–125** wide at level of anterior corners, and **50–58** wide at level of para-anal setae. Ventrianal shield reticulate anteriorly, anterior pores *gv3*, suddenly narrows at level above anus, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*) and a pair of crateriform *gv3* just under the line *JV2-ZV2*, **23** apart. Two pairs of poroids (*ivo*). Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth and short, **17–20** long.

Chelicerae (Fig. 13c) – Fixed digit **23** long, with **eight** teeth; and movable digit **23–25** long, with **two** teeth. Spermatodactyl shaft **21–22**.

Legs (Fig. 13d) – Pointed whip-like macrosetae on genua I–III, tibia and basitarsus III, basitarsus, tibia and genu IV. Measurements: *SgeI* **20**, *SgeII* **20**, *SgeIII* **24**, *StiIII* **28**, *StIII* **18–20**, *SgeIV* **38–40**, *StiIV* **40**, *StIV* **40**. Chaetotactic formula of genua II and III similar to adult female.

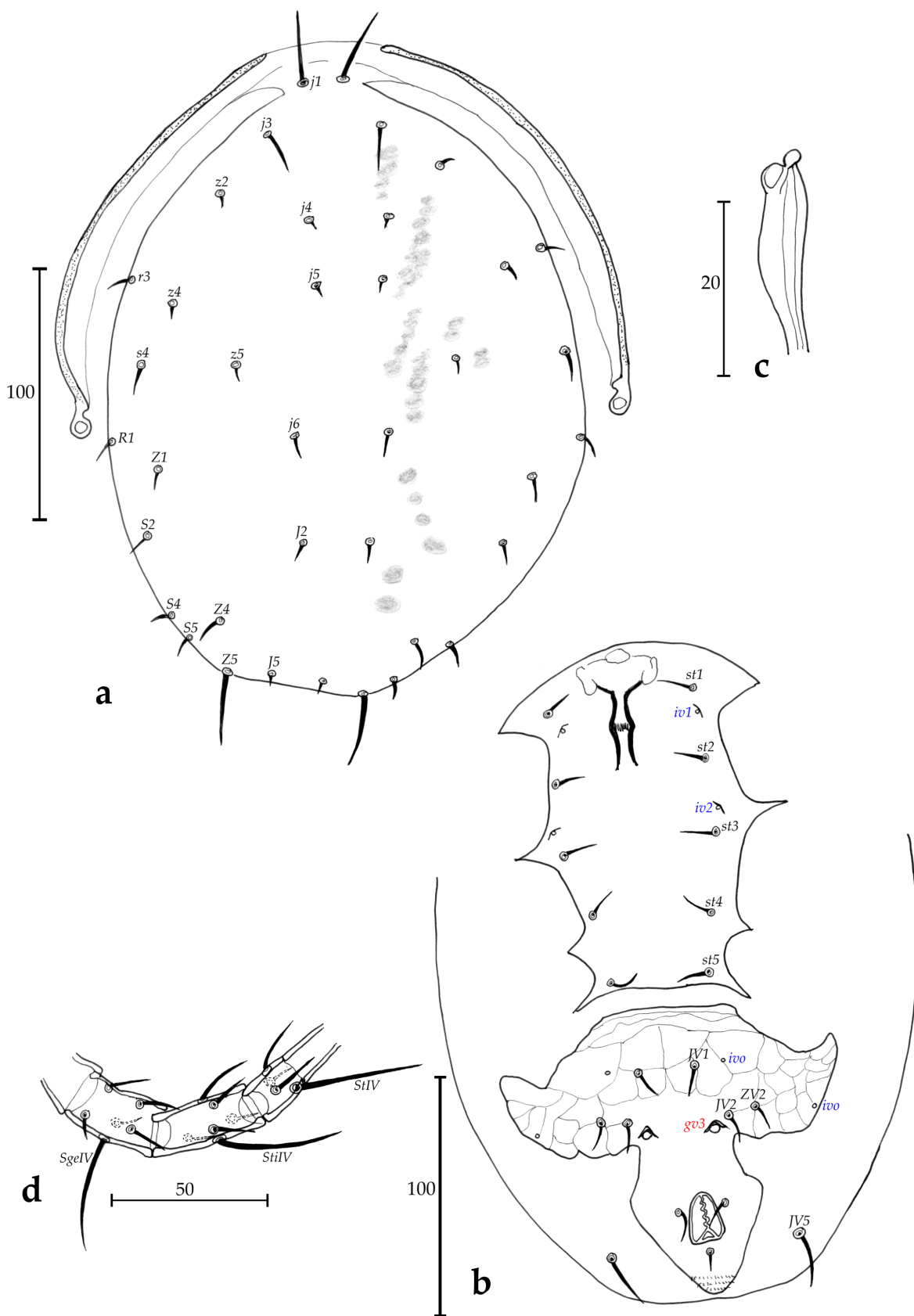


Figure 13 Paratype male of *Ueckermannseius payetae* Kreiter n. sp. – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

Material examined. Five ♀♀ and two ♂♂ collected during this study, measured and type material. **MAYOTTE ISLAND:** **Coconi**, Maison de l'Office National des Forêts (156 m aasl, 12°50'1" S, 45°8'5" E), 1 ♀ and 1 ♂ on *Carica papaya* L. (Caricaceae), 24/XI/2018; **Coconi**, Lycée Agricole (189 m aasl, 12°50'7" S, 45°8'11" E), 2 ♀♀ on *Carica papaya* L. (Caricaceae) and 2 ♀♀ and 1 ♂ on *Trema orientalis* (L.) Blume (Cannabaceae), 26/XI/2018.

Type material. The holotype ♀, four paratype ♀♀ and two paratype ♂♂ are deposited in Institut Agro (MSA) – INRAE Acarology collection, Montpellier, France.

Etymology. The name “*payetae*” refers to the family name of the researcher Rose-My Payet, co-author of this paper, who has worked during her career at CIRAD. She has helped the senior author in many aspects concerning fauna of Phytoseiidae of Indian Ocean Island. This species is named in her honour.

Differential diagnosis and remarks. This species is very similar to *U. saltus* concerning length of setae (Table 3). The description of *U. saltus* is however quite incomplete. But comparison with available characters listed in Table (3) allows that the new species can be distinguished by having: peritreme ending at level of *j1* (and not between *j1* and *j3* as illustrated by Mathysse and Denmark in 1981, or very close, but anteriorly to *j1* as illustrated by Moraes *et al.* in 2006 for *U. saltus*), setae *r3* and *s4* slightly shorter, occurrence of clear macrosetae on genu I and tibia III, a shorter calyx of spermatheca and both digits of chelicera with less teeth (8/3 in the new species compared to 10/4 in *U. saltus*). However, the other species of the species group *havu* Kreiter **new species group** can be clearly distinguished (Table 3).

Subfamily Typhlodrominae Wainstein

Typhlodromini Wainstein 1962: 26 and Typhlodrominae Chant & McMurtry 1994: 235.

Tribe Typhlodromini Wainstein

Typhlodromini Wainstein 1962: 26.

Genus *Typhlodromus* Scheuten

Typhlodromus Scheuten 1857: 111.

Subgenus *Anthoseius* De Leon

Typhlodromus (*Anthoseius*) De Leon 1959: 258; van der Merwe 1968: 20; Karg 1982: 194; Chant & McMurtry 1994: 250, 2007: 149.

Typhlodromus (*Anthoseius*) *grewiae* Zannou, Moraes & Oliveira

Typhlodromus (*Anthoseius*) *grewiae* Zannou, Moraes & Oliveira in Ueckermann *et al.* 2008: 48.

Diagnosis. The male of this species has five solenostomes (*gd2*, *gd4*, *gd6*, *gd8* and *gd9*) similar to adult female, all dorsal setae lanceolate, strongly serrate and inserted on tubercles, except for *J5* smooth, setiform and sharp-tipped, peritreme extending to level of *j1*, three setae on the ventrianal shield with small punctiform pre-anal solenostomes, three thick macrosetae strongly knobbed. This is a unique combination of characters which make specimens of this species very different from all other species within the genus *Typhlodromus*, subgenus *Anthoseius*.

Description of adult male (n = 4, Figs. 14 a-d)

Dorsum (Fig. 14a) – Dorsal shield strongly ornamented, **231** (220–240) long and **136** (130–150) wide, with **five** solenostome well visible (*gd2*, *gd4*, *gd6*, *gd8* and *gd9*), only **two** pairs of poroids visible (probably because of the strong ornamentation), **20** pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* **13** (12–14), *j3* **13** (11–15), *j4* **12** (11–13), *j5* **13** (11–14), *j6* **15**

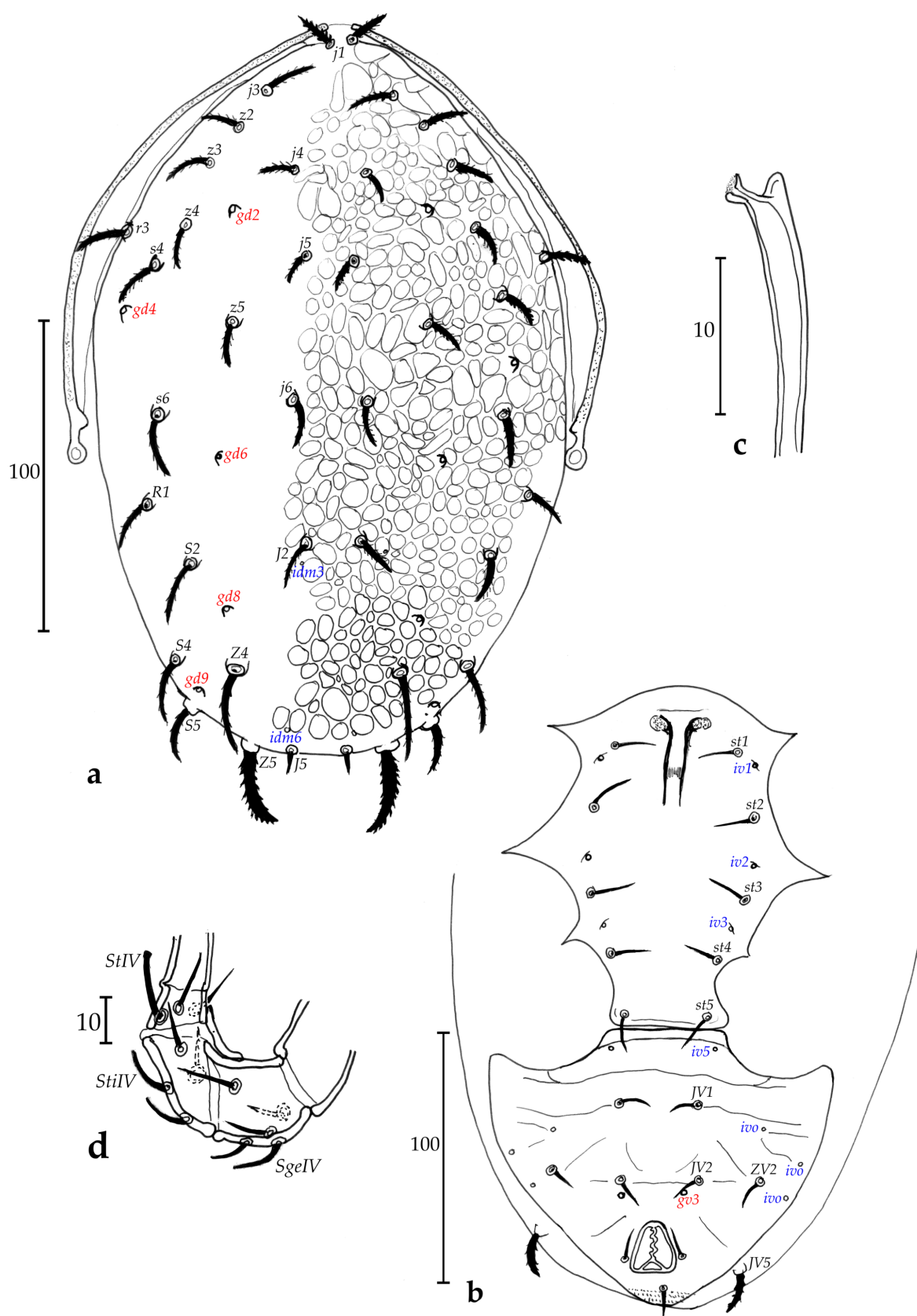


Figure 14 Paratype male of *Typhlodromus (Anthoseius) grewiae* Zannou, Moraes & Oliveira – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

(14–15), *J2* 17 (15–20), *J5* 8 (8–9), *z2* 12 (10–12), *z3* 12 (9–13), *z4* 15 (13–18), *z5* 14 (13–15), *Z4* 21 (19–23), *Z5* 26 (24–29), *s4* 14 (14–15), *s6* 17 (15–18), *S2* 18 (18–19), *S4* 19 (18–20), *S5* 16 (14–18), *r3* 14 (13–15), *R1* 12 (12–13). All setae lanceolate, plumose, strongly serrate and inserted on tubercles with presence of these tubercles starting back to a line constituted of setae *r3*, *s4* and *z5* until the posterior part of the dorsum. Seta *J5* is the only seta smooth, setiform and sharp-tipped.

Peritreme and peritremal plate (Fig. 14a) – Extending to level of *j1*; peritremal plate fused with dorsal shield at level of *j3*.

Venter (Fig. 14b) – Sternogenital shield smooth with few anterior and posterior striae, with five pairs of setae (*st1-st5*) and three pairs of poroids (*iv1-iv3*); distances *st1-st1* 37 (35–38), *st2-st2* 52 (50–54), *st3-st3* 50 (49–50), *st1-st5* 95 (93–98), *st4-st4* 36 (34–38), *st5-st5* 28 (25–30). Ventrianal shield 88 (83–93) long, 111 (105–115) wide at level of anterior corners, and 56 (50–63) wide at level of para-anal setae. Ventrianal shield with few striae, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*), and a pair of small punctiform *gv3* mesad *JV2*, 19 (18–20) apart. Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* lanceolate and strongly serrate, 15 long.

Chelicera (Fig. 14c) – Fixed digit 16 (15–17) long, with **no** teeth visible; and movable digit 18 (17–19) long, with one tooth visible. Spermatodactyl shaft straight, shaft 18 (17–18) long, branch 3.

Legs (Fig. 14d) – One macroseta only on leg IV: *St IV* 15 (13–15), blunt and knobbed. Genua II and III both with **seven** setae. Chaetotactic formula of genu II: **2-2/0**, **2/0-1**; genu III: **1-2/1**, **2/0-1**.

Specimens examined. Four ♂♂ collected during this study, measured and deposited as complementary voucher material. **MAYOTTE ISLAND: Combani**, gîte du Mont-Combani (437 m aasl, 12°48'23" S, 45°9'17" E), 1 ♂ on *Cananga odorata* (Lamark) Hooker & Thomson (Annonaceae) or Ylang-Ylang, 25/XI/2018. **MOHELI ISLAND: Bangoma**, top of the village (42 m aasl, 12°17'15" S, 43°43'40" E), 3 ♂♂ (and 1 ♀ on the same slide) on *Dendrocide moroides* (Weddel) Chew (Urticaceae), 4/XII/2018.

Voucher material. Four males on two slides (one with one female) are deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Remarks. Characters of males are very similar to that of females, except of course for length of setae and few other characters. Ventrianal shield of the male is slightly striate and the ventrianal shield of the female is entirely smooth. Morphological characteristics of this species are so unique within the genus *Typhlodromus*, subgenus *Anthoseius* that is possible to identify the species based on a single male alone.

***Typhlodromus (Anthoseius) hartlandrowei* Evans**

Typhlodromus (Typhlodromus) hartlandrowei Evans 1958: 580; Chant 1959: 60.

Clavidromus hartlandrowei, Muma 1961: 296.

Typhlodromus (Neoseiulus) hartlandrowei, Pritchard & Baker 1962: 222.

Typhlodromus (Anthoseius) hartlandrowei, Moraes *et al.* 2004b: 328; Chant & McMurtry 2007: 155; Ueckermann *et al.* 2008: 50.

Diagnosis. The male of this species has four solenostomes (*gd2*, *gd6*, *gd8* and *gd9*), all dorsal setae serrate and knobbed, except for *j1*, *z2*, *S5* and *r3* sharp-tipped, *J5* smooth and sharp-tipped similar to adult female, peritreme extending to level of *z2*, three setae on the ventrianal shield with small punctiform pre-anal solenostomes, three macrosetae strongly knobbed. This is a unique combination of characters, which make specimens of this species very different from all other species within the genus *Typhlodromus*, subgenus *Anthoseius*.

Description of adult male (n = 1, Figs. 15 a-d)

Dorsum (Fig. 15a) – Dorsal shield slightly striate anteriorly and behind setae *S2-J2* line, 225 long and 150 wide, with **four** solenostomes well visible (*gd2*, *gd6*, *gd8* and *gd9*), with **eight** visible poroids, 20 pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* 21, *j3* 34, *j4* 23,

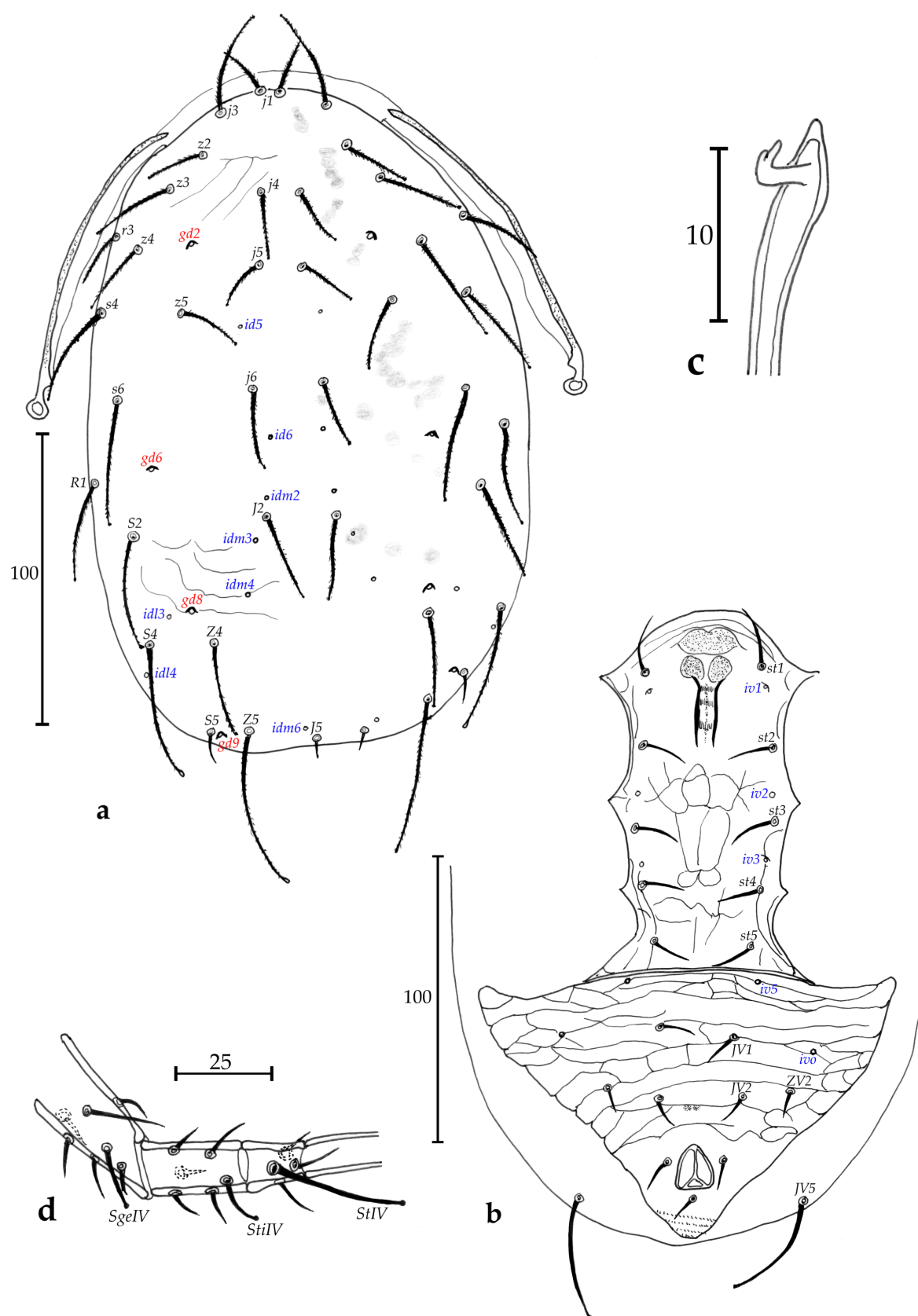


Figure 15 Paratype male of *Typhlodromus (Anthoseius) hartlandrowei* Evans – a. Dorsal shield, b. Ventral shields, c. Spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

j5 22, *j6* 28, *J2* 30, *J5* 9, *z2* 35, *z3* 38, *z4* 42, *z5* 23, *Z4* 40, *Z5* 50, *s4* 45, *s6* 45, *S2* 45, *S4* 45, *S5* 18, *r3* 30, *R1* 33. All setae serrate and knobbed, except for *j1*, *z2*, *S5* and *r3* sharp-tipped, seta *J5* smooth and sharp-tipped similar to adult female.

Peritreme and peritremal plate (Fig. 15a) – Extending to level of *z2*; peritremal plate fused with dorsal shield at level of *z2*.

Venter (Fig. 15b) – Sternogenital shield reticulate, except for smooth part between setae *st1-st2*, with five pairs of setae (*st1-st5*) and three pairs of poroids (*iv1-iv3*); distances between *st1-st1* 40, *st2-st2* 46, *st3-st3* 48, *st1-st5* 95, *st4-st4* 41, *st5-st5* 30. Ventrianal shield 95 long, 145 wide at level of anterior corners, and 43 wide at level of para-anal setae. Ventrianal shield reticulate, with three pairs of pre-anal setae (*JV1*, *JV2* and *ZV2*) and a pair of small punctiform *gv3* mesad *JV2*, 20 apart, two pairs of poroids (*iv5* and *ivo*). Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth and knobbed, 48 long.

Chelicerae (Fig. 15c) – Fixed digit 20 long, with no teeth visible; and movable digit 20 long, with no teeth visible. Spermatodactyl shaft straight, shaft 15 long, branch with hook-shape 4.

Legs (Fig. 15d) – Three macrosetae only on leg IV all strongly knobbed. Measurements: *Sge IV* 20, *Sti IV* 15, *St IV* 36. Genua II and III both with seven setae. Chaetotactic formula of genu II: 2-2/0, 2/0-1; genu III: 1-2/1, 2/0-1.

Specimens examined. One single ♂ collected during this study, measured and deposited as complementary voucher material. **ANJOUAN ISLAND: Pomoni**, exit of the village (29 m aasl, 12°17'01" S, 44°34'37" E), 1 ♀ and 1 ♂ on *Piper nigrum* L. (Piperaceae), 30/XI/2018.

Voucher material. One male on one slide is deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Remarks. Characters of males are very similar to that of females, except of course for length of setae and few other characters. Ventrianal shield of the male is reticulate as that of female, the sternogenital shield is almost reticulate, of normal size, macroseta *StIV* of leg IV in the male is the longer followed by *SgeIV* and *StiIV* as in adult female, seta *JV5* smooth and sharp-tipped as in adult female. The only difference concerns dorsal setae: setae *j1*, *z2*, *S5* and *r3* are sharp-tipped in adult female, while also *j3*, *j5*, *j6*, *z3* and *z4* in the male.

***Typhlodromus (Anthoseius) lobatus* Zannou, Moraes & Oliveira**

Typhlodromus (Anthoseius) lobatus Zannou, Moraes & Oliveira in Ueckermann *et al.* 2008: 59.

Diagnosis. The male of this species has four solenostomes (*gd2*, *gd4*, *gd6* and *gd9*), all dorsal setae sub-equal in length, smooth, except for *Z4* and *Z5* serrate and knobbed, peritreme extending to level between *j3* and *z2*, four setae on ventrianal shield, one macroseta on basitarsus of leg IV, knobbed. This is a unique combination of characters that makes specimens of this species very different from all other species within the genus *Typhlodromus*, subgenus *Anthoseius*.

Description of adult male (n = 2, Figs. 16 a-d)

Dorsum (Fig. 16a) – Dorsal shield with some reticulations close to edges of dorsum from seta *j3* to anterior of *R1* and less marked at level of setae *S2-S4*, 200–203 long and 105–125 wide, with only four pairs of visible solenostomes (*gd2*, *gd4*, *gd6* and *gd9*), five pairs of poroids visible, 20 pairs of dorsal setae (*r3* and *R1* on dorsal shield): *j1* 13–14, *j3* 23, *j4* 17, *j5* 17, *j6* 20, *J2* 23, *J5* 9–10, *z2* 14–15, *z3* 20, *z4* 23–25, *z5* 19, *Z4* 23–24, *Z5* 25, *s4* 23–24, *s6* 23–24, *S2* 25, *S4* 20–22, *S5* 18–20, *r3* 20, *R1* 18. All setae smooth and sharp-tipped, except for *Z4* and *Z5* serrate and knobbed.

Peritreme and peritremal plate (Fig. 16a) – Extending to level between *j3* and *z2*, much closer to *z2*; peritremal plate fused with dorsal shield at level between *z4* and *s4*.

Venter (Fig. 16b) – Sternogenital shield smooth with few lateral striae, with five pairs of setae (*st1-st5*) and three pairs of poroids (*iv1-iv3*). Distances *st1-st1* 32–38, *st2-st2* 38–39, *st3-st3* 38–40, *st1-st5* 90–91, *st4-st4* 31–33, *st5-st5* 28–30. Ventrianal shield 84–88 long, 80–100 wide at anterior corners and 40–50 wide at level of para-anal setae. Ventrianal shield

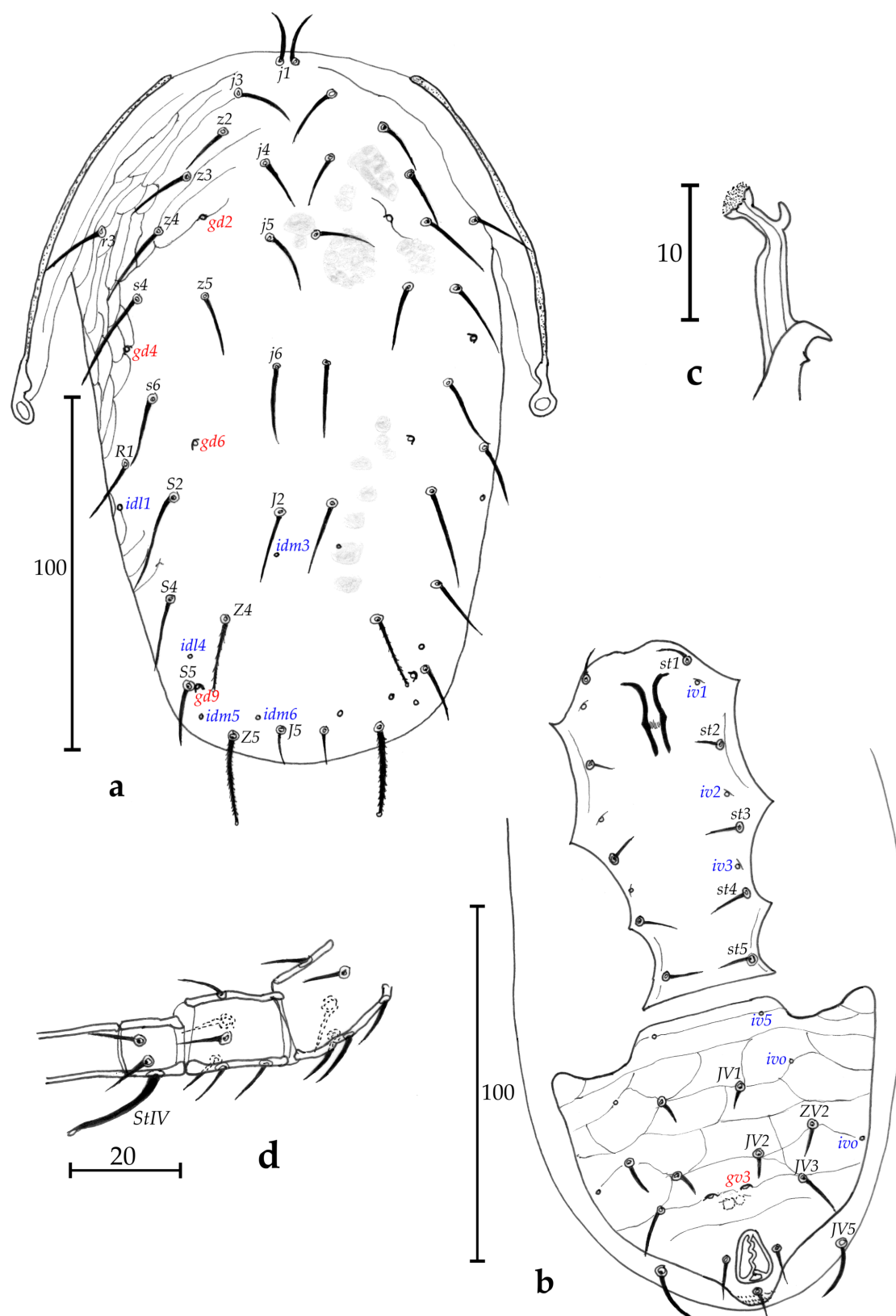


Figure 16 Paratype male of *Typhlodromus (Anthoseius) lobatus* Zannou, Moraes & Oliveira – a. Dorsal shield, b. Ventral shields, c. Movable digit and spermatodactyl, d. Genu, tibia and basitarsus of leg IV.

reticulate with four pairs of pre-anal setae (*JV1-JV3* and *ZV2*) and no solenostome; a pair of *iv5* and two pairs of *ivo* discernible. Unsclerotized cuticle around ventrianal shield with a pair of setae (*JV5*). Seta *JV5* smooth, **16–18** long.

Chelicerae (Fig. 16c). Fixed digit **15** long, with three teeth discernible; and movable digit **16** long, with one tooth discernible. Spermatodactyl shaft **13–14** and branch **7**.

Legs (Fig. 16d). Legs IV with one knobbed macroseta similar to adult female on basitarsus IV: *StIV* **19–20**. Chaetotactic formula of genua II and III similar to adult female: genu II **2-2/0, 2/0-1**; genu III **1-2/1, 2/0-1**.

Specimens examined. Two ♂♂ collected during this study, measured and deposited as complementary voucher material. **MAURITIUS ISLAND: Morne-Brabant** (249 m aasl, 20°22'05" S, 57°29'31" E), 1 ♀ and 1 ♂ on *Chromolaena odorata* (L.) R.M. King and H. Robinson (Asteraceae), 5/XI/2018. **RODRIGUES ISLAND: Mont Lubin** (346 m aasl, 19°42'21" S, 63°26'40" E), 1 ♂ on *Urena lobata* L. (Malvaceae), 15/XI/2018.

Voucher material. Two ♂♂ on two slides are deposited in Institut Agro (Montpellier SupAgro) – INRAE Acarology collection, Montpellier, France.

Remarks. Characters of males are very similar to that of females, except of course for length of setae and other characters. Ventrianal shield of the male is reticulate, while that of female not. All other characters are similar to adult female, and the male of this species is very similar to males of other species, making difficult the identification of the species without collection of males and females together.

Conclusion

Six new species to science and six unknown males have been collected and described in this paper along with a new record, namely: *Paragigagnathus philippe* Kreiter **n. sp.**, *Amblyseius erici* Kreiter **n. sp.**, *Typhlodromips culmulus* new record, unknown males of three species of *Amblyseius*: *A. duplicisetus*, *A. haleakalus* and *A. parasundi*, *Typhlodromalus baillodi* Kreiter **n. sp.**, *Ueckermannseius gutierrez* Kreiter **n. sp.**, *Ueckermannseius jean-marie* Kreiter **n. sp.**, *Ueckermannseius payetae* Kreiter **n. sp.**, unknown males of three species of *Typhlodromus* (*Anthoseius*): *T. (A.) grewiae*, *T. (A.) hartlandrowei* and *T. (A.) lobatus*. These species have to be added to the species list of Archipelagos, Mascareignes and Comoros. A catalogue and a key for all species of both Archipelagos will be published in a following paper.

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