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# A description of the male of *Cocoseius elsalvador* Denmark and Andrews (Acari: Phytoseiidae: Typhlodrominae)

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## Short note

### ABSTRACT

The present work describes the male of *Cocoseius elsalvador* Denmark and Andrews based on specimens collected in Brazil, representing the first characterization of a male of this genus.

**Keywords** mites; phytoseiid; taxonomy; systematics

**Zoobank** <http://zoobank.org/0526F48E-A472-46D4-B692-3B641093622E>

## Introduction

The original description of *Cocoseius elsalvador* Denmark & Andrews was based on the female specimens, holotype collected from *Cocos nucifera* L. (Arecaceae) in El Salvador, and a female paratype, collected from *Sabal palmetto* (Walter) Loddiges ex J. A. & J. H. Schultes (Arecaceae) in Florida, USA (Denmark and Andrews 1981). Besides those countries, it has also been reported from Brazil, in the states of Amazonas, Bahia, Pará, Pernambuco and Roraima, commonly associated with the mite pests *Aceria guerreronis* Keifer (Eriophyidae) or *Raoiella indica* Hirst (Tenuipalpidae) on *C. nucifera* (Argolo *et al.* 2017; Cruz *et al.* 2015; Gondim Jr. and Moraes 2001; Gondim Jr. *et al.* 2012; Lawson-Balagbo *et al.* 2008; Souza *et al.* 2015; Vasconcelos *et al.* 2006). Although supplementary descriptions of *C. elsalvador* females have been published (Chant and McMurtry 1994, 2007; Denmark *et al.* 1999, Denmark and Evans 2011; Gondim Jr. and Moraes 2001; Souza *et al.* 2015), males remain undescribed. The same is true for the other two known species of *Cocoseius* Denmark and Andrews, *Cocoseius palmarum* Gondim Jr., Moraes and McMurtry and *Cocoseius paucisetis* Moraes, Barbosa and Castro (Gondim Jr. *et al.* 2000; Moraes *et al.* 2013). As taxonomy of Phytoseiidae is traditionally based on female morphological characteristics, male descriptions are relatively rare. However, sexual dimorphism is important and the characterization of the morphological features of males has a really taxonomic value, as it might provide new characters to improve species identification and help in determining whole diversity when samples also contain male specimens. This issue is especially important in the case of the genus *Cocoseius*, for which the description of males has not been reported for any species. Thus, the objective of the present work is to describe the male of *C. elsalvador* based on specimens collected from Arecaceae in Pernambuco and Bahia states, Northeastern Brazil.

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## Materials and methods

Males and females of *C. elsalvador* collected from leaves of *Acrocomia aculeata* (Jacq.) Lodd. Ex Mart. and *Euterpe oleraceae* Mart. (Arecaceae) in Igarassu, Pernambuco state, and Una, Bahia state, Brazil, and mounted on slides with Hoyer's medium were identified under a phase contrast microscope Leica DM2500. Males were measured using a graduate eyepiece and drawn using a *camera lucida* attached to the microscope, with plates finalized using Adobe Illustrator CC. Setal notation used in this paper follows Lindquist and Evans (1965), as adapted to Phytoseiidae by Rowell *et al.* (1978) and Chant and Yoshida-Shaul (1989) for dorsal and by Chant and Yoshida-Shaul (1991) for ventral idiosoma, respectively. Measurements are given in micrometers and presented as the mean in bold followed by the range in parenthesis. The system of classification follows that of Chant and McMurtry (2007). Specimens described are deposited in the mite collections of UESC, UFRPE and ESALQ.

## Results and discussion

### Subfamily Typhlodrominae Wainstein

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

### Tribe Chanteiini Chant and Yoshida-Shaul

Chantiinae Chant and Yoshida-Shaul 1986: 2025;  
Chanteiini, Chant and McMurtry 1994: 237.

### Genus *Cocoseius* Denmark and Andrews

*Cocoseius* Denmark and Andrews 1981: 155.  
Type species *Cocoseius elsalvador* Denmark and Andrews

### *Cocoseius elsalvador* Denmark and Andrews 1981: 156.

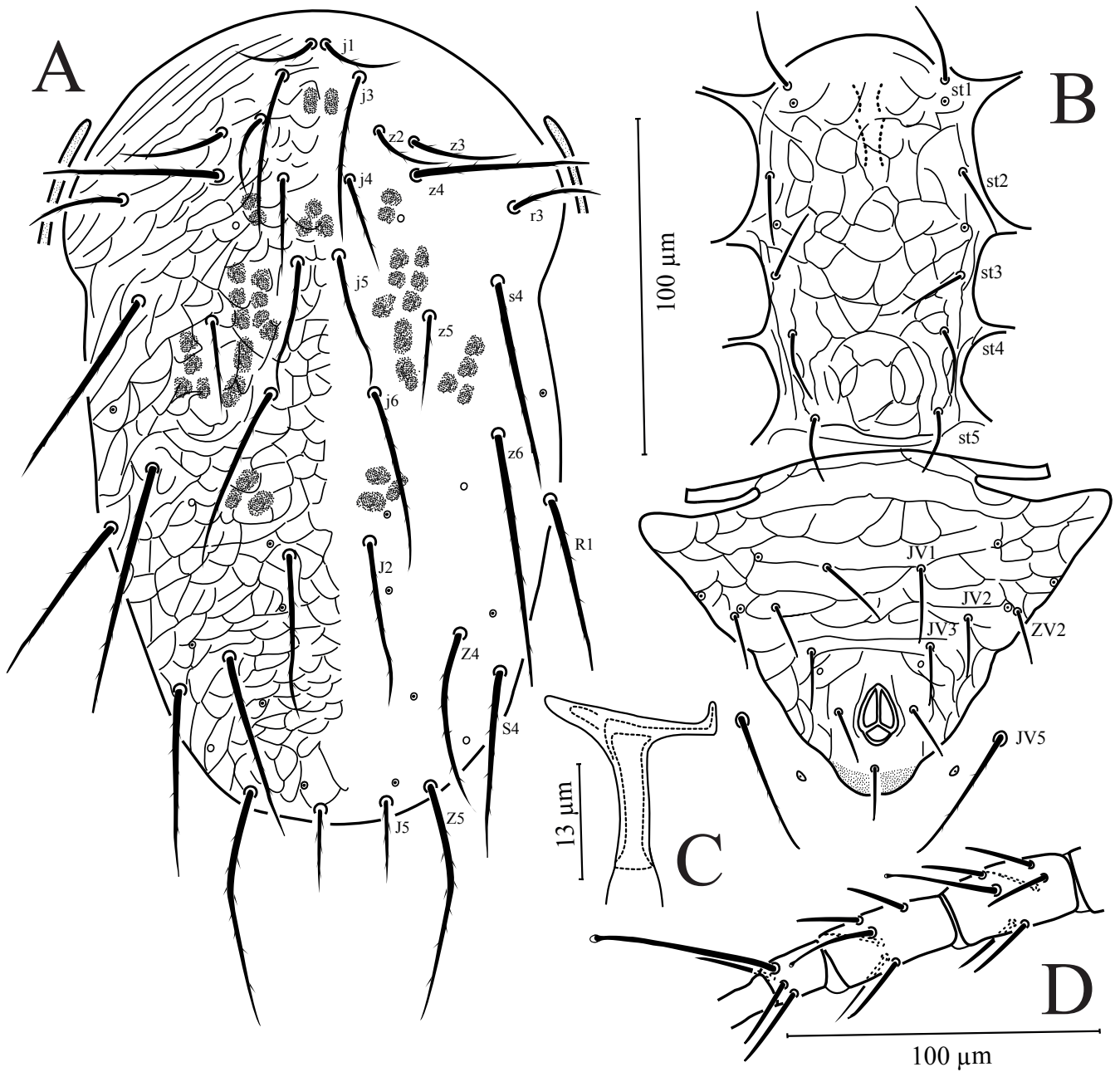
Chant and McMurtry 1994: 238; Denmark *et al.* 1999: 87; Gondim Jr. and Moraes 2001: 88; Moraes *et al.* 2004: 263; Vasconcelos *et al.* 2006: 93; Chant and McMurtry 2007: 134; Lawson-Balagbo *et al.* 2008: 88; Denmark and Evans 2011: 325; Gondim Jr. *et al.* 2012: 531; Souza *et al.* 2015: 104; Argolo *et al.* 2017: 348.

### Adult male description (Fig. 1) (n = 4)

**Dorsum (Fig. 1A)** — Dorsal shield reticulate, 236 (230 – 240) long and 148 (140 – 160) wide, with 6 distinguishable pairs of lyrifissures, 3 pairs of pores, and 18 pairs of pointed, serrated setae: *j1* 20 (19 – 21), *j3* 48 (44 – 49), *j4* 33 (32 – 34), *j5* 50 (47 – 55), *j6* 56 (53 – 61), *J2* 55 (50 – 60), *J5* 22 (21 – 23), *z2* 21 (20 – 22), *z3* 27 (26 – 28), *z4* 60 (58 – 62), *z5* 31 (26 – 33), *z6* 75 (71 – 76), *Z4* 59 (57 – 60), *Z5* 59 (56 – 62), *s4* 65 (60 – 68), *S4* 53 (50 – 56), *r3* 34 (32 – 35), *R1* 54 (51 – 57). Peritreme extending to the level of *z3*.

**Venter (Fig. 1B)** — Sternogenital shield reticulate, with 5 pairs of setae and 2 pairs of lyrifissures. Distances between *st1-st5* 99 (95 – 100), *st1-st1* 47 (45 – 48), *st2-st2* 54 (52 – 56), *st3-st3* 53 (52 – 55), *st4-st4* 46 (43 – 50), *st5-st5* 38 (35 – 40). Ventrianal shield subtriangular and reticulate, 100 (95 – 105) long, 138 (134 – 144) wide at level of anterior corners and 57 (55 – 58) at anus level, with 4 pairs of pre-anal setae (*JV1*, *JV2*, *JV3* and *ZV2*), 1 pair of small pre-anal pores and 3 pairs of lyrifissures. Membrane surrounding the ventrianal shield with only one pair of long, serrated setae *JV5* 44 (43 – 45), and 1 pair of lyrifissures.

**Chelicera (Fig. 1C)** — Fixed digit 19 (18 – 20), with 2 subapical teeth, all distal to *pilus dentilis*, and movable digit 20 (19 – 20) with 1 tooth. Spermatodactyl shaft 12 (11 – 13), foot 16 (13 – 18).



**Figure 1** *Cocoseius elsalvador* male: A – Dorsal shield and anterior peritreme; B – Ventral shields; C – Spermatodactyl; D – Leg IV.

**Legs (Fig. 1D)** — No macrosetae on legs I–III. Macrosetae on leg IV knobbed: *SgeIV* 33 (29 – 35), *StiIV* 28 (23 – 30), *StIV* 57 (50 – 61). Chaetotaxy: genu II 2-2/0, 2/0-1, genu III 1-2/1, 2/0-1.

**Specimens examined** — 3 ♂♂ collected by M.G.C. Gondim Jr. on 8 Jan. 1999 from leaves of *Acrocomia aculeata* (Jacq.) Lodd. Ex Mart., Igarassu-PE, Brazil, at 7°53'27"S, 34°58'36"W; 1 ♂ collected by E.A.S.F. Melo on 19 Apr. 2016 from leaves of *Euterpe oleraceae* Mart., Estação Experimental 'Lemos Maia' – CEPLAC, Una-BA, Brazil, at 15°17'34"S, 39°04'38"W.

**Remarks** — Male dorsal shield reticulation, pores and setae similar to female, except that

*r3* and *R1* are inserted on the shield, and that setae are generally shorter in the male (Denmark and Andrews 1981; Chant and McMurtry 1994; Gondim Jr. and Moraes 2001; Souza *et al.* 2015). Peritreme extends to the level of *z3*, as reported for females by Chant and McMurtry (1994) and Gondim Jr. and Moraes (2001), reported by Denmark and Andrews (1981) as extending beyond *s4* in female holotype. Movable cheliceral digit with one tooth, instead of none in the female (Denmark and Andrews 1981; Chant and McMurtry 1994). Although chaetotaxy of genera II and III differ from what was described for the holotype female (Denmark and Andrews 1981), by the absence of a ventral seta on genu II and the presence of a ventral seta on genu III, the chaetotaxy of the male (genu II 2-2/0, 2/0-1, genu III 1-2/1, 2/0-1) is the same of five females we checked from the mite collection of UESC (vouchers from Souza *et al.* 2015) and of *C. palmarum* (Gondim Jr. *et al.* 2000).

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