

## NEW TAXA OF ERIOPHYID MITES (ACARI: ERIOPHYIDAE) FROM FRUIT TREES IN NORTHEASTERN BRAZIL

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**ABSTRACT** - A new genus and a new species of Phyllocoptini associated with soursop, *Annona muricata* L. (Annonaceae), namely *Shrekin graviolae* n. gen. and n. sp., and a new species of Nothopodini associated with the West Indian cherry, *Malpighia emarginata* Sessé and Moc. (Malpighiaceae), namely *Cosella decorata* n. sp., are described from the State of Pernambuco, northeastern Brazil.

**Key words** - Acari, Eriophyidae, *Cosella*, *Shrekin*, *Malpighia emarginata*, *Annona muricata*, South America, eriophyid mites, taxonomy, Brazil.

### INTRODUCTION

The West Indian cherry or “acerola”, *Malpighia emarginata* Sessé and Moc., is native to various countries of the Antilles, Central America and northern South America and is widely cultivated throughout Brazilian tropical regions (Lorenzi *et al.*, 2006). Two eriophyid species have been reported associated with it: *Acalitus malpighiae* Keifer, 1977 from Jamaica and *Mesalox trapezoidalis* Flechtmann, 2001 from Brazil.

The soursop or “graviola”, *Annona muricata* L., probably originated in the Antilles, and is widely cultivated in almost all tropical regions of Brazil (Lorenzi *et al.*, 2006) and in other South American countries (Oviedo, 2005). Only one eriophyid species is reported associated with *A. muricata*, *Aceria annonae* Keifer, 1973 from Venezuela.

This paper presents the description of a new genus and a new species of Phyllocoptini found on soursop, *Annona muricata*, and a new species of Nothopodini found on West Indian cherry, *Malpighia emarginata* both collected in the State of Pernambuco, northeastern Brazil.

### MATERIALS AND METHODS

In the laboratory, mites were collected from leaf samples from fruit trees by direct examination under a ste-

reoscope, mounted in Hoyer’s medium and studied with a phase-contrast microscope.

Morphology and nomenclature follow that of Lindquist (1996). Systematic classification follows that of Amrine *et al.* (2003). Measurements are given in micrometers ( $\mu\text{m}$ ) and, unless stated otherwise, refer to the length of the structure. For females, each measurement of the holotype precedes the corresponding range for the paratypes. Opisthosomal annuli count start from the genitalia rear margin and dorsal opisthosomal annuli count from the mid prodorsal shield rear margin.

### *Shrekin* Britto and Navia, n. gen. (Fig. 1)

Eriophyidae, Phyllocoptinae, Phyllocoptini

**Diagnosis** - With all usual leg and body setae present; opisthosoma with a broad dorsal trough and prominently rounded lateral ridges; prodorsal shield with a wide anterior lobe and a broad posterior expansion extending over the first opisthosomal annuli; characteristic stalked scapular setae (*sc*) near center of prodorsal shield and directed laterally.

**Type species** - *Shrekin graviolae* n. sp.

**Etymology** - The generic name is derived from “Shrek”, the cartoon character, because of the resemblance of the long, laterodorsal scapular tubercles to the

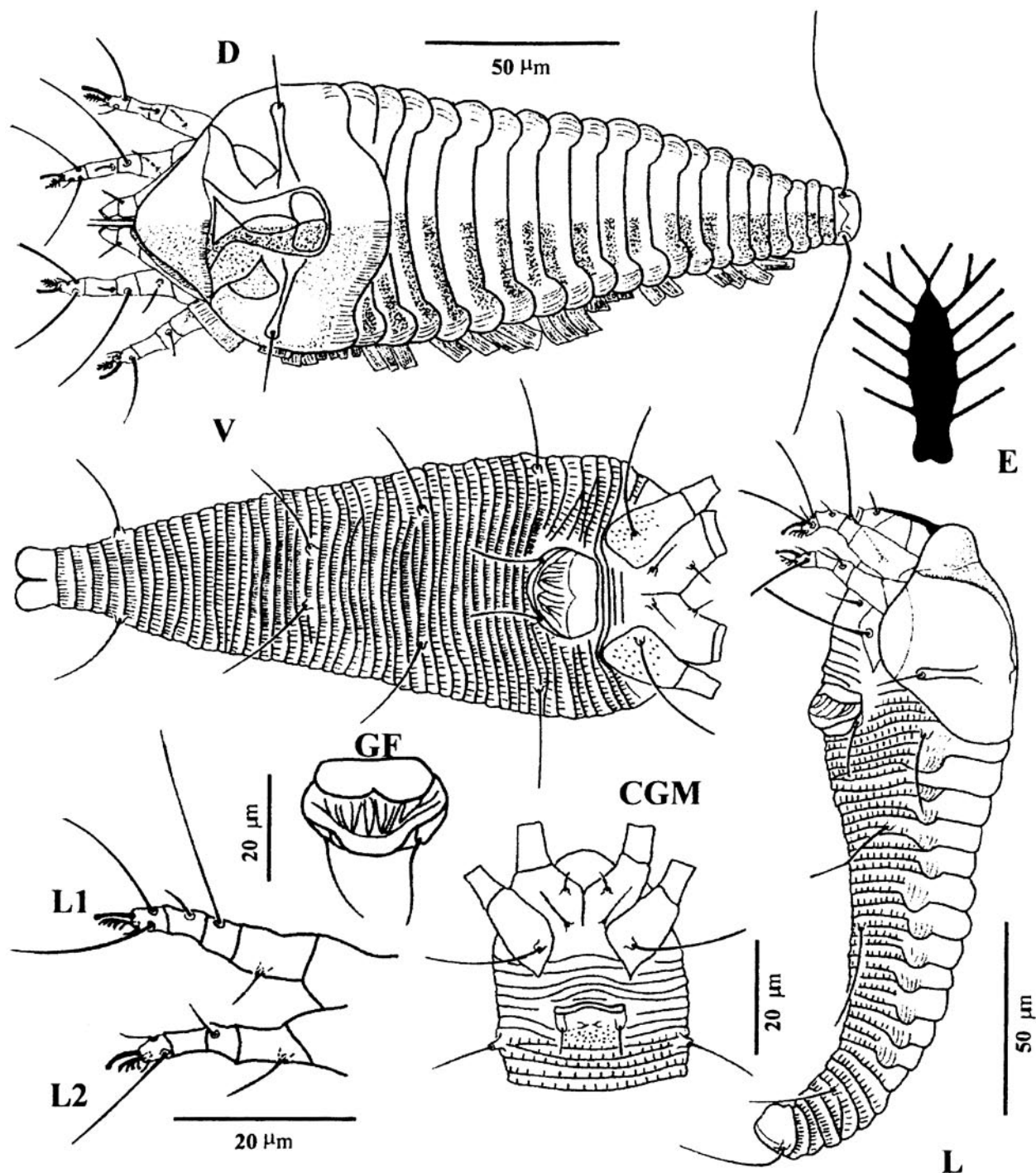


Fig. 1. *Shrekin graviolae* n. sp. - CGM. coxigenital region, male; D. dorsal habitus, female; E. empodium, enlarged, leg I, female; GF. genitalia, female; L. lateral habitus, female; L<sub>1</sub>. leg I, female; L<sub>2</sub>. Leg II, female; V. Ventral habitus, female.

long stalked ears of this character, plus *-in*, Latin diminutive suffix. Gender: *masculine*.

**Remarks** - This new genus is close to *Phyllocopruta* Keifer, 1938, but differs mainly in the shape of the scapular tubercles and of the dorsal opisthosomal ridges.

***Shrekin graviolae* Britto and Navia, n. sp.**  
(Fig. 1)

**FEMALE** (n=10) - Body fusiform, 177 (156-177), 62 (58-62) wide; **Gnathosoma** - Projecting downwards, 18 (18-20); basal seta (*ep*) 3 (3); antapical seta 5 (4-6); chelicerae 25 (18-25); oral stylets (13-15). **Prodorsal**

**shield** - 53 (49-52), 60 (55-60) wide, subhexagonal, with rounded corners; broad posterior expansion extending over first two or three opisthosomal annuli; wax producing areas mainly on anterolateral and posterior margins and on base of frontal lobe; shield design as in Fig. 1. Scapular seta (*sc*) 8 (8-9), on prominent and very elongated tubercles, directed up or laterally near center of prodorsal shield, characteristically stalked, placed well ahead of posterior shield margin, 26 (21-26) apart. Frontal lobe apically rounded, broad-based, thick, extending over gnathosoma, 9 (7-9), 33 (28-33) wide. **Legs** - With all segments and usual setae present. Legs I 24 (23-26); femur 9 (9-10), femoral seta (*bv*) 6 (6-7); genu 4 (4-5), genual seta (*l''*) 21 (19-21); tibia 6 (5-6), tibial seta (*l'*) 4 (4-5); tarsus 5 (5-6), lateral seta (*ft''*) 17 (16-18), dorsal seta (*ft'*) 16 (13-16), unguinal seta (*u'*) 3 (3), solenidion ( $\omega$ ) 6 (5-6); empodium simple, 4 (4-5), 6-rayed. Legs II 23 (21-25); femur 9 (9-10), *bv* 7 (7-8); genu 4 (3-4), *l''* 4 (3-5); tibia 5 (5-7); tarsus 5 (4-5), *ft''* 16 (13-16), *ft'* 4 (4), *u'* 3 (3), solenidion ( $\omega$ ) 5 (5-6); empodium 4 (4-5), 6-rayed. **Coxae** - II with granules. Sternal line conspicuous, 9 (8-10). Coxal seta I (*Ib*) (6-8), 11 apart; coxal seta II (*Ia*) 15 (14-17), 8 (7-9) apart; coxal seta III (*2a*) 35 (30-35), 25 (22-23) apart; (4) coxigenital annuli, smooth. **Genitalia** - 15 (15), 21 (19-21) wide; epigynum with a proximal area smooth and a cleft at center; distally with 12 (12) longitudinal curved lines convergent to mid rear region; genital seta (*3a*) 10 (10-15). **Opisthosoma** - With 22 (20-22) dorsal annuli, smooth; ventrally with 45 (43-45) annuli, microtubercles slightly elongate. Dorsal opisthosoma with a broad dorsal trough and lateral ridges prominently rounded; wax producing areas mainly on lateral ridges. Lateral seta (*c<sub>2</sub>*) 20 (20-25), on annulus 2 (2); ventral seta I (*d*) 30 (30-36), on annulus 14 (12-14), 32 (30-32) apart, 25 (25-30) microtubercles apart; ventral seta II (*e*) 23 (23-28), on annulus 24 (22-24), 13 (13-16) apart, 12 (12-17) microtubercles apart; ventral seta III (*f*) lateral, 21 (17-21), on annulus 40 (38-40), 21 (20-21) apart, 23 (22-30) microtubercles apart. Caudal seta (*h<sub>2</sub>*) 48 (45-50); accessory seta (*h<sub>1</sub>*) minute.

**MALE** (*n* = 5) - Smaller than female, 131-143, 49-56 wide. **Gnathosoma** - 14-19; basal seta (*ep*) 3; antapical seta 4-5; chelicerae 16-20; oral stylets 12-13. **Prodorsal shield** - As in female, 42-49, 48-56 wide. Scapular seta (*sc*) 6-7, on elongate tubercles 20-25 apart. Frontal lobe 8-9, base 28-32 wide. **Legs** - As in female. Leg I 22-24; femur 8-10, femoral seta (*bv*) 5-6; genu 3-5, genual seta (*l''*) 17-20; tibia 5-6, tibial seta (*l'*) 3-4; tarsus 4-5, lateral seta (*ft''*) 15-16, dorsal seta (*ft'*) 13-14, unguinal seta (*u'*) 3, solenidion ( $\omega$ ) 5; empodium 4, 5-rayed. Legs II 20-22; femur 8-10, *bv* 5-6; genu 3-4, *l''* 3-4; tibia 4-5; tarsus 4-5, *ft''* 14-15, *ft'* 2-3, *u'* 2, solenidion ( $\omega$ ) 5; empodium 4, 6-rayed. **Coxae** - As in female. Sternal line 7-8. Coxal seta I (*Ib*) 4-6, 9-11 apart; coxal seta II (*Ia*) 7-9, 6-8 apart; coxal seta III (*2a*) 20-25, 17-21 apart; 6 coxigenital annuli, smooth. **Genitalia** - 3, 13-14 wide, posterior region granulated, papillae as figured; genital

seta (*3a*) 6-11. **Opisthosoma** - As in female, with 18-22 dorsal annuli; 38-40 ventral annuli. Lateral seta (*c<sub>2</sub>*) 15-19, on annulus 2; ventral seta I (*d*) 17-22, 25-28 apart, 18-22 microtubercles apart, on annulus 10-12; ventral seta II (*e*) 7-10, 11-12 apart, 7-9 microtubercles apart, on annulus 19-20; ventral seta III (*f*) lateral, 15-17, 17-19 apart, 15-20 microtubercles apart, on annulus 33-35. Caudal seta (*h<sub>2</sub>*) 40-44; accessory seta (*h<sub>1</sub>*) minute.

**Type material** - Female holotype, 26 female and 17 male paratypes, from *Annona muricata* L. (Annonaceae), Itapirema, Pernambuco, Brazil. 08° 01' 07" S, 34° 56' 41" W, 25 April 2007, coll. J. M. Sousa, on 7 microscopic preparations. Holotype deposited in the collection of Departamento de Agronomia, Entomologia Agrícola, Universidade Federal Rural de Pernambuco - UFRPE, Recife, PE, Brazil. Paratypes deposited in the collection of Departamento de Entomologia, Fitopatologia e Zoologia Agrícola, Universidade de São Paulo, ESALQ, Piracicaba, São Paulo, Brazil, in the Laboratório de Quarentena Vegetal, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, Brazil, and in the collection of Dr. James W. Amrine, Jr., Morgantown, West Virginia, USA.

**Relation to host** - Vagrants.

**Etymology** - The specific designation *graviolae* is derived from the local common name of the fruit of the host plant, latinized.

### *Cosella decorata* Britto and Navia, n. sp.

(Fig. 2)

Eriophyidae, Nothopodinae, Nothopodini

**Diagnosis** - Four rayed empodia; dorsal opisthosomal annuli medially smooth, except for about the last 10 annuli; epigynum basally granulate, distally with three curved transverse lines; prodorsal shield richly ornamented with cells, anteriorly rounded; with a pointed, prominent, projecting anterolateral structure on the female genital rim.

**FEMALE** (*n* = 10) - Body fusiform, 185 (133- 185), 67 (60-80) wide; color in life yellowish-white. **Gnathosoma** - Projecting downwards, 13 (10-14); basal seta (*ep*) 3 (2-3); antapical seta 4 (3-4); chelicerae 14 (13-17); oral stylets 11 (10-11). **Prodorsal shield** - 39 (39-40), 67 (60-79) wide, semicircular. Shield design a complex network, median and admedian lines occupying  $\frac{3}{4}$  posterior shield, slightly sinuous; anterior shield with a line of rectangular cells; many longitudinal and transverse irregular lines forming a pattern of geometric figures as shown in Fig. 2, smooth. Scapular seta (*sc*) 7 (5-7), directed backward, slightly convergent, on prominent tubercles placed anterior to rear shield margin, 25 (22-28) apart. **Legs** - With tibia absent; all usual setae present except for tibial seta I (*l'*). Legs I 19 (17-21); femur 11 (9-11), femoral seta (*bv*) 6 (6-8); genu 2 (2-3), genual seta (*l''*) 22 (22-26); tarsus 6 (5-8), lateral seta (*ft''*) 21 (19-21), dorsal seta (*ft'*) 17 (13-21), unguinal seta (*u'*) minute, solenidion ( $\omega$ ) slightly

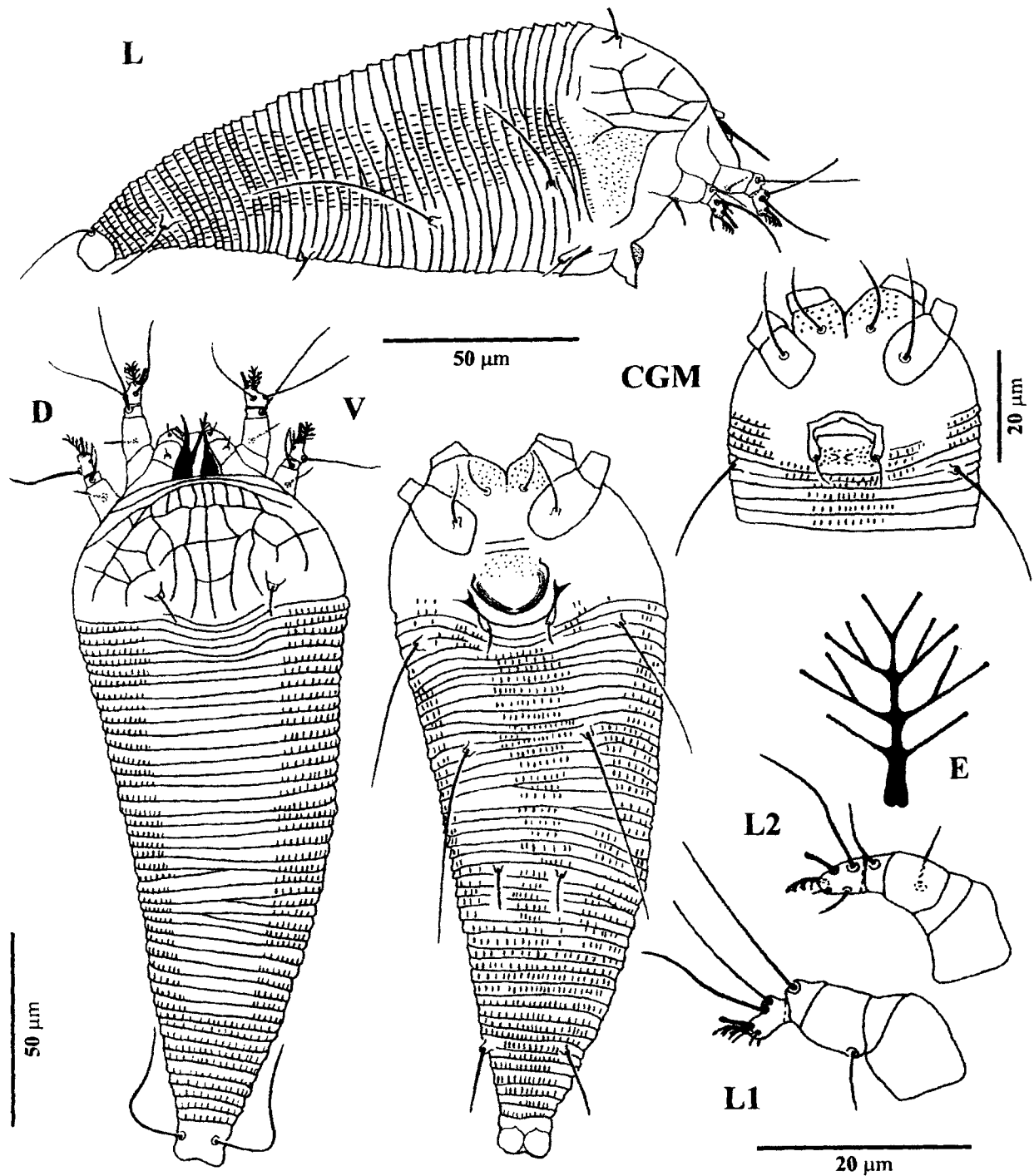


Fig. 2. *Cosella decorata* n. sp. - CGM. coxigenital region, male; D. dorsal habitus, female; E. empodium, leg I; L. lateral habitus, female; L<sub>1</sub>. leg I, female; L<sub>2</sub>. Leg II, female; V. ventral habitus, female.

knobbed, 4 (4-5); empodium simple, 6 (5-6), 4-rayed. Legs II 16 (16-18); femur 8 (8-10), *bv* 7 (7-9); genu 2 (2), *l''* 9 (9-10); tarsus 6 (5-6), *ft''* 18 (17-21), *ft'* 3 (3), *u'* 3 (3), solenidion ( $\omega$ ) slightly knobbed, 5 (5); empodium 5 (5-6), 4-rayed. **Coxae** - I with numerous pointed granules. Sternal line inconspicuous. Coxal seta I (*1b*) absent; coxal seta II (*1a*) 23 (16-23), 10 (9-11) apart; coxal seta III (*2a*) (22-25), 25 (24-31) apart; 2 (2) coxigenital annuli,

smooth. **Genitalia** - 15 (15), 20 (19-20) wide, smooth; epigynum basally granulate, distally with three curved transverse lines parallel to posterior margin, medially interrupted; with a prominent lateral rim projection, pointed, directed anterolaterally; genital seta (*3a*) 6 (5-8). **Opisthosoma** - Annuli subequal dorsoventrally; dorsal annuli with slightly elongate microtubercles present only laterally, except for last ca. 10 annuli; ventral annuli with

slightly elongated microtubercles, except for smooth areas around an imaginary longitudinal line joining the lateral seta (*c*<sub>2</sub>) and ventral seta I (*d*) and II (*e*); 44 (42-47) dorsal annuli; 42 (42-50) ventral annuli. Lateral seta (*c*<sub>2</sub>) 35 (31-40), on annulus 2 (2). Ventral seta I (*d*) 55 (50-57), on annulus 10 (10-13), 33 (31-37) apart, 13 (10-14) microtubercles apart; ventral seta II (*e*) 7 (6-8), on annulus 19-21 (19-26), 15 (15-20) apart, 7 (6-10) microtubercles apart; ventral seta III (*f*) 16 (16-17), on annulus 35 (35-40), 21 (19-25) apart, 15 (12-20) microtubercles apart. Caudal seta (*h*<sub>2</sub>) (30-40); accessory seta (*h*<sub>1</sub>) absent.

**MALE** (n = 5) - Smaller than female, 140-154, 53-60 wide. **Gnathosoma** - 18; basal seta (*ep*) 3; antapical seta 3-4. Chelicerae 13-16; oral stylets 8-9. **Prodorsal shield** - As in female, 33-39, 51-60 wide. Scapular seta (*sc*) 4-5, on tubercles 23-27 apart. **Legs** - As in female. Leg I 16-17; femur 9-10, femoral seta (*bv*) 6; genu 2-3, genual seta (*l'*) 19-22; tarsus 4-5, lateral seta (*ft'*) 17-19, dorsal seta (*ft'*) 12-15, unguinal seta (*u'*) 3; solenidion ( $\omega$ ) 4; empodium 5-6, 4-rayed. Legs II 15-16; femur 7-8, *bv* 6-8; genu 2, *l''* 7-10; tarsus 5-6; *ft''* 16-17, *ft''* 4-6, *u'* 2-3, solenidion ( $\omega$ ) 4-5; empodium 5-6, 4-rayed. **Coxae** - As in female. Sternal line 8. Coxal seta I (*Ib*) absent; coxal seta II (*Ia*) 10-12, 8-10 apart; coxal seta III (*Ia*) 23-27, 23-25 apart; coxigenital semi annuli not seen. **Genitalia** - 11, 13-14 wide, granulated, papillae as figured; genital seta (*3a*) 5. **Opisthosoma** - As in female, with 38-41 dorsal annuli; 39-44 ventral annuli. Lateral seta (*c*<sub>2</sub>) 28-30, on annulus 2; ventral seta I (*d*) 40-52, 26-35 apart, 12-14 microtubercles apart, on annulus 9-11; ventral seta II (*e*) 5, 14-16 apart, 5-8 microtubercles apart, on annulus 20-22; ventral seta III (*f*) lateral, 13-15, 18-20 apart, 13-15 microtubercles apart, on annulus 33-37. Caudal seta (*h*<sub>2</sub>) 42; accessory seta (*h*<sub>1</sub>) absent.

**Type material** - Female holotype, 48 female and 7 male paratypes, from *Malpighia emarginata* Sessé and Moc. (Malpighiaceae), Recife, Pernambuco, Brazil. 8° 01' 10" S, 34° 56' 53" W, 20 March 2007, coll. E. P. J. Britto, on 12 microscopic preparations. Holotype deposited in the collection of Departamento de Agronomia, Entomologia Agrícola. Universidade Federal Rural de Pernambuco-UFRPE, Recife, PE, Brazil. Paratypes deposited in the collection of Departamento de Entomologia, Fitopatologia e Zoologia Agrícola, Universidade de São Paulo, ESALQ, Piracicaba, São Paulo, Brazil, in the Laboratório de Quarentena Vegetal, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, Brazil, and in the collection of Dr. James W. Amrine, Jr., Morgantown, West Virginia, USA.

**Relation to host** - Vagrant, causing slight russeting in leaves.

**Etymology** - The specific designation *decorata* is derived from the Latin *decoro*, -atus, meaning adorned, ornamented, referring to the rich prodorsal shield ornamentation.

**Remarks** - Similar to *Cosella ceratopudenda* Flechtmann (Flechtmann and Moraes, 2002) in the 4-rayed empodia, the lateral prominent pointed projection directed anterolaterally on the female genitalia and in the rich prodorsal shield ornamentation. The most distinctive morphological features of the new species are the opisthosomal pattern of ventral annuli microtubercles, the three parallel close-set transverse curved lines in the distal epigynum, the pointed projections on the genital rim, and in the branches of the empodial rays.

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