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Subscriptions: Year 2020 (Volume 60): 450 €
http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php
Previous volumes (2010-2018): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

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NEW PHYTOSEIID MITES OF THE FRENCH WEST INDIES, WITH DESCRIPTION OF A NEW SPECIES, AND NEW RECORDS (ACARI: MESOSTIGMATA)

Serge Kreiter¹, Julie Mailoux², Marie-Stéphane Tixier¹, Fabrice Le Bellec³, Martial Douin¹, Sabine Guichou¹, and Jean Etienne⁴

(Received 12 November 2012; accepted 21 March 2013; published online 30 September 2013)

¹ Montpellier SupAgro, UMR CBGP INRA/IRD/CIRAD/SupAgro, Campus International de Baillarguet, CS 30016, 34998 Montferrier-sur-Lez cedex; kreiter@supagro.inra.fr (corresponding author to whom all correspondence should be addressed), tixier@supagro.inra.fr, douin@supagro.inra.fr, guichou@supagro.inra.fr
² ASSOFWI, Station de Vieux-Habitants, Le Bouchu, 97 119 Vieux-Habitants; mailoux.assofwi@yahoo.fr
³ CIRAD, UPR HortSys, Station de Bassin Plat, B.P. 180, 97 455 Saint-Pierre; lebellec@cirad.fr
⁴ INRA, Centre Antilles-Guyane, Domaine Duclos, F-97170 Petit-Bourg, Guadeloupe; jean.etienne2@wanadoo.fr

ABSTRACT — The authors report results of several surveys carried out to collect phytoseiid mites, between April 2008 and January 2009, in crops and natural surrounding vegetation in several locations of Guadeloupe, La Désirade, Les Saintes and Martinique. A catalogue of 11 new species for Guadeloupe, La Désirade, Les Saintes and Martinique is provided with some information on their biology, when available, and biogeography. New locations for six additional species rarely recorded in the West Indies are also provided. Among the 11 new species, one species new to Science, named Transeius mariae-angeae, is described.

KEYWORDS — survey, collection, taxonomy, systematics, Transeius mariae-angeae

INTRODUCTION

Several species in the family Phytoseiidae are important natural enemies controlling phytophagous mite in several crops (McMurtry and Croft, 1997). This family is widespread all over the world and consists of about 2,200 valid species dispatched in three sub-families (Kreiter and Tixier, 2006; Chant and McMurtry, 2007; Kreiter and Tixier, 2010).

The Caribbean area constitutes one of the world’s hotspots of biodiversity. The hotspot of biodiversity concept was defined by Myers (1988) in order to identify the most immediately important areas for conservation of biodiversity. These hotspots hold high endemism levels and have lost at least 70 % of their original natural vegetation (Myers et al., 2000). The characterization of the phytoseiids mite diversity in the Caribbean area is thus contributing to this general topic of conservation.

Nine species of phytoseiid mites were found in a first survey conducted in various locations in Guadeloupe and Martinique (Kreiter and Moraes, 1997). In a second survey, 41 additional species were recorded from all islands of the French Antilles (Moraes et al., 2000), including three new species to Science. In a third survey, conducted mainly in Guadeloupe and Martinique, six additional species were added to the French Antilles.
fauna, including a new species to Science (Kreiter et al., 2006). The present known number of species from the French Antilles is 56.

This paper focuses on results of several surveys in Guadeloupe, La Désirade, Les Saintes and Martinique carried out from April 2008 to February 2011.

MATERIALS AND METHODS

Plant inhabiting mites were collected from various cultivated (mainly citrus in Guadeloupe and bananas in Martinique) or uncultivated plants from April 2008 to February 2011. Depending on the plants considered, mites were directly collected on leaves with a brush using a stereoscopic microscope, or by using the leaf dipping-shaking-washing-filtering method (Boller, 1984), or by beating shrubs and trees. Mites were then transferred with a fine brush into small plastic vials containing 70° alcohol.

Plant species were identified according to nomenclature in Fournet (2002).

Mites were then mounted on slides using Hoyer’s medium and identified using a phase and interferential contrast microscope (Leica DMLB, Leica Microsystèmes SAS, Nanterre, France).

Taxonomy follows Chant and McMurtry (1994, 2007), and the catalogue of Moraes et al. (2004b) was used for faunistical and biogeographical aspects. The chaetotaxy terminologies used in this paper followed those proposed by Lindquist and Evans (1965) as adapted by Rowell et al. (1978) for Phytoseiidae for dorsal and by Chant and Yoshida-Shaul (1991) for ventral idiosomal setae, respectively. Adenotomy and poroidotaxy terminologies are those proposed by Athias-Henriot (1975).

Specimens of each species are deposited in the mite collections of Montpellier SupAgro conserved in UMR CBGP.

All measurements are given in micrometers (µm).

The following abbreviations are used in this paper: CBGP (Centre de Biologie pour la Gestion des Populations); CIRAD (Centre International de Recherche Agronomique pour le Développement); FREDON (Fédération Régionale de Défense contre les Organismes Nuisibles); MSA (Montpellier SupAgro, France); UMR (Unité Mixte de recherche); IRD (Institut de Recherche pour le Développement); INRA (Institut National de la Recherche Agronomique; Centre de recherche de Montpellier, France).

RESULTS AND DISCUSSION

Eleven new species for French Antilles were found from April 2008 to February 2011 in these surveys. The catalogue of the 11 sp is completed by the available information on the biology and the distribution, along with taxonomical data. New locations for six rarely collected species in the French Antilles are provided and the new to Science species, Transeius mariae-angeae n. sp., is described here below.

NEW SPECIES FOR GUADELOUPE, LA DÉSIRADE AND MARTINIQUE

Sub-family Amblyseiinae
Tribe Amblyseiini Wainstein
Sub-tribe Amlyseiina Chant and McMurtry

Transeius Chant and McMurtry

Transeius mariae-angeae Kreiter n.sp.

Description

Adult Female (Figs. 1-3) (n = 2)

Dorsum (Fig. 1) — Dorsal shield 305 – 313 long and 205 – 215 wide, strongly reticulated on the whole dorsum, with 5 solenostomes (gd1, 2, 6, 8 and 9), 9 pairs of poroids, 17 pairs of dorsal setae and 2 pairs of sub-lateral setae: j1 20 – 23, j3 36 – 38, j4 15 – 18, j5 16 – 19, j6 15 – 18, j2 13 – 14, j5 8 – 9, z2 33 – 26, z4 29 – 33, z5 9, Z1 16 – 18, Z4 54 – 55, Z5 74 – 75, s4 58 – 60, S2 28 – 30, S4 14 – 15, S5 14 – 16, r3 23 – 25, R1 21. All setae smooth except Z4 and Z5 which are moderately serrated.

Peritreme (Fig. 1) — Extending to the level of j1.

Venter (Fig. 2) — Sternal shield smooth. Other shields smooth. Sternal shield not very large, with 3 pairs of setae and 2 pairs of pores; 1 pair (st4) out of the sternal shield, on a small metasternal shield;
FIGURE 1: Dorsal shield of the female of *Transeius mariae-angeae* n. sp. (from the holotype)
FIGURE 2: Ventral shields of the female of *Transeius mariae-angeae* n. sp. (from the holotype)

Chelicera — Fixed digit 30 – 31 with 9 – 10 teeth and movable digit 33 – 34 with four teeth.

![Spermatheca (Fig. 3)](image)

**Figure 3:** Calyx of spermatheca of the female of *Transeius mariae-angeae* n. sp. (from the holotype)

Spermatheca (Fig. 3) — Calyx of spermatheca peculiar (Denmark et al. 1999) with the cervix elongate, 4 – 6 wide and 6 – 8 long, with a big atrium at the basis and a visible long ductus minor on the paratype female.

Adult Male: unknown.

Holotype — 1 female (on one preparation), La Désirade, Parc Eolien, 16°11’N, 61°39’W, alt. 184 m, on *Coccoloba pubescens*, Kreiter coll., 5 January 2008, deposited in the Montpellier SupAgro Acarology Collection in UMR CBGP.

Paratype — 1 female (on a separate preparation), same location deposited in the same collection.

Etymology — the name of the species refers to the first name of the first author’s wife of this paper and describer of this new species, Marie-Ange Burgell, to whom this species is dedicated.

Diagnosis — the two specimens of *Transeius mariae-angeae* n. sp. found are close to *Transeius bellotti* (Moraes and Mesa) but differ in having: the shape of spermatheca very different (both peculiar sensu denmark et al. (1999) but with an open cervix and with a small atrium at the basis of the cervix for *T. bellotti* and a more closed cervix, a strong large atrium and swollen edges of the cervix for *T. mariae-angeae* n. sp.); the presence of macrosetae on all legs and not only of leg IV; the setae length longer in the new species except Z4, S4, SgelV and StiV; the dorse smooth and not imbricate; the setae j3 and s4 not serrated and the number of teeth on movable/fixed digits = 9-10/4 (against 9/3 in *T. bellotti*).

It resembles also to *T. rufus* (Denmark and Evans) but differs in having: several setae much longer except for j1, Z4, SgelV and StiV which are longer in *T. rufus*; the dorsal shield not reticulated in the new species and slightly reticulated in *T. rufus*; the number of teeth on movable/fixed digits of chelicerae = 9-10/4 against 7/0. It is also close to *T. sanblasensis* (De Leon) but setae are longer in the new species except for some (j1, z4, s4, r3, S2) which are very much longer and all macrosetae of the four legs are smaller in the new species. It resembles also to *T. aciculus* (De Leon) but differs in having j4 shorter (15-18 instead of 36) and S5 longer (14-16 instead of 9); and to *T. cristobalensis* (De Leon) but differs in having a shorter StiV (38 instead of 88).

*Transeius rufus* (Denmark and Evans)

*Neoseiulus rufus* Denmark and Evans, in Denmark et al., 1999: 73.

The biology of this species found only once in Honduras by Denmark and Evans (in Denmark et
Kreiter S. et al., 1999) on the giant thatching grass *Hyparrhenia rufa* (Poaceae), a hairy plant, is unknown.

Previous Records — Honduras (Denmark et al., 1999).

Specimens examined — Martinique, Montagne Pelée, Parking, 14°48’N, 61°09’W, alt. 825 m, 2 ♀ on *Urena lobata*, Kreiter coll., 21 November 2010.

Remarks — this is the first record of this species in the West Indies. The measurements of the two specimens collected fit very well the measurements given by Denmark et al. (1999), except setae r₃ and R₁ (30 µm in our two specimens instead of 16 in Denmark et al. (1999) on a single specimen). The average measurements of the two adult females presently found are as follow: dorsal shield sclerotized, five solenostomes (gd 1, 2, 4, 8 and 9), j₁ 23 – 24, j₃ 27 – 35, j₄ 9 – 10, j₅ 9 – 10, j₆ 10 – 14, j₅ 8 – 10, z₂ 11 – 15, z₄ 20 – 30, z₅ 8 – 9, Z₁ 11 – 15, Z₄ 63, Z₅ 71 – 75, s₄ 47 – 50, S₂ 24 – 27, S₄ 12 – 14, S₅ 13 – 14, r₃ 16, R₁ 16, Z₄ and Z₅ serrated, st₁-st₁ 53 – 59, st₂-st₂ 62 – 65, st₃-st₃ 60 – 62, posterior margin of the sternal shield concave, metapodal 1 length 25, width 3, metapodal 20 length 10, width 2, ventrianal shield 115 long, 78 wide at level of anterior corners and 78 wide at level of anus, 4 poroids around the ventrianal shield and genital shield, JV₅ 80, spermatheca 17 long and 5 width, Sgel 40, SgelII 40, SgelIII 50, StIII 35, SgelIV 75, StIV 62, StIV 75, macrosetae whip-like, fixed digit of chelicerae 37, mobile digit of chelicerae 40, 13-14 denticles on fixed digit and 4 on mobile digit.

**Amblyseius sakalava** Blommers

*Amblyseius sakalava* Blommers, 1976: 96; suspected junior synonym of *Amblyseius largoensis* (according to Ueckermann and Loots, 1988).

Biology — *Amblyseius sakalava* was first found in Madagascar on *Corchorus trilocularis* (Blommers, 1976) and then in a search for native natural enemies of *Tetranychus urticae* Koch in Sri-Lanka, collected on *Manihot esculenta* and identified by Dr Viebergen (Wijesekara, 2006). Its life history, reproductive performance on different foods and functional response to the prey were studied in the laboratory. At an average temperature of 29°C, when fed on pollen, *A. sakalava* completed its life cycle (egg to adult) in 4.5 days on average. The mean preovipositional period is 4.1 days and a female lays an average of 2.2 eggs per day when fed on *T. urticae* and 1.9 eggs per day when fed on pollen of *Tridax procumbens* (Asteraceae). The predatory mite reproduces equally when fed on this pollen and a mixture of *T. procumbens* pollen and the prey mite. But the

Remarks — this is the first record of this species in the West Indies. The measurements of the single specimen collected fit rather well the measurements given by Denmark and Muma (1989). All the setae are however slightly longer, but at maximum less than 10 % of variation, which is less than the threshold of 20 % around the mean defined by Tixier (2012) to characterize infraspecific variations.

The measurements of the adult female presently found are as follow: dorsal shield smooth, dorsal shield length 368, width 288, 1 solenostome visible (gd 9), j₁ 30, j₃ 41, j₄ 3, j₅ 5, j₆ 5, j₂ 5, j₅ 8, z₂ 15, z₄ 12, z₅ 3, Z₁ 10, Z₄ 112, Z₅ 190, s₄ 90, S₂ 10, S₄ 10, S₅ 10, r₃ 12, R₁ 10, all setae smooth, st₁-st₁ 65, st₂-st₂ 75, st₃-st₃ 63, posterior margin of the sternal shield concave, metapodal 1 length 25, width 3, metapodal 20 length 10, width 2, ventrianal shield 115 long, 78 wide at level of anterior corners and 78 wide at level of anus, 4 poroids around the ventrianal shield and genital shield, JV₅ 80, spermatheca 17 long and 5 width, Sgel 40, SgelII 40, SgelIII 50, StIII 35, SgelIV 75, StIV 62, StIV 75, macrosetae whip-like, fixed digit of chelicerae 37, mobile digit of chelicerae 40, 13-14 denticles on fixed digit and 4 on mobile digit.

**Amblyseius Berlese**

*Amblyseius fernandezi* Chant and Baker


The biology of this species, found in Central America, is unknown.

Previous Records — Honduras, Nicaragua and Costa Rica (Chant and Baker, 1965; Denmark et al., 1999; Moraes et al., 2004b; Castro et al., 2010), El Salvador, Mexico and Venezuela (Castro et al., 2010).


Remarks — this is the first record of this species in the West Indies. The measurements of the single specimen collected fit rather well the measurements given by Denmark and Muma (1989). All the setae are however slightly longer, but at maximum less than 10 % of variation, which is less than the threshold of 20 % around the mean defined by Tixier (2012) to characterize infraspecific variations.

The measurements of the adult female presently found are as follow: dorsal shield smooth, dorsal shield length 368, width 288, 1 solenostome visible (gd 9), j₁ 30, j₃ 41, j₄ 3, j₅ 5, j₆ 5, j₂ 5, j₅ 8, z₂ 15, z₄ 12, z₅ 3, Z₁ 10, Z₄ 112, Z₅ 190, s₄ 90, S₂ 10, S₄ 10, S₅ 10, r₃ 12, R₁ 10, all setae smooth, st₁-st₁ 65, st₂-st₂ 75, st₃-st₃ 63, posterior margin of the sternal shield concave, metapodal 1 length 25, width 3, metapodal 20 length 10, width 2, ventrianal shield 115 long, 78 wide at level of anterior corners and 78 wide at level of anus, 4 poroids around the ventrianal shield and genital shield, JV₅ 80, spermatheca 17 long and 5 width, Sgel 40, SgelII 40, SgelIII 50, StIII 35, SgelIV 75, StIV 62, StIV 75, macrosetae whip-like, fixed digit of chelicerae 37, mobile digit of chelicerae 40, 13-14 denticles on fixed digit and 4 on mobile digit.

**Amblyseius sakalava** Blommers

*Amblyseius sakalava* Blommers, 1976: 96; suspected junior synonym of *Amblyseius largoensis* (according to Ueckermann and Loots, 1988).

Biology — *Amblyseius sakalava* was first found in Madagascar on *Corchorus trilocularis* (Blommers, 1976) and then in a search for native natural enemies of *Tetranychus urticae* Koch in Sri-Lanka, collected on *Manihot esculenta* and identified by Dr Viebergen (Wijesekara, 2006). Its life history, reproductive performance on different foods and functional response to the prey were studied in the laboratory. At an average temperature of 29°C, when fed on pollen, *A. sakalava* completed its life cycle (egg to adult) in 4.5 days on average. The mean preovipositional period is 4.1 days and a female lays an average of 2.2 eggs per day when fed on *T. urticae* and 1.9 eggs per day when fed on pollen of *Tridax procumbens* (Asteraceae). The predatory mite reproduces equally when fed on this pollen and a mixture of *T. procumbens* pollen and the prey mite. But the
reproductive performance was significantly lower when the predatory mite was fed on Tetranychus urticae Koch mite alone or pollen of Tithonia diversifolia or a mixture of T. diversifolia pollen and the latter prey mite. Study of functional response showed a typical type 2 response (Wijesekara, 2006).

Previous Records — Madagascar (Blommers, 1976; Moraes et al., 2004b), Sri Lanka (Viebergen, in Wijesekara, 2006).

Specimens examined — Guadeloupe, Bassterre, Riviére Corossol, Route des Mamelles, 16°10’N, 61°41’W, alt. 221 m, 1 ♀ on Syngonium podophyllum, Kreiter coll., 22 Dec. 2008.

Remarks — this is the first record of this species in the West Indies. The measurements of the single specimen collected fit rather well the measurements given by Blommers (1976). This species was considered as a junior synonym of Amblyseius largoensis (Muma) by Ueckermann and Loots (1988). We fully disagree with this claimed synonymy as to our knowledge it was not demonstrated and as several characters are different between the two species: A. sakalava has 30 % longer measurements for several setae, especially Z5, nearly two times longer cervix of the spermatheca, at least 7 poroids on the dorsal shield to up to 15 compared to none to three maximum in A. largoensis, and the posterior limit of the sternal concave instead of straight in A. largoensis. However as we have collected only one specimen, all these differences have to be examined carefully on more individuals and the potential synonymy studied with modern analysis means.

The measurements of the adult female presently found are as follow: dorsal shield smooth, dorsal shield length 365, width 258, 7 solenostomes (gd 1, 2, 3, 4, 5, 8 and 9), j1 35, j3 52, j4 5, j5 8, j6 8, j2 8, j5 13, z2 15, z4 13, z5 8, Z1 10, Z4 100, Z5 264, s4 93, S2 10, S4 8, S5 8, r3 10, R1 8, all setae smooth, st1-st1 65, st2-st2 70, st1-st3 68, posterior margin of the sternal shield straight, metapodal 1 length 20, width 5, metapodal 2 length 15, width 1, ventrianal shield 108 long, 55 wide at level of anterior corners and 68 wide at level of anus, 4 poroids around the ventrianal shield and genital shield, JV5 63, spermatheca 33 long and 5 width, Sgel 45, SgelII 38, SgelIII 43, SgelIV 40, SgelV 118, StilV 83, StilV 70, macrosetae whip-like, fixed digit of chelicerae 33, mobile digit of chelicerae 33, 11 denticles on fixed digit and 5 on mobile digit.

Sub-tribe Proprioseiopsina Chant and McMurtry

Proprioseiopsis penai Denmark and Evans

Proprioseiopsis penai Denmark and Evans, in Denmark et al., 1999: 17.

The biology of this species found only once in Honduras on Citrus sp. by Denmark et al. (1999) is unknown.

Previous Records — Honduras (Denmark et al., 1999; Moraes et al., 2004b).


Remarks — this is the first record of this species in the West Indies. The measurements of three of the four specimens collected fit very well the measurements given by Denmark et al. (1999).

The average measurements of these three adult females are as follow: dorsal shield sclerotized and reticulated, dorsal shield length 449 (439–464), width 332 (321–342), 5 solenostomes (gd 1, 2, 5, 8 and 9), j1 34 (33 – 35), j3 48 (47 – 49), j4 4, j5 6 (5 – 6), j6 9 (8 – 9), j2 5, j5 4, z2 26 (25 – 27), z4 22 (20 – 24), z5 5 (5 – 6), Z1 7 (6 – 8), Z4 93 (83 – 108), Z5 103 (102 – 105), s4 121 (121 – 122), S2 7 (5 – 8), S4 7 (6 – 7), S5 7 (7 – 8), r3 26 (19 – 33), R1 8 (7 – 9), all setae smooth, st1-st1 66, st2-st2 84 (84 – 85), st1-st3 64 (63 – 64), posterior margin of the sternal shield concave, metapodal 1 length 33 (32 – 35), width 6 (5 – 7), metapodal 2 length 16 (13 – 19), width 1, ventrianal shield 121 (120 – 123) long, 120 (119 – 120) wide at level of anterior corners and 99 (95 – 102) wide at level of anus, 5 poroids around the ventrianal shield and genital shield, JV5 68, spermatheca 20 (18 – 21) long and 11 (9 – 13) width, Sgel 32 (30
Sub-tribe Arrenoseiina Chant and McMurtry

Arrenoseius Wainstein

Paraamblyseius crassipes (Denmark)

The biology of this species found only once in Mexico on Eichomia crassipes by Denmark (1988) is unknown.

Previous Records — Mexico (Denmark, 1988; Moraes et al., 2004b).

Specimens examined — Guadeloupe, Basse-Terre, Vernou, Route du Col des Mamelles, 16°11’N, 61°39’W, alt. 184 m, 2 ♀ and 1 ♂ on Ricinus communis, Kreiter coll., 26 December 2008.

Remarks — this is the first record of this species in the West Indies. The measurements of the specimens collected fit well the measurements given by Denmark (1988). Macrosetae are present on all legs but were not mentioned and measured in Denmark (1988).

The average measurements of the two adult females presently found are as follow: dorsal shield sclerotized and reticulated, dorsal shield length 353-422, width 300 – 325, 3 solenostomes (gd 1, 8 and 9), j1 20, j3 25, j4 4, j5 5, j6 5, j5 9 – 12, z2 8 – 10, z4 10 – 13, z5 5, Z1 8, Z4 85 – 100, Z5 95 – 100, s4 87, S2 12, S4 10, S5 10, r3 10, R1 12, all setae smooth, st1-st1’ 53 – 55, st2-st2 64 – 75, st1-st3 40 – 43, posterior margin of the sternal shield concave, metapodal 1 length 28, width 10, metapodal 2 length 8, width 5, ventrianal shield 150 – 153 long, 210 – 212 wide at level of anterior corners and 150 wide at level of anus, 2 poroids around the ventrianal shield, JV5 40, spermatheca 23 – 25 long and 5 – 7 width, StIV 40, macrosetae whip-like, fixed digit of chelicerae 38 – 40, mobile digit of chelicerae 38 – 40, 11 – 12 denticles on fixed digit and 2 on mobile digit.

Tribe Euseiini Chant and McMurtry

Sub-tribe Typhlodromalina Chant and McMurtry

Amblydromalus Chant and McMurtry

Amblydromalus higuilloae (Denmark and Muma)

Typhlodromalus higuilloae Denmark and Muma, 1975: 292.

Typhlodromalus higuilloae Denmark et al., 1999: 59.

The biology of this species found only two times in Puerto Rico (Denmark and Muma, 1975) on “higuillo” leaves (Piper marginatum) and in Honduras by Denmark et al. (1999) on Calea urticifolia remains unknown.

Previous Records — Puerto Rico (Denmark and Muma, 1975; Moraes et al., 2004b), Honduras (Denmark et al., 1999; Moraes et al., 2004b).


Remarks — this is the first record of this species in the French West Indies. The measurements of five (4 ♀ and 1 ♂) of the nine specimens collected fit rather well the measurements given by Denmark et al. (1999). All setae are however slightly shorter, between 1 and 5 for the greater, which represent less than 10 % of variation, which is less than the intraspecific of 20 % around the mean defined by Tixier (2012).
The average measurements of the four adult females presently found are as follow: dorsal shield sclerotized and reticulated, dorsal shield length 351 (350 – 352), width 232 (223 – 250), 5 solenostomes (gd 1, 2, 6, 8 and 9), j1 25 (22 – 28), j3 42 (40 – 44), j4 12 (9 – 13), j5 11 (10 – 14), j6 11 (11 – 14), J2 13 (12 – 14), J5 11 (9 – 14), z2 18 (16 – 21), z4 31 (30 – 33), z5 9 (7 – 9), Z1 12 (11 – 13), Z4 43 (42 – 44), Z5 67 (65 – 71), s4 66 (63 – 68), S2 26 (21 – 30), S4 16 (13 – 18), S5 11 (11 – 17), r3 30 (27 – 34), R1 14, all setae smooth except Z4 and Z5, st1-st1 60 (58 – 61), st2-st2 63 (61 – 65), st1-st3 62 (58 – 64), posterior margin of the sternal shield with a convex lobe, metapodal 1 length 17 (16 – 18), width 4, metapodal 2 length 7 (6 – 8), width 1, ventrianal shield 98 (94 – 104) long, 58 (55 – 58) wide at level of anterior corners and 57 (55 – 58) wide at level of anus, 4 poroids around the ventrianal shield and genital shield, JV5 41, spermatheca 16 (13 – 22) long and 5 width, SgeI 26, SgeII 27 (25 – 29), StIII 19, SgeIV 59 (56 – 63), StIV 31 (29 – 32), StIV 63 (61 – 67), macrosetae whip-like, fixed digit of chelicerae 32 (29 – 33), mobile digit of chelicerae 31, 12 denticles on fixed digit and 5 on mobile digit.

The measurements of the single adult male presently found are as follow: dorsal shield sclerotized and reticulated, dorsal shield length 245, width 162, 2 solenostome (gd 1, 2, 6, 8 and 9), j1 15, j3 25, j4 7, j5 7, j6 9, J2 10, J5 8, z2 10, z4 12, z5 7, Z1 9, Z4 38, Z5 58, s4 32, S2 14, S4 12, S5 9, r3 13, R1 8, all setae smooth except Z4 and Z5, st1-st1 49, st2-st2 55, st1-st3 59, st1-st5 103.

Quadromalus Moraes, Denmark and Guerrero

Quadromalus colombiensis

Moraes, Denmark and Guerrero, 1982: 17

The biology of this species found only once in Colombia on Tanicum paniculatum (Moraes et al., 1982) remains totally unknown.

Previous Records — Colombia (Moraes et al., 1982; Moraes et al., 2004b).


Remarks — this is the first record of this species in the West Indies. The measurements and description of the three female specimens collected fit very well those given by Moraes et al. (1982). No measurement for the male was given in Moraes et al. (1982). Diagnosis proposed by Moraes et al. (1982) corresponds very well to the specimens collected in Guadeloupe: Z4 and Z5 not serrated, only one macroseta on leg IV, 3-4 teeth on fixed and 3 on movable denticles, respectively, and moreover 4 extra-long setaceous setae on the tarsus 1 (Moraes et al., 1982).

The average measurements of three adult females presently found are as follow: dorsal shield smooth, dorsal shield length 370 (361 – 385), width 246 (239 – 255), 6 solenostomes (gd 1, 2, 4, 6, 8 and 9), j1 29 (28 – 30), j3 38 (37 – 40), j4 13 (12 – 13), j5 14 (13 – 15), j6 12, J2 19 (17 – 20), J5 13 , z2 37, z4 41 (40 – 42), z5 17 (15 – 20), Z1 27 (25 – 3), Z4 34 (33 – 35), Z5 33, s4 44 (42 – 45), S2 34 (33 – 35), S4 31 (28 – 32), S5 28 (25 – 30), r3 34 (33 – 35), R1 30, all setae smooth, st1-st1 56 (55 – 58), st2-st2 66 (60 – 75), st1-st3 70 (60 – 75), posterior margin of the sternal shield not straight, metapodal 1 length 25, width 7 (6 – 8), metapodal 2 not visible, ventrianal shield 103 (100 – 108) long, 57 (48 – 67) wide at level of anterior corners and 68 (60 – 75) wide at level of anus, 4 poroids around the ventrianal shield, JV5 41 (40 – 43), spermatheca 24 (20 – 28) long and 3 width, SgeI 24 (23 – 28), SgeII 22 (20 – 23), SgeIII 24 (23 – 25), StIII 21 (20 – 23), SgeIV 29 (28 – 30), StIV 26 (24 – 28), StIV 40 (42), macrosetae very slightly knobbed, fixed digit of chelicerae 31 (28 – 32), mobile digit of chelicerae 32 (30 – 35), 3 large strong denticles on fixed digit and 3 large strong denticles on mobile digit.

The measurements of one adult male are: dorsal shield smooth, dorsal shield length 298, width 225, 6 solenostome (gd 1, 2, 4, 6, 8 and 9), j1 20, j3 25, j4 10, j5 9, j6 10, J2 15, J5 9, z2 25, z4 28, z5 12, Z1 23, Z4 25, Z5 25, Z6 35, S2 25, S4 23, S5 23, r3 25, R1 23, all setae smooth, st1-st1 48, st2-st2 63, st1-st3 58, st1-st5 120, ventrianal shield 100 long, 167 wide at level of
anterior corners and 60 wide at level of anusJV5 25, Sgel 23, SgelII 23, SgelIII 15, StIII 15, SgelIV 23, StIV 24, StIV 28, schaft of the spermatodactyl 23.

Sub-tribe Typhlodromalina Chant and McMurtry

Typhlodromalus peregrinus (Muma)

Typhlodromus peregrinus Muma, 1955: 270;
Typhlodromus peregrinus Muma and Denmark, 1970: 88; Moraes et al., 1986: 132, 2004: 202; Zacarias and Moraes, 2001: 582;
Typhlodromus (Amblyseius) peregrinus Chant, 1959: 97;
Typhlodromus (Amblyseius) robineae Chant, 1959: 98;
Typhlodromus (Amblyseius) evansi Chant, 1959: 99;
Typhlodromus (Amblyseius) primulae Chant, 1959: 99 (synonymy, according to Muma, 1964)

This species is very common on citrus (Muma, 1955, 1967; Peña, 1992; Childers, 1994; Villanueva and Childers, 2004, 2005; Fadamiro et al., 2008, 2009) and solanaceous plants (McMurtry, 1983; Fiaboe et al., 2008) in several countries and is very often reported as the most abundant species.

Typhlodromalus peregrinus can be found at the underside of mature citrus leaves, inside tree canopy, under empty scale armor, clump and dead scale insects whitefly exuvia, sooty mold and mine of Phyllocnistis citrella Stanton (Muma, 1967; Childers, 1994; Villanueva and Childers, 2004, 2005; Fadamiro et al., 2008, 2009) and solanaceous plants (McMurtry, 1983; Fiaboe et al., 2008) in several countries and is very often reported as the most abundant species.

Typhlodromalus peregrinus in the laboratory at 26°C. Each of the following organisms was evaluated as suitable diet: all stages of T. urticae; immature stages of P. citri; and pollens of Malephora crocea, Quercus virginiana, and Typha latifolia. The combination of T. urticae with pollen was also tested. Total developmental time ranged between 5.73 and 7 days for females and between 5.67 and 6.93 days for males. The percentage of females in the total population ranged between 53 and 61 %. A diet of T. urticae provided the shortest generation time (T), greatest female longevity, and mean total fecundity (F) which resulted in the highest net reproductive rate (Ro) value (25.31 expected females per female), intrinsic rate of increase ($r_m = 0.224$), and finite rate of increase ($\lambda = 1.25$) per day for T. peregrinus. Diets of only P. citri or M. crocea resulted in close values of $T = 8.67, 8.91$; $F = 47.11, 49.47$; $R_o = 24.00, 26.65$; $r_m = 0.210, 0.219$; and $\lambda = 1.23, 1.24$, respectively. Quercus virginiana and T. latifolia were the less favorable food sources, with results of $T = 8.78, 9.41$; $F = 30.38, 24.25$; $R_o = 14.20, 12.04$; $r_m = 0.193, 0.170$, and $\lambda = 1.21, 1.18$, respectively.

The occurrence of high densities of this species on ground cover vegetation (weeds) is explained in Alabama citrus orchard (Fadamiro et al., 2008, 2009) by the possibility that grasses may serve as overwintering sites and alternative food sources, which is probably the most important factors in French West Indies citrus orchards as there is no overwintering in citrus crop in this tropical area.

Typhlodromalus peregrinus was collected from 64 ground cover plants or vines in Florida citrus fields (Childers and Denmark, 2011) with highest numbers found on the following plants: Bidens alba, Solanum americanum (which is one plant of the ground cover on which T. peregrinus was collected in Guadeloupe), Amaranthus spinosus, Gnaphali um pennisylvanicum, Lantana camara and Chenopodium ambrosioides). In Florida, the highest numbers of T. peregrinus in ground cover corresponded with peaks in thrips numbers, suggesting possible predation on one or more species of thrips occurring. Childers and Denmark (2011) suggest that this species should therefore be evaluated as a predator of thrips larvae and/or adults. Significant in-
increases in numbers of *T. peregrinus* were also correlated with increased levels of several pollen species on citrus leaves (Villanueva and Childers, 2004).

Thus, considering all these elements, it is possible that *T. peregrinus* may constitute a key species in citrus orchards in French West Indies.

Previous Records — Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Hawaii, Honduras, Mexico, Nicaragua, Puerto Rico, Suriname, USA (Florida, Alabama, Missouri), Venezuela (Moraes et al., 2004b).

Specimens examined — Guadeloupe, Basse-Terre, Vieux-Habitants, Station Le Bouchu du CIRAD, 16°03’N, 61°45’W, alt. 21 m, 9 ♀ and 7 ♂ extracted from a mixture of various herbaceous plants collected in an experimental citrus crop (*Achyranthes aspera*, *Centrosema* sp., *Chamaescye hypericifolia*, *Chloris inflata*, *Croton lobatus*, *Echinochloa colona*, *Ipomea hederifolia*, *Macroptilium lathyroides*, *Merremia umbellata*, *Neonotonia wightii*, *Rhynchosia minima*, *Solanum americanum*, *Tridax procumbens*, *Urena lobata*, *Vernonia cinerea*), Mailloux coll., April to December 2008.

Remarks — this is the first record of this species in the West Indies. The measurements and description of the specimens collected fit very well those given by Moraes and Mesa (1988).

The average measurements of the nine adult females presently found are: dorsal shield strongy reticulated on the whole dorsum, 344 (329 – 350) long and 219 (184 – 285) wide, with 5 solenostomes (gd1, 2, 6, 8 and 9), 10 pairs of poroids, 17 pairs of dorsal setae and 2 pairs of sub-lateral setae: j1 25 (22 – 29), j3 37 (34 – 42), j4 15 (11 – 20), j5 17 (14 – 20), j6 20 (16 – 27), J2 20 (17 – 23), J5 8 (6 – 11), z2 21 (20 – 25), z4 33 (28 – 41), z5 17 (11 – 20), Z1 32 (29 – 35), Z4 48 (47 – 51), Z5 59 (57 – 61), s4 45 (38 – 50), S2 31 (28 – 34), S4 25 (20 – 30), S5 13 (10 – 19), r3 18 (12 – 22), R1 17 (13 – 20). All setae smooth, except Z4 and Z5 which are moderately serrated. Peritreme extending to the level of j1. Ventral shields smooth. Sternomental shield with 5 pairs of setae and 2 pairs of pores. Distances between st1-st3 66 (63 – 71), st2-st2 63 (60 – 65), st5-st5 76 (73 – 78). Two pairs of metapodal shields 16 (14 – 18) long, 4 (3 – 6) wide for the largest, 5 – 8 long and very thin for the smallest one. Ventrianal shield with 3 pairs of pre-anal setae, JV1, JV2 and ZV2 and one pair of elliptical pre-anal pores. Membrane surrounding ventrianal shield with 4 pairs of setae ZV1, ZV3, JV4 and JV5 and 4 pairs of round to oblong poroids; ventrianal shield 93 (88 – 103) long, 64 (60 – 68) wide at level of anterior corners and 61 (57 – 74) wide at level of anus. JV5 42 (37 – 45) long and smooth. All legs with smooth macrosetae: Sgel 17 (13 – 23), Sgel II 20 (18 – 25), Sgel III 30 (28 – 30), StIII 20 (15 – 25), SgelIV 42 (34 – 44), StIV 3 (18 – 25), StIV 62 (58 – 65). All macrosetae are whip-like with a small bulbous tip. Chaeotactic formula of genu II: 2-2/0, 2/0-1; genu III: 1-2/1, 2/0-1. Length of legs I: 342 (278 – 369), II: 253 (226 – 282), III: 251 (214 – 286), IV: 341 (275 – 388). Chelicerae with fixed digit 32 (30 – 36) with 7 teeth and movable digit 30 (28 – 32) with 3-4 teeth. Calyx of spermatheca fundibular (Denmark et al. 1999) with the cervix elongate, 5 (3 – 7) wide and 16 (9 – 22) long, with a big atrium at the basis.

The average measurements of the seven adult males presently found are: dorsal shield like in the female, 256 (243 – 275) long and 143 (134 – 149) wide. Setae j1 19 (18 – 20), j3 29 (25 – 30), j4 11 (7 – 13), j5 12 (8 – 16), j6 14 (12 – 16), J2 11 (7 – 16), J5 7 (5 – 8), z2 16 (13 – 17), z4 27 (25 – 29), z5 11 (10 – 12), Z1 18 (16 – 22), Z4 34 (31 – 37), Z5 39 (34 – 42), s4 35 (33 – 36), S2 17 (16 – 18), S4 14 (12 – 16), S5 9 (7 – 12), r3 17 (15 – 19), R1 13 (12 – 16). Peritreme extending to the level of j1. All venter shields smooth. Sternomental shield with 5 pairs of setae and 2 pairs of pores. Distances between st1-st3 58 (56 – 59), st2-st2 54 (50 – 56), st5-st5 37 (32 – 40). Ventral shield not fused with peritremal shields with 3 pairs of pre-anal setae, JV1, JV2 and ZV2, one pair of elliptical preanal solenostomes and 2 pairs of poroids. Membrane surrounding ventrianal shield with one pair of setae JV5 in level with anal opening, and no visible pair of oblong poroids; ventrianal shield 93 (85 – 100) long, 132 (127 – 146) wide at level of anterior corners and 59 (54 – 65) at level of anus. Macrosetae on all legs: Sgel 15 (13 – 18), Sgel II 16 (15 – 20), Sgel III 22 (20 – 25), StIII 15,
SgeIV 31 (27 – 36), StiIV 17 (15 – 21), StIV 46 (40 – 51). Chaetotactic formula of genu II and genu III are identical to the female. Length of leg I: 250 (228 – 276), II: 202 (182 – 228), III: 218 (193 – 253), IV: 304 (275 – 326). Spermatodactyl of chelicerae with a large toe terminating the foot, shaft 19 (18 – 20) long.

**Tribe Typhlodromipsini Chant and McMurtry**

*Typhlodromis amilus* De Leon


The biology of this species found only two times, in Trinidad Island on *Cedrela* sp. and on an unknown Bromeliaceae by De Leon (1967) and on *Hevea brasiliensis* by Ferla and Moraes (2002) is unknown. This species is mentioned and indicated as a senior synonym of *T. bhoraii* De Leon in the catalogue of Denmark *et al.* (1999).

Previous Records — Brazil, Trinidad (De Leon, 1967; Denmark *et al.*, 1999; Moraes *et al.*, 2004b).


Remarks — this is the first record of this species in the West Indies. The measurements of the single specimen collected fit rather well the measurements given by De Leon (1967) and by Denmark *et al.* (1999). All setae are however slightly shorter, between 1 and 5 µm, which represent less than 10 % of variation, which is less than the intraspecific variation of 20 % around the mean defined by Tixier (2012). In addition, Denmark *et al.* (1999) mentioned that *T. amilus* is a species submitted to variations in lengths of setae.

The measurements of the single adult female presently found are as follow: dorsal shield reticulated, dorsal shield length 355, width 183, six solenostomes (gd 1, 2, 3, 5, 8 and 9), j1 18, j3 20, j4 10, j5 13, j6 10, j2 13, j5 8, z2 15, z4 15, z5 11, Z1 13, Z4 33, Z5 53, s4 20, S2 16, S4 15, S5 10, r3 10, R1 13, Z4 and Z5 serrated, st1-st1 52, st2-st2 63, st1-st3 58, posterior margin of the sternal shield straight, metapodal 1 length 15, width 5, metapodal 2 length 10, width 2, ventrianal shield 100 long, 90 wide at level of anterior corners and 80 wide at level of anus, 3 poroids around the ventrianal shield, JV5 28, spermatheca 18 long and 8 width, Sge 15, SgeII 13, SgeIII 13, StIII 20, SgeIV 28, StIV 13, StIV 30, macrosetae all knobbed, fixed digit of chelicerae 28, mobile digit of chelicerae 28, 8–9 denticles on fixed digit and 3 on mobile digit.

**Sub-Family Typhlodrominae**

**Tribe Typhlodromini Wainstein**

*Typhlodromus Scheuten* *Typhlodromus* (*Anthoseius*) *moraesi* Kreiter and Ueckermann


The biology of this species found only one time in La Réunion Island by Kreiter *et al.* (2002) on various host plants (Kreiter *et al.*, 2002) remains unknown.

Previous Records — La Réunion Island (Kreiter *et al.*, 2002).

Specimens examined — Guadeloupe, Basse-Terre, Vieux-Habitants, Station Le Bouchu du CIRAD, 16°03’N, 61°45’W, alt. 21 m, 18 ♀, 2 ♂ and 1 immature extracted from a mixture of herbaceous plants collected in an experimental citrus crop (*Achyranthes aspera*, *Chamaescye hypericifolia*, *Chloris inflata*, *Cleome rutidosperma*, *Croton lobatus*, *Dicanthium annulatum*, *Echinochloa colona*, *Indigofera tinctoria*, *Macroptilium lathyroides*, *Merremia umbellata*, *Panicum maximum*, *Rhynchosia minima*, *Solanum americanum*, *Tridax procumbens*, *Urena lobata*, *Vernonia cinerea*), Mailloux coll., April to December 2008.

Remarks — this is the first record of this species in the West Indies. Several species are found both in La Réunion Island (in the Indian Ocean) and in the West Indies, probably because of reciprocal introductions certainly long time ago with slaves and commercial exchanges between the two areas or because of introduction of plants in Antilles and La Réunion coming from the same African area than
Slaves. The measurements and description of the specimens collected fit very well those given by Kreiter et al. (2002).

The average measurements of five adult females among the 18 presently found are: dorsal shield sclerotized and reticulated, dorsal shield length 369 (350 – 397), width 221 (194 – 260), 6 solenostomes (gd 1, 2, 6, 8 and 9), j1 22 (20 – 23), j3 16 (14 – 17), j4 10 (7 – 12), j5 10 (8 – 12), j6 13 (12 – 14), J2 14 (12 – 17), J5 11 (10 – 13), Z2 14 (12 – 16), Z3 16 (14 – 19), Z4 16 (14 – 17), Z5 12 (11 – 13), Z6 19 (17 – 22), Z5 35 (29 – 38), s4 18 (16 – 21), s6 19 (17 – 21), S2 21 (18 – 23), S4 24 (20 – 26), S5 23 (18 – 26), r3 16 (13 – 20), R1 18 (16 – 23), some setae serrated, st1-st1 50 (49 – 52), st2-st2 57 (55 – 58), st1-st3 68 (66 – 70), posterior margin of the sternal shield concave, metapodal 1 length 26 (24 – 27), width 4 (2 – 5), metapodal 2 length 12, width 1, ventrianal shield 114 (100 – 118) long, 93 (92 – 93) wide at level of anterior corners and 77 (76 – 78) wide at level of anus, 4 poroids around the ventrianal shield, JV5 33 (30 – 35), spermatheca 17 long and 8 width, StIV 24 (23 – 25), macrosetae knobbed, fixed digit of chelicerae 30 (28 – 31), mobile digit of chelicerae 31 (29 – 32), 2 denticles on fixed digit and 2 on mobile digit.

**NEW RECORDS OF SPECIES RARELY RECORDED FROM WEST INDIES**

**Sub-Family Amblyseiinae**

**Tribe Amblyseiini Wainstein**

**Sub-tribe Amblyseiina Chant and McMurtry**

*Amblyseius* Berlese

*Amblyseius segregans* De Leon


The biology of this species found only four times in British Guyana (2 females), Guatemala and Hondurus (2 females), Guadeloupe (1 female) and Martinique (1 female) on various plants (De Leon, 1966; McMurtry, 1983; Denmark and Muma, 1989; Moraes et al., 2000; Moraes et al., 2004b) remains unknown.

Previous Records — British Guyana (De Leon, 1966), Guadeloupe and Martinique (Moraes et al., 2000), Honduras and Guatemala (Moraes et al., 2004b).


Remarks — the measurements and description of the specimens collected fit very well those mentioned by Moraes et al. (2000).

**Tribe Euseiini Chant and McMurtry**

**Sub-tribe Euseiina Chant and McMurtry**

*Euseius* Wainstein

*Euseius ovaloides* (Blommers)

*Amblyseius* (*Amblyseius*) *ovaloides* Blommers, 1974: 147.


*Euseius ovaloides* Quilici et al., 1997: 284; Moraes et al., 2000; Quilici et al., 2000: 100; 242; Moraes et al., 2001: 43.

The biology of this species found only a few times in Madagascar (Blommers, 1974), Papua-New Guinea (Schicha and Gutierrez 1985), Seychelles (Schicha, 1987), Reunion Island, (Quilici et al., 1997, 2000), Guadeloupe, Martinique and Marie-Galante (Moraes et al., 2000 ; Kreiter et al., 2006) on various plants remains unknown. It was suspected to be a poorly active predator of tetranychid mites (Gutierrez and Etienne, 1986).

Previous Records — French Antilles (Guadeloupe and Marie-Galante) (Moraes et al., 2000), Madagascar, Papua New Guinea, Reunion Island (Kreiter et al., 2000), Seychelles (Moraes et al., 2004b).

Specimens examined — Guadeloupe, Basse-Terre, Vieux-Habitants, Station Le Bouchu du CIRAD , 16°03’N, 61°45’W, alt. 21 m, 1 ♀ on *Spondias*
monbim, Kreiter coll., 19 June 2008; Grande-Terre, Vieux Bourg, Port, 16°21'N, 61°31'W, alt. 2 m, 1 ♀ on Carica papaya, Kreiter coll., 29 December 2008; Basse-Terre, Viard, beach, 16°10'N, 61°35'W, alt. 4 m, 1 ♀ on Ricinus communis, Kreiter coll., 1 January 2009; Martinique, Saint-Esprit, Quartier Régal, 14°32'N, 60°58'W, alt. 112 m, 1 ♀ on Spondias dulcis, Kreiter coll., 15 November 2010; Le Marin, 14°28'N, 60°51'W, alt. 112 m, 2 ♀ on Carica papaya, Kreiter coll., 22 November 2010.

Remarks — the measurements and description of the specimens collected fit very well those given by Moraes et al. (2000).

Tribe Neoseiulini Chant and McMurtry

**Neoseiulus Hughes**

*Neoseiulus longispinosus* (Evans)


This species was already mentioned from Guadeloupe and other Islands of the French Antilles (Moraes et al., 2000) but only in very few localities on various host plants. It is distributed in many countries of the world, mainly in tropical areas.

The biology of this species has been studied for pest control purposes including side effects of acaricides (Bin Ibrahim and Tan, 2000). The activity, feeding, development, predation, cannibalism, intra-guild predation and behaviour have been extensively studied by several authors (Schausberger and Croft, 1999a, b; Croft et al., 1999a, b; Schausberger and Croft, 2000a, b; Blackwood et al., 2001).

Previous Records — French Antilles (Guadeloupe, Les Saintes, Marie-Galante, Martinique, Saint-Barthélemy) (Moraes et al., 2000), Australia, China, Egypt, Hawaii, Hong-Kong, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Papua New Guinea, Philippines, Russia, South Korea, Taiwan, Thailand (Moraes et al., 2004b).

Specimens examined — Guadeloupe, Basse-Terre, Vieux-Habitants, Station Le Bouchu du CIRAD, 16°03'N, 61°45'W, alt. 21 m, 14 ♀ and 1 ♂ on Neonotonia wightii and Tridax procumbens within an experimental citrus crop, Mailloux coll., April to December 2008; Basse-Terre, Petit-Bourg, Domaine Duclos de l’INRA Antilles-Guyane, 16°12'N, 61°39'W, alt. 85 m, 1 ♂ on Vigna sp., Kreiter coll., 21 December 2008.

Remarks — the measurements and description of the specimens collected fit very well those given by Moraes et al. (2000).

**Neoseiulus paspalivorus** (De Leon)


The biology of this species was only recently studied. It seems to be common on various herbaceous plants (Moraes et al., 1986) and could be a Gondwanian species because of its currently known area of distribution: Caribbean, India, Oriental region and Africa (Ueckermann and Lawson-Balagbo, pers. comm.). This species predominates in the dry areas of states of Ceará and Pernambuco in Brazil on coconuts (Lawson-Balagbo et al., 2008a). This species thrived on the coconut eriophyid, Aceria guerreronis Keifer as primary food source resulting in shorter developmental time, higher oviposition rate and higher intrinsic rate of increase than on any other diet (Lawson-Balagbo et al., 2007). *Neoseiulus paspalivorus* is dorso-ventrally flattened giving it an advantage in accessing the area under the bracts (Lawson-Balagbo et al., 2008b). This species is thus cited as a promising candidate for the biological control of the coconut eriophyid (Lawson-Balagbo et al., 2008a). This latter pest was recently introduced in Sri Lanka and southern India where it is causing considerable damage to coconut. *Neoseiulus paspalivorus* was found only on coconut in the area of production and on fruits, in association with A. guerreronis (Fernando et al., 2003; Moraes et al., 2004b).

2004a). Its presence on coconut in French West Indies contaminated by A. guerreronis is thus not surprising. The specimens collected were found very close from coconuts.

Previous Records — Guadeloupe (Moraes et al., 2000), India and Sri Lanka (Fernando et al., 2003; Moraes et al., 2004a), Jamaica, Philippines, USA (Florida) (Moraes et al., 2004b), Cuba (Cabrera et al., 2008), USA Florida (Muma and Denman, 1970), Brazil (Lawson-Balagbo et al., 2008a).

Specimens examined — Guadeloupe, Basse-Terre, Vieux-Habitants, Station Le Bouchu du CIRAD, 16°03’N, 61°45’W, alt. 21 m, 2 ♀ collected on various herbaceous plants covering the soil of an experimental citrus crop (Alysicarpus vaginalis, Chloris inflata, Cleome rutidosperma, Dicanthium annulatum, Echinochloa colona, Vernonia cinerea), Mailloux coll., April to December 2008.

Remarks — the measurements and description of the specimens collected fit very well those given by Moraes et al. (2000).

Sub-Family Phytoseiinae

Phytoseius Ribaga

Phytoseius woodburiyi De Leon


The biology of this species remains unknown.

Previous Records: Brazil, Colombia, French Antilles (Guadeloupe, Marie-Galante, Martinique) (Moraes et al., 2000), Hawaii, India, Jamaica, Puerto Rico, Trinidad (Moraes et al., 2004b).

Specimens examined — Guadeloupe, Basse-Terre, Volcan La Soufrière, 16°02’45.19”N, 61°31’55.65”W, alt. 1300 m, 6 ♀ on Centropogon corr-natus, Kreiter coll., 21 June 2008; Vieux-Habitants, Station CIRAD de Le Bouchu, 16°03’N, 61°45”W, alt. 21 m, 1 ♀ on Erythrina sp. and 1 ♀ on Psidium guajava, Kreiter and Rault coll., 19 December 2008; Les Saintes, Terre de Bas, L’Etang, 15°51’N, 61°37”W, alt. 239 m, 18 ♀ on Cordia alliodora, Kreiter coll., 2 January 2009; Martinique, Lamentin, 14°39’N, 60°58’W, alt. 46 m, 1 ♀ on Psidium guajava, Kreiter coll., 15 November 2010; Case-Pilote, 14°39’N, 61°07’W, alt. 176 m, 1 ♀ on Psidium guajava, Kreiter coll., 22 November 2010.

Remarks — the measurements and description of the specimens collected fit very well those given by Kreiter and Moraes (1997).

Sub-Family Typhlodrominae

Tribe Typhloseiopsini

Typhloseiopsis De Leon

Typhloseiopsis pritchardi (Chant and Baker)


Typhloseiopsis pritchardi Moraes et al., 2000: 259.

The biology of this species remains unknown.

Previous Records — Costa Rica (Moraes et al., 2004b), French Antilles (Guadeloupe, Marie-Galante, Martinique, Saint-Martin) (Moraes et al., 2000).

Specimens examined — La Désirade, Parc Eolien, 16°19’N, 61°02’W, 269 m, 3 ♀ and 1 ♂ on Coccoloba pubescens, Kreiter coll., 5 January 2009.

Remarks — the measurements and description of the specimens collected fit very well those given by Moraes et al. (2000)

CONCLUSION

The number of species from the French Antilles was of 56 before the present study. Thanks to surveys conducted from April 2008 to February 2011, eleven species are herein added to the fauna of French Antilles. In conclusion, a total of 67 species belonging to 22 genera are thus now known from the French Antilles. These species belong to the three sub-families: Amblyseiinae (51 species), Typhlodrominae (12 species) and Phytoseiinae (4 species) and a catalogue of these 67 species will be published soon (Kreiter, in prep.) with a key to identification. Some new collections and localities for rare species are added. Among these 11 species, T. peregrinus and N.
paspalivorus may constitute key species in citrus and coconut orchards in French Antilles, respectively.

ACKNOWLEDGEMENTS

We are grateful to Mr. Denis Girou, Director of the Guadeloupe National Park for the authorization to collect phytoseiid mites within the limit of the National Park. We are also indebted to Mrs. Cécile Rault who has identified some species of plants and to Daniel Marival who has confirmed some identification of plants. We thank Mrs. Rose-Lise Etienne for help concerning housing and intendance. We are also very grateful to Mr. Michel Allène (Executive Director) and Mrs. Anne-Isabelle Lacordaire (Research and Development Director) from Koppert France who has financed a trip in Martinique at the end of 2010. We thank Mr. David Dural (production and Development Director) and Mr. Laurent Gervais (Innovative cropping systems responsible) from Institut Technique Tropical and Mrs. Denise Dufeal (Executive Director) and Mr. Pierre-Damien Lucas (Engineer) from FREDON Martinique for their assistance and help during surveys in Martinique.

REFERENCES


Kreiter S., Tixier M.-S. 2010 — A new genus and species of phytoseiid mite (Acarini: Mesostigmata) from the Brazilian Atlantic Forest — Acarologia 50 (2): 197-205. doi:10.1051/acarologia/20101973


Kreiter S., Ueckermann E.A., Quilici S., 2002 — Seven new Phytoseiidae species, with a new generic assignment and a key to the species of La Réunion Island (Acarini: Mesostigmata) — Acarologia 42 (4): 335-350.


Schicha E. 1981 — A new species of *Amblyseius* from Australia compared with ten closely related species from Asia, America and Africa — Intern. J. Acarol. 7: 203-216. doi:10.1080/01679858108683262


Villanueva R.T., Childers C.C. 2011 — Mine-damaged leaves by *Phyllocnistis citrella* Stanton provide refuge for phytoseiids on grapefruit in Florida and Texas — Zoosymposia 6: 118-123.


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