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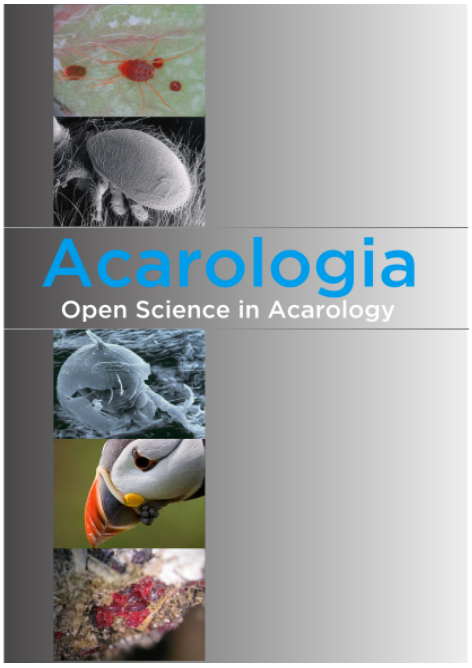

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Phytoseiid mites of Rodrigues Island (Acari: Mesostigmata)

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Original research

ABSTRACT

Rodrigues is one of the three main islands constituting Mascareignes Archipelago, with La Réunion and Mauritius. It belongs to the state of Mauritius. So far, no mite species of the family Phytoseiidae have been reported from this Island. We report in this paper the results of a survey conducted in November 2018 on Rodrigues Island, during which 18 species have been recorded.

Keywords survey; collection; taxonomy; systematics

Introduction

Mites of the family Phytoseiidae are known for their predatory habits on phytophagous mites and small insects on cultivated plants and wild vegetation. Several of them are used for the control of pest organisms in agricultural open fields and protected crops all around the world (McMurtry and Croft 1997; McMurtry *et al.* 2013). This family is widespread around the Globe, presents on all continents except Antarctica and consists presently of 2,521 valid species of 94 genera belonging to three sub-families (Demite *et al.* 2020).

Biodiversity surveys in poorly investigated areas is still an urgent need and might result in the discovery of additional species potentially useful for biological control as well as having more information on the biodiversity of these areas (Kreiter *et al.* 2020a, b, c).

Most of the Indian Ocean constitutes one of the world's biodiversity hotspots. The concept of biodiversity hotspot was defined by Myers (1988) in order to identify the most immediately important areas for biodiversity conservation. These hotspots 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 areas may contribute to future establishment of conservation programs.

Located in the Indian Ocean at 1,740 km from the eastern coast of Madagascar, at 617 km from Mauritius, and 836 km from La Réunion, Rodrigues is one of the three main islands constituting Mascareignes Archipelago, together with La Réunion and Mauritius.

No phytoseiid species have been recorded until now from this island.

The objective of this paper is to present the phytoseiid species recorded as a new survey conducted in November 2018 on Rodrigues Island.

Material and methods

The survey took place on Rodrigues in November 2018. Plant inhabiting mites were collected from cultivated and wild plants in several locations in all parts of the island. Mites were directly collected from leaves with a fine brush or by beating the plants (mainly shrubs and trees). The

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mites were collected in a black plastic rectangular saucer 45 x 30 cm (Ref. STR 45, BHR, 71370 Saint-Germain-du-Plain, France). The method selected was depending on the plant investigated: large leaves of shrubs and trees with the direct collection method or by beating, very small leaves or spines of shrubs and trees with the beating method and herbaceous plants with a brush.

Collected mites were then transferred with brush into small plastic vials containing 1.5 ml of 70% ethanol. Mites were then all mounted on slides using Hoyer's medium and all identified using a phase and interferential contrast microscope (DMLB, Leica Microsystèmes SAS, Nanterre, France). Characters of specimens were measured using a graduated ocular micrometre (Leica, see above).

We have used 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, 2020) for distribution. In the description and re-description, the setal nomenclature system adopted was that of Lindquist & Evans (1965) and Lindquist (1994) as adapted by Rowell *et al.* (1978) for the dorsum and by Chant & Yoshida-Shaul (1991) for the venter. The idiosomal setal pattern follows Chant & Yoshida-Shaul (1992). The notation for solenostomes and poroids is based on Athias-Henriot (1975).

Specimens of each species are deposited in the mite collections of Montpellier SupAgro conserved in UMR CBGP Université de Montpellier INRA/IRD/CIRAD/SupAgro.

Specimens collected in fields in Rodrigues within these surveys were all identified. Only very few single males or immatures collected during this study are not taken into account.

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; **INRA** = Institut National de la Recherche Agronomique; **IRD** = Institut de Recherche pour le Développement; **MSA** = Montpellier SupAgro, France; **UMR** = Unité Mixte de Recherche.

Results and discussion

A total of 18 species have been recorded.

Subfamily Amblyseiinae Muma

Amblyseiinae Muma 1961: 273.

Tribe Neoseiulini Chant & McMurtry

Neoseiulini Chant & McMurtry 2003a: 6.

Genus *Neoseiulus* Hughes

Neoseiulus Hughes 1948: 141.

Neoseiulus barkeri Hughes

Neoseiulus barkeri Hughes 1948: 141; Chant & McMurtry 2003a: 35; Moraes *et al.* 1986: 70, 2004: 104.
Typhlodromus (*Neoseiulus*) *barkeri*, Nesbitt 1951: 35.
Typhlodromus (*Typhlodromus*) *barkeri*, Chant 1959: 63.
Typhlodromus (*Amblyseius*) *barkeri*, Hughes 1961: 222.
Amblyseius barkeri, Athias-Henriot 1961: 440; Moraes *et al.* 1989b: 95.
Typhlodromus barkeri, Hirschmann 1962: 9.
Amblyseius (*Amblyseius*) *barkeri*, van der Merwe 1968: 112.

Neoseiulus bakeri, Ryu *et al.* 2001: 8; Chant & McMurtry 2003a: 33, 2007: 25; Moraes *et al.* 2004: 104.
Amblyseius mckenziei Schuster & Pritchard 1963: 268 (Synonymy according to Ragusa & Athias-Henriot 1983).
Amblyseius usitatus van der Merwe 1965: 71 (Synonymy according to Ueckermann & Loots 1988).
Amblyseius oahuensis Prasad 1968: 1518 (Synonymy according to Ragusa & Athias-Henriot 1983).
Amblyseius picketti Specht 1968: 681 (Synonymy according to Ragusa & Athias-Henriot 1983).
Amblyseius mycophilus Karg 1970: 290 (Synonymy according to Ragusa & Athias-Henriot 1983).
Amblyseius masiaka Blommers & Chazeau 1974: 308 (Synonymy according to Ueckermann & Loots 1988).

This species belongs to the *barkeri* species group of the genus *Neoseiulus*, as the spermathecal atrium is large and forked at junction with major duct. It belongs to the *barkeri* species subgroup as the calyx is not markedly constricted at junction with the atrium, the atrium is deeply forked at the junction with major duct without vacuolated area, and the major duct, atrium and calyx are of approximately the same width (Chant and McMurtry 2003a).

Various studies had shown its ability to control *Frankliniella occidentalis* Pergande (Rodriguez-Reina *et al.* 1992), *Thrips tabaci* (Lindeman) (Broodsgaard and Stengaard Hansen 1992) and *Tetranychus urticae* Koch on cucumbers (Fan and Petitt 1994b). Fan and Petitt (1994a) showed that augmentative releases of *N. barkeri* provided control of broad mite, *Polyphagotarsonemus latus* (Banks), on peppers. *Neoseiulus barkeri* constitutes a potential Biological Control Agents (BCA) for several crops especially in vegetables greenhouses. This species had been mentioned by Quilici *et al.* (2000) and Kreiter *et al.* (2020c) on La Réunion Island.

World distribution: *Neoseiulus barkeri* has a worldwide distribution (Moraes *et al.* 2004; Demite *et al.* 2020).

Specimens examined: A single ♀ collected during this study. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Litchi chinensis* Sonnerat (Sapindaceae), 14/XI/2018.

Remarks: measurements of characters of the female from Rodrigues are only slightly different from female specimens from other countries, especially La Réunion Island. Comparisons with *N. barkeri* measurements of female and male specimens of various origins in Beaulieu and Beard (2018) show shorter dimensions of all characters of Rodrigues specimens. These authors mentioned shorter dorsal setae of African female and male specimens (lower part of observed ranges) compared to their own measurements (Beaulieu and Beard 2018).

Neoseiulus houstoni Schicha

Neoseiulus houstoni Schicha 1987: 111; Chant & McMurtry 2003a: 23; Moraes *et al.* 2004: 123.
Neoseiulus recifensis Gondim Jr. & Moraes 2001: 77 (synonymy according to Kreiter *et al.* 2020c).
Neoseiulus barreti Kreiter in Furtado *et al.* 2005: 135 (synonymy according to Kreiter *et al.* 2020c).

This species belongs to the *cucumeris* species group of *Neoseiulus*. It was collected and described in 1987 on *Vigna unguiculata* (L.) Walp. in Queensland, Australia (Schicha 1987) and described long time after under two different species names, *N. recifensis* Gondim Jr and Moraes and *N. barreti* Kreiter. Kreiter *et al.* (2020c) had established those two species as junior synonyms of *N. houstoni* and described for the first time the male of *N. houstoni*.

Biology of this species remains totally unknown.

World distribution: Australia, Brazil, Reunion Island.

Specimens examined: 15 ♀♀ + 1 ♂ in total. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Citrus limon* (L.) Burman (Rutaceae), 1 ♀ on *Ziziphus mauritiana* Lamarck (Rhamnaceae) and 5 ♀♀ and 1 ♂ on *Casuarina equisetifolia* L. (Casuarinaceae), 8/XI/2018 and 1 ♀ on *Ocimum americanum* L. (Lamiaceae), 13/XI/2018; **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 3 ♀♀ on *Solanum melongena* L. (Solanaceae) and 3 ♀♀ on *Cordia myxa* L. (Boraginaceae), 11/XI/2018; **Samy** (201 m aasl, lat. 19°42′28″ S, long. 63°24′24″ E), 1 ♀ on *Citrus limon* (L.) Burman (Rutaceae), 12/XI/2018.

Remarks: morphological and morphometric characters and all measurements fit well with measurements in Kreiter *et al.* 2020c. This species was described from Australia, but presented also in Brazil and was firstly mentioned in the Indian Ocean from La Réunion Island, an Island distant of 836 km from Rodrigues. Several species are shared by the two Islands and probably by many others.

Neoseiulus longispinosus (Evans)

Typhlodromus longispinosus Evans 1952: 413, 1953: 465; Womersley 1954: 177; Ehara 1958: 55.
Typhlodromus (*Amblyseius*) *longispinosus*, Chant 1959: 74.
Amblyseius longispinosus, Corpuz & Rimando 1966: 129; Schicha 1975: 103.
Neoseiulus longispinosus, Moraes *et al.* 1986: 85, 2000: 245, 2004: 129; Chant & McMurtry 2003a: 37, 2007: 29.

This species belongs to the *barkeri* species group and the *womersleyi* species subgroup as the calyx is markedly constricted at the junction with the atrium that is deeply forked at the junction with the major duct which with atrium and calyx are not of the same width (Chant and McMurtry 2003a).

This species is distributed in many countries of the world, mainly in tropical areas (Moraes *et al.* 2000; Mailloux *et al.* 2010; Kreiter *et al.* 2013, 2018 a, c; Demite *et al.* 2020). It was found in low numbers in Guadeloupe, Martinique and La Réunion except for studies on companion plants in citrus orchards (Mailloux *et al.* 2010; Kreiter *et al.* 2013, 2018c; Le Bellec *et al.*, unpub. data). This species seems to be more common on weeds with populations of tetranychid mites. *Neoseiulus longispinosus*, a type II phytoseiid predatory mite, as is *N. californicus* (McMurtry *et al.* 2013), had received increasing attention in Asia for the control of different spider mites (of *Eutetranychus*, *Oligonychus*, and *Tetranychus*) since 2010 (Nusartlert *et al.* 2011). The feeding, development, predation, cannibalism, intra-guild predation and behaviour had thus been extensively studied by several authors (e.g., Luong *et al.* 2017) for pest control purposes. *Neoseiulus longispinosus* is well-known as a BCA sell in several countries in the world for the management of spider mites. The recent results of Huyen *et al.* (2017) showed at least in controlled laboratory conditions, *N. longispinosus* is a potential biological control agent against the citrus red mite, *Panonychus citri* (McGregor).

World distribution: This species is distributed in many countries of the world, mainly in tropical areas.

Specimens examined: 17 ♀♀ + 2 ♂ in total. **Baie aux huitres** (8 m aasl, lat. 19°41′40″ S, long. 63°24′30″ E), 3 ♀♀ on *Solanum nigrum* L. (Solanaceae) and 1 ♀ on *Nerium oleander* L. (Apocynaceae), 9/XI/2018; **Anse aux Anglais** (2 m aasl, lat. 19°40′33″ S, long. 63°26′05″ E), 5 ♀♀ and 1 ♂ on *Lagenaria siceraria* (Molina) Standley (Cucurbitaceae), 11/XI/2018; **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 6 ♀♀ and 1 ♂ on *Solanum melongena* L. (Solanaceae), 11/XI/2018; **Port-Mathurin**, City Center (11 m altitude above sea level = aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Ocimum americanum* L. (Lamiaceae), 13/XI/2018; **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 1 ♀ on *Malvastrum coromandelianum* (L.) Garcke (Malvaceae), 15/XI/2018.

Remarks: measurements of specimens of Rodrigues females and males overlap with those obtained for populations of various countries, especially for specimens from La Réunion Island (Kreiter *et al.* 2020c).

Tribe Kampimodromini Kolodochka

Kampimodromini Kolodochka 1998: 59; Chant & McMurtry 2003b: 189, 2006b: 137, 2007: 33.

Subtribe Paraphytoseiina Chant & McMurtry

Paraphytoseiina Chant & McMurtry 2003b: 211.

Genus *Paraphytoseius* Swirski & Shechter

Paraphytoseius Swirski & Shechter 1961: 113; Moraes *et al.* 1986: 104, 2004: 160; Chant & McMurtry 2003b: 216, 2007: 49.

Paraphytoseius horrifer (Pritchard & Baker)

Amblyseius (*Ptenoseius*) *horrifer* Pritchard & Baker 1962: 295.
Amblyseius horrifer, Meyer & Rodrigues 1966: 30.
Amblyseius (*Paraphytoseius*) *horrifer*, van der Merwe 1968: 169.
Proprioseius (*Paraphytoseius) horrifer*, Karg 1983: 302.
Paraphytoseius horrifer, Moraes *et al.* 1986: 105, 2004: 152; Beard 2001: 84; Chant & McMurtry 2003a: 37, 2007: 53.

In our collected species of *Paraphytoseius*, setae *S5* are absent. Therefore, according to Chant and McMurtry (2003b) it belongs to the *orientalis* species group. Like Chant and McMurtry (2003b), and Moraes *et al.* (2007), we treated *P. horrifer* and *P. orientalis* as two different valid species. Our specimens have relatively longer *s4*, *Z4*, *Z5*, and lack a distinct short, thick, spatulate macroseta on genu I. Consequently, they belong to the former species. This species is widely distributed in Sub-Saharan Africa and Madagascar. The biology of *P. horrifer* remains totally unknown.

World distribution: Benin, DR Congo, Ghana, India, Kenya, La Réunion Island, Madagascar Island, Malawi, Mozambique, Senegal, South Africa, Uganda.

Specimens examined: 4 ♀♀ in total. **Citronelle**, city parc (349 m aasl, lat. 19°42′00″ S, long. 63°26′15″ E), 3 ♀♀ on *Tibouchina heteromalla* Cogniaux and 1 ♀ on *Cryptomeria japonica* D. Don (Taxodiaceae), 16/XI/2020.

Remarks: morphological and morphometric characters and all measurements fit well with measurements in Kreiter *et al.* 2020b, c. This species was described from Africa (Pritchard & Baker 1962), but distributed also in Vietnam (Kreiter *et al.* 2020b) and was firstly mentioned in the Indian Ocean from la Réunion Island, an Island distant of 836 km from Rodrigues. Several species are shared by the two Islands and probably by many others.

Tribe Phytoseiulini Chant & McMurtry

Phytoseiulini Chant & McMurtry 2006a: 17.

Genus *Phytoseiulus* Evans

Phytoseiulus Evans 1952: 397.

Phytoseiulus persimilis Athias-Henriot

Phytoseiulus persimilis Athias-Henriot 1957: 347; Moraes *et al.*, 1986: 109, 2004: 169; Chant & McMurtry 2006a: 20, 2007: 55.
Phytoseiulus (*Phytoseiulus*) *persimilis*, Wainstein 1962: 17.
Typhlodromus persimilis, Hirschmann 1962: 2.
Phytoseiulus longipes Evans 1958: 306 (synonymy according to Denmark *et al.* 1999).
Phytoseiulus riegeli Dosse 1958: 48 (synonymy according to Chant 1959).
Phytoseiulus tardi (Lombardini 1959): 166 (synonymy according to Kennett & Caltagirone 1968).

Phytoseiulus persimilis is a Mediterranean / subtropical predatory mite that is a type I species, i.e., a specialist predator of the *urticae* species group of the genus *Tetranychus* (McMurtry and Croft 1997; McMurtry *et al.* 2013). Considerable research had been conducted on this predator-prey interaction (see review by Kostiainen and Hoy 1996), and numerous biological control programs had used *P. persimilis* against *T. urticae* on a wide range of ornamental and vegetable crops. *Phytoseiulus persimilis* was the first greenhouse biological control agent available commercially and is one of the most successful biological control agents. It can also be used in temperate climates on open-field crops such as strawberries. Optimum conditions are 20-27 °C and relative humidity of 60-90%. Cooler or warmer temperatures may have a negative effect on reproduction, development and efficiency of this predatory mite. This species is present on Rodrigues probably because of its commercial introduction and uses in vegetable and ornamental greenhouses, dispersion of some specimens released and establishment in the environment. This species was reared and sold on La Réunion and commercialized in Mascareignes since a long time (Quilici, personal communication).

World distribution: widely distributed in Africa, Australia, Europe, especially Mediterranean countries, South America, and Asia, probably after largely distributed commercial uses in the world, dispersion in the environment in at least some locations and establishments of this species.

Specimens examined: 2 ♀♀ in total. **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 2 ♀♀ on *Solanum melongena* L. (Solanaceae), 11/XI/2018.

Remarks: measurements of adult females collected in this work agree very well with measurements in the literature, especially those of Ueckermann *et al.* (2007).

Macrosetae on basitarsus of leg IV are not serrated, but macrosetae of genu and tibia are serrated and there is no pre-anal macrosetae on the ventrianal shield. These are key characters of *P. persimilis* in comparison with the closely related species *Phytoseiulus macropilis* (Banks) (Okassa *et al.* 2010).

Tribe Amblyseiini Muma

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

Subtribe Amblyseiina Muma

Amblyseiina Muma, Chant & McMurtry 2004: 179.

Genus *Amblyseius* Berlese

Amblyseius Berlese 1914: 143.

Amblyseius herbicolus (Chant)

Typhlodromus (*Amblyseius*) *herbicolus* Chant 1959: 84.
Amblyseius (*Amblyseius*) *herbicolus*, Muma 1961: 287.
Typhlodromus herbicolus, Hirschmann 1962: 23.

Amblyseius herbicolus Moraes *et al.* 1986: 14, 1989a: 79, 2004: 27; Chant & McMurtry 2004: 208, 2007: 78.
Amblyseius impactus Chaudhri 1968: 553 (synonymy according to Daneshvar & Denmark 1982; Denmark & Muma 1989).
Typhlodromus (*Amblyseius*) *amitae* Bhattacharyya 1968: 677 (synonymy according to Denmark & Muma 1989).
Amblyseius deleoni Muma & Denmark 1970: 68 (synonymy according to Daneshvar & Denmark 1982; Denmark & Muma 1989).
Amblyseius giganticus Gupta 1981: 33 (synonymy according to Gupta 1986).
Amblyseius (*Amblyseialus*) *thermophilus* Karg 1991: 12 (synonymy according to El-Banhawy & Knapp 2011; Demite *et al.* 2020).

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

It is widespread in all tropical and subtropical regions of the world. It is the second most abundant phytoseiid mite on *Coffea arabica* L. in Brazil, associated with *Brevipalpus phoenicis* (Geijskes), vector of the coffee ring spot virus and it was found to be an efficient predator (Reis *et al.* 2007). *Amblyseius herbicolus* is also found associated with the broad mite, *P. latus* in crops such as chili pepper (*Capsicum annuum* L.) in Brazil and has also a good potential for controlling the pest. Rodriguez-Cruz *et al.* (2013) had studied biological, reproductive and life table parameters of *A. herbicolus* on three different diets: broad mites, castor bean pollen (*Ricinus communis* L.) and sun hemp pollen (*Crotalaria juncea* L.). The predator was able to develop and reproduce on all these three diets. However, its intrinsic growth rate was higher on broad mites and castor bean pollen. Feeding on alternative food such as pollen can facilitate the predator's mass rearing and maintain its population on crops when prey is absent or scarce. Many polyphagous generalist phytoseiid mites are important natural enemies because they can feed on plant provided pollen and various prey species, and thus persist in crops even in the absence of target pests (McMurtry *et al.* 2013). Hence, populations of these predators can be established in a crop by providing alternative food, thus increasing biological control. Alternative food affects *P. latus* control on chilli pepper plants by predatory mites (Duarte *et al.* 2015). *Amblyseius herbicolus* had high oviposition and population growth rates when fed with cattail pollen (*Typha latifolia* L.), chilli pepper pollen and bee-collected pollen, and a low rate on the alternative prey *T. urticae*. Supplementing pepper plants with pollen resulted in better control of broad mite populations (Duarte *et al.* 2015). Release of *A. herbicolus* on young plants with weekly addition of honeybee pollen or cattail pollen until plants produce flowers seems a viable strategy to sustain populations of this predator (Duarte *et al.* 2015). *Amblyseius herbicolus* was recorded recently in Comoros archipelago (Kreiter *et al.* 2018b) and in La Réunion (Quilici *et al.* 1997, 2000; Kreiter *et al.* 2020c).

World distribution: Argentina, Australia, Azores, Benin, Brazil, Burundi, Canary Islands, China, Colombia, Comore Island, Costa Rica, Dominican Republic, Dr Congo, El Salvador, Ghana, Guadeloupe Island, Guatemala, Hawaii, Honduras, India, Iran, Kenya, Les Saintes Island, La Réunion Island, Madagascar Island, Malawi, Malaysia, Martinique Island, New Caledonia Island, Papua New Guinea, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Senegal, Singapore, South Africa, Spain, Taiwan, Thailand, Turkey, USA, Venezuela, West Indies.

Specimens examined: a single ♀ during this study. **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 1 ♀ on *Passiflora edulis* Sims (Passifloraceae), 15/XI/2018.

Remarks: morphological and morphometric characters and all measurements fit well with measurement values given by Kreiter *et al.* (2018b, 2020c) for specimens from Grande Comore in Comoros and from La Réunion and by Ferragut and Baumann (2019) for specimens from Mauritius.

Amblyseius largoensis (Muma)

Amblyseiopsis largoensis Muma 1955: 266.
Typhlodromus (*Amblyseius*) *largoensis*, Chant 1959: 96.
Amblyseius (*Amblyseialus*) *largoensis*, Muma 1961: 287.
Typhlodromus largoensis, Hirschmann 1962: 2.
Amblyseius (*Amblyseius*) *largoensis*, Ehara 1966: 22.
Amblyseius largoensis, Swirski & Golan 1967: 225.
Amblyseius magnolia Muma 1961: 289 (Synonymy according to Denmark & Evans 2011).
Amblyseius sakalava Blommers 1976: 96 (Synonymy according to Ueckermann & Loots 1988).
Amblyseius amtalaensis Gupta 1977: 53 (Synonymy according to Gupta 1986).

This species belongs to the *largoensis* species group, and the *largoensis* species subgroup for the same reasons.

It is widespread in all tropical and subtropical regions of the world and was the most abundant species collected by Moraes *et al.* (2000) in French Caribbean Islands.

Using morphometric analyses of 36 characters, molecular analyses and crossing tests, Navia *et al.* (2014) studied specimens collected from Brazil, La Réunion Island and Trinidad and Tobago to determine whether *A. largoensis* populations from different geographic origins belong to the same taxonomic entity. Though differences in the lengths of some setae were observed, molecular analyses and crossing experiments indicated that populations from Indian Ocean and America were conspecific.

World distribution: this species is widely distributed in the tropical and subtropical regions of Africa, America, Asia and the Pacific Islands.

Specimens examined: 40 ♀♀ + 6 ♂♂ in total. **Port-Mathurin**, City Center (10 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 5 ♀♀ on *Citrus limon* (L.) Burman (Rutaceae), 8/XI/2018 and 1 ♀ + 1 ♂ on *Litchi chinensis* Sonnerat, 14/XI/2018; **Accacia** (11 m aasl, lat. 19°40′48″ S, long. 63°25′°07″ E), 1 ♀ on *Mangifera indica* L. (Anacardiceae), 9/XI/2018; Baie aux Huitres (8 m aasl, lat. 19°41′16″ S, long. 63°24′°13″ E), 1 ♀ on *Carica papaya* L. (Caricaceae) and 2 ♀♀ on *Polyscias scutellaria* (Burman) Fosberg (Araliaceae), 9/XI/2018; **Quatre-Vents** (293 m aasl, lat. 19°44′12″ S, long. 63°27′19″ E), 2 ♀♀ on *Mimusops coriacea* (de Candolle) Miquel (Sapotaceae), 3 ♀♀ on *Pandanus heterocarpus* Balfour (Pandanaceae), 12/XI/2018; **Samy** (201 m aasl, lat. 19°42′28″ S, long. 63°24′24″ E), 3 ♀♀ and 3 ♂♂ on *Citrus limon* (L.) Burman (Rutaceae), 12/XI/2018; **Allée Tamarin** (71 m aasl, lat. 19°41′22″ S, long. 63°24′11″ E), 4 ♀♀ on *Pittosporum balfouri* Cufodontis (Pittosporaceae), 12/XI/2018; **Baie aux huitres**, Front Sea (8 m aasl, lat. 19°41′40″ S, long. 63°24′30″ E), 1 ♀ on *Cupressus sempervirens* L. (Cupressaceae), 9/XI/2018; **Petite-Butte** (80 m aasl, lat. 19°45′00″ S, long. 63°23′00″ E), 3 ♀♀ on *Ixora* sp. (Rubiaceae) and 1 ♀ and 1 ♂ on *Tarrena borbonica* (E.G. Henderson et A.A. Henderson) Verdcourt (Rubiaceae), 14/XI/2018; **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 1 ♀ on *Litsea glutinosa* (Loureiro) Robinson (Lauraceae), 15/XI/2018; **Citronelle**, city parc (349 m aasl, lat. 19°42′00″ S, long. 63°26′15″ E), 8 ♀♀ on *Cryptomeria japonica* D. Don (Taxodiaceae) and 3 ♀♀ and 1 ♂ on *Mimusops coriacea* de Candolle (Miquel), 16/XI/2020; **Citronelle**, Plant Protection Service (388 m aasl, lat. 19°42′02″ S, long. 63°25′17″ E), 1 ♀ on *Prunus persica* (L.) Batsch (Rosaceae), 16/XI/2020.

Remarks: morphological and morphometric characters and all measurements fit well with measurement values given by Zannou *et al.* (2007) for specimens from Africa, Navia *et al.* (2014) for specimens from Brazil, La Réunion and Trinidad and Tobago an,d Ferragut and Baumann (2019) for specimens from Mauritius. This is of the three more numerous species collected during this study and probably one of the more common species on the island, with *A. passiflorae* and *E. ovaloides*.

Amblyseius passiflorae Blommers

Amblyseius passiflorae Blommers 1974: 145; Moraes *et al.* 1986: 27, 2004: 46; Denmark & Muma 1989: 49; Chant & McMurty 2004: 210, 2007: 80.

This species belongs to the *largoensis* species group, and the *arcus* species subgroup as the spermatheca is dish-, cup- or bell-shaped and to the *vasiformis* species complex as seta *Z5* is very long. Its biology is totally unknown.

This species was only known from the type series (five females and one male) (Blommers 1974). The original description was rather complete, providing comprehensive information on female and male morphology, and Ferragut and Baumann (2019) had added information on dorsal adenotaxy and poroidotaxy. This species was collected for the latter authors and thus already recorded from Mauritius, but of course not from Rodrigues.

World distribution: Madagascar, Mauritius.

Specimens examined: 50 ♀♀ and 15 ♂♂ in total. **Quatre-Vents** (293 m aasl, lat. 19°44′12″ S, long. 63°27′19″ E), 8 ♀♀ and 9 ♂♂ on *Mangifera indica* L. (Anacardiaceae), 1 ♂ on *Cordia dichotoma* Forster (Boraginaceae) and 1 ♀ and 1 ♂ on *Hibiscus rosa-sinensis* L. (Malvaceae), 12/XI/2018; **Samy** (201 m aasl, lat. 19°42′28″ S, long. 63°24′24″ E), 1 ♀ on *Citrus limon* (L.) Burman (Rutaceae), 12/XI/2018; **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 8 ♀♀ on *Hibiscus boryanus* de Candolle (Malvaceae), 10 ♀♀ and 1 ♂ on *Clematis mauritiana* Lamarck (Ranunculaceae), 5 ♀♀ on *Psidium guajava* L. (Myrtaceae), 3 ♀♀ on *Litsea glutinosa* (Loureiro) Robinson (Lauraceae), 1 ♀ on *Urena lobata* L. (Malvaceae), 1 ♀ on *Rubus rosifolius* Smith (Rosaceae), 9 ♀♀ and 3 ♂♂ on *Litsea monopetala* (Roxburgh) Person (Lauraceae), 1 ♀ on *Syngonium podophyllum* Schott (Araceae) and 2 ♀♀ on *Terminalia arjuna* (Roxburgh) Wight et Arnott (Combretaceae), 15/XI/2018.

Remarks: this species was reported before by Ferragut and Baumann (2019). Morphological and morphometric characters and all measurements of our specimens fit well with measurements in Blommers (1974) and Ferragut and Baumann (2019). This is one of the three more numerous species collected during this study and probably one of the more common species in the island, together with *A. largoensis* and *Euseius ovaloides*.

Amblyseius tamatavensis Blommers

Amblyseius tamatavensis Blommers 1974: 144; Moraes *et al.* 1986: 31, 2004: 52; Denmark & Muma 1989: 13; Chant & McMurtry 2004: 203, 2007: 81; Ehara & Amano 2004: 17.
Amblyseius (*Amblyseius*) *tamatavensis*, Ehara 2002: 33; Ehara & Amano 2002: 322.
Amblyseius maai Tseng 1976: 123 (synonymy according to Denmark & Muma 1989).
Amblyseius aegyptiacus Denmark & Matthysse in Matthysse & Denmark 1981: 343 (synonymy according to Denmark & Muma 1989).

This species belongs to the *obtusus* species group as setae *J2* and *Z1* are present, setae *z4* are minute and the female ventrianal shield is not vase-shaped or divided. It belongs to the *aerialis* species subgroup (46 species) as the calyx of the spermatheca is tubular (Chant and McMurtry 2004).

It seems to fit the functional type III-b (generalist predators living on glabrous leaves) group defined by McMurtry *et al.* (2013). Cavalcante *et al.* (2017) reported this species as a promising natural enemy of *B. tabaci*. Experimental releases of this predator on caged plants in a screenhouse caused the reduction of the density of *B. tabaci* on pepper plants by up to 60-80% (Massaro and Moraes 2019). It can be easily produced in large numbers (Massaro *et al.* 2018) when fed with astigmatine mites, which could allow the mass production for augmentative biological control. This species is reported from tropical areas from over 20 countries around the world (Africa, Asia, America and Oceania). It was recorded in La Réunion (Quilici *et al.* 2000).

World distribution: this species was described from Madagascar, but is actually widely distributed in several countries of tropical and subtropical regions of Africa, America, Asia and the Pacific Islands.

Specimens examined: 5 ♀♀ in total. **Graviers** (5 m aasl, lat. 19°43′37″ S, long. 63°28′59″ E), 5 ♀♀ on *Capsicum annuum* L. (Solanaceae), 16/XI/2020.

Remarks: this species was described from Madagascar (Blommers 1974), then mentioned in the Indian Ocean from La Réunion Island (Quilici *et al.* 2000) and recently from Mauritius (Ferragut and Baumann 2019). Morphological and morphometric characters and all measurements of our specimens fit well with measurements in Blommers (1974), Ferragut and Baumann (2019) and Kreiter *et al.* (2020c).

Subtribe Proprioseiopsina Chant & McMurtry

Proprioseiopsina Chant & McMurtry 2004: 219.

Genus *Proprioseiopsis* Muma

Proprioseiopsis Muma 1961: 277.

Proprioseiopsis mexicanus (Garman)

Amblyseiopsis mexicanus Garman 1958: 75.
Proprioseiopsis mexicanus, Muma & Denmark 1970: 48; Denmark & Muma 1973: 237; Moraes *et al.* 1986: 118, 2004: 181; Kreiter & Moraes 1997: 379; Chant & McMurtry 2005a: 13, 2007: 89.
Amblyseius mexicanus, Moraes & McMurtry 1983: 134.
Proprioseiopsis tropicanus (Garman 1958): 77 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis asetus (Chant 1959): 80 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis putmani (Chant 1959): 91 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis clausae (Muma 1962): 20 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis temperellus (Denmark & Muma 1967): 171 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis amotus (Zack 1969): 72 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis versutus (Zack 1969): 74 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis kogi (Chant & Hansell 1971): 713 (Synonymy according to Denmark & Evans 2011).
Proprioseiopsis tulearensis (Blommers 1976): 100 (Synonymy according to Denmark & Evans 2011).

This species belongs to the *belizensis* species group as genu I have no macrosetae. As the spermatheca of that species has a short calyx, cup-shaped, it belongs to the *asetus* species subgroup (Chant and McMurtry 2005a).

This species is known from all Islands of French West Indies (Kreiter and Moraes 1997; Moraes *et al.* 2000; Kreiter *et al.* 2006, 2018c; Mailloux *et al.* 2010), but it was found only in very large numbers during a previous study on companion plants in Guadeloupe (Mailloux *et al.* 2010) and in a study on La Réunion (Le Bellec, unpub. data). This species seems to be very abundant on weeds in the lower vegetation. Phytoseiid mites of the genus *Proprioseiopsis* had been found mainly in ground surface, humus, litter, soil, moss or on grass (Muma and Denmark 1970; McMurtry *et al.* 2015).

Proprioseiopsis mexicanus population increased when fed *T. urticae* eggs (Megevand *et al.* 1993) and seems to be a good predator of thrips (Kreiter, unpub. data). It is one of the prevailing phytoseiid species on citrus orchards in Alabama (Fadamiro *et al.* 2009). Denmark and Evans (2011) mentioned that the species can be reared on *T. urticae* and *Oligonychus pratensis* (Banks) and is associated with *Bryobia praetiosa* Koch, *Bryobia* spp. and *P. ulmi*. It was also found in association with *Tetranychus evansi* Baker and Pritchard (Furtado *et al.* 2014), but mentioned as a poor predator of that species. The biology of this species is however almost unknown.

Proprioseiopsis mexicanus was already recorded in the Indian Ocean by Quilici *et al.* (2000) and Kreiter *et al.* (2020c).

World distribution: This species is distributed in many countries of the world, mainly in tropical areas.

Specimens examined: 2 ♀♀ in total. **Citronelle**, Plant Protection Service (388 m aasl, lat. 19°42′02″ S, long. 63°25′17″ E), 2 ♀♀ on *Prunus persica* (L.) Batsch (Rosaceae), 16/XI/2020.

Remarks: measurement values of female specimens from Rodrigues fit well with all those indicated in Kreiter *et al.* (2018c, 2020c) for various countries.

Tribe Euseiini Chant & McMurtry

Euseiini Chant & McMurtry 2005b: 191.

Subtribe Euseiina Chant & McMurtry

Euseiina Chant & McMurtry 2005b: 209.

Genus *Euseius* Wainstein

Amblyseius (*Amblyseius*) section *Euseius* Wainstein 1962: 15;
Euseius De Leon 1966: 86.

Euseius ovaloides (Blommers)

Amblyseius (*Amblyseius*) *ovaloides* Blommers 1974: 147.
Euseius ovaloides Moraes *et al.* 1986: 51, 2004: 78; Chant & McMurtry 2005a: 215, 2007: 121.

Euseius ovaloides was described by Blommers (1974) from specimens collected on *Citrus hystrix* and *Persea americana* in Madagascar. Like all *Euseius* species, this species belongs to the type IV (polliniphagous generalist predators) of McMurtry and Croft (1997) and McMurtry *et al.* (2013). The species had been occasionally recorded in Madagascar (Blommers 1974), Papua-New Guinea (Schicha and Gutierrez 1985), Seychelles (Schicha 1987), La Réunion Island (Quilici *et al.* 1997, 2000), Guadeloupe, Martinique and Marie-Galante (Moraes *et al.* 2000; Kreiter *et al.* 2006) on various plants, though its biology remains unknown. It is suspected to be a poor predator of tetranychid mites (Gutierrez and Etienne 1986), but can be considered as a potentially good predator of thrips and whiteflies. This is one of the most common species on La Réunion Island.

World distribution: Guadeloupe, Madagascar Island, Marie-Galante, Martinique, Papua New Guinea, La Réunion Island, Seychelles Archipelago, Vietnam.

Specimens examined: 102 ♀♀, 13 ♂♂ and 3 im. in total. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 10 ♀♀ and 1 ♂ on *Terminalia cattapa* L. (Combretaceae), 12 ♀♀ on *Ricinus communis* L. (Euphorbiaceae), 1 ♀ on *Artocarpus altilis* (Parkinson) Fosberg (Moraceae), 2 im. on *Allamanda cathartica* L. (Apocynaceae), 8/XI/2020; 1 ♀ on *Ziziphus mauritiana* Lamarck (Rhamnaceae), 2 ♀♀ and 1 ♂ on *Codiaeum variegatum* (L.) Jussieu (Euphorbiaceae); 3 ♀♀ and 1 ♂ on *Acalypha wilkesiana* Müller Argoviensis (Euphorbiaceae), 9/XI/2018; 1 ♀ on *Polyscias scutellaria* (Burman) Fosberg (Araliaceae), 11 ♀♀ and 2 ♂♂ on *Bougainvillea* sp. (Nyctaginaceae) and 10 ♀♀ on *Duranta erecta* L. (Verbenaceae), 11/XI/2018; 1 ♀ and 2 ♂♂ on *Litchi chinensis* Sonnerat (Sapindaceae), 14/XI/2018; **Baie aux huitres**, Front Sea (8 m aasl, lat. 19°41′40″ S, long. 63°24′30″ E), 2 ♀♀ and 1 im. on *Carica papaya* L. (Caricaceae), 5 ♀♀ and 1 ♂ on *P. scutellaria*, 3 ♀♀ on *Morinda citrifolia* L. (Rubiaceae), 9/XI/2018; **Anse aux Anglais** (2 m aasl, lat. 19°40′33″ S, long. 63°26′05″ E), 2 ♀♀ on *Tamarindus indica* L. and 4 ♀♀ and 2 ♂♂ on *Ceasalpinia pulcherrima* (L.) Swartz (Caesalpiniaceae), 11/XI/2018; **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 13 ♀♀ on *R. communis*, 11/XI/2018; **Allée Tamarin** (71

m aasl, lat. 19°41′22″ S, long. 63°24′11″ E), 6 ♀♀ and 2 ♂♂ on *R. communis* and 4 ♀♀ on *C. papaya*, 12/XI/2018; **Plaine-Caverne** (45 m aasl, lat. 19°41′02″ S, long. 63°25′11″ E), 1 ♀ on *C. papaya*, 14/XI/2018; **Petite-Butte** (80 m aasl, lat. 19°45′06″ S, long. 63°23′08″ E), 1 ♂ on *Ixora* sp. (Rubiaceae), 14/XI/2018; **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 1 ♀ on *Hibiscus boryanus* de Candolle (Malvaceae), 2 ♀♀ on *R. communis* and 6 ♀♀ on *Terminalia arjuna* (Roxburgh) Wight et Arnott (Combretaceae), 15/XI/2018; **Graviers** (5 m aasl, lat. 19°43′37″ S, long. 63°28′59″ E), 1 ♀ on *Passiflora edulis* Sims (Passifloraceae), 16/XI/2020.

Remarks: this species was reported from several countries of the world especially from Madagascar, Seychelles Archipelago and La Réunion Island (Quilici *et al.* 2000; Kreiter *et al.* 2020c). This species has recently been reported from Vietnam (Kreiter *et al.* 2020b). Morphological and morphometric characters and all measurements of our specimens fit well with measurements in Kreiter *et al.* (2020b). This is the most numerous species collected during this study and just like La Réunion, probably one of the most common species in the Island, with *A. largoensis* and *A. passiflorae*.

Subfamily Phytoseiinae Berlese

Phytoseiini Berlese 1913: 3; Phytoseiinae Vitzthum 1941: 767.

Genus *Phytoseius* Ribaga

Phytoseius Ribaga 1904: 177

Phytoseius coheni Swirski & Shechter

Phytoseius (*Dubininellus*) *macropilis coheni* Swirski & Shechter 1961: 104.
Phytoseius (*Phytoseius*) *macropilis coheni*, Ehara 1966: 26.
Phytoseius (*Dubininellus*) *coheni*, Swirski & Golan 1967: 226; Wu 1997: 153.
Phytoseius (*Phytoseius*) *coheni*, Moraes *et al.* 1986: 219.
Phytoseius coheni Moraes *et al.*, 2004: 235; Chant & McMurtry 2007: 129.
Phytoseius hawaiiensis Prasad 1968: 1460 (synonymy according to Denmark & Evans 2011).
Phytoseius huangi Ehara 1970: 62 (synonymy according to Ehara 2002).
Phytoseius jianfengensis Chen, Chu & Zhou 1980: 15 (synonymy according to Wu 1997).

This species belongs to the *horridus* species group as setae *J2* and *R1* are absent (Chant and McMurtry 1994).

This species was described from Hong-Kong by Swirski and Shechter (1961) collected on a wide range of plants and very common on citrus. Although species of the genus *Phytoseius* are considered to belong to the type III (polyphagous generalist predators) of McMurtry and Croft (1997) and McMurtry *et al.* (2013), its specific biology is totally unknown.

World distribution: Australia, China, Hawaii, Hon-Kong, India, Indonesia, Japan, Malaysia, Mauritius, Papua New Guinea, Philippines, Singapore, Tahiti, Taiwan, Thailand, USA.

Specimens examined: a single ♀ during this study. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Polyscias scutellaria* (Burman) Fosberg (Araliaceae), 11/XI/2020.

Remarks: this species was firstly reported from Mauritius by Schicha (1984) under the junior synonym name *P. hawaiensis*. Ferragut and Baumann (2019) recovered the species. Kreiter *et al.* (2020b) have recently reported this species from Vietnam. Morphological and morphometric characters and all measurements of our specimens fit well with measurements in Kreiter *et al.* (2020b).

Phytoseius crinitus Swirski & Shechter

Phytoseius (*Dubininellus*) *crinitus* Swirski & Shechter 1961: 102.
Phytoseius crinitus, Amitai & Swirski 1966: 21; Swirski & Amitai 1966: 11; Denmark 1966: 66; Moraes *et al.* 1986: 220, 2004: 236; Chant & McMurtry 2007: 129.

This species belongs to the *horridus* species group (Chant and McMurtry 1994). This species was recorded in several countries of Asia, in Burundi, Madagascar (Demite *et al.* 2020) and La Réunion (Quilici *et al.* 2000; Demite *et al.* 2020). The biology of this species remains totally unknown.

World distribution: Burundi, China, Hong Kong, India, Indonesia, Japan, Madagascar Island, Philippines, La Réunion Island, Singapore, Taiwan.

Specimens examined: 2 ♀♀ in total. **Quatre-Vents** (293 m aasl, lat. 19°44′12″ S, long. 63°27′19″ E), 1 ♀ on *Pandanus heterocarpus* Balfour (Pandanaceae), 12/XI/2018; **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Ocimum americanum* L. (Lamiaceae), 13/XI/2018.

Remarks: this species was reported before by Ferragut and Baumann (2019) from Mauritius, but it was already reported by Quilici *et al.* (2000) from Mascareignes Archipelago in La Réunion Island where Kreiter *et al.* (2020c) have recently recovered the species. Morphological and morphometric characters and all measurements of our specimens fit well with measurements in Kreiter *et al.* (2020c).

Phytoseius haroldi Ueckermann & Kreiter

Phytoseius haroldi Ueckermann & Kreiter in Kreiter *et al.* 2002: 339; Chant & McMurtry 2007: 129.

This species belongs to the *horridus* species group as setae *J2* and *R1* are absent (Chant and McMurtry 1994). It was abundant on lower vegetation in a study of companion plants in citrus orchard in La Réunion Island (Kreiter *et al.* 2020c). It seems that this species prefers low plants, but despite this observation that has to be confirmed, the biology of this species remains totally unknown.

World distribution: La Réunion Island, Mauritius Island.

Specimens examined: 2 ♀♀in total. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Ziziphus mauritiana* Lamarck (Rhamnaceae), 9/XI/2020; **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 1 ♀ on *Solanum melongena* L. (Solanaceae), 11/XI/2018.

Remarks: this species was described by Ueckermann and Kreiter in Kreiter *et al.* (2002) from La Réunion Island and then reported from Mauritius by Ferragut and Baumann (2019). Morphological and morphometric characters and all measurements of our specimens fit well with measurements of the original description by Kreiter *et al.* (2002) concerning specimens from La Réunion Island, Ferragut and Baumann (2019) for specimens from Mauritius and Kreiter *et al.* (2020c) for additional specimens from La Réunion Island.

Phytoseius intermedius Evans & Macfarlane

Phytoseius (*Dubininellus*) *intermedius* Evans & Macfarlane 1962: 587; Denmark 1966: 70; Gupta 1977: 636.
Phytoseius (*Phytoseius*) *intermedius*, Ehara 1972: 170, 1975: 27; Prasad 1974: 171; Blommers 1976: 82; Moraes *et al.* 1986: 222, 2004: 242; Chant & McMurtry 2007: 129.
Phytoseius (*Phytoseius*) *yira* Pritchard & Baker 1962: 227 (synonymy according to Denmark 1966).

This species belongs to the *horridus* species group as setae *J2* and *R1* are absent (Chant and McMurtry 1994). It was recorded in several countries of Asia, Africa, Madagascar (Demite *et al.* 2020) and was known from La Réunion (Quilici *et al.* 2000; Demite *et al.* 2020).

The biology of this species remains totally unknown. This is the most numerous species of *Phytoseius* in this study.

Specimens examined: 13 ♀♀ in total. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Cordia dichotoma* Forster (Boraginaceae), 3 ♀♀ on *Ziziphus mauritiana* L. (Rhamnaceae), 8/XI/2018; **Anse aux Anglais** (2 m aasl, lat. 19°40′33″ S, long. 63°26′05″ E), 6 ♀♀ on *C. dichotoma*, 11/XI/2018; **Port Sud-Est**, Sea Front (2 m aasl, lat. 19°44′36″ S, long. 63°25′17″ E), 3 ♀♀ on *Cordia myxa* L. (Boraginaceae), 11/XI/2018.

Remarks: measurement values of morphological characters of specimens from Rodrigues and specimens from neighbouring countries are very close, especially for specimens from La Réunion (Kreiter *et al.* 2020c).

Subfamily Typhlodrominae Wainstein

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

Genus *Typhlodromus* Scheuten

Typhlodromus Scheuten, 1857: 111

Subgenus *Anthoseius* De Leon

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

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

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

This species belongs to the large *rhenanus* species group (Chant and McMurtry 1994). The biology of that species is totally unknown.

World distribution: Ghana.

Specimens examined: 13 ♀♀ and 1 ♂ in total. **Mont Lubin** (346 m aasl, lat. 19°42′21″ S, long. 63°26′40″ E), 1 ♀ on *Psidium guajava* L. (Myrtaceae), 2 ♀♀ on *Vitex trifolia* L. (Lamiaceae), 8 ♀♀ and 1 ♂ on *Urena lobata* L. (Malvaceae) and 2 ♀♀ on *Litsea monopetala* (Roxburgh) Person (Lauraceae), 15/XI/2018.

Remarks: morphological and morphometric characters and all measurements of our specimens fit well with measurements of the original description by Zannou, Moraes and Oliveira in Ueckermann *et al.* (2008) concerning specimens from Ghana, Western Africa.

Typhlodromus (*Anthoseius*) *muliebris* van der Merwe

Typhlodromus (*Anthoseius*) *muliebris* van der Merwe 1968: 28; Moraes *et al.* 2004: 337; Chant & McMurtry 2007: 155; Ueckermann *et al.* 2008: 69.
Amblydromella muliebris, Moraes *et al.* 1986: 168.
Amblydromella (*Amblydromella*) *muliebris*, Denmark & Welbourn 2002: 308.

This species belongs to the large *rhenanus* species group (Chant and McMurtry 1994). It was described by van der Merwe (1968) from South Africa and then reported by El-Banhawy and Knapp (2011) from Kenya. The biology of that species is totally unknown. This is the first report of that species from a country outside the Africa continent.

World distribution: Kenya, South Africa.

Specimens examined: a single ♀ during this study. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Pandanus heterocarpus* Balfour (Pandanaceae), 8/XI/2020.

Remarks: morphological and morphometric characters and all measurements of our specimens fit well with measurements of the original description by van der Merwe (1968) and redescriptions by Ueckermann *et al.* (2008) and El-Banhawy and Knapp (2011) concerning specimens from South Africa and Kenya, respectively.

Typhlodromus (*Anthoseius*) *moraesi* Kreiter & Ueckermannn

Typhlodromus (*Anthoseius*) *moraesi* Kreiter & Ueckermann in Kreiter *et al.* 2002: 338.

The biology of this species found in La Réunion Island by Kreiter *et al.* (2002) on various host plants and then in French Caribbean Islands (Mailloux *et al.* 2010; Kreiter *et al.* 2013) remains unknown.

World distribution: Guadeloupe, La Réunion Island.

Specimens examined: 4 ♀♀ in total. **Port-Mathurin**, City Center (11 m aasl, lat. 19°40′53″ S, long. 63°25′17″ E), 1 ♀ on *Miscanthus sinensis* Andersson (Poaceae), 8/XI/2018; **Samy** (201 m aasl, lat. 19°42′28″ S, long. 63°24′24″ E), 1 ♀ on *Citrus limon* (L.) Burman (Rutaceae), 12/XI/2018; **Allée Tamarin** (71 m aasl, lat. 19°41′22″ S, long. 63°24′11″ E), 2 ♀ on *Pittosporum balfouri* Cufodontis (Pittosporaceae), 12/XI/2018.

Remarks: several species are found both on La Réunion Island (in the Indian Ocean) and in the West Indies, probably because of reciprocal introductions certainly long time ago with slave markets 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 with those given by Kreiter *et al.* (2002).

Conclusion

The results of an additional survey made in 2018 on Rodrigues Island is presented in this paper. A total of 18 records, 11 Amblyseiinae, 4 Phytoseiinae and 3 Typhlodrominae, have been obtained. The fauna of Rodrigues after our study is composed of this 18 species, namely: *Neoseiulus barkeri*, *N. houstoni*, *N. longispinosus*, *Paraphytoseius horrifer*, *Phytoseiulus persimilis*, *Amblyseius herbicolus*, *A. largoensis*, *A. passiflorae*, *A. tamatavensis*, *Proprioseiopsis mexicanus*, *Euseius ovaloides*, *Phytoseius coheni*, *P. crinitus*, *P. haroldi*, *P. intermedius*, *Typhlodromus* (*Anthoseius*) *lobatus*, *T.* (*A.*) *muliebris* and *T.* (*A.*) *moraesi*.

Among the 18 recorded species, at least seven species are known as biological control agents (BCA). In addition to the intrinsic value of phytoseiid mite biodiversity in tropical environments, demonstration of the natural occurrence of efficient BCAs in a developing country such as Rodrigues is of great agricultural, commercial and strategical interests for the country.

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