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Source: Systematic and Applied Acarology, 21(12) : 1693-1709
Published By: Systematic and Applied Acarology Society
URL: https://doi.org/10.11158/saa.21.12.10

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Abstract

A survey of type localities of new species of the Parasitiformes described in two journals (Systematic & Applied Acarology and Zootaxa) during the last three years (2013–2015) revealed interesting patterns of species discovery. Taxonomically, the 142 new species are unevenly distributed among 24 families with the top three families accounting for over 61% of the total. The economically important Phytoseiidae is the top-ranked family. Geographically, the 142 new species of the Parasitiformes are described from 29 countries in the world. The pattern of distribution of these new species among the countries is highly uneven—over half of the new species (52.8%) are from the top 3 countries (Brazil, Iran and Turkey), whereas most countries (65.5%) have only 1–3 new species each.

Key words: Mites, Parasitiformes, new species, hotspots, type locality, type depository

Introduction

A previous survey of type localities of new mite species described in two journals (Systematic & Applied Acarology and Zootaxa) during 2007–2012 revealed several interesting trends and patterns in new mite species discovery (Liu et al. 2013). These two journals published approximately 38% of the all new species of mites indexed in Zoological Record during that period, and among them, 55% are from the top ten countries—China, Australia, Iran, Brazil, Kenya, USA, Russia, India, Turkey and Vietnam (Liu et al. 2013). A series of follow-up surveys using the same approach examined hotspots for new species of the Trombidiiformes (Liu & Zhang 2016) and the Sarcoptiformes (Li & Zhang 2016) described during 2013–2015. This is a continuation of this series to provide a survey of type localities and depositories of new species in the superorder Parasitiformes described in the same two journals during the last three years (2013–2015). The methods used follow that in Liu et al. (2013).

List of abbreviations for depositories

ACISTE—Acarological Collection, Institute of Science and High Technology and Environmental Sciences, Graduate University of Advanced Technology, Kerman, Iran.

AFCU—Acarology Laboratory, Department of Plant Protection, Çukurova University, Adana, Turkey.

ANIC—Australian National Insect Collection, in CSIRO Ecosystem Sciences, Canberra.

APAS—Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Chaharmahal and Bakhtiari Province, Iran.

ARC-PPRI—Plant Protection Research Institute-Agricultural Research Center - Fruit Acarology Department, Dokki, Cairo, Egypt.
Results and discussion

**Trends in the number of new species**
During 2013–2015, SAA published an average of over 7 new species of the Parasitiformes per year (Table 1), which is more than 7-fold increase over that during 2007–2012 (average 1 per year based on data in Liu et al. 2013). However, Zootaxa published an average of 40 new species of the Parasitiformes per year during 2013–2015 (Table 1) and this is only 71.4% of that during 2007–2012 (average 56 per year based on data in Liu et al. 2013). Overall, the number of new Parasitiformes species per year decreased from 57 during 2007–2012 to 47 during 2013–2015 (Table 1). This decrease is the opposite of that for the Trombidiformes (132 new species per year during 2007–2012 to 163 during 2013–2015; Liu & Zhang 2016) and the Sarcoptiformes (51 new species per year during 2007–2012 to 80 during 2013–2015; Li & Zhang 2016).

**Taxonomic distribution of new species**
Most (over 97%) of the 142 new species of the Parasitiformes described in the two journals during 2013–2015 are in the order Mesostigmata: the order Opilioacarida has only one new species and the order Ixodida has two new species (Table 3A, B).

<table>
<thead>
<tr>
<th>Year</th>
<th>SAA</th>
<th>Zootaxa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>90</td>
<td>93</td>
</tr>
<tr>
<td>2009</td>
<td>2</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>2011</td>
<td>1</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>2013</td>
<td>2</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>2014</td>
<td>13</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>2015</td>
<td>7</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>456</td>
<td>485</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Year</th>
<th>Infraorder</th>
<th>SAA</th>
<th>Zootaxa</th>
<th>Total (% of order Mesostigmata)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007–2012</td>
<td>Antennophorina</td>
<td>3</td>
<td>36</td>
<td>14.39%</td>
</tr>
<tr>
<td></td>
<td>Uropodina</td>
<td>0</td>
<td>34</td>
<td>12.55%</td>
</tr>
<tr>
<td></td>
<td>Gamasina</td>
<td>3</td>
<td>195</td>
<td>73.06%</td>
</tr>
<tr>
<td>2013–2015</td>
<td>Antennophorina</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Uropodina</td>
<td>1</td>
<td>16</td>
<td>12.78%</td>
</tr>
<tr>
<td></td>
<td>Gamasina</td>
<td>21</td>
<td>95</td>
<td>87.22%</td>
</tr>
</tbody>
</table>

### Table 3A. Taxonomic distribution of new species among families of the superorder Parasitiformes from SAA and Zootaxa during 2013–2015; N_s=p=number of new species within each paper, N_fam.=number of families with new species.

<table>
<thead>
<tr>
<th>N_s</th>
<th>N_fam.</th>
<th>Families of Parasitiformes</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>1</td>
<td>Phytoseiidae</td>
</tr>
<tr>
<td>38</td>
<td>1</td>
<td>Laelapidae</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Pachylaelapidae</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Ologanasida</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>Macrochelidae, Rotundabaloghiidae</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Optilioacarida</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Dinychidae, Rhodacarida</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>Ameroseiidae, Blattisociida, Digamasellidae, Eviphididae, Reginacharlottiidae, Trachytidae, Uropodidae</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>Argasidae, Discozerconidae, Polyaspiddidae, Rhinonyssidae, Trachytidae, Trachyuropodidae, Trematuridae, Urodinychidae</td>
</tr>
</tbody>
</table>
Within Mesostigmata, the distribution of new species are highly uneven among infraorders, with most species in the Gamasina (Table 2). Overall the proportion of new species in the Gamasina increased from 73% during 2007–2012 to over 87% during 2013–2015.

The 142 new species of the Parasitiformes described in the two journals during 2013–2015 are unevenly distributed in 24 families (Table 3A). The majority of these new species (61%) are from the top 3 families: Phytoseiidae, Laelapidae and Pachylaelapidae. Most of the families (70.8%) have only 1–3 new species (Table 3A, B).


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Superorder Parasitiformes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Order Opilioacarida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superfamily Opilioacaroidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Opilioacaridae</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td><strong>Order Ixodida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superfamily Ixodoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Argasida</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Order Mesostigmata</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suborder Sejida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superfamily Sejoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Reginacharlottiidae</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Superfamily Heterozerconoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Discozerconida</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Suborder Trigynaspida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Infraorder Antennophorina</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superfamily Celaenopsoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Diplogyniidae</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Superfamily Fedrizzioidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Fedrizziiida</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Family Klinckowstroemiida</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Superfamily Parantennuloidea</td>
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<td></td>
</tr>
<tr>
<td>Family Philodanida</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Superfamily Paramegistoidea</td>
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<td></td>
</tr>
<tr>
<td>Family Paramegistidae</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Suborder Monogynaspida</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Infraorder Uropodina</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superfamily Uropodoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Dinychidae</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Family Metagynuridae</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Family Polyaspididae</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

......continued on the next page
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Rotundabaloghiidae</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Family Trachytidae</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Family Trachyuropodidae</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Family Trematuridae</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Family Trigonuropodidae</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Family Urodinychidae</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Family Uropodidae</td>
<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

Infraorder Gamasina

Hyporder Epicriiæ

Superfamily Epicriioidea

| Family Epicriidae | 0 | 1 |

Superfamily Zerconoidea

| Family Coprozerconidae | 0 | 1 |
| Family Zerconidae      | 0 | 18 |

Hyporder Parasitiae

Superfamily Parasitoidea

| Family Parasitidae | 0 | 1 |

Hyporder Dermanyssiae

Superfamily Veigaiioidea

| Family Veigaiidae | 0 | 5 |

Superfamily Rhodacaroidea

| Family Digamasellidae | 2 | 0 |
| Family Halolaelapidae | 0 | 2 |
| Family Ologamasididae | 8 | 2 |
| Family Rhodacarididae | 3 | 2 |

Superfamily Eviphidoidea

| Family Eviphididae | 2 | 15 |
| Family Macrochelidae | 7 | 4 |
| Family Pachlaelapidae | 10 | 5 |

Superfamily Ascoidea

| Family Ameroseiidae | 2 | 2 |
| Family Ascidae      | 0 | 13 |
| Family Melicharididae | 2 | 2 |

Superfamily Phytoseioidea

| Family Blasttissociidae | 2 | 4 |
| Family Phytoseiidae     | 39 | 103 |
| Family Podocinidae      | 0 | 2 |

Superfamily Dermanysssoidea

| Family Laelapidae | 38 | 14 |
| Family Macronyssidae | 0 | 1 |
| Family Rhinonyssidae | 1 | 0 |
Geographic distribution of new species

The 142 new species are described from 29 countries in the world and their distribution among the countries is highly uneven. Over half of the new species (52.8%) are from the top three countries (Brazil, Iran and Turkey), whereas most countries (65.5%) have only 1–3 new species (Table 4).

**Table 4.** Geographic distribution of new species in the superorder Parasitiformes from SAA and Zootaxa (2013–2015) among countries (or regions); \(N_\text{sp} = \text{number of new species within each country (or region), } N_\text{c} = \text{number of countries with } n_\text{sp} \text{ species.}

<table>
<thead>
<tr>
<th>(N_\text{c})</th>
<th>(N_\text{sp})</th>
<th>Name of countries (regions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>1</td>
<td>Brazil</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>Iran</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>Turkey</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Madagascar</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Italy</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>Argentina, Chile, Egypt, Indonesia, Russia</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Australia, Bulgaria, Greece, Tanzania</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>China, Colombia, France, Mexico, Norway, Papua New Guinea, Romania, Slovakia</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>Bolivia, Malaysia, New Zealand, Peru, The Philippines, Thailand, Ukraine</td>
</tr>
</tbody>
</table>

List of type localities and depositories of new species in SAA 2013–2015

Superorder **Parasitiformes** (22 species)
- Order **Mesostigmata** (22 species)
- Suborder **Monogynaspida** (22 species)
- Infraorder **Uropodina** (1 species)
- Superfamily **Uropodoidea** (1 species)
- Family **Trachytidae** (1 species)

**Acroseius weiri** Bloszyk, Halliday & Napierala, 2013: 274—Holotype female (ANIC, ANIC561), rainforest, Broken river, Eungella National Park, Queensland, Australia (21°10'S, 148°31'E, 700 m).
- Infraorder **Gamasina** (21 species)
- Hyporder **Dermanyssiae** (21 species)
- Superfamily **Gamasinoidea** (3 species)

**Olopachys** (**Olopachylaella**) **transversalis** Özbek & Halliday, 2015a: 140—Holotype female (EUE), rotting wood, Örümcek Forest, Kürtün Town, Gümüşhane Province, Turkey (40°39’85’’N, 39°02’15’’E, 1239 m).

**Olopachys (Olopachys) elongatus** Özbek & Halliday, 2015a: 145—Holotype female (EUE), in moss, Dumanli Forest, Refahiye Town, Erzincan Province, Turkey (39°54’03’’N, 38°41’41’’E, 2030 m).

**Olopachys (Olopachys) ovatus** Özbek & Halliday, 2015a: 143—Holotype female (EUE), litter under *Rubus* sp., between Çamoluk and Alucra Towns, Gümüşhane Province, Turkey (40°08’98’’N, 38°48’48’’E, 1301 m).

**Olopachys** (**Olopachys**) **prolixus** Özbek & Halliday, 2015a: 147—Holotype female (EUE), litter under *Laurus nobilis*, Örümcek Forest, Kürtün Town, Gümüşhane Province, Turkey (40°39’85’’N, 39°02’13’’E, 1239 m).

**Pachyseius crymophilus** Mašán & Fenďa, 2014: 138—Holotype female (IZSAS), soil substrate with roots of grass, alpine meadow, Virf Viştea Mare (Refugiul Alpin), Făgăraș Mountains, Romania (Brasov County) (45°36’19’’N, 24°44’44’’E, 2320 m).
- Superfamily **Phytoseioidea** (1 species)
- Family **Phytoseiidae** (1 species)
**Typhloseiella improvisa** Kolodochka, Bondarev & Gwiazdowicz, 2015: 843—Holotype female (IZNASU, #C–533/323), on glandular globe-thistle (*Echinops sphaerocephalus*), flood plain of river Verkhneje Provalie, branch of the Lugansk Natural Reserve, around the village Provalie, Sverdlovsky district, Luganskaya oblast, Ukraine (48°08’N, 39°49’E).

Superfamily Dermanyssoidea (15 species)
Family Laelapidae (14 species)

**Gymnolaelaps longiosetae** Ramroodi, Joharchi & Hajizadeh, 2015: 130—Holotype female (UGMC), in nest of *Myrmica* sp., Chobar Forest, Shaft, Gilan Province, Iran (37°05’N, 49°24’E).

**Hypoaspis alborzensis** Razavi Susan & Joharchi, 2014 in Susan, Kheradmand, Joharchi & Saboori, 2014: 52—Holotype female (JAZM, ARS-20130311-1a), on adult female of *Oryctes* sp. under plane trees (*Platanus* sp.), Karaj, Alborz province, Iran (35°48’N, 50°59’E, 1384 m).

**Pseudolaelaps barbatus** Mašán, 2014: 287—Holotype female (IZSAS), needle and leaf litter, spruce forest (*Picea abies*) with admixed beech (*Fagus sylvatica*), Poiana Mărului Pass, Poiana Mărului Village, Brașov County, Munții Perșanii Mts., Romania (740 m).

**Pseudolaelaps brevipilis** Mašán, 2014: 288—Holotype female (IZSAS), beech forest (*Fagus sylvatica*) with admixed *Carpinus betulus* and *Quercus* sp., Vitinya Pass, Gorno Kamartsi Village, Stara Planina Mts., Bulgaria (970 m).

**Pseudolaelaps jozefi** Mašán, 2014: 292—Holotype female (IZSAS), leaf litter and soil, oak-hornbeam forest (*Quercus* sp. and *Carpinus* sp.), Vrontou Village, Oros Olympos Mts., Greece (800 m).

**Pseudolaelaps lepidus** Mašán, 2014: 293—Holotype female (IZSAS), soil and decaying plant detritus from under a heap of hay, meadow, Cascine del Riccio, Settlement, Florence city, Valdarno Valley, Italy (70 m).

**Pseudolaelaps mirandus** Mašán, 2014: 295—Holotype female (IZSAS), old beech forest (*Fagus sylvatica*), Ravnogor Village, Rhodope Mts., Bulgaria (1200 m).

**Pseudolaelaps pallidus** Mašán, 2014: 297—Holotype female (IZSAS), leaf litter and soil detritus, broad-leaved deciduous wood (park), Parco di Villa Montalto Gardens, Florence City, Valdarno Valley, Italy (95 m).

**Pseudolaelaps propinquus** Mašán, 2014: 299—Holotype female (IZSAS), broad-leaved deciduous wood, leaf litter, soil and wood detritus, Parco delle Cascine Gardens, Florence City, Valdarno Valley, Italy (45 m).

**Pseudolaelaps regularis** Mašán, 2014: 301—Holotype female (IZSAS), old beech forest (*Fagus sylvatica*), Petrokhan Pass, Gintsi Village, Stara Planina Mts., Bulgaria (1400 m).

**Pseudolaelaps rotundus** Mašán, 2014: 302—Holotype female (IZSAS), leaf litter and soil detritus, oak-hornbeam forest (*Quercus* sp., *Carpinus* sp.) with cherry (*Cerasus avium*), Humenský Sokol Nature Reserve, Humenné Town, Vihorlatské Vrchy Hills, Slovakia (400 m).

**Pseudolaelaps scaber** Mašán, 2014: 304—Holotype female (IZSAS), humid needle litter with tussocks of grass and mushrooms, pine forest (*Pinus* sp.) on a slope with loose rock debris (limestone), Gorges du Guil Canyon, Arvieux Village, Alpes Cottiennes Mts., France (1180 m).

**Pseudolaelaps stellifer** Mašán, 2014: 305—Holotype female (IZSAS), leaf litter and soil detritus, steppe with solitary acacia trees (*Robinia pseudoacacia*) and oaks (*Quercus* sp.), Tarbucka Mt. (southward slope), Malý Kameneck Village, Východoslovenská Rovina Flatland, Slovakia (190 m).

**Seissuralaelaps huberi** Seeman & Alberti, 2015: 708—Holotype female, *Acladocricus* sp., near Busay Cave, Moalbal, south-west Cebu, Republic of the Philippines (9°54’57.5”N, 123°26’13.2”E).

Family Rhinonyssidae (1 species)

**Rhinonyssus dobromiri** Dimov & Spicer, 2013: 292—Holotype female (ZISP, ZISP4820), from *Vanellos vanellus*, Sovetsky village, Leningrad province, Russia (60°32’N, 28°40’E).

List of type localities and depositories of new species in *Zootaxa* 2013–2015

Superorder Parasitiformes (120 species)
   Order Opilioacarida (5 species)
   Superfamily Opilioacaroidea (5 species)
   Family Opilioacaridae (5 species)
   *Amazonacarus paraensis* Vázquez, Araújo & Feres, 2014: 162—Holotype female (ZMT), from thick layer of litter on root turf in primary forest, 11km SE of Santarém, Santarém, Pará, Brazil.

   *Amazonacarus setosu* Vázquez, Araújo & Feres, 2014: 155—Holotype female (INPA), sifted litter from littoral rainforest, Alter do Chão, Pará, Brazil (2°30’29.87”S, 54°57’13.63”W).

Brasilacarus cocaris Vázquez, Araújo & Feres, 2015: 377—Holotype male (ZMT, 10.IX.1983), litter of sparse terra-firme forest, near Negro river and Taruma-Mirim stream, Manaus, Amazonas, Brazil.

Neocarus chaetomenis Vázquez & Klompen, 2015: 537—Holotype female (CNAC 007215), under stones and in litter, medium-high tropical forest, campus Quintana Roo State University, Chetumal, Quintana Roo, Mexico (18°31'22.8"N88°16'13"W, 8 m).

Neocarus comalensis Vázquez & Klompen, 2015: 538—Holotype female (CNAC 007217; 4 slides), under low tropical forest, in Guerrero Mountains on Pacific side, El Comal, Guerrero, Mexico (18°27'36"N, 99°24'36"W, 1749 m).

Order Ixodida (1 species)

Superfamily Ixodoidea (1 species)

Family Argasidae (1 species)


Order Mesostigmata (114 species)

Suborder Sejida (3 species)

Superfamily Sejoidea (2 species)

Family Reginacharlottiidae (2 species)

Reginacharlottia braziliensis Walter, 2013:314—Holotype female (UNESP), from Trichodamon froesi Mello-Leitão, Caverna Agua Fina, Carinhanha, Bahia, Brazil.

Order Heterozerconoidea (1 species)

Family Discozerconidae (1 species)

Afrodinychus africanus Kontschán & Starý, 2013: 276—Holotype female (HNHM), typical elfin forest on the main summit, Kindorko Forest Reserve, Nwaga district, North Pare Mts., Tanzania (2110 m).

Dinychus lepus Kontschán & Starý, 2014: 553—Holotype female (MHNG), prélèvement de sol, vers la Petite Cascade, forêt primaire, Parc National Montagne d’Ambre (= Ambohitriya), Province Antsiranana [Diego-Suarez], Sous-préf. Antsiranana, Madagascar (980m).

Pulchellaobovella madagascarica Kontschán & Starý, 2014: 559—Holotype female (MHNG), prélèvement de sol au pied d’un grand arbre, forêt primaire près Ampasindava, ile Nosy Be, Réserve Lokobe, Sous-préf. Andoany [Hell-Ville], Province Antsiranana [Diego-Suarez], Madagascar (85 m).

Family Polyspididae (1 species)


Family Rotundabaloghiidae (7 species)

Angulobaloghia pedunculata Kontschán & Kiss, 2015: 516—Holotype female (MHNG), primary forest, 12km N of Bukittinggi, Rafflesia Sanctuary, Batang Palupuh, West Sumatra Province, Sumatra, Indonesia (0°14'32"S, 100°21'10"E, 900–1100 m).

Depressorotunda (Depressorotunda) hirca Kontschán & Kiss, 2015: 524—Holotype female (MHNG), primary forest, 12 km N of Bukittinggi, Rafflesia Sanctuary, Batang Palupuh, West Sumatra Province, Sumatra, Indonesia (0°14'32"S, 100°21'10"E, 900–1100 m).

Depressorotunda (Depressorotunda) robusta Kontschán & Kiss, 2015: 524—Holotype female (MHNG), primary forest, 12 km N of Bukittinggi, Rafflesia Sanctuary, Batang Palupuh, West Sumatra Province, Sumatra, Indonesia (0°14'32"S, 100°21'10"E, 900–1100 m).

Rotundabaloghia (Circobaloghia) ermilovi Kontschán & Starý, 2014: 563—Holotype female (MHNG), prélèvement de sol au pied d’un grand arbre, forêt primaire près Ampasindava, Réserve Lokobe, ile Nosy Be, Sous-préf. Andoany [Hell-Ville], Province Antsiranana [Diego-Suarez], Madagascar (85 m).
Rotundabaloghia (Circobaloghia) javaensis Kontschán & Kiss, 2015: 521—Holotype female (MHNG), soil between buttresses of a large tree at the tourist path near the waterfall, forest of Lithocarpus-Castanopsis above the botanical garden, Cibodas, Java, Indonesia (1380 m).

Rotundabaloghia (Circobaloghia) kaydani Kontschán & Starý, 2014: 565—Holotype female (MHNG), prélevement de sol au pied d’un grand arbre, forêt primaire près Ampasindava, Réserve Lokobe, île Nosy Be, Sous-préf. Andoany [Hell-Ville], Province Antsiranana [Diego-Suarez], Madagascar (85 m).

Rotundabaloghia (Rotundabaloghia) wangi Kontschán & Kiss, 2015: 518—Holotype female (MHNG), primary forest, 4 km N of Brastagi, Mt Sibayak, North Sumatra Province, Sumatra, Indonesia (3°13’16”N, 98°29’50”E, 1600 m).

Family Trachyuropodidae (1 species)
Trachyibana sarawakiensis Kontschá, 2015: 273—Holotype female (NHMG, AS-EM07/4), primary forest, near Lundu, Gunung Gading National Park, Sarawak, Borneo, E-Malaysia (01°42’50”N, 109°50’09”E, 600–800 m).

Family Trematuridae (1 species)
Malagana rotunda Kontschán & Starý, 2014: 556—Holotype female (MHNG), prélèvement de sol au pied d’un grand arbre, forêt primaire près Ampasindava, île Nosy Be, Réserve Lokobe, Sous-préf. Andoany [Hell-Ville], Province Antsiranana [Diego-Suarez], Madagascar (85 m).

Family Uropodidae (2 species)
Bloszykiella grebennikovi Kontschán & Starý, 2013: 268—Holotype female (HNHM), litter from mid-altitude afromontane deciduous forest, Bunduki village, Uluguru Mts., Tanzania (1592 m).

Family Uropodidae (2 species)
Spinossisuropoda tanzanica Kontschán & Starý, 2013: 272—Holotype female (HNHM), litter from mid-altitude afromontane deciduous forest, Bunduki village, Uluguru Mts., Tanzania (1592 m).
ter of a disturbed natural vegetation at ESALQ-USP, Piracicaba, São Paulo, Brazil (22°42'30"S, 47°38'30"W).

Family Rhodacaridae (23 species)

**Multidentorbitrhodacarus aegypticus** Abo-Shnaf, Castillo & Moraes, 2013: 29—Holotype female (ARC-PPRI), from soil under mango tree (Mangifera indica) at El-Ahram, Giza governorate, Egypt.

**Multidentorbitrhodacarus colombianus** Rueda-Ramírez, Castillo & Moraes, 2013: 528—Holotype female (ESALQ-USP), from soil in a grassland and from a fragment of secondary alpine forest at “Setor San José” of “Vereda Mundo Nuevo”, municipality of “La Calera”, Colombia (04°39'N 73°51'W).

**Protogamasellopsis zaheri** Abo-Shnaf, Castillo & Moraes, 2013: 33—Holotype female (ARC-PPRI), from soil under apricot tree (Prunus armeniaca) at Senuris, Fayoum governorate, Egypt.

Superfamily Eviphidoidea (14 species)

Family Eviphididae (2 species)


**Pedoniphis persicus** Joharchi, Maşân & Babaæian, 2014: 280—Holotype female (JAZM), in sandy soil, Sabalan Mountains, Ardabil Province, Iran (38°19'N, 47°51'E, 1785 m).

Family Macrochelidae (7 species)

**Geholaspis (Geholaspis) pennulatus** Babaæian, Halliday & Saboori, 2015: 424—Holotype female (JAZM), leaf litter, Kheyroodkenar forest. Nowshahr, Mazandaran province, Iran (36°35.265'N, 051°34.271'E, 532 m).

**Longicheles ayyildizi** Özbek, Bal & Doğan, 2013: 465—Holotype female (EUE), from litter, Niksar, Tokat, Turkey (40°32'03"N, 47°38'30"W).

**Longicheles ozkani** Özbek, Bal & Doğan, 2013: 462—Holotype female (EUE), from litter under Salix sp. Köse, Gümüşhane, Turkey (40°16'39"N, 39°37'59"E, 1769 m).

**Nothrholaspis anatolicus** Özbek & Bal, 2013: 43—Holotype female (EUE), in nest of ant, Köse mountain, Gümüşhane, Turkey (40°16'N, 39°37'E, 1862 m).

**Nothrholaspis doganii** Özbek & Bal, 2013: 45—Holotype female (EUE), from rotting wood, moss and lichen, Kürütn (Spider forest), Gümüşhane Province, Turkey (40°39'58"N, 38°59'50"E, 1990 m).

**Nothrholaspis saboorii** Babaæian & Joharchi, 2014 in Babaæian, Joharchi & Jamshidian, 2014: 586—Holotype female (JAZM), in soil, Shahrestanak, Karaj, Iran (35°56'N, 51°22'E, 2330 m).

**Nothrholaspis turcicus** Özbek & Bal, 2013: 41—Holotype female (EUE), from debris under Pyrus sp., Şirán, Gümüşhane, Turkey (40°09'N, 38°57'E, 1457 m).

Family Pachyalaelpididae (5 species)

**Pachyseius anismi** Marchenko, 2015b: 222—Holotype female (ISEA), from litter in a forest with Betula pubescens and Populus tremula, around Basargino Village, Altaiskoe District, North Altai Mts., South Siberia, Russia (51°44'N, 85°25'E, 700 m).

**Pachyseius destinatus** Özbek & Halliday, 2015: 99—Holotype female (EUE), from litter under Pinus sp., Demirkapı Village, Trabzon Province, Turkey (40°34'23"N, 40°24'06"E, 1740 m).

**Pachyseius masani** Özbek & Halliday, 2014: 110—Holotype female (EUE), from litter under Salix sp. between Şiran and Alucra, Gümüşhane Province, Turkey (40°09'96"N, 39°00'18"E, 1305 m).

**Pachyseius quadrigeminus** Özbek & Halliday, 2015: 101—Holotype female (EUE), from litter under Abies sp., Çikrik düüzü Wold, Gümüşhane Province, Turkey (40°39'58"N, 38°59'50"E, 1990 m).

**Pachyseius siranensis** Özbek & Halliday, 2014: 108—Holotype female (EUE), from litter and moss under Astragalus sp. Çakirkaya Village, Şiran Town, Gümüşhane Province, Turkey (40°09'75"N, 39°04'24"E, 1326 m).

Superfamily Ascoidea (4 species)

Family Ameroseiidae (2 species)

**Ameroseius norvegicus** Narita, Abduch & Moraes, 2015 in Narita, Abduch, Moraes & Klinge, 2015: 391—Holotype female (ESALQ-USP), from litter from a strawberry field at Sylling, Buskerud county, Norway (59°54'00"N, 101°54"E, 170 m).

**Neocypholaelaps kreteti** Narita, Pédelabat & Moraes, 2013: 2—Holotype female (ESALQ-USP), from inflorescences of Cocos nucifera on La Réunion Island, France.

Family Melicharidae (2 species)

**Oroaeaeus piracicabensis** Sourassou, Moraes & Santos, 2015: 315—Holotype female (ESALQ-USP), from decaying corn grains and corn cobs under trees, the campus of Escola Superior de Agricultura “Luiz de
Queiroz”, Universidade de São Paulo, at Piracicaba, São Paulo, Brazil (22°42′16″S, 47°38′1″W).

Oroelaeps tупininquim Sourassou, Moraes & Santos, 2015: 319—Holotype female (ESALQ-USP), from decaying carambola fruits on the ground, the campus of Escola Superior de Agricultura “Luiz de Queiroz”. Universidade de São Paulo, Piracicaba, São Paulo, Brazil (22°42′18″S, 47°37′58″W; 22°42′28″S, 47°37′44″W).

Superfamily Phytoseioidea (40 species)
Family Blattissociidae (2 species)

Blattisocia thacocofloris Oliveira, Chandrapatya & Moraes, 2015: 94—Holotype female (ESALQ-USP), from flowers of Cocos nucifera at Kamphaeng Saen District, Nakhon Pathom Province, Thailand (14°00′ 22″N, 99°59′78″E).

Lasioseius piricabicbensis Moraes & Pérez-Madruga, 2015 in Moraes, Abo-Shnaf, Pérez-Madruga, Sáchez, Karmarak & Ho, 2015: 22—Holotype female (ESALQ-USP), from rice plants, Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ) campus, Universidade de São Paulo (USP), Piracicaba, São Paulo, Brazil.

Family Phytoseiidae (38 species)


Amblydromalus macroatrium Barbosa & Castro, 2013: 317—Holotype female (ESALQ-USP), from Aparisthmium cordatum, Cananéia, São Paulo, Brazil.

Amblyseius atlanticus Moraes, Barbosa & Castro, 2013: 304—Holotype female (ESALQ-USP), from Erythrina speciosa, Pariguara-Açu, São Paulo, Brazil.

Amblyseius caliginosus Ferragut, 2015 in Ferragut & Navia, 2015: 540—Holotype female (MNCN 20.02/17391), on Saxegothaea consipicua, Tinquilo Lake near Pucón, Chile (39°10′09″S, 71°43′33″W, 814 m).

Amblyseius grandiporus Ferragut, 2015 in Ferragut & Navia, 2015: 538—Holotype female (MNCN 20.02/17389), on Eucryphia cordifolia, Tinquilo Lake near Pucón, Chile (39°10′09″S, 71°43′33″W, 814 m).

Breviseius soennae Barbosa & Castro, 2013: 336—Holotype female (ESALQ-USP), from Senna multijuga, Cananéia, São Paulo, Brazil.

Chileseius australis Ferragut, 2015 in Ferragut & Navia, 2015: 527—Holotype female (MNCN 20.02/17377), on Teuquila stipularis, near Ushuaia, Argentina (54°50′51″S, 68°29′19″W, 18 m).

Cocosseius pacificus Barbosa & Castro, 2013: 335—Holotype female (ESALQ-USP), from Syagrus romanzozziana, Glassman, Cananéia, São Paulo, Brazil.

Galendrominus (Galendrominus) roraimensis Demite & Lofego, 2014 in Demite, Gondim, Lofego & Moraes, 2014: 594—Holotype female (ESALQ-USP), from unidentified Areaceae, Icrama, Roraima, Brazil, (2°10′N, 61°03′W).

Ingaseius silvaticus Barbosa, Rocha & Ferla, 2014: 92—Holotype female (ESALQ-USP), from unidentifed Areaceae, Cananéia, São Paulo, Brazil.

Metaseiulus (Metaseiulus) parabreviceollis Ferragut, 2015 in Ferragut & Navia, 2015: 546—Holotype female (MNCN 20.02/17397), on Chilriorchidium diffusum, near Ushuaia, Argentina (54°50′51″S, 68°29′19″W, 18 m).

Neoparaphytoseius charapa Jiménez, McMurtry & Morales, 2014: 294—Holotype female (ESALQ-USP), on Inga edulis, from Iquitos Province, Loreto Department, Peru (03°44′S, 73°14′W).

Neoseius elisiensis Stathakis, Kapaxidi & Papadoulis, 2013: 564—Holotype female (LAZUA), on Rubus sp., collected at Kaiafas Lake, Co. Eleia, Peloponnesus, Greece.

Neoseius grumantensis Kolodochka & Gwiazdowicz, 2014: 446—Holotype female (IZNASU), plant communities with polar willow Salix polaris Wahlenb., Petuniabukta, Billebjer, Svalbjer, Norway (78°42′N, 16°40′E).

Neoseius mapuche Ferragut, 2015 in Ferragut & Navia, 2015: 530—Holotype female (MNCN 20.02/17379), on Saxegothea consipicua, Puerto Blest, Bariloche, near the Argentina-Chile border, Argentina (41°08′10″S, 71°09′35″W, 837 m).

Neoseius neomarginatus Stathakis, Kapaxidi & Papadoulis, 2013: 566—Holotype female (LAZUA), on Anchusa sp., collected at Pithari, Co. Chania, Crete Island, Greece.


Phytoseius ibrahimi Döker & Kazak, 2015 in Döker, Kazak & Karut, 2015: 440—Holotype female (AFCU), on Rubia sp., Turkey.


Propioseiopsis ismailiaensis Abo-Shnaf & Moraes, 2014: 12—Holotype female (FACU), from soil under pomegranate tree, at Ismailia governorate, Egypt.

Propioseiopsis parikerassuensis Moraes, Barbosa & Castro, 2013: 312—Holotype female (ESALQ-USP), from Acotis brachybotria, Triana, Pariquera-Açu, São Paulo, Brazil.

Serraseius caicara Moraes, Barbosa & Castro, 2013: 315—Holotype female (ESALQ-USP), from Nectandra oppositifolia, Cananéia, São Paulo, Brazil.


Typhlodromalus araucariae Gonçalves & Ferla, 2015 in Gonçalves, Cunha, Bampi, Moraes & Ferla, 2015: 573—Holotype female (ZAUMCN), from Bougainvillea spectabilis, São Francisco de Paula, of Rio Grande do Sul, Brazil.

Typhlodromalus feresisimilis Barbosa & Castro, 2013: 325—Holotype female (ESALQ-USP), from Inga vera, Luis Antonio, São Paulo, Brazil.


Typhlodromips corniformis Barbosa & Castro, 2013: 336—Holotype female (ESALQ-USP), from Bougainvillea spectabilis, Ilha Comprida, São Paulo, Brazil.

Typhlodromips fissuratus Ferragut, 2015 in Ferragut & Navia, 2015: 536—Holotype female (MNCN 20.02/17388), on Rubus sp., Tinquillo Lake near Pucón, Chile (39°10’09”S, 71°43’33”W, 814 m).

Typhlodromips pelliti Gonçalves, Silva & Ferla, 2013: 364—Holotype female (ESALQ-USP), from Ilex paraguariensis, Putinga, Rio Grande do Sul, Brazil.


Typhlodromips robustisetus Barbosa & Castro, 2013: 331—Holotype female (ESALQ-USP), from Piptocarpa sp., Cananéia, São Paulo, Brazil.


Typhlodromips vallivianus Ferragut, 2015 in Ferragut & Navia, 2015: 533—Holotype female (MNCN 20.02/17385), on Saxegothea conspicua Puerto Blest, Bariloche, near the Argentina-Chile border, Argentina (41°01’10”S, 71°09’35”W, 837 m).

Typhlodromus (Anthoseius) anomalous Ferragut, 2015 in Ferragut & Navia, 2015: 543—Holotype female (MNCN 20.02/17395), on Araucaria araucana. Mamuil-Malal Pass, 65 Km from Junín de los Andes (Argentina), near the border between Argentina and Chile, Chile (39°34’56”S, 71°27’44”W, 1210 m).

Typhlodromus (Anthoseius) fayoumensis Abo-Shnaf & Moraes, 2014: 46—Holotype female (FACU), from soil under fig plant, at Senuris, Fayoum governorate, Egypt.

Typhlodromus (Typhlodromus) antakyaensis Stathakis & Döker, 2014 in Döker, Stathakis, Kazak & Karut, 2014: 335—Holotype female (AFCU), on Phaseolus vulgaris, Samandağ-Antakya, Turkey.

Typhlodromus sandrae Ragusa & Tslolakis, 2015 in Tslolakis & Ragusa, 2015: 234—Holotype female (UNIPA, No. 2710C), collected on Vitis vinifera at Ruvo di Puglia, Bari, Italy.

Superfamily Dermanychsoidea (24 species)

Family Laelapidae (24 species)

Coleoelaeps massoumii surii Khanjani, Ghaedi & Ueckermann, 2013: 473—Holotype female (BASU), from Polyphylla olivieri collected from cherry trees, Hamadan, Iran.

Cosmoeolaeps bartbatus Moreira, Klompen & Moraes, 2014: 322—Holotype female (ESALQ-USP), from a laboratory colony initiated with specimens collected from litter under Capsicum chinense, at Escola Superior de Agricultura “Luiz de Queiroz”, Piracicaba, São Paulo, Brazil.

Cosmoeolaeps busolii Moreira, Klompen & Moraes, 2014: 331—Holotype female (ESALQ-USP), from soil under Syagrus romanzoffiana at Rodovia 226 (Pariquera-Açu-Cananéia), Cananéia, São Paulo, Brazil.

Cosmoeolaeps confiniteratum Moreira, Klompen & Moraes, 2014: 333—Holotype female (ESALQ-USP), ...
from litter under *Syagrus oleracea* at Rodovia Geraldo de Barros, São Pedro, São Paulo, Brazil.

**Cosmolaelaps dorfakiensis** Ramroodi, Hajizadeh & Joharchi, 2014: 534—Holotype female (UGMC), in soil and leaf litter, Khobesara Village, Astara Town, Guilan Province, Iran (37°10′N, 49°23′E).

**Cosmolaelaps jaboticabalensis** Moreira, Klompen & Moraes, 2014: 336—Holotype female (ESALQ-USP), from a laboratory colony initiated with specimens collected from litter under *Eriobotrya japonica* at Jaboticabal, São Paulo, Brazil.

**Cosmolaelaps oliveirai** Moreira, Klompen & Moraes, 2014: 339—Holotype female (ESALQ-USP), from soil under *Astrocaryum aculeatissimum* at Núcleo Agrícola Vale do Ribeira, IAC, Pariquera-Açu, São Paulo, Brazil.

**Cosmolaelaps pinnatus** Ramroodi, Hajizadeh & Joharchi, 2014: 538—Holotype female (UGMC), in soil and leaf litter under box trees, Chobar Village, Shaft Town, Guilan Province, Iran (38°25′N, 48°52′E).

**Gaeolaelaps ahangarani** Kazemi & Beaulieu, 2014 in Kazemi, Rajaei & Beaulieu, 2014: 514—Holotype female (ACISTE), from decayed wood of Beech trees, Tirom Forest, Tonekabon County, Mazandaran Province, northern Iran (40°6′26″N, 47°11′26″E).

**Gaeolaelaps farajii** Nemati & Mohseni, 2013: 72—Holotype female (APAS), from soil, Izeh, Khuzestan province, Iran (31°49′52″N, 49°52′9″E, 845 m).

**Gaeolaelaps khajooii** Kazemi, Rajaei & Beaulieu, 2014: 510—Holotype female (ACISTE), from soil and litter at an alfalfa farm, Baft County, Kerman Province, southern Iran (28°39′46″N, 56°45′37″E, 1044 m).

**Gaeolaelaps orbiculatus** Nemati & Mohseni, 2013: 76—Holotype female (APAS), Izeh, Khuzestan province, Iran (31°49′52″N, 49°52′9″E, 845 m).

**Gymnolaelaps artavilensis** Joharchi & Halliday, 2013: 41—Holotype female (JAZM), in nest of *Pheidole pallidula* (in JAZM), Ardabil, Iran (38°15′N, 48°17′E, 1875 m).

**Hypoaspis elegans** Joharchi, Ostovan & Babeian, 2014: 570—Holotype female (SRIAUF), on adult female of *Oryctes elegans*, Bam, Kerman province, Iran.

**Hypoaspis (Hypoaspis) surii** Khanjani, Ghaedi & Ueckermann, 2013: 470—Holotype female (BASU), from *Polyphylla olivieri* from potato farms at Bahar, Hamedan Province, Iran.

**Laelaspis morazae** Kazemi, 2015: 420—Holotype female (ACISTE), from *Lepisiota semenovi* (Ruzsky), 1023 m above sea level, Mashad County, Khorasan Razavi Province, Northeastern Iran (59°58′N, 36°24′E).

**Myrmozercon crinitus** Joharchi, 2013 in Joharchi & Moradi, 2013: 245—Holotype female (YIAU), clinging to the abdomen of soldiers of *Myrmica* sp. (in YIAU), Karaj, Alborz, Iran (35°48′N, 50°59′E, 1550 m).

**Myrmozercon hunteri** Joharchi, Babaeian & Seeman, 2015: 550—Holotype female (JAZM), clinging to the abdomen of soldiers of *Myrmica* sp., Khoznan, Savojbolagh, Alborz province, Iran (36°7′1″N, 50°32′E, 1595 m).

**Myrmozercon michaeli** Joharchi, 2013 in Joharchi & Moradi, 2013: 248—Holotype female (YIAU), in nest of *Messor* sp. (in YIAU), Damavand Mountain, Iran (35°52′N, 52°07′E, 2422 m).

**Promacrolaelaps propomacrus** Joharchi, Halliday & Beyzavi, 2013: 380—Holotype female (YIAU), adult of *Propomacrus bimucronatus*, Kamfiruz region, Fars province, Iran.

**Reticulolaelaps hallidayi** Joharchi, Nemati & Babaeian, 2013 in Nemati, Joharchi, Babaeian & Gwiazdowicz, 2013: 76—Holotype female (APAS), soil, Izeh, Khuzestan Province, Iran (31°49′52″N, 49°52′9″E, 845 m).

**Ulyxes autolycus** Shaw, 2014: 266—Holotype female (BBM), from “*Pseudocheirus cupreus* = *Pseudochirops cupreus*”, Collin’s Sawmill, Mt Otto, Papua New Guinea.

**Ulyxes euryclea** Shaw, 2014: 269—Holotype female (QM), ex nestbox recently occupied by *Cacatua longirostris* Long-billed Corella, collected four days after last chick fledged, Candlebark Park, Templestowe, Victoria, Australia (37°31′56″S, 145°06′39″E).

**Ulyxes theoclymenus** Shaw, 2014: 283—Holotype female (BBM, BBM-NG 22634), May River, West Sepik province, Papua New Guinea.

Acknowledgments

We thank our colleague Jian-Feng Liu (University of Auckland) for reviewing this manuscript and comments. Z.-Q. Zhang’s research on New Zealand mites was supported mainly by Core Funding for Crown Research Institutes from the Ministry of Business, Innovation and Employment’s Science and Innovation Group.
References


