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The superfamily Phytoseioidea (Acari: Mesostigmata) from Saudi Arabia: a new species, new records and a key to the reported species

Fahad J. ALATAWI ✉, Jamal BASAHIH and Muhammed KAMRAN

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Acarology Laboratory, Department of Plant Protection, College of Food & Agriculture Sciences, King Saud University, Riyadh 11451, P.O. Box 2460, Saudi Arabia. falatawi@ksu.edu.sa (✉), basahih@gmail.com, kamran1513@gmail.com

ABSTRACT — Twenty two phytoseioid species belonging to three families Blattisociidae Garman, Otopheidomenidae Treat, and Phytoseiidae Berlese (Acari: Phytoseioidea), collected from Baha, Bisha, Jazan, Madinah, Makkah, Riyadh and Tabuk province of Saudi Arabia (SA), are reported in this paper. Among these, a new species *Phytoseius tabukensis* Alatawi, Basahih and Kamran, **n. sp.** is described and illustrated for both females and males, collected from the leaf galls of toothbrush trees, *Savadora persica* (Salvadoraceae), in association with eriophyid mites (Acari: Eriophyidae). Three genera *Amblyseius* Berlese, *Iphiseius* Berlese and *Kuzinellus* Wainstein and ten species of the family Phytoseiidae, and three species belonging to family Blattisociidae, are reported for the first time from SA. New distribution and host records of eight phytoseioid species previously reported are given. A key to females of Phytoseioidea from Saudi Arabia is presented. Also a key to the *horridus* species group of the genus *Phytoseius* Ribaga (Acari: Phytoseiidae) is provided.

KEYWORDS — Phytoseioid; *Phytoseius tabukensis*; *Kuzinellus*; *Iphiseius*; *Cheiroseius*

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INTRODUCTION

The superfamily Phytoseioidea Berlese (Acari: Mesostigmata) includes four families: Blattisociidae Garman, Otopheidomenidae Treat, Phytoseiidae Berlese, and Podocinidae Berlese. The family Phytoseiidae is the most diverse group of mites with approximately more than 2452 species belonging to 91 genera (Demite *et al.* 2016). Mites of the family Phytoseiidae are mostly present on plant surface and are predators of phytophagous mites and other small insect pests of various agricultural crops worldwide (Gerson *et al.* 2003; Chant and McMurtry 2007).

The family Blattisociidae is the second most diverse family in the superfamily Phytoseioidea, including 12 genera and more than 329 nominal species, among these more than 200 species belong to the genus *Lasioseius* Berlese (Moraes *et al.* 2016). Most species of this family have been reported from litter, while some species have been found on rodent and in bird nests as well as from aerial plant parts (Moraes *et al.* 2016). Some species of the genus *Lasioseius* have been reported feeding on phytophagous mites, small insects, springtails and nematodes while some others have also been observed to feed on fungi (Walter and Lindquist 1989; Christian and Karg 2006; Britto *et al.* 2012).

The families Otopheidomenidae and Podocinidae include 30 and 32 species respectively worldwide (Halliday 1994; Menon *et al.* 2012; Yan *et al.* 2012). The phytoseiid mite fauna of SA is poorly known. Previously, 23 species including in eight genera of Phytoseiidae (Dabbour and Abdel-Aziz 1982; Fouly and Al-Rehiayani 2011; Alatawi 2011a, b; Negm *et al.* 2012 a, b; Basahih *et al.* 2015; Alatawi *et al.* 2016), one species each of families Blattisociidae and Otopheidomenidae have been reported from SA (Alatawi 2011a; Negm and Alatawi 2013).

MATERIALS AND METHODS

Different provinces of SA (Baha, Bisha, Jazan, Madinah, Makkah, Riyadh, and Tabuk) were surveyed for the collection of phytoseiid mites. Mites were collected either shaking the different plant parts *i.e.* leaves, flowers and twigs etc. over a white piece of paper and were transferred into 70 % ethanol using camel hair brush or different plant parts, soil and leaf debris were taken to the laboratory and were processed through Tullgren funnels to extract mites. The mite specimens, after mounting on slides in Hoyer's medium, were examined under a phase-contrast microscope (DM2500, Leica®, Germany) and were identified using literature and diagnostic keys. Template illustrations of different mite body parts of specimens were either pictured with an Auto-montage Software System (SYNCROSCOPY®, Cambridge, UK) attached to the microscope or were drawn with pencil by using a drawing tube (U-DA, Olympus®, Japan) attached to the microscope. Final processing of drawings were made in Adobe Illustrator (Adobe Systems Incorporated, USA). The terminology used in this study follows that of Chant and McMurtry (2007). The apical tooth is not included in the number of teeth of the cheliceral digits. All measurements are given in micrometers.

Type specimens of the new species have been deposited at Acarology Research Laboratory, Department of Plant Protection, College of Food and Agriculture Sciences, King Saud University.

RESULTS AND DISCUSSION

A total of 22 phytoseiid species belonging to three families Blattisociidae (four species), Otopheidomenidae (one species) and Phytoseiidae (18 species) (Acari: Phytoseioidea) are reported in this study (Table 1). Also, distribution along with collection data and field association of the reported species are presented in table 1. Among these, three genera *Amblyseius* Berlese, *Iphiseius* Berlese and *Kuzinellus* Wainstein and 11 species including new species, *Phytoseius tabukensis* **n. sp.**, belonging to family Phytoseiidae and three species of the family Blattisociidae are new to the mite fauna of SA.

New distribution and collection data of eight phytoseiid species previously reported are also given in table 1.

Among all phytoseiid species, two generalist predators *i.e.* *Cydnoseius negevi* (Swirski and Amitai) and *Neoseiulus barkeri* Hughes (Acari: Phytoseiidae) were found most abundant and well distributed in all surveyed provinces (Table 1).

Previously, 23 phytoseiid species within eight genera have been reported from SA. Among these, 12 species have been found in date palm agroecosystem (Al-Shammery 2010; Alatawi 2011 a, b; Fouly and Al-Rehiayani, 2011; Negm *et al.* 2012 a, b; Basahih *et al.* 2015; Alatawi *et al.* 2016). *Cydnoseius negevi* (Swirski and Amitai) and *Neoseiulus barkeri* Hughes naturally occur in date palm orchards in different regions of SA and are the most abundant species found even on date palm trees (Negm *et al.* 2012 a). *Cydnoseius negevi* is a common phytoseiid species found in Middle East countries (Abou-Awad *et al.* 1989, 1998; Fouly and Laithy 1992; Palevsky *et al.* 2009; Hountondji *et al.* 2010) and feeds on wide range of phytophagous mites and small insect pests (Momen 2010).

A biological study of *C. negevi* and *N. barkeri*, collected from date palm orchards, was conducted in SA against date palm mite pest, *Oligonychus afrasiaticus* (McGregor) at (25, 35 °C and 35 ± 10 % RH). This study showed that the *C. negevi* could be considered as a valuable predator for the control of spider mite pests especially date palm mite at comparatively low RH levels (Negm *et al.* 2014).

TABLE 1: Phytoseioid mites (Acari: Phytoseioidea) collected in the current study from Saudi Arabia.

Family/Subfamily, Genus	Species	Province/Locality	New Records/New Species	Host/Habitat	Collection time	Field association
Phytoseiidae Amblyseinae <i>Neoseiulus</i> Hughes	<i>N. imbricatus</i>	Corpuz-Raros and Rimando	(Sabya) Jazan, (Dariah) Riyadh	Unidentified plants (Poaceae), <i>Cynodon dactylon</i> L. (Poaceae)	Apr., Sept. 2014	<i>Thrips</i> sp. (Thripidae)
	<i>N. zaheri</i> (El-Borolossy)	Tabuk city, (Dariah) Riyadh		<i>Pulicaria undulata</i> , (L.) (Asteraceae), <i>Convolvulus</i> sp. (Convolvulaceae)	Mar., Oct. 2015	<i>Thrips</i> sp. and <i>Tetranychus urticae</i> (Tetranychidae)
	<i>P. tamaricis</i>	Amitai and Grinberg	(Deesa valley) Tabuk	<i>Tamarix</i> sp. (Tamaricaceae)	Oct. 2015	<i>Spinibdella cronini</i> (Baker and Balock) (Prostigmata: Bdellidae) tamarix leafhopper (Hemiptera: Cicadellidae)
	<i>Paragigagenathus</i>					
<i>Anthysetus</i> Berlese <i>Euseius</i> Wainstein	<i>A. largoensis</i> (Muma)	(Sabya) Jazan		Unidentified plants (Poaceae)	Apr. 2014	<i>Thrips</i> sp.
	<i>E. africanus</i> (Evans)	(Baljurashi) Baha		Unidentified plants (Moraceae)	June 2014	-
	<i>E. yousefi</i> (El-Borolossy)	(Deesa valley) Tabuk		<i>Ziziphus</i> sp. (Rhamnaceae)	Oct. 2015	-
	<i>I. degenerians</i> Berlese	(Wadi Turbah, Baha, (Wadi dafa) Jazan		<i>Ocimum basilicum</i> L. (Lamiaceae), <i>Conocarpus</i> sp. (Combretaceae)	Apr., May 2014	<i>Thrips</i> sp.
<i>Phytoseiulus</i> Ribaga	<i>*P. tabukensis</i> n. sp. Alatawi, Basahih and Kamran	(Duba) Tabuk		<i>Salvadora persica</i> L. (Salvadoraceae)	Oct. 2015	Eriophyid species (Eriophyidae)
Typhlodrominae <i>Typhlodromus</i> Scheuten	<i>T. (Anthysetus) egypticus</i> El-Badry	(Wadi Turbah, Wadi Fesq, Wadi Shoraa, Talgyah) Baha		<i>Ocimum basilicum</i> L. (Lamiaceae), <i>Cupressus</i> sp., <i>Juniperus procera</i> Hochst. (Cupressaceae), <i>Lavandula</i> sp. (Lamiaceae), <i>C. dactylon</i> (Lamiaceae)	Apr. 2013, Feb., June 2014	<i>Oligonychus</i> sp., <i>Spinibdella</i> sp., and <i>Thrips</i> sp.
	<i>T. (A.) persianus</i> McMurtry	(Wadi Turbah, Attalgiaha, Almikhwah) Baha, (Sabya, BinMalek) Jazan		<i>Salvadora</i> sp. (Salvadoraceae), <i>P. crispa</i> (Forsk.) (Asteraceae), <i>Olea</i> sp. (Oleaceae)	Apr. 2013, May, June 2014	<i>Thrips</i> sp.
	<i>T. (A.) tamaricis</i> (Kolodochka)	(Wadi Turbah, Wadi Fesq, Wadi Shora, Attalgiaha) Baha, (Duba) Tabuk		<i>P. unduleta</i> , <i>Acacia</i> sp. (Fabaceae), <i>J. procera</i> , <i>Lavandula</i> sp., <i>Malus</i> sp. (Rosaceae), <i>Tamarix</i> sp. (Rosaceae)	Apr. 2013, June 2014, Oct. 2015	<i>Tetranychus</i> sp. and <i>Thrips</i> sp.
	<i>Kuzinellus</i> Wainstein	<i>Kuzinellus</i> sp.	Tabuk city, (The Ain valley) Baha	<i>Conyza bonariensis</i> L. (Asteraceae), <i>Ocimum basilicum</i>	June 2014, Oct. 2015	<i>Tetranychus</i> sp.
Blattisociidae Garman	<i>L. queenslandicus</i> (Womersley)	Wadi Dwasir, Riyadh		Soil debris under date palm trees	Feb., Dec. 2010	-
Blattisociinae <i>Lasioseius</i>	<i>L. nambirimae</i> Krantz	Riyadh		Soil debris under date palm trees	Jan. 2011	-
Platyseinae <i>Cheiroseius</i>	<i>C. neocorniger</i> (Oudemans)	Hassa		Soil debris under date palms	Mar. 2012	

* New species

TABLE 1: Continued.

Family/Subfamily, genus	Species	Province/Locality	Host and distribution of some previously reported Phytoseiid species collected in current study	Host/Habitat	Collection time	Field association
Phytoseiidae						
<i>Neoseiulus</i> Hughes	<i>N. barkeri</i> Huhges	(Near sea port) Jeddah, Duba, Tabuk, (Sabia, Aboareesh, Bnimalak, Dabia, Faifa) Jazan, (Alwadi) Bisha (near Airport, Talgyah) Baha, (Dariah, Waseel) Riyadh		Different grasses (Poaceae), <i>C. dactylon</i> , <i>Tamarix</i> sp., soil debris of date palm, <i>Olea</i> sp. (Oleaceae), <i>J. procera</i>	Sept. 2013, Apr., May 2014, Jan., Mar., Oct. 2015	<i>Thrips</i> sp., <i>Tetranychus</i> sp.
<i>Proprioseiopsis</i> Muma	<i>P. asetus</i> (Chant)	(Baljurashi) Baha		<i>Malus</i> sp. (Rosaceae)	June 2014	-
<i>Paragigagnathus</i> Amitai and Grinberg	<i>P. insuetus</i> (Livshitz) Kuznetsov <i>P. ovatus</i> (Garman)	and (Wadi e Turbah), Baha Tabuk city, Baha, (Alharef) Bisha		<i>Tamarix</i> sp. <i>C. dactylon</i> , soil debris and unidentified plant species under <i>Acacia</i> trees, unidentified plants (Fabaceae)	Apr. 2013 Apr. 2014, Oct. 2015	-
<i>Euseius</i> Wainstein	<i>E. scutalis</i> (Athias-Henriot)	(Wadi Jin) Madinah, (Duba) Tabuk, (Faifa) Jazan, (Wadi e Turbah, Wadi e Shora) Baha, Riyadh		Different grasses (Poaceae), <i>Ziziphus</i> sp., <i>Acacia</i> sp. <i>Tamarix</i> sp. <i>Conocarpus</i> sp.	Feb., Apr. 2013, May 2014, Feb., May, Oct. 2015	-
<i>Cydnoseius</i> Muma	<i>C. negevi</i> (Swirski and Amitai)	(Near Uhad Mountain), Madinah, (Ariat) Makkah, (Alhuda road) Taif, (Deesa) Tabuk, (Aboareesh, Khbout, Shiba, Dabia, Faifa, Alous) Jazan, (Alasour, Ahazmy) Bisha, (Baljurashi) Baha, (Ammaria, Waseel) Riyadh		<i>C. dactylon</i> , grasses (Poaceae), <i>C. ciliaris</i> , <i>Mentha</i> sp. (Lamiaceae), <i>Trifolium alexandrinum</i> L. (Fabaceae), different grasses (Poaceae)	Feb., Sept. 2013, Jan., Apr., May, June 2014, May, Oct. 2015,	<i>Oligonychus afasiaticus</i> , <i>Tetranychus</i> sp., <i>Thrips</i> sp.
Blattisociidae Garman	<i>L. parberlesci</i> Bhattacharyya	(Near sea port Jeddah) Makkah, Madinah, Riyadh, Jazan		Different grasses (Poaceae)	July 2011, May, Sept. 2014, Jan. 2015	<i>Tetranychus</i> sp.
Otopheidomenidae Treat	<i>N. arabicus</i> Negm and Alatawi	Riyadh, Makkah		<i>Heliotropium bacciferum</i> Forsk. (Boraginaceae)	Apr. 2014, 2016	<i>Aegyptobia</i> sp. (Tenuipalpidae)
<i>Nabiseius</i> Chant and Lindquist						

Moreover, co-occurrence of *C. negevi* along with date palm mite on different grasses (Poaceae) and its abundance and distribution in different provinces of SA as compared to other phytoseiid predators support the previous studies that it can be used as an effective predator against date palm mite under high temperature and low humidity levels. However, it needs further biological studies on this predator at different field conditions to find its potential use against date palm mite.

Another phytoseiid species, *Euseius scutalis* (Athias-Henriot) generally feed on plant pollens, was found abundantly in five provinces, Baha, Jazan, Madinah, Tabuk and Riyadh of SA (Table1). Previously, *E. scutalis* was observed feeding on different phytophagous mites, scale insects and white-flies in Hail, SA. (AlShammery 2010).

A blattisociid species *Lasioseius parberlesei* Bhattacharyya was reported from Jazan, Madinah, Makkah and Riyadh. It has been considered potentially effective as biological control agent of pest mites of the family Tarsonemidae (Moraes *et al.* 2015).

Nabiseius arabicus Negm and Alatawi (Otopheidomenidae) was recorded in high numbers on *H. bacciferum* Forssk. (Boraginaceae) in association with *Aegyptobia* sp. (Tenuipalpidae) from Riyadh and Makkah provinces (Table 1). Before, it was recorded on *C. dactylon* from Riyadh (Negm and Alatawi 2013).

Superfamily Phytoseioidea Berlese, 1916

Family Phytoseiidae Berlese, 1916

Subfamily Phytoseiinae Berlese, 1913

Genus *Phytoseius* Ribaga, 1904

Species group *horridus* Denmark, 1966

***Phytoseius tabukensis* Alatawi, Basahih and Kamran n. sp.**

Zoobank: [7DDC5CB3-F38A-4F6B-A98C-D30B8D8EAFD0](https://zoobank.org/7DDC5CB3-F38A-4F6B-A98C-D30B8D8EAFD0)

Description — Female (n = 3) (Figs. 1-2) — Measurements of holotype female followed by two female paratypes in parenthesis.

Dorsum (Fig. 1) — Dorsal shield 278 (273 – 283) long, 156 (154 – 157) wide, with 15 pairs of setae. Setae r3 on the shield, setae J2 and R1 absent. Length

of dorsal setae j1 21 (21 – 22), j3 18 (18 – 19), j4 6, j5 6 (6 – 7), j6 6, J5 10 (9 – 11), z2 18 (17 – 19), z3 32 (31 – 33), z4 13 (11 – 14), z5 9 (5 – 12), Z4 64 (63 – 65), Z5 53 (50 – 58), s4 55 (53 – 57), s6 73 (70 – 75), and lateral setae r3 28 (26 – 29). All dorsal setae serrate except j4, j5, j6, z4 and z5 smooth. Setae s6 and Z4 finely serrated only on 1/3 distal part, setae Z5, Z4, s4, s6, z3 set on tubercles. Peritremes extending up to setae j1.

Venter (Fig. 2A) — Sternal shield not clear. Distances between ST1-ST1 45 (44 – 45), ST2-ST2 61 (58 – 63), ST3-ST3 76 (72 – 79), ST4-ST4 81 (77 – 100). Genital shield smooth; distance between ST5-ST5 68 (66 – 70); membranous fold between genital and ventrianal shields absent. Ventrianal shield elongate, slightly rounded anteriorly, 74 (73 – 76) long, 46 (44 – 47) wide at the level of para-anal setae, with one pair of pre-anal setae. Four pairs of setae present on the soft cuticle around the ventrianal shield. Lyrifissures not clear. All ventral setae simple except JV5 thick and serrated. Metapodal platelets not clear in all specimens.

Spermatheca (Fig. 2B) — Calyx of spermatheca bell-shaped, 5 long; 4 wide, atrium adjacent to the calyx. Major duct long tube like and minor duct small.

Chelicerae (Fig. 2C) — Fixed digit 19 – 21 long, with two subapical teeth and a pilus dentilis, movable digit 17 (16 – 18) long, with one tooth.

Legs (Fig. 2D) — Macrosetae absent on leg IV, all setae simple.

Male (n= 3) (Figs. 3-4)

Dorsum (Fig. 3) — Dorsal shield 229 (226 – 232) long, and 137 (132 – 141) wide, with 15 pairs of setae. Length of dorsal setae: j1 15 – 16, j3 17 – 18, j4=j5 5 – 6, j6 6, J5 7 – 8, z2 14 – 16, z3 28 – 32, z4 9 – 12, z5 7 – 9, Z4 44 – 46, Z5 39 – 42, s4 44 – 53, s6 47 – 55, and lateral setae r3 21 – 25. All dorsal setae serrate except j4, j5, j6, z4 and z5 which are simple, setae Z5, Z4, s4, s6, z3 and r3 set on tubercles. Peritremes extending to the level between setae j3 and j1.

Venter (Fig. 4A) — Sternogenital shield smooth, 114 long and 63 wide with 5 pairs setae, distances between ST1-ST1 35 – 38, ST2-ST2 44 – 49, ST3-ST3 54 – 58, ST4-ST4 52 – 54; ST5-ST5 43 – 47. Ventrianal

FIGURE 1: *Phytoseius tabukensis* n. sp., Female, Dorsal shield

FIGURE 2: *Phytoseius tabukensis* n. sp., Female: A – Venter; B – Spermatheca; C – Chelicera; D – Leg IV

FIGURE 3: *Phytoseius tabukensis* n. sp., Male, Dorsal shield

FIGURE 4: *Phytoseius tabukensis* n. sp., Male: A – Venter; B – Chelicera

shield wider than long, 83 – 84 long, 104 – 109 wide at the level of ZV2, four pairs of preanal setae, two para-anal and one postanal setae.

Chelicerae (Fig. 4B) — Fixed digit 16 – 17 long, with 3 – 4 subapical teeth and a pilus dentilis; movable digit 15 – 16 long, with one tooth. Spermatodactyl V-shaped distally.

Legs — As in female.

Material Examined — Holotype female and five paratypes (two females and three males), *Salvadora persica* L. (Salvadoraceae), 30 km Sherma road, Duba, Tabuk, 18 Oct. 2015, coll. M. Kamran and J.H. Mirza.

Etymology — The name of new species is derived from province "Tabuk" where the type specimens were collected.

Remarks — *Phytoseius tabukensis* n. sp. belongs to the *horridus* species group of the genus *Phytoseius* due to absence of setae J2 and R1. Within the *horridus* species group Chant and McMurtry 1994, 14 species including new species (mentioned in the diagnostic key #1) in which macrosetae on tibia IV is absent. The new species closely resembles *P. brigalow* Walter and Beard. However, it is different from *P. brigalow* by having one pair preanal setae on the ventrianal shield vs. two pairs, dorsal shield setae z3, s4, s6, and Z4 serrated vs. smooth in *P. brigalow*. The new species is different from other 12 species by the presence of only one pair of preanal setae on the ventrianal shield and four pairs of setae present on the soft cuticle surrounding the ventrianal shield. The other 12 species have 2 or 3 pairs of preanal setae present on the ventrianal shield and 3 pairs of setae on the soft cuticle surrounding the ventrianal shield.

Key to the species of *horridus* species group of the genus *Phytoseius* Ribaga (Acari: Phytoseiidae) with macro setae absent on leg IV tibia

1. Macrosetae on leg IV basi- and disti-tarsus with hyaline knobbed tips ... *P. oreillyi* Walter and Beard
— Macrosetae on leg IV tarsus absent, if present short, without hyaline knobbed tips 2

2. One pair of preanal setae present on ventrianal shield *P. tabukensis* n. sp.
— Two or three pairs of preanal setae present on ventrianal shield 3

3. Two pairs of preanal setae present on ventrianal shield, ZV1 off the shield, on the soft cuticle..... *P. brigalow* Walter and Beard
— Three pairs of preanal setae present on ventrianal shield 4

4. Setae ZV3 absent, two pairs of setae present on soft cuticle around the ventrianal shield .. *P. darwin* Walter and Beard
— Setae ZV3 present, three pairs of setae present on soft cuticle around the ventrianal shield 5

5. Setae Z4 equal in length as Z5 *P. mancus* Afzal *et al.*
— Setae Z4 distinctly longer than Z5 6

6. Setae s6 ≥ Z5 7
— Setae s6 distinctly shorter than Z5 *P. gleba* Afzal *et al.*

7. Setae Z4 serrated 8
— Setae Z4 smooth 12

8. Setae j3 reaching the basis of j4 *P. glyptos* Afzal *et al.*
— Setae j3 well behind to the basis of j4 9

9. Setae s6 = Z5 *P. mantoni* Walter and Beard
— Setae s6 distinctly longer than Z5 10

10. Setae z3 smooth, s4 longer than s6 *P. litchfieldensis* Walter and Beard
— Setae z3 serrated, s4 shorter than s6 11

11. Setae s4, crossing the basis of setae s6, s4 55, s6 72-74, setae s4 almost at the level of r3..... *P. intermedius* Evans and Macfarlane
— Setae s4, just reaching the basis of setae s6, s4

43, s6 52, setae s4 well posterior to the level of r3..... *P. douglasensis* Schicha

12. Setae s4, s6 smooth..... *P. acacia* Walter and Beard

— Setae s4, s6 serrated 13

13. Setae Z2, JV5 smooth, setae s4 subequal to s6..... *P. longchuanensis* Wu

— Setae Z2, JV5 serrated, setae s4 shorter than s6..... *P. ruidus* Wu and Li

NEW RECORDS

FAMILY PHYTOSEIIDAE BERLESE, 1916

Subfamily Amblyseiinae Muma, 1961

Tribe Neoseiulini Chant and McMurtry, 2003

Genus *Neoseiulus* Hughes, 1948

Neoseiulus imbricatus Corpuz-Raros and Rimando

Amblyseius (A.) *imbricatus* Corpuz and Rimando 1966: 127.

Neoseiulus oryzacolus Daneshvar 1987: 18; Faraji *et al.* 2007: 233.

Material examined — Two females, unidentified plant sp. (Poaceae), Sabya, Jazan, 17°07'910N, 042°39'020E, 02 Apr. 2014, coll. J. Basahih; two females, *Cynodon dactylon* L. (Poaceae), Dariah, Riyadh, 04 Sep. 2014, coll. M. Kamran.

Field association — This species was found in association with *Thrips* sp. (Thripidae).

Remarks — Morphology and setal measurements of specimens from SA are similar to those of original description (Corpuz and Rimando 1966) and reported by Ehara and Bhandhuflalck (1977) from Thailand.

World distribution — Philippines, Thailand, India, Azerbaijan, China, Philippines and Iran (Moraes *et al.* 2004; Faraji *et al.* 2007).

Neoseiulus zaheri (El-Borolossy)

Amblyseius zaheri El-Borolossy in Nasr and Abou-Awad 1985: 246.

Material examined — Three females, *Pulicaria undulata* (L.) C.A. Mey (Asteraceae), Tabuk city, 28°20'480N, 36°25'257E, 19 Oct. 2015; four females, *Convolvulus* sp. Convolvulaceae, Dariah, Riyadh, 24°44'272N, 46°34'744E, 21 Mar. 2015, coll. M. Kamran.

Field association — The specimens of this species were collected in association with *Thrips* sp. and *Tetranychus urticae* (Tetranychidae).

World distribution — Egypt (Abo-Shnaf *et al.* 2014).

Genus *Paragigagnathus* Amitai and Grinberg, 1971

Paragigagnathus tamaricis Amitai and Grinberg

Paragigagnathus tamaricis Amitai and Grinberg 1971: 327.

Material examined — Five females, *Tamarix* sp. (Tamaricaceae), Deesa valley, Tabuk, 27°38'031N, 036°30'384E, 17 Oct., 2015, coll. M. Kamran and J.H. Mirza.

Field association — The specimens of this species were collected along with another predatory mite *Spinibdella cronini* (Baker and Balock) (Prostigmata: Bdellidae) and tamarix leafhopper (Hemiptera: Cicadellidae).

World distribution — Egypt, Iran, Israel, Jordan, (Moraes *et al.* 2004; Hajizadeh *et al.* 2010).

Tribe Amblyseiini Muma, 1961

Genus *Amblyseius* Berlese, 1914

Amblyseius largoensis (Muma)

Amblyseius largoensis Muma, 1955:266.

Material examined — One female, unidentified plant species (Poaceae), Sabya, Jazan, 17°07'910N, 042°39'020E, 02 Apr. 2014, coll. J. Basahih.

Field association — The specimen of *A. largoensis* were collected together with *Thrips* sp.

World distribution — Africa: Angola, Ivory Coast, Kenya, Mozambique, Tanzania; North America: California, Florida; Central and South America: Brazil, Colombia, Costa Rica, Guatemala, Honduras, Venezuela; Caribbean: Cuba, Jamaica; Middle East: Israel; Southern Europe: Turkey, Georgia; Asia: China, Hong Kong, India, Indonesia, Iran, Japan, Singapore, Taiwan, Thailand; Pacific: Cook Islands, Fiji, Hawaii, New Caledonia, New Zealand, Papua New Guinea, US Samoa, Vanuatu Australia: Queensland (Moraes *et al.* 2004).

Tribe Euseiini Chant and McMurtry, 2005
Genus *Euseius* Wainstein, 1962

***Euseius africanus* (Evans)**

Typhlodromus africanus Evans 1954: 524.

Euseius africanus (Evans) Moraes and McMurtry 1988: 15.

Material examined — Four females, unidentified plant species (Moraceae), Baljurashi, 19°51'186 N, 041°36'289E, Baha, 15 June, 2014, coll. J. Basahih.

World distribution — Kenya (Moraes *et al.* 2001).

***Euseius yousefi* (El-Borolossy)**

Amblyseius yousefi El-Borolossy in Nasr and Abou-Awad 1985: 246.

Euseius yousefi (El-Borolossy) Moraes *et al.* 2004: 86.

Material examined — Six females, *Ziziphus* sp. (Rhamnaceae), Deesa valley, Tabuk, 27°36'048N, 036°25'592E, 18 Oct. 2015, coll. J.H. Mirza and M. Kamran.

World distribution — Egypt (Nasr and Abou-Awad 1985).

Genus *Iphiseius* Berlese, 1916

***Iphiseius degenerans* Berlese**

Iphiseius degenerans Berlese 1921: 95.

Material examined — Five females, *Ocimum bastimum* L. (Lamiaceae), Wadi Turbah, Baha, 19°49'797N, 041°47'34524, Apr. 2013; one female, *Conocarpus* sp. (Combretaceae), Wadi dafa, Jazan, 17°25'705N, 041°43'10'509E, 27 May 2014, coll. M. Kamran and J. Basahih.

Field association — This species were found together with *Thrips* sp.

World distribution — Algeria, Benin, Brazil-Pique, Burundi, Canary Islands, Cape Verde, Egypt, Georgia, Greece, Israel, Italy, Kenya, Lebanon, Madeira Island, Madagascar, Malawi, Morocco, Nigeria, Portugal, Rwanda, South Africa, Tanzania, Turkey, Yemen, Zaire and Zimbabwe (Moraes *et al.* 2004).

Subfamily Typhlodrominae Wainstein, 1962

Tribe Typhlodromini Wainstein, 1962

Genus *Typhlodromus* Scheuten, 1857

Subgenus *Anthoseius* De Leon, 1959

***Typhlodromus* (*Anthoseius*) *egypticus* El-Badry**

Typhlodromus egypticus El-Badry 1967a: 180

Material examined — Two females, *Ocimum bastimum*, Wadi Turbah, 19°49'797N, 041°26'478E, 24 Apr. 2013; one female, *O. bastimum*, Wadi The Ayn, 19°55'777N, 041°26'478E, 25 Apr. 2013; ten females, *Juniperus procera* Hochst. (Cupressaceae), Wadi Feeq, 19°58'970N, 041°31'665E, 14 June 2014; six females, *Cupressus* sp., Wadi Shoraa, 19°49'576N, 041°47'240E, 16 June 2014; six females and two males, *Lavandula* sp. (Lamiaceae); *O. basilicum* and *J. procera*, Talgyah, 19°51'336N, 041°36'157E, 16 June 2014, all from Baha, coll. M. Kamran and J. Basahih.

Field association — This species was collected along with *Oligonychus* sp. (Tetranychidae), *Spinibdella* sp. and *Thrips* sp.

World distribution — Egypt (El-Badry 1967a; Moraes *et al.* 2004).

***Typhlodromus* (*Anthoseius*) *persianus* McMurtry**

Typhlodromus persianus McMurtry 1977: 563.

Material examined — Five females and two males, *Tamarix* sp., Wadi Turbah, Baha, 19°49'797N, 041°26'478E, 24 Apr. 2013; four females, *J. procera* Hochst, Attalgiaha, Baha, 19°51'336N, 041°36'157E, 16 June 2014; two females *J. procera* Wadi Feeq, Baha, 19°58'970N, 041°31'665E, 15 June, 2014; one female, *Salvadora* sp., Mikhwah, Baha, 19°55'747N, 041°26'479 E, 14 June 2014; five females, *Pulicaria crispa* (Forssk.), *Olea* sp. (Oleaceae), Sabya, Jazan, 17°06'351N, 042°40'887E, 28 May 2014; one female,

Olea sp., Bin Malek, Jazan, 17°16'033N, 043°09'837E, 25 May, 2014, coll. M. Kamran and J. Basahih.

Field association — Specimens of *T. (A.) persianus* were found in association with *Thrips* sp.

World distribution — Oman, Iran, Cape Verde, South Africa and Yemen (Moraes *et al.* 2004; Uecker-mann *et al.* 2008).

***Typhlodromus (Anthoseius) tamaricis*
(Kolodochka, 1982)**

Anthoseius (Amblydromellus) tamaricis Kolodochka 1982: 11.

Amblydromella tamaricis (Kolodochka 1982) Moraes *et al.* 1986: 176.

Typhlodromus (Anthoseius) tamaricis (Kolodochka 1982), Moraes *et al.* 2004; Chant and McMurtry 2007.

Material examined — One female, *P. unduleta*, Wadi Turbah, Baha, 19°49'797N, 041°47'345E, 24 Apr. 2013; seven females *Acacia* sp. (Fabaceae), *J. procera*, Wadi Feeq, 19°58'970N, 041°31'665E, 13 June 2014; three females, *Lavandula* sp., Wadi Shora, 19°49'576 N, 041°47'240E, 16 June 2014; two females, *Malus* sp. (Rosaceae), Attalgiaha, 19°51'336 N, 041°36'157 E, 16 June 2014, coll. M. Kamran and J. Basahih; four females, *Tamarix* sp., 30 km Sherma road, Duba, Tabuk, 27°29'957N, 035°34'919E, 18 Oct. 2015, coll. M. Kamran.

Field association — The specimens of *T. (A.) tamaricis* were reported along with *Tetranychus* sp. and *Thrips* sp.

World distribution — Turkmenistan, Iran, Turkey (Kolodochka 1982; Moraes *et al.* 2004; Asali *et al.* 2012).

**Tribe Paraseiulini Wainstein, 1976
Genus *Kuzinellus* Wainstein, 1976**

***Kuzinellus* sp.**

Material examined — Two females, *Conyza bonariensis* L. (Asteraceae), Tabuk, 28°20'480N, 36°25'257E, 19 Oct., 2015, coll. M. Kamran; one female, *Ocimum bacilicum*, The Ain valley, 19°55'777N, 041°26'478E, Baha, SA., 16 June, 2014, coll. J. Basahih.

Field association — The specimens of this species were found in association with *Tetranychus* sp.

World distribution — Sudan and Egypt (El-Badry 1967b; El-Badry 1970).

FAMILY BLATTISOCIIDAE GARMAN, 1948

**Subfamily Blattisociinae Garman, 1948
Genus *Lasioseius* Berlese, 1916**

***Lasioseius queenslandicus* (Womersley)**

Platyseius queenslandicus Womersley 1956: 550.

Material examined — Two females and one male, soil debris under date palm trees, Fahad Al Falah Farms, Wadi Dwasir, 12 Dec. 2010; two females, soil debris under date palm trees, Imam Muhammad bin Saud University, Riyadh, 24°48'764N, 46°42'737E, 27 Feb. 2010, coll. J. Basahih.

World distribution — Australia and Egypt (Nawar and Nasr 1991; Moraes *et al.* 2016).

***Lasioseius nambirimae* Krantz**

Lasioseius nambirimae Krantz 1962: 19.

Material examined — One female, soil debris under date palm trees, King Saud University, Riyadh, 24°43'336N, 46°37'611E, 01 Jan. 2011, coll. W. Negm.

World distribution — Democratic Republic of the Congo, Africa (Moraes *et al.* 2016).

**Subfamily Platyseiinae, 1957
Genus *Cheiroseius* Berlese, 1916**

***Cheiroseius neocorniger* (Oudemans)**

Hypoaspis neocorniger Oudemans

Material examined — Two females, soil debris under date palms, Hssa, 25°22'601N, 049°34'104E, 20 Mar. 2012, coll. J. Basahih.

Type locality and depository — Unknown.

NEW DISTRIBUTION AND HOST DATA OF SOME PREVIOUSLY REPORTED PYTOSEIROID SPECIES FROM SA

FAMILY PHYTOSEIIDAE

Genus *Cydnoseius* Muma, 1967

Cydnoseius negevi (Swirski and Amitai, 1961)

Material examined — One female and one male, *C. dactylon*, Uhad Mountain, Madinah, 10 Jan. 2014; two females, grasses (Poaceae), near Jabl e Rehmat Mountain, Arfat, Makkah; two females, *Cenchrus ciliaris* L. (Poaceae), Huda road, Taif, 04 May 2015, coll. M. Kamran; two females, *Mentha* asp. (Lamiaceae), one male, *Trifolium alexandrinum* L. (Fabaceae), Deesa valley, Tabuk, 18 Oct. 2015, coll. M. Kamran and J.H. Mirza; 27 females, different grasses (Poaceae) in mango orchards, Aboareesh, 17°15'965N, 043°07'345E, Khbout, 17°06'255N, 042°41'691E, Shiba, 17°07'910N, 042°39'020E, Jazan, 30 Sep. 2013, 02 Apr. 2014; 11 females and four males, unidentified plant species (Poaceae), Dabia, 17°04'681N, 042°41'691E, Aous, 17°02'756N, 042°42'864E, Faifa, 17°15'965N, 043°07'345E, Jazan, 01, 02 Apr., 25 May 2014; four females, different grasses (Poaceae) under date palms, Asour, 19°50'922N, 042°27'180E, Ahazmy, 19°51'8512N, 042°29'50E, Bisha, 17 Apr. 2014; five females, unidentified plant species (Poaceae), Baljurashi, 19°51'186N, 041°36'289E, Baha, SA., 06 June 2014, all collected by J. Basahih.

Field association — *Oligonychus afrasiaticus* (McGregor), *Tetranychus* sp., *Thrips* sp.

Previous records — Wadi Dawaser, Waseel, Kharj, Dierab (Riyadh), Khutta (Hail) and Hssa (Negm *et al.* 2012b).

Genus *Neoseiulus* Hughes, 1948

Neoseiulus barkeri Hughes, 1948

Material examined — One female, grasses (Poaceae), near sea port, Jeddah, 29 Jan. 2015; four females, *C. dactylon*, Dariah, Riyadh, 20 Mar. 2015; two females, grasses, King Saud University, 06 Feb. 2013; one female, *Tamarix* sp., one

male, soil debris of date palm, 30 km Sherma road, Duba, Tabuk, 18 Oct. 2015. Coll. M. Kamran; 22 females, unknown plant species (Poaceae) in mango orchards, *Olea* sp., Sabia, 01 Apr. 2014, 17°07'910N, 042°39'020E, Aboareesh, 17°15'965N, 043°07'345E, Bnimalak, 17°16'033N, 043°09'837E, Dabia, 17°04'681N, 042°41'691E, Faifa, Jazan, 30 Sep. 2013, 04 Apr., 25 May 2014; four females, different grasses under date palms (Poaceae), Alwadi, 19°59'166N, 042°35'791E, Bisha, 16 Apr. 2014, coll. J. Basahih; four females, grasses in date palm orchard, *C. dactylon* (Poaceae), *J. procera*, near Airport, 19°59'755N, 042°35'607E, Talgyah, 19°51'336 N, 041°36'157 E, Baha, SA., 26 Apr. 2013, 16 June 2014, coll. M. Kamran and J. Basahih; 20 females, *C. dactylon*, *C. ciliaris*, Waseel, Ammariya, Riyadh, 15 May 2014.

Field association — This species was found with *Tetranychus* sp. and *Thrips* sp.

Previous records — Apple leaves, *Malus domestica* L. (Alatawi 2011b).

Genus *Proprioseiopsis* Muma, 1961

Proprioseiopsis asetis (Chant, 1959)

Material examined — One female, *Malus* sp., Baljurashi, 19°51'336 N, 041°36'157 E, Baha, 17 June, 2014, coll. J. Basahih.

Previous records — Riyadh, ex *C. dactylon*, *Ficus carica* L., *P. dactylifera*, *Sesuvium* sp., in date palm orchards (Negm *et al.* 2012b).

Propriopseius ovatus (Garman, 1958)

Material examined — One female, *C. dactylon*, Tabuk city, 28°23'754N, 036°32'817E, 19 Oct. 2015, coll. M. Kamran; four females, soil debris and unidentified plant species under *Acacia* trees, Baha, 25 Apr. 2014, coll. M. Kamran; one female, unidentified plant sp. (Fabaceae), Haref, Bisha, 20°01'303N, 042°32'211E, 16 Apr. 2014, coll. J. Basahih.

Previous records — Riyadh and Qassim (Negm *et al.* 2012b).

**Genus *Paragigagnathus* Amitai and Grinberg,
1971**

***Paragigagnathus insuetus* (Livshitz and
Kuznetsov, 1972)**

Material examined — Six females, *Tamarix* sp., 30 km Sherma road, Duba, Tabuk, 27°29'957N, 035°34'919E, 18 Oct. 2015, coll. M. Kamran and J.H. Mirza.

Previous records — Wadi Turbah, Baha, ex. *Tamarix* sp., (Alatawi *et al.* 2016).

Genus *Euseius* Wainstein, 1962

***Euseius scutalis* (Athias-Henriot, 1958)**

Material examined — Three females and one male, grasses (Poaceae), Wadi Jin road, Madinah, 02 Feb., 01 May 2015; two females, *Ziziphus* sp. 30 km Sherma road, Duba, Tabuk, 27°29'957N, 035°34'919E, 18 Oct. 2015; one female, grasses (Poaceae), Arfat, Makkah, 24 Feb. 2013; one female, near Uhad mountain, Madinah, coll. M. Kamran; four females, *Tamarix* sp. *Conocarpus* sp., *Acacia* sp. (Fabaceae), Wadi e Turbah, 19°49'797N, 041°47'345, Wadi e Shora, 19°49'576N, 041°47'240E, Baha, SA., 25 Apr. 2013, 16 June 2014, coll. M. Kamran and J. Basahih; two females, *Acacia* sp., Faifa, 17°25'705N, 043°10'509E, Jazan, 25 May 2014, coll. J. Basahih.

Previous records — Riyadh and Qassim, ex *Solanum melongena* L. (Solanaceae), *Vitis vinifera* L. (Vitaceae), *Ricinus communis* (Euphorbiaceae), *Fragaria* sp. (Rosaceae) (Al-Shammery 2010; Alatawi 2011b).

**FAMILY OTOPHEIDOMENIDAE TREAT,
1955**

Genus *Nabiseius* Chant and Lindquist, 1965

***Nabiseius arabicus* Negm and Alatawi**

Nabiseius arabicus Negm and Alatawi 2013: 184.

Material examined — 25 females and two nymphs, *H. bacciferum* Forssk. (Boraginaceae), Imam Mohammad Bin Saud University, Riyadh, 24°48'764N, 46°42'737E, 07 Apr. 2014; 30 females *H.*

bacciferum, Dariah, Riyadh, 24°43'950N, 46°35'282E, 22 Apr. 2014; five females, *H. bacciferum*, Khasra, Makkah Riyadh road, 23°24'377N, 43°56'444E, 29 Apr. 2016; coll. M. Kamran.

Field association — This species was collected together with *Aegyptobia* sp. (Tenuipalpidae).

Previous records — Riyadh, ex *C. dactylon* (Negm and Alatawi 2013).

FAMILY BLATTISOCIIDAE

***Lasioseius parberlesei* Bhattacharyya**

Lasioseius parberlesei Bhattacharyya 1968: 532.

Lasioseius lindquisti Nasr and Abou-Awad, in Zaher, 1986: 68, Alatawi 2011a.

Material examined — Three females and one male, soil debris under date palms, Madinah, 29 July 2011, coll. J. Basahih; one female, grasses (Poaceae), near sea port, Jeddah, 30 Jan. 2015; two females, grasses (Poaceae), Wadi Hanifa, Dariah, Riyadh, 24°44'140N, 46°34'406E, 04 Sep. 2014, coll. M. Kamran; 5 females, grasses (Poaceae), Jazan, 25 May 2014, coll. J. Basahih.

Field association — This species was found in association with *Tetranychus* sp.

Previous Records — Hayer, ex *Capsicum* sp. (Solanaceae) (Alatawi 2011a).

**Key to the females of Phytoseioidea of Saudi
Arabia**

1. Dorsal shield with less than 20 pairs of setae, setae J1 absent, and with less than 4 pairs of marginal setae on soft integument 7
— Dorsal shield with more than 20 pairs of setae, setae J1 present, and usually with more than 4 pairs of marginal setae on soft integument..... 2
Family Blattisociidae Garman..... 2

2. Legs II-IV with median lobe of pulvillus broadly rounded; para-anal setae inserted anterior to hind margin of anus, and usually at least slightly shorter than postanal seta.....
Subfamily Blattisociinae, Genus *Lasioseius* Berlese..... 4

— Legs II-IV with median lobe of pulvillus slender, acute or narrowly rounded; para-anal setae inserted level with or posterior to hind margin of anus, and usually longer than postanal seta **Subfamily Platyseiniinae, Genus *Cheiroseius* Berlese**.....3

3. Tarsus I longer than tibia I *C. neocorniger* (Oudemans)

— Tarsus I shorter than tibia I or equal in length..... *C. serratus* (Halbert)

4. Anus remarkably large, length of anus = 1/4 to 1/3 of the length of the ventrianal Shield..... *Lasioseius (Borinquolaelaps) dentatus* Fox

— Anus normal, not remarkably large.....5

5. A number of dorsal setae trispinate.....
...*Lasioseius (Crinidens) queenslandicus* (Womersley)

— Dorsal setae acicular or pectinate6

6. Ventrianal shield with six pairs of setae.....
...*Lasioseius (Lasioseius) parberlesei* Bhattacharyya

— Ventrianal shield with five pairs of setae.....*Lasioseius (Cuspiacus) garambae* Krantz

7. Dorsal shield laterally incised, peritremes reduced, extending up to coxae II..... **Family Otopheidomenidae Treat, Genus *Nabiseius* Chant and Lindquist**.....*N. arabicus* Negm and Alatawi

— Dorsal shield entire, peritremes not reduced, extending anteriorly beyond coxae II..... **Family Phytoseiidae Berlese**.....8

8. Setae z3 and s6 absent 9

— Either or both setae z3 and s6 present.....35

9. Sternal shield with median posterior projection; preanal setae JV2 and ZV2 some migrated forwarded and inserted on anterior margin of ventrianal shield..... **Tribe Euseiini Chant and McMurtry**.....10

— Sternal shield without median posterior projection; preanal setae JV2 and ZV2 not migrated forward on ventrianal shield 14

10. Female ventrianal shield divided into separate ventral and anal shields, dorsal shield strongly sclerotized **Genus *Iphiseius* Berlese, *I. degenerans* Berlese**

— Female ventrianal shield entire, dorsal shield not strongly sclerotized .. **Genus *Euseius* Wainstein**..11

11. Peritreme extending up to the level between z2 and z4, spermathecal calyx long and slender..... *E. scutalis* (Athias-Henriot)

— Peritreme extending forward up to setae j3 ... 12

12. Dorsal shield setae in j series small, j1 29-32, j4 6-8, j5 6-8, j6 8-13, J2 8-13 13

— Dorsal shield setae in j series comparatively long, j1=j4 42, j5 49, j6 73, J2 75... *E. yousefi* (El-Borolossy)

13. Spermathecal calyx incompletely sclerotized, broad and apparently fused with atrium ... *E. batus* (Ueckermann and Loots)

— Spermathecal calyx completely sclerotized, proximal two third tubular and distal third cup-shaped not fused with the atrium *E. africanus* (Evans)

14. Setae s4 more than three times long than setae Z1, setae s4, Z5 and Z4 markedly longer than other dorsal setae **Tribe Amblyseiini**.....15

— Setae s4 less than three times as long as setae Z1, setae s4, Z5 and Z4 not greatly longer than other dorsal setae 19

15. Sternal shield as long as or longer than wide, setae J2 present **Genus *Amblyseius* Berlese, *A. largoensis* (Muma)**

— Sternal shield wider than long, setae J2 absent..... **Genus *Proprioseiopsis* Muma**.....16

16. Calyx of spermatheca cup shaped 17

— Calyx of spermatheca elongate and bell shaped..... 18

17. Setae Z5 longer than distance between their bases.....*P. aetus* (Chant)
— Setae Z5 longer than distance between their bases... ..*P. beatus* (Chaudhri)
18. Setae Z5 longer than distance between their bases, sternal shield medially smooth *P. messor* (Wainstein)
— Setae Z5 shorter than distance between their bases, sternal shield medially reticulated .. *P. ovatus* (Garman)
19. GeII without and GeIII rarely with macrosetae; fixed digit of chelicera usually with fewer than 6 teeth, rarely multidentate; never with these 2 character state together .. **Tribe Neoseiulini Chant and McMurtry** 20
— GeII without and GeIII rarely without macrosetae; fixed digit of chelicera usually with more than 6 teeth, most species with both of these 2 character states **Tribe Typhlodromipsini Chant and McMurtry, Typhlodromips De Leon, T. swirskii (Athias-Henriot)**
20. Female ventrianal shield with elongate and prominent waist, length/width ratio at narrowest point 3.3:1.0 primary metapodal platelets unusually elongate.....**Genus Paragigagnathus Amitai and Grinberg** 21
— Female ventrianal shield without prominent waist slightly longer then wider, primary metapodal platelet normal.....**Genus Neoseiulus Hughes**..... 24
21. All dorsal shield setae on prominent tubercles..... 22
— Only posterior setae on dorsal shield or some lateral setae on prominent tubercles 23
22. All dorsal shield setae long (range from 15 to 55 μm); ventrianal shield with three pairs of preanal setae, with/without pores; movable digit of chelicera smooth..... *P. desertorum* (Amitai and Swirski)
— All dorsal shield setae short (range from 11 to 29 μm); ventrianal shield with two pairs of preanal setae and a pair of minute pores; movable digit of chelicera with one blunt tooth *P. tamaricis* Amitai and Grinberg
23. Setae J5 serrated, dorsal shield setae short (9-25)..... *P. insuetus* (Livshitz and Kuznetsov)
— Setae J5 simple, dorsal shield setae long (15-50)..... *P. madinaensis* Alatawi, Kamran and Basahih
24. Macrosetae absent on leg IV *N. mumae* (Shehata and Zaher)
— Macrosetae present on leg IV 25
25. Spermatheca with atrium not forked at junction with major duct..... 26
— Spermatheca with atrium forked at junction with major duct..... 32
26. Dorsal shield with marked shoulder at the level of setae r3..... 27
— Dorsal shield without marked shoulder at the level of setae r3 28
27. Sternal and genital shield moderately reticulated; St IV short (less than 20 μm) .. *N. paspalivorus* (De leon)
— Sternal and genital shield smooth; StIV long (more than 50 μm)..... *N. rambami* (Swirski and Amitai)
28. Spermatheca without a stalk between calyx and atrium as atrium undifferentiated or no duller, joint directly to the calyx 29
— Spermatheca with atrium and calyx joined by a stalk 31
29. Sternal shield reticulated *N. zaheri* (El-Borolossy)
— Sternal shield smooth 30
30. Fixed digit of chelicerae with 9 to 10 teeth; moveable digit with 3 teeth *N. imbricatus* Corpuz-Raros and Rimando
— Fixed digit of chelicerae with 4-5 teeth; moveable

- digit with 1 tooth *N. cucumeris* (Oudemans)
31. Spermathecal calyx dish to bowl shaped, Z5 80-90 *N. bicaudus* (Wainstein)
— Spermathecal calyx bell shaped, Z5 40-50 *N. conterminus* (Kolodochka)
32. Calyx of spermatheca trumpet shaped; genu IV with macroseta *N. makuwa* (Ehara)
— Calyx of spermatheca cone-shaped; genu IV without macroseta 33
33. Spermatheca with a stalk between calyx and atrium *N. saudiensis* Negm, Alatawi and Aldryim
— Spermatheca without a stalk between calyx and atrium 34
34. Setae Z4 subequal in length to Z5 *N. cydnodactylon* (Shehata and Zaher)
— Setae Z4 shorter than Z5 *N. barkeri* Hughes
35. Setae Z1, S2, S4 and S5 absent... .. **Subfamily Phytoseiinae Berlese, Genus Phytoseius Ribaga** 36
— At least one of setae Z1, S2, S4 and S5 present... .. **Subfamily Typhlodrominae Chant and McMurtry** 37
36. Dorsal setae J2 and R1 present *P. plumifer* (Canestrini and Fanzago)
— Dorsal setae J2 and R1 absent... .. *P. tabukensis* n. sp.
37. Setae z3 absent, Z1 present **Genus Cydnoseius, C. negevi (Swirski and Amitai)**
— Setae z3 present, Z1 absent 38
38. Setae z6 present... .. **Genus Kuzinellus Wainstein**
— Setae z6 absent... .. **Genus Typhlodromus Scheuten** 39

39. Setae S5 present... .. **Subgenus Anthoseius De Leon** 40
— Setae S5 absent... .. **Subgenus Typhlodromus, T. (T.) pyri Scheuten**
40. Female ventrianal shield narrow... ..
..... *T. (A.) egypticus* (El-Badry)
— Female ventrianal shield almost pentagonal . . 41
41. Setae Z4 serrated, setae Z5 distally knobbed, ventrianal shield with a pair of preanal pores... .. *T. (A.) persianus* McMurtry
— Setae Z4 simple, setae Z5 distally sharped, ventrianal shield without a pair of preanal pores... .. *T. (A.) tamaricis* Kolodochka

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