Zootaxa 3918 (3): 439–445
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3918.3.8
http://zoobank.org/urn:lsid:zoobank.org:pub:61A020E6-1D75-463B-A9A3-D44D9705A475

A new species and two new records of the family Phytoseiidae (Acari: Mesostigmata) from Turkey

İSMAİL DÖKER, CENGİZ KAZAK & KAMİL KARUT
Çukurova University, Agricultural Faculty, Plant Protection Department, Acarology Laboratory, 01330 Adana, Turkey.
E-mail: idoker@cu.edu.tr

Abstract

Phytoseius ibrahimi Döker & Kazak **sp. nov.** is described and illustrated. The genus *Paragigagnathus* Amitai & Grinberg, represented by *P. insuetus* (Livshitz & Kuznetsov), and *Neoseiulus neomarginatus* Stathakis, Kapaxidi & Papadoulis, are recorded from Turkey for the first time. Identification keys for the Turkish species of *Phytoseius* Ribaga and *Neoseiulus* Hughes are provided.

Key words: taxonomy, predatory mites, *Neoseiulus*, *Phytoseius*, *Paragigagnathus*

Introduction

The genus *Phytoseius* Ribaga is the largest genus in the subfamily Phytoseiinae (Acari: Mesostigmata: Phytoseiidae), with more than 200 species in three species groups, which can be separated based on the presence and/or absence of dorsal setae J2 and R1 (Chant & McMurtry, 1994, 2007; Demite *et al*., 2014). Prior to this study, four species of this genus, namely *P. echinus* Wainstein & Arutunjan, *P. finitimus* Ribaga, *P. ribagai* Athias-Henriot and *P. salicis* Wainstein & Arutunjan were known from Turkey (Moraes *et al*., 2004; Faraji *et al*., 2011).

The genus *Neoseiulus* Hughes is one of the largest genera in the subfamily Amblyseiinae, with more than 350 species in ten species groups (Chant & McMurtry, 2003, 2007; Demite *et al*., 2014). Only 14 species have previously been recorded for the Turkish fauna (Faraji *et al*., 2011; Döker *et al*., 2014).

The genus *Paragigagnathus* Amitai & Grinberg is one of the least diverse genera in the subfamily Amblyseiinae, with about nine nominal species, seven of which were described from Palaearctic Region (Amitai & Grinberg, 1971; Kolodochka, 1989; Chant & McMurtry, 2007). However, none of them has been reported from Turkey so far. Members of this genus are known to be associated with tamarisk trees *Tamarix* sp. (Tamaricaceae), which are common in shoreline habitats in the Palaearctic Region (Papadoulis *et al*., 2009; Hajizadeh *et al*., 2010).

This paper reports a new species and two new records of phytoseiid mites from Turkey. Identification keys for the Turkish species of *Neoseiulus* and *Phytoseius* are also provided.

Material and methods

Mite specimens were directly collected from different plants using a camel hair brush and stored in 70% ethanol. Permanent slides were made using Hoyer's medium. A Leica Axioskop 2 with drawing tube was used for the illustrations. The taxonomic system is based on that proposed by Chant & McMurtry (2007). The setal nomenclature follows Lindquist & Evans (1965) as adapted by Rowell *et al*. (1978). Other terminology follows Athias-Henriot (1975, 1977) for organotaxy, Evans (1963) and Evans & Till (1979) for ventral pores and leg chaetotaxy, and Wainstein (1973) for the spermatheca, as proposed by Papadoulis *et al*. (2009). Dorsal and ventral setal pattern notations follow Chant & Yoshida-Shaul (1989, 1991, 1992b). All measurements are given in micrometres (μm) and presented as the mean followed by the range in parentheses. Keys are modified from those proposed by Faraji *et al*. (2011).

Accepted by B. Halliday: 30 Dec. 2014; published: 12 Feb. 2015

2. Peritreme very short, not reaching bases of any podonotal setae ... *P. ibrahimi* sp. nov.
- Peritreme longer, reaching bases of setae j3 ... *P. finitimus* Ribaga
3. Ventri-anal shield with one pair of pre-anal setae ... *P. ribagai* Athias-Henriot
- Ventri-anal shield with more than one pair of pre-anal setae ... 4
4. Ventri-anal shield with two pairs of pre-anal setae ... *P. salicis* Wainstein & Arutunjan
- Ventri-anal shield with three pairs of pre-anal setae ... *P. echinus* Wainstein & Arutunjan

Key to the Turkish species of *Neoseiulus* Hughes

*According to Abo-Shnaf & Moraes (2014), *Neoseiulus sharonensis* (Rivnay & Swirski) is senior synonym of *N. knappi* Zannou, Moraes, Ueckermann & Oliveira according to Abo-Shnaf & Moraes (2014).

1. Seta Z4 longer than seta Z5 ... *N. ornatus* (Athias-Henriot)
- Seta Z4 shorter than seta Z5 ... 2
2. Spermatheca with atrium forked at juncture with major duct, or atrium appearing thick-walled, vacuolated ... 3
- Spermatheca with atrium neither forked at juncture with major duct nor appearing thick-walled, vacuolated ... 8
3. Genu II with eight setae ... 4
- Genu II with seven setae ... 5
4. Atrium connected to calyx with a long neck ... *N. neomarginatus* Stathakis, Kapaxidi & Papadoulis
- Atrium connected to calyx with a very short neck ... *N. sekeroglui* Döker & Stathakis
5. Seta Z5 shorter than 40 µm ... *N. agrestis* (Karg)
- Seta Z5 longer than 40 µm ... 6
6. Atrium directly connected to calyx without a neck; distance between pre-anal solenostomes 1/3 distance between setae JV2 ... *N. barkeri* Hughes
- Atrium connected to calyx with a neck; distance between pre-anal solenostomes more than half the distance between setae JV2 ... 7
7. Dorsal shield reticulated; calyx longer, about 2/3 length of calyx plus neck plus atrium ... *N. alpinus* (Schweizer)
- Dorsal shield smooth with anterolateral striae; calyx shorter, about 1/2 length of calyx plus neck plus atrium ... *N. marginatus* (Wainstein)
8. Movable digit of chelicera smooth ... *N. zwoelferi* (Dosse)
- Movable digit of chelicera with teeth ... 9
9. Movable digit of chelicera with more than one tooth ... 10
- Movable digit of chelicera with only one tooth ... 12
10. Movable digit of chelicera with two teeth ... *N. umbraticus* (Chant)
- Movable digit of chelicera with three teeth ... 11
11. Both setae r1 and R3 longer than 40 µm ... *Neoseiulus sharonensis* (Rivnay & Swirski)*
- Both setae r1 and R3 shorter than 40 µm ... *N. californicus* (McGregor)
12. Spermatheca with a short neck between calyx and atrium ... *N. bicaudus* (Wainstein)
- Spermatheca without a neck between calyx and atrium ... 13
13. Macroseta of basitarsus IV longer than the distance between its base and the dorsal slit organ ... *N. cucumeris* (Oudemans)
- Macroseta of basitarsus IV shorter than the distance between its base and the dorsal slit organ ... 14
14. Seta S2 subequal to Z4; seta S2 reaches the insertion of S4; calyx of spermatheca short, L:W 1:1 ... *N. insularis* (Athias-Henriot)
- Seta S2 shorter than Z4; seta S2 not reaches the insertion of S4; calyx of spermatheca longer, L:W > 3:1 ... *N. astutus* (Beglyarov)

Acknowledgements

We thank Prof. Georgios Th. Papadoulis and Mr. Theodoros I. Stathakis (Agricultural University of Athens, Greece) for their comments on an early version of the manuscript. This study was funded by Scientific Research Foundation of Çukurova University, Project Number: ZF2013BAP6. Two anonymous reviewers are also acknowledged for their constructive suggestions.

References

Abo-Shnaf, R.I.A. & Moraes, G.J. de (2014) Phytoseiid mites (Acari: Phytoseiidae) from Egypt, with new records, descriptions of new species, and a key to species. *Zootaxa*, 3865 (1), 1–71. http://dx.doi.org/10.11646/zootaxa.3865.1.1

Amitai, S. & Grinberg, T. (1971) Description of a new phytoseiid genus and species (Acarina: Mesostigmata) from Israel. *Israel Journal of Entomology*, 6, 327–335.
Athias-Henriot, C. (1975) Nouvelles notes sur les Amblyseiini. II. Le releve organotaxique de la face dorsale adulte (Gamasides Protoadenique, Phytoseiidae). *Acarologia*, 17, 20–29.
Athias-Henriot, C. (1977) Nouvelles notes sur la Amblyseiini. III. Sur le genre *Cydnodromus*: Redefinition, composition [Parasitiformes, Phytoseiidae]. *Entomophaga*, 22, 61–73.
http://dx.doi.org/10.1007/bf02372991
Barbar, Z. (2013) Survey of phytoseiid mite species (Acari: Phytoseiidae) in citrus orchards in Lattakia governorate, Syria. *Acarologia*, 53, 247–261.
http://dx.doi.org/10.1051/acarologia/20132098
Chant, D.A. & McMurtry, J.A. (1994) A review of the subfamilies Phytoseiinae and Typhlodrominae (Acari: Phytoseiidae). *International Journal of Acarology*, 20, 223–310.
http://dx.doi.org/10.1080/01647959408684022
Chant, D.A. & McMurtry, J.A. (2003) A review of the subfamily Amblyseiinae Muma (Acari: Phytoseiidae): Part I. Neoseiulini new tribe. *International Journal of Acarology*, 29, 3–46.
http://dx.doi.org/10.1080/01647950308684319
Chant, D.A. & McMurtry, J.A. (2007) *Illustrated Keys and Diagnoses for the Genera and Subgenera of the Phytoseiidae of the World* (*Acari*: *Mesostigmata*). Indira Publishing House, West Bloomfield, Michigan, 220 pp.
Chant, D.A. & Yoshida-Shaul, E. (1989) Adult dorsal setal patterns in the family Phytoseiidae (Acari: Gamasina). *International Journal of Acarology*, 15, 219–233.
http://dx.doi.org/10.1080/01647958908683852
Chant, D.A. & Yoshida-Shaul, E. (1991) Adult ventral setal patterns in the family Phytoseiidae (Acari: Gamasina). *International Journal of Acarology*, 17, 187–199.
http://dx.doi.org/10.1080/01647959108683906
Chant, D.A. & Yoshida-Shaul, E. (1992a) A revision of the tribe Phytoseiini Berlese with a world review of the *purseglovei* species group in the genus *Phytoseius* Ribaga (Acari: Phytoseiidae). *International Journal of Acarology*, 18, 5–23.
http://dx.doi.org/10.1080/01647959208683924
Chant, D.A. & Yoshida-Shaul, E. (1992b) Adult idiosomal setal patterns in the family Phytoseiidae (Acari: Gamasina). *International Journal of Acarology*, 18, 177–193.
http://dx.doi.org/10.1080/01647959208683949
Demite, P.R., Moraes, G.J. de, McMurtry, J.A., Denmark, H.A. & Castilho, R. de C. (2014) Phytoseiidae Database. Available from: http://www.lea.esalq.usp.br/phytoseiidae (date of access 10 December 2014)
Döker, İ., Stathakis, T.I., Kazak, C., Karut, K. & Papadoulis, G.Th. (2014) Four new records and two new species of Phytoseiidae (Acari: Mesostigmata) from Turkey, with a key to the Turkish species. *Zootaxa*, 3827 (3), 331–342.
http://dx.doi.org/10.11646/zootaxa.3827.3.3
Evans, G.O. (1963) Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari: Mesostigmata). *Bulletin of the British Museum National History*, 10, 277–303.
Evans, G.O. & Till, W.M. (1979) Mesostigmatic mites of Britain and Ireland (Chelicerata: Acari – Parasitiformes): An introduction to their external morphology and classification. *Transactions of the Zoological Society of London*, 35, 139–270.
http://dx.doi.org/10.1111/j.1096-3642.1979.tb00059.x
Faraji, F., Çobanoğlu, S. & Çakmak, I. (2011) A checklist and a key for the Phytoseiidae species of Turkey with two new species records (Acari: Mesostigmata). *International Journal of Acarology*, 37, 221–243.
http://dx.doi.org/10.1080/01647954.2011.558851
Guanilo, A.D., Moraes, G.J. de & Knapp, M. (2008) Phytoseiid mites (Acari: Phytoseiidae) of the subfamilies Phytoseiinae Berlese and Typhlodrominae Wainstein from Peru, with descriptions of two new species. *Zootaxa*, 1729, 49–60.
Hajizadeh, J., Faraji, F., Rafatifard, M. & Kamranfard, F. (2010) The genus *Paragigagnathus* Amitai and Grinberg (Acari: Phytoseiidae) in Iran, with a key to the known species. *Systematic & Applied Acarology*, 15, 222–227.
Kolodochka, L.A. (1982) New phytoseiid mites (Parasitiformes: Phytoseiidae) from Turkmen. *Vestnik Zoologii*, 6, 7–13. [in Russian]
Kolodochka, L.A. (1989) A revision of the phytoseiid mites of the genus *Pamiroseius* Wain. (Parasitiformes: Phytoseiidae). *Entomologicheskoe Obozrenie*, 68, 221–229. [in Russian]
Lindquist, E.E. & Evans, G.O. (1965) Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata). *Memoirs of the Entomological Society of Canada*, 47, 1–64.
http://dx.doi.org/10.4039/entm9747fv
Livshitz, I.Z. & Kuznetsov, N.N. (1972) Phytoseiid mites from Crimea (Parasitiformes: Phytoseiidae). *In*: Pests and diseases of fruit and ornamental plants. *Proceedings of All-Union V. I. Lenin Academy of Agricultural Science*. *The State Nikita Botanical Gardens*, *Yalta*, *Ukraine*, 61, 13–64. [in Russian]
Moraes, G.J. de, McMurtry, J.A. & Denmark, H.A. (1986) *A Catalog of the Mite Family Phytoseiidae*: *References to Taxonomy*, *Synonymy*, *Distribution and Habitat*. EMBRAPA – DDT, Brasilia, Brazil, 353 pp.
Moraes, G.J. de, McMurtry, J.A., Denmark, H.A. & Campos, C.B. (2004) A revised catalog of the mite family Phytoseiidae.

Zootaxa, 434, 1–494.
Papadoulis, G.Th. & Emmanouel, N.G. (1991) The genus *Amblyseius* (Acari: Phytoseiidae) in Greece, with the description of a new species. *Entomologia Hellenica*, 9, 35–62.
Papadoulis, G.Th., Emmanouel, N.G. & Kapaxidi, E.V. (2009) *Phytoseiidae of Greece and Cyprus* (*Acari*: *Mesostigmata*). Indira Publishing House, West Bloomfield, Michigan, 200 pp.
Rowell, H.L., Chant, D.A. & Hansell, R.I.C. (1978) The determination of setal homologies and setal patterns on the dorsal shield in the family Phytoseiidae (Acarina: Mesostigmata). *The Canadian Entomologist*, 110, 859–876.
Schicha, E. & Corpuz-Raros, L.A. (1992) *Phytoseiidae of the Philippines*. Indira Publishing House, West Bloomfield, Michigan, 190 pp.
Stathakis, T.I., Kapaxidi, E.V. & Papadoulis, G.Th. (2013) Two new species of the genus *Neoseiulus* Hughes (Acari: Phytoseiidae) from Greece with re-description of *Neoseiulus leucophaeus* (Athias-Henriot). *Zootaxa*, 3681 (5), 563–572. http://dx.doi.org/10.11646/zootaxa.3681.5.5
Wainstein, B.A. (1969) Two new species of *Phytoseius* (Parasitiformes, Phytoseiidae). *Zoologicheskii Zhurnal*, 48, 1741–1743. [in Russian]
Wainstein, B.A. (1973) On the structure of some organs of Phytoseiidae (Parasitiformes) important for taxonomy. *Zoologicheskii Zhurnal*, 52, 1871–1872. [in Russian]