



## Raphignathoidea (Acari: Trombidiformes) of Turkey: A review of progress on the systematics, with an updated checklist

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Received: 12 December 2018 Accepted: 5 April 2019 Available online: 31 July 2019

**ABSTRACT:** The present paper provides a historical review of the researches on the superfamily Raphignathoidea in Turkey, with an updated list of the species known from Turkey. Most species reported from this country have been published in a wide range of different journals, mainly by Turkish researchers and a few by their colleagues from other countries, so there was a need to combine them in one paper. To date, about 250 papers on the taxonomy, fauna, morphology, biology and other related fields have been published by 90 authors. Presently, Raphignathoidea is represented in Turkey by 217 species in 26 genera of 8 families. The recorded species richness of the Turkish Raphignathoidea is about 20% of the known world Raphignathoidea fauna.

**Keywords:** Checklist, faunistic, historical review, mite, Raphignathoidea, taxonomy, Turkey.

### INTRODUCTION

The Raphignathoidea is a superfamily of the Acari, belonging to the mite suborder Prostigmata in the order Trombidiformes. This group currently contains 11 families, 8 of them have been recorded from Turkey: Barbutiidae, Caligonellidae, Camerobiidae, Cryptognathidae, Eupalopsellidae, Homocaligidae, Raphignathidae and Stigmaeidae (Doğan, 2007; Doğan and Dönel, 2009; Doğan et al., 2014b). The superfamily currently consists of around 1000 valid species in 66 genera (Fan and Zhang 2005, Zhang et al., 2011; Fan et al., 2016, 2019; Akyol, 2017).

Most species which are discovered from this country were published in scattered journals, mainly by the Turkish researchers and a few by their colleagues from other countries (Table 1). Up to date, this group is represented in Turkey by 217 species in 26 genera of 8 families (Table 2). The recorded species richness of the Turkish Raphignathoidea is about 20% of the world Raphignathoidea fauna. The aim of this paper is to provide an overview of researches on the Raphignathoidea of Turkey with an updated list of 217 raphignathoid species and some unidentified species in 9 genera, and to facilitate the future studies of the Raphignathoidea in Turkey.

#### Researches on raphignathoid mites in Turkey

##### Historical review

In Turkey, the first studies on this superfamily coincide with the early 1950s. These were agricultural studies related to the mite existence of Turkey in which new records were given. In this group, the first species *Zetzellia mali* (Ewing) was recorded by Düzgüneş (1963). It was known as the generic level in the past by the same author (Düzgüneş, 1954). Then, Özkan et al. (1988) listed the same species referring to these references. Özkan, who

was basic contributor to the development of modern Acarology, also made a significant contribution to taxonomy of ticks and water mites in Turkey.

The taxonomic studies on this superfamily started mainly in the mid 1990s and these studies continue. During this time some dissertation studies on this group were written by Koç (1995), Doğan (2002), Kara (2005), Akyol (2007), Kazaklı (2008), Dönel (2010), Özçelik (2010), Somuncu (2012), Uluçay (2013), Karasu (2015), Aksoy (2016), Bingül (2016) and Dilkaraoğlu (2016).

##### Taxonomic and faunistic research

Taxonomic research on this superfamily was initiated by Dr. N. Ayyıldız and his students Dr. K. Koç and Dr. S. Doğan, and their co-workers published a series of studies from 1996 to 2019. Doğan authored or co-authored many papers and described many species from 2001 to present.

The series of taxonomic studies on the superfamily were published from Turkey mainly by: Koç and Ayyıldız in 1996-2000, Koç in 1999-2005, Doğan and Ayyıldız in 2001-2006, Doğan in 2003-2008, 2019, Doğan and Doğan in 2018-2019; Doğan et al. in 2003-2019, Akyol and Koç in 2006-2017, Dönel and Doğan in 2010-2013, Akyol in 2011-2019, Uluçay and Koç in 2013-2014, Uluçay in 2014-2015, Dilkaraoğlu et al. in 2014-2016, Bingül and Doğan in 2016-2017, Bingül et al. in 2016-2018, Akyol and Gül in 2018.

Doğan (2001-2019) and his collaborators described many species, named 66 species, and recorded 43 species from Turkey for the first time. Doğan and Dönel (2010) recognized *Cryptofavognathus* as a distinct genus under the family Cryptognathidae Oudemans.

Doğan et al. (2016a) and Bingül et al. (2016) revealed the raphignathoid mite diversity in peridomestic habitats of

Erzincan city center. They digitally mapped the urban mite dispersion areas in the city using GIS spatial analysis techniques based on the locations. Doğan et al. (2019d) showed distribution areas of raphignathoid mite species of Harşit Valley (Turkey) on the maps using by Geographic Information Technology (GIT). Akyol and Özdemir (2016) statistically evaluated the dispersion of raphignathoid mite in Aegean coast, and Akyol and Koç (2016a) evaluated biodiversity of these mites from the interior and the coastal Aegean region.

Ueckermann and Koç (2005) drew raphignathoid specialists' attention to the authorship of this superfamily, according to article 36 of the International Code of Zoological Nomenclature.

Some pure faunistic works from 2003 to present time were performed by Çobanoğlu et al. (2003), Gençer et al. (2005), Kasap and Çobanoğlu (2007), Göven et al. (2009), Akyol (2012a, 2017), Somuncu and Koç (2012b), Dilkaraoğlu et al. (2016g), Doğan et al. (2014c, 2015d, 2017e, 2018d) and Akyol and Koç (2017c).

### Some taxonomic problems

Many species are still unknown and undescribed in Turkey. It is expected that the number of raphignathoid species in Turkey which inhabit different biotopes and climatic conditions will increase with comprehensive surveys.

There are some common problems in the taxonomy of this superfamily in Turkey. The first one, unfortunately, relationships between the Turkish acarologists and researchers suffer from a lack of communication. They work obliviously and separately from each other. Because of this situation, far from doing collective and comprehensive studies, they may will cause a taxonomic conflict sometimes. The striking one, some species have repeatedly been recorded under different papers. Another one is linguistic barrier. The Turkish researches are facing difficulties in communication with their colleagues who speak different languages.

Another problem, perhaps the most important one is that the specimens are missing or unavailable for further studies. Type specimens of a species are of great significance in nomenclature and taxonomy. If the concept of a new species is a hypothesis, then the future test of this hypothesis rests on the study of the primary type specimens. Therefore, they must be held in trust for science by the persons/institutions, which serve as repositories for primary type specimens (Liu et al., 2017). In Turkey many materials have been stored in the author's or their universities' collection in bad conditions. Unfortunately, there is no any natural historical museum or institution in Turkey for preserving of the type material and slide specimens used in publication. For depositing the specimen series in different collections in Turkey, professional institution must be urgently established. From now on, when there are multiple specimens, some can be sent to the depositories in different countries apart from our own

country. This minimises the risk of loss of the specimens and facilitates access to them.

### Catalogues and checklists

The mite lists of Turkey were previously published by Özkan et al. (1988, 1994). They mentioned only one raphignathoid species (*Zetzellia mali*) in the first list in 1988. Their second list in 1994 did not contain any raphignathoid taxa. Firstly, Doğan (2007) listed 112 raphignathoid species (including 2 undetermined species) in 6 families of the superfamily Raphignathoidea with distribution records and habitats in Turkey. Immediately after this first list, Erman et al. (2007) provided a supplement list of 291 Turkish mite taxa in the order Trombidiformes including Raphignathoidea. Then, Doğan (2008a) catalogued 52 species of the family Cryptognathidae Oudemans including distribution and habitat information of known cryptognathid species. Akyol (2013c) stated 152 species in 21 genera of 7 families, Akyol (2014b) enumerated 157 species in 22 genera of 7 families, and later Akyol et al. (2016) counted 174 species in 23 genera of 7 families in this superfamily in Turkey. The recent increase in the number of newly described and recorded species from Turkey has further exacerbated the urgency of an updated list on the superfamily.

### Research on morphology, biology and related fields

In Turkey there are limited researches about ecology and distribution of soil mites (Ayyıldız, 1987; Koç, 1991; Koç and Ayyıldız, 1992; Ayyıldız and Koç, 1994; Dik et al., 1999; Önen, 2002; Soydan, 2002; Kahveci et al., 2006; Urhan et al., 2008; Koç and Somuncu, 2011; Önen and Koç, 2011; Bezci et al., 2017). Somuncu and Koç (2012a), Akyol and Koç (2016b), and Koç and Poyraz Tınartaş (2017a) surveyed seasonal distribution of raphignathoid mites in Afyonkarahisar province and two counties of İzmir and Manisa.

Koç (1999), Doğan et al. (2004) and Dönel et al. (2011) examined the morphological features of all developmental stages of some raphignathoid mites. Doğan and Ayyıldız (2003d), Doğan (2008a), Dönel and Doğan (2011a), Uluçay (2015a), Uluçay and Koç (2014b), Dilkaraoğlu et al. (2016e), Doğan et al. (2017c,f, 2018f,l) gave first descriptions of immature and male stages of some species.

Doğan et al. (2017a, 2018a) discovered pharate female of *Eustigmaeus segnis* (Koch) under its deutonymphal integument.

Koç and Akyol (2004, 2007), Doğan (2006b), Akyol (2010, 2011a, 2014a, 2018c), Doğan et al. (2015a,c, 2016b, 2017d, 2018b,c,j,k), Dilkaraoğlu et al. (2015d, 2016f), Koç and Poyraz Tınartaş (2017b), Bingül and Doğan (2017c) and Bingül et al. (2017a-d, 2018) mentioned some morphological variations and abnormalities in some members of this superfamily.

Kütük and his co-workers with their overseas cooperation studied biology and life table parameters of *Agistemus industani* Gonzalez, *A. cyprius* Gonzalez and *A.*

*floridanus* Gonzalez (Stigmaeidae) under laboratory conditions (Goldarazena et al., 2004).

Doğan et al. (2003b, 2008), Ocağ et al. (2006, 2007) and Dönel et al. (2009-2010, 2012a) isolated external and internal fungi of raphignathoid mites and discussed the relationships between the isolated fungi and the mites. These studies were the primary works describing the mycoflora of raphignathoid mites. Most of fungi isolated from the mites are saprophytic and soilborn, only a few are entomopathogenic. The authors considered, on bases of their finding in the studies, that mites live in soil and decaying plant material, the setae on the mouthparts, leg setae and body setae are suitable for carrying fungus spores and some mites feed on them.

Karasu et al. (2015, 2018) determined infra-specific genetic variations based on RAPD-PCR method in *Eustigmaeus erciyensis* (Stigmaeidae). This work was a molecular-based study on *Eustigmaeus* species. Molecular approaches are currently among the most popular topics in life sciences and provide many opportunities in the solution of various problems. Karasu's work is important in terms of being the first study in this genus.

#### Checklist of the superfamily Raphignathoidea of Turkey

The Turkish raphignathoid species are arranged alphabetically within families and for each entrance the origin of reference to the published record is provided. Data from unpublished theses were not included here. In undetermined species list, the abbreviation "spp." used as plural shows possibly distinct unspecified species of the same genus in multiple recordings. References perused for the compilation of this research work, have been listed alphabetically in the reference list.

The family with largest number of species was Stigmaeidae (54.3%), with 118 species in 11 genera. The second one was Camerobiidae (16.1%), with 35 species in 3 genera. The other Raphignathidae was the third (10.5%), represented by 23 species in one genus.

#### Family BARBUTIIDAE (2 species in 1 genus)

1. *Barbutia anguineus* (Berlese) – Doğan and Dönel, 2009
2. *Barbutia iranensis* Bagheri, Navaei and Ueckermann – Dilkaraoğlu et al., 2016d; Doğan et al., 2016c; Dönel Akgül, 2016, 2019

#### Family CALIGONELLIDAE (14 species in 3 genera)

1. *Caligonella humilis* (Koch) – Koç and Ayyıldız, 1996b; Doğan, 2003c, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Dönel and Doğan, 2012a; Somuncu and Koç, 2012a,b; Doğan et al., 2015d, 2017e, 2018d,h,j; Bingül et al., 2016; Akyol and Koç, 2016a; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a; Akyol and Gül, 2018b
2. *Caligonella haddadi* Bagheri and Maleki – Yamaç et al., 2019

3. *Caligonella urhani* Akyol – Akyol, 2018a
4. *Molothrognathus crucis* Summers and Schlinger – Doğan, 2003c, 2007; Erman et al., 2007
5. *Molothrognathus kamili* Doğan – Doğan, 2003c, 2007; Erman et al., 2007; Akyol, 2017; Akyol and Gül, 2018b
6. *Molothrognathus phytocolus* Meyer and Ueckermann – Akyol and Koç, 2012
7. *Molothrognathus terrulentus* Meyer and Ueckermann – Akyol and Koç, 2012; Bingül et al., 2016
8. *Molothrognathus venusta* (Khaustov and Kuznetsov) – Koç and Ayyıldız, 1997a; Doğan, 2003c, 2007; Erman et al., 2007; Doğan et al., 2015d  
[*Molothrognathus artvinensis* Koç and Ayyıldız – Koç and Ayyıldız, 1997a]  
Synonymised to *M. venusta* by Doğan (2003c).
9. *Neognathus eupalopus* Meyer and Ueckermann – Doğan and Doğan, 2019b
10. *Neognathus ozkani* Akyol and Koç – Akyol and Koç, 2012; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a
11. *Neognathus pusillus* Doğan and Doğan – Doğan and Doğan, 2019b
12. *Neognathus spectabilis* (Summers and Schlinger) – Doğan, 2003c, 2007; Doğan et al., 2003b; 2015d, 2017e, 2018d; Erman et al., 2007; Bingül et al., 2016
13. *Neognathus terrestris* (Summers and Schlinger) – Doğan and Ayyıldız, 2003b; Doğan, 2003c, 2007; Erman et al., 2007; Dönel, and Doğan, 2012a,c; Dönel et al., 2012a; Doğan et al., 2015d, 2017e, 2018d,h,j; Bingül et al., 2016; Akyol, 2017
14. *Neognathus ueckermanni* Bagheri, Doğan and Haddad – Dilkaraoğlu et al., 2014; 2015e; Doğan et al., 2018d

#### Family CAMEROBIIDAE (35 species in 3 genera)

1. *Camerobia turcicus* Koç and Kara – Koç and Kara, 2005; Doğan, 2007; Erman et al., 2007
2. *Neophyllobius afyonensis* Akyol and Koç – Akyol and Koç, 2006e; Doğan, 2007; Erman et al., 2007
3. *Neophyllobius askalensis* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003d; Doğan, 2007; Erman et al., 2007
4. *Neophyllobius atriplicis* Bolland – Koç, 2001; Doğan, 2007; Erman et al., 2007
5. *Neophyllobius ayvalıkensis* Akyol – Akyol, 2013d

- [*Neophyllobius conocarpi* Bolland – Akyol, 2013a]
6. *Neophyllobius ayyildizi* Koç and Madanlar – Koç and Madanlar, 2002; Doğan, 2007; Erman et al., 2007
  7. *Neophyllobius bolvadinensis* Akyol and Koç – Akyol and Koç, 2006c; Doğan, 2007; Erman et al., 2007
  8. *Neophyllobius communis* Gerson – Koç, 1999; Doğan, 2007; Erman et al., 2007; Çobanoğlu and Yeşilayer, 2016; Akyol, 2017
  9. *Neophyllobius demirsoyi* Akyol and Koç – Akyol and Koç, 2006c; Doğan, 2007; Erman et al., 2007
  10. *Neophyllobius fani* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003d; Doğan, 2007; Erman et al., 2007
  11. *Neophyllobius izmirensis* Akyol – Akyol, 2013d
  12. *Neophyllobius karabagiensis* Akyol and Koç – Akyol and Koç, 2006a; Doğan, 2007; Erman et al., 2007; Akyol and Gül, 2018c
  13. *Neophyllobius lachishensis* Bolland – Akyol and Koç, 2006c; Doğan, 2007; Erman et al., 2007; Somuncu and Koç, 2012a,b; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a; Akyol and Gül, 2018c
  14. *Neophyllobius lamimani* McGregor – Akyol, 2012a,b; 2013b, 2017, 2018b
  15. *Neophyllobius olurensis* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003d; Doğan, 2007; Erman et al., 2007
  16. *Neophyllobius orhani* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003d; Doğan, 2007; Erman et al., 2007
  17. *Neophyllobius parthenocissi* Bolland – Akyol, 2012a,b; 2017, 2018b
  18. *Neophyllobius persiaensis* Khanjani and Ueckermann – Çobanoğlu and Yeşilayer, 2016
  19. *Neophyllobius podocarpi* Bolland – Koç, 2005b; Doğan, 2007; Erman et al., 2007
  20. *Neophyllobius populus* Akyol and Koç – Akyol and Koç, 2006a; Doğan, 2007; Erman et al., 2007; Akyol and Gül, 2018c
  21. *Neophyllobius quercus* Uluçay and Koç – Uluçay and Koç, 2014b
  22. *Neophyllobius sultanensis* Akyol and Koç – Akyol and Koç, 2006e; Doğan, 2007; Erman et al., 2007
  23. *Neophyllobius turcicus* Koç and Ayyıldız – Koç and Ayyıldız, 1996a; Doğan, 2007; Erman et al., 2007
  24. *Neophyllobius yunusi* Akyol and Koç – Akyol and Koç, 2006c; Doğan, 2007; Erman et al., 2007; Uluçay and Koç, 2014b; Akyol, 2017; Akyol and Gül, 2018c
  25. *Tycherobius anatolicus* Uluçay, Koç and Akyol – Uluçay et al., 2016c
  26. *Tycherobius bollandi* Ayyıldız and Doğan – Ayyıldız and Doğan, 2003; Doğan, 2007; Erman et al., 2007
  27. *Tycherobius dazkiriensis* Akyol and Koç – Akyol and Koç, 2006a; Doğan, 2007; Erman et al., 2007
  28. *Tycherobius farsiensis* Khanjani, Yazyanpanah, Ostovan and Fayaz – Akyol and Koç, 2017b; Koç and Poyraz Tınartaş, 2017a
  29. *Tycherobius iranensis* Khanjani, Yazyanpanah, Ostovan and Fayaz – Uluçay et al., 2016c
  30. *Tycherobius izmirensis* Akyol and Koç – Akyol and Koç, 2017b; Akyol and Gül, 2018c
  31. *Tycherobius polonicus* Bolland – Koç, 2005b; Koç and Akyol, 2007; Doğan, 2007; Erman et al., 2007
  32. *Tycherobius quercus* Bolland and Koç – Bolland and Koç, 2001; Doğan, 2007; Erman et al., 2007
  33. *Tycherobius sahragardi* Khanjani, Hajizadeh, Hoseini and Jalili – Uluçay et al., 2016c
  34. *Tycherobius stramenticola* Bolland – Koç and Ayyıldız, 1998a; Koç and Akyol, 2007; Doğan, 2007; Erman et al., 2007; Somuncu and Koç, 2012a,b; Koç and Poyraz Tınartaş, 2017a
  35. *Tycherobius turcicus* Ayyıldız and Doğan – Ayyıldız and Doğan, 2003; Doğan, 2007; Erman et al., 2007
- Family CRYPTOGNATHIDAE (18 species in 3 genera)**
1. *Cryptognathus ayyildizi* Akyol and Koç – Akyol and Koç, 2010; Uluçay and Koç, 2013a
  2. *Cryptognathus lagena* Kramer – Koç and Ayyıldız, 1998b; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Özçelik et al., 2010; Dönel and Doğan, 2008a, 2011b, 2012a; Dönel et al., 2012a; Uluçay and Koç, 2013a; Bingül et al., 2016; Akyol, 2017; Doğan et al., 2018e
  3. *Cryptognathus luteolus* Summers and Chaudhri – Koç and Ayyıldız, 1998b; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2008a, 2011b; Ayyıldız et al., 2010; Dönel et al., 2012a
  4. *Cryptognathus kutahyaensis* Uluçay and Koç – Uluçay and Koç, 2013a
  5. *Cryptognathus ozkani* Doğan and Ayyıldız – Doğan and Ayyıldız, 2001, 2003d; Doğan et al.,

- 2003b; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2008a, 2011b; Dönel et al., 2012a
6. *Cryptofavognathus afyonensis* (Koç and Akyol) – Koç and Akyol, 2004; Doğan and Dönel, 2010  
[*Favognathus afyonensis* Koç and Akyol – Koç and Akyol, 2004; Doğan, 2007, 2008a; Erman et al., 2007]
  7. *Cryptofavognathus anatolicus* Doğan and Dönel – Doğan and Dönel, 2010
  8. *Favognathus acaciae* Doğan and Ayyıldız – Doğan and Ayyıldız, 2004a; Doğan, 2007, 2008a; Erman et al., 2007; Dönel and Doğan, 2011b, 2012a; Dönel et al., 2012a; Bingül et al., 2016
  9. *Favognathus amygdalus* Doğan and Ayyıldız – Doğan and Ayyıldız, 2004a; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2008a, 2011b; Uluçay and Koç, 2013a; Akyol, 2017; Gül and Akyol, 2017a
  10. *Favognathus bafranus* Doğan – Doğan, 2008a; Dönel and Doğan, 2011b
  11. *Favognathus cucurbita* (Berlese) – Doğan and Ayyıldız, 2004a; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2008a, 2011b; Uluçay and Koç, 2013a; Doğan et al., 2015d, 2018e; Akyol, 2017; Gül and Akyol, 2017a
  12. *Favognathus distortus* (Kuznetsov) – Doğan, 2008a; Dönel and Doğan, 2011b; Doğan et al., 2018e
  13. *Favognathus erzurumensis* Doğan and Ayyıldız – Doğan and Ayyıldız, 2002; Doğan, 2007, 2008a; Erman et al., 2007
  14. *Favognathus izmirensis* Akyol – Akyol, 2011b, 2012a; Akyol, 2017; Gül and Akyol, 2017a
  15. *Favognathus kamili* Dönel and Doğan – Dönel and Doğan, 2011b; Uluçay and Koç, 2013a; Doğan et al., 2015d, 2018e; Bingül et al., 2016; Akyol, 2017; Gül and Akyol, 2017a  
[*Favognathus orbiculatus* (Livshitz) – Koç and Ayyıldız, 1999; Doğan et al., 2003b; Doğan and Ayyıldız, 2004a; Doğan, 2007; Erman et al., 2007]
  16. *Favognathus luxtoni* Koç and Ayyıldız – Koç and Ayyıldız, 1999; Doğan, 2007, 2008a; Erman et al., 2007; Akyol, 2017
  17. *Favognathus manisaensis* Akyol and Koç – Akyol and Koç, 2017a
  18. *Favognathus turcicus* Koç and Ayyıldız – Koç and Ayyıldız, 1999; Doğan, 2007, 2008a; Erman et al., 2007

#### Family EUPALOSELLIDAE (6 species in 3 genera)

1. *Eupalopsellus deformatus* Fan – Dilkaraoğlu et al., 2016c; Doğan et al., 2017g
2. *Eupalopsellus olandicus* Sellnick – Doğan and Ayyıldız, 2004; Doğan, 2007; Erman et al., 2007
3. *Eupalopsellus prasadi* Bagheri and Khanjani – Kasap et al., 2013a,b
4. *Eupalopsellus rostridius* Summers – Doğan, 2006b, 2007; Erman et al., 2007; Dönel and Doğan 2010; Dilkaraoğlu et al., 2016e
5. *Eupalopsis maseriensis* (Canestrini and Fanzago) – Doğan, 2008b
6. *Saniosulus deliquus* Doğan, Bingül and Doğan – Doğan et al., 2019a  
[*Saniosulus longidius* Fan, Zhang and Liu – Bingül et al., 2016; Doğan et al., 2019a]

#### Family HOMOCALIGIDAE (1 species)

1. *Homocaligus crassipus* Fan – Doğan et al., 2014a,b

#### Family RAPHIGNATHIDAE (23 species in 1 genus)

1. *Raphignathus afyonensis* Akyol and Koç – Akyol and Koç, 2006b; Doğan, 2007; Erman et al., 2007
2. *Raphignathus atyeoi* Meyer and Ueckermann – Doğan, 2003b; Doğan, 2007; Erman et al., 2007
3. *Raphignathus bathursti* Meyer and Ryke – Akyol and Koç, 2010
4. *Raphignathus collegiatus* Atyeo, Baker and Crossley – Doğan and Ayyıldız, 2003e; Doğan, 2003b, 2007; Koç and Akyol, 2004; Erman et al., 2007; Bingül et al., 2016; Doğan et al., 2018g, 2019c
5. *Raphignathus emirdagiensis* Akyol and Koç – Akyol and Koç, 2006b; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2012a; Bingül et al., 2016
6. *Raphignathus ensipilosus* Meyer and Ueckermann – Akyol and Koç, 2006b; Doğan, 2007; Erman et al., 2007
7. *Raphignathus erzincanica* Doğan – Doğan, 2003b, 2007; Erman et al., 2007; Dilkaraoğlu et al., 2016a
8. *Raphignathus fani* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003e; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2011a; Dönel et al., 2012a; Bingül et al., 2016; Doğan et al., 2018g, 2019c
9. *Raphignathus giresuniensis* Doğan – Doğan, 2003b, 2007; Erman et al., 2007

10. *Raphignathus giselae* Meyer and Ueckermann – Akyol and Koç, 2006d, 2007; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2012a; Akyol, 2017
11. *Raphignathus gracilis* (Rack) – Koç and Ayyıldız, 1996c; Doğan, 2003b, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Somuncu and Koç, 2012a,b; Dönel and Doğan, 2012a; Dönel et al., 2012a; Yeşilayer and Çobanoğlu, 2013; Doğan et al., 2015d, 2018g,j, 2019c; Bingül et al., 2016, 2017b, 2018; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a
12. *Raphignathus hecmatanaensis* Khanjani and Ueckermann – Doğan, 2003b, 2007; Erman et al., 2007; Dönel and Doğan, 2012a; Akyol, 2014a, 2017, 2018c; Akyol and Koç, 2016a; Bingül et al., 2016, 2017b, 2018; Gül and Akyol, 2017b; Doğan et al., 2018g, 2019c
13. *Raphignathus karabagiensis* Akyol and Koç – Akyol and Koç, 2006b; Doğan, 2007; Erman et al., 2007
14. *Raphignathus kelkitensis* Dönel and Doğan – Dönel and Doğan, 2011a
15. *Raphignathus khorramabadensis* Bagheri – Uluçay et al., 2016b
16. *Raphignathus koseiensis* Dönel and Doğan – Dönel and Doğan, 2013b
17. *Raphignathus kuznetzovi* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003e; Doğan, 2007; Erman et al., 2007; Somuncu and Koç, 2012a,b; Dönel and Doğan, 2012a; Dönel et al., 2012a; Bingül et al., 2016, 2017b, 2018; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a; Doğan et al., 2018g, 2019c
- [*Raphignathus hirtellus* Athias and Henriot – Koç and Ayyıldız, 1996c; Ayyıldız et al., 2010].
18. *Raphignathus ozkani* Doğan – Doğan, 2006b; 2007; Erman et al., 2007
- [*Raphignathus domesticus* Shiba – Doğan and Ayyıldız, 2006].
19. *Raphignathus protaspus* Khanjani and Ueckermann – Akyol and Koç, 2006d, 2007; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2012a; Özçelik et al., 2010; Somuncu and Koç, 2012a,b; Gül and Akyol, 2017b; Koç and Poyraz Tınartaş, 2017a
20. *Raphignathus quadrigeminus* Dönel and Doğan – Dönel and Doğan, 2013b
21. *Raphignathus ueckermanni* Koç and Kara – Koç and Kara, 2005; Doğan, 2007; Erman et al., 2007; Somuncu and Koç, 2012a,b; Akyol, 2017; Gül and Akyol, 2017b; Koç and Poyraz Tınartaş, 2017a
22. *Raphignathus vahiti* Doğan – Doğan, 2003b, 2007; Erman et al., 2007; Dönel and Doğan, 2012a
23. *Raphignathus zhaoi* Hu, Jing and Liang – Akyol and Koç, 2006b,d, 2007; Doğan, 2007; Erman et al., 2007; Özçelik et al., 2010; Dönel and Doğan, 2012a; Dönel et al., 2012a; Gül and Akyol, 2017b
- Family STIGMAEIDAE (118 species in 11 genera)**
1. *Agistemus collyerae* Gonzalez-Rodriguez – Kasap et al., 2013a; Yeşilayer and Çobanoğlu, 2013
2. *Agistemus duzgunesae* Koç, Çobanoğlu and Madanlar – Koç et al., 2005; Doğan, 2007; Erman et al., 2007
3. *Agistemus terminalis* (Quayle) – Göven et al., 2009; Yeşilayer and Çobanoğlu, 2013; Kasap et al., 2013a
4. *Cheylostigmaeus californicus* Summers and Ehara – Akyol and Koç, 2008, 2010
5. *Cheylostigmaeus salinus* Evans – Dönel and Doğan, 2011c
6. *Cheylostigmaeus mirabilis* Wood – Bingül et al., 2016
7. *Cheylostigmaeus salmani* Koç – Koç, 2005a; Doğan, 2007; Erman et al., 2007; Akyol, 2017
8. *Cheylostigmaeus tarae* Khanjani – Bingül et al., 2016; Bingül and Doğan, 2017a,b
9. *Cheylostigmaeus urhani* Dönel and Doğan – Dönel and Doğan, 2011c; Doğan et al., 2015d; Bingül et al., 2016
10. *Cheylostigmaeus variatus* Doğan, Dilkaraoğlu and Fan – Doğan et al., 2015c, 2018i
11. *Eryngiopus anatolicus* Doğan, Dilkaraoğlu and Fan – Doğan et al., 2015b; Dilkaraoğlu et al., 2016g
12. *Eryngiopus coheni* Vacante and Gerson – Uluçay, 2015d
13. *Eryngiopus siculus* Vacante and Gerson – Akyazı et al., 2016
14. *Eryngiopus tauricus* Kuznetsov – Yeşilayer and Çobanoğlu, 2013
15. *Eustigmaeus absens* Doğan – Doğan, 2005, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Dilkaraoğlu et al., 2016g
16. *Eustigmaeus anauniensis* (Canestrini) – Koç and Ayyıldız, 2000; Doğan et al., 2003b, 2015d, 2018h,j; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Özçelik et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c; Dönel

- et al., 2012a; Dilkaraoğlu et al., 2016g; Bingül et al., 2016; 2017c,d; Akyol and Koç, 2016a; Akyol, 2017; Akyol and Gül, 2017
17. *Eustigmaeus anophthalmus* Doğan, Dönel and Özçelik – Doğan et al., 2011
  18. *Eustigmaeus bali* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003c; Doğan, 2007; Erman et al., 2007
  19. *Eustigmaeus chilensis* (Chaudhri) – Koç and Ayyıldız, 2000; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010
  20. *Eustigmaeus collarti* (Cooreman) – Doğan 2004c; 2006a, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Bingül et al., 2016; Doğan and Doğan, 2018
  21. *Eustigmaeus dogani* Khanjani, Fayaz, Mirmoayedi and Ghaedi – Uluçay and Koç, 2013b, 2014a
  22. *Eustigmaeus erciyesiensis* Doğan, Ayyıldız and Fan – Doğan et al., 2003a, 2004, 2015d; Doğan, 2005, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Dilkaraoğlu et al., 2016g; Karasu et al., 2015, 2018; Doğan and Doğan, 2018
  23. *Eustigmaeus erzincanensis* Doğan – Doğan, 2005, 2007; Erman et al., 2007; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c; Doğan et al., 2015d, 2017f; Bingül et al., 2016; Dilkaraoğlu et al., 2016a,g
  24. *Eustigmaeus erzurumensis* Doğan – Doğan, 2005, 2007; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c; Dönel et al., 2012a; Bingül et al., 2016; Dilkaraoğlu et al., 2016g
  25. *Eustigmaeus jiangxiensis* Hu, Chen and Huang – Doğan, 2005, 2007; Erman et al., 2007; Özçelik et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c, 2012a; Dilkaraoğlu et al., 2016g; Bingül et al., 2016; 2017c,d; Doğan and Doğan, 2018
  26. *Eustigmaeus johnstoni* Zhang and Gerson – Özbel et al., 1999; Doğan, 2007; Erman et al., 2007; Pekağırbaş et al., 2017
  27. *Eustigmaeus kentingensis* Tseng – Doğan, 2005, 2007; Erman et al., 2007
  28. *Eustigmaeus kermesinus* (Koch) – Koç and Ayyıldız, 2000; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010
  29. *Eustigmaeus kulaensis* Akyol – Akyol, 2019a
  30. *Eustigmaeus lacuna* (Summers) – Özçelik and Doğan, 2011; Dönel and Doğan, 2011c Dilkaraoğlu et al., 2016g
  31. *Eustigmaeus pinnatus* (Kuznetsov) [Eustigmaeus ioanninensis Kapaxidi and Papadoulis – Doğan et al., 2003a, 2015d; Doğan, 2007; Erman et al., 2007; Özçelik and Doğan, 2011; Bingül et al., 2016; 2017c,d; Akyol, 2017; Akyol and Gül, 2017] Synonymised to *E. pinnatus* by Khaustov (2019).
  32. *Eustigmaeus ottavii* (Berlese) – Koç and Ayyıldız, 2000; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010
  33. *Eustigmaeus rhodomela* (Koch) – Dönel and Doğan, 2011c; Dönel et al., 2011; Dilkaraoğlu et al., 2016g [Eustigmaeus fani Doğan – Doğan, 2005, 2007; Erman et al., 2007] Synonymised to *E. rhodomela* by Faraji et al. (2007).
  34. *Eustigmaeus schusteri* (Summers and Price) – Doğan, 2005, 2007; Erman et al., 2007
  35. *Eustigmaeus sculptus* Doğan, Ayyıldız and Fan – Doğan et al., 2003a, 2015d; Doğan, 2007; Erman et al., 2007; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c; Dönel et al., 2012a; Dilkaraoğlu et al., 2016g; Bingül et al., 2016, 2017c,d; Akyol, 2017; Akyol and Gül, 2017; Doğan and Doğan, 2018
  36. *Eustigmaeus segnis* (Koch) – Koç and Ayyıldız, 2000; Doğan, 2005, 2007; Ocak et al., 2006, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Özçelik et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c, 2012a; Somuncu and Koç, 2012a,b; Dönel et al., 2012a; Dilkaraoğlu et al., 2016g; Bingül et al., 2016, 2017c,d; Doğan et al., 2003b, 2015d, 2017a, 2018a,c,h; Akyol and Koç, 2016a; Akyol, 2017; Akyol and Gül, 2017; Doğan and Doğan, 2018
  37. *Eustigmaeus setiferus* Bagheri, Saber, Uecker-mann, Ghorbani and Bonab –Doğan et al., 2019d
  38. *Eustigmaeus turcicus* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003c; Doğan, 2005, 2007; Erman et al., 2007; Özçelik et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c; Dönel et al., 2012a; Bingül et al., 2016; Dilkaraoğlu et al., 2016g; Akyol, 2017; Doğan et al., 2018f, 2019b
  39. *Eustigmaeus vacuus* Doğan – Doğan et al., 2003b; Doğan, 2005, 2007; Erman et al., 2007; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c, 2012a
  40. *Eustigmaeus varius* Dönel and Doğan – Dönel and Doğan, 2011c
  41. *Ledermuelleriopsis aydinensis* Akyol and Gül – Akyol and Gül, 2019
  42. *Ledermuelleriopsis ayyildizi* Doğan – Doğan, 2004b, 2007; Erman et al., 2007; Özçelik and

- Doğan, 2011; Dönel and Doğan, 2011c; Dönel et al., 2012a; Doğan et al., 2015d, 2018h,j; Bingül et al., 2016; Dilkaraoğlu et al., 2016g; Akyol, 2017
43. *Ledermuelleriopsis bisetalis* Doğan – Doğan, 2004b, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Dilkaraoğlu et al., 2016g
  44. *Ledermuelleriopsis giresuniensis* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003a; Doğan, 2007; Erman et al., 2007
  45. *Ledermuelleriopsis indiscretus* Dönel and Doğan – Dönel and Doğan, 2011c
  46. *Ledermuelleriopsis pulmosus* Willmann – Koç and Ayyıldız, 1997c; Doğan, 2007; Erman et al., 2007; Somuncu and Koç, 2012a,b; Doğan et al., 2015d; Bingül et al., 2016; Akyol, 2017; Koç and Poyraz Tınartaş, 2017a; Akyol and Gül, 2017
  47. *Ledermuelleriopsis punctata* Soliman – Koç and Ayyıldız, 1997c; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010
  48. *Ledermuelleriopsis rizeiensis* Doğan – Doğan, 2004a; Doğan, 2007; Erman et al., 2007; Dilkaraoğlu et al., 2016g
  49. *Ledermuelleriopsis sezeki* Doğan – Doğan, 2004b, 2007; Erman et al., 2007; Özçelik and Doğan, 2011
  50. *Ledermuelleriopsis tamariski* Maleki and Bagheri – Bingül and Doğan, 2016a,b; Bingül et al., 2016
  51. *Ledermuelleriopsis toleratus* Kuznetsov – Doğan, 2004b, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Bingül et al., 2016; Dilkaraoğlu et al., 2016g
  52. *Ledermuelleriopsis triscutata* Willmann – Koç and Ayyıldız, 1997c; Doğan, 2007; Erman et al., 2007
  53. *Mediolata acus* (Summers) – Doğan, 2006b, 2007; Erman et al., 2007
  54. *Mediolata chanti* Gonzalez-Rodriguez – Yeşilayer and Çobanoğlu, 2013
  55. *Mediolata granaria* Gonzalez-Rodriguez – Dönel and Doğan, 2012b
  56. *Mediolata obtecta* Dönel and Doğan – Dönel and Doğan, 2012b
  57. *Mediolata ozkani* Dönel and Doğan – Dönel and Doğan, 2012b
  58. *Mediolata petilus* Doğan and Ayyıldız – Doğan and Ayyıldız, 2004b; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2012a
  59. *Mediolata pini* (Canestrini) – Dilkaraoğlu et al., 2016g; Bingül et al., 2016
  60. *Mediolata turcica* Dönel and Doğan – Dönel and Doğan, 2012b
  61. *Prostigmaeus integrius* Dönel and Doğan – Dönel and Doğan, 2011c
  62. *Stigmaeus additicus* Dönel and Doğan – Dönel and Doğan, 2011c, 2012a; Doğan et al., 2015d
  63. *Stigmaeus amasyanus* Dönel, Doğan, Sevsay and Bal – Dönel et al., 2012b
  64. *Stigmaeus angustus* Dönel and Doğan – Dönel and Doğan, 2011c
  65. *Stigmaeus ayyildizi* Dönel and Doğan – Dönel and Doğan, 2011c
  66. *Stigmaeus communis* Doğan, Doğan and Erman – Doğan et al., 2017d
  67. *Stigmaeus berwariensis* Uluçay – Uluçay, 2015d
  68. *Stigmaeus bifurcus* Bingül, Doğan and Dilkaraoğlu – Bingül et al., 2017a
  69. *Stigmaeus ceylani* Uluçay – Uluçay, 2015b
  70. *Stigmaeus creber* Barilo – Uluçay, 2015c
  71. *Stigmaeus dazkiriensis* Akyol and Koç – Akyol and Koç, 2007; Akyol and Gül, 2017
  72. *Stigmaeus devlethanensis* Akyol and Koç – Akyol and Koç, 2007; Dönel and Doğan, 2011c; Doğan et al., 2015d; Dilkaraoğlu et al., 2015c, 2016g; Bingül et al., 2016
  73. *Stigmaeus dogani* Akyol – Akyol, 2019b
  74. *Stigmaeus elongatus* Berlese – Doğan, 2003a, 2007; Erman et al., 2007; Koç and Somuncu, 2012; Somuncu and Koç, 2012a,b; Doğan et al., 2015d, 2018b, 2019e; Bingül et al., 2016
  75. *Stigmaeus erzincanus* Doğan, Bingül, Dilkaraoğlu and Fan – Doğan et al., 2015a, 2017c, 2018h; Bingül et al., 2016, 2017c,d; Dilkaraoğlu et al., 2016a
  76. *Stigmaeus fidelis* Kuznetsov – Özçelik and Doğan, 2011; Dönel and Doğan, 2012a
  77. *Stigmaeus fimus* Doğan, Doğan and Erman – Doğan et al., 2017d
  78. *Stigmaeus furcatus* Dönel and Doğan – Dönel and Doğan, 2011c; Doğan and Doğan, 2019c
  79. *Stigmaeus glabrisetus* Summers – Özçelik and Doğan, 2011; Dönel and Doğan, 2011c
  80. *Stigmaeus harsitensis* Doğan, Doğan and Erman – Doğan et al., 2017d



81. *Stigmaeus hashtrudensis* Bagheri and Maleki – Uluçay, 2015c
82. *Stigmaeus indivisus* Doğan – Doğan, 2019
83. *Stigmaeus kamili* Doğan and Ayyıldız – Doğan and Ayyıldız, 2003f; Doğan, 2007; Erman et al., 2007
84. *Stigmaeus karabagiensis* Akyol and Koç – Akyol and Koç, 2007; Somuncu and Koç, 2012a,b
85. *Stigmaeus kelkitensis* Dönel and Doğan – Dönel and Doğan, 2011c; Dilkaraoğlu et al., 2016b,g
86. *Stigmaeus kumalariensis* Akyol and Koç – Akyol and Koç, 2007; Doğan et al., 2015d, 2018k, 2019f, Uluçay, 2015a
87. *Stigmaeus livschitzi* Kuznetsov – Dilkaraoğlu et al., 2016g; Doğan et al., 2017b
88. *Stigmaeus longiclipeatus* Doğan, Doğan and Erman – Doğan et al., 2017d
89. *Stigmaeus longipilis* (Canestrini) – Koç and Ayyıldız, 1997b; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2012a; Dilkaraoğlu et al., 2015d, 2016f,g
90. *Stigmaeus luxtoni* Wood – Doğan, 2003a, 2007; Erman et al., 2007; Özçelik et al., 2010; Bingül et al., 2016  
[*Stigmaeus turcica* Doğan – Doğan, 2003a, 2007; Erman et al., 2007]  
Synonymised to *S. luxtoni* by Faraji and Ueckermann (2006).
91. *Stigmaeus miandoabiensis* Bagheri and Zarei – Bingül et al., 2016, 2017a
92. *Stigmaeus obtectus* Summers – Koç and Ayyıldız, 1997b; Doğan, 2007; Erman et al., 2007; Ayyıldız et al., 2010
93. *Stigmaeus pilatus* Kuznetsov – Doğan and Ayyıldız, 2003f; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2011c, 2012a; Dönel et al., 2012a; Doğan et al., 2015d; Bingül et al., 2016; Dilkaraoğlu et al., 2016g; Akyol, 2017; Doğan and Doğan, 2018
94. *Stigmaeus planus* Kuznetsov – Koç and Ayyıldız, 1997b; Doğan, 2007; Erman et al., 2007; Dönel and Doğan, 2011c; Doğan et al., 2015d
95. *Stigmaeus pricei* Summers – Dilkaraoğlu et al., 2016g
96. *Stigmaeus pseudoparmatus* Doğan, Doğan and Erman – Doğan et al., 2017d
97. *Stigmaeus pulchellus* Kuznetsov – Uluçay, 2015a
98. *Stigmaeus sariensis* Bagheri – Uluçay et al., 2016a
99. *Stigmaeus scaber* Summers – Koç and Ayyıldız, 1997b; Doğan, 2007; Erman et al., 2007
100. *Stigmaeus seferihisarensis* Koç – Koç, 2005c; Doğan, 2007; Erman et al., 2007
101. *Stigmaeus siculus* (Berlese) – Doğan, 2006b, 2007; Erman et al., 2007; Dönel and Doğan, 2011c  
[*Stigmaeus scilus* [sic] (Berlese) – Dönel and Doğan, 2012a]
102. *Stigmaeus solidus* Kuznetsov – Dönel and Doğan, 2011c; Doğan et al., 2016b; Dilkaraoğlu et al., 2015f, 2016g; Bingül et al., 2017c,d
103. *Stigmaeus sphagneti* (Hull) – Doğan et al., 2014c, 2015d
104. *Stigmaeus tokatensis* Dönel, Doğan, Sevsay and Bal – Dönel et al., 2012b
105. *Stigmaeus tolstikovi* Khaustov – Doğan and Doğan, 2019a
106. *Stigmaeus urhani* Koç – Koç, 2005c; Doğan, 2007; Erman et al., 2007
107. *Stigmaeus uzunolukensis* Özçelik and Doğan – Özçelik and Doğan, 2011; Dilkaraoğlu et al., 2016g,h
108. *Storchia ardabiliensis* Safasadati, Khanjani, Razmjou and Doğan – Akyol, 2011a, 2012a, 2017; Koç and Somuncu, 2012; Somuncu and Koç, 2012a,b; Doğan et al., 2015d; Bingül et al., 2016
109. *Storchia hakkariensis* Uluçay – Uluçay, 2014
110. *Storchia hendersonae* Fan and Zhang – Dilkaraoğlu et al., 2015a,b; 2016g
111. *Storchia mehrvari* Bagheri and Gheblealivand – Koç and Poyraz Tınartaş, 2017a,b
112. *Storchia robusta* (Berlese) – Koç and Ayyıldız, 1997b; Doğan and Ayyıldız, 2003f; Doğan, 2007; Erman et al., 2007; Akyol, 2010, 2011a, 2017; Ayyıldız et al., 2010; Özçelik et al., 2010; Özçelik and Doğan, 2011; Dönel and Doğan, 2011c, 2012a; Somuncu and Koç, 2012a,b; Yeşilayer and Çobanoğlu, 2013; Doğan et al., 2015d; Dilkaraoğlu et al., 2016g; Bingül et al., 2016, 2017c,d; Koç and Poyraz Tınartaş, 2017a; Akyol and Gül, 2017
113. *Villersia sudetica* Willmann – Koç and Ayyıldız, 1997b; Doğan, 2007; Erman et al., 2007; Özçelik and Doğan, 2011
114. *Zetzellia crassirostris* (Leonardi) – Çobanoğlu and Kaźmierski, 1999

115. *Zetzellia erzincanica* Bingül and Doğan – Bingül and Doğan, 2017c
116. *Zetzellia kamili* Akyol and Gül – Akyol and Gül, 2018a
117. *Zetzellia mali* (Ewing) – Çobanoğlu and Kaźmierski, 1999; Akyazı and Ecevit, 2003; Çobanoğlu et al., 2003; Doğan, 2007; Kasap and Çobanoğlu, 2007; Kumral and Kovancı, 2007; Elma and Alaoğlu, 2008; Kasap et al., 2008, 2013a, 2014; Göven et al., 2009; Sağlam and Çobanoğlu, 2010; Dönel and Doğan, 2013a; Yeşilayer and Çobanoğlu, 2013; Satar et al., 2013; Çobanoğlu and Kumral, 2014; Kumral and Çobanoğlu, 2015a,b; Akyazı et al., 2017; Inak and Cobanoglu, 2018; Soysal and Akyazı, 2018; Altunç and Akyazı, 2019
- [*Mediolata mali* Ewing – Düzgüneş, 1963; Özkan et al., 1988]
118. *Zetzellia talhouki* Dosse – Koç and Madanlar, 1998; Doğan, 2007; Erman et al., 2007; Kasap et al., 2013a; Yeşilayer and Çobanoğlu, 2013; Akyazı et al., 2017

#### Undetermined species

1. *Agistemus* spp. – Özman and Çobanoğlu, 2001; Gençer et al., 2002, 2005; Çakmak and Akşit, 2003; Altunç and Akyazı, 2019
2. *Mediolata* spp. – Akyazı and Ecevit, 2003; Yanar and Ecevit, 2005, 2008; Çobanoğlu and Kumral, 2014
3. *Molothrognathus* sp. – Koç and Poyraz Tınartaş, 2017a
4. *Neognathus* sp. – Akyol and Gül, 2018b
5. *Neophyllobius* spp. – Doğan et al., 2015d; Akyazı et al., 2017; Koç and Poyraz Tınartaş, 2017a
6. *Raphignathus* sp. – Koç and Poyraz Tınartaş, 2017a
7. Stigmaeidae spp. – Bayram and Çobanoğlu, 2006
8. *Stigmaeus* spp. – Doğan et al., 2003b; Bayram and Çobanoğlu, 2006; Çobanoğlu, 2008
9. *Tycherobius* spp. – Akyol, 2017 (in immature stages); Koç and Poyraz Tınartaş, 2017a
10. *Zetzellia* sp. – Özman and Çobanoğlu, 2001; Satar et al., 2013

**Table 1.** A list of authors and their co-authors who published some raphignathoid papers on the taxonomy, fauna, morphology, biology and related fields in Turkey

A. Kaźmierski (Poland)	İ. Kasap	O. Erman
A. Özdemir	İ. Ocak	O.A. Kesik
A. Yarımbatman	İ. Uluçay	Ö. Alaoğlu
A. Yeşilayer	İ. Hasenekoğlu	Ö.F. Algur
B. Güven	İ.C. Balcıoğlu	Q.-H. Fan (New Zealand)
B. Kovancı	K. Koç	R. Akyazı
B. Polat	K.S. Coşkuncu	S. Adil
C. Uysal	M. Ada	R. Atlıhan
D. Akyol	M. Akyol	S. Çobanoğlu
D.A. Bal	M. Aykut	S. Doğan
D. Yanar	M. Bingül	S. Doğan (Dilkaraoğlu)
E. Ökten	M. Çankaya	S. Örtücü
E. Poyraz Tınartaş	M. Kara	S. Özçelik
E. Zeytun	M. Karakuş	S. Özensoy
E.A. Ueckermann (S. Africa)	M. Kuzucu	S. Pehlivan
F. Akkafa	M. Pekağırbaş	S. Satar
F. Akyazı	M. Soysal	S. Sevsay
F. Ersin	M. Ulukanlıgil	S. Somuncu
E. Polat	M.A. Göven	S. Töz
F. Faraji (The Netherlands)	M.B. Kaydan	S.Ç. Yamaç
F. Sezek	M.N. Aydoğan	S.K. Arserim
F.N. Elma	M.P. Gül	S.K. Özman
G. Dönel Akgül	M.S.Özgökçe	T. Akşit
H. Aksoy	M.Z. Alkan	Ş. Bayram
H. Eren	N. Ayyıldız	Ş. Kök
H. Kütük	N. Karasu	Ş. Uğurlu
H.D. Sağlam	N. Madanlar	Y. Özbel
H.H. Özbek	N.A. Kumral	Y.E. Altunç

H.R. Bolland (The Netherlands)	N.S. Gençer	Z. Düzgüneş
İ. Çakmak	O. Ecevit	Z. Soysal

**Table 2.** The number of raphignathoid mite species known from Turkey.

Superfamily RAPHIGNATHOIDEA
Family BARBUTIIDAE (1 genus, 2 species)
Genus <i>Barbutia</i> (2 species)
Family CALIGONELLIDAE (3 genera, 14 species)
Genus <i>Caligonella</i> (3 species)
Genus <i>Molothrognathus</i> (5 species)
Genus <i>Neognathus</i> (6 species)
Family CAMEROBIIDAE (3 genera, 35 species)
Genus <i>Camerobia</i> (1 species)
Genus <i>Neophyllobius</i> (23 species)
Genus <i>Tycherobius</i> (11 species)
Family CRYPTOGNATHIDAE (3 genera, 18 species)
Genus <i>Cryptognathus</i> (5 species)
Genus <i>Cryptofavognathus</i> (2 species)
Genus <i>Favognathus</i> (11 species)
Family EUPALOSELLIDAE (3 genera, 6 species)
Genus <i>Eupalopsellus</i> (4 species)
Genus <i>Eupalopsis</i> (1 species)
Genus <i>Saniosulus</i> (1 species)
Family HOMOCALIGIDAE (1 genus, 1 species)
Genus <i>Homocaligus</i> (1 species)
Family RAPHIGNATHIDAE (1 genus, 23 species)
Genus <i>Raphignathus</i> (23 species)
Family STIGMAEIDAE (11 genera, 118 species)
Genus <i>Agistemus</i> (3 species)
Genus <i>Cheylostigmaeus</i> (7 species)
Genus <i>Eryngiopus</i> (4 species)
Genus <i>Eustigmaeus</i> (26 species)
Genus <i>Ledermuelleriopsis</i> (12 species)
Genus <i>Mediolata</i> (8 species)
Genus <i>Prostigmaeus</i> (1 species)
Genus <i>Stigmaeus</i> (46 species)
Genus <i>Storchia</i> (5 species)
Genus <i>Villersia</i> (1 species)
Genus <i>Zetzellia</i> (5 species)

## Acknowledgments

This work was presented as short summary at the XV. International Congress of Acarology, held from September 2 to 8, 2018 in Antalya, Turkey.

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Edited by: Sebahat OZMAN-SULLIVAN

Reviewed by: Two anonymous referees

Citation: Doğan, S. 2019. Raphignathoidea (Acari: Trombidiformes) of Turkey: A review of progress on the systematics, with an updated checklist. Acarological Studies, 1 (2): 129-151.