Persian J. Acarol., 2024, Vol. 13, No. 4, pp. 797–811.
https://doi.org/10.22073/pja.v13i4.85563
Journal homepage: http://www.biotaxa.org/pja

Article

An annotated checklist of house dust mites (Acari: Acariformes) of Türkiye

Medeni Aykut

Department of Mathematics and Science, Ziya Gökalp Education Faculty, Dicle University, TR-21280 Diyarbakır, Türkiye; E-mail: medeni.aykut@dicle.edu.tr

ABSTRACT
This checklist of house dust mites (Acari: Trombidiformes, Sarcoptiformes) from Türkiye is based on published data and private collections. The species are listed alphabetically. In total, 33 dust mite species and their zoogeographical distributions are presented. This study represents the first checklist of house dust mite fauna in Türkiye.

KEYWORDS: Acariformes, distribution, domestic mites, stored mites, Trombidiformes.

PAPER INFO.: Received: 2 May 2024, Accepted by: *A. Saboori*, 2 August 2024, Published: 15 October 2024

INTRODUCTION

Allergic diseases have become increasingly prevalent worldwide over the past few decades. House dust mites (HDM's) are significant domestic sources of allergens, leading to allergic rhinitis, asthma, and atopic dermatitis (Huang *et al*. 2017; Dhaliwal *et al.* 2021). Up to a third of people with eczema who test positive for house dust mite allergies report worsening eczema or respiratory symptoms upon exposure to dust (Gülbahar *et al*. 2004; Nankervis *et al.* 2015). After discovering that dust mites and their residues cause allergic diseases, significant research has focused on this area. From 1980 to 2018, over 4,750 studies on this subject were indexed in the Web of Science Core Collection database (Demir *et al.* 2020). The term "house dust mite" generally refers to mites in the family Pyroglyphidae whose biotope is house dust (Colloff 2009).

In parallel with global studies, in Türkiye studies with regards of HDM's have accelerated after the 1980s. As a result, studies on this subject have been conducted in 38 of the 81 provinces of Türkiye (Fig. 1). Up to now several catalogues and checklists of mites (Acari) of Türkiye have been published (Özkan *et al.* 1988, 1994; Erman *et al.* 2007, 2010; Baran *et al.* 2018; Doğan 2019, 2022). In the mentioned studies mites belong to the various mite groups have been listed alphabetically without any informations. In the current study, mites that reported to be isolated only from the house dust were listed. This study is the first annotated checklist for Turkish HDM's. A total of 33 species belong to 10 families of Acariformes and two families of Trombidiformes are included in the checklist.

MATERIAL AND METHODS

All publications regarding HDMs from Türkiye were analyzed. It was observed that poor collecting methods, insufficient diagnostic experience, and disruption of mite integrity prevented the identify-

How to cite: Aykut, M. (2024) An annotated checklist of house dust mites (Acari: Acariformes) of Türkiye. *Persian Journal of Acarology*, 13(4): 797–811.

cation of mites at the species level in most studies. In this current study, only mite specimens identified to the species level were included in the checklist. Mites that could not be definitively identified were excluded. The classification was done based on Lindquist *et al.* (2009) and the species are arranged alphabetically.

Figure 1. Faunistic studies of the house dust mites in Türkiye. Studied provinces are shown in grey and unstudied provinces are shown in white.

RESULTS

Superorder Acariformes
Order Sarcoptiformes Reuter, 1909
Suborder Oribatida van der Hammen, 1968
Supercohort Desmonomata Woolley, 1973
Cohort Astigmata Canestrini, 1891
Superfamily Acaroidea Latreille, 1802
Family Acaridae Latreille, 1802
Genus *Acarus* Linnaeus, 1758

Acarus farris (Oudemans, 1905)

Distribution in Türkiye – Ankara, Diyarbakır, İzmir, Kars and Muş (Özkan *et al.* 1994; Aytekin *et al.* 2002; Aykut and Yılmaz 2010; Aykut *et al*. 2013a, b; Aykut 2021).

Distribution in the world – China, Germany, Iran, Poland and Spain (Amoli & Cunnington 1977; Franz *et al.* 1997; Sánchez-Ramos *et al.* 2007; Klimov and Tolstikov 2011).

Acarus siro Linnaeus, 1758

Distribution in Türkiye – Ankara, Diyarbakır, Erzincan, Erzurum, Edirne, Giresun, Kars, Kütahya and Trabzon (Akdemir & Gürdal 2005; Kalpaklıoğlu *et al.* 2004; Aykut *et al*. 2013a, b; Zeytun *et al.* 2015, 2016; Akdemir *et al*. 2019; Mutlu *et al.* 2019; Aykut 2021).

Distribution in the world – Algeria, Brazil, Chile, Colombia, Czech Republic, England, Finland, France, Greece, Palestine, India, Iran, Italy, Japan, Lithuania, Norway, Poland, Portugal, Russia, Spain, Sweden and Taiwan (Amoli and Cunnington 1977; Colloff 2009).

Genus *Acotyledon* Oudemans, 1903

Acotyledon tjibodas Zakhvatkin, 1941

Distribution in Türkiye – Muş (Aykut and Yılmaz 2010).
Distribution in the world – Germany, Pakistan (Franz *et al.* 1998; Halliday *et al.* 2018).

Genus *Baloghella* Mahunka, 1963

Baloghella melis (Wurst and Pfister 1990)

Distribution in Türkiye – İstanbul and Tekirdağ (Bakay *et al.* 2021).
Distribution in the world – Belgium, Germany and Poland (Fain and Lukoschus 1974; Wurst and Pfister 1990; Kurek *et al*. 2020)

Genus *Rhizoglyphus* Claparéde, 1869

Rhizoglyphus robini Claparéde, 1869

Distribution in Türkiye – Diyarbakır (Aykut *et al.* 2013a).
Distribution in the world – Australia, New Zealand and Poland (Radwan *et al.* 2000; Fan and Zhang 2003)

Genus *Tyrophagus* Oudemans, 1924

Tyrophagus perniciosus Zakhvatkin, 1941

Distribution in Türkiye – Antalya, Erzincan, Kars and Muş (Aykut *et al.* 2013a; Zeytun *et al.* 2015; Aykut 2021).
Distribution in the world – Australia, Bulgaria, England, Iran, Japan, Poland and Russia (Amoli and Cunnington 1977; Zhang and Fan 2005).

Tyrophagus putrescentiae (Schrank, 1781)

Distribution in Türkiye – Ankara, Bursa, Diyarbakır, Edirne, Elazığ, Erzincan, Erzurum, Giresun, İstanbul, İzmir, Kars, Kütahya, Malatya, Muş, Samsun and Tekirdağ (Özkan *et al.* 1988; Çobanoğlu 2008; Aytekin *et al.* 2002; Akdemir and Gürdal 2005; Kalpaklıoğlu *et al.* 2004; Güleğen *et al.* 2005; Aykut *et al.* 2013a, b; Zeytun *et al.* 2015; Akdemir *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021; Bakay *et al.* 2021).
Distribution in the world – Algeria, Argentina, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Czech Republic, Ecuador, England, Finland, France, Greece, India, Indonesia, Iran, Italy, Japan, Kazakhstan, Lithuania, Malaysia, Nigeria, Norway, South Korea, Spain, Sweden, Uzbekistan, Palestine, Panama, Peru, Poland, Portugal, Romania, Russia and Taiwan (Amoli and Cunnington 1977; Colloff 2009).

Family Suidasiidae Hughes, 1948

Genus *Suidasia* Oudemans, 1905

Suidasia nesbitti Hughes, 1948

Distribution in Türkiye – Erzincan (Zeytun *et al*. 2016).

Distribution in the world – Asia, Africa, Australia, Europe, North America; Puerto Rico, and United Kingdom (Amoli and Cunnington 1977; Montealegre *et al.* 1997; Devi *et al.* 2022).

Superfamily Analgoidea Trouessart and Mégnin, 1884
Family Pyroglyphidae Cunliffe, 1958
Genus *Euroglyphus* Fain, 1965

Euroglyphus maynei (Cooreman, 1950)

Distribution in Türkiye – Diyarbakır, Erzincan, Giresun, İstanbul, Kars, Muş and Tekirdağ (Aykut *et al.* 2013a, b; Zeytun *et al*. 2015, 2016; Akdemir *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021; Bakay *et al*. 2021).

Distribution in the world – Algeria, U.S.A., Argentina, Belgium, Brazil, Bulgaria, China, Colombia, Costa Rica, Czech Republic, Denmark, Finland, France, Germany, Greece, Indonesia, Iran, Italy, Japan, Kazakhstan, Kenya, Lithuania, Malaysia, The Netherlands, Norway, Palestine, Peru, Poland, Portugal, Romania, Spain, Sweden, Thailand and Uzbekistan (Amoli and Cunnington 1977; Colloff 2009).

Genus *Dermatophagoides* Bogdanov, 1864

Dermatophagoides aureliani Fain, 1967

Distribution in Türkiye – Muş (Aykut *et al.* 2013b).

Distribution in the world – Africa, Brasil, India (Fain and Rosa 1982; Colloff 2009; Dhaliwal *et al*. 2021).

Dermatophagoides farinae Hughes, 1961

Distribution in Türkiye – Ankara, Bursa, Çanakkale, Diyarbakır, Giresun, Hatay, İstanbul, İzmir, Kars, Muş, Ordu and Tekirdağ (Özkan *et al.* 1988; Kalpaklıoğlu *et al.* 1997; Güleğen *et al.* 2005; Aykut *et al.* 2013a, b; Zeytun *et al.* 2016; 2018; Akyazı *et al.* 2018; Akdemir *et al.* 2019; Gulkan *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021; Bakay *et al.* 2021; Kılıç *et al.* 2021).

Distribution in the world – It is a cosmopolite species and its presence has been reported in all countries studied (Colloff 2009).

Dermatophagoides microceras Griffiths & Cunnington, 1971

Distribution in Türkiye – Diyarbakır (Aykut *et al.* 2013a).

Distribution in the world – England, India and Taiwan (Griffiths and Cunnington 1971; Dhaliwal *et al.* 2021; Hu *et al.* 2022).

Dermatophagoides pteronyssinus (Trouessart, 1897)

Distribution in Türkiye – Ankara, Bitlis, Bursa, Çanakkale, Denizli, Diyarbakır, Erzincan, Eskişehir, Giresun, Hatay, Isparta, İstanbul, İzmir, Kars, Konya, Kütahya, Malatya, Manisa, Muş, Ordu, Samsun, Sivas, Tekirdağ and Uşak (Budak 1988; Kalpaklıoğlu *et al.* 1997; Güngör *et al.* 1999; Aygan and Özçelik 2002; Akdemir and Gürdal 2005; Güleğen *et al.* 2005; Atambay *et al.* 2006; Çiftçi *et al.* 2006; Doğan *et al.* 2008; Aykut and Yılmaz 2010; Aykut *et al.* 2013a, b; Zeytun *et al.* 2015, 2016, 2018; Akyazı *et al.* 2018; Akdemir *et al.* 2019; Gulkan *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021; Bakay *et al.* 2021; Kılıç *et al.* 2021).

Distribution in the world – It is a cosmopolite species and its presence has been reported in all countries studied (Colloff 2009).

***Dermatophagoides siboney* Dusbabek, Cuervo & Cruz, 1982**

Distribution in Türkiye – Muş (Aykut *et al.* 2013b).
Distribution in the world – Algeria, Cuba, Panama and Puerto Rico (Montealegre *et al.* 1997; Colloff 2009).

Superfamily Hemisarcoptoidea Oudemans, 1904
Family Carpoglyphidae Oudemans, 1923
Genus *Carpoglyphus* Robin, 1869

***Carpoglyphus lactis* (Linnaeus, 1758)**

Distribution in Türkiye – Bitlis and Muş (Aykut *et al.* 2013a).
Distribution in the world – It is a cosmopolite species. It is commonly found in dried fruits such as dried apricots, figs and prunes in North America and throughout Europe (Özer and Toros 1978).

Family Winterschmidtiidae Oudemans, 1923
Genus *Allocalvolia* Fain and Rack, 1987

***Allocalvolia habrocytus* Fain & Rack, 1987**

Distribution in Türkiye – Bitlis and Muş (Aykut *et al.* 2013b).
Distribution in the world – Austria (Fain 1987).

Superfamily Glycyphagoidea Berlese, 1897
Family Chortoglyphidae Berlese, 1897
Genus *Chortoglyphus* Berlese, 1897

***Chortoglyphus arcuatus* (Troupeau, 1879)**

Distribution in Türkiye – Afyon, Ankara, Bitlis, Denizli, Diyarbakır, Eskişehir, Giresun, Hatay, Isparta, Kütahya, Malatya, Muş, Ordu and Uşak (Kalpaklıoğlu *et al.* 2004; Atambay *et al.* 2006; Çiftçi *et al.* 2006; Doğan *et al.* 2008; Aykut and Yılmaz 2010; Aykut *et al.* 2013a, b; Akyazı *et al.* 2018; Akdemir *et al.* 2019; Gulkan *et al.* 2019; Mutlu *et al.* 2019).
Distribution in the world – Algeria, Belgium, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Czech Republic, Ecuador, Finland, France, Georgia, Germany, India, Iran, Italy, Japan, Lithuania, Malaysia, The Netherlands, New Zealand, Norway, Panama, Peru, Poland, Portugal, Puerto Rico, Russia, Slovakia, Spain, Taiwan and U.S.A., (Amoli and Cunnington 1977; Colloff 2009).

Family Glycyphagidae Berlese, 1887
Genus *Glycyphagus* Hering, 1838

***Glycyphagus domesticus* (De Geer, 1778)**

Distribution in Türkiye – Ankara, Bitlis, Bursa, Diyarbakır, Edirne, Eskişehir, Giresun, İzmir, Kars, Kütahya and Muş (Akdemir and Gürdal 2005; Kalpaklıoğlu *et al.* 2004; Güleğen *et al.* 2005; Aykut *et al.* 2013a, b; Zeytun *et al.* 2016; Akdemir *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021).

Distribution in the world – Algeria, Argentina, Belgium, Bulgaria, Chile, Czech Republic, Denmark, Ecuador, England, Ethiopia, Finland, France, Germany, Greece India, Iran, Italy, Japan, Kazakhstan, Lithuania, New Zealand, Norway, Peru, Poland, Portugal, Russia, South Korea, Spain and Sweden (Colloff 2009).

Glycyphagus privatus Oudemans, 1903

Distribution in Türkiye – Erzincan, İzmir and Muş (Özkan *et al.* 1994; Aykut *et al.* 2013a; Zeytun *et al.* 2015).

Distribution in the world – China, Czech Republic, Italy, Poland and Spain (Boner *et al.* 1989; Tinghuan 1989; Boquete *et al.* 2006; Stejskal and Hubert 2008; Solarz 2009).

Genus *Gohieria* Oudemans, 1939

Gohieria fusca (Oudemans, 1902)

Distribution in Türkiye – Diyarbakır, İstanbul, Kars, Kocaeli and Muş (Kalpaklıoglu *et al.* 1997; Aykut *et al.* 2013a, b; Aykut 2021).

Distribution in the world – Argentina, Algeria, Belgium, Chile, Colombia, Costa Rica, Czech Republic, England, France, Greece, India, Iran, Japan, Kazakhstan, Lithuania, The Netherlands, New Zealand, Peru, Poland, Portugal, Russia, Slovakia and Spain (Colloff 2009).

Genus *Lepidoglyphus* Zachvatkin, 1936

Lepidoglyphus destructor (Schrank, 1781)

Distribution in Türkiye – Ankara, Bursa, Denizli, Diyarbakır, Erzincan, Eskişehir, Giresun, Hatay, Isparta, İstanbul, İzmir, Kars, Konya, Kütahya, Malatya, Manisa, Muş, Ordu, Sivas and Uşak (Budak 1988; Özkan *et al.* 1994; Kalpaklıoğlu *et al.* 1997; Güngör *et al.* 1999; Aygan and Özçelik 2002; Akdemir and Gürdal 2005; Güleğen *et al.* 2005; Çiftçi *et al.* 2006; Atambay *et al.* 2006; Doğan *et al.* 2008; Aykut and Yılmaz 2010; Aykut *et al.* 2013a, b; 2016; Zeytun *et. al.* 2015; 2016; Akyazı *et al.* 2018; Akdemir *et al.* 2019; Gulkan *et al.* 2019; Mutlu *et al.* 2019; Aykut 2021).

Distribution in the world – It is a cosmopolite species and its presence has been reported in all countries studied (Colloff 2009).

Cohort Brachypylina Hull, 1918
Superfamily Oppioidea Grandjean, 1951
Family Oppiidae Grandjean, 1951
Genus: *Ramusella* Hammer, 1962

Ramusella elliptica (Berlese, 1908)

Distribution in Türkiye – Bitlis, Erzurum, Kars, Muş and Yozgat (Baran and Ayyıldız 2004; Erman *et al.* 2007; Toluk and Ayyıldız 2008; Aykut *et al.* 2013b; Aykut 2021).

Distribution in the world – It is widespread in the Holarctic region (Weigmann 2006).

Ramusella fasciata (Paoli, 1908)

Distribution in Türkiye – Bitlis, Kars and Muş (Aykut *et al.* 2013b; Aykut 2021).

Distribution in the world – It is widespread in the Holarctic region (Weigmann 2006).

Superfamily Oripodoidea Jacot, 1925

Family Oribatulidae Thor, 1929
Genus *Zygoribatula* Berlese, 1916

***Zygoribatula excavata* Berlese, 1916**

Distribution in Türkiye – Erzincan (Zeytun *et al*. 2016).
Distribution in the world – Italy, Spain (Caruso *et al.* 2009; Camps-Sagué *et al*. 2024)

SupercohortEnarthronota Grandjean, 1969
Superfamily Protoplophoroidea Ewing, 1917
Family Haplochthoniidae van der Hammen, 1959
Genus *Haplochthonius* Willmann, 1930

***Haplochthonius simplex* (Willmann, 1930)**

Distribution in Türkiye – Ordu (Akyazı *et al.* 2019).
Distribution in the world – Japan, Spain, Ukraine (Sakaki and Suto 1996; Seniczak and Seniczak 2010a; b)

Family Cosmochthoniidae Grandjean, 1947
Genus *Cosmochthonius* Berlese, 1910

***Cosmochthonius lanatus* (Michael, 1885)**

Distribution in Türkiye – Bitlis, Kars and Muş (Aykut *et al.* 2013a; Aykut 2021).
Distribution in the world – It is widespread in the Holarctic region (Weigmann 2006).

***Cosmochthonius plumatus* Berlese, 1910**

Distribution in Türkiye – Muş and Kars (Aykut *et al.* 2013b; Aykut 2021).
Distribution in the world – It is widespread in the Holarctic region (Weigmann 2006).

***Cosmochthonius reticulatus* Grandjean, 1947**

Distribution in Türkiye – Erzincan (Zeytun *et. al*. 2016).
Distribution in the world – It is widespread in the Holarctic region (Weigmann 2006).

Order Trombidiformes Reuter, 1909
Suborder Prostigmata Kramer, 1877
Supercohort Eleutherengona Oudemans, 1909
Cohort Raphignathina Kethley, 1982
Superfamily Cheyletoidea Leach, 1815
Family Cheyletidae Leach, 1815
***Genus Cheyletus* Latreille, 1776**

***Cheyletus eruditus* (Schrank, 1781)**

Distribution in Türkiye – Ankara, Antalya, Bitlis, Erzincan, İzmir and Muş (Özkan *et al.* 1988; Kalpaklıoğlu *et al.* 1997; Aykut *et al.* 2013b; Zeytun *et al*. 2016; Aykut 2021).

Distribution in the world – Australia, Belgium, Brazil, Brunei, Bulgaria, Chile, China, Colombia, Cuba, Czech Republic, England, Finland, France, Greece, India, Iran, Italy, Japan, New Zealand, Nigeria, Palestine, Poland, Portugal, Romania, Slovakia, Tajikistan and U.S.A. (Colloff 2009).

Cheyletus malaccensis Oudemans, 1903

Distribution in Türkiye – Bitlis, Erzincan, İzmir, Kars and Muş (Özkan *et al.* 1988; Aykut *et al.* 2013b; Zeytun *et al*. 2016; Aykut 2021).

Distribution in the world – Armenia, Burma, China, Czech Republic, England, Germany, Iran, Korea, Malaysia, Saudi Arabia, Senegal, Uganda, (Franz *et al.* 1997; Han *et al.* 1997; Mariana *et al.* 2000; Baker and Craven 2003; Lukas *et al.* 2006; Soleimani and Rafinejad 2008; Edres 2009; Beron 2021).

Genus *Acaropsellina* Summers, 1976

Acaropsellina docta (Berlese, 1886)

Distribution in Türkiye – Bitlis and Muş (Aykut *et al.* 2013b).

Distribution in the world – China, Czech Republic, Egypt, England, Greece, Great Britain, Holland, Hungary, Iran, Pakistan, Poland, (Qayyum and Chaudhri 1979; Baker and Craven 2003; Lukas *et al.* 2006; Beron 2021).

Genus *Cheyletiella* Yasguri Smiley, 1965

Paracheyletiella volgini (Mégnin,1878)

Distribution in Türkiye – İstanbul and Tekirdağ (Bakay *et al.* 2021).

Distribution in the world – Russia and Ukraine (Beron 2021)

Superfamily Raphignathoidea Kramer 1877
Family Raphignathidae Kramer, 1877
Genus *Raphignathus* Dugès 1834

Raphignathus collegiatus Atyeo, Baker & Crossley, 1961

Distribution in Türkiye – Erzincan (Zeytun *et al*. 2016).

Distribution in the world – Egypt, Hungary, Iran and Russia (Ripka *et al.* 2005; Bochkov 2008; Khanjani and Ueckermann 2003; Zaher and Gomaa 1981).

DISCUSSION

Temperate and humid environments (75–80% relative humidity [RH] and 25–30 °C) are optimal conditions for house dust mites. Türkiye, with its seven geographical regions featuring diverse climates, provides optimal conditions for dust mites. As mentioned in above, many mite specimens collected from house dust samples could not be identified to the species level. Further studies and complete diagnoses are expected to increase the number of species representing the house dust mite fauna of Türkiye.

ACKNOWLEDGMENT

I wish to express my sincere thanks to Dr. Osman Solmaz, a member of the English Language Teaching Department at Ziya Gökalp Education Faculty, Dicle University, for improving the English of an earlier version and providing linguistic assistance.

REFERENCES

Akdemir, C. & Gürdal, H. (2005) House dust mites in Kütahya, Turkey. *Acta Parasitologica Turcica*, 29(2): 110–115.

Akdemir, C., Uzunoğlu, E., Direkel, Ş. & Güler, N.C. (2019) The investigation of the prevalance and epidemiology of house dust mites in Giresun. *Acta Parasitologica Turcica*, 43(2): 78. DOI: 10.4274/tpd.galenos.2019.6149

Akyazı, R., Soysal, M. & Akyol, D. (2018) House dust mite population in the bedrooms of people with dust mite allergy in the city of Ordu, Turkey. *Türkiye Entomoloji Dergisi*, 42(3): 205–213. DOI: 10.16970/entoted.427959

Akyazı, R., Soysal, M., Klimov, P.B. & Altunc, Y.E. (2019) House dust mite Species in Ordu, Turkey. *Journal of Agricultural Sciences*, 25(4): 417–426. DOI: 10.15832/ankutbd.441469

Amoli, K. & Cunnington, A.M. (1977) House dust mites in Iran. *Clinical & Experimental Allergy*, 7(1): 93–101.

Atambay, M., Aycan, O.M. & Daldal, N. (2006) House dust mite fauna in Malatya. *Acta Parasitologica Turcica*, 30(3): 205–208.

Aygan, Ç. & Özçelik, S. (2002) The prevalence of mites in specimens of house dust and their possible role in atopic allergy. *Acta Parasitologica Turcica*, 26: 186–191.

Aykut, M. & Yilmaz, H. (2010) Distribution of house dust mites in Hasköy town, Muş. *Acta Parasitologica Turcica*, 34(4): 160–163. DOI: 10.5152/tpd.2010.04

Aykut, M., Erman, Ö.K. & Doğan, S. (2013a) The incidence of house dust mites in home, hotels and dormitories in Diyarbakır of Turkey. *Dicle University Journal of the Institute of Natural & Applied Science*, 2: 41–47.

Aykut, M., Erman, Ö.K. & Doğan, S. (2016) Variability in population density of house dust mites of Bitlis and Muş, Turkey. *Journal of Medical Entomology*, 53(3): 513–518. DOI: 10.1093/jme/tjw009

Aykut, M., Erman, Ö.K., Doğan, S. & Ayyıldız, N. (2013b) House dust mites of Bitlis and Muş provinces. *Turkish Bulletin of Entomology*, 3: 169–177.

Aykut, M. (2021) Comparison of goose down and woolen pillows in terms of house dust mites. *Systematic & Applied Acarology*, 26(11): 2070–2077. DOI: 10.11158/saa.26.11.7

Aytekin, M.A., Çağatay, N. & Hazır, S. (2002) Floral choices, parasites and micro-organisms in natural populations of bumblebees (Apidae: Hymenoptera) in Ankara Province. *Acta Parasitologica Turcica*, 26: 149–155.

Bakay, B.B., Bakay, H. & Gülpınar, D. (2021) Factors affecting the prevalence of house dust mite in Tekirdağ and İstanbul provinces in comparison with house dust mite population of Sivas Province during the same period. *Acta Parasitologica Turcica*, 45(2): 137. DOI: 10.4274/tpd.galenos.2020.7056

Baker, A.S. & Craven, J.C. (2003) Checklist of the mites (Arachnida: Acari) associated with bats (Mammalia: Chiroptera) in the British Isles. *Systematic & Applied Acarology Special Publications*, 14: 1–20.

Baran, Ş. & Ayyıldız, N. (2004) First records of Ramuse/la Hammer, 1962 (Acari: Oribatida: Oppiidae) species in Turkey. *Turkish Journal of Entomology*, 28(1): 39–44.

Baran, Ş., Bezci, T. & Ayyıldız, N. (2018) Supplementary checklist of oribatid mites (Acari) from Turkey. *Munis Entomology and Zoology*, 13(1): 91–97.

Beron, P. (2021) *Acarorum Catalogus VIII. Trombidiformes, Prostigmata, Superfamilia Cheyletoidea (Cheyletidae, Psorergatidae, Demodecidae, Harpyrhynchidae, Syringophilidae), Superfamilia Cloacaroidea (Cloacaridae, Epimyodicidae)*. Advanced Books, DOI: https://doi.org/10.3897/ab.e69591

Bochkov, A.V. (2008) New observations on phylogeny of cheyletoid mites (Acari: Rostigmata: Cheyletoidea). *Proceedings of the Zoological Institute*, 312(1–2): 54–73.

Boquete, M., Iraola, V., Fernandez-Caldas, E., Arenal-Villaroel, L., Carballada, F.J., Gonzales de la Cuesta, C., Lopez-Rico, M.R., Nunez Orjales, R., Parra, A., Soto- Mera, M.T., Varela, S. & Vidal, C. (2006) House dust mite species and allergen levels in Galicia, Spain: a Cross-sectional, multicenter, comparative study. *Journal of Investigational Allergology and Clinical Immunology*, 16(3): 169–176.

Boner, A.L., Richelli, C., Vallone, G., Verga, A., Parotelli, R., Andri, L. & Piacentini, G.L. (1989) Skin and serum reactivity to some storage mites in children sensitive to *Dermatophagoides pteronyssinus*. *Annals of Allergy*, 63: 82–84.

Budak, S. (1988) Mite fauna in house dust in the Aegean region of Turkey. *Acta Parasitologica Turcica*, 13: 355–361.

Camps-Sagué, F., Lavaquiol, B., Bosch-Serra, À. D., Molina, M. G. & Domingo-Olivé, F. (2024) Sustainability assessment after twenty years of sewage sludge application on calcareous soil following N or P criterion. *Sustainability*, 16(6): 2304. DOI: 10.3390/su16062304

Caruso, T., Migliorini, M., Bucci, C. & Bargagli, R. (2009) Spatial patterns and autocorrelation in the response of microarthropods to soil pollutants: The example of oribatid mites in an abandoned mining and smelting area. *Environmental Pollution*, 157(11): 2939–2948.

Colloff, M.J. (2009) *Dust Mites*. Collinwood, Australia, Csiro Publishing. 583 pp. DOI: 10.1071/9780643100497

Çiftçi, İ.H., Çetinkaya, Z., Atambay, M., Aycan, M.Ö. & Daldal, N.Ü. (2006) House dust mite fauna in western Anatolia, Turkey. *Korean Journal of Parasitology*, 44(3): 259–264.

Çobanoğlu, S. (2008) Mites (Acari) associated with stored apricots in Malatya, Elazığ and İzmir provinces of Turkey. *Turkish Journal of Entomology*, 32(1): 3–20.

Demir, E., Akmeşe, Ö.F., Erbay, H., Taylan-Özkan, A. & Mumcuoğlu, K.Y. (2020) Bibliometric analysis of publications on house dust mites during 1980–2018. *Allergologia et Immunopathologia*, 48(4): 374–383. DOI: 10.1016/j.aller.2020.01.001

Devi, P., Gulati, R. & Rani, S. (2022) *Suidasia nesbitti* hughes (Acari: Suidasiidae) and its damage in stored grains. *Uttar pradesh journal of zoology*, 43(4): 84–92.

Dhaliwal, A.K., Singh, D., Randhawa, R.K. & Singh, A. (2021) Sensitivity in allergic asthmatic subjects towards house dust mite allergens. *Systematic and Applied Acarology*, 26(1): 75–84. DOI: 10.11158/saa.26.1.5

Doğan, N., Aycan, O.M., Miman, O., Atambay, M. & Daldal, N. (2008) Determination of house dust mites in Eskisehir. *Acta Parasitologica Turcica*, 32(2): 139–141.

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.

Doğan, S. (2022) An overview of research on the family Cheyletidae (Acariformes) in Turkey, with a checklist of the Turkish cheyletid mites. *Systematic & Applied Acarology*, 27(6): 1132–1151. DOI:10.11158/saa.27.6.12

Edres, N.O. (2009) Distribution dynamics of dust mites in two locations of patient homes with respect to the allergical kind. *American Eurasian Journal of Agricultural and Environment*, 6(6): 680–688.

Erman, O., Özkan, M., Ayyıldız, N. & Doğan, S. (2007) Checklist of the mites (Arachnida: Acari) of Turkey. Second supplement. *Zootaxa*, 1532(1): 1–21. DOI:10.11646/zootaxa.1532.1.1

Erman, O., Pešić, V., Esen, Y. & Özkan, M. (2010) A checklist of the water mites of Turkey (Acari: Hydrachnidia) with description of two new species. *Zootaxa*, 2624: 148. DOI: 10.11646/zootaxa.2624.1.1

Fain, A. (1987) *Allocalvolia habrocytus* gen. n., sp. n. (Acari, Winterschmidtiidae) a new hypopus phoretic on *Habrocytus elevatus* (Walker, 1834) (Hymenoptera, Pteromalidae) in Austria. *Entomologischen Mitteilungen Zoologischen Museum, Hamburg*, 8(129): 309–318.

Fain, A. & Lukoschus, F. (1974) Observations sur le developpement postembryonnaire des acariens de la famille Glycyphagidae a hypopes pilicoles ou endofolliculaires (Acarina: Astigmata). *Bulletins de l'Académie Royale de Belgique*, 60(1): 1137–1159.

Fain, A. & Rosa, A.E. (1982) Pyroglyphid mites from nests of sparrows *Passer domesticus* L., 1758 in Brazil. *Revista Brasileire Biologia*, 42: 317–20.

Fan, Q.-H. & Zhang, Z.-Q. (2003) *Rhizoglyphus echinopus* and *Rhizoglyphus robini* (Acari: Acaridae) from Australia and New Zealand: identification, host plants and geographical distribution. *Systematic &Applied Acarology Special Publications*, 16: 1–16. DOI: 10.11158/saasp.16.1.1

Franz, J-Th., Masuch, G., Müsken, H. & Bergmann, K-Ch. (1997) Mite fauna of German farms. *Allergy*, 52: 1233–1237. DOI: 10.1111/j.1398-9995.1997.tb02529.x

Franz, J.T., Masuch, G., Bergmann, K.C. & Müsken, H. (1998) Study of the domestic mite fauna of farms in Germany: a cross-section analysis. *Allergologie*, 21(8): 371–380.

Gulkan, B., Degerli, S., Culha, G., Savas, N. & Ozcelik, S. (2019) Search of house mite's fauna and investigation of relationship between house dust mite and allergy in the province of Hatay, Turkey. *Kuwait Medical Journal*, 51(1): 78–85.

Gülbahar, O., Mete, N., Kokuludağ, A., Sin, A.Z. & Sebik, F. (2004) House dust mite allergens in Turkish homes. *Allergy*, 59(2): 231–41.

Güleğen, E., Girişgin, O., Kütükoğlu, F., Girişgin, A.O. & Coşkun, Ş.Z. (2005) Mite species found in house dust in houses in Bursa. *Acta Parasitologica Turcica*, 29(2): 185–187.

Güngör, Ç., Işık, K., Cicioğlu, B. & Altıntaş, K. (1999) The prevalence of house dust mites in carpet workshops in Isparta and the relationship between allergic complaints and mites in weaving women. *Acta Parasitologica Turcica*, 23: 32–34.

Griffiths, D.A. & Cunnington, A.M. (1971) *Dermatophagoides microceras* sp. n.: A description and comparison with its sibling species, *D. farinae* Hughes, 1961. *Journal of Stored Products Research*, 7(1): 1–14.

Halliday, B., Kamran, M. & Bashir, M.H. (2018) Checklist of the mites of Pakistan. *Zootaxa*, 4464(1): 1–178. DOI: 10.11646/zootaxa.4464.1.1

Han, R.I, Soung, H.J., Yong, I.L., Chein, S.H. & Dong K.L. (1997) Fauna and geographical distribution of house dust mites in Korea. *Korean Journal of Parasitology*, 35(1): 9–17.

Hu, R.H., Wu, C.T., Wu, T.S., Yu, F.Y., Ko, J.L., Lue, K.H. & Liu, Y.F. (2022) Systematic characterization of the group 2 house dust mite allergen in *Dermatophagoides microceras*. *Frontiers in Cellular and Infection Microbiology*, 11: 793559. DOI: 10.3389/fcimb.2021.793559

Huang, F.L., Liao, E.C. & Yu, S.J. (2017) House dust mite allergy: Its innate immune response and immunotherapy. *Immunobiology*, 223(3): 300–302. DOI: 10.1016/j.imbio.2017.10.035

Kalpaklıoğlu, A.F., Emekçi, M., Ferizli, A.G. & Mısırlıgil, Z. (1997) House dust mite fauna in Turkey. *Journal of Investigational Allergology and Clinical Immunology*, 7: 578–582.

Kalpaklıoğlu, A.F., Emekçi, M., Ferizli, A.G. & Mısırlıgil, Z. (2004) A survey of Acarofauna in Turkey: Comparison of seven different geographic regions. *Journal of Allergy and Asthma Proceedings*, 25(3): 185–190.

Khanjani, M. & Ueckermann, E.A. (2003) Two new species of the genus *Raphignathus* Dugés (Acari: Raphignathidae) from Iran. *Acarologia*, 43(3): 299–306.

Kılıç, S.O., Çiçekliyurt, M.M.H. & Yalçın, S.O. (2021) The relationship between house dust mites and environmental factors beyond the analysis power of a skin prick test. *Alergologia Polska-Polish Journal of Allergology*, 8(2): 64–71. DOI: 10.5114/pja.2021.106687

Klimov, P.B. & Tolstikov, A.V. (2011) Acaroid mites of northern and easthern Asia (Acari: Acaroidea). *Acarina*, 19(2): 252–264.

Kurek, P., Nowakowski, K., Rutkowski, T., Ważna, A., Cichocki, J., Zacharyasiewicz, M. & Błoszyk, J. (2020) Underground diversity: Uropodina mites (Acari: Mesostigmata) from European badger (Meles meles) nests. *Experimental and Applied Acarology*, 82: 503–513. DOI: 10.1007/s10493-020-00563-6

Lindquist, E., Krantz, G.W. & Walter, D.E. (2009) Classification. *In*: *A manual of acarology*. Third edition. Krantz, G.W. & Walter, D.E. (Eds.), Texas Tech University Press, Lubbock, Texas, USA, pp. 97–103.

Lukas, L., Stejskal, V., Jarosik, V., Hubert, J. & Zdarkova, E. (2006) Differential natural performance of four *Cheyletus* predatory mite species in Czech grain stores. *Journal of Stored Products Research*, 43: 97–102.

Mariana, A., Ho, T.M., Sofian-Azirun, M. and Wong, A.L. (2000) House dust mite fauna in the Klang Valley, Malaysia. *Sout East Asian Journal of Tropical Medicine and Public Health*, 31(4): 712–721.

Montealegre, F., Sepulveda, A., Boyama, M., Quinones, C. & Fernandez-Caldas, E. (1997) Identification of the domestic mite fauna of Puerto Rico. *Journal of Health Science*, 16: 109–116.

Mutlu, D., Akdemir, C., Uzunoğlu, E., Direkel, Ş. & Cebeci G.N. (2019) The ınvestigation of the prevalance and epidemiology of house dust mites in Giresun. *Acta Parasitologica Turcica*, 43: 78–82. DOI: 10.4274/tpd.galenos.2019.6149

Nankervis, H., Pynn, E.V., Boyle, R.J., Rushton, L., Williams, H.C., Hewson, D.M. & Platts-Mills, T. (2015) House dust mite reduction and avoidance measures for treating eczema. *Cochrane Database of Systematic Reviews 2015*, Issue 1. Art. No., CD008426. DOI: 10.1002/14651858.CD008426.pub2

Özer, M. & Toros, S. (1978) Kuru meyve akarı *Carpoglyphus lactis* (L.). *Türkiye Bitki Koruma Dergisi*, 2(4): 223–230.

Özkan, M., Ayyıldız, N. & Erman, O. (1994) Check list of the Acari of Turkey. First supplement. *Euraac News Letter*, 7(1): 4–12.

Özkan, M., Ayyıldız, N. & Soysal, Z. (1988) Turkish mite fauna. *Doğa Türk Zooloji Dergisi*, 12(1): 75–85.

Qayyum, H.A. & Chaudhri, W.M. (1979) Three species of the genus *Acaropsis* (Acarine: Cheyletidae) from Pakistan. *Pakistan Entomologist*, 1(1): 1–8.

Radwan, J., Czyż, M., Konior, M. & Kolodziejczyk, M. (2000) Aggressiveness in two male morphs of the bulb mite *Rhizoglyphus robini*. *Ethology*, 106(1): 53–62.

Ripka, G., Fain, A., Kazmierski, A., Kreiter, S. & Magowski, W.L. (2005) New data to the knowledge of the mite fauna of Hungary (Acari: Mesostigmata, Prostigmata and Astigmata). *Acta Phytopathologica et Entomologica Hungarica*, 40(1–2): 159–176.

Sakaki, I. & Suto, C. (1996) Cluster analysis of domestic mites and associated housing conditions in concrete-built apartments in Nagoya, Japan. *Medical Entomology and Zoology*, 47: 23–29.

Sánchez-Ramos, I., Álvarez-Alfageme, F. & Castañera, P. (2007) Development and survival of the cheese mites, *Acarus farris* and *Tyrophagus neiswanderi* (Acari: Acaridae), at constant temperatures and 90% relative humidity. *Journal of Stored Products Research*, 43(1): 64–72.

Seniczak, S. & Seniczak, A. (2010a) Differentiation of body form of Protoplophoroidea (Acari: Oribatida) in the light of ontogeny of three species. *Journal of Natural History*, 44(7–8): 389–419. DOI: 10.1080/00222930903384782

Seniczak, S. & Seniczak, A. (2010b) Oribatid mites (Acari, Oribatida) of various habitats in southern Andalusia (Spain).*Biological Letters*, 47(1): 29–35.

Solarz, K. (2009) Indoor mites and forensic acarology. *Expeimental & Applied Acarology*, 49: 135–142.

Soleimani, M. & Rafinejad, J. (2008) House dust mite contamination in hotels and inns in Bandar Abbas, South of Iran. *Iranian Journal of Environmental Health Science and Enginering*, 5(3): 207–210.

Stejskal, V. & Hubert, J. (2008) Risk of occupational allergy to stored grain arthropods and false pest-risk perception ın Czech grain stores. *Annals of Agricultural and Environmental Medicine*, 15: 29–35.

Tinghuan, C.L.W. (1989) Faunal survey and seasonal prevalence of house dust mites in the urban area of Shanghai. *Acta Ecologica Sinica*, 9: 225–229.

Toluk, A. & Ayyıldız, N. (2008) Yozgat çamlığı milli parkının Oppioid Oribatid akarları (Acari: Oribatida) üzerine sistematik çalışmalar. *Erciyes Üniversitesi Fen Bilimleri Enstitüsü Fen Bilimleri Dergisi*, 24(1): 52–81.

Wurst, E. & Pfister, T. (1990) On the biology of *Baloghella melis* Mahunka, 1963 (Acari: Acaridida: Glycyphagidae). *Bonn Zool Beitr*, 41: 157–62.

Weigmann, G. (2006) *Hornmilben (Oribatida)*. 76. Teil. Goecke & Evers, Keltern, 520 pp.

Zaher, M.A. & Gomaa, E.A. (1981) Three new species of the genus Raphignathus in Egypt (Prostigmata: Raphignathidae). *Acarologia*, 21(2): 197–203.

Zeytun, E., Dogan, S., Aykut, M., Özçiçek, F., Ünver, E. & Özçiçek, A. (2015) House dust mites in Erzincan province. *Acta Parasitologica Turcica*, 39(2): 124. DOI: 10.5152/tpd.2015.3759

Zeytun, E., Doğan, S., Özçiçek, F., Ünver, E. & Dilkaraoğlu, S. (2016) Comparison of living and bedrooms in terms of house dust mites in the province of Erzincan, Turkey. *Journal of Medical Entomology*, 53(1): 26–30. DOI:10.1093/jme/tjv186

Zeytun, E., Doğan, S., Ünver, E. & Özçiçek, F. (2018) Evaluation of *Dermatophagoides pteronyssinus* (Trouessart) and *D. farinae* Hughes (Acari: Pyroglyphidae) sensitivity in patients with allergic rhinitis: a comparative study. *Systematic and Applied Acarology*, 23(2): 206–215. DOI: 10.1093/jme/tjv186

Zhang, Q.-Z. & Fan, Q.-H. (2005) *Revision of* Tyrophagus *Oudemans (Acari: Acaridae) of New Zealand and Australia*. Landcare Research, New Zealand, 189 pp.

فهرست مشروح کنه های گرد و غبار خانگی (Acari: Acariformes) ترکیه

مدنی آیکوت

گروه ریاضیات و علوم، دانشکدهٔ آموزشی ضیا گوکالپ، دانشگاه دجله، ت.ر. ۲۱۲۸۰ دیارباکر، ترکیه؛ رایانامه: medeni.aykut@dicle.edu.tr

چکیده

این فهرست از کنه‌های گرد و غبار خانگی (Acari: Trombidiformes, Sarcoptiformes) از ترکیه بر اساس داده‌های منتشر شده و کلکسیون‌های خصوصی تهیه شده است. گونه‌ها بر اساس حروف الفبا فهرست شده‌اند. در مجموع، ۳۳ گونهٔ کنه گرد و غبار و پراکندگی جغرافیایی آنها ارایه شده است. این نخستین فهرست فون کنه‌های گرد و غبار خانگی در ترکیه را نشان می دهد.

واژگان کلیدی: Acariformes، کنه‌های خانگی، پراکندگی، کنه‌های انباری، Trombidiformes.

اطلاعات مقاله: تاریخ دریافت: ۱۴۰۳/۲/۱۳، پذیرش توسط ع. صبوری: ۱۴۰۳/۵/۱۲، تاریخ چاپ: ۱۴۰۳/۷/۲۴