

INVASIVE PLANT PESTS (INSECTA AND ACARINA) OF TURKEY

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[Öztemiz, S. & Doğanlar, M. 2015. Invasive plant pests (Insecta and Acarina) of Turkey. Munis Entomology & Zoology, 10 (1): 144-159]

ABSTRACT: Turkey with its geographical location and favorable climate has very rich fauna terms of biodiversity, and has been invaded by a number of harmful exotic plant pests. For the invasion of pest, four steps are required to complete; introduction, establishment, spread and naturalization. The invasive plant pests recorded by several works in Turkey are: 12 species from Lepidoptera; 12 species from Coleoptera; 23 species from Hemiptera; 10 species from Diptera; 17 species from Thysanoptera; 3 species from Hymenoptera; 1 species from Orthoptera; 15 species from Acarina. Their origine, introduction area, distribution in Turkey and worldwide were given in the study.

KEY WORDS: Invasive, plant pests, Turkey.

Insects can live in almost all ecosystems due to their highest chance of survival and ability to adapt to changing conditions. As in many countries of the world, the insects identified as invasive or exotic are quite high in Turkey. Invasive species can be defined as for any reason added afterwards to from outside of an ecosystem, and then after a certain period they have directly or indirectly affected by biological diversity in ecosystems and become a dominant species. Turkey has a rich geography at the crossroads of three continents; Asia, Europe and Africa, and is a potential of containing the appropriate properties to the establishment and spread of invasive species in terms of biological diversity. Invasive species are spread by natural and human activities. They spread with agricultural trade between countries and continents. There are also distinct pathways for aquatic and terrestrial species. Terrestrial invasive species are introduced and move around in a number of ways such as cargo shipments and containers, transport of infested plant materials, wood products, ornamental plants and pet trade. Invasive species compete with native species for habitat and food, and adversely affect biodiversity, cause to reduction or extinction of native or endemic species and disruption of ecosystems. Invasive species, as well as the ecological damage they also cause of economic loss in agricultural activities. It was reported that economic and environmental losses caused by invasive species in six countries of the world was to be 314 billion dollars per year (GISP, 2007). In addition, adversely affect human health with toxic organisms and the spread of germs and pathogens. Understanding the mechanisms of invasive species into new ecosystems, distribution of species and the effects of natural species are compulsory to combating invasive species in order to be protected from all of these negative effects. Determination of measures to solve the problem, the preparation and implementation of action plans is very important.

In Turkey, whole society including especially farmers should be informed in terms of biodiversity and trained for conservation of biological diversity and the data should be transferred to future generations. The creation of databases associated with invasive and native species, endemic and endangered species will be an important step for the future of any of countries. For this purpose, in this study some common species were listed below as preliminary work. The

introduced species will be added, once they found in the future.

Table 1. Invasive plant pests of Turkey.

Family	Scientific Name	Origin Country	First Entry in Turkey	Distribution in Turkey	World Distribution	Reference
Lepidoptera						
Gelechiidae	<i>Tuta absoluta</i> Povolny	South America	2009-Aegean; Izmir Mugla, Marmara; Canakkale	All Regions	Africa Asia Central America	Urbaneja et al. (2007), Desneux et al. (2010), Kiliç (2010), EPPO (2011)
Gracillariidae	<i>Phyllocnistis citrella</i> Stainton	Asia; India, North China	1994- Mediterranean; Hatay (Samandag, Dörtöyl)	Mediterranean Aegean	Africa Australia Europe North America Central America and Caribbean South America Oceania; Japan, Philippines, China	Stainton (1856), Slosser (1915), Fletcher (1920), Clausen (1927, 1931, 1933), Badawy (1967), (CAB 1970), Heppner (1993), Uygun et al. (1995), Jones (2001), Beathe & Hardy (2004), CABI/EPPO (2003, 2013)
Arctiidae	<i>Hyphantria cunea</i> (Drury)	North America	1975 - Edirne, Istanbul (Catalca, Silivri), Tekirdag	Marmara Black Sea North Aegean	Europe Canada Asia; China, North Korea, Japan	Bovey (1954), Morris (1963), İren (1977), Bas (1982)
Gracillariidae	<i>Cameraria ohridella</i> Deschka & Dimić	1984- Balkans; Macedonia 1879-Greece	Istanbul	Marmara-Thrace basin	Europe Asia	Deschka & Dimić (1986), Lack (2000, 2002), Cebeci & Acer (2007), Cebeci et al. (2011), Lees et al. (2011), CABI/EPPO (2012), EPPO (2013)
Crambidae	<i>Cydalima perspectalis</i> (Walker)	East Asia	2011-Istanbul; Sarıyer	Marmara; Istanbul	Asia Europe	Mally & Nuss (2010), Hizal (2012), Hizal et al. (2012)
Crambidae	<i>Ostrinia nubilalis</i> (Hübner)	Europe	?	All Regions	Europe Asia	Brindley & Dicke (1963), Mutunura & Munroe (1970), EPPO (2013)
					Africa North America	
Tortricidae	<i>Grapholita molesta</i> (Busck)	East Asia; Northwest China	?	All Regions	Africa Europe Asia North America South America Oceania; Australia	CIE (1990), CABI & EPPO (1998), EPPO (2013)
Tortricidae	<i>Lobesia botrana</i> Denis & Schiffermüller	Central Africa; Ethiopia, Eritrea, Kenya	1938-1941- Ankara	All Regions	North and West Africa Europe Asia North America South America	Gunaydin (1972), Kırakurek (1972), İren (1972, 1976), Otacı (1972), CIE (1974), Kacar (1982), Zeki (1996), CABI/EPPO (2012), EPPO (2013)
Gelechiidae	<i>Phthorimaea operculella</i> (Zeller)	America	Marmara; Bolu	All Regions	Africa Europe Asia North America Central America and Caribbean South America Oceania	Keyder & Ataman (1965), Gökcu et al. (1971), CABI & EPPO (2012), EPPO (2013)
Pieridae	<i>Pieris rapae</i> L.	Europe	?	All Regions	Asia Africa Europe Mediterranean Basin North America Oceania	(CIE 1952), Keyder (1953)
Noctuidae	<i>Mythimna unipuncta</i> Haworth	America Canada	?	Mediterranean	Asia Africa Europe North America Central America and Caribbean South America	Karsholt & Razowski (1996), CIE (1967)
Tortricidae	<i>Rhyacionia buoliana</i> (Denis & Schiffe.)	Europe	?	Regions of pine tree	Asia Africa	EPPO (2013)
					North America South America Europe	

Coleoptera						
Cerambycidae	<i>Phoracantha recurva</i> Newman	Australia Papua New Guinea	?	?	Asia Africa North America South America Europe Oceania	Wang (1995), Ozdiken & Caglar (2004), CABI/EPPO (2009), EPPO (2013)
Cerambycidae	<i>Phoracantha semipunctata</i> (Fabricius)	Australia	1957-Mediterranean; Mersin, Tarsus	Mediterranean Aegean Southeast Anatolia; Sanliurfa	Europe Asia Africa Latin America Middle East North America South America Oceania	Acatay (1960), Demelt & Alkan (1964), Sekendiz & Yildiz (1969), Yildiz et al. (1981), CIE (1985), Guler (1990), CABI/EPPO (1998,2007), Tavakilian & Chevillotte (2013), EPPO (2013)
Bostrichidae	<i>Rhyzopertha dominica</i> (Fabricius)	Asia; India, Bangladesh	1957-Central Anatolia	Central Anatolia Marmara Aegean Mediterranean Southeast Anatolia	Asia Africa Europe North America Central America and Caribbean South America Oceania	Ozer (1957), Erakay (1967), Aydin & Soran (1987), Yucel (1988), Sinha & Sinha (1990)
Curculionidae	<i>Ceutorhynchus assimilis</i> (Paykull)	Europe	1989- Central Anatolia, Ankara	Mediterranean Central Anatolia	Asia Africa Europe North America	McLeod (1962), Sert & Cagatay (1999), Lodos et al. (2003), Colonnelli (2004), Sert (2005)
Bruchidae	<i>Callosobruchus maculatus</i> (Fabricius)	Africa	1952-Aegean	Aegean; Usak, Denizli Marmara Southeast and Central Anatolia	Africa Europe Asia North America Central America and Caribbean South America Oceania	Ozer (1957), Alkan (1966), Karman et al. (1967), Kalkan (1972), Yucel (1985) Ozer & Yucel (1989), Ozar & Genc (1993), Mergen & Cagatay (1996), EPPO (2013)
Dermestidae	<i>Trogoderma granarium</i> Everts	South Asia, India	1954-Aegean	Central, South and Southeast Anatolia Aegean	Africa Europe Asia North America South America Oceania	Hinton (1945), Esin (1955,1959,1967,1968), Alkan (1956), Ernak (1956), Kancu (1961,1962), Cakillar (1963), Kalkan (1963), Ozer & Kalkan (1963), Banks (1977), Lodos (1998), EPPO (2013)
Curculionidae	<i>Ips typographus</i> (L.)	Europe Asia; China	East Black Sea- 1971-Artvin East Anatolia- 1966-Kars	Black Sea; Artvin, Giresun, Ordu, Rize, Trabzon East Anatolia; Ardahan, Erzurum Marmara; Sakarya	Europe Asia North America	Alkan (1985), Coskun et al. (2010), EPPO (2013)
Curculionidae	<i>Pissodes castaneus</i> (De Geer)	Europe Africa	East Anatolia; Kars	East Anatolia East Black Sea East Mediterranean	Europe Asia Africa South America	Abgrall et al. (1999), Tozlu (2001), Gomez & Hartel (2010), Panzavolta & Tiberi (2010), Avgin & Colonnelli (2011), CABI (2011), EPPO (2013)
Curculionidae	<i>Lymantria coryli</i> (Perris)	?	2008- Central and East Black Sea; Rize, Giresun, Samsun Ordu, Trabzon	Central and East Black Sea	Central, South and North Europe South Scandinavia, Caucasia, Romania, Rusia, Far East	Ural et al. (1973), Grune (1979), Kurt (1982), Selmi (1998), Mandelstam & Popovichev (2000), Ak (2004), Ak et al. (2004, 2010)
Curculionidae	<i>Dendroctonus micans</i> (Kugel.)	Asia	1966- Black Sea; Artvin	East Black Sea; Artvin, Giresun, Ordu, Rize, Trabzon East Anatolia; Ardahan	Asia Europe Australia	Serez (1979) Grune (1979), Wood (1982), Alkan (1985), Gregoire (1988) DKO (2001), EPPO (2013)
Curculionidae	<i>Rhynchophorus ferrugineus</i> (Olivier)	1891- Southeast Asia; India	2005-Mediterranean; Mersin	All Regions	Asia Africa Europe South America Central America and Caribbean Oceania	Lefroy (1906), IPPC (2007), Booth et al. (1990), Karut & Kazak (2005), CABI/EPPO (2010), El-Mergawy & Al Ajlan (2011), EPPO (2013)
Chrysomelidae	<i>Leptinotarsa decemlineata</i>	West	1963-Marmara;	All Regions	Europe	Atak (1973), OEPP/EPPO
	Say.	America; 1863- Mexico, 1867- Colorado	Edirne		Africa Asia North America Central America and Caribbean Canada	(1990), Capurra (2001)

Hemiptera						
Monophlebidae (Margarodidae)	<i>Icerya purchasi</i> Maskell	1868- Australia	1912-Sakiz island 1922-Istanbul	Mediterranean Aegean Marmara East Black Sea	Europe Asia North America Central America and Caribbean South America Oceania	CIE (1971), Duzgunes (1970), Lodos (1986), Canakcioglu (1977,1993), EPPO (2013)
Aphididae (Pemphigidae)	<i>Eriosoma lanigerum</i> (Hausmann)	Northeast America	? 1972-Aegean	All Regions	Europe Africa Asia North America Central America and Caribbean South America Oceania	CIE (1975), APPPC (1987), Gul-Zumreoglu (1972)
Aphididae	<i>Aphis spiraeola</i> Patch	Far East	1955-Mediterranean, Adana	Mediterranean; Adana, Antalya, Mersin, Hatay, K. Maras Marmara; Istanbul Southeast Anatolia; Diyarbakir Central Anatolia; Ankara, Nigde Aegean; Denizli West Black Sea; Bartin	Asia Africa Europe North America Central America and Caribbean South America Oceania	Tuatay & Remaudiere (1964), Canakcioglu (1978), Lodos (1982), Duzgunes et al. (1982), Uygun et al. (1987, 1992), Yumruktepe & Uygun (1994), Blackman & Eastop (2000), Olmez (2000), CABI/EPPO (2001), Bayindir (2003), Cota (2007)
Diaspididae	<i>Quadraspidiotus pernicius</i> (Comstock)	Northeast Asia; China, Korea	1962- Black Sea; Samsun 1963-Marmara; Kocaeli, Gebze	Marmara;Trakya, Istanbul Black Sea; Artvin, Samsun, Tokat, Amasya, Rize, Zonguldak, Gumushane	Europe Africa Asia North America Central America and Caribbean	Altay et al. (1968), Giray (1969), Gunaydin & Pekyer (1970), Iren & Okul (1972), Tuncyurek (1976), Bozan et al. (1979), Erden (1979), Kozar et al. (1979),
				Aegean; Afyonkarahisar, Izmir, Aydin, Manisa Central Anatolia; Ekişehir, Cankiri, Corum, Kayseri, Konya East Anatolia; Erzurum, Erzincan, Mus, Kar,, Igdir, Elazig, Hakkari Marmara; Canakkale, Bursa, Sakarya, Kocaeli, Balikesir Mediterranean; Adana, Mersin, Antalya, Burdur, Isparta	South America Oceania; Australia, New Zeland	OEP/EPPO (1981), CIE (1986), Kozar & Konstantinova (1981), Kozar (1990), CABI (2009), EPPO (1998), Yasar et al. (2003), Tanyurek (2006)
Aphelinidae	<i>Eremocerus debachi</i> Rose & Rosen	Japan	1986- East Mediterranean; Adana Aegean; Izmir	Mediterranean Aegean	North America Europe Asia Africa	Uygun et al. (1990), Rose & Rosen (1992), Rose & DeBach (1992), LaSalle (1993) Sengonca et al. (1993), Yoldas & Oncuer (1994)
Aleyrodidae	<i>Dialeurodes citri</i> (Ashmead)	Asia, India America, ?Florida	1965-Black Sea, Hopa	Mediterranean Aegean Black Sea Southeast Anatolia	North America Central America and Caribbean South America South Europe Asia Africa	Ashmead (1885), Morrill & Black (1911), Soylu & Urel (1977), Lodos (1982), Uygun et al. (1990), Martin (1999), Jensen (2001), EPPO (2013)
Aleyrodidae	<i>Parabemisia myricae</i> (Kuwana)	Japan	1982- East Mediterranean	1988-Aegean, Izmir	North America Europe Asia Africa Oceania	Rose et al. (1981), Rose & DeBach (1982), CIE (1986), Uygun & Sekeroglu (1987) Uygun et al. (1990), Sengonca et al. (1993)
Coccidae	<i>Pulvinaria floccifera</i> (Westwood)	East Asia, Australia	East Black Sea	Marmara Black Sea	Asia Europe Africa South America North America Oceania, Australia	Bodenheimer (1952), Canakcioglu (1977), Selmi (1979), Ben-Dov (1993), Malumphy (2013)
Coreidae	<i>Leptoglossus occidentalis</i> (Heidemann)	North America	2009-Istanbul	Marmara; Edirne, Istanbul, Kizilirmak Aegean; Izmir	North America Europe Asia	McPherson et al. (1990), Dursun (2011), Arslangundogdu & Hizal (2010), Hizal & Inan (2012)
Ricanidae	<i>Ricania simulans</i> (Walker)	1956- Georgia	2006-East Black Sea, Rize	East Black Sea	Asia; China Africa Australia	Guclu et al. (2010)
Phoenicococcidae	<i>Phoenicococcus marletti</i> Cockerell	North Africa Middle East	2008-Mediterranean; Hatay, Adana, Antalya	Mediterranean	North America Asia Europe North America South America Central America and Caribbean	Avidov & Harpaz (1969), Zaid et al. (2002), Miller et al. (2007), Ben-Dov (2008), Doganlar & Yigit (2008)

Pyllidae	<i>Blattopylla occidentalis</i> Taylor	South and West Australia	2004- Mediterranean; Tarsus, Karabucak	Mediterranean Aegean	North America; California, Mexico, South America Africa Asia New Zealand, China Europe	Taylor (1985), Hodkinson (1991), Gill (1998), Brennan & Gill (1999)
Tingidae	<i>Corythucha ciliata</i> Say	North America, Canada	2007-Marmara; Bolu, Tekirdag	Marmara East Black Sea	Asia Europe North America South America Oceania	CABI & EPPO (2007), Muthu (2009), EPPO (2013)
Diaspididae	<i>Pseudaulacaspis pentagona</i> (Targioni Tozzetti)	East Asia; Japan, China	1912-Istanbul	All Regions	Africa Europe Asia North America Central America and Caribbean South America Oceania	MacGillivray (1921), Bodenheimer (1949, 1958), Keyder (1952), Kiroglu (1981), Kosztarab & Kozar (1988), Kozar (1990), EPPO (2013)
Aphididae	<i>Macrozaphus euphorbiae</i> Thomas	North America	Istanbul	All Regions	Africa Europe Asia	Tuaty & Remaudiere (1964), Giray (1974), Canakcioglu (1975), CIE (1984),
					North America Central America and Caribbean South America Oceania	Toros et al. (2002), Gorur (2004), Ozdemir (2004), EPPO (2013)
Pseudococcidae	<i>Phenacoccus solenopsis</i> Tinsley	North America; 1897-New Mexico 1990-Texas Arizona, California, Colorado	2012-Mediterranean, Adana	Mediterranean, Adana	Africa Europe Asia North America Central America and Caribbean South America Oceania	Tinsley (1898), Fuchs et al. (1991), Williams & Granara de Willink (1992), Ben-Dov (1994), Williams (2004), Kaydan et al. (2008, 2013)
Pseudococcidae	<i>Phenacoccus solani</i> Ferris	North America; California, Mexico, Texas	2012-Mediterranean, Adana	Mediterranean; Adana, Hatay	Africa Europe Asia North America Central America and Caribbean South America Oceania	Ben-Dov (1994), Ben-Dov et al. (2005), Kaydan et al. (2008, 2013)
Pseudococcidae	<i>Phenacoccus madeirensis</i> Green	North America; Mexico	2012-Mediterranean; Adana, Antalya Marmara; Canakkale	Mediterranean Marmara	Africa Europe Asia North America Central America and Caribbean South America Oceania	Williams & Granara de Willink (1992), Ben-Dov (1994), Williams (1987, 2004), Ben-Dov et al. (2012), Kaydan et al. (2012)
Aleyrodidae	<i>Aleurothrix floccosus</i> (Maskell)	South America	1994-Mediterranean; Hatay 1996-Aegean; Izmir	Mediterranean; Hatay, Mersin, Antalya Aegean; Izmir, Aydin	Africa Europe Asia North America Central America and Caribbean South America Oceania	Mound & Halsey (1978) Liotta & Maniglia (1983), Barboglio et al. (1986), Vatanserver & Ulusoy (2005), EPPO (2013)
Coccidae	<i>Saissetia oleae</i> (Olivier)	North Africa	Marmara 1938-Aegean	Marmara Aegean	Africa Europe	Bodenheimer (1941, 1953), De Lotto (1965), Tuncyurek (1970), CIE (1973), Tuncyurek & Yalcin (1979), Gokmen & Seckin (1979), Duzguner (1982), Ben-Dov (1993), EPPO (2013)
				Black Sea Mediterranean Central Anatolia	Asia North America Central America and Caribbean South America Oceania	
Pseudococcidae	<i>Planococcus citri</i> (Risso)	Asia; China	?	Mediterranean Aegean Marmara Central Anatolia	Africa Europe Asia North America Central America and Caribbean South America Oceania	Ferris (1950), Bodenheimer (1953), Soylu & Urel (1977), Bartlett (1978), Uygur et al. (1987), CABI & EPPO (1999), EPPO (2013)
Homotomidae	<i>Macrohomotoma gladiata</i> Kuwayama	Asia	Aegean, Aydin	Aegean Mediterranean Marmara	Asia; China, Japan, Taiwan, Indonesia Australia Europe Africa	Crawford (1911), Wiebes (1979), Hollis & Broomfield (1989), Gencer et al. (2007), Li (2011), Martin & Lau (2011), Shalva et al. (2011), Mifud & Porcelli (2011)

Phylloxeridae	<i>Viteus vinifoliae</i> (Fitch)	North America	1881-Istanbul 1885-Izmit 1888-Izmir	West, North, Central and South Anatolia ? All Regions	Africa Europe Asia North America Central America and Caribbean South America Oceania	Bodenheimer (1958), CIE (1975), Lodos (1986), CABI/EPPO (1998), EPPO (2013)
Diptera						
Agromyzidae	<i>Liriomyza sativae</i> Blanchard	America	Aegean; Mugla	Aegean	Asia Africa Europe North America Central America and Caribbean South America Oceania	Blanchard (1938), Freeman (1958), Spencer (1973), Parelle (1982), Civelek (2002), EPPO (2013)
Agromyzidae	<i>Liriomyza huidobrensis</i> (Blanchard)	Central and South America, 1926-Argentina	1985- Aegean	Mediterranean	Africa	Blanchard (1926), Spencer (1973), Deeming (1992), CABI & EPPO (1997, 2012), EPPO (2013)
Agromyzidae	<i>Agromyza albipennis</i> Meigen	America Canada	Saniurfa (Birecik)	Southeast Anatolia	America, Canada Asia; Japan Siberia Europe	Spencer (1976, 1980), Cıkman (2003)
Agromyzidae	<i>Agromyza reptans</i> Fallen	America Canada	Saniurfa, (Ceylanpinar, Koruklu) ?	Southeast Anatolia	America, Canada, Northern Europe	Spencer (1976), Giray (1980), Cıkman (2003)
Agromyzidae	<i>Agromyza rondenensis</i> Strobl	Northern Europe	Izmir Saniurfa (Halfeti, Hilvan, Siverek)	Aegean Southeast Anatolia	Northern European countries	Spencer (1976), Civelek (1998), Cıkman (2003)
Agromyzidae	<i>Melanagromyza vernalis</i> Spencer	Southern Africa	Saniurfa (Viransehir)	Southeast Anatolia	Southern African countries	Spencer (1976), Cıkman (2003)
Agromyzidae	<i>Cerodontha denticornis</i> (Panzet)	Northern Europe	Saniurfa ?	Southeast Anatolia	Northern European countries	Spencer (1976), Giray (1980), Cıkman (2003)
Agromyzidae	<i>Phytomyza affinis</i> Fallen	Northern Europe	Saniurfa (Halfeti) ?	Southeast Anatolia	Northern European countries	Spencer (1976), Bodenheimer (1958), Cıkman (2003)
Agromyzidae	<i>Phytomyza chelonae</i> Spencer	America	Saniurfa (Siverek) ?	Southeast Anatolia	America	Spencer (1969, 1990), Cıkman (2003)
Tephritidae	<i>Ceratitis capitata</i> (Wiedemann)	Africa	Nearly a century ago	Mediterranean Aegean Central Anatolia	Africa Europe Asia North America Central America and Caribbean South America Oceania, Australia	CIE (1988), Fumiani (1989), CABI & EPPO (1999), EPPO (2013)
Thysanoptera						
Thripidae	<i>Frankliniella occidentalis</i> (Pergande)	Northwest America, Canada	1993- Mediterranean, Antalya	Mediterranean Southeast Anatolia	Europe Africa Asia North America	Tunc & Gocmen (1994), CABI/EPPO (1999), Kirk & Terry (2003), Doganlar & Aydın (2009), EPPO (2013)
Thripidae	<i>Retithrips zyracus</i> Mayet	Central Africa; India	2001-Mediterranean; Hatay (Center, Samandag, Iskenderun)	Mediterranean	Central America and Caribbean South America Oceania	Bodenheimer (1939), Avidov & Harpaz (1969), Hamas Avas & Edward (1994), Doganlar & Yigit (2002)
Thripidae	<i>Heliothrips haemorrhoidalis</i> (Bouché)	South America	East Black Sea; Rize	East Black Sea South and West Anatolia	North America Central America and Caribbean South America Oceania; Australia, New Zealand Asia Africa Europe	Bodenheimer (1958), CSIRO (2009), Ulgenurk et al. (2011), CABI (2014)
Thripidae	<i>Dendrothrips saltatrix</i> Uzel	Europe, NW India, Iran	?	Aegean; Izmir	Europe, Asia; NW India, Iran	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Eremiothrips taghitadehi</i> (zur Strassen)	Spain, Iran	?	Aegean; Izmir	Europe; Spain, Asia; Iran	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Limothrips angulicornis</i> Jablonowski	West-Palearctic	?	Aegean	West Palearctic	Strassen (2003), Tunc et al. (2012)

Thripidae	<i>Limothrips cerealeum</i> Haliday	Atlantic West Europe	?	Aegean, Eastern Mediterranean, Southeastern Anatolia	Atlantic, West Europe	Strassen (2003), Aydin (2010), Tunc et al. (2012)
Thripidae	<i>Limothrips denticornis</i> Haliday	Euro-Siberia	?	Aegean, Eastern Mediterranean, Southeastern Anatolia	Euro-Siberia	Strassen (2003), Aydin (2010), Tunc et al. (2012)
Thripidae	<i>Neohydotothrips gracilicornis</i> (Williams)	Japan	?	Aegean, Eastern Mediterranean, Southeastern Anatolia	Asia; Japan, China, Siberia Europe; Spain Africa; Morocco	Strassen (2003), Aydin (2010), Tunc et al. (2012)
Thripidae	<i>Oxythrips halidayi</i> Bagnall	Europe; Germany Crimea	?	Aegean; Cal	Crimia, Germany, England, France	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Rubiothrips validus</i> (Karuy)	North & East Europe	?	Aegean; Usak	North & East Europe	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Thrips australis</i> (Bagnall)	Australia	2005-Mediterranean; Adana, Mersin, Antalya	Mediterranean Aegean Marmara Southeastern Anatolia	North America; California South America Africa Asia	Doganlar (2007), Vierbergen et al. (2010) Aydar et al. (2011), Hazir et al. (2011)
Thripidae	<i>Thrips angusticeps</i> Uzel	West-Palearctic	?	Aegean, Eastern Mediterranean, Southeastern Anatolia	West-Palearctic	Strassen (2003), Aydin (2010), Tunc et al. (2012)
Thripidae	<i>Thrips atratus</i> Haliday	North Africa South America	?	Aegean	North Africa South America	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Thrips fedorovi</i> (Priesner)	Europe; Ukraine	?	Aegean; Usak	Europe; Romania, Bulgaria, Ukraine	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Thrips fuscipennis</i> Haliday	North Africa	?	Aegean; Izmir Marmara; Yalova Black Sea; Ordu, Samsun	North Africa America	Strassen (2003), Tunc et al. (2012)
Thripidae	<i>Thrips viminalis</i> Uzel	West Siberia	Ankara	Ege, Central Anatolia	West Siberia	Strassen (2003), Tunc et al. (2012)
Hymenoptera						
Eulophidae	<i>Leptoclype invasa</i> Fisher & LaSalle	Australia	1885-Mediterranean; Adana, Mersin	Mediterranean Aegean	Europe Asia and Pacific Africa North America Middle East	Adali (1944), Acataz (1960), Aydar (2003), Mendel et al. (2004), Protasov et al. (2008)
Eulophidae	<i>Ophelmus maskeli</i> (Ashmead)	Australia	2004-Mediterranean; Adana	Mediterranean; Adana, Hatay, Mersin Aegean; Mugla	Mediterranean Basin Europe Africa Asia Middle East Oceania	Aydar (2006), Boucek (1988), CABI (2005), Tilbury & Jukes (2006), EPPO (2006), Protasov et al. (2007), Doganlar & Mendel (2007)
Eulophidae	<i>Quadrastichodella nova</i> (Girault)	Australia	2006-Mediterranean; Aegean	Mediterranean Aegean	Canary Islands, Europe Asia South Africa America, California	Flock (1957), Timberlake (1957), LaSalle (1994), Boucek (1977, 1988), Doganlar (2007) Doganlar & Doganlar (2008), Aydar (2008), Aydar et al. (2011)
Orthoptera						
Acrididae	<i>Schistocerca gregaria</i> (Forsk.)	Old World, New World, America West Africa	1915-Mediterranean; Adana	East Mediterranean Southeast Anatolia	North Africa Southwest Asia; India Middle East North America Central America; South America Mexico gulf islands; Cuba Europe Iberian peninsula	Scudder (1899), Uvarov (1928), Erkilic & Balamir (1946) Dirsh (1974), Kevan (1989), Song (2004)
Acarina						
Eriophyidae	<i>Acalitus phloeocoptes</i> (Nalepa)	Austria	Central Anatolia, Ankara Aegean, Izmir	Central Anatolia; Ankara Aegean; Izmir	Asia Europe Africa North America	Nalepa (1890), Karaca (1951, 1954), Denizhan (2007)
Eriophyidae	<i>Coptophylla lamimani</i> (Keifer)	America	?	Central Anatolia; Ankara Black Sea	Europe and Balkans; Bulgaria, Greece, Hungary, Yugoslavia, Italy, Poland, Portugal, Spain America; California	Ozman & Cobanoglu (2001), Denizhan (2007)
Eriophyidae	<i>Phyllocoptes abaemus</i> Keifer	America	?	Central Anatolia; Ankara	Europe; Germany, Greece, Bulgaria, Hungary, Yugoslavia Italy, Poland, Switzerland, Spain, Bosnia and Herzegovina, Asia; Armenia, Lebanon America; Chile Canada, Oceania; New Zealand	Denizhan (2007)

Eriophyidae	<i>Phyllocoptes didelphis</i> Keifer	America, California	?	Central Anatolia; Ankara	Turkiye	Denizhan (2007)
Eriophyidae	<i>Platypytus zabiniinae</i> Keifer	America, California	?	Central Anatolia; Ankara Camlidere	Asia; Turkiye, Ukraine Europe; Hungary, Italy, Poland, Portugal America	Denizhan (2007)
Eriophyidae	<i>Vasates immigrans</i> Keifer	America,	?	Central Anatolia; Ankara	America	Denizhan (2007)
Eriophyidae	<i>Calepitrimerus baileyi</i> (Keifer)	California	?	Center, Kalecik	Asia; India, Turkiye	
Eriophyidae	<i>Aceria calaceris</i> Keifer	America, California	?	Central Anatolia; Ankara East Anatolia; Erzurum Black Sea; Amasya	Palaeartic, Nearctic, Australian	Denizhan (2007)
Eriophyidae	<i>Aculus ligustri</i> (Keifer)	America	?	Central Anatolia; Ankara	Nearctic Turkiye	Denizhan (2007)
Eriophyidae	<i>Aculus rhodensis</i> (Keifer)	America	?	Central Anatolia; Ankara	America Asia; China, Japonya Europe; Hungary, Italy, Poland, Yugoslavia	Denizhan (2007)
Eriophyidae	<i>Tetra concava</i> (Keifer)	America, California, Washington	?	Central Anatolia; Ankara Kalecik	America Europe; Italy, Hungary Asia; China, Turkiye	Denizhan (2007)
Eriophyidae	<i>Tegolophus califraximi</i> (Keifer, 1938)	America, California	?	Central Anatolia; Ankara	America Europe; Italy, Hungary Asia; Turkiye	Denizhan (2007)
Eriophyidae	<i>Shenchenella brevisetosa</i> (Hodgkiss)	America	?	Central Anatolia; Ankara	America; Canada Europe; Italy, Hungary Poland, Yugoslavia	Denizhan (2007)
Diptilomiopidae	<i>Rhyncaphytoptus ficifoliae</i> Keifer	America, California	?	Central Anatolia; Ankara	Europe and Balkans; Bulgaria, Greece, England, Italy, Portugal, Yugoslavia, Bosnia and Herzegovina, Croatia, Macedonia, Asia; Armenia, India, Iraq, Iran Africa; Egypt America; Chile	Denizhan (2007)
Diptilomiopidae	<i>Brevilacus reticulatus</i> Manson	New Zeland	?	Central Anatolia; Ankara	Asia; Turkiye, China Europe; Poland Oceania; New Zeland	Denizhan (2007)

CONCLUSION

Turkey has many different climates and microclimates in several parts of the regions. Due to this reason any exotic insect can find a place in which there is at least a suitable host and ecological condition to grow and distribute there.

On the other hand Turkey is an old country and placed between three continents, and during the periods of the Roman and Ottoman Empires different kind of pupal with their special food plants came into Turkey from many regions, including Asia (Far East), Europe, Africa, India, South Asian countries, New Zealand and Australia.

In 20th Century Turkey have received many exotic insects by transfers of many nursery stocks from different continents without good quarantine control, because of this reason Turkey has had many new introductions in the last decade. Our list given above includes many new exotic pests came into Turkey and become very injurious pest and distribute all most all over the country, such as *Tuta absoluta*, *Frankliniella occidentalis*, *Leptocybe invasa*, *Ophelimus masceli*, etc.

The list still needs many new names of exotic pests to be added in the future, once the new research to be conducted and completed in different parts of Turkey for obtaining the new ones and their distributions and damage levels.

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