

Aphids (Hemiptera, Aphididae) Chapter 9.2

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Abstract

Our study aimed at providing a comprehensive list of Aphididae alien to Europe. A total of 98 species originating from other continents have established so far in Europe, to which we add 4 cosmopolitan species of uncertain origin (cryptogenic). The 102 alien species of Aphididae established in Europe belong to 12 different subfamilies, five of them contributing by more than 5 species to the alien fauna. Most alien aphids originate from temperate regions of the world. There was no significant variation in the geographic origin of the alien aphids over time. The average introduction rate was 0.5 species per year since 1800. The mean number of newly recorded species per year decreased since 2000 but this pattern may change in the following years.

Keywords

alien, Hemiptera, Aphid, Aphididae, Europe

9.2.1. Introduction

About 4700 species of Aphididae have been described worldwide (Remaudière and Remaudière 1997). About one third of these species are present in Europe. As for many other taxonomic groups, very few checklists of alien Aphididae have been available for Europe until recently. In 2002, Geiter et al. (2002) published a list of 131 species

considered non-indigenous in Germany and Nobanis (2005) listed 34 species of non-native Aphididae in its geographic area in 2005. Lampel and Gonseth (2005) listed 37 species alien to Switzerland in 2005 whilst Rabitsch and Essl (2006) listed 40 alien aphid species from Austria in 2006. The differences in the number of species considered non-indigenous clearly reflect differences in the composition of the fauna of each country, but also reflect differences in the definition of 'alien'. Lampel and Gonseth (2005) considered only species of non-European origin whereas Geiter et al. (2002) included all species considered non-native to Germany.

The goal of this work is to provide a first comprehensive list of Aphididae alien to Europe. Aphid species originating from one European country and introduced into another, i.e. species alien *in* Europe such as *Diuraphis noxia* (Kurdjumov, 1913) and *Brachycorynella asparagi* (Mordvilko, 1929), will not be considered in this work. These species may have an invasive status in the area where they were introduced but it appeared difficult to disentangle human-mediated introductions from natural expansion.

To define the species present in Europe, we used the list of European Aphididae elaborated by Nieto Nafria for Fauna Europaea (Nieto Nafria et al. 2007). We compiled information about each species from published sources and experts to define their origin, i.e. European vs non-European. Among the references consulted, the lists cited above and the three comprehensive books by Blackman & Eastop (Blackman and Eastop 1994, 2000, 2006) proved to be particularly useful. Once a first list of alien aphids had been defined, we sought additional information, such as the date of first occurrence in Europe. June 2008 was the cut-off date for our literature survey. All the information collected for the 102 species considered is provided in Table 9.2.1.

9.2.2. Taxonomy of alien species

The delineation of the taxa included under the family name Aphididae has varied over the last 50 years. Here, we use Aphididae *sensu* Eastop and Hille Ris Lambers (1976) and Remaudière and Remaudière (1997). Therefore, we did not consider Adelgidae and Phylloxeridae in this chapter. Taxonomy and nomenclature are as described by Remaudière and Remaudière (1997), Nieto Nafria et al. (1998), Quednau (1999, 2003), and Eastop and Blackman (2005). Some of the names cited in published studies could not be clearly attributed to a currently valid taxon and were therefore excluded.

A total of 98 species present in Europe but originating from another continent have been listed to date, to which we can add four cosmopolitan species of uncertain origin (cryptogenic) (Table 9.2.1). For comparison, the European aphid fauna currently includes 1,373 species (Nieto Nafria et al. 2007), meaning that 7.4 % of the European aphid fauna is of alien origin.

The 102 alien species of Aphididae established in Europe belong to 12 different subfamilies, most of which are already represented among the native entomofauna (Figure 9.2.1). However, three subfamilies (Greenideinae, Lizerinae and Neophyllaphidinae) were not known in Europe before introductions. Each of these three subfamilies

is represented by a single species. *Greenidea ficicola* is a member of the Greenideinae subfamily widespread in eastern regions and living on several species of *Ficus*. It was introduced into Italy in 2004 and seems to be widespread in Southern Europe (Italy, Spain and Malta) (Barbagallo et al. 2005a, Mifsud 1998). *Paoliella eastopi*, a species belonging to the Lizerinae described from Kenya, has only been found in one European country, England. All *Paoliella* species are of African origin. *Neophyllaphis podocarpi*, the only Neophyllaphidinae species known in Europe, originates from Asia and was recorded on *Podocarpus* in Italy in 1990 (Limonta 1990) but appears to have spread. Five subfamilies contribute more than five species to the alien fauna (Figure 9.2.1). The subfamily Aphidinae predominates, accounting for 59% of the alien Aphididae, followed by Calaphidinae (16%), Lachninae (5.8%), Eriosomatinae (4.8%) and Chaitophorinae (4.8%). These five subfamilies are also the most species-rich in native species. Each of the other seven subfamilies accounts for less than 1% of the alien Aphididae (Figure 9.2.1). The Hormaphidinae is the only subfamily represented by more alien than native species (4 species vs 1).

The taxonomic composition of the alien entomofauna is highly diverse at genus level. The 102 alien species belong to 58 different genera (Table 9.2.1). Thirty-two (55%) of these genera are represented in Europe by only non-native species and 40 (69%) contribute only one species to the alien fauna. The genus *Aphis* is the most represented, with eight species. This is not surprising, given that this genus contains more than 10% of the world's Aphididae and is abundant in all biogeographical regions of the world. This is not the case for another two species-rich genera, the North American *Illinoia* (seven alien species in Europe and 54 species worldwide) and the Asian *Tinocallis* (six alien species in Europe and 25 species worldwide). Although the genus *Cinara* is the second most species-rich genus in the world, with 222 species worldwide, three quarters of which being of non-European origin, surprisingly only three alien species from this genus are present in Europe

9.2.3. Temporal trends

The date of the first record in Europe is known, with various degrees of precision, for 94 of the 102 alien aphid species (Table 9.2.1). The precise date of arrival is unknown for most species because their introduction was unintentional (see below 9.2.5) and large delays may occur between the date of introduction and the date of reporting. However, in certain cases, introduction is relatively well documented, available data suggesting that the date of the first report was close to the date of introduction. This is the case for recent introductions, such as the species detected and monitored by the permanent aerial suction-trap network "Euraphid". This system of aphid flight surveys, based on a 12.2 m.-high suction trap, was developed by the Rothamsted Experimental Station in the 1960s (Taylor and Palmer 1972). This device is now used in several European countries, as part of integrated control networks, and has also proved useful for studies of the long-range dispersal of alates and for the regular detection of

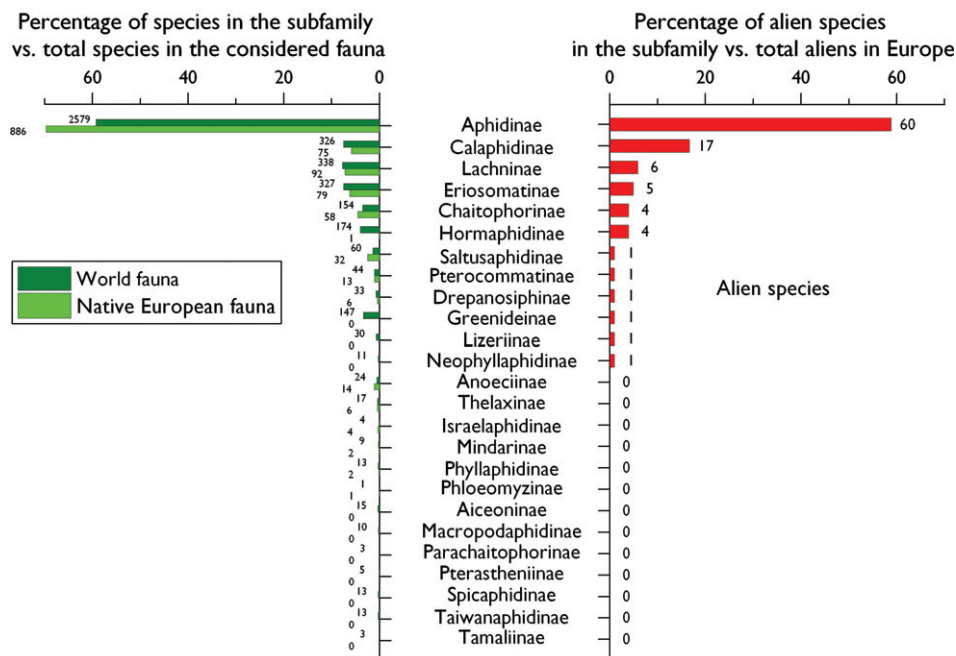


Figure 9.2.1. Taxonomic overview of the aphid species alien to Europe compared to the native European fauna and the world fauna. Subfamilies are presented in a decreasing order based on the number of alien species. Species alien to Europe include cryptogenic species. Data about native European aphids from Fauna europaea (Nieto Nafria et al. 2007); world data from Remaudière and Remaudière (1997). The number over each bar indicates the number of species observed per subfamily.

aphid species new to the national or European fauna (Hullé et al. 1998). In France, a network of five such traps spread over the territory has been monitoring the aphid species trapped since 1978. This system detected four species new to Europe between 1984 and 1988 (Hullé et al. 1998): *Essigella californica* (Turpeau and Remaudière 1990), *Klimaszewskia salviae* (Leclant and Remaudière 1986), *Myzocallis walshii* (Remaudière 1989), and *Tinocallis takachihoensis* (Leclant and Remaudière 1986), and has monitored the extension of their geographical range in France. In a very small number of cases, more ancient introductions have also been documented, generally for important pest species. For example, the occurrence of *Eriosoma lanigerum*, a pest of apple trees originating from North America, was noted for the first time in a nursery in the outskirts of London in 1787 (Balachowsky and Mesnil 1935). The species was described by Hausmann in 1802, based on material from Germany, where aphids had been found in nurseries, causing extensive damage. In 1812, the species was found in France, by 1841, it was found in Italy and in 1870 it was reported in Switzerland. *E. lanigerum* has subsequently spread gradually to all temperate countries of the world (Balachowsky and Mesnil 1935, Marchal 1928).

For most alien species, the date of first report sighting may not correspond to the date of introduction and secondary expansion. For example, the pest species *Myzus persicae*, *Panaphis juglandis*, and *Chromaphis juglandicola* were all reported for the

first time in Europe between 1800 and 1849, but they were probably introduced long before along with their host plants. The primary host of *Myzus persicae*, the peach tree, grown since classical times in the Mediterranean basin, was imported to Europe from Persia, but probably originated from western China, where it has been cultivated since 5,000 yr BP (Faust and Timon 1995). The host plant of *Chromaphis juglandicola* and *Panaphis juglandis*, the walnut, may have been introduced to Europe from Persia during the classical era, but this remains a matter of debate (Huntley and Birks 1983). Even for more recent introductions, the time lag between introduction and the first reported sighting may be considerable, particularly if the species concerned is not a pest. The date on which a taxonomic group was first recorded is therefore more likely to refer to the period during which it was studied for the first time. Börner between 1930 and 1952 made the largest single advance to studies of the aphid fauna of Europe, with the publication of “Europae Centralis Aphid” (Börner 1952). This catalysed intensive studies of the aphid fauna in various European countries over the following 20 years. The increase in the number of introduced species observed between 1950 and 1974 is partly attributable to this increase in taxonomic and faunistic activity.

Bearing these biases in mind, and taking the first recorded sighting as a proxy for the date of introduction, the mean rate of introduction since 1800 was 0.5 species per year. A similar rate has also been reported for a more recent period (0.42 between 2000 and 2007). The number of introductions increased in the second half of the 20th century (Figure 9.2.2). The mean number of new records increased from 0.3–0.4 per year before 1950 to more than 1.3 per year between 1950 and 1974. The mean number of introductions per year has decreased since 2000, but this pattern may change again in the future. The three most recent alien aphid species introduced to Europe are *Aphis illinoisensis*, a Nearctic species and a pest of vineyards introduced into Crete in 2005 (Tsitsipis et al. 2005), *Prociphilus fraxiniifolii*, also of Nearctic origin, introduced into Europe in 2003, (Remaudière and Ripka 2003), and *Greenidea ficicola*, a tropical species, probably originating from Asia, introduced into Sicily in 2004 (Barbagallo et al. 2005a).

9.2.4. Biogeographic patterns

9.2.4.1 Origin of alien species

A precise continent of origin was ascertained for 90.2% (92 species) of the alien Aphididae species, whereas 5.9% (six species) of the alien species were known only to be native to tropical or subtropical regions and 3.9% (four species) were of unknown origin (cryptogenic, Table 9.2.1, Figure 9.2.3).

The cryptogenic species include the polyphagous pest species *Myzus persicae* and *M. cymbalariae*, which have a cosmopolitan distribution. Data concerning their host plant relationships and the distribution of other species of the genus *Myzus*, strongly

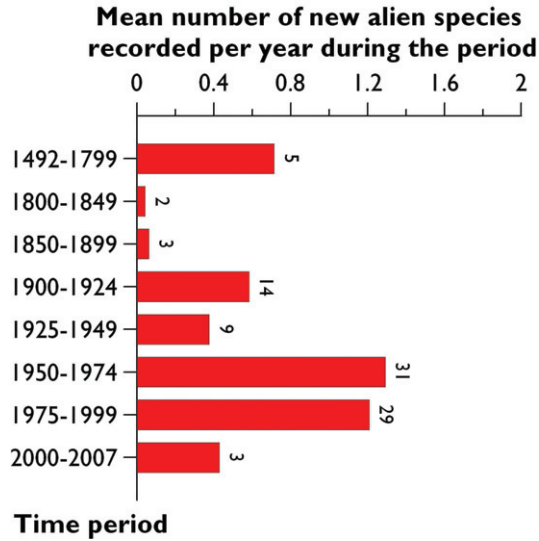


Figure 9.2.2. Changes over time in the mean number of first sightings per year of aphid species alien to Europe from 1492 to 2007. The number to the right of the bar indicates the absolute number of species reported for the first time during the corresponding time period.

suggest that these species originate from a continent other than Europe. Many other cosmopolitan species are not included in this list because they are thought to be of European origin, e.g. *Acyrtosiphon pisum*, *Brevicoryne brassicae*, although their origin is unclear and it remains possible that they were introduced into Europe by humans a long time ago.

Most of the alien aphid species in Europe originate from temperate regions of the world. Asia and North America have contributed the largest numbers (each 43.1%, Figure 9.2.3). Most of the Asian species originated from temperate zones (32 species), and only four species (*Cerataphis brasiliensis*, *Cerataphis orchidearum*, *Greenidea ficicola*, and *Stomaphis mordvilkoï*) are known to have originated from tropical Asia. Only four alien species in Europe are of African origin. Two of these species come from North Africa (*Cinara laportei* and *C. cedri*) and two from sub-Saharan regions (*Aloephagus myersi* and *Paoliella eastopi*). No alien aphid species has yet been introduced into Europe from Australasia or South America. The proportions of aphids of different geographical origins in the alien aphid fauna of Europe have remained fairly constant over time (Figure 9.2.4) and seem to reflect the species diversity of the donor continents. Most of the described aphid species are of temperate origin, with Aleyrodidae and Coccoidea appearing to replace aphids in the tropics and subtropics (Dixon 1998). With only 219 (Remaudière et al. 1985) and 180 (Hales 2005) species, respectively, sub-Saharan Africa and Australia have a very poor aphid fauna. By contrast, 1,416 species are found in North America (Footitt et al. 2006) and 1,007 species are found in China (Qiao and Zhang 2004). Thus, the origins of the alien species in Europe might reflect regional species di-

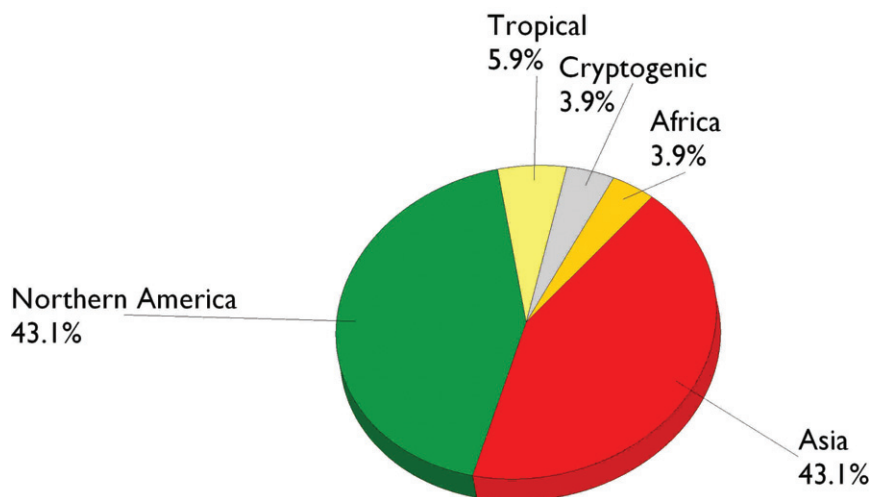


Figure 9.2.3. Geographic origin of the alien species of Aphididae established in Europe.

versity rather than preferential routes of introduction from North America and temperate Asia.

9.2.4.2. Distribution of alien species in Europe

Alien Aphididae species are not evenly distributed within Europe (Figure 9.2.5). The number of alien species present in a country is significantly and positively correlated with the number of native species recorded in that country ($r=0.6226$, $p<0.001$). This may reflect differences in sampling intensity and in the number of local taxonomists. The number of alien species also seems to be weakly positively correlated with the total area covered by each country ($r=0.3361$, $p=0.0182$). Similarly, the number of native species is strongly correlated with the area of the country ($r=0.6803$, $p<0.001$).

The top ten countries/regions within Europe with the largest numbers of recorded alien aphid species are: Great Britain (64), mainland France (63), mainland Italy (58), mainland Spain (56), Sicily (Italy) (45), Germany (44), Switzerland (37), Madeira (Portugal) (36), mainland Portugal (31), Czech Republic (29).

Alien aphid species are well distributed across Europe, with 58% present in at least five European countries and 38% occurring in more than 10 countries or regions. The polyphagous pest species, *Myzus persicae*, *Macrosiphum euphorbiae* and *Aphis gossypii* are the most widely distributed alien species: they have been recorded in 43, 41 and 40 countries or regions, respectively. Only one of the 15 species occurring in more than half of the countries of Europe, *Acyrtosiphon caraganae*, is not considered to be a pest of crop plants. This species, probably originating from the Altai region, is now found in temperate regions throughout the Northern hemisphere, where it lives on woody Leguminosae, particularly *Caragana* and *Colutea* species. In

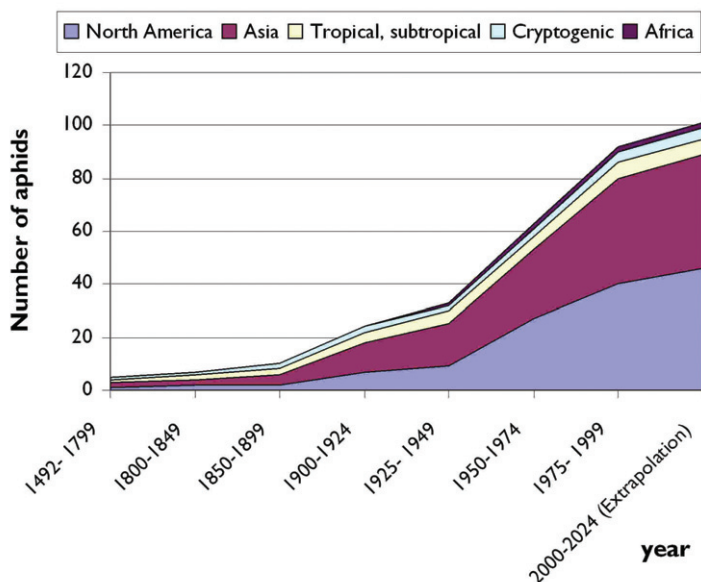


Figure 9.2.4. Cumulative numbers of alien aphid species established in Europe, by year and by geographic origin

most cases, it is not known whether the species expanded naturally after its establishment in a country, or whether the extension of its distribution was driven by repeated introductions from abroad.

Thirteen of the 19 species present in only two European countries have discontinuous distributions, probably resulting from independent introductions. Thus, for example *Ericaphis wakibae* has been found in Great Britain and the Czech Republic, *Chaitophotus populifolii* in Germany and Serbia and *Macrosiphum ptericolens* in Poland and Great Britain. A continuous but restricted area may be accounted for by recent introductions, as for *Aphis illinoisensis* Shimer, 1866, a pest of grapevines introduced into Greece in 2005 (Tsitsipis et al. 2005). This species has extended its range from Crete to continental Greece and recently (2007) to the Mediterranean part of Montenegro (Petrovic, personal communication).

Eight alien aphid species have each been found in only one European country. Four of these species are confined to England, two to Italy, one to Switzerland and one to the Ukraine. These species were all introduced before 2000 and have not spread elsewhere since. They may be unable to colonise a wider geographical area in Europe, they may have disappeared or they may simply have been overlooked.

9.2.5. Main routes and vectors for introduction into Europe

No cases of intentional introduction of aphids into Europe are known. All alien species were therefore introduced accidentally. In a very small number of cases, the pathway

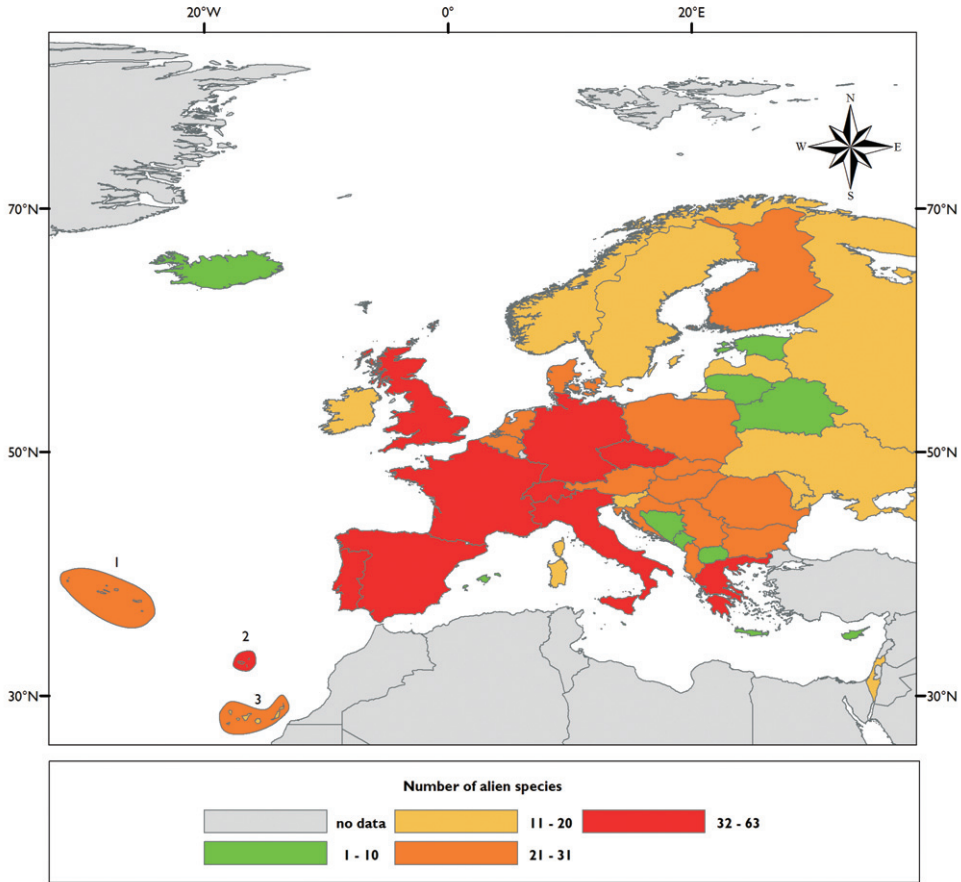


Figure 9.2.5. Comparative colonization of continental European countries and islands by Aphididae species alien to Europe. Archipelago: **1** Azores **2** Madeira **3** Canary islands.

and vector are precisely known. For example, two Japanese aphids, *Tinocallis ulmiparvifoliae* and *T. zelkovae* were introduced into Europe in 1973 with their hosts, bonsai trees that were imported into Great Britain directly from Japan. The infested bonsai trees had been in Great Britain for about six months before the aphids were detected, and were growing in slatted wood buildings providing no effective physical barrier to insect dispersal (Prior 1971).

In most cases, it is difficult to identify the vector of accidental introductions; most have been inferred from the known biological requirements of the aphid species. Most Aphididae have a high level of host-plant specificity and most alien species are therefore thought to have been introduced into Europe with their host plants. For example, the *Takecallis* species included in our list feed on bamboos of Asian origin. The Ne-

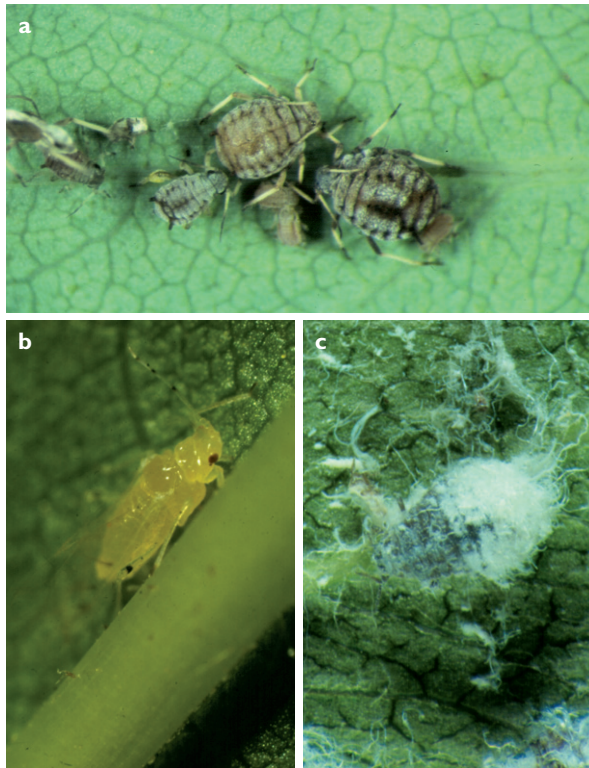


Figure 9.2.6. Some alien aphids. **a** Spiraea aphid, *Aphis spiraeophaga*. (Credit: Olivera Petrović-Obradović) **b** Walnut aphid, *Chromaphis juglandicola*. (Credit: Olivera Petrović-Obradović) **c** Woolly apple aphid, *Eriosoma lanigerum*. (Credit: Olivera Petrović-Obradović).

arctic aphid *Prociphilus fraxinifolii* has recently been detected in Budapest (Hungary) (Remaudière and Ripka 2003), but only on the North American red ash tree, *Fraxinus pennsylvanica* Marsh. This aphid has not been found on European ash planted in the same area. Two oriental species, *Reticulaphis distylii* and *Greenidea ficicola*, live on several species of *Ficus*, all originating from tropical regions. These *Ficus* species have been planted as ornamental trees in the warmest areas of the Mediterranean basin (Bargallo et al. 2005a). These two species of aphids are found on tropical fig trees, but never on *Ficus carica*, the only European species of this genus. All these alien species are thought to have been introduced into Europe through trade, but the aphid species may have been introduced several years after their hosts. *Impatiens asiaticum* is a species originating from Central Asia. It was introduced into Europe in 1967, whereas its host, *Impatiens parviflora* DC. was introduced into Europe much earlier, in the 19th Century, subsequently escaping from botanic gardens to establish itself as a common weed. The aphid was not introduced at the same time as its host plant in this case because the host plant is an annual, which was imported in the form of seeds. The aphid arrived more than 100 years later, probably on an aeroplane (Holman 1971, Tambs-Lyche and Heie 1973). Another example is provided by *Rhopalosiphoninus latysiphon*,

a pest species particularly damaging to potato. This species was not introduced into Europe until the end of the 1st World War, long after the introduction of its host plant, and was transported with potatoes from the USA. It was subsequently found in Italy (1921), the Netherlands (1930), Germany (1943), England (1945), Switzerland and Austria (1949) (Remaudière 1952).

Finally, we cannot exclude the possibility that some species originating in areas close to Europe may have been transferred into Europe by wind, air streams or windstorms. For example, it is difficult to determine whether *Cinara laportei* and *C. cedri* were transferred with their host, the Atlas cedar, which was planted in Europe, or whether these species colonised Europe following their introduction via wind or air streams.

9.2.6. The ecosystems and habitats most frequently invaded

All aphids are phytophagous and their distribution is limited by the presence of their host plants. Aphid species with a limited spectrum of host plants of exotic origin, not present at natural sites, are restricted to artificial habitats, such as agricultural land, greenhouses and parks and gardens. For example, *Illinoia liriodendri* and *Neophyllaphis podocarpi* feed on exotic trees (*Liriodendron tulipifera* L. and *Podocarpus* spp., respectively). As a result, these aphids are restricted to parks, gardens and city areas in which these trees have been planted in Europe. Similarly, *Cinara cedri* and *C. laportei* which feed specifically on *Cedrus* are restricted to forest areas in which their hosts have been planted. Other species restricted to artificial habitats include tropical and subtropical aphids present only in indoor conditions in Europe. These species were included in the list because it is clear that they have become established in Europe. For example, *Cerataphis* spp., particularly *C. lataniae* and *C. orchidearum* have repeatedly been found in European greenhouses (Chapin and Germain 2005). Similarly, *Sitobion luteum* and *Pentalonia nigronervosa* are considered to have been introduced into hothouses in Europe (Blackman and Eastop 2000). Another subtropical *Cerataphis*, *C. brasiliensis*, has recently been found established outdoors in the south of the France (Chapin and Germain 2005, 2004). Some aphid species have a less limited host range spectrum. They can adapt to new hosts when introduced and may disperse in natural habitats. *Cinara curvipes*, a species recently introduced into Europe, is known to feed on various species of *Abies* in its native area (North America). In Europe, it is found on North American *Abies* species, but also on native *Abies* species and has recently been reported on many other conifers, including *Picea*, *Tsuga*, and *Pinus* (Scheurer and Binazzi 2004). *C. curvipes* is found in parks, gardens and forests. It could potentially colonise all European coniferous forests. Finally, polyphagous aphids, notably *Myzus persicae*, *M. ascalonicus*, *M. ornatus*, *Macrosiphum euphorbiae* and *Aphis gossypii*, have established themselves on many native plants in natural habitats.

Most of the alien aphids seem to have become established in the European environment and habitats. However, some species, such as *Paoliella eastopi* and *Macrosi-*

phum ptericolens have been recorded only once or twice, and it remains unclear whether these species are truly established. Other species, such as *Rhopalosiphum parvae* Hottes & Frison (1931), a North American aphid found in Sicily in 1982 (Barbagallo and Stroyan 1982), or *Tuberocephalus higansakurae hainnevilleae* Remaudière & Sorin, 1993, detected in France in 1990 on trees of *Prunus subhirtella* Miq. var. *pendula* Y.Tanaka imported from Japan (Remaudière and Sorin 1993), have been observed in Europe but have since been eradicated. Such species are not included in our list.

9.2.7. Ecological and economic impact

Most of the alien Aphididae are recognised pests, feeding on crops, ornamental plants and forest trees in Europe. Other alien Aphididae species may have remained undetected because they feed on plants that are not commercially exploited. As for most insects, much more is known about the economic impact of aphids than about their ecological impact. Aphids cause direct (sap-feeding, deformation of their hosts) and indirect (transmission of plant diseases, deposition of honeydew on the leaves) damage.

The economic impact of each species depends on (i) the type and extent of the damage caused and (ii) the economic importance of the host. Of the 102 alien aphid species in Europe, 52 are recognised pests of agricultural and horticultural crops (Blackman and Eastop 2000). The polyphagous species *Myzus persicae*, *Macrosiphum euphorbiae* and *Aphis gossypii* attack a wide range of vegetable crops, both indoors and outdoors. They are vectors of many viral diseases and are probably the aphids with the greatest economic impact in vegetable crops (Lampel and Gonseth 2005).

European orchards are attacked by several alien aphid species. Apple trees can be severely damaged by the North American woolly aphid *Eriosoma lanigerum* and the Asian species *Aphis spiraeicola*. The recent introduction of *Toxoptera citricidus* into the Iberian Peninsula (Portugal and Spain) (Ilharco et al. 2005) poses a serious threat to Mediterranean citrus fruit production because this aphid is the principal vector of the *Tristeza* closterovirus of *Citrus*. *Citrus* trees in Europe are also the hosts of *Aphis spiraeicola* and *Toxoptera aurantii*, two polyphagous species also capable of transmitting this closterovirus, albeit with a lower efficiency.

The recent introduction and rapid dispersion of *Aphis illinoiensis*, a grapevine aphid, poses a particular threat to viticulture in the Mediterranean area (Remaudière et al. 2003, Tsitsipis et al. 2005). Some alien aphids attack agricultural crops, often as potential virus vectors. *Rhopalosiphum maidis* is known as a pest of maize and other grain crops in Europe and transmits the persistent luteovirus “yellow dwarf” virus of barley. The grass aphid, *Hysteroneura setariae* Thomas, 1878, has recently been recorded in Spain (Meliá Masiá 1995). Its impact is difficult to predict because it usually lives on wild grass species, but it may occasionally infect cereals and can transmit several viral diseases to these crops. *Macrosiphum albifrons* is a widespread species in North America that has been introduced into Europe (Stroyan 1981) where the damage it causes to

lupins (Ferguson 1994) has stimulated recent research (Blackman and Eastop 2000). Finally, *Acyrtosiphon kondoi*, which currently has a restricted distribution in Europe, is known to be a serious pest of lucerne (Blackman and Eastop 2000).

Exotic Aphididae are not considered to be serious pests of forest species in Europe (EUROFOR 1994) by contrast to the major damage caused to agricultural and horticultural crops. However, some species may cause economic losses. For example, the North African species *Cinara cedri* and *C. laportei* have been reported to damage plantations of *Cedrus* in southern France (Emonnot et al. 1967, Fabre 1976).

Finally, in addition to their measurable economic impact, some alien aphids may have an aesthetic impact. The production of abundant honeydew and the distortions induced by feeding may significantly modify the appearance of the foliage of ornamental plants in parks and private gardens. *Appendiseta robiniae* has such an aesthetic impact on *Robinia pseudacacia* L., as does *Prociphilus fraxinifolii* on the red ash tree *Fraxinus pennsylvanica* and *Illinoia liriodendri* on *Liriodendron tulipifera*.

9.2.8. Conclusion

There are several possible reasons for the overrepresentation of Aphididae in the alien insect fauna of Europe. First, aphids are phytophagous insects and many are pests of economically important host plants (Blackman and Eastop 2000). For this reason, many studies are carried out on the distribution, taxonomy and biology of this family. New alien species of Aphididae are therefore more likely to be detected than new members of other taxonomic groups, and this effect is enhanced by standard phytosanitary procedures. Second, aphids have the ability to reproduce both parthenogenetically and sexually. Several species can reproduce exclusively by parthenogenesis, and all species can potentially maintain parthenogenetic populations throughout the year in areas of mild climate. Consequently, very few introduction events, and theoretically even the introduction of a single parthenogenetic female, may lead to the development of a population and the establishment of an alien species. Third, although aphids, as a group, are cosmopolitan, they are most strongly represented in temperate regions. Consequently, most of the World's aphids live in climatic conditions similar to those of Europe and are therefore preadapted to establishment where suitable hostplants are present. Moreover, global warming is also likely to promote the survival of alien tropical and subtropical species, at least locally (e.g. along the Mediterranean coast). Finally, aphids are small insects easily transported around the globe with plant materials.

These factors and trends are unlikely to change and the number of introductions of alien Aphididae observed in Europe will probably continue to increase, due to both environmental (climate change) and economic factors (expanding markets and globalisation, and the ever increasing numbers of goods transported and agents of transport).

References

- Aguiar AMF, Fernandez A, Ilharco FA (1994) On the sudden appearance and spread of the black citrus aphid *Toxoptera citricidus* (Kirkaldy) (Homoptera Aphidoidea) on the island of Madeira. *Bocagiana* 168: 1–7.
- Aguiar AMF, Ilharco FA (1997) New records for aphids (Homoptera: Aphidoidea) from Madeira Island. *Boletín de Sanidad Vegetal* – 23: 565–570.
- Aguiar AMF, Ilharco FA (2001) Aphids (Homoptera : Aphidoidea) from Madeira Island – New records and Corrections. *Boletín de Sanidad Vegetal - Plagas* 27: 323–336.
- Angst A, Scheurer S, Forster B (2007) First record of *Cinara curvipes* (Patch) (Homoptera, Aphididae, Lachnidae) on *Abies concolor* in Switzerland. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 80: 247–252.
- Arzone A, Vidano C (1990) Exotic insects newly introduced in Italy and Piedmont. *Informatore Fitopatologico* 40: 47–54.
- Balachowsky A (1933) I. Sur la présence en France de *Capitophorus fragaefolii* Ckll., Aphide nouvellement introduit et nuisible au fraisier. II. Sur l'existence de nouveaux foyers d'*Aphis forbesi* Weed. *Revue de Pathologie Végétale et d'Entomologie Agricole de France* 20: 256–267.
- Balachowsky A, Mesnil L (1935) Les insectes nuisibles aux plantes cultivées. Paris, France: Mery L. 1921 pp.
- Barbagallo S (1994) Considerazioni faunistiche e biogeografiche sugli afidi italiani. *Atti Accademia Nazionale italiana di entomologia* XLII: 141–178.
- Barbagallo S, Stroyan HLG (1982) Osservazioni biologiche, ecologiche e tassonomiche sull'afidofauna delle Sicilia - Biological, ecological and taxonomic notes on the aphid fauna of Sicily. *Frustula Entomologica (N.S.)* 3: 1–182.
- Barbagallo S, Coccuzza GE (1998) Sulla presenza in Sicilia dell'afide *Neotoxoptera violae* (Pergrande). *Bollettino di Zoologia Agraria e di Bachicoltura* 30 (2): 321–326.
- Barbagallo S, Bosio G, Brussino G, Scarpelli F (1998) Aphids infesting cultivated blueberries and cranberries in Italy. *Informatore Fitopatologico* 10: 65–71.
- Barbagallo S, Bosio G, Brussino G, Patti I, Scarpelli F (1999) Annotazioni morfo-biologiche sull'afide dei Mirtilli americani, *Ericaphis scammei* (Mason) (Rhynchotha Aphidoidea). *Bollettino di Zoologia Agraria e di Bachicoltura* 31: 207–227.
- Barbagallo S, Suma P (1999) Recenti infestazioni in Sicilia dell'afide giallo del Pecan, *Moneliopsis pecanis* Bissell. *Bollettino di Zoologia Agraria e di Bachicoltura* 31: 241–249.
- Barbagallo S, Ciampolini M (2000) Rinvenimento in Italia dell'afide della cipolla *Neotoxoptera formosana* (Takahashi). *Bollettino di Zoologia Agraria e di Bachicoltura* 32: 245–258.
- Barbagallo S, Bella S, Cocuzza G (2005) Rinvenimento dell'afide orientale *Greenidea ficicola* su *Ficus* ornamentali in Italia meridionale. *Informatore Fitopatologico* 55: 25–29.
- Barbagallo S, Ilharco FA, Nieto Nafria JM, Sousa-Silva RC (2005) D Recent aphid records in Southern Europe: Towards the tropicalization of the Mediterranean ?. 7 th International Symposium on Aphids, Freemantle, WA Australia. 2–7. October 2005.
- Binazzi A, Barbagallo S (1991) Annotazioni faunistico-ecologiche sugli afidi del genere *Chaitophorus* Koch in Italia. XVI. Congr. Naz. Ital. Entomol., Settembre 1991, pp. 59–63.

- Biurrun R, Nieto Nafria JM (1987) Sobre la presencia en España de *Illinoia azaleae* (Mason, 1925) (Hom., Aphididae). *Boletín de la Asociación Española de Entomología*. 11:418.
- Blackman RL, Eastop VF (1994) *Aphids on the World's Trees: an Identification and Information Guide*. Wallingford, UK: CAB International. 1024 pp.
- Blackman RL, Eastop VF (2000) *Aphids on the World's Crops - an Identification and Information Guide*. 2nd edn. Chichester UK: John Wiley & Sons. 476 pp.
- Blackman RL, Eastop VF (2006) *Aphids on the world's herbaceous plants and shrubs*. Chichester, UK: John Wiley & Sons. 1460 pp.
- Blackman RL, Eastop VF (2007) Taxonomic Issues. In Van Emden H, Harrington R., *Aphids as Crop Pests*. CAB International, 1–29.
- Blanchard E (1840) *Aphidiens. Histoire Naturelle des insectes. Orthoptères, Hémiptères, Hyménoptères, Lépidoptères et Diptères*. Paris, France: Duménil. 672 pp.
- Boisduval JA (1867) Essai sur l'entomologie horticole comprenant l'histoire des insectes nuisibles à l'horticulture avec l'indication des moyens propres à les éloigner ou à les détruire, et l'histoire des insectes et autres animaux utiles aux cultures. Paris, France: Librairie Centrale d'Agriculture et de Jardinage. 664pp.
- Börner C (1952) Europae centralis Aphides. Die Blattläuse Mitteleuropas. Namen, Synonyme, Wirtspflanzen, Generationszyklen. *Mitteilungen der Thüringischen Botanischen Gesellschaft* 3:1–488.
- Bozhko MP (1976) New and little known aphids (Homoptera, Aphidoidea) in the south of the European part of the USSR (in Russian). *Entomologicheskoe Obozrenie* 55: 863–874.
- Boyer de Foscolombe M (1841) Description des pucerons qui se trouvent aux environs d'Aix. *Annales de la Société Entomologique de France* 10:157–198.
- Buckton GB (1876) *Monograph of the British aphides Vol.I*. London, UK: The Ray Society. 190pp. + 38 plates.
- Buckton GB (1879) *Monograph of the British aphides Vol.2*. London, UK; The Ray Society. 176pp.
- Cairaschi EA (1942) *Pentalonia nigronervosa* Coquerel (Hem. Aphididae) espèce nuisible nouvellement introduite en France. *Bulletin de la Société entomologique de France* 46: 138–140.
- Carter CI, Four DF, Bartlett PW (1984) The lupin aphid's arrival land consequences. *Antennata* 8: 129–182.
- Chapin E, Germain JF (2005) Un nouveau puceron des palmiers pour la côte varoise. *PHM Revue Horticole* 466: 41–45.
- Cholodkovsky N (1907) On the biology of aphids on papilionaceous plants. *Russkoe entomologicheskoe obozrenie* 2–3: 87–95.
- Ciampolini M, Martelli M (1977) Appearance in Italy of the peach trunk aphid *Pterochloroides persicae* (Cholodk.). *Bollettino di Zoologia Agraria e di Bachicoltura* 14: 189–196.
- Coccano PG, Petrovic-Obradovic O (2006) New Aphid species for Italy caught by suction trap. *Phytoparasitica* 34: 63–67.
- Colombo M (1981) *Stomaphis mordvilkoii* Hille Ris Lambers (Aphidoidea Lachnidae) afide orientale riscontrato su noce nell'Italia del Nord. *Bollettino di Zoologia Agraria e di Bachicoltura ser. II* 16: 199–206.

- Covassi M (1971) Osservazioni preliminari sulla presenza in Italia di un afide nocivo ai cedri: *Cedrobium laportei* Remaud. (Homoptera, Aphidoidea, Lachnidae). *Redia* 52: 641–652
- Covassi M, Binazzi A (1974) Note corologiche e morfologiche sulla *Cinara cedri* Mim. In Italia (Homoptera Aphidoidea, Lachnidae). *Redia* 55: 331–341.
- Del Guercio G (1911) Intorno ad alcuni Afididi della Penisola Iberica e di altre localita, raccolti dal prof. I.S. Tavares. *Redia* 11: 296–333.
- Del Guercio G (1913) Generi e specie nuove di afidi o nuovi per la fauna italiana. *Redia* 9: 169–196.
- Del Guercio G (1917) Contribuzione alla conoscenza degli afidi. *Redia* 12: 197–277.
- Dixon AFG (1998) *Aphid Ecology* 2nd edn. London, UK: Chapman & Hall. 300 pp.
- Doncaster JP (1946) The shallot Aphis, *Myzus ascalonicus* sp. n. (Homiptera, Aphididae). *Proceeding of the Royal Entomological Society (Lond.)* 15: 17–48.
- Doncaster JP (1954) Two aphids new to Britain. *Entomologist* 87: 127–128.
- Doncaster JP (1961) *Francis Walker's aphids*. London, UK: Britsih Museum (natural History). 165pp.
- Dospevski S (1910) Bolesti i nepriyateli na kulturnite rasteniy za unischtozenietona koito sa iskani nastavleniya ot stantziyavata i takiva, nabyudavani v Sadovo prez 1908 godina, Godischen otchet na Durzavnata opitna zemedelska stanciya v Sadovo.
- Eastop VF (1956) Thirteen aphids new to Britain and records of some other rare species. *Entomologist's Monthly Magazine* 92: 271–275.
- Eastop VF (1958) The history of *Macrosiphum euphorbiae* (Thomas) in Europe; The Entomologist 91: 198–201.
- Eastop VF (1962) Additions to the wild fauna and flora of the Royal Botanic Gardens, Kew. 25. A contribution to the aphid fauna. *Kew Bulletin* 16: 139–146.
- Eastop VF (1971) Keys for the identification of *Acyrtosiphon* (Homiptera: Aphididae). *Bulletin of the British Museum (Natural History) Entomology* 26: 1–115.
- Eastop VF, Hille Ris Lambers D (1976) *Survey of the World's Aphids*. The Hague, Netherlands: Dr Junk W. b.v. 573 pp.
- Eastop VF, Blackman RL (2005) Some new synonyms in Aphididae [Homoptera: Sternorrhyncha]. *Zootaxa* 1089: 1–36.
- Emonnot P, Gayraud Y, Leclant F, Remaudière G (1967) Sur la présence en France de *Cedrobium laportei* Remaudière puceron nuisible au cèdre. *Comptes-Rendus de l'Académie d'Agriculture de France* Juin 1967: 966–972.
- EUROFOR (1994) L'europe et la forêt: Les grands problèmes des forêts de l'union européenne - Dégâts occasionnés aux forêts et conséquences pour l'environnement. http://www.europarl.europa.eu/workingpapers/agri/ch4-3_fr.htm.
- Fabre JP (1976) Sur la présence en France de *Cinara cedri* (Mimeur) puceron nuisible au cèdre. *Comptes-Rendus de l'Académie d'Agriculture de France* Juin 1976: 771–775.
- Faust M, Timon B (1995) Origin and dissemination of peach. *Horticultural Review* 17: 331–379.
- Ferguson AW (1994) Pests and plant injury on lupins in the south of England. *Crop Protection* 13: 201–210.

- Footitt RG, Halbert SE, Miller GL, Maw E, Russell LM (2006) Adventive aphids (Hemiptera: Aphididae) of America north to Mexico. *Proceedings of the Entomological Society of Washington*. 108: 583–610.
- Geiter O, Homma S, Kinzelbach R (2002). *Bestandsaufnahme und Bewertung von Neozoen in Deutschland*. Forschungsbericht 296. Berlin: Umweltbundesamt. Texte. 25/2002
- Germain JF, Chapin E (2004) Discovery in France of the palm aphid *Cerataphis brasiliensis* (Hempel) (Hemiptera, Aphididae, Hormaphidinae). *Revue Francaise d'Entomologie (N.S.)* 26: 174.
- Germain JF, Deogratias JM (2008) Confirmation de la presence en France du puceron de la violette. *PHM-revue Horticole*, 507: 42–44.
- Giacalone I, Lampel G (1996) Pucerons (Homoptera, Aphidina) de la région insubrique tessinoise d'origine subméditerranéenne, méditerranéenne, esteuropéenne, asiatique et américaine. *Mitteilungen der schweizeischen entomologischen Gesellschaft* 69: 229–260.
- Goeze JA (1778) *Hemiptera. Entomologische Beyträge zu des ritter Linné Zwölften ausgabe des Natursystems*. Leipzig, Germany: Weidmann. 352pp.
- Hales D (2005) *Aphidoidea in Australia*. 7 th International Symposium on Aphids, Freemantle, WA Australia: 2–7 October 2005.
- Heie OE (1973) Tilføjer til listen over danske bladlus (Homoptera, Aphidoidea). *Entomologiske Meddelelser* 41: 177–187.
- Heie OE (1980) The Aphidoidea of Fennoscandia and Denmark. I General Part. The families Mindaridae, Hormaphididae, Thelaxidae, Anoeciidae and Pemphigidae. *Fauna Entomologica Scandinavica* 9: 1–236.
- Heie OE (1982) The Aphidoidea of Fennoscandia and Denmark. II The family Drepanosiphidae. *Fauna Entomologica Scandinavica* 11: 1–176.
- Heie OE (1986) The Aphidoidea of Fennoscandia and Denmark. III The family Aphididae: subfamily Pterocommatinae, tribe Aphidini of subfamily Aphididae. *Fauna Entomologica Scandinavica* 17: 1–314.
- Heie OE (1992) The Aphidoidea of Fennoscandia and Denmark. IV Family Aphididae: Part 1 of the tribe Macrosiphini of subfamily Aphidinae. *Fauna Entomologica Scandinavica* 25: 1–188.
- Heie OE (1994) The Aphidoidea of Fennoscandia and Denmark. V Family Aphididae: Part 2 of the tribe Macrosiphini of subfamily Aphidinae. *Fauna Entomologica Scandinavica* 28: 1–239.
- Heie OE (1995) The Aphidoidea of Fennoscandia and Denmark. VI Family Aphididae: Part 3 of tribe Macrosiphini of subfamily Aphidinae, and family Lachninae. *Fauna Entomologica Scandinavica* 31: 1–217.
- Hermoso de Mendoza (1988) Primera cita en Espana de *Monellia caryella* (Fitch, 1855) (Hom., Aphidinea, callaphididae). *Boletín de la Asociación Española de Entomología* 12: 359.
- Hille Ris Lambers D (1947) Neue Blattläuse aus des Schweiz II. Mitteilungen der Schweizerischen Entomologischen Gesellschaft 20: 649–660
- Hille Ris Lambers D (1966) New and little known members of the aphid fauna of Italy (Homoptera, Aphididae). *Bolletino di Zoologia agraria e di bachicoltura, serie II* 8: 1–32.

- Hille Ris Lambers D (1973) *Masonaphis lambersi* MacGillivray, 1960 (Homoptera, Aphididae), a new pest of Rhododendron in Europe. *Netherlands Journal of Plant Pathology* 79: 159–161.
- Holman J (1965) Some unrecorded Middle European aphids. *Acta Faunistica Entomologica Musei Nationalis Pragae* 11: 277–283.
- Holman J (1971) Taxonomy and Ecology of *Impatiensium asiaticum* Nevsky an aphid species recently introduced to Europe (Homoptera, Aphididae). *Acta Entomologica Bohemoslovaca* 68: 153–166.
- Holman J (2009) Host Plant Catalog of Aphids-Palaeartic Region. New York, USA: Springer Verlag. 1216pp.
- Holman J, Pintera A (1981) Übersicht der Blattläuse (Homoptera, Aphididoidea) der Rumänischen Sozialistischen Republik. Praha, Ceskoslovenska: Akademie Ved. 125 pp.
- Hrzič A (1996) Opazovanje naleta listnih uši (Aphididae) v letu 1994 (in Slovenian) [Observation of aphid flight in the year 1994]. *Slobodno kmetijstvo* 29: 54–56.
- Hullé M, Renoust M, Turpeau E (1998) New aphid species detected by permanent aerial sampling programmes in France. In: Nieto Nafria JM, Dixon AFG (Eds) *Aphids in Natural and Managed Ecosystems*. León, Spain: Universidad de León, Secretariado de Publicaciones. 365–369.
- Huntley B, Birks HJB (1983) *An Atlas of Past and Present Pollen Maps for Europe: 0–13,000 BP Years Ago*. Cambridge-London-New York-New Rochelle-Melbourne-Sydney: Cambridge University Press. 667 pp.
- Ilharco FA (1960) The knowledge of aphids in Portugal. *Broteria* 29: 150–174.
- Ilharco FA (1961) On an aphid collection found in the Estçap Agronomica Nacional, including a new species, *Paraschizaphis rosazevedoi*. *Agros* 44: 71–77.
- Ilharco FA (1968) Algumas correcções e adições a lista de afídios de Portugal Continental. I Parte. *Agronomia Lusitana* 29: 117–139.
- Ilharco FA (1968) Algumas correcções e adições a lista de afídios de Portugal Continental. II Parte. *Agronomia Lusitana* 29: 221–245.
- Ilharco FA (1969) Algumas Correcções e adições a lista de afídios de Portugal Continental. III Parte. *Agronomia Lusitana* 41: 313–321.
- Ilharco FA (1973) *Catálogo dos Afídios de Portugal Continental*. Oeiras, Portugal: Estação Agronómica Nacional. 134 pp.
- Ilharco FA (1974) List of the aphids of Madeira Island (Homoptera, Aphidoidea). *Bocagiana (Museu Municipal de Funchal- História Natural)* 35: 1–44.
- Ilharco FA (1984) New records to the aphid fauna of the archipelago of Madeira [Homoptera, Aphidoidea]. *Boletim do Museu Municipal do Funchal* 36: 177–206.
- Ilharco FA, Sousa-Silva CR, Alvarez Alvarez A (2005) First report on *Toxoptera citricidus* (Kirkaldy) in Spain and continental Portugal (Homoptera, Aphidoidea). *Agronomia Lusitana* 51: 19–21.
- Jurc M, Poljakovic-pajnik L, Jurc D (2009) The first record of *Cinara curvipes* (Patch, 1912) (Homoptera, Aphididae) in Slovenia and its possible economic impact. *Zbornik Gozdarstva in Lesarstva* 88: 21–29.

- Kaltenbach JH (1843) Monographie der familien der Pflanzenläuse (Phytophtires) - I. Theil Die Blatt- und Erdläuse (Aphidina et Hyponomeutes). *Aachen*: 223pp.
- Koch CL (1855) Die Pflanzenläuse Aphiden, getreu nach dem liben abgebildet und beschrieben Heft IX. Nürnberg, Germany. 135–236.
- Laing F (1923) Aphidological Notes (Hemiptera-Homoptera). *The Entomologist's Monthly Magazine* 59: 238–247.
- Laing F (1932) A new aphid pest on violets. *The Entomologist's Monthly Magazine* 68: 52–53.
- Lampel G (1983) Für die neue Blattlaus-Arten (Homoptera, Aphididna). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 56: 125–162.
- Lampel G, Gonseth Y (2005) Hemiptera- Aphidina. In: Wittenberg R (Ed) *An inventory of alien species and their threat to biodiversity and economy in Switzerland*. Bern, Switzerland: Federal Office for the Environment FOEN. 157 pp.
- Lawton JH, Eastop VF (1975) A bracken feeding *Macrosiphum* (Hem., Aphididae) new to Britain. *Entomologist Gazette* 26: 135–138.
- Leclant F (1967) Un Aphididae americain nouveau pour la faune europeenne: *Nearctaphis bakeri* Cowen (Hom.). *Bulletin de la Société Entomologique de France* 72: 25–26.
- Leclant F (1978) *Étude bioécologique des Aphides de la région méditerranéenne. Implications Agronomiques*. Montpellier, France: Université des Sciences et Techniques du Languedoc 1–43. 318 pp.
- Leclant F, Renoust M (1986) Le puceron du Lagerstroemia, nouveau ravageur pour notre flore. *Phytoma Défense des cultures* Février 1986: 49–50.
- Leclant F, Rемаудиєre G (1986) Aphids new to France and Europe. *Aphidologist's Newsletter* 21: 8.
- Limonta L (1990) Callaphididae (Aphidoidea) new to Italy. *Bollettino di Zoologia Agraria e di Bachicoltura, SerII* 22: 93–99.
- Limonta L (2001) Heavy infestation of *Illinoia liriodendri* (Monell) (Rhynchota Aphididae) in gardens in northern Italy. *Bollettino di Zoologia Agraria e di Bachicoltura, SerII* 33: 133–136.
- Lozzia GC, Binaghi P (1992) Entomofauna delle alberate cittadine e studio di un metodo di protezione integrata. *Disinfestazione* 9: 35–41.
- Lucchi A, Pollini A (1995) Un nuovo fitomizo per la fauna italiana : l'afide callafidino *Tinocallis ulmiparvifoliae* Matts. (Rhynchota Homoptera). *Informatore Fitopatologico* 6: 31–32.
- Macchiati L (1883) Fauna e flora degli afidi di calabria. *Bolletino della Societa Entomologica Italiana* 15: 221–287.
- Malkov K (1908) Bolesti i povredi po kulturnte rastenja izprateni za izslevane v sadovskata opitna stancia prez 1907. Godishen otchet na durjavna zemlena opitna stancia v Sadovo. *Plovdiv* 5 (1907): 207–274.
- Mamontova VA (1955) *Dendrophilous aphids of the Ukraine*. Kiev, Ukraine: Academy des Sciences, Ukrainian SSR. 91pp.
- Marchal P (1928) Etude biologique et morphologique du puceron lanigère du pommier [*Eriosoma lanigerum* (Hausmann)]. *Annales des Epiphyties* 14: 1–106.
- Martin JH (2000) Two new british aphid introductions since 1999, in the contexte of other additions over the preceding thirty years (Sternorrhyncha: Aphidoidea). *Entomologist's Gazette* 51: 97–105.

- Meier W, Schweizer C (1987) *Macrosiphum albifrons*, eine für die Schweiz und für Mitteleuropa neue Blattlausart auf Lupine. *Mitteilungen für die Schweizerische Landwirtschaft* 87: 41–42.
- Meliá Masía A (1995) Novedades de la tribu Rhopalosiphina (Homoptera: Aphididae) para Europa y el este Ibérico. *Boletín de la Asociación Española de Entomología* 19: 131–139.
- Meliá Masía A (1998) Contribution to knowledge of the Macrosiphini (Aphididae) of Castellón (Spain): new records for the Spanish fauna. In: Nieto Nafria JM, Dixon AFG (Eds) *Aphids in natural and managed ecosystems*. León, Spain: Universidad de León, 379–383.
- Micieli De Biase L (1988) *L'Aloephagus myersi* Essig (Homoptera-Aphididae) nuova specie per l'Italia su piante dei generi Aloe e Gasteria. *Informatore Fitopatologico* 3: 76–77.
- Micieli De Biase L, Calambuca E (1979) *L'Appendiseta robiniae* (Gillette), nuova specie per l'Italia su *Robinia pseudoacacia* L. *Informatore Fitopatologico* 11–12: 31–33.
- Mier Durante MP, Pérez Hidalgo N (2002) Dos especies de Panaphidini (Hemiptera, Aphididae: Calaphidinae), propias de árboles ornamentales, introducidas en la Península Ibérica. *Boletim da Sociedade Portuguesa de Entomologia* 157 (Suppl. 6): 213–217.
- Mifsud A (1998) A new tree dwelling aphid *Greenidea ficicola* Takahashi. *Bulletin of the Entomological Society of Malta* 1: 39–41.
- Mimeur JM (1936) Aphididae (Hem.) d'Espagne. *Boletín de la Sociedad Entomológica de España* 1936: 33–40.
- Mordvilko AK (1914) *Insectes Hémiptères (Insecta Hemiptera). Volume I. Aphidoidea. Faune de la Russie et des pays limitrophes*. Petrograd, Russia: Musée Zoologique de l'Académie Impériale des Sciences. 236pp.
- Müller FP (1974) *Aphis oenotherae*, Erstfunde in Europa und als potentieller Zierpflanzenschädling. *Entomologische Nachrichten Dresden* 18: 129–133.
- Nieto Nafria JM (2007) Fauna Europaea: Aphididae. Fauna Europaea version 13. <http://www.faunaeuro.org>.
- Nieto Nafria JM, Mier Durante MP (1998) *Fauna Ibérica. Hemiptera, Aphididae I*. Madrid, Spain: Museo Nacional de Ciencias Naturales, CSIC. 425 pp.
- Nieto Nafria JM, Mier Durante MP, Remandiere G (1998) Les noms des taxa du groupe famille chez les Aphididae (Hemiptera). *Revue Française d'Entomologie* 19: 77–92.
- Nobanis (2005) *European Network on Alien Invasive Species*. www.nobanis.com.
- Ossiannilsson F (1959) Contributions to the knowledge of Swedish aphids. II. List of species with find records and ecological notes. *Kungl. LantbrHögsk. Annlr. Uppsala* 25: 375–527.
- Paillot A (1928) Rapport sur le fonctionnement de la station entomologique de Saint Genis en laval. *Annales des Epiphyties* 14: 448.
- Passerini G (1861) Additamenta ad indicem Aphidanarum quas hucusque in Italia legit. *Atti della Società Italiana di Scienze Naturali Milano* 3: 398–401.
- Patti I (1983) Nuovi reperti sulla composizione dell'afidofauna Siciliana. *Bolletino del laboratorio di Entomologia Agraria "Filippo Silvestri" di portici* 40: 33–53.
- Pati I (1984) Un afide nocivo alla *Lagerstroemia* in Italia. *Informatore Fitopatologico*: 12, 12–14.
- Pati I, Tomatore MG (1988) Utilità delle trappole ad aspirazione di tipo Rothamstead nel censimento faunistico degli Afidi. *Atti XV Congresso Nazionale Italiano di Entomologia, L'Aquila*, 925–932.

- Pedro Mansilla J, Pérez R, Pérez N, Seco V, del Estal P (2001) Presencia de *Tuberculatulus kunicola* (Hemiptera: Aphididae) sobre catasnos híbridos en España. *Boletín de Sanidad Vegetal: Plagas* 27: 395–400.
- Pérez Hidalgo N, Gonzales Hernandez A, Seco Fernandez MV (2000) Dos especies de *Cerataphis* (Hemiptera, Aphididae: Hormaphidinae) introducidas en las Islas Canarias. *Boletín de Sanidad Vegetal: Plagas* 26: 425–432.
- Pérez-Hidalgo N, Nieto Nafria JM (2005) *Tinocallis ulmiparvifoliae* Matsumura, 1919 (Hemiptera: Aphididae, calaphidinae): una nueva especie de pulgón introducida en la península ibérica. *Boletín de la Asociación española de Entomología* 29: 125–127.
- Pérez Hidalgo N, Pons X, Mier Durante M (2008) Detection of *Drepanaphis acerifoliae* (Thomas) [Hemiptera: Aphididae: Drepanosiphinae] on sugar maple trees, *Acer saccharinum*, in Spain. *Boletín Sociedad Entomológica Aragonesa* 43: 441–444.
- Petrović O (1998) Check-list of aphids (Homoptera :Aphididae) in Serbia. *Acta entomologica serbica* 3: 9–42.
- Petrović O, Milanović S (1999) [*Pterochloroides persicae* Choldk. – new pest of peach in Serbia] (in Serbian). *Biljni lekar* 4: 354–356.
- Petrović-Obradović O, Tomanović Ž, Poljaković-Pajnik L, Vučetić A (2007) An invasive species of aphid, *Prociphilus fraxinifolii* (Hemiptera, Aphididae, Eriosomatinae), found in Serbia. *Archives of Biological Sciences, Belgrade* 59: 9–10.
- Petrović-Obradović O, Tomanović Ž, Poljaković-Pajnik L, Hrnčić S, Vučetić A, Radonjić S (2010) New Invasive Species of Aphids (Hemiptera, Aphididae) in Serbia and Montenegro. *Archives of Biological Sciences, Belgrade* (in press).
- Pintera A (1987) Taxonomic revision of the species of the genus *Chaitophorus* Koch in palearctis (Homoptera: Aphidoidea). *Deutsche Entomologische Zeitschrift* 34: 219–340.
- Piron PGM (1987) The advance of the American lupin aphid (*Macrosiphum albifrons* Essig) (Homoptera: Aphididae) in Europe. *Journal of Applied Entomology* 103: 111–112.
- Poljaković-Pajnik L, Petrović-Obradović O (2002) Bow-legged fir aphid *Cinara curvipes* (Patch) (Aphididae, Homoptera) new pest of *Abies concolor* in Serbia. *Acta entomologica serbica* 7: 147–150.
- Poljaković-Pajnik L, Petrović-Obradović O (2009) *Chaitophorus populifolii* (Aphididae : Homoptera) new species on poplars in Serbia. In: *Proceedings International Scientific Conference Forestry in achieving millennium goals*, Novi Sad, Serbia, November 2009, 379–381.
- Prior RNB (1971) Some notes on new or uncommon aphids recently found in Britain. *Zoological Journal of the Linnean Society* 50: 397–430.
- Prior RNB (1974) Three Japanese aphids introduced to Britain on imported «bonsai» trees. *Plant Pathology* 23: 48.
- Prior RNB (1975) Three north american aphid species recently found in Britain infesting cultivated rose, *Cupressus macrocarpa* and *Poa trivialis*. *Plant Pathology* 24:123–124.
- Qiao G, Zhang GX (2004) Preliminary study of aphid diversity in China: taxonomic and geographic variation. In: Simon JC, Dedryver CA, Rispé C, Hullé M (Eds) *Aphids in a new Millennium. Proceedings of the 6th International Symposium on aphids*. Rennes, France Sept. 2001, INRA Editions, 139–146.

- Quednau FW (1954) Monographie der mitteleuropäischen Callaphididae (Zierläuse (Homoptera, Aphidina)) unter besonderer Berücksichtigung des ersten Jugendstadiums. I. Die Junglarven des ersten Stadiums der mitteleuropäischen Callaphididae. *Mitteilungen der Biologischen Bundesanstalt für Land- und Forstwirtschaft* 78: 1–55.
- Quednau FW (1999) Atlas of the Drepanosiphine aphids of the world. Part I.: *Panaphidini* Oestlund, 1922 - *Myzocallidina* Börner, 1942 (1930) (Hemiptera: Aphididae: Calaphidinae). *Contributions of the American Entomological Institute* 31: 1–281.
- Quednau FW (2003) Atlas of the drepanosiphine aphids of the world. Part II: *Panaphidini* Oestlund, 1922 - *Panaphidina*, Oestlund 1923 (Hemiptera: Aphididae: Calaphidinae). *Memoirs of the American Entomological Institute* 72: 1–301.
- Rabasse JM, Coceano PG, Barbagallo S (2005) On the presence in France and North Italy of *Siphonatrophia cupressi* (homoptera, Aphididae), a new aphid of North American origin living on Cupressaceae. *Bolletino de Zoologia Agraria e Bachicoltura* 37: 77–83.
- Rabasse JM, Drescher J, Chaubet B, Limonta L, Turpeau E, Barbagallo S (2005) On the presence in Europe of two *Illinoia* aphids of North American origin (Homoptera, Aphididae). *Bolletino di Zoologia Agraria e di Bachicoltura, serie II* 37: 151–168.
- Rabitsch W, Essl F (2006) Biological invasions in Austria: patterns and case studies. *Biological Invasions* 8: 295–308.
- Remaudière G (1951) Contribution à l'étude des Aphidoidea de la faune française. Description de quelques Aphididae nouveaux et addition a la liste des *Myzinae* et *Dactynotinae*. *Revue de Pathologie Végétale et d'Entomologie Agricole de France* 30: 125–144.
- Remaudière G (1952) Contribution à l'étude des Aphidoidea de la faune française. Description de quelques Aphididae nouveaux et addition a la liste des *Myzinae* et *Dactynotinae*. *Revue de Pathologie Végétale et d'Entomologie Agricole de France* 31: 232–263.
- Remaudière G (1954) Contribution à l'étude des Aphidoidea de la faune française (7^e note). Deuxième addition a la liste des *Dactynotinae* et *Myzinae* (Hom. Aphidoidea) de la faune Française. *Revue de Pathologie Végétale et d'Entomologie Agricole de France* 30: 2125–144.
- Remaudière G (1989) Découverte en France de l'espèce américaine *Myzocallis* (*Lineomyzocallis*) *walshii* (Monell) (Hom. Aphididae). *Annales de la Société Entomologique de France* 25: 117.
- Remaudière G, Eastop VF, Autrique A (1985) Distribution des aphides de la region éthiopienne. In: Remaudière G (Ed) Contribution à l'écologie des aphides africains. Roma, Italy: Organisation des Nations Unies pour l'Alimentation et l'Agriculture, 77–93.
- Remaudière G, Quednau FW, Heie OE (1988) Un nouveau *Tinocallis* sur *Ulmus*, originaire d'Asie Centrale et semblable à *T. saltans* (Nevsky) (Homoptera; Aphididae). *The Canadian Entomologist* 120: 211–219.
- Remaudière G (1989) Découverte en France de l'espèce américaine *Myzocallis* (*Lineomyzocallis*) *walshii* (Monell) (Hom.Aphididae). *Revue Francaise d'Entomologie* 14: 172.
- Remaudière G, Serain M, Trouve C, Demeester S (1992) Données nouvelles sur le genre *Trichosiphonaphis* Takahashi: cycles, hôtes, synonymies et distribution géographique (Homoptera, Aphididae). *Revue Française d'Entomologie* 14: 40–58.
- Remaudière G, Munoz Viveros AL (1992) Sur la presence en France de *Myzus hemerocallis* Talahashi (Homoptera, Aphididae). *Revue Francaise d'Entomologie* 14: 172.

- Remaudière G, Sorin M (1993) Two new aphids of the genus *Tuberocephalus* Shinji (Homoptera, Aphididae). *Japanese Journal of Entomology* 61: 683–690.
- Remaudière G, Remaudière M (1997) Catalogue des Aphididae du monde - Catalogue of the world's Aphididae (Homoptera, Aphidoidea). Paris, France: INRA Editions. 437 pp.
- Remaudière G, Ripka G (2003) Arrival in Europe (Budapest, Hungary) of American ash aphid, *Prociphilus (Meliarhizophagus) fraxinifolii* (Hemiptera, Aphididae, Eriosomatinae, Pemphigini). *Revue Francaise d'Entomologie* 25: 152.
- Remaudière G, Sertkaya E, Ozdemir I (2003) Alert! Discovery in Turkey of the American aphid, *Aphis illinoisensis*, a grapevine pest (Hemiptera, Aphididae). *Revue Francaise d'Entomologie* 25: 170.
- Ripka G (2001) New data to the knowledge of the aphid fauna of Hungary (Homoptera: Aphidoidea). *Acta Phytopathologica et Enomologia Hungarica* 36: 81–87.
- Roberti D (1975) Aspetti fitopatologici della mandorlicoltura pugliese: gli insetti. *Entomologica* 11: 9–20.
- Scheurer S, Binazzi A (2004) Notes in bio-ecology and ethology of *Cinara curvipes* (Patch), a newly introduced species into Europe (Aphididae, Lachninae). *Redia* 87: 61–65.
- Schouteden H (1906) catalogue des aphides de Belgique. *Mémoires de la Société Entomologique des Belgique* 12: 189–246.
- Silvestri F (1939) Compendio di Entomologia applicata, VolII. Portici, Napoli, Italy: Tipografia Bellavista. 972pp.
- Sousa-Silva CR, Ilharco FA (1995) *Afideos do Brazil e suas plantas hospedeiras*; Sao Carlos, Brazil: Editora da Univeridade de Sao Carlos. 85pp.
- Stroyan HLG (1950) Recent additions to the British aphid fauna. Part. I. *Dactynotus* Rafinesque to *Rhopalosiphum* Koch C.L. *Transactions of the Royal Entomological Society (Lond.)* 101: 90–123.
- Stroyan HLG (1954) A new subgenus and species of *Myzus* (Passerini, 1860). *Proceeding of the Royal Entomological Society (Lond.)* 23: 1–40.
- Stroyan HLG (1956) More Merioneth aphid records. *The Entomologist* 89: 302–303.
- Stroyan HLG (1964) Notes on hitherto unrecorded or overlooked british aphid species. *Transactions of the Royal Entomological Society (Lond.)* 116: 29–72.
- Stroyan HLG (1971) *Masonaphis lambersi* MacGill: An introduced aphid pest of hybrid rhododendron. *Plant Pathology* 20: 196.
- Stroyan HLG (1972) Additions and amendments to the check list of British aphids (Homoptera: Aphidoidea). *Transactions of the Royal Entomological Society (Lond.)* 124: 37–79.
- Stroyan HLG (1977) *Homoptera. Aphididae (Part) Chaitophoridae, Callaphididae. Handbooks for the identification of British Insects Vol. 2 Part 4a*. London, UK : Royal Entomological Society of London. 130 pp.
- Stroyan HLG (1981) A North American lupin aphid found in Britain. *Plant Pathology* 30: 253.
- Stroyan HLG (1984) *Aphids – Pterocommatinae and Aphidinae, Homoptera. Aphididae. Handbooks for the identification of British Insects Vol. 2 Part 6*. London, UK: Royal Entomological Society of London. 232 pp.
- Süss L (1972–73) Reperti afidologici su alcune piante in serra nel Milanese. *Bollettino di Zoologia Agraria e di Bachicoltura ser. II* 11: 177–193.

- Szelegiewicz H (1978) Przegląd systematyczny mszyc polski. Zeszyty problemowe postępow nauk rolniczych. *Polska Akademia Nauk* 208: 40pp.
- Tambs-Lyche H, Heie O (1973) An Asian aphid suddenly appearing in large numbers on *Impatiens parviflora* in Europe. *Entomologiske Meddelelser* 41: 167–173.
- Tashev D (1961) Novi listni vushki (Homoptera, Aphididae) za faunata na Bulgaria, godishnik na SU, biologo-geologo-geografski fakultet. *1-biologia* 1958/1959, 53: 157–162.
- Tashev D (1964) Novi za faunata na Bulgaria listni bushki (Homoptera Aphididae), godishnik na SU biologo-geologo-geografski fakultet. *1-biologia* 1961/1962, 56: 179–190.
- Tashev D (1982) A list of the aphids from Bulgaria. *Annuaire de Universite de Sofia "Kliment Ohridski" Faculte de Biologie; Livre 1 – Zoologie*: 20–35.
- Tavares JS (1900) As zoocecidias Portuguesas. *Anais das Ciencias Naturaes* 7: 15–108.
- Tavares JS (1905) Synopse das zoocecidias portuguesa. *Broteria* 4: 1–123.
- Taylor LR, Palmer JMP (1972) Aerial sampling. In: Van Emdem HF (Ed) *Aphid Technology*. London, UK: Academic Press, 189–234.
- Theobald FV (1912) A new strawberry *Aphis*. *The Entomologist* 45: 223.
- Theobald FV (1913) The British species of the genus *Macrosiphum* pass. *Journal of Economical biology* 8: 47–94.
- Theobald FV (1918) Notes on new and little known british aphides IV. *The Entomologist* 51:25–29.
- Theobald FV (1926) *The plant lice or Aphididae of Great Britain, Vol I.*, London, UK: headley Brothers. 372pp.
- Theobald FV (1927) *The plant lice or Aphididae of Great Britain, Vol 2.*, London, UK: headley Brothers. 411pp.
- Theobald FV (1929) *The plant lice or Aphididae of Great Britain 3.* London, UK: Headley Brothers. 364 pp.
- Tschorbadjiev P (1924) Konstatirani vredni nasekomi i drugi zivotinski nepriyateli po kultur-nite rasteniya w Bulgaria prez 1923 g. *Svedeniya po zemedelieto* 5: 2–26.
- Tsitsipis JA, Angelakis E, Margaritopoulos JT, Tsamandani K, Zarpas KD (2005) First record of the grapevine aphid *Aphis illinoisensis* in the island of Kriti, Greece. *Bulletin OEPP/EPPO* 35: 541–542.
- Tsitsipis JA, Katis N, Margaritopoulos J, Lykouressis D, Avgelis A, Gargalianou I, Zarpas K, Perdakis D, Papapanayotou A (2007) A contribution to the aphid fauna of Greece. *Bulletin of Insectology* 60: 31–38.
- Turpeau E, Remaudière G (1990) Découverte en France d'un puceron des pins américains du genre *Essigella* (Hom. Aphididae). *Comptes-Rendus de l'Académie d'Agriculture de France* 76: 131–132.
- Van Harten A (1982) Lista anotada dos afideos (Homoptera: Aphidoidea) conhecidos das Ilhas de cabo Verde. *Agronomia lusitana* 41: 313–321.
- Van Harten A, Coceano GG (1981) On some interesting species (Hemiptera Aphidoidea) trapped in Udine Province, Italy. *Bollettino del Laboratorio di Entomologia Agraria "Filippo Silvestri" in Portici* 38: 29–51.
- Vasilev IV (1910) Brachcevaja, ili tykvennaja tlja (*Aphis gossypii* Glover). *Trudy Byuro Entomologii* 8: 1–24.

- Velimirovic V (1976) A new pest in yugoslavia *Pterochloroides persicae* (Homoptera. Aphididae) on peach trees. *Zastita Bilja* 27: 29–35.
- Walker F (1848) Descriptions of aphids (2). *Annals and magazine of natural History* 1: 443–454.
- Walker F (1849) Descriptions of new British aphides. *Zoologist* 7: xxxi–xl.
- Ward PH (1961) A note on an aphid new to Europe. *Entomologist's Gazette* 12: 116.

Table 9.1.1. List and main characteristics of Aphididae species alien to Europe. Status: A: Alien to Europe; C: cryptogenic species. Country codes abbreviations refer to ISO 3166 (see appendix I). Habitat abbreviations refer to EUNIS (see appendix II). Only selected references are given. Last update February 2010.

Species	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Acyrtosiphon Acyrthosiphon caraganae</i> Cholodkovsky 1908	A	phyto-phagous	Asia-Temperate	1907, RU	AL, AT, BG, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IT, IT-SIC, LT, LV, MK, NO, NL, NO, PL, RO, RS, RU, SE, SI, SK, UA	E, I2	<i>Caragana</i> . other Fabaceae	Cholodkovsky (1907), Hrižić (1996), Mordvilko (1914), Petrović (1998), Remaudière (1951), Tashev (1982)
<i>Acyrtosiphon Acyrthosiphon kondoi</i> Shinji, 1938	A	phyto-phagous	Asia-Temperate	< 2004, FR-COR	FR-COR, GR	E, I1	<i>Medicago</i>	Eastop (1971), Nieto Nafria e al. (2007), Tsitsipis et al. (2007)
<i>Acyrtosiphon Acyrthosiphon primulae</i> Theobald 1913	A	phyto-phagous	Asia-Temperate	1913, GB	BG, CH, CZ, DK, ES, FR, DE, GB, GR, IE, IT, IT-SIC, NL, PT, SE, SK	I2, J100	<i>Primula</i>	Heie (1994), Remaudière (1952), Theobald (1913), Tsitsipis et al. (2007)
<i>Aloephagus myersi</i> Essig, 1950	A	phyto-phagous	Africa	1937, GB	ES, FR, GB, GR, IT, IT-SIC	I2, J100	<i>Aloe</i> , <i>Haworthia</i> , <i>Gasteria</i>	Eastop (1956), Leclant (1978), Micieli De Biase (1988), Tsitsipis et al. (2007)
<i>Aphis Aphis forbesi</i> Weed, 1889	A	phyto-phagous	North America	1928, FR	AL, AT, BE, BG, CH, CZ, DE, DK, EE, ES, FR, HR, HU, IT, LV, MD, PL, RO, RS, SK	I1, J100	<i>Fragaria</i>	Balachowsky (1933), Heie (1986), Paillot (1928)
<i>Aphis Aphis gossypii</i> Glover 1877	A	phyto-phagous	Tropical, sub-tropical	<1758 Unknown	AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, ES-BAL, ES-CAN, FI, FR, FR-COR, GB, GR, GR-CRE, HR, HU, IL, IT, IT-SAR, IT-SIC, LT, LV, MD, MK, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, RU, SE, SK, UA	I2, I1, J100, E, F	Polyphagous (mainly Cucurbitaceae, Rutaceae and Malvaceae)	Blackman and Eastop (2006), Buckton (1879), Theobald (1927), Tschorbadjev (1924), Vasiliev (1910)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Aphis Aphis illinoisensis</i> Shimer 1866	A	phyto-phagous	North America	2005, GR-CRE	GR-CRE, ME	FB	<i>Vitis</i>	Petrović-Obradović et al. (in press), Tsitsipis et al. (2005)
<i>Aphis Aphis spiraeicola</i> Patch, 1914	A	phyto-phagous	Asia-Temperate	1961, PT	AT, BG, CH, DE, ES, ES-BAL, ES-CAN, FR, FR-COR, GB, GR, HR, IL, IT, IT-SAR, IT-SIC, MT, PT, PT-AZO, PT-MAD, RS, UA	E, I2, FA, FB, G	Polyphagous (<i>Citrus</i> , apple, <i>Spiraea</i>)	Blackman and Eastop (2000), Blackman and Eastop (2007), Ilharco (1968b)
<i>Aphis Aphis spiraeophaga</i> F.P. Müller, 1961	A	phyto-phagous	Asia-Temperate	1955, CZ	AL, AT, CH, CZ, DE, DK, ES, FI, FR, HR, HU, IT-SIC, LT, LV, MD, MK, PL, PT, RO, RU, SE, SI, SK, UA	I2	<i>Spiraea</i>	Heie (1986), Holman (1971), Ilharco (1968b), Ilharco (1973), Tashev (1964)
<i>Aphis Aphis spiraeophila</i> Patch, 1914	A	phyto-phagous	North America	1955 UA	UA	I2	<i>Spiraea</i>	Holman (1971), Nieto Nafria et al. (2007)
<i>Aphis Bursaphis oenotherae oenotherae</i> Oestlund 1887	A	phyto-phagous	North America	1972, DE	FR, DE, GB, IT-SIC, PL, RS	G3, I2	<i>Oenothera</i>	Barbagallo (1994), Müller (1974)
<i>Aphis catalpae</i> Mamontova, 1953	A	phyto-phagous	Asia	0	HU, UA	I2	<i>Catalpa</i>	Mamontova (1955), Petrović-Obradović et al. (in press), Ripka (2001)
<i>Appendiseta robiniae</i> (Gillette, 1907)	A	phyto-phagous	North America	1978, IT	BE, BG, CH, CZ, DE, ES, ES-BAL, FR, FR-COR, GB, GR, HR, HU, IT, IT-SIC, NL, RS, SK	I2, G5	<i>Robinia</i>	Arzone and Vidano (1990), Lampel (1983), Leclant and Remaudière (1986), Miceli De Biase and Calambuca (1979), Pati and Tomatore (1988), Petrović (1998)
<i>Brachycaudus Mordvilkomemor rumexicolens</i> (Patch, 1917)	A	phyto-phagous	North America	1953, GB	BE, CZ, DE, DK, ES, ES-CAN, FI, FR, GB, IT, IT-SAR, IT-SIC, MK, NL, NO, PL, PT, PT-MAD, RO, RU, SE, SK, UA	H5, I1	<i>Rumex</i> ; other Polygonaceae	Barbagallo (1994), Barbagallo and Stroyan (1982), Heie (1973), Holman (1965), Ilharco (1974), Stroyan (1956)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Cerataphis brasiliensis</i> (Hempel, 1901)	A	phyto-phagous	Asia-Tropical	1981, PT-MAD	ES-CAN, FR, PT-MAD	I2, J100	Palms	Chapin and Germain (2005), Germain and Chapin (2004), Ilharco (1984), Pérez Hidalgo et al. (2000)
<i>Cerataphis lataniae</i> (Boisduval, 1867)	A	phyto-phagous	Asia-tropical	1867, FR	CZ, ES-CAN, DE, FR, GB, IT, PL	I2, J100	<i>Areca, Musa</i>	Boisduval (1867), Chapin and Germain (2005), Pérez Hidalgo et al. (2000)
<i>Cerataphis orchidearum</i> (Westwood, 1879)	A	phyto-phagous	Asia-Tropical	1906, BE	BE, ES, FI, FR, GB, HU, PT-MAD, RU, SE	J100	Orchids	Germain and Chapin (2004), Heie (1980), Ilharco (1973), Ilharco (1974), Schouteden (1906)
<i>Chaetosiphon Pentatrichopus fragaefolii</i> (Cockerell, 1901)	A	phyto-phagous	North America	1912, GB	AT, BE, BG, CH, CZ, ES, ES-CAN, FR, DE, GB, HR, HU, IE, IL, IT-SIC, IT, LV, MK, NL, NO, PT, PT-AZO, PT-MAD, RO, RS, SI	I1, J100	<i>Fragaria</i>	Balachowsky (1933), Theobald (1912)
<i>Chaitophorus populifolii</i> (Essig, 1912)	A	phyto-phagous	North America	1956, DE	DE, RS	I2	<i>Populus</i>	Pintera (1987), Poljaković-Pajnik and Petrović-Obradović (2009)
<i>Chaitophorus saliapteris quinque maculatus</i> Bozhko 1976	A	phyto-phagous	Asia	1953, UA	IT, UA	F9	<i>Salix</i>	Binazzi and Barbagallo (1991), Bozhko (1976), Pintera (1987)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Chromaphis juglandicola</i> (Kaltenbach, 1843)	A	phytophagous	Asia-Temperate	< 1758 Unknown	AT, BE, BG, CH, CZ, DE, DK, ES, ES-CAN, FR, FR-COR, GB, HR, HU, IL, IT, IT-SAR, IT-SIC, MD, MK, PL, PT-AZO, PT-MAD, PT, RO, RS, SE, SI, SK, UA	I2, G5	<i>Juglans</i>	Balachowsky and Mesnil (1935), Heie (1982), Kaltenbach (1843), Schouteden (1906), Theobald (1927)
<i>Cinara Cedrobium laportei</i> (Remaudière, 1954)	A	phytophagous	Africa	1967, FR	ES, FR, GB, IT, IT-SAR, IT-SIC, NL, PT, SI	G3, G5, I2	<i>Cedrus</i>	Covassi (1971), Emonnot et al. (1967), Leclant (1978)
<i>Cinara Cinana cedri</i> Mimeur, 1936	A	phytophagous	Africa	1974, IT	BE, CH, DK, ES, FR, GB, HR, HU, IL, IT, IT-SAR, IT-SIC, RS, SI	I2, G5	<i>Cedrus</i>	Covassi and Binazzi (1974), Fabre (1976)
<i>Cinara Cinara curvipes</i> (Patch, 1912)	A	phytophagous	North America	1999, GB	CZ, CH, DE, GB, RS, SK, SL	I2	<i>Abies</i>	Angst et al. (2007), Jurec et al. (2009), Martin (2000), Poljaković-Pajnik and Petrović-Obradović (2002), Scheurer and Binazzi (2004)
<i>Drepanaphis acerifoliae</i> (Thomas, 1878)	A	phytophagous	North America	1992, IT	IT, ES	I2	<i>Acer</i>	Lozzia and Binaghi (1992), Pérez Hidalgo et al. (2008)
<i>Ericaphis scammelli</i> Mason 1940	A	phytophagous	North America	1964, GB	FR, GB, IT, NL	I1, I2	<i>Vaccinium</i>	Barbagallo et al. (1999), Barbagallo et al. (1998), Prior (1971)
<i>Ericaphis wakibae</i> (Hottes, 1934)	A	phytophagous	North America	1963, GB	CZ, GB	I1, B3	<i>Fragaria</i>	Stroyan (1972)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Eriosoma lanigerum</i> (Hausmann, 1802)	A	phytophagous	North America	1787, GB	AL, AT, BE, BG, CH, CY, CZ, DE, DK, ES, ES-CAN, FR, DE, GB, GR, HR, HU, IE, IL, IT, IT-SAR, IT-SIC, LT, LV, MD, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, RS, SE, SI, SK, UA	I, I1	<i>Malus</i> ; orchard trees	Balachowsky and Mesnil (1935), Marchal (1928)
<i>Essigella</i> <i>Essigella californica</i> (Essig, 1909)	A	phytophagous	North America	1988, FR	ES, FR, IT, IT-SAR, IT-SIC, PT-MAD	G5, I2	<i>Pinus radiata</i> , <i>P. pinaster</i>	Aguiar and Ilharco (2001), Turpeau and Remaudière (1990)
<i>Greenidea</i> <i>Greenidea ficicola</i> Takahashi 1921	A	phytophagous	Asia-Tropical	2004, IT	ES, IT, IT-SIC	I2	<i>Ficus</i>	Barbagallo et al. (2005a), Mifsud (1998)
<i>Hysteroneura</i> <i>Hysteroneura setariae</i> (Thomas, 1878)	A	phytophagous	North America	1982, PT-MAD	ES, PT-MAD	E, I	<i>Prunus</i> , fruit trees, Graminae	Blackman and Eastop (2006), Meliá Masía (1995), Van Harten (1982)
<i>Idiopterus</i> <i>Idiopterus nephrolepidis</i> Davis, 1909	A	phytophagous	Tropical, sub-tropical	1915, GB	BE, CH, CZ, DE, DK, ES, ES-CAN, FR, GB, GR, IE, IL, IT, IT-SIC, NL, PL, PT, PT-AZO, PT-MAD, PT, RU, SE, SI, SK	I2, J1, J100	Tropical ferns indoors	Heie (1994), Laing (1923), Theobald (1926), Tsitsipis et al. (2007)
<i>Illinoia</i> <i>Illinoia andromedae</i> (MacGillivray, 1958)]	A	phytophagous	North America	1960, GB	GB	I2	Asteraceae	Eastop (1962), Stroyan (1964)
<i>Illinoia</i> <i>Illinoia azaleae</i> Mason, 1925	A	phytophagous	North America	1950, GB	AT, CH, CZ, DK, ES, FI, FR, DE, GB, HU, IT, IT-SIC, NL, PL, PT, PT-AZO, PT-MAD, RO, RU, SE, SI	I2, J100	<i>Rhododendron</i> ; Ericaceae	Biurrun and Nieto Nafria (1987), Heie (1995), Ilharco (1968b), Stroyan (1950)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Illinoia Illinoia goldamaryae</i> (Knowlton, 1938)	A	phytophagous	North America	1960, GB	GB	I2, J100	Asteraceae (<i>Aster</i> , <i>Erigeron</i> , <i>Solidago</i>)	Eastop (1962), Stroyan (1964), Ward (1961)
<i>Illinoia Illinoia liriiodendri</i> (Monell, 1879)	A	phytophagous	North America	1998, FR	DE, FR, GB, IT, SI	G5, I2	<i>Liriodendron</i>	Limonta (2001), Rabasse et al. (2005b)
<i>Illinoia Illinoia morrisoni</i> (Swain, 1918)	A	phytophagous	North America	1960, GB	FR, GB	I2	<i>Cupressus</i>	Eastop (1962), Prior (1975), Rabasse et al. (2005b) Stroyan (1964)
<i>Illinoia Masonaphis lambersi</i> (MacGillivray, 1960)	A	phytophagous	North America	1971, NL	BE, CH, CZ, DK, GB, NL, NO, PT-MAD, SK	I2	<i>Rhododendron</i> , <i>Kalmia</i>	Aguiar and Ilharco (2001), Heie (1995), Hille Ris Lambers (1973), Stroyan (1971), Stroyan (1972)
<i>Illinoia Masonaphis rhododendri</i> (Wilson, 1918)]	A	phytophagous	North America	1939, GB	GB, NL, SK	I2, J100	<i>Rhododendron</i>	Eastop (1956), Heie (1994), Stroyan (1950)
<i>Impatiens Impatiens asiaticum</i> Nevsky 1929	A	phytophagous	Asia-Temperate	1967, RU	AT, CH, CZ, DE, DK, EE, FI, FR, GB, LV, PL, RO, RU, SE, SI, SK	G, I2, X25	<i>Impatiens</i>	Heie (1994), Holman (1971), Ilharco (1968b), Tams-Lyche and Heie (1973)
<i>Iziphyia flabella</i> (Sanborn, 1904)	A	phytophagous	North America	1954, DE	DE, UA	I2	<i>Carex</i>	Quednau (1954)
<i>Macrosiphoniella Macrosiphoniella sanborni</i> (Gillette, 1908)	A	phytophagous	Asia-Temperate	1907, PT	AL, AT, BE, BG, CH, CY, CZ, DK, ES, ES-CAN, FI, FR, DE, GB, GR, HR, IE, IL, IT, IT-SIC, LT, LV, MD, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, RU, SE, UA	I2, J100	<i>Chrysanthemum</i>	Balachowsky and Mesnil (1935), Del Guercio (1911), Del Guercio (1913), Holman (2009), Ilharco (1968b), Ilharco (1974), Theobald (1926)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Macrosiphum Macrosiphum albifrons</i> Essig, 1911	A	phytophagous	North America	1981, GB	AT, BE, CH, DE, FR, GB, GR, IE, IT, IT-SIC, SE	I1, I2	<i>Lupinus</i> , <i>Fragaria</i>	Carter et al. (1984), Hullé et al. (1998), Meier and Schweizer (1987), Piron (1987), Stroyan (1981)
<i>Macrosiphum Macrosiphum euphorbiae</i> (Thomas, 1878)	A	phytophagous	North America	1917, GB	AL, AT, BE, BG, CH, CZ, DK, EE, ES, ES-CAN, FI, FR, FR-COR, DE, GB, GR, HR, HU, IS, IE, IL, IT, IT-SAR, IT-SIC, LT, LV, MD, MK, MT, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, RU, SE, SI, SK, UA	E, F, I, J, J100	Polyphagous (vegetables, <i>Fragaria</i>)	Blackman and Eastop (2000), Eastop (1958)
<i>Macrosiphum Macrosiphum ptericolens</i> Patch, 1919	A	phytophagous	North America	1972, GB	GB, PL	G	<i>Pteridium aquilinum</i> (bracken)	Holman (2009), Lawton and Eastop (1975)
<i>Megoura lespedezae</i> (Essig & Kuwana, 1918)	A	phytophagous	Asia-Temperate	1994, CH	CH	I1	Polyphagous (vegetables; <i>Lepedeza</i> , Japanese clover)	Giacalone and Lampel (1996)
<i>Melanaphis bambusae</i> (Fullaway, 1910)	A	phytophagous	Asia-Temperate	1961, IT	ES, FR, GR, IT-SIC, IT, PT, PT-MAD, RS	I2	<i>Bambusa</i>	Hille Ris Lambers (1966), Nieto Nafria et al. (2007)
<i>Melanaphis rhois</i> (Fitch, 1866)	A	phytophagous	North America	1902, GB	GB, SE	I2	<i>Rhus</i>	Blackman and Eastop (1994), Theobald (1918), Theobald (1929)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Monellia caryella</i> (Fitch, 1855)	A	phytophagous	North America	1985, ES	IL, ES	G5	<i>Juglans, Carya</i>	Hermoso de Mendoza (1988), Nieto Nafria and Mier Durante (1998)
<i>Monelliopsis caryae</i> (Monell ex Riley & Monell, 1879)	A	phytophagous	North America	1984, FR	ES, FR, HU, IL, IT, PT	G5	<i>Juglans, Carya</i>	Hullé et al. (1998), Mier Durante and Pérez Hidalgo (2002)
<i>Monelliopsis pecanis</i> Bissell, 1983	A	phytophagous	North America	1995, PT-MAD	IT-SIC, PT-MAD	G5	<i>Carya</i>	Aguiar and Ilharco (1997), Barbagallo and Suma (1999)
<i>Myzaphis tunanica</i> Nevsky, 1929	C	phytophagous	Cryptogenic	1976, ES	ES,FR, GB, IT-SIC, SE	I2	<i>Rosa rugosa</i>	Meliá Masía (1998), Patti (1983)
<i>Myzocallis Lineomyzocallis walshii</i> (Monell ex Riley & Monell, 1879)	A	phytophagous	North America	1988, FR	BE, CH, CZ, DE, ES, FR, HU, IT, IT-SIC, RS	G, I2	<i>Quercus rubra</i>	Hullé et al. (1998), Petrović-Obradović et al. (2007), Rемаудиере (1989)
<i>Myzus Myzus hemerocallis</i> Takahashi, 1921	A	phytophagous	Asia-Temperate	1990, FR	FR, PT-MAD	I2	<i>Hemerocallis</i>	Aguiar and Ilharco (1997), Rемаудиере and Munoz Viveros (1992)
<i>Myzus Myzus ornatus</i> Laing, 1932	A	phytophagous	Asia-Temperate	1932 GB	AL, AT, BE, BG, CH, CZ, DE, DK, EE, ES, ES-CAN, FI, FR, FR-COR, GB, GR, HR, HU, IE, IT, IT-SAR, IT-SIC, LV, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, RU, SE, SI, SK	I, I100, X8	Polyphagous (<i>Prunus cornuta</i> -primary host); many herbaceous plants and vegetables-secondary host)	Blackman and Eastop (2000), Ilharco (1969), Laing (1932)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Myzus Myzus varians</i> Davidson, 1912	A	phyto-phagous	Asia-Temperate	1946, CH	AL, AT, BA, BE, BG, CH, CZ, DE, ES, FR, FR-COR, MK, DE, GB, GR, HR, HU, IT, IT-SIC, PL, RO, RS, RU, SI, SK	I2, G5	<i>Prunus persicae</i> , <i>Clematis</i>	Blackman and Eastop (2000), Börner (1952), Hille Ris Lambers (1947)
<i>Myzus Nectarosiphon ascalonicus</i> Doncaster, 1946	A	phyto-phagous	Asia-Temperate	1941, GB	AL, AT, BE, BG, CH, CZ, DE, DK, ES, ES-CAN, FI, FR, MK, DE, GB, GR, HR, IE, IS, IT, LT, LV, NL, NO, PL, PT, PT-AZO, RO, RS, RU, SE, SK	I2, E	<i>Fragaria</i> , <i>Allium</i>	Börner (1952), Doncaster (1946)
<i>Myzus Nectarosiphon persicae</i> Sulzer 1776	C	phyto-phagous	Crypto-genic	<1758 Unknown	AL, AT, BE, BG, CH, CY, CZ, DK, EE, ES, ES-BAL, ES-CAN, FI, FR, FR-COR, MK, DE, GB, GR, GR-CRE, HR, HU, IE, IT, IT-SAR, IT-SIC, LT, LV, ME, MD, MT, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, RS, SE, SI, SK, UA	G5	Polyphagous	Balachowsky and Mesnil (1935), Blackman and Eastop (2000), Boisdual (1867), Buckton (1876), Koch (1855), Macchiati (1883), Schoureden (1906), Theobald (1926)
<i>Myzus Sciamyzus cymbalariae</i> Stroyan, 1954	C	phyto-phagous	Crypto-genic	1950, GB	BE, CH, CZ, DE, ES, FR, GB, GR, IT, PT-AZO, PT-MAD	I	Polyphagous	Blackman and Eastop (2000), Ilharco (1974), Stroyan (1954)
<i>Nearctaphis bakeri</i> (Cowen ex Gillette & Baker, 1895)	A	phyto-phagous	North America	1964, FR	AL, CH, ES, ES-BAL, FR, DE, GB, GR, IT, IT-SIC, PT, PT-AZO, SK UA	I, E	Maloideae (primary hosts) and Fabaceae (secondary hosts; e.g. <i>Trifolium</i>)	Heie (1992), Lédant (1967), Stroyan (1972)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Neomyzus circumflexus</i> Buckton 1876	A	phyto-phagous	Asia	1876, GB	AL, AT, BE, BG, CH, CZ, DE, DK, EE, ES, ES-CAN, FI, FR, FR-COR, GB, HR, HU, IE, IT, IT-SIC, LT, LV, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, SE, UA	I2, J100	Polyphagous flower crops	Blackman and Eastop (2000), Buckton (1876), Ilharco (1969)
<i>Neophyllaphis podocarpi</i> Takahashi, 1920	A	phyto-phagous	Asia-Temperate	1990, IT	IT	I2	<i>Podocarpus</i>	Limonta (2001)
<i>Neotoxoptera formosana</i> (Takahashi, 1921)	A	phyto-phagous	Asia	1994, FI	DE, FI, FR, GB, IT, NL, PT-MAD	I1, J1, J100	<i>Allium</i>	Aguiar and Ilharco (2001), Barbagallo Ciampolini (2000), Blackman and Eastop (2000)
<i>Neotoxoptera oliveri</i> (Essig, 1935)	A	phyto-phagous	Asia-Temperate	1959, PT	ES, FR, IT-SIC, PT-MAD, PT, RS	I1, J100	<i>Viola, Allium</i>	Ilharco (1960), Ilharco (1968b)
<i>Neotoxoptera violae</i> (Pergande, 1900)	A	phyto-phagous	Asia-Temperate	1939, IT	ES, ES-CAN, FR, IT IT-SIC	I2	<i>Viola</i>	Barbagallo and Coccuzza (1998), Germain and Deogratias (2008) Silvestri (1939)
<i>Panaphis juglandis</i> (Goeze, 1778)	A	phyto-phagous	Asia	<1758 unknown	AL, AT, BE, BA, BG, CH, CZ, DK, ES, ES-CAN, FR, FR-COR, DK, GB, GR, HR, HU, IL, IT-SIC, IT, MD, PL, PT, RO, RS, SE, SI, SK, UA	I2, G5	<i>Juglans</i>	Blanchard (1840), Goeze (1778), Ilharco (1968a), Kaltenbach (1843), Malkov (1908), Schouteden (1906), Walker (1848)
<i>Paoliella eastopi</i> Hille Ris Lambers, 1973	A	phyto-phagous	Africa	<2004, GB	GB	U	Passionfruit in native range (Kenya)	Niero Nafria et al. (2007)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Pemphigus Pemphigus popultroversus</i> Riley ex Riley & Monell, 1879	A	phyto-phagous	North America	1966, PT-MAD	GB, PT-AZO, PT-MAD	I2, F	<i>Populus</i>	Blackman and Eastop (1994), Ilharco (1974)
<i>Pentalonia nigronervosa</i> Coquerel, 1859	A	phyto-phagous	Tropical, sub-tropical	1922, GB	DK, DE, GB, IL, IT, NL, PT-AZO, ES-CAN	J100	<i>Musa</i> (preferred); Poly-phagous on tropical and subtropical ornamental plants	Cairaschi (1942), Süs (1972–73)
<i>Periphyllus californiensis</i> (Shinji, 1917)	A	phyto-phagous	Asia-Temperate	1932, GB	HR, DK, DE, GB, IT, NL, CH	I2, G5	<i>Acer</i>	Blackman and Eastop (1994), Doncaster (1954), Eastop (1956), Petrović-Obradović et al. (2007), Remaudière and Ripka (2003)
<i>Prociphilus Meliarhizaphagus fraxinifolii</i> Riley ex Riley & Monell, 1879	A	phyto-phagous	North America	2003, HU	BG, HU, RS	G, G5	<i>Fraxinus</i>	Petrović-Obradović et al. (2007), Remaudière and Ripka (2003)
<i>Pterochloroides persicae</i> (Cholodkovsky, 1899)	A	phyto-phagous	Asia-Temperate	1975, IT	AL, BG, CY, ES, FR, GR, IT, IT-SIC, RO, RS, UA	I2, G5	<i>Prunus</i> fruit trees (peach)	Ciampolini and Martelli (1977), Petrović and Milanović (1999), Roberti (1975), Velimirovic (1976)
<i>Pterocomma pseudopopuleum</i> Palmer, 1952	A	phyto-phagous	North America	<2004, UA	EE, UA	G	<i>Populus</i>	Nieto Nafria et al. (2007)
<i>Reticulaphis disjuncta</i> vander Goot 1917	A	phyto-phagous	Asia-Temperate	1998, PT	ES, PT	I2, G5	<i>Ficus</i>	Barbagallo et al. (2005b)
<i>Rhodobium porosum</i> (Sanderson, 1900)	A	phyto-phagous	Tropical, sub-tropical	1934, ES	AL, AT, BA, BG, CH, CZ, DE, DK, ES, ES-CAN, FI, FR, GB, GR, HU, IL, IT, IT-SIC, LV, NL, PL, PT, PT-MAD, RO, RS, SE, SI, SK	I2, J100	<i>Fragaria</i> , <i>Rosa</i> (in greenhouses in Central Europe)	Ilharco (1969), Mimeur (1936), Tashev (1964)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Rhopalosiphoninus</i> <i>Rhopalosiphoninus latysiphon</i> (Davidson, 1912)	A	phyto-phagous	North America	1921, IT	AL, AT, BE, BG, CH, CZ, DE, ES, FR, GB, GR, HR, IT, IT-SIC, NL, PL, PT, PT-AZO, PT-MAD, RO, RU	I1	<i>Solanum</i> ; polyphagous on vegetables (<i>Beta</i> , <i>Fragaria</i> , <i>Ipomea</i>) and flowers (<i>Gladiolus</i>)	Blackman and Eastop (2000), Rемаудиере (1952), Tashev (1961)
<i>Rhopalosiphum insertum</i> (Walker, 1849)	A	phyto-phagous	North America	1848 GB	AL, AT, BY, BE, BG, CH, CZ, DE, DK, EE, ES, ES-CAN, FI, YU, FR, FR-COR, DE, GB, GR, HU, IE, IT, LT, LV, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RU, RS, SE, SI, SK, UA	I1, E	Graminae (<i>Poa</i> , <i>Festuca</i> , <i>Juncus</i>)	Blackman and Eastop (2000), Dospevski (1910), Ilharco (1968a), Walker (1849)
<i>Rhopalosiphum maidis</i> (Fitch, 1856)	A	phyto-phagous	Asia	1903, IT	AL, BE, BG, CH, CY, CZ, DE, DK, ES, ES-CAN, FI, FR, FR-COR, GB, GR, GR-CRE, HU, IT-SAR, IT-SIC, IT, LV, MD, NL, NO, PL, PT, PT-AZO, PT-MAD, RO, RS, RU, SE, ES, SK, UA	I1, E	Maize, sorghum; other crops	Blackman and Eastop (2000), Del Guercio (1913), Del Guercio (1917), Dospevski (1910), Eastop (1956), Heie (1986), Ilharco (1961)
<i>Rhopalosiphum rufiabdominale</i> (Sasaki, 1899)	A	phyto-phagous	Asia-Temperate	1960 PT	BG, DK, ES, FI, FR, GR, IT, IT-SIC, PT, PT-AZO, PT-MAD, RU, UA	I1	Rice roots, Gramineae	Blackman and Eastop (2006), Heie (1986), Ilharco (1968a), Ilharco (1973)
<i>Sipha Siphia flava</i> (Forbes, 1884)	A	phyto-phagous	North America	1979, PT-AZO	AL, PT-AZO	I1	Sugarcane	Sousa-Silva and Ilharco (1995)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Siphonotrophia cupressi</i> Swain, 1918	A	phyto-phagous	North America	1999, FR	FR, IT	G5, I2, FA	<i>Cupressus</i>	Rabasse et al. (2005a)
<i>Sitobion Sitobion alopecuri</i> (Takahashi, 1921)	A	phyto-phagous	Asia-Temperate	<2004, GB	GB, NL	I2, E	Graminae	Blackman and Eastop (2006), Nieto Nafria et al. (2007)
<i>Sitobion Sitobion luteum</i> (Buckton, 1876)	C	phyto-phagous	Crypto-genic	1875 GB	BE, DE, FR, GB, PT-MAD	J100	Orchidaceae, Bromeliaceae, Araceae	Blackman and Eastop (2006), Buckton (1876), Del Guercio (1911) Schouteden (1906)
<i>Stomaphis mordvilkoii</i> Hille Ris Lambers, 1933	A	phyto-phagous	Asia-Tropical	1980, IT	IT	G	<i>Juglans</i>	Colombo (1981)
<i>Takecallis arundicolens</i> (Clarke, 1903)	A	phyto-phagous	Asia-Temperate	1923, GB	CH, DE, ES, FR, GB, IE, IT, PT	I2	Bamboos	Hille Ris Lambers (1947), Ilharco (1969), Laing (1923), Stroyan (1964), Stroyan (1977), Theobald (1927)
<i>Takecallis arundinariae</i> (Essig, 1917)	A	phyto-phagous	Asia-Temperate	1961, GB	CH, DE, ES, GB, GR, IT, IT-SIC, PT-MAD	I2	Bamboos	Giacalone and Lampel (1996), Pari and Tomatore (1988), Stroyan (1964), Stroyan (1977)
<i>Takecallis taiwana</i> (Takahashi, 1926)	A	phyto-phagous	Asia-Temperate	1923, GB	CH, DE, ES, FR, GB, HR, IT, IT-SIC	I2	Bamboos (<i>Phyllostachys</i>)	Giacalone and Lampel (1996), Limontra (1990), Stroyan (1964)
<i>Timocallis Sappocallis nevskyi</i> Remaudière, Quednau & Heie, 1988	A	phyto-phagous	Asia-Temperate	1978, PL	AT, BE, CH, CZ, DE, DK, FI, GB, HU, IT, NL, PL, SE	G, G5, I2, FA	<i>Ulmus</i>	Remaudière et al. (1988), Szelegiewicz (1978), Van Harten and Cocciano (1981)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Tinocallis Sappocalis saltans</i> (Nevsky, 1929)	A	phytophagous	Asia-Temperate	1976, RO	ES, FR, HU, IT, IT-SIC, MD, NL, PL, RO, RU, UA	G, G5, I2	<i>Ulmus</i>	Holman and Pintera (1981), Hullé et al. (1998), Rемаудière et al. (1988), Van Harren and Cocciano (1981)
<i>Tinocallis Sappocalis takachithoensis</i> Higuchi 1972	A	phytophagous	Asia-Temperate	1985, FR	ES, FR, IT, IT-SIC	G, G5, I2	<i>Ulmus</i>	Hullé et al. (1998), Leclant and Renoust (1986), Leclant and Rемаудière (1986)
<i>Tinocallis Sarucallis kabauduokalani</i> (Kirkaldy, 1906)	A	phytophagous	Asia-Temperate	1984, IT	DE, ES, FR, GR, IT, IT-SIC, ME	I2, G5	<i>Lagerstroemia indica</i>	Arzone and Vidano (1990), Leclant and Renoust (1986), Ossiannilsson (1959), Pati (1984), Petrović-Obradović et al. (in press)
<i>Tinocallis Tinocallis ulmiparvifoliae</i> Matsumura, 1919	A	phytophagous	Asia-Temperate	1973, GB	ES, GB, IT	I2, J100	<i>Ulmus</i>	Lucchi and Pollini (1995), Pérez Hidalgo and Nieto Nafria (2005), Prior (1971), Stroyan (1977)
<i>Tinocallis Tinocallis zelkova</i> (Takahashi, 1919)	A	phytophagous	Asia-Temperate	1973, GB	FR, GB	I2, J100	<i>Zelkova</i>	Prior (1971), Stroyan (1977)
<i>Toxoptera aurantii</i> Fonscolombe 1841	A	phytophagous	Tropical, sub-tropical	1841 FR	AL, BE, CH, CY, DE, ES, ES-BAL, FR, FR-COR, GB, GR, HR, IL, IT, IT-SAR, IT-SIC, ME, MT, PT-AZO, PT-MAD, PT, RO	I, G5, J100	Polyphagous (mainly <i>Citrus</i>)	Boyer de Fonscolombe (1841), Del Guercio (1917), Passerini (1861), Stroyan (1984), Tavares (1900)

<i>Species</i>	Status	Feeding Regime	Native range	1st record in invaded areas	Invaded countries	Habitat	Hosts	References
<i>Toxoptera citricidus</i> Kirkaldy 1906	A	phyto-phagous	Tropical, sub-tropical	1994, PT-MAD	ES, PT, PT-MAD	I, G5	<i>Citrus</i>	Aguiar et al. (1994), Ilharco et al. (2005)
<i>Trichosiphonaphis Xenomyzus polygonifoliae</i> (Shinji, 1944)	A	phyto-phagous	Asia-Temperate	1990, FR	FR, GB, HU, IT, RS, UA	I2	<i>Lonicera</i> , <i>Polygonum</i>	Coccano and Petrovic-Obradovic (2006), Petrović-Obradović et al. (in press), Remaudière et al. (1992)
<i>Tuberculatus Nippocallis kuricola</i> (Matsumura, 1917)	A	phyto-phagous	Asia-Temperate	1981, PT-MAD	ES, PT, PT-AZO, PT-MAD	G1, I2	<i>Castanea</i> , <i>Quercus</i>	Ilharco (1984), Pedro Mansilla et al. (2001)
<i>Uroleucon Lambersius erigeronense</i> (Thomas, 1878)	A	phyto-phagous	North America	1952, FR	AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, IT, IT-SIC, LV, MD, NL, PL, PT-MAD, RO, RS, SE, SI, RK	I, J6	Asteraceae (<i>Erigeron</i> , <i>Coniza</i>)	Blackman and Eastop (2006), Heie (1995), Remaudière (1954)
<i>Uroleucon Uroleucon pseudoambrosiae</i> (Ollive, 1963)	A	phyto-phagous	North America	<2004	PL	I	Asteraceae (Mainly <i>Lactuca</i> spp.)	Blackman and Eastop (2000), Blackman and Eastop (2006), Nieto Nafria et al. (2007)
<i>Utamphorophora humboldti</i> (Essig, 1941)	A	phyto-phagous	North America	1974, GB	FR, GB, GR, IE	I2	<i>Physocarpus</i> , Poaceae	Hullé et al. (1998), Prior (1975), Tsitsipis et al. (2007)
<i>Wahlgreniella arbuti</i> (Davidson, 1910)	A	phyto-phagous	North America	1905, PT	ES, ES-BAL, FR, FR-COR, GB, GR, IT, IT-SAR, IT-SIC, NL, PT, PT-MAD	I2, F6	<i>Arbutus</i> , <i>Arctostaphylos</i>	Heie (1995), Ilharco (1969), Tavares (1905), Tsitsipis et al. (2007)
<i>Wahlgreniella nervata</i> (Gillette, 1908)	A	phyto-phagous	North America	1973, GB	AT, BE, ES, ES-CAN, FR, GB, GR, IT-SIC	I2	<i>Rosa</i>	Blackman and Eastop (2006), Prior (1975), Tsitsipis et al. (2007)