

Aphids associated with shrubs, herbaceous plants and crops in the Maltese Archipelago (Hemiptera, Aphidoidea)

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ABSTRACT. A survey of the aphids associated with Maltese shrubs, herbaceous plants and crops was carried out. Sixty six aphid species were recorded from more than 90 species of host plants. Forty eight aphids were recorded from the Maltese islands for the first time bringing the total number of aphid species known from these islands to 99. New records include: *Acyrtosiphon lactucae*, *A. pisum*, *Anoecia vagans*, *Aphis alienus*, *A. euphorbiae*, *A. hederarum*, *A. lambersi*, *A. multiflorae*, *A. nasturtii*, *A. parietariae*, *A. picridicola*, *A. ruborum*, *A. sedi*, *Aulacorthum solani*, *Brachycaudus helichrysi*, *Capitophorus* sp. nr. *similis*, *Clypeoaphis suaedae*, *Cryptomyzus korschelti*, *Dysaphis apiifolia*, *D. foeniculus*, *D. pyri*, *D. tulipae*, *Hyadaphis coriandri*, *H. foeniculi*, *H. passerinii*, *Hyperomyzus lactucae*, *Idiopterus nephrolepidis*, *Macrosiphoniella absinthii*, *M. artemisiae*, *M. sanborni*, *Macrosiphum euphorbiae*, *Ma. rosae*, *Melanaphis donacis*, *Metopolophium dirhodum*, *Pterochloroides persicae*, *Rectinasus buxtoni*, *Rhopalosiphum maidis*, *R. padi*, *R. rufiabdominale*, *Schizaphis graminum*, *Semiaphis dauci*, *Sipha maydis*, *Sitobion avenae*, *S. fragariae*, *Therioaphis alatina*, *Uroleucon inulae*, *U. hypochoeridis* and *U. sonchi*. Of these 99 aphid species, 58 are of economic importance and 16 are alien introductions. For 15 of the aphid species, a total of 22 new host-plant records are made. Ten species of ants were found attending 18 aphid species.

KEY WORDS. Malta, Mediterranean, new records.

INTRODUCTION

The aphids (Hemiptera, Aphidoidea) are a group of phloem sap-sucking insects, each generally 1-5mm long. There are some 4,500 described aphid species worldwide in about 500 presently accepted genera on about 87,000 plant species. The aphids are a predominantly northern temperate taxon; most species are found in North America, Europe, Central and Eastern Asia (BLACKMAN & EASTOP, 2000, 2006).

Although aphids are important crop pests, until recently the aphid fauna of the republic of Malta was poorly studied. BORG (1922) in his book entitled “*Cultivation and diseases of fruit trees in the Maltese Islands*” mentioned several species of aphids but it is often not clear if species mentioned

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therein were actually found in Malta. Moreover, it seems that he based his information on what was found in the literature from Continental Europe and as such no taxonomic studies were carried out on Maltese material. An important work, often overlooked by foreign entomologists, was that of CARUANA GATTO (1926) who provided the first study on some 90 plant deformations/galls found in Malta. In this work some 20 aphid species were recorded based on plant deformation/gall morphology. SALIBA (1963) provided a list of insect pests of crop plants found in the Maltese islands and included 11 aphid species. Again this work lacked taxonomic studies and certain records are most likely incorrect. It was only in the last 15 years that proper taxonomic studies were undertaken to evaluate the aphidofauna of the Maltese islands through proper surveys. Some of these surveys were part of larger projects funded from overseas and a summary of these is to be found in MIFSUD *et al.* (2009b). Aphids associated with trees were covered by MIFSUD (2008) and MIFSUD *et al.* (2009a). MIFSUD *et al.* (2009b) provided a checklist of 50 aphid species recorded from Malta including much detailed information on earlier records. The establishment of *Aphis illinoisensis* was also documented by MIFSUD & PÉREZ HIDALGO (2011).

The interspecific interaction networks in communities and their geographical and seasonal variation, with the related concepts of nestedness (BASCOMPTE *et al.*, 2003) and conditionality (GOVE & RICO-GRAY, 2006) is a growing field of interest and relevance when drawing important conclusions about evolutionary and ecological processes. The tritrophic plant-aphid-ant interactions are well documented in the tropics (VÁZQUEZ *et al.*, 2009) and here we aim to document such interactions for the Maltese islands.

The main goal of the present work is to provide an annotated faunistic list of the aphids found on shrubs (low woody perennial plants with several major stems), herbaceous plants (with no woody tissue) and crop plants (including vegetables and fruit trees) and to provide an updated list of all aphid records including host plant data for the Maltese archipelago.

MATERIAL AND METHODS

Sampling was mainly carried out on the island of Malta but some collecting was done on Gozo and Comino. Crops, shrubs and herbaceous plants were searched for aphids, by direct inspection. The young, actively growing parts of plants, where aphids generally feed, were examined closely. Samples were collected from leaf- and flower buds, flower heads, the undersides of young leaves, along green stems and inside grass leaf sheaths. Movement of the vegetation was minimised because some aphids immediately drop to the ground when disturbed. A fine brush was used to transfer adult aphids and any associated ants into sample vials containing 75% alcohol. Ants attending aphids, deformed leaves and plant galls were also collected. Plant parts infested with immature aphids were collected in polyethylene bags, for rearing. For each sample collected, note was taken of the location, date, host-plant, collector and other relevant ecological data.

Aphid samples were preserved in 75% ethanol and labelled carefully. Material examined in the present study was slide mounted in Canada balsam following BROWN (1997). Examination of slide mounted aphids was carried out using a compound microscope (Zeiss Axioskope 2 plus). The higher classification used is based on FAVRET (2011), which is derived from REMAUDIÈRE & REMAUDIÈRE (1997), NIETO-NAFRÍA *et al.* (1998) and other sources.

The ants were identified on the basis of published papers on the ants of the Maltese islands (BARONI URBANI, 1968a, b; SCHEMBRI & COLLINGWOOD, 1981, 1995) and SEIFERT (1992) for *Lasius* species.

The plants were mostly identified by local botanists, mainly Edwin Lanfranco, Timothy Tabone and Stephen Mifsud and nomenclature follows TROPICOS.ORG (2011).

Aphid and ant voucher material is deposited in the private collection of D. Mifsud, Malta, the Natural History Museum, London, UK, the Department of Biodiversity and Environmental Management, University of Leon, Spain, and the Autonomous University of Barcelona Collection, Spain.

Material examined was collected by Marija Mangion (MM), David Cuesta-Segura (DC), David Mifsud (DM) and Erika Azzopardi (EA). The DM collection includes aphid material collected by DM, B. Wheeler (BW), G.W. Watson (GW), C. Farrugia (CF), L. Attard (LA), A. Tabone (AT), M. Scicluna (MS), M. Ebejer (ME), J.W. Ismay (JI) and C. Cullinan (CC).

Previous records of aphids associated with shrubs, herbaceous plants and crops that were not encountered in the present study are not repeated in the section which follows. However, Appendix 1 provides detailed information on all aphids so far recorded from Malta. The host plant data given in Appendices do not include host records of vagrant (alate) aphids documented in the respective Material examined sections.

ANNOTATED FAUNISTIC LIST

Aphid records are listed in alphabetical order. New aphid records for the Maltese islands are marked with an asterisk (*), alien species with [A] and economically important aphids are marked with [E].

****Acyrtosiphon (Acyrtosiphon) lactucae* (Passerini, 1860) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Buskett, 24.vi.2009, apterae on *Lactuca serriola*, MM; Mgarr, 7.ix.2009, apterae on *Lactuca virosa*, MM.

This species occurs in Europe and the Middle East, and has been introduced to North America. It feeds on the stems and occasionally leaf undersides of *Lactuca* spp. (Fig. 1). In Italy, it also occurs on *Sonchus* (ROBERTI, 1993) and occasionally on genera closely related to Liguliflorae (BARBAGALLO & STROYAN, 1982). *Ac. (Ac.) lactucae* has a monoecious holocycle with alate males (BLACKMAN & EASTOP, 2006). It is frequently damaging to cultivated *Lactuca sativa* in Italy, preferentially infecting the inflorescence, and is a vector of Lettuce Mosaic *Potyvirus* (ROBERTI, 1993; BLACKMAN & EASTOP, 2000). Further studies are needed to confirm its separation from *Ac. (Ac.) scariolae* Nevsky (BLACKMAN & EASTOP, 2006).

****Acyrtosiphon (Acyrtosiphon) pisum* (Harris, 1776) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Buskett, 9.iii.1994, apterae on *Trifolium nigrescens*, GW.
GOZO: Ramla (sand dune), 15.iv.1994, apterae on Fabaceae, DM.

This species is sub-cosmopolitan in distribution. It occurs on the young growth and pods of many herbaceous and some shrubby Fabaceae (BLACKMAN & EASTOP, 2006; 2010). In summer, in Italy, the species also occurs on *Capsella bursa-pastoris* (ROBERTI, 1993). *Ac. (Ac.) pisum* has a monoecious holocycle in cold climates, with both apterous and alate males, but it is paracyclic or anholocyclic

in temperate climates (ROBERTI, 1993). This aphid is an important pest of peas, alfalfa and other legumes, and is known to transmit more than 30 plant viruses (BLACKMAN & EASTOP, 2000). Recent studies indicate that this taxon probably consists of two or three species (on *Sarothamnus*, *Ononis*, and a third possible on *Lotus*) and about eight sub-species on *Lathyrus*, *Medicago*, *Melilotus*, *Pisum* and *Trifolium*, with some gene flow between them (PECCOUD *et al.*, 2009).

****Anoecia (Anoecia) vagans* (Koch, 1856)**
(Anoeciinae)

Material examined. MALTA: Marsa (Ghammieri), 19.iii.1994, apterae on roots and bases of Poaceae, CC; Marsa (Ghammieri), 8.v.1995, apterae on roots of oats (*Avena* sp.), DM.

This species is found in Europe, Egypt, Israel, Turkey, India and Eastern Siberia (BLACKMAN & EASTOP, 2006). Its primary host is *Cornus sanguinea*; secondary hosts are roots of Poaceae such as *Agropyrum*, *Cynodon*, *Dactylis*, *Eragrostis*, *Panicum* and *Setaria* (ROBERTI, 1993). On grass, this species is visited by ants (HEIE, 1980). *A. vagans* has a heteroecious holocycle but can also be anholocyclic.

****Aphis (Aphis) alienus* Theobald, 1915**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Birzebbuga, Wied Has-Saptan, 10.i.1997, apterae on *Teucrium flavum*, DM.

Aphis (Aph.) alienus occurs in Europe and Pakistan. It is oligophagous on *Teucrium* spp., especially *T. scorodonia*, occurring mostly on the rhizomes and basal parts in ant shelters (BLACKMAN & EASTOP, 2006). The species is supposedly monoecious (STROYAN, 1984). *Aph. (Aph.) teucritii* (Börner) is morphologically indistinguishable from *Aph. (Aph.) alienus* and feeds on the leaves of *Teucrium*, especially *T. chamaedrys*, causing leaf curl (BLACKMAN & EASTOP, 2006). *Teucrium flavum* represents a new host-plant record for *Aph. (Aph.) alienus*.

***Aphis (Aphis) craccivora* Koch, 1854 [E]**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Marsa (Ghammieri), 11.x.1994, apterae on *Asparagus* sp., DM; Birzebbuga, 3.viii.2009, apterae and alatae on *Lantana camara*, MM; Marsascalea, 24.vii.2009, alatae on *Portulaca oleracea*, attended by *Lepisiota frauenfeldi*, MM; Mgarr, 7.ix.2009, apterae and alatae on *Portulaca oleracea*, MM; Swatar, 14.ix.2009, on *Portulaca oleracea*, MM; Marsaxlokk, 14.xi.1994 apterae and alatae on *Spartium junceum*, DM. **COMINO:** North-west of the island, 8.iv.2009, on *Ononis natrix*, DC.

This is a cosmopolitan species and is especially common in tropical and warm temperate areas. It is polyphagous, especially in southern regions, but is typically found on young growth of Leguminosae (BARBAGALLO & STROYAN, 1982) associated with ants (BLACKMAN & EASTOP, 2010). The species is anholocyclic in tropical regions and in Sicily (BARBAGALLO & STROYAN, 1982) but paracyclic in mild climates (ROBERTI, 1993). In Germany and India, it has a monoecious holocycle with alate males (BLACKMAN & EASTOP, 2006). *Aph. (Aph.) craccivora* is a major pest on leguminous crops and is a vector of some 30 plant viruses (BLACKMAN & EASTOP, 2000). It was recorded from the Maltese islands previously on *Ceratonia siliqua* (MIFSUD *et al.*, 2009a).

****Aphis (Aphis) euphorbiae* Kaltenbach, 1843**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Fomm ir-Riĥ, 26.iv.1997, apterae on *Euphorbia* sp., DM.

Aphis (Aph.) euphorbiae is found throughout Europe (though it is rare in northern Europe), the Mediterranean basin, Africa, and South-West and Central Asia; it has been accidentally introduced to Australia (Victoria) and North America. It occurs on the upper parts of *Euphorbia* spp. stems, especially on *E. cyparissias* in Europe (BLACKMAN & EASTOP, 2006). *Aph. (Aph.) euphorbiae* has a monoecious holocycle (STROYAN, 1984) with a possible anholocycle in mild climates (ROBERTI, 1993). It is the commonest and most broadly oligophagous species from a taxonomically difficult group of closely-related species occurring on *Euphorbia* (BARBAGALLO & STROYAN, 1982).

***Aphis (Aphis) fabae* Scopoli, 1763 [E]**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Żabbar, 10.iii.1994, apterae on shoots and pods of *Vicia faba*, BW; Marsa (Għammieri), 12.iii.1994, alatae on irrigated kohlrabi leaves, GW; 18.iii.1994, apterae on globe artichoke head (*Cynara scolymus*), BW; Salina, 11.iii.1995, apterae on *Atriplex prostrata*, DM; Żurrieq (public garden), 2.vii.2009, and Chadwick Lakes, 12.vii.2009, apterae on *Chenopodium murale*, attended by *Tapinoma nigerrimum*, MM; Bahrija, 7.vii.2009, apterae on *Chenopodium opulifolium*, MM; Wied iż-Żurrieq, 25.vi.2009, apterae on *Cichorium spinosum*, MM; Bahrija, 7.vii.2009, apterae on *Dendranthema* sp., MM; Buskett, 19.iv.2009, apterae on *Hedera helix*, MM; Wied iż-Żurrieq, 25.vi.2009, apterae and alatae on *Hypochaeris achyrophorus*, MM; Rabat, 18.viii.2009, apterae on *Kickxia spuria*, attended by *Crematogaster scutellaris*, MM; Żurrieq (public garden), 5.vii.2009, apterae and alatae, on *Pittosporum tobira*, MM; Mġarr, 7.ix.2009, apterae on *Portulaca oleracea*, MM. Apterae and alatae on *Foeniculum vulgare*, MM: Wied Babu, 22.vi.2009; Wied iż-Żurrieq, 25.vi.2009; Wied Inċita, 1.vii.2009; Gharghur, 1.vii.2009; Bahrija, 7.vii.2009; Qrendi, 15.vii.2009, attended by *Camponotus barbaricus*; Imtahleb, 17.vii.2009; Kuncizzjoni, 17.vii.2009; Fomm ir-Riĥ, 22.vii.2009; Siġġiewi, 31.vii.2009; Wied il-Ghasel, 21.viii.2009; Mtarfa, 27.viii.2009; Imqabba, 2.ix.2009; Mġarr, 7.ix.2009; Wardija, 11.ix.2009, attended by *Tapinoma nigerrimum*; Swatar, 14.ix.2009; Chadwick Lakes, 10.vii.2009, attended by *Camponotus barbaricus*. On *Solanum luteum*, MM: Żurrieq (public garden), 2.vii.2009, apterae; Żurrieq, 5.vii.2009, apterae and alatae, attended by *Tapinoma nigerrimum*. Apterae and alatae on *Solanum nigrum*, MM: Bahrija, 16.vii.2009, attended by *Crematogaster scutellaris*; Swatar, 14.ix.2009. Apterae on *Solanum nigrum* or *Sol. luteum*, MM: Buskett (woodland), 24.vi.2009; Marsascala, 24.vii.2009. Wied il-Ghasel, 26.viii.2009, apterae and alatae, on *Solanum* sp., MM; Buskett, 19.iv.2009, apterae and alatae on *Urtica membranacea*, attended by *Plagiolepis pygmaea*, MM; Marsa (Għammieri), 3.iv.1995, apterae on *Urtica* sp., DM; Manikata, 3.iv.1994, apterae, on *Ferula communis*, DM; Marsa (Għammieri), 19.iii.1994, apterae and alatae on marigold-like weed, GW. **GOZO:** Xlendi, 9.iv.2009, on *Galium aparine*, DC; Mġarr, 8.iv.2009, on *Papaver rhoeas*, DC; Mġarr, 8.iv.2009, on *Papaver pinnatifidum*, DC.

Aphis (Aph.) fabae is widespread in the temperate Northern hemisphere regions, South America and Africa. In Europe there are four subspecies whose primary host is *Euonymus europaeus* or sometimes *Viburnum opulus*; their secondary host preferences are polyphagous but differ slightly (BLACKMAN & EASTOP, 2010). Their taxonomy was discussed by BLACKMAN & EASTOP (2007). *Aph. (Aph.) fabae* is typically anholocyclic (BARBAGALLO & STROYAN, 1982). Heteroecious holocycles occur on mountains, although monoecious holocycles are also known (BLACKMAN & EASTOP, 2006). Large colonies (Fig. 2) of *Aph. (Aph.) fabae* may be very damaging to legumes (especially to broad

bean) and beetroot, causing leaf deformation and arrested development. It is a vector of about 30 plant viruses. The species was recorded previously from the Maltese islands by SALIBA (1963). *Atriplex prostrata* and *Kickxia spuria* are new host-plant records for *Aph. (Aph.) fabae*.

***Aphis (Aphis) gossypii* Glover, 1877** [A] [E]
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Qormi, 21.ix.2009, apterae on marrow (*Cucurbita pepo*), attended by *Pheidole pallidula*, EA; Marsa (Ghammieri), 30.ix.2009, apterae on melon (*Cucumis melo*), EA; Handaq, 27.ix.2009, apterae on pomegranate (*Punica granatum*), attended by *Tapinoma nigerrimum*, EA; Żebbug, 15.viii.2009, apterae on pumpkin (*Cucurbita maxima*), EA; Marsa (Ghammieri), 30.ix.2009, apterae on loquat (*Eriobotrya japonica*), EA; Gharghur, 1.vi.2009, apterae on pomegranate, attended by *Pheidole pallidula* and *Plagiolepis pygmaea*, EA; Qormi, 22.ix.2009, apterae on watermelon (*Citrullus lanatus*), EA; 13.viii.2008, apterae on capsicum (*Capsicum* sp.), EA; 21.ix.2009, apterae on aubergine (*Solanum melongena*), EA; 24.vi.2009, apterae on orange tree (*Citrus sinensis*), EA; 5.vii.2009, apterae on orange tree, EA; 4.vii.2009, apterae on tomato (*Solanum lycopersicum*), EA; Rabat (Buskett), 15.vii.2009, apterae on orange tree, attended by *Lasius emarginatus*, EA; 17.vii.2009, apterae on orange tree (*Citrus sinensis*), EA; Ġnien il-Kbir, 18.vii.2009, apterae on orange tree, attended by *Tapinoma nigerrimum*, EA; Qormi, 21.ix.2009, alatae on marrow, EA; 13.viii.2009, alatae on capsicum, EA; Ġnien il-Kbir, 18.vii.2009, alatae on orange tree, EA; Marsa (Ghammieri), 17.x.1995, apterae on cucumbers (*Cucumis sativus*), DM; 26.x.1995, apterae on cucumbers, DM; St. Paul's Bay, 10.xi.1994, apterae on strawberries (*Fragaria* sp.), DM; Rabat, 13.vi.1994, immature aphids on marrow, JI; Magħtab, 10.vi.1994, apterae on pumpkin, DM; Marsa (Ghammieri), 4.i.1994, apterae on aubergine, DM; Little Armier, 14.vi.1994, apterae on pumpkin, JI; St. Paul's Bay, 14.xi.1994, alatae on cucumber under glass, DM & GW; Żabbar, 10.iii.1994, apterae on potato (*Solanum tuberosum*), GW; 10.iii.1994, apterae on marrow, DM & GW; Marsa (Ghammieri), 12.iii.1994, apterae on parsley (*Petroselinum crispum*), GW. Apterae on *Hibiscus* sp., MM: Żurrieq, 2.vii.2009, attended by *Lepisiota frauenfeldi*; Rabat, 18.viii.2009, attended by *Lasius lasioides*; Mgarr, 4.iv.2009, DC; Żabbar, 13.ix.2009, attended by *Tapinoma nigerrimum*. On *Kickxia spuria*, MM: Buskett (woodland), 24.vi.2009, apterae and alatae; Bahrija, 21.vii.2009, apterae; Girgenti, 8.viii.2009, apterae. Hagar Qim, 17.iv.2009, apterae, on *Periploca angustifolia*, MM; Wied Babu, 6.iv.2009 and 22.vi.2009, apterae on *Prasium majus*, MM. Apterae on *Rosa* sp., MM: Żabbar, 13.ix.2009; Swatar, 14.ix.2009. Marsascala, 24.vii.2009, apterae on *Sinapis alba*, MM; Girgenti, 8.viii.2009, apterae on *Urospermum picroides*, attended by *Plagiolepis pygmaea*, MM; Mosta, 9.ix.2009, apterae on *Verbena officinalis*, attended by *Tapinoma nigerrimum*, MM; Wardija, 11.ix.2009, apterae on *Portulaca oleracea*, MM. **GOZO:** Ghasri, 19.xi.2004, apterae on cauliflower (*Brassica oleracea* var. *botrytis*), CF; Kerċem, 9.xi.2008, apterae on lemon tree (*Citrus limon*), AT.

Aphis (Aph.) gossypii is a member of the *Aph. (Aph.) frangulae* complex, sub-cosmopolitan in distribution and especially abundant and well-distributed in hot regions. Primary hosts include *Catalpa bignonioides*, *Hibiscus syriacus*, *Celastrus orbiculatus*, *Rhamnus* spp. and *Punica granatum* (BLACKMAN & EASTOP, 2006; 2010), and it is polyphagous on its secondary hosts. The confused taxonomy of this complex was discussed by BLACKMAN & EASTOP (2007). In Europe, *Aph. (Aph.) gossypii* is mostly anholocyclic, but is holocyclic in East Asia and North America on unrelated primary hosts, and monoeocious holocyclic on cotton and *Hibiscus* in China (BLACKMAN & EASTOP, 2006). *Aph. (Aph.) gossypii* is a major pest of citrus, peppers, potato and cotton, as well as various ornamental plants, and is a vector of more than 50 plant viruses (BLACKMAN & EASTOP, 2000). The species was recorded previously from the Maltese islands by MIFSUD & WATSON (1999). New host-plant records for *Aph. (Aph.) gossypii* include *Periploca angustifolia*, *Prasium majus*, *Sinapis alba* and *Urospermum picroides*.

****Aphis (Aphis) hederæ* Kaltenbach, 1843**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Marsa (Ghammieri), 13.v.1995, apterae and alatae on *Hedera helix*, DM; Buskett, 19.iv.2009, apterae and alatae on *Hedera helix*, attended by *Crematogaster scutellaris*, MM; Fawwara, 10.viii.2009, apterae on *Hedera helix*, MM.

Aphis (Aph.) hederæ is widespread in Europe, West and South-West Asia, South Africa, New Zealand, North and temperate South America (BLACKMAN & EASTOP, 2006). It occurs on young shoots and leaves of *Hedera helix*, and on *Fatsyhedera lizaei* in Italy (ROBERTI, 1993; BLACKMAN & EASTOP, 2010). It is sometimes found on other Araliaceae (e.g. *Aralia* and *Schefflera*) and *Cuscuta* (Convolvulaceae). *Aph. (Aph.) hederæ* has a monoecious holocycle with apterous or alate males but can also be anholocyclic (ROBERTI, 1993).

***Aphis (Aphis) illinoisensis* Shimer, 1866** [A] [E]
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Attard, 26.vii.2011, apterae and alatae on *Vitis vinifera*, DM; Dingli, 21.viii.2011, apterae and alatae on *Vitis vinifera*, DM.

Aphis (Aph.) illinoisensis is a pest of grape vines, *Vitis vinifera*, native to America. The species is monoecious holocyclic in Virginia, U.S.A., overwintering on *Viburnum prunifolium* and some ornamental *Viburnum* spp.; however, it is likely to be anholocyclic on vines in warmer climates and glasshouses (BLACKMAN & EASTOP, 2000; 2006). The species is a vector of Watermelon Mosaic *Potyvirus* (WEBB *et al.*, 1994) but there is no evidence of transmission of grape vine viruses by this aphid (KUNUYUKI *et al.*, 1995). *Aph. (Aph.) illinoisensis* was recently reported as a newly established introduction to Europe and the Mediterranean basin, with records from southern Turkey, Greece, Israel, northern Cyprus, Tunisia, Algeria, Libya, Montenegro and Malta (MIFSUD & PÉREZ HIDALGO, 2011). Although this pest is a recent introduction to Malta, the heavy infestations encountered (Fig. 3) indicate that it is already well established.

****Aphis (Aphis) lambersi* (Börner, 1940)** [E]
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Msida (University grounds), 29.iii.1994, apterae on *Daucus carota*, DM.

Aphis (Aph.) lambersi is found throughout Europe and Russia. It occurs on Apiaceae (STROYAN, 1984), especially on the basal leaf sheaths and root collars of *Daucus carota*, where it may be attended by ants (ROBERTI, 1993). It has a monoecious holocycle with apterous males, but can also be anholocyclic (BLACKMAN & EASTOP, 2006). Development of *Aph. (Aph.) lambersi* along the flower stems is damaging to crops destined for seed production (BARBAGALLO & STROYAN, 1982).

****Aphis (Aphis) multifloræ* Barbagallo & Stroyan, 1982**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Birzebbuga, 27.iii.1994, apterae and alatae on *Erica multiflora*, DM; Wied Babu, 6.iv.2009, apterae on *Erica multiflora*, attended by *Plagiolepis pygmaea*, MM.

Aphis (Aph.) multiflorae is known from Italy (Sicily), South France and Spain. It occurs on *Erica* spp. and *Daboecia cantabrica*, on young shoot apices (BARBAGALLO & STROYAN, 1982).

****Aphis (Aphis) nasturtii* Kaltenbach, 1843 [E]**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Girgenti, 8.viii.2009, apterae on *Anagallis arvensis*, attended by *Plagirolepis pygmaea*, and apterae and alatae on *Urospermum picroides*, MM.

Aphis (Aph.) nasturtii is sub-cosmopolitan in distribution but has not been recorded from Australasia. The primary host is *Rhamnus* spp., especially *R. cathartica*, but it is polyphagous on a wide range of secondary herbaceous hosts, such as *Rumex* spp., *Nasturtium officinale*, *Solanum tuberosum*, *Veronica beccabunga* and *Drosera rotundifolia* (ROBERTI, 1993; BLACKMAN & EASTOP, 2006). *Aph. (Aph.) nasturtii* has a heteroecious holocycle, but in Sicily, anholocycle with female virginoparae was also recorded (BARBAGALLO & STROYAN, 1982). The species infests potato and is a vector of three plant virus diseases: non-persistent Potato A and Y *Potyvirus*es and Aucuba Mosaic *Potexvirus* (BLACKMAN & EASTOP, 2000). *Urospermum picroides* is a new host-plant record for *Aph. (Aph.) nasturtii*.

***Aphis (Aphis) nerii* Boyer de Fonscolombe, 1841 [E]**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Mosta, 16.vi.1994, apterae on *Hoya carnosa*, MS; 22.vi.1994, apterae on *Stephanotis floribunda*, DM. Apterae on *Nerium oleander*, MM: Bahrija, 16.vii.2009; Kuncizzjoni, 17.vii.2009; Ta' Qali, 22.vii.2009; Marsascalea, 24.vii.2009, attended by *Tapinoma nigerrimum*; Siggiewi, 30.vii.2009, attended by *Tapinoma nigerrimum*; Siggiewi, 31.vii.2009, attended by *Tapinoma nigerrimum*; Birzebbuga, 3.viii.2009, attended by *Tapinoma nigerrimum*; Fawwara, 10.viii.2009; Saqajja, 17.viii.2009, apterae and alatae; Hal-Luqa, 29.viii.2009; Imqabba, 2.ix.2009; Mgarr, 4.ix.2009; Mosta, 9.ix.2009; Żebbuġ, 13.ix.2009; Żurrieq, 4.x.2009.

Aphis (Aph.) nerii (Fig. 4) is widely distributed in tropical and subtropical regions. It occurs on *Nerium oleander*, sometimes causing leaf deformation and sometimes flower and fruit hypertrophy. In Italy, it also occurs occasionally on Compositae and Euphorbiaceae, amongst other host plants (ROBERTI, 1993). The species is mostly anholocyclic. *Aph. (Aph.) nerii* is a vector of four plant viruses. It was recorded previously from Malta as *Myzus nerii* (CARUANA GATTO, 1926). *Stephanotis floribunda* is a new host-plant record for *Aph. (Aph.) nerii*.

****Aphis (Aphis) parietariae* Theobald, 1922**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Marsaskala, 1.viii.2010, apterae and alatae on *Parietaria judaica*, DM; Gudja, 15.viii.2010, apterae and alatae on *Parietaria judaica*, DM; Msida, 10.iv.2011, apterae on *Parietaria judaica*, DM.

Aphis (Aph.) parietariae is widely distributed in Europe, North Africa and the Middle East. It forms dense colonies on the stems and under leaves and inflorescences of *Parietaria* spp. only. The species has a monoecious holocycle, with apterous males (BLACKMAN & EASTOP, 2006).

***Aphis (Aphis) pomi* de Geer, 1773** [E]
(Aphidinae, Aphidini)

Material examined. MALTA: Dingli, 13.vi.1994, apterae on apple (*Malus domestica*), JI; Żejtun, 17.vi.2009, apterae and alatae on loquat (*Eriobotrya japonica*), DM.

Aphis (Aph.) pomi occurs in Europe, Pakistan, North America, North-West India, and the Middle East (Iran, Israel and Turkey). The species tends to colonize young growth, is often ant-attended (BLACKMAN & EASTOP, 2010) and eventually causes leaf curling, as was observed on loquat in Malta (Fig. 5). It is a pest of crops such as apple, pear and quince. *Aph. (Aph.) pomi* is normally monoecious holocyclic, with apterous males. In Malta, it was recorded as *Aphis eriobothryae* on *Crataegus azarolus* by CARUANA GATTO (1926).

****Aphis (Aphis) ruborum* (Börner, 1931)** [E]
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Wied il-Ghasel, 31.viii.2009, apterae and alatae on *Rubus ulmifolius*, MM; Buskett, 19.iv.2009, attended by *Plagiolepis pygmaea*, MM; Wied Babu, 22.vi.2009, MM; Buskett, 27.vi.2009, attended by *Camponotus lateralis*, MM; Girgenti, 8.viii.2009, attended by *Crematogaster scutellaris*, MM.

Aphis (Aph.) ruborum is found in Europe, North Africa, and South-West and Central Asia eastward to India and Pakistan on herbaceous Rosaceae (STROYAN, 1984), heavily infesting blackberry and occasionally strawberry (BLACKMAN & EASTOP, 2000; 2006). In Chile it occurs on *Rubus fruticosus*, sometimes on *Fragaria x ananassa*, and on *R. idaeus*. Dense colonies feed on young shoots in spring, and later on the underside of leaves, in flowers and on developing fruit (BLACKMAN & EASTOP, 2006). *Aph. (Aph.) ruborum* causes leaf deformations on *R. fruticosus* in Italy (ROBERTI, 1993). The species has a monoecious holocycle, with both alate and apterous males. Apterous are dwarfs in late summer (STROYAN, 1984).

****Aphis (Aphis) sedi* Kalténbach, 1843**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Wied Babu, 6.iv./22.vi.2009, apterae and alatae on *Sedum sediforme*, attended by *Crematogaster scutellaris*, MM; Wied Inċita, 1.vii.2009, apterae and alatae on *Sedum sediforme*, MM.

Aphis (Aph.) sedi is found in Europe, east to Transcaucasia and Western Siberia, North and South America, Australia and New Zealand. This ant-attended aphid occurs on *Sedum* spp. and other Crassulaceae, on the distal parts of young stems, the undersides of leaves and on inflorescences (BLACKMAN & EASTOP, 2006). Large colonies may distort shoots (STROYAN, 1984). *Aph. (Aph.) sedi* has a monoecious holocycle with apterous males.

***Aphis (Aphis) spiraecola* Patch, 1914** [A] [E]
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Qormi, 14.vii.2009, apterae on *Citrus* sp., EA; Ġnien iż-Żgħir, 15.vii.2009, apterae on loquat (*Eriobotrya japonica*), EA; Gharghur, 1.vii.2009, apterae on apple (*Malus domestica*), attended by *Pheidole pallidula*, EA; Marsa (Għammieri), 14.x.2009,

apterae on apple, EA; St. Lučija, 26.vi.2009, apterae on lemon (*Citrus limon*), EA; Balzan (San Anton Gardens), 12.vii.2009, apterae on grapefruit (*Citrus x paradisi*), attended by *Tapinoma nigerrimum*, EA; Dingli, 13.vi.1994, apterae on apple, JI; Siggiewi, 30.vi.2008, apterae on *Dodonea* sp., DM; Żurriq (public garden), 2.vii.2009, apterae on *Pittosporum tobira*, MM.

Aphis (Aph.) spiraecola is probably of Far Eastern origin but is now sub-cosmopolitan in distribution. It has been present in North America at least since 1907. In about 1939 it started to establish itself in the Mediterranean Region and spread beyond to Australia (1926), New Zealand (1931) and Africa (1961). *Aph. (Aph.) spiraecola* is polyphagous on a wide range of secondary hosts in more than 20 plant families, but especially on Caprifoliaceae, Compositae, Rosaceae, Rubiaceae and Rutaceae, particularly shrubs (BLACKMAN & EASTOP, 2006), and is often ant attended (BLACKMAN & EASTOP, 2010). *Aph. (Aph.) spiraecola* has a heteroecious holocycle in East Asia and North America; and an anholocycle in the other territories (ROBERTI, 1993). In Sicily, it is mostly anholocyclic (BARBAGALLO & STROYAN, 1982) but it also exists as a dioecious holocycle and it may be paracyclic (ROBERTI, 1993). This species is likely to cause curling and distortion of the leaves, particularly leaves near the apices of young shoots. *Aph. (Aph.) spiraecola* is an important pest of *Citrus* (BARBAGALLO & STROYAN, 1982). The species is a vector of at least eight plant viruses including Citrus Tristeza *Closterovirus* (CTV); however, it is a much less efficient vector than *Toxoptera citricidus* (Kirkaldy). Vectors of CTV in the Maltese islands include *Aphis (Aph.) gossypii*, *Aph. (Aph.) spiraecola* and *Toxoptera aurantii* and the fact that CTV was recently detected in Malta may indicate that these aphids are becoming more effective at transmitting this virus. *Aph. (Aph.) spiraecola* was recorded previously from the Maltese islands by MIFSUD & WATSON (1999).

***Aphis (Aphis) umbrella* (Börner, 1950)**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Delimara, 7.xi.1995, apterae and alatae, on *Malva sylvestris*, DM; Buskett, xii.2009, apterae and alatae, on *Lavatera arborea*, DM; apterae and alatae on *Malva sylvestris*: Bahrija, 7/21.vii.2009, MM; Chadwick Lakes, 10.vii.2009, attended by *Pheidole pallidula*, MM; Fawwara, 10.viii.2009, attended by *Camponotus barbaricus*, MM.

Aphis (Aph.) umbrella is found in Europe, the Middle East and Central Asia, and is usually ant attended. Its primary host is *Malva* spp. and some other Malvaceae. In Italy, *Aph. (Aph.) umbrella* is mainly found on *M. sylvestris*, with *Althea* spp., *Lavatera cretica* and *Malope malacoides* as secondary hosts (ROBERTI, 1993). The species causes umbrella-like leaf-curl in the terminal leaves of *Malva sylvestris*. It has a monoecious holocycle with alate males in North Europe, although it is probably anholocyclic in warmer regions (BLACKMAN & EASTOP, 2006). *Aph. (Aph.) umbrella* was recorded previously from Malta as *Aphis malvae* Koch (CARUANA GATTO, 1926).

****Aphis (Pseudoprotaphis) picridicola* Holman, 1966**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Buskett, 24.vi.2009, apterae on *Hypochaeris achyrophorus*, attended by *Tetramorium semilaeve* and *Plagiolepis pygmaea*, MM.

Aphis (Ps.) picridicola is widely distributed in Europe. It is oligophagous on Asteraceae (HOLMAN, 2009), occurring on *Hypochaeris* spp., *Leontodon* spp. and *Picris hieracioides* on the lower leaves and root collar, where it is ant-attended. *Aph. (Ps.) picridicola* has a monoecious holocycle with apterous males (BLACKMAN & EASTOP, 2006). *Hypochaeris achyrophorus* represents a new host-plant record for *Aph. (Ps.) picridicola*.

****Aulacorthum (Aulacorthum) solani* (Kaltenbach, 1843) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Valletta (Hastings Gardens), 5.iv.2009, on *Oxalis pes-caprae* var. *florepleno*, DC; Żurrieq (Wied Babu), 6.iv.2009, on *Acacia saligna*, *Borago officinalis* and *Solanum nigrum*, DC; Buskett, 19.iv.2009, alatae and apterae on *Hedera helix*, MM; Haġar Qim, 17.iv.2009, apterae and alatae on *Hyoseris radiata*, MM; Buskett, 24.vi.2009, apterae on *Solanum nigrum* and *Sol. luteum*, MM. GOZO: Kerċem, 16.iii.1994, alatae (probably vagrant) on *Mesembryanthemum* sp., DM.

Aulacorthum (Au.) solani is probably of European origin but it is now almost cosmopolitan in distribution. It is widely polyphagous on many families of dicots and monocots (BLACKMAN & EASTOP, 2006), especially Liliiflorae. It is not found on Graminaceae in Italy, although it is frequent on bulbs, especially tulips (ROBERTI, 1993). *Au. (Au.) solani* has a monoecious holocycle with apterous and alate males, laying overwintering eggs on various plant species. It is anholocyclic in mild climates and glasshouses. It infests potato and soybean heavily, also bulbs, especially tulips, and is a vector of about 40 plant viruses (BLACKMAN & EASTOP, 2000). *Hyoseris radiata* represents a new host-plant record for *Au. (Au.) solani*.

***Brachycaudus (Appelia) schwartzi* (Börner, 1931) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Dingli, 13.vi.1994, apterae on peach (*Prunus persica*), JI & DM; Rabat, 13.vi.1994, apterae on peach leaves, DM; Ġnien iż-Żghir, 15.vii.2009, apterae on peach leaves, EA; Marsa (Ghammieri), 14.x.2009, apterae on peach leaves, EA. GOZO: Xewkija, 18.x.2008, apterae on peach leaves, AT.

Brachycaudus (Ap.) schwartzi is distributed in Europe, North America (California), South America and Asia (India and Iran). This species does not host alternate, but lives on *Prunus persica* all year round; literature records on other species of *Prunus* are probably referable to other species of *Brachycaudus* (BLACKMAN & EASTOP, 2010). *B. (Ap.) schwartzi* is a pest, causing severe curling and distortion of peach leaves (Fig. 6). It has a monoecious holocycle on peach trees, with alate males. The species was reported previously from Malta by CARUANA GATTO (1926) and SALIBA (1963).

****Brachycaudus (Brachycaudus) helichrysi* (Kaltenbach, 1843) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Wied iż-Żurrieq, 25.vi.2009, apterae on *Hypochoeris achyrophorus*, MM.

Brachycaudus (Bra.) helichrysi is cosmopolitan in distribution. Generally, this species is heteroecious in cold climates but anholocyclic in glasshouses and warmer regions. The primary hosts are *Prunus* spp., especially *P. domestica*, *P. insititia* and *P. spinosa*. The secondary hosts are usually Compositae and Boraginaceae, on which it feeds on the flower heads and stems (BLACKMAN & EASTOP, 2006), but it sometimes occurs on the young growth of various trees (BLACKMAN & EASTOP, 2010). *Bra. (Bra.) helichrysi* is a major pest of plum; in Italy it also damages almond, resulting in dry, curled leaves. It is also a vector of several plant viruses.

***Brachycaudus (Prunaphis) cardui* (Linnaeus, 1758) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 18.iii.1994, apterae on globe artichokes (*Cynara scolymus*), BW; Bahrija, 7.vii.2009, apterae and alatae, on *Senecio bicolor*, attended by *Lasius emarginatus*, MM.

Brachycaudus (Pr.) cardui (Fig. 7) is found in North Africa, North America, Asia and Europe. *Prunus* spp. are the primary hosts, especially *P. domestica*. The secondary hosts are various Asteraceae, Boraginaceae and other plants. In Italy, *Bra. (Pr.) cardui* also occurs on the secondary host *Capsella bursa-pastoris* (ROBERTI, 1993). The aphid has a heteroecious holocycle but it is anholocyclic in temperate climates (ROBERTI, 1993). *Bra. (Pr.) cardui* is a vector of several plant virus diseases. It was recorded previously from Malta by CARUANA GATTO (1926), on the authority of BORG (1922), as *Aphis pruni*.

***Brevicoryne brassicae* (Linnaeus, 1758) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Rabat, 13.vi.1994, alatae on cabbage (*Brassica oleracea* var. *capitata*), DM; Little Armier, 14.vi.1994, alatae on cauliflower (*Brassica oleracea* var. *botrytis*), JI; Dingli, 13.vi.1994, apterae on kohlrabi leaves (*Brassica oleracea* “gongyloides group”), JI; Mġarr, 21.ix.1992, apterae on *Brassica* sp., DM. **GOZO:** Xaghra, 19.i.1994, apterae on *Brassica* sp., LA.

Brevicoryne brassicae is a cosmopolitan species. It occurs on many crucifer genera and species. In Italy, it is also found on Capparidaceae (*Capparis spinosa*) (ROBERTI, 1993). The colonies are dense and develop on both leaf surfaces and the flower heads (Fig. 8) (ROBERTI, 1993). *Brev. brassicae* has a monoecious holocycle in cold climates with alate males, but it is anholocyclic in milder climates. It is a major pest of crops (such as cabbage, cauliflower, Brussels sprouts, radish, swede and mustard) in temperate and warm temperate regions. *Brev. brassicae* is a vector of about 20 plant viruses including Turnip Mosaic *Potyvirus* and Cauliflower Mosaic *Caulimovirus*. The species was recorded previously from Malta by CARUANA GATTO (1926), SALIBA (1963) and FARRUGIA (1997).

****Capitophorus* sp. nr. *similis* van der Goot, 1915**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Wied Inċita, 1.vii.2009, apterae on *Chiliadenus bocconeii*, DM.

Capitophorus similis is found in Europe, West Asia and East Himalayas. The primary hosts are *Elaeagnus* and *Hippophae*; secondary hosts are *Tussilago*, *Petasites* and *Homogyne*. *Cap. similis* has a heteroecious holocycle but it is anholocyclic in milder climates (PATTI, 1983). The above examined material is very similar to *Cap. similis* but differs in the length of the hairs on the third antennal segments and other details. More samples of apterae and alatae are required to confirm this identification. This is the first record of any aphid feeding on *Chiliadenus bocconeii* (Asteraceae), which is a common endemic species in the Maltese islands.

***Cavariella (Cavariella) aegopodii* (Scopoli, 1763) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Buskett, 24.iii.1994, apterae and alatae on *Ferula communis*, DM; Valletta (Hastings Gardens), 5.iv.2009, on *Daucus carota*, DC.

Cavariella (Cav.) aegopodii is a cosmopolitan species. The primary hosts are *Salix* spp., and several genera and species of Umbelliferae act as secondary hosts, on which *Cav. (Cav.) aegopodii* feeds on the leaves and umbels. In Italy, *Salix alba* and *Sal. fragilis* are the primary hosts (ROBERTI, 1993). *Cav. (Cav.) aegopodii* has a heteroecious holocycle but it is anholocyclic in warmer climates. It is an important pest of cultivated Umbelliferae and a vector of various plant virus diseases. *Cav. (Cav.) aegopodii* was recorded from Malta previously by MIFSUD *et al.* (2009a).

****Clypeoaphis suaedae* (Mimeur, 1934)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: St. Thomas Bay (Tal-Munxar), 11.xi.1996, apterae on *Suaeda vera*, DM; Marsaxlokk (salt marsh), 26.iii.1994, apterae on *Suaeda vera*, DM; 9.iv.2009, on *Suaeda maritima*, DC; Marsaxlokk, 9.iv.2009, on *Suaeda vera*, DC.

Clypeoaphis suaedae is found in North Africa, the Middle East, Europe and Korea. It is oligophagus on Chenopodiaceae (HOLMAN, 2009), especially *Suaeda* spp., in salt marshes and similar habitats, occurring as small colonies or scattered on stems. The species is also found on *Kochia scoparia* and *Salsola komarovii*. *Cl. suaedae* has a monoecious holocycle, with oviparae and apterous males produced in September.

****Cryptomyzus (Cryptomyzus) korschelti* Börner, 1938**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Chadwick Lakes, 10.vii.2009, apterae on *Prasium majus*, MM.

Cryptomyzus (Cr.) korschelti is widely distributed in Europe and the eastern Palaearctic. In Italy, *Cr. (Cr.) korschelti* causes red or yellow galls on the primary host *Ribes alpinum* (ROBERTI, 1993). Various Lamiaceae (such as *Lamium* and *Prasium* spp.) are the secondary hosts, on which it feeds on the leaf undersides (ROBERTI, 1993). Although *Ribes alpinum* is not found in Sicily, *Cr. (Cr.) korschelti* has been recorded from there too, suggesting an anholocycle (BARBAGALLO & STROYAN, 1982). The genus *Cryptomyzus* is currently being revised because the morphological variation between different species has not been well investigated (BAŠILOVA *et al.*, 2008). SWIRSKI & AMITAI (2001) mentioned a species of *Cryptomyzus* near *korschelti* recorded in Israel on *Prasium majus* that needs to be investigated.

***Daktulosphaira vitifoliae* (Fitch, 1851) [A] [E]**
(Phylloxeridae)

Material examined. MALTA: In galls on wild vine (*Vitis* sp.) leaves: Marsa (Ghammieri), 27.vii.2007, DM; Wardija, 26.vii.2008, DM; Rabat, Buskett, 4.ix.2009, EA.

Daktulosphaira vitifoliae, commonly known as Grape Phylloxera, is native to North America and was accidentally introduced to Europe (around 1860), from whence it spread to the Mediterranean

basin, Africa, Asia and the Middle East. In Italy, this species was first detected in 1879, and one year later it was found in Sicily. For almost 40 years Malta remained free from this pest, but in the summer of 1919 it was detected at Ramla on Gozo. From that time, the viticulture industry of the Maltese islands was almost completely destroyed (BORG, 1922; MIFSUD & WATSON, 1999). *D. vitifoliae* is a pest of great economic importance, often killing European vines (BLACKMAN & EASTOP, 2000). It attacks the roots and occasionally colonizes the leaves, causing characteristic spherical, reddish galls.

****Dysaphis (Dysaphis) apiifolia* (Theobald, 1923) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 12.iii.1994, apterae on potted celery (*Apium graveolens*), GW; Buskett, 24.iii.1994, apterae and alatae on *Ferula communis*, DM. Apterae and alatae on *Foeniculum vulgare*: Birżebbuga, 27.iii.1994, DM; Wied Babu, 6.iv.2009, attended by *Plagiolepis pygmaea*, MM.

Dysaphis (Dy.) apiifolia is found in Europe, the Middle East, Central Asia, Africa, Mauritius, Australia, and North and South America. The species is usually anholocyclic but is partially heteroecious holocyclic in the Mediterranean. In Italy, the primary host is *Crataegus* sp., on which it forms red pseudogalls (ROBERTI, 1993). The secondary hosts are Apiaceae, on which it forms dense colonies at the leaf bases, attended by ants. *Dy. (Dy.) apiifolia* is a world-wide pest on celery and parsley, and transmits Celery Mosaic *Potyvirus* (BLACKMAN & EASTOP, 2000).

****Dysaphis (Dysaphis) foeniculus* (Theobald, 1923) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Bahrija, 7.vii.2009, apterae on *Foeniculum vulgare*, MM; Wied Babu, 6.iv.2009, apterae on *Sedum sediforme*, MM.

Dysaphis (Dy.) foeniculus occurs in South Europe, the Mediterranean, Middle East, Central Asia, India, Pakistan, Africa, Australia, New Zealand, and North and South America. It forms dense colonies on the basal parts of Apiaceae, usually attended by ants (BLACKMAN & EASTOP, 2000). In Italy, it is found on *Daucus carota*, *Foeniculum vulgare*, *Ferula communis*, *Apium*, *Anethum* and occasionally on *Rumex* (ROBERTI, 1993). *Dy. (Dy.) foeniculus* is anholocyclic. *Sedum sediforme* is a new host-plant record for *Dy. (Dy.) foeniculus*.

****Dysaphis (Dysaphis) tulipae* (Boyer de Fonscolombe, 1841) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Wied Babu, 22.vi.2009, apterae and alatae on *Arum italicum*, attended by *Crematogaster scutellaris*, MM; Buskett, 30.vi.2009, apterae on *Iris foetidissima*, attended by *Plagiolepis pygmaea*, MM.

Dysaphis (Dy.) tulipae is almost cosmopolitan in distribution, though it has not yet been recorded from South America. It occurs in colonies on shoots, leaves, underground bulbs and stems of monocots, and is sometimes attended by ants. It is oligophagous on Liliaceae and Iridaceae (HOLMAN, 2009). In Italy, it occurs on *Tulipa gesneriana*, *Gladiolus* spp., *Iris* spp., and *Arum italicum* (ROBERTI, 1993). *Dy. (Dy.) tulipae* is entirely anholocyclic. In the floriculture industry, it is a pest on iris and transmits two plant viruses, Lily Symptomless *Carlavirus* and Tulip Breaking *Potyvirus* (BLACKMAN & EASTOP, 2000). *Iris foetidissima* is a new host-plant record for *Dy. (Dy.) tulipae*.

****Dysaphis (Pomaphis) pyri* (Boyer de Fonscolombe, 1841) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Bahrija, 5.vi.2008, alatae on *Pyrus communis* (local cultivar “*bambinella*”), DM; Dingli, 3.vi.2011, DM, on *Pyrus communis* (local cultivar “*bambinella*”), DM.

Dysaphis (Po.) pyri occurs in Europe, North Africa, South-West and Central Asia, Nepal, Northern India and Pakistan, and has been introduced into the U.S.A. (Colorado) (BLACKMAN & EASTOP, 2010). It is heteroecious and holocyclic; the first two to three spring generations on pear cause distortion and yellowing of the leaves (Fig. 9) before the aphids migrate to *Galium* spp., the summer hosts (BLACKMAN & EASTOP, 2010). In Malta this aphid is quite common in early summer on the young shoots of a local cultivar of pear.

***Forda riccobonii* (de Stefani Perez, 1899)**
(Eriosomatinae: Fordini)

Material examined. MALTA: Valletta (between St. Michael’s and St. Andrew’s), 5.iv.2009, on *Bromus madritensis*, DC.

Forda riccobonii is native to the Mediterranean Region and is also widely distributed in South-West Asia. It has a heteroecious holocycle, forming characteristic leaf-edge galls on its primary host, *Pistacia* spp., and feeding on the roots of grasses as secondary hosts. *F. riccobonii* was recorded previously from Malta by BLACKMAN & EASTOP (1994), MIFSUD *et al.* (2009a) and ORTIZ-RIVAS *et al.* (2009). *Bromus madritensis* is a new host plant record for this aphid.

***Hayhurstia atriplicis* (Linnaeus, 1761)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: St. Thomas Bay, 15.xii.2009, apterae on *Chenopodium opulifolium*, DM.

Hayhurstia atriplicis is widespread in Europe and Asia, and is also found in North and Central Africa and America. It occurs on Chenopodiaceae, usually *Atriplex* and *Chenopodium* spp., causing yellow pod-like pseudogalls (Fig. 10). In Italy, it is also found on *Beta* spp., but gall formation is not commonly observed (ROBERTI, 1993). *H. atriplicis* has a monoecious holocycle with apterous or alate males (HEIE, 1992). It has been recorded from Malta previously by CARUANA GATTO (1926).

****Hyadaphis coriandri* (B. Das, 1918) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Apteræ and alatae on *Foeniculum vulgare*: Girgenti, 8.viii.2009, MM; Hal Farruġ, 21.viii.2009, MM; Wied il-Ghasel, 31.viii.2009, MM; Żejtun (public garden), 28.vii.2009, DM.

Hyadaphis coriandri is probably of Asian origin but is now known from the Mediterranean Region, Middle East, Central Asia, India, Pakistan, Africa, USA (Florida) and Peru. It occurs in the umbels of Apiaceae, especially *Coriandrum* and occasionally on *Amaranthus*, *Glycine* and *Mentha*. *H. coriandri* is an anholocyclic species over much of its range (BLACKMAN & EASTOP, 2006).

****Hyadaphis foeniculi* (Passerini, 1860) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Apterae and alatae on *Foeniculum vulgare*: Wied Incita, 1.vii.2009; Gharghur, 1.vii.2009, attended by *Lepisiota frauenfeldi*; Fawwara, 10.viii.2009; Bahrija, 13.viii.2009; Bahrija, 16.vii.2009, attended by *Camponotus lateralis*; Rabat, 18.viii.2009; Marsascala, 24.vii.2009; Bir Miftuh, 27.vii.2009; Siggiewi, 29.vii.2009. All MM.

Hyadaphis foeniculi is widespread in Europe, especially in the north, eastward to Turkey and Iraq; and in North America. The species is heteroecious. Its primary host is *Lonicera* spp., especially *L. xylosteum*, and sometimes *Symphoricarpos* spp., causing leaf curl in spring; it then migrates to various Umbelliferae, where colonies occur on the stems (Fig. 11), leaves and inflorescences (BLACKMAN & EASTOP, 2006). *H. foeniculi* has spread worldwide on cultivated Apiaceae, which it damages (especially celery), and on ornamental Caprifoliaceae (ROBERTI, 1993). The species is a vector of 12 plant viruses.

****Hyadaphis passerinii* (del Guercio, 1911)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Apterae on *Lonicera implexa*: Wied Anġlu, 9.iv.1996, DM; Żurrieq, 6.iv.2009, MM; Żurrieq (Wied Babu), 6.iv.2009, DC.

Hyadaphis passerinii is found in Europe (especially in South Europe), the Mediterranean Region, Middle East, Pakistan and India. It has been accidentally introduced to South Africa, Australia, New Zealand, North and South America. The primary host is *Lonicera* spp., especially *L. caprifolium* and *L. periclymenum*; various Apiaceae are secondary hosts, especially *Daucus* but also *Conium* and *Pastinaca* species. *H. passerinii* is anholocyclic in warm climates (BLACKMAN & EASTOP, 2006).

****Hyperomyzus (Hyperomyzus) lactucae* (Linnaeus, 1758) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Mġarr, 14.iii.1994, apterae on outdoor crops, DM; Marsa (Ghammieri), 12.iii.1994, alatae on irrigated kohlrabi and cabbage, GW; St. Paul's Bay, 14.iii.1994, alatae on tomato, GW; Birzebbuga, 27.iii.1995, alatae on *Galium* sp., DM; Żurrieq (Wied Babu), 6.iv.2009, alatae, on *Prasium majus*, DC; Hagar Qim, 17.iv.2009, alatae on *Foeniculum vulgare*, MM; 17.iv.2009, apterae on *Sonchus asper*, MM. Apterae and alatae on *Sonchus oleraceus*: Wied Babu, 6.iv.2009, MM; Żurrieq (Wied Babu), 6.iv.2009, DC; Marsaxlokk, 9.iv.2009, DC; Buskett, 19.iv.2009, MM; Wied Babu, 29.iii.2009, MM; Valletta, 5.iv.2009, DC. **GOZO:** Xagħra, Selhun, 17.iii.1994, on leaves of cucumber, GW; Munxar, 9.iv.2009, on *Reichardia picroides*, DC; Victoria (Rabat), 9.iv.2009, on *Sonchus oleraceus*, DC; Xlendi, 9.iv.2009, on *Sonchus oleraceus*, DC; Mġarr, 8.iv.2009, on *Sonchus* sp., DC.

Hyperomyzus (H.) lactucae is sub-cosmopolitan in distribution. The primary host is *Ribes* spp., especially *R. nigrum*, on which it occurs on the undersides of young leaves, causing leaf curl and yellow spotting (BLACKMAN & EASTOP, 2006). In Italy, the secondary hosts are *Sonchus* spp., *Lactuca sativa* and *Rhagadiolus stellatus*, on which colonies form on the stems and flowers (ROBERTI, 1993). *H. (H.) lactucae* has a heteroecious holocycle in temperate regions but it is anholocyclic in warmer regions, including Sicily (BARBAGALLO & STROYAN, 1982). The species heavily infests blackcurrant and is a vector of about 12 plant viruses (BLACKMAN & EASTOP, 2000).

****Idiopterus nephrolepidis* Davis, 1909** [A]
(Aphidinae: Macrosiphini)

Material examined. GOZO: Dwejra, 3.x.1992, apterae on *Adiantum capillus-veneris*, DM.

Idiopterus nephrolepidis is probably of Neotropical origin but is now almost cosmopolitan in distribution; in northern temperate regions it occurs only in glasshouses. It feeds on many genera of ferns (BLACKMAN & EASTOP, 2006), occurring frequently on *Adiantum capillus*, but has also been recorded on *Saintpaulia veneris* in Italy (ROBERTI, 1993) and on *Sai. aionantha* in Sicily (BARBAGALLO & STROYAN, 1982). *I. nephrolepidis* appears to be entirely anholocyclic.

***Lipaphis (Lipaphis) pseudobrassicae* (Davis, 1914)** [E]
(Aphidinae: Macrosiphini)

Material examined. MALTA: Little Armier, 14.vi.1994, alatae on cauliflower, JI; Rabat, 13.vi.1994, alatae on cabbage, DM; Żabbar, 11.iii.1994, apterae and alatae on *Matthiola longipetala*, GW; Chadwick Lakes, 12.vii.2009, on *Brassica* sp., MM; Buskett, xii.2009, apterae and alatae on *Brassica* sp., DM. **GOZO:** Ghasri, 19.xii.1994, alatae on cauliflower, CF.

Lipaphis (L.) pseudobrassicae is a cosmopolitan pest of Brassicaceae, as opposed to *L. (L.) erysimi* (Kaltenbach), a European species that is not normally a pest of brassica crops. *L. (L.) pseudobrassicae* has permanently parthenogenetic populations on crops, although there may be a holocycle in West Bengal (BLACKMAN & EASTOP, 2000). This species is the most damaging pest to oilseed cruciferous crops in India (DILAWARI *et al.*, 1996). It was previously reported for Malta by FARRUGIA (1997).

****Macrosiphoniella (Macrosiphoniella) absinthii* (Linnaeus, 1758)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), iv.1995, apterae and alatae on *Artemisia arborescens*, DM.

Macrosiphoniella (M.) absinthii is found in North and Central Europe, eastwards to Siberia, North Africa and the Mediterranean Region. It has been accidentally introduced to North America (BLACKMAN & EASTOP, 2006). The species is commonly found on *Artemisia absinthium* on the distal parts of stems, and on other *Artemisia* spp. in Italy (ROBERTI, 1993) and *Seriphidium* spp. in North Africa and the Mediterranean. *M. (M.) absinthii* has a monoecious holocycle with oviparae and apterous males produced in October, although alate males also occur (BLACKMAN & EASTOP, 2006). It may also be anholocyclic (ROBERTI, 1993).

****Macrosiphoniella (Macrosiphoniella) artemisiae* (Boyer de Fonscolombe, 1841)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 6.iv.1995, apterae on *Artemisia arborescens*, leg. DM.

Macrosiphoniella (M.) artemisiae is found in North Africa (ROBERTI, 1993) and Europe eastward to Siberia, Mongolia and China; it has been accidentally introduced to North America (BLACKMAN & EASTOP, 2006). The species occurs mainly as large colonies on the distal parts of *Artemisia vulgaris* but has been recorded also on *Leucanthemum vulgare*, *Tanacetum parthenium* and other *Artemisia*

spp. *M. (M.) artemisiae* has a monoecious holocycle with oviparae and alate males in Western Europe, but it is also anholocyclic (ROBERTI, 1993).

****Macrosiphoniella (Macrosiphoniella) sanborni* (Gillette, 1908) [A] [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Żabbar, 11.iii.1994, apterae on *Dendranthema* sp., leg. GW.

Macrosiphoniella (M.) sanborni is probably of East Asian origin but is now cosmopolitan in distribution (ROBERTI, 1993; BLACKMAN & EASTOP, 2006). It is a widespread pest of florists' chrysanthemums (*Dendranthema indicum*, *D. morifolium* and *D. frutescens*), feeding on the leaf undersides. *M. (M.) sanborni* has a monoecious anholocycle and sexual forms are not known. It is a vector of Chrysanthemum B *Carlavirus* (BLACKMAN & EASTOP, 2000).

****Macrosiphum (Macrosiphum) euphorbiae* (Thomas, 1878) [A] [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: St. Paul's Bay, 14.iii.1994, apterae under leaves of aubergine (*Solanum melongena*), GW; Dingli, 24.iii.1994, apterae on lettuce (*Lactuca sativa*), MS; Marsa (Ghammieri), 12.iii.1994, alatae on heads of irrigated cabbage, GW; Armier, 14.vi.1994, apterae on tomato (*Solanum lycopersicum*); Mgarr, 14.iii.1994, apterae on outdoor strawberries (*Fragaria* sp.), DM; Żabbar, 10.iii.1994, apterae on undersides of marrow leaves (*Cucurbita pepo*), DM & GW; Birżebbuga, 27.iii.1994, alatae, on *Galium* sp., DM; Balzan, 20.iii.1994, apterae on *Rosa* sp., ME.

Macrosiphum (Ma.) euphorbiae is of North American origin but is now sub-cosmopolitan in distribution. In eastern North America it has a heteroecious holocycle on *Rosa* spp., but elsewhere in the world *M. (Ma.) euphorbiae* is mostly anholocyclic and polyphagous (BLACKMAN & EASTOP, 2010), occurring on mostly herbaceous hosts in more than 20 plant families (ROBERTI, 1993). This species is known to transmit more than 45 plant viruses (BLACKMAN & EASTOP, 2000).

****Macrosiphum (Macrosiphum) rosae* (Linnaeus, 1758) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Balzan, 20.iii.1994, apterae on *Rosa* sp., ME; Dingli, 30.iii.1994, alatae on *Rubus* sp., DM; Buskett, 19.iv.2009, alatae on *Sanguisorba minor*, MM.

Macrosiphum (Ma.) rosae (Fig. 12) is of Palaearctic origin but is now almost cosmopolitan in distribution, although it is absent from East and South-East Asia (BLACKMAN & EASTOP, 2006). The primary host is *Rosa* spp. and numerous other plants are secondary hosts, especially Dipsacaceae and Valerianaceae (BLACKMAN & EASTOP, 2010); but there is a facultative holocycle, as it may remain on *Rosa* in summer, forming sexuales in autumn. *M. (Ma.) rosae* is anholocyclic on the primary host in hot climates (ROBERTI, 1993). The species may cause leaf deformations and distortions (ROBERTI, 1993) and is a pest of roses, to which it is known to transmit 12 different plant viruses including Strawberry Mild Yellow Edge *Luteovirus* (BLACKMAN & EASTOP, 2000).

****Melanaphis donacis* (Passerini, 1862)**
(Aphidinae: Aphidini: Rhopalosiphina)

Material examined. MALTA: Apteræ on *Arundo donax*: Mgarr, 14.iii.1994, DM; Buskett, 23.vi.2009, MM; Chadwick Lakes, 12.vii.2009, attended by *Plagiotelepis pygmaea*, MM.

Melanaphis donacis (Fig. 13) is found in South Europe, the Mediterranean, North Africa, the Middle East, and Central Asia eastward to India and Pakistan; it has a monoecious holocycle with apterous males (BLACKMAN & EASTOP, 2006), but can be anholocyclic (ROBERTI, 1993). It feeds on both the leaves and inflorescences of *Arundo donax* and *Phragmites australis* (BARBAGALLO & STROYAN, 1982).

****Metopolophium (Metopolophium) dirhodum* (Walker, 1849) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 10.iii.1994, apteræ and alatae on *Avena sativa*, GW; 12.iii.1994, alatae on heads of irrigated cabbage and kohlrabi leaves, GW.

Metopolophium (Me.) dirhodum is widely distributed in Europe, the Middle East, Africa, Central Asia, Japan, Australia, New Zealand, North America and South America. Its primary hosts are cultivated and wild *Rosa* spp., and occasionally *Agrimonia* and *Fragaria* spp. Numerous species of grasses and cereals are secondary hosts of this species. *M. dirhodum* is a vector of Barley Yellow Dwarf *Luteovirus* (BLACKMAN & EASTOP, 2000).

***Myzus (Nectarosiphon) persicae* (Sulzer, 1776) [A] [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 12.iii.1994, alatae on heads of irrigated cabbage and kohlrabi leaves, GW; Żabbar, 20.ii.1995, apteræ, on green pepper (*Capsicum* sp.), DM; 10.iii.1994, apteræ, on potato (*Solanum tuberosum*) leaves, CF; Wardija, 4.v.1996, apteræ, on *Lycium intricatum*, DM; Marsa (Ghammieri), 19.iii.1994, apteræ on *Papaver* sp., GW; 9.iii.1994, apteræ, on *Trifolium nigrescens*, GW; Żurrieq (Wied Babu), 6.iv.2009, apteræ on *Borago officinalis*, DC; 6.iv.2009, apteræ on *Ferula communis*, DC & DM; Mellieħa, 7.iv.2009, apteræ on *Erodium moschatum*, DC; Marsaxlokk, 9.iv.2009, apteræ on *Aeonium arboreum* and *Sinapis alba*, DC; Buskett, 24.vi.2009, apteræ on *Kickxia spuria*, MM. GOZO: Għasri, 19.ix.1994, apteræ on cauliflower (*Brassica oleracea* var. *botrytis*), CF.

Myzus (N.) persicae is probably of East Asian origin but is now cosmopolitan. It is extremely polyphagous on herbaceous plants belonging to more than 40 families. In cold climates the aphid has a heteroecious holocycle and *Prunus* spp. (especially *persica*) are the primary hosts, but in milder climates it is partially anholocyclic, and entirely anholocyclic in tropical climates or when the primary host is absent (BLACKMAN & EASTOP, 2006). *M. (N.) persicae* is one of the most damaging aphid pests of agricultural crops. It heavily infests peach and potato, and is a vector of more than 100 plant virus diseases. This species was recorded previously from Malta by FARRUGIA (1997) and MIFSUD & WATSON (1999). *Kickxia spuria*, *Lycium intricatum* and *Trifolium nigrescens* represent new host plant records for *M. (N.) persicae*.

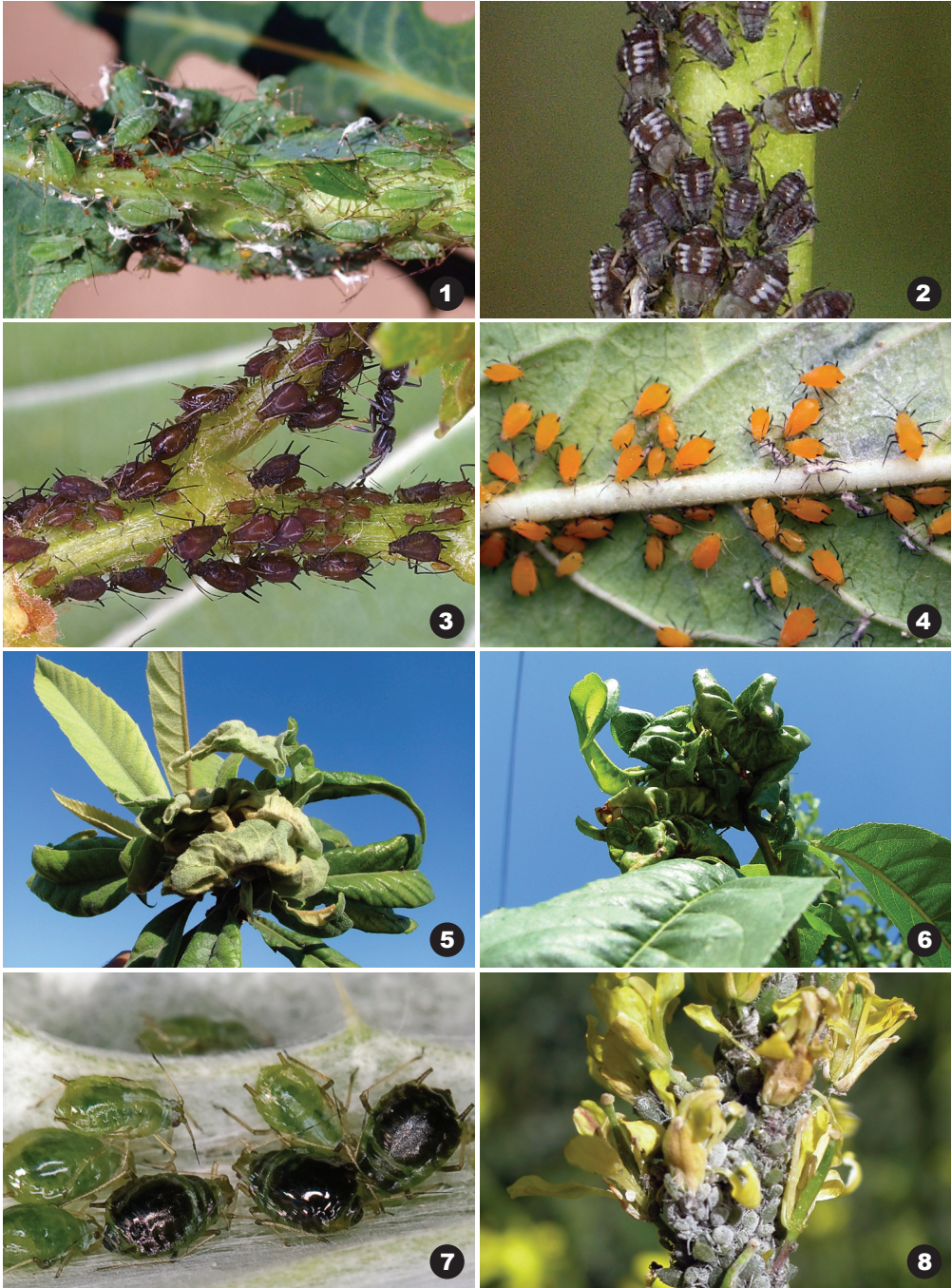


Figure 1: *Acyrtosiphon lactucae*; **Figure 2:** *Aphis fabae*; **Figure 3:** *Aphis illinoisensis*; **Figure 4:** *Aphis nerii*; **Figure 5:** leaf damage on loquat by *Aphis pomi*; **Figure 6:** leaf curling of peach by *Brachycaudus schwartzi*; **Figure 7:** *Brachycaudus cardui*; **Figure 8:** *Brevicoryne brassicae*.

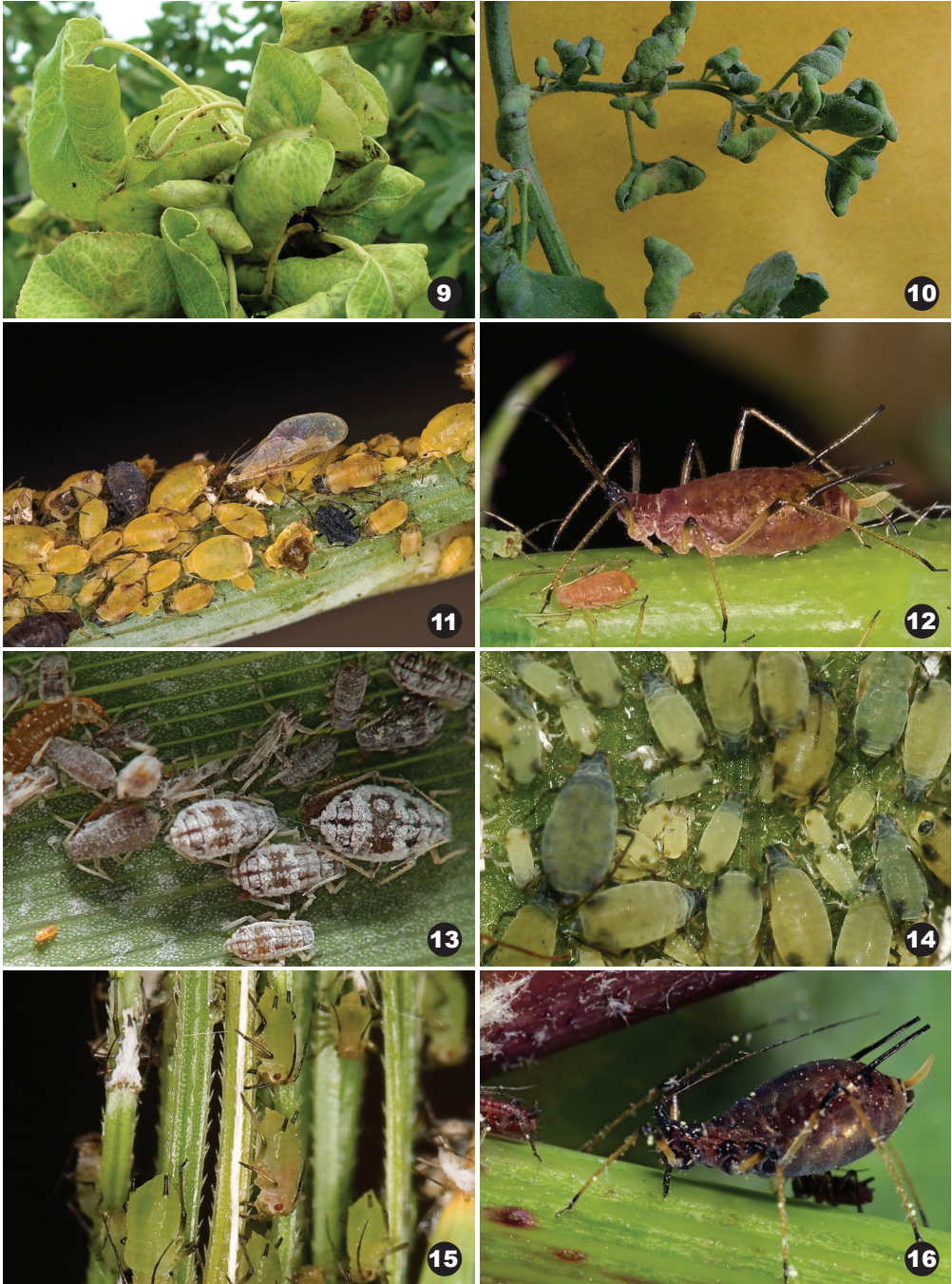


Figure 9: leaf damage on pear by *Dysaphis pyri*; **Figure 10:** leaf deformations on *Chenopodium opulifolium* by *Hayhurstia atriplicis*; **Figure 11:** *Hyadaphis foeniculi*; **Figure 12:** *Macrosiphum rosae*; **Figure 13:** *Melanaphis donacis*; **Figure 14:** *Rhopalosiphum maidis*; **Figure 15:** *Sitobion avenae*; **Figure 16:** *Uroleucon sonchi*.

****Pterochloroides persicae* (Cholodkowsky, 1899)** [A] [E]
(Lachninae: Lachnini)

Material examined. MALTA: Żebbug, 10-19.vii.2009, apterae on branches of almond (*Prunus dulcis*), EA; Msida (University), 1.vii.2009, apterae on branches of almond, DM & EA; Rabat, 13.vi.2009, apterae on branches of almond, DM; 2.iii.2009, apterae on branches of peach (*Prunus persica*), DM; Żejtun, 26.x.1997, alatae on peach, DM; Marsa (Ghammieri), 1.vii.2008, apterae on bitter almond, DM.

Pterochloroides persicae is of Middle Eastern origin but occurs worldwide. It was first recorded in Italy in 1975 and from there it spread all over the Mediterranean Region. It is found in colonies along the undersides of stout or medium-sized branches of *Prunus* species, and sometimes also in large colonies on the trunk. These aphids infest fruit trees belonging to the genus *Prunus*, mostly *P. armeniaca* and *P. persica*; however, it is also found on *P. amygdalus*, *domestica*, *cerasus* and *spinosa*. *Pt. persicae* is monoecious holocyclic on *Prunus* spp. in cool regions but anholocyclic in the Mediterranean, Southern Europe and along coastal areas in the Middle East (COEUR D'ACIER *et al.*, 2010).

****Rectinasus buxtoni* Theobald, 1914**
(Eriosomatinae: Fordini)

Material examined. GOZO: Ta' Ċenċ, 1996, apterae on Poaceae, DM.

Rectinasus buxtoni is found in South Europe, South-West and Central Asia, and North Africa (Algeria). It forms long, red, spindle-shaped leaf galls on various *Pistacia* spp., the primary hosts (BLACKMAN & EASTOP, 2010). Secondary hosts are various, usually the roots of Asteraceae as well as *Orobanche*, *Papaver*, *Citrus*, *Gossypium* and Poaceae (ROBERTI, 1939; BLACKMAN & EASTOP, 2006). *R. buxtoni* has a heteroecious holocycle in South-West Asia and is anholocyclic in other parts of its distribution range, sometimes in ants' nests or where the primary host is lacking (BLACKMAN & EASTOP, 2006).

****Rhopalosiphum maidis* (Fitch, 1856)** [A] [E]
(Aphidinae: Aphidini: Rhopalosiphina)

Material examined. MALTA: Wied tal-Isqof, 17.vii.2009, apterae on *Sorghum halepense*, DM.

Rhopalosiphum maidis (Fig. 14) is Asiatic in origin, but is now almost cosmopolitan in distribution. It is found on young leaves of grasses belonging to more than 30 genera. The species is heteroecious holocyclic with *Prunus* spp. as primary hosts in Asia, but apparently is entirely anholocyclic elsewhere - although males occur sporadically (BLACKMAN & EASTOP, 2006). *Rh. maidis* is probably the most important aphid pest of cereals in tropical and warm temperate climates (BLACKMAN & EASTOP, 2000).

****Rhopalosiphum padi* (Linnaeus, 1758)** [E]
(Aphidinae: Aphidini: Rhopalosiphina)

Material examined. MALTA: Marsaxlokk, 9.iv.2009, apterae on *Hordeum vulgare*, DC; Żabbar, 10.iii.1994, apterae on leaves of wheat (*Triticum* sp.), GW; Burmarrad, 14.iii.1994,

apterae on oats (*Avena sativa*), GW; Marsa (Għammieri), 12.iii.1994, alatae on irrigated kohlrabi leaves, pumpkin and cabbage, GW; 9.iii.1994, apterae on *Avena sativa*, GW; Valletta, 4.iv.2009, on Poaceae, DC; Marsaxlokk, 9.iv.2009, on *Hordeum leporinum*, DC.

Rhopalosiphum padi is a cosmopolitan species of Palaearctic origin (ROBERTI, 1993). In Europe the species is heterocyclic between *Prunus* species, especially *P. padi* (the primary host) and Poaceae; it is anholocyclic on its secondary host plants in mild winter climates. *Rh. padi* is able to transmit a number of plant viruses (BLACKMAN & EASTOP, 2000).

****Rhopalosiphum rufiabdominale* (Sasaki, 1899)** [A] [E]
(Aphidinae: Aphidini: Rhopalosiphina)

Material examined. MALTA: St. Paul's Bay, 14.iii.1994, alata on leaves of aubergine, GW.

Rhopalosiphum rufiabdominale occurs virtually worldwide, with records from Europe, tropical and subtropical regions, South America and the Far East. It is normally anholocyclic on the roots of grasses; however, it is heterocyclic in Japan between *Prunus* species and the roots of Poaceae (TANAKA, 1961). *Rh. rufiabdominale* is very damaging to rice in the Far East (HSIEH, 1970) and is known to transmit plant virus diseases.

****Schizaphis (Schizaphis) graminum* (Rondani, 1852)** [E]
(Aphidinae: Aphidini: Rhopalosiphina)

Material examined. MALTA: Hal Far, 2.vi.2011, apterae and alatae on *Cynodon dactylon*, DM.

Schizaphis (Sch.) graminum is found in Southern Europe, the Middle East, Central Asia, parts of southern Asia, Japan, and North, Central and South America; it is often called greenbug. It has a monoecious holocycle in cold temperate climates but overwinters anholocyclically wherever winter conditions permit (BLACKMAN & EASTOP, 2000). The aphids feed on the leaves of many species of grasses and cereal crops, often causing yellowing. Several subspecies have been described from particular grass species, especially on *Phleum pratense*. Greenbug is a serious pest of cereal crops because it is the vector of several serious plant viruses including barley yellow dwarf *Luteovirus* (especially strain BYDV-SGV), miller red *Luteovirus*, sugarcane mosaic *Potyvirus* and maize dwarf mosaic *Potyvirus*, among others that reduce yield (BLACKMAN & EASTOP, 2000).

****Semiaphis dauci* (Fabricius, 1775)** [E]
(Aphidinae: Macrosiphini)

Material examined. MALTA: Valletta (Hastings Gardens), 5.iv.2009, apterae and alatae on *Daucus carota*, DC.

Semiaphis dauci is widely distributed in Europe and the Middle East. It is generally found on wild and cultivated *Daucus carota* but has been recorded also on *Aegopodium podagraria*. It is monoecious holocyclic with alate males, or anholocyclic (BLACKMAN & EASTOP, 2006). The feeding of this species on carrots can cause severe stunting and rolling of young shoots. *S. dauci* can transmit Celery Mosaic *Potyvirus* and several other plant viruses (BLACKMAN & EASTOP, 2000).

****Sipha (Rungsia) maydis* Passerini, 1860** [E]
(Chaitophorinae: Siphini)

Material examined. MALTA: Wied Ghollieq, 8.viii.2009, apterae on *Sorghum halepense* attended by *Plagiolepis pygmaea*. Apterae and alatae on *Cynodon dactylon*: Imqabba (public garden), 2.ix.2009, attended by *Tapinoma nigerrimum*; Mġarr, 7.ix.2009; Fawwara, 10.viii.2009, attended by *Tapinoma nigerrimum*. All MM.

Sipha (R.) maydis is found in Europe and the Mediterranean Region, the Middle East, Central Asia, India, Pakistan, North and South Africa. It occurs on numerous species in more than 30 genera of Poaceae, often attended by ants. *Si. (R.) maydis* is anholocyclic; it also has a monoecious holocycle with alate males. It is a cereal crop pest in drier climates outside North-West Europe, and is known to transmit Cucumber Mosaic *Cucumovirus* and Barley Yellow Dwarf *Luteovirus* (BLACKMAN & EASTOP, 2000; 2006).

****Sitobion (Sitobion) avenae* (Fabricius, 1775)** [E]
(Aphidinae: Macrosiphini)

Material examined. MALTA: Buskett, 23.vi.2009, apterae, on *Panicum repens*, MM.

Sitobion (Sit.) avenae (Fig. 15) occurs in Europe, the Mediterranean, the Middle East, Central Asia, India, Nepal, Pakistan, Africa, and North, Central and South America (BLACKMAN & EASTOP, 2006). It feeds on both cultivated and wild species of Poaceae (ROBERTI, 1993) and many other monocots. *Sit. (Sit.) avenae* has a monoecious holocycle, but in mild climates it is anholocyclic, with asexual overwintering. This species is damaging to cultivated cereals and pasture grasses, and it is a vector of Barley Yellow Dwarf *Luteovirus* and at least three other plant virus diseases (BLACKMAN & EASTOP, 2000). *Panicum repens* represents a new host-plant record for *Sit. (Sit.) avenae*.

****Sitobion (Sitobion) fragariae* (Walker, 1848)** [E]
(Aphidinae: Macrosiphini)

Material examined. MALTA: Marsa (Ghammieri), 9.iii.1994, apterae and alatae on *Avena sativa*, GW; Buskett, 23.vi.2009, apterae and alatae on *Hordeum leporinum* and *Panicum repens*, MM.

Sitobion (Sit.) fragariae is found in Europe and Asia and has been accidentally introduced to South Africa, North and South America (BLACKMAN & EASTOP, 2006). Its primary hosts are *Rubus* species, also *Fragaria*, *Rosa* and *Geum* spp., and it is polyphagous on secondary hosts in various unrelated plant families (HOLMAN, 2009). *Sit. (Sit.) fragariae* has a heteroecious holocycle (BLACKMAN & EASTOP, 2006), an anholocycle and a possible paracycle (ROBERTI, 1993). The species heavily infests blackberry and cereals, and is a vector of Barley Yellow Dwarf *Luteovirus* (BLACKMAN & EASTOP, 2000). *Hordeum leporinum* and *Panicum repens* represent new host-plant records for *Sit. (Sit.) fragariae*.

****Therioaphis (Therioaphis) alatina* Hille Ris Lambers & van den Bosch, 1964**
(Calaphidinae: Panaphidini)

Material examined. COMINO: North-west of the island, 8.iv.2009, on *Ononis natrix*, DC.

Therioaphis (Th.) alatina is known from France, Italy and Switzerland. The species feeds on *Ononis* spp.; all the adult vivipae have small and often non-functional wings, and it produces sexual morphs in October (BLACKMAN & EASTOP, 2006).

***Toxoptera aurantii* (Boyer de Fonscolombe, 1841) [A] [E]**
(Aphidinae: Aphidini: Aphidina)

Material examined. MALTA: Qormi, 14.vi.-28.ix.2009, apterae on orange (*Citrus sinensis*), EA; Msida, 4.xi.2008, apterae on orange, AT; Rabat, 12.iii.1994, alatae and apterae on stems of *Euonymus japonicus*, CC; Żurrieq (Wied Babu), 6.iv.2009, apterae on *Anagallis arvensis*, DC.

Toxoptera aurantii is found in the tropics, subtropics, and in temperate climates under glass. It is extremely polyphagous, feeding on more than 120 hosts from different plant families, attended by ants. The species has been considered entirely anholocyclic (BLACKMAN & EASTOP, 2006) but PÉREZ HIDALGO & MIFSUD (2011) recorded the first sexual morphs of this species from the field. *Tox. aurantii* is the only aphid known to have audible stridulation, with colonies making a scraping-like sound when disturbed (EASTOP, 1952). *Tox. aurantii* is particularly common and damaging on citrus, which it infests throughout the year but most heavily in spring, and it is known to transmit nine plant viruses (BLACKMAN & EASTOP, 2000). The species was recorded from Malta previously by CARUANA GATTO (1926).

****Uroleucon (Belochilum) inulae* (Ferrari, 1872)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Buskett, 24.vi.2009, apterae and alatae on *Dittrichia viscosa*, MM.

Uroleucon (Be.) inulae is common on *Dittrichia viscosa*; in Italy, it has been found also on *Pulicaria sicula* (ROBERTI, 1993). It occurs in South Europe and throughout the Mediterranean from Portugal to Lebanon, and has a monoecious holocycle (BLACKMAN & EASTOP, 2006).

****Uroleucon (Uroleucon) hypochoeridis* (Fabricius, 1779)**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Wied Babu, 29.iii.2009, apterae on *Reichardia picroides*, MM; Fawwara, 11.viii.2009, apterae on *Urospermum picroides*, MM.

Uroleucon (U.) hypochoeridis is widely distributed in Europe. It generally occurs on *Hypochoeris* spp. and occasionally on *Crepis*, *Leontodon* and *Taraxacum*, on the distal ends of flower stalks. It has a monoecious holocycle, with oviparae and alate males produced in late August to September (BLACKMAN & EASTOP, 2006). *Urospermum picroides* is a new host plant record for *U. hypochoeridis*.

****Uroleucon (Uroleucon) sonchi* (Linnaeus, 1767) [E]**
(Aphidinae: Macrosiphini)

Material examined. MALTA: Apterae and alatae on *Sonchus* sp.: Valletta, 5.iv.2009, DC; Mellieħa, 7.iv.2009, DC; Marsaxlokk (salt marsh), 9.iv.2009, DC; Haġar Qim, 17.iv.2009, apterae on *Foeniculum vulgare*, MM. Apterae on *Hyoseris radiata*: Haġar Qim, 17.iv.2009, MM; 17.iv.2009, apterae on *Sonchus asper*; Wied Babu, 29.iii.2009, MM. Apterae on *Sonchus oleraceus*: Żurrieq (Wied Babu), 6.iv.2009, DC; Buskett, 19.iv.2009, Wied Babu, 29.iii.2009,

MM; Bahrija, 21.vii.2009, MM. **GOZO:** Mgarr, 8.iv.2009, on *Sonchus* sp., DC; Xlendi, 9.iv.2009, on *Sonchus oleraceus*, DC; Munxar, 9.iv.2009, on *Reichardia picroides*, DC.

Uroleucon (U.) sonchi (Fig. 16) is sub-cosmopolitan in distribution. It is oligophagous on *Sonchus* spp. and other Lactuceae genera and sometimes on other Asteraceae. In cold northern temperate regions *U. sonchi* has a monoecious holocycle, with apterous males, but it is presumably anholocyclic in milder climates (ROBERTI, 1993).

DISCUSSION

The present work brings to a total of 99 the species of aphids (Appendix 1) associated with almost 130 host plant species (Appendix 2) known from the Maltese islands. Of these 99 species, 48 represent new records for the Maltese islands. This is quite significant given the fact that only two species of aphids were included in the Fauna Europea project (NIETO NAFRÍA *et al.*, 2011) as occurring in Malta. It is worth mentioning that more than half (58 species) of all aphid species recorded are of economic importance according to BLACKMAN & EASTOP (2000) and many of these are known to transmit plant viruses on economically important plants. These species constitute a potential threat to agricultural crops (ROBERTI, 1993; BLACKMAN & EASTOP, 2000) in the Maltese islands. Sixteen of the aphid species are considered as alien to Europe according to the lists of COEUR D'ACIER *et al.* (2010) and MIFSUD *et al.* (2010). The majority of these alien species are associated with crops and have been present in Europe for many years (e.g. *Aphis (Aph.) gossypii*, *Aph. (Aph.) spiraeicola*, *Macrosiphum (Ma.) euphorbiae*, *Myzus (N.) persicae* and *Rhopalosiphum maidis*). Other aphids are of Asian origin and have established in the Mediterranean Region in recent years (e.g. *Greenidea ficicola* and *Tinocallis (S.) takachihoensis* (DÖRING, 2007; BELLA *et al.*, 2009; MIFSUD *et al.*, 2009a)), whereas Nearctic aphids such as *Daktulosphaira vitifoliae* have been in Europe since the 1860s. *Aphis (Aph.) illinoisensis* is the most recent alien aphid introduction to Malta. It is a Nearctic vineyard pest and was first recorded in the Mediterranean Region from Turkey, but is now present in various parts of the Mediterranean (MIFSUD & PÉREZ HIDALGO, 2011).

Some biogeographical considerations can also be made for the aphids of the Maltese islands. Based on the chorological categories used by BARBAGALLO & PATTI (1998a, 1998b), the chorological composition of the 99 aphid species present in Malta can be divided as follows. Thirty five species (35.35%) are cosmopolitan or subcosmopolitan, including crop pests like *Aphis (Aph.) fabae*, *Myzus (N.) persicae* and *Macrosiphum (M.) euphorbiae*, and aphids with pantropical or intertropical distributions, such as *Toxoptera aurantii*, *Rhopalosiphum maidis* and *Idiopterus nephrolepidis*. Thirty six species (36.36%) are considered as Palaearctic, occurring throughout Europe, extending to the Mediterranean Region and eastwards over most of Asia (e.g. *Brachyunguis (B.) tamaricis*). Nine species (9.09%) represent European taxa, and 16 thermophilous species (15.56%) are restricted to Southern Europe and the Mediterranean area (Euro-Mediterranean) (e.g. all species of Fordini). Within this last category it is worth mentioning *Trama (Neotrampa) baronii*, originally described from the Maltese islands but now known from southern Peninsular Italy, Lebanon and Turkey, representing an Eastern Mediterranean element. The last group is represented by three Nearctic (3.03%) species (e.g. *Essigella (E.) californica*), which are now found in the Maltese archipelago.

During the present study, ant species recorded in association with the aphids comprised six members of Formicinae, three of Myrmicinae and one of Dolichoderinae (Appendix 3). The ant species referred to as "*Lasius emarginatus*" in this work is probably an undescribed species, since it differed morphologically from samples from continental Europe. Most *Aphis*, some *Brachycaudus*, *Dysaphis*, and *Hyadaphis* spp. were ant-attended. The relationship between the aphid and ant

species collected appeared to be diffuse, since in most cases each ant species was recorded with several different aphid species. It is noteworthy that *Plagiolepis pygmaea* attends ten aphid species, perhaps indicating a strong reliance on honeydew for this species in Malta. All ant species here involved have very effective trail-laying mechanisms that should allow them to rapidly recruit, and sometimes retain, the discovered honeydew sources, the aphid colonies. Trofallaxis, the exchange of liquid food between colony members, is also present in all these ant species.

The aphid host-plant species recorded in the present study were compared with all the host-plant species listed for the relevant aphid species in BLACKMAN & EASTOP (2006) and HOLMAN (2009). It was thus determined that a total of 22 new host-plant records were made for 15 of the aphid species collected in the Maltese islands.

Other aphid species may be expected to be found in Malta, especially those present in other Mediterranean countries whose host-plants also grow in Malta. Only 96 km separates the Maltese islands from Sicily, which has a similar climate to Malta. Sicily has the richest aphidofauna of all the Italian regions, with 436 aphid species recorded. The heterogeneous habitats and the 3,201 vascular plants present in Sicily represent a unique opportunity for such species richness in aphids (PATTI & BARBAGALLO, 1999; BARBAGALLO *et al.*, 2009). The flora of the Maltese islands is relatively rich, consisting of some 1,100 vascular plants (Edwin Lanfranco *pers. comm.*, 2011), but most important habitats are now reduced to small pockets (as Malta represents one of the most densely populated countries in the World). Despite all this, it is suspected that a larger aphidofauna may occur in Malta than is presently known. Examination of the Sicilian aphid literature (BARBAGALLO & STROYAN, 1982; PATTI, 1983; PATTI & BARBAGALLO, 1997; PATTI & BARBAGALLO, 1999; BARBAGALLO, 2002) reveals that some 50 additional aphid species could potentially occur in Malta because of the presence of their host-plant/s in Malta. Some North African host-plants occur in Malta; Tunisia is 290 km away, so aphid species occurring in Tunisia (but not in Italy) may also be found in Malta. However, literature on the aphidofauna of North Africa is not easily available (AHMEID AL-NAGAR & NIETO NAFRÍA, 1998; LAAMARI *et al.*, 2010), and that fauna has not been studied as thoroughly as that of Sicily.

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APPENDIX 1. Systematic list of aphids and their host-plants in the Maltese Archipelago.

New records of aphids from the Maltese islands are marked with an asterisk (*). The new host plant records in the world mentioned in this article are marked with two asterisks (**). Alien species are marked with [A] and economic important aphids with [E]. Plant names follow the system of TROPICOS.ORG (2011).

FAMILY **APHIDIDAE** Latreille, 1802
SUBFAMILY **ANOECIINAE** Tullgren, 1909

****Anoecia (Anoecia) vagans* (Koch, 1856)**

Avena sp.; Poaceae, on the roots.

SUBFAMILY **APHIDINAE** Latreille, 1802
TRIBE **APHIDINI** Latreille, 1802
SUBTRIBE **APHIDINA** Latreille, 1802

****Aphis (Aphis) alienus* Theobald, 1915**

***Teucrium flavum* L.

***Aphis (Aphis) craccivora* Koch, 1854 [E]**

Asparagus sp., *Cerantonía siliqua* L., *Lantana camara* L., *Ononis natrux* L., *Portulaca oleracea* L., *Spartium junceum* L.

****Aphis (Aphis) euphorbiae* Kaltenbach, 1843**

Euphorbia sp.

***Aphis (Aphis) fabae* Scopoli, 1763 [E]**

***Atriplex prostrata* Boucher ex DC. In Lam. & DC., *Cichorium spinosum* L., *Chenopodium murale* L., *Chenopodium opulifolium* Schrad., *Cynara scolymus* L., *Dendranthema* sp., *Ferula communis* L., *Foeniculum vulgare* Miller, *Galium aparine* L., Cass. ex Spach., *Hedera helix* L., *Hypochaeris achyrophorus* L., ***Kickxia spuria* (L.) Dumort., *Papaver pinnatifidum* Moris, *Papaver rhoeas* L., *Pittosporum tobira* (Thunb.) Aiton fil., *Portulaca oleracea* L., *Solanum luteum* Miller, *Solanum nigrum* L., *Urtica membranacea* Poiret in Lam., *Vicia faba* L.

***Aphis (Aphis) gossypii* Glover, 1877 [A] [E]**

Brassica oleracea var. *botrytis* [cauliflower], *Capsicum* sp. [capsicum], *Citrullus lanatus* (Thunb.) Matsum. & Nakai [watermelon], *Citrus limon* (L.) Burm. fil. [lemon tree], *Citrus sinensis* (L.) Osbeck [orange tree], *Cucumis melo* L. [melon], *Cucumis sativus* L. [cucumber], *Cucurbita maxima* Duchesne ex Poiret [pumpkin], *Cucurbita pepo* L. [marrow], *Eriobotrya japonica* (Thunb.) Lindley [loquat], *Fragaria* sp. [strawberry], *Hibiscus* sp., *Kickxia spuria* (L.) Dumort., ***Periploca angustifolia* Labill., *Petroselinum crispum* (Miller) Fuss. [parsley], *Portulaca oleracea* L., ***Prasium majus* L., *Punica granatum* L. [pomegranate], *Rosa* sp., ***Sinapis alba* L., *Solanum lycopersicum* L. [tomato], *Solanum melongena* L. [aubergine], *Solanum tuberosum* L. [potato], ***Urospermum picroides* (L.) Scop. ex. F.W. Schmidt., *Verbena officinalis* L.

Aphis (Aphis) hederæ Kaltenbach, 1843Hedera helix* L.**Aphis (Aphis) illinoisensis Shimer, 1866** [A] [E]*Vitis vinifera* L. [grape vine]***Aphis (Aphis) lambersi (Börner, 1940)** [E]*Daucus carota* L.***Aphis (Aphis) multifloræ Barbagallo & Stroyan, (1982)***Erica multiflora* L.***Aphis (Aphis) nasturtii Kaltenbach, 1843** [E]*Anagallis arvensis* L., ***Urospermum picroides* (L.) Scop. ex. F.W. Schmidt.**Aphis (Aphis) nerii Boyer de Fonscolombe, 1841** [E]*Hoya carnosa* (L.) R. Br., *Nerium oleander* L., ***Stephanotis floribunda* Brongn.***Aphis (Aphis) parietariæ Theobald, 1922***Parietaria judaica* L.**Aphis (Aphis) pomi de Geer, 1773** [E]*Malus domestica* (Borkh.) Borkh., *Eriobotrya japonica* (Thunb.) Lindley***Aphis (Aphis) ruborum (Börner, 1931)** [E]*Rubus ulmifolius* Schott**Aphis (Aphis) rumicis Linnaeus, 1758***Rumex conglomeratus* Murray, *Solanum nigrum* L.***Aphis (Aphis) sedi Kaltenbach, 1843***Sedum sediforme* (Jacq.) Pau**Aphis (Aphis) spiraecola Patch, 1914** [A] [E]*Citrus limon* (L.) Burm. fil. [lemon tree], *Citrus x paradisi* Macfad. [grapefruit], *Dodonea* sp., *Eriobotrya japonica* (Thunb.) Lindley [loquat], *Malus domestica* (Borkh.) Borkh., *Pittosporum tobira* (Thunb.) Aiton fil**Aphis (Aphis) umbrella (Börner, 1950)***Lavatera arborea* L., *Malva sylvestris* L.***Aphis (Pseudoprotaphis) picridicola Holman, 1966*****Hypochaeris achyrophorus* L.**Brachyunguis (Brachyunguis) tamaricis (Lichtenstein, 1885)***Tamarix africana* Poiret**Toxoptera aurantii (Boyer de Fonscolombe, 1841)** [A] [E]*Anagallis arvensis* L., *Citrus sinensis* (L.) Osbeck, *Euonymus japonicus* L. fil

SUBFAMILY APHIDINAE Latreille, 1802
 TRIBE APHIDINI Latreille, 1802
 SUBTRIBE RHOPALOSIPHINA Mordvilko, 1914

**Melanaphis donacis* (Passerini, 1862)

Arundo donax L.

**Rhopalosiphum maidis* (Fitch, 1856) [A] [E]

Sorghum halepense (L.) Pers.

**Rhopalosiphum padi* (Linnaeus, 1758) [E]

Avena sativa L., *Hordeum leporinum* Link., *H. vulgare* L., *Triticum* sp.

**Rhopalosiphum rufiabdominale* (Sasaki, 1899) [A] [E]

Vagrant on *Solanum melongena* L.

**Schizaphis (Schizaphis) graminum* (Rondani, 1852) [E]

Cynodon dactylon (L.) Pers.

SUBFAMILY APHIDINAE Latreille, 1802
 TRIBE MACROSIPHINI Wilson, 1910

**Acyrtosiphon (Acyrtosiphon) lactucae* (Passerini, 1860) [E]

Lactuca serriola L., *Lactuca virosa* L.

**Acyrtosiphon (Acyrtosiphon) pisum* (Harris, 1776) [E]

Trifolium nigrescens Viv.

Amphorophora (Amphorophora) rubi (Kaltenbach, 1843)¹ [E]

Rubus ulmifolius Schott

Anuraphis farfarae (Koch, 1854)² [E]

Pyrus communis L.

**Aulacorthum (Aulacorthum) solani* (Kaltenbach, 1843) [E]

Acacia saligna (Labill.) H.L. Wendl., *Borago officinalis* L., *Hedera helix* L., ***Hyoseris radiata* L., *Oxalis pes-caprae* (L.) var. *florepleno*, *Solanum nigrum* L., *S. luteum* Miller

Brachycaudus (Appelia) schwartzi (Börner, 1931) [E]

Prunus persica (L.) Batsch [peach]

**Brachycaudus (Brachycaudus) helichrysi* (Kaltenbach, 1843) [E]

Hypochoeris achyrophorus L.

Brachycaudus (Prunaphis) cardui (Linnaeus, 1758) [E]

Senecio bicolor (Willdenow) Todaro

¹ Most likely an incorrect record by CARUANA GATTO (1926)

² This species was not collected in recent surveys

Brachycolus (Brachycolus) cucubali* (Passerini, 1863)Silene vulgaris* (Moench) Garcke***Brevicoryne brassicae* (Linnaeus, 1758) [E]***Brassica oleracea* L. “gongylodes group” [kohlrabi], *Chenopodium murale* L.****Capitophorus* sp. nr. *similis* van der Goot, 1915*****Chiliadenus bocconeii* Brullo***Cavariella (Cavariella) aegopodii* (Scopoli, 1763) [E]***Ferula communis* L., *Daucus carota* L.***Chaetosiphon (Pentatrachopus) fragaefolii* (Cockerell, 1901)³ [E]***Fragaria* sp.****Clypeoaphis suaedae* (Mimeur, 1934)***Suaeda maritima* (L.) Dumort., *Suaeda vera* Forssk. ex J.F. Gmel.****Cryptomyzus (Cryptomyzus) korschelti* Börner, 1938***Prasium majus* L.****Dysaphis (Dysaphis) apiifolia* (Theobald, 1923) [E]***Apium graveolens* L., *Ferula communis* L., *Foeniculum vulgare* Miller***Dysaphis (Dysaphis) crithmi* (Buckton, 1886)⁴***Crithmum maritimum* L.****Dysaphis (Dysaphis) foeniculus* (Theobald, 1923) [E]***Foeniculum vulgare* Miller, ***Sedum sediforme* (Jacq.) Pau****Dysaphis (Dysaphis) tulipae* (Boyer de Fonscolombe, 1841) [E]***Arum italicum* L., ***Iris foetidissima* L.***Dysaphis (Pomaphis) plantaginea* (Passerini, 1860)⁵ [E]***Pyrus communis* L., *Malus domestica* (Borkh.) Borkh.****Dysaphis (Pomaphis) pyri* (Boyer de Fonscolombe, 1841) [E]***Pyrus communis* L. local cultivar ‘*bambinella*’***Hayhurstia atriplicis* (Linnaeus, 1761)***Chenopodium opulifolium* Schrad.****Hyadaphis coriandri* (B. Das, 1918) [E]***Foeniculum vulgare* Miller.

³ This species was recorded by SALIBA (1963) and material from Malta is deposited at the BMNH with the following data: Marsa, Ghammieri, 17.iii.1969 on *Fragaria vesca*, coll. J. M. Wilkinson (J. H. Martin *pers. comm.*).

⁴ Recorded on the bases of a single alate (Jon Martin, *pers. comm.*, 2010) whose identification is uncertain.

⁵ The record of this aphid is in need of verification.

Hyadaphis foeniculi (Passerini, 1860) [E]Foeniculum vulgare* Miller***Hyadaphis passerinii (del Guercio, 1911)***Lonicera implexa* Aiton***Hyperomyzus (Hyperomyzus) lactucae (Linnaeus, 1758) [E]***Sonchus asper* (L.) Hill, *S. oleraceus* L., *Reichardia picroides* (L.) Roth.***Idiopterus nephrolepidis Davis, 1909 [A]***Adiantum capillus-veneris* L.**Lipaphis (Lipaphis) pseudobrassicae (Davis, 1914) [E]***Brassica* sp., *Matthiola longipetala* (Vent.) DC.***Macrosiphoniella (Macrosiphoniella) absinthii (Linnaeus, 1758)***Artemisia arborescens* L.***Macrosiphoniella (Macrosiphoniella) artemisiae (Boyer de Fonscolombe, 1841)***Artemisia arborescens* L.***Macrosiphoniella (Macrosiphoniella) sanborni (Gillette, 1908) [A] [E]***Dendranthema* sp.***Macrosiphum (Macrosiphum) euphorbiae (Thomas, 1878) [A] [E]***Cucurbita pepo* L., *Fragaria* sp., *Lactuca sativa* L., *Rosa* sp., *Solanum lycopersicum* L., *Solanum melongena* L.***Macrosiphum (Macrosiphum) rosae (Linnaeus, 1758) [E]***Rosa* sp.***Metopolophium (Metopolophium) dirhodum (Walker, 1849) [E]***Avena sativa* L.**Myzus (Myzus) cerasi (Fabricius, 1775)⁶ [E]***Prunus armeniaca* L., *Prunus avium* L.**Myzus (Nectarosiphon) persicae (Sulzer, 1776) [A] [E]***Aeonium arboreum* (L.) Webb & Berth., *Borago officinalis* L., *Brassica oleracea* var. *botrytis* (cauliflower), *Capsicum* sp. [green pepper], *Erodium moschatum* (L.) L'Hér., *Ferula communis* L., ***Kickxia spuria* (L.) Dumort., ***Lycium intricatum* Boiss., *Papaver* sp., *Sinapis alba* L., *Solanum tuberosum* L. (potato), ***Trifolium nigrescens* Viv.***Semiaphis dauci (Fabricius, 1775) [E]***Daucus carota* L.⁶ Recorded by SALIBA (1963) and is probably incorrect

**Sitobion (Sitobion) avenae* (Fabricius, 1775) [E]

***Panicum repens* L.

**Sitobion (Sitobion) fragariae* (Walker, 1848) [E]

Avena sativa L., ***Hordeum leporinum* (Link) Arcang., ***Panicum repens* L.

**Uroleucon (Belochilum) inulae* (Ferrari, 1872)

Dittrichia viscosa (L.) W. Greuter

**Uroleucon (Uroleucon) hypochoeridis* (Fabricius, 1779)

Reichardia picroides (L.) Roth., ***Urospermum picroides* (L.) Scop. ex F.W. Schmidt.

**Uroleucon (Uroleucon) sonchi* (Linnaeus, 1767) [E]

Foeniculum vulgare Miller, *Hyoseris radiata* L., *Reichardia picroides* (L.) Roth., *Sonchus asper* (L.) Hill, *Sonchus oleraceus* L.

SUBFAMILY CALAPHIDINAE Oestlund, 1919

TRIBE PANAPHIDINI Oestlund, 1923

Hoplocallis picta (Ferrari, 1872)

Quercus ilex L.

Myzocallis (Myzocallis) boernerii Stroyan, 1957

Quercus ilex L.

**Therioaphis (Therioaphis) alatina* Hille Ris Lambers & van den Bosch, 1964

Ononis natrix L.

Tinocallis takachihoensis Higuchi, 1972 [A]

Ulmus canescens Melville

SUBFAMILY CHAITOPHORINAE Mordvilko, 1908

TRIBE CHAITOPHORINI Mordvilko, 1908

Chaitophorus capreae (Mosley, 1841)

Salix pedicellata Desf.

Chaitophorus populiae (Boyer de Fonscolombe, 1841)

Populus alba L.

TRIBE SIPHINI Mordvilko, 1928

**Sipha (Rungia) maydis* (Passerini, 1860) [E]

Sorghum halepense (L.) Pers., *Cynodon dactylon* (L.) Pers.

SUBFAMILY ERIOSOMATINAE Kirkaldy, 1905 (1843)

TRIBE ERIOSOMATINI Kirkaldy, 1905 (1843)

Eriosoma lanigerum* (Hausmann, 1802)⁷ [A] [E]Malus domestica* (Borkh.) Borkh.***Eriosoma lanuginosum* (Hartig, 1839) [E]***Ulmus canescens* Melville***Tetraneura* (*Tetraneura*) *nigriabdominalis* (Sasaki, 1899) [E]***Ulmus canescens* Melville***Tetraneura* (*Tetraneurella*) *ulmi* (Linnaeus, 1758)⁸ [E]***Ulmus canescens* Melville

TRIBE FORDINI Acloque, 1897

Aploneura lentisci* (Passerini, 1856) [E]Pistacia lentiscus* L.***Baizongia pistaciae* (Linnaeus, 1767) [E]***Pistacia terebinthus* L.***Forda riccobonii* (de Stefani Perez, 1899)***Pistacia atlantica* Desf., ***Bromus madritensis* L.***Paraclletus cimiciformis* von Heyden, 1837***Pistacia terebinthus* L., *Hordeum* (?) *leporinum* (Link) Arcang.****Rectinasus buxtoni* Theobald, 1914**

Poaceae

Smynthurodes betae* Westwood, 1849 [E]Pistacia atlantica* Desf., *Brassica oleracea* L. var. *botrytis*

SUBFAMILY GREENIDEINAE Baker, 1920 (1910)

TRIBE GREENIDEINI Baker, 1920 (1910)

Greenidea ficicola* Takahashi, 1921 [A] [E]Ficus* spp.

SUBFAMILY LACHNINAE Herrich-Schaeffer, 1854

TRIBE EULACHNINI Baker, 1920

Cinara* (*Cinara*) *maghrebica* Mimeur, 1934Pinus halepensis* Miller⁷ Not recorded in recent surveys but probably a valid record⁸ Most likely an incorrect record since galls on *Ulmus* were attributed to preceding species

Cinara (Cinara) palaestinensis* Hille Ris Lambers, 1948Pinus halepensis* Miller***Cinara (Cupressobium) cupressi* (Buckton, 1881)***Cupressus sempervirens* L.***Essigella (Essigella) californica* (Essig, 1909) [A]***Pinus halepensis* Miller***Eulachnus rileyi* (Williams, 1911)***Pinus* sp.***Eulachnus tuberculostemmatus* (Theobald, 1915)***Pinus halepensis* Miller

TRIBE LACHNINI Herrich-Schaeffer, 1854

Lachnus roboris* (Linnaeus, 1758) [E]Quercus ilex* L.****Pterochloroides persicae* (Cholodkowsky, 1899) [A] [E]***Prunus dulcis* (Millar) D.A. Webb. [almond], *Prunus persica* (L.) Batsch [peach]***Tuberolachnus (Tuberolachnus) salignus* (J.F. Gmelin, 1790)***Salix pedicellata* Desf.

TRIBE TRAMINI Herrich-Schaeffer, 1854

Trama (Neotrama) baronii* (Hille Ris Lambers, 1969)Carduus* sp. (Asteraceae) roots, in nest of the ant *Camponotus barbaricus*

SUBFAMILY THELAXINAE Baker, 1920

Thelaxes suberi* (del Guercio, 1911) [E]Quercus ilex* L.

FAMILY PHYLLOXERIDAE Boyer de Fonscolombe, 1834

Daktulosphaira vitifoliae* (Fitch, 1851) [A] [E]Vitis* sp.

APPENDIX 2. Plant-aphid list for the Maltese Archipelago

Acacia saligna* (Labill.) H.L. Wendl. [FABACEAE]Aulacorthum (Au.) solani* (Kaltenbach, 1843)***Adiantum capillus-veneris* L. [ADIANTACEAE]***Idiopterus nephrolepidis* Davis, 1909***Aeonium arboreum* (L.) Webb & Berth. [CRASSULACEAE]***Myzus (N.) persicae* (Sulzer, 1776)***Anagallis arvensis* L. [PRIMULACEAE]***Aphis (Aph.) nasturtii* Kaltenbach, 1843*Toxoptera aurantii* (Boyer de Fonscolombe, 1841)***Apium graveolens* L. [APIACEAE]***Dysaphis (Dy.) apiifolia* (Theobald, 1923)***Artemisia arborescens* L. [ASTERACEAE]***Macrosiphoniella (M.) absinthii* (Linnaeus, 1758)*Macrosiphoniella (M.) artemisiae* (Boyer de Fonscolombe, 1841)***Arum italicum* L. [ARACEAE]***Dysaphis (Dy.) tulipae* (Boyer de Fonscolombe, 1841)***Arundo donax* L. [POACEAE]***Melanaphis donacis* (Passerini, 1862)***Asparagus* sp. [LILIACEAE]***Aphis (Aph.) craccivora* Koch, 1854***Atriplex prostrata* Boucher ex DC. In Lam. & DC. [CHENOPODIACEAE]***Aphis (Aph.) fabae* Scopoli, 1763***Avena sativa* L. [POACEAE]***Metopolophium (Me.) dirhodum* (Walker, 1849)*Rhopalosiphum padi* (Linnaeus, 1758)*Sitobion (Sit.) fragariae* (Walker, 1848)***Avena* sp. [POACEAE]***Anoecia (Anoecia) vagans* (Koch, 1856)***Borago officinalis* L. [BORAGINACEAE]***Aulacorthum (Au.) solani* (Kaltenbach, 1843)*Myzus (N.) persicae* (Sulzer, 1776)***Brassica oleracea* L. “gongyloides group” [kohlrabi] [BRASSICACEAE]***Brevicoryne brassicae* (Linnaeus, 1758)

***Brassica oleracea* var. *botrytis* [cauliflower] [BRASSICACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Myzus (*N.*) *persicae* (Sulzer, 1776)
Smynthuroides betae Westwood, 1849

***Brassica* sp. [BRASSICACEAE]**

- Brevicoryne brassicae* (Linnaeus, 1758)
Lipaphis (*L.*) *pseudobrassicae* (Davis, 1914)

***Bromus madritensis* L. [POACEAE]**

- Forda riccobonii* (de Stefani Perez, 1899)

***Capsicum* sp. [capsicum] [SOLANACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Myzus (*N.*) *persicae* (Sulzer, 1776)

***Carduus* sp. [ASTERACEAE]**

- Trama* (*N.*) *baronii* (Hille Ris Lambers, 1969)

***Cerantonía siliqua* L. [CAESALPINIACEAE]**

- Aphis* (*Aph.*) *craccivora* Koch, 1854

***Chenopodium murale* L. [CHENOPODIACEAE]**

- Aphis* (*Aph.*) *fabae* Scopoli, 1763
Brevicoryne brassicae (Linnaeus, 1758)

***Chenopodium opulifolium* Schrad. [CHENOPODIACEAE]**

- Aphis* (*Aph.*) *fabae* Scopoli, 1763
Hayhurstia atriplicis (Linnaeus, 1761)

***Chiliadenus bocconeii* Brullo [ASTERACEAE]**

- Capitophorus* sp. nr. *similis* van der Goot, 1915

***Cichorium spinosum* L. [ASTERACEAE]**

- Aphis* (*Aph.*) *fabae* Scopoli, 1763

***Citrullus lanatus* (Thunb.) Matsum. & Nakai [watermelon] [CUCURBITACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877

***Citrus limon* (L.) Burm. fil. [lemon tree] [RUTACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Aphis (*Aph.*) *spiraecola* Patch, 1914

***Citrus sinensis* (L.) Osbeck [orange tree] [RUTACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Toxoptera aurantii (Boyer de Fonscolombe, 1841)

***Citrus x paradisi* Macfad. [grapefruit] [RUTACEAE]**

- Aphis* (*Aph.*) *spiraecola* Patch, 1914

- Crithmum maritimum* L. [APIACEAE]**
Dysaphis (Dysaphis) crithmi (Buckton, 1886)
- Cucumis melo* L. [melon] [CUCURBITACEAE]**
Aphis (Aph.) gossypii Glover, 1877
- Cucumis sativus* L. [cucumber] [CUCURBITACEAE]**
Aphis (Aph.) gossypii Glover, 1877
- Cucurbita maxima* Duchesne ex Poiret [pumpkin] [CUCURBITACEAE]**
Aphis (Aph.) gossypii Glover, 1877
- Cucurbita pepo* L. [marrow] [CUCURBITACEAE]**
Aphis (Aph.) gossypii Glover, 1877
Macrosiphum (Ma.) euphorbiae (Thomas, 1878)
- Cupressus sempervirens* L. [CUPRESSACEAE]**
Cinara (Cu.) cupressi (Buckton, 1881)
- Cynara scolymus* L. [ASTERACEAE]**
Aphis (Aph.) fabae Scopoli, 1763
- Cynodon dactylon* (L.) Pers. [POACEAE]**
Schizaphis (Sci.) graminum (Rondani, 1852)
Sipha (R.) maydis Passerini, 1860
- Daucus carota* L. [APIACEAE]**
Aphis (Aph.) lambersi (Börner, 1940)
Cavariella (Cav.) aegopodii (Scopoli, 1763)
Semiaphis dauci (Fabricius, 1775)
- Dendranthema* sp. [ASTERACEAE]**
Aphis (Aph.) fabae Scopoli, 1763
Macrosiphoniella (M.) sanborni (Gillette, 1908)
- Dittrichia viscosa* (L.) W. Greuter [ASTERACEAE]**
Uroleucon (Be.) inulae (Ferrari, 1872)
- Dodonea* sp. [SAPINDACEAE]**
Aphis (Aph.) spiraecola Patch, 1914
- Erica multiflora* L. [ERICACEAE]**
Aphis (Aph.) multiflorae Barbagallo & Stroyan, 1982
- Eriobotrya japonica* (Thunb.) Lindley [loquat] [ROSACEAE]**
Aphis (Aph.) gossypii Glover, 1877
Aphis (Aph.) pomi de Geer, 1773
Aphis (Aph.) spiraecola Patch, 1914

***Erodium moschatum* (L.) L'Hér. [GERANIACEAE]**

Myzus (N.) persicae (Sulzer, 1776)

***Euonymus japonicus* L. fil [CELASTRACEAE]**

Toxoptera aurantii (Boyer de Fonscolombe, 1841)

***Euphorbia* sp. [EUPHORBIACEAE]**

Aphis (Aph.) euphorbiae Kaltenbach, 1843

***Ferula communis* L. [APIACEAE]**

Aphis (Aph.) fabae Scopoli, 1763

Cavariella (Cav.) aegopodii (Scopoli, 1763)

Dysaphis (Dy.) apiifolia (Theobald, 1923)

Myzus (N.) persicae (Sulzer, 1776)

***Ficus* spp. [MORACEAE]**

Greenidea ficicola Takahashi, 1921

***Foeniculum vulgare* Miller [APIACEAE]**

Aphis (Aph.) fabae Scopoli, 1763

Dysaphis (Dy.) apiifolia (Theobald, 1923)

Dysaphis (Dy.) foeniculus (Theobald, 1923)

Hyadaphis coriandri (B. Das, 1918)

Hyadaphis foeniculi (Passerini, 1860)

Uroleucon (U.) sonchi (Linnaeus, 1767)

***Fragaria* sp. [strawberry] [ROSACEAE]**

Aphis gossypii Glover, 1877

Chaetosiphon (Pentatrichopus) fragaefolii (Cockerell, 1901)

Macrosiphum (Ma.) euphorbiae (Thomas, 1878)

***Galium aparine* L., Cass. ex Spach. [RUBIACEAE]**

Aphis (Aph.) fabae Scopoli, 1763

***Hedera helix* L. [ARALIACEAE]**

Aphis (Aph.) fabae Scopoli, 1763

Aphis (Aph.) hederæ Kaltenbach, 1843

Aulacorthum (Au.) solani (Kaltenbach, 1843)

***Hibiscus* sp. [Malvaceae]**

Aphis (Aph.) gossypii Glover, 1877

***Hordeum leporinum* (Link) Arcang. [POACEAE]**

Paracletus cimiciformis von Heyden, 1837

Sitobion (Sit.) fragariae (Walker, 1848)

Rhopalosiphum padi (Linnaeus, 1758)

***Hordeum vulgare* L. [Poaceae]**

Rhopalosiphum padi (Linnaeus, 1758)

***Hoya carnosa* (L.) R. Br. [ASCLEPIADACEAE]**

Aphis (*Aph.*) *nerii* Boyer de Fonscolombe, 1841

***Hyoseris radiata* L. [ASTERACEAE]**

Aulacorthum (*Au.*) *solani* (Kaltenbach, 1843)

Uroleucon (*U.*) *sonchi* (Linnaeus, 1767)

***Hypochoeris achyrophorus* L. [ASTERACEAE]**

Aphis (*Aph.*) *fabae* Scopoli, 1763

Aphis (*Ps.*) *picridicola* Holman, 1966

Brachycaudus (*Bra.*) *helichrysi* (Kaltenbach, 1843)

***Iris foetidissima* L. [IRIDACEAE]**

Dysaphis (*Dy.*) *tulipae* (Boyer de Fonscolombe, 1841)

***Kickxia spuria* (L.) Dumort. [SCROPHULARIACEAE]**

Aphis (*Aph.*) *gossypii* Glover, 1877

Aphis (*Aph.*) *fabae* Scopoli, 1763

Myzus (*N.*) *persicae* (Sulzer, 1776)

***Lactuca sativa* L. [ASTERACEAE]**

Macrosiphum (*Ma.*) *euphorbiae* (Thomas, 1878)

***Lactuca serriola* L. [ASTERACEAE]**

Acyrtosiphon (*Ac.*) *lactucae* (Passerini, 1860)

***Lactuca virosa* L. [ASTERACEAE]**

Acyrtosiphon (*Ac.*) *lactucae* (Passerini, 1860)

***Lantana camara* L. [VERBENACEAE]**

Aphis (*Aph.*) *craccivora* Koch, 1854

***Lavatera arborea* L. [MALVACEAE]**

Aphis (*Aph.*) *umbrella* (Börner, 1950)

***Lonicera implexa* Aiton [CAPRIFOLIACEAE]**

Hyadaphis passerinii (del Guercio, 1911)

***Lycium intricatum* Boiss. [SOLANACEAE]**

Myzus (*N.*) *persicae* (Sulzer, 1776)

***Malus domestica* (Borkh.) Borkh. [ROSACEAE]**

Aphis (*Aph.*) *pomi* de Geer, 1773

Aphis (*Aph.*) *spiraecola* Patch, 1914

Dysaphis (*Po.*) *plantaginea* (Passerini, 1860)

Eriosoma lanigerum (Hausmann, 1802)

Malva sylvestris* L. [MALVACEAE]Aphis (Aph.) umbrella* (Börner, 1950)***Matthiola longipetala* (Vent.) DC. [BRASSICACEAE]***Lipaphis (L.) pseudobrassicae* (Davis, 1914)***Nerium oleander* L. [APOCYNACEAE]***Aphis (Aph.) nerii* Boyer de Fonscolombe, 1841***Ononis natrix* L. [FABACEAE]***Aphis (Aphis) craccivora* Koch, 1854*Therioaphis (Th.) alatina* Hille Ris Lambers & van den Bosch, 1964***Oxalis pes-caprae* (L.) var. *florepleno* [OXALIDACEAE]***Aulacorthum (Au.) solani* (Kaltenbach, 1843)***Panicum repens* L. [POACEAE]***Sitobion (Si.) avenae* (Fabricius, 1775)*Sitobion (Si.) fragariae* (Walker, 1848)***Papaver pinnatifidum* Moris [PAPAVERACEAE]***Aphis (Aph.) fabae* Scopoli, 1763***Papaver rhoeas* L. [PAPAVERACEAE]***Aphis (Aph.) fabae* Scopoli, 1763***Papaver* sp. [PAPAVERACEAE]***Myzus (N.) persicae* (Sulzer, 1776)***Parietaria judaica* L. [URTICACEAE]***Aphis (Aph.) parietariae* Theobald, 1922***Periploca angustifolia* Labill. [ASCLEPIADACEAE]***Aphis (Aph.) gossypii* Glover, 1877***Petroselinum crispum* (Miller) Fuss. [parsley] [APIACEAE]***Aphis (Aph.) gossypii* Glover, 1877***Pinus halepensis* Miller [PINACEAE]***Cinara (Ci.) maghrebica* Mimeur, 1934*Cinara (Ci.) palaestinensis* Hille Ris Lambers, 1948*Essigella (E.) californica* (Essig, 1909)*Eulachnus tuberculostemmatum* (Theobald, 1915)***Pinus* sp. [PINACEAE]***Eulachnus rileyi* (Williams, 1911)

Pistacia atlantica* Desf. [ANACARDIACEAE]Forda riccobonii* (de Stefani Perez, 1899)*Smynthuodes betae* Westwood, 1849***Pistacia lentiscus* L. [ANACARDIACEAE]***Aploneura lentisci* (Passerini, 1856)***Pistacia terebinthus* L. [ANACARDIACEAE]***Baizongia pistaciae* (Linnaeus, 1767)*Paracletus cimiciformis* von Heyden, 1837***Pittosporum tobira* (Thunb.) Aiton fil [PITTOSPORACEAE]***Aphis* (*Aph.*) *fabae* Scopoli, 1763*Aphis* (*Aph.*) *spiraecola* Patch, 1914**POACEAE***Anoecia* (*Anoecia*) *vagans* (Koch, 1856)*Rectinasus buxtoni* Theobald, 1914*Rhopalosiphum maidis* (Fitch, 1856)***Populus alba* L. [SALICACEAE]***Chaitophorus populiabae* (Boyer de Fonscolombe, 1841)***Portulaca oleracea* L. [PORTULACACEAE]***Aphis* (*Aph.*) *craccivora* Koch, 1854*Aphis* (*Aph.*) *fabae* Scopoli, 1763*Aphis* (*Aph.*) *gossypii* Glover, 1877***Prasium majus* L. [LABIATAE]***Aphis* (*Aph.*) *gossypii* Glover, 1877*Cryptomyzus* (*Cr.*) *korschelti* Börner, 1938***Prunus armeniaca* L. [apricot] [ROSACEAE]***Myzus* (*M.*) *cerasi* (Fabricius, 1775)***Prunus avium* L. [cherry] [ROSACEAE]***Myzus* (*M.*) *cerasi* (Fabricius, 1775)***Prunus dulcis* (Millar) D.A. Webb. [almond] [ROSACEAE]***Pterochloroides persicae* (Cholodkowsky, 1899)***Prunus persica* (L.) Batsch [peach] [ROSACEAE]***Brachycaudus* (*Ap.*) *schwartzi* (Börner, 1931)*Pterochloroides persicae* (Cholodkowsky, 1899)***Punica granatum* L. [pomegranate] [PUNICACEAE]***Aphis* (*Aph.*) *gossypii* Glover, 1877

***Pyrus communis* L. [ROSACEAE]**

- Anuraphis farfarae* (Koch, 1854)
Dysaphis (*Po.*) *plantaginea* (Passerini, 1860)
Dysaphis (*Po.*) *pyri* (Boyer de Fonscolombe, 1841)

***Quercus ilex* L. [FAGACEAE]**

- Hoplocallis picta* (Ferrari, 1872)
Lachnus roboris (Linnaeus, 1758)
Myzocallis boerneri Stroyan, 1957
Thelexes suberi (del Guercio, 1911)

***Reichardia picroides* (L.) Roth. [ASTERACEAE]**

- Hyperomyzus* (*H.*) *lactucae* (Linnaeus, 1758)
Uroleucon (*U.*) *hypochoeridis* (Fabricius, 1779)
Uroleucon (*U.*) *sonchi* (Linnaeus, 1767)

***Rosa* sp. [ROSACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Macrosiphum (*Ma.*) *euphorbiae* (Thomas, 1878)
Macrosiphum (*Ma.*) *rosae* (Linnaeus, 1758)

***Rubus ulmifolius* Schott [ROSACEAE]**

- Aphis* (*Aph.*) *ruborum* (Börner, 1931)
Amphorophora (*Amp.*) *rubi* (Kaltenbach, 1843)

***Rumex conglomeratus* Murray [POLYGONACEAE]**

- Aphis* (*Aph.*) *rumicis* Linnaeus, 1758

***Salix pedicellata* Desf. [SALICACEAE]**

- Chaitophorus capreae* (Mosley, 1841)
Tuberolachnus (*Tu.*) *salignus* (J.F. Gmelin, 1790)

***Sedum sediforme* (Jacq.) Pau [CRASSULACEAE]**

- Aphis* (*Aph.*) *sedi* Kaltenbach, 1843
Dysaphis (*Dy.*) *foeniculus* (Theobald, 1923)

***Senecio bicolor* (Willdenow) Todaro [ASTERACEAE]**

- Brachycaudus* (*Pr.*) *cardui* (Linnaeus, 1758)

***Silene vulgaris* (Moench) Garcke [CARYOPHYLLACEAE]**

- Brachycolus* (*Brachycolus*) *cucubali* (Passerini, 1863)

***Sinapis alba* L. [BRASSICACEAE]**

- Aphis* (*Aph.*) *gossypii* Glover, 1877
Myzus (*N.*) *persicae* (Sulzer, 1776)

***Solanum luteum* Miller [SOLANACEAE]**

- Aphis* (*Aph.*) *fabae* Scopoli, 1763
Aulacorthum (*Au.*) *solani* (Kaltenbach, 1843)

Solanum lycopersicum* L. [tomato] [SOLANACEAE]Aphis* (*Aph.*) *gossypii* Glover, 1877*Macrosiphum* (*Ma.*) *euphorbiae* (Thomas, 1878)***Solanum melongena* L. [aubergine] [SOLANACEAE]***Aphis* (*Aph.*) *gossypii* Glover, 1877*Macrosiphum* (*Ma.*) *euphorbiae* (Thomas, 1878)***Solanum nigrum* L. [SOLANACEAE]***Aphis* (*Aph.*) *fabae* Scopoli, 1763*Aphis* (*Aph.*) *rumicis* Linnaeus, 1758*Aulacorthum* (*Au.*) *solani* (Kaltenbach, 1843)***Solanum tuberosum* L. [potato] [SOLANACEAE]***Aphis* (*Aph.*) *gossypii* Glover, 1877*Myzus* (*N.*) *persicae* (Sulzer, 1776)***Sonchus asper* (L.) Hill [ASTERACEAE]***Hyperomyzus* (*H.*) *lactucae* (Linnaeus, 1758)*Uroleucon* (*U.*) *sonchi* (Linnaeus, 1767)***Sonchus oleraceus* L. [ASTERACEAE]***Hyperomyzus* (*H.*) *lactucae* (Linnaeus, 1758)*Uroleucon* (*U.*) *sonchi* (Linnaeus, 1767)***Sorghum halepense* (L.) Pers. [POACEAE]***Rhopalosiphum* *maidis* (Fitch, 1856)*Sipha* (*R.*) *maydis* (Passerini, 1860)***Spartium junceum* L. [FABACEAE]***Aphis* (*Aph.*) *craccivora* Koch, 1854***Stephanotis floribunda* Brongn. [APOCYNACEAE]***Aphis* (*Aph.*) *nerii* Boyer de Fonscolombe, 1841***Suaeda maritima* (L.) Dumort. [CHENOPODIACEAE]***Clypeoaphis* *suaedae* (Mimeur, 1934)***Suaeda vera* Forssk. ex J.F. Gmel. [CHENOPODIACEAE]***Clypeoaphis* *suaedae* (Mimeur, 1934)***Tamarix africana* Poiret [TAMARICACEAE]***Brachyunguis* (*B.*) *tamaricis* (Lichtenstein, 1885)***Teucrium flavum* L. [LAMIACEAE]***Aphis* (*Aph.*) *alienus* Theobald, 1915

Trifolium nigrescens* Viv. [FABACEAE]Acyrtosiphon (Ac.) pisum* (Harris, 1776)*Myzus (N.) persicae* (Sulzer, 1776)***Triticum* sp. [POACEAE]***Rhopalosiphum padi* (Linnaeus, 1758)***Ulmus canescens* Melville [ULMACEAE]***Eriosoma lanuginosum* (Hartig, 1839)*Tetraneura (Tetraneurella) nigriabdominalis* (Sasaki, 1899)*Tetraneura (Tetraneura) ulmi* (Linnaeus, 1758)*Tinocallis (Sappocallis) takachihoensis* Higuchi, 1972***Urospermum picroides* (L.) Scop. ex F.W. Schmidt. [ASTERACEAE]***Aphis (Aph.) gossypii* Glover, 1877*Aphis (Aph.) nasturtii* Kaltenbach, 1843*Uroleucon (U.) hypochoeridis* (Fabricius, 1779)***Urtica membranacea* Poiret in Lam. [URTICACEAE]***Aphis (Aph.) fabae* Scopoli, 1763***Verbena officinalis* L. [VERBENACEAE]***Aphis (Aph.) gossypii* Glover, 1877***Vicia faba* L. [FABACEAE]***Aphis (Aph.) fabae* Scopoli, 1763***Vitis vinifera* L. [grape vine] [VITACEAE]***Aphis (Aph.) illinoisensis* Shimer, 1866***Vitis* sp. [VITACEAE]***Daktulosphaira vitifoliae* (Fitch, 1851)**Host plant: Unknown***Rhopalosiphum rufiabdominale* (Sasaki, 1899)

APPENDIX 3. Ant-aphid list for the Maltese Archipelago***Camponotus barbaricus* Emery, 1905 (Formicinae: Camponotini)**

Aphis (Aph.) fabae, Aph. (Aph.) umbrella

***Camponotus lateralis* (Olivier, 1792) (Formicinae: Camponotini)**

Aphis (Aph.) ruborum, Hyadaphis foeniculi

***Crematogaster scutellaris* (Olivier, 1792) (Myrmicinae: Crematogastrini)**

Aphis (Aph.) fabae, Aph. (Aph.) hederæ, Aph. (Aph.) ruborum, Aph. (Aph.) sedi, Dysaphis (Dys.) tulipæ

***Lasius emarginatus* (Olivier, 1792) (Formicinae: Lasiini)**

Aphis (Aph.) gossypii, Brachycaudus (Prunaphis) cardui

***Lasius lasioides* (Emery, 1869) (Formicinae: Lasiini)**

Aphis (Aph.) gossypii

***Lepisiota frauenfeldi* (Mayr, 1855) (Formicinae: Plagiolepidini)**

Aphis (Aph.) craccivora, Aph. (Aph.) gossypii, Hyadaphis foeniculi

***Pheidole pallidula* (Nylander, 1849) (Myrmicinae: Pheidolini)**

Aph. (Aph.) gossypii, Aph. (Aph.) spiræcola, Aph. (Aph.) umbrella

***Plagiolepis pygmaea* (Latreille, 1798) (Formicinae: Plagiolepidini)**

Aphis (Aph.) fabae, Aph. (Aph.) gossypii, Aph. (Aph.) multifloræ, Aph. (Aph.) nasturii, Aph. (Aph.) ruborum, Aph. (Ps.) picridicola, Dysaphis (Dys.) apifolia, Dys. (Dys.) tulipæ, Melanaphis donacis, Siphæ (Rungsiæ) maydis

***Tapinoma nigerrimum* (Nylander, 1886) (Dolichoderinae: Tapinomini)**

Aphis (Aph.) fabae, Aph. (Aph.) gossypii, Aph. (Aph.) nerii, Aph. (Aph.) spiræcola, Siphæ (R.) maydis

***Tetramorium semilæve* Andre, 1883 (Myrmicinae: Tetramoriini)**

Aphis (Ps.) picridicola