

Aphids /Hemiptera, Aphidoidea/ on garden perennial plants

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Introduction

There are only few publications in Poland about aphids settling decorative perennial plants. Data concerning the aphids on perennial plants are found in a paper by ACHREMOWICZ (1978) and OSIADACZ (2007). The information about aphids on herbs is provided by GOSZCZYŃSKI & CICHOCKA (1992). Moreover, in Polish publications there is a key to identify perennial plant pests on the basis of the extent of damage (ŁABANOWSKI, 1996) and a book “Protection of Perennial Plants” (“Ochrona Bylin”) (ŁABANOWSKI *et al.*, 2005) in which one can find data concerning insect pests from other orders.

The present paper presents and discusses the information on aphids collected on perennial ornamental plants in nurseries, and botanical gardens as well as on flower-beds in home gardens.

Material and methods

A survey of garden perennial plants has been carried out since 1981 especially on flower-beds in home gardens. In 2000-2007 the observations were concerned with perennial plants in perennial nurseries specializing in the production of garden perennial-plants as well as in nursery-gardens reproducing trees and ornamental shrubs, as well as in botanical gardens. From May to

August all plants or their parts with aphid colonies were taken to a laboratory where they were mounted on slides using Hoyer liquid as a medium (mixture of 50 ml of distilled water, 30 g of Arabic gum, 200 g of chloral hydrate, 20 g of glycerine) (BOCZEK, 1980). The species of the collected specimens were identified on the basis of the keys by HEIE (1980; 1986; 1992; 1994; 1995). Aphid nomenclature was adopted after the checklist of animals of Poland edited by RAZOWSKI (1990). Particular developmental stages were identified as follows: apt. – wingless virginoparae, al. – winged virginoparae, nim. – nymphs, lar. – larvae.

Results

Review of aphid species

Pemphigidae Pemphiginae

Parathecabius lysimachiae (Börner, 1916)

Collected material: *Lysimachia nummularia* L. (Borowno near the town of Częstochowa, 8.05.2001 – apt., nim.; OB.-Warszawa, 1.07.2003 – apt., lar.; Sielce near the town of Puławy, 13.06.2001 – lar.; Skierniewice, 22.09.2006 - lar.).

In Poland this aphid was recorded for the first time on *L. nummularia* by CZYŁOK *et al.* (1988) while earlier it was known only by its presence on *Populus nigra* L., on leaves of which it formed galls (SZELEGIEWICZ, 1968).

Type of damage: on *L. nummularia* aphids form colonies on the roots and at the base of shoots. As a result of feeding plant growth is inhibited, and when the number of aphids is very high the plant dies.

Thecabius affinis (Kaltenbach, 1843)

Collected material: *Ranunculus acris* L. (village of Sielce near the town of Puławy, 21.06.1995).

It is known primarily from its occurrence on *Populus nigra* L., *Populus italica* Moench, *Populus alba* L. 'Pyramidalis', where the fundatrix folds down the leaf ridge and its offspring develops on shoot tops in leaves folded along the veins. This aphid migrates from *Populus* spp. onto *Ranunculus repens* L., *Ranunculus acris*, *Ranunculus bulbosus* L., *Ranunculus flammula* L., which are its secondary hosts (HEIE, 1980; SZELEGIEWICZ, 1968).

Type of damage: aphids remained at the base of shoots and roots under cover consisting of white wax excretion reminiscent of cotton wool clusters. On plants infested by aphids the drying of individual shoots, followed by the entire plant drying out was observed.

Aphididae, Aphidinae, Aphidinae***Acaudus cardui*** (Linnaeus, 1758)

Collected material: *Echinops ritro* L., (OB-Warszawa, 21.06.2000 apt., – lar.), *Leucanthemum x superbum* (Bergmans ex J. Ingram) R. Soreng et. E.A. Cope (Warszawa Włochy, 15.06.2005 – apt., lar.); *Helenium hoopesi* A. Gray (OB-Powsin, 12.07.2001 – apt., al.), *Lythrum salicaria* L. (Skierniewice, 8.06.2006 – apt., lar.).

This aphid is commonly found on *Prunus* spp., which is considered to be its primary host and on different wild and crop plants, especially from the Asteraceae family, including *Achillea millefolium* L. and *Matricaria chamomilla* L. (GOSZCZYŃSKI & CICHOCKA, 2004) which are its secondary hosts.

Type of damage: aphids fed on the youngest leaves and inflorescence causing their deformation.

Aphis fabae Scopoli, 1763

Collected material: *Campanula latifolia* (O.B. – Warszawa, 5.06.2001 – apt., al.).

The primary host of this aphid are deciduous shrubs, including *Viburnum opulus* L., *Euonymus* sp., *Philadelphus coronarius* L., on which it overwinters in the form of eggs, whereas its secondary hosts are different herbal plants, including *Mentha piperita* L., *Melissa officinalis* L. (GOSZCZYŃSKI & CICHOCKA, 2004). It also appears on perennial plants of the following genera: *Campanula*, *Eryngium*, *Papaver*, *Tulipa* from mid-May until the end of June, and from mid-August until the end of September – on *Dahlia variabilis* (Willd.) Desf. and *Gladiolus gandavensis* L. (BURDAJEWICZ & BOREJSZA-WYSOCKI, 1978).

Type of damage: Aphids formed quite numerous colonies on inflorescence shoots of the bottom side of leaves (around leaf petiole) and on inflorescence peduncles and in inflorescence. As a result of aphid feeding the inflorescence was deformed. Its development and harmfulness on field beans (*Vicia faba minor*) was researched by GOSZCZYŃSKI *et al.* (1992).

Aphis frangulae Kaltenbach, 1845

Collected material: *Nepeta x faassenii* Bergmans ex Stearn (Warszawa, 15.06.2005 apt., lar., nim., Nowy Dwór, 16.05.2005 – apt.; Warszawa, 15.06.2005; Skierniewice, 11.07.2005 – apt., lar.).

This aphid was confirmed also on a related species *Nepeta cataria* L. in the United States but never before was it recorded on *Nepeta faassenii* (SMITH, 1939). There are references to its presence on *Lamium* spp and on *Acinos*

arvensis (Lam.) Dandy, which are its secondary hosts on which it migrates from *Frangula alnus* (Mill.) (GOSZCZYŃSKI & CICHOCKA, 2004; OSIADACZ, 2007).

Type of damage: aphids formed large and numerous colonies on shoots and inflorescence as well as on leaves.

Aphis newtoni Theobald, 1927

Collected material: *Iris pumila* L. (OB.-Powsin, 6.06. and 1.07.2003 – apt., lar.), *Iris sibirica* L. (Skierniewice, 9.07.2000 – lar.; OB-Warszawa, 1.07.2003 – apt., nim.)

This aphid was also collected from other species *Iris tubergiana* L., *Iris germanica* L. and *Iris pseudacorus* L. (ACHREMOWICZ, 1978).

Type of damage: aphids formed numerous colonies, initially on the bottom part of leaves near the ground, and later also on inflorescence.

Aphis sambuci Linneus, 1758

Collected material: *Lychnis alpina* (Lodd.) Reuter et Burdet (Nowy Dwór, 25.05.2005 – nim., al.).

This aphid is primarily known from its presence on *Sambucus nigra* L. and *Sambucus racemosa*, L., where it forms very large colonies on shoots. From shrubs it migrates on the roots of *Rumex crispus* L. and *Dianthus* spp. (SZELEGIEWICZ, 1968; CICHOCKA GOSZCZYŃSKI, 1992) but their damage has never been observed.

Type of damage: the aphid formed colonies on shoots at the base of roots. When plants were strongly infested by aphids the dying out of single shoots and then of the entire plants was recorded. This aphid is known also from its presence on *Dianthus carthusianorum* L., *Capsella bursa – pastoris* (L.) Medik. and *Oenothera fruticosa* L. as its secondary hosts (OSIADACZ, 2007).

Aphis sedi Kalthenbach, 1843

Collected material: *Sedum anacampseros* L. (Nowy Dwór, 7.06.2000 – apt., al., lar.), *Sedum hybridum* L. ‘Matrona’ (Nowy Dwór, 1.06.2004 – apt., nim., Pakość near the town of Inowrocław, 15.06.2000 – apt., al., nim., lar.), *Sedum spectabile* Boreau. (Pakość, 22.05.1998 – al., lar., Pakość, 6.07.1999 – apt., nim.), *Sedum spurium* M. Bieb. (Warszawa, 15.09.1994 apt., lar.; Warszawa-Włochy, 20.05.1998 – apt., lar.; Sielce near the town of Puławy, 16.05.2000 – apt., nim., lar.), *Sedum telephium* L. (Nowy Dwór, 3.06.1988 – apt., lar.), *Sempervivum tectorum* L. (Młynki near the town of Puławy, 30.06.1999 – apt., nim., lar.).

Previously it was known from its occurrence on leaves and inflorescence of *Sedum maximum* L., *Sedum acre* L., *Sedum telephium*, *Sedum Kamtschaticum*

middendorffianum (Maxim.) R.T. Clausen (SZELEGIEWICZ, 1968), *Sedum maximum* (L.) Hoffm and *Sedum spurium* M. Bieb. (OSIADACZ, 2007).

Type of damage: the aphids form colonies in plant tops and inflorescence among the flowers causing leaf twisting and inhibiting the growth of shoots.

Aphis ulmariae Schrank, 1801

Collected material: *Filipendula ulmaria* (L.) Maxim. 'Aurea Variegata' (Warszawa-Włochy, 10.06.2003 – al., nim., lar.)

It was previously reported on *Filipendula ulmaria* (SZELEGIEWICZ, 1968).
Type of damage: aphids feed in a large number on leaves causing their beating into loose nests. Aphid colonies were attended by ants.

Aphids verbasci Schrank, 1801

Collected material: *Verbascum x hybridum* (Skierniewice, 1.07.1986; 10.06.1987).

In Poland recorded on *Verbascum phlomoides* L. and *Verbascum thapsiforme* Schrad., and *Verbascum thapsus* L. in the area of Ojców National Park (OSIADACZ, 2007).

Type of damage: aphid colonies were observed in inflorescence.

Aulacorthum langei (Brner, 1939)

Collected material: *Pulmonaria saccharata* Mill. 'Mrs Moon' (Skierniewice, 14.08.2001 – apt., lar.; Nowy Dwór near the town of Skierniewice, 4.07.2002 – apt., lar.).

In Poland it is known from its presence on *Pulmonaria obscura* Dumort (SZELEGIEWICZ, 1968).

Type of damage: aphids form small colonies on the bottom side of leaves which folded and twisted as a result of feeding.

Aulacorthum solani (Kaltenbach, 1843)

Collected material: *Echinacea purpurea* (L.) Moench (23.05.2005; Warszawa-Włochy, 15.06.2005 – apt., al., lar.), *Bergenia cordifolia* (Haw.) Sternb. (Borowno, 8.05.2001 – nim., lar.; 30.05.2001); *Heuchera x brizoides* (Topola Królewska, 15.06.2004 – apt., nim., lar.); *Nepeta faasseni* Bergmans ex Stearn (Nowy Dwór k/ Skierniewic 16.05.2004 – apt., lar.), *Salvia nemorosa* L. (Skierniewice, 27.05.2005 – apt., lar.), *Sedum spurium* M. Bieb. (Sielce near the town of Końskowola, 20.05.1998 – apt., lar.), *Tulipa* spp. (Skierniewice, 5.06.1989 – apt., nim., lar.).

This aphid is mostly known from its presence on ornamental plants under cover (BOGDANOWICZ *et al.*, 2004). Out of all the ornamental plants growing in the ground it was recorded on *Papaver rhoeas* L., *Geum urbanum* L., *Lamium album* L (SZELEGIEWICZ, 1968), on *Tulipa* spp. (BURDAJEWICZ *et al.*, 1978) and out of herbal plants it was recorded on *Melissa officinalis* L. and *Salvia officinalis* L. (GOSZCZYŃSKI & CICHOCKA, 2004).

Type of damage: aphids feed on the bottom side of leaves causing their severe deformation and weakening plant growth.

Brachycaudus helichrysi (Kaltenbach, 1843)

Collected material: *Achillea filipendulina* Lam., syn. *A. eupatorium* (Skierniewice, 30.05.2005 – al.; Bestwinka, 30.05.2007); *Aster dumosus* L. (Pakość near the town of Inowrocław, 27.06.2001 – apt., nim.; Bestwinka, 30.05.2007 – apt., lar.); *Echinacea purpurea* (L.) Moench. (Bestwinka, 30.05.2007 – apt., lar.); *Erigeron speciosus* (Lindl.) DC. (OB-Powisin, 27.05.2002 – apt., lar.; Skierniewice, 27.06. and 1.07.1994 – apt., lar.), *Eupatorium purpureum* L. (Pakość, 15.06.2004), *Eupatorium maculatum* L. (27.05.2002 – apt., lar.) *Leontopodium alpinum* Cass. (Bestwinka, 30.05.2007 – apt., lar.), *Leucanthemum x superbum* (Bergmans ex J. Ingram) R. Sorng et. E.A. Cope (Warszawa-Włochy, 15.06.2005 – apt., lar.; Bestwinka, 30.05.2007 – apt., lar.); *Penstemon barbatus* (Cav.) Roth., (Końskowola near the town of Puławy, 20.07.2005 – apt., lar.; Skierniewice, 30.05.2007 – apt., lar.), *Rudbeckia speciosa* Wender (Młynki near the town of Puławy, 30.06.1999 – nim., lar.), *Solidago hybrida* (Skierniewice, 30.05.2005; 5.06.1989 – apt., al., lar.).

This aphid migrates from *Prunus domestica* L. on to plants of the Asteraceae: *Solidago virgaurea* L., *Erigeron canadensis* L., *Helichrysum arenarium* (L.) Moench), *Anthemis tinctoria* L., *Achillea millefolium* L., *Tripleurospermum inodorum* (L.) Sch.-Bip., *Tanacetum vulgare* L., *Artemisia vulgaris* L., *Senecio vulgaris* L., *Senecio vernalis* Waldst. & Kit, *Echinops*, *Centaurea cyanus* L., uncommonly on other plants such as: *Rosa canina* L., *Myosotis palustris* (L.) Nath. (SZELEGIEWICZ, 1968). It was collected as well as from *Aster novi-belgii* L., *Chrysanthemum indicum* L., *Inula helenium* L. (ACHREMOWICZ, 1978).

Type of damage: aphids which were feeding in large groups on inflorescence buds and in inflorescence as well as on the bottom side of apical leaves caused their folds and twisting.

Brachysiphon thalictri (Koch, 1854)

Collected material: *Thalictrum aquilegifolium* L. (OB.-Warszawa, 10.07.2000 – apt.), *Aquilegia vulgaris* L. (Skierniewice 3.09.1991 – apt., lar.).

Previously it was recorded on *Thalictrum aquilegiifolium* and *Thalictrum minus* L. (SZELEGIEWICZ, 1968).

Type of damage: aphids form colonies on inflorescence, polluting them with honeydew and moults.

Cryptomyzus alboapicalis (Theobald, 1916)

Collected material: *Lamium maculatum* L. (Skierniewice, 8.06.1993 – apt., lar.; 21.06.2005 – apt., lar.).

In Poland it is known from its presence on *Lamium album* L. and *Lamium purpureum* L. (SZELEGIEWICZ, 1968), and *Ballota nigra* L. (OSIADACZ, 2007).

Type of damage: aphids feed individually on the bottom side of the youngest leaves not causing visible changes in appearance of leaf blades.

Delphinobium junackianum (Karsh, 1887)

Collected material: *Delphinium x cultorum* Voss., *D. consolida* L. (Skierniewice, 30.05.1989 – apt., nim.; 3.06.1995 – apt., nim., lar.).

Previously recorded on: *Consolida ajacis* (L.) Schur, *Delphinium barlovii*, *Aconitum variegatum* L. (SZELEGIEWICZ, 1968) and *Aconitum firmum* Rchb. (OSIADACZ, 2007).

Type of damage: aphids form large groups especially in the upper part of shoots and in inflorescence as well as on the bottom side of leaves causing deformation of shoots, yellowing and browning of leaves.

Longicaudus trirhodus (Walker, 1849)

Collected material: *Aquilegia vulgaris* L. (Sielce near the town of Puławy, 7.08.1996 – apt., lar.; 16.05.2000 – apt., lar.; Dąbrówka near the town of Warszawa ; Warszawa-Włochy, 10.06.2003 – apt., lar.; Skierniewice, 3.09.1991 apt., lar.); *Thalictrum minus* L. ‘Adiantifolium’ (OB-Powsin, 12.07.2001 – apt., lar.).

This aphid migrates from *Rosa canina* L. on to *A. vulgaris* and *Thalictrum aquilegiifolium* L. and *T. minus* (NAST *et al.*, 1990).

Type of damage: aphids feed on the bottom side of leaves in small colonies. When feeding they excrete honeydew, on which saprophytic fungi, which cover plants with black coating, develop. They are not attended by ants.

Macrosiphoniella artemisiae (Boyer de Fonscolombe, 1841)

Collected material: *Artemisia verlotiorum* Lamotte (OB.-Warszawa, 5.06.2001 – apt., nim., lar.).

In Poland it was recorded on *Artemisia vulgaris* L. and *Artemisia absinthum* L. (SZELEGIEWICZ, 1968; OSIADACZ, 2007).

Type of damage: aphids feed on inflorescence where they form numerous colonies.

Macrosiphoniella millefolii (De Geer, 1773)

Collected material: *Achillea filipendulina* Lam. (Pakość by the town of Inowrocław, 26.05.1998; Nowy Dwór, 14.07.2002 – apt., lar.).

It was recorded on inflorescence of *Achillea millefolium* L., *Achillea pannonica* (Scheele) less often on plants of the Asteraceae family: *Anthemis arvensis* L., *Chrysanthemum parthenium* (L.) Bernh. (SZELEGIEWICZ, 1968) and *Leucanthemum vulgare* Lam (OSIADACZ, 2007).

Type of damage: aphids feed in inflorescence.

Macrosiphum albifrons (Essig, 1911)

Collected material: *Lupinus polyphyllus* Lindl. (Skierniewice, 16.06.1994 – apt., nimf., lar.; Jasieniec near the town of Grójec, 26.05.2007 – apt., lar.).

OSIADACZ was the first to report the presence of this aphid in Poland on *Lupinus polyphyllus* in the Ojcowski National Park (2007).

Type of damage: it forms large colonies on leaves and inflorescence. Aphids abundantly excrete honeydew.

Macrosiphum euphorbiae (Thomas, 1878)

Collected material: *Astilbe grandis* Stapf ex E.H.Wilson (Gospodarz near the town of Łódź 23.04.2004 – al., nim.), *Doronicum caucasicum* M. B. (Skierniewice, 20.05.1994 – apt., nim., lar.).

This aphid is often present on different lignified and herbaceous plants, including *Mentha piperita* L. (GOSZCZYŃSKI & CICHOCKA, 2004), and *Chrysanthemum indicum* L. (ACHREMOWICZ, 1978).

Type of damage: Aphids form large and numerous colonies on shoots and bottom side of leaves causing their twisting.

Nectarosiphon ajugae Schouteden, 1903

Collected material: *Ajuga reptans* L. (Pakość, 3.06.2001 – apt. lar.).

It was previously reported on *Ajuga reptans* (SZELEGIEWICZ, 1968)
Type of damage: aphids fed on the upper side of the youngest leaves causing twisting up of leaf blade ridges and leaf twisting.

Nectarosiphon persicae (Sulzer, 1776)

Collected material: *Dianthus barbatus* L. (Skierniewice, 25.07. 1999 – apt., lar.,).

This aphid is present on trees and shrubs which are its primary hosts and during summer it occurs on different herbaceous plants, including such herbal plants as *Mentha piperita* L., *Salvia officinalis* L. and *Ocimum basilicum* L. (GOSZCZYŃSKI *et al.*, 1992) and on *Dahlia variabilis* (Willd.) Desf., *Inula elenium* L., *Verbena rigida* Spreng (BURDAJEWICZ, 1978).

Type of damage: aphids form colonies consisting of wingless forms on the bottom side of leaves and on flower buds. Leaves and flowers are deformed and change their colour to yellow. This aphid is a vector of many viruses which cause mosaics in plants.

Ovatomyzus stachyos Hille Lambers, 1947

Collected material: *Lamium maculatum* L. (8.06.2000); *Stachys byzantina* K. Koch (Skierniewice, 16.06. 2002 – apt., larvae).

This species is listed in the checklist of aphids of Poland in the catalogue by BOGDANOWICZ *et al.* (2004), but there are no details on its presence in Poland. In Europe it is also known in Denmark, Sweden, the Netherland, France, the Czech Republic and Portugal, as well as in the United Kingdom (HEIE, 1994). Type of damage: aphids form dispersed colonies on the bottom part of older leaves, and they are hidden among hairs. While feeding, these insects suck out the cell content leading to plant's weakening.

Uroleucon (Uromelan) daronici (Börner, 1942)

Collected material: *Doronicum caucasicum* M. B. syn. *Doronicum orientale* Hoffm (Skierniewice, 13.06.1994 – apt.).

In Poland it is known to occur on *Doronicum austriacum* Jacq. (SZELEGIEWICZ, 1968).

Type of damage: Aphids form colonies on stalks and leaves.

Conclusions

1. On perennial ornamental plants in perennial nurseries and botanical gardens 24 aphid species of 2 families were recorded: Pemphigidae and Aphididae.

2. Three aphid species: *Parathecabius lysimachiae*, *Thecabius affinis* and *Aphis sambuci* settle underground parts whereas the remaining 21 species are present on over ground parts.

3. Among the polyphagous aphids, it is the *Brachycaudus helichrysi*, which posed the greatest threat to perennial plants from the Asteraceae family in perennial nurseries.

4. Out of the monophagous aphids the most dangerous for plants of the *Sedum* genus was *Aphis sedi*, for *Ajuga reptans* - *Nectarosiphon ajugae*, whereas for *Filipendula ulmaria* 'Aurea Variegata' *Aphis ulmariae*.

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Mszyce /Hemiptera, Aphidoidea/ zasiedlające byliny ogrodowe

Streszczenie

Wieloletnie badania nad składem gatunkowym owadów zasiedlających byliny w szkółkach bylinowych oraz ogrodach botanicznych pozwoliły stwierdzić 25 gatunków mszyc, z których 2 – należały do rodziny, bawelnicowatych (*Pemphigidae*) natomiast pozostałe 23 gatunki reprezentowały rodzinę mszycowatych (*Aphididae*). Mszyce z rodziny bawelnicowatych *Parthecabius affinis* i *Thecabius affinis* oraz *Aphis sambuci* zasiedlały podziemne części roślin, natomiast pozostałe gatunki mszyc wystąpiły na nadziemnych częściach roślin.

Z mszyc zasiedlających nadziemne części roślin szczególnie groźna była mszyca śliwowo-kocankowa (*Brachycaudus helichrysi*), która wystąpiła na 12 gatunkach roślin z rodziny *Asteraceae* oraz mszyca śliwowo-ostowa (*Acaudus cardui*), która tworzyła gęste kolonie na *Chrysanthemum superbum*. Na orlikach (*Aquilegia* sp.) pospolicie występowała mszyca różano-rutewkowa (*Longicaudus trirhodus*), a na kocimiętce Faassena (*Nepeta x faasseni*) żerowała mszyca kruszynowo-ziemniaczana (*Aphis frangulae*) natomiast na kosańcu niskim (*Iris pumila*) – mszyca kosańcowa (*Aphis newtoni*). Rozchodniki (*Sedum* sp.) były opanowane przez mszycę rozchodnikową (*Aphis sedi*). Dla dąbrówki rozłogowej (*Ajuga reptans*) największe zagrożenie stanowiła mszyca dąbrówkowa (*Nectarosifon ajugae*). Na jasnocie plamistej (*Lamium maculatum*) oraz czyścicu wełnistym (*Stachys byzantina*) żerowała mszyca czyścówka (*Ovatomyzus stachyos*).

