

Aphids (*Hemiptera: Aphidoidea*) on selected marshy communities

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Introduction

Marshy forests are a plant community connected with hydrogenic settlements such as river and stream valleys. They belong to azonal plants the formation of which is conditioned by habitat factors humid or wet soils flooded regularly with water rich in oxygen and minerals (SZWEYKOWSKA & SZWEYKOWSKI, 1993). They are formed by different species of trees of the *Alnus* (alder), *Populus* (poplar), *Salix* (willow), *Ulmus* (elm), *Fraxinus* (ash tree) genus. *Aegopodium podagraria* L., *Festuca gigantea* (L.) Vill., *Urtica dioica* L. and *Filipendula ulmaria* (L.) Maxim. are species constant to all the types of marshes.

These forests are divided into two groups:

alnus ash tree and elm forests which belong to the *Querco-Fagetea* Class, *Fagetalia sylvaticae* Order which form *Alno-Ulmion* Br.-Bl. Et tx. 1943 community,

salix and poplar forests from the *Salicetea purpureae* Moor 1958 class and community of *Salicion albae* Tx. 1955.

Within the *Alno-Ulmion* community 8 forest marsh associations were identified: *Ficario-Ulmetum minoris*, *Fraxino-Alnetum*, *Carici remotae Fraxinetum*, *Alnetum incanae*, *Caltho laetae-Alnetum*, ash tree with *Astrantia* and elm with *Viola odorata*. However, willow-poplar marshy can be diversified in Poland into two communities: (*Salicetum albo-fragilis*) and *Populetum albae* (MATUSZKIEWICZ, 2001).

Aphids *Aphidoidea* are piercing-sucking phytophags with a trophic determined host plant. In an overwhelming majority they are strict monophagous insects connected with one botanic species or oligophagous feeding on one type of host plant. The smallest number within this group of *Hemiptera* is constituted by polyphagous insects (SZELEGIEWICZ, 1978). Such tight trophic connections enable one to observe the groups of aphids connected with given plant communities. Such research was also concerned with dunes (SZELEGIEWICZ, 1974b), forest communities (CZYŁOK *et al.*, 1982; CZYŁOK, 1983; CZYŁOK *et al.*, 1988; PŁACHTA *et al.*, 1996, HAŁAJ & WOJCIECHOWSKI, 1997; DURAK & WOJCIECHOWSKI, 2005), forest growing on dry ground (CZYŁOK, 1983; BOCHEN, 1989), or xerothermic grasses (CZYŁOK & WOJCIECHOWSKI, 1987; HAŁAJ & WOJCIECHOWSKI, 1996). Also marshy forests were the subject of such research CZYŁOK *et al.*, (1982) (Biebrzanska Valley); CZYŁOK *et al.*, (1988) (Bieszczady Mts.), HAŁAJ & WOJCIECHOWSKI, (1997) (Częstochowska Upland), DURAK & WOJCIECHOWSKI, (2005) (Sandomierska Upland). Contrary to the previously mentioned plant communities, the marshy are one of the most reduced in Poland usually due to transformed forest environments, which is caused to a large extent by drying of the terrain, meliorating works and regulation of river- and stream-beds.

The aim of this research was to undertake faunistic studies in such valuable environment and to present an index of aphids collected in selected marshy communities of the Ojcowski National Park and Orawsko-Nowotarska Valley and a potential species list of aphids associated with this dispersing community.

Materials and methods

In the Ojcowski National Park the research was carried out in 2003-2006, from the beginning of May until mid-October, in marshy communities which were located in the following sites: Pieskowa Skała, Młynnik, Ojców-Zazamcze, Seismological Observatory, central part of the Sąspowska Valley, Ojców near Pstrągarnia, Ojców near Źródło Miłości, Ojców near the Caritas.

In the Orawsko-Nowotarska Valley the research was carried out in 2003-2006, from mid-May until mid-September, in marshy communities, the sites of which were in Przymiarki, Ludźmierz, Wróblówka and Czarny Dunajec.

The so called on 'stalking' method, based on searching across host plants, was used to collect the research material (SZELEGIEWICZ, 1959). Additionally the shaking off trees and shrubs for the insects to fall into a standard entomological net was applied.

Results

Thirty five aphid species recorded on inspected marshy communities, among them in the Ojców National Park (ONP) 19 species, and in Orawsko-Nowotarska Valley (ONV) 21 species:

- Drepanosiphum acerinum* (Walker, 1848): *Acer pseudoplatanus* L.; ONP
D. platanoidis (Schrank, 1801): *A. platanoides* L., *A. pseudoplatanus* L.; ONV
Clethrobius comes (Walker, 1848): *Betula pendula* Roth.; ONV
Pterocallis albidus, Börner, 1940: *Alnus incana* Moench.; ONV
Chaitophorus capreae (Mosley, 1841): *Salix caprea* L., *S. cinerea* L.; ONV
Ch. horii beuthani (Börner, 1950): *S. fragilis* L.; ONV
Ch. hypogaeus Hille Ris Lambers, 1947: *S. fragilis* L.; ONP
Ch. leucomelas Koch, 1854: *Populus nigra* L.; ONV
Ch. mordvilkoii Mamontova, 1961: *S. purpurea* L.; ONV
Ch. parvus Hille Ris Lambers, 1935: *S. repens* L.; ONV
Ch. populiae (Boyer de Fonscolombe, 1841): *P. alba* L.; ONV
Ch. salicis (Schrank, 1801): *S. caprea* L., *S. viminalis* L.; ONV
Ch. salijaponicus niger Mordvilko, 1929: *S. fragilis* L.; ONP
Ch. truncatus Hausmann, 1802: *S. alba* L., *S. fragilis* L., *S. purpurea* L.,
S. triandra L.; ONP, ONV
Ch. vitellinae Schrank, 1801: *S. fragilis* L.; ONV
P. aceris (Linnaeus, 1761): *A. platanoides* L., *A. pseudoplatanus* L.; ONV
P. testudinaceus (Ferne, 1852): *A. platanoides* L., *A. pseudoplatanus* L.; ONP
Plocamaphis flocculosa brachysiphon Ossiannilsson, 1959: *S. alba* L.; ONP
Pterocomma jacksoni Theobald, 1921: *S. caprea* L., *S. aurita* L.; ONV
P. pilosum pilosum Buckton, 1879: *S. alba* L., *S. fragilis* L.; ONP, ONV
P. rufipes (Hartig, 1841): *S. alba* L., *S. fragilis* L., *S. triandra* L.; OPN, KON
P. salicis (Linnaeus, 1758): *S. caprea* L.; ONV
A. fabae fabae Scopoli, 1763: *Aegopodium podagraria* L., *Urtica dioica* L.; ONP
A. farinosa Gmelin, 1790: *S. alba* L., *S. caprea* L., *S. cinerea* L., *S. fragilis* L.;
ONP, ONV
A. podagrariae Schrank, 1801: *A. podagraria* L.; ONP
A. sambuci Linnaeus, 1758: *Sambucus nigra* L.; ONP
A. urticata J. F. Gemlin, 1790: *U. dioica* L.; ONP
Acyrtosiphon malvae (Mosley, 1841): *Geranium phaeum* L.; ONP
Aulacorthum solani (Kaltenbach, 1843): *A. podagraria* L., *G. phaeum* L.; ONP
Cavariella aegopodii (Scopoli, 1763): *A. podagraria* L., *Anthriscus sylvestris*
(L.) Hoffm., *S. aurita* L., *S. purpurea* L.; ONP, ONV
Impatiens asiaticum Nevsky, 1929: *Impatiens noli-tangere* L.; ONV
Delphinobium junackianum (Karsch, 1887): *Aconitum firmum* Rchb.; ONV
Macrosiphum cholodkovskyi (Mordvilko, 1909): *Filipendula ulmaria* (L.) Ma-
xim.; ONP

Macrosiphum gei (Koch, 1855): *Anthriscus sylvestris* (L.) Hoffm., *Chaerophyllum hirsutum* L., *Ch. temulum* L.; ONP
Microlophium carnosum (Buckton, 1876): *U. dioica* L.; ONP

Discussion

Marshy forests are characterized by complex structure of space and layers which have a large number of ecological niches for diversified living organisms (TOMIAŁOJĆ, 1995). It consists of about 90 species of herbal plants, trees and shrubs, but when the tree layer is properly formed and rich in species then the undergrowth layer is relatively poor and the number of plants which form the communities is half the size. Potentially about 100 aphid species can be associated with this community (SZELEGIEWICZ, 1968). Usually, however, the number of species recorded is much smaller (Biebrzanska Valley 33 species, Bieszczady Mts. 59 species, the Częstochowska Upland 42 species, the Sandomierska Upland 13 species, Ojcowski National Park 19 species, Orawsko-Nowotarska Valley 21 species). For alder swamp *Prociphilus fraxini* and *Clethrobium comes* are provided as species that stand out as well as aphids from the *Pterocallis* genera and *Impatientinum balsamines* (HAŁAJ & WOJCIECHOWSKI, 1997; DURAK & WOJCIECHOWSKI, 2005). Characteristic species are *Glyphina schrankiana*, *Macrosiphum daphnidis* and *I. asiaticum*. In the *Salix* marshy the following species are considered to be characteristic: *Chaitophorus horii beuthani*, *Ch. salijaponicus niger*, or *Plocamaphis americanae* (CZYŁOK *et. al.*, 1988). In this community aphid species that are associated with trees and shrubs representing the following genera: *Clethrobium*, *Drepanosiphum*, *Pterocallis*, *Periphyllus*, *Chaitophorus*, *Pterocomma* and *Cavariella* dominated.

Also aphids collected in marshy communities of the Orawsko-Nowotarska Valley belong to these genera. Among them two species of the *Chaitophorus* genus *Ch. mordvilkoii* and *Ch. parvus* deserve attention; they have been so far known from a single locality in Poland (WIECZOREK & OSIADACZ, 2006-2007). The remaining species are those which are typically mentioned for alder swamps as standing out (*C. comes*, *P. albidus*) or characteristic (*I. asiaticum*).

However, in the *Salix* marshy species of the *Pterocomma* and *Chaitophorus* genera dominated along with characteristic species *Ch. horii* and *Ch. truncatus*. In this index it is the appearance of *Delphinobium junackianum* that provokes the greatest doubt for it is a species trophically associated with monkshood (*Aconitum firmum* Rch.), which is not a plant typical for the marshy community. The community of this site was located in Wróblówka, near the bank of Czarny Dunajec, which may be connected with migration of mountainous plants along the river banks. Floods are considered to be the main factor which favours such migration and which causes both the increase in the number of

species and mountainous plant location on river alluviums which flow out of mountains (including Czarny Dunajec river) as well as a clear boundary of their presence in river areas (KOCZUR, 2002).

Chaitophorus hypogaeus deserves particular attention from all the aphid species recorded in marshy community of the Ojcowski National Park. This European species, which is associated mainly with peat and humid meadows, is very rare in Poland (SZELEGIEWICZ, 1974a). So far it has been indexed only to be present in the area of Upper Silesia (OLESIŃSKI & SZELEGIEWICZ, 1974) and the Krakowsko-Wielunska Upland (WOJCIECHOWSKI *et al.*, 1989). It is considered to be a monophagous aphid associated with *Salix repens* L. (= *S. rosmarinifolia* L.), where it feeds on its underground parts. In the ONP aphids of this species were recorded in the upper parts of shoots of crack willow (*S. fragilis* L.) and the weeping willow *S. x sepulcralis* Simonk. "Chrysocoma". *Macrosiphum cholodkowsky* also deserves attention for it is a monophagous species that occurs exclusively in marshy communities and is associated with *Filipendula ulmaria* (L.) Maxim.

Marshy forests in the Orawsko-Nowotarska Valley, and especially in the Ojcowski National Parks form small fragments constituting mosaic with other communities. They remain by now in Poland on the surface of about 15% of the previous area. They are in danger of extinction because of traditional hydrotechnic activities which make impossible for the annual flush of rivers to reach them (TOMIAŁOJC, 1995), and stimulate their development. As a result this leads to disappearance of many plant and animal species and an impoverishment of biological and landscape diversity (DENISIUK, 2002). Such unfavorable changes in these environmentally valuable marshies cause a decrease in aphid species number. In case of aphids, which are closely associated with their host plants, one can observe a decline in the potential number of species present there, along with the appearance of accidental species unassociated with this community which makes it difficult to correctly determine the association of these *Hemiptera*.

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Mszyce (*Hemiptera: Aphidoidea*) wybranych zbiorowisk łągowych

Streszczenie

Praca przedstawia wykaz gatunków mszyc (*Hemiptera, Aphidoidea*) związanych z wybranymi zbiorowiskami łągowymi Ojcowskiego Parku Narodowego i Kotliny Orawsko-Nowotarskiej. Łącznie w badanych zbiorowiskach łągowych wykazano 35 gatunków mszyc, w tym w Ojcowskim Parku Narodowym 19 gatunków, natomiast w Kotlinie Orawsko-Nowotarskiej 21 gatunków. W zbiorowiskach tych dominują gatunki mszyc związane z drzewami i krzewami, należące do rodzajów *Clethrobium*, *Drepanosiphum*, *Pterocallis*, *Periphyllus*, *Chaitophorus*, *Pterocomma* i *Cavariella*. Obok gatunków wyróżniających (*C. comes*, *P. albidus*) i charakterystycznych (*I. asiaticum*) wykazano również gatunki rzadkie w skali kraju i znane dotychczas z pojedynczych stanowisk (*Chaitophorus hypogaeus*, *Ch. mordvilkoii*, *Ch. parvus*).

