

Sambucus nigra L. in Lublin area landscape and its aphid fauna

WOJCIECH GOSZCZYŃSKI*, MAREK OSAK

Department of Plant Protection, The John Paul II Catholic University of Lublin
Konstantynów 1H, 20-708 Lublin, Poland

*wgoszcz@kul.lublin.pl

Introduction

In the Lublin landscape black elder (*Sambucus nigra* L.) is very common, and although it grows usually in concentrations one can also encounter its individual instances. Because of its nitrophility the black elder is one of the most expansive domestic plant groups. It is very common in forest thickets and gardens where soil is rich in nitrogen (CHOJNOWSKA, 2000). It can also be encountered in moderately humid, fertile deciduous, willow-poplar forests on streams, on edges and roadsides (POLAKOWSKA, 1987), on boundary stripes by over-fertilized fields, in neglected or abandoned neighbourhoods. It grows even in edges of pine forests. These are, however, its secondary habitats (KUŹNIEWSKI & AUGUSTYN-PUZIEWICZ, 1999). Black elder often forms its own thicket phytocenosis which is considered to belong to the community of *Sambucetum nigrae* (Order: *Epilobietea angustifolii*) (WYSOCKI & SIKORSKI, 2002). Most often it settles rural habitats: house-arounds, rubble heaps and dumping grounds. Because of its healing and decorative values it is often planted in parks and gardens (WIERZBICKI, 2002). As a decorative plant black elder is grown in several cultivarities which differ mainly by means of colour, leaf shape and habit (CHOJNOWSKA, 2000). Wild black elder is attractive in all the seasons and it produces a characteristic fruity smell (KRAMER, 1997). Black elder is consumed in Poland in form of flowers, dipped in pancake dough and baked in oil (CHOJNACKA & KRZEŚNIAK, 2000). Moreover, all part of this plant (including roots,

leaves, flowers and fruit) are important herbal products (OZAROWSKI & JAROMOWSKI, 1989; LEWKOWICZ-MOSIEJ, 2004; SARWA, 1992; 1995). Additionally, the fruit is used in food industry to dye products.

In the city of Lublin black elder can be encountered almost everywhere. It is most numerous in parks, in recreational areas and by communication tracks. One can also encounter hedges formed from cut black elder. Single specimens are present in green areas of many neighbourhoods. Usually these are self-sown plants of low aesthetic value. Much greater decorative value is to be found in the varieties of black elder which occur in the Botanical Garden of the Marie Skłodowska-Curie University and the Museum of the Lublin Village, the Sasaki Garden and the People's Park.

When designing afforestations in the fields it is advisable to introduce plants which are useful to many organisms and hence the suitability of black elder which delivers nutrients for 62 bird species, 8 mammal – and 11 butterfly species, not to mention the variety of insects (DAWIDZIAK, 2007) including *Aphis sambuci* L., which is the only aphid species settling *Sambucus nigra* (BLACKMAN & EASTOP, 1994).

The aim of this paper is to find out about the life cycle of *Aphis sambuci* L. on black elder in the urban area of Lublin.

Material and methods

The research was carried out in 2005-2006 in the city of Lublin. Two sites were selected for the observation:

1. Single shrubs around which within 300m radiant there were no plants of the same species;
2. Shrubs which grew in concentration: 17 black elder shrubs were planted next to each other;

Every two weeks aphids were counted on 100 leaves and shoots under a binocular. In a laboratory, in spring eggs were sought for and subsequently the hatching of larvae, their moults and the appearance of adult females and subsequent generations (fundatrigeniae and migrantes) took place. Throughout the whole summer leaves and shoots of shrubs were searched for in order to determine the time of migration and to state if a part of aphids remained on studied shrubs, and find out about the time of aphids' return to black elder from summer hosts.

Results and discussion

Bionomy

Black elder (*S. nigra*) is a primary host to *Aphis sambuci* L. eggs laid in cracks of the bark of young twigs are a form in which they overwinter. The

hatching of fundatrices' larvae started in mid-April. In 2005, 61 larvae hatched out from 100 eggs (61%) and in 2006 63 fundatrices' larvae. The maturation of fundatrices took from 21 to 27 days and around 11 May they began to give birth to the fundatrigeniae larvae. Fundatrices were dark-green and the fundatrigeniae were matte-black, dark-green or brown. The development of 4 (in 2006) and 5 generations (2005) of fundatrigeniae was registered on the black elder. At the moment of these females appearance a large number of ants in their colonies was recorded.

The first generation of fundatrigeniae was wingless and starting from the second generation, a part of females was constituted by migrantes. Aphid colonies fed mainly on topmost parts of young shoots. These colonies were very densely packed and numerous (from 567 to 1322 specimens in a colony in 2005, and from 853 to 5328 in 2006). In the first days of July migrantes females started to appear in this aphid colony on black elder, and migration onto secondary hosts lasted until mid-July. HEIE (1986) provides similar records. This species undergoes an obligatory change of host moving onto the roots (and other ground parts) of several species of herbal plants. Broadleaf dock (*Rumex obtusifolius* L.), curly dock (*Rumex crispus* L.), a few genera of plants of the pink family (*Caryophyllaceae* Juss.) including *Dianthus*, *Lychnis*, *Silene*, *Melandrium*, *Moehringia*, *Spergula*, *Cerastium*, and *Capsella bursa-pastoris* L., *Oenothera* sp, and *Saxifraga* sp. These plants are enumerated as secondary hosts by many authors including SZELEGIEWICZ (1964), HEIE (1986), RUPAIS (1964), BLACKMAN & EASTOP (1994).

In the summer of 2005 four generations of virginoparous females exules developed on *Rumex crispus* L. Females of these generations were dark-green or green-blue with no wax stripes. In the last days of August (26 August) first winged re-emigrant females (gynoparae) appeared on this plant and migration continued until the end of October. This aphid was registered in the summer also on *Dianthus* sp., *Oenothera* sp. and *Spergula* sp.

Aphids have to migrate from the secondary host onto black elder in order to lay overwintering eggs (HEIE, 1986). The Gynoparae returning to black lilies settled their leaves and not their shoots which was done by spring generations. Only just before the leaves fell down did they go down to the shoots. First re-emigrants appeared on black elder as soon as the end of August when from 9 to 45 specimens were observed on 100 leaves. Their number though was the highest in the first half of October (from 32 to 237 specimens/ 100 leaves) and up to 892 aphids were registered on a single shoot in the first days of November. Oviparous females and winged males as well as egg laying were registered on shoots of black elder throughout the whole of October and when there was no frost (2006) they remained there

even until mid-November. The oviparae laid from 1 to 6 eggs on shoots in cracks of bark or next to buds. Oviparous females were brown-yellow or brown. And all the winged morphs of this aphid were dark with transversal dorsal stripes.

Spring migration on *R. crispus* and return in autumn on *S. nigra* were complete. In the summer (between 16 July and 27 August) no aphids were recorded on black elder and in November sorrel was free from aphids. In areas where winters are mild e.g. in England, viviparous females may overwinter on underground parts of the black elder and on secondary hosts (BLACKMAN & EASTOP, 1994). This species is often attended by ants (HEIE, 1986). Shrubs that grow singly were less often settled by aphids than shrubs grown in communities (Fig. 1 and 2.). The highest number of aphids on single shrubs were observed in the first part of June when from 4 to 18 aphid colonies (on shoots) in which the number ranged from 480 to 1312 specimens were recorded. On shrubs in large communities the highest number was recorded between 20 May and 17 June and the number of aphids in a colony on a shoot ranged from 818 to 5328 specimens (Fig. 3 and 4.). From 21 to 27 colonies were observed on a single shrub.

In colonies of this aphid on *Sambucus nigra* the presence of *Chrysopa* sp. and larvae as well as adults of *Adalia bipunctata* was recorded. Single larvae and adults of *Anthocoris* sp. were also recorded.

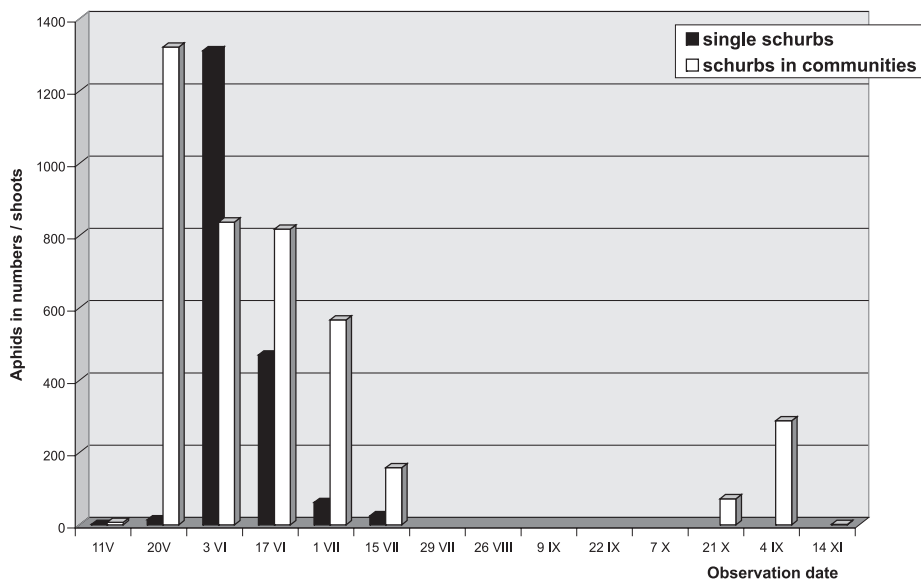


Fig. 1. Number of aphids on black elder shoots in 2005

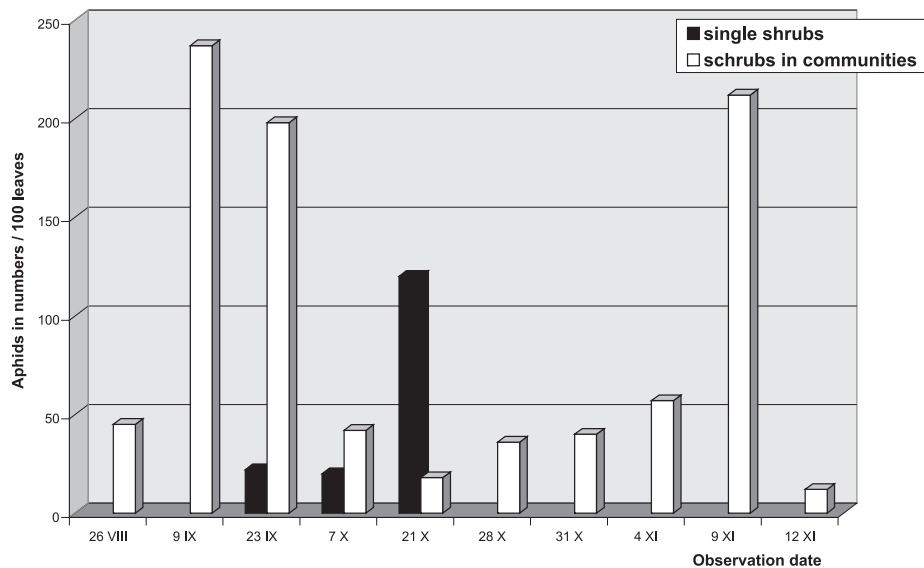


Fig. 2. Number of aphids on leaves of black elder in 2005

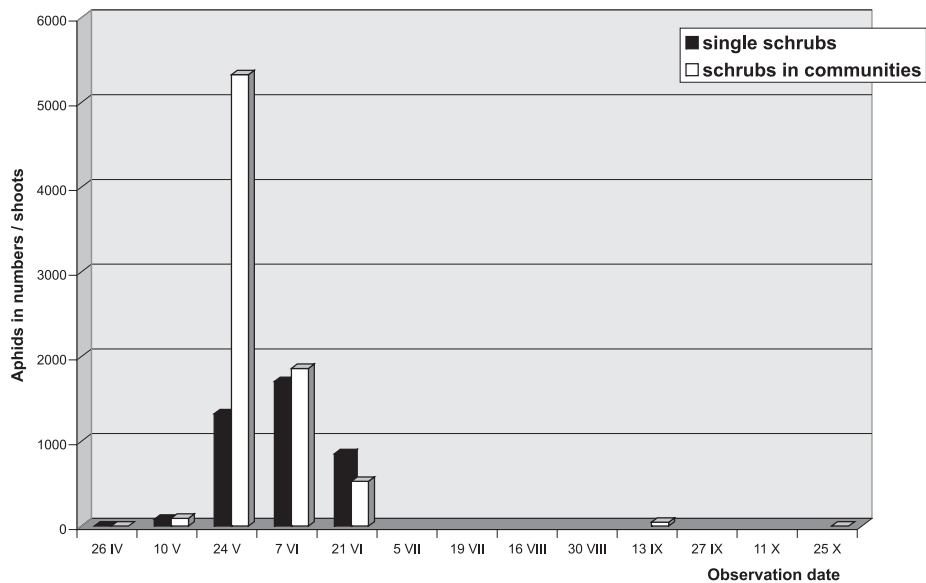


Fig. 3. Number of aphids on black elder shoots in 2006

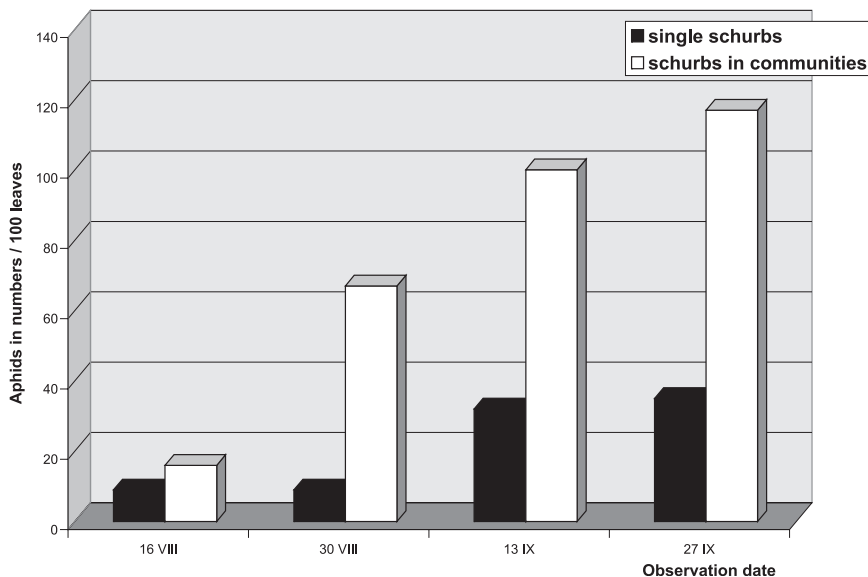


Fig. 4. Number of aphids on leaves of black elder in 2006

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***Sambucus nigra* L. w krajobrazie Lubelszczyzny i jego afidofauna**

Streszczenie

Sambucus nigra L. (bez czarny) rosnący na Lubelszczyźnie należy do najbardziej ekspansywnych roślin rodzimych. Jest polecanym gatunkiem do zadrzewień pól. Stanowi pożywienie dla wielu gatunków ptaków, ssaków i owadów. *Sambucus nigra* jest żywicielem pierwotnym dla *Aphis sambuci* L. Badania dotyczą niektórych elementów bionomii *Aphis sambuci*. Określa się liczbę składanych jaj, procent ich wylęgu, termin wylęgu, długość osiągnięcia dojrzałości przez założycielki rodów i następnych pokoleń, również tych rozwijających się na żywicielu wtórnym, *Rumex crispus* L. Obserwacje liczebności mszyc tego gatunku na liściach i pędach żywiciela pierwotnego przedstawiają różnice w zasiedlaniu pojedynczo rosnących okazów i w skupiskach. W latach 2005 i 2006 stwierdza się we wszystkich kombinacjach liczniejsze występowanie tego gatunku na roślinach rosnących w skupiskach.

