

DIVERSITY OF PHYLLOPHAGOUS ORGANISMS ON WOODY PLANTS IN THE BOTANICAL GARDEN IN NITRA, SLOVAKIA

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Abstract

This paper deals with identification of phyllophagous organisms colonizing various woody plant species in the Botanical Garden of the SUA (Slovak University of Agriculture). The research was carried out from 2010 to 2012 and the field work took place at two week intervals during the growing season. The main objective was to determine and evaluate the phyllophagous pests according to host plants. Adults, larvae of pests and damaged leaves were collected in a specified locality and documented by herbal samples and macrophotos. The occurrence of non-native insect pests was observed as well. During the research taxa of 108 species of phyllophagous pests on 48 woody plants were recorded. As the results indicate, the most phyllophagous insect species were found on *Quercus* (16), *Acer* (12), and *Betula* (11). The largest number of insect species belongs to the families *Lepidoptera* (49) and *Hemiptera* (17). Concerning the alien pests, 10 phyllophagous species were identified. These were *Phyllonorycter platani* (Staudinger, 1870), *Phyllonorycter issikii* (Kumata, 1963), *Phyllonorycter leucographella* (Zeller, 1850), *Cameraria ohridella* (Deschka & Dimic 1986), *Monarthropalpus flavus* (Schrank, 1776), *Dasineura gleditsiae* (Osten Sacken, 1866), *Corythuca ciliata* (Say, 1832), *Aceria erinea* (Nalepa, 1891), *Aceria pyracanthi* (G. Canestrini, 1891) and *Aphis craccivora* (Koch, 1854). A list of all recorded phyllophagous species in the Botanical Garden is mentioned in Tab. I.

KEY WORDS: botanical garden, phyllophagous species, alien species, woody plant, pest

Introduction

Animal pests of woody plants represent a numerous group of phytophagous insect species, which are fixed to forest or ornamental woody plants. The method by which pests affect woody plants characterizes the qualitative aspect of the damage done. This aspect is typical for each pest species (STOLINA *et al*, 1985). Phyllophagous pests include species which damage assimilatory organs of woody plants by feeding or sucking. Occasionally they can also damage parenchyma tissues of branches or stems (e.g. *Diprionidae*,

Curculionidae, *Adelgidae*, etc.). Foliophagous insects, which often damage leaves and needles, comprise: caterpillars (*Lepidoptera*), larvae of sawflies (*Hymenoptera*, *Symphyla*), larvae and adults of beetles (*Coleoptera*), bugs and their development stages (*Heteroptera*), aphids and their development stages (*Hemiptera*), or others from the mites group (*Acarí*) (HOLECOVÁ, 2012). As BARTA (2009b) indicates, phyllophagous pests are the most important pests of woody plants in Arboretum Mlyňany SAS. The dominant species there are the *Hemiptera* order species. KOLAŘÍK (2010) ranks among the most important phyllophagous pests tortrix moths, species which cause clean-eatings, and mining species (*Phyllonorycter robinellus*, *Cameraria ohridella*, *Parectopa robinella*). Approximately 10 000 species from the *Hymenoptera* order live in Slovakia. Phyllophagous species feed on plant tissues. They live on leaves (e.g. *Tethredinidae*), develop in wood (*Siricidae*), in galls on plants (*Cynipidae*), in seeds etc. (ZÚBRÍK & KUNCA, 2011). The most significant species from the *Diptera* order are various gall midge species (*Cecidomyiidae*), which create very diverse galls on shoots, needles, leaves, and buds (HRUBÍK, 1988).

Damages caused by phytophagous species induce serious physiological, biochemical and anatomical changes on ornamental woody plants (assimilation decrease, respiration increase, mineral nutrition and water impoverishment). As a result of natural resistance weakening, the damaged ornamental woody plants are more quickly subject to infestations of pests and diseases. Greenery pests not only cause physical damage, but also destroy or reduce the aesthetic, decorative quality (HRUBÍK *et al.*, 2008).

Feeding of phyllophagous pests on deciduous woody plants inhibits the growth of the plants and thus the damaged trees fall into normal physiological activity only after a few years. Coniferous woody plants are characterized by inferior regeneration (KŘÍSTEK & URBAN, 2004). Recently, in the region of Europe there is increased concern about the possibility of accidental introduction of alien species of plant and animal pests (HRUBÍK *et al.*, 2002). The SUA Botanical Garden in Nitra includes many introduced woody plants, which is a prerequisite for the occurrence of alien species in this facility. Introduced trees have a verifiable impact on the spread of new, non-native species (JUHÁSOVÁ & HRUBÍK, 1984). The occurrence of non-native species of animal pests is related to the increased speed in the exchange of goods and climate changes (ZÚBRÍK *et al.*, 2007). The development stages of some species cause damage to various plant tissues, which does not necessarily lead to the death of the plants, but does result in aesthetic harm. This group includes various gall-forming species (GREGOROVÁ *et al.*, 2006). The research objective was to identify phyllophagous pest species on woody plants in the SUA Botanical Garden and to evaluate trophic relations together with the most frequently occurring pest groups.

Material and Methods

The research was carried out from 2010 to 2012. Individual samples were collected in the area of the Botanical Garden in Nitra, which represents one of the departments of the Slovak University of Agriculture in Nitra, Slovakia. The field work was carried out in a park area that spreads across 6 ha. The site is located at an altitude of 144 m a.s.l. The geographical position of the Botanical Garden is 18°06'30''E and 48°19'15''N. The locality is characterized by an average annual temperature of 10.9° C and annual mean precipitation of 527 mm. The territory is situated between the Zobor hills (587 m a.s.l.) and Kalvária Hill (215 m a.s.l.), which belong to Tribeč Mountain. The area belongs to the warmest and the driest localities of Slovakia. The area substrate is composed of alluvial soil with a high content of clay fraction. Adults, larvae and damage symptoms on the woody plants were collected in the Botanical Garden and subsequently documented via herbal samples and macro photos. The field work was performed during the growing season at two week intervals. During the research individual taxa of woody plants were visually inspected, and

necessary material was collected and identified. The pests were determined mainly according to damage symptoms on assimilatory organs, or adults and their development stages. Adults were deposited to glass pots impregnated with ethyl acetate for further detailed analysis. Larvae of insects or species with a tender body were inserted into the tubes with 80 % alcohol (e.g. development stages of aphids, larvae of pests). Assimilatory organs damaged by feeding, mining, shape or colour changes were collected and subsequently stored in prepared envelopes, ordered by the name of host plant and harvest date. Collected samples were specified according to the following publications: CSÓKA (1997, 2003), SCHNAIDER (1976), SKUHRAVÝ & SKUHRAVÁ (1998), BLACKMAN & EASTOP (1994), LAŠTŮVKA & LAŠTŮVKA (1997), PÉRICART (1998), REDFERN & SHIRLEY (2002).

Results

During the research, taxa of 108 species of phyllophagous pests on 48 woody plants were recorded. Of the total number, most species belong to the Lepidoptera and Hemiptera orders. Orders Hymenoptera, Prostigmata, Diptera, Coleoptera, Heteroptera, Homoptera (Fig. 1) are represented less frequently. A detailed list of recorded species can be seen in Tab. I.

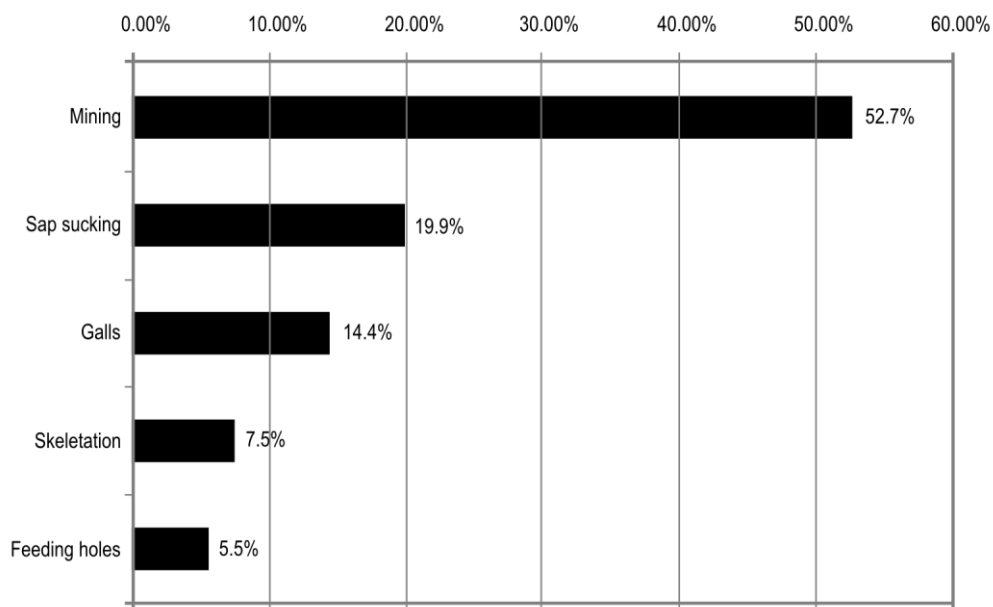


Figure 1. Percentage of pest species in Botanical Garden according to orders.

Furthermore, during the research 10 alien species were recorded as well. Alien species are marked using asterisk (*) (Tab. I). The largest number of pests was found on woody plants from the families *Betulaceae* (24.3 %), *Fagaceae* (21.6 %) and *Aceraceae* (11.7 %). The least species were found in the *Caprifoliaceae*

(0.9 %), *Juglandaceae* (0.9 %), *Buxaceae* (0.9 %) and *Hippocastanaceae* (0.9 %) families (Fig. 2). The damage to the horse chestnut tree was already immense in its vegetation period, when more than 50% of its leaves were already deformed. Significant damage was also recorded on leaves of *Platanus x acerifolia* (Ait.) Willd. by *Phyllonorycter platani* (Staudinger, 1870) and lace bug *Corythuca ciliata* (Say, 1832).

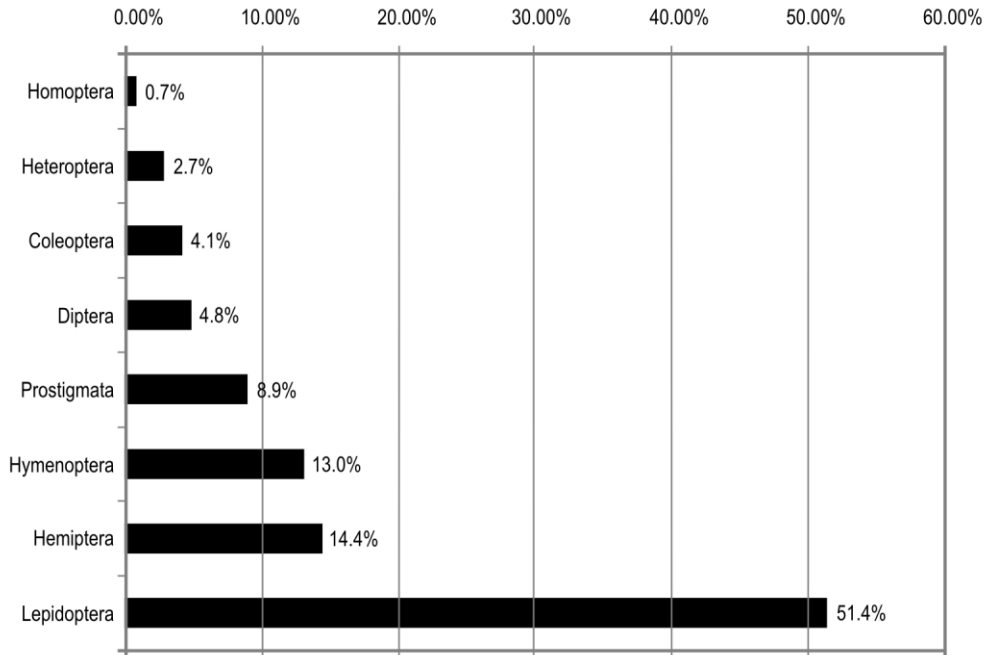


Figure 2. Total percentage of phyllophagous pest numbers according to host plant families.

The damage of assimilatory organs according to damage type can be seen in Fig. 3. Most woody plants were damaged by mining pests (52.7 %) and sap sucking pests (19.9 %). The most numerous species were from the families *Aphididae* and *Tetranychidae*. These species damaged assimilatory organs by sap sucking. The most abundant aphid from the *Aphididae* family was *Phyllaphis fagi* (Linnaeus, 1767). The *Tetranychidae* family was most frequently represented by *Tetranychus urticae* (Koch, 1836), which damaged mainly the *Salix* genus. Enormously harmful sucking activity, caused by *Stephanitis pyri* (Fabricius, 1775) from the *Rosaceae* family, was recorded on *Crataegus* and *Sorbus*. Recorded species (and numbers of recorded individuals) usually do not constitute a more serious risk to the hygienic conditions and vitality of woody plants. However, there were several cases when plants were considerably impaired in their aesthetic value. Recorded phyllophagous pest species belong to 8 orders. Most species were found from the orders *Lepidoptera* (51.4 %) and *Hemiptera* (14.4 %).

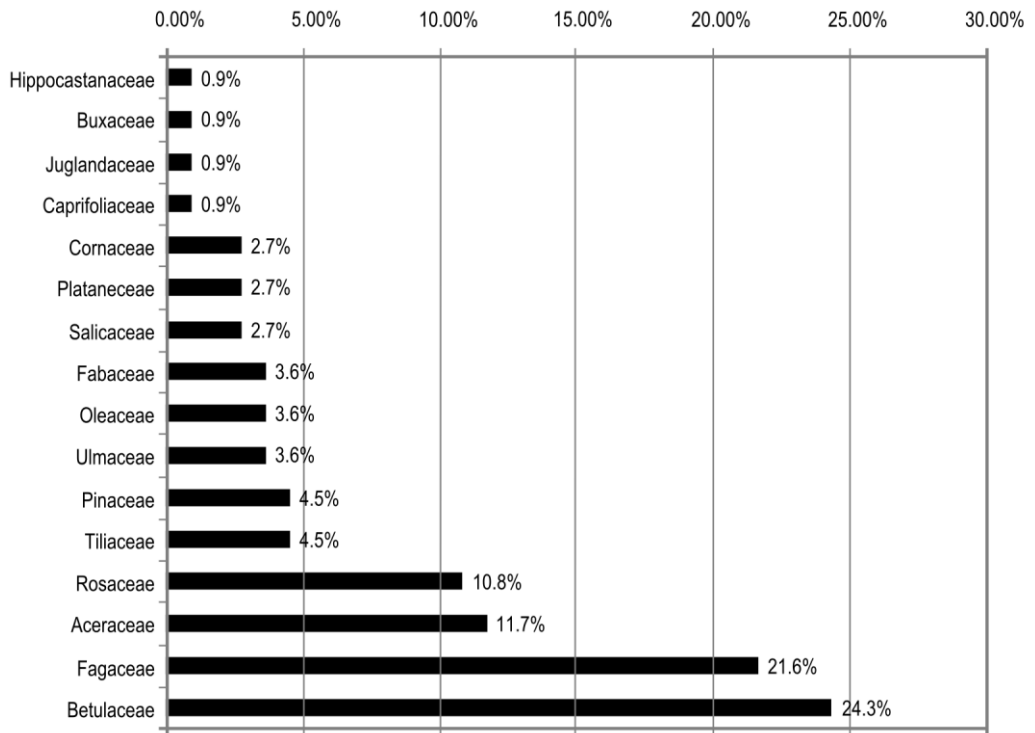


Figure 3. Percentage of damage type on assimilatory organs of woody plants.

Discussion and Conclusion

As the research results indicate, the largest number of recorded pests belongs to the Lepidoptera order (43 species). This group of pests was also the most significant one in other research as well. KOLLÁR (2008) recorded 121 species belonging to the Lepidoptera order in the years 2006 – 2009. BARTA (2009b) mentioned 39 species from the Lepidoptera order and 53 species from the Hemiptera order in the Arboretum Mlyňany SAS. ŠEĎROVÁ (2005) recorded in the Arboretum of Mendel University of Agriculture and Forestry in Brno, Czech Republic, 132 species of mining Lepidoptera. We determined only 40 species of mining Lepidoptera. Alien pest species in the Botanical Garden have been studied as well. The presence of introduced woody plants is a precondition to the occurrence of alien pest species. Besides the native species, 10 alien phyllophagous pest species were recorded during the research, namely: *Phyllonorycter platani* (Staudinger, 1870) on the plane tree, *Phyllonorycter issikii* (Kumata, 1963) on linden, *Phyllonorycter leucographella* (Zeller, 1850) on firethorn and service trees, *Cameraria ohridella* (Deschka & Dimic, 1986) on the horse chestnut, *Monarthropalpus flavus* (Schränk, 1776) on dogwood, *Dasineura gleditsiae* (Osten Sacken, 1866) on honeylocust, *Corythuca ciliata* (Say, 1832) on the plane tree, *Aceria erinea* (Nalepa, 1891) on walnut, *Aceria pyracanthi* (G. Canestrini, 1891) on firethorn, and *Aphis craccivora* (Koch, 1854) on the golden chain tree and Siberian peashrub. These species were also recorded by KOLLÁR (2008) during his research oriented on the qualitative and quantitative structure of pests in a city environment. In 2007 – 2009

the uniform species were also mentioned by BARTA (2009a) in Průhonice Park and in Mlyňany Arboretum. The most important pests in the Botanical Garden are *Cameraria ohridella* (Deschka & Dimic, 1986) on *Aesculus hippocastanum* L. and *Phyllonorycter platani* (Staudinger, 1870) on *Platanus x acerifolia* (Ait.) Willd. *Platanus* was also damaged by lace bug *Corythuca ciliata* (Say, 1832). According to the damage type of assimilatory organs of woody plants, the most numerous were the mining pests (52.7%). HRUBÍK (1988) mentioned this group of pests as the most important in the greenery in the city of Nitra.

Table I. List of recorded phyllophagous pest species in SUA botanical garden in Nitra, Slovakia

Host plant	Pest species	Taxonomic classification (Order/ Family)	Damage type
<i>Acer campestre</i> L.	<i>Aceria macrochelus</i> Nalepa, 1891	Prostigmata / Eriophyidae	galls
	<i>Acericecis campestre</i> (Harris, 2004)	Diptera / Cecidomyiidae	sap sucking
	<i>Stigmella aceris</i> (Frey, 1857)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella speciosa</i> Frey 1858.	Lepidoptera / Nepticulidae	mining
<i>Acer monspessulanum</i> L.	<i>Caliroa annulipes</i> (Klug, 1814)	Hymenoptera / Tenthredinidae	skeletation
	<i>Stigmella speciosa</i> Frey 1858.	Lepidoptera / Nepticulidae	mining
<i>Acer opalus</i> Mill.	<i>Stigmella aceris</i> (Frey, 1857)	Lepidoptera / Nepticulidae	mining
<i>Acer palmatum</i> Thunb.	<i>Phyllonorycter platanoideella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
<i>Acer platanoides</i> L.	<i>Periphyllus aceris</i> (Linnaeus, 1761)	Hemiptera / Aphididae	sap sucking
	<i>Phyllonorycter acerifoliella</i> (Zeller, 1839)	Lepidoptera / Nepticulidae	mining
	<i>Phyllonorycter platanoideella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella aceris</i> (Frey, 1857)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella speciosa</i> Frey 1858	Lepidoptera / Nepticulidae	mining
<i>Acer pseudoplatanus</i> L.	<i>Aceria macrorhynchus</i> (Nalepa 1889)	Prostigmata / Eriophyidae	galls
	<i>Acericecis vitrina</i> (Kieffer, 1909)	Diptera / Cecidomyiidae	sap sucking
	<i>Caloptilia rufipennella</i> (Hübner, 1796)	Lepidoptera / Gracillariidae	mining
	<i>Drepanosiphum platanoidis</i> (Schrank 1801)	Hemiptera / Aphididae	sap sucking
	<i>Heterarthrus aceris</i> (Kaltenbach, 1856)	Hymenoptera / Tenthredinidae	mining
	<i>Phyllonorycter platanoideella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella aceris</i> (Frey, 1857)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella speciosa</i> Frey 1858.	Lepidoptera / Nepticulidae	mining
<i>Acer sacharinum</i> L.	<i>Phyllonorycter platanoideella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
<i>Acer tataricum</i> L.	<i>Drepanosiphum platanoidis</i> (Schrank 1801)	Hemiptera / Aphididae	sap sucking
	<i>Phyllonorycter platanoideella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella aceris</i> (Frey, 1857)	Lepidoptera / Nepticulidae	mining
<i>Aesculus hippocastanum</i> L.	<i>Cameraria ohridella</i> Deschka & Dimic 1986 *	Lepidoptera / Gracillariidae	mining
<i>Alnus cordata</i> (Loisel.) Desf.	<i>Tetranychus urticae</i> (Koch, 1836)	Prostigmata / Tetranychidae	sap sucking
<i>Alnus glutinosa</i> (L.)	<i>Aceria brevitarsa</i> (Fockeu, 1890)	Prostigmata / Eriophyidae	galls

Host plant	Pest species	Taxonomic classification (Order/ Family)	Damage type
(Table I - continued)			
<i>Alnus glutinosa</i> (L.)	<i>Agelastica alni</i> (Linnaeus, 1758)	Coleoptera / Chrysomelidae	skeletation
	<i>Plagiosterna aenea</i> (L., 1758)	Coleoptera / Chrysomelidae	skeletation
<i>Betula pendula</i> Roth.	<i>Dasystoma salicella</i> Hubner, 1796	Lepidoptera / Oecophoriidae	skeletation
	<i>Ectoedemia occultella</i> (Linnaeus, 1767)	Lepidoptera / Nepticulidae	mining
	<i>Euceraphis betulae</i> Koch, 1855	Hemiptera / Aphididae	sap sucking
	<i>Euceraphis punctipennis</i> (Zetterstedt, 1828)	Hemiptera / Aphididae	sap sucking
	<i>Heliozela hammoniella</i> Sorhagen, 1885	Lepidoptera / Heliozelidae	mining
	<i>Kleidocerys resedae</i> (Panzer 1797)	Heteroptera / Lygaeidae	sap sucking
	<i>Lyonetia clerkella</i> (Linnaeus 1758)	Lepidoptera / Lyonetiidae	mining
	<i>Parornix betulae</i> (Stainton, 1854)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella betulicola</i> (Stainton 1856)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella confusella</i> (Wood & Walsingham 1894)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella lapponica</i> (Wocke, 1862)	Lepidoptera / Nepticulidae	mining
<i>Buxus sempervirens</i> L.	<i>Monarthropalpus flavus</i> (Schrank, 1776) *	Diptera / Cecidomyiidae	sap sucking
<i>Caragana arborescens</i> Lam.	<i>Aphis craccivora</i> Koch (1854) *	Hemiptera / Aphididae	sap sucking
<i>Carpinus betulus</i> L.	<i>Myzocallis carpini</i> (Koch, 1855)	Hemiptera / Aphididae	sap sucking
	<i>Parornix carpinella</i> (Frey, 1863)	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter esperella</i> (Goeze, 1783)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella carpinella</i> (Heinemann, 1862)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella flosfactella</i> (Haworth, 1828)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella microtheriella</i> (Stainton, 1854)	Lepidoptera / Nepticulidae	mining
<i>Carpinus betulus</i> L. - 'Laciniata'	<i>Parornix carpinella</i> (Frey, 1863)	Lepidoptera / Gracillariidae	mining
<i>Cerasus</i> sp.	<i>Caliroa cerasi</i> (Linnaeus, 1758)	Hymenoptera / Tenthredinidae	skeletation
	<i>Phyllonorycter cerasicolella</i> (Herrich-Schaffer, 1855)	Lepidoptera / Gracillariidae	mining
<i>Colutea arborescens</i> L.	<i>Palomena viridisima</i> (Poda, 1761)	Heteroptera / Pentatomidae	sap sucking
<i>Cornus mas</i> L.	<i>Antispila metallella</i> (Denis & Schiffmuller, 1775)	Lepidoptera / Heliozelidae	mining
	<i>Coleophora ahenella</i> Heinemann & Wocke, 1877	Lepidoptera / Coleophoridae	mining
<i>Cornus officinalis</i> Siebold & Zucc.	<i>Antispila metallella</i> (Denis & Schiffmuller, 1775)	Lepidoptera / Heliozelidae	mining
<i>Fagus sylvatica</i> L.	<i>Stigmella tityrella</i> (Stainton, 1854)	Lepidoptera / Nepticulidae	mining
<i>Fagus sylvatica</i> L. - 'Atropurpurea'	<i>Clytra laeviuscula</i> Ratzeburg, 1837	Coleoptera / Chrysomelidae	feeding
	<i>Tetranychus urticae</i> (Koch, 1836)	Prostigmata / Tetranychidae	sap sucking
<i>Fagus sylvatica</i> L. - 'Roseo-Marginata'	<i>Phyllaphis fagi</i> (Linnaeus, 1767)	Hemiptera / Aphididae	sap sucking
	<i>Phyllonorycter maestingella</i> (Müller, 1764)	Lepidoptera / Gracillariidae	mining

Host plant (Table I - continued)	Pest species	Taxonomic classification (Order/ Family)	Damage type
<i>Fagus sylvatica</i> L. - 'Rotundifolia'	<i>Caliroa annulipes</i> (Klug, 1816)	Hymenoptera / Tenthredinidae	skeletation
	<i>Phyllonorycter maestingella</i> (Müller, 1764)	Lepidoptera / Gracillariidae	mining
<i>Fraxinus exelsior</i> L.	<i>Eriophyes fraxinivorus</i> Nalepa, 1909	Prostigmata / Eriophyidae	galls
<i>Fraxinus exelsior</i> L.- 'Jaspidea'	<i>Dasineura fraxini</i> (Bremi, 1847)	Diptera / Cecidomyiidae	galls
	<i>Prociphilus fraxini</i> (Fabricius, 1777)	Homoptera / Pemphigidae	galls
<i>Fraxinus ornus</i> L.	<i>Stereonychus fraxini</i> (De Geer, 1775)	Coleoptera / Curculionidae	feeding
<i>Gleditsia triacanthos</i> L.	<i>Dasineura gleditsiae</i> (Osten Sacken, 1866) *	Diptera / Cecidomyiidae	galls
<i>Juglans regia</i> L.	<i>Aceria erinea</i> (Nalepa, 1891) *	Prostigmata / Eriophyidae	galls
<i>Laburnum anagyroides</i> Med.	<i>Aphis craccivora</i> Koch, 1854 *	Hemiptera / Aphididae	sap sucking
	<i>Aphis fabae</i> Scopoli, 1763	Hemiptera / Aphididae	sap sucking
	<i>Palomena viridissima</i> (Poda, 1761)	Heteroptera / Pentatomidae	sap sucking
<i>Larix decidua</i> Mill.	<i>Coleophora laricella</i> (Hübner, 1817)	Lepidoptera / Coleophoridae	mining
	<i>Sachipantes viridis</i> (Ratzeburg, 1843)	Hemiptera / Adelgidae	sap sucking
<i>Ostrya carpinifolia</i> Scop.	<i>Stigmella flosactella</i> (Haworth, 1828)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella microtheriella</i> (Stainton, 1854)	Lepidoptera / Nepticulidae	mining
<i>Picea omorika</i> Purk.	<i>Sachipantes viridis</i> (Ratzeburg, 1843)	Hemiptera / Adelgidae	galls
<i>Picea pungens</i> Engelm.	<i>Physokermes piceae</i> (Schrank, 1801)	Hemiptera / Coccidae	sap sucking
<i>Pinus nigra</i> Arnold	<i>Rhyacionia buoliana</i> (Denis & Schiffermuller, 1775)	Lepidoptera / Tortricidae	feeding
<i>Pinus strobus</i> L.	<i>Panolis flammea</i> (Denis & Schiffermuller, 1775)	Lepidoptera / Noctuidae	feeding
<i>Platanus x acerifolia</i> (Ait.) Willd.	<i>Corythuca ciliata</i> (Say, 1832)*	Hemiptera / Tingidae	sap sucking
	<i>Phyllonorycter platani</i> (Staudinger, 1870) *	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter platanoidella</i> (Joannis, 1920)	Lepidoptera / Gracillariidae	mining
<i>Prunus mahaleb</i> L.	<i>Phyllonorycter cerasicolella</i> (Herrich-Schäffer, 1855)	Lepidoptera / Gracillariidae	mining
<i>Pyracantha coccinea</i> M. Roem.	<i>Aceria pyracanthi</i> (G. Canestrini, 1891) *	Prostigmata / Eriophyidae	galls
	<i>Caliroa cerasi</i> (Linnaeus 1758)	Hymenoptera / Tenthredinidae	skeletation
	<i>Phyllonorycter leucographella</i> (Zeller, 1850) *	Lepidoptera / Gracillariidae	mining
<i>Quercus delachampii</i>	Ten. <i>Caloptilia robustella</i> Jäckh, 1972	Lepidoptera / Gracillariidae	mining
	<i>Neuroterus numismalis</i> (Geoffroy in Fourcroy, 1785)	Hymenoptera / Cynipidae	galls
	<i>Phyllonorycter heegerella</i> (Zeller, 1846)	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter roboris</i> (Zeller, 1839)	Lepidoptera / Gracillariidae	mining
	<i>Stigmella atricapitella</i> (Haworth, 1828)	Lepidoptera / Nepticulidae	mining
	<i>Tischeria ekebladella</i> (Bjerkander, 1795)	Lepidoptera / Tischeriidae	mining

Host plant	Pest species	Taxonomic classification (Order/ Family)	Damage type
(Table I - continued)			
<i>Quercus robur</i> L.	<i>Andricus solitarius</i> (Fonscolombe, 1832)	Hymenoptera / Cynipidae	galls
	<i>Heliozela sericiella</i> (Haworth, 1828)	Lepidoptera / Heliozelidae	mining, feeding
	<i>Neuroterus quercusbaccarum</i> (Linnaeus, 1758)	Hymenoptera / Cynipidae	galls
	<i>Phyllonorycter roboris</i> (Zeller, 1839)	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter quercifoliella</i> (Zeller, 1839)	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter heegeriella</i> (Zeller, 1846)	Lepidoptera / Gracillariidae	mining
	<i>Periclista lineolata</i> (Klug, 1816)	Hymenoptera / Tenthredinidae	skeletation
	<i>Profenusa pygmaea</i> (Klug, 1816)	Hymenoptera / Tenthredinidae	mining
	<i>Rhynchaenus quercus</i> (Linnaeus, 1758)	Coleoptera / Curculionidae	feeding
	<i>Stigmella atricapitella</i> (Haworth, 1828)	Lepidoptera / Nepticulidae	mining
	<i>Stigmella roborella</i> (Johansson, 1971)	Lepidoptera / Nepticulidae	mining
	<i>Tischeria decidua</i> Wocke, 1876	Lepidoptera / Tischeriidae	mining
	<i>Tischeria dodonea</i> Stainton, 1858	Lepidoptera / Tischeriidae	mining
	<i>Tischeria ekebladella</i> (Bjerkander, 1795)	Lepidoptera / Tischeriidae	mining
<i>Salix</i> sp.	<i>Aculus tetanothrix</i> (Nalepa, 1889)	Prostigmata / Eriophyidae	galls
	<i>Pontania viminalis</i> . Linnaeus, 1758	Hymenoptera / Tenthredinidae	galls
	<i>Tetranychus urticae</i> (Koch, 1836)	Prostigmata / Tetranychidae	sap sucking
<i>Sorbus aria</i> (L.) Grantz	<i>Caliroa cerasi</i> (Linnaeus, 1758)	Hymenoptera / Tenthredinidae	skeletation
	<i>Phyllonorycter leucographella</i> (Zeller, 1850) *	Lepidoptera / Gracillariidae	mining
	<i>Phyllonorycter mespilella</i> (Hübner, 1805)	Lepidoptera / Gracillariidae	mining
	<i>Stephanitis pyri</i> (Fabricius, 1775)	Hymenoptera / Tingidae	sap sucking
<i>Spiraea x vanhouttei</i> Nunspeet	<i>Agromyza spiraeoidearum</i> Hering, 1954	Diptera / Agromyzidae	mining
<i>Tilia cordata</i> Mill.	<i>Bucculatrix thoracella</i> (Thunberg, 1794)	Lepidoptera / Bucculatricidae	mining
	<i>Caliroa annulipes</i> (Klug, 1816)	Hymenoptera / Tenthredinidae	skeletation
	<i>Dasyneura tiliamvolvans</i> (Rübsaamen, 1889)	Diptera / Cecidomyiidae	galls
	<i>Eriophyes tiliae</i> var. <i>leiosoma</i> (Nalepa, 1918)	Prostigmata / Eriophyidae	galls
	<i>Phyllonorycter issikii</i> (Kumata, 1963) *	Lepidoptera / Gracillariidae	mining
<i>Ulmus x hollandica</i> Mill. 'Jacqelin Hillier'	<i>Fenusa ulmi</i> Sundevall, 1844	Hymenoptera / Tenthredinidae	mining
	<i>Schizoneura ulmi</i> (Linnaeus, 1758)	Hemiptera / Aphididae	galls
	<i>Stigmella ulmivora</i> Fologne, 1860	Lepidoptera / Nepticulidae	mining
	<i>Tetraneura ulmi</i> (Linnaeus, 1758)	Hemiptera / Aphididae	galls
<i>Viburnum opulus</i> L.	<i>Aphis viburni</i> Scopoli, 1763	Hemiptera / Aphididae	sap sucking

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ДИВЕРЗИТЕТ ФИЛОФАГНИХ ОРГАНИЗАМА НА ДРВЕЋУ У БОТАНИЧКОЈ БАШТИ У НИТРИ, СЛОВАЧКА

ЈАН КОЛАР и ЛУБОШ ДОНОВАЛ

Извод

Истраживања на утврђивању филофагних организама на дрвећу у Ботаничкој башти у Нитри обављана су током вегетацијске сезоне од 2010. до 2012. у интервалима од петансет дана.

Идентификовали смо 108 врста на 48 врсти дрвећа. Највећи број филофагних инсеката нађено је на *Quercus* (16), *Acer* (12) и *Betula* (11). Највећи број уловљених инсеката припада фамилијама Lepidoptera (49) и Hemiptera (17).

Утврдили смо 10 интродукованих филофагних врста: *Phyllonorycter platani* (Staudinger), *Phyllonorycter issikii* (Kumata), *Phyllonorycter leucographella* (Zeller), *Cameraria ohridella* (Deschka & Dimic), *Monarthropalpus flavus* (Schrank), *Dasineura gleditsiae* (Osten Sacken), *Corythuca ciliata* (Say), *Aceria erinea* (Nalepa), *Aceria pyracanthi* (G. Canestrini) и *Aphis craccivora* (Koch). Списак свих сакупљених врста у Ботаничкој башти налази се у Табели I.

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