

Current Status of Pests Associated with Urban Vegetation in Bucharest Area

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Abstract: Pests of urban vegetation cause substantial aesthetic, economic and biodiversity damages, by weakening or completely destroying the plants. The recent climate changes, such as the excessive droughts alternating with heavy rain falls, and the significant imports of ornamental plants for urban landscape, as small parks, private gardens, and vertical walls, drastically increase the number of urban pests. These species are either newly introduced in the area, either they enlarge their host plant spectrum or increase their aggressiveness. We present the results of over a five-year period of monitoring of pests in the main city parks and private ornamental gardens in Bucharest. We detected 52 species of pests of urban vegetation. Each species locations and host plants are given. Eighteen of these species are alien to Romania: *Cameraria ohridella* on *Aesculus hippocastanum*, *Cydalima perspectalis* on *Buxus* spp., *Unaspis euonymi* on *Euonymus* sp., *Corythucha ciliata* and *Phyllonorycter platani* on *Platanus* sp., *Corythucha arcuata* on *Quercus* sp., *Pseudaulacaspis pentagona* on *Syringa vulgaris* and *Morus alba*, *Adelges piceae* on *Picea* sp., *Adelges abietis* on *Abies* sp., *Adelges laricis* on *Larix* sp., *Macrosiphoniella sanborni* on *Chrysanthemum* sp., *Aphis spiraeophaga* on *Spiraea* × *vanhouttei*, *Halyomorpha halys*, *Nezara viridula*, *Hyphantria cunea*, *Metcalfa pruinosa*, *Tetranychus urticae*, and *Trialeurodes vaporariorum* on numerous ornamental species. Twelve of the alien species are considered invasive. More detailed information is presented for six of the most destructive species and a single case of interception for a mite not present in Europe.

Key words: Urban vegetation, native pests, invasive alien species, host plant spectrum, climate change

Introduction

The life quality in crowded cities is affected by multiple factors, such as air quality, noise levels, temperature variations, water after rainfalls, possibilities of recreation, social and community events, biodiversity preservation, aesthetical aspects etc. (COLESCA & ALPOPI 2011, LUCA et al. 2015). Bucharest's green areas have suffered great losses in the past 27 years, as almost half of its surface disappeared. Despite the fact that the World Health Organization recommends 50 m² green area per inhabitant and the European rules ask for at least 26 m² per inhabitant for 2013 (COLESCA & ALPOPI 2011), according to several studies, Bucharest has only 8.5 m² (NISTOR & BILȚ 2015), 9.86 m² (ROMANIA-INSIDER 2016) or 11.09 m² (NEAMȚU & NEAMȚU 2014) per inhabitant, depending on the source cited and calculation methodology. Some other documents affirm that Bucharest prides itself to have 23 m² of green space per capita, including parks, cemeteries, green spots and forests (LUCA et al. 2015), but the truth has to be somewhere in between. In the last years, Bucharest has ranked

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second in Europe as the most polluted city, as three months a year the air pollution exceeds the admitted level of dust (ROMANIA-INSIDER 2012). Because of this, the existing urban vegetation in Bucharest must be preserved, protected and plant health should represent a high priority for the local authorities.

All over Europe, new alien pests are spreading rapidly and some of them have destroyed the landscape completely, killing old trees or topiaries, some of which declared as natural monuments, and causing losses of billion Euro. At the world level, the invasive insects generate costs of minimum US\$ 70.0 billion per year globally and, in addition, US\$ 6.9 billion as associated health costs (BRADSHAW et al. 2016). According to ROQUES et al. (2016), unrestricted horticultural trade is the key driver of alien insect spread in Europe and the majority of these traded plants are the plants used for urban green spaces. The same author estimated that the rate of establishment of new alien insects doubled in the last decades to the amount of 19.6 species per year for the period 2000-2008 (ROQUES et al. 2010). This fact is proven by recent studies on alien insects in different European countries, e.g. TOMOV & TRENCEVA (2013) reported that out of the 300 alien species ever recorded in Bulgaria, 108 have been introduced in the last 20 years. Another study on pests of urban vegetation carried out in Slovakia led to the conclusion that out of 409 pest species recorded, 52 were alien and nine of them were identified for the first time during that study (KOLLÁR et al. 2009). MANOLE et al. (2012) cited 88 species of alien invertebrates in Romania in 2012. TUDOSE et al. (2005) were the first to monitor the pests of urban vegetation, including those in parks and private gardens in the area of study.

In this work we present the results of over a five-year period of monitoring of pests of ornamental plants in the main city parks and private gardens in Bucharest. Our results will be of help to main actors involved in green area management.

Materials and Methods

The monitoring of invertebrate pests associated with ornamental plants in public parks, green areas and private gardens was conducted mostly in the central and northern part of Bucharest City, during the period 2012-2016. Samples were collected in the parks: Cişmigiu, Kisellef, 'Grădina Maicii Domnului' Park, USAMV Campus and Herăstrău, as well as in private ornamental gardens. During our visits, direct sampling and yellow sticky traps were used. The samples were brought to the laboratory

and identified to the lowest possible taxonomic level. The immature stages of pests (mostly larvae and pupae of defoliating and mining Lepidoptera) were reared at the laboratory to confirm the species determination by the adults.

Results and Discussion

As a result of our survey, 52 pest invertebrate species were detected on ornamental plants (Table 1). Most of the species belonged to the order Hemiptera (24), followed by Lepidoptera (8), Coleoptera (7), Hymenoptera (4), and Diptera (1). Seven mites and one slug species were detected as well. Eighteen of the recorded species are alien, introduced to Romania, mainly by import of living plants for planting in green areas or private gardens. Twelve of the alien species are considered invasive according to ROQUES et al. 2010 (Table 1).

The pest species recorded had different densities, population structure and distribution. Most frequently found were the wasps on rose, aphids on different host plants, galls aphids, woolly aphids and scales.

The main host plant species from the urban green areas were represented by *Tilia* spp., *Aesculus hippocastanum*, *Hibiscus syriacus*, *Salix alba*, *Salix tortuosa*, *Rosa chinensis*, *Ulmus* spp., *Populus* spp., *Spiraea albiflora*, *Phyllostachys aureosulcata*, *Catalpa* spp., *Euonymus* spp., *Ligustrum vulgare*, *Buxus sempervirens*, and *Fraxinus* spp. (Table 1).

The invasive alien species *Metcalfa pruinosa*, *Nezara viridula* and *Halyomorpha halys* were found on a large spectrum of ornamental plants. *Metcalfa pruinosa* was firstly mentioned in Romania in 2009 (PREDA & SKOLKA 2009), in Constanta area, on few host plants: *Aesculus hippocastanum*, *Fraxinus pennsylvanica*, *Robinia pseudoacacia*, *Hibiscus syriacus*, *Philadelphus coronarius*, *Evonymus japonicus*, *Spiraea x vanhouttei*, *Ligustrum vulgare*, *Ficus carica*, and *Vitis vinifera*. Later, PREDA & SKOLKA (2011) detected 110 host species in the same Constanta area, while CHIRECEANU & GUTUE (2011) found 33 host species in Bucharest. VLAD (2016) indicated 77 host species of 34 families in the Banat area. Currently, the impact of the invasive alien stink bugs *N. viridula* and *H. halys* on ornamental plants have not been assessed, because the species usually feed on the juicy fruits and vegetables, such as: cherries, peaches, pears, maize, tomatoes and sweet pepper. However, they are considered nuisance pests, as they aggregate around the houses and playground constructions, especially in the cold season. Dermatitis caused by *H. halys* was already mentioned in the USA (ANDERSON et al. 2012).

Table 1. Pests of ornamental plants found in public parks and private gardens in central and northern area of Bucharest. A – species alien to Romania; I – species invasive to Europe according to ROQUES et al. (2010)

No	Taxon	Host plants	Observation period	Location
Arachnida, Acari				
1	<i>Eotetranychus tiliarum</i> Hermann, 1804	<i>Tilia cordata</i>	2012-2016	USAMV B green areas
2	<i>Eriophyes tiliae exilis</i> Nalepa, 1891	<i>Tilia platyphyllos</i> , <i>Tilia cordata</i>	2012-2016	USAMV B green areas
3	<i>Eriophyes tiliae var. rudis</i> Nal.	<i>Tilia tomentosa</i>	2012-2016	USAMV B green areas
4	<i>Eriophyes tiliae tiliae</i> Pgst.	<i>Tilia platyphyllos</i> , <i>T. cordata</i> , <i>T. tomentosa</i>	2012-2016	USAMV B green areas
5	<i>Eriophyes triradiatus</i> Nalepa, 1892	<i>Salix alba</i> , <i>Salix tortuosa</i>	2012-2016	Cișmigiu & Herăstrău Park, USAMV B green areas
6	<i>Schizotetranychus celarius</i> Banks, 1917 ^A	<i>Phyllostachys aureosulcata</i>	2012	Private garden
7	<i>Tetranychus urticae</i> Koch, 1836 ^{A, I}	<i>Tilia</i> sp., <i>Catalpa bignonioides</i> , <i>Catalpa speciosa</i> , <i>Hibiscus syriacus</i> , <i>Spiraea vanhouttei</i> , <i>Ligustrum vulgare</i> , <i>Phylladelphus coronarius</i> , <i>Crataegus</i> sp., <i>Campsis radicans</i> , <i>Quercus rubra</i> , <i>Rosa</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău, ‘Grădina Maicii Domnului’ Parks, USAMV B green areas
Insecta, Homoptera				
8	<i>Adelges abietis</i> Linnaeus, 1758 ^A	<i>Abies</i> sp.	2012-2016	USAMV B green areas
9	<i>Adelges laricis</i> Vallot, 1836 ^A	<i>Larix</i> sp.	2012-2015	Private gardens
10	<i>Adelges piceae</i> Ratzeburg, 1844 ^A	<i>Picea</i> sp.	2012-2016	USAMV B green areas
11	<i>Aphis ligustri</i> Kalt, 1843	<i>Ligustrum vulgare</i>	2012-2016	Cișmigiu, Kisellef, Herăstrău, ‘Grădina Maicii Domnului’ Parks, USAMV B green areas
12	<i>Aphis spiraeophaga</i> F.P. Müller, 1961 ^{A, I}	<i>Spiraea</i> × <i>vanhouttei</i>	2012-2016	Cișmigiu, Kisellef, Herăstrău, ‘Grădina Maicii Domnului’ Parks, USAMV B green areas, Private gardens
13	<i>Aphis</i> spp.	<i>Catalpa bignonioides</i> , <i>Catalpa speciosa</i>	2012-2016	Herăstrău Park, USAMV B green areas, Private gardens
14	<i>Aulacaspis rosae</i> Bouché, 1833	<i>Rosa</i> sp.	2012-2013	‘Grădina Maicii Domnului’ Park, Private gardens
15	<i>Brachycaudus chrysanthemii</i> Koch, 1854	<i>Chrysanthemum</i> sp.	2012-2016	Cișmigiu, Herăstrău Parks, Private gardens
16	<i>Chionaspis pinifoliae</i> Fitch, 1856	<i>Pinus</i> sp.	2012-2016	USAMV B green areas, Private gardens
17	<i>Gossyparia spuria</i> Modeer, 1778	<i>Ulmus</i> sp.	2012-2013	‘Grădina Maicii Domnului’ Park, USAMV B green areas, Private gardens
18	<i>Macrosiphum rosae</i> Linnaeus, 1758	<i>Rosa</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău, ‘Grădina Maicii Domnului’ Parks, USAMV B green areas, Private gardens
19	<i>Macrosiphoniella sanborni</i> Gillette, 1908 ^A	<i>Chrysanthemum</i> sp.	2012-2016	Cișmigiu, Herăstrău Parks, Private gardens

Table 1. Continued

No	Taxon	Host plants	Observation period	Location
20	<i>Pemphigus spirothecae</i> Passerini, 1860	<i>Populus</i> sp.	2012-2016	Herăstrău Park, USAMV B green areas, Private gardens
21	<i>Pinus pini</i> Macquart, 1819	<i>Pinus</i> sp.	2012-2014	USAMV B green areas
22	<i>Pseudaulacaspis pentagona</i> Targioni Tozzetti, 1886 ^{A,1}	<i>Syringa vulgaris</i> , <i>Morus alba</i>	2012-2014	Herăstrău Park, USAMV B green areas, Private gardens
23	<i>Tetraneura ulmi</i> Linnaeus, 1758	<i>Ulmus</i> sp.	2012-2016	'Grădina Maicii Domnului' Park, USAMV B green areas, Private gardens
24	<i>Trialeurodes vaporariorum</i> Westwood, 1856 ^{A,1}	<i>Salvia</i> sp., <i>Pelargonium</i> sp., <i>Impatiens</i> sp., <i>Aquilegia</i> sp., <i>Petunia</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
25	<i>Unaspis euonymi</i> Comstock, 1881 ^{A,1}	<i>Euonymus</i> sp.	2012-2016	Kiselief and 'Grădina Maicii Domnului' Park, Private gardens
Insecta, Hemiptera				
26	<i>Corythucha arcuata</i> Say, 1832 ^A	<i>Quercus robur</i> , <i>Quercus petraea</i>	2016	USAMV B green areas, Arenele BNR Park
27	<i>Corythucha ciliata</i> Say, 1832 ^{A,1}	<i>Platanus</i> × <i>acerifolia</i>	2015-2016	'Grădina Maicii Domnului' Park
28	<i>Halyomorpha halys</i> Stål, 1855 ^{A,1}	<i>Rosa</i> sp., <i>Hibiscus syriacus</i> , <i>Syringa</i> sp., <i>Magnolia</i> sp., <i>Tilia</i> sp., <i>Cedrus</i> sp., <i>Pelargonium</i> sp., <i>Impatiens</i> sp., <i>Petunia</i> sp., <i>Vinca rosea</i> , <i>Hyacinthus orientalis</i>	2014-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
29	<i>Metacalfa pruinosa</i> Say, 1830 ^{A,1}	<i>Rosa</i> sp., <i>Hibiscus syriacus</i> , <i>Syringa vulgaris</i> , <i>Buxus</i> sp., <i>Tilia</i> sp., <i>Cornus</i> sp., <i>Parthenocissus</i> sp., <i>Forsythia</i> sp., <i>Ailanthus</i> sp., <i>Platanus</i> sp., <i>Salvia</i> sp., <i>Pelargonium</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
30	<i>Nezara viridula</i> Linnaeus, 1758 ^{A,1}	<i>Rosa</i> sp., <i>Hibiscus syriacus</i> , <i>Ligustrum</i> sp., <i>Berberis</i> sp., <i>Syringa</i> sp., <i>Magnolia</i> sp., <i>Pelargonium</i> sp., <i>Impatiens</i> sp., <i>Petunia</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
31	<i>Psylla buxi</i> Linnaeus, 1758	<i>Buxus sempervirens</i>	2012-2016	Herăstrău and 'Grădina Maicii Domnului' Parks, Private gardens
Insecta, Lepidoptera				
32	<i>Autographa gamma</i> Linnaeus, 1758	<i>Pelargonium</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks
33	<i>Cameraria ohridella</i> Deschka & Dimic, 1986 ^{A,1}	<i>Aesculus hippocastanum</i>	2012-2016	Cişmigiu and Herăstrău Parks, USAMV B green areas
34	<i>Cydalima perspectalis</i> Walker, 1859 ^{A,1}	<i>Buxus sempervirens</i>	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
35	<i>Helicoverpa armigera</i> Hübner, 1809	<i>Rosa</i> sp., <i>Pelargonium</i> sp., <i>Gladiolus</i> sp., <i>Chrysanthemum</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
36	<i>Hyphantria cunea</i> Drury, 1773 ^{A,1}	<i>Acer negundo</i> , <i>Acer platanoides</i> , <i>Fraxinus excelsior</i> , <i>Morus alba</i> , <i>Populus</i> sp.	2012-2016	Cişmigiu, Kiselief, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens

Table 1. Continued

No	Taxon	Host plants	Observation period	Location
37	<i>Palpita vitrealis</i> Rossi, 1794	Ligustrum vulgare	2013	'Grădina Maicii Domnului' Park
38	<i>Rhyacionia buoliana</i> Denis & Schiffermüller, 1775	<i>Pinus</i> sp.	2012	USAMV B green areas, Private gardens
39	<i>Phyllonorycter platani</i> Staudinger, 1870 ^A	<i>Platanus</i> × <i>acerifolia</i>	2015-2016	'Grădina Maicii Domnului' Park
Insecta, Coleoptera				
40	<i>Byctiscus betulae</i> Linnaeus, 1758	<i>Tilia</i> sp.	2013	'Grădina Maicii Domnului' Park
41	<i>Lilicercis lilii</i> Scopoli, 1763	<i>Lilium candidum</i>	2014-2015	'Grădina Maicii Domnului' Park, Private gardens
42	<i>Lytta vesicatoria</i> Linnaeus, 1758	<i>Syringa vulgaris</i>	2013	Private gardens
43	<i>Otiorynchus sulcatus</i> Fabricius, 1775	<i>Rhododendron</i> sp., <i>Syringa vulgaris</i> , <i>Euonymus</i> sp.	2012-2016	Cișmigiu, Herăstrău, 'Grădina Maicii Domnului' Park, Private gardens
44	<i>Ovalisia festiva</i> Linnaeus, 1767	<i>Thuja occidentalis</i>	2013-2014	Private gardens
45	<i>Semanotus ruscicus</i> Fabricius, 1776	<i>Cupressocyparis leylandii</i>	2012-2013	Private gardens
46	<i>Tropinota hirta</i> Poda, 1761	<i>Salix</i> sp. <i>Rosa</i> sp.	2012-2015	Herăstrău Park
Insecta, Hymenoptera				
47	<i>Ardis pallipes</i> Serville, 1823	<i>Rosa</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens
48	<i>Arge ochropus</i> Gmelin, 1790	<i>Rosa</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas
49	<i>Cladius pectinicornis</i> Geoffroy, 1785	<i>Rosa</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău Parks, USAMV B green areas
50	<i>Megachile centuncularis</i> Linnaeus, 1758	<i>Rosa</i> sp.	2012-2016	Herăstrău Park, 'Grădina Maicii Domnului' Park, Private gardens
Insecta, Diptera				
51	<i>Monarthropalpus flavus</i> Schrank, 1776	<i>Buxus sempervirens</i>	2012-2016	USAMV B green areas, Private gardens
Mollusca, Gastropoda				
52	<i>Deroceras agreste</i> Linnaeus, 1758	<i>Impatiens</i> sp., <i>Salvia</i> sp., <i>Hyacinthus</i> sp., <i>Begonia</i> sp., <i>Ageratum</i> sp.	2012-2016	Cișmigiu, Kisellef, Herăstrău, 'Grădina Maicii Domnului' Parks, USAMV B green areas, Private gardens



Fig. 1. Box tree plants destroyed by *Cydalima perspectalis* in the Herăstrău Park, Bucharest, Romania



Fig. 2. *Ligustrum vulgare* hedge at the start of *Palpita vitrealis* attack

Ovalisia festiva and *Semanotus ruscicus* were identified on imported *Thuja occidentalis* and *Cupressocypris leylandii* found in a private garden. *Ovalisia festiva* was considered an accidental introduction in Romania, in Moara Domnească Village, 17 km away from Bucharest (NITZU et al. 2016).

The most destructive six pest species of ornamental plants are presented below, followed by a single case of interception for a mite not present in Europe.

The box tree moth *Cydalima perspectalis* (Walker, 1859)

Cydalima perspectalis was recorded for the first time in Bucharest in 2010 (IAMANDEI 2010, SZÉKELY et al. 2011). Our observations showed that the species has been well established and spread rapidly in the city and in the country. It has had a devastating impact especially on the topiary landscape (Fig. 1), leading to elimination of very old plants from the landscape. The

larvae of *C. perspectalis* are voracious and consume the leaves of *Buxus* sp. shrubs entirely. At larval emergence, the lower epidermis and parenchyma are consumed, leaving superior parenchyma untouched. Later, the larvae completely defoliate the plants, leaving the shrub covered by numerous silky yarns and blackish-green droppings. On the ground under the plants, little wastes of green leaves and green excrements indicate the presence of *C. perspectalis*. The growing processes are slowed and the development of plants is stopped. The *Buxus* species are known for their relatively slow growth (GUTUE et al. 2014). *Cydalima perspectalis* is a widely spread and established invasive alien species, which threatens also the box tree plants in the Romanian nurseries. The lack of natural predators and parasitoids contribute to its rapid expansion every year.

The jasmine moth *Palpita vitrealis* (Rossi, 1794)

Palpita vitrealis, was found in ‘Grădina Maicii



Fig. 3. *Aesculus hippocastanum* destroyed by *Cameraria ohridella*. The biotic stress induced a second bloom in August



Fig. 4. *Unaspis euonymi* attack

Domnului' Park in 2013, causing severe defoliation to *Ligustrum vulgare* plants. Although the attack was severe, in the following years *P. vitrealis* was not detected in the same place. In Bucharest, *L. vulgare* has been often used as roadside vegetation and in the

last five years many plants died or were completely defoliated, but it was not confirmed that the damages were produced by *P. vitrealis*. The species was previously reported in Banat, Transylvania, Moldavia and Dobrogea in Romania, under the synonym *P.*



Fig. 5. Colonies of *Schizotetranychus celarius* under waxy webbings on *Phyllostachys aureosulcata* leaves

unionalis (Hübner, 1796), but no damages were mentioned (RÁKOSY et al. 2003). SZÉKELY (2011) reported that the species is more frequent in southern Romania, but again there were no records about its damages. The larvae stay localised in a narrow area, where completely defoliate the branches and only afterwards they move to the next plant of the hedge (Fig. 2). Before pupation, a visible silk web can be spotted on the hedge, while during the feeding period, black droppings can be seen both on the plants and under the hedge, being a good ‘detector’ sign. The attacked plants are quickly debilitated and die.

The horse-chestnut leafminer *Cameraria ohridella* Deschka & Dimic, 1986

Cameraria ohridella had a dramatic negative impact on the urban landscape in Bucharest, as the European horse-chestnut, *Aesculus hippocastanum*, has been used for many roadside plantations and alignments of streets and parks. The foliage of the trees was totally destroyed and the plant physiology was highly altered, in such a way that a second bloom occurred at the end of summer (Fig. 3), which affected also the seeds and their multiplication. Many kilometres of street alignments planted with *A. hippocastanum* in Bucharest and other important Romanian cities have been already replaced with other tree species, because of this highly damaging invasive pest.

The London midget *Phyllonorycter platani* (Staudinger, 1870) and the sycamore lace bug *Corythucha ciliata* (Say, 1832)

Between 2015 and 2016 many London plane trees, *Platanus × acerifolia*, were attacked by two insect species poorly known in Romania, *Phyllonorycter platani* and *Corythucha ciliata*. Since the London plane tree has excessively been used in street alignments and parks after the destructions produced by *C. ohridella* on the European horse-chestnut, the

economic importance of these two species have increased accordingly. As the London plane trees are usually very tall, the pest species are very difficult to control by the authorities, fact that facilitates their spread even more. Also, many people reported small pinching due to *C. ciliata*.

The euonymous scale *Unaspis euonymi* (Comstock, 1881)

Unaspis euonymi is a well-established pest in all Romanian regions and recently has become a serious problem for ornamental plant nurseries, parks and private gardens (GUTUE et al. 2015). The main host plants are *Euonymus* spp., but the scale can also be found on *Syringa vulgaris*, *Hedera helix*, *Hibiscus* spp., *Catalpa bignonioides*, and *Lonicera* spp. (GUTUE et al. 2015). The infested plants are completely defoliated and if no measures are taken, the plants die (Fig. 4).

The bamboo spider mite *Schizotetranychus celarius* (Banks, 1917)

Schizotetranychus celarius was mentioned in Europe in the past, only once, in Britain, by OSTOJA-STARZEWSKI (2000). It was found in 2012 on *Phyllostachys aureosulcata* in one private garden in Bucharest. The plants were destroyed immediately after the pest identification and the presence of *S. celarius* was not confirmed in the following years (GUTUE et al. 2012). The mite develops colonies under the white-greyish waxy circular webbings (Fig. 5).

The control measures for all these harmful pests of urban vegetation are scarce due to the lack of approved plant protection products for ornamentals in Romania, but also because of the lack of data on biology and ecology of pests, the location of plants (playgrounds for children, places of relaxation and rest, roadside vegetation, private gardens) and plant height (chestnut, plane, etc.). Some preventive and curative control measures can still be applied, e.g.,

cutting and destroying the infested branches, removal of caterpillar nests, plant pruning, soil maintenance (especially for wasps pupae destruction), optimum plant fertilisation, etc. In private gardens, approved plant protection products could be used.

Conclusions

The recent boom of ornamental and landscape activities has also negative implications, as the trade with ornamentals is considered the main pathway for the introduction of alien species. As a result of our monitoring, we only recorded pests harmful to plants that we could spot in the main public parks of the Romanian capital and in few private gardens

to which we had access. By far of being a complete list of pests, our work should be a warning sign for the researchers and all the actors involved in the management of urban green areas.

The presence of 12 new invasive alien species, including *Cameraria orhidella* and *Cydalima perspectalis*, has totally changed the face of our capital and should increase the importance we give to the trade with ornamental plants, to the environment protection and also citizen science. Even if the control measures are difficult to be managed by the local authorities, some prevention and curative measures taken by each citizen could help to limit the spread of these pests and to prevent future introductions.

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