



THE MOST FREQUENT INVASIVE SPECIES IN THE FORESTS, ALLEYS AND PARKS OF THE REPUBLIC OF SERBIA

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Aash dieback - *Hymenoscyphus pseudoalbidus* Baral et al. *Chalara fraxinea* (asexual stage) (Ascomycota; Helotiales; Helotiaceae)

- Chalara causes leaf loss, crown dieback and bark lesions in affected trees.
- Once a tree is infected the disease is usually fatal, either directly, or indirectly by weakening the tree to the point where it succumbs more readily to attacks by other pests or pathogens, especially Armillaria fungi, or honey fungus.

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- Keca et al. (2017). First Report of the Invasive Ash Dieback Pathogen *Hymenoscyphus fraxineus* on *Fraxinus excelsior* and *F. angustifolia* in Serbia. Baltic Forestry, 23(1): NP Tara -Debelo Brdo

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Marković et al. (2016). Monitoring of the fungus *Chalara fraxinea* in Vojvodina during 2016. Topola, 197/198: 111-122.

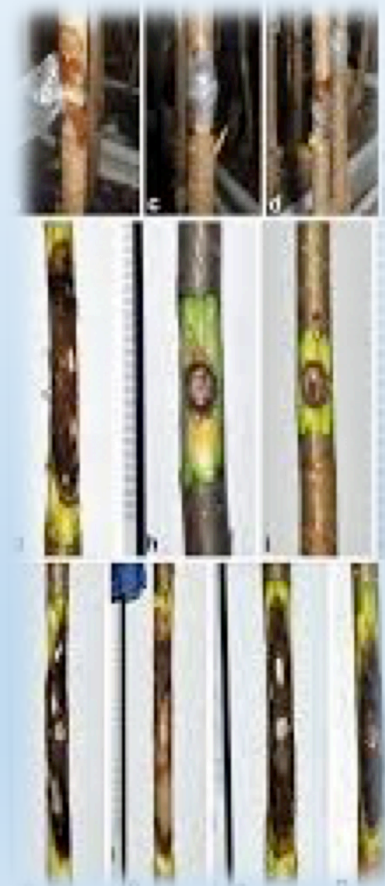
- Forest Administrations Višnjićevo, Bački Monoštor, Apatin - the fungus is present in all young plantations in which narrow-leaved ash is grown. Intensity of tree infection was 40.8-64.6%.

Phytophthora

(Oomycota; Peronosporales: Peronosporaceae)

Milenković et al. (2014). diversity and pathogenicity of *Phytophthora* species in Serbia and Poland and interaction of these organisms with *Chalara fraxinea* in ash decline and dieback in particular ash stand in Poland. ResearchGate, poster:

- *Phytophthora* species are fungi like organisms and proved being one of the main pathogens of fine root systems.
- Around 400 samples were collected in different stands in Serbia from 46 hosts, and 20 hosts (*Quercus petraea*, *Q. cerris*, *Q. frainetto*, *Ulmus glabra*, *Alnus glutinosa*, *Betula pendula*, *Fagus sylvatica*, *Salix caprea*, *Pyrus piraster*, *Populus tremula*, *Populus euroamericana*, *Picea abies*, *Prunus laurocerasus* ...) were positive on the presence of *Phytophthora* species.
- 14 different *Phytophthora* species and one taxon have been confirmed: *P. europaea*, *P. cambivora*, *P. citricola*, *P. cactorum*, *P. citrophthora*, *P. cryptogea*, *P. hedraiaandra*, *P. plurivora*, *P. pini*, *P. polonica*, *P. quercina*, *P. syringae*, *P. gonapodyides*, *P. taxon 'Pg chlamydo'*, and *P. lacustris*. Twelve out of 15 identified species are recorded for the first time in different ecosystems in Serbia.



Oak Lace Bug - *Corythucha arcuata* (Say) (Heteroptera: Tingidae)

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Boris Hrašovec, Milka Glavendekic, György Csóka (2014). The rapid spread of *Corythucha arcuata* in Southeastern Europe. Pp presentation:

First record locations in Serbia - Forest Estate Sremska Mitrovica, Forest Administration Morović: Locality 1 -44o 9118' N; 19o 0874' E; Locality 2-44o 8730' N; 19o 0169' E

Poljaković-Pajnik L. et al (2015). occurrence of major damages from *Corythucha arcuata* (Say) (Heteroptera: Tingidae) in the oak forests in Vojvodina. XIII plant protection advice, p. 63:

- In Serbia, it was first established in 2013 on the territory of Forest Estate Sremska Mitrovica, Forest Administration Morović (Jamena site), on *Quercus robur* and *Q. cerris*.
- During 2015, the presence of this invasive pest was established on large areas in the territory of FE Sremska Mitrovica, FA Sombor, and Novi Sad, and in the area of NP "Fruška gora".
- Only in the territory of FE Sremska Mitrovica the presence of this pest was in almost 27,000 ha of oak forests.

Oak Lace Bug - *Corythucha arcuata* (Say) (Heteroptera: Tingidae)

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Mara Tabaković-Tošić - non-published results of the research in the period 2015-2018:

- widespread species in urban areas of central Serbia;
- established in large numbers on all oak trees in the alleys, parks, as well as on trees along the regional roads.





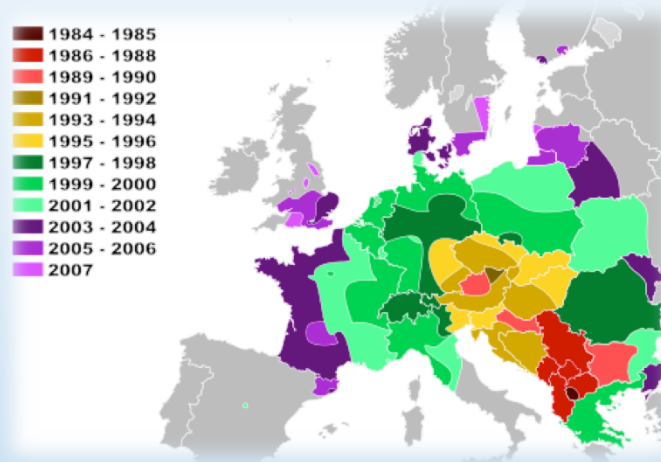
Horse Chestnut Leaf-miner
***Cameraria ohridella* Deschka & Dimić, 1985**
(Lepidoptera: Gracillariidae)

- The horse-chestnut leaf miner was first observed in Macedonia in 1984, and was described as a new species in 1986.
- *Cameraria ohridella* is an herbivorous organism and its impact is seen on particular trees and stands of trees in urban green. A high number of mines make the leaves wilt. In July and August leaves on trees are frequently heavily damaged.
- However, it might put an additional stress on horse chestnut trees that are already affected e.g. by the salt used in the streets during winter. It is mostly the aesthetic aspects that are important, because ugly looking trees make a sad impression on town inhabitants. No ecological or abiotic processes are influenced.
- The moth has attained a very rapid dispersal rate across Europe of 60 km. per year.

Horse-chestnut Leaf-miner

Cameraria ohridella Deschka & Dimić, 1985

(Lepidoptera: Gracillariidae)



First records in European countries

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- first record in 1987
- widespread species in urban areas
- established in large numbers on all horse-chestnut trees *Aesculus hippocastanum* L. in the alleys and parks



Planthopper - *Metcalfa pruinosa* (Say) (Hemiptera: Flatidae)

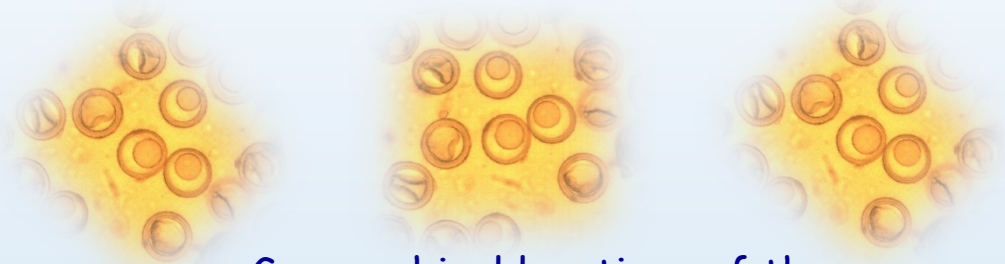
- Nearctic, polyphagous invasive species - planthopper *Metcalfa pruinosa* has been present in Europe since 1979 when it was incidentally introduced to the province of Treviso, Italy.
- In the following few decades, positive findings were published for most European countries - France, Spain, Slovenia, Switzerland, Croatia, Great Britain, Austria, the Czech Republic, Greece, Turkey, Montenegro, Hungary, Bulgaria, the Republic of Serbia, Bosnia and Herzegovina, Romania.
- In Serbia, it was first noticed in the area surrounding Belgrade. In the following years, it spread over many areas of Vojvodina and central Serbia.
- It most commonly occurs on urban ornamental trees and shrubs.
- So far, it hasn't been found at higher altitudes. The climatic conditions of our area seem to favor the growth of this species.



Entomophaga maimaiga Hamber, Shimaizu & Soper

Entomophthorales: Entomophthoraceae

- Natural enemy of the gypsy moth in Japan, China, Russian Far East.
- Bulgaria has been the first one in Europe in which it was introduced successfully. Since 2011 the fungus has been found in Turkey, Georgia, Serbia, Greece, FYR Macedonia, Croatia, Hungary, Slovakia, Bosnia and Herzegovina, Romania.
- Regarding the situation in Serbia, it was first established to spread naturally in Belgrade and Valjevo regions. Then the fungus was introduced or found in many places of the country.
- *Entomophaga maimaiga* proved to be a powerful reducer of the population size of the gypsy moth in Serbian forests.



Geographical locations of the *Entomophaga maimaiga* first recorded in Central Serbia (Mara Tabaković-Tošić)

Locality - Region	Type of forest	Year of the first record	gypsy moth attack intensity
1. Beograd	oaks and beech	2011	severe
2. Valjevo	oaks and beech	2011	severe
3. Krupanj	beech	2013	severe
4. Kučevo	beech	2013	severe
10. Majdanpek	beech	2013	severe
5. Kragujevac	oaks	2013	medium
6. Kraljevo	oaks	2013	medium
7. Kruševac	oaks	2013	Severe
8. Vrnjačka Banja	beech	2013	high
9. Prokuplje	oaks and beech	2013	severe
10. Kuršumlija	oaks and beech	2013	severe
11. Brus	beech	2013	high
12. Blace	beech	2013	High
13. Donji Milanovac	beech	2012	severe
14. Negotin	oaks and beech	2012	severe
15. Leskovac	beech	2013	Medium
16. Kragujevac	oaks	2014	Severe
17. Bor	oaks and beech	2014	Severe
18. Sokobanja	oaks and beech	2014	Severe

Thank you for your attention

