





THE ROLE OF INVASIVE SPECIES IN URBAN FOREST PLANNING Skopje, North Macedonia
4-6 June 2024

MAJOR PESTS AND DISEASES OF TREES IN URBAN AREAS

Prof. Milka Glavendekic, D. Sc.
UNIVERSITY OF BELGRADE - FACULTY OF FORESTRY
Department of Landscape Architecture and Horticulture
Belgrade, Serbia





Content

- Introduction
 - Terminology: Urban forests, Urban green, trees outside of forests, Green infrastructure
- Threats for health of woody plants
- Material and Methods
- Major pests and diseases
- Conclusions









THE ROLE OF INVASIVE SPECIES IN URBAN FOREST PLANNING

- Introduction
- Managed forests/Urban forests
- Trees outside of forests (TOF): the main source of landscape connectivity absent from forest inventories.
- Green infrastructure
- Native and non-native trees and shrubs







Possible threats for woody plants in urban region

- Biotic and abiotic factors have a negative impact on woody species:
 - Pathogenic organisms: nematodes, fungi, bacteria, viruses
 - Harmful insects
 - Solar radiation
 - Lack of precipitation
 - Wind extremes
 - Damage caused by humans
 - Inappropriate planting
 - Not suitable microhabitat for trees and shrubs
 - Wrong pruning
 - · Mechanical damage (traffic accident)
 - Damage by construction works
 - Lack of irrigation



Threats for woody plants in urban region





- Invasive forest pathogens increased exponentialy in the last four decades (Santini et al., 2013).
- Touristm, trade and transport increase distribution of non-native and invasive insect pests,
- Climate change supports biological invasions.
- Mediterranean plants are, due to changed climate conditions, successfully grown in continental part of Europe, South East Europe.
- Pests from Mediterranean region follow their host plants and migrate to the continent and in the direction east.
- Plant health monitoring in urban area is likely not enough successful, nor regulated.

In Europe 449 non-native species are related to:

- Ornamental shrubs 23%
- Ornamental trees 23%
- Conifers 16,3%
- First records from southern countries: 297 records (66,5%)
 - Mainland Italy: 107 records
 - Mainland France: 80 records
- First records from western Europe: 87 spp.
 - Great Britain 47 records
- First records from Eastern Europe: 25 records
- First records from Central Europe: 20 records
- First records from Nothern Europe (7 records).





Material and Methods

- Visual tree inspections,
- Parts of plants are sampled grown in laboratories for determination of insects and pathogens.
- Pheromone traps Sticky color traps







Major trees in urban area

- Abies spp.
- Cedrus atlantica, C. deodara
- Chamaecyparis spp.
- Juniperus spp.
- Thuja spp.
- Picea spp.
- Pinus spp.
- Taxus baccata

- Acer spp.
- Aesculus hippocastanum
- Buxus sempervirens and cv.
- Fraxinus spp.
- Ginkgo biloba
- Malus spp.
- · Platanus spp.
- Prunus spp.
- · Quercus spp.
- Robinia pseudoacaccia and cv.
- Tilia spp.

· Ulmus spp.

4-6 June 2024

REUFIS

Major pests and diseases of ABIES spp. (A. alba, A. nordmanniana, A. pinsapo) in urban areas

• Fungi: Phytophthora cinnamomi

Insects: Dreyfusia nordmannianae – silver fir adelges,

non-native;

natural area: North America

Cinara curvipes - Bow-legged fir aphid

Occurs on the trunk or branches of Abies spp., Cedrus deodora and

Pinus contorta.

natural area: North America

In the 1990s it was first recorded in the UK, and is now widely distributed in Europe







Major pests and diseases of *Cedrus* spp. in urban areas

• Fungi: Diplodia sapinea, Botryosphaeria dothidea

(Botryosphaeriaceae) (Zlatkovic et al., 2016)

- Insects: Cinara cedri Common in Mediterranean region.
- Expanding range all over the world.
- Phloeosinus spp.

- Aphid of body leangth 3-4 mm, bronze or read-brown with dark spots on upper part of thorax and covered with wax powder
- In large and dense colonies on the bark of 1-5 cm thick branches. They produce large quantities of honey dew.
- Attacked trees are sometimes defoliated, produce no cones and the growth is reduced.

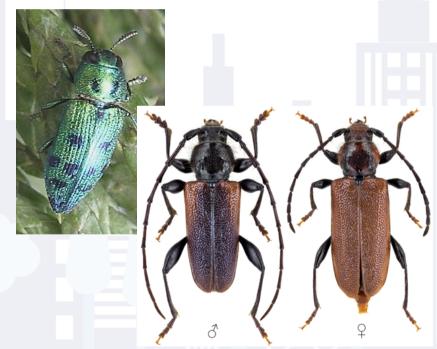


Major pests and diseases of *Chamaecyparis* spp., *Juniperus* spp., *Thuja* spp. trees in urban areas

Fungi: Pestalotiopsis funerea - Pestalotiopsis dieback
 Shoots turn brown and die back, often from the tips. Infections occur mainly in spring and summer in wet conditions
 Diplodia seriata

- Mites: Oligonychus ununguis, Tenuipalpidae
- Insects: Lamprodila festiva (Coleoptera: Buprestidae).
- Native range: South Europe; expansion with favourable climate conditions and available plants
- Callidiellum rufipenne (Coleoptera: Cerambycidae)
- Native range: East Asia
 Polyphagous in coniferous trees (Cryptomeria, Pinus, Abies, Larix, Chamaecyparis, Thuja)

Planococcus vovae (Hemiptera: Pseudococcidae)







Major pests and diseases of *Pinus* spp. trees in urban areas

• Fungi: Dothistroma septosporum, D. pini,

Diplodia sapinea. The diseases symptoms include: damping off and collar rot of seedlings, stem canker, root disease, and shoot blight.

- Insects: Neodiprion sertifer (Hym.:Diprionidae)
- Leptoglossus occidentalis (Heteroptera, Coreidae)
- Thaumetopoea pytiocampa
- Phaenops cyanaea (Coleoptera: Buprestidae)
- Ips sexdentatus
- Orthotomicus erosus (Coleoptera: Curculionidae:

Scolytinae

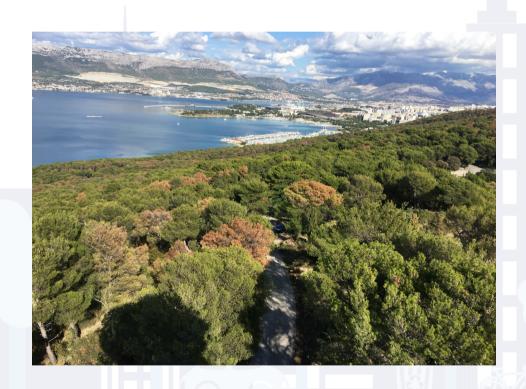


(Picture: G. Csoka, Hungary Forest Research Institute, bugwood.org)





Outbreak of Orthotomicus erosus at the Mt Marjan in Croatia



- Recorded outbreaks:
- Israel (Mendel 1983)
- Turska, Iran, Alžir
 (Sarikaya &Sen 2017)
 Tunis (Bepen Jamaa et al. 2007)

Croatia, (Pernek, 2019)



Major pests and diseases of Acer spp. trees in urban areas

- Pathogens: Phytophthora spp.
- Rhytizma acerinum
- Insects: Agrilus viridis,
- Zeuzera pyrina
- Metcalfa pruinosa
- Cameraria ohridella

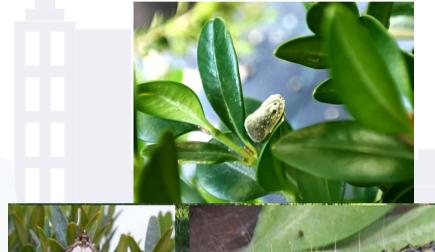






Major pests and diseases of Buxus spp. trees in urban areas

- Fungi: Cylindrocladium buxicola
 - box blight
- Pseudonectria buxi (formerly Volutella buxi) - Volutella Blight Disease
- Insects: Psylla buxi
- Metcalfa pruinosa
- Cydalima perspectalis
- Mites: Eurytetranychus latus (Acari Tetranychidae)





REUFIS

Major pests and diseases of Quercus spp. trees in urban areas

- Fungi: Phytophthora spp.
- Armillaria mellea
- Insects: Early spring defoliators: Tortrix viridana, Operophtera brumata, Noctuidae
- Corythucha arcuata (Hemiptera: Tingidae
- Metcalfa pruinosa (Hemiptera: Flatidae)
- Neoclytus arcuatus



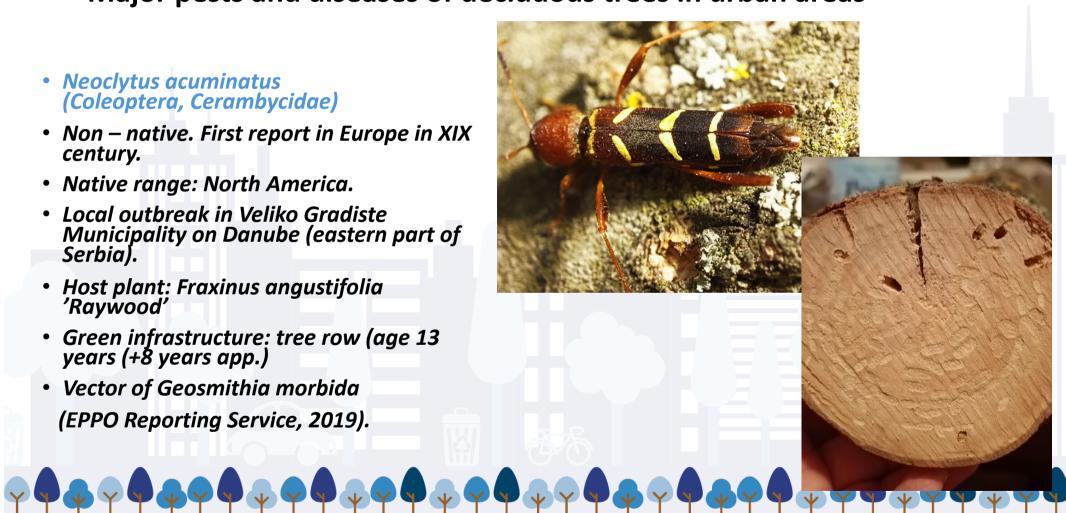


Skopie, North Macedonia 4-6 June 2024



Major pests and diseases of deciduous trees in urban areas

- Neoclytus acuminatus (Coleoptera, Cerambycidae)
- Non native. First report in Europe in XIX century.
- Native range: North America.
- Local outbreak in Veliko Gradiste Municipality on Danube (eastern part of Serbial.
- Host plant: Fraxinus angustifolia 'Raywood'
- Green infrastructure: tree row (age 13 years (+8 years app.)
- Vector of Geosmithia morbida (EPPO Reporting Service, 2019).



Skopje, North Macedonia 4-6 June 2024



Major pests and diseases of *Fraxinus* spp. in urban areas

- Phytophthora root rot
- Fungi: Hymenoscyphus fraxineus
- Insects: Tomostethus nigritus (Hymenoptera: Tenthredinidae)
- Zeuzera pyrina (Lepidoptera: Cossidae
- Neoclytus arcuatus (Coleoptera Cerambycide)
- Agrilus spp.:
- Metcalfa pruinosa (Hemiptera: Flatidae)
- Stereonychus fraxini (ColeopteraCurculionidae)
- Scale insects, miner moths etc.



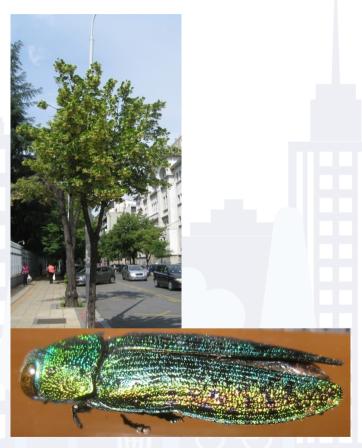


Skopje, North Macedonia 4-6 June 2024



Major pests and diseases of Tilia spp. in urban areas

- Phytophthora root rot
- Fungi: Hymenoscyphus fraxineus
- Insects: Eucallipterus tiliae (Hemiptera: Aphididae)
- Phyllonorycter issikii (Lepidoptera: Gracillariidae) the Lime Leaf Miner, non-native
- Neoclytus arcuatus (Coleoptera Cerambycide), non-native
- Zeuzera pyrina (Lepidoptera: Cossidae
- Agrilus viridis (Coleoptera:Buprestidae)
- Ovalisia rutilans (Coleoptera:Buprestidae)







Conclusions

- Mayor pests and diseases of trees in urban areas are native and non-native species.
- Number of non-native species mainly originate from Asia and North America
- Main pathway of introduction of non-native species is trade with ornamental trees and active flight of some species. Danube is also one of corridors for invasive species.
- Climate change is favorable for expansion of Mediterranean plants and they are followed by their pests, which are established and tend to outbreak (Lamprodila festiva, Orthotomicus erosus).
- Emerging pests, native species which tend to outbreak in changed climate conditions (Tomostethus nigritus, Zeuzera pyrina).
- Preventive measures: education of stuff, nursery producers, landscape architects.
- Select a tree that is suited to the circumstances at the site. Native trees should prevail because of their coevolution with pests and diseases..
- Raising public awareness

