



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE



INTERNATIONAL YEAR OF
PLANT HEALTH

2020

Phytosanitary measures – are they enough to protect our forests?

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*GenRes Bridge
Workshop on Phytosanitary barriers for genetic resources
24 February 2021
MS Teams*



Foto: Nina Sramel



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Foto: Simon Zidar



Foto: Andreja Kuvčič, GIS



foto: dr. Tine Hauptman

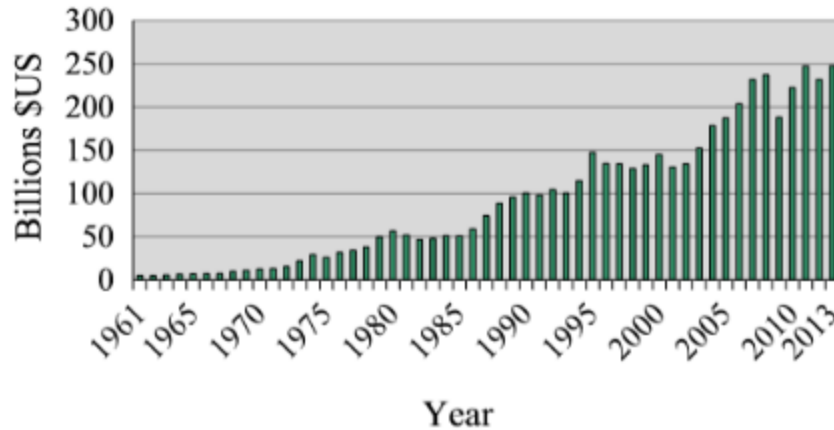




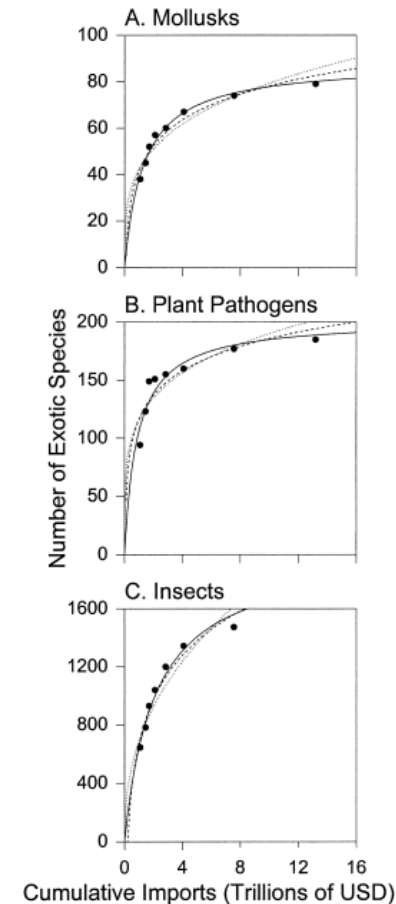
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Threats

- increasing global trade, tourism... → new threats to forest health

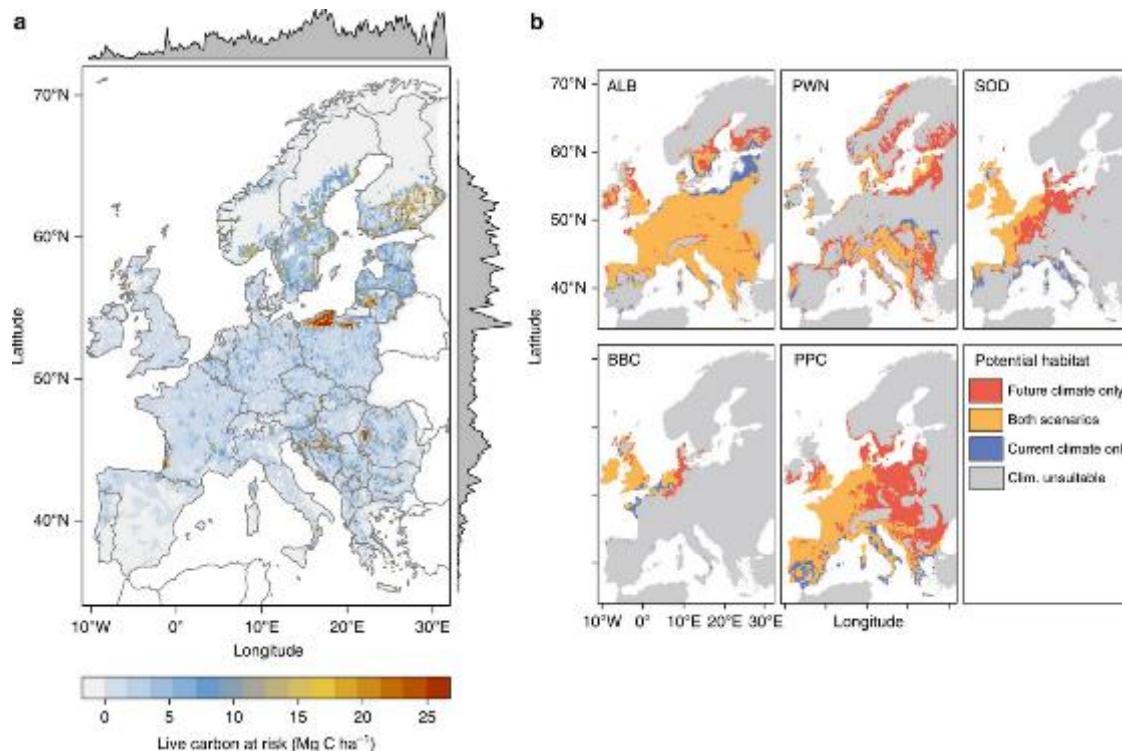


Value of global forest product exports Source: Allen et al., 2017 (Biological Invasions)



Relationship between US imports and the accumulation of exotic mollusks, plant pathogens, insects (from 1920-1990) Source: Levine & d'Antonio, 2003 (Conservation Biology)

Threats & impacts

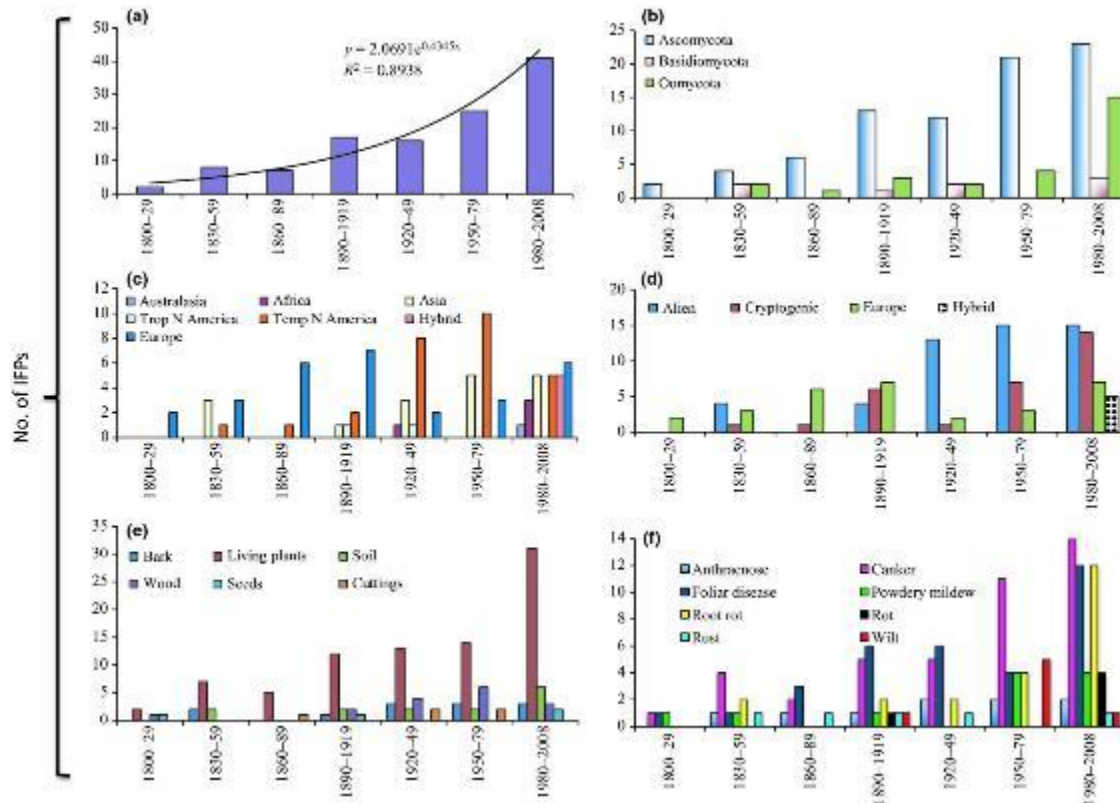


*Live tree carbon at risk from an invasion of five alien pest species into their climatically suitable areas in Europe. a The total amount of live tree carbon at risk (in Megagrams carbon per hectare) from a complete invasion of all five pest species into their climatically suitable areas under intermediate climate change (2030–2080, scenario RCP 4.5). b Climatically suitable ranges for each pest species under current climate (1950–2000) and intermediate climate change (2030–2080, scenario RCP 4.5). ALB: Asian Long-horned Beetle (*Anoplophora glabripennis*), PWN: Pine Wood Nematode (*Bursaphelenchus xylophilus*), SOD: Sudden Oak Death (*Phytophthora ramorum*), BBC: Beech Bleeding Canker (*Phytophthora kernoviae*), PPC: Pitch Pine Canker (*Fusarium circinatum*)* Source: Seidl et al., 2018 (*Nature Communications*)



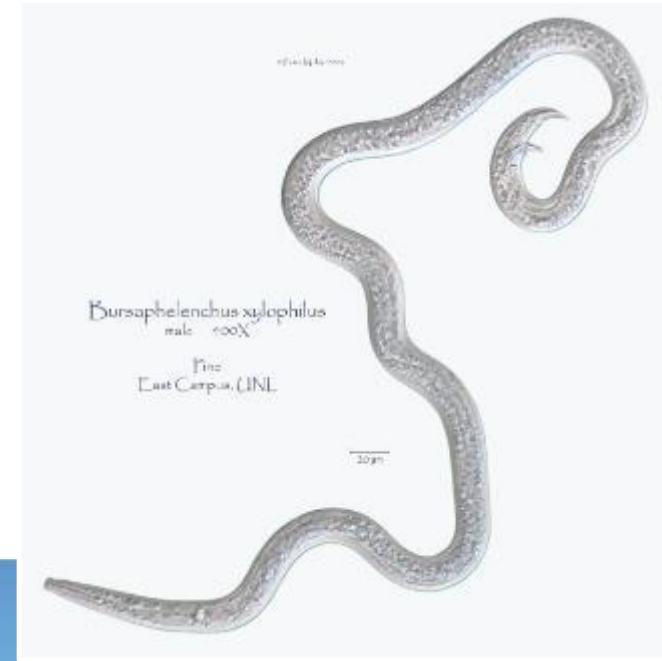
Threats

- In the last decade several pests have been introduced into other countries and continents through international trade → **international recognition of the importance of phytosanitary measures** (www.fao.org)



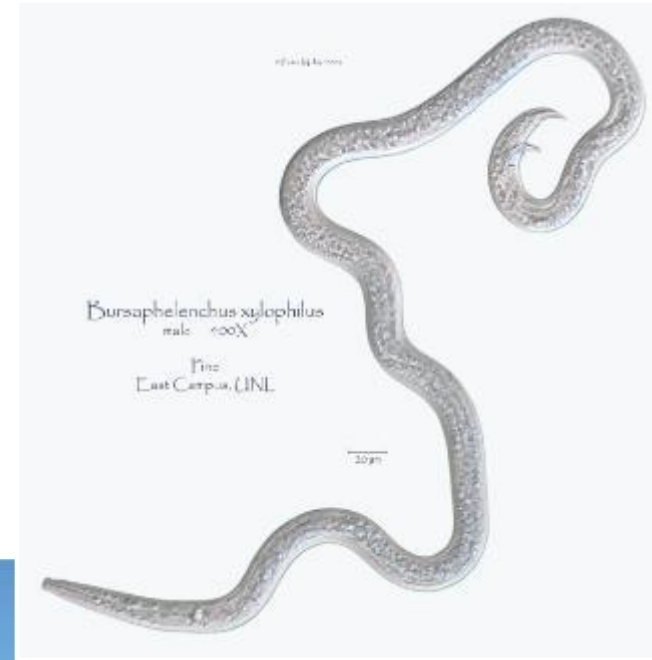
Pine wilt disease (*Bursaphelenchus xylophilus*)

- One of the major threats to forest ecosystems worldwide
- Japan, China, Korea, North America, Portugal, Spain (EPPO)



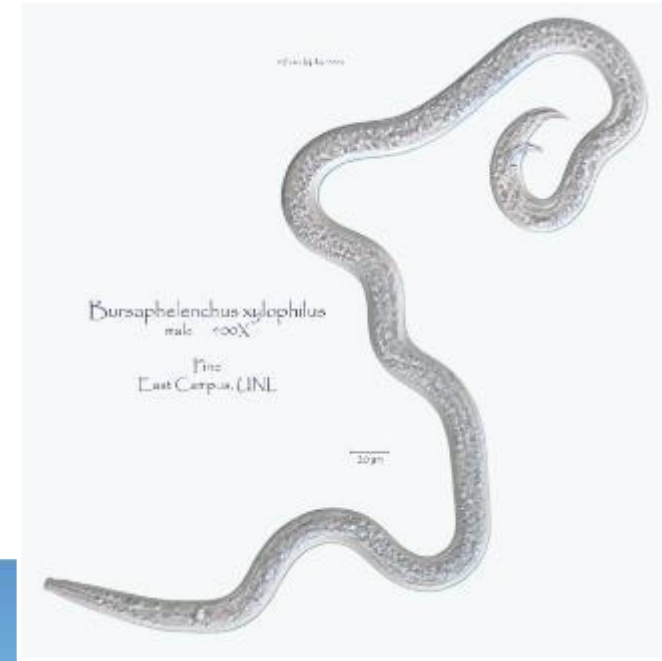
Pine wilt disease (*Bursaphelenchus xylophilus*)

- Damage in non-native regions – example of Japan: huge annual losses after increased mortality and growth loss of pine forest
- vast and irreversible changes to the native forest ecosystems including tree species conversions, wildlife habitat destruction, soil and water conservation and loss of biodiversity



Pine wilt disease (*Bursaphelenchus xylophilus*)

- EU: Q-organism; priority pest
- Phytosanitary measures in place (EU plant health legislation):
 - Trade (eg. plant passports, restrictions)
 - Surveys
 - Measures



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)

- European common ash (*Fraxinus excelsior*)
- 1992 in Poland, fungus described in 2006



Figure 1. Distribution map of *Fraxinus excelsior*, including year for first report of ash dieback. (Timmermann et al. 2011, EUFORGEN 2009, personal communication²)

Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)

- European population of the fungus is hypothesized to be founded by two divergent haploid individuals from Asia (probably on imported seedlings)
- Current levels of the EU-pathogen genetic diversity may infect and kill ~95% of all European ash
- Less than 5% of trees are partially resistant or tolerant

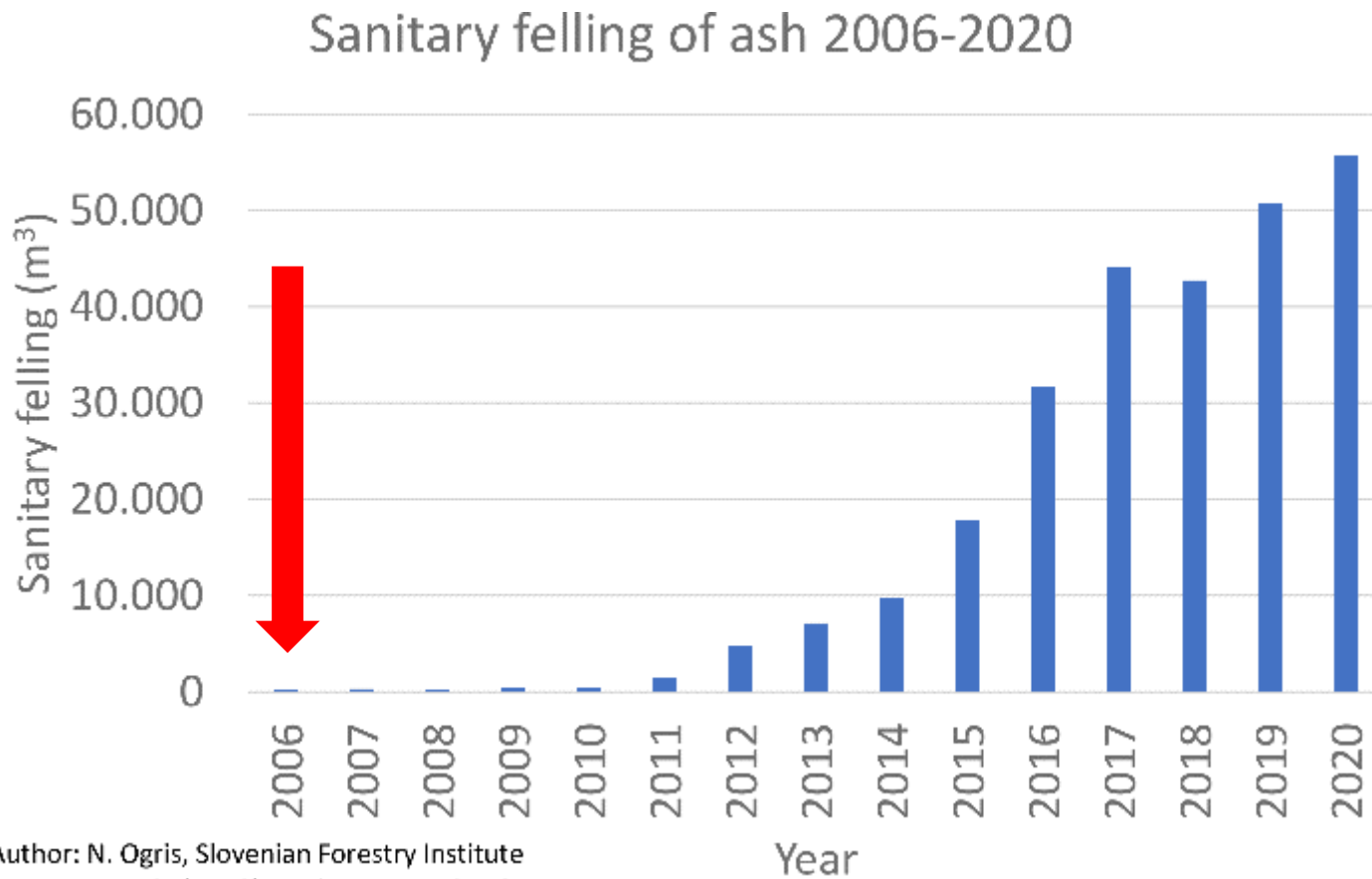


Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)

- Further introductions of new genotypes of this fungus into EU?
- Current: 85% mortality rate in plantations and 69% in woodlands (Coker et al., 2019)



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)



Author: N. Ogris, Slovenian Forestry Institute
Datasource: Timber, Slovenia Forestry Service



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)



Photo: N. Ogris



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)



foto: dr. Tine Hauptman



Ash dieback - *Hymenoscyphus fraxineus* (*Chalara fraxinea*)



Threats of new pathogens, pests – not listed on EU lists, not yet described

- **High risk plants:** plants, plant products whose introduction poses an unacceptable pest risk to EU, import into EU PROHIBITED (Commission Implementing Regulation (EU) 2018/2019)
- full risk assessments (Commission Implementing Regulation (EU) 2018/2018)
- *But if the pathogen is not known?*
- *New conditions in new areas?*
- *???*
- *Example of ash dieback!*



Phytosanitary measures (forest reproductive material)

- EU plant health legislation:
 - Plant passports (movement and trade within the EU, compliance with the legislation requirements; Regulation (EU) 2016/2031)
 - Q-organisms (Regulation EU 2019/2072/EU)
 - RNQP (Regulation EU 2019/2072/EU)
- Non-Q organisms; non-regulated pests: ??? eg. *Verticillium dahliae*, *Ips* spp., powdery mildews (*Erysiphe* spp.), ...
- *Council Directive 1999/105/EC on the marketing of forest reproductive material: plant health legislation; and fair marketable quality (also health)*



Take- Away Message

Foresters + nurseries + inspectors
+ scientists + national plant
protection organizations (NPPOs)

let's strengthen

our efforts to prevent pest
introduction and spread!



Phytosanitary
measures –
are they
enough to
protect our
forests?

- **Not enough, but they are necessary**
- Diagnostics, identification and quick actions to prevent new diseases, pests, populations to enter our forests
- Regular surveys of forests, nurseries
- Healthy FRM (free of pathogens, not just free of symptoms)
- Raising awareness
- Genetically diverse forests





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Protecting forests for a healthy future!

Varujemo gozdove za zdravo prihodnost!