



Plant health research in the context of biosafety and environmental protection

# Prevention strategies against new and emerging diseases and pests

Belgian scientific plant health symposium

PROTECTING PLANTS, PROTECTING LIFE

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# Introduction



- The **introduction and spread of harmful organisms** have important economic and ecological consequences - SDG 15 “Life on land”
  - The International Plant Protection Convention (IPPC) Strategic Framework 2020-2030 considers as a Development Agenda the **“Strengthening of Pest Outbreak Alert and Response Systems”**
  - At the regional or national levels, actions are increasingly being taken on **alert systems**
- in Europe on 14/12/2019, **Regulation (EU) 2016/2031** came into force, which fundamentally reformed the **plant health policy**

# Introduction



## Regulation (EU) 2016/2031 on protective measures against pests of plants = ‘new plant health policy’

- introduces a **proactive approach** to **prevent** the introduction and spread of harmful organisms
- Prevention strategies needed to **rapidly** detect changes in existing populations or introductions of new harmful organisms **on our territory**:
  - risk-based **survey programs**
  - **more involvement** of operators and citizens in the detection of harmful organisms
  - extension of compulsory notification
  - need for a **system** for raising awareness, warning and reporting quarantine organisms (**Q-organisms**) harmful to plants (in Belgium)

# Introduction

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### PART 2

- risk-based **survey programs**
- **more involvement** of operators and citizens in the detection of harmful organisms
  - extension of compulsory notification

### PART 1

- need for a **system** for raising awareness, warning and reporting quarantine organisms (**Q-organisms**) harmful to plants (in Belgium)

**FOCUS ON FORESTS**



## Beware&Note

Development of a system for awareness, early detection and notification of organisms harmful to plants in Belgium (and beyond)

**01/07/2019 – 31/12/2020**

# Roadmap



- **Define target organisms**
- Create info/identification sheets
- Define features of the alert system
- Develop the 'B&N' web platform
- Launch the platform / raise public awareness

# Define target organisms

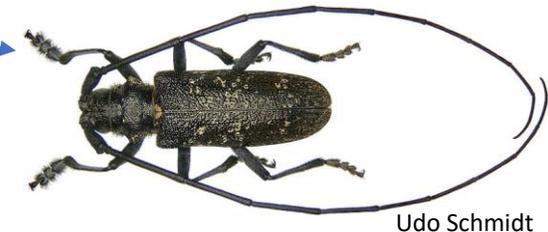


- All target **quarantine organisms** appear on (one of) the following **lists**:
  - *European Union quarantine annex II list of the Commission Implementing Regulation (EU) 2019/2072*
  - *Several Commission Implementing Decisions (EU) (emergency measures) or Council Directives (covered by Regulation (EU) 2016/2031)*
  - *EPPO A1 and A2 Lists of pests/pathogens recommended for regulation as quarantine organisms*
- Initially, only the most important and threatening quarantine organisms harmful to plants (**'high risk'**)
- The focus is on quarantine organisms that are relatively **easy to identify** (insects) or whose **damage symptoms** (fungi, bacteria, viruses) are **very typical** and clearly recognisable
  - start with some test cases (20) and extend the list stepwise

# Define target organisms

## Insects:

- *Anoplophora glabripennis* (Asian longhorn beetle) and *Anoplophora chinensis* (citrus long-horned beetle)
- *Aromia bungii* (red-necked longhorn beetle)
- *Monochamus* spp. (sawyer beetles)  
→ *Bursaphelenchus xylophilus* (Pine Wood Nematode)



Udo Schmidt

# Define target organisms

## Insects:

- *Epitrix papa* and *Epitrix cucumeris*
- *Agrilus planipennis*, *Agrilus anxius*, *Agrilus fleischeri*, *Agrilus bilineatus* (wood-boring jewel beetles)
- *Popillia japonica* (Japanese beetle)
- *Naupactus xanthographus*



# Define target organisms

## Fungi:

- *Ceratocystis platani* (canker stain of plane)
- *Geosmithia morbida* (thousand cankers disease)  
+ vector *Pityophthorus juglandis*
- *Synchytrium endobioticum*
- *Heterobasidion irregulare*  
→ as a test, easy to misidentify



# Define target organisms

## Viruses:

- Rose rosette emaravirus (witches' broom)
- Chrysanthemum stem necrosis tospovirus
- Tomato brown rugose fruit virus



## Bacteria:

- *Xylella fastidiosa*



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# Create info/id sheets



- Correct, easily accessible and clear **information sheets** on these target organisms (in Dutch, French and English)
  - **Content:** identification/typical damage symptoms (pictures/video), host plants, distribution, Q status + consequences (compulsory notification)
  - Existing files, presentations and other information material (e.g. **EPPO** communication kits, **EFSA** Pest Survey Cards, **CABI** datasheets etc.) are being used as much as possible
    - EPPO provided permission to use their leaflet template and images
- These fact sheets will be freely accessible on the new Beware&Note platform

How to identify *Monochamus* longhorn beetles and the symptoms of the pine wood nematode?

Can you help us?

#### Adult beetle (= longhorn beetle)

There are different types of *Monochamus* longhorn beetle species that can transmit the pine wood nematode, with a number of common characteristics:

- 15-30 mm long
- Antennae longer than the body
- A large stout lateral spine on both sides of the pronotum (neck)
- Dark elytra (backs) with varying white to yellow spots
- Typical yellow to brown triangular scutellum between the pronotum and elytra
- Round exit holes
- These longhorn beetles carry the nematodes on the body and spread them during feeding and laying eggs.



*M. sartor* – Jožka © 2016

#### Symptoms of the pine wood nematode (*Bursaphelenchus xylophilus*)

Nematodes block the sap flow, leading to local wilting, which is the first visible symptom.

Dying off of the entire tree. This can happen within a year.

The pine wood nematode is included in the **EPPO A2 list**. This list contains plant-harmful organisms that may cause **severe damage** to many wild and cultivated plants. Therefore, it is important to report if you have seen this insect or symptoms of the nematodes. **Early detection** allows a fast and efficient implementation of control measures so that this invasive exotic species **cannot establish itself**.

If you spot *Monochamus* or the pine wood nematode:

If possible, take a photo of the insect and note the precise location.

Report via [Waarnemingen.be/exoten](http://Waarnemingen.be/exoten)

#### More info?

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project BEWARE&NOTE (RT 19/03),  
financed by FOD



Source of info and images: (BURSY) <https://gd.eppo.int>  
and [tidcf.nrcan.gc.ca/en](http://tidcf.nrcan.gc.ca/en) or see images

# STOP *Monochamus*!

These longhorn beetles are  
vectors of

pine wood nematode  
*Bursaphelenchus xylophilus*



*M. galloprovincialis* courtesy of  
Roweromaniak @  
commons.wikimedia.org

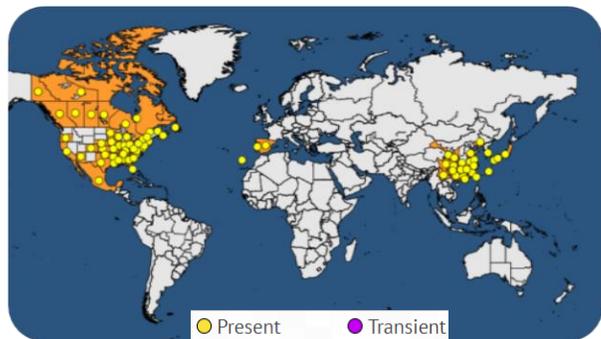


*Bursaphelenchus xylophilus* (BURSY) - <https://gd.eppo.int>



In collaboration with EUPHRESOCO and EPPO [www.eppo.int](http://www.eppo.int)

## Distribution



The nematode and longhorn beetles were found in **Portugal** in 1999. Since then, several outbreaks have been observed in **Portugal and Spain**. An exotic *Monochamus* longhorn beetle was once found in Germany in 2006. There are several species of the genus *Monochamus*. Some are exotic and originate from **North America** (*M. carolinensis* and *M. scutellatus*) or **Asia** (*M. alternatus*). Five species are **native to Europe** (*M. galloprovincialis*, *M. sartor*, *M. sutor*, *M. saltuarius* and *M. rosenmuelleri*).

The nematodes can be spread through **raw, infected wood**, e.g. wood chips or bark for mulching. The longhorn beetles can also be spread via **raw wood**, but also through **wood packing material** such as pallets.



## Damage symptoms



### Phytosanitary measures

- Removal and destruction of **infected trees**
- Removal and destruction of **host plants** in the immediate vicinity
- **Traps** for *Monochamus* up to 20 km around the infected trees for further inspection



## Host plants



For both the longhorn beetle and the nematode, **Pinus** is the main host plant, but other **needle-leaf trees and conifers**, both dead and alive, can be infected, e.g., fir (*Abies* sp.), cedar (*Cedrus* sp.), Japanese cedar (*Cryptomeria* sp.), larch (*Larix* sp.), spruce (*Picea* sp.) and Douglas-firs (*Pseudotsuga* sp.).



# Roadmap



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- Launch the platform / raise public awareness

# Features of the alert system



- Waarnemingen.be/observations.be as a **basic platform** as these websites reach the **whole of Belgium** and are **known to the general public**
- Other **advantages**: user-friendly - free of charge – no login needed – app for use in the field – geolocation included - identification app integrated
- Adopt main components and principles from its mother website (apps included), accentuated with ideas gathered from existing platforms:
  - Scientific materials (fact sheets, PowerPoint presentations, technical notes)
  - Host plant and pest/pathogen categories (filters)
  - Inclusion of training video's



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# Platform development



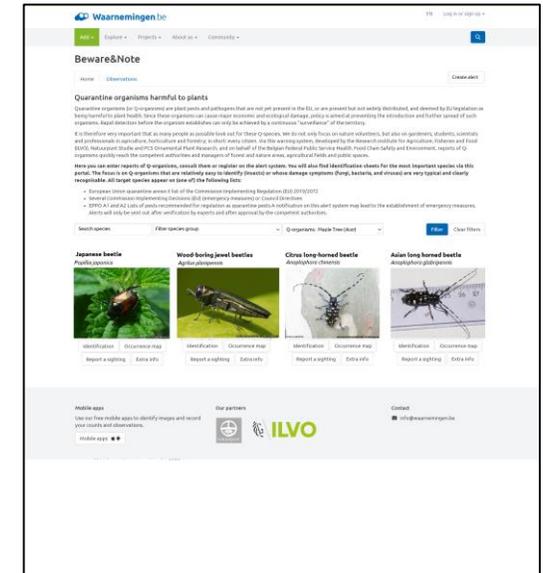
- Structure of the B&N platform has been drawn; it will be organised into four pillars:

**identification - reporting - set warnings - observations**

+ an admin page for verifying the identification (ILVO) and delaying/sending out an alert (FASFC/FPS)

- An external software development company is entrusted with programming the platform

→ delay due to Covid-19 measures



# Beware&Note

Home

Observations

Create alert

## Quarantine organisms harmful to plants

Quarantine organisms (or Q-organisms) are plant pests and pathogens that are not yet present in the EU, or are present but not widely distributed, and deemed by EU legislation as being harmful to plant health. Since these organisms can cause major economic and ecological damage, policy is aimed at preventing the introduction and further spread of such organisms. Rapid detection before the organism establishes can only be achieved by a continuous "surveillance" of the territory.

It is therefore very important that as many people as possible look out for these Q-species. We do not only focus on nature volunteers, but also on gardeners, students, scientists and professionals in agriculture, horticulture and forestry; in short: every citizen. Via this warning system, developed by the Research institute for Agriculture, Fisheries and Food (ILVO), Natuurpunt Studie and PCS Ornamental Plant Research, and on behalf of the Belgian Federal Public Service Health, Food Chain Safety and Environment, reports of Q-organisms quickly reach the competent authorities and managers of forest and nature areas, agricultural fields and public spaces.

**Here you can enter reports of Q-organisms, consult them or register on the alert system. You will also find identification sheets for the most important species via this portal. The focus is on Q-organisms that are relatively easy to identify (insects) or whose damage symptoms (fungi, bacteria, and viruses) are very typical and clearly recognisable. All target species appear on (one of) the following lists:**

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- EPPO A1 and A2 Lists of pests recommended for regulation as quarantine pests A notification on this alert system may lead to the establishment of emergency measures. Alerts will only be sent out after verification by experts and after approval by the competent authorities.

Search species

Filter species group

Q-organisms: Maple Tree (*Acer*)

Filter

Clear filters

### Japanese beetle

*Popillia japonica*



Identification

Occurrence map

Report a sighting

Extra info

### Wood-boring jewel beetles

*Agrilus planipennis*



Identification

Occurrence map

Report a sighting

Extra info

### Citrus long-horned beetle

*Anoplophora chinensis*



Identification

Occurrence map

Report a sighting

Extra info

### Asian long horned beetle

*Anoplophora glabripennis*



Identification

Occurrence map

Report a sighting

Extra info



## Beware&Note

Home Observations

Create alert

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species Coleoptera Q-organisms-Belgium Filter Clear filters

**Black pine sawyer beetle**  
*Monochamus galloprovincialis*



Identification Occurrence map

Report a sighting

**Sawyer beetle**  
*Monochamus sartor*



Identification Occurrence map

Report a sighting

**Citrus long-horned beetle**  
*Anoplophora chinensis*



Identification Occurrence map

Report a sighting Extra info

**Asian long horned beetle**  
*Anoplophora glabripennis*



Identification Occurrence map

Report a sighting Extra info

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# Public awareness



- Target audience:
  - **Non-professionals** = citizen scientists (nature lovers, gardeners, teachers, students, ...)
  - **Professionals**: forestry, agriculture and horticulture sector, scientists, public green space managers, plant growth advisors, FASFC/AFSCA inspectors, ...
- Conducting a **media campaign** to promote the launch of the website
- Training and awareness-raising of young people → provide **online teaching material**
  - students in horticultural and agricultural education and landscaping
  - primary school

# Public awareness

- '10 most wanted' poster as part of the media campaign:

## 10 MOST WANTED

Quarantaine-organismen  
Organismes de quarantaine

<p style="text-align: center;"><b>Oost-Aziatische boktor / Capricorne Asiatique des agrumes</b> — <i>Anoplophora chinensis</i></p> <ul style="list-style-type: none"> <li>• Eelworm en andere loofzotten / Erable et autres puces</li> <li>• 22-37 mm</li> <li>• Lange zwarte en gele gestreepte antennes / Longues antennes noires avec et blanc</li> </ul>	<p style="text-align: center;"><b>Asiatische loofhoutboktor / Capricorne asiatique</b> — <i>Anoplophora glabripennis</i></p> <ul style="list-style-type: none"> <li>• Eelworm en andere loofzotten / Erable et autres puces</li> <li>• 22-30 mm</li> <li>• Lange zwarte en gele gestreepte antennes / Longues antennes noires avec et blanc</li> </ul>	<p style="text-align: center;"><b>Japanse Kever / Scarabée japonais</b> <i>popilla japonica</i></p> <ul style="list-style-type: none"> <li>• Gevoel van vliegen / Peut se déplacer sans sentir la terre / Capricorne</li> <li>• 12 mm lang / Longueur 12 mm / 12 mm de longueur</li> <li>• 12 pluisjes witte en zwarte vliegen en achterste / 12 touffes de poils blancs noires et postérieures</li> </ul>
<p style="text-align: center;"><b>Monochamus beldi / Capricorne monochama</b> — <b>Dammerhoutnematode / Nématode du pin</b></p> <ul style="list-style-type: none"> <li>• Antwoord op de vraag van een rivierlijk veldje / Le capricorne en tant que vecteur d'un nématode morte</li> <li>• Dennen / Pins</li> <li>• 15-30 mm</li> <li>• Large antennes / Longues antennes</li> </ul>	<p style="text-align: center;"><b>Aromia buagi boktor / Le longicorne à col rouge</b></p> <ul style="list-style-type: none"> <li>• Prunus soorten zoals kerselaar en pruimelaar / Espèces de Prunus comme le cerisier et le prunier</li> <li>• 22-38 mm</li> <li>• 1 phase volwassen met blauw glanzend, het lichaam helderblauw (vrij) / Une phase entièrement noir à reflets bleus, à l'exception de son rouge</li> </ul>	<p style="text-align: center;"><b>Duizendkankerziekte op walnoot / Chancre du noyer</b> <i>Geosmitia morio</i></p> <ul style="list-style-type: none"> <li>• Schimmel / Champignon</li> <li>• Verzorgd door minuscule aderzilver / Pityophthorus juglandis (1,5-2 mm) / Transmis par le soolyte Pityophthorus juglandis (1,5-2 mm)</li> <li>• Waardplant: walnoot / Plante hôte: noyer</li> </ul>
<p style="text-align: center;"><b>Aromia buagi boktor / Le longicorne à col rouge</b></p> <ul style="list-style-type: none"> <li>• Prunus soorten zoals kerselaar en pruimelaar / Espèces de Prunus comme le cerisier et le prunier</li> <li>• 22-38 mm</li> <li>• 1 phase volwassen met blauw glanzend, het lichaam helderblauw (vrij) / Une phase entièrement noir à reflets bleus, à l'exception de son rouge</li> </ul>	<p style="text-align: center;"><b>Olijfbomenpest / Maladie de Pierce – Xylella fastidiosa</b></p> <ul style="list-style-type: none"> <li>• Verwelking van bladeren tot volledig afsterven van de boom / Brûlure foliaire jusqu'à la mort de l'arbre</li> <li>• Verspreid door de schuimvlieg / Diffusé par la phlébotome</li> <li>• Olijfbomen, elsander, Prunus soorten, Poligale myrtillifolia, kalfspleet, lavendel, e.e. / Olives, laurier-rose, espèces de Prunus, poligale à feuilles de Myrte, caféier, lavande, e.e.</li> </ul>	<p style="text-align: center;"><b>Rose Rosette Virus – RRV / Virus de la Rosette du rosier – VRR</b></p> <ul style="list-style-type: none"> <li>• Roodverkleuring, uitbundige vertakking en slomgravi, minuscule hirmen / Décoloration rouge, les arborescences et épiques excessives, fleurs déformées, ...</li> <li>• Alle Rosa soorten / Toutes espèces de Rosa</li> <li>• Verzorgd door een minuscule mijt (0,4 mm) / Transmis par un acarien minuscule (0,4 mm)</li> </ul>
<p style="text-align: center;"><b>Tomate Brown Rugose Fruit Virus / Virus du fruit rugueux Brun de la Tomate – TBRV</b></p> <ul style="list-style-type: none"> <li>• Tomaten en paprika's / Tomates et poivrons</li> <li>• Verwelkt, verkleuren en misvormen van de bladeren / Flétrissement, décoloration et déformation des feuilles</li> <li>• Mutaal van gele en groen op de vruchten en bladeren en misvorming van de vruchten / Mutaal van gele en groen op de vruchten et bladeres et un déformement inégal</li> </ul>	<p style="text-align: center;"><b>Platanensterfte / Chancre coloré du platane – Corticosticta platani</b></p> <ul style="list-style-type: none"> <li>• Schimmel / Champignon</li> <li>• Oranje wonden en poeze vertekking onder de schors / Plaies oranges et veines bleues sous l'écorce</li> <li>• Deel No. 3-7 van manifestatie / Mu. 3-7 en après infection</li> <li>• Waardplant: platane / Plante hôte: platane</li> </ul>	

Deze organismen gezien? / Avez-vous vu ces organismes?  
waarnemingen.be  
observations.be




This poster has been prepared in collaboration with ILVO, ILVA, Natuurpunt and the support of FOD/SP, Euphrasco and EPO (www.appo.be)

ILVO

# Closely related **Euphresco** project



- **ILVO is coordinator of Euphresco project: 2019-D-311 ‘Systems for awareness, early detection and notification of organisms harmful to plants’**
- **13 partners:** Belgium (ILVO) - Cyprus (DoA) - Germany (JKI) - Italy (IAMB, MAFF/CREA-DC) - Spain (INIA/IAS-CSIC) - UK (forest research, DEARA, JIC) – Slovenia (SFI) – Serbia (UNS FA, UBFA) – Slovakia (NFC)
- **4 observers:** EPPO – EFSA - FAO/IPPC and New Zealand (PHEL)
- Project duration: 01/06/2020 – 31/05/2022 (24 months)

# Closely related Euphresco project



## Main objective:

- Similar to Beware&Note, with the difference that no platform will be developed, but **information** will be **provided** to create/adapt systems for awareness, early detection and notification of organisms harmful to plants

## Important secondary objectives:

- Description of the **selection process for target quarantine organisms** harmful to plants
- Make suggestions on how to **harmonise efforts between several organisations/partners producing data sheets on Q-organisms**
- **Stakeholder mapping** and **overview of potential communication** channels for awareness raising
- Recommendations on the **need to exchange information between surveillance systems worldwide**



I give the floor to Anne