

# Designing risk-based detection surveys for quarantine *Agrilus* species in Belgium

Statistically sound approaches for EU quarantine insect pest monitoring in forests & public green spaces

**Merckx Céleste & Kuhn Alexandre**



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- EU Plant Health Regulation requires risk-based, statistically sound surveillance



# SURQUAPUB Project aims

- Develop statistically sound, risk-based detection surveys for **12 EU quarantine insect(-mediated) pests** in Belgium

*Agrilus anxius*

*Agrilus planipennis*

*Anoplophora chinensis*

*Anoplophora glabripennis*

*Aromia bungii*

*Conotrachelus nenuphar*

*Dendrolimus sibiricus*

*Monochamus* spp.

*Pityophthorus juglandis*

*Popillia japonica*

*Bursaphelenchus  
xylophilus*

*Geosmithia morbida*

 Insect pests

 Insect mediated-pests

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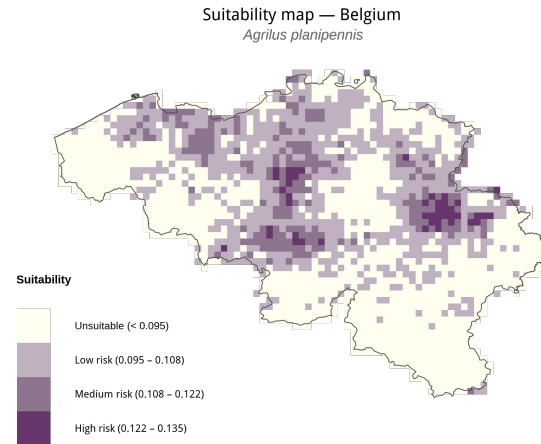
*Geosmithia morbida*

○ Insect pests

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- Develop scientifically **robust monitoring network** for quarantine organisms with Belgian botanical gardens and arboreta
  - High plant diversity / Imported non-native material

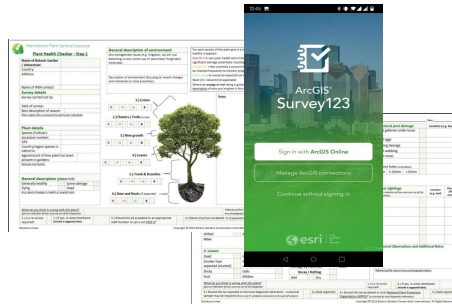


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- Develop scientifically **robust monitoring network** for quarantine organisms with Belgian botanical gardens and arboreta
  - a. Raise awareness through **fact sheets**, training and **user-friendly reporting tools**

e-PHC -> BGCi/IPSN's 'Plant Health Checker'

Thanks Lara Salido !



Want to know more?  
Come find us during the break!



But first, any questions?

## Designing risk-based detection surveys for quarantine *Agrilus* species in Belgium

Statistically sound approaches for EU quarantine insect pest monitoring in forests & public green spaces

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### 1 Introduction

The **SURQAPUB** project addresses this gap by developing risk-based detection surveys for 12 EU quarantine insect pests, including *Agrilus planipennis* and *A. annuus*, integrating introduction pathways, host plant distribution, climatic suitability, and the EFSA RIBESS+ tool.

In Belgium, annual detection surveys for EU quarantine pests in forests and public green spaces are conducted by the FASFC (Federal Agency for the Safety of the Food Chain). These campaigns must follow risk-based, scientifically sound approaches as required by Plant Health Regulation (EU) 2016/2031. However, number of inspections, traps or the sampling effort are currently determined on pragmatic basis rather than statistically.

First results for *A. planipennis* are presented here.

***Agrilus planipennis***  
Emerald ash borer (EAB)


(Phylozoan carpenter) BI 41

**Host plants:** Ash species and *Chionantha virginiana*

**Origin:** China, Japan, North Korea, South Korea and Eastern Russia

**Spread vector:** infested plants, timber trade, solid wood packing material, wood chips, firewood and an additional dispersal is generated by human movement

**Status in Belgium:** No pest record



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### 2 Methods and results

**Stack of 144 predictors** (Muller et al., 2016)

**Species occurrences geo-data** (i.e. National Atlas of Belgium, Forest Atlas of Belgium, Forest Atlas of Belgium)

**Pseudo-absences generated with the target group method** (Guisard et al., 2012)

**Data pre-processing** (Check for duplicates, non-NA values, missing values, etc.)

**Data set** (Evaluation metrics: ROC curve, Sensitivity)

**Data\_train** (Model selection: BestFit (SVM), Random Forest, etc.)

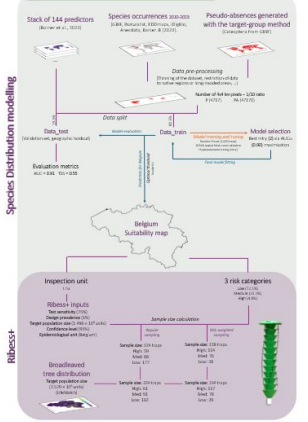
**Belgium Suitability map**

**3 risk categories**

**RIBESS+**

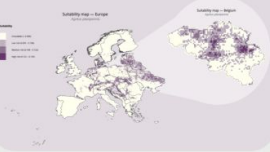
**Inspection unit**

**Species Distribution Modelling**

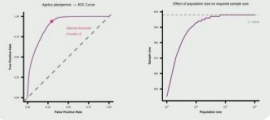


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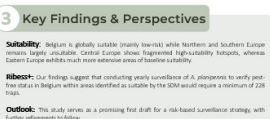
**Belgium Suitability map**



**Aggr. probability - 100% Case**



**Effect of population size on detection probability**



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### 3 Key Findings & Perspectives

- Suitability:** Belgium is globally suitable (mainly towards the Northern and Southern Europe regions largely suitable). Central Europe shows fragmented high-suitability hotspots, whereas Eastern Europe exhibits much more extensive areas of favorable suitability.
- RIBESS+:** Our findings suggest that conducting yearly surveillance of *A. planipennis* to verify pest-free status in Belgium within areas identified as suitable by the SDM would require a minimum of 128 traps.
- Outlook:** This study serves as a promising first draft for a risk-based surveillance strategy, with further refinements to follow.

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