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INSTITUUT  
NATUUR- EN BOSONDERZOEK

# Control trials for invasive Oregon grape, can we go without herbicides

Sam Provoost & Tim Adriaens



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## 1. **Introducing Berberis aquifolium**

2. Distribution and conservation issues (along the Belgian coast)
3. Eradication experiments
4. Conclusions

# *Berberis aquifolium* Pursh.

(*Mahonia aquifolium* Nutt.)

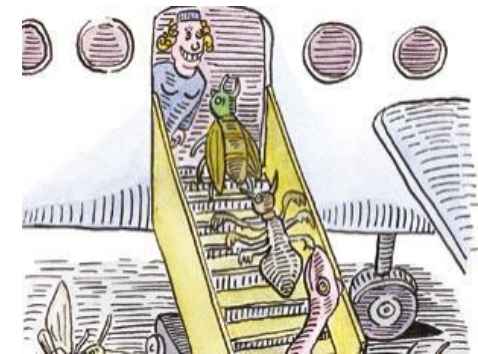
Oregon grape, mahonia (à feuilles de houx), uva de Oregon, stechdornblättrige Mahonie, uvas Oregon, almindelig mahonie



## Origin & introduction

- Hybridized cultivars of *B. aquifolium* with *B. repens* or *B. pinnata*
- Originate from North America (Oregon...)
- Selected for ornamental purposes (faster, stronger, brighter, ...)
- Frequently planted in gardens & public greenery
- Garden escape (birds or garden waste dumping)

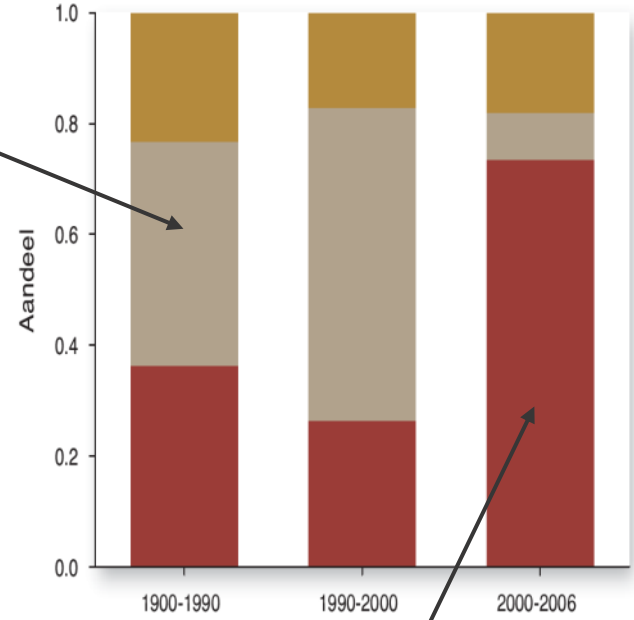
(*Ross et al. 2009 Biological Invasions*)



# Garden escapes



**Agriculture**



**Gardens**

*Berberis aquifolium* Pursh.

## **Annoying characteristics**

- Perennial, evergreen shrub
- Vegetative growth: stoloniferous, many stems
- Calciphilous, shade tolerant
- Fleshy berries, easily dispersed by birds
- Good establishment
- Nice flowers, nectar plant (public opinion...)



## **But luckily...**

- Berries ripe in summer (less long distance dispersal by migrating birds)
  - Bright yellow flowers
- *Easily recognised/mapped*

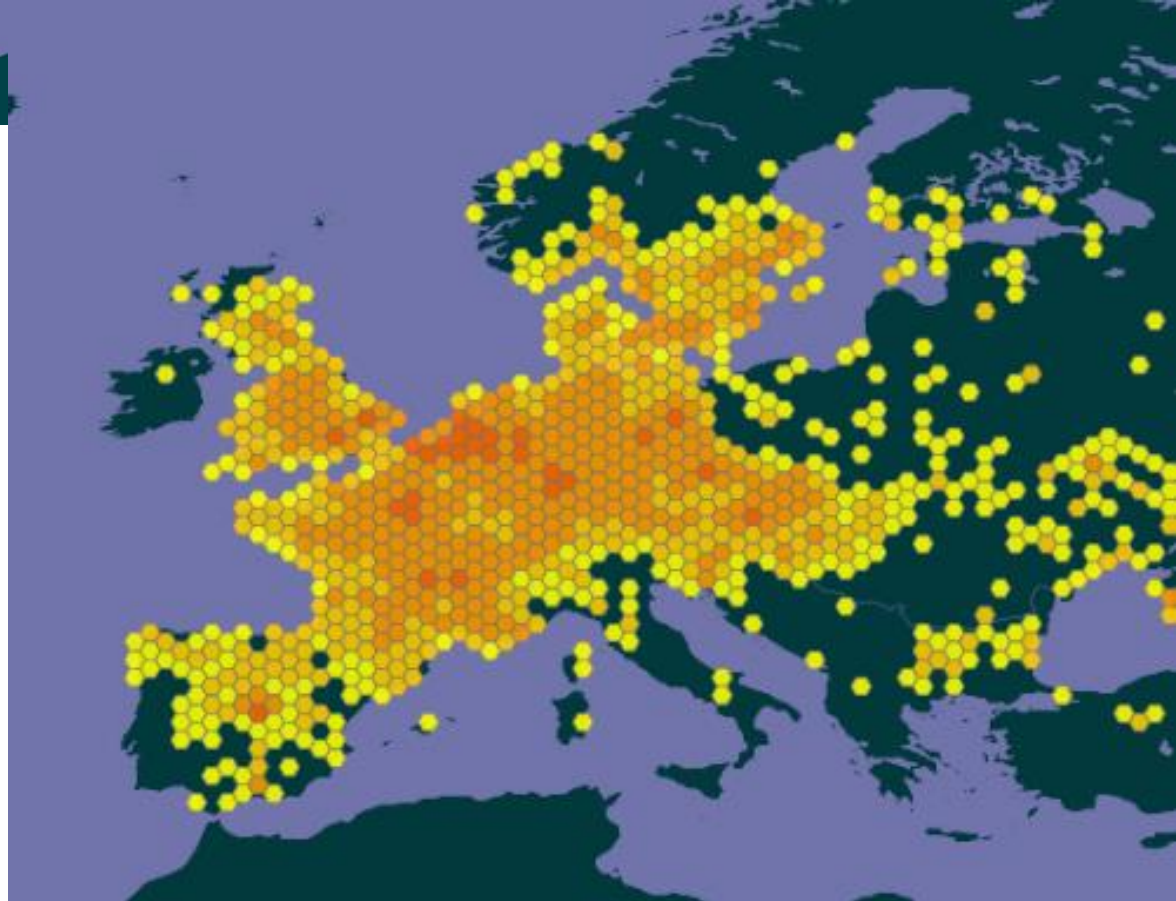
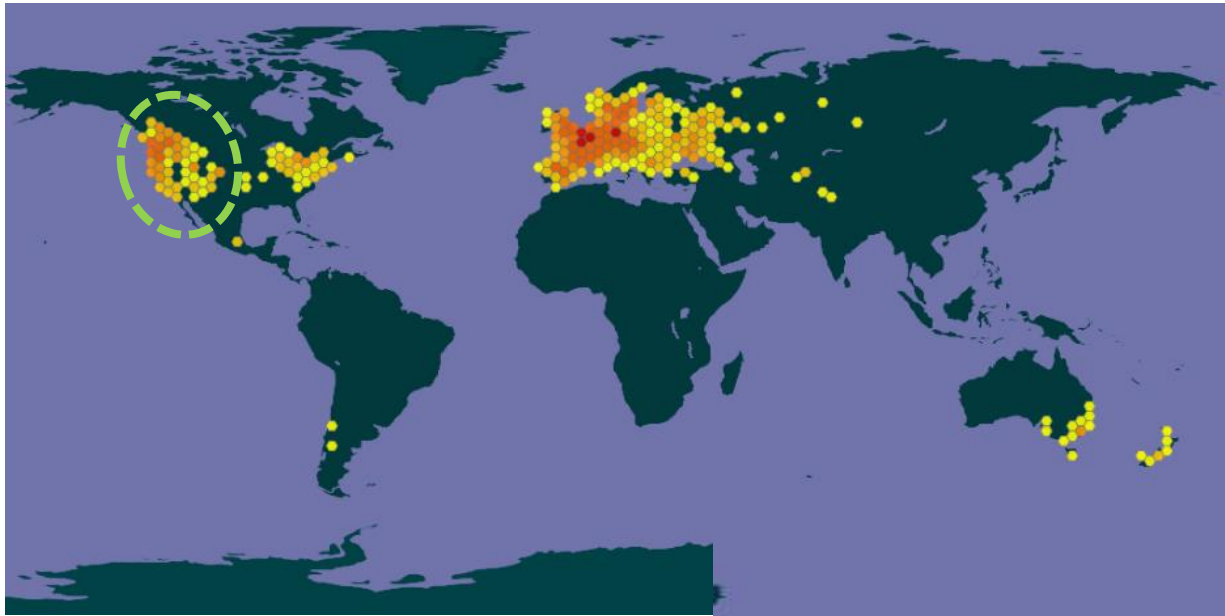


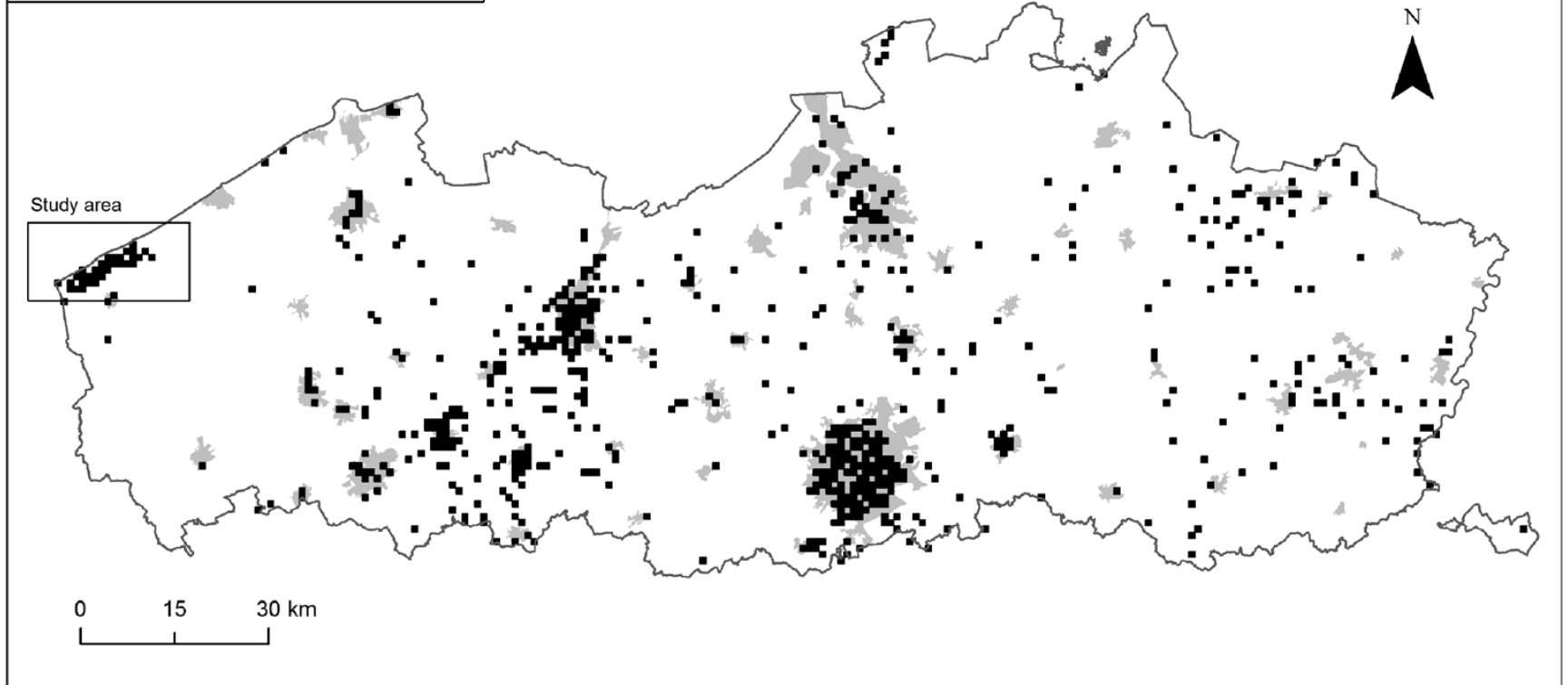
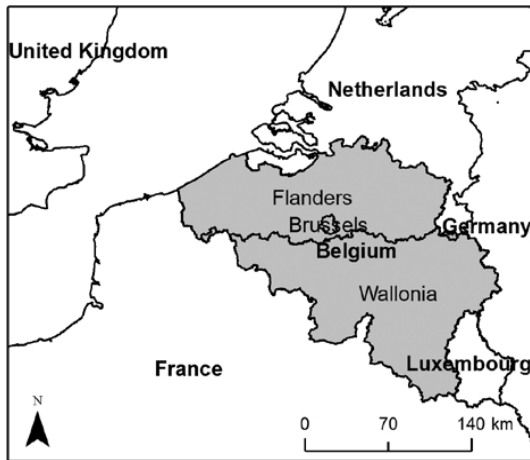
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**GBIF**







# Expansion history

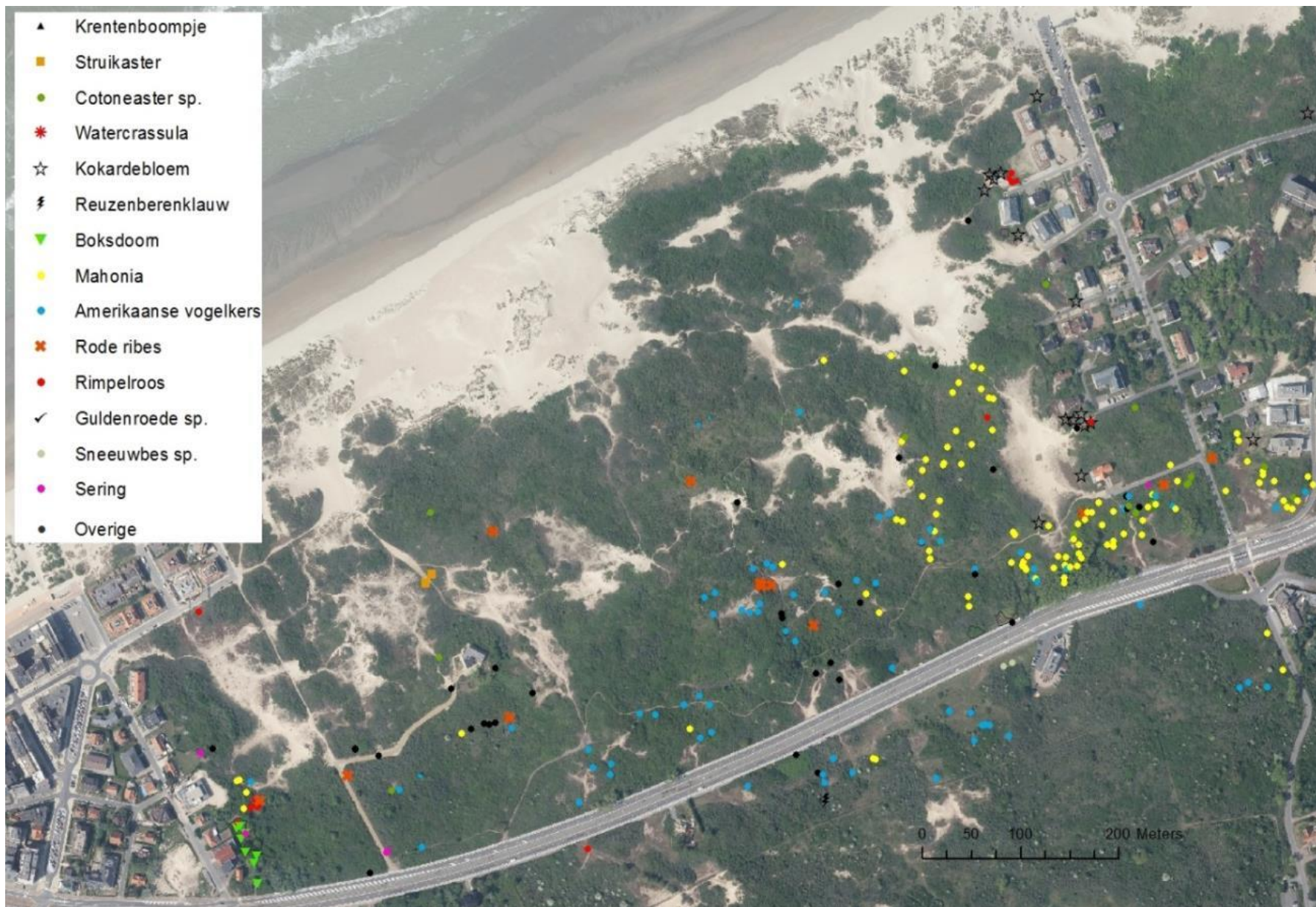


***We are here***

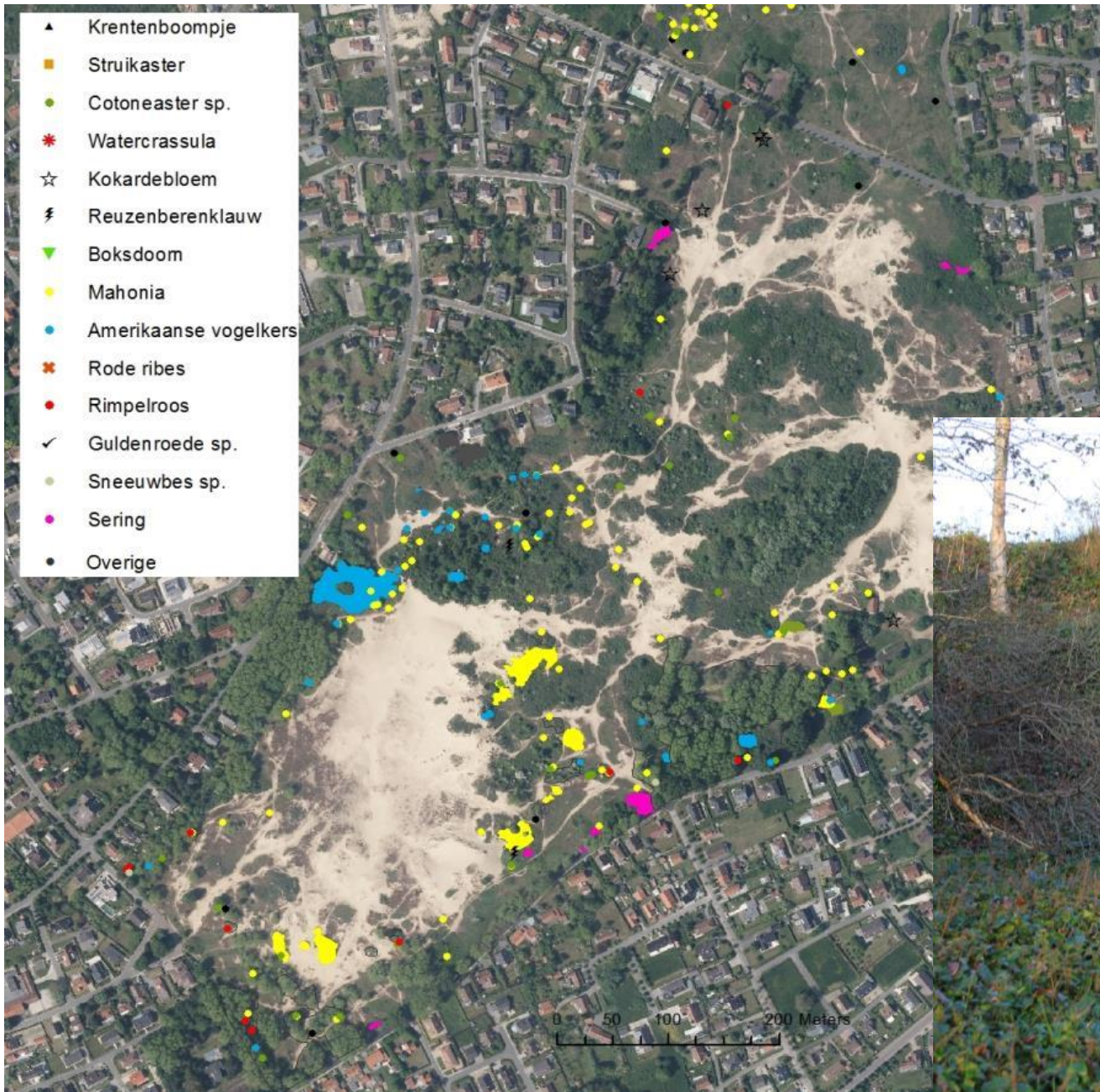
0 500 1 000 2 000 Meters



# Schipgat



# Plaatsduinen



*... on landscape level*

**Noordduinen**



**Nature reserves have  
become major source of  
mahonia !**



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# Strategy

## 1. Large (accessible) clones

→ *Heavy machinery*



## 2. Scattered individuals

→ *Manual approach*



# 1. Excavating large patches (> ±15 m<sup>2</sup>)

*“Cobblestone-shovel”*





October 2012



November 2013



Spring 2014



## 2. Treatment of individual plants / small clones



## Treatments 2013 experiment:

### 1. Manual digging out

*Chemical treatments: glyphosate 5% (Roundup Max)*

### 2. Leaf

### 3. Stem (cut & paint)

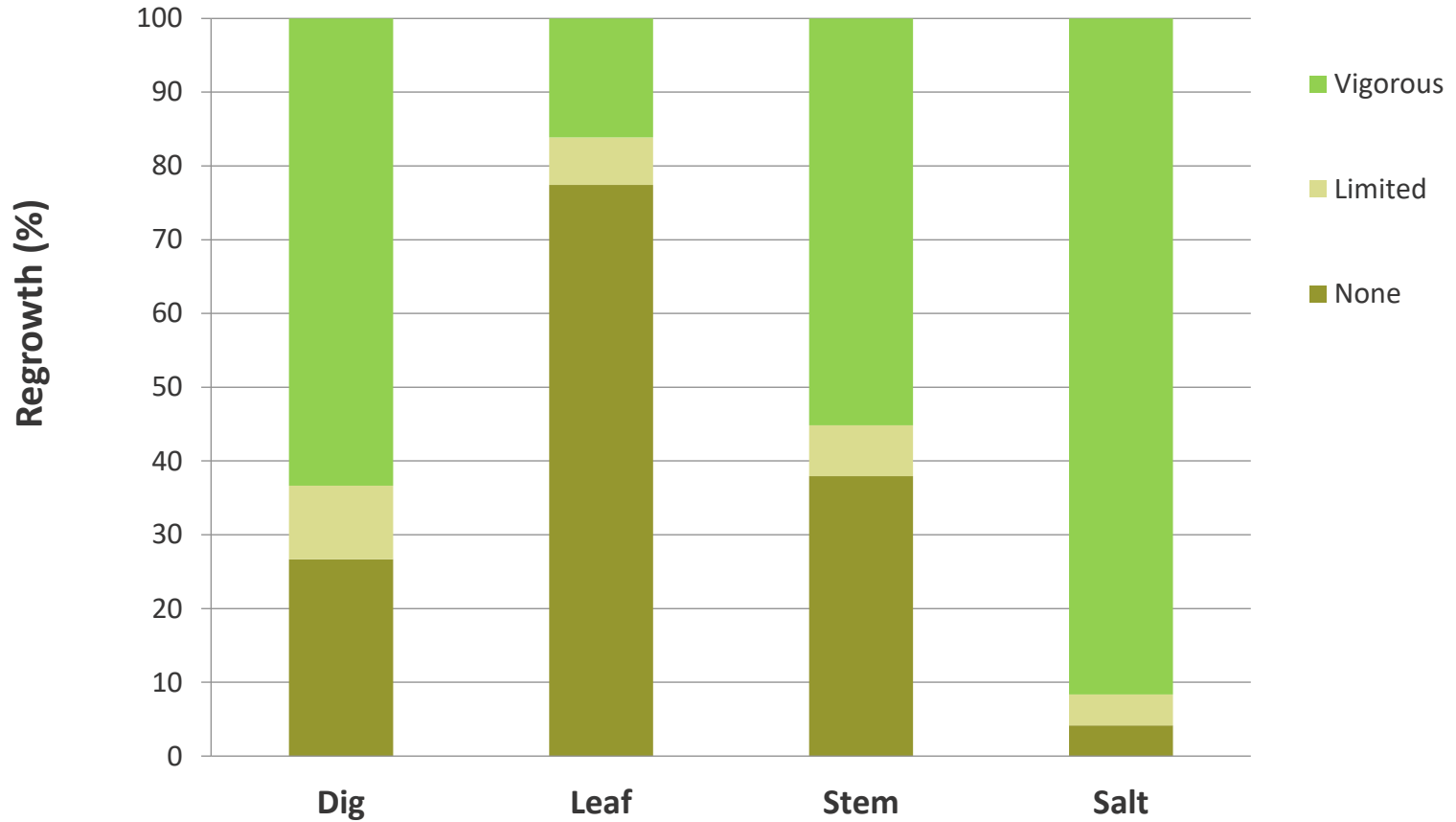
### 4. Stem treatment with salt solution (cut & paint)





Location	Leaf	Digging	Stem	Salt	Treated	Revisited
<u>Westhoek</u>	8	9	9	7	33	33
<u>Houtsaegerduinen</u>	7	7	6 (1)	6 (1)	26	24
<u>Noordduinen</u>	7 (1)	8 (1)	8 (1)	7 (2)	30	25
<u>Plaatsduinen</u>	10	10	9 (1)	9 (1)	38	36
<b>Total</b>	<b>31</b>	<b>33</b>	<b>29</b>	<b>25</b>	<b>127</b>	<b>118</b>

# Regrowth assessment after 1 year



# Leaf treatment

April 2013



October 2013



May 2014



However... spring 2014



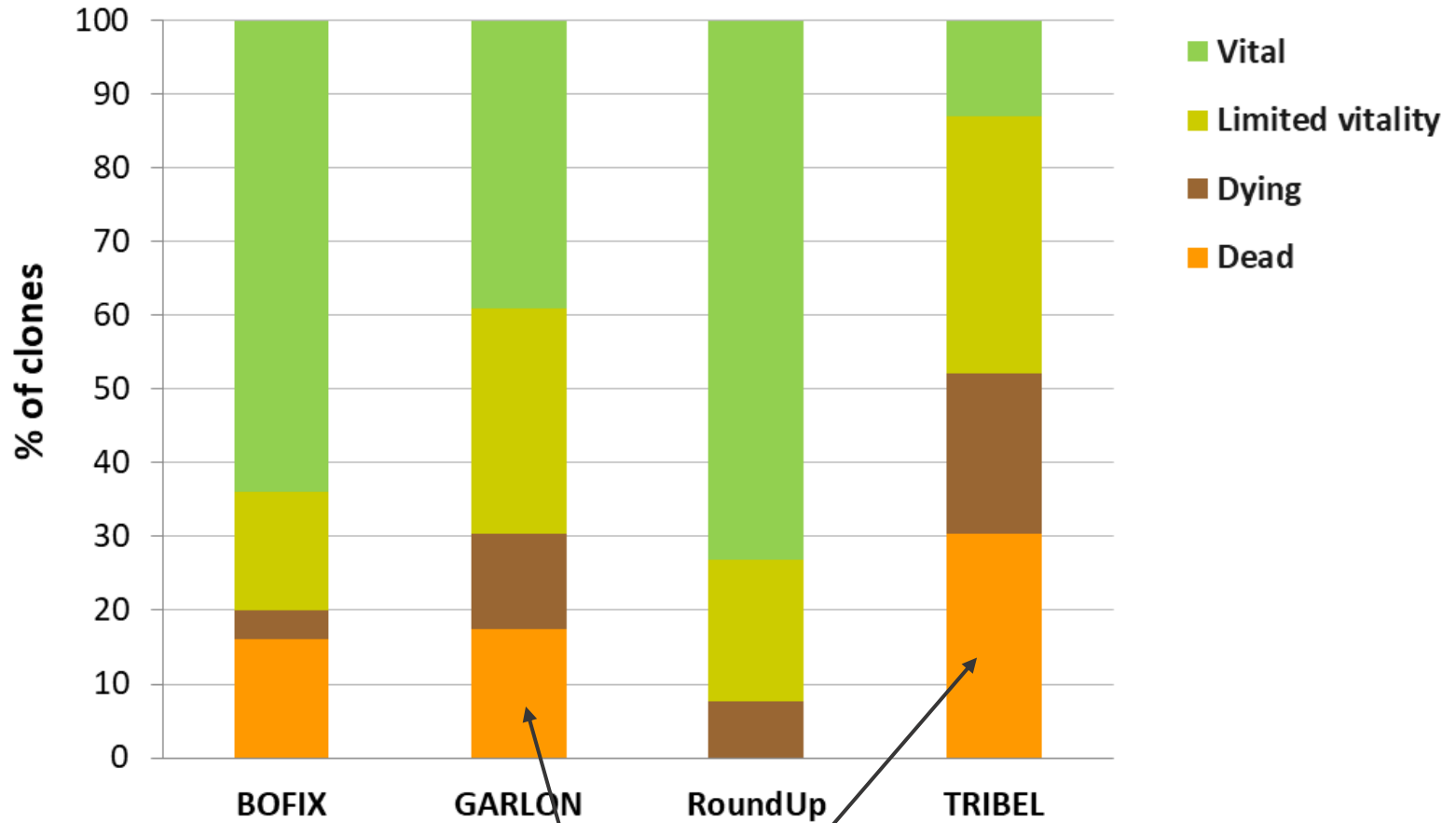
## Treatments 2020 experiment (leaf treatment):

1. Bofix (20 g/l clopyralid - 40 g/l Fluroxypyr - 200 g/l MCPA), **1%**
2. Garlon Super (30 g/l Aminopyralide - 240 g/l Triclopyr): **0,4%**
3. Roundup Ultra (360 g/l glyphosate),  $\pm$  **1%**
4. Tribel XXL (93 g/l 1,4-D - 103,6 g/l Triclopyr); **1,2%**





# Regrowth assessment



*Contain triclopyr*



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→ Where possible: mechanical removal (excavators)

→ After-care !

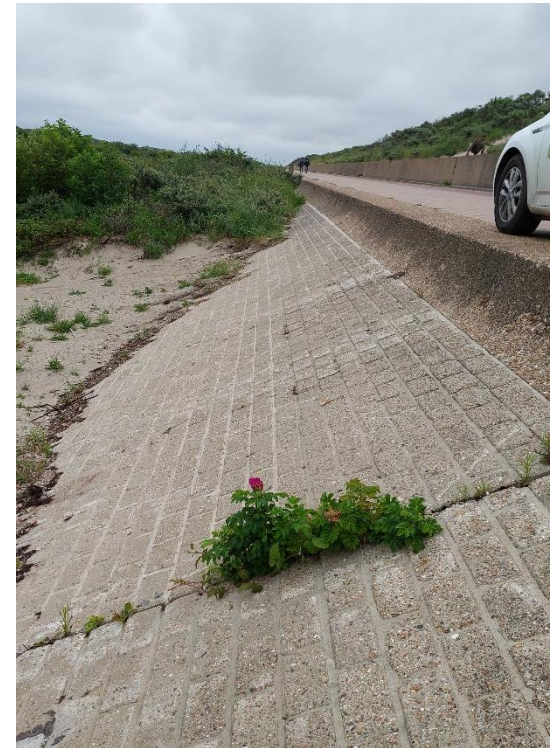
Don't be afraid of some manual work

→ Combination with landscape rejuvenation



→ Mechanical removal is not always applicable

→ Chemicals are most efficient for isolated plants



# Use of herbicides

- Use chemicals specifically intended for ligneous plants
- Minimise use (mow first)
- Use correct dilutions
- Health, safety and other regulations
- Re-visiting = standard procedure !  
(see after-care)



## Don't throw the baby out with the bathwater – ban of glyphosate use depends on context

Jan Pergl<sup>1</sup>, Handrij Härtel<sup>2</sup>, Petr Pyšek<sup>1,3</sup>, Robert Stejskal<sup>4</sup>

*Herbicides .... which might replace glyphosate in the future, have a much less favorable ecotoxicological profile (Burn et al. 2003).*

*we call for a balanced approach to the use of herbicides, taking into account the context of an environmental problem in question.*

*necessary to distinguish between application for economic reasons such as in large-scale agriculture, and for nature conservation including the control of invasive species*



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## Further reading

→ <https://doi.org/10.3897/neobiota.53.38183>

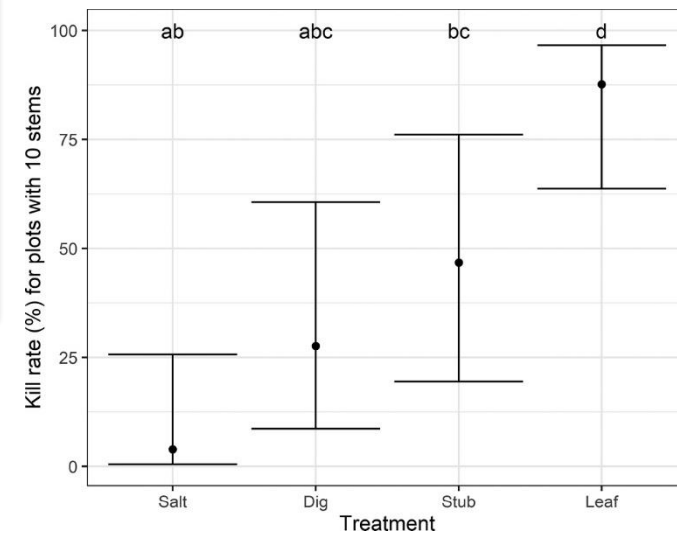
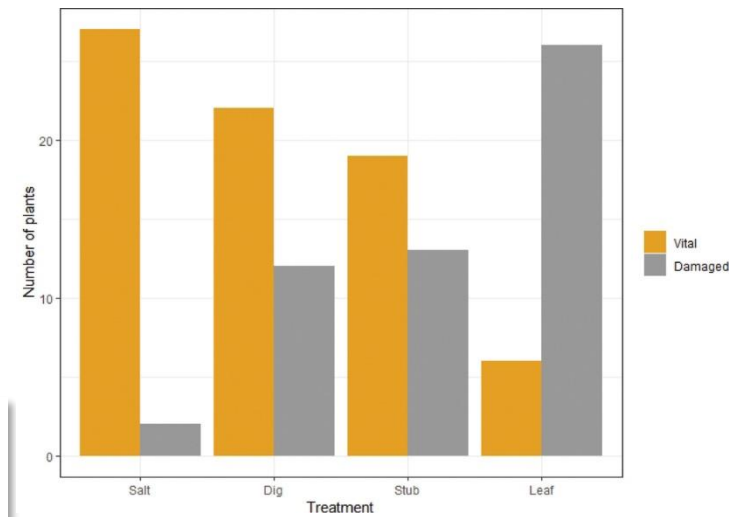
NeoBiota 53: 41–60 (2019)  
doi: 10.3897/neobiota.53.38183  
<http://neobiota.pensoft.net>

RESEARCH ARTICLE

A peer-reviewed open-access journal  
 NeoBiota  
Advancing research on alien species and biological invasions

### A preliminary field trial to compare control techniques for invasive *Berberis aquifolium* in Belgian coastal dunes

Tim Adriaens<sup>1</sup>, Pieter Verschelde<sup>1</sup>, Emma Cartuyvels<sup>1</sup>, Bram D'hondt<sup>2,3</sup>, Edward Vercruyse<sup>1</sup>, Wouter van Gompel<sup>1</sup>, Evy Dewulf<sup>3</sup>, Sam Provoost<sup>1</sup>





Thanks to Frédérique Everaert, Kris Lesage, Ward Vercruyssen, Wouter van Gompel, Evy Dewulf, Guy Vileyn, Pieter Verschelde, Emma Cartuyvels, Bram D'hondt, ...