

# Control of *Acer negundo* insights from experimental and physiological studies

**Merceron N., Lamarque L.J., Brogniez S., Ducournau Y., Buyle S., Degrave L., Roudie J., Felis O., Moreau A., Vernin P., Guengant Y., Delzon S., Porté A.J.**

[nastasia.merceron@u-bordeaux.fr](mailto:nastasia.merceron@u-bordeaux.fr)

**4th International Symposium on Weeds and Invasive Plants,  
Montpellier, 19-23 May 2014**

# Target species : Boxelder maple (*Acer negundo*)



Light green foliage



Fast-growing



Dioecious species



Seed dispersal by  
wind and water



Resprouts from  
the stump



Source : urban plantations

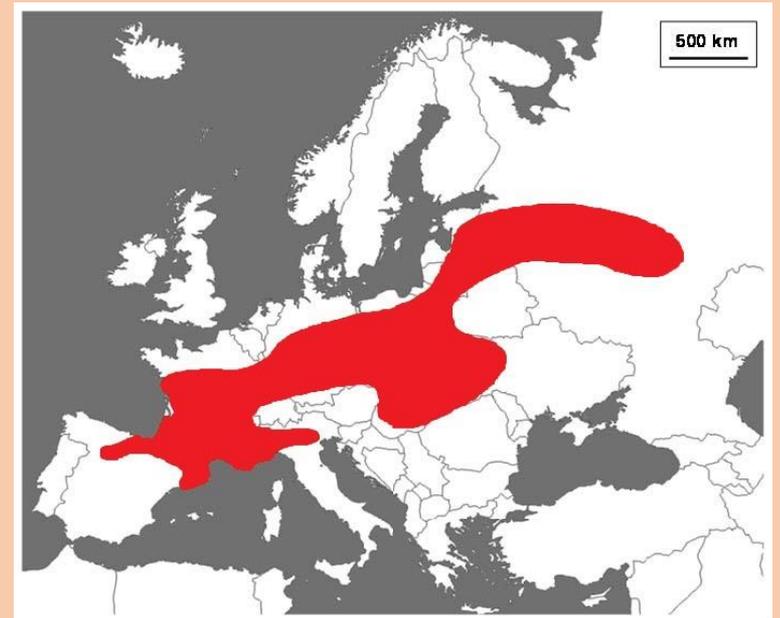
# Distribution areas

introduced in Europe in 1689 (GB)

around 1749 in France



**Native range**



**Invasive range**

# Invaded habitats

## Riparian forests and wetlands



## Local distribution

*Fraxinus sp,*  
*Quercus sp*  
= LATE-  
SUCCESSIONAL  
SPECIES

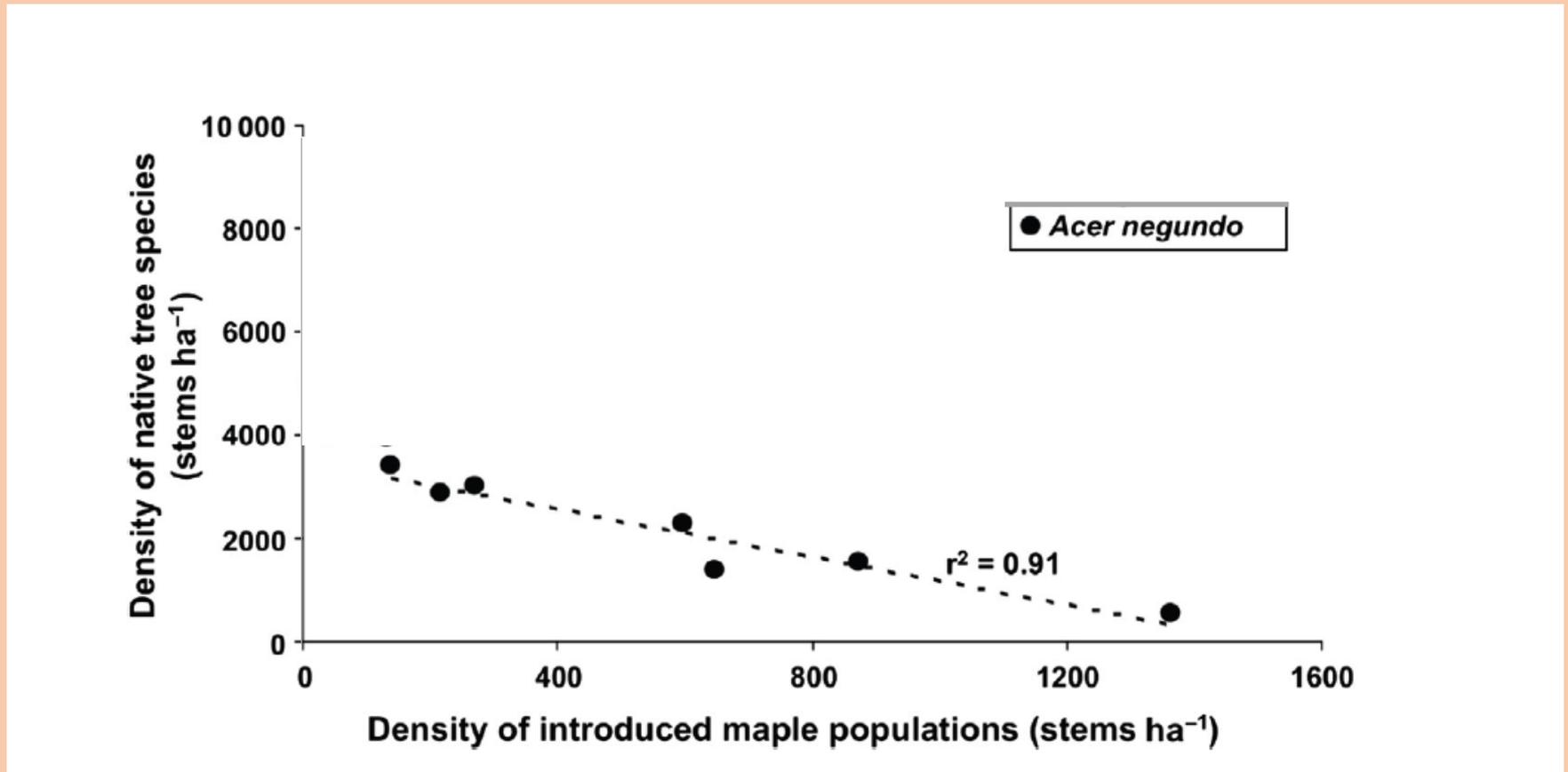
*Acer negundo*  
=  
INTERMEDIATE  
POSITION +  
RIVERBANKS

*Salix sp,*  
*Populus sp,*  
*Alnus sp*  
= PIONEER  
SPECIES



# Negundo negatively impacts native tree species

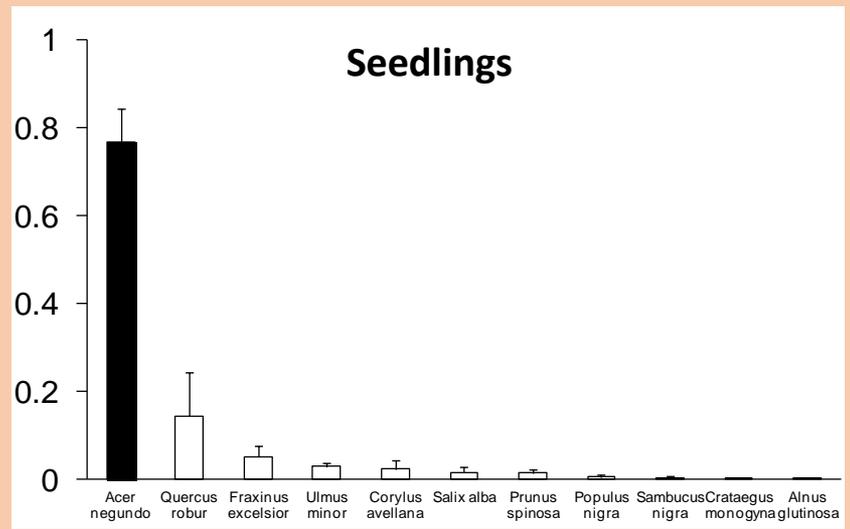
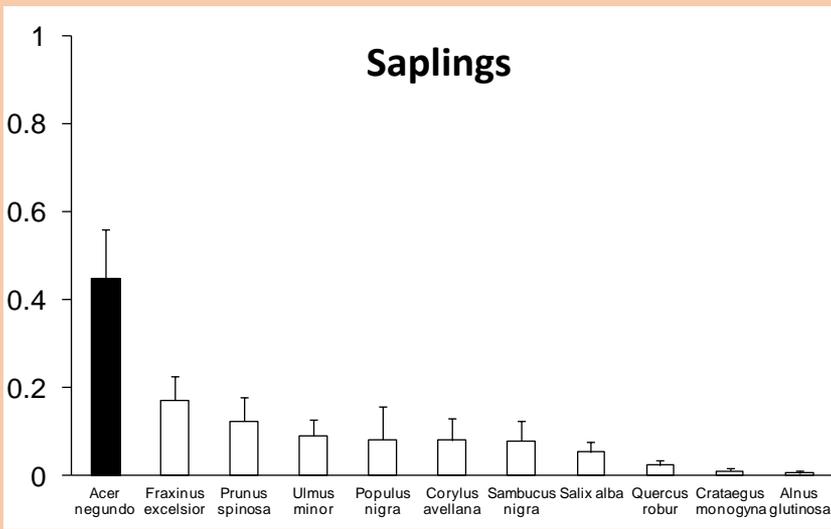
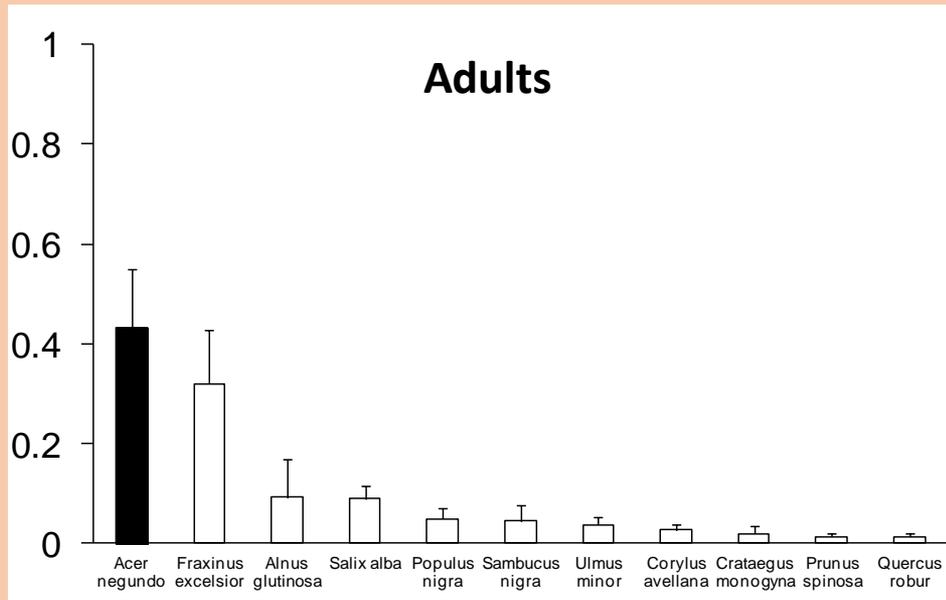
## Density



# Negundo dominates native tree species

## Frequency

- *Acer negundo*
- Native tree species



# Local context : ecological and economic impacts

- River bank collapse



- Lower nesting



- Production and conservation concerns :
  - Replacement of *Populus* (paper pulp), *Alnus* (energy)
  - Protected areas

# Questions ?

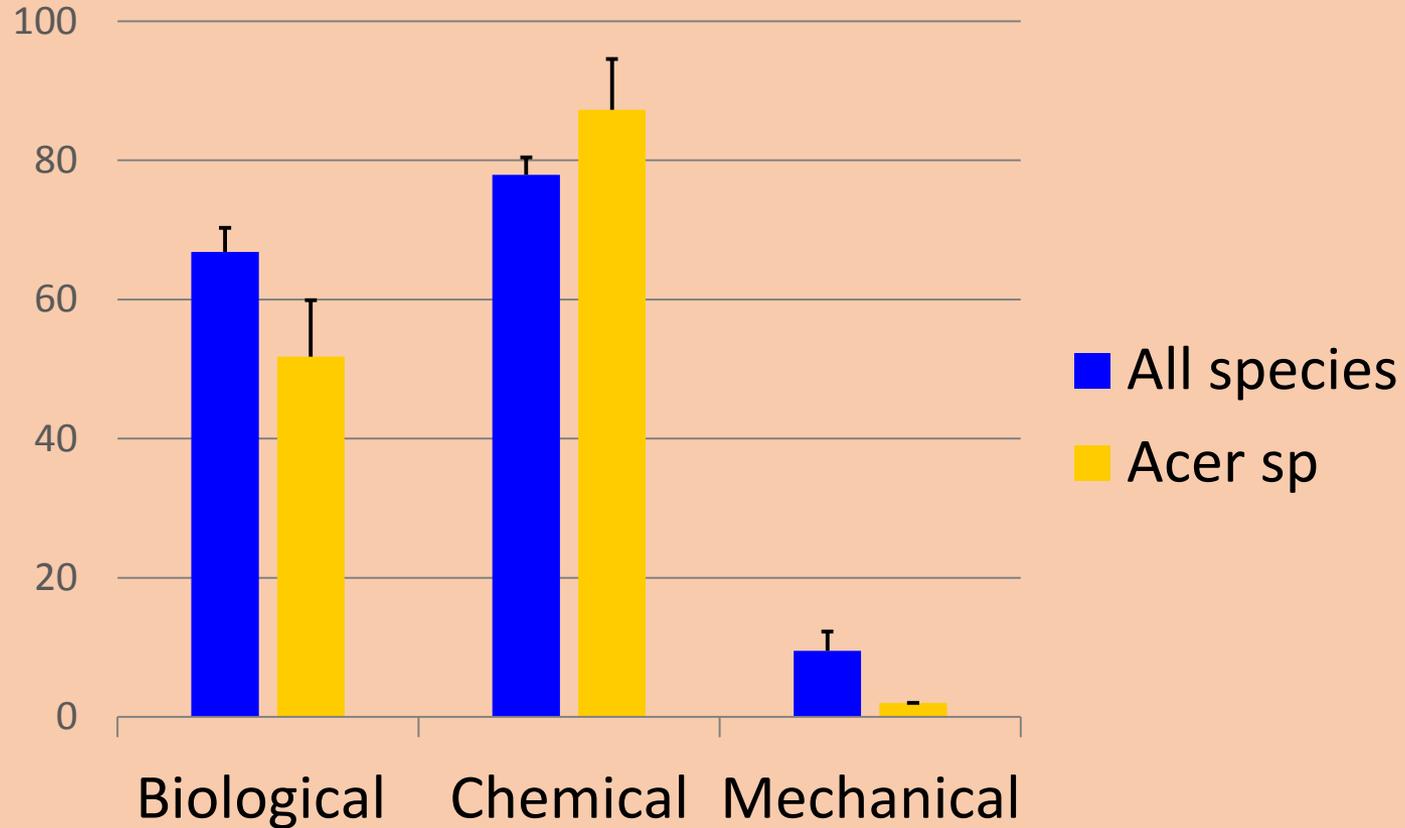


**Can we control  
*Acer negundo*  
establishment?**

**In which way?**

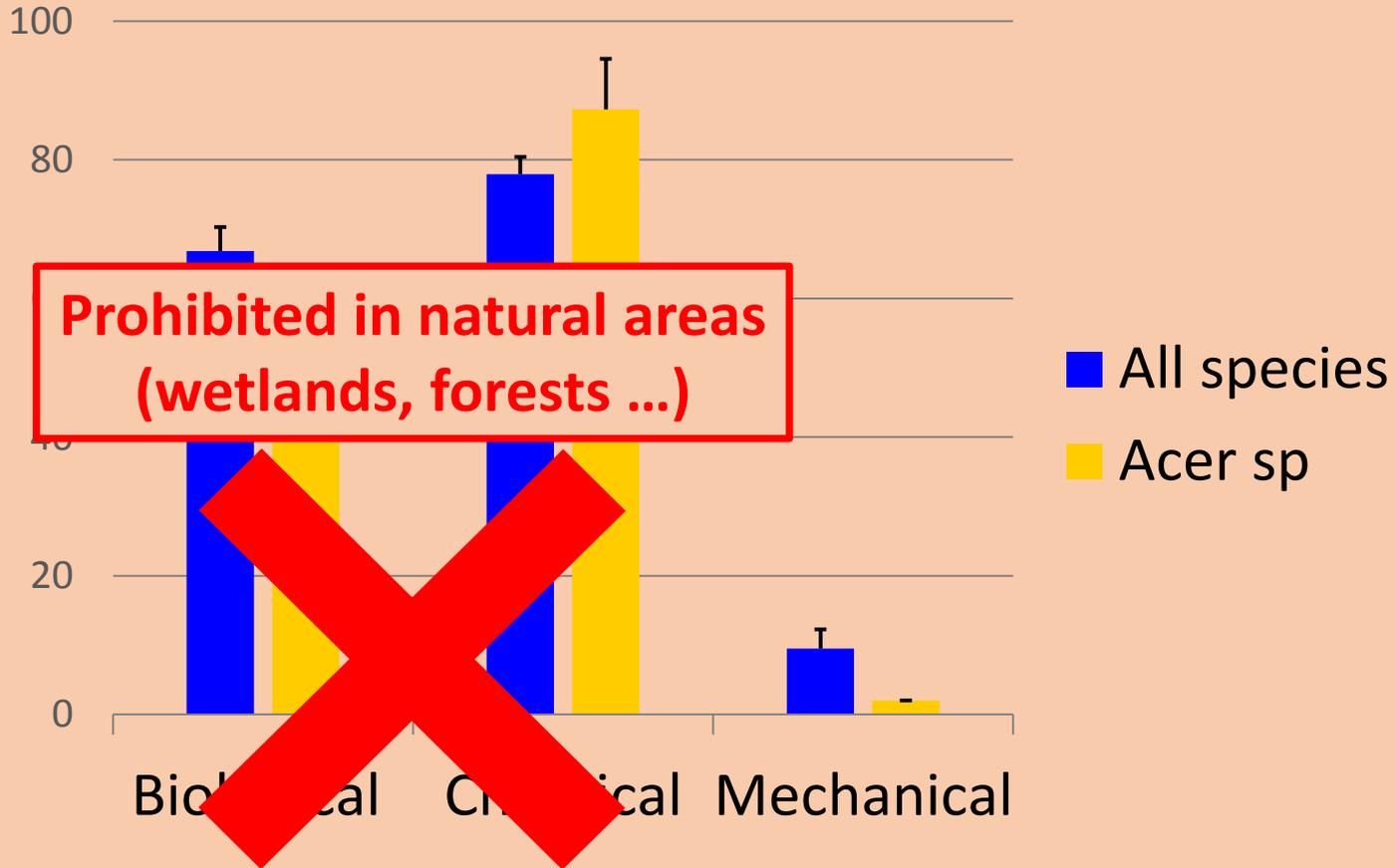
# Main methods to control invasive trees

## Mortality rate (%) of resprouting invasive species

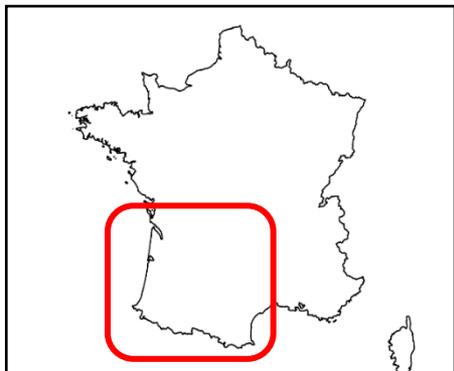


# Main methods to control invasive trees

## Mortality rate (%) of resprouting invasive species

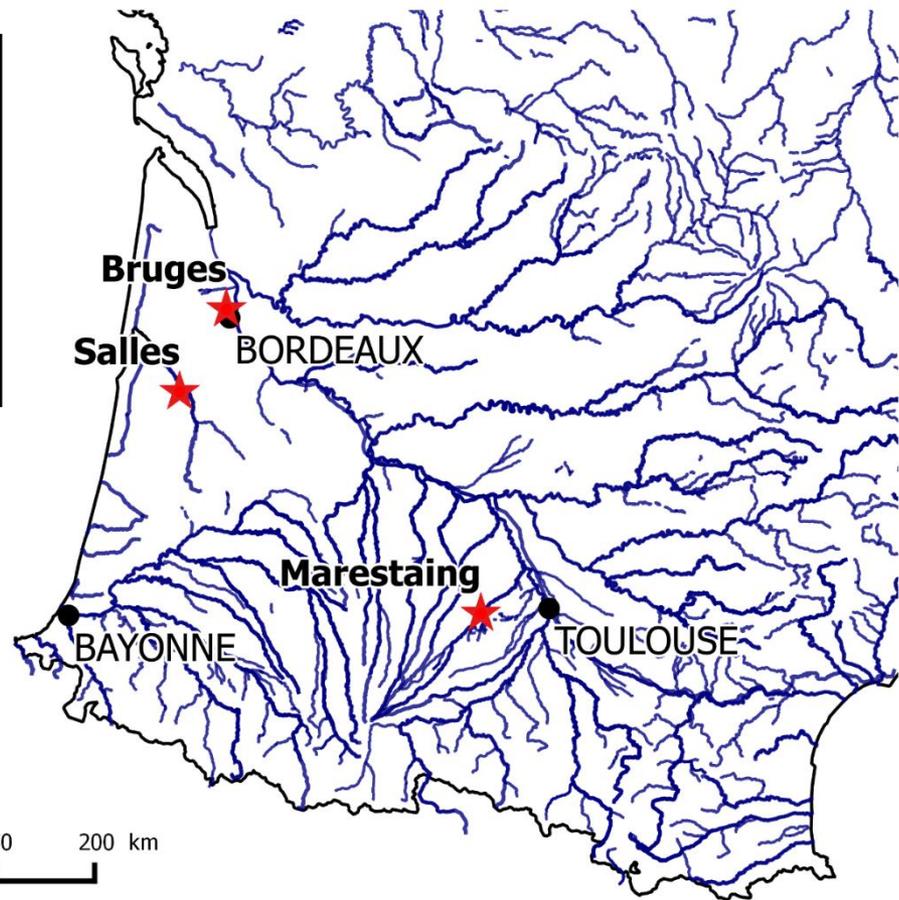
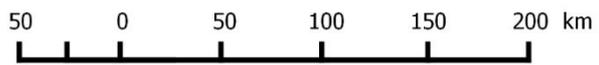


# Experimental sites

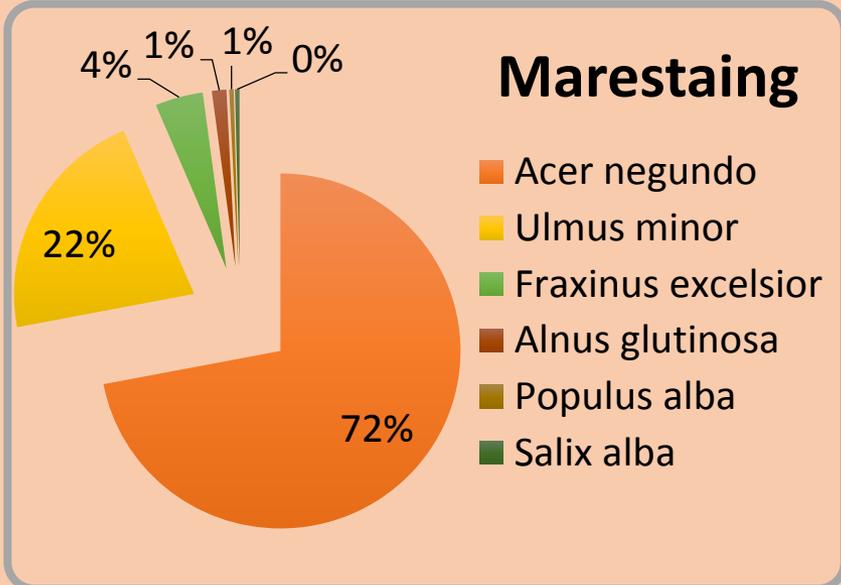
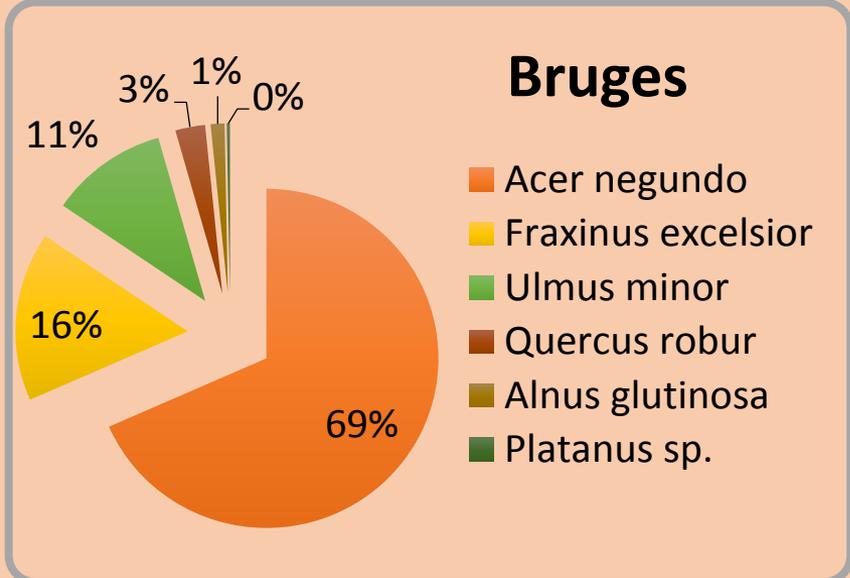
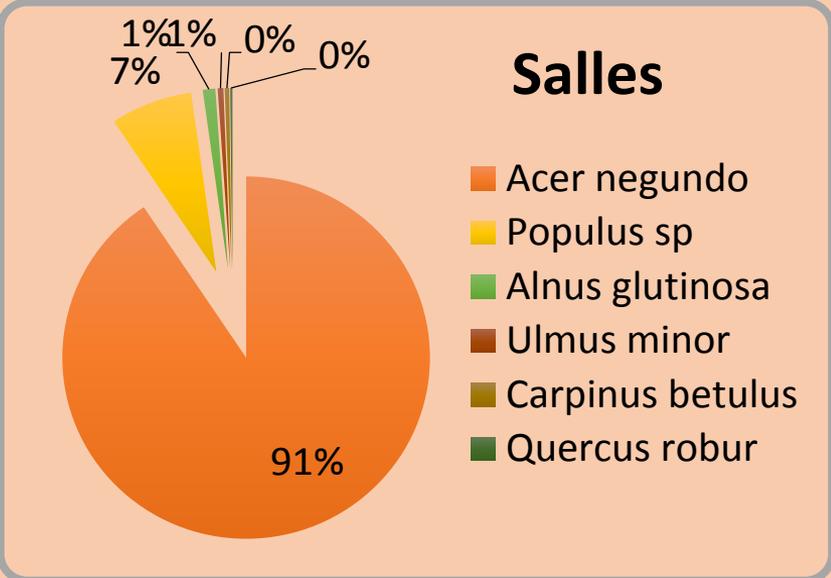


**Legend**

- ★ Management locations
- Major cities
- Rivers

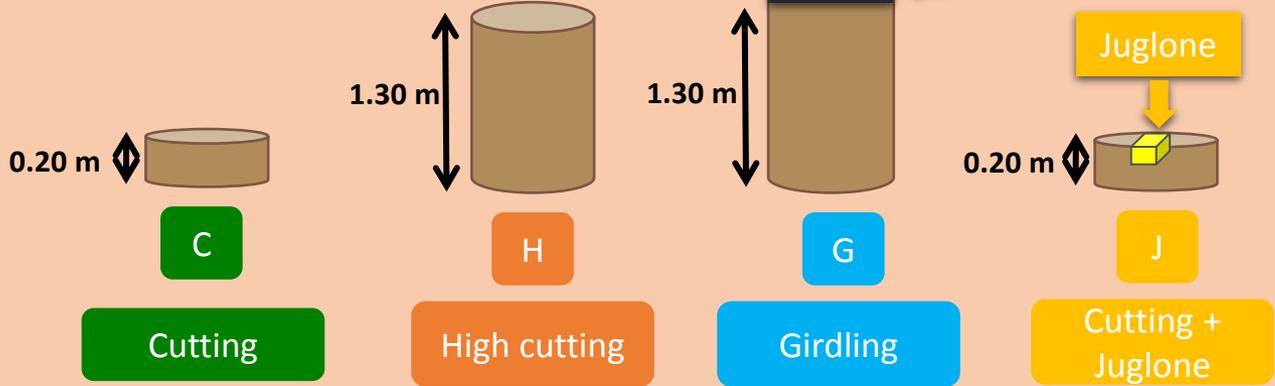
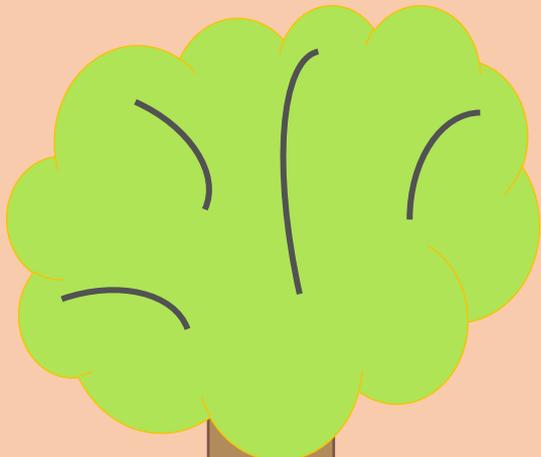


# Experimental sites

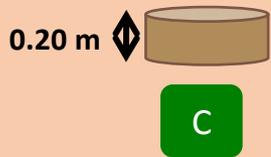


# Experimental treatments

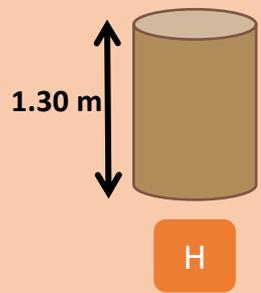
Cutting



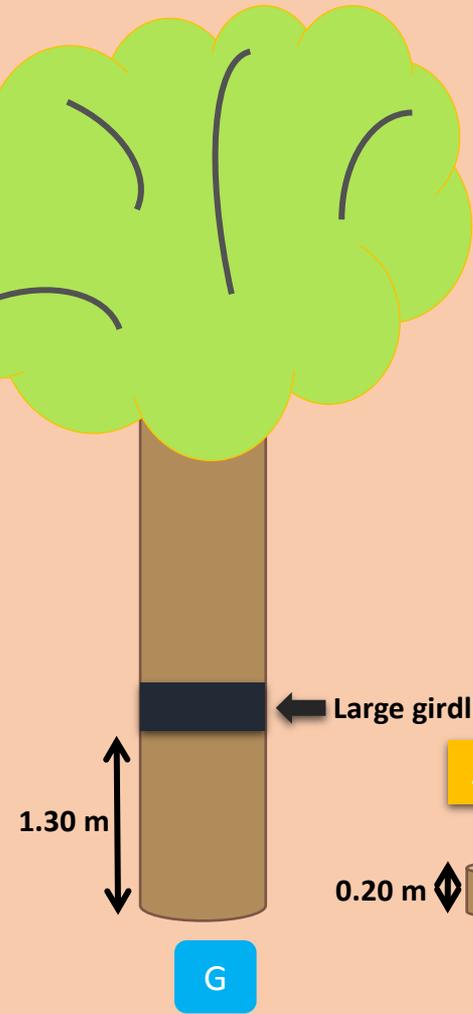
# Experimental treatments



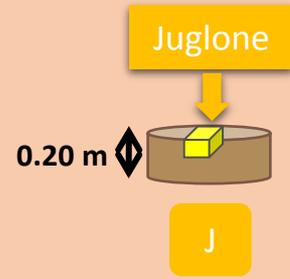
Cutting



High cutting

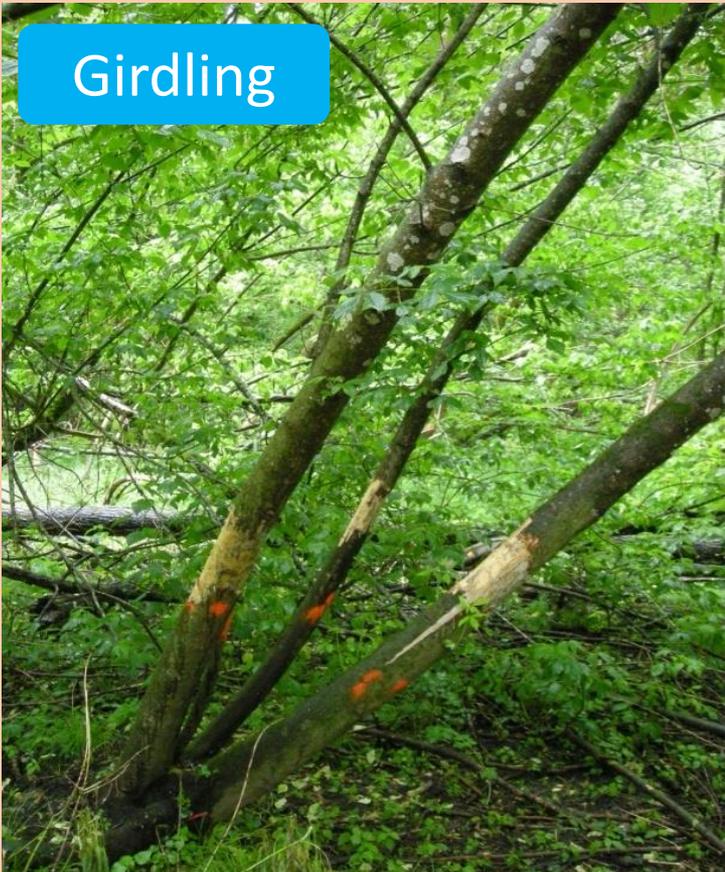


Girdling

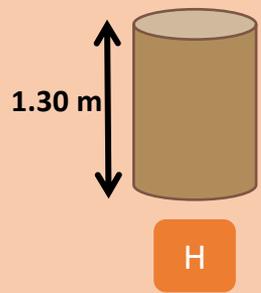


Cutting + Juglone

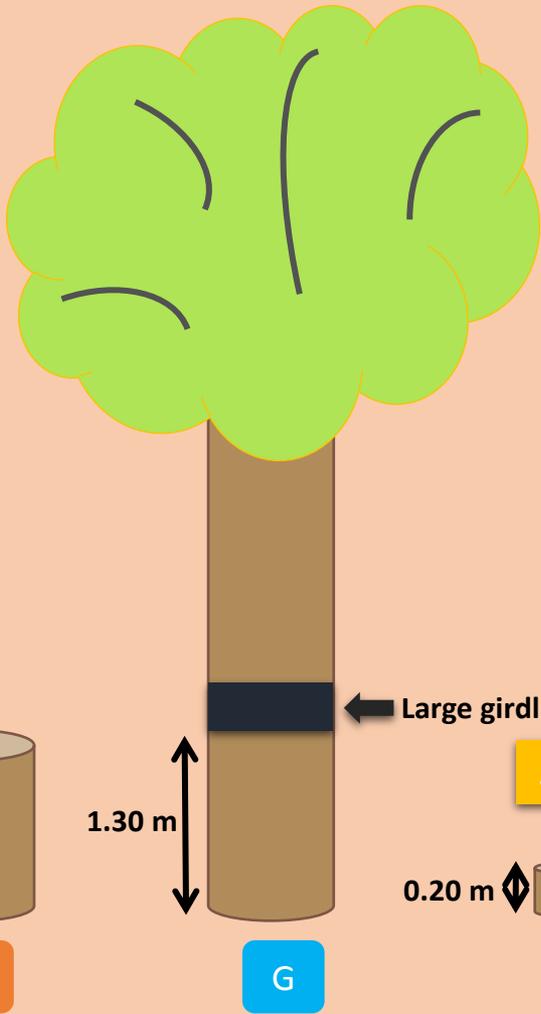
# Experimental treatments



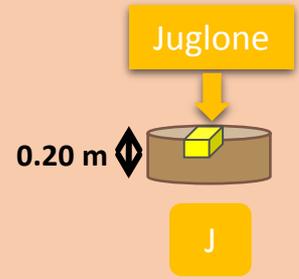
Cutting



High cutting



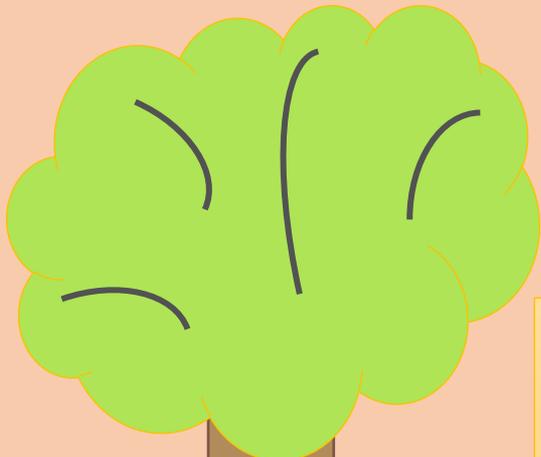
Girdling



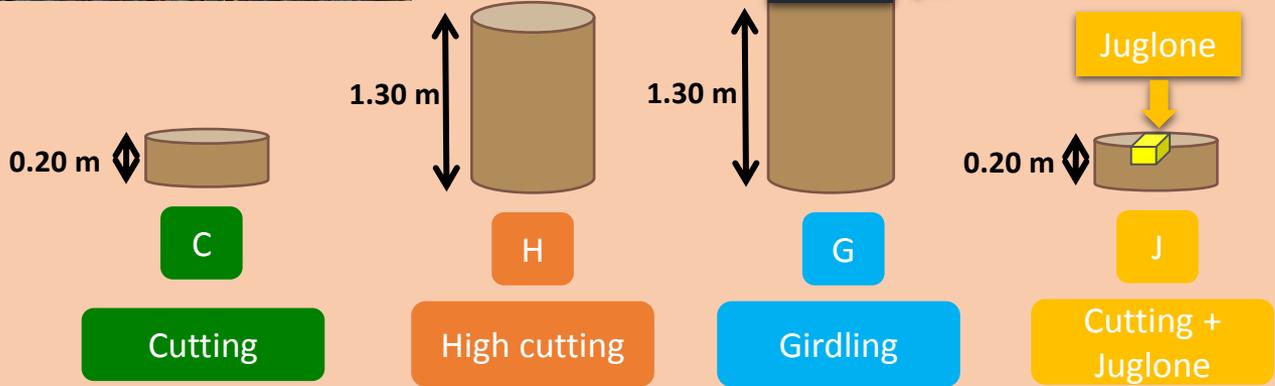
Cutting + Juglone

# Experimental treatments

Juglone



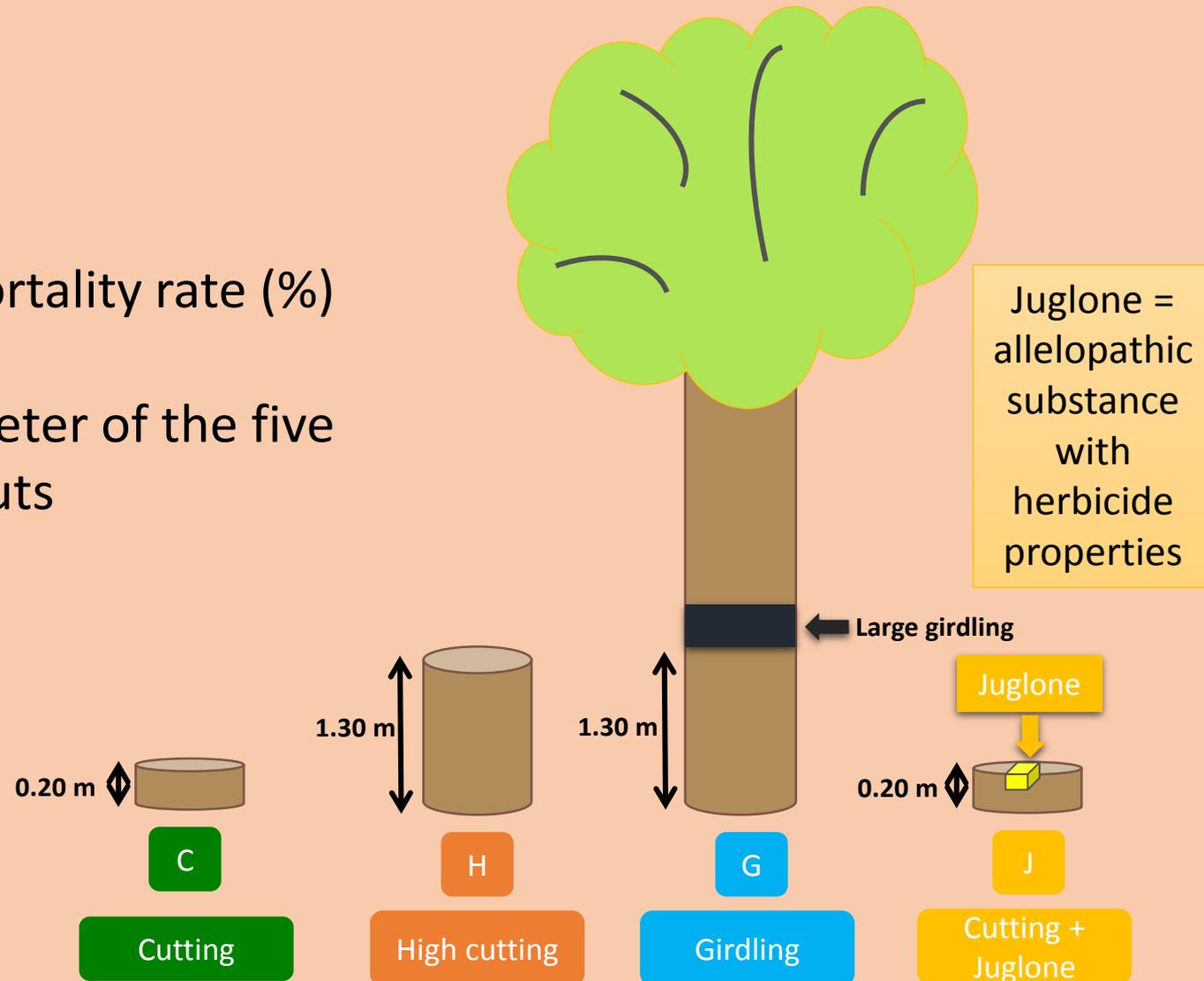
Juglone = allelopathic substance with herbicide properties



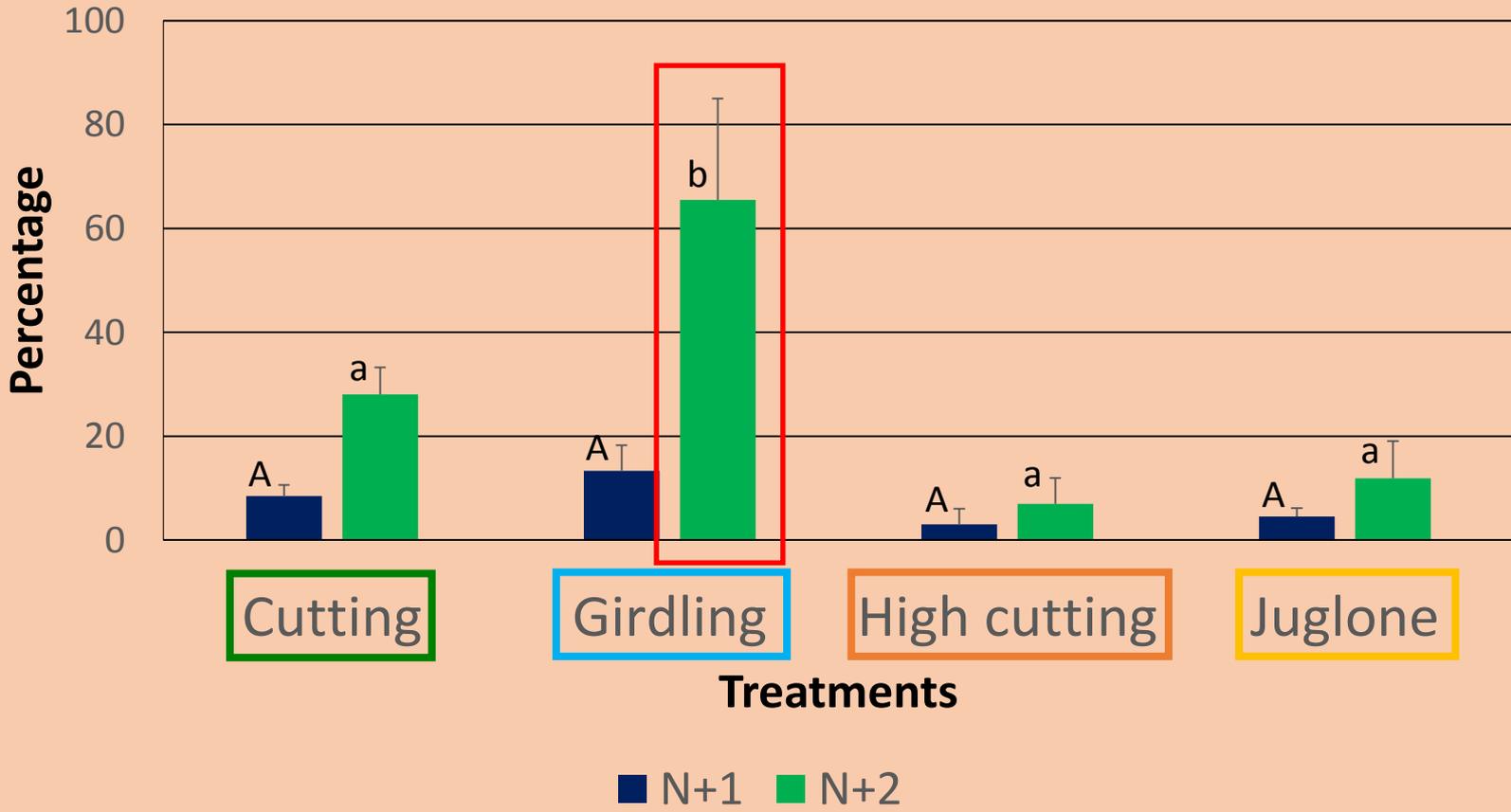
# Experimental treatments

## Measurements :

- **Mortality** : mortality rate (%)
- **Vitality** : diameter of the five largest resprouts

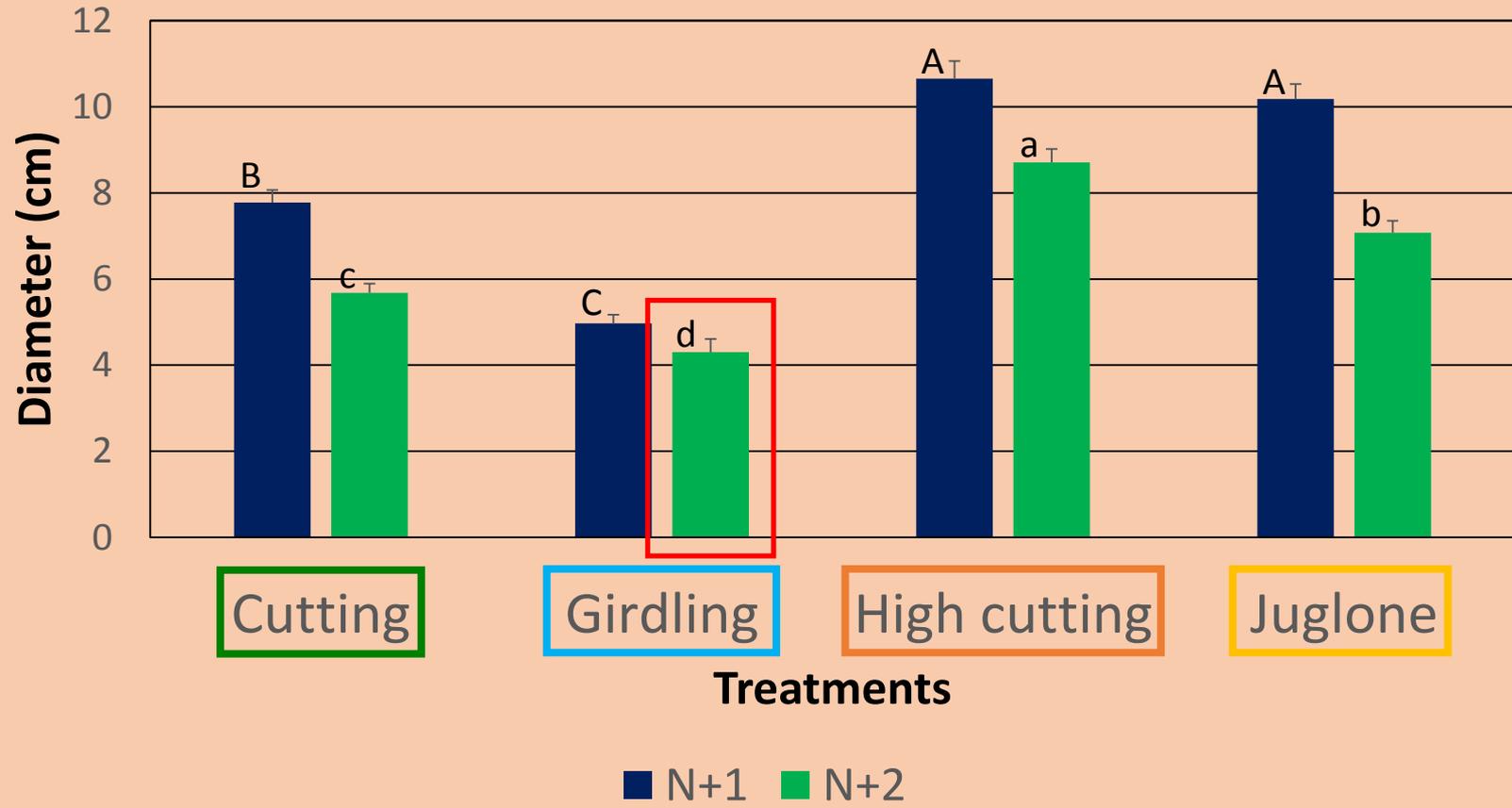


# Mortality rate (%)



Mortality rate by **girdling** best method

# Diameter of resprouts



Girdling limits diameter of resprouts

# Control method of *A. negundo* in natural areas

## ➤ Adults: girdling

- Control rather than eradication
- 2-3 year long
- Stand level method

## ➤ Seedlings: removal

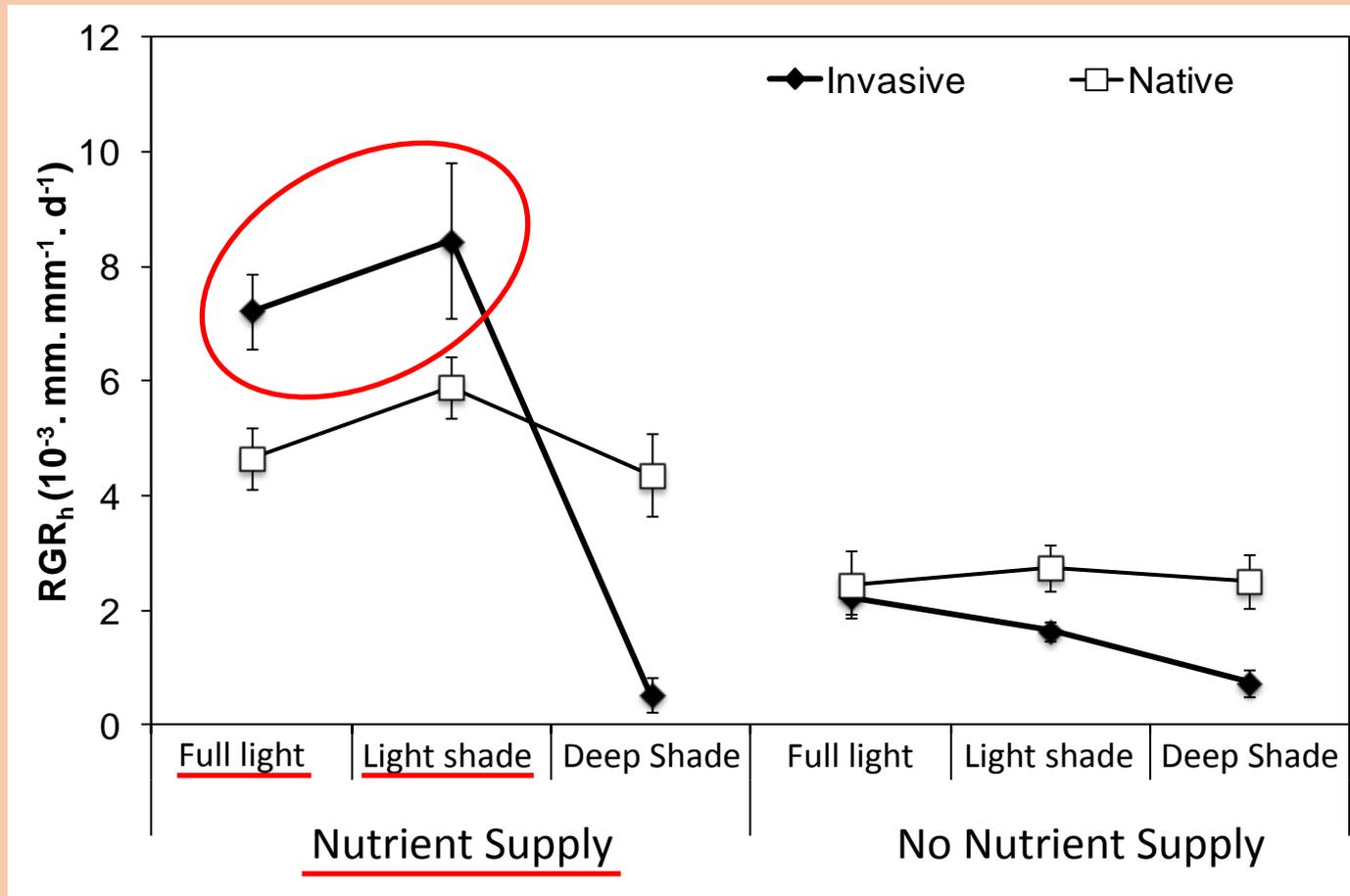
- No germination
- No seed rain
- Long distance dispersal?



Scars reconstructing  
the phloem tissues

# High level of plasticity to nutrients and Light

- Growth (Relative Growth Rate)



Beware of an opening in forest cover

# Take Home Message

- No eradication but local elimination and control
- **Girdling** and **seedling removal** : best methods
  - Beware of timing
  - Beware of light and nutrients availability

# The Negundo Team



And all the people from the Gers river management center, Bruges National Reserve, Natural Park of Landes de Gascogne, Pierroton Hermitage Experimental Unit