Bosland 10th anniversary Conference - Lommel, Belgium 12-14 October2016

Exploring the multiple effects of the invasive alien robinia tree: a PhD project presentation

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Background

- *Robinia pseudoacacia* (black locust) is one of the most widespread invasive forestry species in the world
- Human interest for this species and its ecological traits favour greatly the spread of this tree
- Black locust is a species of particular concern to the European Regulation on invasive alien species and threat to habitats listed in Annex I of the Habitat Directive, nevertheless it represents an economically important multipurpose tree
- Ecological effects on ecosystems and socio-economic impacts need to be further explored to find a trade-off between biodiversity conservation and black locust exploitation
- A cost-benefit balance is hard to be assessed but it represents a key address to guide management decisions


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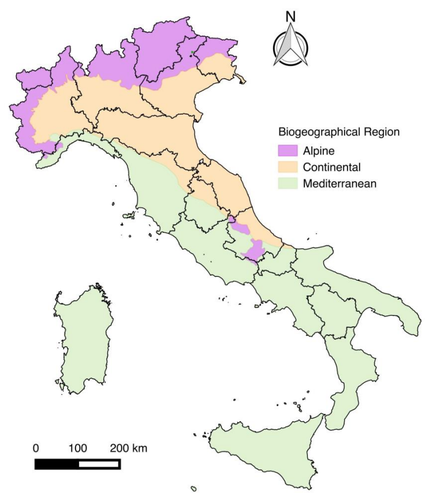
Research questions and objectives

- Which are the socio-economic drivers of the spread of black locust?
- Which are the impacts caused by the invasive black locust on ecological dynamics, ecosystem services provision and public opinion in different landscapes?

This study will be carried out at three scales: a national scale, a landscape scale (with three different types) and a stand scale.

➢ National scale

To investigate socio economic drivers on black locust spread.
The influence of landscape factors (pattern, man-made elements, soil use) on the invasion of black locust (at the national scale) will be investigated.

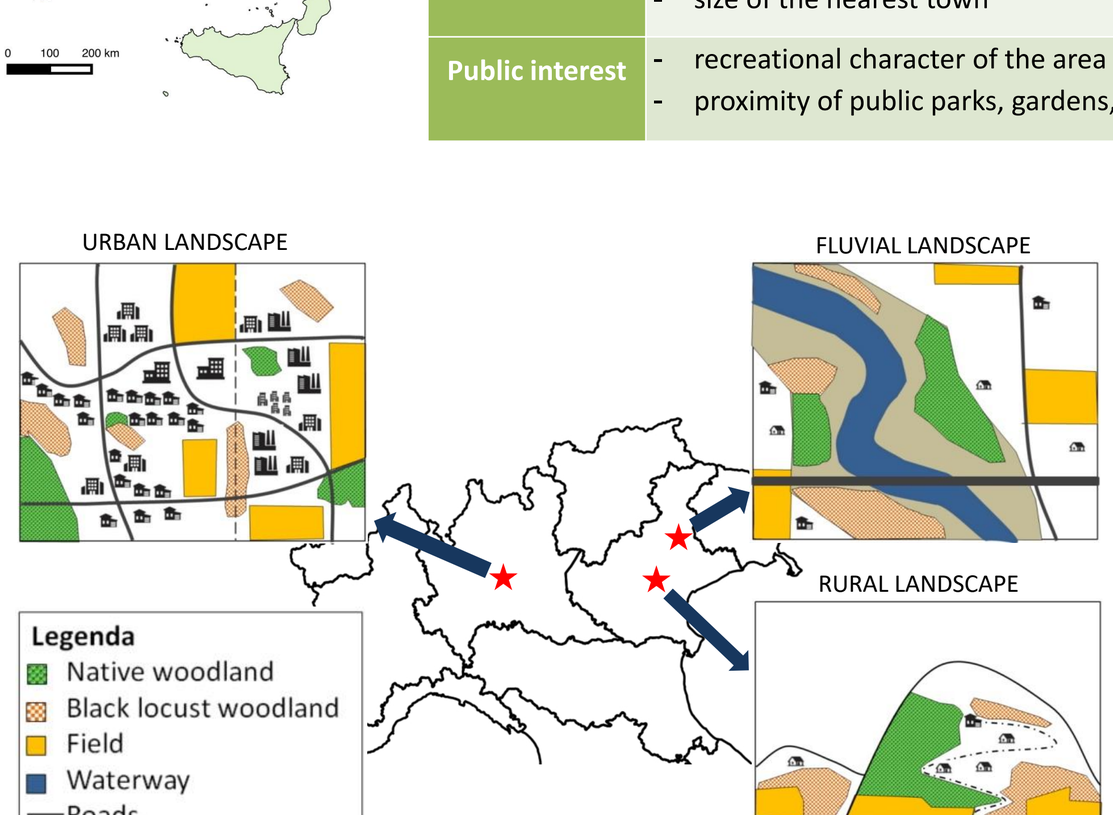


List of example variables to be correlated with black locust woodlands

Type	Variables	Source
Management	- native plant health conditions - present and previous forest management (coppice or high forest) - harvesting activities - no longer managed areas: former cultivations, abandoned factories	Forest and other land use plans
Landscape	- distance from river active channel	Geo-referenced data
Anthropic	- density of urban centers - roads density - size of the nearest town	
Public interest	- recreational character of the area - proximity of public parks, gardens, green areas for recreational use	

➢ Landscape scale

To compare the provision of some important ecosystem services between black locust and native woodlands in rural, urban and riverine landscapes.
Differences in ecosystem services (ES) provisions (with and without market value) will be assessed and compared beetwen native vs. black locust woodlands.



Examples of ES to be assessed

Theme	Class	ES example
Provisioning	Materials	Firewood
Regulation and maintenance	Flow regulation	Erosion protection
	Regulation of physical Environment	C-sequestration
Cultural	Symbolic	Landscape aesthetics appreciation

➢ Stand scale nested inside the landscape scale

- To compare ecological dynamics in black locust vs. native woodlands
- To study black locust impact on biological communities

A number of pairs of native vs. black locust plots will be selected within each landscape type. Each plot will be 100 m^2, a maximum distance of 500 m between plots within the same pair and a minimum distance of 1 km between plots of different pair will be respected. Further details on the paired sampling approach are provided in Sitzia *et al*. (2012).

Examples of woodland variables to be measured

Type	Variables
Structure	DBH, tree height, stand age from cores
Flora	species occurrence, BB coverage
Soil	nitrogen content, soil structure

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*** Joint between ecologists, hydrologists and economists: exploring the multiple effects of the invasive alien ROBINIa tree - Linda Scattolin grant 2016**