

# Comparison of plant species richness between hedgerows and a bamboo field in Ireland

Litsa Bogaerts

# Master thesis

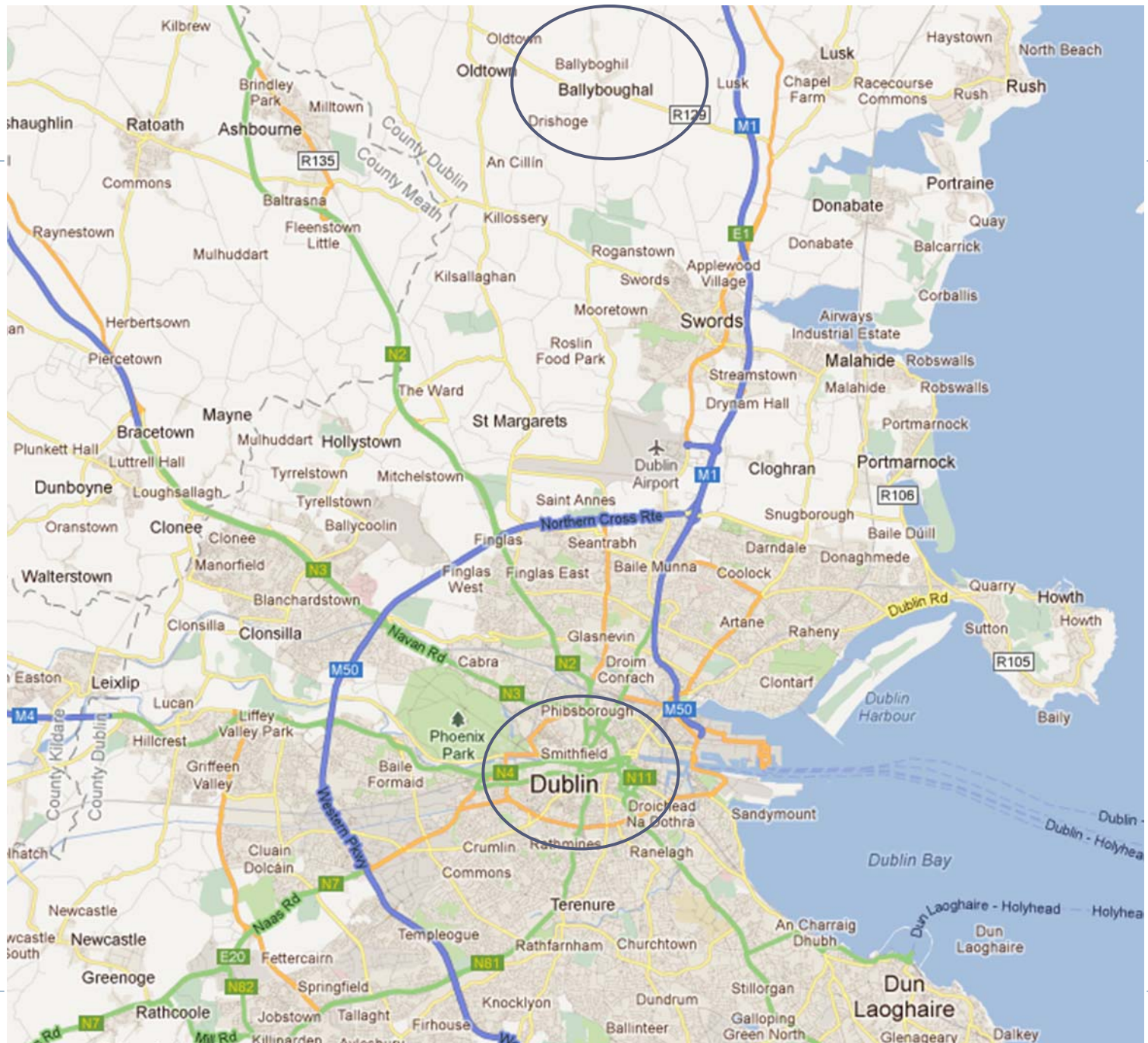
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--> Student Bio Science Engineering UGent

--> specialisation: forest and nature

--> 'Evaluation of the potential of hedgerow networks for forest biodiversity restoration in an Irish rural landscape'





# What ?

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- ▶ 204 hedgerows
- ▶ 6 big and several smaller properties
- ▶ 129 herbs, 25 shrubs en 32 trees
- ▶ Per hedgerow:
  - ▶ Flora
  - ▶ Length, width, height (+ variation)
  - ▶ Presence tree layer and/or shrub layer
  - ▶ Percentage gaps
  - ▶ Presence hill
  - ▶ Presence ditch, depth and waterlevel
  - ▶ Adjacent landuse
  - ▶ Height above sealevel
  - ▶ Soil type
  - ▶ Age



# Bamboo plantation

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Figure 1: Picture of the property in Ireland (marked in red) and of the bamboo plantation on that property (marked in yellow). Adapted from Google Maps.

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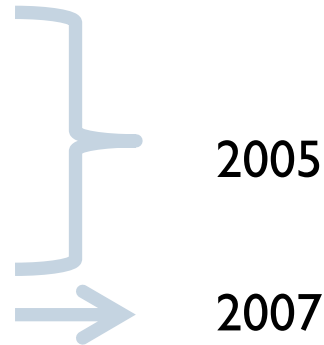


# Bamboo plantation

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## ▶ 5 temperate species:

- ▶ *Phyllostachys humilis*
- ▶ *P. decora*
- ▶ *P. bissetii*
- ▶ *P. aurea*
- ▶ *P. aureosulcata* 'Alata'



## ▶ Origin: China



# Bamboo plantation

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- ▶ Produced via in-vitro techniques by Oprins Plant NV., Rijkevorsel, Belgium
- ▶ 1th year: semozine to suppress upcoming weeds
- ▶ 2nd year: spot-treatment for emerging weeds



# Need - Solution

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- ▶ Need for sustainable resources
- ▶ Several sources of energy investigated
- ▶ Biomass also able to replace fossil fuels as a major resource for other industries as well

=> bamboo as one of the candidates



# But...

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- ▶ Spreading of bamboo by rhizomes
- ▶ Growth reserves kept underground

--> Failure to contain bamboo plants to the plantation area

- ▶ Dense canopy
- ▶ Capacity to drain water from a given area

=> Bamboo might therefore be an invasive plant with a devastating potential for endemic flora and fauna



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**IT IS OF PARAMOUNT IMPORTANCE THAT WE  
DO NOT COMBAT ONE RISK WITH ANOTHER !!!**



# Dataset

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- ▶ 41 hedgerows
- ▶ 101 plant species

Table 1: Summary of the data collected on hedgerows.

	number of species	area (m <sup>2</sup> )
average	23	440
minimum	9	70
maximum	39	1470

- ▶ Bamboo plantation:
  - ▶ Number of species: 39
  - ▶ Area : 1400 m<sup>2</sup> (5m edge)



# Used techniques

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- ▶ Species - area relation

- ▶  $S = cA^z$

- ▶ TWINSpan - analysis

- ▶ Classifies the samples according to the principal indicator species

- ▶ Sørensen similarity index

- ▶ To tell the extent to which the flora around the bamboo field resembled the community in the hedges nearby
  - ▶  $QS = 2C / A + B$  with A and B number of species in samples A (a hedge) and B (bamboo plantation) and C number of common species



# Species - area relation

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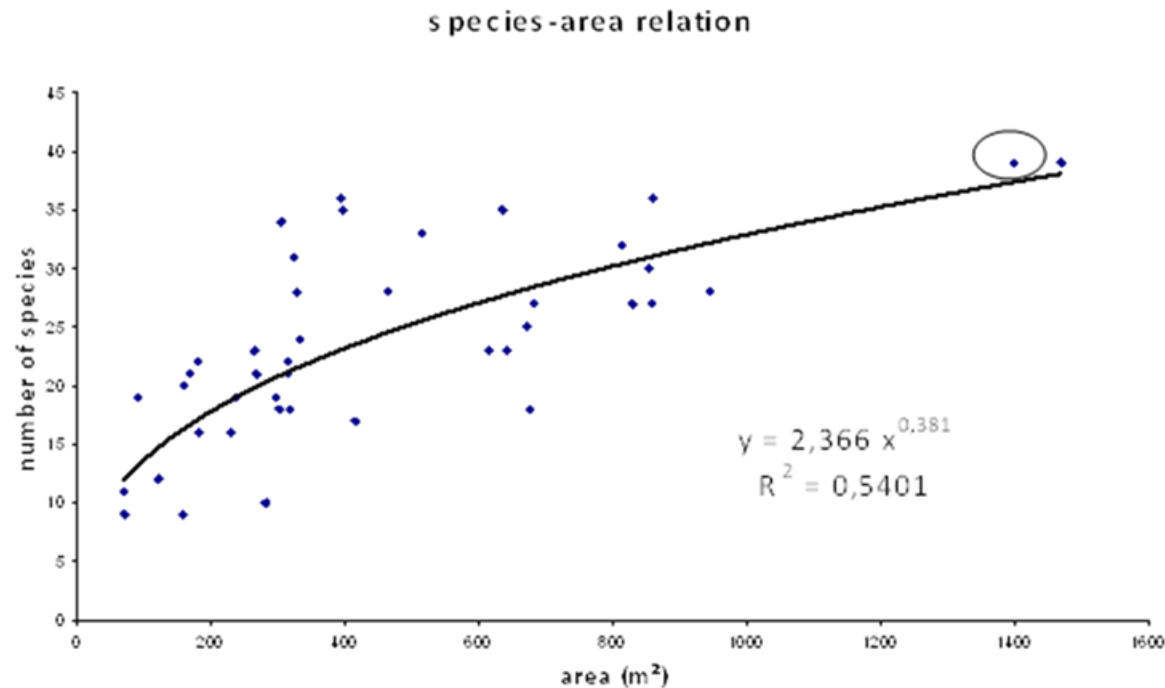


Figure 2: Species - area relation for the 41 hedgerows and the bamboo plantation (encircled in black)

# TWINSPAN - analysis

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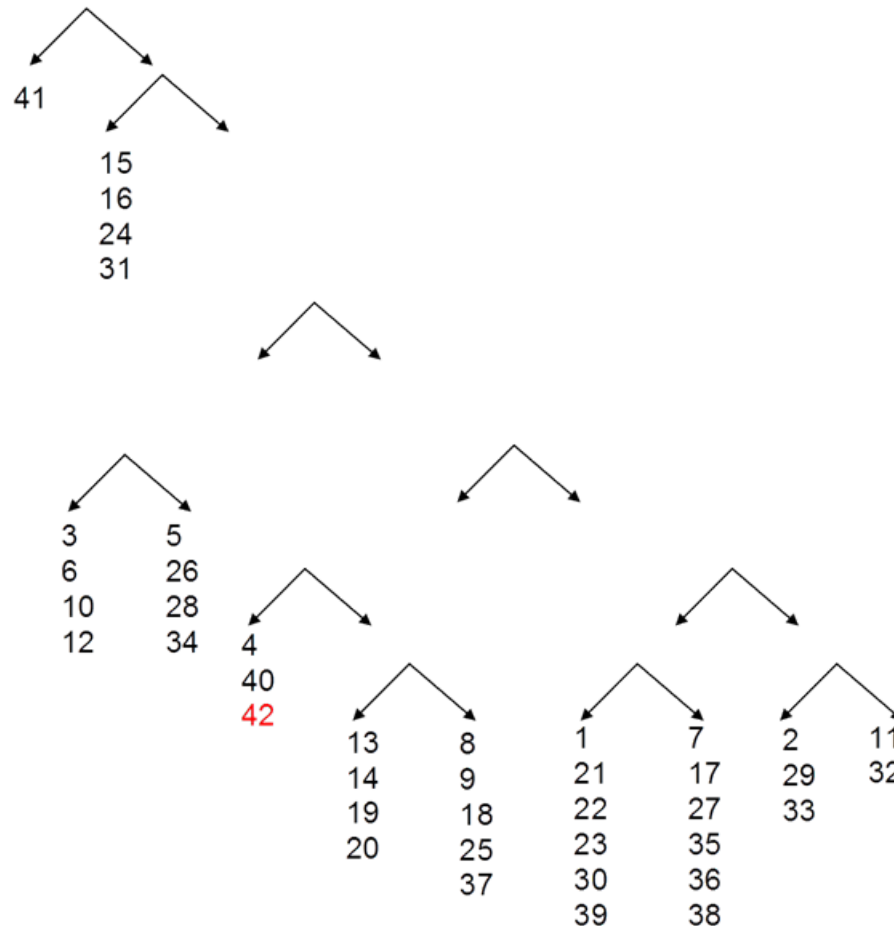


Figure 3: Classification of the samples in groups using Twinspan. Number 1 till 41 (in black) are the different hedgerows and number 42 (in red) is the bamboo plantation.

# Is bamboo a threat ?

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- ▶ Clustering fails to demonstrate great differences in species composition
- ▶ Species richness is not affected

=> No negative influence of bamboo on the indigenous plant species for this property in Ireland

=> Hypothesis: bamboo biomass plantations need not have negative influence on the rural flora



# Is bamboo a threat ?

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- ▶ Seed dispersal as a possible way of becoming invasive  
--> not for bamboo because of infrequent mass flowering
  - ▶ Longer periods between harvests  
--> biomass plantation as refuge and seed bank
- => small plots, mixed into common types of landuse and attention for elements that allow migration



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Thank you for your attention !  
Are there any questions ?

