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# INCREASING THE GERMINATION PERCENTAGE OF AN ENDANGERED NATIVE ORCHID (*HIMANTOGLOSSUM ADRIATICUM*) BY POLLEN TRANSFER AND OUTBREEDING BETWEEN POPULATIONS

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## *Himantoglossum adriaticum* H. Baumann

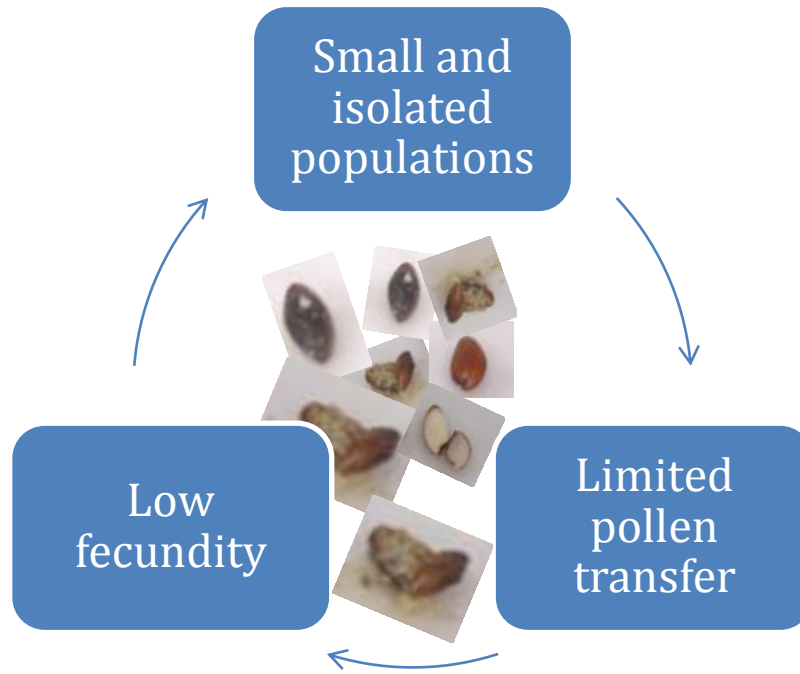


Population trend: 

- Complex autoecology
  - Food deceptive
  - Low fruit set
- Habitat loss
  - small patches of dry grasslands

Annex II Habitat Directive 92/43/CEE

*H. adriaticum*



OUTBREEDING



Population 1

Pollen transfer  
----->



Population 2



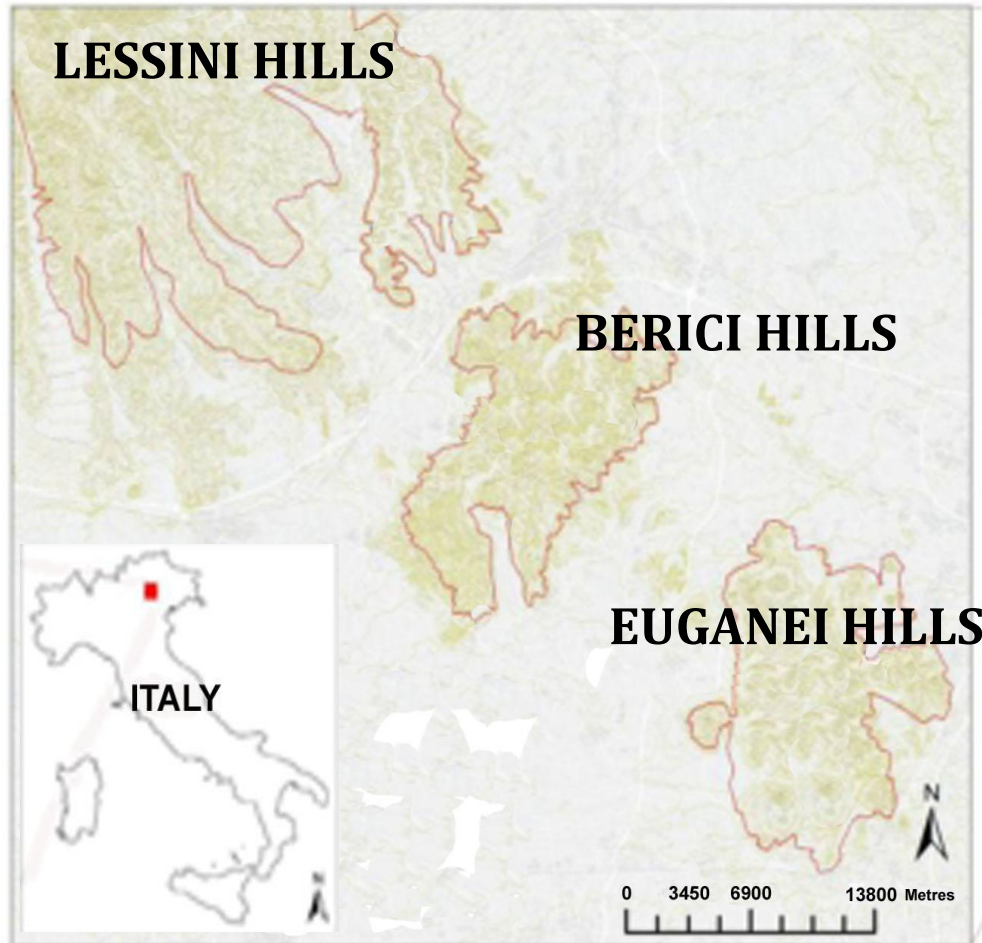
**High  
reproductive  
fitness**

# Aims

1. Test the **germination capacity** of *H. adriaticum*
2. Test the efficacy of artificial pollen transfer (hand pollination) and **outbreeding** for increasing the **germination percentage**



## Study area

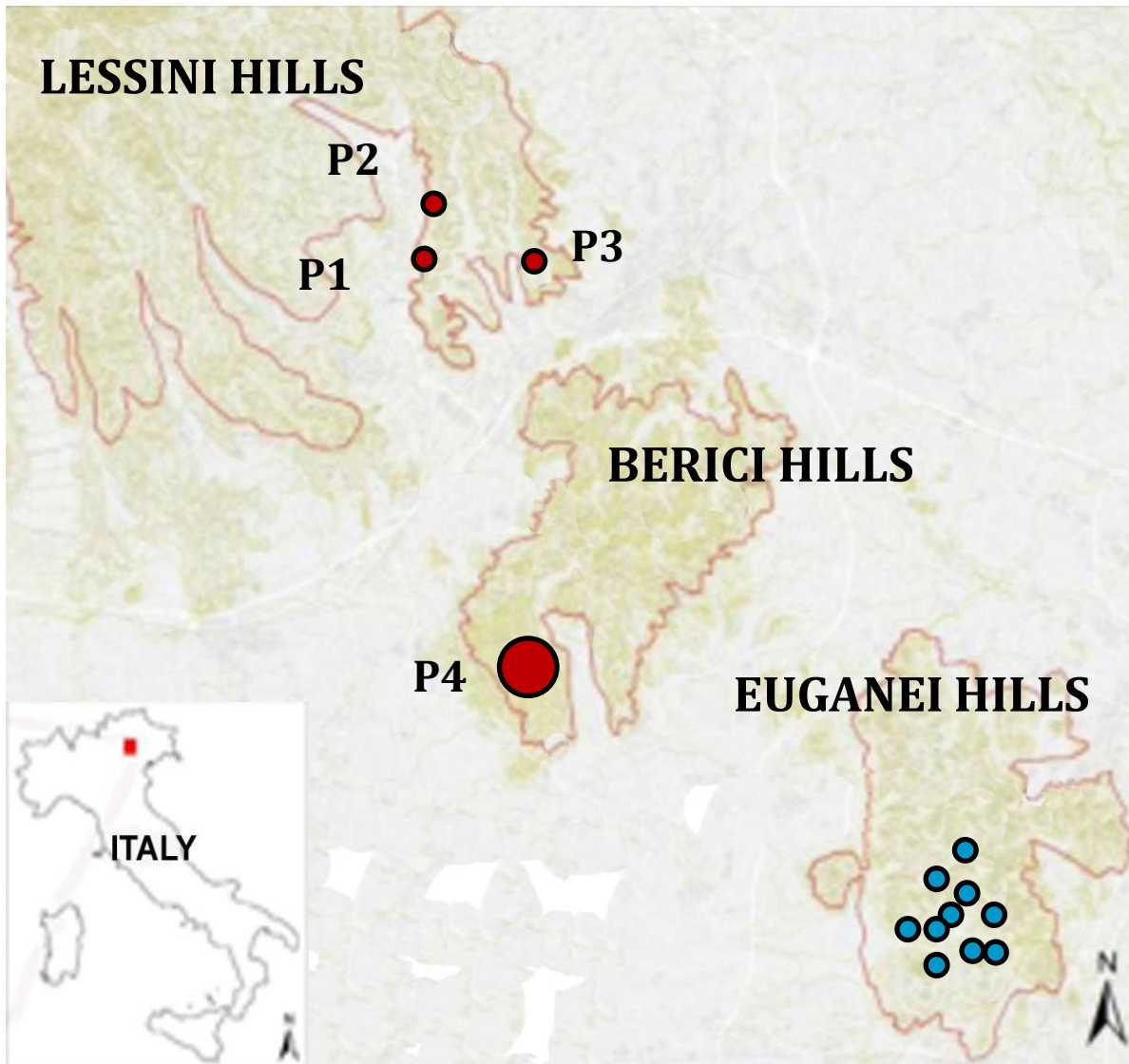


## Dry grasslands – Habitat 6210\*

- Semi-natural (grazing and mowing)
- Shallow soils
- Nutrient poor
- High species richness (many orchid species)



## Population selection



## Germination capacity

**10 reference populations**

(10-100 ramets)

Most suitable habitat conditions

20/10 °C day/night for six months



## Pollen transfer



### LESSINI HILLS

P2  
P1

P3

### BERICI HILLS

P4

### EUGANEI HILLS

## Outbreeding effect

### 4 populations

#### P4 - Donor population

Ramets > 500

#### Recipient populations

P1: Small (35 ramets)

P2: Small (27 ramets)

P3: Small (28 ramets)

#### control

Within population hand  
pollination

Kruskall-Wallis ANOVA, with  
Multiple Comparisons

Grouping variable: 3 control  
populations and 3 hand pollinated  
populations (6 levels)



# Pollen transfer



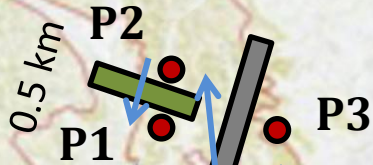
Agro-forest matrix



Urban-industrial barrier



LESSINI HILLS



BERICI HILLS



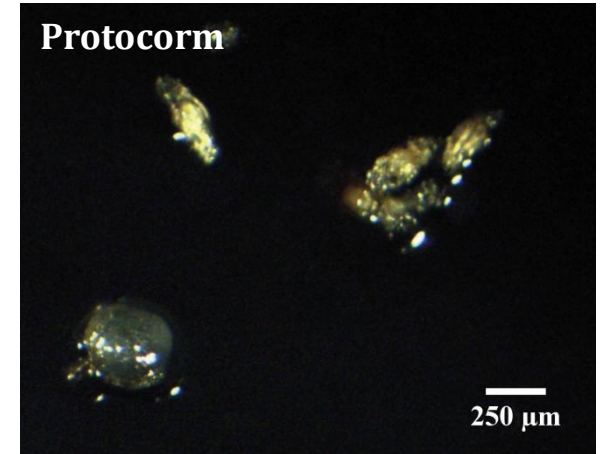
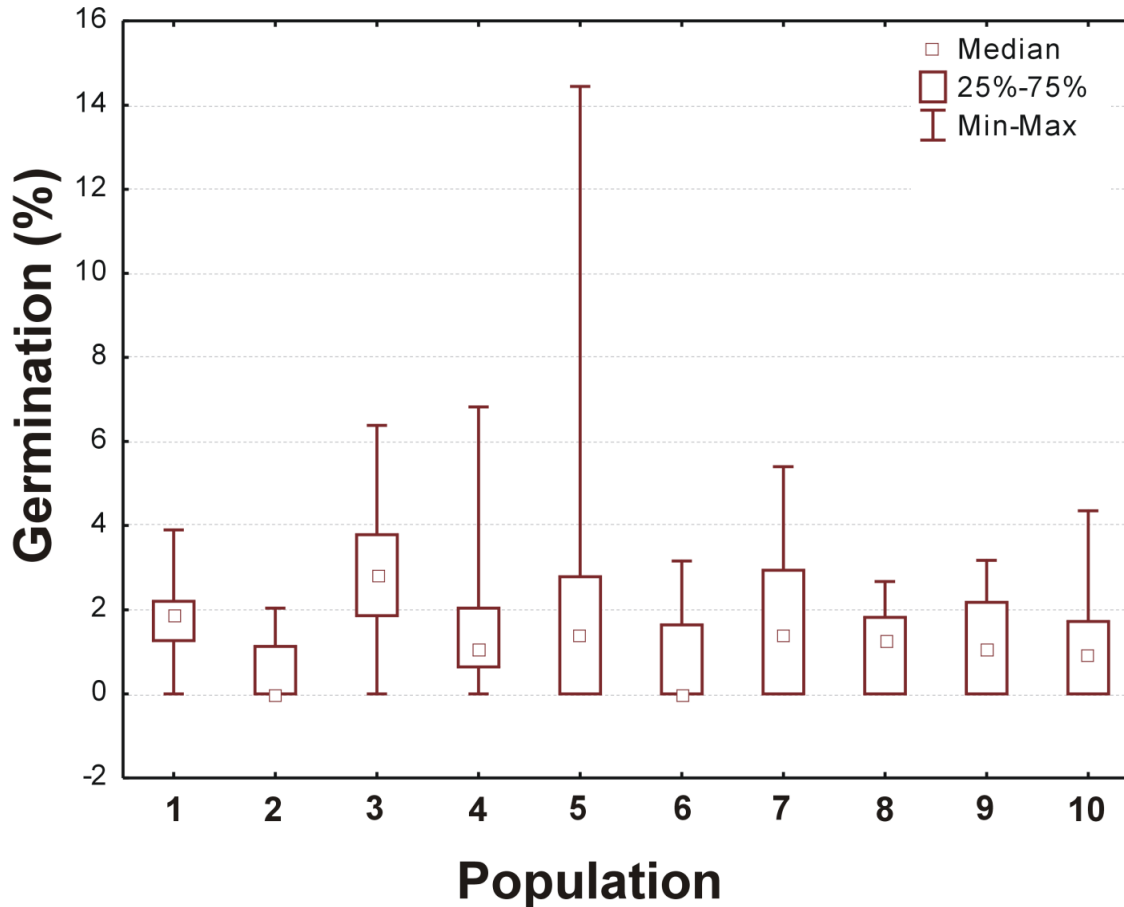
EUGANEI HILLS



ITALY



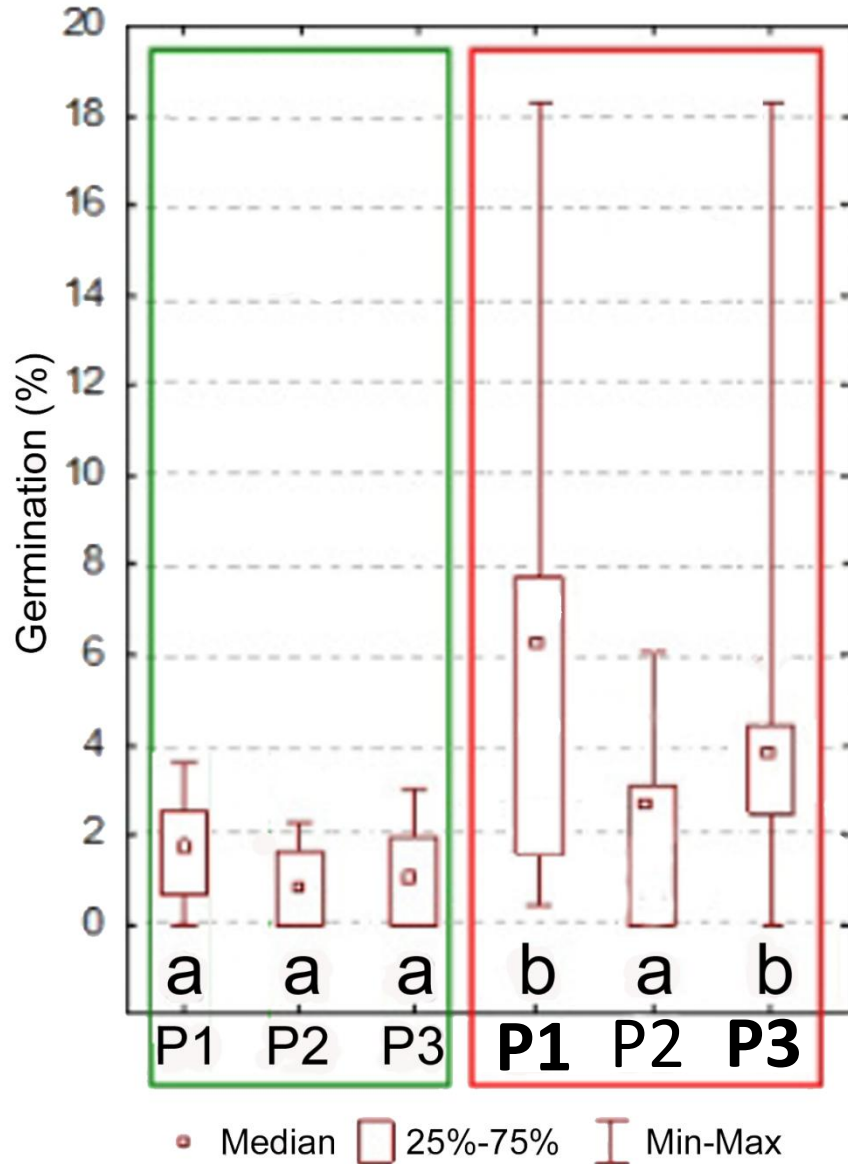
## 1st germination test reference populations



Germination percentage <5%

**CONTROL****OUTBREEDING**

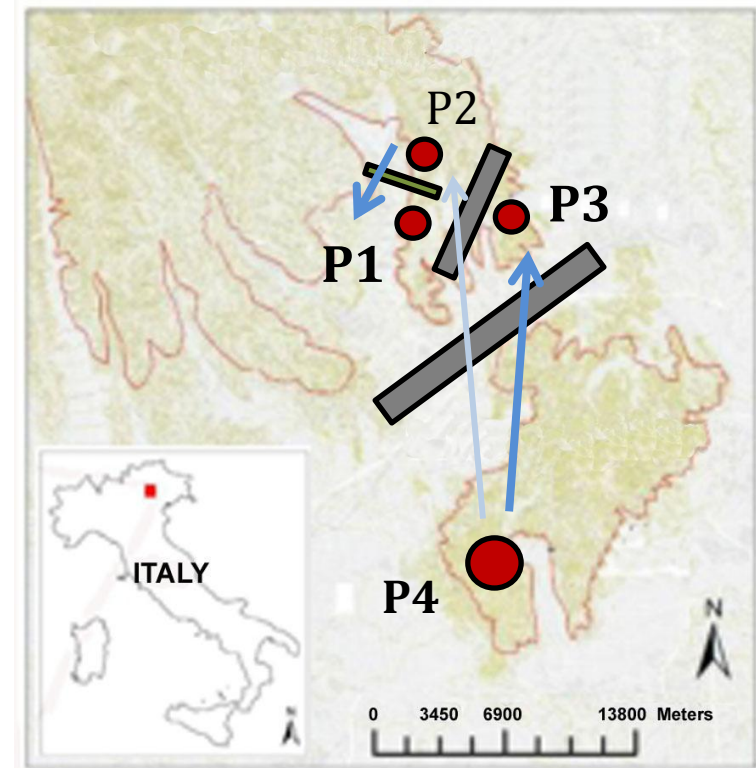
Within-populations    Between-populations



Incremented germination percentage:

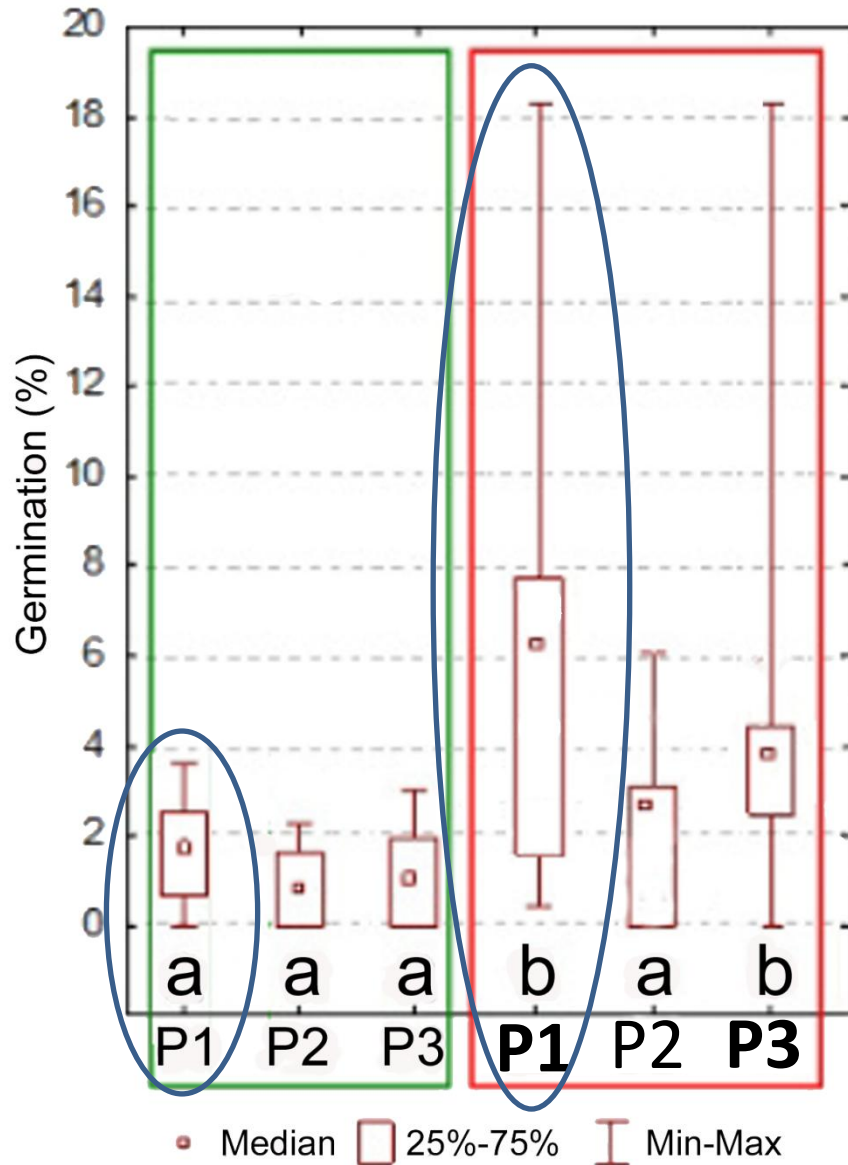
P3 (from large to small and isolated)

P1 (between smalls and not isolated)



**CONTROL****OUTBREEDING**

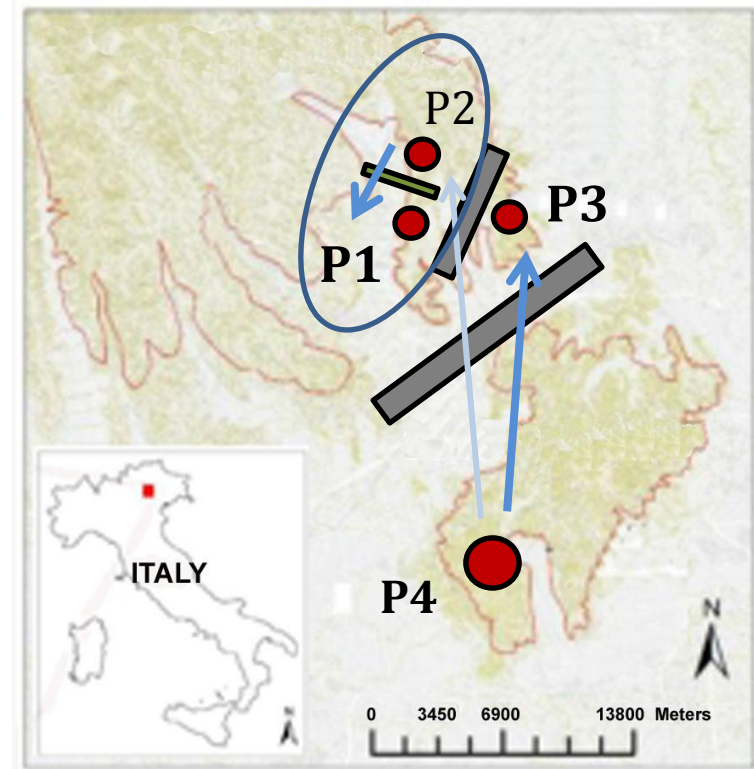
Within-populations    Between-populations



Incremented germination percentage:

P3 (from large to small and isolated)

P1 (between smalls and not isolated)



*H. adriaticum* showed a very low germination capacity



Inbreeding is likely to occur

The artificial pollen transfer enhances the germination capacity of *H. adriaticum*

- Outbreeding can represent a useful tool for the conservation of *H. adriaticum*

## restoration ecology

Donor population size  
does not assure success

Neighbour donor  
populations increase  
success



**Thank you !**

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