

Ex-situ studies on biology of endangered oromediterranean plant  
as a first step towards successful in-situ conservation actions



2nd Mediterranean Plant Conservation Week  
"Conservation of Mediterranean Plant Diversity: Complementary Approaches and New Perspectives"

Population on Mt. Snežnik

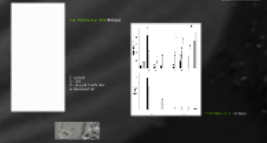


Threats and first conservation measures

In-situ (so far)



Ex-situ (so far)



Further steps...



Phytogeography



# Introduction



Ignaz von Sapsykowski (1857-1918)



Pradědské hory, Dnievarské Alpy (Moravské)



Pradědské hory, Dnievarské Alpy (Moravské)

*carinthiacum*



*latifolium*

*dinaricum*



*uniflorum*



morphology + phytochemistry + cytogenetics = *Cerastium latifolium* group  
Niketić & al 2015, Bot J Linn Soc



Mt. Mlýnský náhon  
Pradědské hory, Dnievarské Alpy (Moravské)



Karstské hory  
Pradědské hory, Dnievarské Alpy (Moravské)



Distribution area of *Cerastium dinaricum*





Ignaz von Szyszyłowicz (1857-1910)



Komovi Mts, Dinaric Alps, Montenegro





*Cerastium dinaricum* Beck & Szyszyl.



*carinthiacum*



*dinaricum*



*latifolium*

*uniflorum*



morphology + phytochemistry + cytogenetics = Cerastium latifolium group  
Niketić & al 2013, Bot J Linn Soc

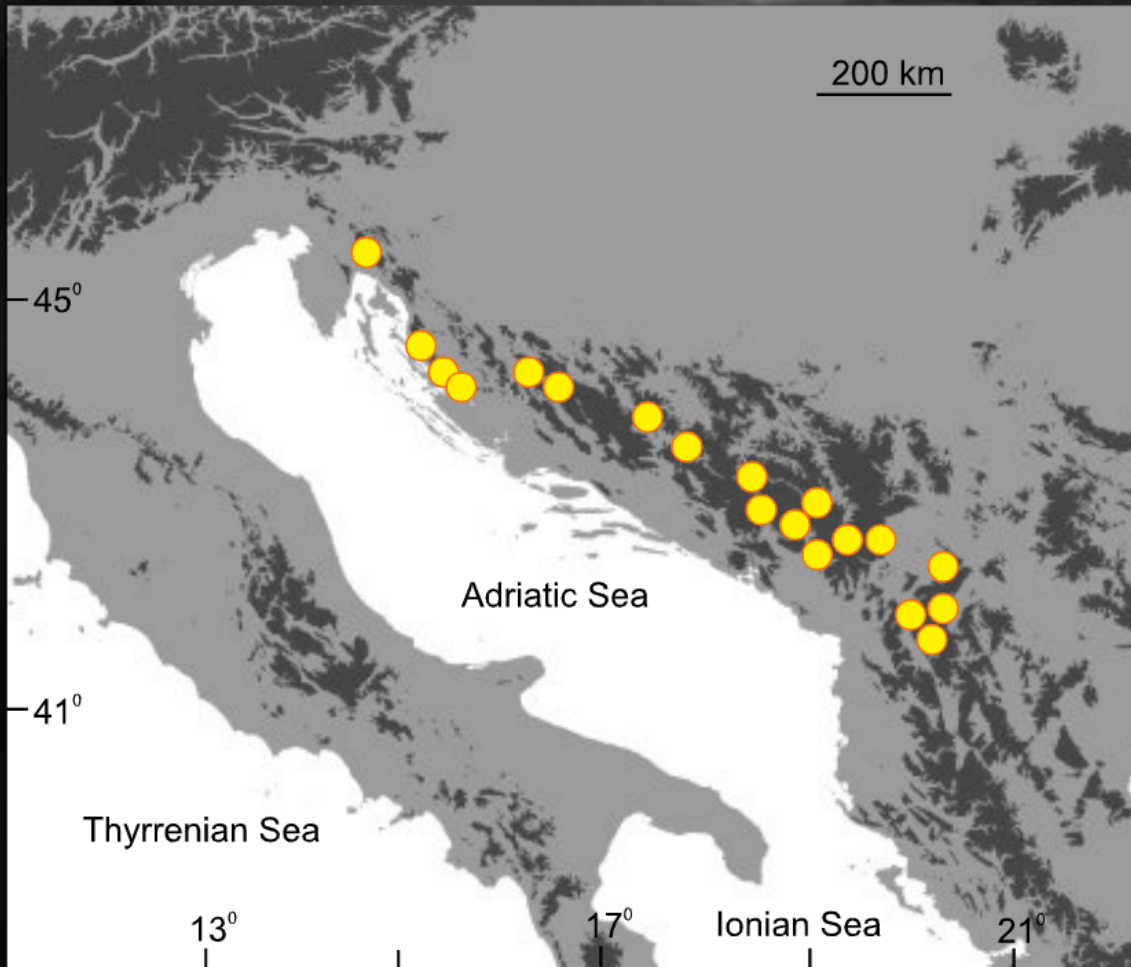




Mt. Maja e Papluqes  
Prokletije Mts., Dinaric Alps (Albania)



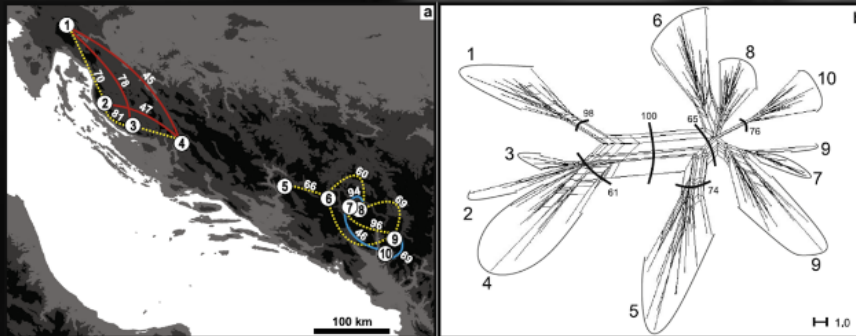
Karanfili mountain ridge  
Prokletije Mts., Dinaric Alps (Montenegro)



Distribution area of *Cerastium dinaricum*



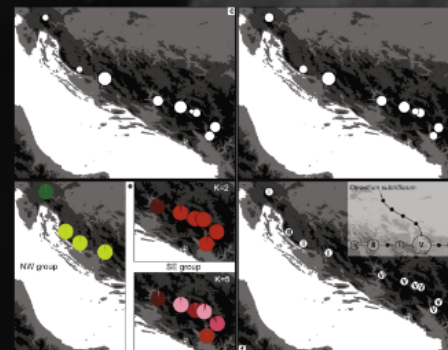
# Phylogeography



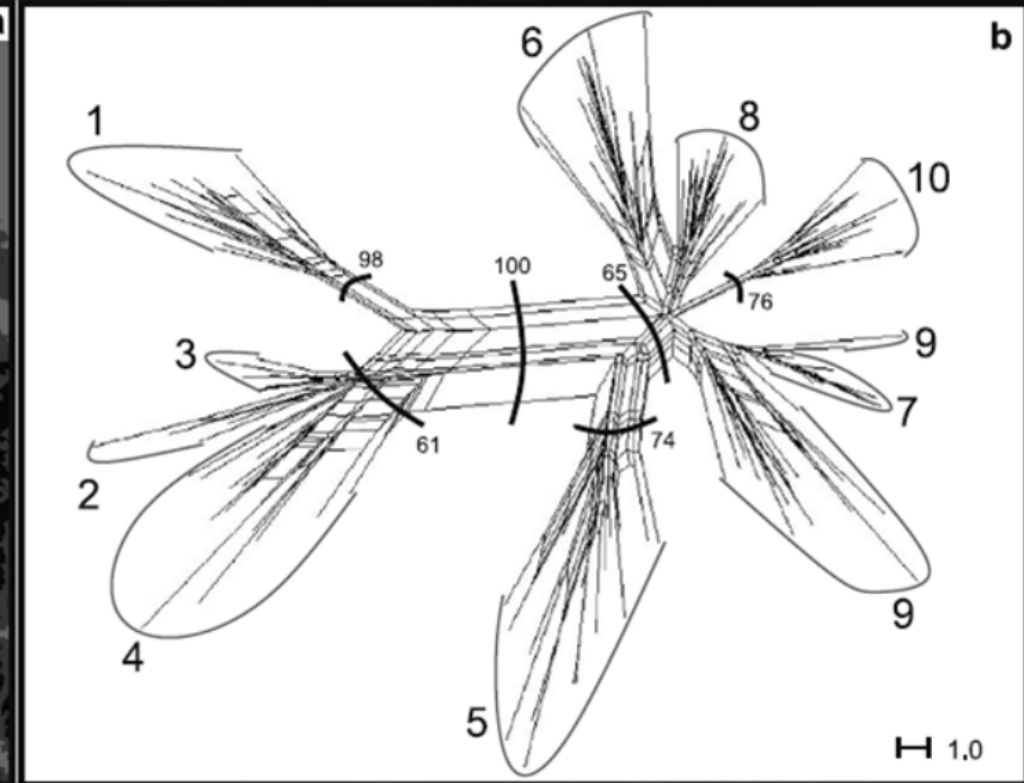
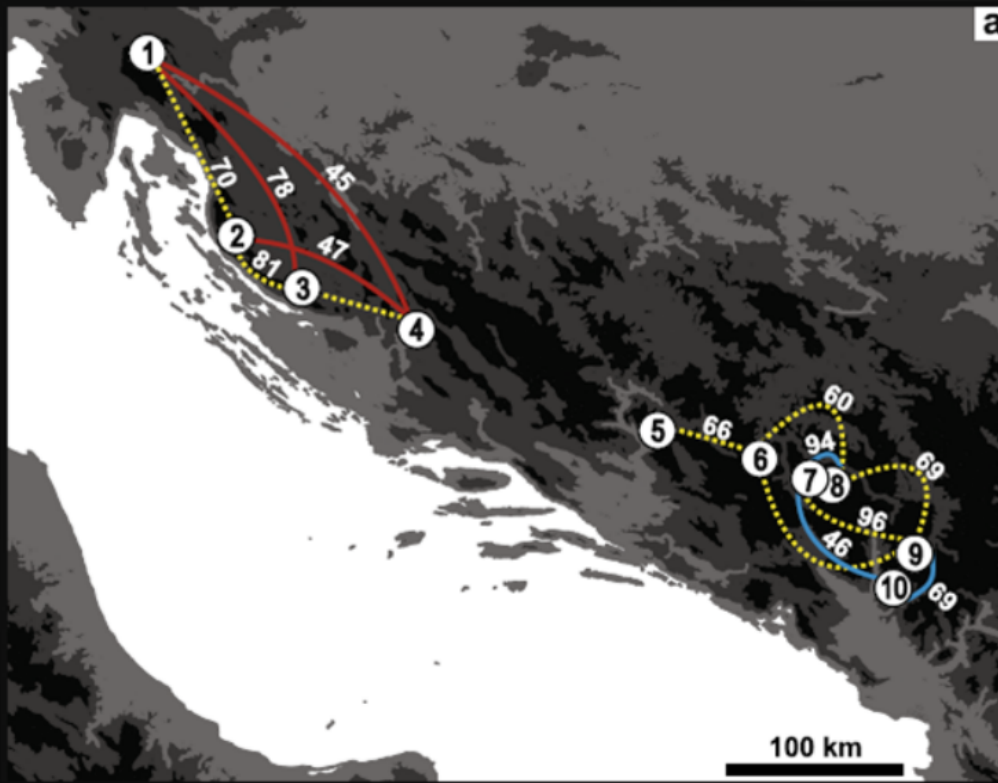
AFLPs, Kutnjak & al 2014 (Mol Ecol Evol)



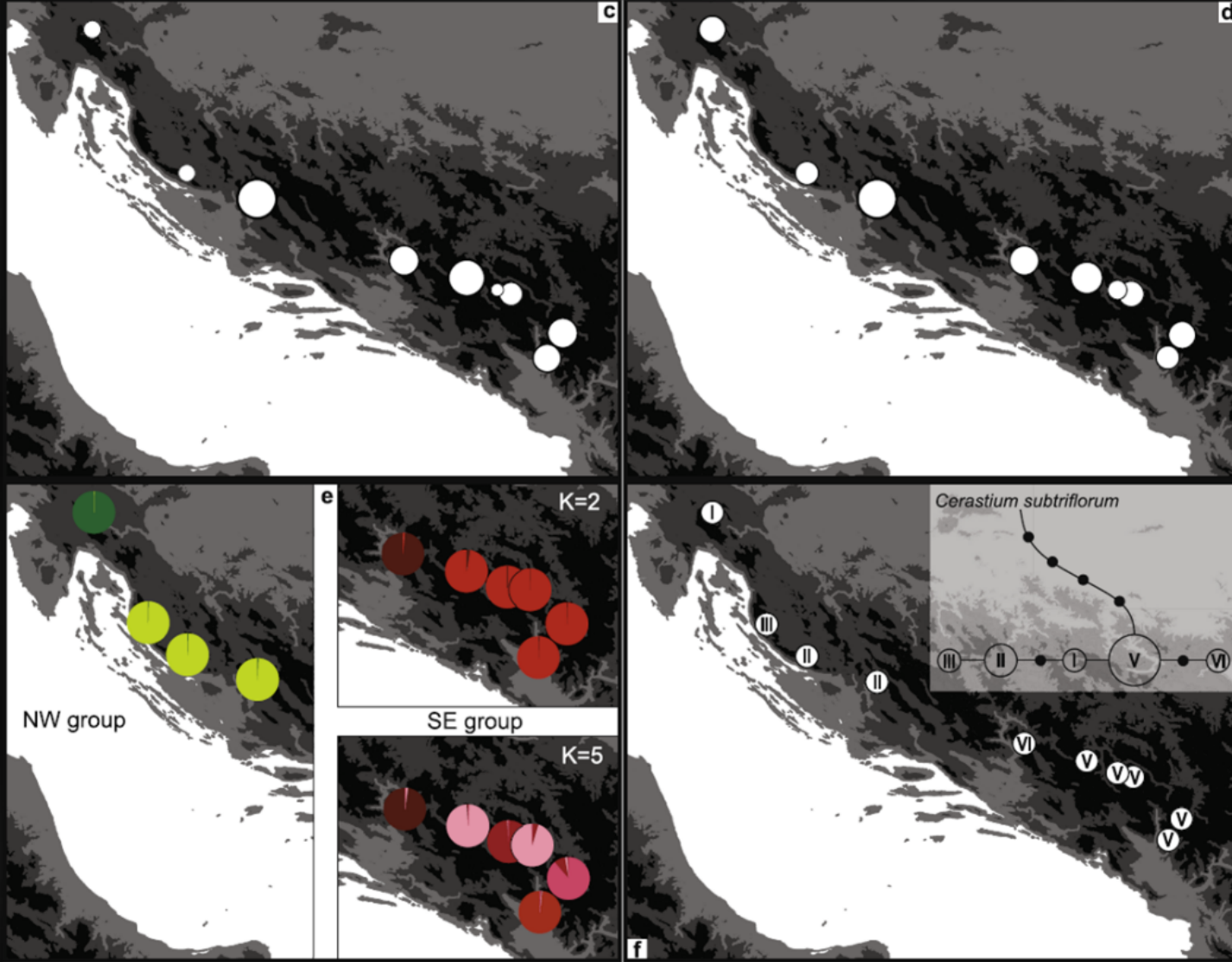
Distribution of the genetic clusters identified in the Adriatic Sea region (Kutnjak & al 2014). Map from Kutnjak & al 2014 (Mol Ecol Evol)



AFLPs: Nei's gene diversity and frequency down-weighted values  
Structure & cpDNA haplotypes  
Kutnjak & al 2014 (Mol Ecol Evol)

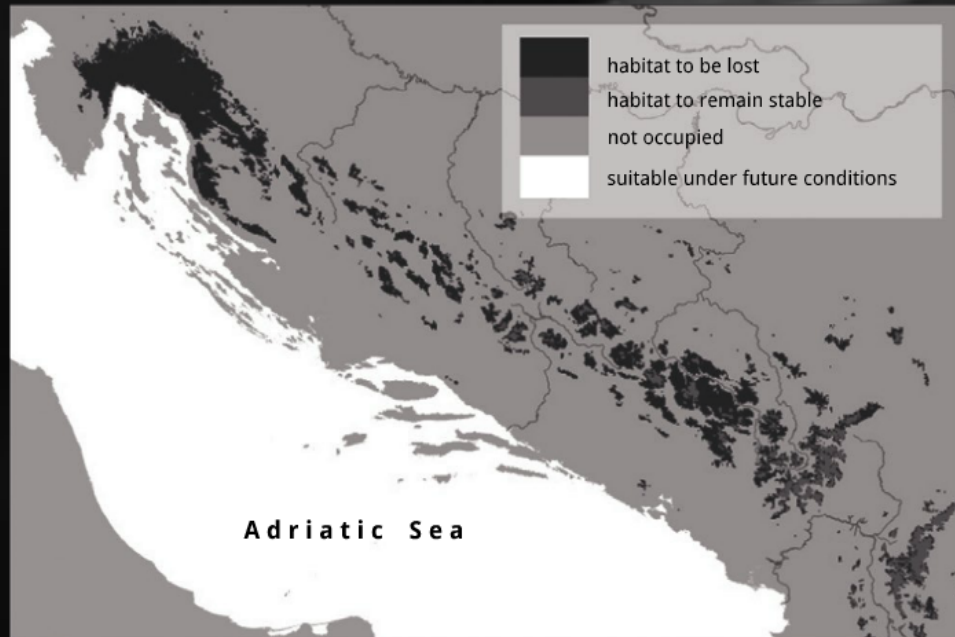


AFLPs, Kutnjak & al 2014 (Mol Ecol Evol)



AFLPs: Nei's gene diversity and frequency down-weighted values  
 Structure & cpDNA haplotypes  
 Kutnjak & al 2014 (Mol Ecol Evol)





Outcomes of the niche based modelling of *Cerastium dinaricum* under future climatic conditions (2080).  
Excerpt from [Kutnjak & al. 2014](#) (Mol Eco Evol)

# Ex-situ studies on biology of endangered oromediterranean plant as a first step towards successful in-situ conservation actions

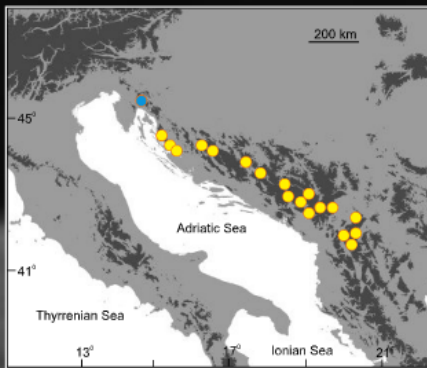
Boštjan Surina  
Živa Fišer Pečnikar  
Manica Balant  
Peter Glasnović



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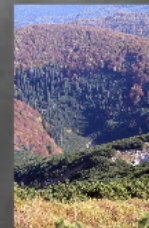
# Population on Mt. Snežnik



Wraber 1995 (Hladnikia)



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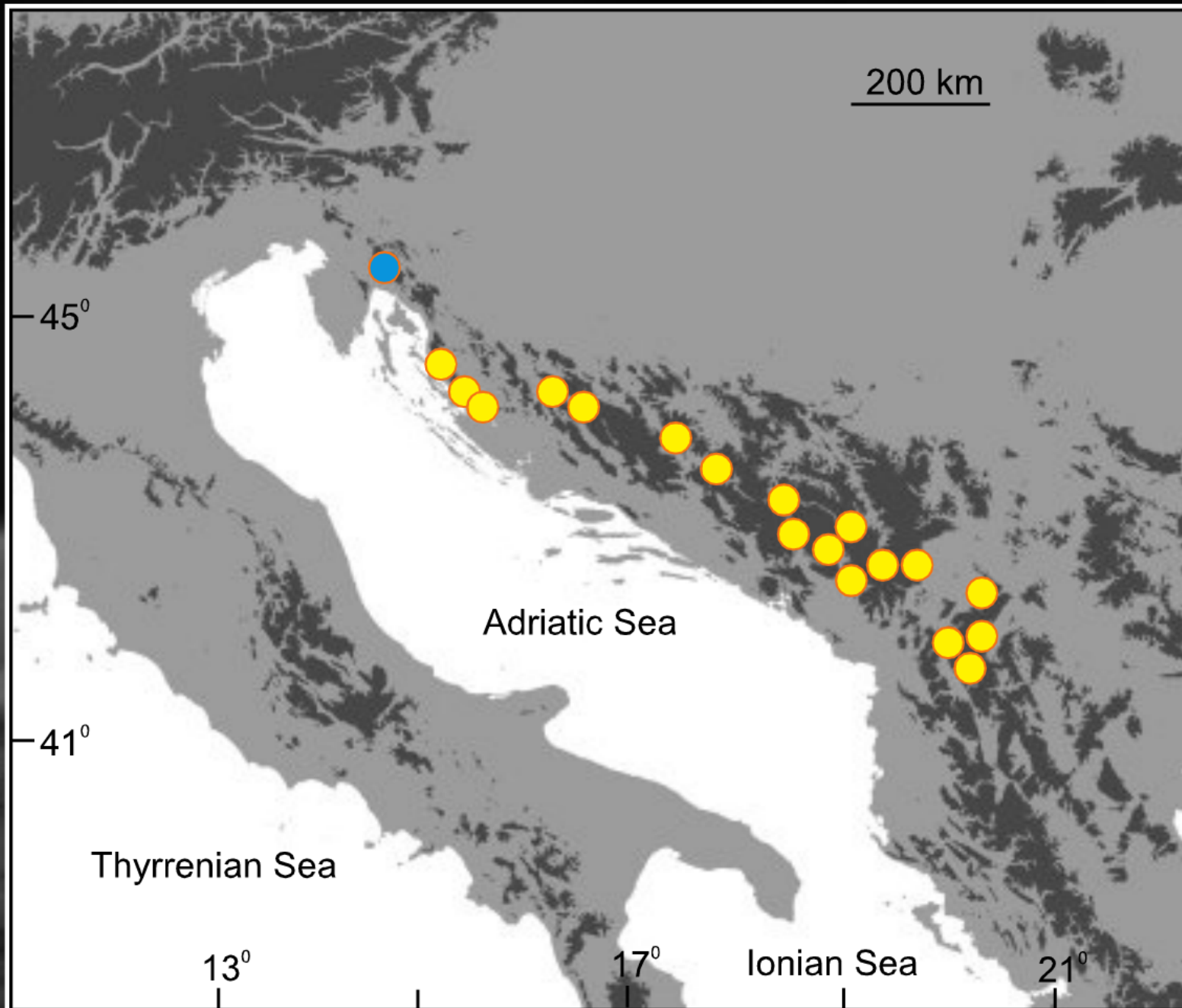


Snežnik (džep dolina)



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Wraber 1995 (Hladnikia)



Mt. Snežnik, 1796 m a.s.l. (Liburnian karst, NW Dinaric Alps), southern slopes





Smrekova draga doline



Velika K



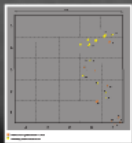


Velika Kolobarnica doline



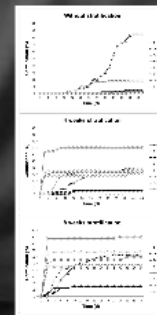
# Threats and first conservation measures

## In-situ (so far)



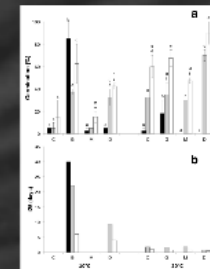
Check for the presence of the species (Borjesson et al. 2010)

## Ex-situ (so far)



Tilzer, Pecháček & al. 2012 (Biologia)

C - control  
C - GA3  
M - manual scarification  
D - dark treatment



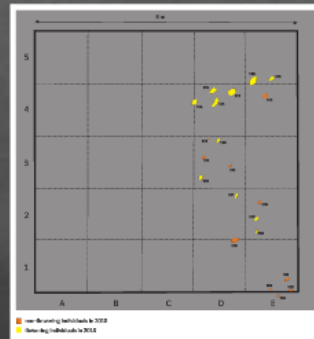
Tilzer, Pecháček & al. 2011 (Biologia)



# In-situ (so far)



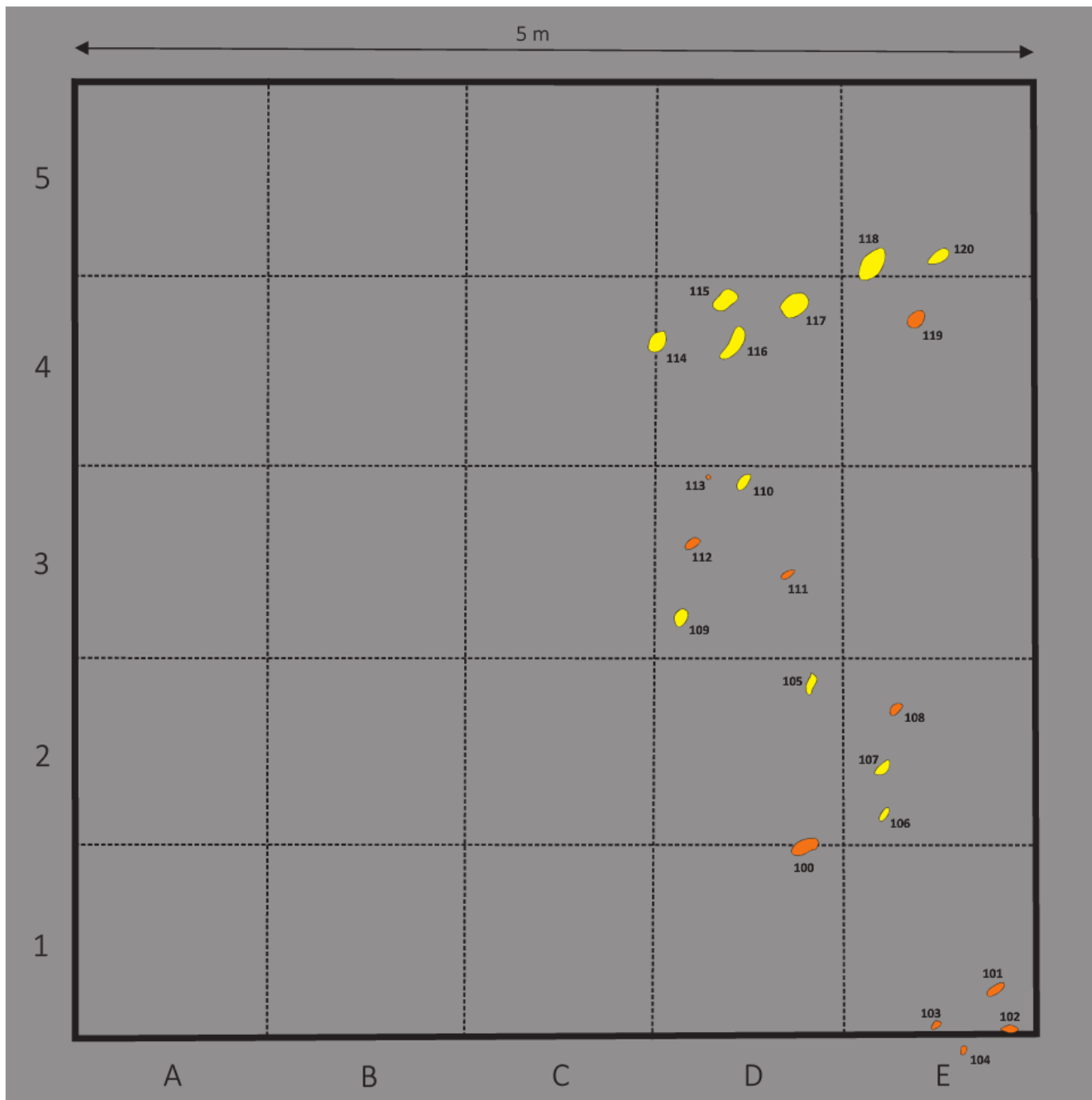
Floral visitors...



Clearing the growth site of *Cerastium dinaricum* on Mt. Snežnik







- non-flowering individuals in 2018
- flowering individuals in 2018





Clearing the growth site of *Cerastium dinaricum* on Mt. Snežnik

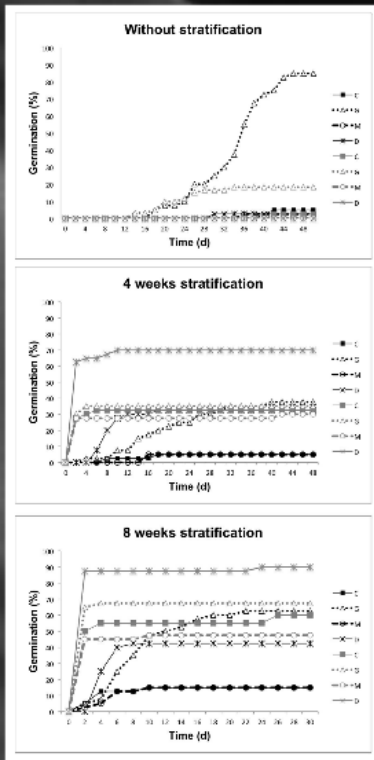




Floral visitors...

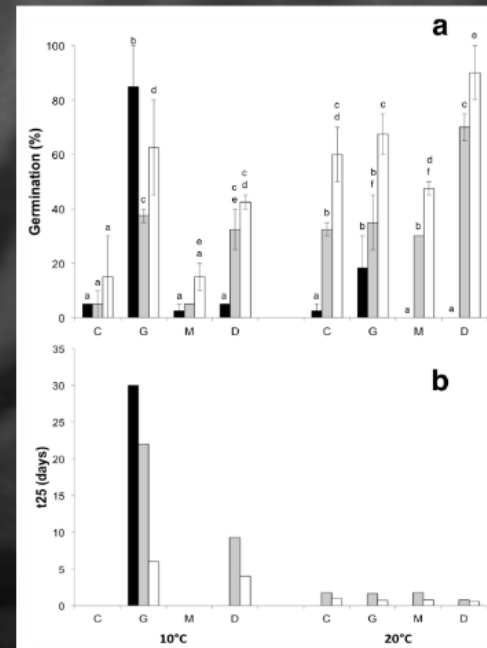


# Ex-situ (so far)



Fišer Pečnikar & al. 2018 (Biologia)

C - control  
 G - GA3  
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Fišer Pečnikar & al. 2018 (Biologia)

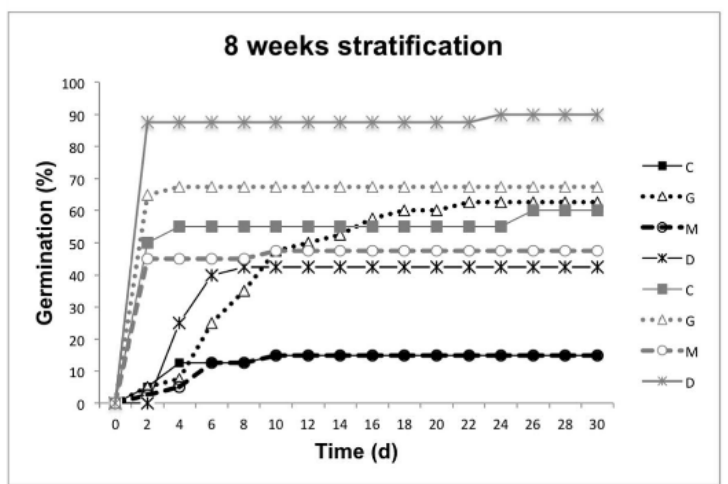
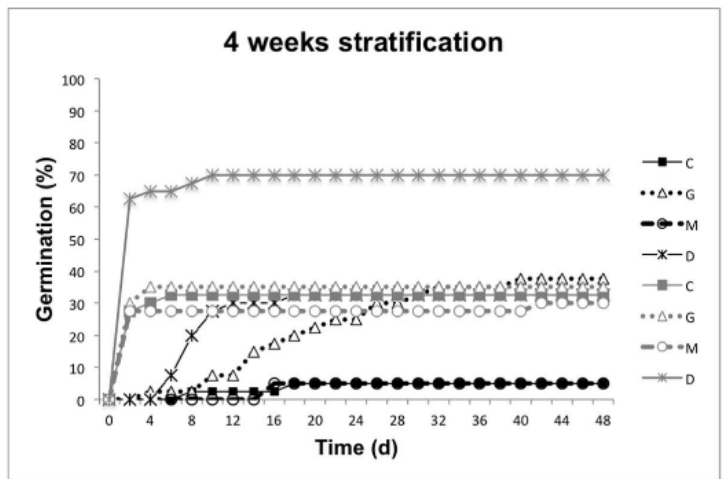
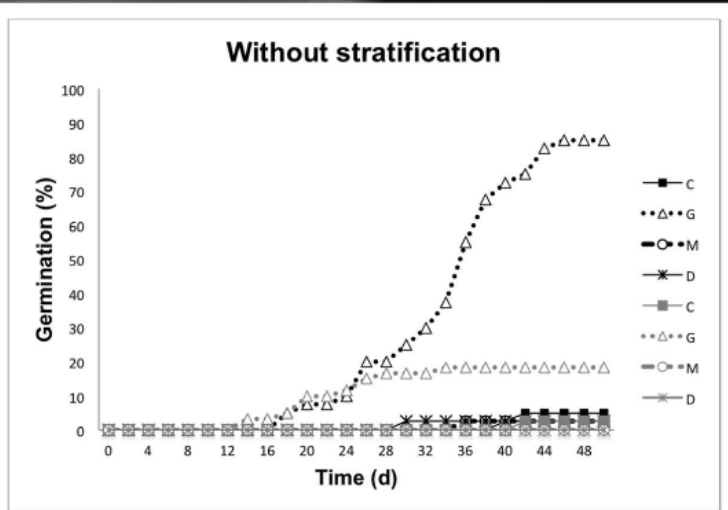




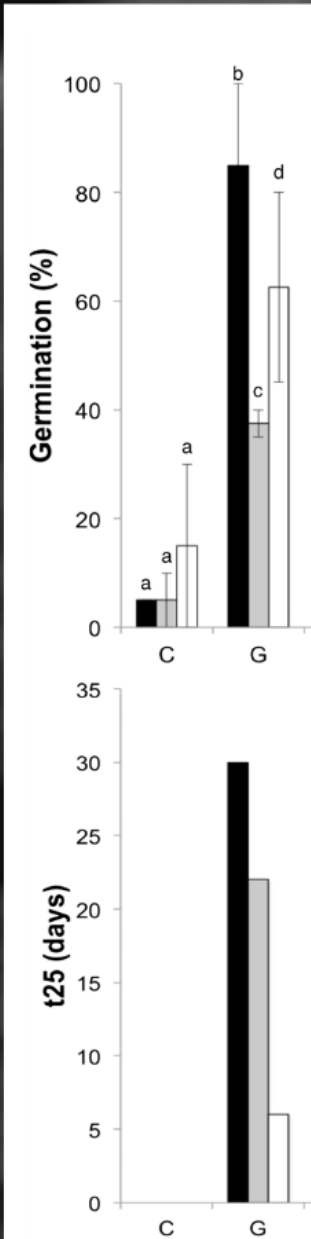
... floral visitors...

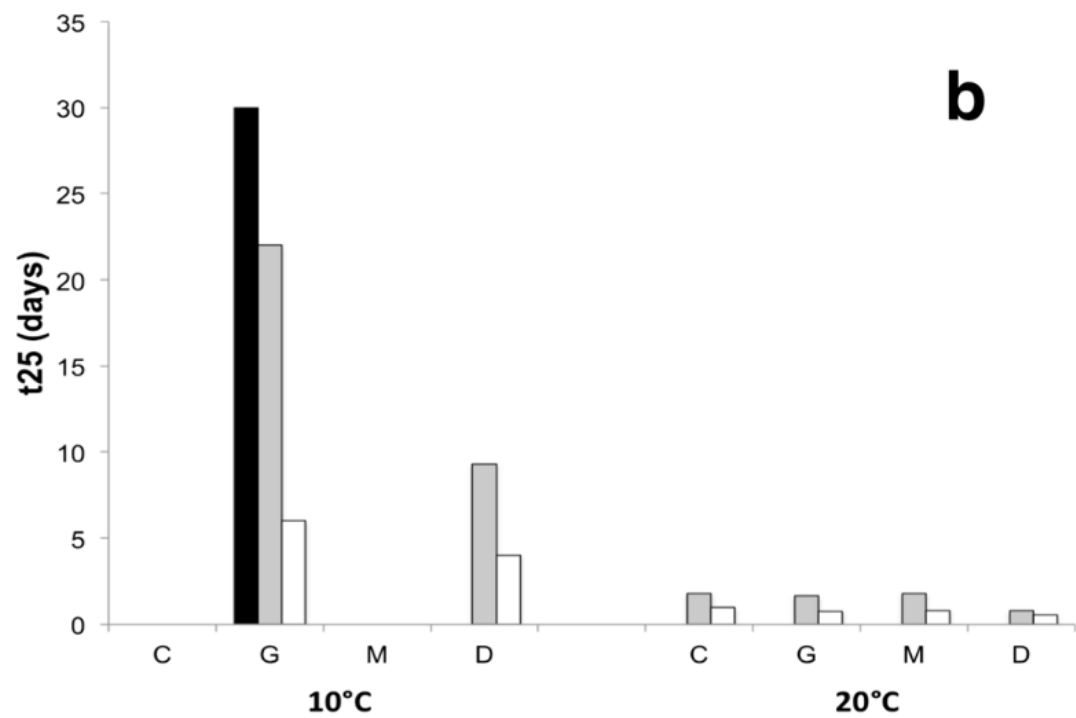
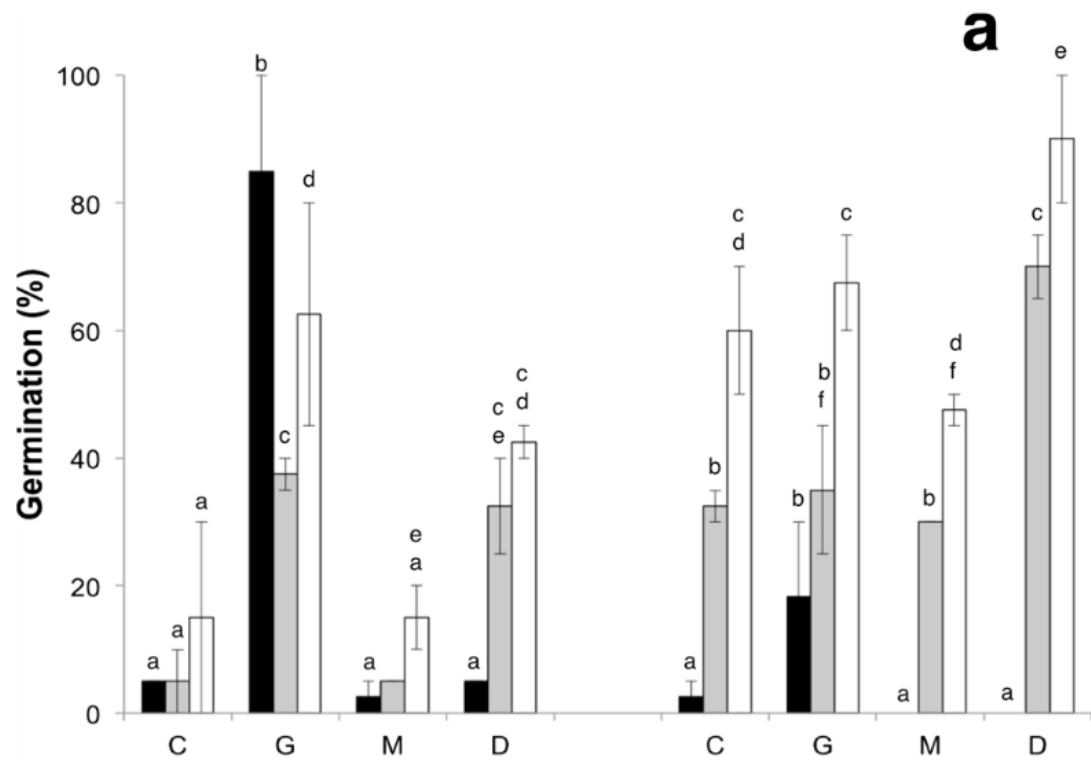


Fišer Pečnikar & al. 2018 (Biologia)



C - control  
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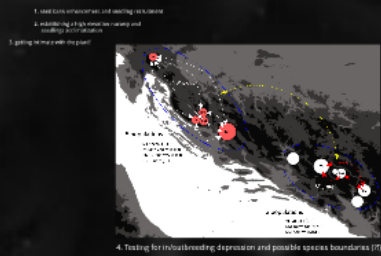








# Further steps...

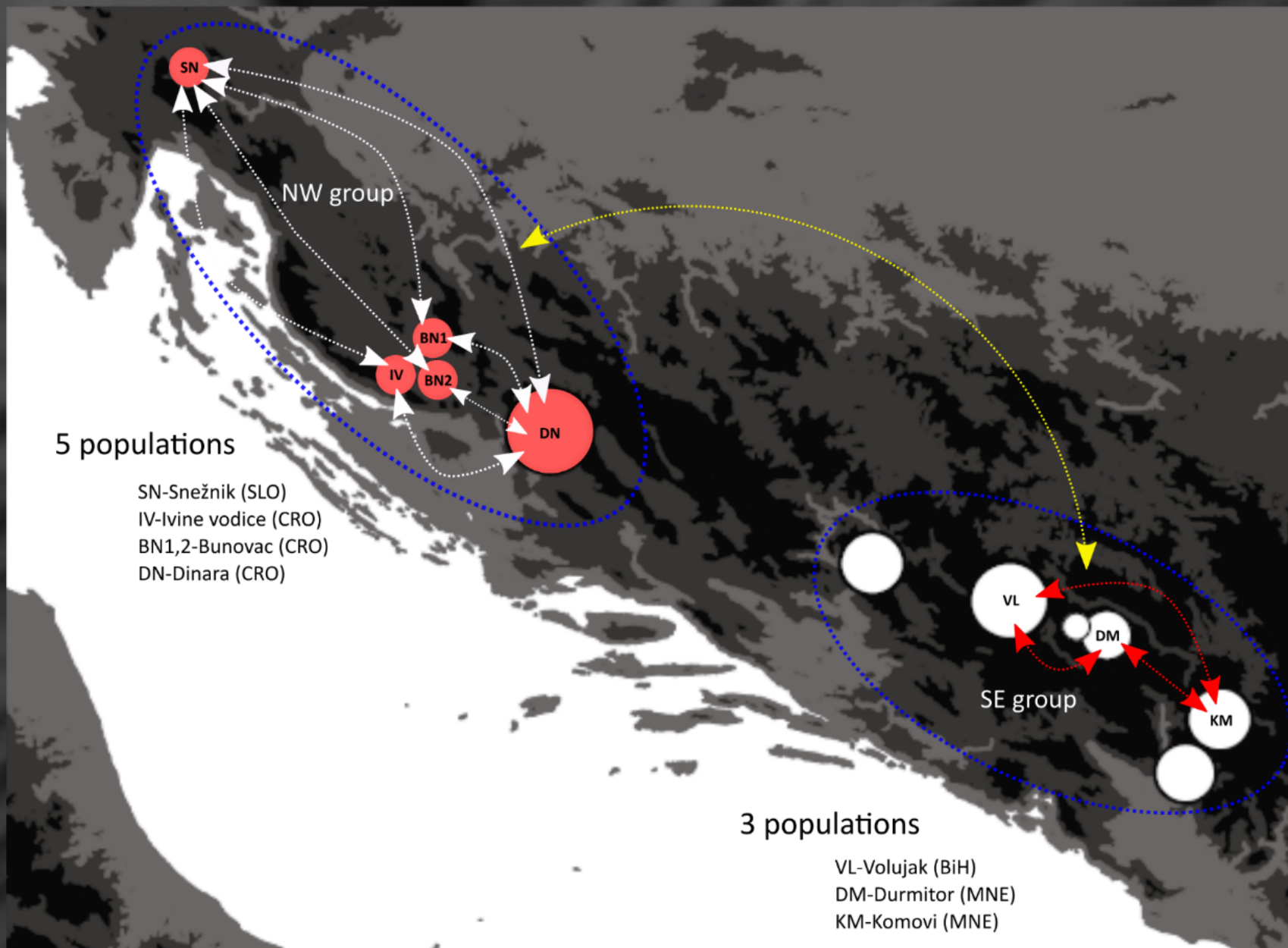


5. population reinforcement by means of planting well established and adapted plant specimens
6. specimens introduction to ecologically suitable sites
  - indigenous seedlings and/or
  - crosses between the populations from the same provenience
7. continuing monitoring programme




1. seed bank enhancement and seedling re
2. establishing a high elevation nursery and seedlings acclimatization
3. getting intimate with the plant!





4. Testing for in/outbreeding depression and possible species boundaries (!?)





IV-Ivine vodice (CRO)  
BN1,2-Bunovac (CRO)  
DN-Dinara (CRO)

4. Testing for in/outbreeding depression

5. population reinforcement by means of planting well established and adapted plant specimens

6. specimens introduction to  
- indigenous seedlings and  
- crosses between the populations

### 3 populations

VL-Volujak (BiH)  
DM-Durmitor (MNE)  
KM-Komovi (MNE)

4. Testing for in/outbreeding depression and possible species boundaries (?!)

ns of planting well established

6. specimens introduction to ecologically suitable sites

- indigenous seedlings and/or
- crosses between the populations from the same provenience

7. continuing monitoring program



ly suitable sites

from the same provenience

7. continuing monitoring programme