10th Conference on Medicinal and Aromatic Plants of Southeast European Countries - CMAPSEEC

Genetic Diversity of Immortelle (*Helichrysum italicum* /Roth/ G. Don) Populations in Croatia

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ABOUT IMMORTELLE

- aromatic, perennial subshrub
- familly Asteraceae
- heliophyte and xerophyte
- grows on calcareous and well drained soils
- hight up to 60 cm

widely distributed in the Mediterranean basin

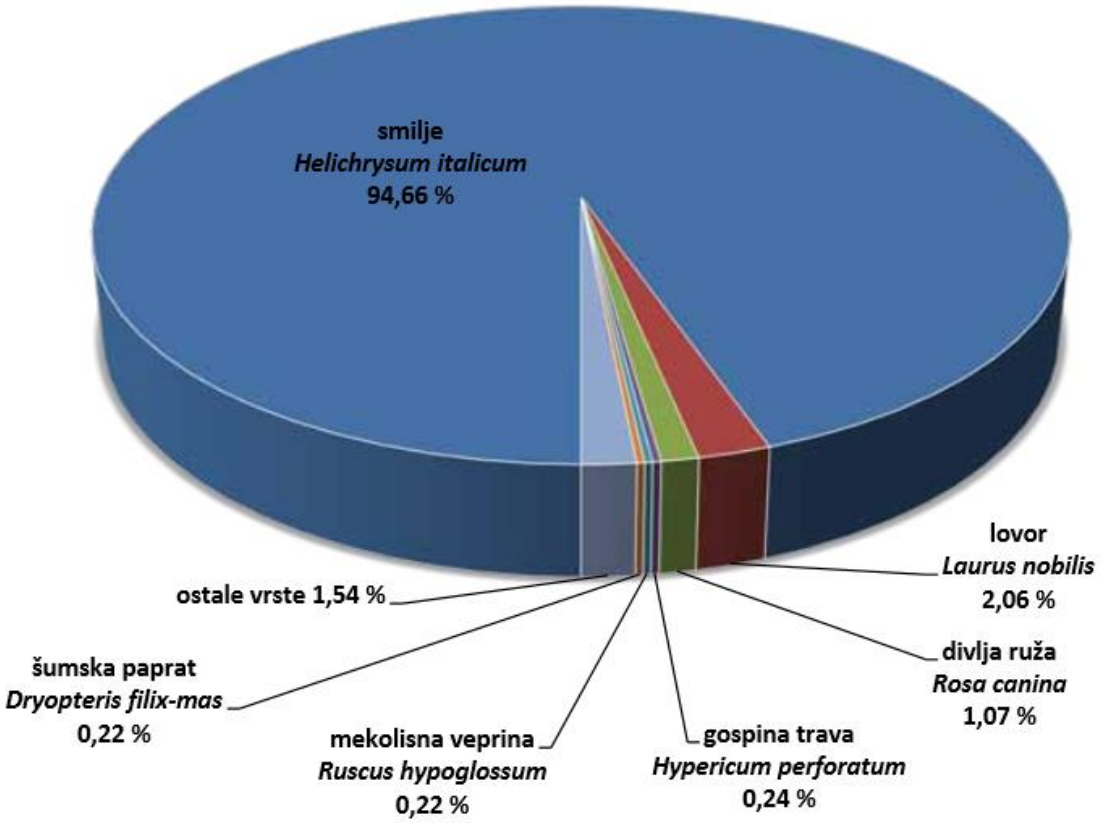
USAGE

- Cosmetic industry
- Pharmaceutical preparations
- Parfumes

BIOLOGICAL ACTIVITIES:
anti-inflammatory
antibacterial
antioxidant

IMMORTELLE IN CROATIA

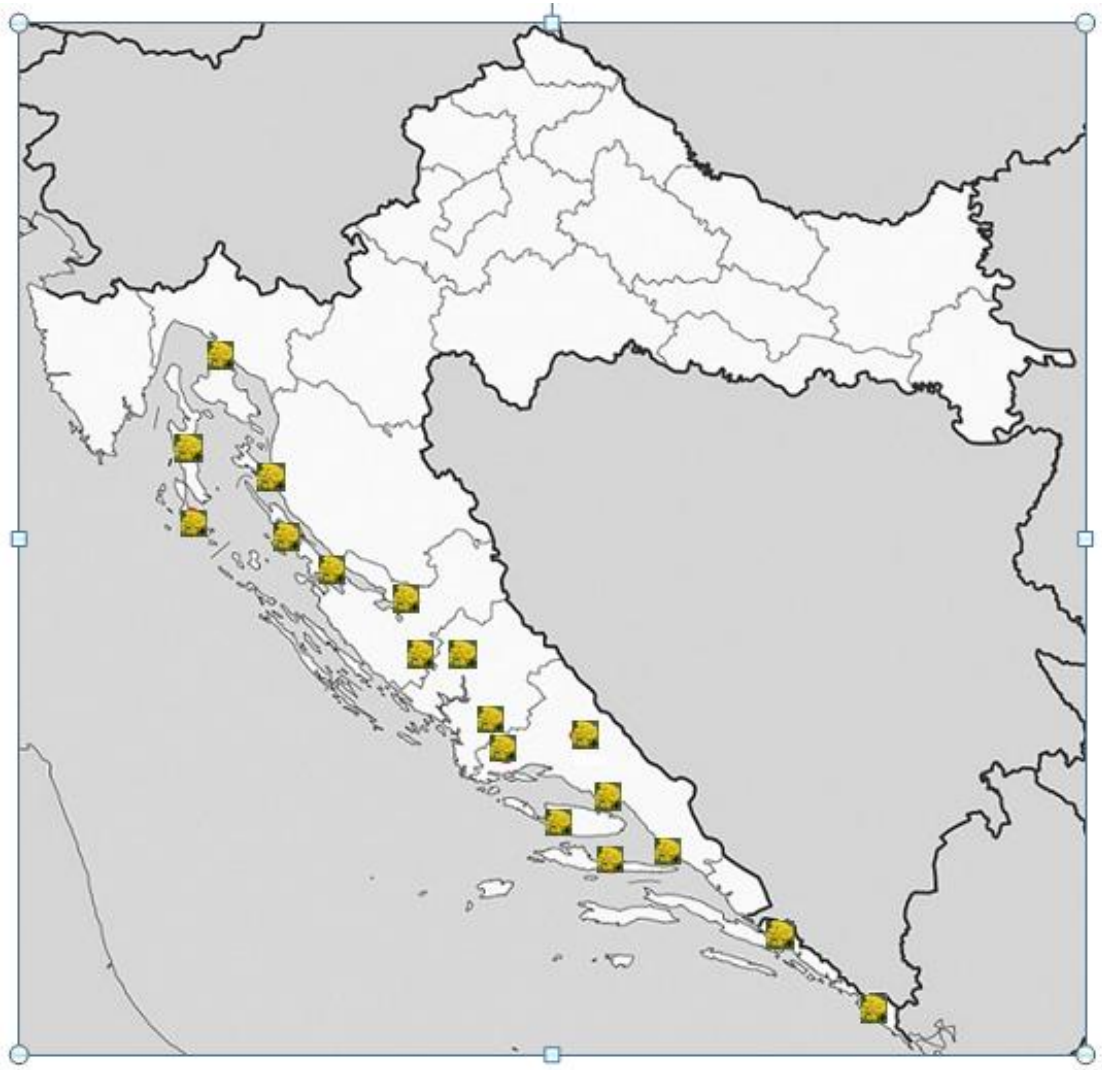
- Immortelle is the most collected plant in Croatia
- Nearly 10 000 t of natural populations were harvested in 2017.
- Many private plantations



RESEARCH ON *H. italicum* IN CROATIA

Sampling sites of 18 collected populations

P1 Voz, Krk;
P2 Stanić, Cres;
P3 Ćunski, Lošinj;
P4 Mišnjak, Rab;
P5 Zrće, Pag;
P6 Miškovići, Pag;
P7 Modrići, Obrovac;
P8 Rodaljice,Benkovac;
P9 Kolašac, Kistanje;
P10 Unešić;
P11 Ljubovitica;
P12 Ložišća, Brač;
P13 Humac, Hvar;
P14 Brnaze, Sinj;
P15 Marušići, Omiš;
P16 Blato, Živogošće;
P17 Podimoć;
P18 Uskoplje, Cavtat



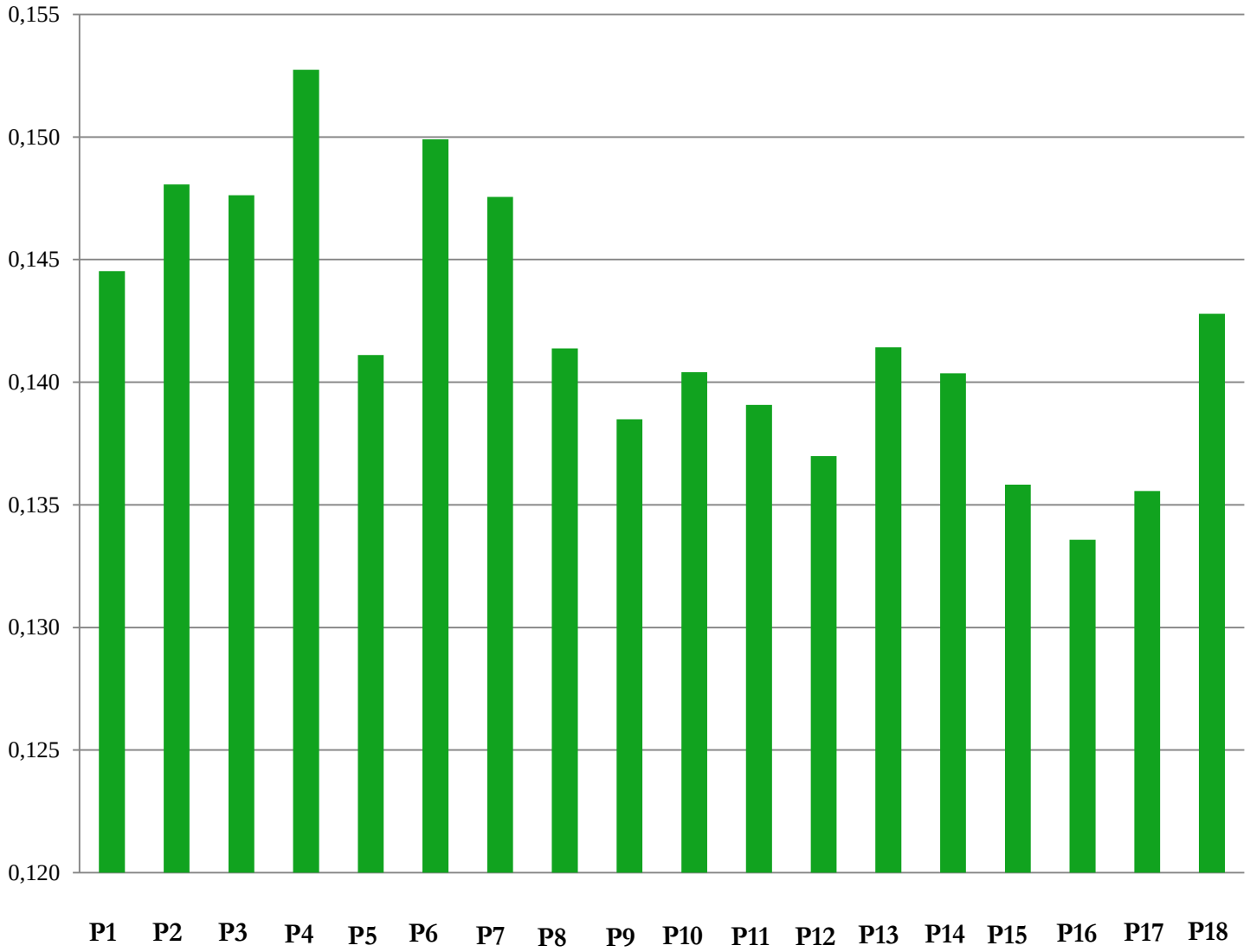
- DNA was isolated from young leaves.
- **Genetic diversity and population structure** of 18 immortelle populations from Croatia were examined by using amplified fragment length polymorphism (AFLP) markers.
- Four combinations of primers and restriction enzymes were used.

GENETIC DIVERSITY

Genetic diversity (H_E)

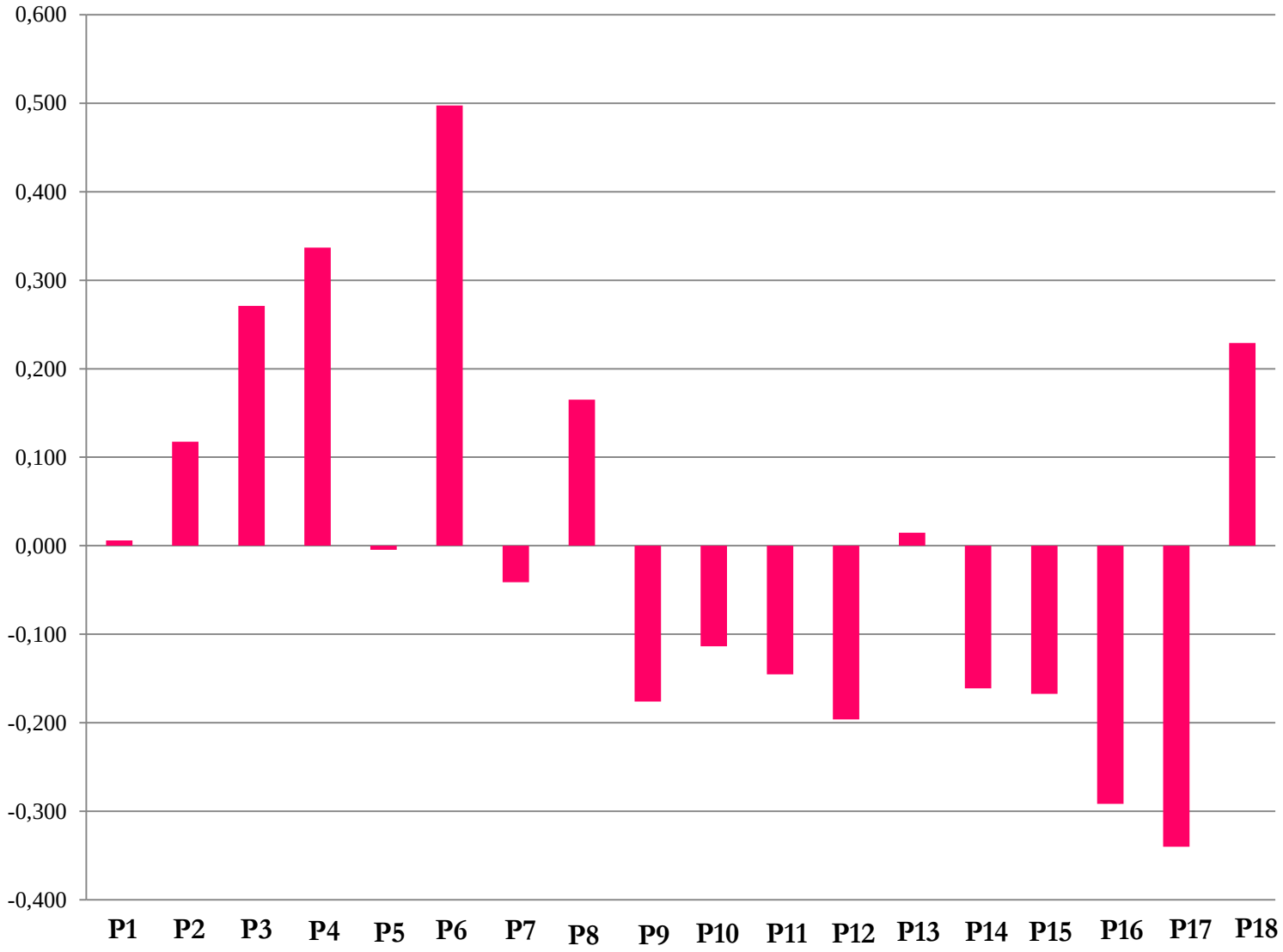
Average: 0.142

Range: 0.134-0.153



$Rpop_{st}$ Frequency of rare alleles

Average:
0,00
Range:
-0.59 – 1.09

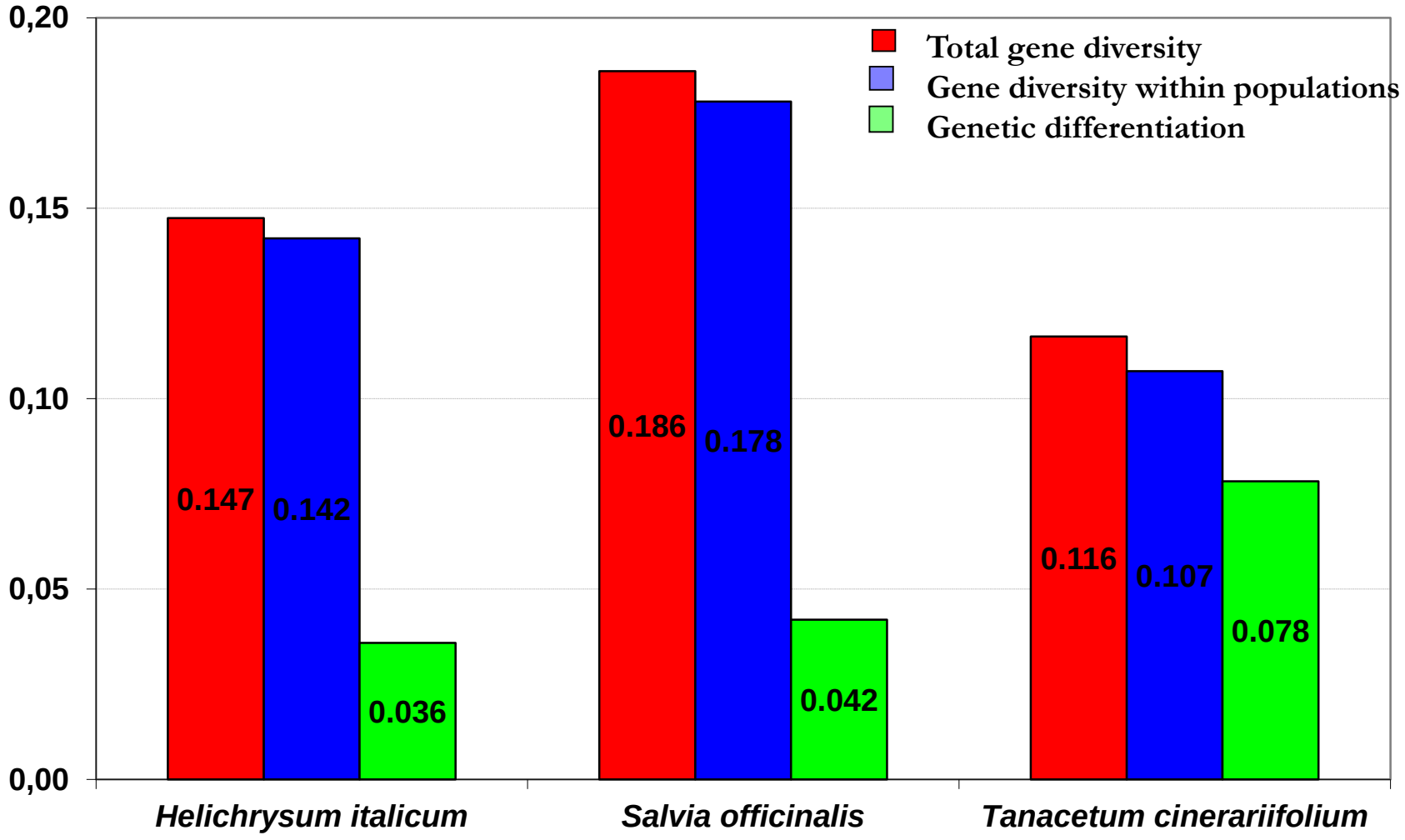


COMPARISON WITH OTHER RELATED RESEARCH

Immortelle (*Helichrysum italicum*)	Sage (*Salvia officinalis*)	Dalmatian pyrethrum (*Tanacetum cinerariifolium*)
Asteraceae	Lamiaceae	Asteraceae
Outcrossing, perennials, subshrubs		
Mediterranean	IT, CRO, BIH, MNE, ALB, FYRM, GRE	CRO, BIH, MNE, ALB
18 populations	25 populations	20 populations
444 plants	593 plants	411 plants
Number of polymorphic markers (AFLP)		
693	559	593

COMPARISON WITH OTHER RELATED RESEARCH

GENETIC STRUCTURE



COMPARISON WITH OTHER RELATED RESEARCH

ANALYSIS OF MOLECULAR VARIANCE (AMOVA)

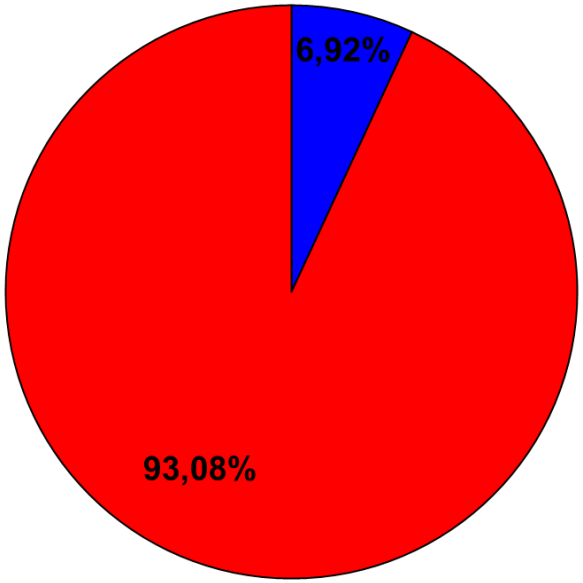
Helichrysum italicum

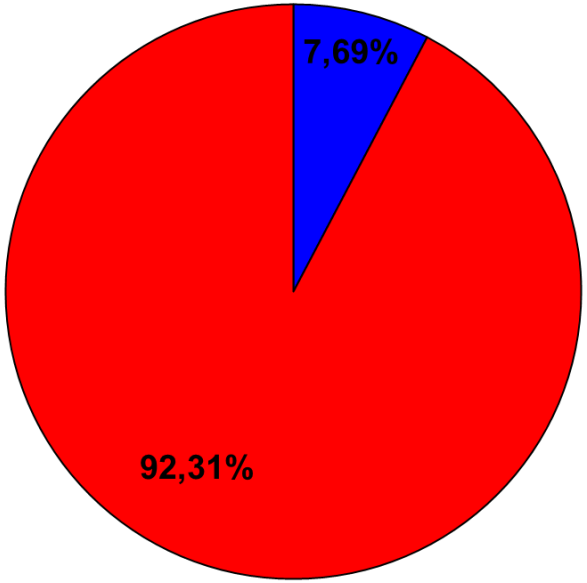
Salvia officinalis

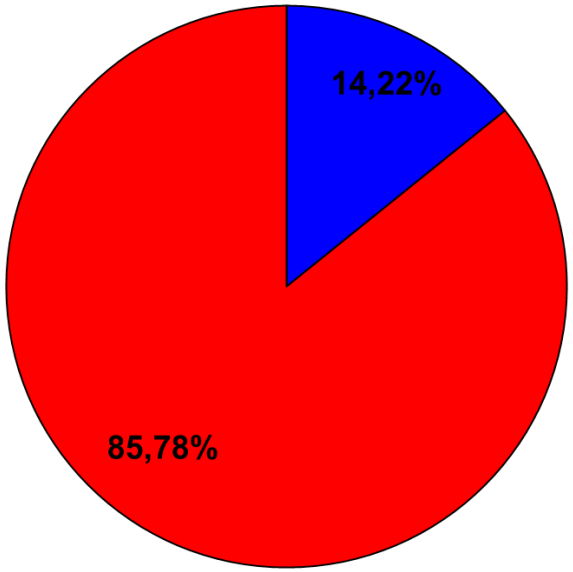
Tanacetum cinerariifolium

% variance between populations

% variance within populations





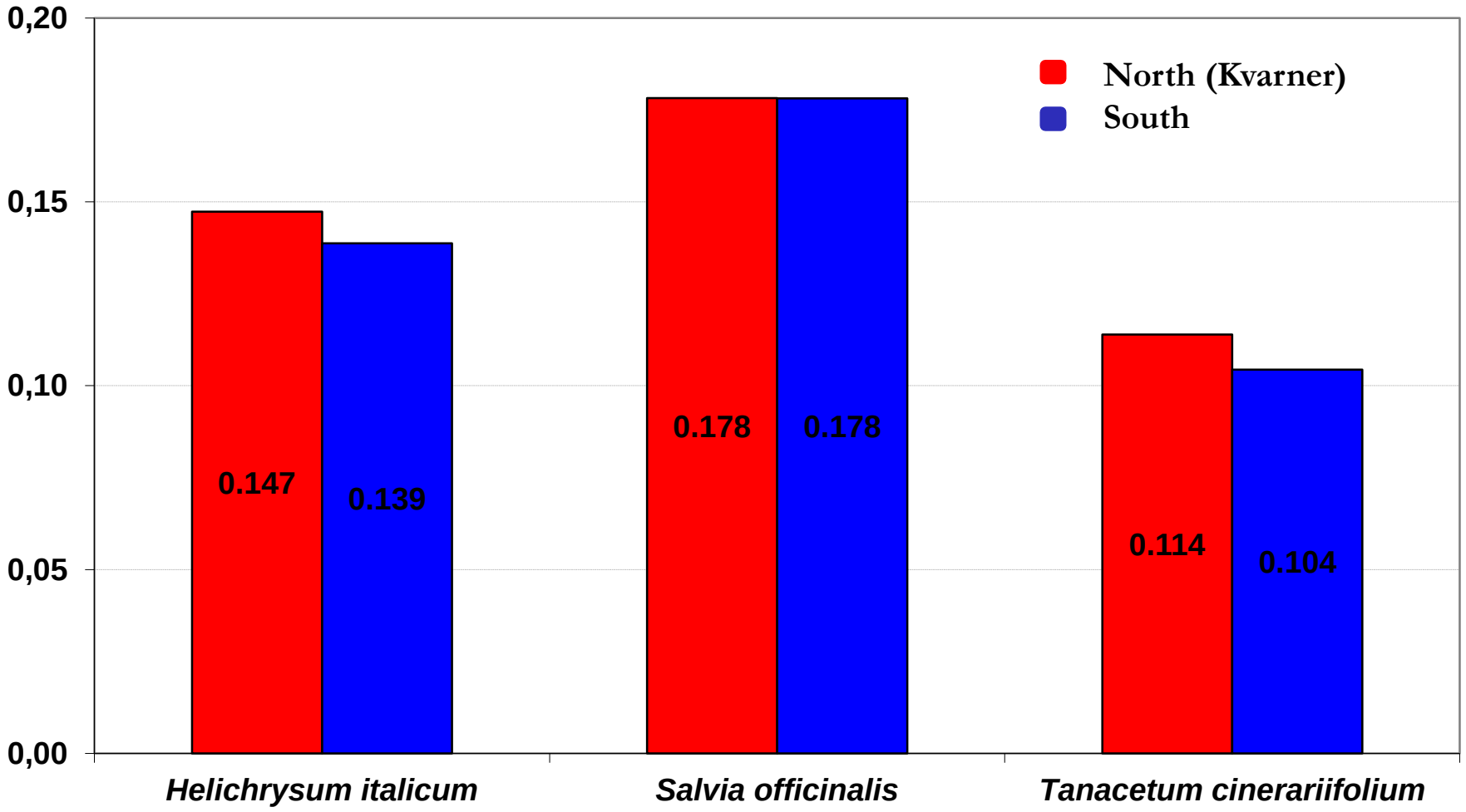


Similar distribution of genetic diversity within and between populations
High level of gene transfer between populations >> related populations

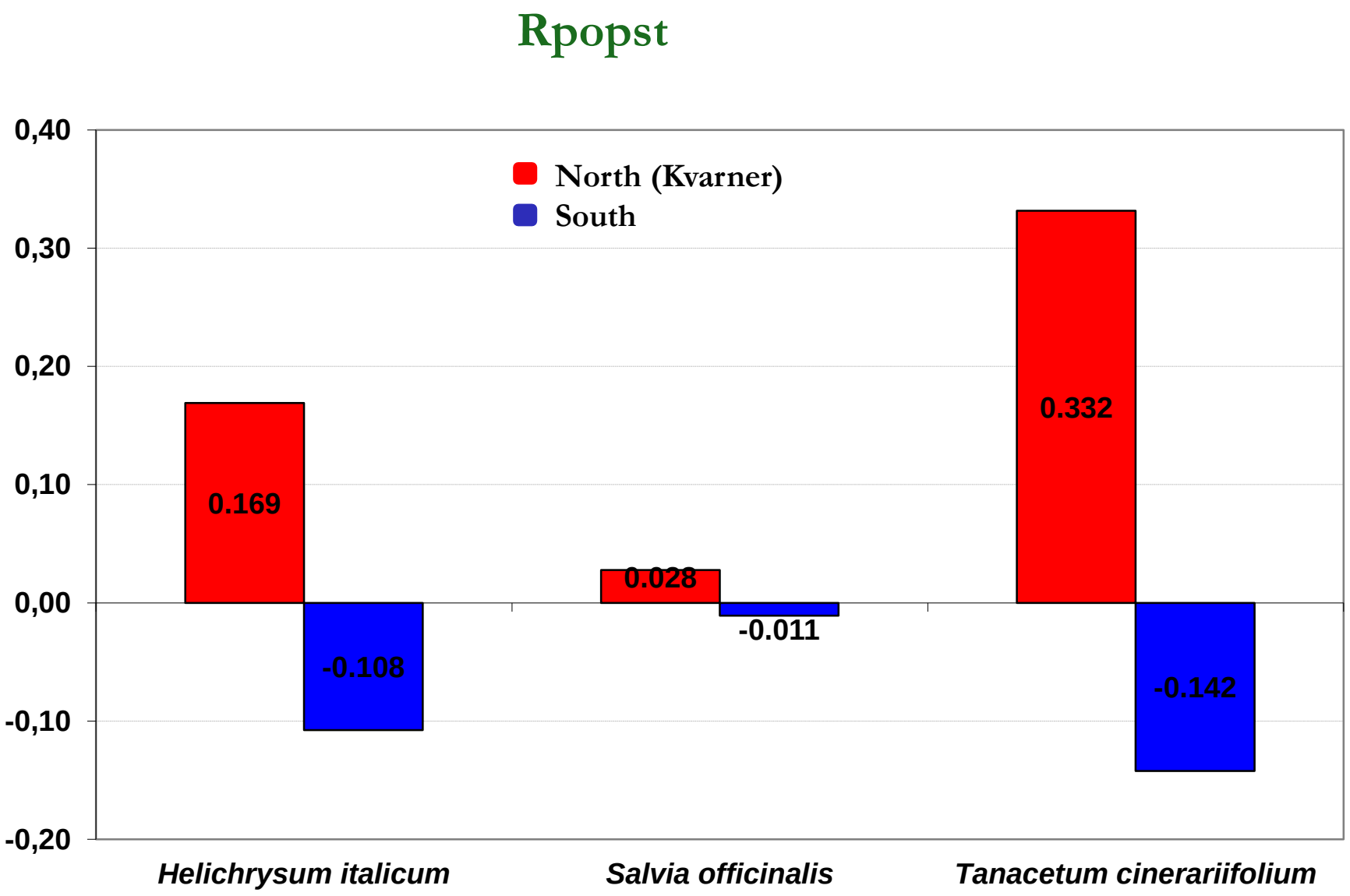
Lower level of gene transfer between populations >> Populations are more isolated

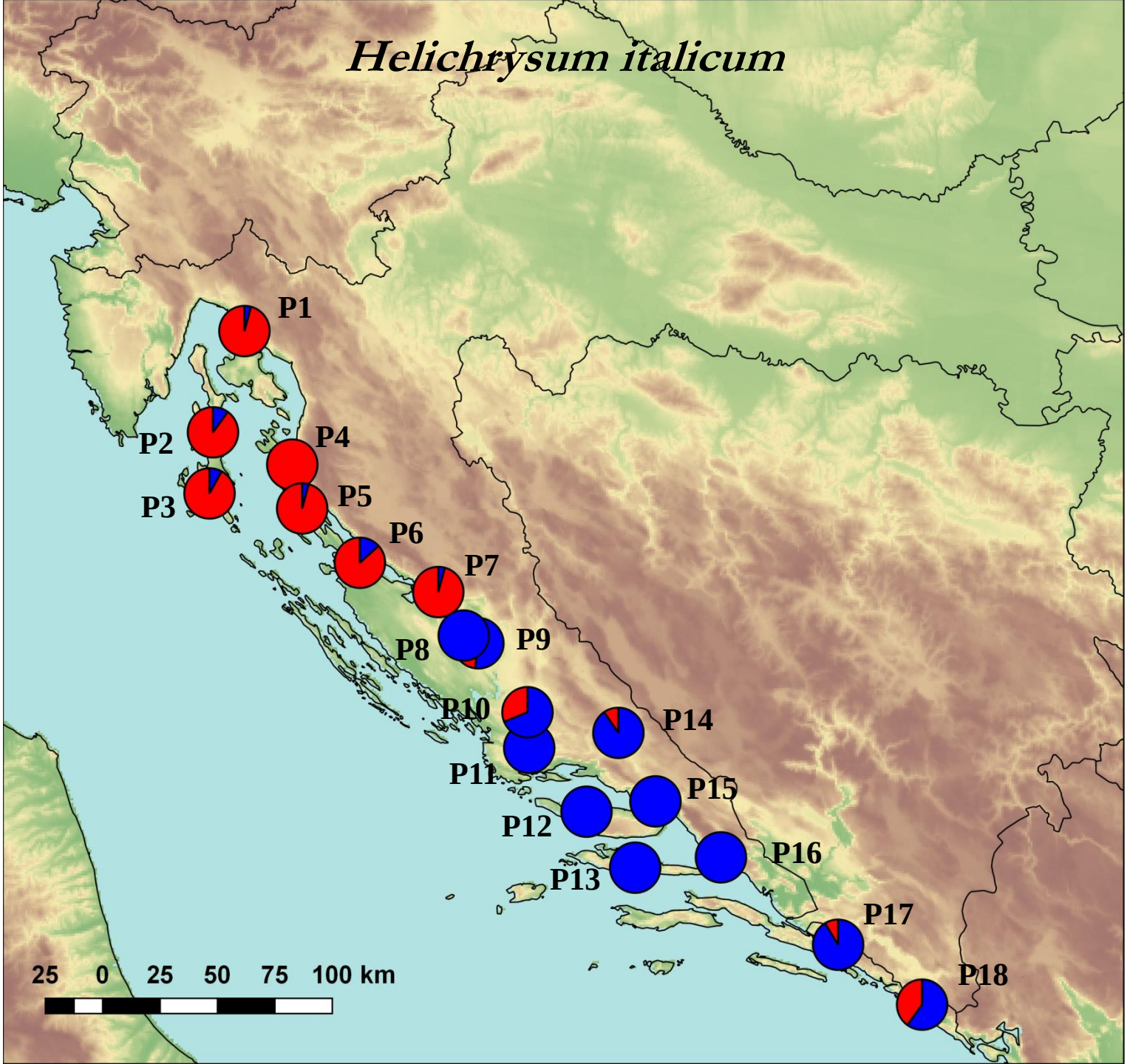
COMPARISON WITH OTHER RELATED RESEARCH

HE

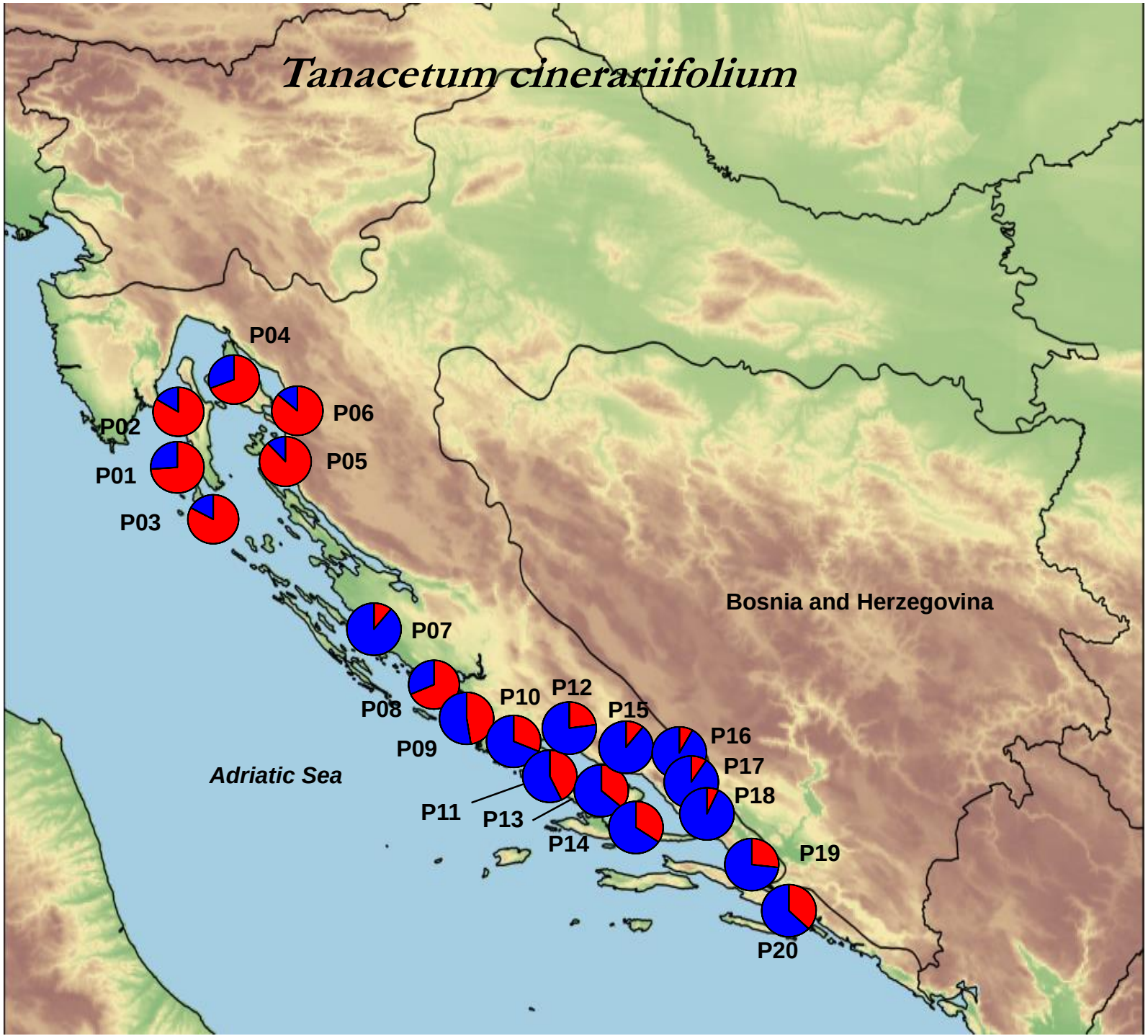


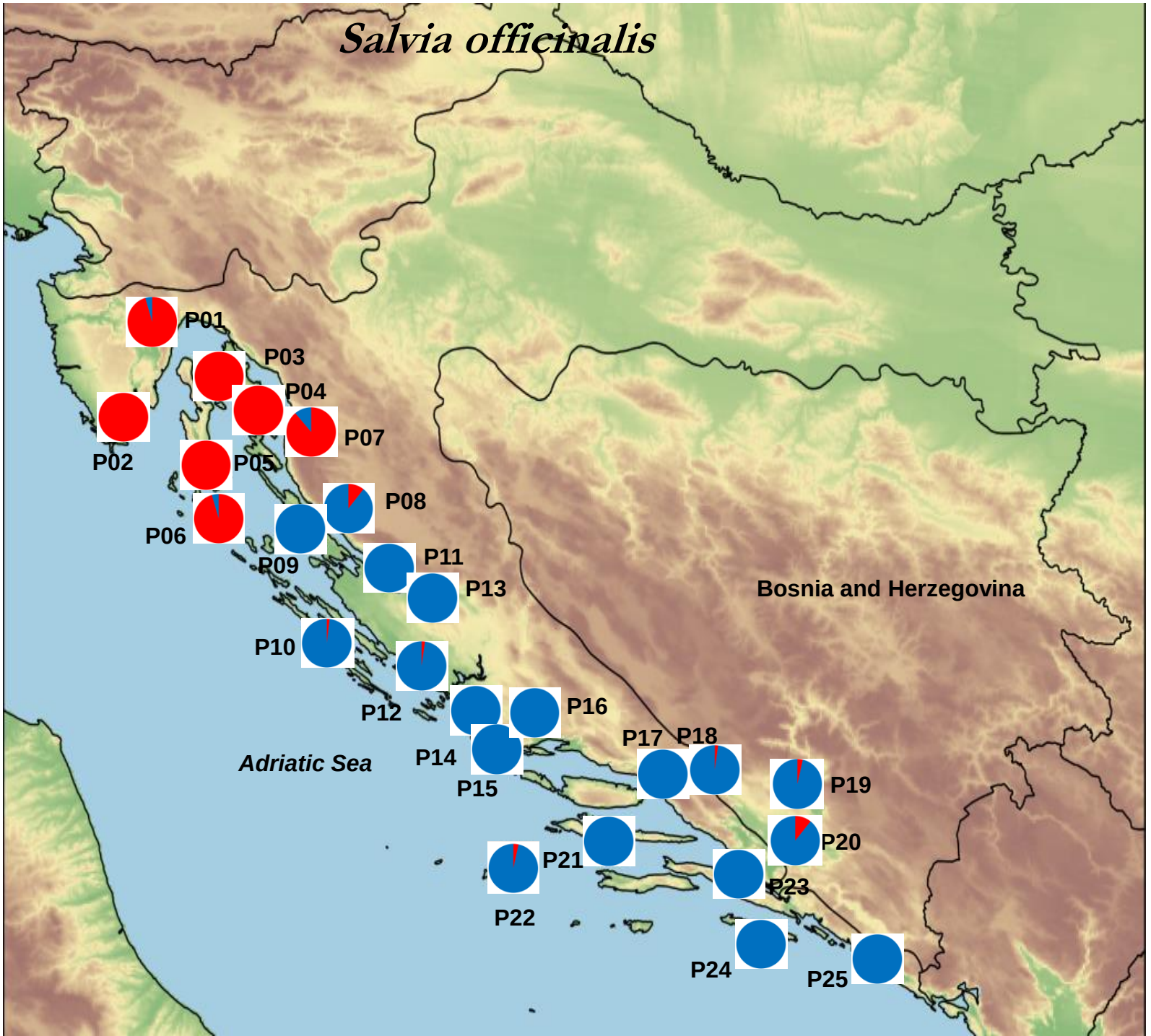
COMPARISON WITH OTHER RELATED RESEARCH




Helichrysum italicum
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
25 0 25 50 75 100 km

k=2


Tanacetum cinerariifolium
k=2
P04
P06
P02
P05
P01
P03
Bosnia and Herzegovina
P07
P08
P10
P12
P15
P16
P09
P17
Adriatic Sea
P18
P11
P13
P14
P19
P20


Salvia officinalis
P01
P03
P04
P07
P02
P05
P08
P06
P09
P11
P13
Bosnia and Herzegovina
P10
P12
P16
P17
P18
Adriatic Sea
P14
P15
P19
P20
P21
P23
P22
P24
P25

k=2

CONCLUSION

- the highest level of gene diversity and frequency of rare alleles were found in northern Adratic populations and gradualy decreased towards the south (all of three species)

- detected pattern is not in concordance with the general predictions that highest lewels of diversity can be detected among southern regions of species distribution range

- there are more possible explanations : human activity and excesive gathering primarly in the south; climate changes-glaciation

Thank you for your attention!