10th CMAPSEEC

Strong influence of clonality on the fine scale spatial and genetic structure of *Salvia brachyodon* Vandas (Lamiaceae) population

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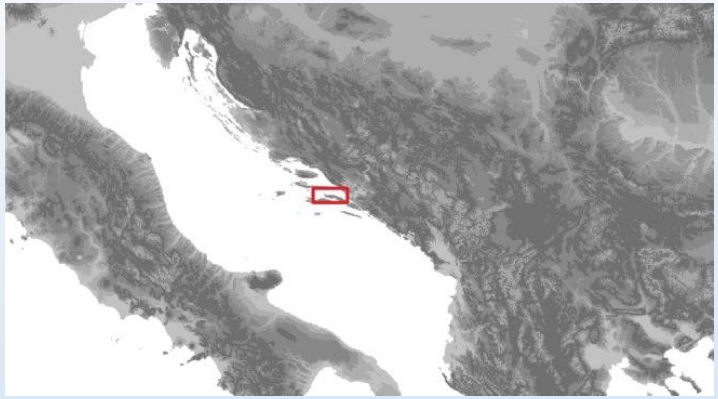
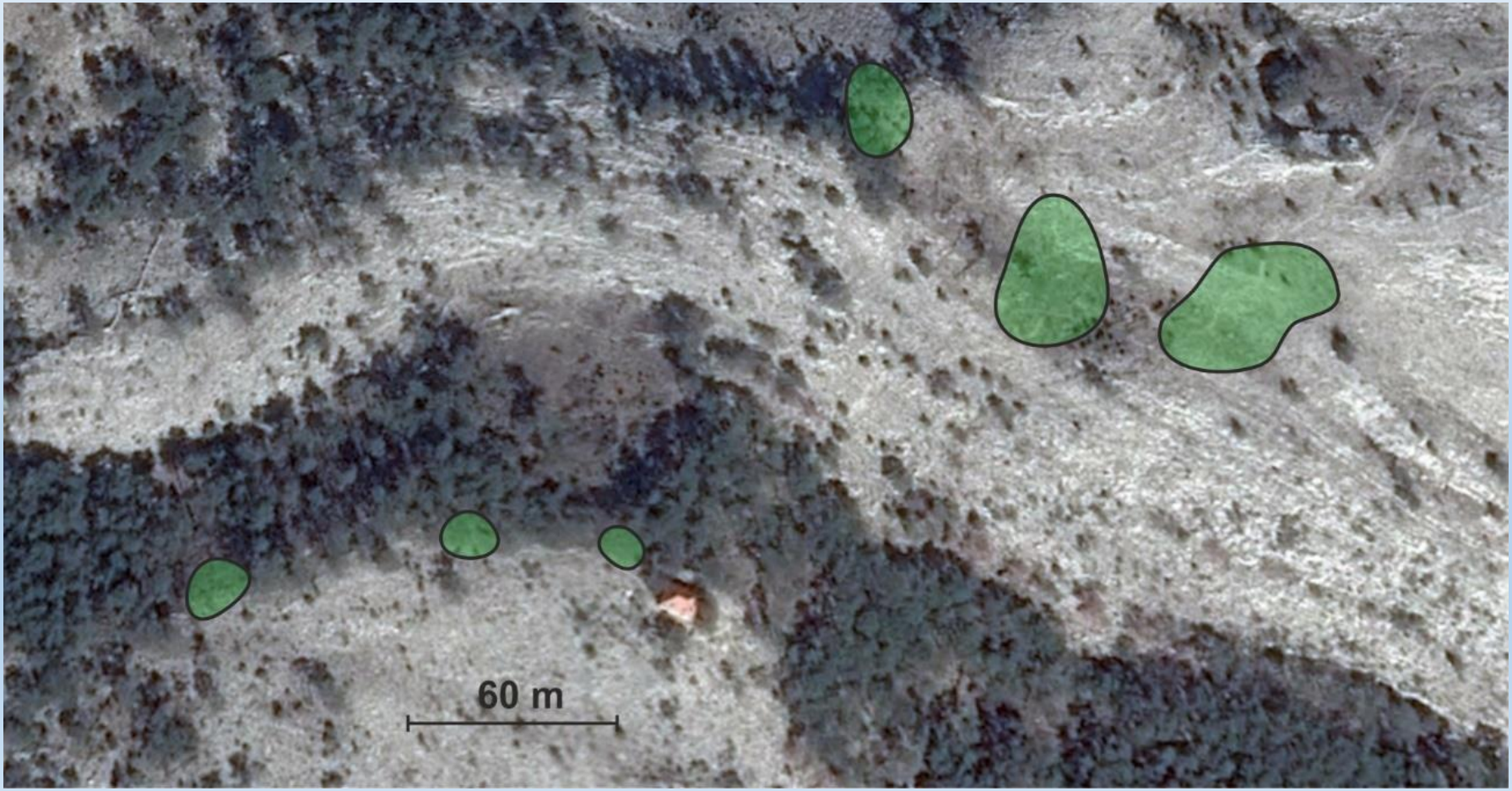
Salvia brachyodon Vandas – short-toothed sage

- perennial species
- narrow endemic
- reproduction strategies:
  - sexually
  - clonally (underground stolons)

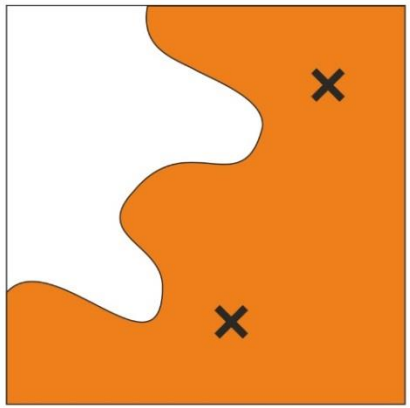
Location: Pelješac peninsula
Altitude: ~900 m.a.s.l.
Exposition: south
Habitat: dry grassland, garrigue



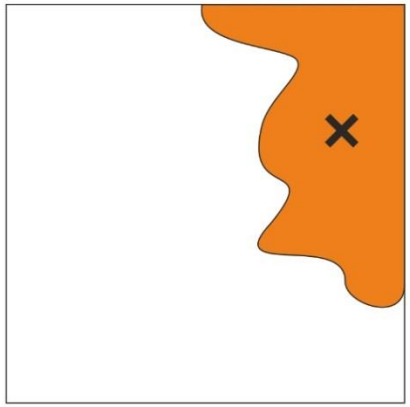


Sampling strategy:

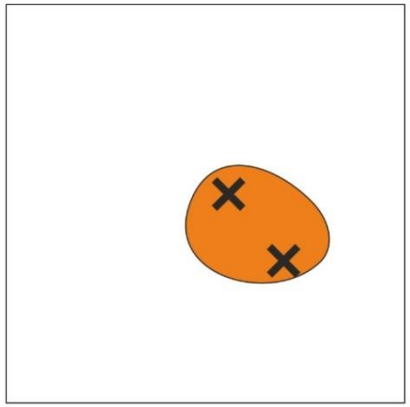
- entire population
- from each square meter:
    - one to four samples
    - all ramets were counted
    - all inflorescences were counted
- each sample was georeferenced
- patches were drawn in details on millimeter block

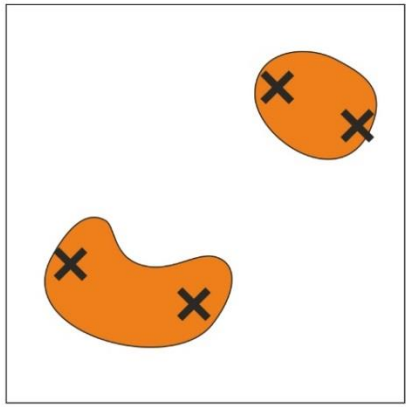


> 50% coverage: 2 samples



< 50% coverage: 1 sample

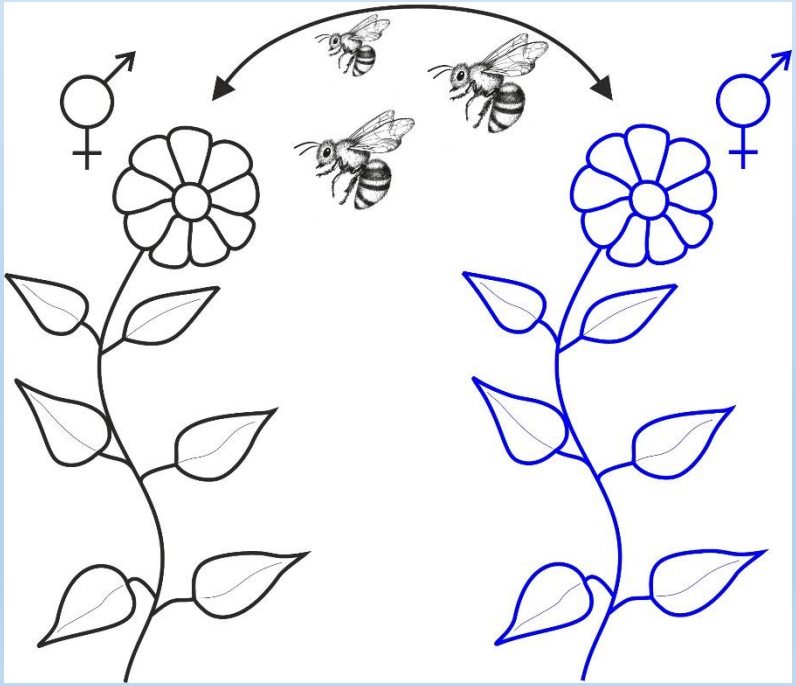




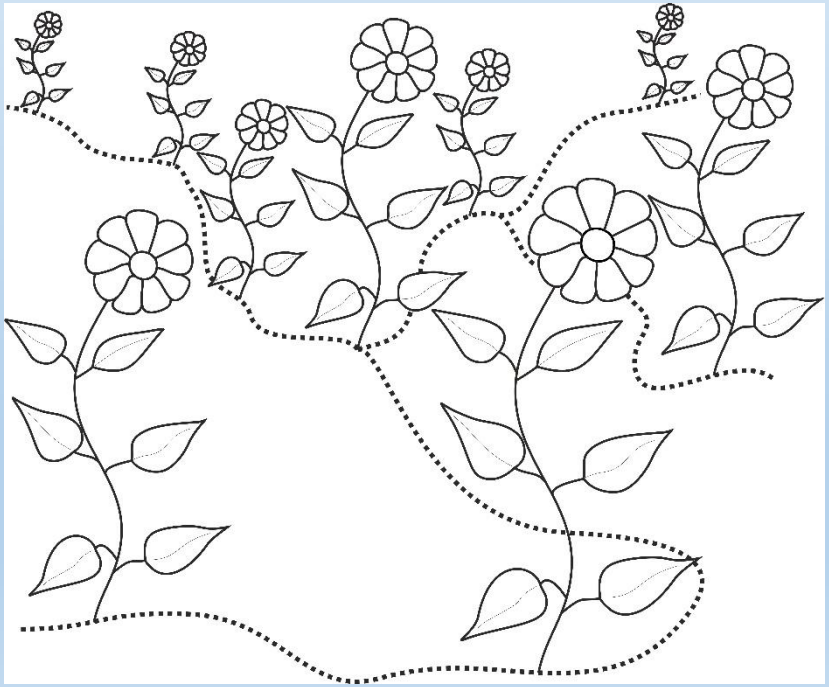
2 samples per patch

Objectives:

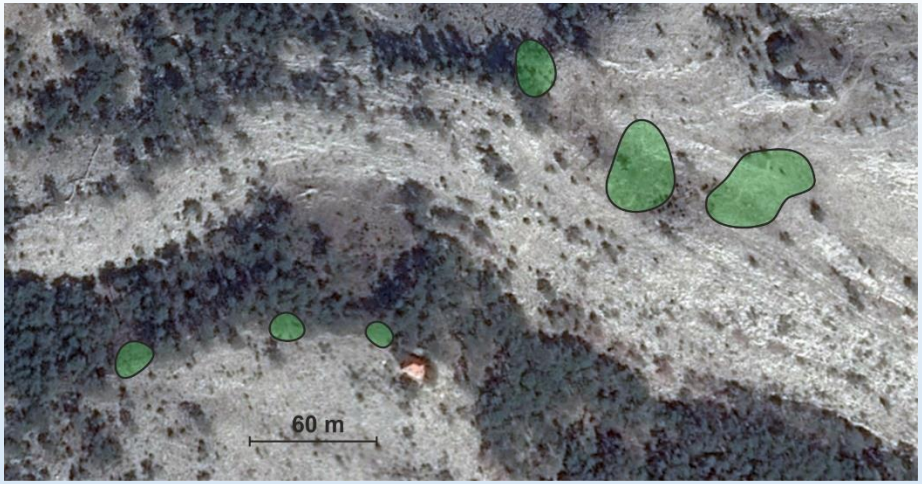
- genetic diversity
- genotypic diversity
- spatial structure
- fine-scale spatial genetic structure/clonal architecture
- trade-off beetwen sexual reproduction and clonality

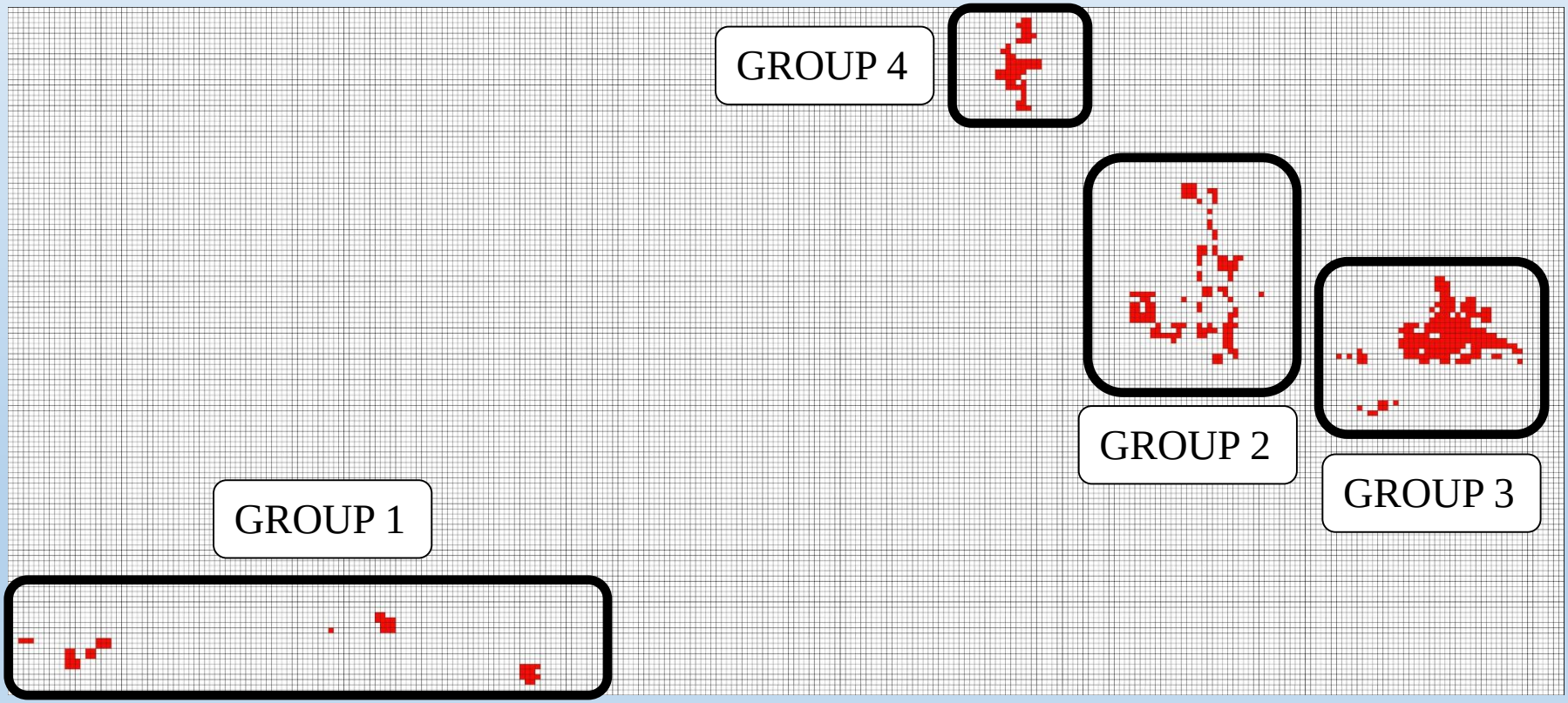


VS.



- 687 samples
- 8 microsatellite loci
- 14095 ramets
- 1188 inflorescences





Results

Clonal diversity

	N	G	R	Pareto's β	Ac	clonal subrange (m)
group 1	74	32	0.42	0.86	0.68	2.16
group 2	187	73	0.39	0.90	0.77	5.17
group 3	332	110	0.33	0.47	0.72	10.90
group 4	94	26	0.27	0.44	0.64	5.71
overall	687	241	0.35	0.69	0.73	-

- N - number of sampling units
- G - N_{MLG} - number of multi-locus genotypes; MLG
- R - genotypic richness
- Ac – aggregation index

Genetic diversity

	N	Na	H_O	H_e	F_{IS}
group 1	32	7,000	0,672	0,656	-0,028
group 2	73	7,000	0,685	0,662	-0,021
group 3	110	6,250	0,751	0,698	-0,078
group 4	26	5,375	0,731	0,662	-0,135
overall	241	9,125	0,718	0,702	$-0,023^{ns}$

- N - number of clones
- Na – average number of alleles
- H_O – observed heterozigosity
- H_e – expected heterozigosity
- F_{IS} – inbreeding coefficient

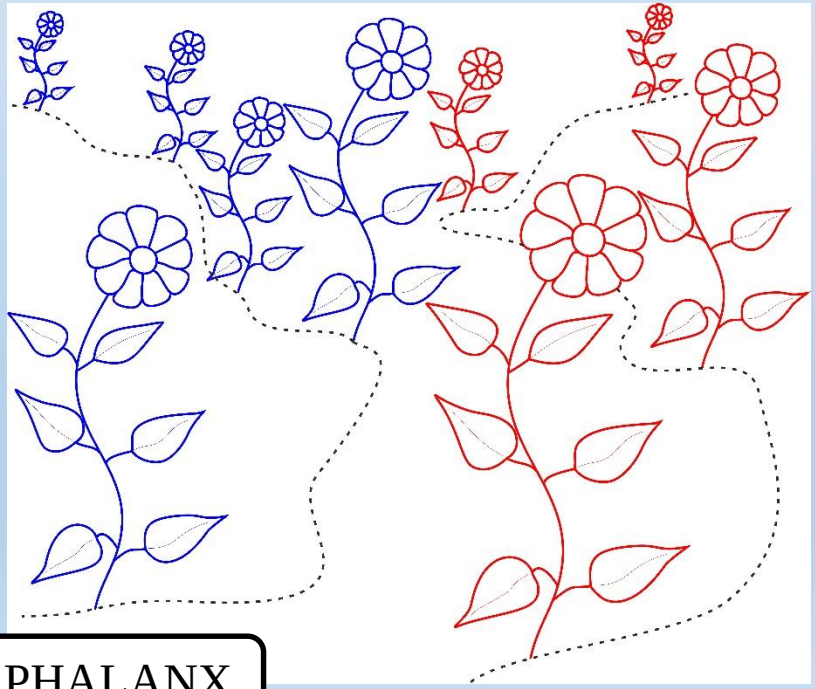
Surface area of all patches: SA_{total} =159.4 m^2

Surface area of all clones: SA_{clones} =164.9 m^2

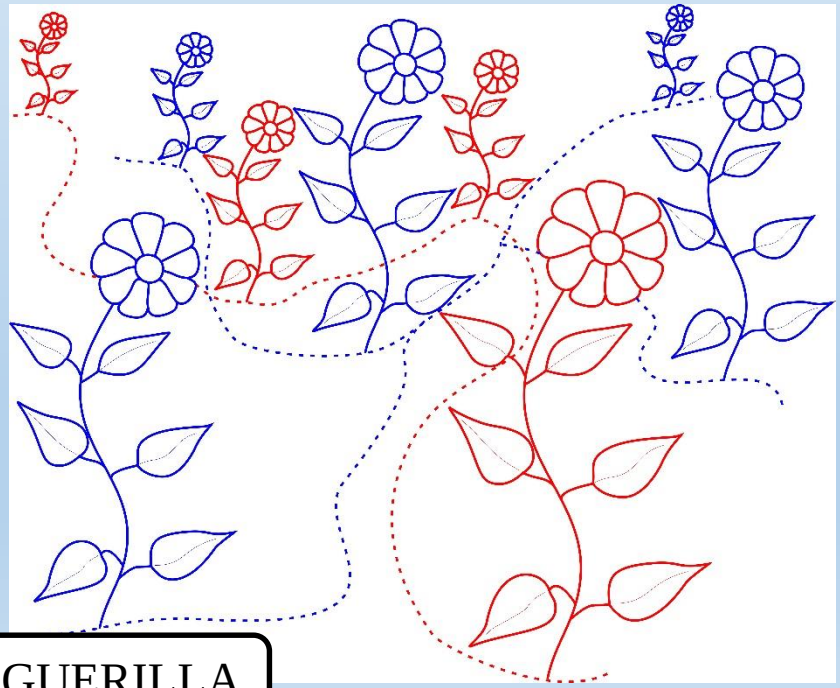
$$1- SA_{total}/ SA_{clones} = 3.4\%$$

Conclusion: clones do not intermingle with each other.

Ramets separation within a genet: phalanx strategy, despite propagation by stolons!

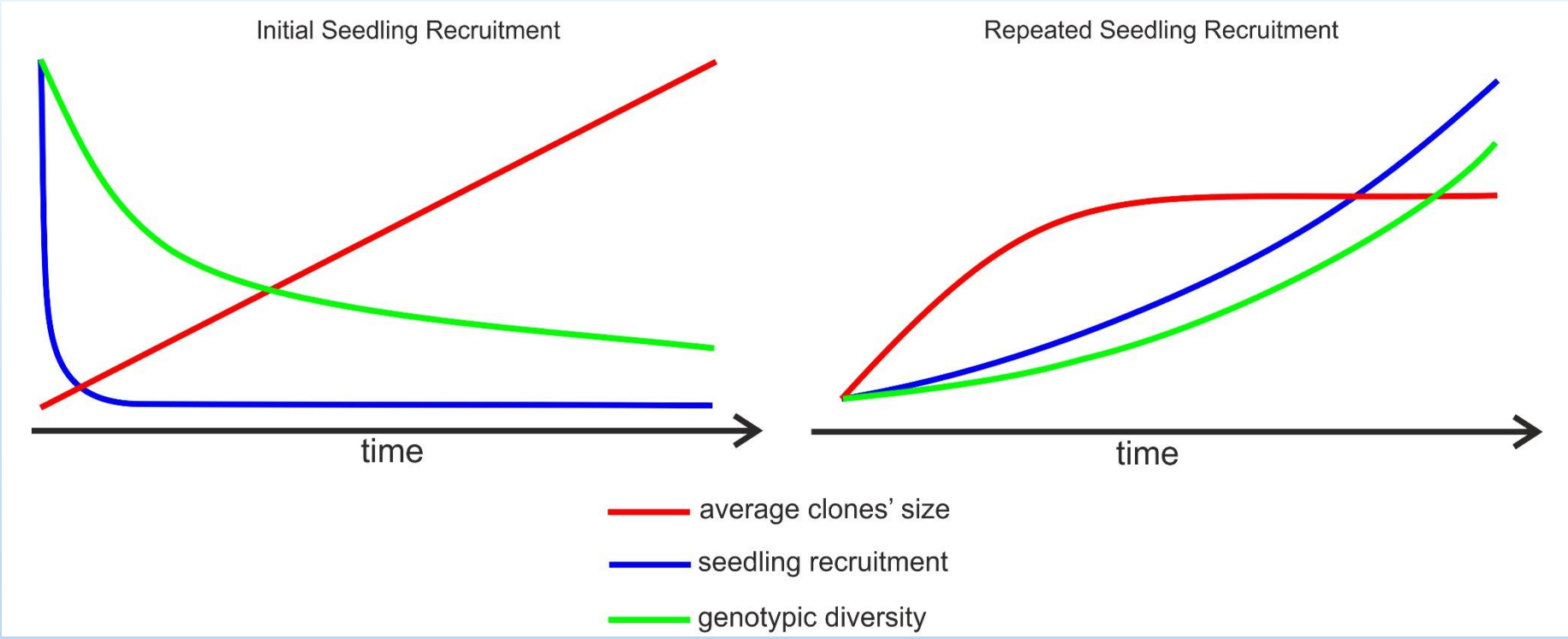


PHALANX



GUERILLA

Seedling recruitment strategy?

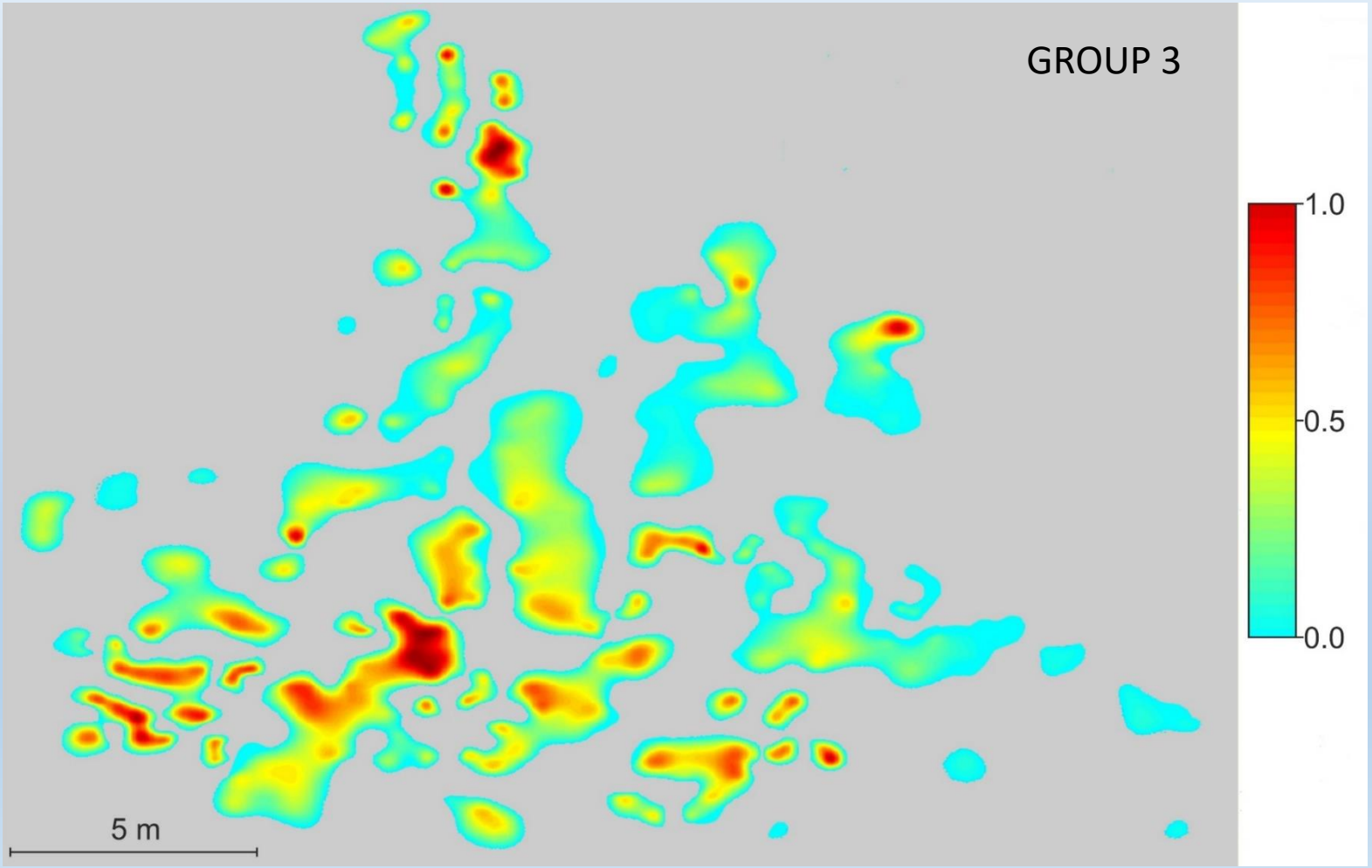


RSR strategy!

Spatial distribution of clones in accordance to their size

N=332

- coordinate of a sample
- genotypic richness in a radius of 1.5 m



Influence of clonality on sexual reproduction?

Competition among clones of different sizes?

e.g. largest clone → ~1190 ramets, 60 inflorescences, 68 square meters

Total number of inflorescences vs. clone' s size

R=0.8, $P < 0.05$

Larger clones contribute more to sexual reproduction than the smaller ones!