Environmental Determinants of **Clonal Spread in Whitetop** (*Lepidium draba*) in northeast Colorado

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18th Annual RiversEdge West
Riparian Restoration Conference
Colorado Mesa University
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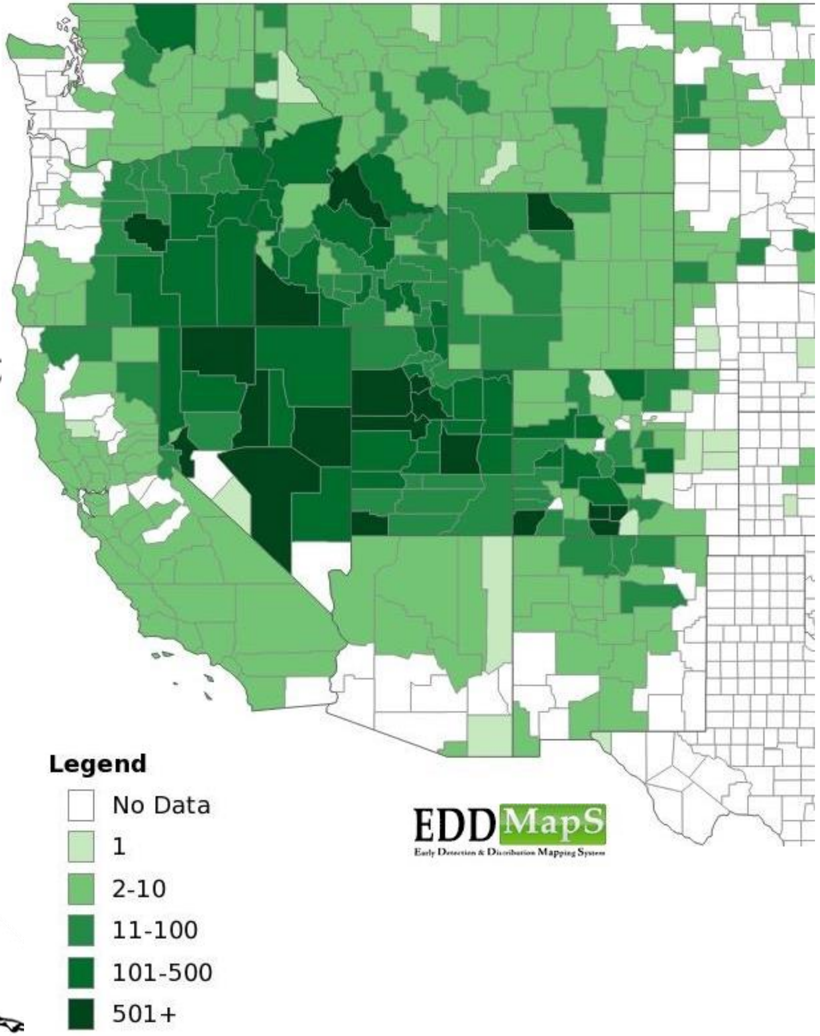
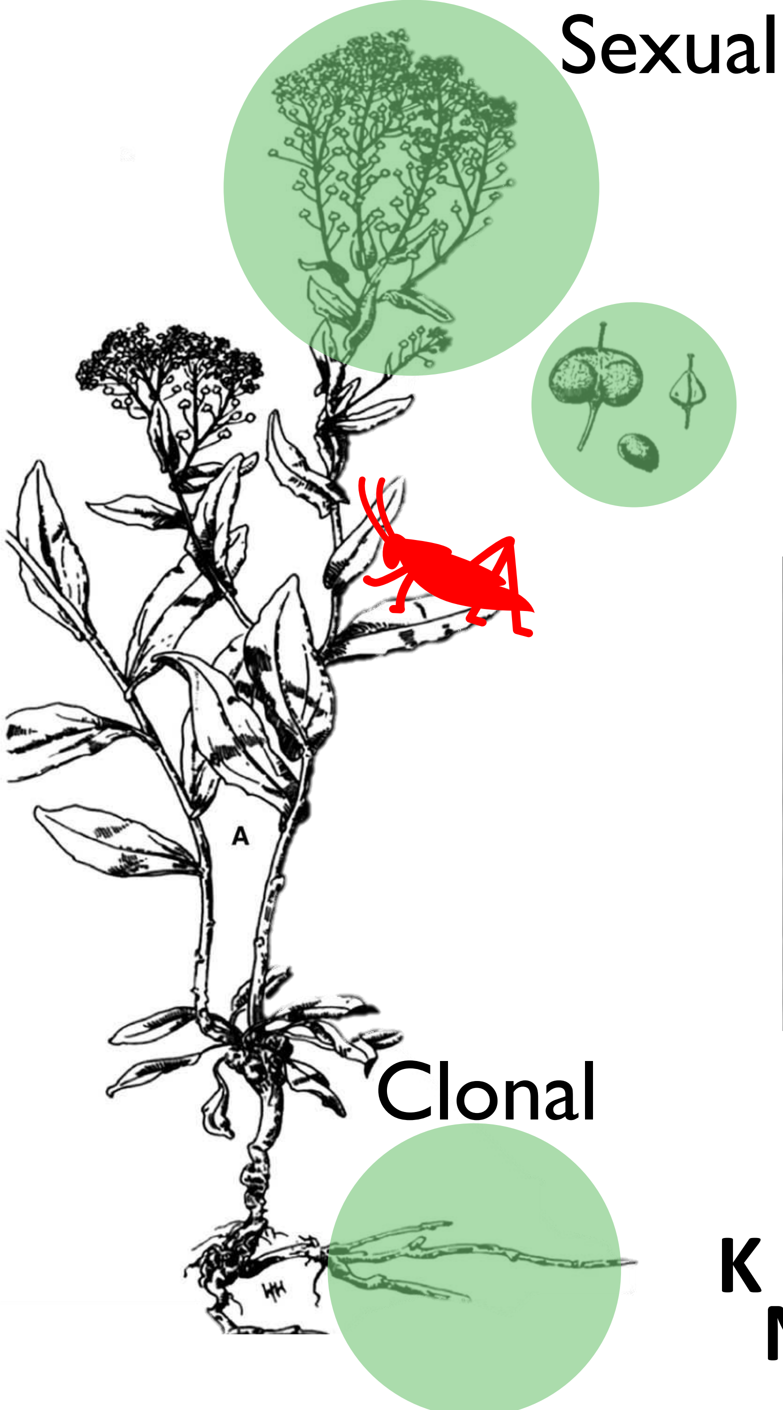
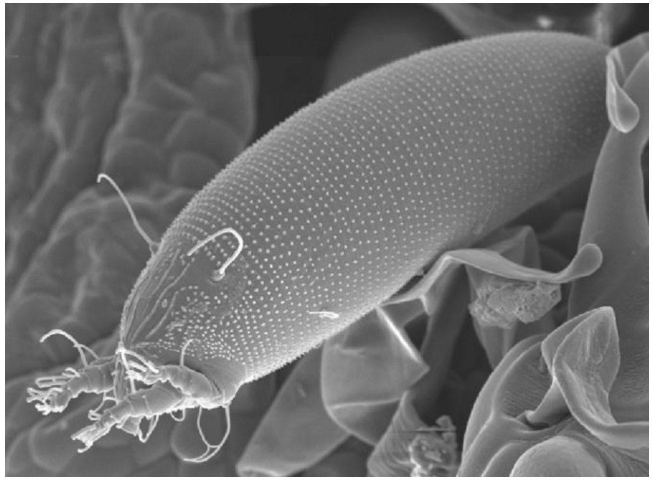
Whitetop (Lepidium draba)
aka Hoary Cress

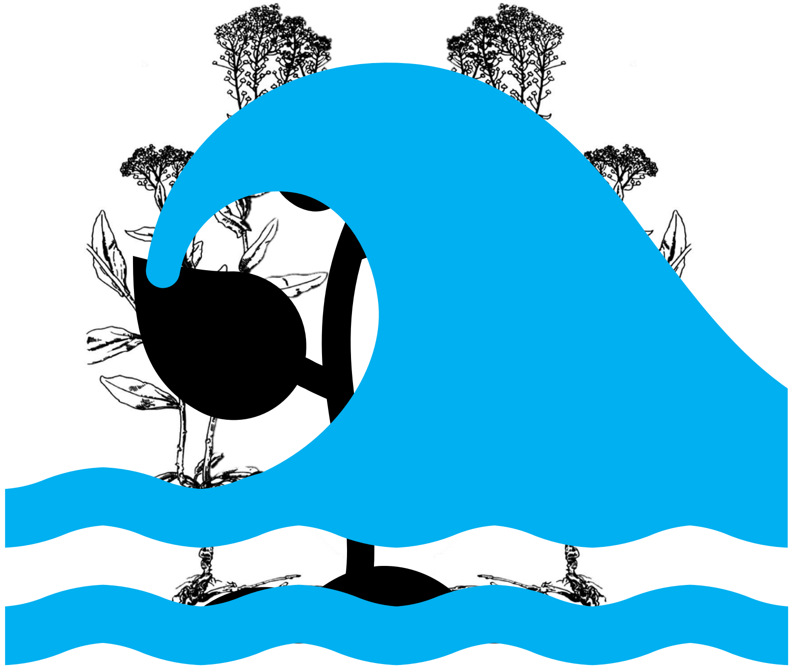


Spread, persistence, and efficacy of control are determined in part by reproductive strategies

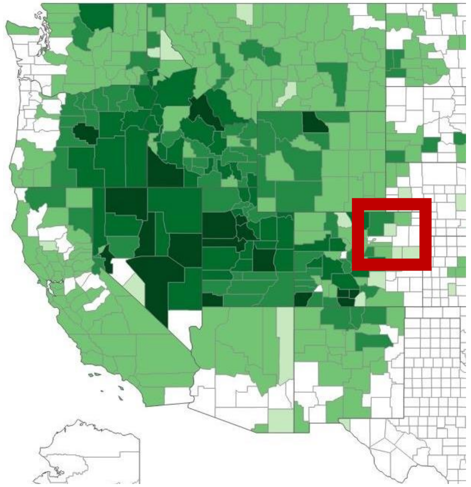


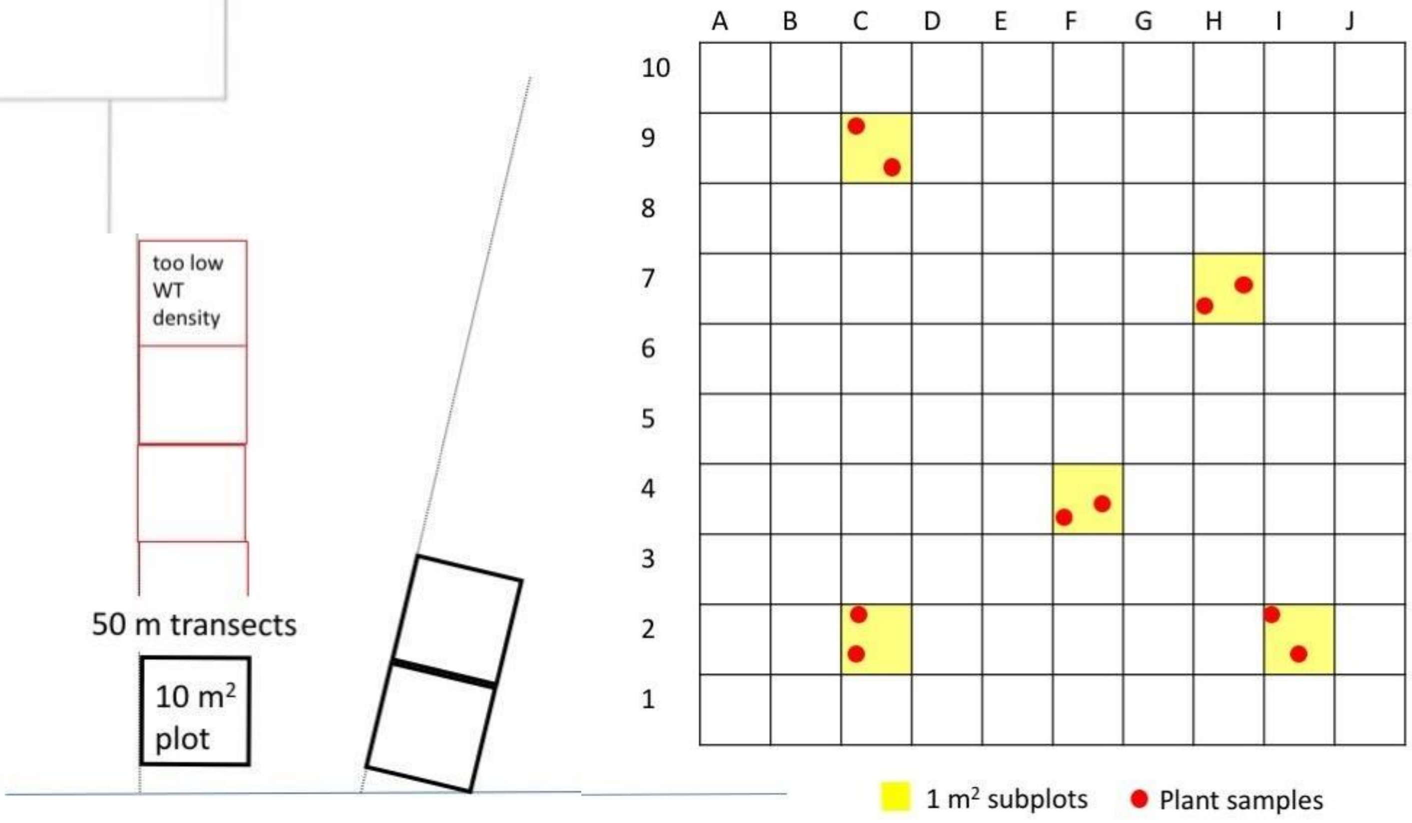


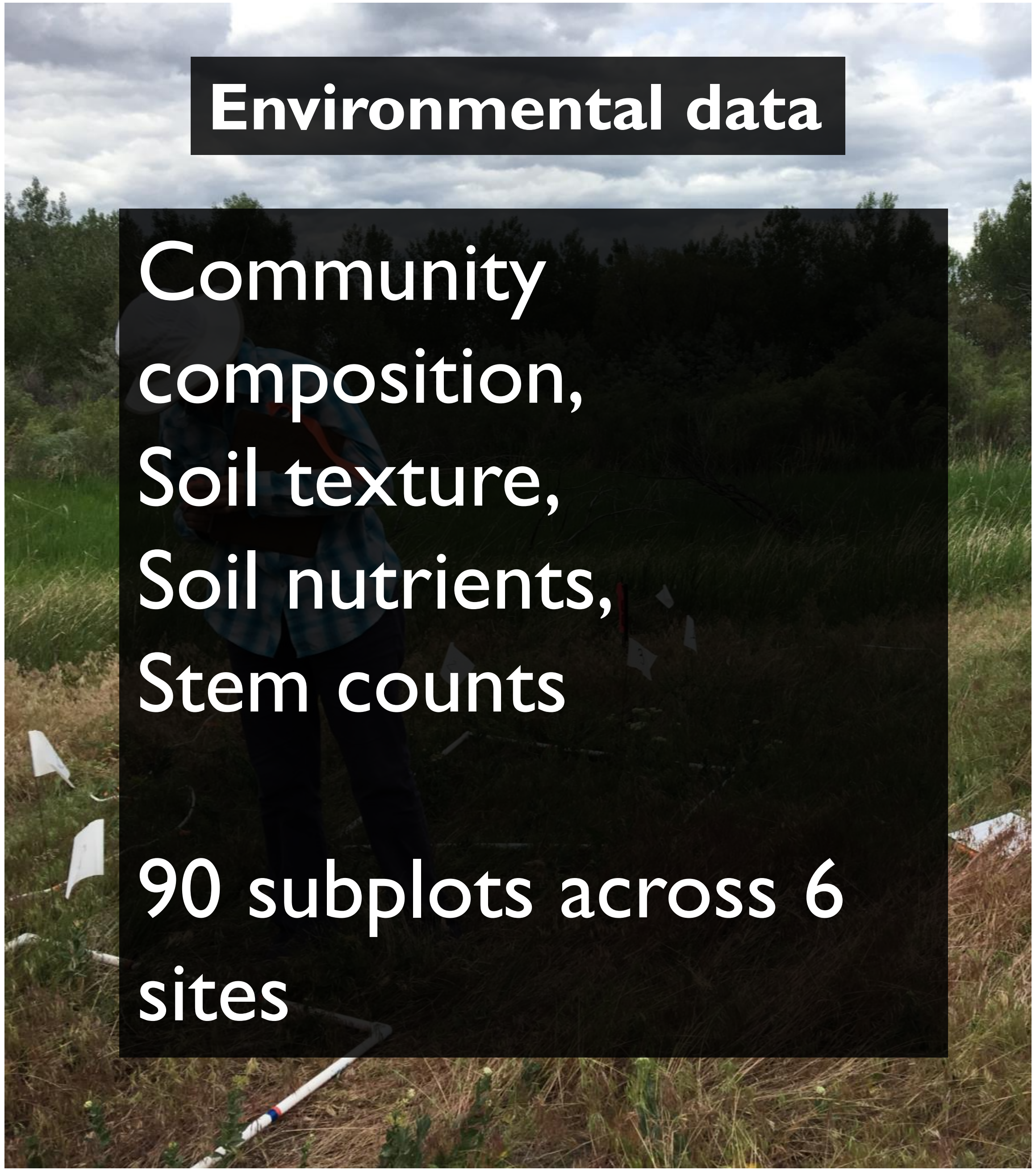
N N P
K K P
N P K P



We examined the relationship between **clonality and environmental variables** in the South Platte River Basin



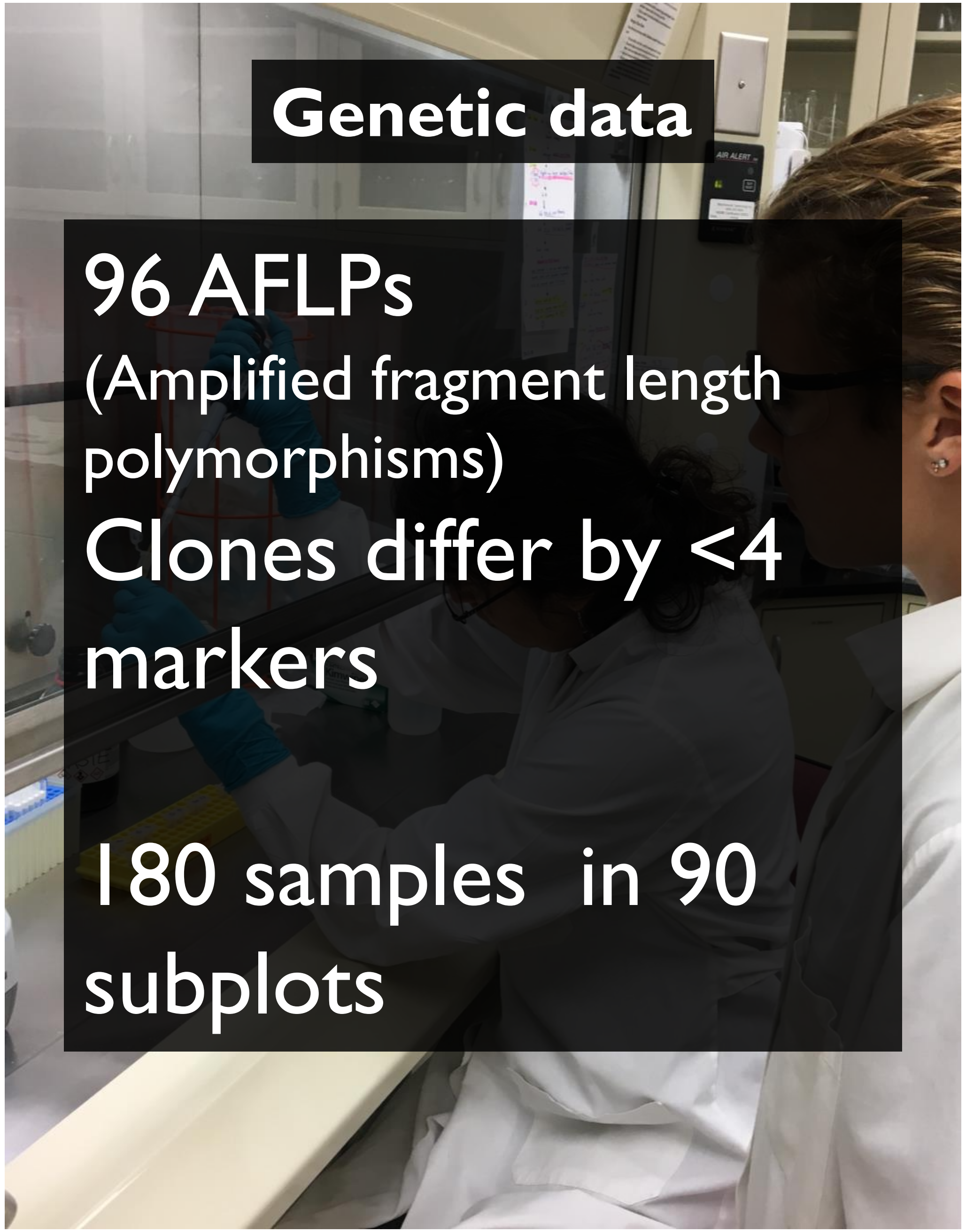




Environmental data

Community composition,
Soil texture,
Soil nutrients,
Stem counts

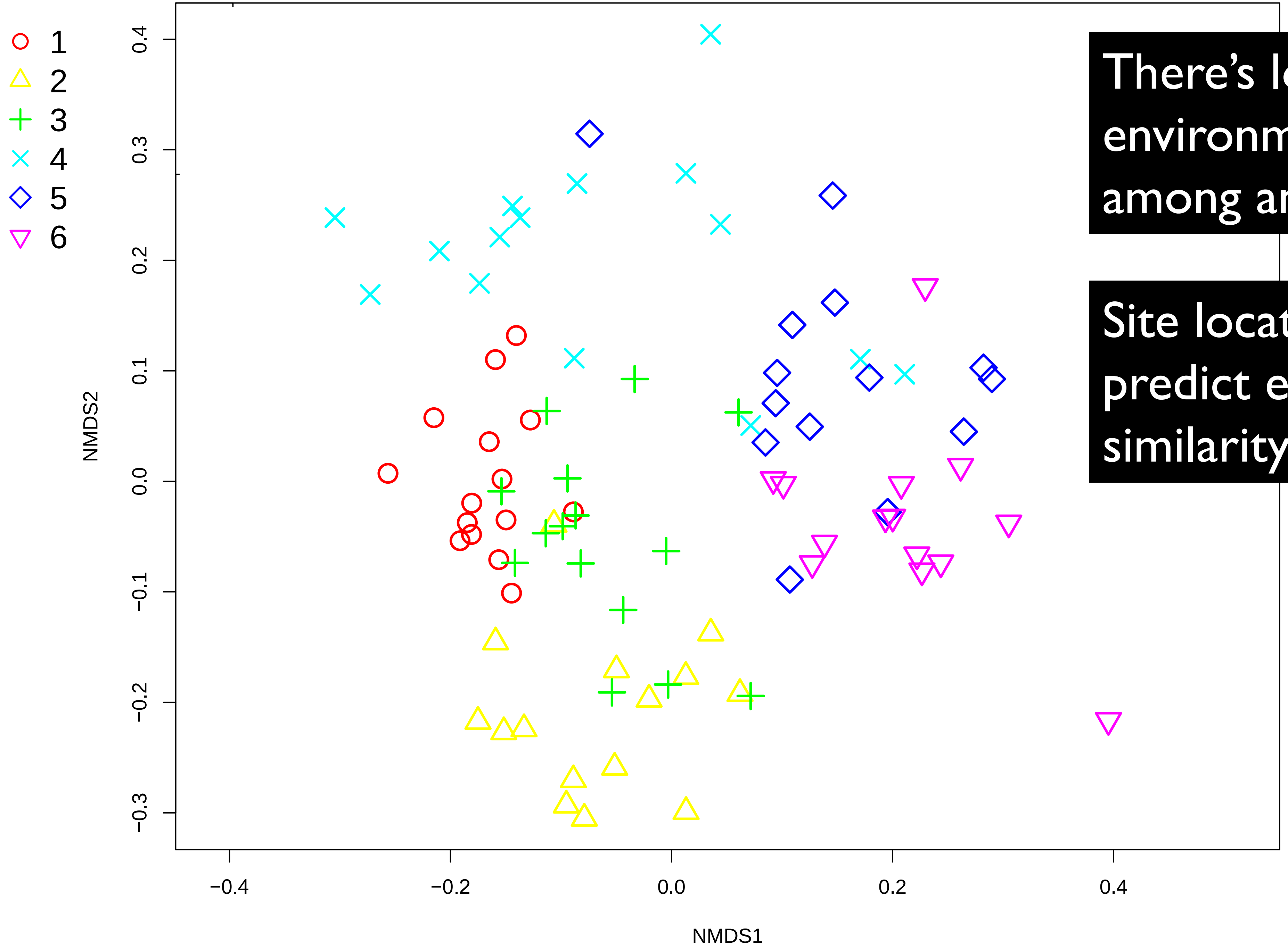
90 subplots across 6 sites



Genetic data

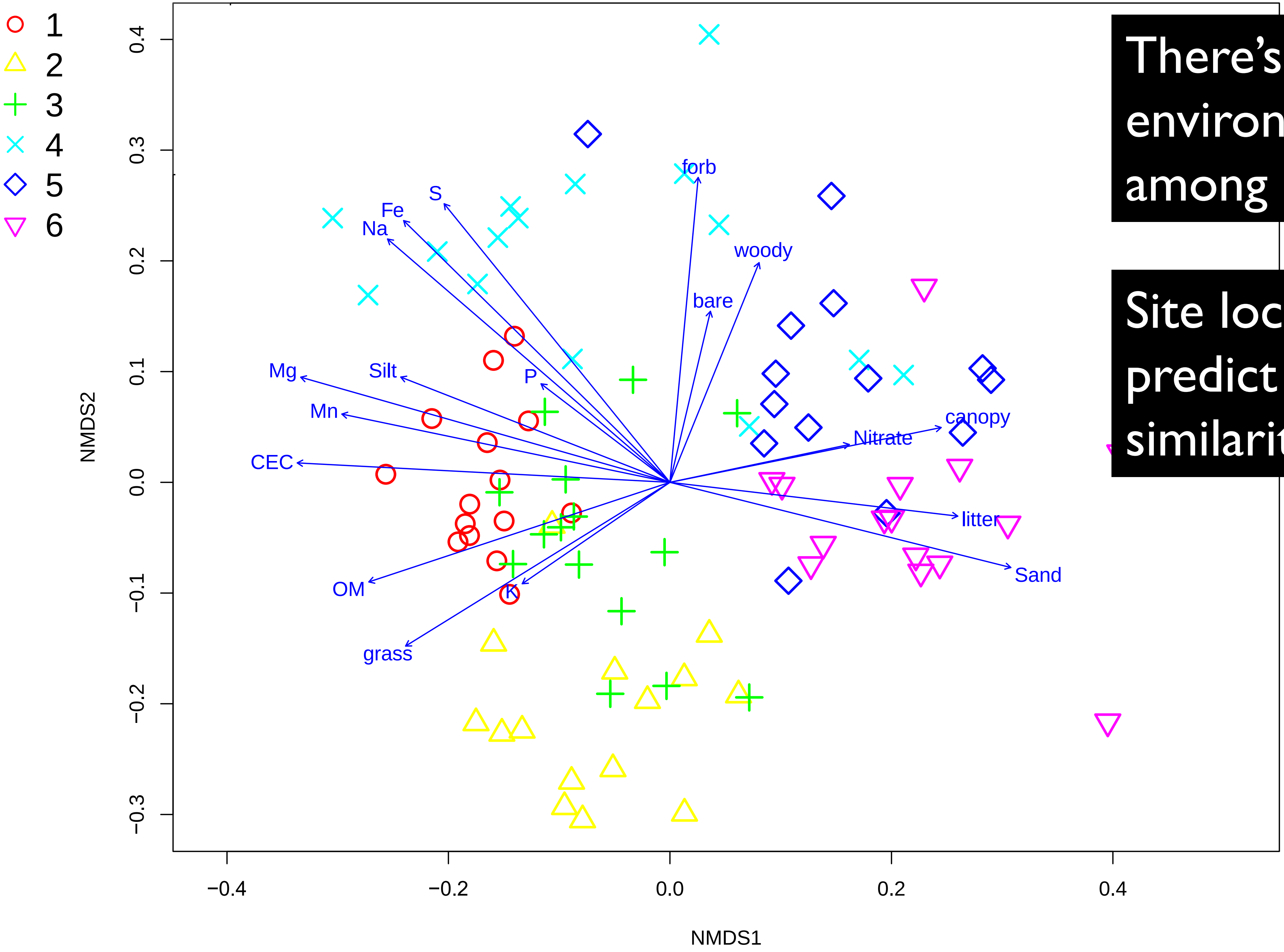
96 AFLPs
(Amplified fragment length polymorphisms)
Clones differ by <4 markers

180 samples in 90 subplots



There's lots of environmental variation among and within sites

Site location does not predict environmental similarity



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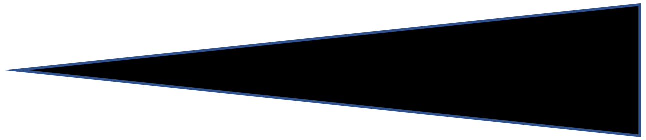
Site location does not predict environmental similarity

$$\frac{1\ \text{Genet}}{3\ \text{Samples (N)}} = .33$$

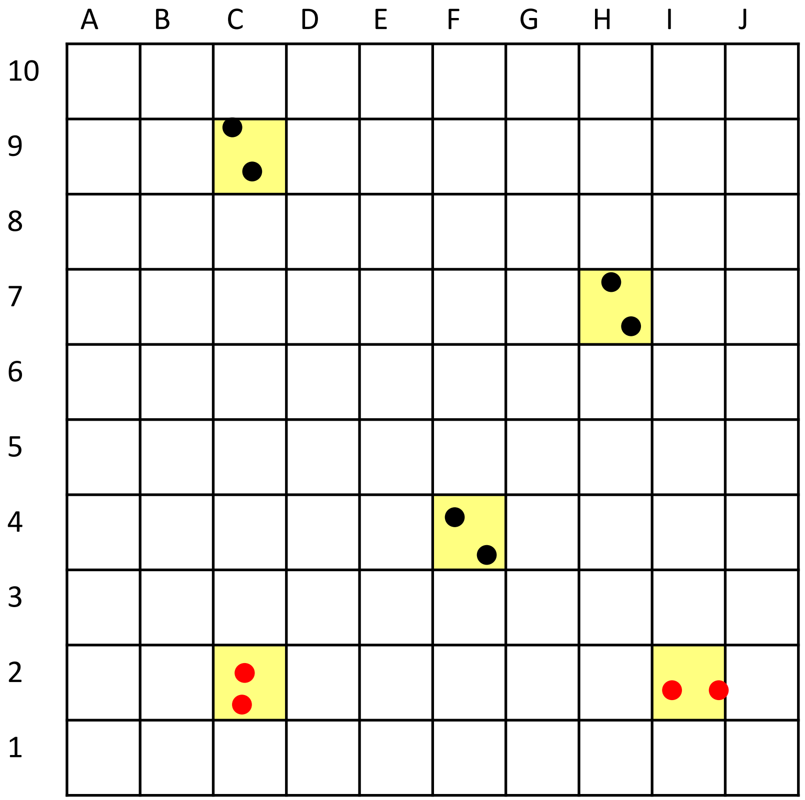


0
Clonal patch

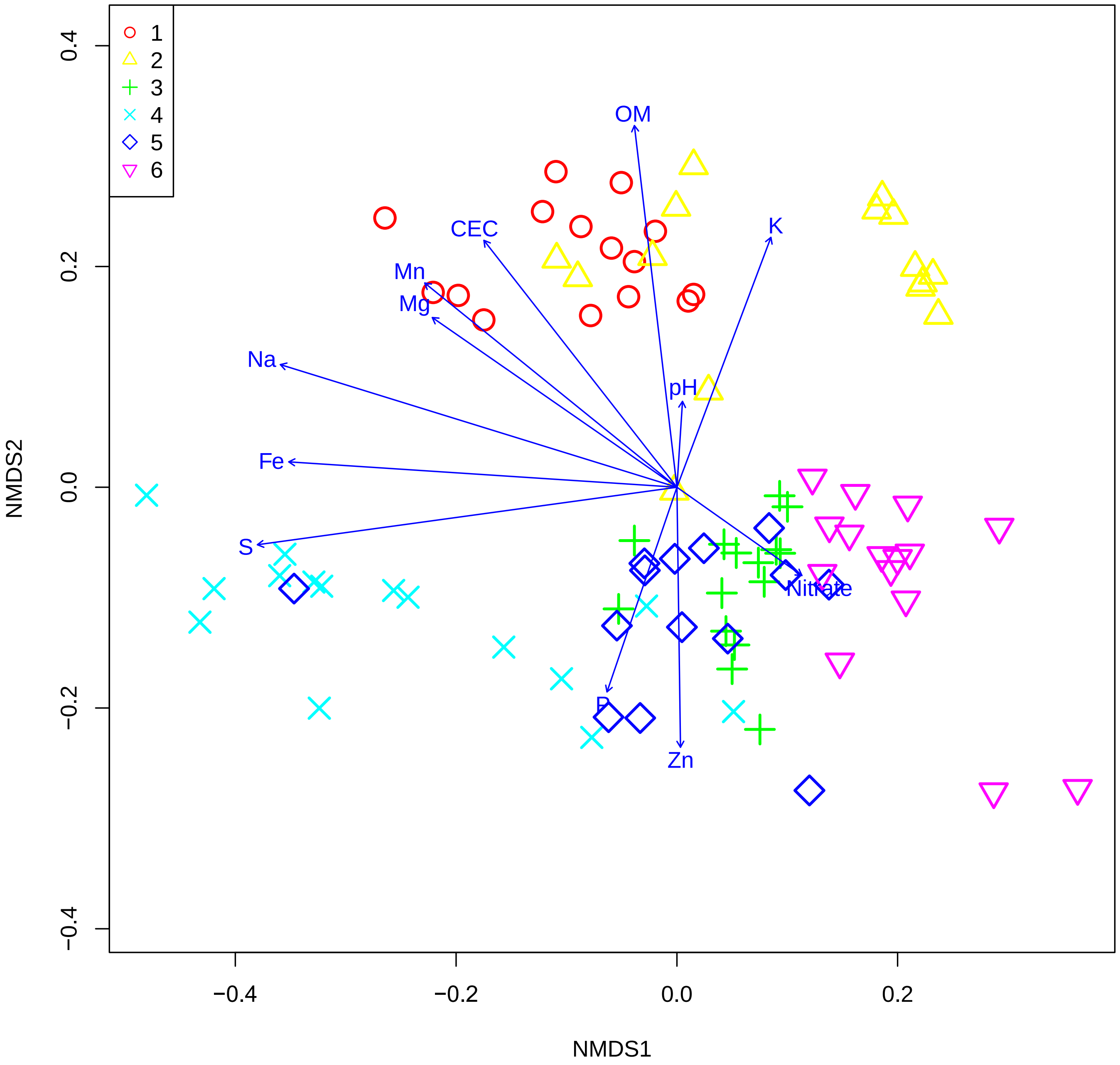
1
No clones

Site	N	G	MLG/N
○ 1	30	20	0.7
△ 2	30	13	**0.4**
+ 3	30	20	0.7
× 4	30	15	0.5
◇ 5	30	15	0.5
▽ 6	30	24	**0.8**

Subplot clonal incidence reflects clonal richness across sites



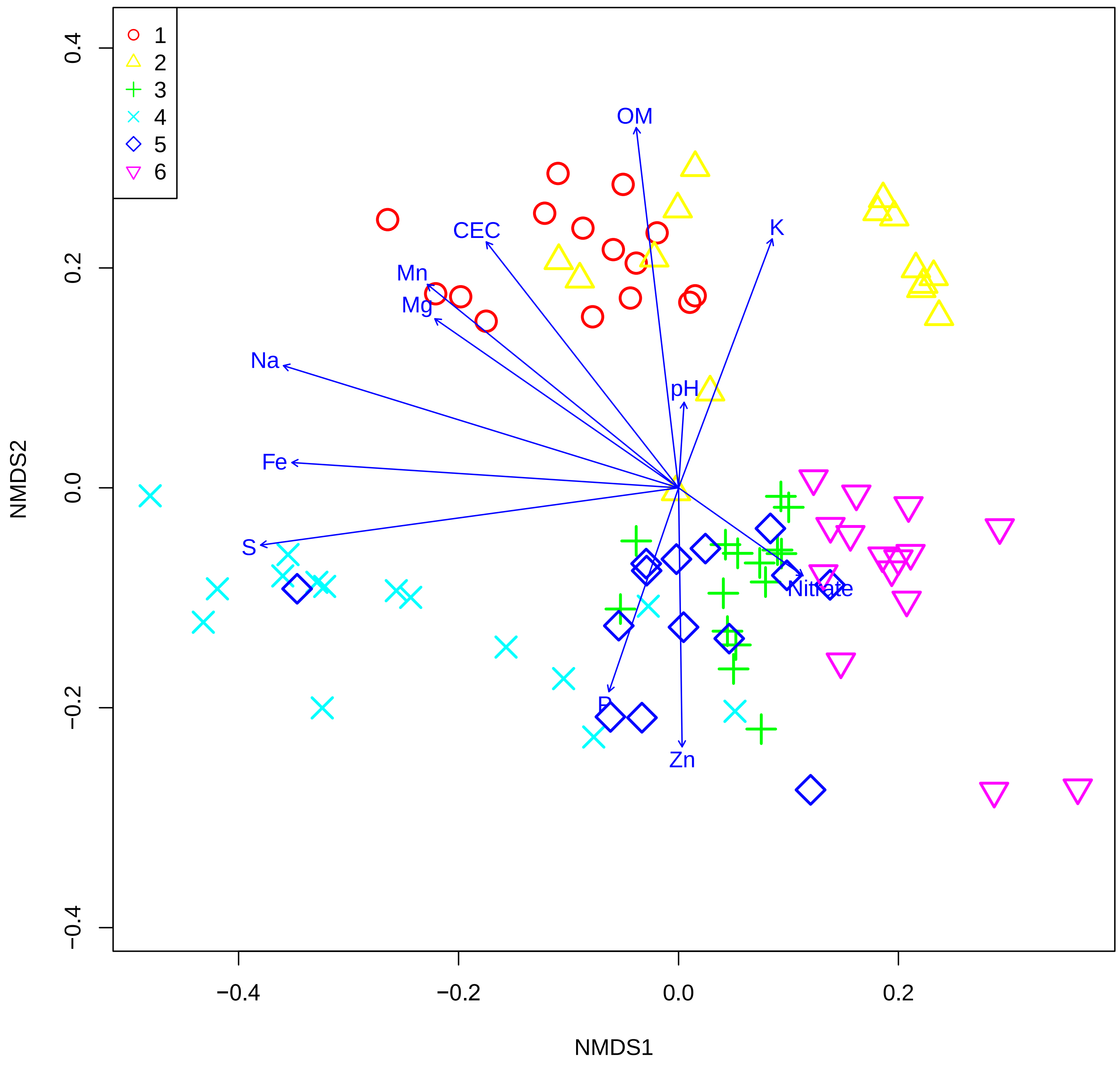
Site	N	G	MLG/N	Clones in subplots	Subplot clones
○ 1	30	20	0.7	7	0.47
△ 2	30	13	**0.4**	9	0.60
+ 3	30	20	0.7	8	0.53
× 4	30	15	0.5	12	**0.80**
◇ 5	30	15	0.5	7	0.47
▽ 6	30	24	**0.8**	0	**0.00**



Which factors explain subplot clonality and stem count?

Compared factors in a multi-model framework with a generalized linear model:

- Soil nutrients
- % sand
- % cover
- % bare ground
- Site as random effect (or not)



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- ~~% bare ground~~
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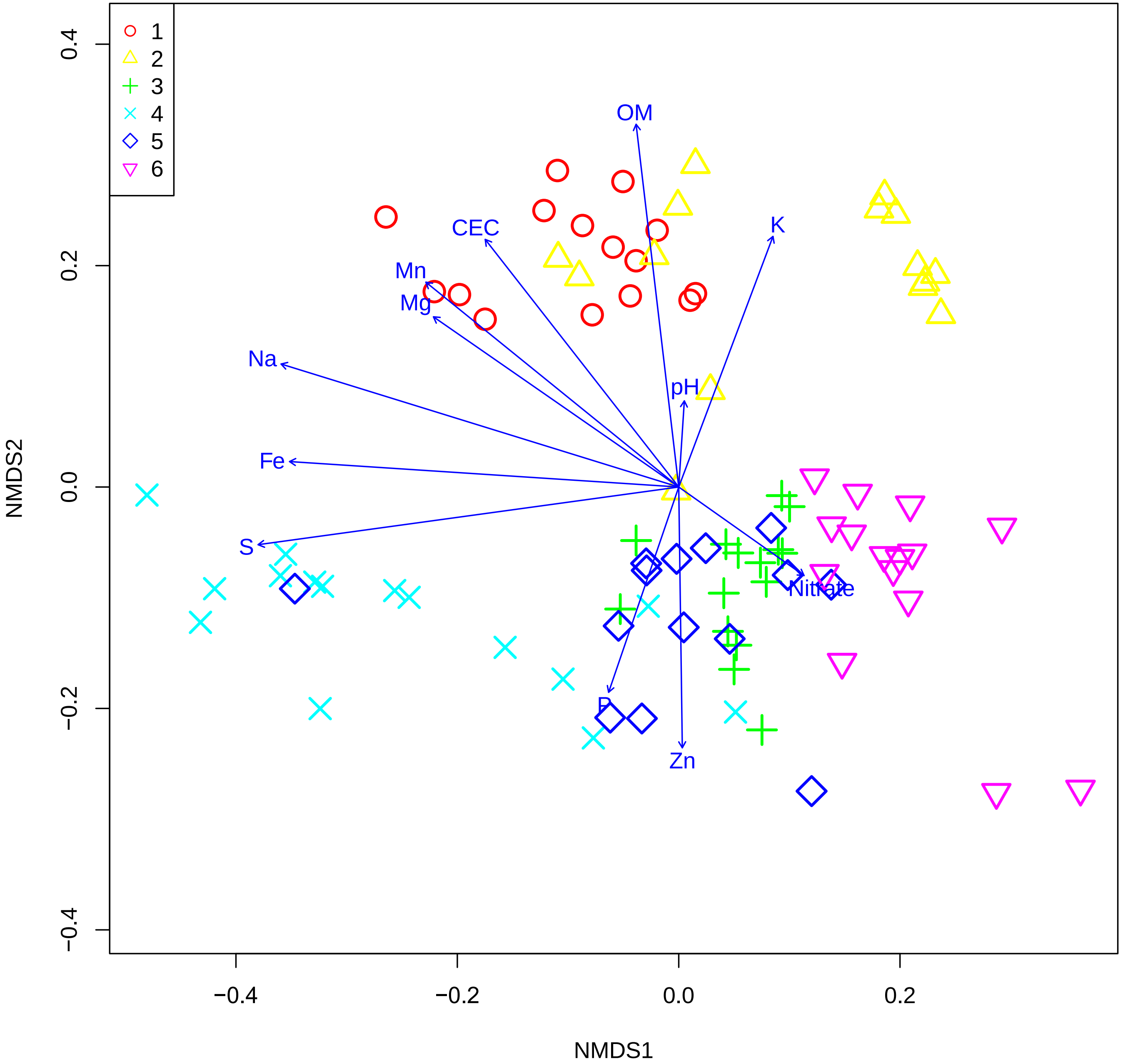

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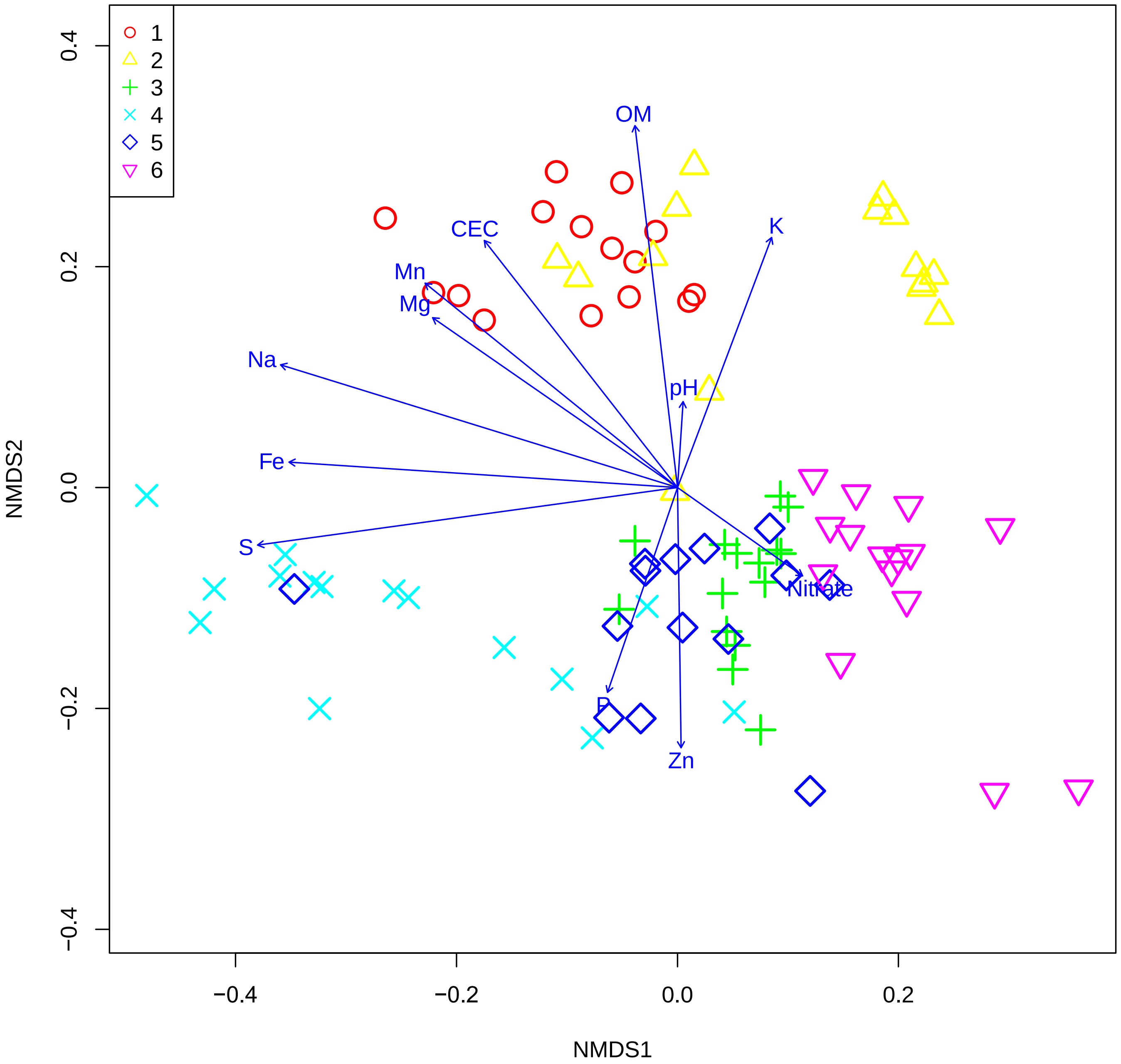

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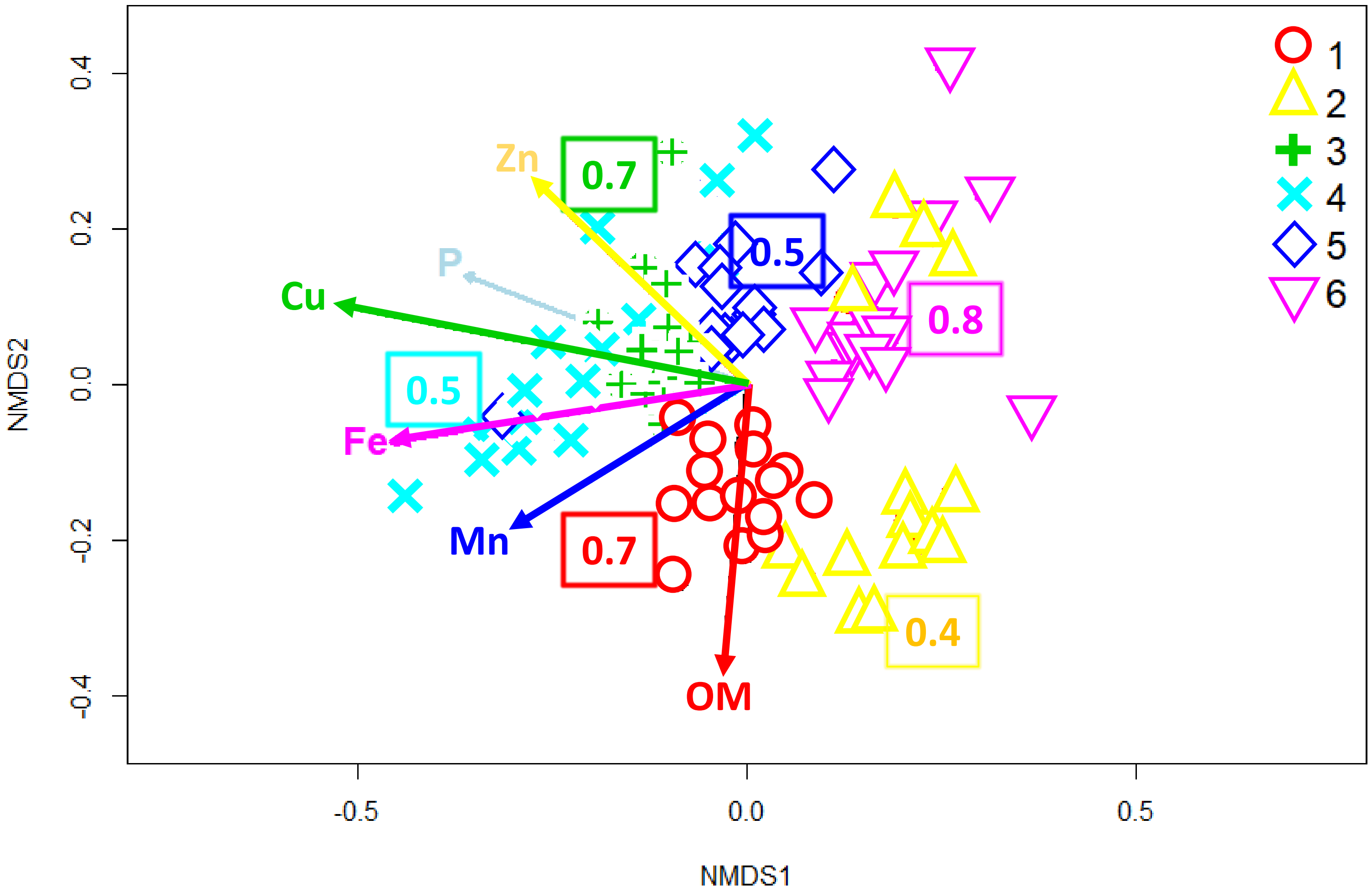
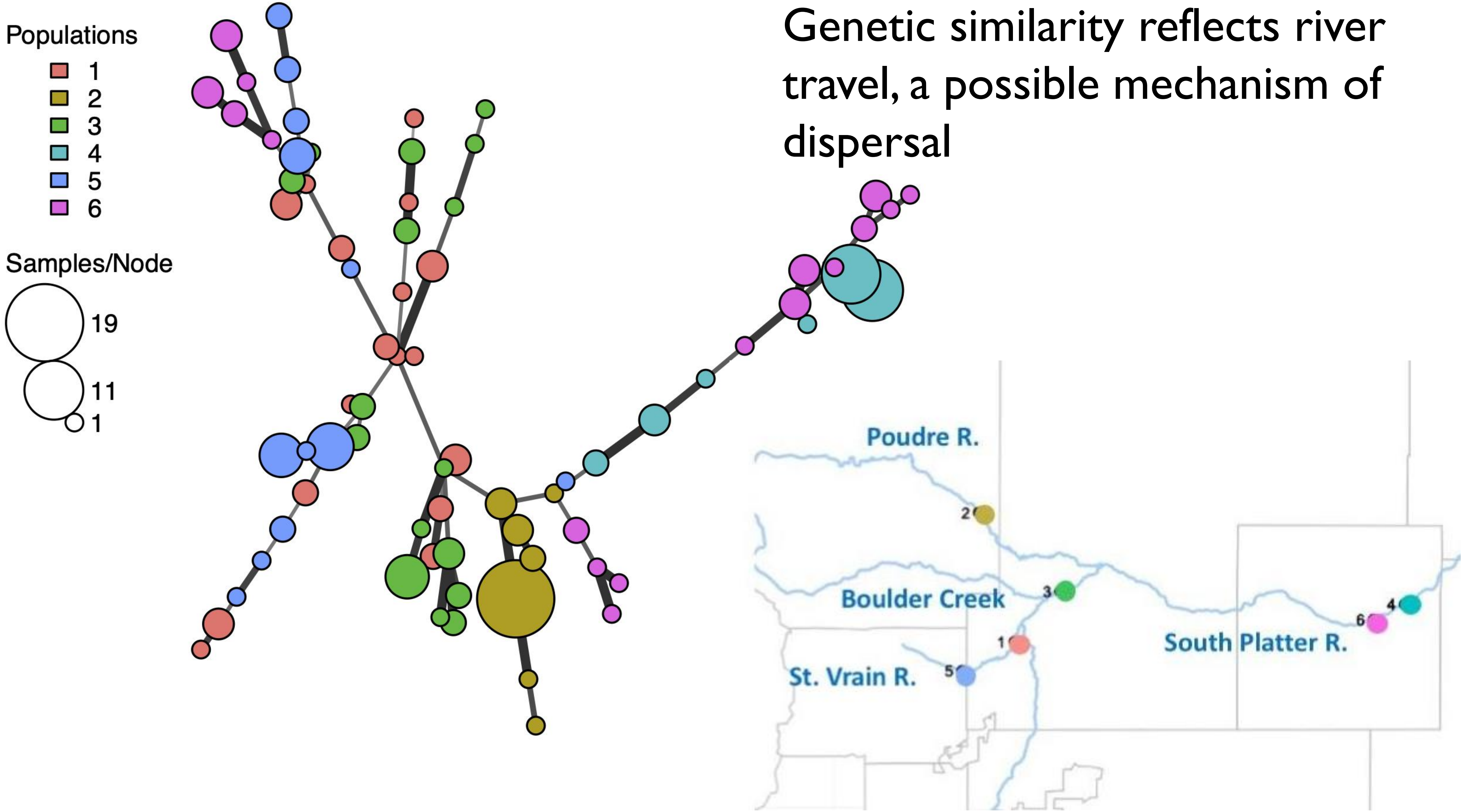
Soil characters that distinguish sites not necessarily correlated with clonality*



Stahlke, West, and Gaskin (*in prep*)

Genetic similarity reflects river travel, a possible mechanism of dispersal



Stahlke, West, and Gaskin (*in prep*)

- Clonality was associated with K, **Mn, OM** & CEC
- Can measure clonality across sites at the subplot scale; Spread within site may be largely clonal, across site by seed
- If mite feeds on stems, belowground spread within site may not be contained
- Common gardens and more sites across bigger gradients in the works

Thanks!

- Colorado Parks & Wildlife State Wildlife Area Owners
- Andrew Norton (CSU)
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- Dora Alvarez de Srygley (USDA-ARS NPARL)
- RiversEdge West
- Bioinformatics and Computational Biology Fellowship (University of Idaho)

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