How are functional traits related to the invasibility of a restored plant community?

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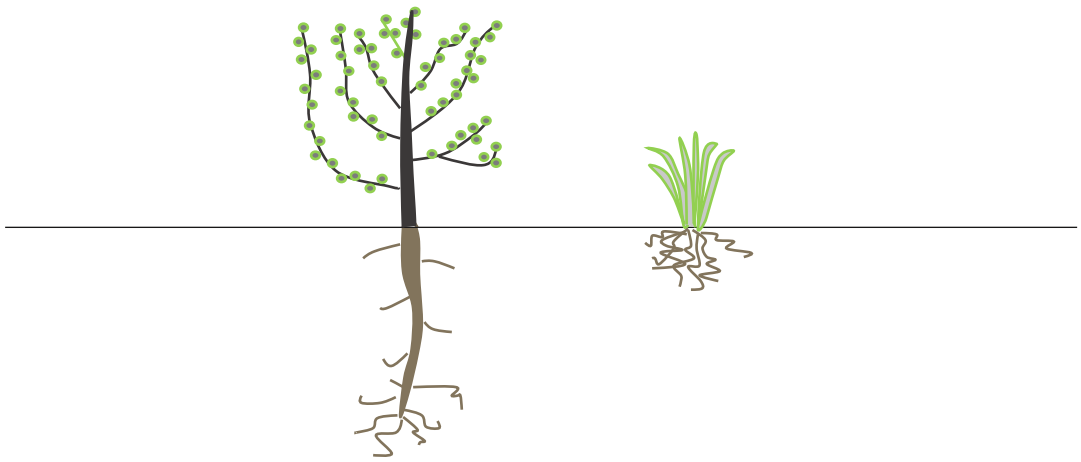
Community resistance to invasion could be increased in a number of ways:

1. Limiting similarity: there is a finite limit to the similarity between the resource-use of co-existing species



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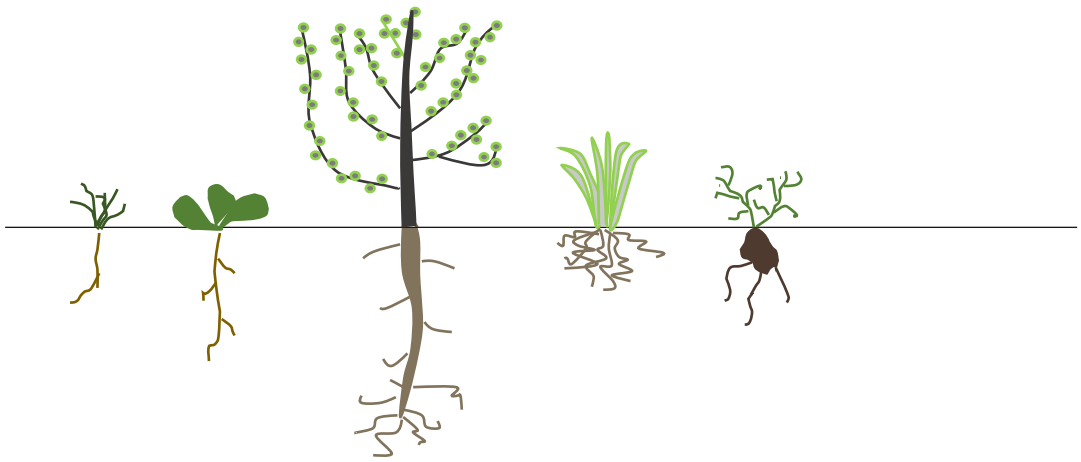

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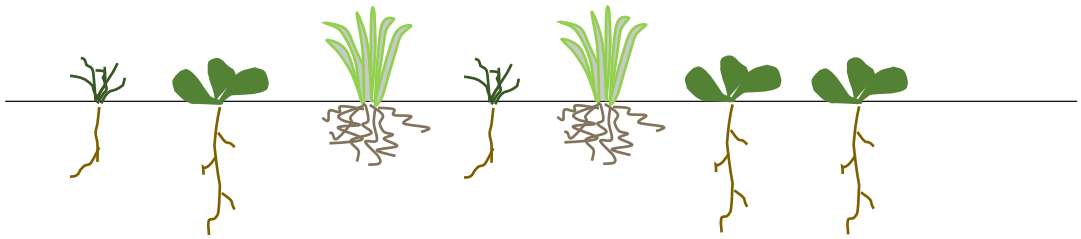
3. Competitive hierarchy: species with fastest growth and resource extraction will outcompete invaders



Research Questions

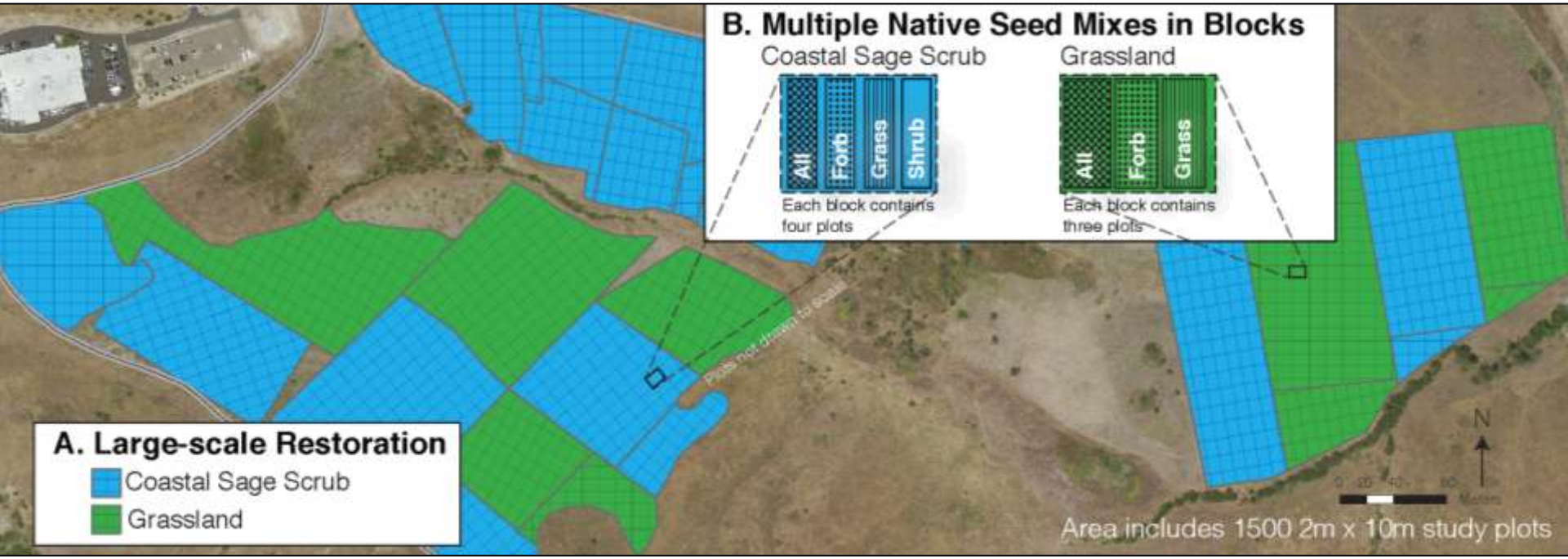
1. What mix of native species produces a community that is resistant to invasion by non-native species?

2. How are the traits of species in a restored community related to the invasibility of that community?

3. Does the relationship between traits and invasibility vary depending on environment?


Santa Ana Mountains, Orange County, CA
25 hectare restoration project

Multiple seed mixes within coastal sage scrub and grassland communities



Seeds applied with drill or imprint seeder in strips

Manual weeding and glyphosate wicking for one year after seeding

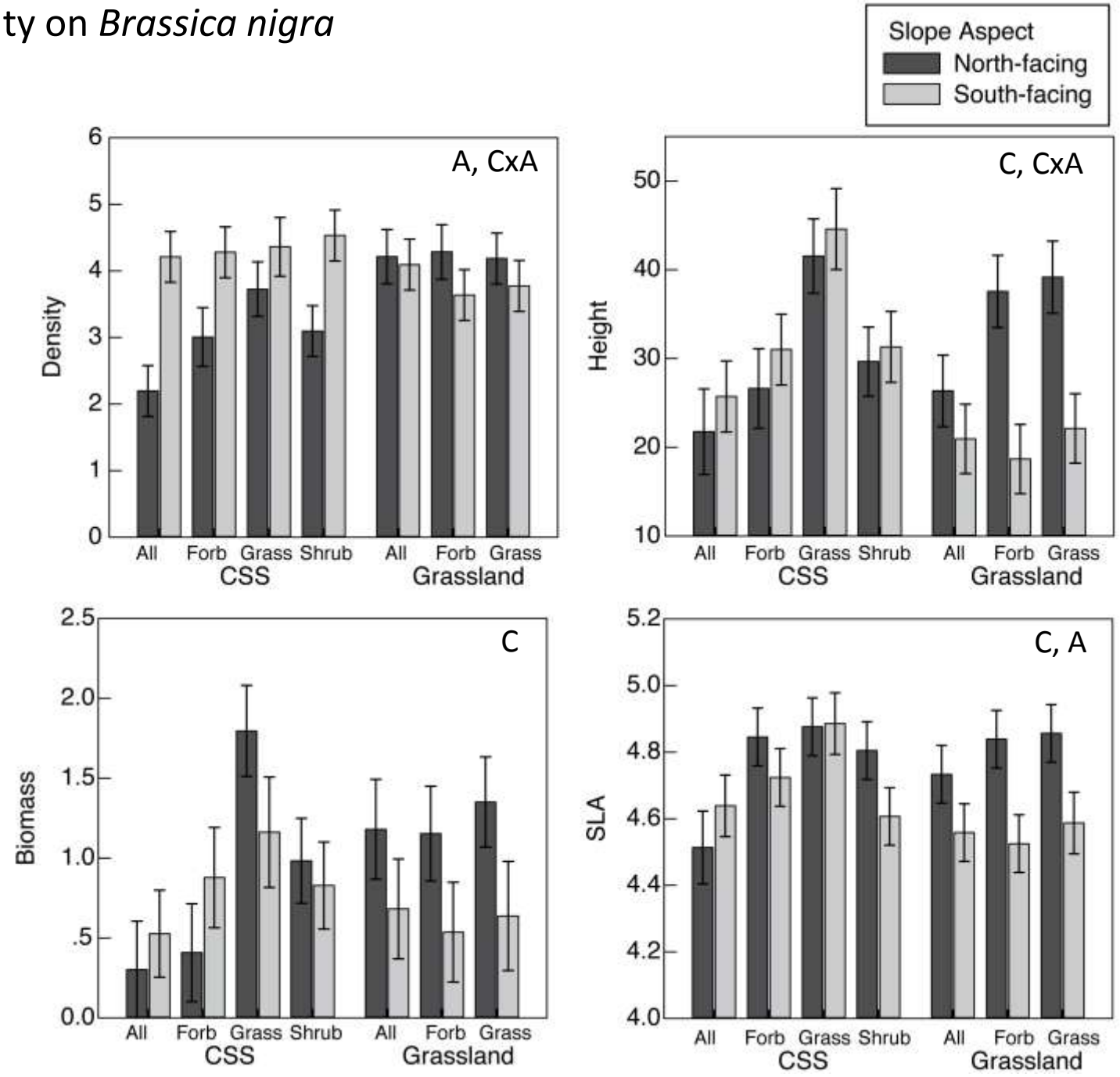
Plot measurements

- Number of native and non-native seedlings and adults
- *Brassica nigra*: density, height, biomass, specific leaf area, stomatal conductance, soil moisture

Irvine Ranch Conservancy Native Seed Farm

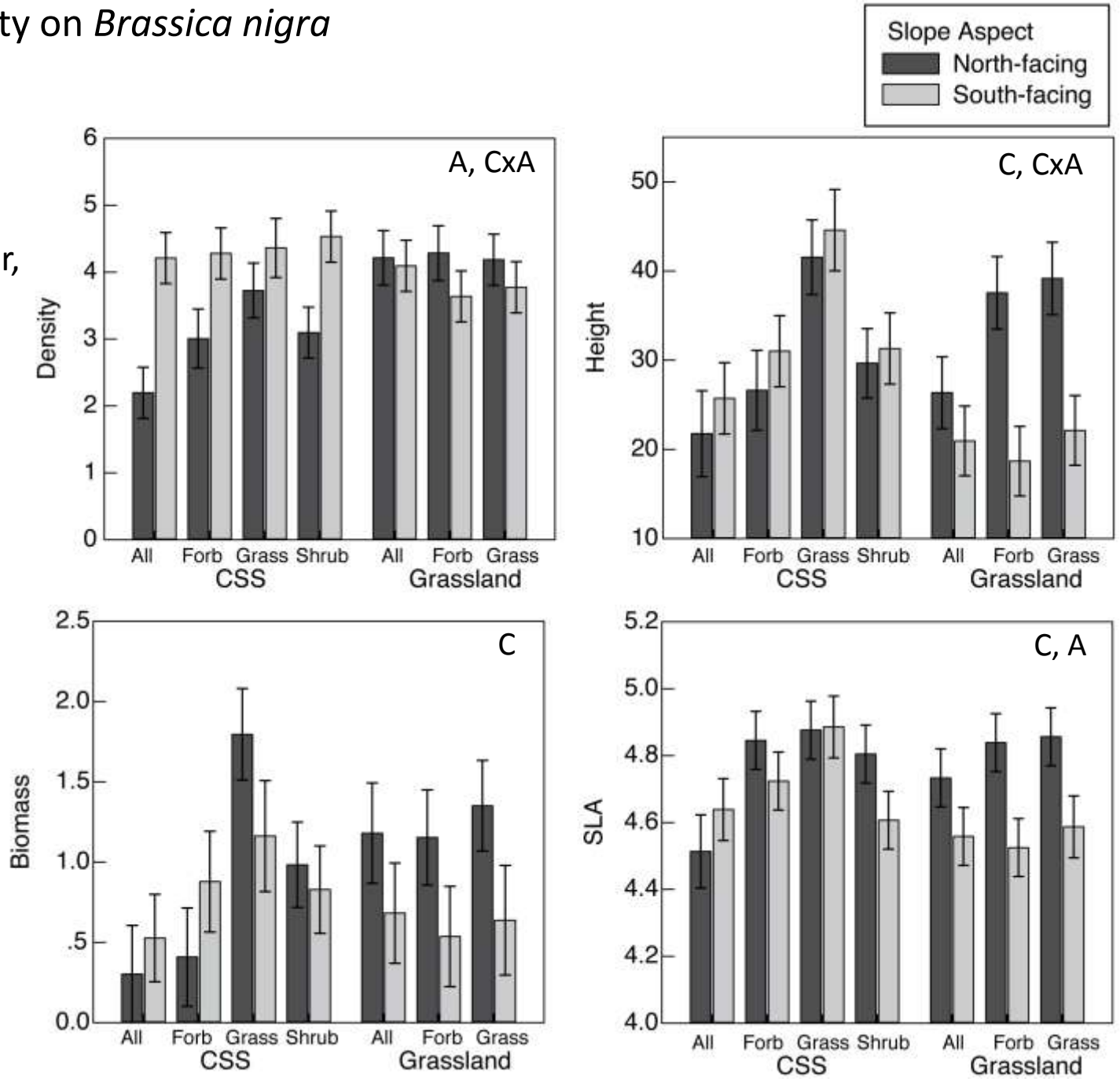
Photosynthetic rate
Water-use efficiency
Specific leaf area
Leaf N concentration
Seed mass
Root diameter
Specific root length
Root tissue density
Root mass fraction

Effect of community on *Brassica nigra*



Effect of community on *Brassica nigra*

North slopes had fewer, but larger weeds with higher SLA



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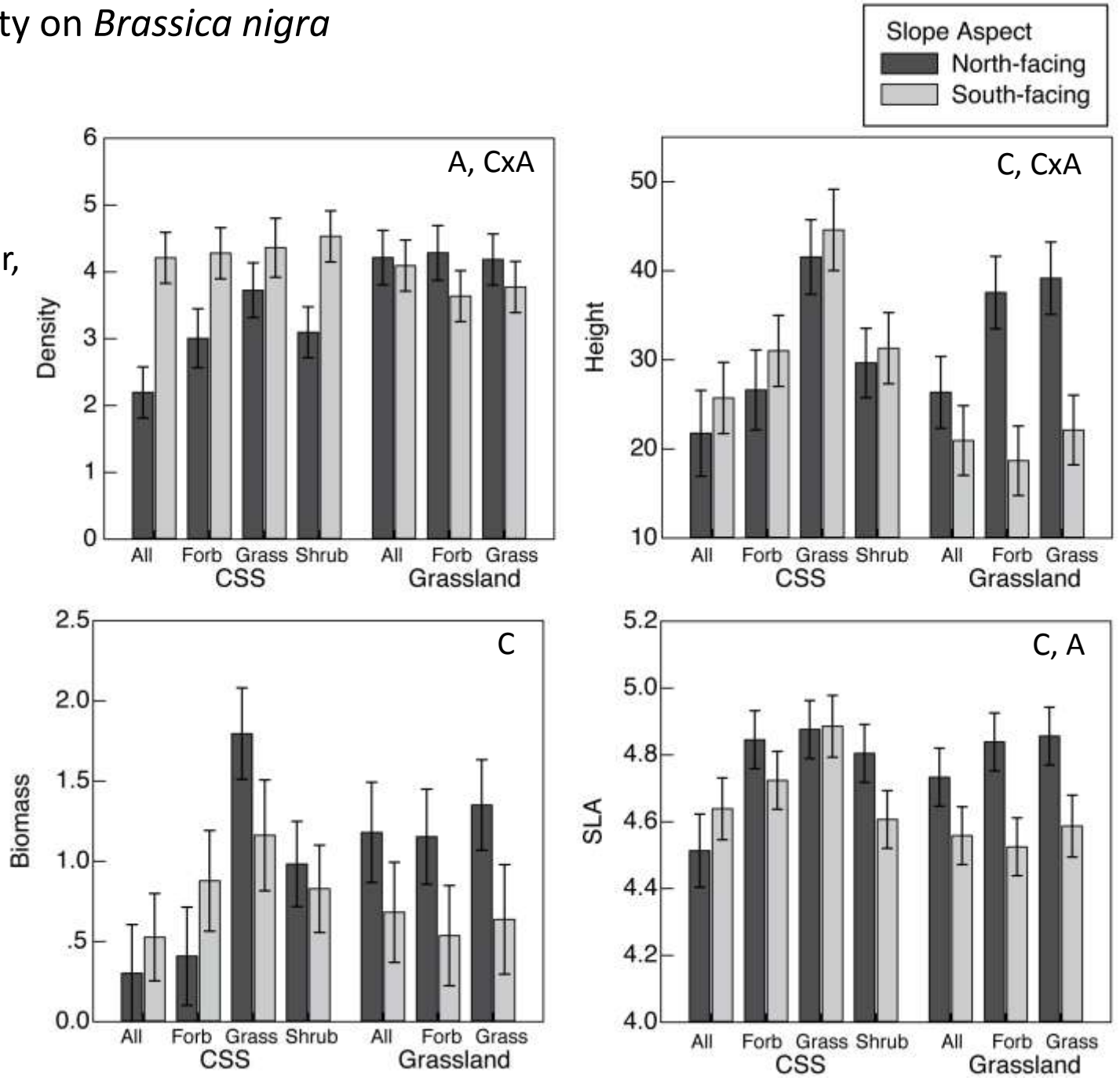

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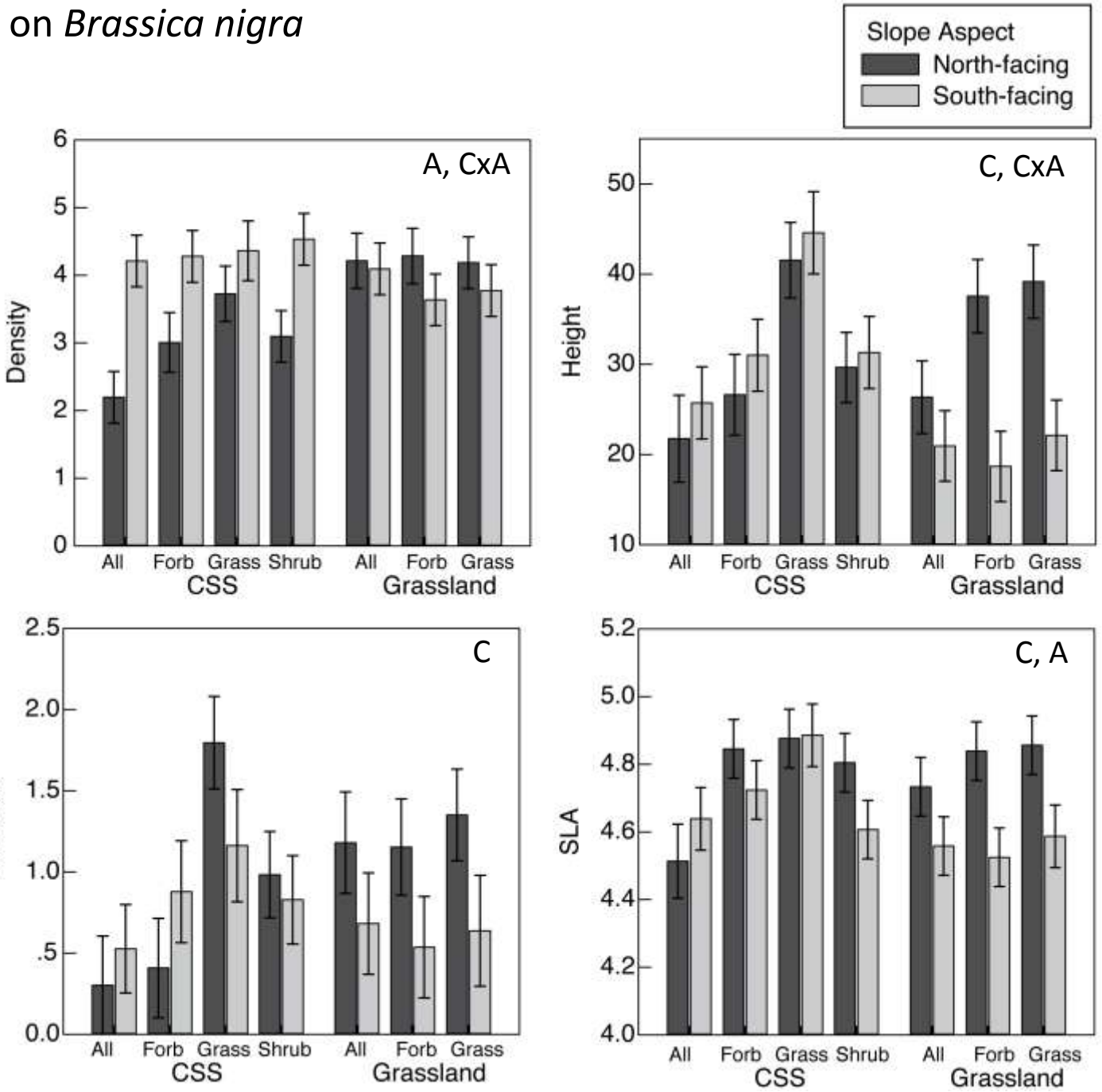
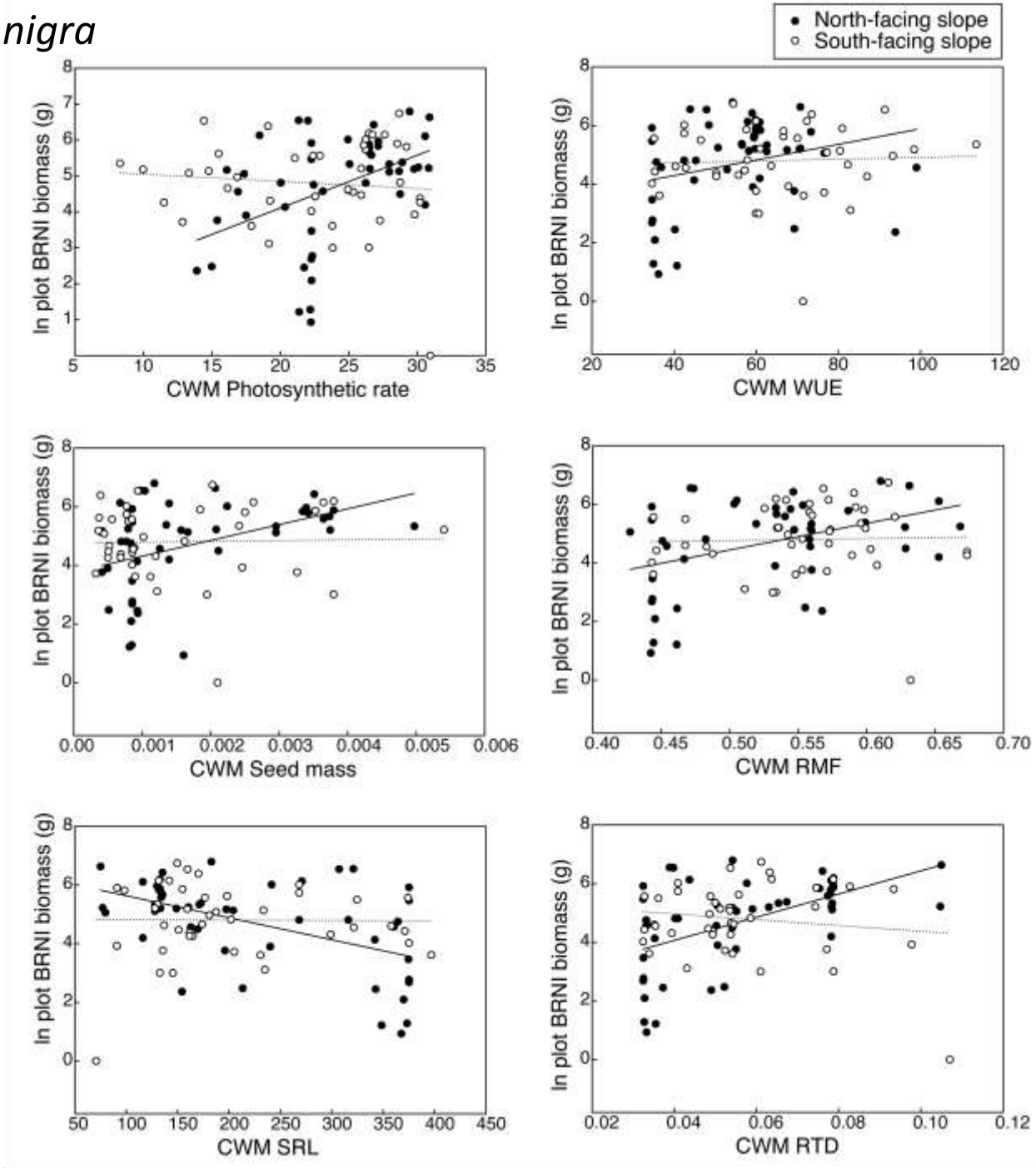


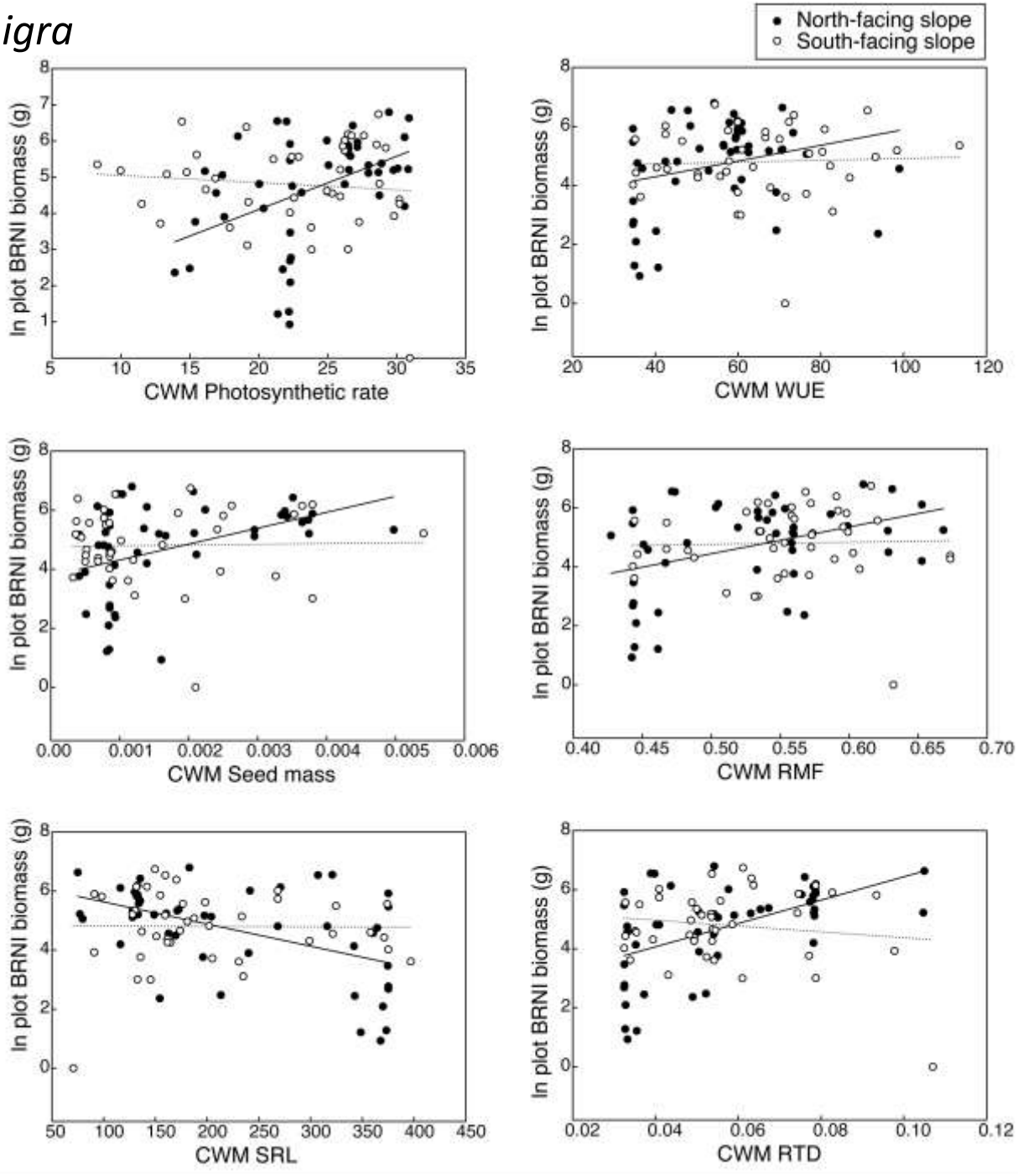
Effect of traits on *Brassica nigra*



Effect of traits on *Brassica nigra*

Traits of effective competitors

- Low photosynthesis
- Low water-use efficiency
- Low seed mass
- Low root mass fraction
- Low root tissue density
- High specific root length



Conclusions

Diverse species mixes tend to be more invasion resistant

Community mix is strongly affected by environment

Competitive hierarchy: fast-growing species with aboveground allocation are best competitors in high-resource environments

Acknowledgements

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