Sunflower Seedling Salinity Tolerance Assay

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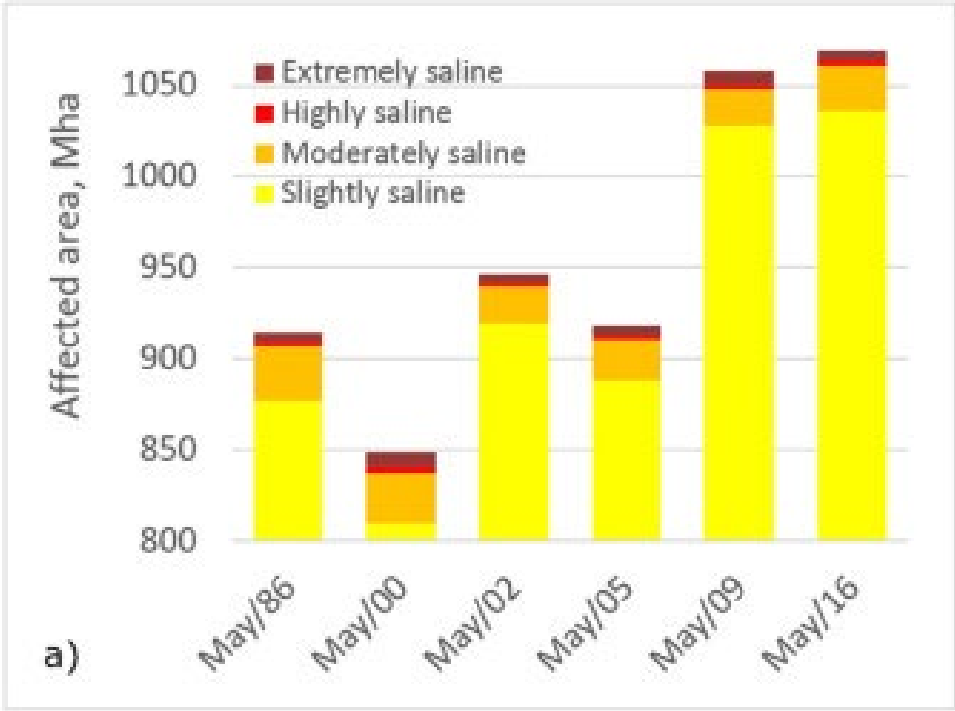
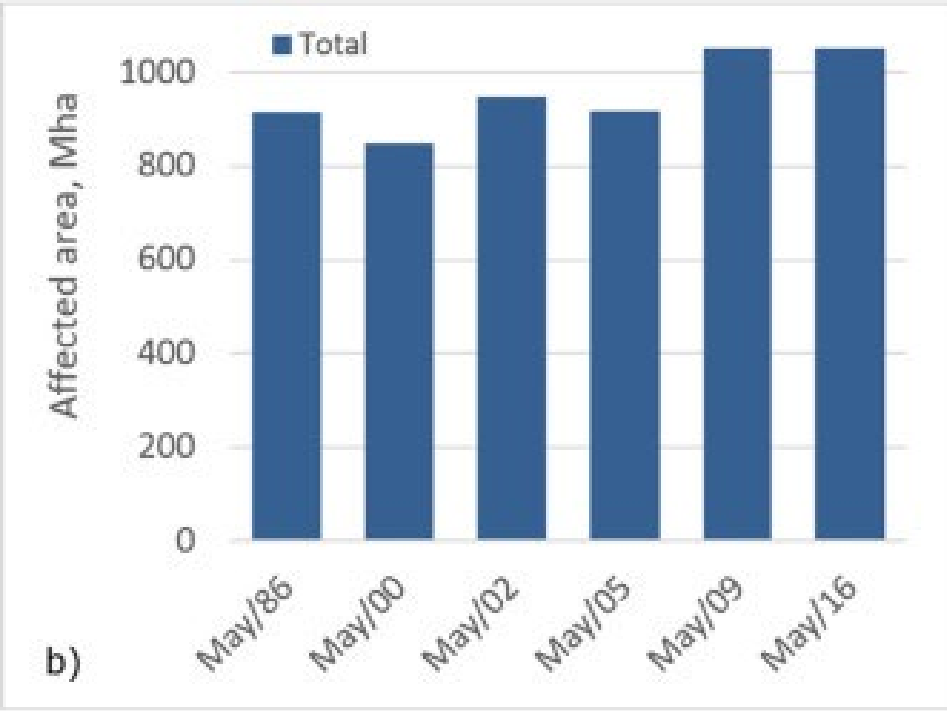
An introduction…

Franzen *et al.* (2024), www.ndsu.edu/agriculture/sites/default/files/2024-06/sf1087.pdf

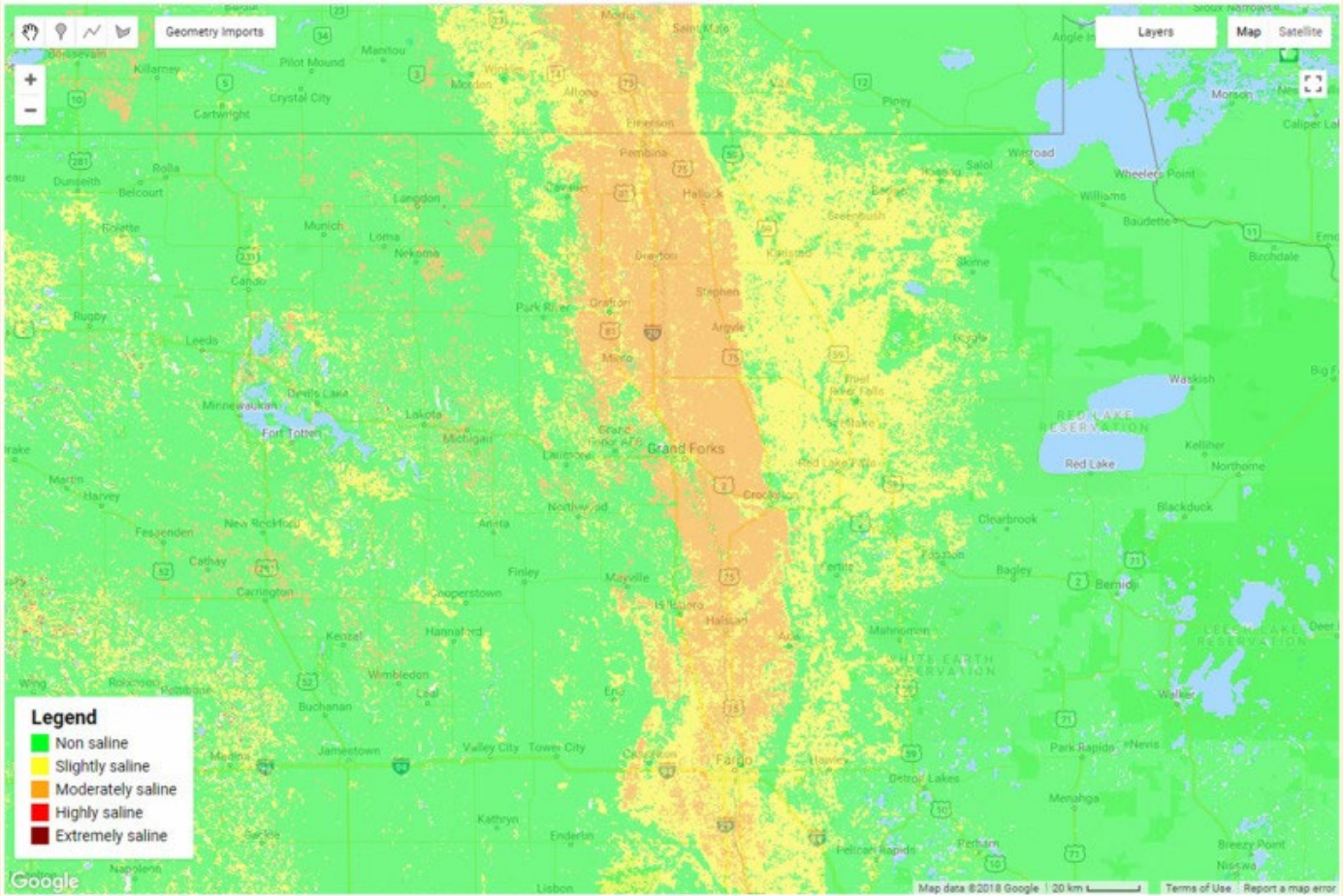
Volatility in saline acreage globally





Ivushkin *et al.*, 2019. doi.org/10.1016/j.rse.2019.111260.

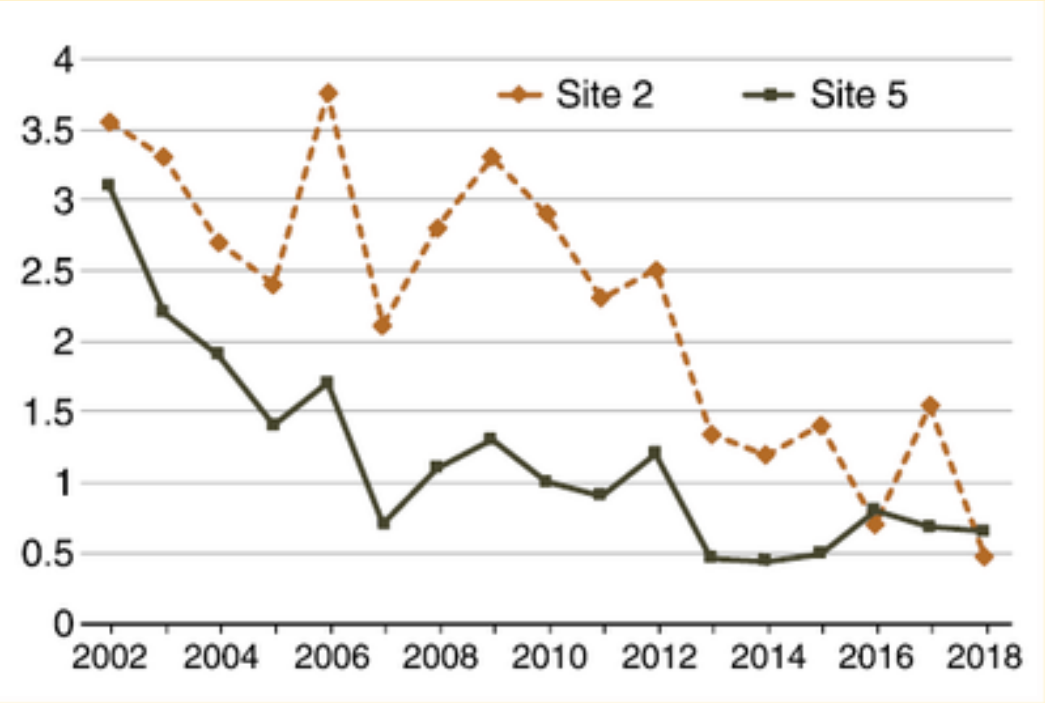
Clearer regional patterns



Strategies for salt mitigation

- Tile drainage.
- Maintaining crop coverage.
  - Keeping cash crops growing
  - Using cover crops
- Alfalfa buffer strips.
- Chemical treatments.

Wet spring, dry fall.

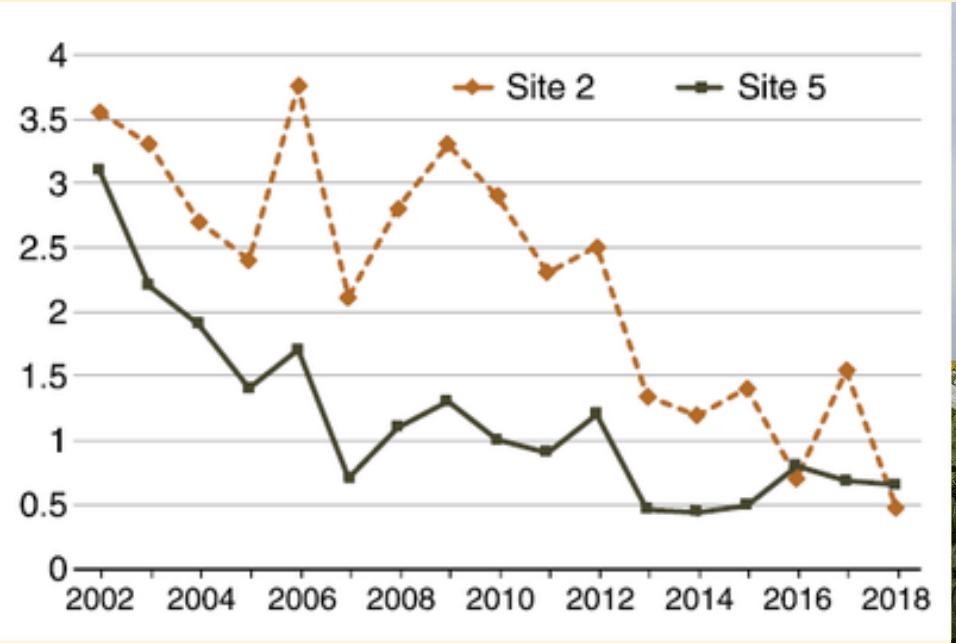


Franzen *et al.*, 2024. www.ndsu.edu/agriculture/sites/default/files/2024-06/sf1087.pdf

Sunflower’s place in salt mitigation

- Already moderately salt tolerant, lots of variation to select on.
- Deeper root system than most crops
- Giving options for maintaining crop presence in saline fields.

Sunflower’s place in salt mitigation



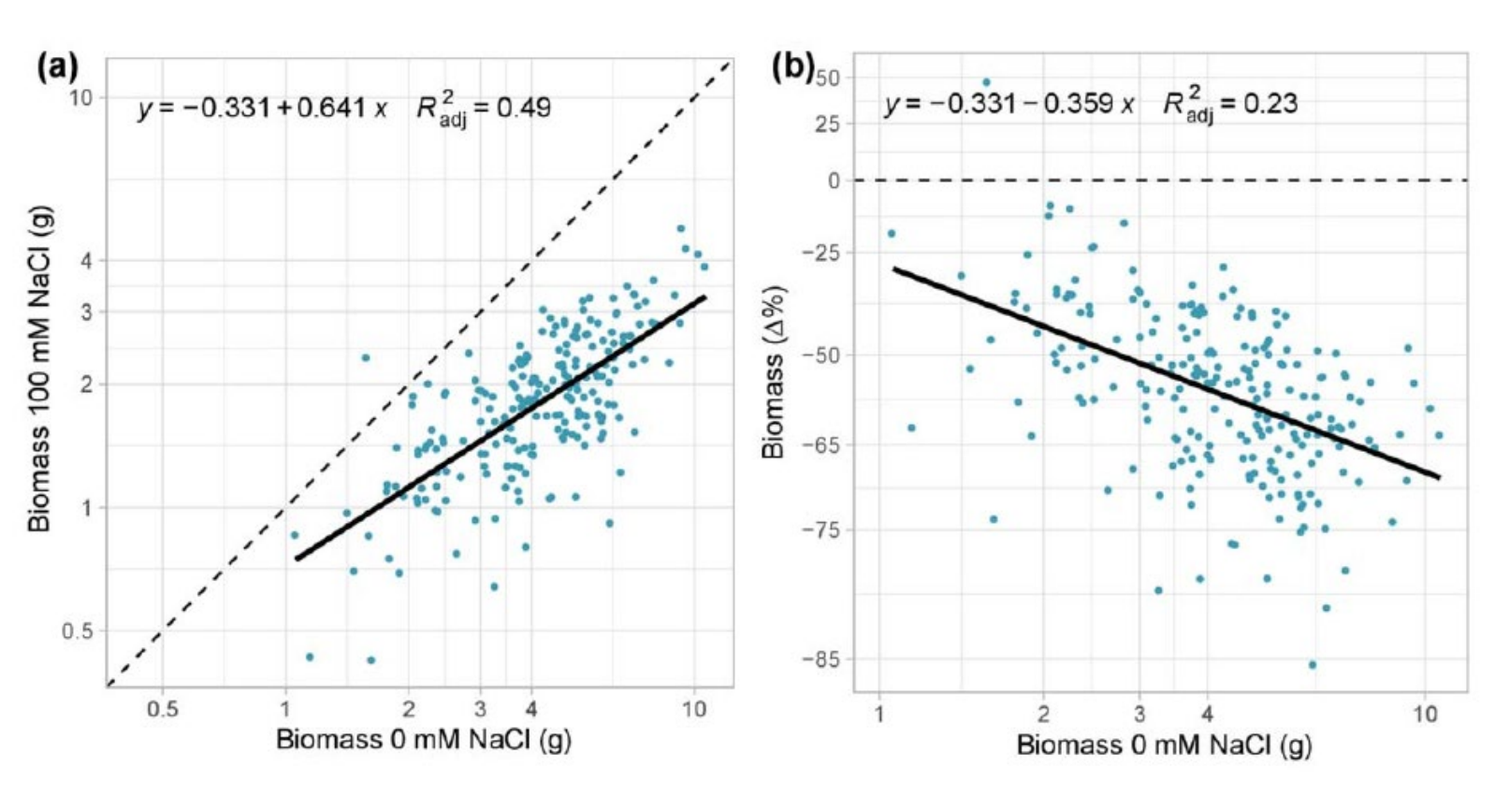
Difficulties in breeding for salt tolerance

Previous work:

Key Traits and Genes Associate with Salinity Tolerance Independent from Vigor in Cultivated Sunflower[1][OPEN]

Andries A. Temme,[2] Kelly L. Kerr, Rishi R. Masalia, John M. Burke, and Lisa A. Donovan[3]
Department of Plant Biology, University of Georgia, Athens, Georgia 30602

Previous work: Temme *et al.* 2020

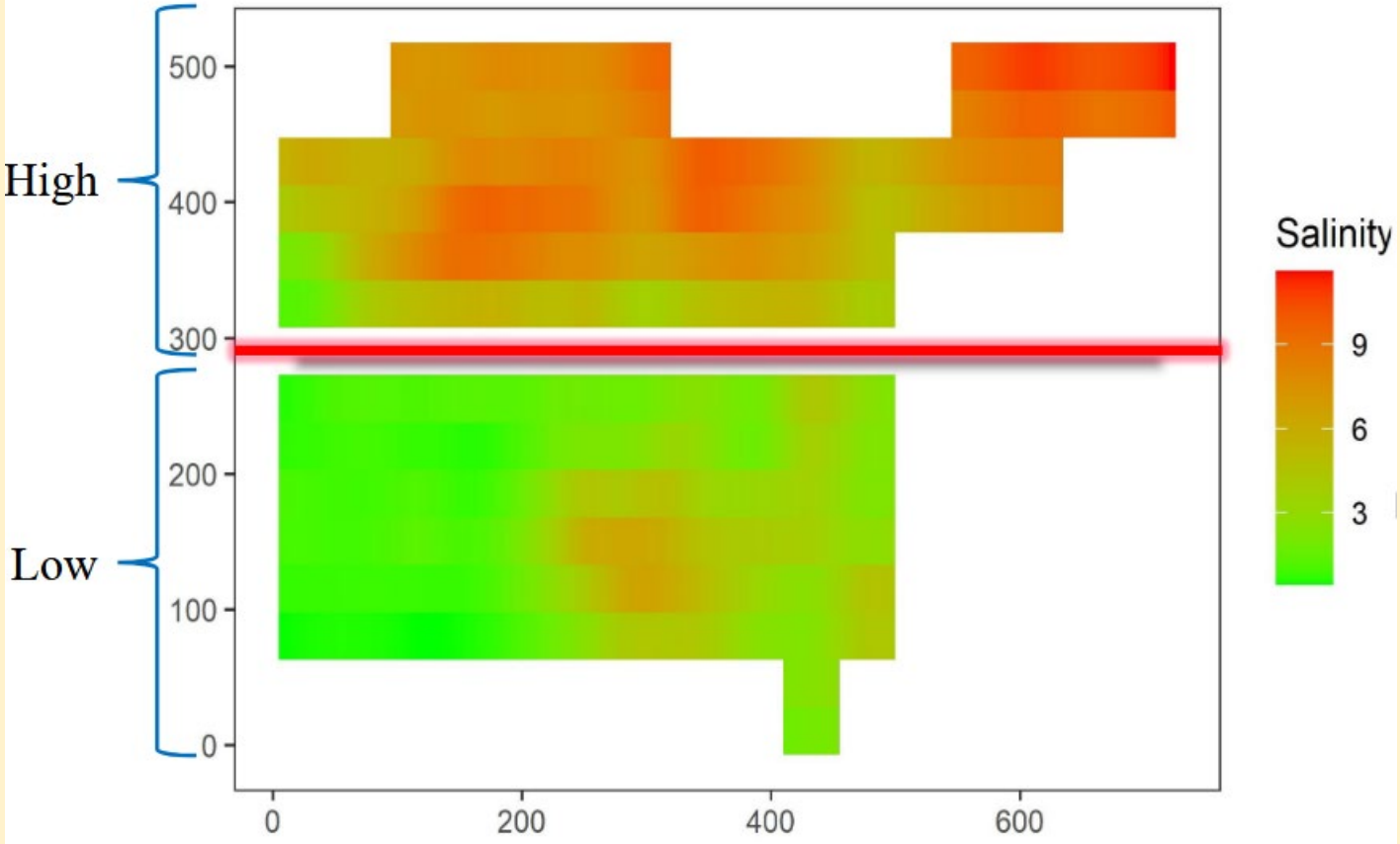


Previous work:

Association studies of salinity tolerance in sunflower provide robust breeding and selection strategies under climate change

James P. McNellie[1] · William E. May[2] · Loren H. Rieseberg[3] · Brent S. Hulke[1]

Received: 13 March 2024 / Accepted: 8 June 2024 / Published online: 15 July 2024



2017

Depth: 6”-24”

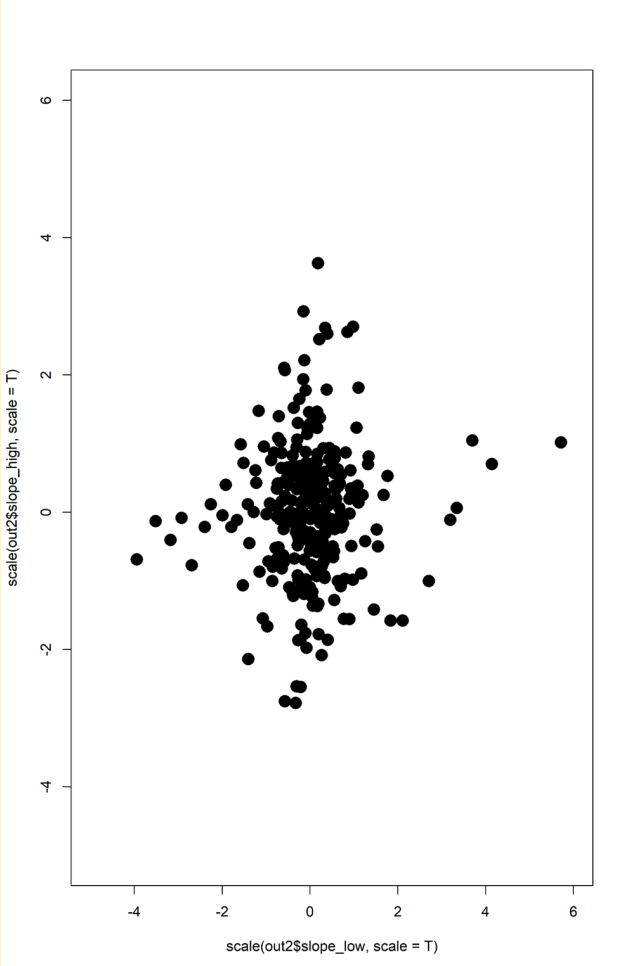
Results of McNellie *et al.* and Temme *et al.*:

Trait	Salinity	Chr.	Position
Leaf Area	Slope	12	61,311,476
Leaf Weight (suggestive)	High	10	20,541,564

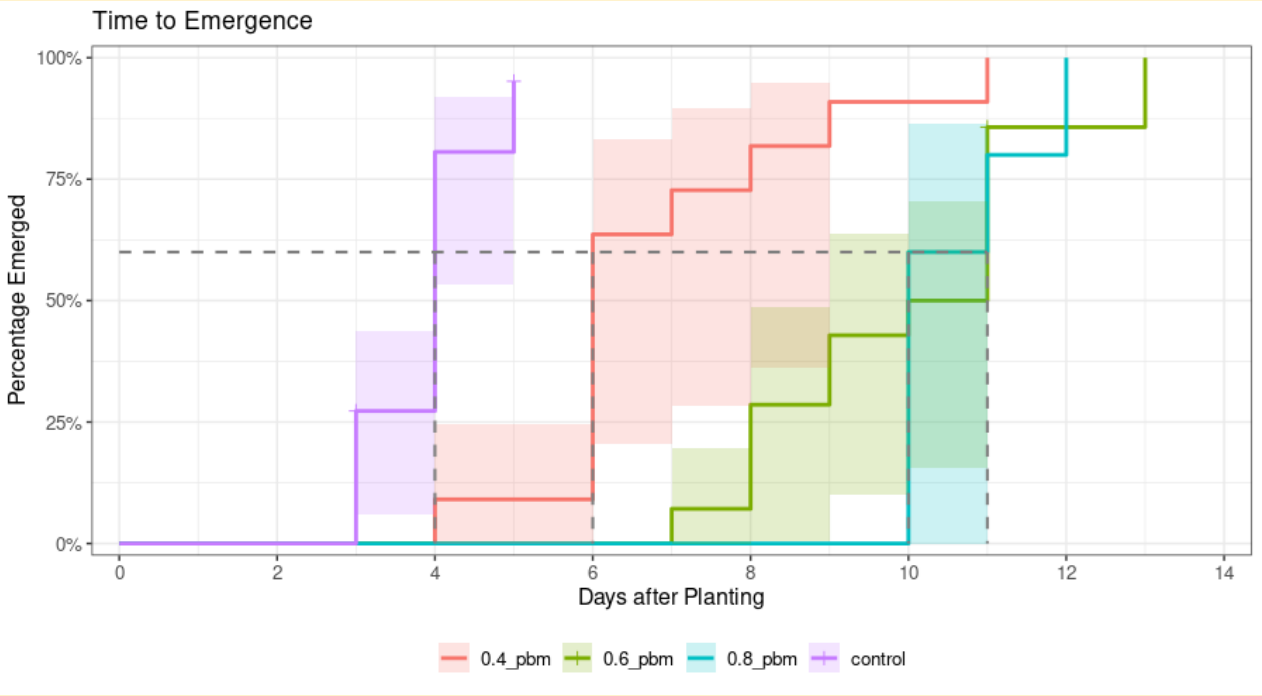
Temme et al. 2020

- Height & plant mass
- Leaf & plant mass

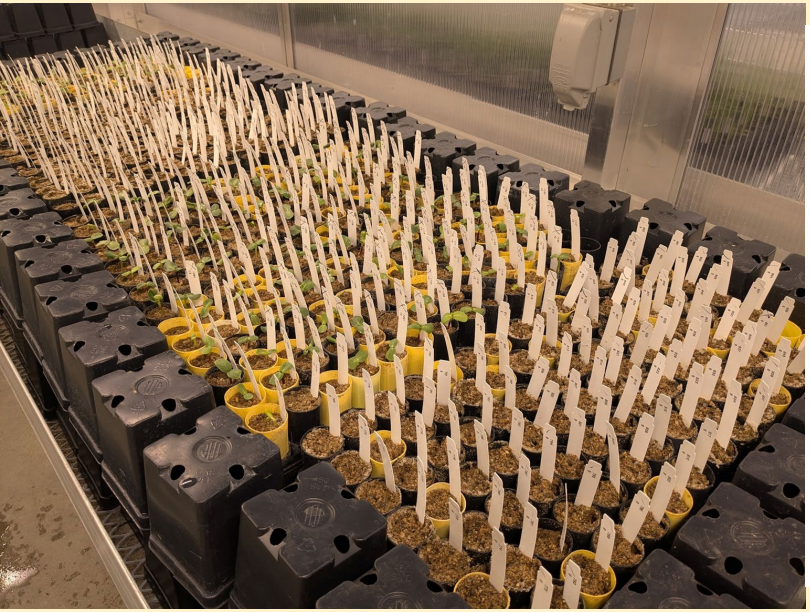
Motive for continuing the search

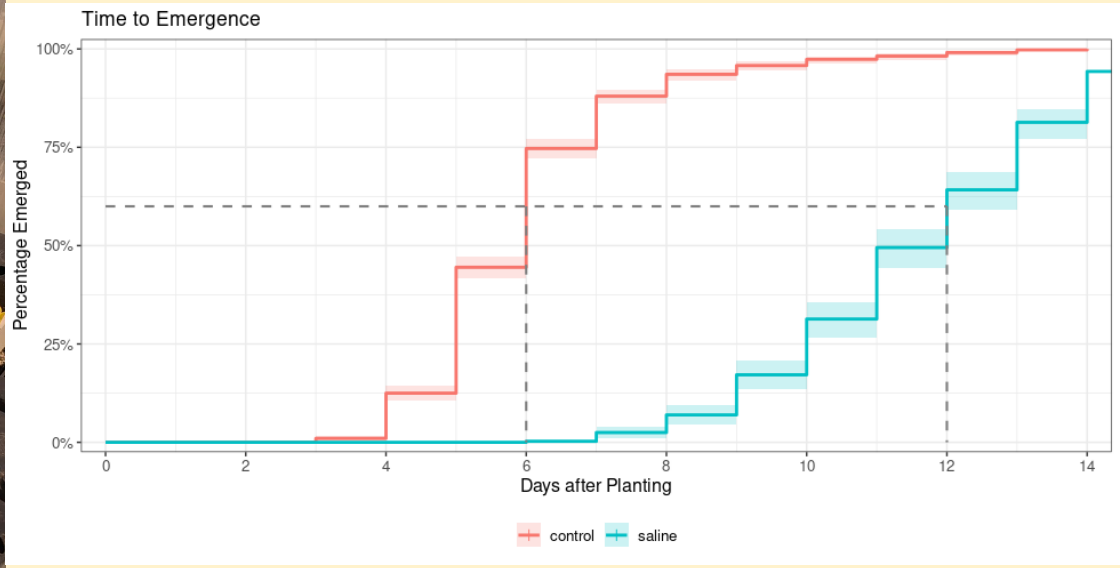


Methodology

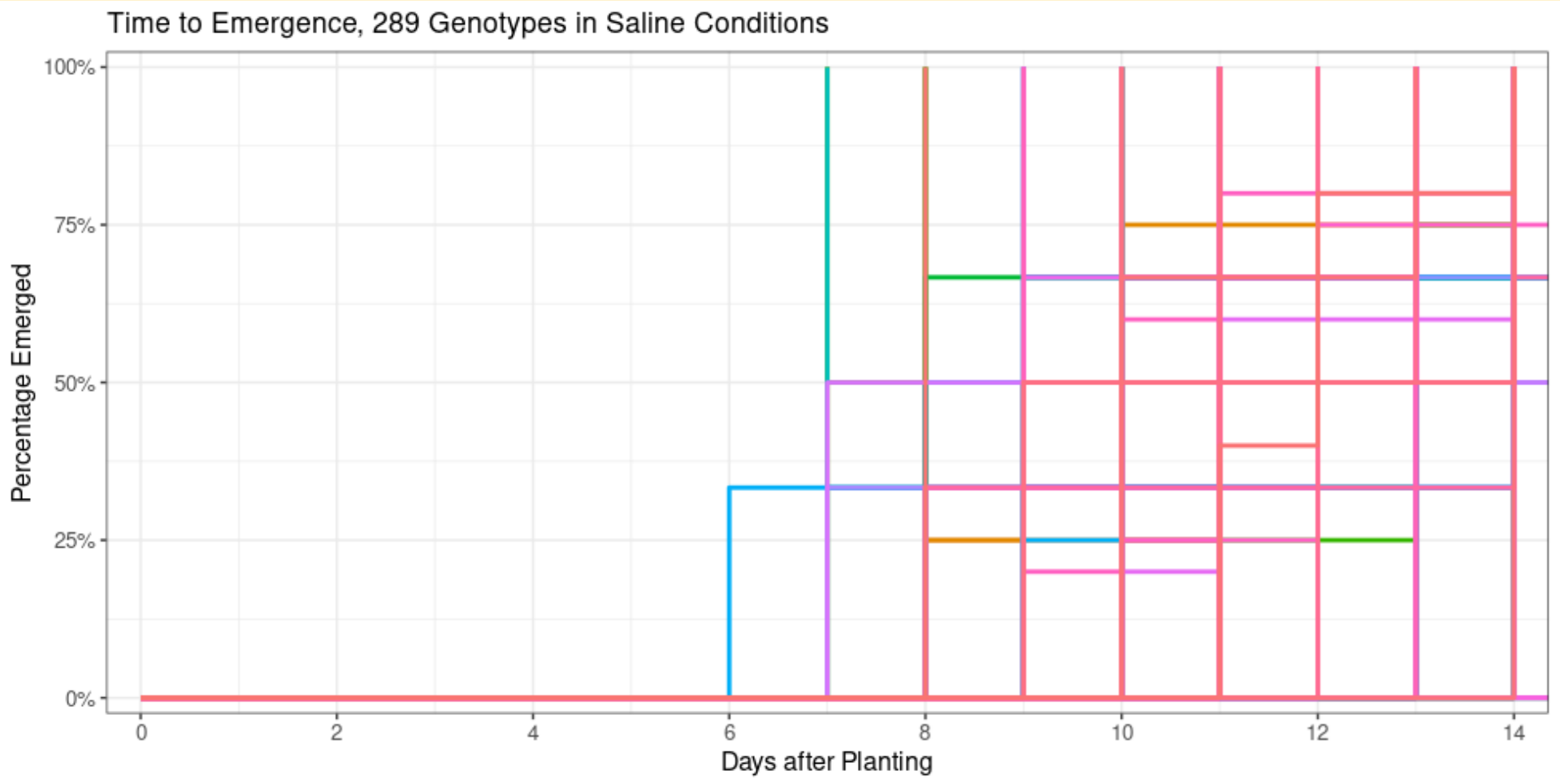


Preliminary Results





A truly ugly plot



What’s Next:

- With phenotyping winding down, the project should wrap up shortly.
- Some additional replicates may be necessary.
- Various models to test.
- Reconnecting this greenhouse work to field data.

Questions!

Authors:
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(and likely more)

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