The significance of *Brachypodium distachyon* in agricultural research

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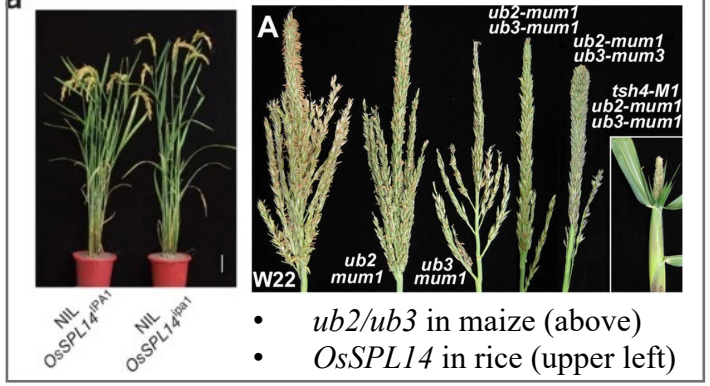
Importance of *Brachypodium*

- *Brachypodium* is a great grass species to study crop genetics in maize. They are distant evolutionary relatives within the grass family.
- Maize orthologs in *B. distachyon* are used to study the evolution of gene function in grass plants.
- We plan to study *Brachypodium ub2* gene function, and the maize ortholog *unbranched2/unbranched3* (*ub2/ub3*).

ub2/ub3 regulate grass branch events



- *ub2/ub3* in maize (above)
- *OsSPL14* in rice (upper left)

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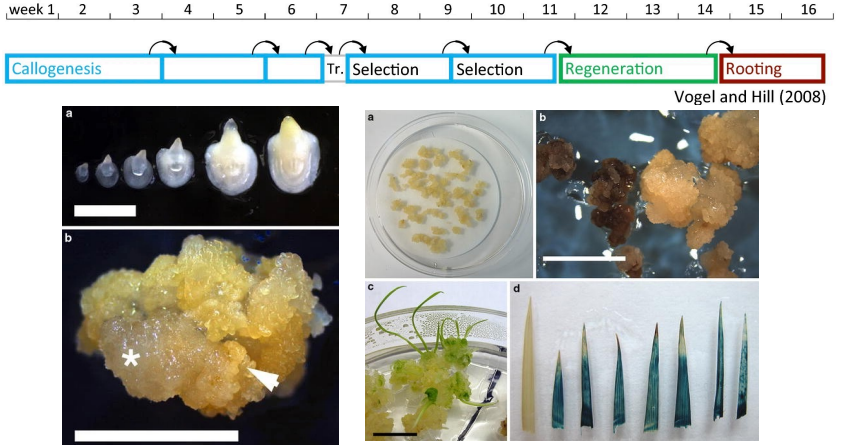
What is *Brachypodium distachyon* ?

Brachypodium distachyon (*B. distachyon*) is a model grass organism that is used to study the effects of genetic mutations, which can be applied to staple crops such as wheat, barley, rye, rice, sorghum, and maize.

Why?

- Easy to grow in a lab
- Easy to transform
- Short seed-to-seed life cycle

Brachypodium transformations and workflow



Maize genetic work on research farm

Apart from *Brachypodium* work, I am working on maize to speed up the research in *ub2/ub3* gene functions.

- Shoot bagging
- Phenotyping
- Trait investigation

Conclusions and moving forward

- *Brachypodium gt1* embryos dissected, plans to mutate and study phenotypic effects
- Mutate *ub2/ub3* transcription factor region of wild type *bd21-3* and *Brachypodium gt1* (grassytiller1) plants
- Shown to regulate rate of lateral primordia initiation (leaves, tassel branches, kernels)

References:

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- Liu et al., 2021, https://doi.org/10.3390/ijms22105167
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- Vogel and Hill, 2008, https://doi.org/10.1007/s00299-007-0472-y