Breeding for CLCuD Resistance

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Breeding for CLCuD Resistance

Agenda:

- **Breeding for resistance to the new CLCuD '*Burewala*' strain.**
  - **New source of resistance**
  - **Methodology**
  - **Plans for the future**

Breeding for CLCuD Resistance

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- **Breeding for resistance to the new CLCuD strain, *Burewala*.**
  - **New source of resistance**
  - **Methodology**
  - **Plans for the future**
- **Partnerships between Industry stakeholders, NGOs and cotton experts to improve cotton production in Pakistan.**

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- **Incorporate new CLCuD resistance into elite Pakistan commercial materials.**

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- Incorporate new CLCuD resistance into elite Pakistan commercial materials.
- Increase the genetic diversity in Pakistan by introducing US germplasm.
- Develop CLCuD resistant US commercial germplasm.

Breeding for CLCuD Resistance

CLCuD in South Asia

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- It has spread to India, China and Philippines.
- In 2015, Pakistan was hit by a 35% reduction in projected yield. CLCuD was a major factor.

Breeding for CLCuD Resistance

Mac 7

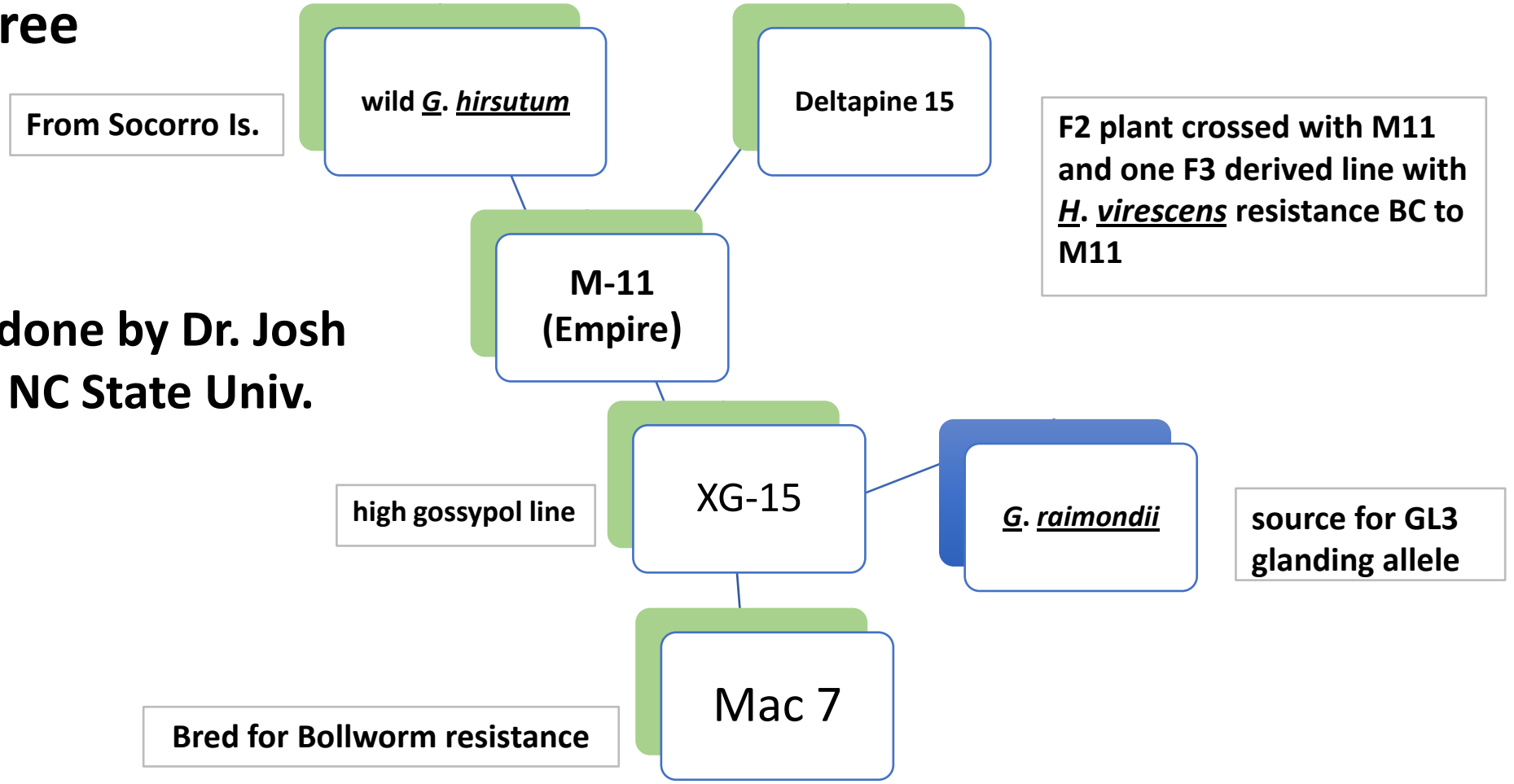
- **Identified as resistant to the "*Burewala*" strain.**
- **Released as a germplasm line by the USDA in 2014, GVS 8 and GVS 9. (Dr. Jodi Scheffler)**

Breeding for CLCuD Resistance

Mac 7

- **Unique pedigree**

Original work was done by Dr. Josh Lee, a cytologist at NC State Univ.



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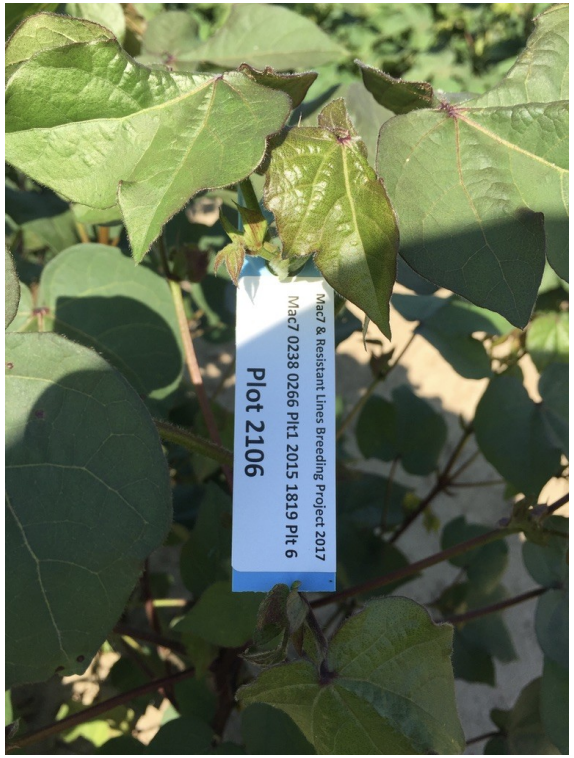
- Linkage drag has been observed in single crosses.
- Resistance is controlled by two dominant genes conferring complete resistance. One gene exhibits tolerance.

Breeding for CLCuD Resistance

Reselected Mac 7

- Reselected lines were screened for CLCuD resistance.
- The agronomic phenotype looks more similar to a tetraploid.



Breeding for CLCuD Resistance

Breeding Method for Pakistan

Crosses (2017)
Stoneville, MS

F1 cross with Pakistan lines
- 3 – way cross

F1-F3
2018-19
- Modified Bulk-SSD method
- Derive lines on F3, run HVI.

Progeny rows
2020
- Test HVI

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- Test in multi locations
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- Utilize winter nursery.
- Plant segpops in CLCuD hot spots.
- Harvest single locks on selfing generations.
- Another BC to commercial types (modified BC).

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Breeding CLCuD resistance for the US.

- A similar method will be used to incorporate CLCuD resistance in US commercial cotton germplasm by using US elite materials in the 3-way cross.
- These will involve using the winter nursery in Costa Rica.

Breeding for CLCuD Resistance

Breeding CLCuD resistance for the US.

- A similar method will be used to incorporate CLCuD resistance in US commercial cotton germplasm by using US elite materials in the 3-way cross.
- These will involve using the winter nursery in Costa Rica.
- To screen the derived lines for CLCuD, a portion of seeds from the single plants will be sent to Pakistan for evaluation. Resistance will be confirmed in later generations.

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Related Projects:

- **Markers are under development.**
- **MS4 male sterile populations have been develop with this CLCuD genes.**

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Related Projects:

- **Markers are under development.**
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- **Other sources of CLCuD resistance are being pursued by several groups.**
  - **A resistant wild looking tetraploid from Brazil has been identified.**
  - **Researchers in Pakistan are using the diploid (*G. arboreum*) as a source of resistance.**

Acknowledgements

- Dr. Jodi Scheffler, USDA Stoneville Research Station, Leland, Mississippi
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