Rust Diversity and Screening for Resistance: An Update

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Sunflower Rust Research

1. Race Assessment

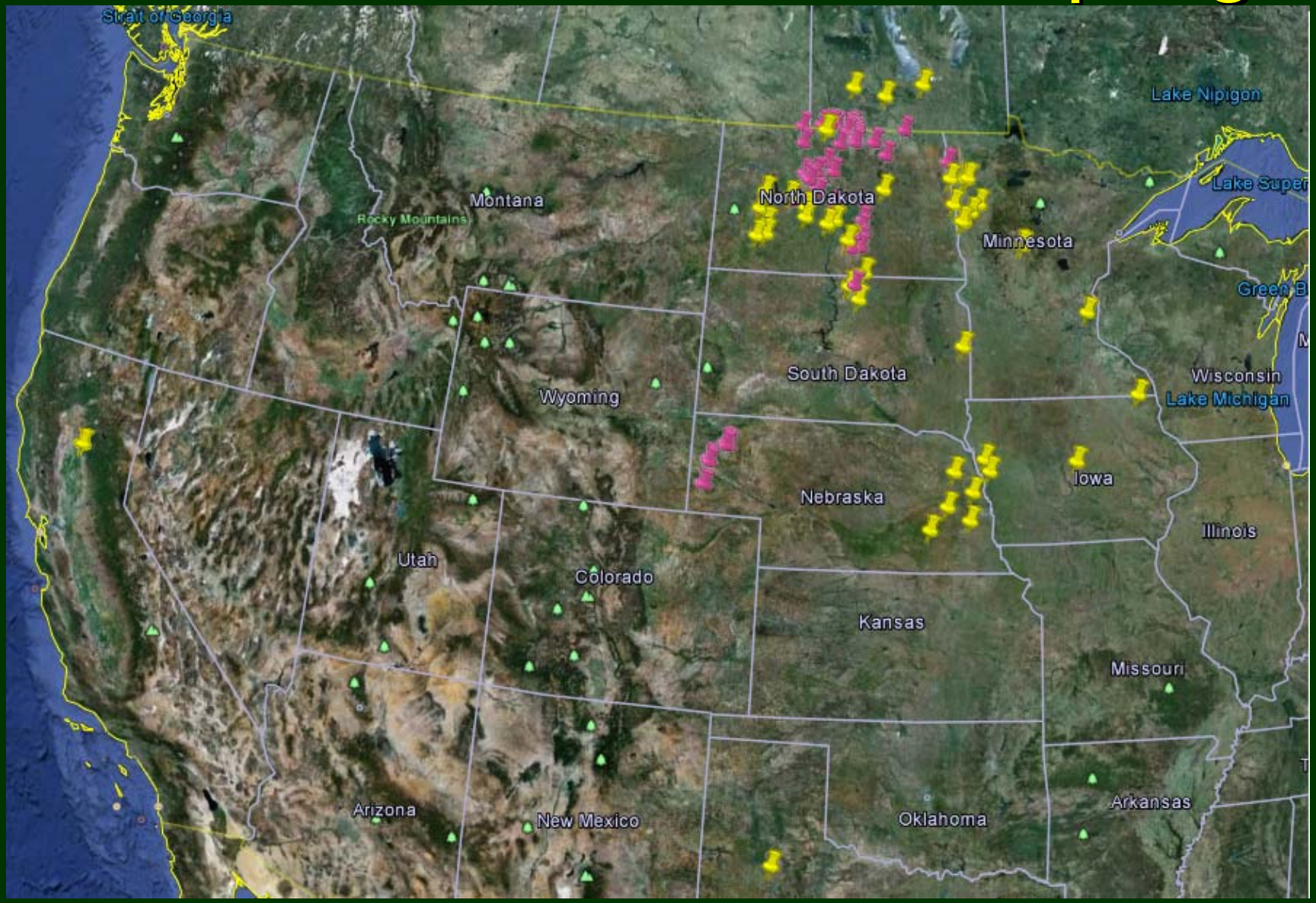
    -Surveys conducted in 2011 and 2012

2. Screen Sunflower Germplasm

    -Field screening summer 2012

    -Greenhouse screening 2013

Race Assessment – Sampling



Pink - 2011 **Yellow - 2012**

Race Assessment - 2011

2011 Survey

- 129 single pustule isolates characterized
- Obtained from NE, ND, and SD
- 17 races detected
- Races 300 and 304 were the most commonly detected
- Most virulent race detected was 776

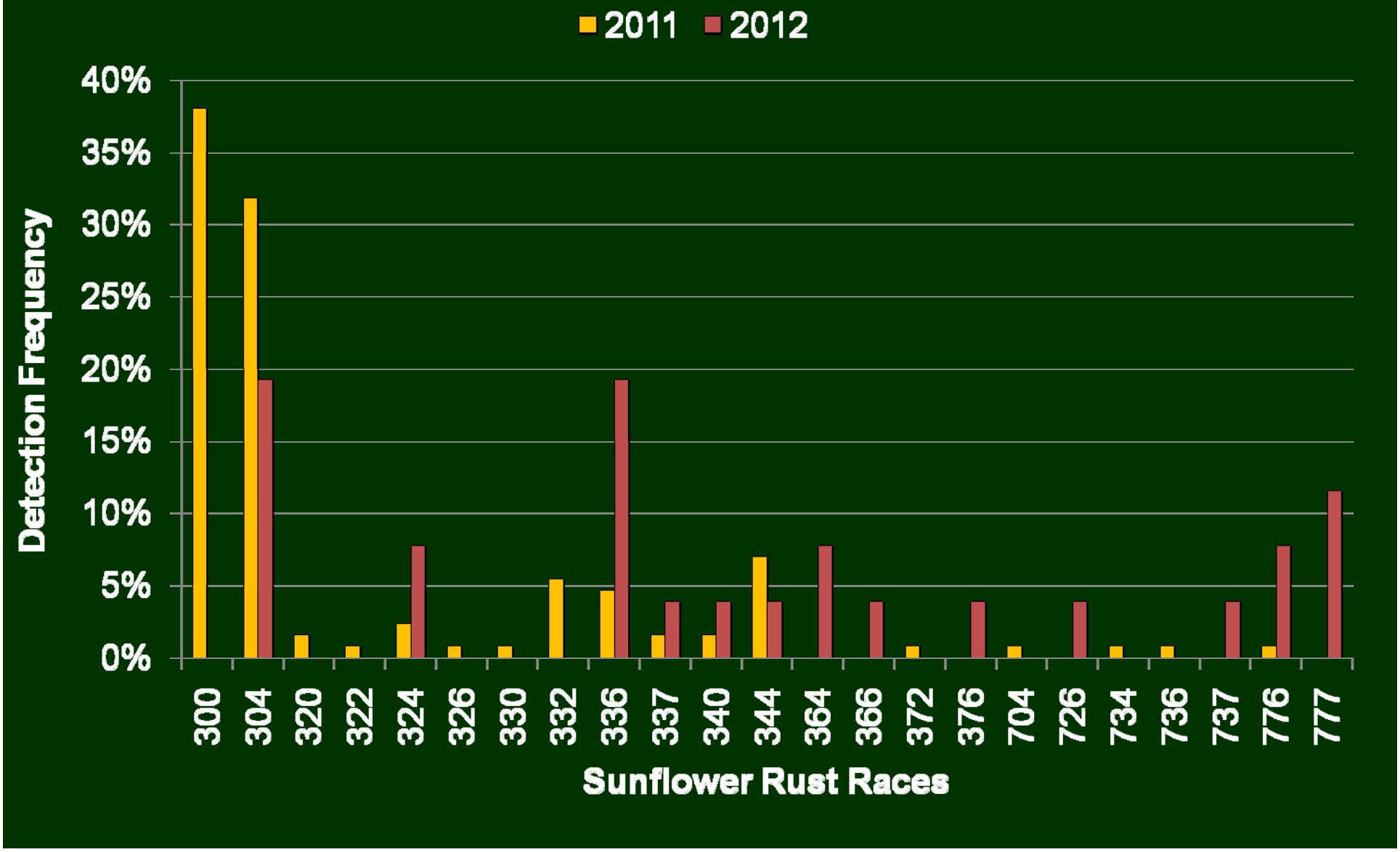
Race Assessment - 2012

2012 Survey

- 117 single pustule isolates to be characterized
- Obtained from CA, Canada, IA, MN, NE, ND, SD, and TX
- 13 races detected so far
- RACE 777 has been detected

Results

Rust races and % detection from single pustule isolates



Race Assessment – Wrap up

- Finish up phenotypic data for 2012 isolates
- Extract DNA from all isolates for genotypic analysis
- Genotype by sequence procedure will be used
- Compare isolates from 2011 and 2012

Germplasm Screening

Field Germplasm Screening

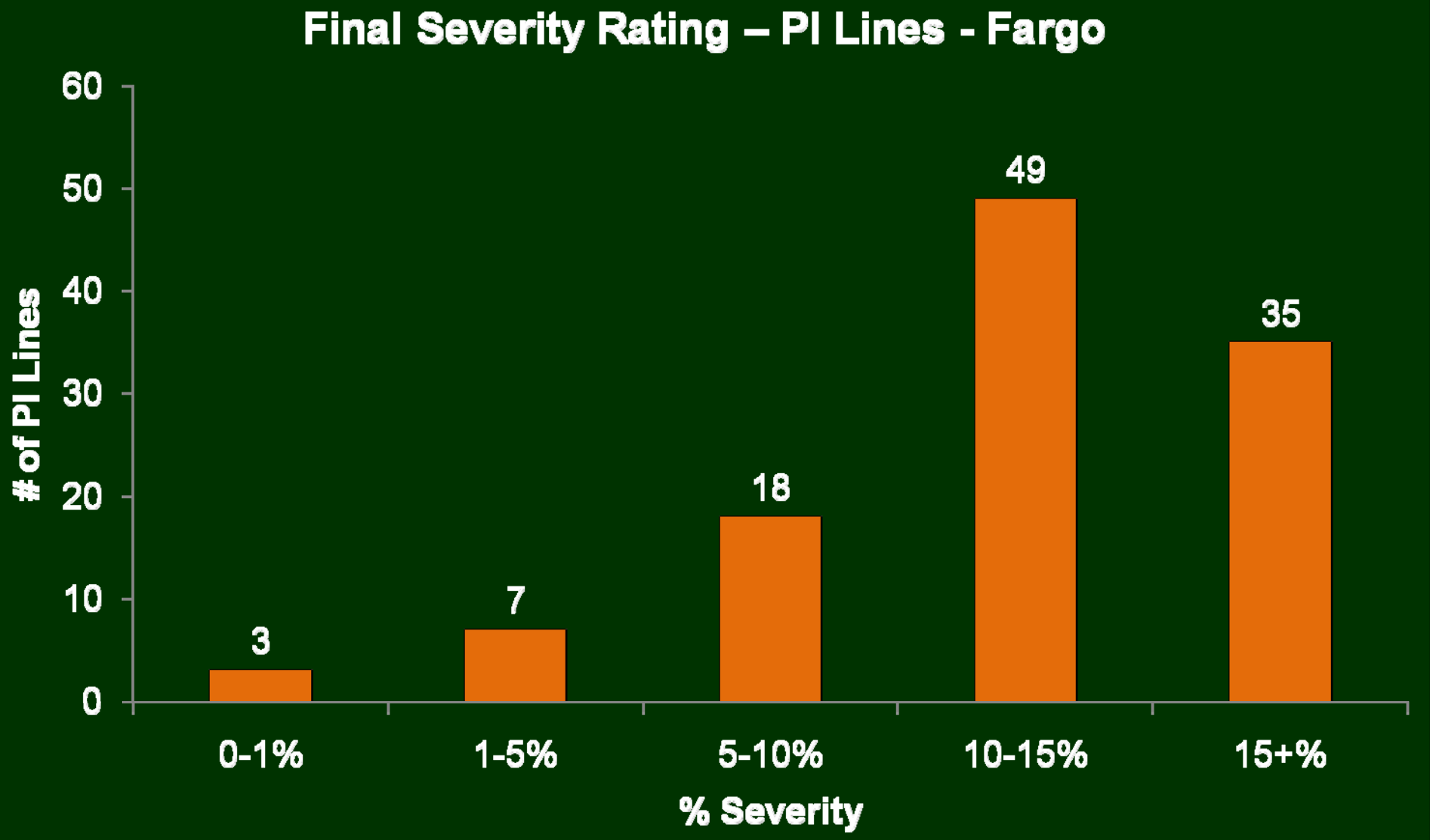
- 113 PI lines obtained from North Central Regional Plant Introduction Station
- 8 lines from USDA
- 9 differential lines
- Planted at 3 locations

  -Langdon, ND; Fargo, ND; Staples, MN (irrigated)
- Spreader rows inoculated with races 300, 304, 336, and 337
- Severity rated on sporulating leaf area on ~11 plants/line/rep

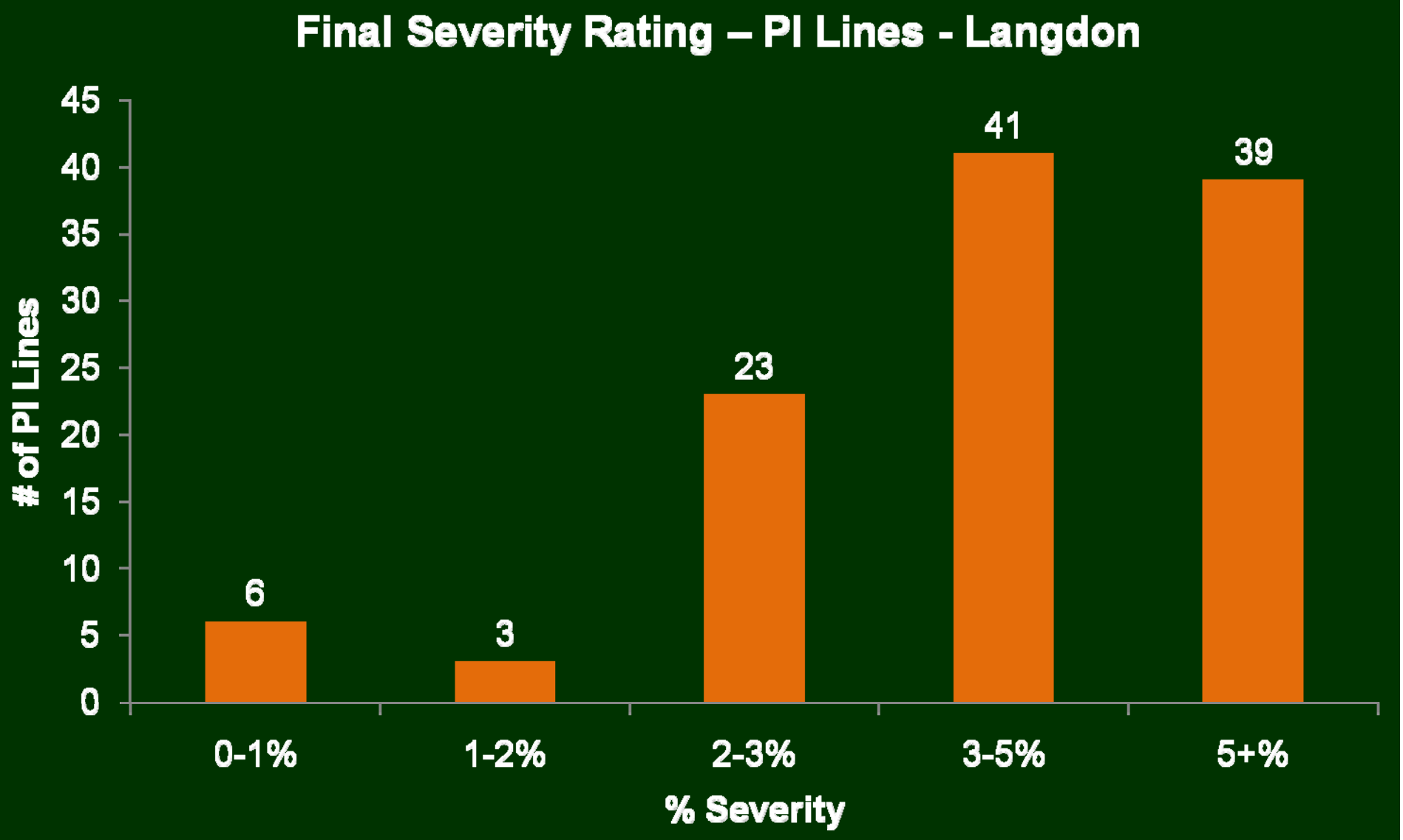
Field Germplasm Screening

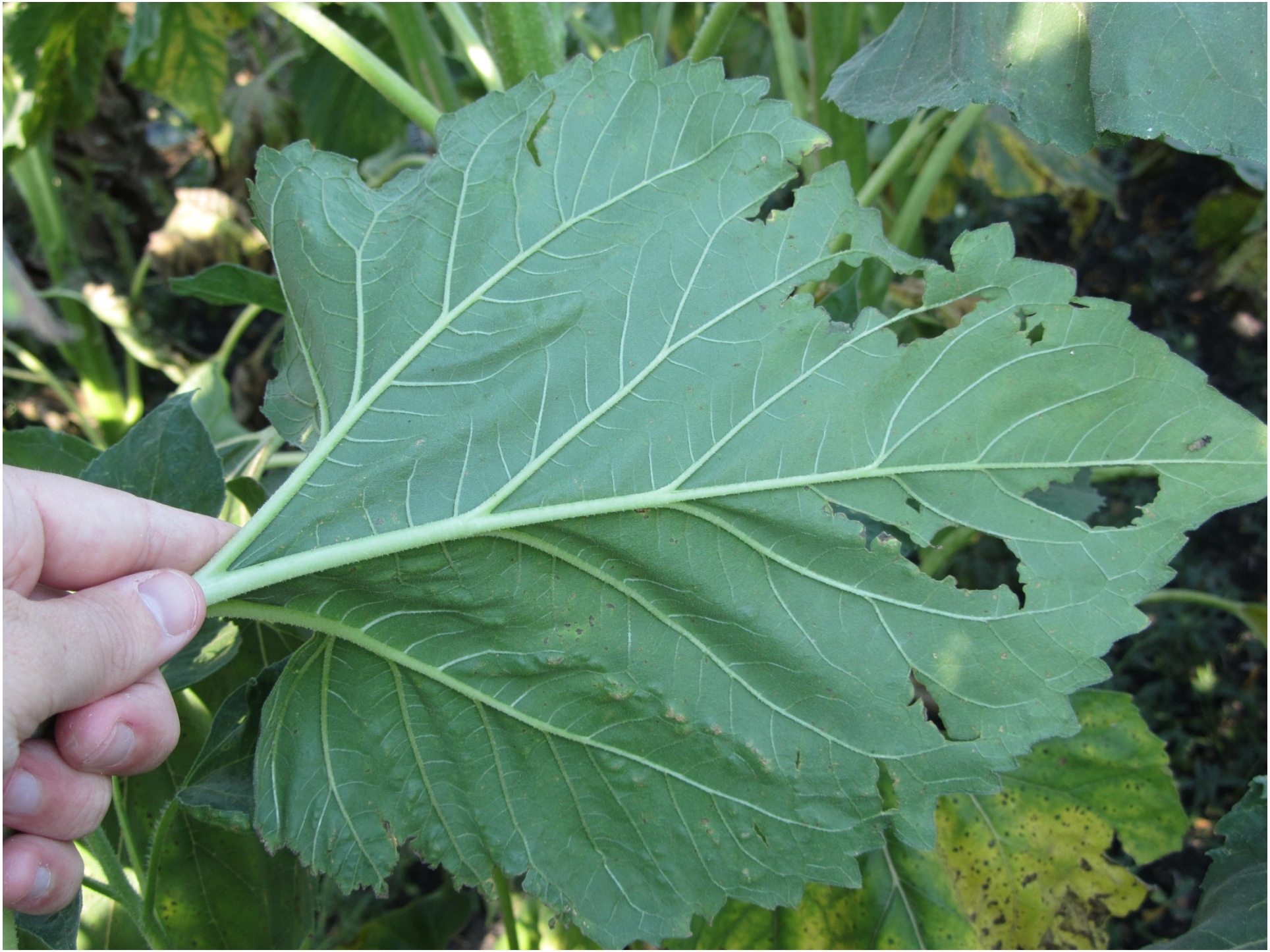
Location	Rust Pressure
Fargo	High
Langdon	Intermediate
Staples	Trace

Germplasm Screening Results



Germplasm Screening Results





Germplasm Screening Summary

- Locations varied in disease pressure
- Three PI lines had rust severity <1% at both Fargo and Langdon

  -One line had zero to trace levels of rust
- Lines will be assessed in greenhouse for resistance to races 300, 304, 336, 337, 776, and 777
- Results from both studies will be examined

Acknowledgements

- National Sunflower Association
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