

# **Update on Resistance to Banded Sunflower Moth in USDA Inbreds and Related Germplasm**



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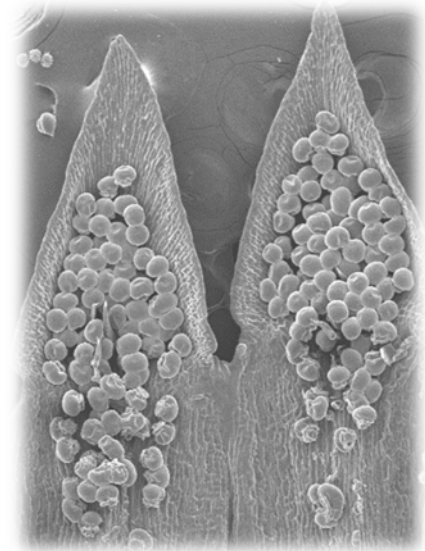
**USDA-ARS-RRVARC, Fargo, North Dakota, U.S.A**

# Presentation Outline

- **Update on mapping insect traits**
- **BSM and glandular trichome population**
  - Test of ‘secondary’ explanation for variation
- **BSM and R-line susceptibility**
  - Inbred correlation with hybrids (common parent)

# Update on mapping insect traits

- **Glandular trichome variation (#)**
  - Two QTL found
  - doi: [10.3389/fpls.2017.02227](https://doi.org/10.3389/fpls.2017.02227)
- **Red seed weevil resistance**
  - Found one marker in mapping effort
  - More work needed to refine interval, validate
- **Brent can provide additional details**



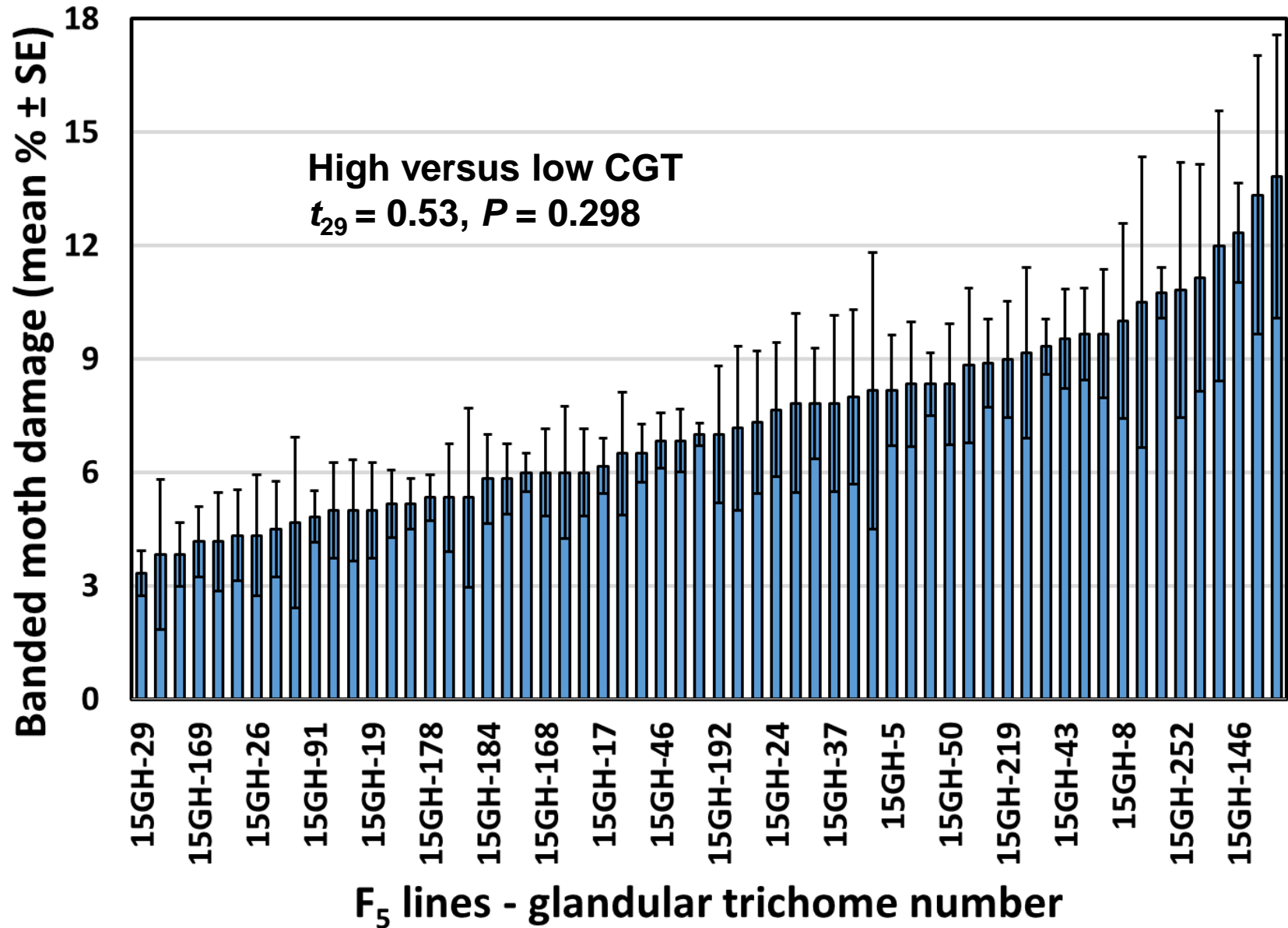
# BSM and Trichome Number



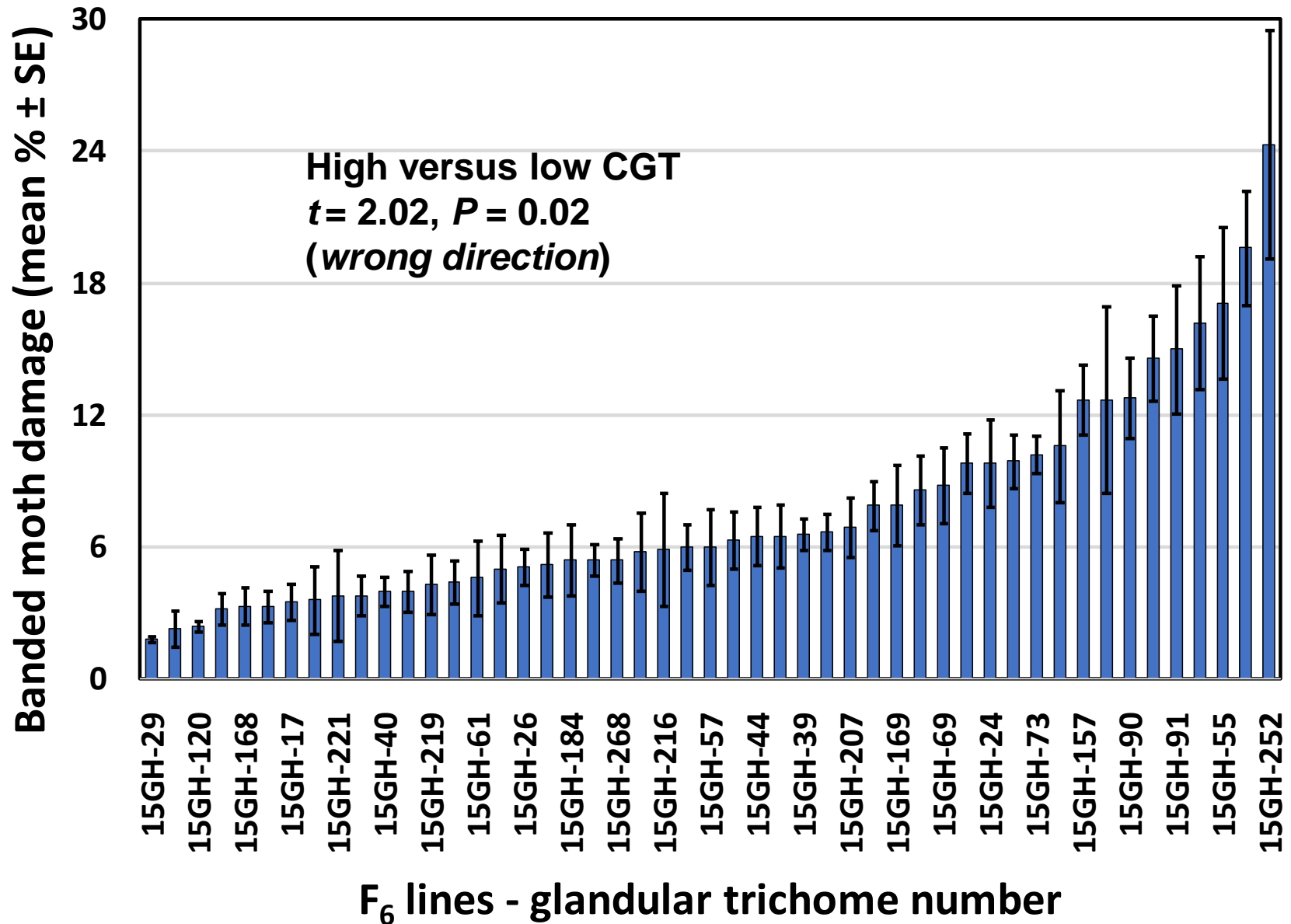
- **HA 300 × RHA 464 for mapping**
  - Trait against sunflower moth
  - Trichome extracts active against many insects
  
- **Banded moths in Casselton, ND**
  - F5 – 30 high, 30 low CGT lines
  - F6 – 22 high, 27 low “ “ “
  - 5 replicates each year
  - X-ray achenes for % damage data



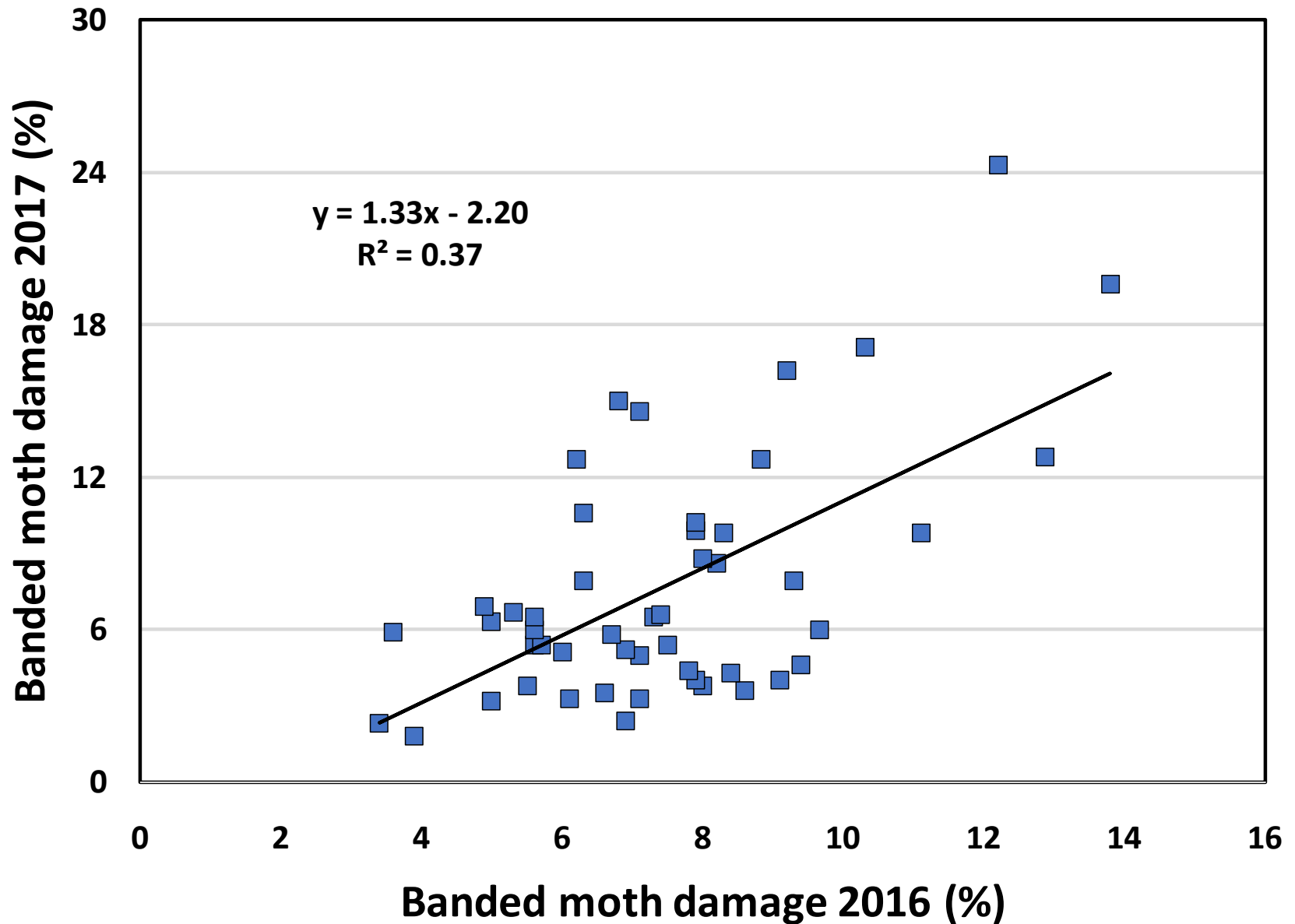
# Trichome Number, 2016



# Trichome Number, 2017



# Trichome Number, 2016–2017

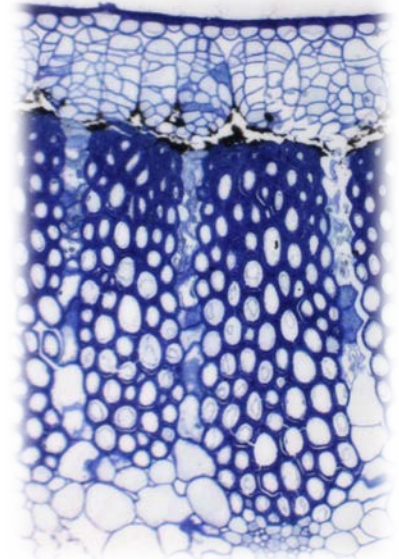




# Trichome Number



- **Why weren't high CGT lines better?**
- **Banded moth  $\neq$  sunflower moth**
- **STL composition limits effects**
- **Other traits (pericarp strength)**
  - **Tested 10 least, most damaged in 2017**
  - **Least damaged lines NOT tougher**



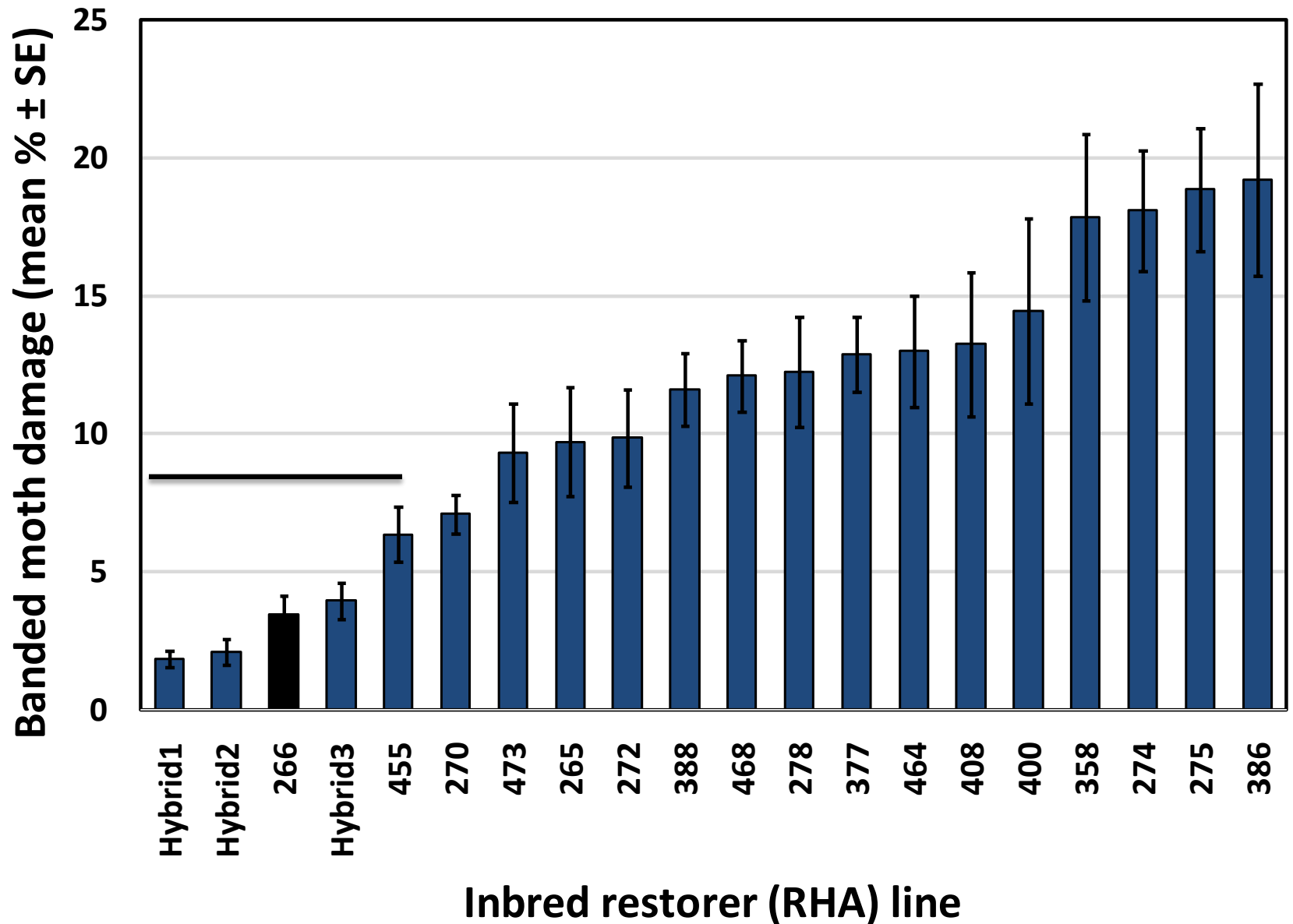


# BSM and USDA R-lines

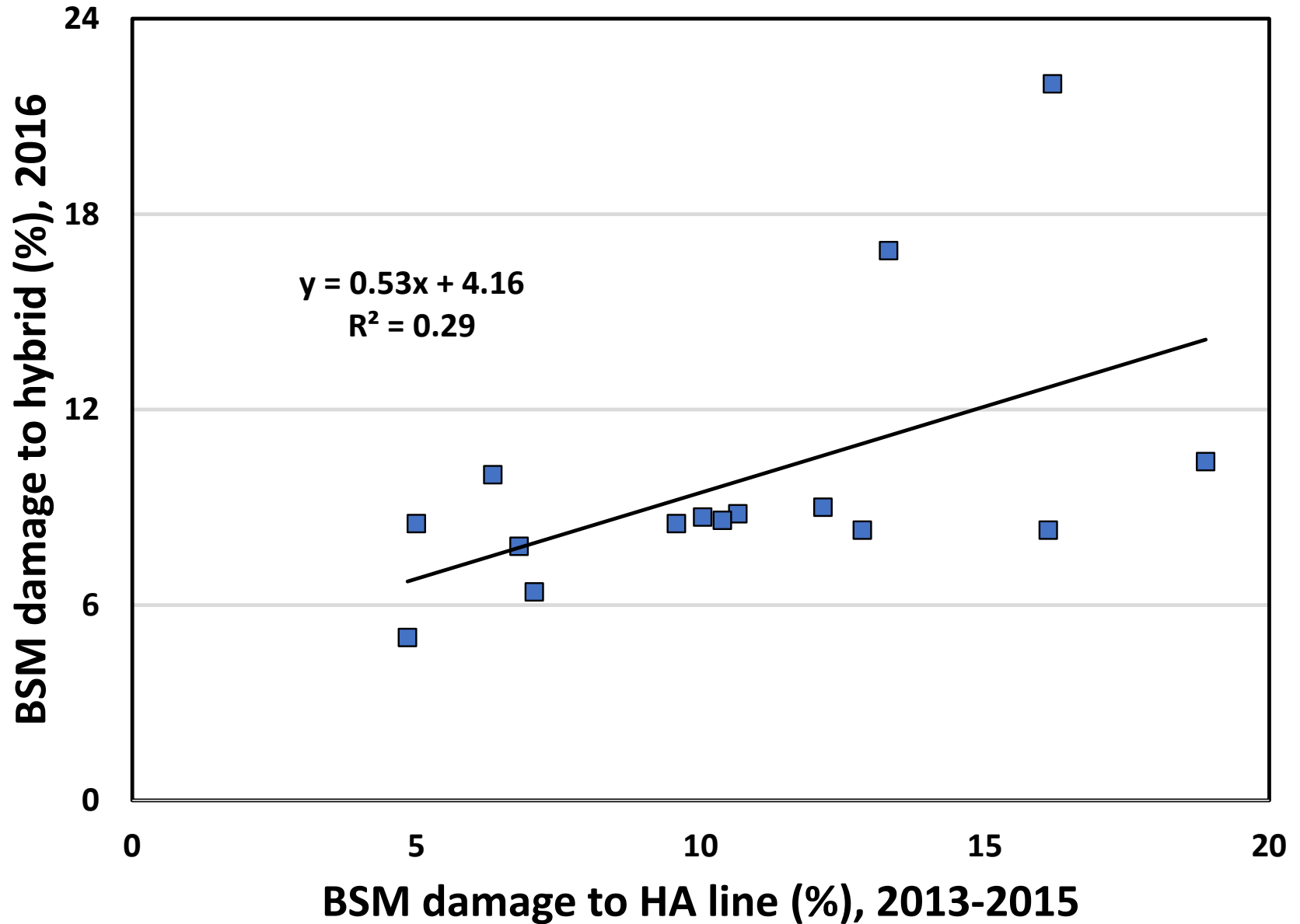


- **Tested in 2013–2015 in Casselton, ND**
  - Overlapping trial showed variation in B-lines
  - doi: [10.4039/tce.2016.32](https://doi.org/10.4039/tce.2016.32) (or email me)
  - *Also compared R-lines to commercial hybrids*
- **Testing inbred-hybrid correlation**
  - Use all B-lines x common male (RHA 266)
  - 5 replicates each year
  - 2016 data complete, 2017 still going

# BSM and R-lines, 2013–2015



# R-lines and Hybrids (RHA 266)



# Summary

- **No glandular trichome benefit in 2016–2017**
  - **Seed damage not explained by pericarp strength**
- **BSM damage USDA inbreds varies**
  - **Best R-line seemed to benefit most hybrids**
- **Resistance not explained by known traits**
  - **Map without understanding mechanism?**

# Acknowledgements

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  - BSM samples
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