

Pod Shatter in Canola

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Outline

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Background

- Canola is the main oilseed crop grown in western Canada, and *Brassica napus* L. occupies 99% of the acres grown
 - The majority of acres are sown to hybrids
- *B. napus* was only domesticated as an oilseed crop 400-500 years ago, and shatter resistance was not targeted during domestication
 - Consequently, pod shatter remains a problem in canola production
 - There is a lack of shatter resistant germplasm within *B. napus* commercial lines
- Pod shatter causes economic concern:
 - Lost seed during harvest causes loss of revenue
 - Increased weed pressure from volunteer canola in following years (Seeds persist for up to 7 years)

More Background

- Pod shattering could be reduced not only through increased pod strength, but through selection of beneficial agronomic characteristics that have indirect effects on shattering potential
- Studies have found that plant height^{a&b} and plant vigor^b are correlated with less in-field pod shatter
 - There are also studies that have found no significant correlations between agronomic characteristics and shattering^c
- Pod shattering does not occur equally in every environment because it is a result of many variables such as wind and harvest timing

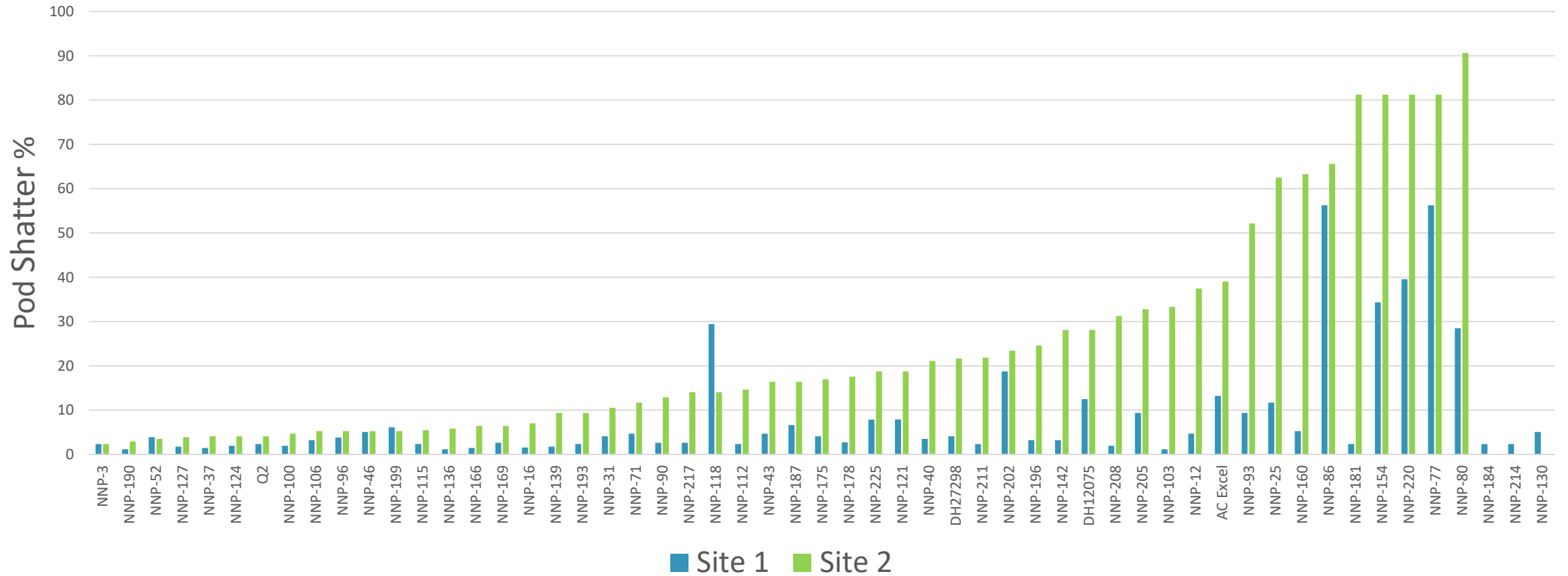
Objectives

- 1. Examine the range of pod shatter resistance in a diverse collection of spring *B. napus* lines**
- 2. Evaluate different agronomic characteristics of each line and the impact of these characteristics on pod shatter resistance**
- 3. Evaluation of hybrid lines to determine if the level of pod shatter resistance could be predicted by looking at the inbred parents**
4. Examine the lines across multiple environments to determine the interaction between pod shatter and the environment

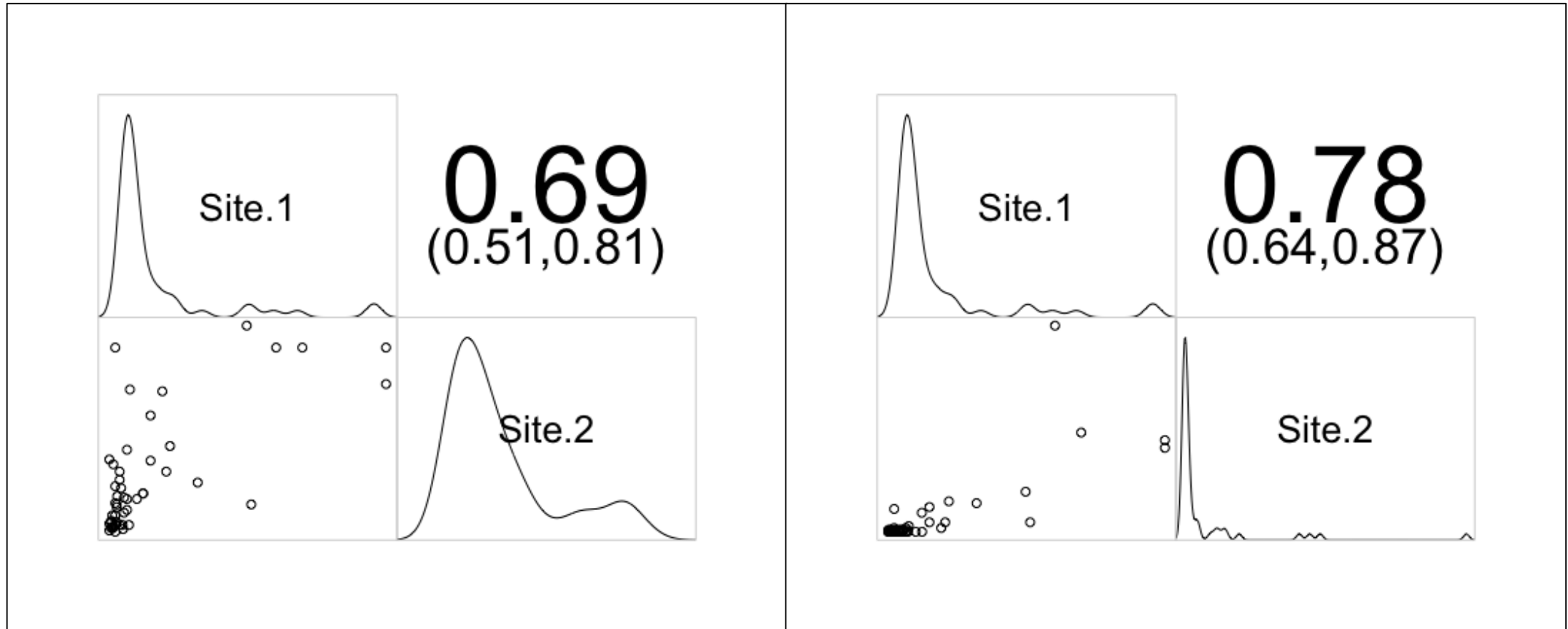
Experimental Design

- A randomized block design was used
- 2 sites
 - 4 replications of the diversity collection at each site
 - Worked with an industry collaborator to generate experimental hybrids using 2 tester females and the diversity collection of male lines
 - Only evaluated hybrids at Site 1
- Several evaluations were taken to assess the differences in plant structure and agronomic characteristics between lines at both sites
 - DTF, DTM, Height, Plant Vigor, AGR, Lodging
 - A disease rating was taken at Site 1 due to high disease pressure
 - Pedicle-rachis and pedicle-pod angles were measured on a main raceme of a single replication of the diversity collection at Site 2

Range of Pod Shatter Across Lines



Correlations Between Sites for % Shatter



Site 1 Julian 271 vs. Site 2 Julian 295

Site 1 Julian 271 vs. Site 2 Julian 273

Correlations Between Agronomic Characteristics and Pod Shatter Ratings

- Only loose correlations were observed at each site
 - No significant correlations were found
- Indication that these correlations are largely dependent on the material being tested, and the environment they are in
- Closely related parameters such as DTF:DTM were highly correlated
- There were moderate correlations observed for some traits, although they were not significant
 - Earlier flowering and maturing material had a tendency to shatter more
 - Lodged material shattered less

Shatter Resistant Lines



NNP-3



NNP-52

Shatter Susceptible Lines

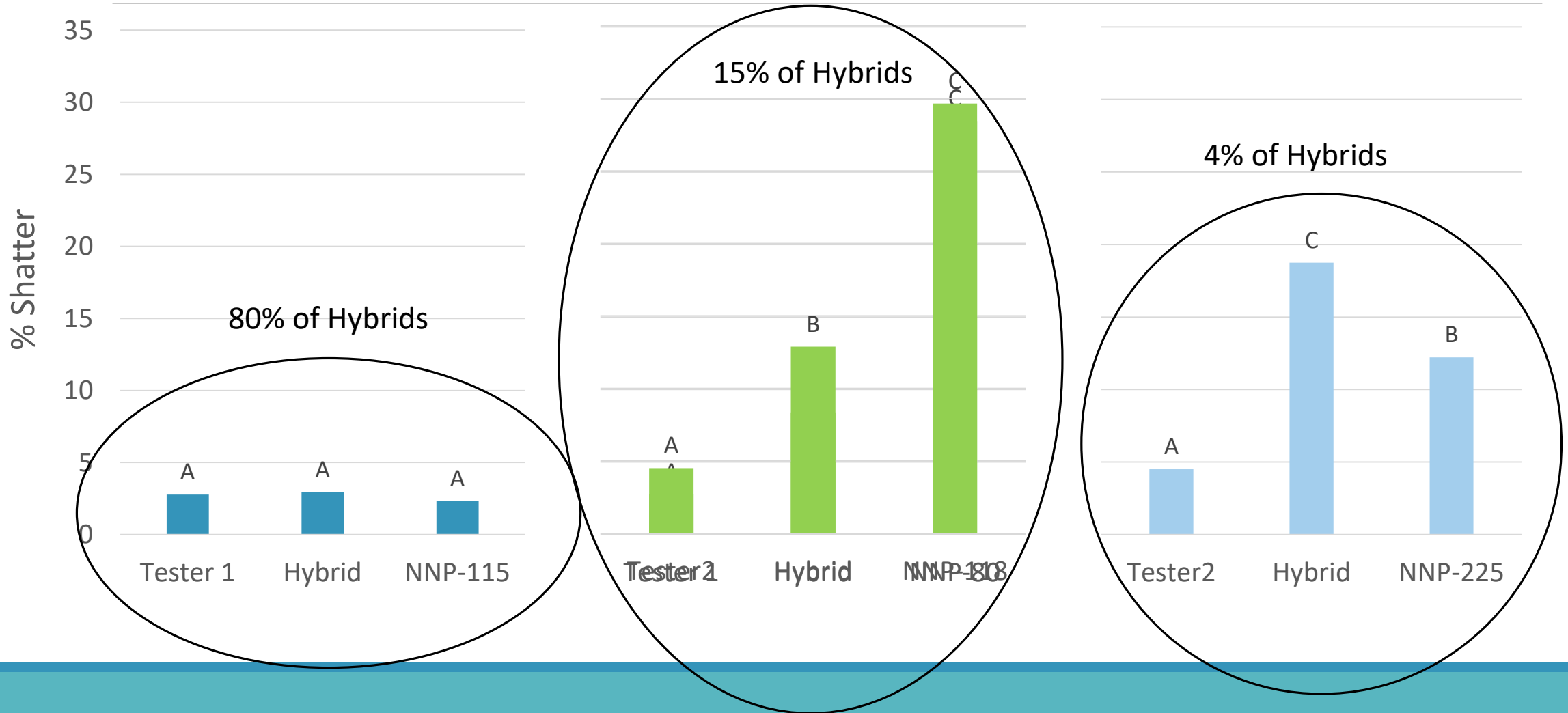


NNP-86



NNP-80

Shattering of Hybrids Relative to Inbred Parents



Conclusions

- Found a wide range of pod shatter susceptibility across the different *B. napus* lines
 - Indication that we have access to pod shatter resistant genes
- No significant correlations were found between any single plant morphological characteristic and pod shatter susceptibility
- Most of the hybrids shattered as expected compared to its parents
 - Small proportion showed a mid-parental level of shattering
 - A few of the hybrids shattered significantly more than either parent

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Field crews at each site

