

# The Oregon Promise Barley Population: A Tool for Understanding the Genetic Basis of Traits Fundamental for Barley Production, Malting, Brewing, and Distilling



Full Pint and Golden Promise, the parents in the Oregon Promise population



The Oregon Promise population growing in Corvallis, OR. Spring 2012.

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## Introduction

The Oregon Promise population is an array of 202 barley doubled haploids developed from the cross of Full Pint x Golden Promise. Golden Promise is an iconic variety for malting, brewing, and distilling; Full Pint is a contributor to the craft brew Renaissance. The Oregon Promise will provide a valuable resource for extending current knowledge of malting and brewing genes to the frontiers of sensory assessment.

## Materials and Methods

- The population was grown in single row plots at Corvallis, OR in 2012-13.
- Phenotypic data was collected for a number of traits including plant height, spike length, barley stripe rust resistance, and an array of malt quality traits.
- The population was genotyped using the Eureka Genomics Next Generation Genotyping Barley SNP panel.
- Linkage maps were made in JoinMap 4.1 using manual curation and imputation.
- QTL analysis was done using Windows QTL Cartographer 2.5.

## Results and Discussion

- Marker orders were as expected, as were linkage group lengths.
- There are gaps in chromosomes 1H and 6H.
- Truncated maps for 3H and 4H.
- Genes with known phenotypes – *denso*, *ari-e.GP* – map to expected locations.
- Novel effects of alleles at known genes: *Vrs1* for TKW and % plump.
- QTLs co-localized with prior reports: Amy and BSR on 5H, *Glb2* on 7H, *Eps2* on 2H.
- Novel(?) QTLs: Spike length on 2H, height on 7H.

## Future Projects

- Regional and international multi-location trials.
- Malt quality data from larger plots.
- Flavor gene discovery.

## Acknowledgments

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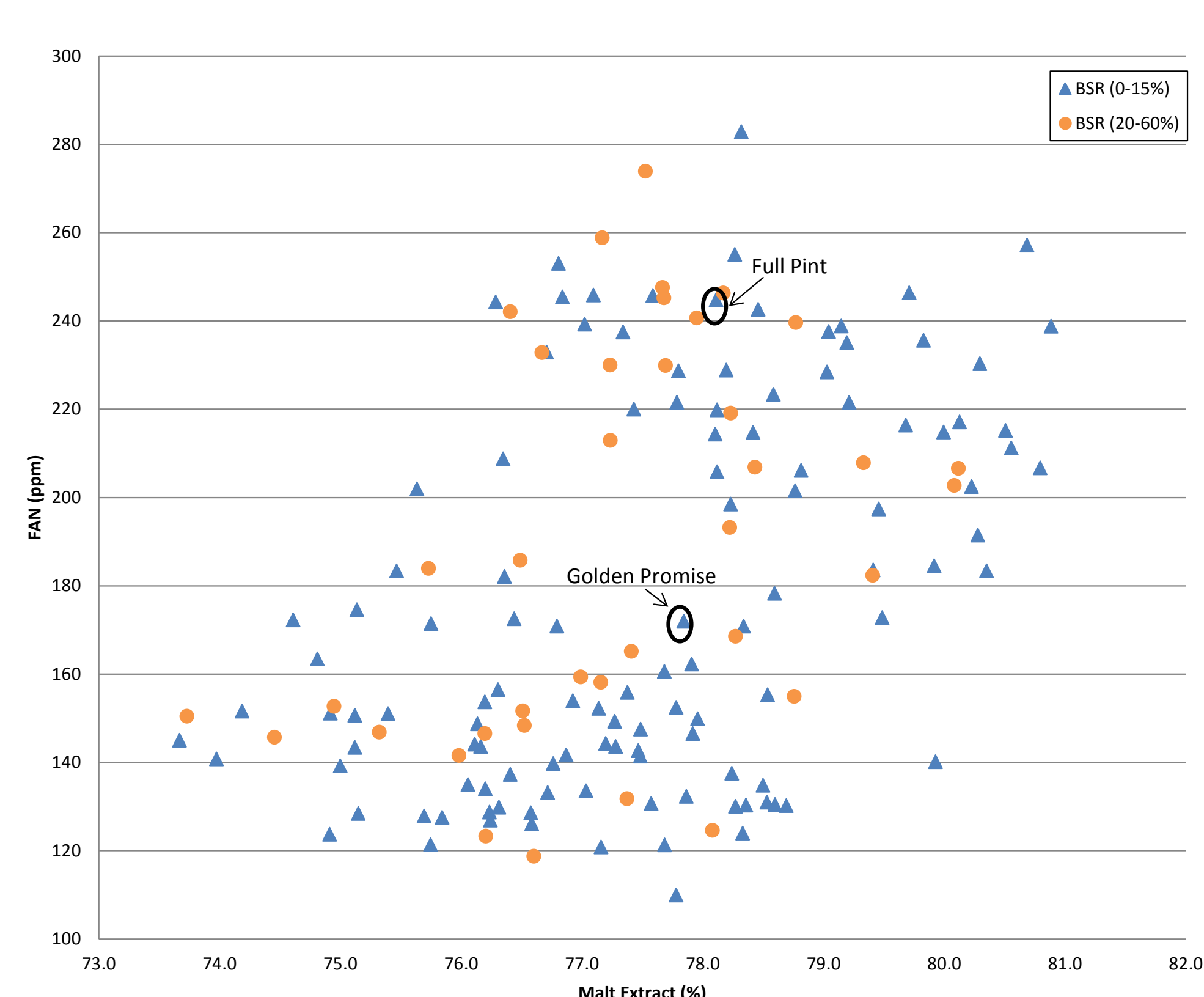
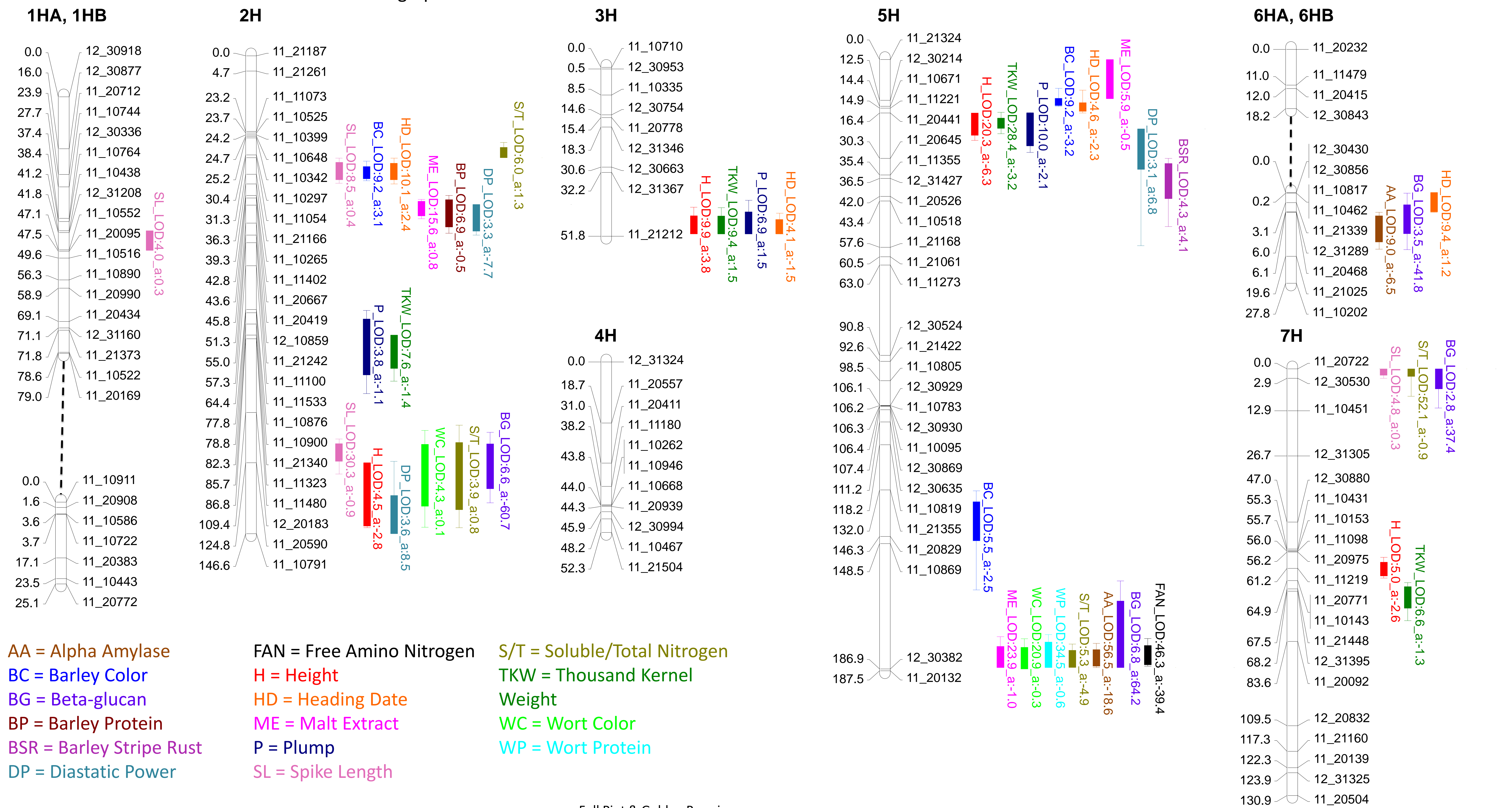


Figure 1. Scatterplot comparing Malt Extract (%) and FAN (ppm), with parents included. Corvallis, OR, 2012-13.

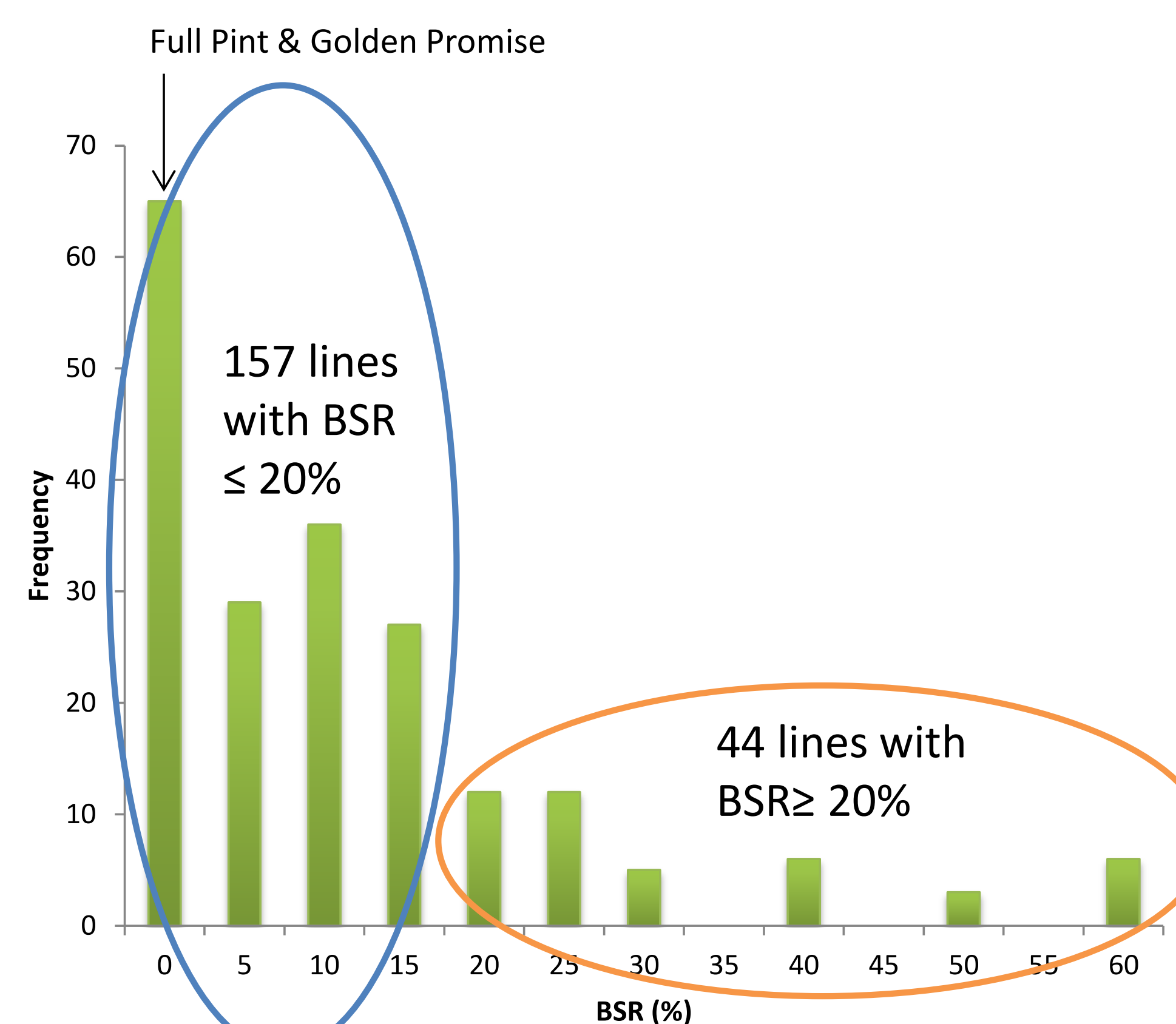


Figure 2. Histogram describing barley stripe rust severity (%). Corvallis, OR, 2012-13.

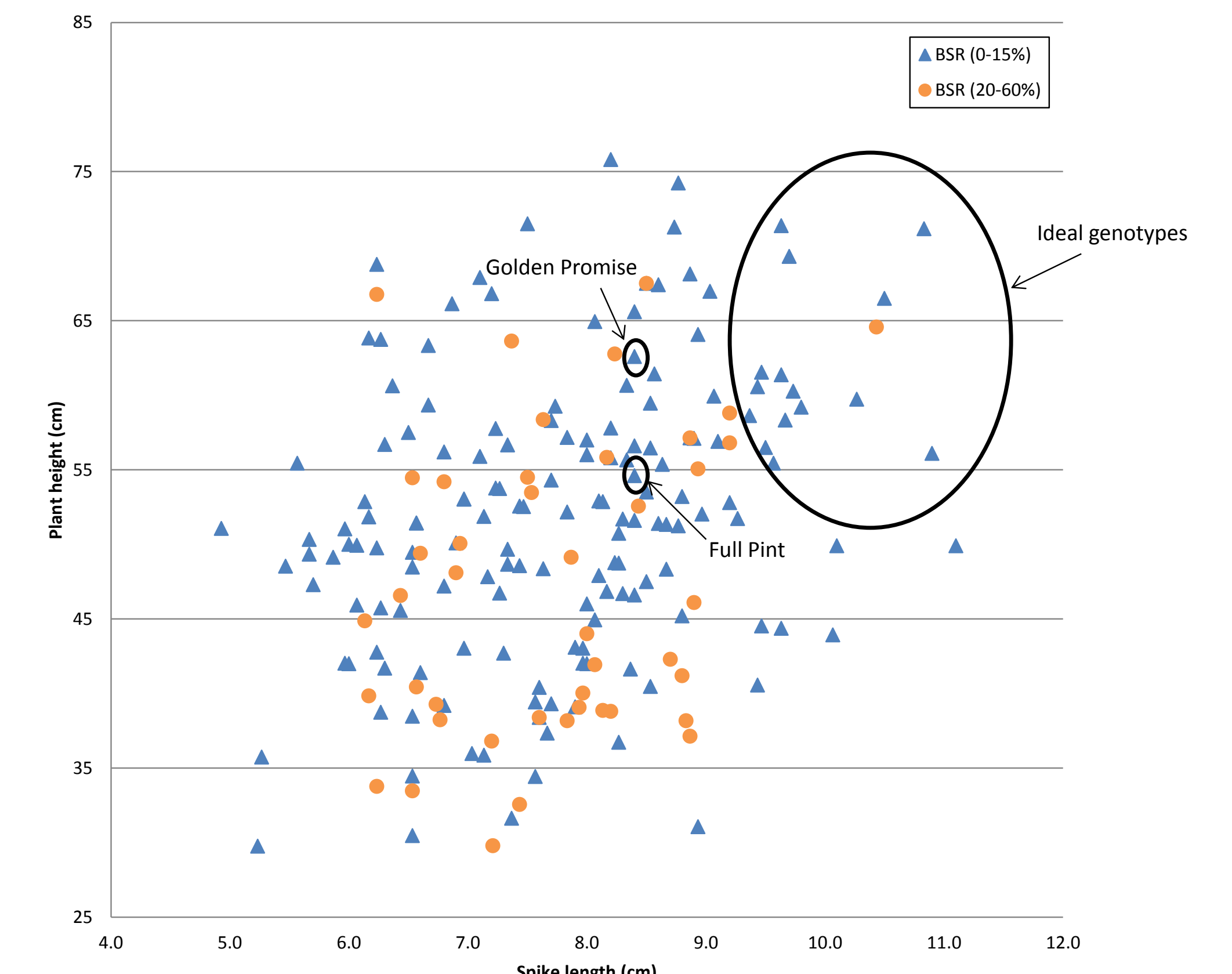


Figure 3. Scatterplot comparing spike length (cm) and plant height (cm), with parents included. Corvallis, OR, 2012-13.