



G X E 2018/19 Maize Project Discussion

CBR G X E Organizational Meeting

March 8th, 2017

www.Genomes2Fields.org

Project Concept:

- ✧ Sample alleles for G X E from ex-PVP, old, and unselected pool
- ✧ Dissect Good G X E (mechanisms allowing specific adaptation) vs Bad G X E (poor performance in specific environments due to poor alleles such as disease susceptibility)



Parameters:

- ✧ Substrate for:
 - ✧ Phenotyping
 - ✧ Modeling/Genome Prediction
- ✧ Minimal barriers to sharing seed and data
- ✧ Use materials with a relatively narrow maturity window
 - ✧ Reduce impact of flowering time on results
 - ✧ More uniform data
 - ✧ Simplify plot management for collaborators
- ✧ Use same genetics across all locations
 - ✧ Division of 2016-17 experiments within G X E is not fully leveraging the breadth of environments
 - ✧ Utilize early testers to adapt to northern sites
- ✧ Experiment should be founded in hypotheses/concepts
 - ✧ Links to previous years is helpful
- ✧ Must be possible to produce large amounts of hybrid seed reliably

The Challenge with Extreme Flowering



Photo from Byron Good

Project Plan:

✧ Populations - mini-NAM DH:

- ✧ PHW65 X PHN11 (ex-PVP x ex-PVP) – “Good” allele source
- ✧ PHW65 X Mo44 (ex-PVP x Old) - “Bad” allele source
- ✧ PHW65 X MoG (ex-PVP x Unselected) – “Ugly” allele source

✧ Tester:

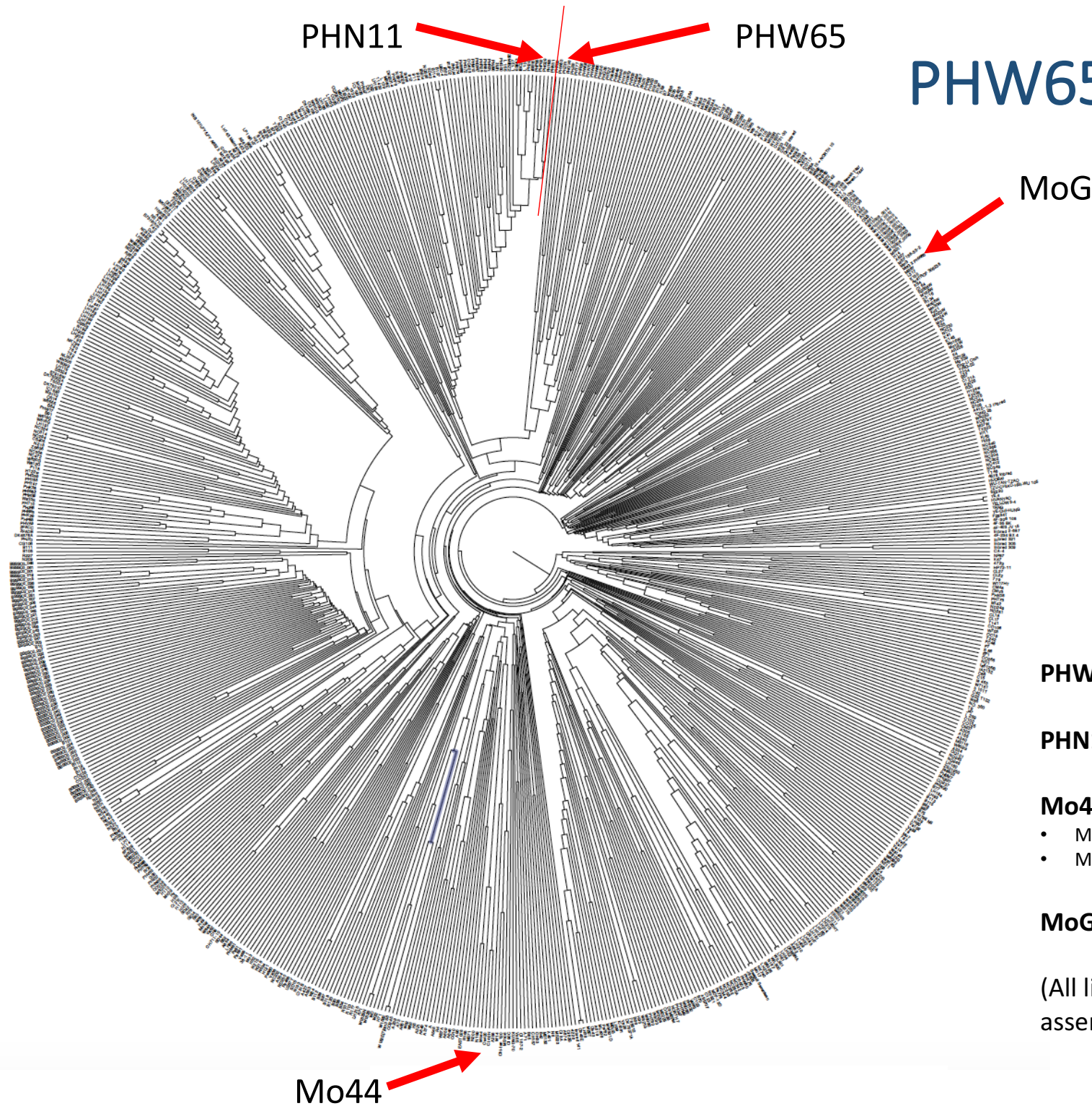
- ✧ LH195 (B37 X B73) Midwest to South
- ✧ Early SS (TBD) for North

✧ Selected Subset of Yellow Stripe hybrids (30 plots/location)

- ✧ Accumulate G X Y data and link previous work to new locations

✧ Continue a small component of the ex-PVP Design II hybrids or TX714 vs B73 and NILAS testing (~70 plots at a subset of locations)

PHW65 Populations



PHW65: PH861 X PH595

PHN11: PH806 X PH207(2)

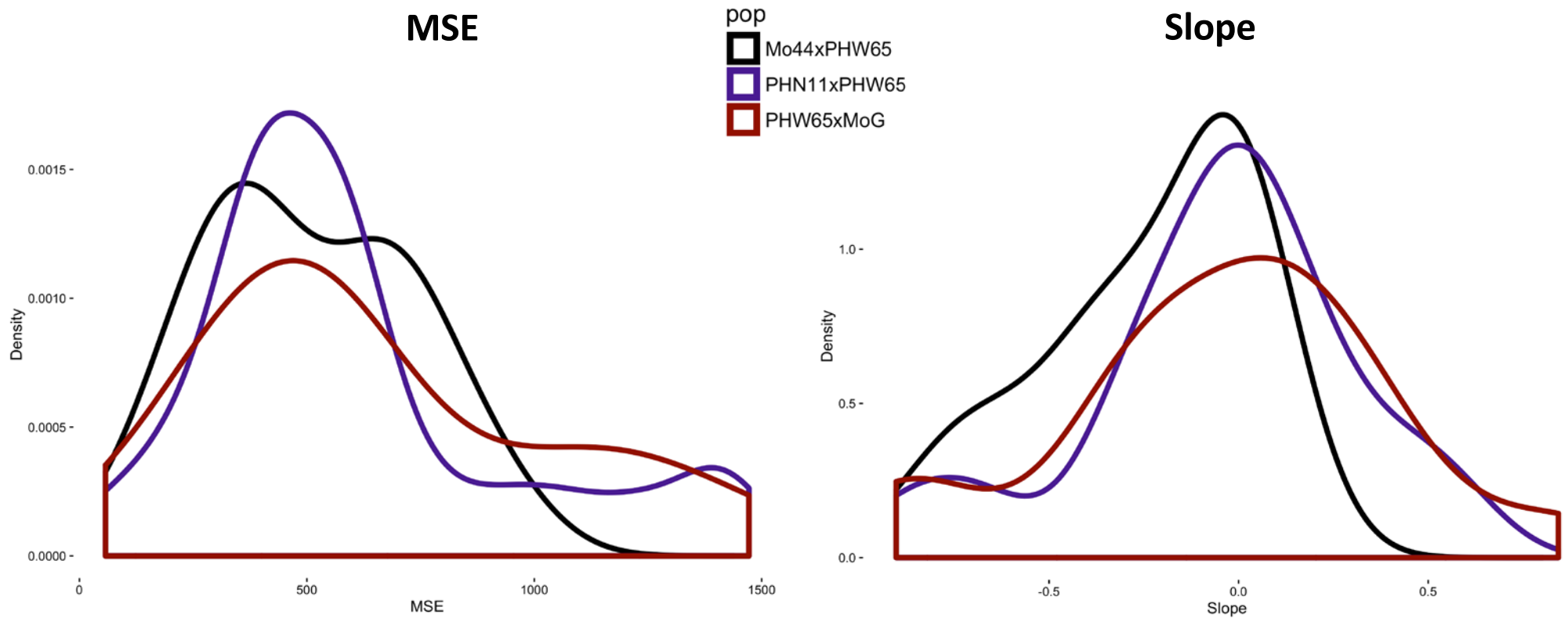
Mo44: Mo22 X Pioneer Mex Syn 17

- Mo22: Laguna
- Mo18W (NAM Parent): Wf9 x Mo22(2)

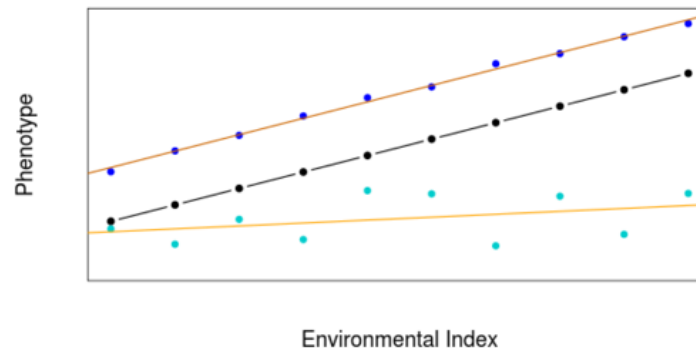
MoG: Mastadon

(All lines resequenced; PH207 assembly)

2014/15 Summary – Hybrids Span Range of Slope and MSE Across Testers – Grain Yield:



✧ 6 to 8 location per hybrid



2016 Testcross Data: 313 lines by PHB47

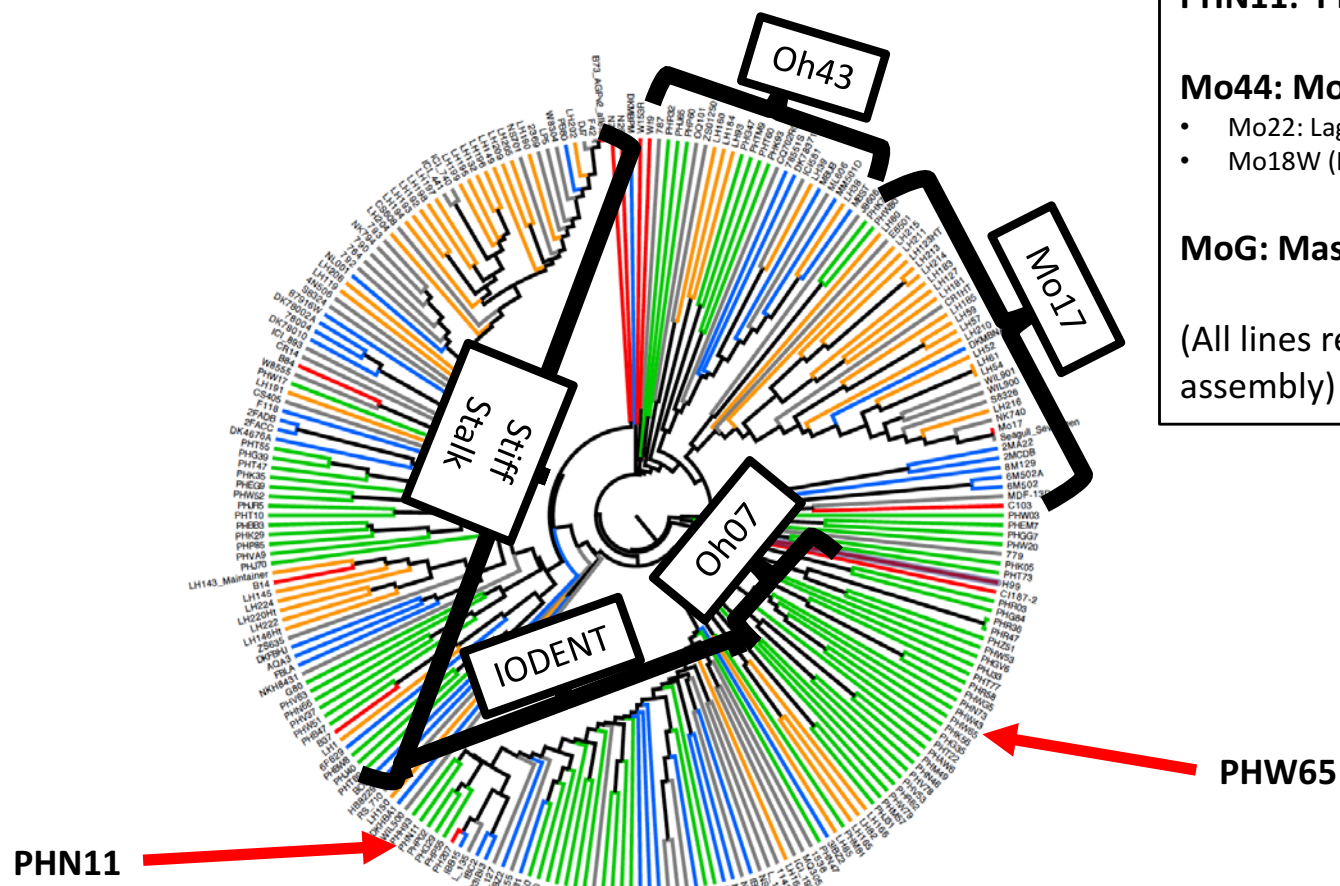
	Yield (bu/A)			Moist (%)		
	AVE	MAX	MIN	AVE	MAX	MIN
PHN11 X PHW65	183.4	135.8	208.5	17.8	16.2	19.4
Mo44 X PHW65	177.7	134.6	204.0	18.1	16.1	19.6
PHW65 X MoG	166.1	134.6	193.6	17.8	16.1	19.3

Things to Think About:

- ✧ Earlier tester
- ✧ Proportion (10 – 20%) of hybrids replicated at each site
 - ✧ Possibly those hybrids already included in the 2014 & 15 experiment to allow calculation of G X Y estimates
 - ✧ Same hybrids replicated across locations
- ✧ Design?
 - ✧ Randomizing across populations allow direct comparison or block by population?
- ✧ Phenotyping
 - ✧ Can we implement phenotyping technologies across sites?
- ✧ Analysis – NAM QTL
 - ✧ Identify specific lines and extreme groups for further more detailed mechanistic analysis
- ✧ Mini-weather stations within canopy



PHW65 Populations – ex-PVPs Comparison:



PHW65: PH861 x PH595

PHN11: PH806 x PH207(2)

Mo44: Mo22 x Pioneer Mex Syn 17

- Mo22: Laguna
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MoG: Mastadon

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