



Genomes to Fields Initiative

G X E 2014: Overview and Progress

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G X E Cooperators

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- ✧ Candy Hirsch (**UMN**)
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- ✧ Shawn Kaeppler (**UW**)
- ✧ Sherry Flint-Garcia (**ARS**)
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- ✧ Torbert Rocheford (**Purdue**)
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Multi-State G X E Project

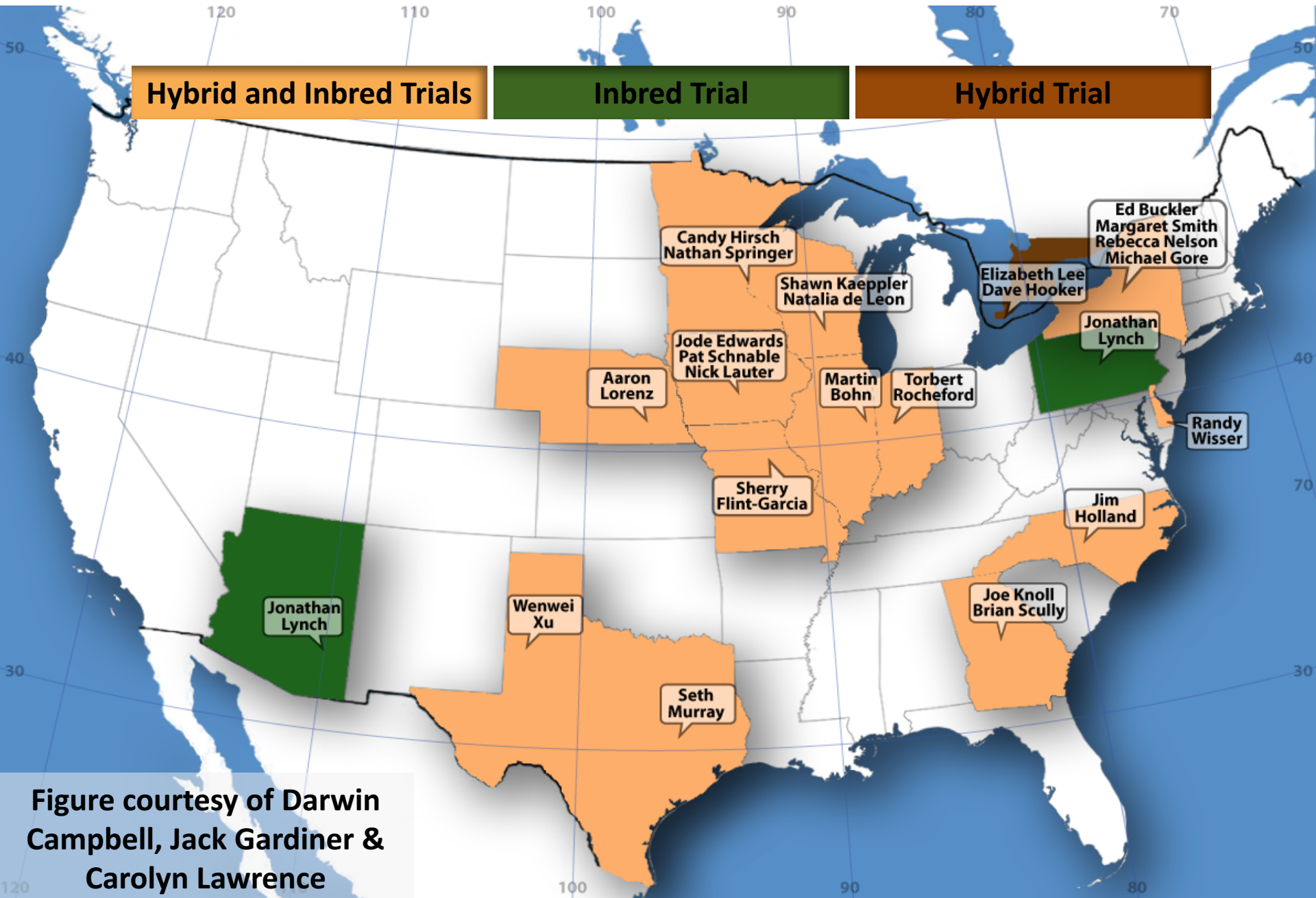


Figure courtesy of Darwin Campbell, Jack Gardiner & Carolyn Lawrence

Scale and Scope in 2014

- ✧ Scale of the project:
 - ✦ 12,678 hybrid plots
 - ✦ 1,798 inbred plots
 - ✦ Environmental data (weather station at each location)
- ✧ Involvement:
 - ✦ 25 Scientists across North America
 - ✦ 14 States and 1 Province
- ✧ Framework for the deployment and testing of tools & procedures
- ✧ To be repeated in 2015 and beyond



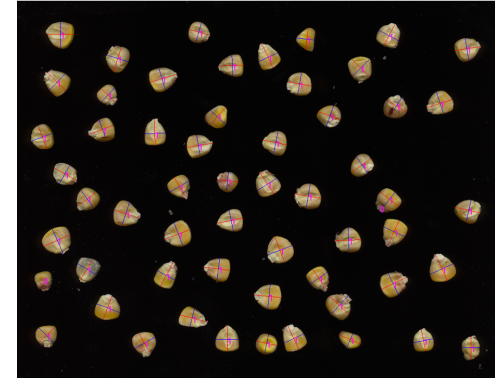
Experimental Details - Hybrids

- ✧ Set of ~250 hybrids, 2 reps per location
- ✧ Hybrids involve 394 inbred lines (ex-PVPs, RILs from biparental populations, breeding materials)
- ✧ Set of 10 hybrids are common across locations
- ✧ Remaining 240 hybrids overlapping sets as we move south to north in the geography of the US
- ✧ In 2014 testers are LH198, LH185, LH195, PB80 and CG102
- ✧ Inbreds genotyped using GBS



Experimental Details - Inbreds

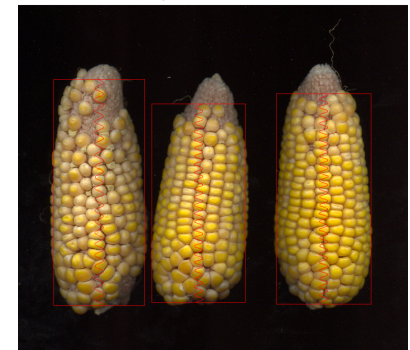
- ✧ Set of 31 inbreds, from 2 to 12 reps per location (some represent specific treatments)
- ✧ Identify sensitive indicator traits and standards across environments
- ✧ Establish their potential association with specific stress conditions?



Kernel Length: 191.8054 173.2309 171.0924



Kernel Length: 253.0986 186.1596 186.0505



Data Being Collected

Hybrids:

- ✧ Stand Count
- ✧ Plot Weight
- ✧ Grain Moisture
- ✧ Test Weight
- ✧ Stalk Lodging
- ✧ Root Lodging
- ✧ Anthesis
- ✧ Silking
- ✧ Ear Height
- ✧ Plant Height

Inbreds:

- ✧ Stand Count
- ✧ Stalk Lodging
- ✧ Root Lodging
- ✧ Anthesis
- ✧ Silking
- ✧ Ear Traits (automated)
- ✧ Additional specific traits in some locations (shovelomics, pubescence, ionomics, etc)

Environmental Data:

- ✧ Environmental data:
- ✧ All locations (inbreds & hybrids)
- ✧ watchdog – temperature, precipitation, solar radiation, wind speed, and related info

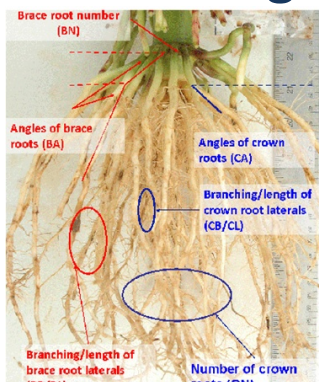


Photo credit: Jonathan Lynch



Collaborators and Sponsors

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- ✧ Candy Hirsch (UMN)
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- ✧ *Darwin Campbell (ISU)
- ✧ ***David Ertl (IA Corn)**
- ✧ David Hooker (Guelph)
- ✧ *Diego Jarquin (UNL)
- ✧ **Ed Buckler (ARS)**
- ✧ Edgar Spalding (UW)
- ✧ Greg Kruger (**UNL**)
- ✧ *Jack Gardiner (ISU)
- ✧ James Schnable (UNL)
- ✧ *Jianming Yu (ISU)
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**Members of the G2F
Executive Committee**

***G X E Coordinating &
Data Analysis Groups**



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- ✧ Liang Dong (ISU)
- ✧ ***Liz Lee (Guelph)**
- ✧ Margaret Smith (Cornell)
- ✧ ***Martin Bohn (UIUC)**
- ✧ Michael Coen (UW)
- ✧ Mike Gore (Cornell)
- ✧ **Nathan Springer (UMN)**
- ✧ Nick Lauter (ARS)
- ✧ **Pat Schnable (G2F co-lead - ISU)**
- ✧ Patricio Grassini (UNL)
- ✧ *Randy Wisser (UDel)
- ✧ Rebecca Nelson (Cornell)
- ✧ Rod Williamson (IA Corn)
- ✧ ***Seth Murray (TAMU)**
- ✧ **Shawn Kaeppler (UW)**
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