

## **Applying new methods & research tools to the University of California Small Grains variety testing program**

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### **Key points:**

1. New data is being collected from statewide variety trial locations.
2. New statistical methods are being used to summarize variety performance.
3. Reporting & variety recommendation methods being updated.

### **What is the purpose of a variety-testing program?**

The goal the UC variety-testing program is to efficiently develop unbiased, objective, & reliable information regarding the performance of crop varieties. In 2016, we began evaluating the statewide small grains testing program to look for opportunities to apply new methods & technologies to increase the value of the program for its stakeholders.

### **New data from statewide field trials**

More project resources are being directed towards collecting both environmental & in-season crop phenotype data. This data will assist in the analysis & interpretation of field trial data as well as allow data to be applied to other end uses, such as crop modeling.

### **Applying new data analyses**

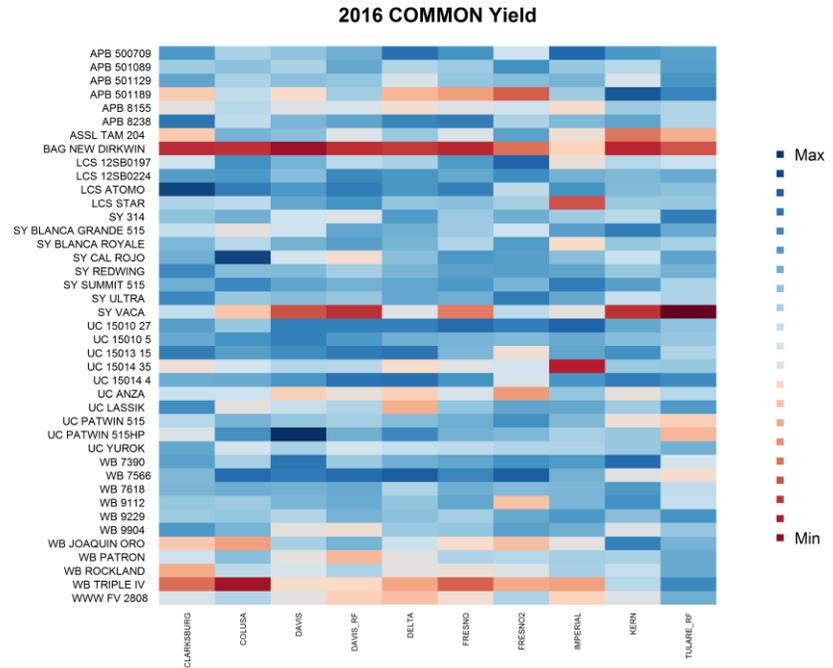
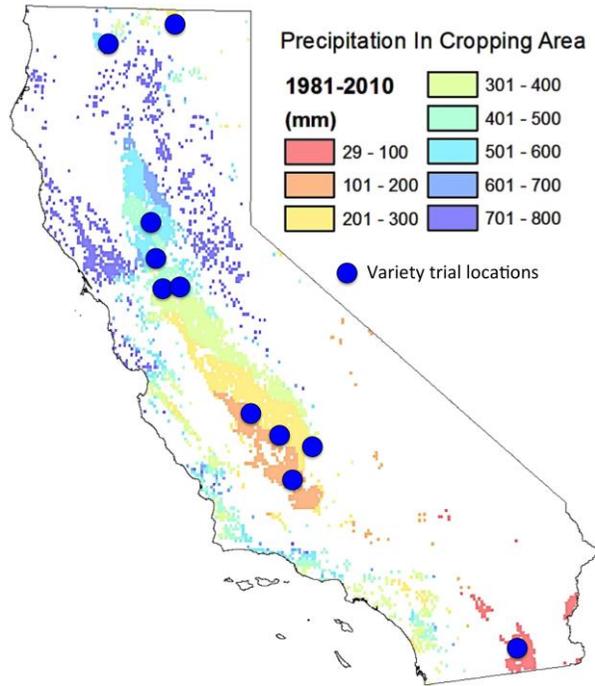
The ideal crop varieties for one region of California will not necessarily be the ideal varieties for another region (genotype by environment interaction). Meaningful variety recommendations are best made with a good understanding of variety performance patterns across a landscape. In recent years, the development of new analytical methods & cheap, powerful, computers has made it possible to apply complex statistical techniques to large variety trial datasets, such as those generated by our program. We have begun to apply these new analytical methods to more effectively group trials over locations & years and to produce more accurate estimates of crop performance. More detail on this can be found in our recent paper presented at the California Plant & Soil Conference<sup>1</sup>.

### **Changes to reporting & variety recommendations**

Historically, our program has reported trial results on a yearly basis for individual trial locations. The performance of crop varieties based on data from single locations or seasons are not as reliable as aggregating performance across multiple locations & season. To make more precise & reliable variety recommendations we will begin to emphasize multi-location, multi-year means as our primary form for reporting. As a publicly funded program we believe trial data should be publically available & we are also making efforts to make replication level & site-year level data available through our website.

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<sup>1</sup> <http://calasa.ucdavis.edu/files/257056.pdf>



University of California small grains test locations (blue circles). The map also shows the cereal production regions of California & the average winter rainfall of these areas.

An example of an analysis of genotype x environment interaction for 2016 Common wheat. **Dark blue** indicates highest relative yields; **dark red** indicates lowest relative yields for a given variety. Varieties given on the left axis and test locations given on the bottom axis.