

# UC Small Grains Research and Extension: Variety Selection



Mark Lundy  
Assistant CE Specialist  
Grain Cropping Systems  
melundy@ucdavis.edu



# 2018-19 UC small grain variety testing locations



# Acknowledgments



Taylor Nelsen, MS  
Assistant Specialist

Maria Sandate-Reyes, BS student  
Steven Spivak, BS student  
Thuraiya Zerrouk, BS student

Taylor Becker, MS student  
Kalyn Diederich, PhD student



Ethan McCullough, BS  
Junior Specialist

UC Cooperative Extension Colleagues  
Michelle Leinfelder-Miles  
Konrad Mathesius  
Sarah Light  
Lynn Sosnoskie  
Nickolas Clark  
Brian Marsh  
Rob Wilson  
Darrin Culp  
Merf Solorio



Cooperating Growers

# Genotype x Environment

## 2018 - 2019 UC Small Grain Trial Locations



## California a Single Environment for Common Wheat Adaptation

To maximize the productivity of agricultural systems, it is important for growers to choose crop varieties that are well adapted to their specific production environment, but genotype-by-environment

(G×E) effects can complicate the identification of truly superior genotypes. If strong and repeatable G×E effects are present, then it may be necessary to divide a production region into sub-regions that differ consistently in terms of which genotypes are superior. Dividing production regions in this way has drawbacks though because it makes breeding and variety testing more complex. Understanding G×E interaction is therefore necessary for efficient and reliable crop-breeding and variety-testing activities.

In a recently published article in *Crop Science*, researchers from the University of California–Davis report on a study that investigated G×E effects in a long-term yield trial dataset for common wheat. California has historically been divided into a number of sub-regions for the purposes of analyzing and reporting on cereal yield trials, but the team found no consistent differences

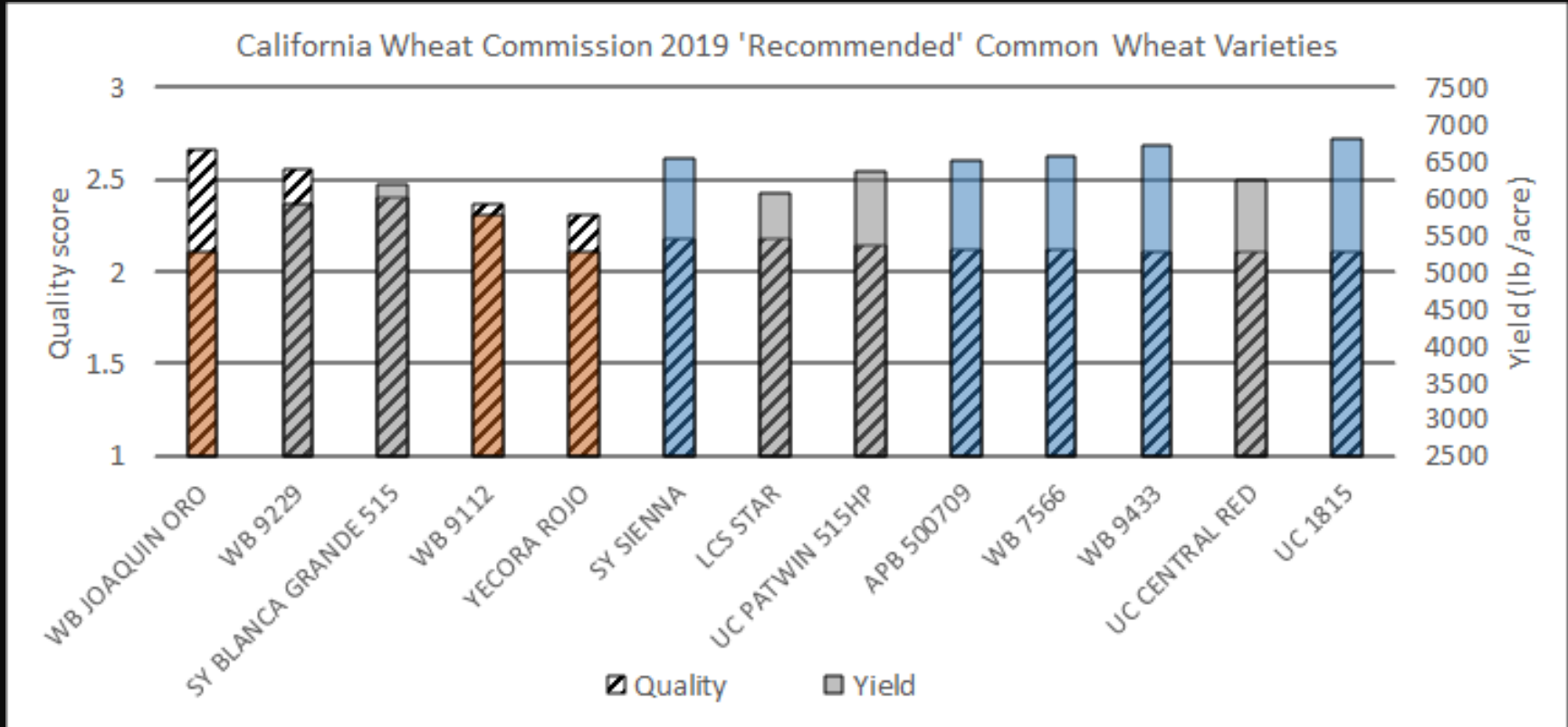
in how different genotypes were adapted to these sub-regions. Instead, in terms of yield, California is a single environment for common wheat adaptation. Most variation in yield was found to be independent of genotype and associated primarily with factors like nitrogen management and water availability. Seasonality also interacted strongly with genotype, making yield variation due to G×E effects unpredictable.



Variety trials of common wheat at Davis, CA. Photo by Taylor Nelsen.



# Quality-Yield Tradeoff



- Average yield in the low yield group (red) is about 1,200lb less than in the high yield group (blue).
- At \$5/bu (current prices), this amounts to about \$100/acre difference in what a grower would receive in payment.

# Multivariate variety selection

VARIETY	Quality Group	Quality Score	Yield average (lb/acre)	Yield Stability (Drought)	Yield Stability (N stress)	Stripe Rust (1 = R, 4 = S)	Septoria (1 = R, 4 = S)
WB 9433	Recommended	2.11	6708	20	22	2	2
WB 7566	Recommended	2.12	6555	10	1	1	2
SY SIENNA	Recommended	2.18	6535	7	-4	1	1
UC PATWIN 515HP	Recommended	2.14	6351	-6	-6	1	1
UC CENTRAL RED	Recommended	2.11	6227	2	-7	1	1
SY BLANCA GRANDE 515	Recommended	2.41	6180	-4	-12	1	3
LCS STAR	Recommended	2.17	6065	-15	5	1	1
WB 9229	Recommended	2.55	5917	-15	-10	1	2
WB 9112	Recommended	2.36	5754	-12	-11	1	1
YECORA ROJO	Recommended	2.30	5276	-18	-25	4	3
WB JOAQUIN ORO	Recommended	2.66	5272	-31	-43	1	4
LCS 12SB0224	Acceptable	1.93	6662	9	10	1	1
WB 9350	Acceptable	1.99	6635	14	9	1	3
SY SUMMIT 515	Acceptable	2.05	6561	-3	-5	1	3
UC PATWIN 515	Acceptable	1.90	6439	16	5	1	2
SY REDWING	Acceptable	2.06	6396	9	14	3	1
SY BLANCA ROYALE	Acceptable	1.89	6242	2	1	1	1
SY CAL ROJO	Acceptable	1.98	6112	2	1	1	1
UC YUROK	Acceptable	1.90	5936	-3	0	1	1
LCS ATOMO	Not Acceptable	1.80	6898	13	17	2	2
LCS 12SB0197	Not Acceptable	1.76	6509	9	15	1	1
UC LASSIK	Not Acceptable	1.82	6207	1	6	1	2
WB 9904	Not Acceptable	1.73	6051	-10	6	1	1
WB PATRÓN	Not Acceptable	1.75	5786	-14	-5	1	2

# Programmatic changes

2018 - 2019 UC Small Grain Trial Locations



- Substantial reductions in funding from the California Wheat Commission for UC statewide variety testing in 2019-20 season
- Substantially reduced UC trial footprint
- Changes to Collaborators Program

Thank you!