the PLANT BREEDING CENTER
UNIVERSITY OF CALIFORNIA, DAVIS
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Graduate Student Spotlight

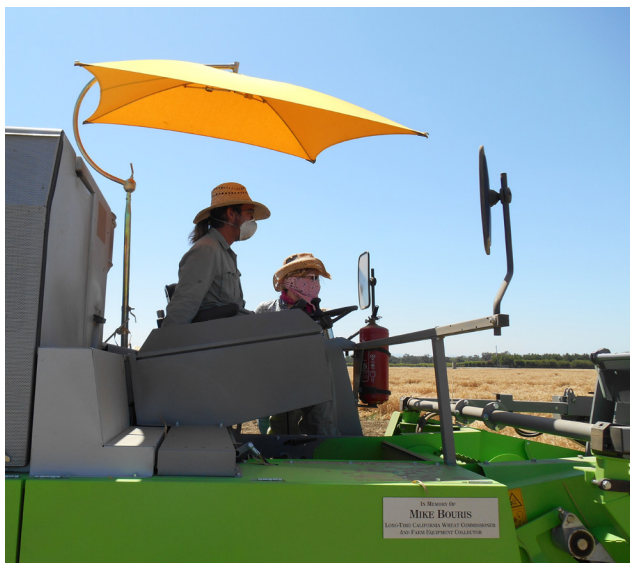
Joshua Hegarty

I am beginning my fifth year as a PhD student in the Horticulture and Agronomy Graduate group working with wheat and barley in the lab of Dr. Jorge Dubcovsky. After growing up in Michigan, I went to the University of Washington in Seattle and earned a B.S. in the College of Forestry, where I focused on soil science and plant eco-physiology. When I was not hiking, skiing, or rock climbing in the Cascade Mountains, I was able to participate in many types of research, from restoration ecology to nutrient dynamics in alpine soil crusts, and finally to a senior thesis in utilizing soil parameters to determine the historic extent of some endangered Puget Sound prairies.

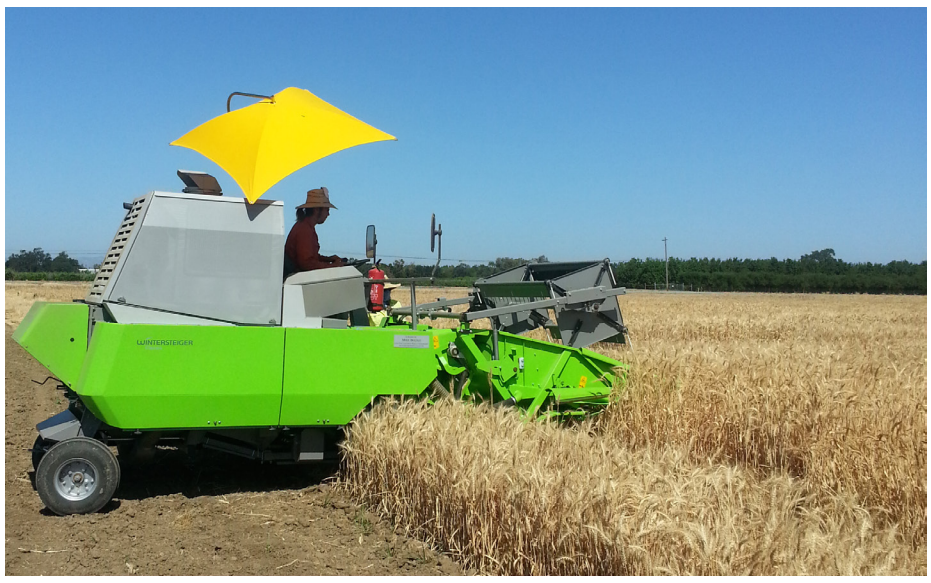
The major turning point that lead me to work in Agriculture was the six months I spent working at an agricultural non-profit in northern India. While working with the extension specialists, I was able to see the amazing diversity among and within crops, and witnessed the impact of improved cultivars. It became clear that, instead of observing variability and understanding natural selection in plants as an ecologist, I wanted to learn how to harness that variability via plant breeding to create improved crops.

In selecting an institution and mentor for my graduate education, I wanted a place that would provide cutting edge knowledge in plant science and an ability to gain field experience. This is exactly what I have at UC Davis and especially in the Dubcovsky Lab; the great fortune to be taught and collaborate with leading plant scientists, and an ability to see my research applied in an active breeding program.

In the five years since I arrived at Davis my work has focused on the identification, genetic mapping, and validation of new sources of resistance to stripe rust in wheat, a pathogen that recently caused 25% yield loss in California. In addition to finding novel sources of resistance from diverse plant material, I have found mutant plants with both increased and decreased resistance to the rust. Once I identify the genes that were mutated, we can begin to have a better understanding of the genes that are required for both resistance and susceptibility.



In addition to working with wheat rust, I have been fortunate to be involved with the release process of a malting barley variety from the UC Davis Barley program. Despite having more than 500 craft breweries in the state, there is no malting facility and no adapted malting barley variety to supply the brewers with their most important ingredient. To help spur investment in a malting facility we applied for and received support to prototype some elite barley lines with good malting quality developed by Dr. Gallagher. With this support we have completed the first year of statewide yield and quality trials and have started collaborations with Sierra Nevada Brewing and a start-up company that is beginning to establish a craft malting facility. This fall we will plant breeder seed of the line selected to be released, and by next spring foundation seed will be available.



The knowledge and experiences of taking an idea or trait from the lab to the field are invaluable. I have been fortunate to gain both while in graduate school here at UC Davis, and look forward to taking them with me when I graduate next year and find another place in public sector plant breeding.

-Joshua Hegarty

UC DAVIS NEWS

FOURTH WHEAT GENE IS KEY TO FLOWERING AND CLIMATE ADAPTATION
- EGGHEAD

In the game of wheat genetics, Jorge Dubcovsky's laboratory at UC Davis has hit a grand slam, unveiling for the fourth time in a dozen years a gene that governs wheat vernalization, the biological process requiring cold temperatures to trigger flower formation.

Identification of the newly characterized VRN-D4 gene and its three counterpart genes is crucial for understanding the vernalization process and developing improved varieties of wheat, which provides about one-fifth of the calories and proteins that we humans consume globally.

The new study, reported Aug. 31 online in the Proceedings of the National Academy of Sciences, also shows how the spring growth habit in some wheat varieties traces back to ancient wheat that grew in what is now Pakistan and India.

>>>read more

RELATED NEWS

SEQUENCING OF BARLEY GENOME ACHIEVES NEW MILESTONE - A MAINLY UC RIVERSIDE GROUP OF RESEARCHERS IMPROVES A RESOURCE USED WORLDWIDE
- SEEDQUEST

Barley, a widely grown cereal grain commonly used to make beer and other alcoholic beverages, possesses a large and highly repetitive genome that is difficult to fully sequence. Now a team led by scientists at the University of California, Riverside has reached a new milestone in its work, begun in 2000, on sequencing the barley genome. The researchers have sequenced large portions of the genome that together contain nearly two-thirds of all barley genes.

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OPPORTUNITIES AND EVENTS

SEPTEMBER 24TH, 4-5:30PM
THIRD THURSDAY FIELD TOUR
PROFESSOR ANDY WALKER
HOPKINS ROAD

We will be visiting the vineyard west of the UCD airport with Professor Andy Walker to tour germplasm blocks from wild species to advanced selections and discuss rootstock and scion breeding, their different objectives, stacking of resistance genes, complexing multiple traits in one background and, if we are lucky and the weather stays cool, eat lots of grapes. Register for van **here**.

OCTOBER 6TH, 12-1:30PM
PBC SEMINAR SPEAKER: AMIGO BOB CANTISANO
PES 3001

Amigo Bob, of the Felix Gilett Institute, will be giving a talk about the history of fruit, nut and grape growing in the Sierra, beginning with the Gold Rush; the role of Felix Gillet in introducing many of the commercial fruit and nut crops that California is now famous for; techniques they use for identification and evaluation of heirloom varieties; the FGI nursery project to propagate these heirlooms and reintroduce them to gardening and farming; and the appreciation of hardy 100+ year old perennials that produce amazing crops with no human intervention.
FOR THE SEMINAR: Register **here**.

OCTOBER 6TH, 1:30-2:30PM
STUDENT LUNCH DISCUSSION SESSION
AMIGO BOB CANTISANO
PES 2005

Immediately following the talk, Amigo Bob will host an informal student lunch to discuss career paths as a plant scientist.
FOR THE STUDENT LUNCH: Register **here**.

ASA, CSSA, AND SSSA ANNUAL MEETING
NOVEMBER 15-18, 2015
MINNEAPOLIS CONVENTION CENTER, MN

The 2015 Annual Meeting offers a unique opportunity as ASA, CSSA, and SSSA co-locate with the Entomological Society of America (ESA) to connect more than 7,000 scientists, professionals, educators, and students.
For more information, or to register, click **here.**

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