

IMPROVING CALIFORNIA WHEAT FOR GRAIN AND FORAGE

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ABSTRACT

The wheat breeding program at UC Davis includes subprograms in common wheat (white and red) and durum wheat. Every year hundreds of crosses are produced and thousands of headrows and yield plots are evaluated for agronomic traits, disease resistance and quality. During the last 20 years average yields have increased 1180 lb/ac for common wheat and 450 lb/ac for durum wheat documenting a continuous increase in productivity. The traditional field-based breeding efforts are complemented by marker assisted selection strategies to improve disease resistance, quality, abiotic stress resistance and nutritional value. Molecular markers have been used successfully to develop commercial varieties with improved resistance to stripe rust, increased grain protein content, and reduced cadmium content. In addition to multiple varieties for grain (pasta and bread wheat) the UC Davis wheat breeding program, in collaboration with Baglietto Seeds, released the forage wheat variety New Dirkwin. The very successful forage variety Dirkwin became susceptible to stripe rust in 2000. Using molecular markers the UC Davis wheat breeding program pyramided the stripe rust resistance genes *Yr5*, *Yr15* and *Yr17* and developed the variety New Dirkwin that is resistant to stripe rust and maintains the excellent forage quality of the original Dirkwin. This work has benefitted the forage and dairy industry, and additional improvements are possible if the users of these wheat forage varieties are interested. The UC Davis program is also deploying new genes for improved drought tolerance in durum and bread wheat varieties, which can also be used in forage wheat. We have numerous projects to map and clone additional genes to improve resistance to biotic and abiotic stresses and to improve quality and nutritional value of wheat. In addition to the breeding efforts, the UCD program conducts cereal evaluation tests in 14 locations in the Sacramento, San Joaquin, and Imperial Valleys; the intermountain valleys of northern California and in the south central coastal region. Results from these trials are summarized at <http://smallgrains.ucdavis.edu/>.

Key Words: wheat, barley, breeding, forage

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