

# New Barley Variety

*“Low input” crop uses less  
water, fertilizer*

*By Susan McGinley*

**A**fter ten years of breeding and five years of testing, an improved variety of low input, six-rowed barley has been released by the Arizona Agricultural Experiment Station. Named “Solar,” the new introduction has a significantly better yield, higher test weight and greater resistance to lodging (falling over) than its predecessor, “Solum,” a UA variety released in 1991.

Barley plays an important part in the Arizona crop mix, where it is often planted after cotton or vegetables. The high biomass stalks, when incorporated into the soil at the end of the growing season, reduce crusting and improve the soil structure, which in turn enhances water intake in the next crop. Planting barley can also reduce the effect of root knot nematodes on cotton.

As one of the world’s most adaptable crops, barley grows from the arctic tundra to the equatorial highlands. The hardy grain is salt-, drought-, and cold-tolerant. It stabilizes soil and breaks pest cycles in a crop rotation.

Solar was developed as a winter crop for low water-use environments in the Southwestern United States and in Arizona, where only one or two irrigations (6-12 inches) are applied per season, according to the researchers. The crop is planted in December for harvest in May.

“Barley is grown between crops that have high value, usually after cotton in Arizona,” says Mike Ottman, an agronomist in the Department of Plant Sciences in the College of Agriculture and Life Sciences. “Planting barley or wheat after cotton can help flush salt from the soil. Because barley and wheat are grown in the winter and spring when water use is less than in the summer, it is easier to apply enough water to flush salts compared with a summer crop.”

Farmers can obtain these benefits by growing barley through either high or low input methods. Grain yield of low input barley



A seed-increase crop of the “Solar” variety of low input barley, grown in Wellton, Yuma County

Al Simons, Arizona Crop Improvement Association (ACIA)

is about half that of the high input type, but it requires only a third of the irrigation water and a quarter of the fertilizer. The potential savings by growing low input barley is about two acre-feet per acre of water and 150 pounds of nitrogen fertilizer per acre grown.

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“The beauty of this type of barley is that you may not make much money off it, but you can cut your expenses and still get the rotational effect,” Ottman says. Thus instead of yielding 6,000 pounds per acre with high input barley, the grower gets half that yield, but reaps all of the other advantages of growing the grain while reducing production costs. Growing low input barley can be especially economical when water and fertilizer costs are high.

In 2005, about 30,000 acres of barley were harvested in Arizona, valued at \$8 million. A few thousand acres of low input barley (Solum) are grown each year in Arizona, according to Ottman. Solum barley is also grown in California for forage and grain.

“There really isn’t any other variety adapted to low input conditions,” he says. Most of the state’s barley is grown mainly for feed, although a limited amount of malting barley is grown occasionally. “Either Solum or Solar would be good for grazing or as a forage crop. Sheep like to graze on it.”

Ottman spent more than 15 years working on an improved variety that would have the advantages of Solum without some of its problems.

“Solum tended to lodge and had a low test weight, which is a measure of grain density,” Ottman says. “The stems fell down, and when that happens, at harvest you either can’t pick it up, or the combine has to go real slow, which increases harvest costs.” Low test weight in barley means it has reduced starch content and more hull, which lowers the feed quality of the grain. Some dairies and cattle feeders may not accept the grain if the test weight is too low, according to Ottman.

Original breeding work on Solum was begun by Tom Ramage, a former UA

and USDA barley breeder. When Solum was released in 1991, it was the first low input winter cereal developed for Arizona. When Ramage retired in 1999, Ottman continued the research that led to the release of Solar. Researchers conducted trials on plots at the UA’s Maricopa Agricultural Center in central Arizona, with support over the past five years from the Arizona Grain Research and Promotion Council.

Solar was selected out of a group of 142 lines of barley in the breeding program. Ottman tested Solar against Solum and also compared it to Barcott, a high input barley sometimes grown under reduced water use conditions. When grown under low input conditions at the Maricopa Agricultural Center in 2002-2004, Solar yielded an average of 320 pounds more per acre than Solum and a surprising 682 pounds per acre more than Barcott.

Lodging for Solar averaged 15 percent, compared to 39 percent for Solum and 12 percent for Barcott. Solar’s test weight was about five pounds per bushel more than Solum and 6 pounds per bushel more than Barcott. Thus compared with Solum, Solar has 11 percent higher grain yield, 10 percent higher grain test weight, and 24 percent less lodging.

“It’s not going to save the world or bring in a lot of income, but right now,



Joanne Littlefield

“Solar” is a six-rowed spring barley variety bred for reduced water use environments.

with barley prices going the way they are, Solar can bring in more income for farmers,” Ottman maintains. “It’s not as lucrative as vegetables, but if you can get a reasonable return, that’s good. Plus, people like to look at it—it’s green for half the year.”

The new barley variety is in the seed-increase stage. The UA Plant Sciences Department developed the breeder’s seed for Solar, and will maintain that stock. The foundation seed produced last year will be increased by the Arizona Crop Improvement Association during the 2006 crop year and harvested as certified seed. Various seed companies in the state have already expressed interest in the germplasm to be released by this project. Certified seed should be publicly available through local grain companies in commercial quantities next year. ☒

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Al Simons, ACIA

(l to r) Pat McBride and Alan Rubida of Barkley Seed confer with Abed Anouti of the Arizona Crop Improvement Association (ACIA) and Mike Ottman, UA agronomist in field of new low input barley variety.