



DEVELOPING NEW CROP VARIETIES WITH ENHANCED TRAITS AND DISEASE RESISTANCE

ARS advances multiple crop industries by developing new crop varieties with disease resistance and other trait enhancements and providing new tools and approaches that will support future breeding efforts. In addition to supporting major commodities, ARS breeding programs advance specialty crops, which alone have a U.S. farm gate value of \$87.7 billion. The following accomplishments are examples of ARS advances in crop breeding for disease resistance and trait enhancement that were made in FY 2020.

Identification of romaine lettuces with reduced browning discoloration for fresh-cut processing.

Lettuce is one of the top 10 most valuable crops in the United States, with an annual farm-gate value of more than \$2.5 billion. Fresh-cut lettuce is the primary ingredient of the increasingly popular packaged, ready-to-eat salads; however, discoloration (browning) represents a major challenge that limits its quality and shelf life. ARS researchers in Salinas, California, and Beltsville, Maryland, identified lettuces with limited browning that will be used in breeding programs and to help identify genes associated with limited browning.



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Reducing preharvest sprouting (PHS) in soft winter wheat. PHS is the germination of wheat grains in the field before harvest following 2 or more consecutive days of rain with cool temperatures. It can cause farmers to lose approximately 30 percent of their crop value, translating into approximately \$420 million annually in the United States. Because its genetic nature is not well understood, few markers exist for breeders to use in developing resistant lines. ARS scientists in Wooster, Ohio, identified nine PHS-tolerant soft winter wheat varieties that hold potential for future breeding of PHS resistance.

Potato postharvest quality evaluations and release of new potato cultivars. Acceptable processing quality after storage is an essential attribute of a successful potato variety. ARS scientists in East Grand Forks, Minnesota, play a critical role in the overall process for evaluating and releasing new cultivars by Federal and State cooperators nationwide. In the past year, the team screened 139 advanced breeding lines for storage/processing quality. Since 2015, they have identified 17 chip clones and 14 fry processing clones that have superior storage quality. These identified clones were advanced through other national trial evaluations; since 2015, 4 chipping varieties and 14 fry varieties have been released.

Identification of blueberry species with fruit fly resistance. Spotted wing drosophila fruit fly causes more than \$511 million in damage annually to fruit production in Western states. ARS scientists from Corvallis, Oregon, and Poplarville, Mississippi, screened 29 blueberry species for resistance to fruit fly feeding and identified 10 resistant species. Most highbush blueberry cultivars were susceptible, but rabbiteye and other blueberry cultivars with smaller, firmer fruit types were resistant. These findings will enable blueberry breeders to produce new blueberry cultivars resistant to this fruit fly.