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Agroborealis

Spring 2017 Research Highlights

UAF agronomist Mingchu Zhang stands in his wheat trial plots at the Fairbanks Experiment Farm.

— Photo by Jeff Fay

Growing Alaska wheat

Research continues on finding the best early maturing spring wheat variety

The quest for a spring wheat variety that grows well in Alaska has been ongoing for more than 200 years.

Russians reportedly tried to grow wheat, with limited success, in coastal Alaska to provide bread flour for the Russian American Co. fur trading posts in the 1790s.

The hunt continued with the development of agricultural experiment stations in Sitka in 1898 and then in Rampart (1900) and Palmer (1915). Researchers developed several spring wheat varieties, most recently 'Ingal' in 1981. Most of the early maturing wheat varieties developed in Alaska have had problems with "shattering," where the grains fall off the plant before they are harvested.

University of Alaska Fairbanks agronomist Mingchu Zhang is continuing the research with Bob Van Veldhuizen, a research assistant in agronomy and soils. Zhang believes that with Alaska's warming climate, more opportunities may exist to find or develop a wheat variety that grows well in Alaska.

Zhang said that farmers in Alaska, the Yukon and Newfoundland have expressed an interest in an early maturing spring wheat that does not shatter. While hobbyists and Alaska farmers have experimented with growing wheat, no one raises it commercially on a large scale.

"If we can grow wheat in the state, it can help with food security," he said.

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Developing and testing wheat varieties

Since Alaska does not have a plant breeder, Zhang and Van Veldhuizen are working with Washington State University wheat breeder Stephen Jones at the Mount Vernon Research Center. In 2010, Jones' doctoral student, Karen Hills, developed three crosses with 'Ingal' and wheat varieties grown in Saskatchewan and Alberta. A second graduate student developed four new varieties of hard red spring wheat in 2014. The first crosses were tested over three years, but no varieties could be selected until 2015 because of unusual weather — a cold, wet summer in 2013, followed by a hot, dry summer in 2014.

This past summer, Zhang and Van Veldhuizen grew 80 varieties, including the crosses, parent varieties of the crosses and 68 varieties Jones obtained from northern European countries, including Sweden, Finland, Norway, Denmark and Switzerland. All varieties were grown in a one-acre plot at the Fairbanks Experiment Farm. Each stand of wheat grew in plots that measured 6 by 35 feet or 6 by 15 feet, depending on the amount of seed available. The plots were bordered on all sides by a 10-foot strip of barley, intended to attract birds that otherwise might eat the wheat.

Standing in the wheat field in late summer, one can easily see which varieties grew better. Some of the taller wheat toppled in the rain, and the shorter dwarf varieties appeared to ripen faster. The slower-maturing wheat was still green.

Van Veldhuizen harvested the wheat in late August. While the test weight and yield data are still being analyzed, Zhang said two varieties from Scandinavian countries look promising. They are both "dwarf" varieties, about two feet tall.

The process of selection, however, will take years. "It's a long process," says Van Veldhuizen. They expect to grow all varieties again next year and then select for the varieties that mature early, don't shatter,

Eighty varieties of wheat were planted in a test plot at the Fairbanks Experiment Farm during the 2016 summer.

have high yields and don't fall down. The varieties will also be tested to determine nutritive value, baking quality and shelf life. Selections will continue for three to five years in Fairbanks.

Van Veldhuizen, who has worked with grains research for 36 years, is hopeful that a commercial variety will be found, but, unlike barley, which is resilient in low temperatures, wheat is a much fussier crop, he said. Wheat stops growing when temperatures reach 40 degrees. "Wheat is very, very sensitive to the environment," he said.

If a variety is shown to grow well in Fairbanks, it will be further tested in Delta Junction and in Palmer for three to five years.

Zhang said WSU is interested in their results because it is also trying to develop early-maturing wheat to grow in western Washington, particularly for niche markets. While farmers in Alaska want wheat that will mature in a short growing season, Washington farmers want wheat that matures before the late-summer rainy season begins.

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