

ARS scientists turn to a wild oat to combat crown rust

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Agricultural Research Service (ARS) scientists are tapping into the DNA of a wild oat, considered by some to be a noxious weed, to see if it can help combat crown rust, the most damaging fungal disease of oats worldwide.

Crown rust reduces oat yields up to 40 percent and shows a remarkable ability to adapt to varieties bred to genetically resist it. ARS researchers and colleagues have inserted individual resistance genes into oat varieties that produce proteins believed to recognize strains of crown rust and trigger a defense response against them. "Multiline" cultivars with several resistance genes also have been developed.

Crown rust is caused by *Puccinia coronata*, a fungus that reproduces both sexually and asexually and has enough genetic flexibility to overcome resistance genes, usually in about five years, according to Martin L. Carson, research leader at the ARS Cereal Disease Laboratory in St. Paul, Minn. His analysis also shows crown rust is increasing in virulence throughout North America.

Carson has turned to a wild variety, *Avena barbata*, for new [genes](#) with effective resistance. The slender oat, listed as a noxious weed in Missouri and classified as moderately invasive in California, grows wild in South Asia, much of Europe and around the [Mediterranean region](#).

Carson inoculated *A. barbata* seedlings with crown rust. After several crosses, he found seedlings highly resistant to a variety of crown rust

strains. In ongoing studies, he is crossing them with the domestic oat, *A. sativa*, to try to develop the right blend of resistance and desirable traits, such as high yield and [drought tolerance](#). The goal is new plant lines that will effectively fight off crown rust for many years.

The research, which supports the U.S. Department of Agriculture (USDA) priority of promoting international food security, was published in the journal *Plant Disease*.

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