

New Leaf Rust Races in the United States

In 2011 many new races of wheat leaf rust (*Puccinia triticina*) were described in the United States. Among the 440 isolates that were tested for virulence, 92 different races were described. Many of the new races had virulence to the resistance gene *Lr39/41* that is found in many of the hard red winter wheat cultivars grown in the Great Plains. In 2011, 25 races had virulence to *Lr39/41* in contrast to 2010 when only five races had virulence to this gene. Many of the races with virulence to *Lr39/41* were also virulent to *Lr17* that is also present in many hard red winter wheat cultivars. Cultivars with *Lr39/41* such as Armour, Fuller, TAM 112, and Postrock will have increased susceptibility to leaf rust now that many more races are virulent to these cultivars. Also contributing to the large number of new races was the increase in races with virulence to resistance gene *Lr21*. Virulence to this gene was first found in 2010 in two races from leaf rust collections in Minnesota and North Dakota. Many hard red spring wheat cultivars in Minnesota, North Dakota, Manitoba and Saskatchewan have *Lr21*. In 2011, five races with virulence to *Lr21* were found in leaf rust collections from Texas, Kansas, and North Carolina in addition to North Dakota and Minnesota. In 2011, plots of spring wheat cultivars with *Lr21* had high leaf rust severity in Minnesota and North Dakota. The races with virulence to *Lr21* are now well established in North America. Genotyping of the *Lr21* virulent races with simple sequence repeat (SSR) markers and DNA sequence data determined that these races are highly related to other races that are avirulent to *Lr21*. This indicates that virulence to *Lr21* arose by mutation from within the *P. triticina* population in North America. Races with virulence to resistance genes *Lr11*, *Lr18* and *Lr26* were common in the southeastern states and Ohio Valley region where soft red winter wheat cultivars with these genes are grown. Races with virulence to *Lr9*, present in some soft red winter wheat cultivars, and *Lr24*, present in hard red and soft red wheat cultivars were found throughout the eastern, southeastern and Great Plains region. As race-specific resistance genes are used in wheat cultivars in the U.S., the leaf rust races will continue to be selected for virulence to these resistance genes, ultimately reducing their effectiveness.