


DISEASE NOTES

First Report of Virulence to *Sr25* in Race TKTTF of *Puccinia graminis* f. sp. *tritici* Causing Stem Rust on Wheat

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Citation

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Puccinia graminis f. sp. *tritici* (*Pgt*) race TKTTF was reported as the dominant race in the wheat stem rust epidemics in Ethiopia during 2014–15 (Olivera et al. 2015). The race and variants hereof have also been recorded elsewhere in Africa, the Middle East, and Europe (www.wheatrust.org/stem-rust-tools-maps-and-charts/race-frequency-map). Here, we report the presence of additional virulence to *Sr25* in the TKTTF population, a resistance gene transferred to several Australian and CIMMYT wheat genotypes. At the seedling stage, *Sr25* confers infection type (IT) 2 or lower for isolates in the Ug99 race group and up to IT 2+ toward race TKTTF (Newcomb et al. 2016; Olivera et al. 2015). Our results are based on *Pgt* isolates of the TKTTF race from Ethiopia (2012, 2013, 2015), Egypt (2014), Azerbaijan (2014), Iran (2009, 2011, 2014), Iraq (2014), Lebanon, Sudan, and Turkey (2012), Denmark and Germany (2013), and Sweden (2014). Race typing was carried out at the Global Rust Reference Center according to Jin et al. (2008), except that we scored IT on both leaf 1 and 2; additional single pustule isolates of each sample were raised and stored in liquid nitrogen (–196°C). *Sr25* response was assayed using seedling leaves and stems of adult plants of Misr1 (Oasis/Skauz//4*BCN/3/2*Pastor) and Agatha/9*LMPG (*Sr25* carriers) along with two reference lines, Triumph 64 (*SrTmp*) and NA101/MqSr7a

(*Sr7a*), and Morocco as a control. Seedling ITs were scored 17 days post-inoculation at $18 \pm 2^{\circ}\text{C}$ using a 0 to 4 scale (McIntosh et al. 1995). Isolates showing ITs of 33+ to 4 on Misr1, Agatha/9*LMPG, and susceptible check were considered *Sr25* virulent, and clearly different from ITs conferred by *Sr25* avirulent isolates. Results were confirmed for each isolate by race typing additional single-pustule isolates derived from cultivars Misr1 and/or Agatha, along with avirulent reference isolates. Virulence for *Sr25* was observed in race TKTTF isolates from Azerbaijan, Egypt, Ethiopia, Iran, Iraq, and Sweden, collected in 2014 or 2015, but not in any sample collected earlier than 2014. The results were confirmed on adult plants of Misr1 and Agatha/9*LMPG by *Sr25* virulent and avirulent isolates of TKTTF, TTKSK, and TTKST, respectively. Spore suspensions of ~ 0.5 ml at concentration of $\sim 3 \times 10^5$ spores/ml were injected into the stem internodes at Zadoks 45. The adult plant and seedling tests were carried out concurrently using the environmental conditions described above. The plants containing *Sr25* were susceptible to the *Sr25* virulent isolate and moderately resistant to moderately susceptible to the *Sr25*-avirulent isolates of TKTTF, TTKSK, and TTKST. The experiments were repeated two times with three replicates, using cv. Morocco as a susceptible check. Emergence of virulence to *Sr25* in the race TKTTF is considered significant due to its spread into new areas and the potential loss of a significant source of resistance against Ug99.

References:

Section:

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