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DISEASE NOTES

# Emergence of Virulence to *SrTmp* in the Ug99 Race Group of Wheat Stem Rust, *Puccinia graminis* f. sp. *tritici*, in Africa

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## ABSTRACT

The Ug99 race (TTKSK) of wheat stem rust was first detected in Uganda in 1998 (Pretorius et al. 2000) and since then, seven additional variants have been reported: TTKSF, TTKST, TTTSK, TTKSP, PTKSK, PTKST, and TTKSF+ (Pretorius et al. 2012). In this study, 84 stem rust samples from the 2014 surveys of wheat fields in Africa (Kenya, 9; Uganda, 28; Rwanda, 41; and Egypt, 6) were sent to the Global Rust Reference Center (GRRC, Denmark) for race analysis. *Puccinia graminis* f. sp. *tritici* (*Pgt*) samples were recovered on cv. Morocco, and resulting urediniospores of 53 single-pustule isolates were inoculated onto 20 North American stem rust differential lines using standard procedures (Jin et al. 2008). The pathotyping was repeated in two or three independent experiments. Twelve of the derived isolates were also typed at the USDA-ARS Cereal Disease Laboratory (USA) for an independent confirmation. Among the Kenyan samples, four collected from Njoro (Central Rift, cvs. Robin and Kwale) and two from Ntulumeti and Olgilai (South Rift, cv. Robin), were typed as TTKTK. Race TTKTK was similar to TTKSK except for additional virulence to *SrTmp* (Infection Type 4). An additional single-pustule isolate derived from one sample from Njoro showed a high infection type on LcSr24Ag and CnsSrTmp, testers for *Sr24* and *SrTmp*, respectively, and was typed as TTKTT. These isolates were also tested on Siouxland (PI 483469, *Sr24+Sr31*), Sisson (PI 617053, *Sr31+Sr36*), and Triumph 64 (CI 13679, donor of *SrTmp*) to confirm their virulence/avirulence combinations to *Sr24*, *Sr31*, *Sr36*, and *SrTmp*. Race TTKTK was also



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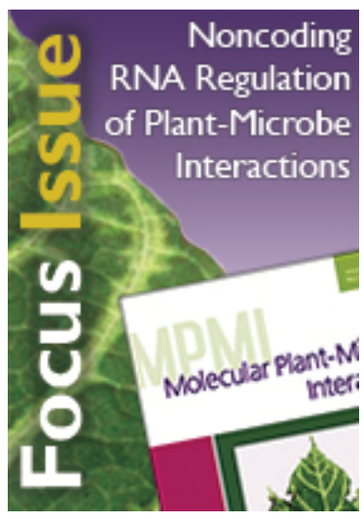


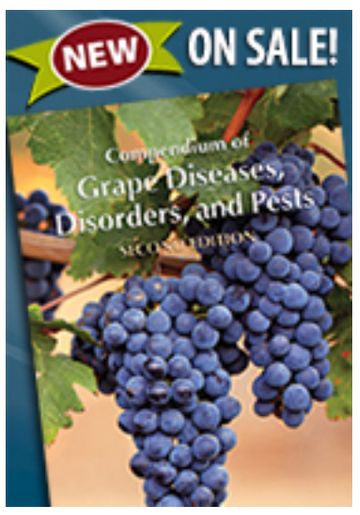

detected at two locations in Uganda (Rubaya and Muko in Kabale region) and at five locations in Rwanda (Kinigi, Rwerere, Rufungo, Gatebe, and Kamenyo). Three isolates derived from stem rust samples collected on cv. PBW343 (carrying *Sr31*) in Sakha in the Nile Delta region in Egypt were also typed as TTKTK. In addition, DNA from isolates of race TTKTK were analyzed using a diagnostic qPCR assay (Ug99 RG stage-1, Szabo, *unpublished data*), which confirmed that these samples belong to the Ug99 lineage. The identification of *SrTmp* virulence in the Ug99 race group in several countries in one year emphasizes the relevance of coordinated international surveillance efforts and utilization of diverse sources of resistance to control stem rust in wheat. Further studies are in progress to determine the detailed relationship of the newly emerged races and other *Pgt* isolates identified in the Ug99 group.



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