

QTL mapping of resistance to stem rust pathotype Ug99 in Indian and Australian wheat

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The recent emergence of a highly virulent stem rust (*Puccinia graminis* f.sp. *tritici*) pathotype Ug99 and its derivatives in Eastern Africa, together with its steady migration to the Middle East, is presenting a major threat to global wheat production with potentially serious consequences for global food security. Molecular markers closely linked to effective stem rust resistance genes are required to accelerate pre-emptive breeding in countries in the migration path of Ug99 to produce wheat cultivars that are resistant to both the unusually broad virulence package of Ug99 and its derivatives, as well as resistant to stem rust pathotypes currently present in a particular country. Mapping populations derived from Indian (VL404/WL711 RILs) and Australian (Diamondbird/Janz DHs) wheat cultivars displaying low stem rust response at the adult plant

stage were phenotyped in multiple field trials conducted against pathotype Ug99+Sr24 in Kenya and in Australia and India against prevalent stem rust pathotypes of the respective countries. Stem rust response assessments were recorded at the adult plant stage using either the modified Cobb scale or a 1-9 scale. Both mapping populations were genotyped using DArT markers (Triticarte Pty. Ltd., Australia) and enriched using SSR markers. Composite interval mapping revealed QTL effective against pathotype Ug99+Sr24 in a similar region on chromosome 2BL in both the Indian and Australian population. These QTL explained up to 58% and 39% of the variation in stem rust response in the Indian and Australian population, respectively. Additional QTLs effective only in India or Australia were also detected in each of the populations.

Biography

Dr R.S. Zwart is a postdoctoral fellow affiliated with the University of Sydney, Australia and based as a visiting scientist at the NCL in Pune, India. R. Banerjee is a Masters graduate and project assistant at NCL. Dr U.K. Bansal is a molecular geneticist in the Australian Cereal Rust Control Program at the University of Sydney, Australia. Dr M. Sivasamy is a senior wheat breeder at the IARI Regional Station Wellington. Dr D. Singh coordinated the screening of the wheat material against stem rust pathotype Ug99 at CIMMYT Regional Station in Njoro, Kenya. Dr V.S. Gupta is head of the Biochemical Sciences division at NCL and leads the Plant Molecular Biology group. Assoc. Prof. H.S. Bariana leads the germplasm screening and enhancement activities of the Australian Cereal Rust Control Program at the University of Sydney, Australia.

