

Genetic analysis of rust resistance genes in global wheat cultivars: an overview

ABSTRACT

Rust is the most devastating fungal disease in wheat. Three rust diseases, namely, leaf or brown rust caused by *Puccinia triticina* Eriks, stem or black rust caused by *Puccinia graminis* f. sp. *tritici* West, and stripe or yellow rust caused by *Puccinia striiformis* f. *tritici* Eriks, are the most economically significant and common diseases among global wheat cultivars. Growing cultivars resistant to rust is the most sustainable, cost-effective and environmentally friendly approach for controlling rust diseases. To date, more than 187 rust resistance genes (80 leaf rust, 58 stem rust and 49 stripe rust) have been derived from diverse wheat or durum wheat cultivars and the related wild species using different molecular methods. This review provides a detailed discussion of the different aspects of rust resistance genes, their primitive sources, their distribution in global wheat cultivars and the importance of durable resistant varieties for controlling rust diseases. This information will serve as a foundation for plant breeders and geneticists to develop durable rust-resistant wheat varieties through marker-assisted breeding or gene pyramiding.

Keyword: Durable resistant variety; Gene pyramiding; Marker-assisted breeding; Resistance genes; *Triticum aestivum*