

## LEAF RUST DEVELOPMENT ON WHEAT CULTIVARS WITH AND WITHOUT Lr. GENES

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### Abstract

Wheat leaf rust (*Puccinia recondita*) development on wheat cultivars carrying known Lr genes viz., Blue Silver (Lr13+), Lyallpur-73 (Lr1+Lr13+), Rawal-87 (Lr26), WL-711 (Lr13+Lr15) and Pak-81 (Lr26); and those without Lr genes viz., Local White, Mexi-Pak, Morocco, Pak-70; as well as near isogenic lines carrying Lr13, Lr16, Lr26, Lr1+Lr13, Lr13+Lr26+Slow rusting genes were examined under field conditions at the CDRI, PARC, Karachi University Campus, Karachi. Wheat varieties were artificially inoculated with aqueous suspension of a mixture of urediospore (*Puccinia recondita*) in the last week of January when the wheat plants were 50 days old. Leaf rust development started in the second week of February 2001 on Local White, Mexi-Pak and Morocco. Development of rust on varieties carrying Lr genes delayed rust infection by 10 days under field conditions. Similarly the rate of development of rust per unit time also differed on varieties carrying different Lr genes.

### Introduction

Among the fungal diseases affecting wheat crop of the country, leaf rust caused by *Puccinia recondita* is the most important. Considering the economic importance of this disease, extensive studies are being done on different aspects of its development. The wheat breeders are trying to develop resistant cultivars which seem fairly successful, but frequently the varieties carrying major genes resistance become susceptible to new races of the pathogen. Eleven physiologic races of leaf rust fungus identified so far in Pakistan are 12, 20, 57, 77, 84, 104, 129, 140, 149, 158 and 184. Wheat rust epidemic was caused by leaf and stripe rusts during the 1977-78 crop season (Hussain *et al.*, 1979) resulting in a national loss of 10.1% which is equivalent to 830,000 tones amounting to Rupees 5,160 million (US\$ 86 million). It is now known that this epidemic was incited by Race 77 of leaf rust.

Aslam (1972) indicated that the delay in the onset of an epiphytotic was proportional to the amount of resistance in the host population (Hamid, 1988). Hussain *et al.*, (1988) and Khanzada (1989) postulated the presence of leaf rust resistant genes in Pakistani wheats. The present studies were carried out because Lr genes viz., Lr1, Lr2b, Lrc, Lr3, Lr3k, Lr3BG, Lr10, Lr11, Lr12, Lr14a, Lr15, Lr16, Lr17, Lr18, Lr22A, Lr23, Lr24, Lr25, Lr26, Lr29, Lr30, Lr32, Lr33 and Lr34 had shown different leaf rust reaction whereas Lr9, Lr14B, Lr19, Lr20, Lr21, Lr10+Lr27+Lr31, Lr28, Lr35, Lr36 and Lr37 afforded complete protection to the crop. Studies on leaf rust development on wheat varieties with and without Lr genes were carried under field conditions to study the extent of delay in rust development on varieties carrying Lr genes.

line carrying Lr26. Isogenic lines carrying Lr16 and Lr13+Lr26+Slow rusting gene(s) showed TMRMS-10MRMS and TMSS-5MSS respectively. The remaining four varieties i.e., Local White, Mexi Pak, Morocco and Pak-70 which showed high level of susceptibility varied from 30S-70S on the last day of the data recording. These results are similar as has been reported by Van der Planck (1968) and Hakro *et al.*, (1994) that the use of monogenic lines delayed the start of epidemic and polygenic slowed the progress of the epidemic.

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