

GGE biplot model for environmental delineation and identification of resistant sources for stripe rust and spot blotch in India

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Stripe rust (*Puccinia striiformis f. sp. hordei*) and spot blotch (*Bipolaris sorokiniana*) are major biotic constraints in yield maximization in barley in India. Stripe rust is wide spread in different agro-ecologies of India *i.e.* northern hills and north western plains (NWPZ), whereas, spot blotch is a very serious disease in both NEPZ and NWPZ. Since these are multicycle diseases in one crop season, chemical control with repeated sprays is difficult to practice, hence host resistance is a better option. GGE biplots for environmental interactions were obtained using “R” software for stripe rust and spot blotch on 19 barley genotypes evaluated for stripe rust (at Karnal, Ludhiana and Durgapura) and for spot blotch (at Kanpur, Varanasi and Faizabad) under artificial epiphytotics. Two principal components PC1 and PC2 explained a good amount of variation *i.e.* 51.31 %, 38.87 % for stripe rust and 58.29 % and 33.56 % for spot blotch biplots, respectively. For stripe rust the environments were classified into two groups representing Karnal and Ludhiana in one group, while Durgapura location created separate environment. For spot blotch, all three environments depicted separate niches. Environments Ludhiana and Durgapura for stripe rust and Kanpur and Varanasi for spot blotch evaluation were found discriminative and representative. In mean vs. stability biplots, the genotypes namely BH1013, DWRB147, DWRB149, DWRB150, PL890 and RD2941 showed high resistance for stripe rust, while, for spot blotch, the genotypes viz., BH1011 and DWRB149 were found tolerant with the highest reaction of 47 double digit score. In addition, some promising genotypes viz., Isaria, C9173, Orosus and Emir were also identified from ICARDA material with combined resistance to stripe rust and spot blotch and further utilization in breeding programs.