



Resistance to stripe rust and its inheritance pattern in elite wheat germplasm from Northern Himalayan zone of India

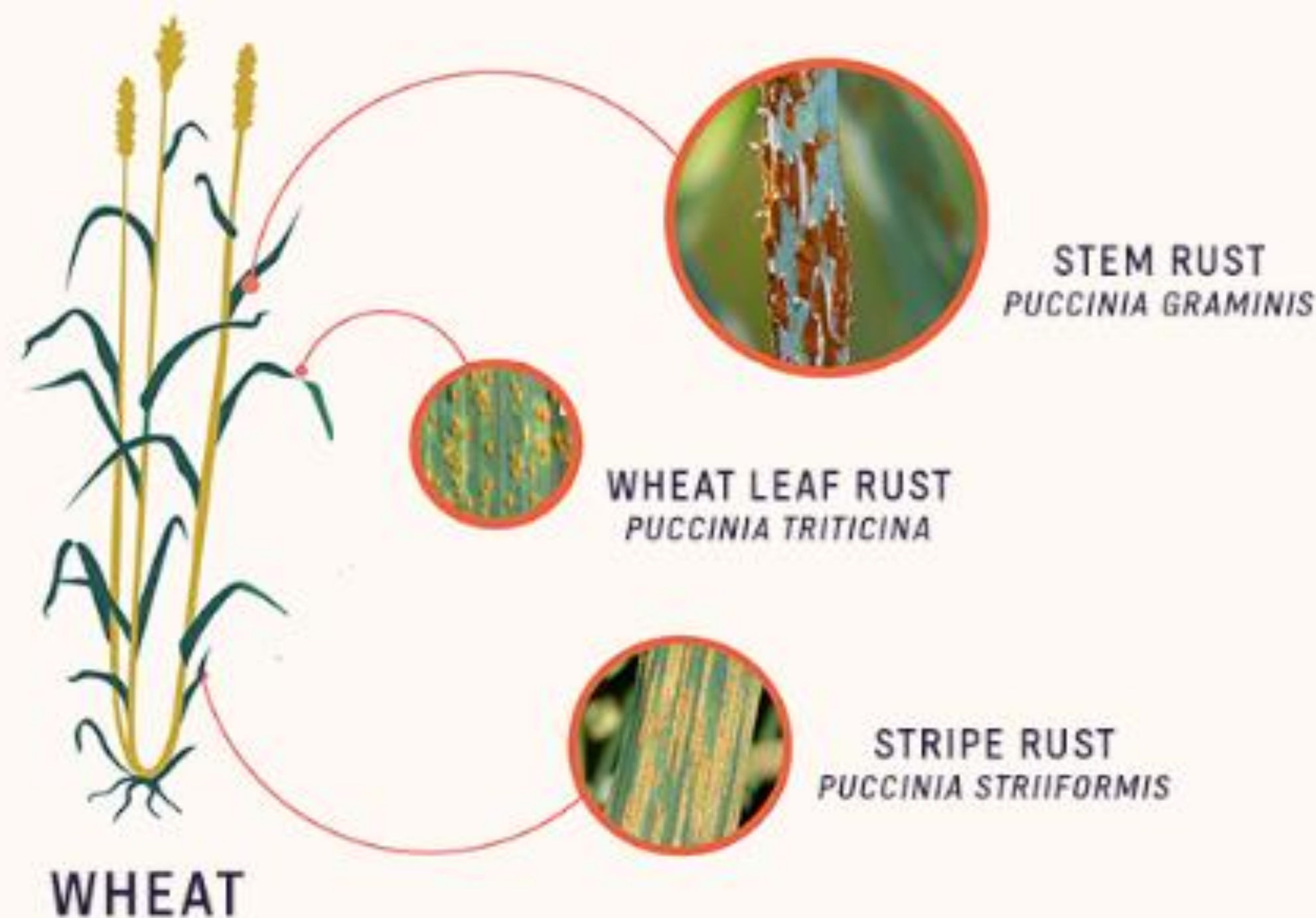
Priyanka*, Vijay Rana, Amit Rana and Harinder Kumar Chaudhary

Department of Genetics and Plant Breeding, CSK Himachal Pradesh Agricultural University, Palampur-176062, India

Corresponding author email: guleriapriyanka033@gmail.com

INTRODUCTION

Wheat crop is affected by a number of pathogens causing disease out of which the rust pathogens are very important. Rusts are the destructive diseases responsible for colossal damage to wheat crop and it have historically been one of the major biotic production constraints in the world. Major biotic constraints in wheat production are wheat rusts caused by Puccinia species. Among the three rusts i.e. (stem rust = Puccinia graminis f. sp tritici, leaf rust = P. recondita f. sp. tritici and stripe rust = P. striiformis f. sp tritici); stripe rust is the major problem in north hills of India



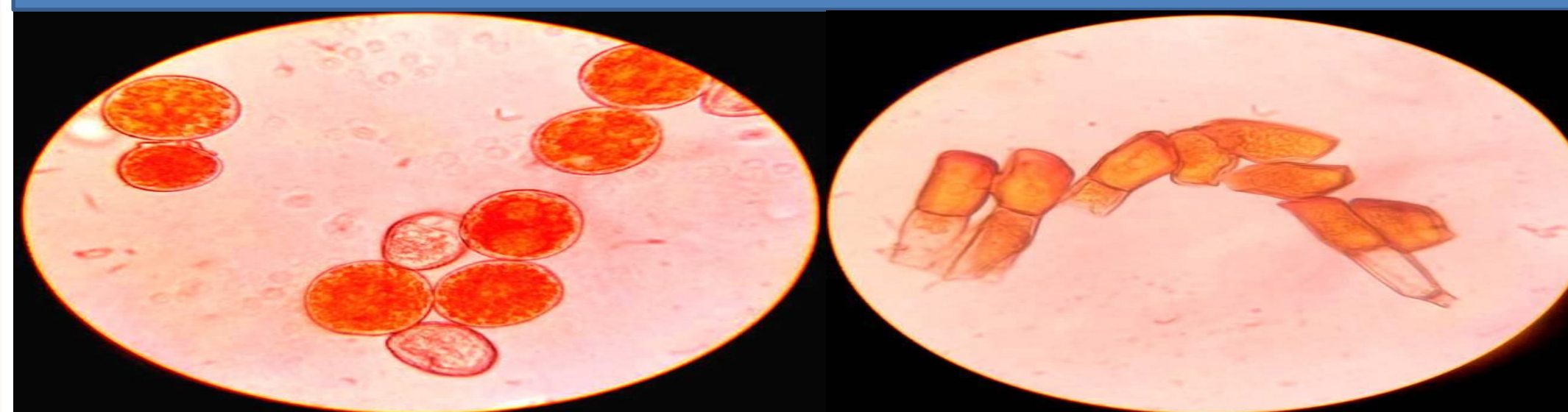
OBJECTIVES

To study the genetics and inheritance pattern of yellow rust resistance in 66 diverse wheat genotypes including 5 resistant mutants from BARC, Trombay (Mumbai; India)

Methods and Materials

❖ Sixty six diverse genotypes were studied for (APR) adult plant resistance including 5 resistant mutants of HD 2967 (TYRM1, TYRM2, TYRM3, TYRM4, TYRM5) from Bhaba Atomic Research Centre, Mumbai and were evaluated under field and controlled conditions. SRT was performed in aluminum trays filled with a mixture of FYM and sandy loam soil. Primary leaf of the seven day old seedlings was inoculated using appropriate rust cultures using spray inoculation method. Yellow rust severity and responses of plants were assessed by taking consecutive observations with 8 days intervals according to Modified Cobb scale method to estimate AUDPC . Inheritance studies were done on F₂ population

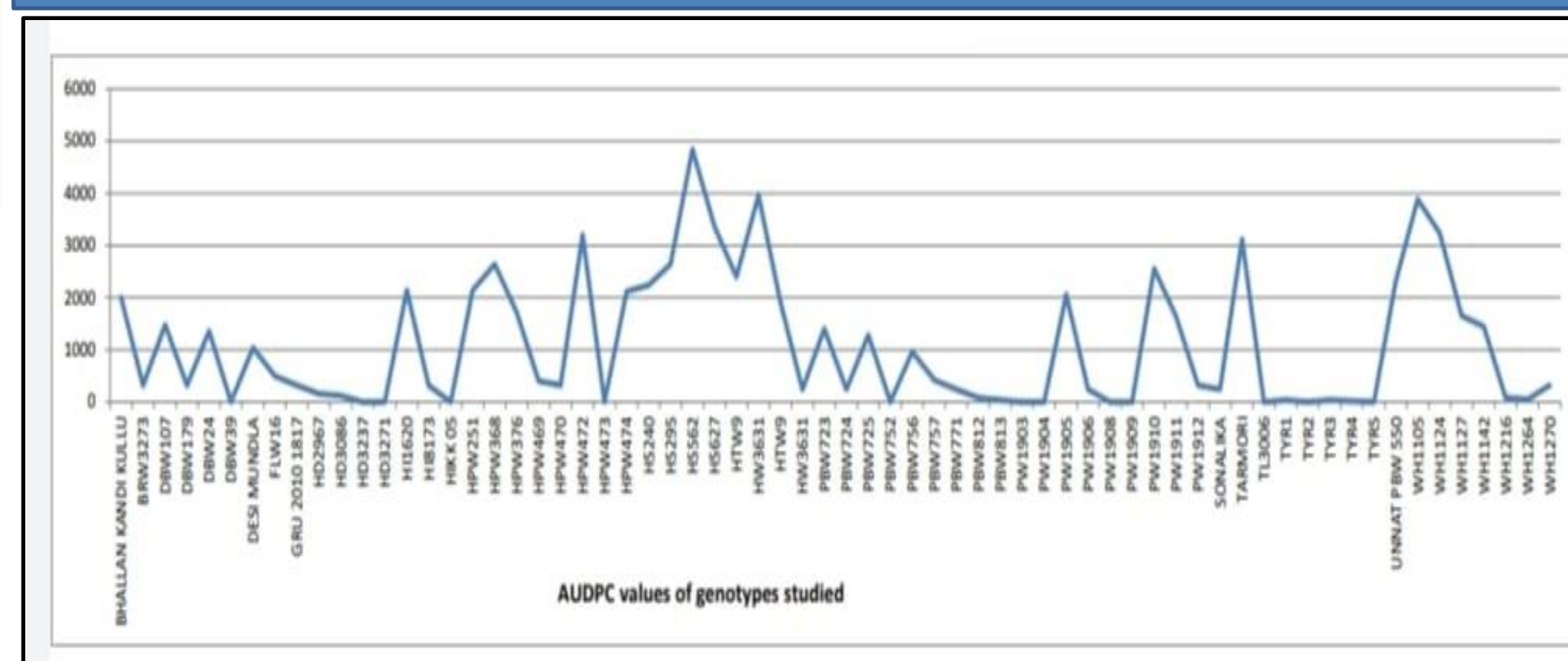
SPORES OBSERVED UNDER LIGHT MICROSCOPE (40X) RESOLUTION



UREDINIOSPORES

TELIOSPORES

AUDPC OF GERmplasm STUDIED



Seedling Reaction To Yellow Rust Races



46S119



78S84

RUST REACTION ON HD2967 AND ITS 5 RESISTANT MUTANTS



HD 2967

TYR1

TYR2

TYR3

TYR4

TYR5

RESULTS AND CONCLUSIONS

Genotypes viz., HPW 373, Unnat PBW 550, TYRM2, TYRM4 and HS 507 were found to be highly resistant to yellow rust at both seedling and adult plant stages. While, genotypes HPW 360, HPW 314, HS 490 and TRYM1 showing very low AUDPC values were found to be moderately resistant under field conditions. These lines have been suggested for use in breeding programs, and some are currently undergoing network trials for their direct release. TYRM 2 mutant showed near immune response in Multi-location trails. So, inheritance studies were carried out in TYRM 2 to decipher the genetics of seedling rust resistance. The F₂s were evaluated for seedling resistance against yellow rust (46S119, 78S84) races. Resistance in TYRM 2 is controlled by single dominant gene against stripe rust (78S84) while against stripe rust (46S119); resistance of TYRM 2 is controlled by recessive gene. These findings are expected to contribute towards wheat improvement programs that aim to enhance resistance to stripe rust.

Contact

Priyanka
Department of Genetics and Plant Breeding, CSKHPKV, Palampur, India
Email: guleriapriyanka033@gmail.com
Phone: +91 7876286261

References

Agrios, G.N. 2005. Plant Pathology. pp13-14. Elsevier Academic Press. USA.
Loegering W.Q. 1959. Method of recording cereal rust data, USDA International Spring Wheat Nursery