

Pantnagar Student honoured with IAUA Best PhD Thesis Award

Pantnagar. 25 May, 2026. Dr Tushadri Singh, PhD from the Department of Genetics and Plant Breeding, G.B. Pant University of Agriculture and Technology (GBPUAT), Pantnagar, was awarded the Indian Agricultural University Association (IAUA) Award for Outstanding Ph.D. Thesis Research in Crop Sciences category for the Ph.D. thesis entitled “Advancing Heat Stress Tolerance via Introgression and Gene Interaction Studies in Bread Wheat (*Triticum aestivum* L. em. Thell)”. The doctoral research was carried out under the supervision of Dr J.P. Jaiswal, Professor and Head, Genetics & Plant Breeding, and Principal Wheat & Barley Breeder.

The research work focused on advancing heat stress tolerance in bread wheat through integration of conventional breeding, gene interaction studies, and CRISPR/Cas9-based genome editing strategies. Significant genetic variability was observed among wheat genotypes for morpho-physiological, yield, and yield-related traits under heat stress conditions, leading to development of promising introgressed lines possessing superior adaptability and stable yield performance under elevated temperature environments.

A major highlight of the study was the optimization of gRNA designing strategies for SDN1-CRISPR/Cas9 genome editing in wheat targeting heat stress tolerance. The research addressed critical challenges associated with the highly complex hexaploid wheat genome through comprehensive *in silico* analysis, target specificity assessment, secondary structure evaluation, and off-target prediction for precise genome editing. Efficient and highly specific guide RNAs were identified for candidate genes associated with heat stress tolerance, thereby enhancing the precision and effectiveness of CRISPR/Cas9-mediated genome modification in wheat. The findings hold significant potential for accelerating next-generation wheat improvement programmes aimed at sustaining productivity and ensuring food security under changing climatic conditions.

Prof Jaiswal says that Genome editing is the latest concept in molecular breeding, which requires high end lab facilities. PhD thesis research work of Dr Tushadri was conducted in the collaboration of Indian Wheat and Barley Institute, Karnal of ICAR where Dr Mumrutga, H.M., Senior Scientist facilitated Dr Tushadri's research work. He says that this is an excellent example of collaborative research where research outcome was recognised gracefully.

Hon'ble Vice-chancellor of GBPUAT, Prof. S.K. Kashyap while congratulating Dr Tushadri says that this remarkable achievement is a reflection of her dedication, hard work, academic excellence and valuable contribution to research. Her success has brought pride and inspiration to everyone associated with her and the University.



Dr Tushadri Singh



*Dr. J.P. Jaiswal, Prof. and
Head, Genetics Plant Breeding*