ABSTRACT

Titleofthe thesis	**:**	CHARACTERIZATION OF DIVERSE BREAD WHEAT GENOTYPES FOR NITROGEN USE EFICIENCY
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Wheat (*Triticum aestivum*L.) is a globally significant cereal crop whose productivity and qualityareprofoundlyinfluencedbynitrogen(N)availability.However,excessivenitrogenuse leadstoenvironmentaldegradationandeconomicinefficiency.Thisstudyaimedtocharacterize 26diversebreadwheatgenotypesfornitrogenuseefficiency(NUE)undercontrastingnitrogen regimes (120 kg N/ha as controland 0 kg N/ha as stress). The investigation was carried out at SKUAST-Jammu during the Rabi seasons of 2021–22 and 2022–23 using a two factorial randomized block designwiththree replications. Comprehensive assessmentswere conducted across morphological, physiological, biochemical, and grain quality traits. Significant genotypic variation was observed for traits such as plant height, leaf area, biomass, SPAD values, relative growth rate (RGR), nitrogen uptake, utilization efficiency (NUtE), and grain proteinconcentration(GPC). Genotypes suchasNP 710, C306, HD2781, and PxCIM49-265 consistentlyexhibited higher NUE and better performance under nitrogenstress. Biochemical parametersliketotalsolublecarbohydratesandC:Nratiohighlightedadaptivestrategiestolow nitrogen, while SDS-PAGE-based protein profiling revealed differences in storage protein expression.Notably,somegenotypesshowedpositivegrainproteindeviation(GPD),breaking thetypicalinverserelationship betweenyieldand proteincontent.Thefindingsunderscorethe potential of certain genotypes to maintain yield and quality under reduced nitrogen inputs, offering promising avenues for breeding nitrogen-efficient wheat cultivars. This research contributes to sustainable agriculture by identifying wheat genotypes that optimize nitrogen utilization without compromising productivity or grain quality.

Keywords: Nitrogenuseefficiency,Grainproteindeviation,SPAD values,Nitrogenremobilization efficiency, SDS-PAGE protein profiling

Signature of Major Advisor **Signature of the Student**