Biomass Accumulation Impacts Wheat Nitrogen Use Efficiency

Wheat production relies on efficient nitrogen management to maximize grower profitability and reduce the negative environmental impacts associated with nitrogen loss. These drivers have prompted breeders to actively develop soft red winter wheat cultivars with a greater capacity to take up and utilize applied nitrogen fertilizers. However, the complexity of nitrogen use efficiency requires breeders to identify proxy traits associated with growth and grain production under multiple nitrogen rates.

In a recent article published in Agronomy Journal, researchers report on the variation for grain yield, in-season biomass, and nitrogen-related traits of 11 winter wheat lines grown under low and high nitrogen rates. They found that increased biomass at anthesis was not influenced by plant height or maturation but was directly associated with grain yield under high nitrogen supplies. Moreover, biomass at anthesis for the tested wheat lines was highly associated between low and high nitrogen rates.

Biomass at anthesis may serve as a viable target trait for improved nitrogen use efficiency as it is not associated with undesirable physiological changes and evaluations can be conducted under current testing schemes. Future work is required to develop more efficient screening and evaluations of wheat lines with high-anthesis biomass and nitrogen use efficiency.


Soft red winter wheat nitrogen use efficiency field trials in Warsaw, VA.

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