عنوان مقاله:

Identification of the carriers of genes for resistance common bunt, Tilletia caries (DC) Tul. using molecular and breeding methods

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خلاصه مقاله:

Common bunt, caused by Tilletia caries (DC) Tul., is a significant threat to wheat production worldwide. This study aimed to identify carriers of genes for resistance to common bunt in winter wheat using molecular and breeding methods, with the objective of developing high-yielding, disease-resistant varieties. Thirty winter wheat varieties and lines were evaluated for resistance to T. caries under field conditions in Almaty region, Kazakhstan from ۲۰۲۱ to ۲۰۲۳. Resistance levels were assessed through visual inspection and phytopathological evaluation. Plant health was monitored using Normalized Difference Vegetation Index (NDVI) measurements. Agronomic characteristics, including plant height, ear length, and grain yield components, were analyzed. Correlation analysis was performed to identify relationships between various traits. Of the ۳۰ samples tested, ۷۰% showed complete resistance to common bunt, with ۶۳.۳% exhibiting ۰% infection levels. A strong positive correlation (R = ۰.۹۸۷) was observed between the number of spikelets per ear and the number of grains, suggesting a potential avenue for yield improvement. NDVI measurements revealed significant variations in plant health throughout the growing season, with mean values ranging from ۰.۴۲ to ۰.۷۱. This study demonstrates the effectiveness of current breeding strategies in incorporating bunt resistance genes into wheat germplasm. The strong correlation between spikelet number and grain number provides a promising selection criterion for simultaneous improvement of yield and disease resistance. The findings contribute significantly to our understanding of common bunt resistance in winter wheat and offer valuable insights for future breeding programs aimed at developing resilient, high-yielding wheat varieties.