

EFFECT OF NITROGEN FERTILIZER RATES ON YIELD, YIELD COMPONENTS AND GRAIN QUALITY MEASUREMENTS OF SOME WHEAT CULTIVARS USING SPAD-METER

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Abstract

Two field experiments were carried out at Agric. Res. Station, Agric. Res. Centre, Giza Governorate, Egypt during 2006/2007 and 2007/2008 growing seasons. The aim of this study was to find the relationships between fertilization rates and SPAD readings and economic N application to minimize pollution and cost, and maximize wheat growth and yield. Three bread wheat genotypes namely Sakha 94, Giza 168 and Gemmiza 9 and five N fertilization treatments, i.e., 0, 40, 80 kg N/fad (as a recommended N rate) and 120 kg N/fad as high rate as well as N applied according to SPAD measurements, nitrogen sufficiency indices (NSI).

The results showed gradual remarkable increase in SPAD values versus advancing wheat plant towards maturity till reached their maximum values at early grain filling stage, i.e., 118 days from planting. On the other hand, the relationship between SPAD readings and N rates indicated that wheat plants received either 80 kg N/fad or N fertilizer according to NSI had statistically the same values of yield and its components with insignificant discrepancy between them. The results clearly indicated that the studied characters were significantly affected by increasing N fertilizer rates except for harvest index. The increment of grain and biological yields via N fertilization rates was accompanied with rising crude protein yield. The results indicated significant increases in crude protein, wet and dry gluten versus increasing N fertilizer rates till reached their maximal values at a level of 80 kg N/fad or according to NSI. A positive relationship between grain protein content and both wet and dry gluten was found. The rate of increase in wet gluten was lower than that of dry gluten, therefore, the hydration value was significantly decreased. In conclusion, the use of SPAD meter and NSI was very important to detect the nitrogen physiological rate for growth, yield and grain quality of wheat plant. Moreover, the use of NSI economized the cost of nitrogen fertilizer by rate of about 25% and more reliable for production of wheat without effect on wheat yield.

Key words: Wheat genotypes, SPAD measurements, Nitrogen fertilizer rates, Grain quality.