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USING CHLOROPHYL METER FOR PREDICTING WHEAT NITROGEN REQUIREMENTS

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ABSTRACT

Two field experiments were conducted at the Agric. Res. Centre Station, Giza Governorate, Egypt during 2006/2007 and 2007 /2008 seasons. Each experiment included three bread wheat cultivars (Sakha-94, Giza-168 and Gemmiza-9) and five N fertilization treatments (0, 40, 80 120 kg N/fed. and conditional N treatment). Results revealed that Gemmiza-9 cultivar achieved the highest increases in yield and its attributes, weight of 1000 grains and wet and dry gluten %. Also, this cultivar was the most efficient for producing higher grain yield at low nitrogen rate and was the most responsive to the increase in N fertilizer rates (ER). Adding 120 kg N/fed. recorded the maximum values of yield and its attributes. N recommended rate came in the second order statistically equalizing with conditional N treatment for grain yield. The conditional N treatment, 80 and 120 kg N/fed. (for protein %) as well as conditional N treatment and 80 kg N/fed. (for protein yield, wet gluten % and dry gluten %) were substantially equaled. Moreover, conditional N treatment achieved the highest values of AE and RF.

Key words: Wheat cultivars, nitrogen use efficiency, chlorophyll meter

INTRODUCTION

Adding nitrogen fertilizers is important for increasing the productivity of wheat plant, the excess of its doses may cause environmental hazards. Hence, the balance between the possible maximum productivity (by supplying N) and minimizing pollution of environment (from excessive N application) is a goal to be reached. SPAD or chlorophyll meter is a dynamic, simple and diagnostic tool that measures greenness or relative chlorophyll content of leaves (Kariya *et al.*, 1982). SPAD readings positively related to chlorophyll levels in plant tissue which highly correlated with leaf N content in wheat (Singh *et al.*, 2002 and Balasubramanian *et al.*, 2003). Moreover, leaf area-based N concentration has a unique linear relationship with SPAD values of wheat at all growth stages (Uddling *et al.*, 2007). Such relation indicates the suitability of SPAD meter to assess crop N status and determine the plant need for additional N fertilizer (Peng *et al.*, 1996 and Balasubramanian *et al.*, 1999). In this concern, Singh *et al.* (2002) showed that plant need-based N management through chlorophyll meter reduced N requirement from 12.5-25 %, relative to typical practices of growers, with no loss in yield. On the other hand, varietal differences can greatly affect the SPAD meter reading as some wheat cultivars are greener than other.

Therefore, the objective of the present investigation was to recognize the validity of using SPAD meter to assess crop N status and determine adequate N need for some wheat cultivars.