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SHORT COMMUNICATION

RELATIONSHIP OF CHLOROPHYLL CONTENT AND LEAF AREA WITH GRAIN YIELD IN WHEAT GENOTYPES

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Sixteen wheat (*Triticum aestivum* L.) genotypes raised under field conditions, were examined for leaf area, chlorophyll content and yield per plant. The leaf area and chlorophyll contents were not correlated with higher grain yield in the genotypes tested.

Wheat is an important cereal crop of the world and is the staple food of the people of Pakistan. In order to feed the ever growing population, increase in cultivated land area has a limitation, therefore, methods to increase yield per unit area has to be explored. There has been commendable increase in wheat grain production during the past few years, but still there is further scope for improvement. It has been suggested that by increasing photosynthetic efficiency, productivity could be increased (Rosenow *et al.*, 1983). It is known that photosynthetic efficiency depends on leaf area, chlorophyll contents and the stomatal response/gas exchange. Therefore, an experiment was conducted to study these parameters and analysing the correlation if any, in various locally available genotypes.

A preliminary experiment was conducted in the field using 16 wheat (*Triticum aestivum* L.) genotypes with five replicates. Fertilization was done @ 172 kg N, 115 kg P and 5.6 kg K ha^{-1} with normal cultural practices. Ninty days after sowing, six upper leaves of each tiller of each plant were excised and their area was measured with a leaf area meter (LI-3100; LI-COR, Inc, USA) and average/ leaf was calculated. Chlorophyll content (a, b and total), of these leaves were then determined according to Arnon (1949) and at maturity the yield per plant was also recorded.

The results showed wide variations in the chlorophyll contents of the genotypes tested (Table I). The role of chlorophyll in photosynthesis is well established but the relationship between chlorophyll content and the rate of photosynthesis is equivocal (Vu *et al.*, 1987; Ashraf and Khan, 1993; Ashraf *et al.*, 1994). Wide variation in chlorophyll contents, within species have been reported (Wright and Smith, 1983; Ashraf and Khan, 1990; Sinha and Patil ,1986 and Estill *et al.*, 1991). Leaf area and grain yield per plant also varied significantly in these genotypes. There are many reports indicating that genotypes with higher leaf area may have higher grain yield (Ludlow and Muchow, 1990; Rosenow *et al.*, 1983; Ashraf *et al.*, 1992; Duncan *et al.*, 1981). However, in the present study highest leaf area was observed in SH-8921 and the highest yield per plant in SH-8918. Therefore, these results show that leaf area and chlorophyll contents cannot be correlated with higher grain yield in the genotypes tested.

Table I. Chlorophyll content (a, b, total) leaf area and yield per plant of different wheat genotypes.

Genotype	Chl (a)	Chl (b)	Chl (total)	Leaf area (cm^2)	Yield per plant (g)
			mg g^{-1} fresh weight		
SI-8927	1.119 a	0.409 ab	1.528 ab	22.03 fg	6.09 cdef
SH-8918	1.141 a	0.409 ab	1.550 ab	24.91 ef	8.52 a
SH-8921	1.126 a	0.409 ab	1.535 ab	39.12 a	5.90 def
SP-89126	1.047 a	0.345 b	1.393 ab	25.22 ef	5.52 ef
SP-89128	1.099 a	0.406 ab	1.505 ab	21.62 fg	6.54 bcde
SI-9077	1.114 a	0.340 b	1.455 ab	31.70 bc	7.18 bc
SI-90157	1.021 a	0.371 ab	1.392 b	27.93 cde	6.23 cdef
SH-9044	1.165 a	0.385 ab	1.551 ab	20.21 g	5.20 fg
PN-9005	1.098 a	0.379 ab	1.477 ab	22.58 fg	6.56 bcde
PN-9041	1.133 a	0.408 ab	1.541 ab	25.70 ef	7.10 bc
PN-9083	1.027 a	0.349 b	1.376 b	18.97 g	5.42 fg
PN-9086	1.100 a	0.444 a	1.544 ab	26.90 de	7.12 bc
PN-90111	1.030 a	0.367 ab	1.397 b	33.02 b	7.37 b
Sarsabz	1.148 a	0.448 a	1.596 a	30.36 bcd	6.72 bcd
Soghat-90	1.056 a	0.397 ab	1.453 ab	29.85 bcd	4.46 g
Mehran-89	1.770 a	0.441 a	1.618 a	28.70 cde	7.54 b

Mean in the same column sharing the same letters did not differ significantly according to Duncan's Multiple Range Test ($P<0.05$).

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