https://doi.org/10.29321/MAJ.10.A02268

Madras Agric. J. 73 [5]: 278–280 May, 1986

ESTIMATION OF LEAF AREA IN WHEAT GENOTYPES

S. THIMMEGOWDA

Leaf product constants for eight wheat genotypes, were investigated. The leaf product constants varied significantly (0.729 to 0.799 for flag-leaf, 0.737 to 0.864 for other than flag leaf and 0.740 to 0.831 for all leaves) among the genotypes. This indicated that a single constant for wheat crop as such cannot be accepted. However, a leaf product constant of flag leaf only could be used for estimating leaf area in wheat genotypes as the high relationship existed between the actual leaf area and the estimated leaf area in all the genotypes as compared to other than flag leaf and all leaves

Linear measurments to estimate leaf area based on the correlation technique have been popular. This is so because, they are simple, sufficiently accurate and the leaves remain intact. Complete measurment of all leves of a plant in field trials is a labour and time consuming processes. Attempts have also been made to estimate the leaf area of the plant, using the area of selected leaves in crops like tobacco (Tojwani *et. al.* 1957), Maize (Francis *et. al.*, 1969) and sorghum (Stickler *et. al.*, 1961). Such a work on wheat crop is not available. Therefore, an effort was made to determine an appropriate factor to work out leaf area of the whole intact plant in wheat genotypes.

MATERIAL AND METHODS

The study was made at Agronomy Field Unit, Main Research Satation. University of Agricultural Sciences, Bangalore, on red sandy loam of average fertility during *rabi* season. Wheat genotypes included were, Chotilerma, Sonalika, Safed lerma. UP-301 and Hirad. Bijiga yellow and Narmada-4 and Gamut - an Australian variety. The experiment was laid out in a randomised block design with four replications. The crop was sown in the first week of October under irrigated cropping, adopting a row spacing of 18 cm and a seed rate of 150 kg per ha. The crop was fertilized at a dose of 150 N, 100 P_2O_5 and 75 K_2O kg per ha. Nitrogen was applied in two split doses, viz, at sowing and three weeks from sowing in the form of ammonium sulphate, while, all the P_2O_5 and K_2O were applied at the time of sowing in the form of single super phosphate and muriate of potash, respectively. Routine cultural practices were attended to.

Twenty five main shoots were selected at random in each plot when the crop was at heading stage. The flag leaves and other leaves of these were traced separately. The length and maximum width of the leaves

University of Agricultural Sciences, Bangalore.

* Present Address : Associate Professor of Agronon[illegible] Agricultural College, Hebyal.

were also recorded separately besides obtaining actual leaf area of the leaves with the help of planimeter. The factor was computed for different type of leaves in each genotype as the ratio of actual leaf area and the product of length with maximum width. Using this factor, the leaf area was estimated. Correlations between actual and estimated leaf area were also worked out.

RESULTS AND DISCUSSION

A high degree of correlation between actual and estimated leaf area in all the genotypes was observed (Table 1). However, the degree of relationship differed with the po-

Table 1. Relationship of actual leaf area with the estimated area by leaf product. (L constant) method in wheat genotypes

Genotypes	Correlation co-efficients*		
	Flag leaf	other than flag leaf	All leaves
UP–301	0.948	0 896	0 910
Hira	0.896	0.910	0.932
Gamut	0.969	0.943	0.942
Sonalika	0.960	0.899	0.922
Safed Lerma	0.888	0.860	0.872
Choti Lerma	0.974	0.898	0.940
Bijiga yellow	0 967	0.956	0.954
Narmada 4	0.977	0 951	0.939

* All value are significant at 1% level.

Table 2: Leaf product constant in wheat genotypes

Genotypes	Leaf product constants			Flag leaf other
	Flag leaf	Other than flag leaf	All leaves	than flag leaf
1. UP-301	0.729 (0.0137)	0.773 (0.0101)	0.758 (0.0061)	Sig
2. Hira	0.744 (0.0170)	0.737 (0.0113)	0.740 (0.0059)	NS
3. Gamut	0.799 (0 0178)	0.826 (0.0061)	0.818 (0 0045)	Sig
4. Sonalika	0.791 (0.0173)	0.836 (0 0106)	0.820 (0.0055)	Sig
5. Safed Lerma	0.752 (0.0243)	0.827 (0.0065)	0.808 (0.0058)	Sig
6 Choti Lerma	0.742 (0.0099)	0.805 (0 0092)	0.783 (0.0050)	Sig
7. Bijiga yellow	0.788 (0.0250)	0.823 (0.0065)	0.811 (0.0044)	NS
8. Narmada - 4	0.753 (0.0082)	0.864 (0.0062)	0.831 (0 0052)	Sig

Figures in parenthesis represents SE for leaf product constants.

Flag - leaf : 0 729 [1] 0.742 [6] 0.744 [2] 0 752 [5] 0.753 [8] 0.788 [7] 0.791 [4] 0.799 [3]

All leaves : 0 740 [2] 0.758 [1] 0.783 [6] 0.808 [5] 0.811 [7] 0.818 [3] 0.820 [4] 0.831 [8]

Figures in parenthesis represents wheat genotypes.

sition of leaves. The relationship between the actual and estimated leaf area was high with flag leaf (0.888 to 0 996). but not so with all leaves (0.872 to 0.954) and other than flag. leaf (0.860 to 0.956) of the plant However, the relationship was better with other than flag leaf (0 951 to 0.956) as compared to all leaves (0.939 to 954) in case of Narmada - 4. Bijiga yellow and Gamut.

The leaf product constant of flag leaf ranged from 0.729 to 0.799 among wheat genotypes It was 0.737 to 0.864 and 0.740 to 0 820 with other than flag and all leaves respectively (Table 2).

Genotypice differences in leaf product constant indicated that a single leaf product constant for the whet crop as such cannot be used. There is need to use appropriate constant for each genotype.

The leaf product constant of all the genotypes differed significantly between flag leaf and other leaves except Hira and Bijiga yellow (Table 2). This necessitates to have separate leaf product constant for flag leaf and the leaves below it. Stickler *et. al.* (1961) while evaluating the error in estimating leaf area by the leaf product method, observed that 90 per cent of the error arose due to differences in the leaf position.

However, a leaf product constant of either flag leaf or other leaves could be used for estimating leaf area in Hira and Bijiga yellow since the difference in the leaf product constant of flag leaf and other leaves did not differ significantly.

REFERENCES

FRANCIS, C. A. J. N. RUTGER and A. F. E. FALMER 1969. A rapid method for plant leaf are aestimation in maize (*Zea mays* L.). *Crop Sci*, *9* : 537-539

STICKLER, F. C., S. WEARDEN, and A. W. PAULI, 1961. Leaf area determination in grain sorghum. *Agron. J., 53 :* 187 - 189

TEJWANI, K G., C. K. RAMAKRISHNA KURUP, and K V., VENKATARAMAN, 1957. Measurement of leaf area of tobacco. *Indian J. Agron., 2* : 35-39