COMPARISON OF THREE METHODS OF MEASUREMENT
OF LEAF AREA IN SOYBEAN

Among the methods of measurement of leaf area of plants, the graph paper method is one of the most direct. The method consists in making sketches of leaves on graph paper and counting the number of squares. This method, is time-consuming and laborious. As an alternative to this method, the feasibility of using two other methods on soybean was tried. The tested methods were 'weight of paper method' and using length and width of leaves. In the former, sketches of sample leaves were made on uniform quality paper and the portion of the paper covered by the leaf was cut off. The weight of these paper bits was found out. Taking 20 papers of the same quality of known dimensions, the weight-area relationship of the paper was found out. From the area of paper per unit weight, the area of paper bits and thus area of leaves was calculated. In the second method, the length and maximum width of each of the sample leaves were measured and the product of length and width was multiplied by a factor. This factor was worked out using the equation. $F = \dfrac{- A}{\Sigma 1 \times W}$ where F = the multiplication factor ΣA = the sum of area of leaves measured using the weight of paper method 2 LxW = the sum of products of length and maximum width of leaves. The calculated value of the factor came to 0.712.

A total of 510 leaves were used for the study and the leaf area calculated by the above three methods. To get leaves of different sizes, leaf samples were drawn from an experiment laid out to compare the effect of levels of nitrogen and culture inoculation on soybean. These were collected from 17 random plots of the experiment and from three locations of each plot. Ten leaves each were collected from each of the locations, Leaf area was measured plot- wise using all the three methods. Comparison of the three methods using analysis of variance showed that the differences in area between the three methods were not significant (Table 1), indicating thereby that all the three methods are equally vaiid for the estimation of leaf area. The mean area of leaf by the three methods were 34.74 cm^2, 34.12 cm^2 and 34.18 cm^2 for gragh paper, paper weight and length-width multiplication methods respectively. Area of leaves by graph paper method ranged from 30.52 to 38.94 cm- for the leaves sampled. The differences between the plots were highly significant indicating that the leaf sizes were different in the different plots. Correlation coefficient between the area by 'weight of paper method' and the area calculated from ength and width worked out to + 0,9746 which was significant. A similar

correlation coefficient was worked out between area by graph paper method
and area calculated from length and width.   It came to a statistically significant
value of +0 9532.

It is concluded that all the three methods discussed above are suitable
for measurement of leaf area of the soybean plant.   A multiplication factor of
0.712 may be used while calculating **leaf** area from length and width measure-
ments.

Table 1   Analysis of variance for leaf area by the graph paper, paper
weight and length-width multiplication methods of
estimation of leaf area in soybean.

Source	Sum of squares	Df.	Variance	F
Total	1212959	50		
Methods	3574	2	1787	3.0636
Replications				xx
(Plots)	190717	16	74420	127.5688
Frror	i8668	32	583	

xx Significant at ! per cent level.

സംഗ്രഹം

സോയാബീൻ ചെടിയുടെ ഇലയുടെ വിസ്തീർണ്ണം കണ്ടുപിടിക്കാനുള്ള മൂന്നു രീതികളം
തമ്മിലുള്ള flj>0(B«n<i>i-ുഗനം നടത്തിയതിൽ ഈ മൂന്നു ro*lrijtl<9i<3o ഒരുപോലെ അനുയോജ്യമാ
ണെന്നു കണ്ടു. ഗ്രാഫ് പേപ്പർ ഉപയോഗിക്കക, പേപ്പറിന്റെ ഭൂക്കം വഴി കണ്ടുപിടിക്കുക,
ഇലയുടെ നീളം, വീതി ഇവ ഉപയോഗിച്ചു കണക്കാക്കുക, ഇവയാണ് മേൽപ്പറഞ്ഞ മൂന്നു ro*l
തികളം. ഇലയുടെ നീളവും വീതിയും കൂടി ഗുണിച്ച ഫലത്തെ 0.712 കൊണ്ടു ഗുണിച്ചാൽ
ഇലയുടെ വിസ്തീർണ്ണം കിട്ടുന്നതാണ്.

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