

ESTIMATION OF LEAF AREA IN *GARCINIA CAMBOGIA*(KODAMPULI) THROUGH LINEAR MEASUREMENTS

Leaf area plays an important role in the characterisation of various morphological parameters of a crop plant. The correlation of characters with production has been found to be influenced by leaf area. The estimation of leaf area through linear parameters has been carried out by many scientists (Spencer, 1962; Nair *et al.* 1978; Rajeevan *et al.*, 1992).

Though the leaf area methods such as graph paper (Winter *et al.*, 1956) and gravimetric methods (Ruck and Bolas, 1956) are more accurate, these methods are time consuming and also require the removal of leaves from plants. Hence the most suitable method of estimation of leaf area is through the measurement of linear parameters.

Table 1. Regression equations and their coefficients of determination

Sl. No.	Male		Female	
	Equation	R ² , %	Equation	R ² , %
1	A = -31.49 + 7.14L	46.26	A = -29.96 + 7.06L	71.57
2	A = 1.011 + 0.987 (L x B)	99.20	A = 0.58 + 0.943 (L x B)	97.81
3	A = 0.945 (L x B)	99.01	A = 0.953 (L x B)	94.48

No work has been carried out so far in *Garcinia cambogia* (KODAMPULI) for estimation of leaf area. As the leaf area varies with sex, it is possible to predict the sex through a measurement of leaf area. An attempt in this direction is also made in this paper.

A sample of 100 leaves each was collected from five male and five female plants of *Garcinia cambogia*. The length, and breadth at half length were measured for each leaf. Leaf area was accurately measured using graph paper. The leaf area was predicted using the linear measurements, $A = a_1 + b_1L$, $A = a_2 + b_2(LxB)$ and $A = b_3 (LxB)$.

Where A = area of the leaf; a_1, a_2 = respective y-intercepts; b_1, b_2, b_3 = respective regression coefficients; L = length; and B = breadth of the leaf. The parameters of the equations were estimated using the method of ordinary least squares (Snedecor and Cochran, 1967).

Comparison of the above regression equations was done by finding the correlation with the actual leaf area measured using graph paper

(Snedecor and Cochran, 1967). Prediction of leaf area was made separately for male and female plants.

The maximum leaf area measured for female plants was 81.20 cm² whereas for male plants 50.67 cm² and the minimum leaf areas were 32.10 cm² and 46.89 cm² for male and female plants, respectively. The regression equations along with their respective coefficients of determination are given in Table 1. From the table, it is evident that the regression of area on length alone gave a poor fit for female and comparatively poorer fit for males (Model-1). The other two models did not differ significantly.

Thus, of the three models tried using linear measurements, Model 2 exhibited high R² both in male and female plants (99.2% and 97.81% respectively). Even though Model-3 also registered a high R² value in male plant, Model-2 was selected to predict the leaf area in both the male as well as female trees.

Length, breadth, actual and estimated leaf area are compared for some representative samples

Table 2. A comparison of leaf measurements between male and female plants of *Garcinia cambogia*

Sl. No.	Length, cm		Breadth, cm		L x B, cm ²		Leaf area, cm ²				Deviation over actual leaf area %	
	Male	Female	Male	Female	Male	Female	Actual		Computed (L x B)		Male	Female
							Male	Female	Male	Female		
1	12.0	12.6	4.0	5.4	48.00	68.04	46.83	65.93	48.39	64.74	-3.33	-3.30
2	9.5	14.0	3.5	6.0	33.25	84.00	32.10	81.20	33.83	79.79	-5.38	+1.74
3	10.4	13.4	4.2	5.2	43.68	69.68	43.08	65.10	44.12	66.29	-2.41	-1.83
4	9.7	12.4	4.0	5.3	38.80	65.72	38.00	61.28	39.31	62.55	-3.45	-2.07
5	10.0	10.9	3.8	5.2	38.00	56.68	37.40	53.71	38.52	54.03	-2.99	-0.60
6	10.9	14.1	4.3	4.9	46.87	69.09	46.13	66.18	47.27	65.73	-2.47	+0.67
7	10.1	10.0	4.6	5.3	46.46	53.00	47.13	51.83	46.87	50.56	+0.55	+2.45
8	12.8	10.3	4.0	4.9	51.20	50.47	50.67	46.89	51.55	48.17	-1.74	-2.73
9	11.0	11.6	4.3	4.6	47.30	53.36	46.06	49.10	47.69	50.90	-3.50	-3.67
10	10.8	11.6	3.6	4.3	38.88	49.88	37.11	47.00	39.39	47.62	-6.14	-1.32
t (0.01)	Sig		Sig		Sig		Sig		-		-	

drawn from male and female trees (Table 2). There were significant variation between length and breadth of the leaves of the male and female trees. Difference in leaf breadth was more conspicuous than leaf length. This was reflected in actual leaf area also where female trees had a higher value than male trees. This gives an indication that leaf breadth can be taken as one of the identifying

characters for demarkating the female trees from male ones. The actual and computed leaf area and the deviation over the actual leaf area of male and female plants are also given in Table 2. The data showed that these values are in good conformity with each other both in male as well as female trees and the deviations are relatively insignificant.

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