

Biometric Studies in Sunflower

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Analysis of per plant yield proved that the cultures EC. 68413 and EC. 101497 were superior to the variety Ramson Record. From the simple correlations as well as the partial regressions it was inferred that in the above varieties the diameter of the head and stem girth had remarkable contributions towards yield of grain.

Sunflower is a promising oilseed crop in our country. This crop has been recently introduced in this country and the performance is being studied. Burns (1970) while studying the head size as an indicator of plot yield recorded that the head diameter of Armairrec and Smene was closely correlated ($r = 0.95$) with yield. The present study was conducted to find out the relative contribution of different metric characters towards yield.

MATERIALS AND METHODS

A field trial was laid out during kharif 1973 with three varieties, viz. Ramson Record (V1) EC, 68413 (V2) EC. 101497 (V3) which were sown in a 10 X 3 Randomised Block Design under irrigated conditions. One hundred plants in each variety were separately taken up at random for observations of biometric characters.

RESULTS AND DISCUSSION

The analysis of the different biometric characters among the three varieties revealed that the average height in the case of Ramson Record being

the highest differing significantly from the other two varieties (Table).

TABLE. Mean Biometric values of three sunflower varieties

Variety	Height in cm	No. of leaves	Girth in cm	Diameter of head in cm
Ramson Record	168.3	29	1.99	9.66
EC. 101497	139.6	29	1.63	9.41
EC. 68413	159.6	29	1.81	9.49

The next best was the variety EC. 68413 while the variety EC. 101497 recorded the minimum height. In the case of number of leaves there was hardly any difference among varieties. The mean girth of the varieties established that average girth in Ramson Record was found to be significantly higher than the other two varieties. In the case of the average diameter of the head the varieties did not differ significantly from each other.

The analysis of the yield components recorded on per plant basis revealed that the varieties EC. 68413 and EC. 101497 excelled the variety Ramson

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Record while the former two were found to be on a par.

The simple correlation co-efficients between yield (Y), height of plant (X_1), number of leaves (X_2), girth of main stem (X_3) and diameter of the head (X_4) were worked out and furnished below :

	V_1 (R.Record)	V_2 (EC. 68413)	V_3 (EC. 101497)
$ry X_1$	0.3481**	0.5306**	0.5729**
$ry X_2$	0.1043NS	0.3109**	0.4436**
$ry X_3$	0.4173**	0.6814**	0.6429**
$ry X_4$	0.8026**	0.8639**	0.9019**

From the correlation values it could be seen that in the case of Ramson Record, it is the diameter of the head that has the major part to play in recording a greater yield, followed by the girth and height of the plant. The number of leaves did not have any significant part to play in increasing or decreasing the yield.

In the case of the variety EC. 68413, all the metric characters had significant parts to play in increasing the yield and all the co-efficients were positive. The intensity of relationship showed that the diameter of the head had the maximum strength, followed by girth of stem, height of plant and number of leaves. A similar analysis of the simple correlation co-efficients in the case of EC. 101497 established that the intensity of relationship between yield and the diameter of the head was the highest followed by girth of the stem, height of the plant and number of leaves.

Multiple regression analysis for the 3 varieties was separately worked out.

The regression equation for the variety Ramson Record was as follows :

$$Y = 47.6723 + 0.0476 X_1 + 1.6241^{**} X_2 + 1.2010^{**} X_3 - 4.6514^{**} X_4$$

$$R^2 : 0.65$$

$$R : 0.80$$

From the analysis it is inferred that 65% of the total contribution towards yield was available from the four yield attributes namely height, number of leaves, girth of stem, and diameter of the head. From the significance of the partial regression co-efficients it is inferred that the characters leaves (X_2), girth (X_3) and diameter of head (X_4) have significant influence while height had no influence towards the yield of this variety.

The multiple regression equation fitted for the variety EC. 68413 was as follows.

$$Y : 0.0056X_1 - 0.3257 X_2 + 46.9938^{**} X_3 + 1.4325^{**} X_4 - 76.3627$$

$$R^2 : 0.4862$$

$$R : 0.70$$

From the analysis it is found that with the four variables studied only 49 per cent of the reasons for the variations in the yield components could be explained. From the regression co-efficients it is inferred that the girth of the stem and diameter of the head had significant parts to play in increasing the yield while the other two characters did not have any impact on yield. From the analysis it is also inferred that there is wide scope for

increasing the girth and diameter of head beyond 1.84 cm and 9.49 cm respectively.

A multiple regression equation was fitted for the variety EC. 101497. The equation was as follows :

$$Y: 8.674625 - 0.0643583^{**}X_1 - 0.49801 X_2 + 1.06239 X_3 + 1.9000 X_4$$

R²: 0.675
R : 0.822

From the R² value it could be inferred that 68 per cent of the total variations

in yield has been explained by the four variables. The test of significance revealed that the height of plant and diameter of the head had remarkable contributions towards yield. There was wide scope for increasing the diameter of the head beyond 9.5 cm.

REFERENCE

- BURNS, R.E. 1970. Head size as indicator of of plant yields. *Georgia Coll. Agri. Exp. bln. Experiment* 62: 112-13.