Correlation for Yield and Yield Related Trait in Mutant and Segregating Genotypes in Sunflower (*Helianthus annuus*. L)

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Abstract  146 genotypes including 46 mutant and 100 segregants of sunflower were selected for the character association study to assess the relationship among yield and its components. Observations were recorded on six traits viz., 50% flowering, days to maturity, plant height, head diameter, 100-seed weight and seed yield per plant. Character association analysis revealed strong positive association of head diameter and 100 seed weight with seed yield per plant. Hence simultaneous selection of these characters would contribute for the seed yield per plant improvement. And this association study revealed the need of development of early and dwarf genotype for improvement of seed yield per plant.

Keywords  Sunflower; Seed yield; Correlation

Introduction  Sunflower (*Helianthus annuus* L.) has become an important oil crop in the world with annual production of 20 to 25 million hectares worldwide in the present decade. Yield is a complex character and is a function of several component characters and their interaction with environment. It would be more meaningful if the structure of yield were probed through breeding. It is necessary to measure the mutual relationship between various plant characters and determine the component characters on which selection can be based for genetic improvement in yield. Genotypic and phenotypic association reveal the degree of association between different characters. Thus it helps to base selection procedure to a required balance where two opposite desirable characters affecting the principal characters are being selected. It also helps to improve different characters simultaneously. Desai (1989), Patil et al (1996b) and Abdelgawad et al (1987) have reported positive associations of seed yield with various yield components. Ibrahim (1985) and Srinivasa (1982) have reported positive associations of various yield components with oil content.

Results and discussion  Simple correlation coefficients among the yield and yield component characters in sunflower are presented in Table 1.

| Days to flowering | Plant height (cm) | Days to maturity | Head diameter (cm) | Test weight (g) |
|-------------------|-------------------|-----------------|-------------------|----------------|
| Days to flowering | 1                 |                 |                   |                |
| Plant height (cm) | 0.339**           | 0.475**         | 0.1042 ns         |                |
| Days to maturity  | 0.7189**          | 0.0767 ns       | 0.7189**          | 0.5106**       |
| Head diameter (cm)|                   |                 |                   |                |
| Test weight (g)   |                   |                 |                   |                |
| Seed yield per plant | -0.2**   | -0.0305 ns | 0.4407**          | 1              |

Seed yield with other characters  Seed yield was highly significant and positively correlated with head diameter (0.7189) and 100 seed weight (0.5106) similar results were reported by Lakshminarayana et al (2004) and seed yield was
negatively correlated with days to flowering (-0.2), and days to maturity similar results were reported by Manjula (1997).

Between Other Characters
Days to flowering had significant and positive correlation with plant height similar rests reported by Sathish (1995) and Manjula (1997) and similarly positively correlated with days to maturity similar results obtained by Lakshmananaiah (1978) Days to flowering shown negative and significant correlation with head diameter and test weight. Similar results were obtained by D’jakov (1972) and Patil (1993).

Plant height had positive and significant correlation with days to maturity similar results obtained by Anandha et al (2010). Head diameter had positive and significant correlation with seed yield per plant and test weight similar result obtained by Anandhan et al (2010).

Plant height had negative and significant correlation with head diameter. From the above discussion, it may be concluded that differential association was observed among these component characters. Due to the presence of significant and negative association of plant height with head diameter and presence of non significant association with head diameter and seed yield per plant, it may be inferred that, the early and dwarf genotype can be developed with high seed yield. The character days to maturity, 100-seed weight and head diameter were considered as important selection indices for seed yield improvement.

Materials and Methods
In this present investigation, 146 genotypes include 46 mutants and 100 genotype derived by crossing 3 A lines, 2 B lines and 2 R lines with one male parent TX–16R which is resistance to *Alternaria helianthi*. Alternaria leaf blight was studied. They were raised in a randomized block design with three replication in the botany garden in department of Genetics and Plant Breeding UAS Dharwad during kharif 2013. In each replication, each entry was raised in single rows of 4 m length adopting a spacing of 60 cm between the rows and 30 cm between the plants within each row. Normal agronomic practices were followed under irrigated condition. The data were recorded on five randomly selected plants of each entry of each replication for six yield and yield contributing traits viz, days to 50% flowering, days to maturity, plant height, head diameter, 100-seed weight and seed yield per plant. The data collected for aforesaid plant traits were statistically analyzed for simple correlation utilizing the formula suggested by Weber and Moorthy (1952).

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