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Correlation analysis of achene yield in sunflower (*Helianthus annuus* L.) to study genetic variability

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Abstract

Sunflower (*Helianthus annuus* L.) is an important edible oilseed crop which contain 35-50% oil content. Achene yield is 1.3 tons hectare[1] in Pakistan which is low as compare to other sunflower growing countries. Therefore a study was conducted in experimental field of Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad. Eighty sunflower accessions were planted following a Randomized Complete Block Design (RCBD) during 2022-23 season. Data were collected on several yield-related traits, including 50% flowering, plant height, number of leaves per plant, achene yield per plant, maturity, head angle, leaf area, and oil content. Recorded data was subjected to genetic variability, correlations and path coefficient analysis. Results revealed that genotype L11 stood out with the highest yield (43.5g), while genotype L1 had the lowest yield (24.66g). Genotypes included L-1 for days to 50% flowering, L-10 for plant height, L-61 for number of leaves, L-11 for head diameter and achene yield, L-41 for maturity, and L-31 for oil content showed better results. Achene yield per plant strongly correlated with head diameter, oil content, and leaf area, while plant height correlated positively with head diameter and correlated negatively with 50 % flowering initiation. Analysis of variance showed highly significant variation among genotypes for traits studied. Accession numbers L-11, L-21, L-10, L-31, L-61, L-41, L-71, L-51, L-30, L-20, L-9, L-60, L-50, L-70, L-80, L-40, and L-19 exhibited strong performance across both seasons., and others, which consistently performed well across different sowing times and seasons. These findings offer valuable resources for future breeding programs that enhance sunflower yield and productivity.

Keywords: *Sunflower, Genetic variability, Correlation, Yield, Oil content, ANOVA*