

T19882007

CORRELATION BETWEEN OIL CONTENT AND 1000 KERNELS WEIGHT AND THEIR NARROW SENCE HERITABILITY ON SUNFLOWER VARIETY (ZARJA), IN DRY FARMING CONDITION  
SOLTANI, E. & ARSHI, Y. Oil Crops Research Dep, Seed & Plant Improvement institute Mardabad-Road KARAJ-IRAN

The narrow sence heritability of oil content and 1000 kernels weight and correlation between these two characters were studied on sunflower families which were selected from ZARJA variety in dry farming condition. The correlation coefficient for two characters were calculated  $r=0.346$  which is significant. The narrow sence heritability for oil content which is estimated 0.292, was calculated by finding COV between off-spring and one of the parents and using the equation:  $b=1/2h_{ns}^2$ . Narrow sence heritability for 1000 kernels weight was estimated:  $h_{ns}^2=0.51$  and correlation coefficient between 1000 kernels weight of off-spring and parent was significant. The study showed that 1000 kernels weight will come down by inheritance to the next generation about two times more than oil content.

#### INTRODUCTION

Sunflower (*Helianthus annuus* L.) is one of the oil plants which is planting in many regions of IRAN. The farmers of Azarbayjan, Gorgan, North of Khorasan, Fars and Bakhtaran are familiar to this crop. The annual rainfall varies from 250mm to 450mm in these regions due to the year and region. However most portion of annual rainfall is in the fall and winter times but sunflower planting begins before May. So sunflower cultivation must tolerate the deficit of water and moisture in most of its vegetation period specially in flowering stage. Improving adapted varieties which can be suitable for dry farming condition is in periority in the research program.

(ZALI & YAZDI SAMADI, 1976) studied the association of seed yield and seed oil content with other plant and seed characteristics. They found that seed oil content was positively correlated with plant height, but negatively correlated with head diameter, stem circumference, seed

yield and seed size. (K. Gilraj et al 1979) found that 1000 seeds weight of plant, height of plant and diameter of head have the most important effects on sunflower seed yield. (I. J. Arand and S. Chandra) determined that height of plant, diameter of head and 1000 seeds weight have positive significant correlation with seed yield. Due to these investigations the 1000 kernels weight is one of the main factors which must be accounted in sunflower selection. In dry farming cultivation the 1000 kernels weight can be a criterion for better nutrition of plant. The oil content has a very important effect on final yield (apart from its correlation to other yield components). According to the effects of 1000 kernels weight and oil content in final yield, considering to the nature of heritability of these characters will be useful for beginning a selection program.

Broad sense heritability estimates ranging from 27 to 32% for hull percentage (Kinman 1975, Pathak, 1924) to 32% for oil percentage of kernels (Kinman, 1975) to 65 and 72% for oil percentage of seeds (Fick, 1975 and Shabana, 1974) have been reported. Narrow sense heritability estimates reported by Nikolic-vig et al for two populations were 20 to 37% for hull percentage and 57 to 75% for percentage of seeds. Fick reported narrow sense estimates of 52 to 61% for oil percentage of seeds. Broad sense heritability estimates of seed weight has an intermediate level (ranging from 30 to 66%) as indicated by Kinman, Pathak and Shabana.

#### MATERIALS AND METHOD

ZARJA is an early maturity sunflower variety with high oil content. This variety was planted in dry farming condition in 1983 and 123 heads were selected separately. These heads were showed a satisfied performance. 1000 seeds weight and oil content of all heads were determined. The oil content and 1000 seeds weight were decreased sharply. The oil content mean decreased to about 40% while it is from 48 to 50% in normal condition and 1000 seeds weight decreased from 60 grams to 41 grams.

According to the results, 77 heads were selected. These heads

had higher oil content and 1000 seeds weight than the general mean of all heads. One sample of selected seeds were planted in Dry -farming Research Station in Maraghe(North-west of IRAN) in 1984.

The planting rows were 3 meters long. Distance between rows were 70cm while distance between plants were 30cm. Height of plants, diameter of heads, seed yield of each row were measured on the field and 1000 seeds weight and oil content were determined after harvesting.

According to the results in 1983 and 1984, correlation of oil content between parents and their offsprings and the same for 1000 seeds weight calculated besides correlation between oil content and 1000 seeds weight measured based on the results in 1984. (Figure 1 to 4).

## RESULTS

1) Correlation between oil content and 1000 seeds weight is presented in table(1)  
table(1)

Character	sum	Mean	SS	n
Oil content(X)	3071	39.883	2509.948	77
1000 Seed weight(Y)	3199.48	40.383	643.191	77

Regression Coefficient    R=0.346  
  B=0.684

Regression equation:  $Y=12.275+0.6848x$

2) Narrow sense heritability of oil content.  
table (2)

Character	sum	Mean	SS	n
The oil content of Parents (X)	3227.94	41.921	830.902	77
The oil content of off-springs (Y)	3125.38	40.589	622.595	77

$$R=0.168$$

$$B=0.146$$

$$\frac{1}{2}h^2_n = B=0.146$$

$$h^2_n = 0.292$$

3) Narrow sense heritability of 1000 seeds weight  
table(3)

Character	sum	Mean	SS	n
1000 seeds weight of parents (X)	3002.5	38.994	2775.247	77
1000 seeds weight of offsprings (Y)	3077.54	339.968	2480.560	77

$$R=0.270^*$$

$$B=0.255 = \frac{1}{2}h^2_n$$

$$h^2_n = 0.510$$

$$Y = 30.03 + 0.255(x)$$

CONCULUTION

The estimates are related to a specific population of ZARJA variety without any rainfall during its budding stage till harvesting. Under this situation oil content and 1000 seeds weight can improve simultaneously. But improving of 1000 seeds weight will be more rapid.

## ACKNOWLEDGMENTS

The authors are grateful to from Mr.H.Pourdavaii for guidness and preparing the paper, to Mr R.Ghaffari from Genetic Resourse Division for statistical analising of the results.

## REFERENCES:

- 1-A.A.ZALI and B.Y.SAMADI, Association of seed yield and seed oil content with other plant and seed characteristics, *Helianthus annuus* L.P.164-172, proc of 8th Int sunflower. Conf, (MINNEAPOLIS, MINNESOTA U.S.A.)
- 2-FICK, G.N, 1975, Heritability of oil content in sunflower , *Crop Sci* 15:77-78
- 3-FICK, G.N., D.E.ZIMMER. and D.C.ZIMMERMAN, 1974. Correlation of seed oil content in sunflowers with other plant and seed characteristics. *Crop Sci.* 14:755-757
- 4-I.J.ANAND and S.Chandra. Genetic diversity and Interrelationships of oil yielding traits in sunflower.
- 5-K.Gilraj, T.S. 1979 path coefficient and analysis of seed yield in sunflowers, *sunflower Newsletter*, Vol3, No4 P:10-12
- 6-NIKOLIC-Vig, V, D.Skoric, and S.Bedov., 1971 Variability of oil and husk content in the sunflower seed of Peredovik and VNIIMK 8931 varietal populations and their heritability. *savermena polyaprivreda* 19(3):23-32
- 7-Pathak, R.S. 1974 yield components in sunflower. p.271-281 in *proc 6th Int sunflower Conf.* (Bucharest, Romania).

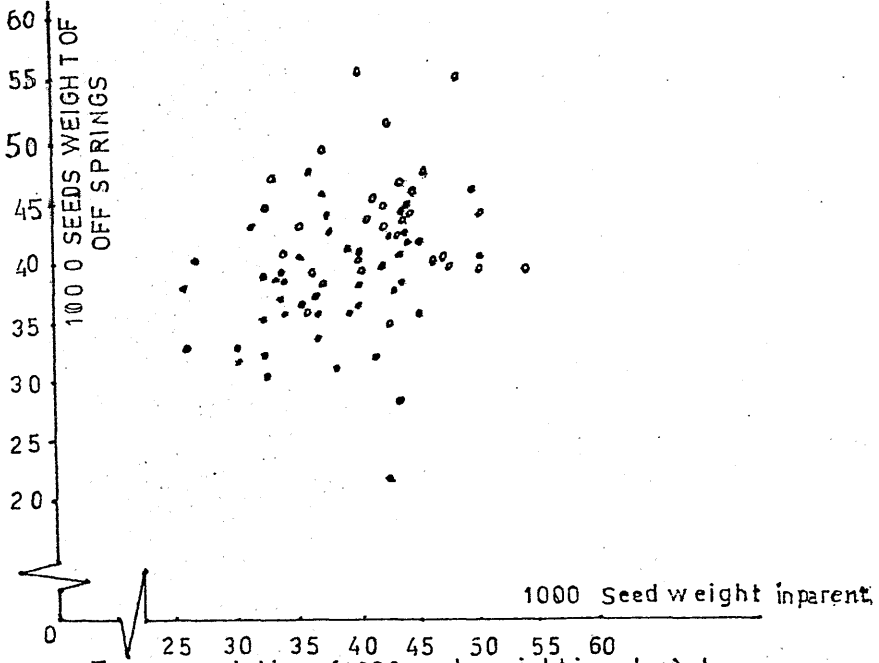


Fig-1 Correlation of 1000 seeds weight in selected heads of 1983 and their off springs 1984

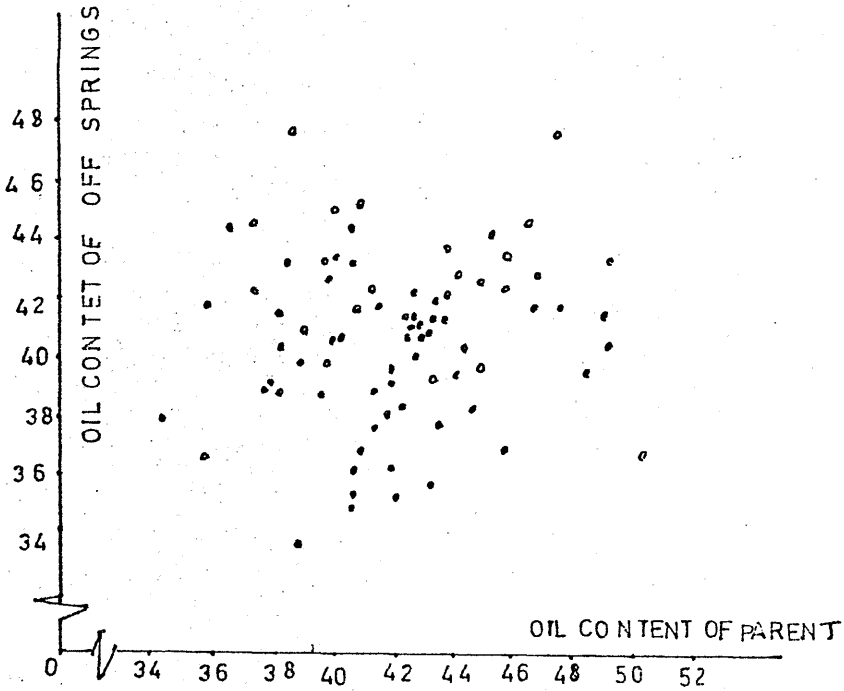


Fig-2 correlation of oil content between parents and off springs

