



Journal of Biological Sciences

ISSN 1727-3048

science
alert

ANSI*net*
an open access publisher
<http://ansinet.com>

Effect of Weed Control Treatments on the Performance of Sunflower

Hafeez Ullah, ¹Gulzar Ahmad and ¹Zar Quresh

NWFP Agricultural University, Peshawar ²Agricultural Research Institute, Tarnab, Peshawar, Pakistan

Abstract: There was no significant effect of different weed control methods on the number of days to emergence of sunflower. Maximum plant height (175.33 cm), Head Diameter (18.75 cm), thousand kernel weight (69.83 g), achene yield (2274.99 kg/ha) and oil yield (946.59 kg/ha) were obtained by manual weed control plots while minimum plant height (159.5 cm), Head Diameter (16.26 cm), thousand achene weight (61.68 g) and achene yield (1547.49 kg/ha) were exhibited by treatments where no weeding was done. Maximum weeds (331.83 gm/m²) were recorded in plots where no weeding had taken place while minimum weeds (139.66 gm/m²) were recorded in the treatments where manual weed control had been practiced.

Key words: Sunflower, *Helianthus annuus* L, weeds, treatments

Introduction

The sunflower (*Helianthus annuus* L.) belongs to the family composite. It is said to be of American origin (Heiser, 1976). It has a tap root system which grows as deep as 3 m. Sunflower grows 1.5 m tall. The stem is circular, 3-6 cm in diameter with rough hairs. The leaves are large, hairy, ovate and petiolate. Sunflower produces a disc shaped head called the "Capitulum" on top of the stem. The head commonly varies from 10-30 cm in diameter (Heiser, 1976). The capitulum is heliotropic until most of the flowers are fertilized, after which it generally remains fixed facing the east. The flowers are normally cross-pollinated mainly by honeybees. Seed colour varies from black to white. The seeds are usually 10-25 mm long with 8-15 mm width and 3.0-7.5 mm thick. One thousand seeds weigh 50-100 g or more. Sunflower is a Temperate Zone crop, but it is adaptable to a wide range of climatic conditions. It is grown on all types of the soils provided they are well drained. Acidic and saline soils are not desirable, though it can tolerate a pH range from 6.5-8.0 (Hatam and Abbasi, 1994).

In Pakistan, sunflower can be grown throughout the country on irrigated as well as rainfed areas, but its production is too low to meet or even narrow down the gap between requirements and production of edible oil of the country. In 1997-98 sunflower was grown on 98459 hectares in Pakistan, which produced 129693 tones of seeds. Its yield is 1300 kg/ha (Anonymous, 1998) which is very low as compared to other agriculturally advanced countries. Sunflower yields in Argentina, Turkey, France, USSR are 1435, 1535, 2595 and 1439 kg/ha respectively (FAO, 1989). Pakistan imported edible oil worth Rs. 43.0 billion during the fiscal year 1998-99 (Pakistan Oilseed Development Board). If due attention is given to sunflower crop, the gap between production and consumption can be narrowed down considerably.

It is generally agreed that appropriate sowing methods and weed control treatments are necessary for obtaining good yield of this crop.

Subbaiah *et al.* (1995) reported excellent control of all types of weeds with manual weeding, where as different chemicals gave moderate to good control. Solunkhe *et al.* (1990) reported good weed control with hand weeding and hoeing, 3 and 6 weeks after sowing. El Naggar (1991) stated that weed weight was lowest with hand hoeing. Legha *et al.* (1992) obtained reduced weed dry weight and maximum grain yield with manual weeding. Bially and Samie (1997) reported maximum head diameter and highest grain yield from hand weeded plots.

Keeping in mind the above facts, the present project was

under taken to investigate the response of sunflower hybrid SF-177 to different weed control treatments for higher yield in Peshawar valley.

Materials and Methods

The effects of different weed control methods on the performance of sunflower were investigated at Agriculture Research Institute Tarnab Peshawar, during spring 1999. Sunflower hybrid SF-177 was sown on April 13, 1999.

The experiment was laid out in RCB design having four replications. The sub plots size was 3 × 5 m². Each treatment had four rows, five meter long and 75 cm apart. Plant to plant distance was kept about 20-25 cm.

Recorded data were analyzed statistically according to RCB design and Least Significant Difference (LSD) test was applied to detect whether the effects of different treatments were significant or not.

Results and Discussion

Results presented in Table 1 revealed that emergence/m² of sunflower was not significantly affected by different weed control treatments. The possible reason could be that the chemical was selective in nature for sunflower.

Fresh weight of weeds per m² after 45 days of emergence was significantly affected by weed control treatments. Maximum fresh weight of weeds was recorded in the control plots while minimum fresh weight of weeds was observed in the hand weeded plots. The possible reason could be that most of the weeds that came under the blow of kudal were eliminated irrespective of any selectivity like in case of chemical treatments. Both the highest levels of 2.5 and 3.75 lit./ha of stomp had similar effect on the fresh weight of weeds with the possible reason that some of the weeds might have been adversely affected per unit area and therefore, as compared to control less fresh weight of weeds was observed. These observations are supported by El Naggar (1991) who reported that weed weight was lowest with hand hoeing. Plant height was significantly affected by different weed control treatments. Maximum plant height was recorded in plots where hand weeding was carried out. The minimum plant height was recorded in the control treatment. The possible reason could be that hand weeding eliminated most of the weeds and the plant met its requirements easily from the soil. These results are in agreement with Fleck *et al.* (1989).

Head Diameter was significantly affected by weed control treatments. The maximum head diameter was produced in the plots where hand weeding was carried out, while the minimum was produced in the control plots. The possible reason could

Hafeez Ullah *et al.*: Effect of weed control treatments on the performance of sunflower

Table 1: Results of different weed control treatments on the performance of Sunflower.

Treatment	Emergence/ m ²	weeds g/m ²	Plant height (cm)	Head Diameter (cm)	1000 grain weight (g)	Grain yield (kg/ha)	Oil yield (kg/ha)
Hand weeding	4.82	139.66 ^D	175.33 ^A	18.75 ^A	69.83 ^A	2274.99 ^A	946.59 ^A
Control	4.56	331.83 ^A	159.50 ^C	16.62 ^D	61.68 ^C	1547.49 ^C	593.81 ^B
Herbicide (1.25 litre/ha)	4.49	267.25 ^B	165.33 ^{BC}	17.20 ^{CD}	65.72 ^B	1711.66 ^{BC}	678.33 ^B
Herbicide (2.5 litre/ha)	5.02	207.83 ^C	170.66 ^{AB}	17.80 ^{BC}	67.53 ^{AB}	2018.88 ^{AB}	847.93 ^A
Herbicide (3.75 litre/ha)	4.40	192.83 ^C	172.25 ^{AB}	18.24 ^{AB}	68.60 ^{AB}	2044.88 ^{AB}	856.48 ^A
LSD Value at 5% N.S	34.52	9.861	0.7606	3.595	335.10	136.30	

be that hand weeding cleared the plots from all type of weeds and therefore, plants had not to compete for nutrients and moisture. These results were also confirmed by Legha *et al.* (1992) and Bially and Samie (1997).

Thousand grains weight was significantly affected by different weed control treatments. Maximum grain weight was recorded in plots where hand weeding was carried out and lighter grains were produced by those plots where no weeding was carried out. Hand weeding eliminated most of the weeds, hence balance nutrition was available to the plants and bigger grains were produced. These results are similar to those reported by Legha *et al.* (1992) who obtained maximum 1000 grain weight with mechanical weeding.

Grain yield of sunflower was significantly affected by the different weed control treatments. The maximum grain yield of 2274.99 kg/ha was recorded in those plots where hand weeding was done and minimum yield was recorded in those plots where no weeding was carried out. Hand weeding removed all types of weeds and loosened the soil and in this way the crop availed better environment for high production. These results are similar to those reported by Bially and Samie (1997) who found that highest grain yield was obtained in plots, which were hand weeded.

Oil yield per hectare was significantly affected by different weed control treatments. Maximum Oil yield of 946.59 kg/ha was given by the plots where hand weeding had been practiced while minimum oil yield was recorded in the control plots. These results are in agreement with Girijesh and Patil (1989) who reported that hand weeding provided the highest sunflower oil yield.

References

- Anonymous, 1998. Agricultural statistic of Pakistan. Ministry of Food, Livestock and Agriculture, Islamabad.
- Bially, M.E. and F.S.A. Samie, 1997. Integrated weed management in sunflower. *Ann. Agric. Sci. Cairo*, 42: 147-158.
- El Naggar, H.M.M., 1991. Response of sunflower to weed control and plant spacing. *Ann. Agric. Sci. Moshtohor*, 29: 137-1383.
- FAO., 1989. FAO quarterly bulletin of statistics No. 2. Food and Agriculture Organization of the United Nations, Rome, pp: 71.
- Fleck, N.G., I.P. Mengarda and J.J.O. Pinto, 1989. Weed interference in sunflower. *Competition in space. Pesquisa Agropecuaria Brasileira*, 24: 1131-1137.
- Girijesh, G.K. and V.C. Patil, 1989. Effect of weed control in groundnut and sunflower intercropping system with reference to nutrient uptake and oil yield. *J. Oilseeds Res.*, 6: 334-340.
- Hatam, M. and G.Q. Abbasi, 1994. *Oilseed Crops: Crops Production*. National Book Foundation, Islamabad, Pakistan.
- Heiser, C.B., 1976. *The Sunflower*. University of Oklahoma Press, USA.
- Legha, P.K., R.K. Malik and A.S. Faroda, 1992. Weed management in Kharif sunflower *Helianthus annuus*. *Crop Res. Hisar*, 5: 376-378.
- Solunkhe, U.V., D.K. Shelke and R.H. Bhosle, 1990. Integrated weed management in sunflower during rabi season in Marathwada. *J. Maharashtra Agric. Univ.*, 15: 367-367.
- Subbaiah, H., H.V. Nanjappa and B.K. Ramachandrappa, 1995. Chemical weed control studies under sole and intercropping systems in groundnut (*Arachis hypogaea* L.). *Mysore J. Agric. Sci.*, 29: 320-326.