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## Effect of Nitrogen Fertilizer Application Levels on Morphological Traits, Yield and Yield Components of Sunflower (Cultivar Masters)

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### ABSTRACT

In order to effect different levels of nitrogen fertilizer on yield and its components in sunflower (Cultivar Masters) in 2009 in pilot randomized complete block design with three replications was done in University azad Bojnourd branch. Treatments included different levels of nitrogen fertilizer (0, 90 and 180 kg N ha) had Masters and cultivars used. Traits measured, including number of grains per head, Seed yield, grain1000 weight, percentage of osteoporosis, plant height, diameter and stem diameter was. Based on the results, no significant effect on nitrogen increased seed number per head and stem diameter showed. In general, nitrogen consumption increased number of grains per head, Seed yield, Grain1000 weight, plant height, diameter and stem diameter was used, but grain nitrogen percentage of osteoporosis reduced. It seems that the application of 180 kg nitrogen per hectare to achieve good Performance in the test area is advisable.

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## INTRODUCTION

Considering that much of the vegetable oil needed will be supplied from outside the country, increasing production of oilseeds, including sunflower (*Helianthus annuus L.*) is important in the country and could play an important role in the country needed oil supplies have be. This plant, due to wide compatibility, and having the highest oil content of seeds (40 to 50 percent) as the most important grain yield and quality of oil is raised seed oil is also high (Schneider and Miller,1981). Sunflower seeds also have a 29 to 35 percent protein (Wiess,2000). And also produces oil, drawing oil meal from grains in the diet can also be used in livestock. nitrogen fertilizer as environmental Factors affecting growth and yield in crop plants such as sunflower is known (Debaeke *et al.*,1998). On the other hand, the production of nitrogen fertilizer per Kg total of 22,000 kcal of energy from non-renewable resources are consumed. Cheap energy and fertilizer prices caused some it is the indiscriminate use (Tauer,1989). Most research on determining the best amount of nitrogen fertilizers and their effects on sunflower yield and plant traits have been conducted in different regions. The results of this study generally shows that increasing N fertilizer stimulated vegetative growth causes, delayed flowering and maturity may lead to (Gubbels *et al.*,1986) Nitrogen fertilizer and oil yield increase, but percentage of protein reduces oil. Also negative correlation between seed oil and seed protein is seen . Reports in the Sunflower tell that nitrogen fertilizer increased plant height, stem diameter, head diameter, number of grains per head, Seed weight, matter accumulation Dry grain yield and its components increases (Miller and Fick,1978 , Yegappan *et al.*,1982 , Mahal and Makota,1998).Sunflower plants in the use of fertilizers with nitrogen to 150 kg ha rate so that the available nitrogen in soil reached 300 Kg per hectare, thereby increasing yield and seed oil content and oil yield in the end, or conditions in some areas is peripheral (Schneider and Miller,1981). Another study on sunflower in different amounts of 34, 67 and 101 pounds of nitrogen used and Increase the yield of nitrogen is increased (Halvorson *et al.*,1999). The study aimed to assess the effect of nitrogen fertilizer on yield components and other agronomic traits of sunflower varieties were Masters.

## MATERIAL AND METHOD

This experiment in 2009 in University research farm Bojnourd (Iran) (located 40 km west of Bojnourd) was performed. Tested field soil type is clay loam. Before testing the depth of 0 to 30 cm in order to field soil

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physical and chemical analysis were sampled. The study randomized complete block design with three replications was carried out. Experimental treatments included three levels of nitrogen consumption zero, 90 and 180 Kg of nitrogen per hectare was. Planting seeds on the Persian month April 25 to work and were available. Each experimental plot consists of five rows 10 m in length were implanted. Fertilizer treatments in each half of the fertilizer before planting and half before the start of the reproductive stage, as roads were added to the ground. Developmental stages based on the method (Schneiter and Miller, 1981) since emergence to harvest was determined. In order to prevent bird damage after pollination period, according to the desired had been randomly selected were covered by a cloth. Traits measured in this experiment included seed weight, diameter and stem diameter (caliper using the crown at a distance 25 cm was performed in 15 randomly selected plants), plant height, percent unfilled seed (200 g samples of the product selected sub-plots and hollow beads separation and was counted by hand and using the fitness levels and percentage) number of grains per head, total biomass and ultimately Seed yield. Variance and mean comparison of treatments using SAS software was performed to compare mean data from Duncan method at 5% was used.

## RESULTS AND DISCUSSION

### *Number of Grains Per:*

Analysis of variance table (Table 1) shows different levels of nitrogen at 1% significant effect on seed number per head is. Highest number of grains per 180 Kg of nitrogen in treatments is ha (Table 2). Much depends on the number of grains per area of leaf floret differentiation stage, the dry material stored in the plant organs and nitrogen uptake in the plant organs are. In various experiments also reported that nitrogen fertilizer significantly the number of grains per head increases (Sinwat *et al.*, 1993).

### *Seed Yield:*

Results Analysis of variance table (Table 1) shows that between different levels of nitrogen there are significant differences. Highest yield average 3420.5 kg seeds per hectare is about N180 (Table 2). Performance increase with the application of nitrogen fertilizer on sunflower many researchers have reported (Massy,1971 , Narwal and Malik,1985 , Gubbels and Dedio,1986). Yield increases result in increased seed weight and seed number per head has been reported by researchers (Mahal and Makota,1998).

### *Grain1000 Weight:*

According to a table between different levels of nitrogen, there are significant differences. Maximum grain 1000 weight to be 180 kg N ha (Table 2). With increased access and transfer of nitrogen to nitrogen plant more seeds, seed weight increased. Some researchers also research confirms these results (Malik *et al.*,1992).

### *Percentage of unfilled Seed:*

Different levels of nitrogen, no significant effect on percentage seed has osteoporosis (Table 1). Percentage of seeds treated for osteoporosis without nitrogen had the highest value (Table 2). N deficiency in some reports operating loss of material handling and increased photosynthesis to grain percentage osteoporosis has been reported (Malik *et al.*, 1992).

### *Plant Height:*

Between different levels of nitrogen, no significant differences were observed (Table 1). The results showed that the highest plant height was observed in the N180 treatment (Table 2).

### *Diameter:*

Different levels of nitrogen application no significant effect on diameter was (Table 1). Greatest diameter about 180 kg N ha application respectively (Table 2). Diameter increases in nitrogen fertilizer application results by some researchers have also been reported (Mahal and Makota,1998).

### *Stem Diameter:*

Different levels of nitrogen application of the significant differences in stem diameter was over 1% (Table 1). Nitrogen increased N uptake increased more and shoot growth was the highest amount with average stem diameter 1.63 cm at 180 kg N ha treatment was seen (Table 2).

### *Final Conclusions:*

According to the results we can say that application of nitrogen fertilizer increased seed number per head, seed yield, seed 1000 weight, diameter and stem diameter was. Application of nitrogen fertilizer also reduced the percentage of seeds was osteoporosis. Among treatments 180 kg ha treatments for cultivars studied (Masters) and the appropriate function has been enhanced. With increased access and transfer of nitrogen to

nitrogen plant more seeds, seed 1000 weight increased and parallel to the grain yield increased. Some researchers also research confirms these results (Mahal and Makota, 1998).

**Table 1:** Morphological variance analysis, yield component of sunflower (cultivar Masters).

Stem diameter (cm)	Diameter (cm)	Plant height (cm)	Osteoporosis seeds %	Grain 1000 weight (gr)	Seed yield Kg/ha	Number of grains	df	S.OV
1.0	4.9	3.2	0.1	0.4	0.8	0.7	2	Block Treatment Error
9.5*	15.1*	3.4	13.1*	10.1*	15.9*	12.0*	2	
							3	

\*and\*\*significant at 5 and 1 percent

**Table 2:** Comparison of morphological traits, yield and yield components of sunflower (Cultivar Masters) at different levels of nitrogen

Stem diameter (cm)	Diameter (cm)	Plant height (cm)	Osteoporosis seeds %	Grain 1000 weight (gr)	Seed yield Kg/ha	Number of grains	Treatment
0.9b	10.1b	93.5a	30.2a	38.4b	1807b	624b	NO
1.1b	11.8ab	100.3a	20.7b	40.9b	2260b	818a	N90
1.6a	14.8a	115.1a	21.0b	53.1a	3402a	865a	N180

In each column mean that at least a common letter are, no statically significant 5% level test based on at significant (Duncan).

## REFERENCES

- Blamy, P.C. and J. Chapman, 1981. "Protein, oil and energy yild of sunflower as affected by N and Pfertilization". *Agronomy Journal*, 3: 583-587.
- Can, J., *Plant Science*. 58: 579-600.
- Debaeke, P., M. Cabluenn, A.D. Raffaillac, 1998. "Crop management system for rainfed and irrigated sunflower (*Helianthus annuus*) in south-western France". *J. Agric. Sci., Camb.*, 131: 171-185.
- Gubbels, G.H., W. Dedio, 1986. "Plant density and soil fertility on the performance of non-oil sunflower". *Can. J. Plant Science*, 66: 521-804.
- Gubbels, G.H., W. Dedio, 1986b. "Effect of plant density and soil fertility on oil seed sunflower genotype". *Can. J. Plant Science*, 66: 521-527.
- Halvorson, A.D., A.L. Black, J.M. Krupinsky, S.D. Merrill, D.L. Tanaka, 1999. "Sunflower response to tillage and nitrogen fertilization under intensive cropping in wheat rotation". *Agron. Journal*. 91: 637-642.
- Mahal, S.S., H.S. Makota, 1998. "Performance of spring sunflower (*Helianthus annuus* L.) under different levels of soil moisture regime and nitrogen" *Environmental Ecology*, 16: 599-692.
- Malik, M.A., M. Akram, A. Tanvir, 1992. "Effect of planting geometry as fertilization growth, yield and quality of a new sunflower cultivar SF-100". *Journal of Agricultural Research. Lahore*, 30: 59-63.
- Massy, J.H., 1971. "Effect of nitrogen rate and plant spacing on sunflower seed yield and other characteristics". *Agron Journal*, 63: 137-138.
- Miller, P.A., G.N. Fick, 1978. "Influence of plant population on performance of sunflower hybrids".
- Narwal, S.S., D.S. Malik, 1985. "Response of sunflower cultivars to plant density and nitrogen". *J. Agric. Science., Camb.*, 104: 95-97.
- Schneiter, A.A., J.F. Miller, 1981. "Description of sunflower growth stages". *Crop Science*. 21.pp.901-903.
- Sinwat, V., B.T. Streer, 1993. "Growth of florets of sunflower (*Helianthus annuus* L.) in relation to their position on capitulum. Shading and nitrogen supply". *Field Crops. Research*, 34: 83-100.
- Tauer, L.W., 1989. "Economic impact of future biological nitrogen fixation technology on United State agriculture". *Plant and Soil.*, 114: 261-270.
- Wiess, E.A., 2000. *Oilseed Crops*. Black well Sci. Itd London, pp: 364.
- Yegappan, T.M., D. Mpaton, C.T. Gated, W.J. Muller, 1982. "Water stress in sunflower (Responses of cypsela size) *Annals of Botany*". London, 94(1): 63-68.