

(A)

()
)

(A

:

.()

.()

.()

.()

.()

.()

.()

()

()

()

()

()

pH

()

()

()

()

:

A

()

()

()

()

()

)

(

è

)

(

.()

)R3

ç

(

éi ç

ç/çç

R3

R3

ç/çç

)

(A

MSTAT-C

x

.()

)

(

i / / /

-

/	ééí éç ð*	çéð' è' éç*	ççð' èç**	í/ ìç*	ç/ íð*	ç/çð	é	
í/ ðé**	î / íí**	ç í ç ð'é ç**	é è çé/ í**	èí/èéé**	é/èð**	é /ééé**	è	
/	î ìç/ííí	íéí/èí	é è í/í	é/ íè	ç/çéí	ç/ çð		
/	î èçð' é /ð'í**	çééç ç'é *	ë é í/ í**	/ íí**	í/éð**	/ éí	é	
ç/ í	ìííð' /ç ð	éç' é / í	ì èéð /ðç'í	é/ ð	ç/	ç/ðçð		x
ç/ é	çç ìí/ç'í	éé íí / íð	èíííí/é	/íí	ç/ í	/ è	éç	
é/ð %	é /ðé%	è/ %	í/íð%	è/í ç%	ç/íí%	ð' %	(%)	

.% %i ::** *

ì ç)
 / (A
 éí ç
 /çèè A
 .()

-é

()	()	()	()	()	()	()	()
è íí ^a	/ ^a	é ^a	èí/íí ^a	é/èí ^a	í/í ^c	í/éí ð ^a	ì ç
í ^b	ç'í ^b	í ^b	èé/ ð ^{ab}	/è í ^b	çðð ^{bc}	ì/éé ^b	çç
éçé ^c	ð'í í ^{bc}	í ^c	éé/í ^b	/ ç ^c	í ^b	è'í ^c	ì ç
ééì ç ^d	í/éð ^{cd}	ð'í/í ^d	ð'í ^c	é/ í ^{cd}	èí ð ^{ab}	é/é ð ^{cd}	éçç
é ^d	/çéé ^d	çé ^d	í/éé ^c	é/í ^d	éé ^a	/ íí ^d	éí ç

%i

í

R₃

/ A

/

/

/

.()

.()

.()

()	()		()	
ii ^a	ii ^a	éé/ç ^b	/èi ^a	éi ^a
ç ^b	ééi ^b	ǎǎ ^c	/è ^a ç ^a	ìéç ^b
é ^{ab}	ìç ^a	ëë/ ^a	é/ì ^b	íéi ^a

%i

é

íi

.(é)

.()

í / / /

() ()

è/éi A
éi ç A
éi í
()
()

)
(
)
(
()

(/èi /è ç)

(éi)
()

() ()
()

(íéi éi)

(i)

)

(iéc)

í/éi ð A

(

.....

() .(

A

.()

ê ç

/ î î

ê ç

ë ç/ç

ì ç

()

()

()

.()

A

A

/

/

.()

()

()

.(ë)

A

()

()

)

ð / / /

-ë

î	í	ì	è	é		
					/ççç	-
				/ççç	ç/ è **	-é
			/ççç	ç/ î **	ç/ í **	-
			/ççç	-ç/èðð **	-ç/éðð	-è
		/ççç	-ç/ ã **	ç/ðè **	ç/ í **	ç/ ì **
	/ççç	ç/ î **	-ç/ì **	ç/ îð **	ç/ é **	ç/èí **
/ççç	ç/î ð **	ç/ éé **	-ç/èì ð	ç/ ç **	ç/ð ð **	ç/î ð **

.% .:**

1. Alyari, H., F. Shekari and F. Shekari. 2000. Oilseeds. Amidi Press, Tabriz. 162 pp.
2. Brown, C.L. 1977. Effect of data of final irrigation on yield components of sunflower. *Agronomy Journal*. 54: 19-23.
3. Daneshian, J. and H. Jabbari. 2009. Effect of limited irrigation and plant density on morphological characteristics and grain yield in a dwarf sunflower hybrid (CMS26 ×R103) as second crop. *Iranian Journal of Crop Science*. 10 (40): 377-388 (in Persian).
4. Flagella, Z., T. Rutunno, E. Tarantino, R. Dicaterina and A. DE caro. 2002. Changes in seed yield and oil fatty acid composition of high oleic sunflower hybrids in relation to the sowing date and the water regime. *European Journal of Agronomy*. 17: 331-334.
5. Ghaffaripor, A. 2004. Drought effect on yield and quantitative and qualitative attributes in new sunflower hybrids. M.Sc. AIU. Karaj Branch. 126 pp.
6. Human, J.J., D. Du Toit, H.D. Bezuidenhout and L.P. Bruin. 1990. The influence of plant water stress on net photosynthesis and yield of sunflower. *Crop Sci.*, 164: 231-241.
7. Jafarzadeh-Kenarsari, M. and K. Postini. 1998. Investigating the effect of drought stress at different growth stages on some morphological characteristics and yield components of sunflower (cv Record). *Iranian Journal of Agriculture Science*. 29(2): 353-362.
8. Khalilvand, E. 2006. Effect of drought on two sunflower (*Helianthus annuus* L.) hybrid yield and yield components in different density M.Sc. Thesis. IAU. Tabriz Branch. 147 pp.
9. Khomri, S. 2004. Investigating the effect of water deficit on grain filling, yield components and yield of three sunflower cultivars. M.Sc. Thesis. In *Agronomy*. Faculty of Agriculture, University of Tabriz. 94 pp.
10. Lahoti, M. and F. Rahimzadeh. 1991. principles of Plant physiology (translated in Persian) astan gods razavi Press. 107 pp.
11. Najafi, A. 1999. Selection for the resistance of water deficit stress M.Sc. Thesis. In *Plant Breeding*. Faculty of Agriculture, University of Tabriz. 97 pp.
12. Rafiei, F., A. Kashani, R. Mamghani and A. Golchin. 2005. The effect of the timing of irrigation and nitrogen application on grain yield and some morphological traits in hybrid sunflower, cv. Golshid. *Iranian J. Crop Sci.*, 7(1): 44-54.
13. Rafiei, H., D. Habibi, N. KHodabande, J. Daneshian, M. Mashhadi Akbar Bojar, M. Shokravi and A. Mohammadi. 2005. Effect of drought stress on yield components of different oil Sunflower varieties (*Helianthus annuus* L.) *Iranian Journal of Agronomy and Plant Breeding* vol. 1, No. 1. p. 75-83.
14. Razi, H. and T. Asaad. 1998. Evaluation the change of important agronomic traits and drought stress tolerance related criteria in sunflower cultivar. *J. Agric. Sci., Natur. Resour.* Vol. 2(1): 31-43.
15. Yegappan, T.M., D.M. Paton, C.T. Gates and W.J. Muller. 1980. Water stress in sunflower (*Helianthus annuus* L.), 1. Effect on plant development. *Annals of Botany*. 46: 61-70.
16. Yegappan, T.M., D.M. Paton, C.T. Gates and W.J. Muller. 1982. Water Stress in sunflower (*Helianthus annuus* L.), 3. Responses of cypsela size. *Annals of Botany*. 49: 69-75.

..... / / /

Comparison of Performance Potential of Sunflower Cultivars for Seed and Oil Yield in Water Deficit Stress Conditions

E. Abbasi Seyahjani¹, S. Khomari² and A. Sadeghi³

Abstract

In order to investigate the effects of water deficit stress on grain yield and some traits three sunflower cultivars, have been used based on randomized complete block design using a split plot experiment at Agricultural Research Station of Azad University of Tabriz in 2007. Five levels of water deficit (50, 100, 150, 200 and 250 mm evaporation from evaporation pan, class A) were assigned as main-plot and three levels of cultivars (Armavirsky, Allstar and Euroflour) were used as sub-plot in present work. Results indicated that grain yield were reduced to 4865 to 2122, kg.ha⁻¹ when plots were irrigated after 50 to 250 mm evaporation from the pan class A. Among cultivars studied 'Armavirsky' produced higher yield than 'Allstar' but it did not show significant difference from 'Euroflour'. Increasing water deficit stress decreased seed yield, oil yield, oil percentage, 100 grain weight, achene hull weight, kernel weight and increased number of unfilled seed.

Keywords: Sunflower, Cultivar, Grain yield, Grain oil, Water deficit stress

1- Former M.Sc. Student, Islamic Azad University, Tabriz Branch

2- Associate Professor, University of Mohaghegh Ardabili, Ardabil

3- B.Sc., Eastern Azarbaijan Research Center for Agriculture and Natural Resources