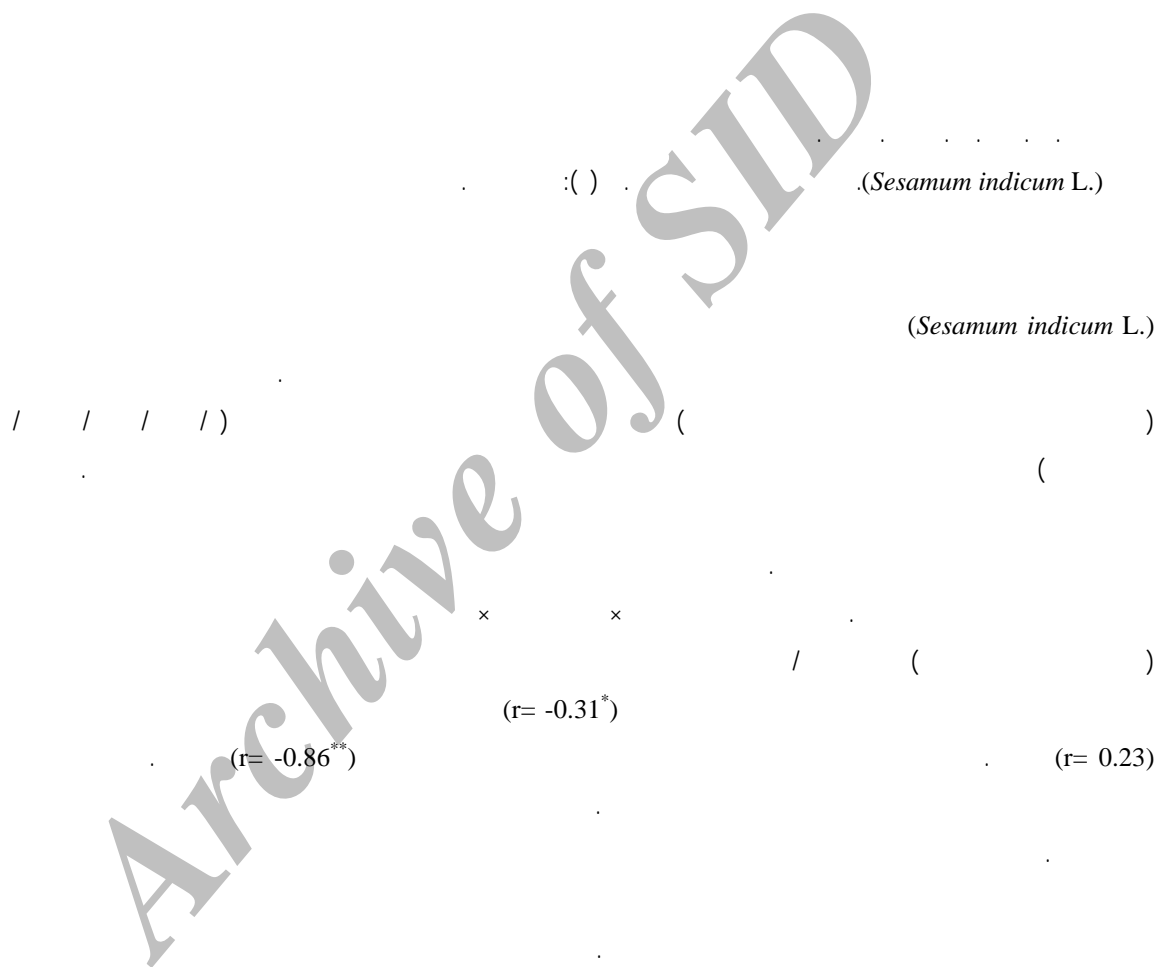


(*Sesamum indicum* L.)

**Effect of different levels of plant density and nitrogen fertilizer on grain and its yield components and some quality traits in two sesame (*Sesamum indicum* L.) cultivars**



( )

(Kamel *et al.*, 1983)

(Bennet *et al.*, 1996)

( )

( )

( )

( )

(Sinharoy *et al.*, 1990)

( )

(Sing *et al.*, 1992)

(Ramakrishnan *et al.*, 1996)

×

( / × )

(Bennet *et al.*, 1996)

(Bakhshandeh and Rahnama, 2006)

(Adebisi *et al.*, 2005)

( × )

(Balasubramanian *et al.*, 1995)

(Chungarol *et al.*, 1991)

(Dilip *et al.*, 1991)

/ / /

( / )

(Phyllody)

(*Fusarium oxysprum* F. sp Sesame)

MSTATc

Table 1. Soil physico-chemical properties of experimental site.

Organic matter (%)	( )	2.0
N (%)	( )	0.2
P (mg/kg)	( )	26.5
pH		7.5
Texture		Clayloam
Soil order		Ramjerd fine mixed, mesic, Typic Calcixerpts

( )  
( )

/

( )  
(Ramakrishnan *et al.*, 1996)

( / ) ( )  
/

)  
(Dillip *et al.*, 1991)

/ ( ) ( )  
/ /

)  
Kamel *et al.*, 1983  
(Singl *et al.*, 1996 Bennet *et al.*, 1996  
( )

(Adebisi *et al.*, 2005)

/

Table 2. Effect of levels of plant density and nitrogen fertilizer on grain yield, yield components and some quality traits in two sesame cultivars

Treatment	Days to maturity	Capsuls per plant	1000-grain weight (g)	Grain yield (kg/ha)	Harvest index (%)	Oil content (%)	Protein content (%)
<b>Plant density (plant m<sup>2</sup>)</b>							
16.6	118.2a	76.9a	3.7a	1084c	33.6a	53.8a	23.0b
20.8	118.5a	73.6a	3.6ab	1447b	25.9a	55.1a	23.9ab
33.0	119.1a	58.3b	3.6ab	1700b	26.4a	56.9a	24.6ab
41.6	119.5a	52.7b	3.5b	2001a	26.1a	54.3a	25.7a
<b>Nitrogen fertilizer (kg ha<sup>-1</sup>)</b>							
0	117.0c	40.3c	3.6a	1382b	25.0a	56.1a	23.2b
60	118.7b	70.0b	3.6a	1594ab	25.7a	55.2a	24.3ab
120	120.7a	86.0a	3.7a	1698a	25.7a	53.8a	25.3a
<b>Cultivar</b>							
Darab-14	120.9a	63.8b	3.5a	1542a	24.7a	55.6a	24.2a
Local	116.8a	67.8a	3.7a	1573a	26.3a	54.4a	24.4a
Zarghan							

Means, in each column and treatment, followed by similar letters are not significantly different at 5% probability level- using Duncan's Multiple Range Test.

(Gosh and Patra, 1993)

(Adebisi *et al.*, 2005)

(Weise, 2000)

Table 3. Interaction of plant density × nitrogen fertilizer × cultivar on grain yield of two sesame cultivars

Plants density (Plant m <sup>2</sup> )	Cultivar	Nitrogen (kg ha <sup>-1</sup> )		
		0	60	120
16.6	Darab-14	825k	1318fj	1200jk
	Local Zarghan	870jk	979jk	1309fk
20.8	Darab-14	1104ijk	1477ei	1629bh
	Local Zarghan	1272gk	1488di	1714ag
33.0	Darab-14	1507ci	1519bi	1957ac
	Local Zarghan	1513bi	1912ae	1912ae
41.6	Darab-14	1995abc	2164a	1981abc
	Local Zarghan	1968ad	1892ae	2002ab

Means, in each column and treatment, followed by similar letters are not significantly different at 5% probability level- using Duncan's Multiple Range Test.

Table 4. Correlation coefficients between yield and its components and some quality traits in sesame

	Grain yield	Capsuls per plant	1000-grain weight	Harvest index	Oil content
Capsuls per plant	0.06 <sup>ns</sup>				
1000-grain weight	-0.13 <sup>ns</sup>	-0.14 <sup>ns</sup>			
Harvest index	-0.31*	-0.03 <sup>ns</sup>	0.19 <sup>ns</sup>		
Oil content	0.23 <sup>ns</sup>	-0.16 <sup>ns</sup>	0.15 <sup>ns</sup>	0.09 <sup>ns</sup>	
Grain protein	0.18 <sup>s</sup>	0.10 <sup>ns</sup>	-0.15 <sup>ns</sup>	-0.03	-0.86**

\* and \*\* Significant at 5% and 1% probability levels, respectively.

(Weise, 2000) (r= -0.86\*\*) (Bennet *et al.*, 1996; Sinharoy *et al.*, 1990)

## References

- (*Sesamum indicum* L.)
- Adebisi, M. A., M. O. Ajala, D. K. Ojo, and A. W. Salau. 2005.** Influence of population density and season on seed yield and its components in Nigerian sesame genotypes. *J. Tropical Agric.* 43: 13-18.
- Balasubramanian, P., P. Gnanamurthy, and V. Dharmaligam. 1995.** Response of irrigated sesame varieties to planting design and nitrogen. *Sesame and Safflower Newsletter.* 101: 59-62.
- Bennet, M. R., K. Thaigalingam, and D. F. Beech. 1996.** Effect of nitrogen application on growth, leaf nitrogen content, seed yield and seed components of sesame. *Sesame and Safflower Newsletter.* 11: 21-28.
- Dilip, M. A., Jumdar, and S. Roy. 1991.** Response of summer sesame to irrigation, row spacing and plant population. *Ind. J. Agron.* 37: 758-762.
- Chungarol, S. R., D. A. Chavana, U. V. Alse, and G. V. Yeaonkar. 1991.** Effect of plant density and variety on yield of sesame. *Indian J. Agron.* 37: 380-385.

- "
- Gosh, D. C., and K. Patra. 1993.** Effect of plant density and fertility levels on growth and yield of sesame in dry season of Indian subtropics. *Indian. Agriculturalist* 32: 83-87.
- Kamel, M. S., R. Sabana, and M. N. Abu-hugaza. 1983.** Population arrangements and fertility effect on yield of seed of irrigated sesame. *Zeits Chirift Faracker and Pflanz Zehbav.* 156: 252-259.
- Metwally, M. A., N. S. El-Yazal, and F. N. Mahrous. 1984.** Effect of irrigation and nitrogen fertilizer on sesame. *Egyptian J. Soil Sci.* 42: 64-68.
- Patra, A. K., D. C. Gosh, Mishira, S. K. Tripathy, M. K. Nanda, and S. C. Mahapatra. 1996.** Growth models and path coefficient analysis of sesame in dry season. *Field Crops Abst.* 49(10): 976.
- Rahma, A., and A. Bakhshandeh. 2006.** Determination of optimum row spacing and plant density for unbranched sesame in Khuzestan province. *J. Agric. Sci. Technol.* 8:25-33.
- Ramakrishnan, A. N., A. Sundram, and K. Apparoo. 1996.** Influence of fertilization on yield and yield components of sesame. *Field Crops Abst.* 49(5): 452.
- Singh, S. B., Y. S. Chauhan, and G. S. Verma. 1992.** Effect of row spacing and nitrogen level on yield of sunflower (*Carthamus tinctorius L.*) in salt-affected soil. *Ind. J. Agron.* 37: 90-93.
- Sinharoy, A. R. C., A. Samul, M. N. Ahsam, and B. Roy. 1990.** Effect of different sources and levels of nitrogen on yield attributes and seed yield of sesame varieties. *Environ. Ecol.* 8: 211-215.
- Weise, E. A. 2000.** Oilseed crops. Blackwell. Sci., Ltd, Oxford, UK, pp 364.



" .. "

## Effect of different levels of plant density and nitrogen fertilizer on grain yield and its components and some quality traits in two sesame (*Sesamum indicum* L.) cultivars

Bahrani, M. J<sup>1</sup>, and G. H. Babaei<sup>2</sup>

### ABSTRACT

**Bahrani, M. J., and G. H. Babaei. 2007.** Effect of different levels of plant density and nitrogen fertilizer on grain yield and its components and some quality traits in two sesame (*Sesamum indicum* L.) cultivars. **Iranian Journal of Crop Sciences. 9(3): 237-245.**

A field experiment was conducted to evaluate the effect of different levels of plant density and nitrogen fertilizer (N) on grain yield and its components and some quality traits in two sesame (*Sesamum indicum* L.) cultivars-using split-split plot arrangement in randomized complete block design with three replications at Agricultural Research Station of Kushkak, College of Agriculture, Shiraz University in 2002 cropping season. The treatments included: plant density (16.6, 20.8, 33.0 and 41.6 plants m<sup>-2</sup>) assigned to main plots, nitrogen fertilizer (N) (0, 60, and 120 kg ha<sup>-1</sup>) and cultivars (CV) (Local Zarghan and Darab-14) were randomized in sub-plot and sub-sub plots, respectively. Both plant density and N fertilizer had significant effect on days to maturity, capsule number per plant, 1000-grain weight, grain yield, harvest index, oil and protein contents. Grain yield of cultivars increased with increased N rate, but CVs had different response to N levels. There was a significant interaction between N × plant densities × CV on grain yield, and the highest grain yield (2161 kg ha<sup>-1</sup>) was produced by Darab-14. in 41.6 plants m<sup>-2</sup> and 60 kg N ha<sup>-1</sup>, which was not significantly different from local Zarghan, at this plant density. Grain yield had negative and significant correlation ( $r = -0.31^*$ ) with harvest index and positive correlation ( $r = 0.23$ ) with 1000-grain weight and oil content. Grain oil content had negative and significant correlation ( $r = -0.86^{**}$ ) with grain protein content. In summary, two sesame cultivars had no significant yield differences, but it local Zarghan, was more responsive to N application. Of course Darab-14 is harvested later relative to local Zarghan and therefore, it is recommended early maturity local Zarghan be sown where there are early autumn rain and cold with less N fertilizer application.

**Keywords:** Capsule number per plant, 1000-grain weight, Grain yield, Harvest index, Oil content, Protein content.

---

**Received: May 2007**

1- Professor, Shiraz University, Shiraz, Iran (Corresponding author)

2- Former M.Sc., Student, College of Agriculture, Shiraz University, Shiraz, Iran