

Evaluation of Planting Density on Seed Yield and Seed oil Percent of Rapeseed Cultivars (*Brassica napus*)

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ABSTRACT

To aim effects of row spacing on seed yield and seed oil percent of three cultivars of winter canola and planting them in the test treatments and variety, factorial experiment in randomized complete block design in three replicates in which the planting distance in 3 levels: 35, 45 and 55 cm in 3 levels and three varieties. This experiment was carried out in 2010-11 crop season of Chaloos in Iran. The results showed that effect of variety Simple has significant on seed yield ($P < 0.01$). The effect of planting distance has a significant effect on grain yield ($P < 0.05$) has significant. In mean comparison of varieties was found that the varieties of Zarfam in comparison with the average 2599 ($\text{kg}\cdot\text{ha}^{-1}$) maximum and Okapi varieties with an average 1575.7 ($\text{kg}\cdot\text{ha}^{-1}$) had the lowest grain yield.

Key words: Canola , Row Spacing, Seed Yield, seed Oil Percent , Variety

Introduction

Sowing time is an important factor that determines the length of growing season and hence yields. Early spring sowing of oil canola delayed flowering and reduced reflection of radiation during flowering which were important factors leading to the highest yields achieved by late sowing (Jenkins and Leitch, 1986). Al Barzinjy *et al* (1999) investigated the effects of different plant densities ranging from 20 to 130 plants. m^2 in rapeseed. They concluded that pods per plant, seed weights and dry matter per plant decreased as plant density increased. In oilseed rape, row spacing or plant density vary considerably worldwide, depending on the environment, production system and cultivar. Previous studies have shown that plant density is an important factor affecting rapeseed yield. Plant density in rapeseed governs the components of yield, and thus the yield of individual plants. A uniform distribution of plants per unit area is a prerequisite for yield stability (Diepenbrock 2000). Leach *et al.* (1999) also reported that plants grown at high density had fewer pod-bearing branches per plant but produced more branches, and that with an increase in density 1000-seed weight increased. The same researchers also observed that there was no effect of density on seed oil content. Rapeseed is sometimes grown in rows with spacing wide enough to allow for mechanical cultivation. In most areas where herbicides are used, the crop is either broadcast seeded or planted in drill rows spaced 15–20 cm apart (Lewis and Knight 1987). Rapeseed has generally slight or inconsistent seed yield responses to various row spacing's. Therefore, optimum densities for each crop and each environment should be determined by local research. However, there are no published research data on the plant density or row spacing response of rapeseed in the region of Chaloos, Iran of North. The objective of this study was to evaluate the effects of different spacing's between or within rows on the agronomic characteristics of three genotypes of *Brassica napus* .

Material And Methods

In this field experiment was conducted in 2010-2011 in Chaloos Local, Iran. According to the weather, the weather hot and humid regions of with mild winters and hot summers and temperate and humid tropical areas is public. To determine the effects of row spacing on yield components of three cultivars of rapeseed fall and planting them in the test treatments and variety, Factorial experiment in randomized complete block design in three replicates in which the planting distance in 3 levels: 35, 45 and 55 cm in 3 levels and varieties, including Opera, Zarfam and Okapi. At the end of the growing season, to determine the agronomic characteristics of each experimental plot, 10 plants were randomly selected and their characteristics were measured. According to statistical data model factorial design in randomized complete block analysis of variance was simple and mean comparison using Duncan's multiple range test was performed. Comparison of data for analysis and statistical software Gensat 12.1 software was used for drawing diagrams.

Results And Discussion

Seed Yield:

Grain Yield of rapeseed is the most important traits, can be affected in varieties, different treatments and different climates and the volatility is large (Shirani rad *et al.*, 2005). In mean comparison of Varieties was found that the varieties in comparison with the average Zarfam 2599 ($\text{kg}\cdot\text{ha}^{-1}$) maximum and Okapi varieties and with an average 1575.7 ($\text{kg}\cdot\text{ha}^{-1}$) had the lowest grain yield. This is difference a significant between the varieties (table 1). In the mean comparison distance of planting on yield attributes of varieties of the highest Okapi with an average 2211.4 ($\text{kg}\cdot\text{ha}^{-1}$) and the new line character to the lowest mean is 1983.4 kg per hectare that the simple analysis of data in normal distribution, this difference was significant (table 1). According to various research studies on the performance of different density can be changed given that the density of plants per hectare, the planting distance between plants on line and the line has fluctuated. And regional plans, the use of varieties Okapi introduced to the short height is not a good performance. Chen *et al.*, The study of four different concentrations of 1,3,6 and 9 plants per square foot of rapeseed, Three planting dates, they observed an increase in density to 32 plants per square meter increased performance, But was observed with the increasing density of the reduced performance. The highest yield on 16 April and the density was 32 plants per square meter (Chen *et al.*, 2008).

Seed Oil Percent:

A simple analysis of variance showed that Simple varieties of the seed oil was significantly ($P < 0.01$). The comparison showed that varieties mean varieties Zarfam 40.9 of the most and Opera variety with a mean of 27.9 percent allocated to the lowest seed oil. As noted above, this difference was significant among the varieties ($P < 0.01$) (Table 1). In the mean interaction between varieties and sowing was found that the highest percentage of oil in this study Zarfam varieties with an average 41.8% and 30 cm row spacing. And the lowest value of this attribute to a Opera is obtained with the average 26.8% and planting distance 30 cm. In this study, the density has no significant effect on the varieties the varieties of varieties Zarfam won the highest percentage of oil, In this study has not been seen the relationship between density and seed oil.

Table 1: Mean Comparison of Cultivars and Planting Row Spacing on Seed Yield and Seed Oil Percent of Rapeseed Cultivar

Treatment	Seed Yield ($\text{Kg}\cdot\text{ha}^{-1}$)	Seed Oil Percent (%)
Variety(A)		
V ₁ =Opera	2359.6a	27.9c
V ₂ =Zarfam	2454.8a	40.9a
V ₃ =Okapi	1575.7b	31.1b
Row Spacing(B)		
R.S ₁ =35 cm	1983.4b	33.4a
R.S ₂ =45 cm	2195.4a	32.7a
R.S ₃ =55 cm	2211.4a	33.8a
Variety* Row Spacing(AB)		
V ₁ .R.S ₁	2068.2bc	26.8d
V ₁ .R.S ₂	2441.8a	28.2cd
V ₁ .R.S ₃	2568.8a	28.7cd
V ₂ .R.S ₁	2448.5a	41.8a
V ₂ .R.S ₂	2599.5a	39.5a
V ₂ .R.S ₃	2316.5ab	41.4a
V ₃ .R.S ₁	1433.4d	31.7b
V ₃ .R.S ₂	1544.8d	30.3bc
V ₃ .R.S ₃	1748.9cd	31.2b
Significant (M.S)		
A	**	**
B	*	NS
A*B	NS	NS
CV%	11.21	8.34

Means with similar letter were not significant at the 5% probability level.

Levels of significant: * = $P < 5\%$, ** = $P < 1\%$ and NS = not significant

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