

Effect of planting row spacing on agronomic traits of winter canola cultivars (*Brassica napus* L.)

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Abstract: To determine the effects of row spacing on yield components 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: 30, 40 and 50 cm in 3 levels and three varieties, including new lines (crossed two varieties of H19, goliath), Zarfam and Pahnab-e-joybar (Local varieties). This experiment was carried out in 2010-11 crop season. The results showed that the Cultivar effect is significant ($P < 0.01$) on all traits measured in this paper, also Effect of row spacing was significant ($P < 0.01$) on plant height, stem diameter and grain yield. Simple variance analysis showed that was significant Simple effect of varieties and planting distance on plant height ($P < 0.01$) In mean comparison of Varieties has Maximum of grain yield the zarfam variety (2454 kg/ha). In Mean comparison the effect of planting distance on average than the number of pods per plant, most varieties of this trait to Pahnab-e-joybar by average 60.3 and the lowest number of pods per plant, the new line with a mean of 53.6 is that this difference was not significant in the normal distribution of data.

Key words: Canola, Row spacing, Grain yield, variety.

INTRODUCTION

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). Al Barzinjy *et al.*, (1999) investigated the effects of different plant densities ranging from 20 to 130 plants/m² in rapeseed. They concluded that pods per plant, seed weights and dry matter per plant decreased as plant density increased. 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* new lines (crossed two varieties of H19, goliath), Zarfam and were Pahnab-e-joybar (Local varieties).

MATERIAL AND METHODS

In this field experiment was conducted in 2010-2011 in Chaloos Branch, Islamic Azad University Research Farm. According to the weather, the weather hot and humid regions of the and 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: 30, 40 and 50 cm in 3 levels and varieties, including new lines (crossed two varieties of H19, goliath), Zarfam and were Pahnab-e-joybar (Local varieties). In this study, all stages of plant phenology and traits were measured, such as plant height, stem diameter, main stem branches, pod length, number of pods on main stem and branches, pods per plant, seed number, the pods on main stem and

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branches, seeds per pod, seed yield, biological yield, harvest index, seed oil content and seed oil yield and number of pods per plant. The most important feature is the quality of canola oil Percent That determine the amount of seeds per plot in envelopes and placed 20 g was transferred to a laboratory. The canola seed oil was determined by NMR(Nuclear Magnetic Resonance) based on magnetic induction works and a hydrogen atom is spectrometry .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 MSTAT-C – SPSS and Excel software was used for drawing diagrams.

RESULTS AND DISCUSSION

Height of plant:

Simple variance analysis showed that Simple effect of varieties and planting distance on plant height was significant at the one percent level($P < 0.01$). And in the critical area is the normal distribution , the interaction between cultivars and planting the rapeseed plant height is not significant(Table 1). Mean comparison Varieties showed that the new lines compared with the average 147.5 cm and maximum stream Pahnab-e-joybar 72.3 cm minimum height to be allocated(Table 2). Also was the mean interaction between varieties and planting that The maximum height of canola in this study, the new line is 30 cm row spacing And minimum height stream is of 40 cm row spacing compared Pahnab-e-joybar (chart1). The planting density and the expected With low density due to less competition for space and light, more height is more, But this was not true in all treatments .Momoh et al, In the experiment conducted on rapeseed noted that the density of the wing Wires and degradation of chlorophyll in the plant increased and this increase in mortality from competing And the result is a drop in performance (Momoh *et al.*, 2003).

Diameter of stem:

Mean comparison of Varieties showed that the new lines compared with the average 54.1 mm maximum and Pahnab-e-joybar varieties with mean 38.2 mm diameter stems had the lowest(Table 2).also In the mean interaction between varieties and planting was Rapeseed, the highest stem diameter in this study, a new line with a planting distance is 50 cm and Minimum stem diameter of 30 cm row spacing was Pahnab-e-joybar(Char 2). Increased plant height , light penetration decreases and the lower part of the so-called dark shrubs are grown (Nasiri *et al.*, 2004).

Pod number per plant:

In Mean comparison the effect of planting distance on average than the number of pods per plant , most varieties of this trait to Pahnab-e-joybar variety by average 60.3 and the lowest number of pods per plant, the new line with a mean of 53.6 is that this difference was not significant in the normal distribution of data(Table 2,Chart 3). In this study, the lower branches of growth and high enough density and number of pods per plant increased.

Grain 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 2454.8 kg\ ha and Pahnab-e-joybar varieties and with an average 1575.7 kg\ ha had the lowest 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 Pahnab-e-joybar with an average 2211.4 kg\ ha 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 2,Chart 4). 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 Pahnab-e-joybar 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).

Table 1: Analysis of variance on some agronomic traits affected by different variety and planting row spacing.(M.S)

S.O.V	D.F	Height plant(cm)	Diameter of stem(mm)	Pod number per plant	Grain Yield (Kg/ha)
Replication	2	*	n.s	n.s	n.s
Variety	2	**	**	**	**
Row Spacing	2	**	**	n.s	*
Variety* R.S	4	n.s	n.s	n.s	n.s
Error	16	15.4	7.81	32.04	35519.2
C.V %	-	3.25	6.16	9.91	8.85

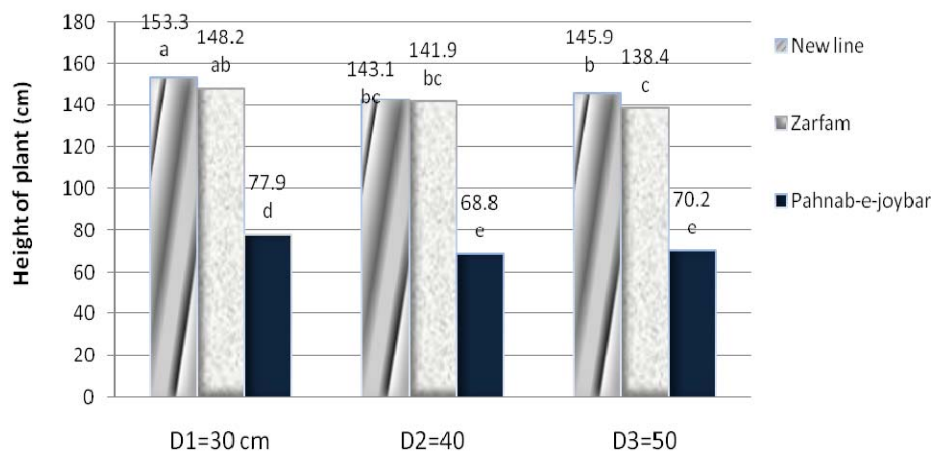
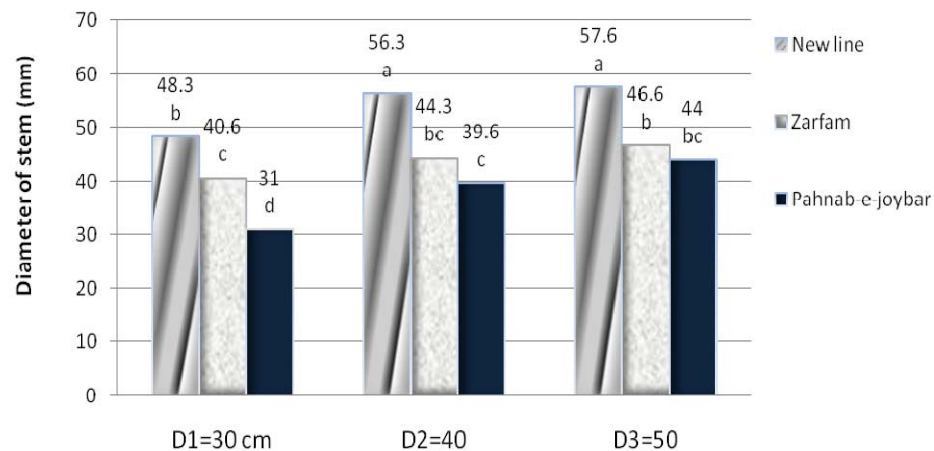
ns, * and **: Non significant at the 5 and 1% levels probability respectively.

Table 2: Mean Comparison the effect of cultivars and planting row spacing on some canola agronomic traits.

treatment	Height plant(cm)	Diameter of stem(mm)	Pod number per plant	Grain Yield (Kg/ha)
Variety				
New line	147.5a	54.1a	59.8a	2359.6a
Zarfam	142.8b	43.8b	64.6a	2454.8a
Pahnab-e-joybar	72.3c	38.2c	46.8b	1575.7b
Row Spacing				
30 cm	126.6a	40b	53.6b	1983.4b
40 cm	117.9b	46.7a	57.4ab	2195.4a
50 cm	118.2b	49.4a	60.3a	2211.4a

Means with similar letter were not significant at the 5% probability level. New line:(crossed two varieties of H19, goliath)

Pahnab-e-joybar:(Local varieties)

**Chart 1:** Mean of comparison the height plant calnola varitis in different levells of eow spacing.**Chart 2:** Mean of comparison the Diameter of tem canola varitis in different levellsof row spacing.

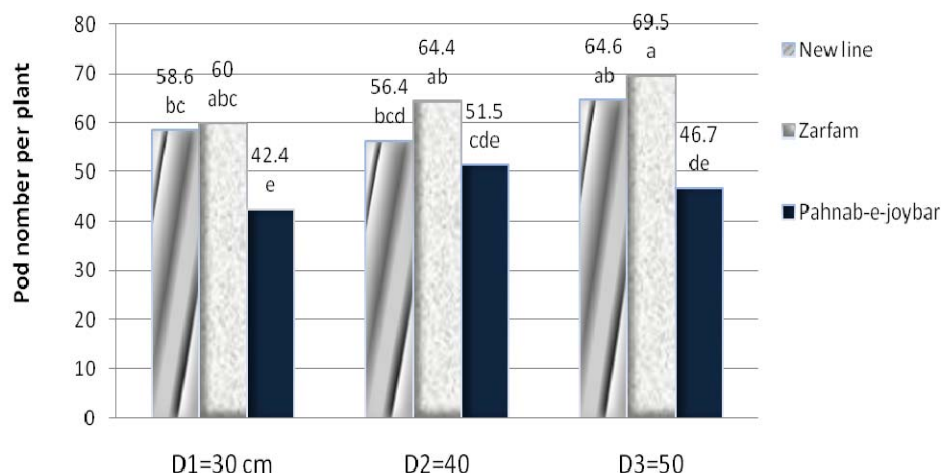


Chart 3: Mean of comparison the pod number per plant canola varieties in different levels of row spacing.

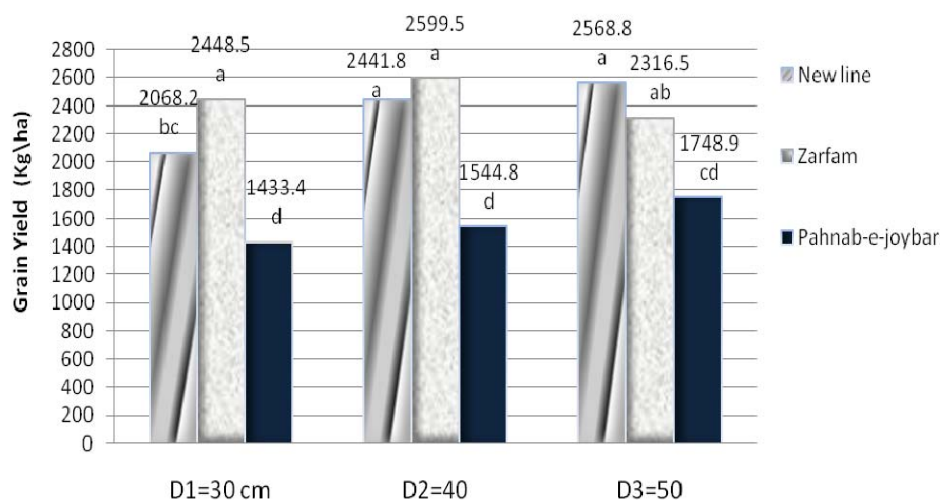


Chart 4: Mean of comparison the Grain Yield(kg/ha) canola varieties in different levels of row spacing.

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