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Influences of seeding rate on the agronomical traits of rapeseed cultivar (*Brassica napus* L.)

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ABSTRACT

A field experiment was conducted to investigate the influences of seeding rate on the agronomical traits of the spring canola (Brassica napus L.), which included three varieties, H308, H401, RGS003, and four seed rate (6, 8, 10, 12kg.ha^{-1}) treatments in growing seasons (2012), in Chaloos research farm of Iran. Analysis of variance showed that, independent of the varieties were not significant pod length, while the other characters, between different cultivars of vegetative characteristics were significantly. The results of main comparisons showed that mean compared to the SNK method, Seed yield of H401 variety was significantly more of H308 and RGS003 varieties. Also, 1000-seed weight in RGS003 Varity (p<0.01) was the lowest of H308, H401 varieties. Plant height in RGS003 Varity was more of H308, H401 varieties. With increasing density (6 kg.ha^{-1} seed to 12 kg.ha^{-1}) 1000-Seed weight was significantly reduced. Number of second branch under sowing planting (6 kg seed in ha) significantly more than other planting densities.

Keywords: Oilseed rape (*Brassica nupus* L.), Agronomical traits, Seed rate, Variety

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INTRODUCTION

Canola (*Brassica napus* L.) is a valuable oil seed that has attracted the attention of many people in recent years. This plant has been given a great importance in the plan for "oil seed import reduction". The canola plant, on account of enjoying high percentage of oil and protein, was ranked third and second, respectively among the oil seeds. This plant grows annually in the favorable weather conditions. The meal and oil are two products extracted from this plant. The canola seed contains 40-50 percent oil. The production of oil seed in Iran is not high; about 80% of Iran's necessary oil is imported from foreign countries [1]. The average yield of oil crops in Iran is 245000 t (Area harvested 521000 ha), whereas the world average yield of oil crops is 261,099,000 t (Area harvested 157,382,000 ha) [2]. Plant density is an important management factor that influences the seed yield of food crops [3, 4, 5]. Crop seed yield per unit area responds to plant density in a curvilinear fashion, with maximum yield occurring at the optimum plant density which depends upon crop species, environmental conditions and agronomic factors [4,6]. As plant densities decline, reduction in the number of plants per unit area is partially compensated by an accompanying increase in the productivity of each plant. The number of pods per plant is the most responsive of all the yield components in oilseed rape [7]. Low density populations produce more branches that carry fertile pods, thus prolonging the seed development phase. Plants grown at high densities are often more susceptible to lodging and increased disease incidence without the benefit of any yield increase, but the presence of fewer pod-bearing branches should produce more synchronous pod and seed development and result in more uniform seed maturation, improved harvesting ability and possibly lower seed glucosinolate and higher oil contents [8]. Angadi et al. (2003) noted that plant populations reduced from 80 to 40 plants m-2 produced similar seed yields when plant stands were uniformly distributed [9]. Higher plant population density has been recommended and adopted to ensure a competitive crop and to control weeds in the early growth stages [10]. Chen et al. (2005) found that a seeding rate of 32 to 65 seeds m-2 produced optimum oilseed rape yields [11]. Morrison et al. (1990b) reported studies conducted in southern Manitoba that showed that B. napus yield was greater from stands grown at a 15 cm row spacing compared with those using 30 cm row spacing [12]. One form of cultural control is the manipulation of plant density. A simple test of differential seeding rates may indicate whether canola producers already have another tool available to manage this disease. Many studies have suggested that crop density is related to sclerotinia stem rot incidence [13], but few have demonstrated this relationship in canola. In this experiment we studied effect of seed rate on agronomical traits of canola varieties.

MATERIALS AND METHODS

The present experiment was laid out with the purpose of evaluation of spring rapeseed cultivars response to seed rate the 2012 cropping years in the Research Field of Chaloos, Iran. The yearly average precipitation (30-years long term period) which is mostly concentrated during the autumn and winter months was 1256 mm. The experimental design was laid out in a Randomized Complete Block with a split plot arrangement of treatments in three replications. Treatments were included seed rate in four levels such: 6, 8, 10, 12kg.ha^{-1} in mane plot and spring three cultivar such; H308, H401, RGS003 varieties in sub plots (Table 1).

Table (1) Type of Growth and Source of Canola Varieties Evaluated

Variety	Source	Cultivar	Hybrid
Hyola 308	Canada		*
Hyola 401	Canada		*
RGS 003	Germany	*	

Before the beginning of experiment, soil samples were taken in order to determine the physical and chemical properties. A composite soil sample was collected from depth of 0-30 and 30-60 cm. It was air dried, crushed, and tested for physical and chemical properties. The research field had a clay loam soil. The first top dressing distribution at 4-6 true leaf stage (135 kg urea/ha) and the second was conducted at the time of reproductive organs appearance (130 kg urea /ha). Hand weeding was done at 4-6 true leaf stage as well as mid stem elongation stage. At the end of growing season and prior to crop harvest, 10 plants were chosen randomly from each experimental unit and were cut from the surface. At physiological maturity stage, for determining the seed yield, the crop was harvested from a 4 m^2 area per each plot and was left in the field for drying until constant weight (up to 12% moisture). Processed by the combined analysis of variance using SPSS statistical software. Means comparison of the data was done by SNK at 5% probability level.

RESULTS AND DISCUSSION

Analysis of variance showed that, independent of the varieties were not significant pod length, while the other characters, between different cultivars of vegetative characteristics were significantly. There was no significant independent effect of seeds on pod length in main branch, while in other cases, the amount of seed vegetative characteristics were significantly. The interaction effect of seed rate and varieties on plant height ($p<0.01$) and number of pod in main branch and pod length in plant were significant ($p<0.05$) (Table 2). The results of main comparisons showed that mean compared to the SNK method, Seed yield of H401 variety was significantly more of H308 and RGS003 varieties. Also, 1000-seed weight in RGS003 Varity ($p<0.01$) was the lowest of H308, H401 varieties. Plant height in RGS003 Varity was more of H308, H401 varieties (Table 2). With increasing density (6 kg.ha^{-1} seed to 12 kg.ha^{-1}) 1000-Seed weight was significantly reduced. Number of second branch under sowing planting (6 kg seed in ha) significantly more than other planting densities (Table 2).

The maximum of seed yield in planting density with rate of 8 kg.ha^{-1} seed and lowest of seed yield was in planting density with rate 6 kg.ha^{-1} seed. In this study the maximum of seed yield in planting density 8 kg seed per hectare for H401 variety and lowest of seed yield in planting density 12 kg seed per hectare was for H401 variety H308. The maximum standard deviation in the amount of seed in varieties H401 and attained for seed rate of 10 kg.ha^{-1} (Table3). 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 were 32 plants per square meter [14].

Table (2) Analysis of variance independent and interactive effects of cultivar and seeding rate on vegetative characteristics

Treatments	Agronomical traits	df	SS	MS	CV %	F
Cultivar	Plant height	2	9402.12	4701.06	7.03	60.258**
	No. of second branch	2	57.15	28.57	24.94	14.47**
	Pod/main branch	2	361.50	180.75	21.79	3.74*
	Pod length in plant	2	0.48	0.24	9.58	0.84ns
	100-seed weight	2	2.70	2.70	1.35	16.98**
	Seed yield ($Kg.ha^{-1}$)	2	19750321.99	9875160.99	6.22	232.08**
Seed rate	Plant height	3	708.48	236.16	7.03	3.03*
	No. of second branch	3	46.81	15.60	24.94	7.90**
	Pod/main branch	3	19.038	63.46	21.79	1.31ns
	Pod length in plant	3	5.33	1.78	9.58	6.27**
	100-seed weight	3	2.11	0.70	7.27	8.82**
	Seed yield ($Kg.ha^{-1}$)	3	881404.96	29380.65	6.22	6.90**
Cultivar* Seed rate	Plant height	6	2733.51	455.42	7.03	5.84**
	No. of second branch	6	23.12	3.85	24.94	1.95ns
	Pod/main branch	6	788.76	131.46	21.79	2.72**
	Pod length in plant	6	4.71	0.78	9.58	2.77*
	100-seed weight	6	0.12	0.02	7.27	0.25ns
	Seed yield ($Kg.ha^{-1}$)	6	121837.51	20306.25	6.22	0.48ns

*ns: Not significant, * and **: significant at P<0.05 and P<0.01, respectively*

Table (3) Interaction, variety and seed rate on seed yield of canola

Cultivar	Seed rate ($Kh.ha^{-1}$)	Yield Average ($Kh.ha^{-1}$)	Standard Deviation
H308	6	2276.46	130
H308	8	2594.12	49
H308	10	2455.05	24
H308	12	2130.33	90
H401	6	3915.33	65
H401	8	4426.92	46
H401	10	419.54	611
H401	12	4145.99	94
RGS003	6	3278.20	133
RGS003	8	3611.24	58
RGS003	10	3454.93	70
RGS003	12	3272.29	258

CONCLUSION

The results showed that the independent effect of seed rate and cultivar on grain yield was significant, but the interaction of seed rate and cultivar on grain yield was not significant. In this study the maximum seed yield in planting date of 8 $kg.ha^{-1}$ seed for H401 variety and minimum seed yield in planting density of 12 kg seed was for H308 variety. From these results it is concluded that seeding rate and planting density contributed to the closing of the plant's genetic potential.

REFERENCES

[1] G T H. Crubbens ; O A. Denton, *Plant Resources of Tropical Africa* , **2004** , pp: 668.
[2] FAO FAO, Food and Agricultural Organization of the United Nations. Rome, **2010**.
[3] F J. Lopez-Bellido; L Lopez-Bellido ; R J. Lopez-Bellido, *Eur. J. Agron*., **2005,**23: 359–378.
[4] H Z. Dong; X Q. Kong; W J Li; W Tang; D M. Zhang, *Field Crop Res*., **2010**,119:106–113.
[5] I A. Ciampitti ; T J. Vyn, *Field Crop Res*., **2011**,121, 2–18.
[6] J Hiltbrunner ; B Streit ; M Liedgens ,*Field Crop Res*.,**2007**,102: 163–171.
[7] W Diepenbrock, *Field Crops Research*, **2000**, 67:35- 49.
[8] J Leach ; E Stevenson; A Rainbow, *Journal of Agricultural Science*, **1999**,132:173-180.
[9] S W. Angadi ; H Cutforth ; W Mcconkey; Y Gan, *Crop Science*, **2003**,43:1358-1366.
[10] M J. Morrison ; P B E McVetty; R Scarth, *Canadian Journal of Plant Science*, **1990a**, 70:127-137.
[11] C Chen ; G Jackson ; G Neill ,*Agronomy Journal*, **2005**,97:1252-1262.
[12] M Morrison ; J McVetty; R Scarth ,*Canadian Journal of Plant Science*, **1990b,**70:139-149.
[13] J M. Krupinsky ; K L. Bailey ; M P. McMullen ,*Agronmy Journal*, **2002**,94:198 -209.
[14] P Chen ; P Ji ; S L. Li, *Asian-Aust. J. Anim. Sci.*, **2008**, 21:204-213.