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Effect of Sowing Date and Seed Rate on Yield of Coriander

Mohammed Ahmed Eltyeb
Hudeiba Research Station

Abstract: **An experiment was carried out for two seasons at Hudeiba Research Station farm, in River Nile State, seasons 2012/013-2013/014 to study the effect of sowing date and seed rate of coriander (Coriander sativum L.). The experiment based on a randomized complete block design with three replications. The sowing date (20-October, 5-November, 20-November and 5-December) seed rate (5, 10, 15, 20 and 25kg/fa). The results showed significantly differences in number of plant per plot, plant highest (cm), number of umbel pre plant, number of flower per umbel and yield (kg/ha^{-1}), and no significant differences in yield per plant (g) and weight of 1000seeds. The early sowing date 20-October obtained highest yield at seed rate 25kg/fa, (*fa=4200m^2*)(1206.3kg/ha^{-1}). The seed rate (15, 20 and25kg/fa) are no significant differences at all sowing date in two seasons.**

Keywords: **Seed Rate on Yield of Coriander**

1. Introduction

Scientific name (Coriander*sativium* L.), English name coriander, it's the most important spice and medicinal plant; belong to the Apiaceae (Umbelliferae) family. Two species of coriander named sativium and molfitnes have been known (Omidbeigi, 1997). Coriander is an annual plant of the Mediterranean whose origin is in the Eastern Mediterranean (Middle East) region. There is abundant scientific literature on coriander botanical and chemicals characteristics (Kurkcuoglu et al,2003) but there is not much a small amount work done in concerning agronomic practices (Carrubba 2009). The coriander plant is widely distributed and mainly cultivated for its seeds which are used for different purposes such as food, drugs, cosmetics and perfumery. The seeds also have medicinal uses, treating rheumatism and pain in the joints, gastrointestinal complaints, flatulence and castralgia (said et al, 1996). In the Sudan coriander used as spice and in local or alternate medicine also few amount for export, no cultural practices released for growing coriander. Many factors explicitly influences growth and yield (Omidbeigi, 1997) of which sowing date and seed rate are important. The objective of this study, growing coriander with optimum sowing dare and seed rate.

2. Materials and Methods

The field experiment was carried out during seasons 2012/013 and 2013/014 at Hudeiba Research Station (Lat 17^0 34· N, Long 33^0 56· E, elev. 350) in NahrElNile State. The soil pH is 7.8-8.4. The seeds sowing in ridges size 70cm, 8meter long, each plot is 8x5 meters, and 6 ridges. Make a groove above the ridge and distributed seeds (Sarsaba). Four sowing (20-October, 5-November, 25-November and 5-December) and five sowing date (5, 10, 15, 20 and 25kg/feddan), treated in Randomize Complete Block Design with three replications. Irrigation and hand weeding used when needed, the commonly cultivar used is Baladi. Seeds germination 6-10 days from first irrigation, 30 plants selected randomly from each plot to calculate plant high(cm) from the ground to the upper branch, number of umbels per plant, number of flowers per umbel and yield per plant (g). The harvest about 75 days from first irrigation, each plot harvested manually by cutting the plants from the ground and dried in the field 10-15 days, calculate the yield per plot (kg) and weight of 1000seeds from each plot. The data analysis with the Genostat and the means separated with (LSD) at 5% level.

3. Results and Discussion

Number of plant per plot:

Sowing date and seed rate significantly influenced the number of plant per plot, highest number per Plot obtained from first sowing date (2o October) and fifth seed rate (25kg/fa), 1301 plants per plot in first season (Table 1) and 1172 plants per plot obtained in second sowing date (20 November) at fifth seed rate (25kg/fa) in second season (Table 2). That means (32.5) and (29.3) plant per m^2 in the first and second season respectively. These disagree with the finding of Diereichsen (1996) he fined that the maximum yield of coriander obtained with 50 plants per m^2 density. And agree with the finding of Akbarinia et al (2006) they finding 30 plant per m^2 obtained highest yield and essential oil. Also Gobbadi and Gobadi (2010) show that sowing densities were significant on seeds yield and structural elements at 30 an 50 plant per m^2.

Plant height (cm):

Tables (1, 2) show significant differences in two seasons at height plant, highest (65 and 47.3cm) at 5November and 20 October in the first and second season respectively. The lowest plant high 19cm at third sowing date 20 November and seed rate 20kg/fa in the second season. The results show decrease in plant height in the delaying of sowing date. These agree with the finding of Baswana et al (1989), they treated that plant height were greatly reduced if sowing was delaying.

Number of Umbel per plant:

The large number of umbel per plant obtained is 19.3 umbel at the first sowing date 20 October in third seed rate 15kg/fa in the first season (Table 1), and small number of umbel per plant 6.7 at last sowing date 5December and last seed rate 25kg/fa in the second season (Table 2). The results show reduction of umbel per plant in delaying

sowing date and increase in seed rate at two seasons. This result agree with finding of Mohammed H. Zareleet al (2012) they said that the umbel per plant decrease with the increasing the plant density and delaying the sowing date, due to the temperature during the plant growth.

Number of fruit per Umbel:

Tables (1, 2) showed significant differences in number of fruit per umbel, the large number is 14.6 obtained from first sowing date (20 October) and third seed rate 15kg/fa in first season, while the small number of fruit per umbel obtained at last sowing date (5 December) and last seed rate in the second season. The results showed delaying in the sowing date and large seed rate decrease the number of fruit per umbel in two seasons. These agree with finding of Mohamed H. Zarele et al (2012), they said that the number of fruit per umbel reduced with increasing plant density and delaying sowing date. Also in the line of the Gobadi and Gobadi (2010) explain, poor pollination and abortion of flowers due to shedding in flowering stage may reduce the number of inoculated flowers, in addition lack of inoculated embryo growth may cause the reduction of fertile fruits number, also in seems that in higher density due to compotation for leaching light the plant consume more energy and photosynthesis power for increasing its highest through increasing the length and these results in the reduction of assimilated translocation to physiological sinks in fruits and consequently abortion of embryo which decreases the number of fertile fruits.

Yield per plant (g) and weight of 1000seeds (g):

In this study no significant differences in yield per plant and weight of 1000seeds at two seasons the highest yield per plant 3.2g obtained at first sowing date 20 October and third seed rate 15kg/fa in second season. The lowest yield per plant obtained 2.8g at third sowing date 20 November in fourth seed rate 20kg/fa in second season (Table 2). The highest weight of 1000seeds is 5.4g at third sowing date 20November and second seed rate 10kg/fa in the second season (Table 2). This agrees with the finding of Mohammed H. Zarele et al (2012), they reported that the plant density and sowing date was not effected 1000seeds weight (g) and yield of coriander plant.

Yield Kg/ha^{-1}:

The results showed significant differences in yield, the highest yield obtained is 1206.4 (kg/ha^{-1}) from first sowing date 25 October and last seed rate 25kg/fa in the first season (Table1). The lowest yield obtained is 328.2 kg/ha^{-1} at last sowing date 5Decmber and first seed rate 5kg/fa, in the second season (Table 2). The first and second sowing date (20 October and 5 November) at seed rate 15, 20 and 25kg/fa showed no significant differences in two seasons (Tables 1, 2). This results agree with the finding of Meen et al (2006) and Tiwari et al (2002), they report that the *Coriander sativum* L., had more growth and seed yield in sowing date 15 October. Also Akbarinia et al (2006) report the highest fruit yield of coriander at 30plant/m^2 density. Gobadi and Gobadi (2010) showed that sowing density 30-50 plant/m^2 observed high yield of coriander seeds.

The results showed reductions of yield in the second season compared to the yield in first season this due to the infection of some diseases at second season, (Tables (1, 2 and 3). Further research is required in breeding, fertilization, water requirement, weed control, pest and disease and etc…of coriander crop in the Sudan.

4. RECOMMENDATIONS

From the above data recommended that the optimum sowing date and seed rate for obtaining high yield of Coriander sativum L. in RIVER NILE STATE is 20 October with seed rate 15kg/FADAN.

Table 1.

2012/013								
Sowing date	Seed rate	No.plant/ plot	Plant high(cm)	No.umbel/ plant	No.flowe/ umbel	Yield/plant (g)	WT.1000 seed	Yield Kg/ha^{-1}
20October	5	300	51.9	17.0	11.0	3.0	5.1	703.5
	10	700	63.6	17.0	12.3	3.0	5.1	962.2
	15	913	58.9	19.3	14.6	3.0	5.2	1186.1
	20	1201	42.9	11.6	9.0	2.9	5.0	1193.5
	25	1301	34.9	12.0	7.6	2.9	5.0	1206.4
5November	5	341	50.8	14.3	9.3	3.0	4.9	801.5
	10	777	58.9	17.6	13.6	3.0	5.3	969.3
	15	813	65.0	16.3	14.3	3.1	5.2	1082.6
	20	940	42.0	13.0	11.0	2.9	5.0	1099.7
	25	1168	40.0	11.0	9.3	2.9	4.9	1106.6
20November	5	245	45.4	15.0	8.3	2.9	4.9	557.6
	10	262	47.1	14.3	10.0	3.0	5.3	680.4
	15	704	50.8	13.3	10.0	3.0	5.2	736.6
	20	973	40.8	10.7	8.3	2.9	4.9	737.3
	25	1298	40.7	10.7	7.0	2.9	4.9	747.0
5December	5	218	51.1	11.3	9.6	3.0	5.0	505.0
	10	610	52.1	12.3	10.0	3.1	5.1	627.6
	15	697	50.7	12.7	11.3	3.0	4.9	671.3
	20	851	41.5	9.3	10.0	3.0	4.9	674.0

	25	1144	38.4	8.7	10.3	2.9	4.9	674.4
SE+		130.50	9.1	1.76	2.19	0.15	0.25	36.5
L.S.D		264.2	18.5	3.56	4.44	0.25	0.52	73.9
C.V%		20.3	23.2	16.1	24.9	5.2	6.3	12.6

Table 2.

2012/013								
Sowing date	Seed rate	No.plant/ plot	Plant high(cm)	No.umbel/ plant	No.flower/ umbel	Yield/plant (g)	WT.1000 seed	Yield Kg/ha^{-1}
20October	5	224	42.0	14.6	12.0	3.0	5.1	486.2
	10	626	47.3	15.0	10.7	3.0	5.1	506.2
	15	823	43.2	15.3	12.7	3.1	5.3	549.1
	20	938	33.3	11.0	7.8	2.9	4.8	563.3
	25	1078	28.7	9.0	6.3	2.9	5.0	575.0
5November	5	272	44.6	13.0	10.3	3.0	4.9	510.0
	10	640	39.7	15.0	11.6	3.0	5.3	611.6
	15	767	38.7	14.3	11.6	3.1	5.3	649.0
	20	1027	28.5	11.6	9.6	2.9	5.1	659.9
	25	1172	28.7	9.3	8.0	2.9	4.8	655.2
20November	5	203	26.6	11.0	8.3	2.9	4.9	358.6
	10	418	24.0	10.6	8.0	3.0	5.3	420.1
	15	563	22.4	11.3	8.6	3.0	5.2	508.1
	20	642	19.5	9.0	7.0	2.8	4.8	522.8
	25	810	21.7	8.3	6.0	2.9	4.8	525.9
5December	5	207	26.4	9.6	6.6	3.0	5.0	328.2
	10	444	30.0	8.6	7.0	3.1	5.1	498.2
	15	612	24.9	9.0	7.6	3.0	4.9	382.2
	20	721	22.1	8.3	6.0	2.9	4.8	388.6
	25	866	21.8	6.7	5.7	2.9	4.8	389.1
SE+		119.1	6.37	1.84	1.40	0.12	0.26	19.51
L.S.D		241.1	12.89	3.72	2.82	0.36	0.52	39.49
C.V%		22.3	25.4	20.9	19.9	6.8	6.1	11.4

Table 3.

Year	Month	Temperature(C^0)	Humidity (%)
2012	10	32^0	37
	11	27^0	39
	12	23^0	30
2013	1	20.6	45
	2	24.6	36
	3	26.2	34
	10	32.5	29
	11	27.5	44
	12	24.5	54
2014	1	22.5	53
	2	23.5	41
	3	27.9	37

Hudeiba Metrological Department

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