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Effect of nitrogen and potash on yield of coriander (Var. super Midori)

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Abstract

An experiment entitled "Integrated nutrient management of Coriander variety Super Midori" of Tokita seed was conducted in the Department of Vegetable Science, College of Agriculture, OUAT, Bhubaneswar during *Rabi*2013 - 2014 to assess the effect of nitrogen (50, 60 and 70 kg/ha), potash (50 and 60 kg/ha) in combination with FYM (20 t/ha), phosphorous (40 kg/ha) on growth, growth attributing characters of coriander leaves under two sets of experiment i.e. line sowing and broadcasting. Average no. of leaves after 30 days was observed highest in N_3K_2 (36.78) in line sowing and 22.20 no. in N_3K_2 in broadcasting. The highest yield was recorded in N_3K_2 (15.90 ton/ha) in line sowing and 15.72 ton/ha in N_3K_2 treatment in broadcasting practice.

Keywords: Nitrogen, potash, Midori, coriander variety

Introduction

Coriander (*Coriandrum sativum* L.) family Apiaceae is an important seed spices cultivated in almost all the states of India for its leaves and seeds. Coriander is probably one of the five spices used by mankind, having been known as early as 5000 BC. Coriander is an annual herb originated in the Mediterranean region is now mainly grown in India (Area 547421ha and production 527390 tonnes), Morocco, Canada, Romania, Russia, Ukraine, Iran, Turkey, Israel, Egypt, China, USA, Argentina *etc.* and is commonly known as coriander, cilantro, or Chinese parsley. The plant is name After Koris, the Greek word for bug, as the unripe fruits have a smell that has been compared to the bed bugs. It is one of the oldest condiments and does not require any prologue and description at least to home makers since it is used almost daily in every kitchen. In Spanish regions the Coriander crop when grown for its foliage is known as Clantro. The stems, leaves, and seeds of coriander are used in a number of culinary preparations. However, dry seeds, are extensively used in form of powder, but, flavour of fresh leaves is highly liked by consumers in curries sauces, soups and different preparations. An infusion of coriander seed is useful in flatulence, indigestion, vomiting and other intestinal disorder.

Materials and Methods

The field experimental entitled "Integrated nutrient management in coriander Variety super Midori" was carried out in the experiment plot of the Department of Vegetable Science, OUAT during 2013-14. The present experiment constitutes six treatments with four replications in Randomized Block design (Factorial). The coriander variety "Super Midori" was sown in the trial field. The detail of the experiment conducted is given below.

1. Design Layout- Complete Randomized block design (factorial).
2. Number of Treatment - 6
3. Number of replications - 4
4. Number of Trials-2 (line sowing and broadcasting)
5. Total of number of plots - 24
6. Plot Size - 1mtx1.5 mt
7. Spacing - row to row -10 cm line to line - continuous thinly sowing of seeds
8. Number of rows per plot - 14
9. Length of the experimental field - 10.5 mt
10. Width of the experimental field - 5 mt
11. Area of the experimental field - 52.5 m²
12. Two trial were conducted, one for line showing & other for broadcasting.

Levels of chemical fertilizers

N_1 - 50 kg of Nitrogen/ha.

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N2 - 60 kg of Nitrogen/ha.
 N3 - 70 kg of Nitrogen/ha.
 K1 - 50 kg of Potassium/ha.
 K2 - 60 kg of potassium /ha.
 FYM- @ 20 t/ha.

Details of Treatments

T1 - N1PK1 - 50:40: 50
 T2 - N1PK2-50:40: 60
 T3 - N2PK1 - 60:40:50
 T4 - N2PK2 - 60:40:60
 T5 - N3PK1 - 70:40:50
 T6 - N3PK2 - 70:40:60

Discussion

Average number of leaves before harvesting was recorded. The tabulated value revealed that maximum number of leaves per plant (35.18) was observed N3, followed by 34.70 in N2&33.31 in N₁ (Table - 1). Due to potash application 36.01 number of leaves were recorded per plant in K2 followed 32.78 number of leaves per plant in K1. In interaction effect it was found that highest number of leaves i.e. 37.45 was recorded with N3K2, 37.23 with N1K2, 36.05 with N2K1, 33.35 with N2K2, 32.90 with N₃K₁&29.40 with N₁K₁ only.

It was observed from the tabulated value that highest number of leaves of 34.49 was obtained with N3 followed by 34.54 in N2 and 33.01 in N1 (Table - 2). Due to varied dose of potash application 35.72 numbers of leaves were observed in K2&32.31 number of leaves in K1. Due to interaction effect between nitrogen & potash 36.78 numbers of leaves per plant was recorded in N3K2, followed by 36.75 in N1K2, 35.45 in N2K1, 33.63 in N2K2, 32.20 in N3K1&29.28 in N1K1 respectively.

The average leaves area is present in Table - 3. It was found that the leaf area was 4.51 cm² in N₃ followed by 4.50 cm² in N₂ and 4.09 cm² in N₁. In potash application the leaf area was 4.38 cm² in K2 and 4.35 cm² in K1. So far interaction effect of nitrogen and potash was concerned maximum leaf area of 4.75 cm² was found with N2K1, 4.53 cm² in N3K2, 4.50 cm² in with N3K1, 4.38 cm² with N1K2, 4.25 cm² with N2K2 and lowest 3.80 cm² in N1K1.

The average leaf area of leaves is presented in Table - 4. It was found that the leaf area was 4.50 cm² in N3 followed by 4.39 cm² in N2 and lowest 4.11 cm² in N1. Due to potash application the leaf area was 4.39 cm² in K2 and was 4.28 cm² with K1. Due to interaction effect between N and K the maximum leaf area 4.60 cm² found with N₃K₁ followed by 4.50 cm² in N₂K₂, 4.40 cm² in N₃K₂, 4.28 cm² in N₁K₂ and N2K1 and lowest value of 3.95 cm² was recorded in N1K1.

The average weight of plant was recorded in line sowing is presented in Table - 5. It was observed that highest plant weight of 7.54g was recorded in N3 followed by 7.10g in N1 and 7.04g in N2. Due to potash application average plant weight of 7.32g was recorded in K2 followed by 7.10g in K1. Due to interaction effect of nitrogen and potash it was observed that highest plant weight of 7.88g was recorded with N3K2, followed by 7.20g in N3K1, 8.60g in N3K1, 7.18g in N1K2, 7.08g in N2K1, 7.03g in N1K1 and 7.00g in N2K2. The average weight of plant was recorded broad casting is Presented in Table - 6. It was observed that highest plant weight of 7.55g was recorded in N2 followed by 7.15g in N2 and 6.71g in N3. Due to potash application average plant weight of 7.36g was recorded in K2 followed by 6.92g in K1. Due to interaction effect of nitrogen and potash it was observed that highest plant weight of 7.80g was recorded with

N3K2, followed by 7.30g in N2K2 and N3K1, 7.00g in N2K1, 6.98g in N1K2 and 6.45g in N1K1.

The yield of coriander per hectare due to line sowing of seed is presented in Table - 7. It was observed that yield of 15.44 (t/ha) was recorded in N3 followed by 14.39 (t/ha) in N2 and 13.73 (t/ha) in N1. Due to effect of potash application a yield of 14.83 (t/ha) was recorded in K2 followed by 14.22 (t/ha) in K1. Due to interaction effect of nitrogen and potash it was found that highest yield of 15.90 (t/ha) was recorded with N3K2 followed by 14.97 (t/ha) in N3K1, 14.74 (t/ha) in N2K2, 14.05 (t/ha) in N2K1, 13.85 (t/ha) in N1K2 and 13.62 (t/ha) in N1K1.

The yield of coriander per hectare due to broad casting of seed is presented in Table - 8. It was found that yield of 15.62 (t/ha) was recorded in N3 followed by 13.64 (t/ha) in N2 and 12.17 (t/ha) in N1. Due to varied dose of potash application a yield of 14.13 (t/ha) was recorded in K2 followed by 13.32 (t/ha) in K1. Due to interaction effect of nitrogen and potash it was found that highest yield of 15.72 (t/ha) was recorded with N3K2 followed by 15.51 (t/ha) in N3K1, 14.25 in N2K2, 13.02 (t/ha) in N2K1, 12.93 (t/ha) in N1K2 and 11.42 (t/ha) in N1K1.

The leaves are the major site of Photosynthesis and act as a major source for different type of sink. The production of number of leaves in a plant is greatly influenced by the environment, soil moisture and nutrition and management practices. The leaves per plant showed variation due to different treatment under line sowing & broadcasting. Numbers of leaves were higher in line sowing as compared to broadcasting. Highest number of leaves of 37.45/plant was recorded in N3K3 under line sowing. Due to interaction effect & nutrition there was not much variation in leaf area as observed during the experiment? The increase in leaf area is a positive indication of response of growth factors in many of the nutritional investigation and also of directly indicated the increase in photosynthetic activity of a plant producing more of photosynthates and more metabolic activity. The highest leaf area of 4.53 sq.cm was recorded in N3K2 in line sowing & 4.50 m² in broadcasting. The present findings also corroborate the finding of Datt *et al.* (2003) [1] and Sharangi *et al.* (2011) [5]. There was significant variation in yield per plot & yield per hectare due to varied doses of Nitrogen & Potash & their combination. It was observed that the highest yield per plot (3.48 kg) was observed in N3K2 in line sowing as compared to lowest yield of 2.71 kg/plot in N1. Whereas the yield per hectare was significantly influenced which was 15.90 (t/ha) in N3K2 in line sowing & 15.72 (t/ha) in broadcast in N3K2. Application of higher doses of nitrogen and potash has increased the leaf yield both in line sowing & broadcasting and the interaction effect was more pronounced which type of findings were also reported by Bhati (1988), Admer *et al.* (2003), Choudhury and Jat (2004) and Singh *et al.* (2008) [4].

Table 1: Average numbers of leaves (line sowing)

Mean table			
	K1	K2	Mean
N1	29.40	37.23	33.31
N2	36.05	33.35	34.70
N3	32.90	37.45	35.18
Mean	32.78	36.01	
	N	K	N x K
Sem	1.548	1.094	1.896
CD 5%	4.665	3.298	5.713
CV %	14.70		

Table 2: Average numbers of leaves (broadcasting)

Mean table				
	K1	K2	Mean	
N1	29.28	36.75	33.01	
N2	35.45	33.63	34.54	
N3	32.20	36.78	34.49	
Mean	32.31	35.72		
		N	K	N x K
	Sem	1.389	0.982	1.701
NS	CD 5%	4.185	2.959	5.126
NS	CV %	13.33		

Table 3: Average leaf area cm² (line sowing)

Mean table (cm ²)				
	K1	K2	Mean	
N1	3.80	4.38	4.09	
N2	4.75	4.25	4.50	
N3	4.50	4.53	4.51	
Mean	4.35	4.38		
		N	K	N x K
	Sem	0.140	0.099	0.171
NS	CD 5%	0.421	0.298	0.515
S	CV %	10.44		
NS				

Table 4: Average leaf area cm² (broadcasting)

Mean table (cm ²)				
	K1	K2	Mean	
N1	3.95	4.28	4.11	
N2	4.28	4.50	4.39	
N3	4.60	4.40	4.50	
Mean	4.28	4.39		
		N	K	N x K
	Sem	0.162	0.115	0.199
NS	CD 5%	0.489	0.346	0.599
NS	CV %	12.23		
NS				

Table 5: Average weight of plant (line sowing)

Mean table (g)				
	K1	K2	Mean	
N1	7.03	7.18	7.10	
N2	7.08	7.00	7.04	
N3	7.20	7.88	7.54	
Mean	7.10	7.35		
		N	K	N x K
	Sem	0.190	0.134	0.232
NS	CD 5%	0.572	0.404	0.701
NS	CV %	8.58		

Table 6: Average weight of plant (broadcasting)

Mean table (g)				
	K1	K2	Mean	
N1	6.45	6.98	6.71	
N2	7.00	7.30	7.15	
N3	7.30	7.80	7.55	
Mean	6.92	7.36		
		N	K	N x K
	Sem	0.215	0.152	0.263
NS	CD 5%	0.648	0.458	0.794
S	CV %	9.84		

Table 7: Yield of coriander per hectare (t/ha) (line sowing)

Mean table (t/ha)				
	K1	K2	Mean	
N1	13.62	13.85	13.73	
N2	14.05	14.74	14.39	
N3	14.97	15.90	15.44	
Mean	14.22	14.83		
		N	K	N x K
	Sem	0.544	0.384	0.666
NS	CD 5%	1.639	1.159	2.007
NS	CV %	12.23		

Table 8: Yield of coriander per hectare (t/ha) (broadcasting)

Mean table (t/ha)				
	K1	K2	Mean	
N1	11.42	12.93	12.17	
N2	13.02	14.25	13.64	
N3	15.51	15.72	15.62	
Mean	13.32	14.13		
		N	K	N x K
	Sem	0.677	0.479	0.829
NS	CD 5%	2.040	1.443	2.499
S	CV %	16.01		

Conclusion

It was concluded that the maximum growth (leaves, average weight of plant and root) and yield was observed in N3K2 treatment in line sowing practice. Hence it may be recommended for farmers to get maximum return with minimum use of inputs.

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