

Original Research Article

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Effect of Nitrogen and Potash on Growth of Coriander (Var. Super Midori)

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ABSTRACT

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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. It was found that inline sowing the number of day (8.25 day) to germinate was lowest in interaction effect of nitrogen and potash (N₂K₂). Similarly in broad casting i.e. 8 days in N₁K₁ and N₃K₃. Germination percentage was found maximum in N₂K₁ (90.78 %), N₃K₂ (85.83) in line sowing & broadcasting respectively. The height of the plant at 30 days is 17.48 in N₃K₂ treatment under line sowing whereas 18.38 cm was found in N₃K₂ under broadcasting.

Introduction

India is known as the “Land of Spices” and is the largest producer, consumer and exporter of spices and spice products. Out of the total sixty three spices grown in India twenty are classified as seed spices with thirty six percent shares in area and seventeen per cent share in production of total spices in India.

It is a challenge for us to modernise technologies with efficient utilization of resources to derive higher production with excellent quality. This required the intervention of technologies that are less environment dependent, capital intensive, with the capacity to improve the productivity and

quality of the produce. 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). Coriander is largely cultivated as a spice crop both for seed purpose & leaves purpose in almost all the states on commercial scales like Rajasthan, Andhra Pradesh, Madhya Pradesh, Tamilnadu, Gujarat, Uttar Pradesh, Bihar, Karnataka and Odisha. The farmers of Orissa are growing

coriander crop in rabi season for leaf & seed purpose. Various agronomic practices such as application of FYM, INM, IPM, bio-fertilizers and different level of nutrients are more deciding factors along with agronomic manipulation of the existing practices for success of a crop to make it more remunerative.

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.

Design Layout- Complete Randomized block design (factorial).

Number of Treatment - 6

Number of replications - 4

Number of Trials-2 (line sowing and broadcasting)

Total of number of plots - 24

Plot Size - 1m x 1.5 m

Spacing - row to row - 10 cm

Line to line - continuous thinly sowing of seeds

Number of rows per plot - 14

Length of the experimental field - 10.5 m

Width of the experimental field - 5 m

Area of the experimental field - 52.5 m²

Two trial were conducted, one for line showing & other for broadcasting.

Levels of chemical fertilizers

N1 - 50 kg of Nitrogen/ha.

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

Results and Discussion

Days to germination of seeds are tabulated and presented in Table 1 revealed that maximum mean days to seed germination of 8.5 days was recorded in all the treatments. Application of different doses of potash took 8.41 days to germination with K2 & 8.58 K1.

However with interaction maximum days to germination (8.75) were found with N2K1 and 8.50 was recorded with N1K1, N3K1, N1K2, N3K2 and lowest of 8.25 in N2K2.

The data presented in Table 2 revealed that maximum day (9.25) to germination was recorded with N2 followed by 8.5 days in N3 & 8.13 days in N1.

Application of different doses of potash took 8.92 days to germination in K1 & 8.3 days to germination in K2. With respect to the interaction effect maximum days to germination was recorded with N2 K1 (9.75) followed by 9.0 days to germinate in N3K1, 8.75 days to germinate in N2K2, 8.25 days to germinate in N1K1 & 8.0 days to germinate in N1K1 & N3K2.

Table.1 Days to germination (line sowing)

Mean table			
	K1	K2	Mean
N1	8.50	8.50	8.50
N2	8.75	8.25	8.50
N3	8.50	8.50	8.50
Mean	8.58	8.41	

		N	K	N x K
	Sem	0.437	0.309	0.535
NS	CD 5%	1.316	0.931	1.612
NS	CV %	16.78		

Table.2 Days to germination (broadcasting)

Mean table			
	K1	K2	Mean
N1	8.00	8.25	8.13
N2	9.75	8.75	9.25
N3	9.00	8.00	8.50
Mean	8.92	8.3	

		N	K	N x K
	Sem	0.214	0.151	0.262
S	CD 5%	0.645	0.456	0.790
S	CV %	8.11		

Table.3 Germination percentage (line sowing)

Mean table (%)			
	K1	K2	Mean
N1	88.55	89.38	88.96
N2	90.78	89.85	90.31
N3	86.85	90.55	88.70
Mean	88.73	89.92	

		N	K	N x K
	Sem	1.664	1.176	2.038
NS	CD 5%	5.014	3.546	6.141
NS	CV %	6.08		

Table.4 Germination percentage (broadcasting)

Mean table (%)			
	K1	K2	Mean
N1	85.50	84.38	84.94
N2	84.05	84.98	84.51
N3	84.55	85.83	85.19
Mean	84.70	85.06	

		N	K	N x K
	Sem	2.664	1.884	3.263
NS	CD 5%	8.030	5.678	9.835
NS	CV %	10.25		

Table.5 Height of plant after 30 days (line sowing)

Mean table (cm)			
	K1	K2	Mean
N1	13.48	16.38	14.93
N2	14.25	16.75	15.50
N3	15.40	17.48	16.44
Mean	14.38	16.87	

		N	K	N x K
	Sem	0.436	0.308	0.534
NS	CD 5%	1.314	0.929	1.609
S	CV %	9.11		

Table.6 Height of plant after 30days (broadcasting)

Mean table (cm)			
	K1	K2	Mean
N1	14.95	16.63	15.79
N2	16.20	16.40	16.30
N3	16.08	18.38	17.23
Mean	15.74	17.13	

		N	K	N x K
	Sem	0.465	0.329	0.570
NS	CD 5%	1.402	0.992	1.717
NS	CV %	9.24		

Table.7 Height of plant after 35days (line sowing)

Mean table (cm)			
	K1	K2	Mean
N1	18.33	20.50	19.41
N2	18.38	20.40	19.39
N3	20.68	22.20	21.44
Mean	19.13	21.03	

		N	K	N x K
	Sem	0.544	0.385	0.667
NS	CD 5%	1.641	1.160	2.009
S	CV %	8.85		

Table.8 Height of plant after 35days (broadcasting)

Mean table (cm)			
	K1	K2	Mean
N1	19.20	21.63	20.41
N2	20.85	22.73	21.79
N3	20.50	23.33	21.91
Mean	20.18	22.56	

		N	K	N x K
	Sem	0.644	0.456	0.789
NS	CD 5%	1.942	1.373	2.378
NS	CV %	9.85		

From the data tabulated and presented in Table 3 revealed that highest (90.31) percentage of seed germination was recorded in N2 followed by 88.96% in N1 & 88.70% in N3. With respect to application of potash, maximum germination (89.92%) was recorded in K2 followed by K1 (88.73%). So far the interaction between nitrogen & potash was concerned, maximum percentage of seed germination (90.78%) was found in N2K1 followed by N3K2 (90.55%), N2K2 (89.85%), N1K2 (89.39%) & 86.85% in N3 K1.

Application of different doses nitrogen recorded varied germination percentage in broadcasting of coriander seeds. Highest germination percentage (84.94%) was recorded with N1 application followed by 85.19% in N3 & 84.51% in N2 (Table 4). So far as Potash application was concerned 85.06% of germination was recorded in K2 followed by 84.70% Ki. In interaction effect with nitrogen and potash highest percentage of germination (85.83%) recorded with N3 K2, 85.50 in N1K1, 84.98 in N2K2 and 84.05 in N2K1.

The height of the plant was recorded after thirty days and from the mean tabulation value it was founded that the height of the plant was maximum (16.44 cm) with N3, followed by 15.50 cm in N2 & 14.93 cm in N1 (Table 5). So, far application of potash K2 recorded plant height of 16.87 cm followed by K1 which recorded 14.38 cm plant height. From the interaction effect it was found that N3 K2 recorded a plant height of 17.48 cm, followed by 16.75 cm in N2K2, 16.38 cm in N1K2 & 15.40 cm in N3K1 & 14.25 cm in N2K1. N1K1 recorded the lowest plant height of 14.38 cm.

It was revealed from the tabulated data that the height of the plant was 17.23 cm in N3, followed by in 16.30 cm N2 and 15.79 cm N1 (Table 6). With respect to application of Potash 17.3 cm plant height was recorded in K2 followed by 15.74 cm in K1. In interaction effect it was found from the tabulated data that 18.38 cm was recorded with N3K2, followed by

16.63 cm in N1K2, 16.40 cm in N2K2, 16.20 cm in N2K1, 16.08 cm in N3K1 & the minimum of 14.95 cm in N1K1.

It was found that height of plant was less in line sowing as compared to broadcasting. The height of the plan was maximum (21.44 cm) in N3 followed by 19.41 cm in N1 & 19.39 cm in N2 (Table 7). Due to varied dose of potash plant height was found to be 21.03 cm with K2 & 19.13 cm in K1. In the interaction effect plant height of 22.20 cm was recorded with N3K2 followed by 20.68 cm in N3K1 & 20.50 cm in N1K2, 20.40 cm in N2K2 and the lowest height of 18.33 cm in N1K1.

Due to broadcasting of Coriander seeds a plant height of 21.91 cm was recorded in N3, followed by 21.79 cm in N2 & 20.41 cm N1 after 35 days of sowing (Table 8). Due to Potash application 22.56 cm plant height was recorded in K2 followed by 20.18 cm in K1. Due to Interaction effect plant height of 23.33 cm was recorded with N3K2 which was the highest Plant height of 22.73 cm was recorded with N2K2, 21.63 cm with N1K2, 20.85 cm with N2K1 & 20.50 cm with N3K1. Lowest plant height of 19.20 cm was obtained with N1K1.

Days to germination & germination percentage of coriander seeds due to line sowing & broadcasting did not varied significantly due to different doses of Nitrogen & Potassium application. Maximum days to germination (8.75) was found with N2K1 in line sowing & highest percentage of seed germination (90.75) was found in line sowing with N3K2 & 85.06% in N3K2 in broadcasting of seeds. Application of different doses of nitrogen and potash did not influence much the days to germination and germination percentage. The result revealed that plant height in coriander was influenced by application of Nitrogen, Potash and due to their combined effect both in line sowing & in broadcasting. In both the cases higher doses of potash has increased the plant height & in combination of Nitrogen & Potash highest plant height of 17.48 cm in N3K2 & 18.38 cm in

N3K2 was recorded in line sowing & broadcasting respectively. Increase in plant height along with branches is a desirable character to make the plant more bushy and also thereby increase in yield. Increase in plant height due to varied doses and their combination might be due to the production of more chlorophyll, photosynthates, phytohormones and cytokinin which are utilized by the plant during growth & development helping cell formation & elongation. Increase in plant height due to varied nutrition was also reported by Raghavaiah *et al.*, (1985), Bhati (1988) and Pawar *et al.*, (2007). Combined effect of nitrogen and potash resulted in the production of maximum number of branches as compared to Nitrogen & Potash alone both in line sowing & broadcasting. Due to increase in nutrient efficiency and synergistic effect of nitrogen & potash there is increase in number of primary branches per plant which was also reported by Pawar *et al.*, (2007), Patel *et al.*, (2013) and Shanu *et al.*, (2013). Due to interaction effect number of primary branches was 6.50 under N3K2 in line sowing in which the first leaf appeared at a height of 16.60 cm as compared to 15.80 cm in K2&15.30 in N2 which indicate that combined application influenced the production of primary branches and also resulted in increase in length at which first leaf appear in the plant was also reported by Patel *et al.*, (2013). Length of root & weight of root & weight of plant. Due to varied combination of Nitrogen & Potash root length of 9.50 cm was recorded in N3K1&9.26 cm in N2. The change in root length many a times is an important factor in deciding the yield of a crop. Application of combined source of nutrition that is Nitrogen & Potash influenced

the root length.

It was concluded that the maximum growth 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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