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Effect of nitrogen and phosphorus on seed yield of coriander (*Coriandrum sativum* L.)

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ABSTRACT : A field experiment was conducted during *Rabi* season of 2017-2018 to study the effect of nitrogen and phosphorus on seed yield of coriander (*Coriandrum sativum* L.). The experiment comprising of 16 treatment combinations with four levels of nitrogen *viz.*, 0, 20, 40 and 60 kg N ha⁻¹ and four levels of phosphorus *viz.*, 0, 20, 40 and 60 kg P₂O₅ ha⁻¹ was laid out in RBD design with three replications. The experiment results revealed that the combination of 60 kg N ha⁻¹; 20 kg P₂O₅/ha promoted yield attributes *viz.*, number of umbels per plant (14.27), the combination of 60 kg N ha⁻¹; 60 kg P₂O₅/ha promoted number of seeds per umbellate (5.96), the combination of 60 kg N ha⁻¹; 40 kg P₂O₅/ha promoted seed weight per plant (4.82 g), the combination of 40 kg N ha⁻¹; 40 kg P₂O₅/ha promoted number of umbellate per umbel (5) and ultimately higher seed yield (1469 kg ha⁻¹) was given by combination of 60 kg N ha⁻¹; 40 kg P₂O₅/ha .

KEY WORDS : Coriander, Nitrogen, Phosphorus

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Coriander (*Coriandrum sativum* L.) is the oldest spice used by the human being and it is used in world as condiment. According to National Horticulture Board area under coriander is 532 '000 Ha and production is 710 '000 MT in India in 2017-2018. The coriander has pleasant aroma in leaves and seeds. Dry seeds have coriandrol from 0.1 to 1.3 per cent. Coriander oil seeds are used in various products such as cosmetic products, chocolate and beverages. Coriander contains vitamin C (125-250 mg/100 g) and vitamin A (5200 IU/100g). Seed is used as a carminative, refrigerant and diuretic as medicines. Coriander dry seed contain 0.3 per cent essential oil, 19.6 per cent non-volatile oil, 24 per cent carbohydrates, 5.3 per cent mineral matter and 175 IU/100 vitamins A. Nutrients are required for the growth of the coriander. Essential nutrient for coriander

is nitrogen and phosphorus and their deficiency cause yellowish of lower leaves, stunted plant growth and shadings of leaves and poor fruit yield. Whereas, excess application of nitrogen phosphorus cause vigorous plant growth and poor seed yield. Interaction of both nutrients has been reported to be involved in biosynthesis of important proteins and other important organic compounds. According to Javiya *et al.* (2017) the 60 kg N/ha promoted yield parameters *viz.*, number of umbels per plant, number of umbellates per umbel, number of seeds per umbellate, weight of seed per plant, ultimately higher seed yield (1483 kg/ha) and stover yield (1760 kg/ha) and application of phosphorus enhanced significantly yield parameters *viz.*, number of umbels per plant, number of umbellates per umbel, number of seeds per umbellate, weight of seeds per plant, seed yield (1388

kg/ha) and stover yield (1613 kg/ha) of coriander upto 40 kg P₂O₅/ha, the yield further increased with increasing level of P₂O₅ but could not reach upto level of significant. It considered that nitrogen and phosphorus fertilizers are economical to improve the crop yield. It was, therefore, considered necessary to study the effect of nitrogen and phosphorus on seed yield of coriander (*Coriandrum sativum* L.) with the objective to evaluate the effect of phosphorus and nitrogen on seed yield of coriander.

The present investigation was carried out in experimental area on research farm of Guru Kashi University, Talwandi Sabo (Bathinda) during *Rabi* season in 2017-2018 entitled, effect of nitrogen and phosphorus on seed yield of coriander (*Coriandrum sativum* L.) has been presented in this chapter. The experiment was laid out in Randomized Block Design with total sixteen treatment combinations *i.e.* (N₁P₁: 0 kg N/ha; 0 kg P₂O₅/ha, N₁P₂: 0 kg N/ha; 20 kg P₂O₅/ha, N₁P₃: 0 kg N/ha; 40 kg P₂O₅/ha, N₁P₄: 0 kg N/ha; 60 kg P₂O₅/ha, N₂P₁: 20 kg N/ha; 0 kg P₂O₅/ha, N₂P₂: 20 kg N/ha; 20 kg P₂O₅/ha, N₂P₃: 20 kg N/ha; 40 kg P₂O₅/ha, N₂P₄: 20 kg N/ha; 40 kg P₂O₅/ha, N₃P₁: 40 kg N/ha; 0 kg P₂O₅/ha, N₃P₂: 40 kg N/ha; 20 kg P₂O₅/ha, N₃P₃: 40 kg N/ha; 40 kg P₂O₅/ha, N₃P₄: 40 kg N/ha; 60 kg P₂O₅/ha, N₄P₁: 60 kg N/ha; 0 kg P₂O₅/ha, N₄P₂: 60 kg N/ha; 20 kg P₂O₅/ha,

N₄P₃: 60 kg N/ha; 40 kg P₂O₅/ha, N₄P₄: 60 kg N/ha; 60 kg P₂O₅/ha). Punjab sugandh variety was sown by row spacing thirty centimetres and seed rate was ten kilogram per acre. Appropriate analysis of variance on the results of each experiment was performed, using EDA software, a computer programme for statistics. Comparisons among the means of different treatments were undertaken using the revised L.S.D. procedure at 0.05 level of probability as illustrated by Steel and Torrie (1984).

Result shows that number of umbels per plant (14.27) significantly increased by N₄P₂ and at par with N₄P₃ and N₄P₄ (13.81,13.98). Minimum number of umbels per plant was obtained from N₄P₂ (9.86) and N₂P₂ (9.14). Mehta *et al.* (2013) concluded that the application of irrigation at 18 days interval with 50 kg N + 25 kg P₂O₅/ha at 30 x 10 cm crop geometry is better for realizing higher net return and profitability in coriander production. Number of umbellate umbel⁻¹ (5) was given by N₃P₃, N₄P₄, N₂P₄ produce the lower umbellate umbel⁻¹ (3). Pooja *et al.* (2017) conducted and from the result of the study it could be concluded that treatment (N 60 + P₅0 kg/ha) was found to be best for obtaining higher seed yield. Number of seeds per umbellate (5.96) was increased significantly from N₄P₄ and at par with N₄P₃ (5.82), N₄P₂ (5.72). The minimum mean seeds per

Table 1: Effect of nitrogen and phosphorus on seed yield of coriander

Parameters Treatments	Number of umbellate per umbel	Number of umbels per plant	Number of seeds per umbellate	Seed weight per plant (g)	Seed yield kg/ha
N ₁ P ₁	4	9.86	2.99	3.15	1195
N ₁ P ₂	5	9.14	4.52	3.22	1202
N ₁ P ₃	4	9.44	4.64	3.22	1208
N ₁ P ₄	4.36	9.5	4.72	3.66	1218.66
N ₂ P ₁	4	9.5	4.64	4.05	1225
N ₂ P ₂	4	9.41	4.5	4.15	1259.33
N ₂ P ₃	4	9.5	4.73	4.18	1272
N ₂ P ₄	3	9.91	4.63	4.21	1315
N ₃ P ₁	4	9.95	4.96	4.30	1330
N ₃ P ₂	4	10.81	4.98	4.35	1388.33
N ₃ P ₃	5	12.26	5.33	4.50	1395
N ₃ P ₄	5	12.31	5.43	4.52	1429
N ₄ P ₁	4	12.9	5.62	4.52	1415
N ₄ P ₂	4	14.27	5.72	4.55	1460
N ₄ P ₃	4	13.81	5.82	4.82	1469
N ₄ P ₄	4	13.98	5.96	4.53	1391
LSD (P=0.05)	0.22	2.27	1.08	0.025	2.95

umbellate (2.99) were produced by the control treatment N_1P_1 . P. P. Javiya *et al.* (2017) concluded that 60 kg N/ha (half dose of nitrogen as basal and remaining half dose at 30 DAS) and 60 kg P_2O_5 /ha (full doses of phosphorus as basal) is optimum for higher production and net returns from coriander on clayey soil under South Saurashtra agro-climatic condition. Seed weight per plant (4.82g) of coriander was significantly enhanced by N_4P_3 . Minimum seed weight per plant was recorded in N_1P_1 (3.15 g). Lokhande *et al.* (2015) conducted that 60 kg nitrogen per hectare and 45 kg phosphorus per hectare is optimum for greater foliage and maximum seed yield. Seed yield (1469 kg ha^{-1}) was highest recorded from N_4P_3 , it was significant then control. The minimum of seeds yield per hectare (1195 kg ha^{-1}) was produced by the N_1P_1 . Hossain *et al.* (2018) concluded that treatment (N 60 + P 40 kg/ha) was found to be best for obtaining higher seed yield and yield attribute characters. It was concluded that major nutrient which are required for the good production or yield of coriander are nitrogen and phosphorus. So, seed yield ultimately depends on good yield contributing characters, which can obtain from adequate dose of fertilizers. To standardize the nitrogen and phosphorus doses the study was carried out in Guru Kashi University, Bathinda and the results shows that combination of nitrogen (60 kg ha^{-1}) and phosphorus 40 kg ha^{-1} fetched the highest seed yield from coriander in

comparison to other treatments.

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