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Short communication

Effect of integrated use of nitrogen on growth and seed yield of bottle gourd

L.N. Bairwa* and S.K. Khandelwal
Department of Horticulture, S.K.N. College of Agriculture (RAU), Jobner-303 329

Bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] is gaining importance due to it's high yield potential, steady market price throughout the season and export potential. It is also a rich source of minerals, protein, carbohydrate and vitamins. It also has a wide medicinal properties such as laxative, digestive and to prevent constipation. Application of nitrogen through inorganic fertilizer can enhance the growth and yield to considerable extent but soil fertility and productivity cannot be retained for a longer period. Integration of chemical fertilizers with organic manures maintains long-term fertility and sustains higher productivity (Pillai *et al.*, 1985). Use of organic manures is not only the liable way for obtaining high productivity with sustainable fertilizer economy but is also a concept of ecological soundness leading to sustainable agriculture (Swaminathan, 1987). Vermicompost is a good organic source of nitrogen and by application of nitrogen through a combination of urea with vermicompost can increase the seed and fruit yield. With this point in view, the present investigations was undertaken to find out the suitable combination of urea and vermicompost in bottle gourd.

Field experiment was carried out during kharif 2004 and 2005 at Agricultural Research Station, Durgapura, Jaipur. The soil of experimental field was sandy loam having available N (149.9 kg ha^{-1}), P (27.4 kg ha^{-1}), K (190.5 kg ha^{-1}) and pH of 7.7. Five different combinations of nitrogen i.e., 100 % through urea (N_1), 75 % through urea + 25 % through vermicompost (N_2), 50 % through urea + 50 % through vermicompost (N_3), 25 % through urea + 75 % through vermicompost (N_4) and 100 % through vermicompost (N_5). were replicated thrice in a randomized block design. The seeds of cv. Pusa Naveen was sown in the rows spaced at 2.50 m maintaining a plant-to-plant distance of 0.75 m in 6.75 m x 2.5 m plot size. The recommended dose of NPK for bottle gourd is 80:40:60 kg ha^{-1}. Nitrogen was supplied through urea and vermicompost in different combinations as per the treatments. Phosphorus and potash were applied uniformly through single super phosphate and muriate of potash, respectively at the time of field preparation in individual plots. The whole quantity of vermicompost was uniformly spread at the time of bed preparation below and around the ridges and then thoroughly mixed. The required quantity of urea as per nitrogen treatments was supplied in three splits i.e. one-third at the time of sowing and remaining quantity in two splits. The first dose of urea was top dressed 30 days after sowing and remaining dose at 50 days after sowing. The nitrogen was estimated by Nesseler's reagent (Snell and Snell, 1939). The pooled data of two years on various growth and yield attributes were recorded and subjected to statistical analysis.

The data revealed that different nitrogen sources influenced the growth parameters of bottle gourd as presented in Table 1. It is evident from the data that the highest vine length (526 cm), maximum number of primary branches (11.29), fruit length (41.60 cm) and fruit girth (25.71 cm) were recorded under N_3 treatment where nitrogen was supplied through 50% urea and 50% through vermicompost. However, the effect of treatments N_4 and N_5 on these attributes was at par with N_3 treatment. It might be due to better nutritional environment in root zone as well as in plant system. Improved growth parameters with combination of vermicompost might be due to better moisture holding capacity, supply, and availability of major and minor nutrients due to favourable soil condition. These results are in close conformity with Reddy *et al.* (1998) in garden pea and Yadav *et al.* (2006) in okra.

Application of nitrogen 50 per cent through urea and 50 per cent through vermicompost was found best for yield and yield attributing characters . It might be due to profused vegetative growth which must have provided more sites for translocation of photosynthates with ultimately increased yield attributes. The findings of present investigation are being supported by Sreeniwas *et al.* (2000b) in Ridge gourd and Anon (2006) in cucumber.

Nitrogen content of seed and nitrogen uptake (kg ha^{-1}) by seed were observed highest in treatment N_3 where nitrogen was given 50 per cent through urea and 50 per cent through vermicompost. This might be due to improved growth and photosynthetic activities in plants. These

***Corressponding author's E-mail:**
ln_bairwa@hotmail.com

Table 1. Effect of integrated use of nitrogen on vine length, number of primary branches per vine, fruit length and fruit girth.

Treatments	Vine length (cm)	No. of primary branches /plant	Fruit length (cm)	Fruit girth (cm)	No. of fruits per vine	No. of seeds/ fruit	Seed yield/ plot (g)	Seed index	N uptake by seed (kg ha^{-1})	N content (%)	B:C ratio
Nitrogen											
N_1	456.3	9.22	37.25	23.43	2.28	429.98	1242.20	12.69	21.09	3.03	2.46
N_2	461.8	9.48	38.37	23.70	2.58	444.29	1473.03	12.84	25.24	3.06	2.61
N_3	526.0	11.29	41.60	25.71	2.99	464.32	1808.07	12.98	31.64	3.12	2.96
N_4	496.0	10.56	40.72	25.09	2.83	451.05	1656.84	12.94	28.63	3.08	2.28
N_5	442.4	8.90	39.70	24.47	2.50	442.48	1425.86	13.18	24.58	2.99	1.64
C D at 5%	16.7	0.42	1.92	1.04	0.11	14.82	90.05	NS	0.87	0.04	0.21

results also confirms the findings of Sreeniwas *et al.* (2000b) in ridge gourd and Patil *et al.* (1998) in tomato. The nitrogen supplied through 50 per cent urea and 50 per cent vermicompost was found superior over the other sources on B: C ratio where it was observed 2.96.

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