Nitrogen and potassium fertilizer response on growth and yield of hybrid Luffa –Naga f1 variety

D.R.T.N.K Dissanayake,H.M.S.K. Herath,H.K.S.G.Gunadasa
Faculty of Animal Science and Export Agriculture, UvaWellassa University of Sri Lanka.

and

P.Weerasinghe
Horticultural Crops Research and Development Institute, Gannoruwa, Peradeniya. Sri Lanka

Introduction

Luffa is a tropical and subtropical vegetable, belongs to family Cucurbiteceae. It is predominantly monoecious in sex expression and provides an ample scope for utilization of hybrid vigor. Hybrid varieties develop through open pollination, produce higher yields due to its hybrid vigor. Naga F1 hybrid variety consists number of desirable traits other than higher yield such as strong and vigorous plants, fruits with long deep ridges, attractive green color fruits ,better fruit weight, length and early maturity compared to the local Luffa cultivars.Unavailability of fertilizer recommendations for hybrid cucurbit vegetables leads to an excess fertilizer application causing a vital environmental issue that creates undesirable impacts on nature and the human health.

Main Objective of this research is to determine effect of different nitrogen and potassium fertilizer rates on growth and yield of Naga F1 Variety. Other objectives are, to evaluate specific growth parameters and yield, to identify the optimum nitrogen and potassium fertilizer levels based on growth and yield of hybrid Luffa variety. As well as to formulate the general fertilizer recommendation for hybrid Luffa -Naga F1 variety.

Methodology

Hybrid Luffa - Naga F1 variety seeds were used as planting material. The experiment consisted of nine treatments involving three nitrogen fertilizer levels and three potassium fertilizer levels based on recommendation of the Department of Agriculture for local Luffa varieties. Recommended dosage of phosphorous fertilizer level was applied for each treatment.Fertilizers were applied at the basal dressing and two top dressings in three week intervals accordingly. Fertilizer sources for N, K and P are Urea, Muriate of Potash (MOP) and Triple Super Phosphate (TSP) respectively. The study was carried out in randomized complete block design.

Field experiment was conducted in order to obtain growth and yield parameters of Naga F 1 variety. Plant growth parameters were leaf number per vine and vine length at 1st, 2nd and 3rd weeks after planting intervals. Yield attributes were fruit girth, fruit length, yield per vine, yield per hectare up to ten consequent harvest. Laboratory analysis were performed in order to determine initial soil composition andnitrogen and potassium contents in leaves and fruitsat peak harvesting stage. Data were analyzed using Minitab 17 statistical software. Treatment means differences were evaluated by Tukey mean comparison tests at 0.05 significant level.

Results and Discussion

According to growth performances, significantly (P<0.05) highest mean vine length (14.8, 62.3, 118.7) was observed with T5 at 1WAP, 2WAP and 3WAP intervals respectively. T5 consisted with 75% (56.25Kg/ha) urea and 75% (45Kg/ha) muriate of potash fertilizer levels. Researches has proven slightly contrasting results regarding nitrogen fertilizer application rates in cucurbits. Das et al. (1987) observed significant increase in length of vine with the application of 90 kg nitrogen per ha compared to lower doses (0, 30 and 60 kg ha-1) of nitrogenin pointed gourd.

Table 01: Effect of N and K fertilizer levels on vine length

	Mean Vine Length (cm)		
Treatment	1WAP	2WAP	3WAP
T1 N (0%) K (0%)	14.0 ^{bc}	57.2 ^{b}	83.3 ^{g}
T2 N (75%) K (0%)	12.9 ^{d}	57.2 ^{b}	106.0 ^{bc}
T3 N (150%) K (0%)	14.2 ^{ab}	39.6 ^{g}	93.2 ^{ef}
T4 N (0%) K (75%)	14.0 ^{bc}	43.5 ^{e}	96.7 ^{de}
T5 N (75%) K (75%)	14.8 ^{a}	62.3 ^{a}	118.7 ^{a}
T6 N (150%) K (75%)	14.5 ^{ab}	48.3 ^{d}	88.0 ^{fg}
T7 N (0%) K (150%)	13.6 ^{c}	43.6 ^{e}	97.7 ^{cde}
T8 N (75%) K (150%)	14.1 ^{bc}	53.6 ^{c}	103.4 ^{bcd}
T9 N (150%) K (150%)	14.0 ^{bc}	42.0 ^{f}	111.3 ^{ab}
CV	89.86	99.99	99.97

Values followed by the same letters are not significantly difference at $P \leq 0.05$

According to the yield performances exhibited in Table 02 , highest yield per ha (23.09 t)) was recorded with the application of 150% (112Kg/ha) urea and 75%(45Kg/ha) muriate of potash fertilizer levels.Main effect of nitrogen fertilizer was significant (P<0.05) on yield per hectare. This results were supported by Suresh and Papaiah (1991) that observed significantly higher fruit weight, number of fruits, fruit yield and fruit yield per ha with the application of 80 kg nitrogen per ha compared to lower doses of nitrogen (0 and 40 kg ha $^{-1}$) in bitter gourd.Umamaheswarappa*et al.* (2003) recorded increase in fruit yield with increased level of nitrogen in bottle gourd.

Table 02**:** Effect of N and K fertilizer levels on yield per ha

Treatment	Yield per ha (t)
T1 N (0%) K (0%)	12.26 [a]
T2 N (75%) K (0%)	16.10 [a]
T3 N (150%) K (0%)	17.59 [a]
T4 N (0%) K (75%)	13.92 [a]
T5 N (75%) K (75%)	21.36 [a]
T6 N (150%)K (75%)	23.09 [a]
T7 N (0%) K (150%)	12.19 [a]
T8 N (75%) K (150%)	21.64 [a]
T9 N (150%) K (150%)	19.83 [a]
CV	56.38

Values followed by the same letters are not significantly difference at $P \leq 0.05$

Conclusions

Naga F1 variety exhibited positive growth and yield responses at different nitrogen and potassium fertilizer levels in significant manner. At vegetative growth, better vine length was observed with the application of 75% (56.25 kg ha-1) urea and 75% (45 kg ha-1) muriate of Potash fertilizer combination level.According to the yield attributes, maximum yield per hectare was exhibited with the application of 150% (112 Kg/ha) urea and 75% (45 Kg/ha) muriate of potash fertilizer levels. A general fertilizer recommendation can be concluded as 150% (112 Kg/ha) urea, 100% (65 Kg/ha) triple super phosphate and 75% (45 Kg/ha)muriate of potashfor the selected Luffa hybrid - Naga F1 variety.

References

Ali, S. M., Moghadem, H. H., Yazdani, D. And Avval, P. A., 1999, Effect of plastic mulches,spacing, nitrogen, phosphorus and potassium fertilizer levels on the growth and yield ofcommon pumpkin (Cucurbitapepovar. Styrica). Journal of Medicinal and AromaticPlant Sciences, 21(3) : 650-653.

Patil, S. D., Keskar, B. G. And Lawande, K. E., 1998, Effect of varying levels of N, P and K on growth and yield of cucumber (CucumissativusL.) cv. Hemangi. Journal of Soils andCrops, 8(1) : 11-15

Das, M. K., Maity, T. K. And Som, M. G., 1987, Growth and yield of pointed gourd (TrichosanthesdioicaRoxb.) as influenced by nitrogen and phosphorus fertilization. Vegetable Science, 14(1) : 18-26.

Umamaheswarappa,P.,Krishnappa,K.S.,Pitchai,M.M., Nachegowda, V. And Venkateshamurthy, P., 2003, Effect of varying levels of NPK on growth and yield of bottle gourd in southern dry region of Karnataka. Mysore Journal of Agricultural Sciences, 37(1) : 56-64.