

EFFECT OF GRADED DOSES OF NITROGEN, PHOSPHORUS AND POTASSIUM ON GROWTH AND YIELD OF ORIENTAL PICKLING MELON (*CUCUMIS MELO* VAR. *CONOMON*)

M. A. Hassan, V. K. Sasidhar and K. V. Peter

College of Horticulture, Vellanikkara 680 654, Trichur, Kerala

Oriental pickling melon (*Cucumis melo* var. *conomon*) is grown in Kerala during summer season for salad and cooked vegetable purposes. The yield of melon per unit of land and per unit of time has remained very low in our state. Poor genetic potential of the existing genotypes to manufacture and store the photosynthates, incidence of many parasitic and non-parasitic diseases and above all lack of appropriate agronomic package of practices have been the main reason for the poor performance of melon. Studies on fertilizer requirements, fertilizer application, plant population etc. have been rather limited in melon which call for urgent need to chalk out a fertilizer schedule for this vegetable. A high yielding variety of melon (CS 26) was used for the study.

Materials and Methods

The experiment was conducted at the Research Station and Instructional Farm, Mannuthy during November-February, 1979-80. The soil of the experimental area is a deep well drained sandy loam. The basic chemical characteristics of the soil before planting the experiment are: total nitrogen 0.054% available P_2O_5 86.66 kg/ha, available K_2O 201.6 kg/ha and pH 5.6. Seeds of the variety CS 26 obtained from the Department of Olericulture, College of Horticulture-Vellanikkara were used for the study. Farm yard manure at the rate of 10 kg/pit of size 30 x 30 x 30 cm was applied uniformly. Urea, superphosphate and muriate of potash were used to supply required quantities of nitrogen, phosphorus and potassium. The experiment was laid out in a 3^3 factorial design with two replications. The higher order interactions NPK and NPK^2 were confounded in replications I and II respectively. The plot size was 12 m². The treatments constituted combinations of 3 levels each of nitrogen (0, 60, 120 kg/ha), phosphorus (0, 45 and 90 kg P_2O_5 /ha) and potassium (0, 45 and 90 kg K_2O /ha). The full doses of phosphorus and potassium and half the dose of nitrogen were applied as basal and the rest given twice at 45 days after sowing and 15 days after second application. Observations were recorded on growth components such as vine length, leaves per plant, fruits per plot, average fruit weight, seed weight per plot, fruit length, fruit girth, length-girth ratio, flesh thickness and fruit yield per plot. The data were analysed and economic optimum level of nitrogen was worked out as per Snedecor and Cochran (1967).

Table 1

Effects of graded doses of N, P and K on the growth and yield of melon

Levels of N, kg/ha	Length of vine	Leaves/plant	Fruits/plot	Average fruit weight, kg	Weight of seeds per plot, kg	Length of fruit, cm	Girth of fruit, cm	Length/girth ratio	Flesh thickness, cm	Fruit yield plot/kg,
0	268.70	204.44	8.78	2.08	138.51	32.81	33.67	0.98	3.11	18.11
60	305.35	270.29	14.50	2.25	212.06	35.71	34.87	1.02	3.43	32.29
120	334.78	260.42	12.56	1.99	184.72	32.89	33.50	0.98	3.25	25.08
CD (0.05)										
'F' test	36.91	33.59	1.33	N.S.	23.41	N.S	N.S	0.035	N.S	3.47
Levels of P ₂ O ₅ , kg/ha										
0	291.82	252.29	11.89	2.05	170.33	33.12	33.76	0.98	3.20	23.88
45	325.45	232.57	11.61	2.07	181.56	34.00	33.68	1.01	3.18	24.51
90	301.57	259.29	12.33	2.19	183.39	34.28	34.59	0.99	3.11	27.09
CD (0.05)										
'F' test	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
Levels of K ₂ O, kg/ha										
0	291.92	230.18	11.28	2.04	172.78	33.49	33.69	0.99	3.34	22.57
45	310.40	259.57	12.28	2.16	167.22	34.73	34.35	1.01	3.29	26.32
90	306.51	245.40	12.28	2.12	195.28	33.18	33.99	0.97	3.19	26.60
CD (0.05)										
'F' test	N.S	N.S	N.S	N.S	23.41	N.S	N.S	N.S	N.S	3.47

Table 2
Effects of graded doses of N, P and K on the number of fruits per plot and seed yield of melon

Nutrient levels (kg/ha)	No of fruits per plot				Seed yield per plot (g)			
	N levels				N levels			
P ₂ O ₅ levels	0	60	90	Mean	0	60	90	Mean
0	8.33	13.5	13.83	11.89	109.67	204.50	196.83	170.33
45	10.83	13.5	10.50	11.61	186.83	193.50	164.33	181.55
90	7.17	16.5	13.33	12.33	119.00	238.17	193.00	183.39
Mean	8.78	14.50	12.55		138.50	212.06	184.72	
K ₂ O levels								
0	8.5	14.67	10.67	11.28	160.00	224.67	133.67	172.78
45	10.67	14.33	11.83	12.28	130.67	130.67	195.83	175.17
90	7.17	14.50	15.17	12.58	124.83	124.83	215.67	248.33
Mean	8.78	14.50	12.55		138.50	212.06	184.72	
K ₂ O levels	P ₂ O ₅ levels (kg/ha)				P ₂ O ₅ levels (kg/ha)			
	0	45	90		0	45	90	
0	12.67	11.50	9.67	11.28	197.50	194.17	126.67	172.28
45	13.17	10.33	13.33	12.28	171.67	142.83	187.17	167.22
90	9.83	13.00	14.00	12.28	141.83	207.67	236.31	195.28
Mean (P ₂ O ₅)	11.89	11.61	12.33		170.33	181.56	183.39	
CD (0.05)	2.310				40.550			

Results and Discussion

The three levels of nitrogen produced significant differences in melon variety CS 26 for vine length, leaves per plant, fruits per plot, weight of seeds per plot, length/girth ratio and fruit yield per plot (Table 1). The nitrogen level did not produce any significant difference for average fruit weight, fruit length, fruit girth and flesh thickness. The phosphorus level *per se* had no significant effect on the melon variety for the characters under study. This may be due to the fact that the available P_2O_5 in the soil was sufficiently high being 86.66 kg/ha. Nath (1976) reported that phosphorus need not be applied to cucumber under tropical conditions.

Potassium produced significant differences only for seed weight per plot. The interactions between nitrogen and phosphorus produced significant differences for fruit per plot and seed yield per plot. The combinations of 60 kg of nitrogen along with 90 kg of P_2O_5 per ha gave 16.5 fruits per plot compared to 8.33 fruits per plot at control. The seed yield also was the highest (238.17 g per plot) at this combination.

The combinations of nitrogen and potassium produced significant differences for fruits per plot and seed yield per plot. The combination of 120 kg N and 90 kg K_2O gave an yield of 15.17 fruits per plot as compared to 8.5 fruits in control. The same combination produced the highest seed yield per plot (245.33 g) as compared to 160.00 g per plot at control.

The combined effects of P_2O_5 and K_2O produced significant differences for fruits per plot and seed yield per plot. The highest number of 14 fruits was observed at a combination of 90 kg P_2O_5 per ha and 90 kg K_2O /ha. The combined effect of P_2O_5 and K_2O on the seed yield per plot was significant and the highest seed yield of 236.33 g/plot was observed at a combination of 90 kg K_2O along with 90 kg P_2O_5 .

The response curve indicated a quadratic response to nitrogen ($y=32.39+3.485x-13.695x^2$). The optimum dose of nitrogen for highest yield was calculated to be as 96.6 kg/ha in the form of urea. But the economic dose of nitrogen was worked out to be 45.38 kg per ha. The response to K_2O was found to be linear.

Summary

A 3^3 factorial experiment with nitrogen (0, 60, 120 kg/ha), P_2O_5 (0, 45, 90 kg/ha) and K_2O (0, 45, 90 kg/ha) was laid out to find out optimum and economic levels of the above nutrients for maximising fruit yield in oriental pickling melon. Response to nitrogen was observed to be quadratic and the optimum level was

calculated as 96.6 kg/ha and the economic level as 45.38 kg/ha. The P_2O_5 application produced no significant effects in melon for different characters studied. Response to K_2O was linear.

സംഗ്രഹം

വിവിധ അളവുകളിൽ പാക്യജനകം, ജാവഹം, ക്ഷാരം എന്നിവ നൽകുന്നതുകൊണ്ട് CS-26 എന്നയിനം വെള്ളരിക്കയിൽ ഉണ്ടാകുന്ന പ്രതികരണങ്ങൾ നിരീക്ഷിക്കുന്നതിനു വേണ്ടി മണ്ണുത്തി ഇൻസ്ട്രക്ഷണൽ ഫാമിൽ ഒരു പരീക്ഷണം നടത്തുകയുണ്ടായി. പാക്യജനകം, ക്ഷാരം എന്നിവ വിളവിൽ അനുകൂലപ്രതികരണങ്ങൾ ഉളവാക്കി. പാക്യജനകം ഹെക്ടറോന്നിന് 96.6 കിലോഗ്രാം എന്നതോത് പരമാവധി വിളവ് നൽകിയപ്പോൾ ക്ഷാരത്തിന്റെ <mofa> കൂട്ടുന്നതനുസരിച്ച് ക്രമമായി വിളവ് വർദ്ധനയുണ്ടായി. വരുമാന അടിസ്ഥാനത്തിൽ വിശകലനം CTijgrnjoco പാക്യജനകം ഹെക്ടറോന്നിന് 45.38 കിലോഗ്രാം നൽകിയാൽ മതിയെന്നു കണ്ടു.

References

Nath, P. 1976. *Vegetables for the Tropical Region*. 1st edn., Indian Council of Agricultural Research, New Delhi, p. 32
Snedecor, G. W. and Cochran, W. G. 1967. *Statistical Methods*, 3rd edn., Oxford and I. B. H Publishing Co., p. 358