EFFECTS OF GRADED DOSES OF NITROGEN, PHOSPHORUS AND POTASSIUM ON YIELD OF PUMPKIN (CUCURBITA MOSCHATA POIR)*

The production potential of any crop variety is fully realised only under adoption of ideal package of practices. Fertilizer scheduling is one of the essential components of such a package of practices which considerably decides the production as well as the economic return from the crop.

Work and Carew (1970) recommended one tonne/ha of a NPK mixture (5:10:10) over a basal application of 10 to 15 tonnes of organic manure for pumpkin. Katyal (1977) reported that the optimum dose of nitrogen is 100 kg/ ha over a basal application of farm yard manure (25 to 30 tonnes). Chauhan (1972) reported that an application of farm yard manure (20 tonnes/ha) one month before sowing and application of ammonium sulphate (162 to 184 kg/ha) as top dressing would considerably increase the yield. Sharma and Shukla (1971) observed that 103 kg N/ha and 106 kg P_2O_5/ha were optimum doses for higher yield during summer season and 96 kg N and 88 kg P_2O_5/ha for rainly season crop.

The above findings were observed to be very high invioving a total expenditure of Rs 793/ha for fertilizer alone (Sharma and Shukla, 1971). The present study was intended to find out the economic optimum levels of nitrogen, phosphorus and potassium for pumpkin.

The experiments were conducted during three consecutive seasons viz , November-February, 1979-80; September-December, 1980; and October-January, 1981-82 at the Instructional Farm of College of Horticulture, Vellanikkara. The soil type was a deep well drained sandy loam with a pH of 5.1. The soil was moderately rich in nitrogen (0.075%) and potassium (157.5 ppm). The available phosphorus content was 2.15 ppm. The variety used was CM 14. The experiments were laid out in a 3^3 confounded factorial randomised block design, confounding NPK in replication I and NPK^2 in replication II. Three levels each of N (0,50,100 kg N/ha), P (0,50,100 kg P_2O_5/ha), K (0,25,50 kg K_2O/ha) and their combinations formed the 27 fertilizer treatments in the present study. The spacing was 1.5 x 6.0 m. Two plants were retained in a pit. Farm yard manure was applied in the pits at the rate of 10 kg/pit. Complete doses of phosphorus and potassium were applied along with half doze of nitrogen as basal application. Rest of nitrogen was applied 30th day after sowing. Fruit yield measured in terms of kg/pit was recorded.

Effect due to different levels of nitrogen was significant during all the three seasons. The different levels of phosphorus did not produce any significant

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differences in performance. The varying levels of potassium produced significant
difference only in September-December, 1980 (Table 1).

Table 1

General analysis of variance

| Source | M.S | | |
	Nov-Feb 1979-80	Sept-Dec 1980	Oct–Jan 1981-82
Blocks	39.11	41.52	1.68
N	2917.47**	96.03**	187.89**
P	233.19	14.66	15.45
NP	13.88	5 48	27.67
K	152.16	32.36**	3.56
NK	231.79	18.12	10.42
PK	50.62	6.34	25.77
NP²K	65.08	15.34	29.04
NP²K²	28.28	10.29	13.56
NPK	159.11	3.26	40.21
NPK²	208.55	19.78	21.98
Error	73.63	6.02	13.46

** p = 0.01

Table 2

Analysis of linear and quadratic effects of nitrogen on yield

| Sources of variation | Mean squares | | |
	Nov-Feb 1979-80	Sept-Dec 1980-81	Oct-Jan 1981-82
Linear	4544.91**	29.17"	19.16**
Quadratic	1288.95	16.41	8.76**

** p = 0.01

Response to nitrogen was observed quadratic during first and third seasons and linear during second season (Table 2). Response to potassium was linear only during the second season and was not significant during remaining seasons. Mean performance for fruit yield at different levels of N, P and K is given in Table 3. The optimum level of nitrogen was calculated and found to be 77 kg/ha during the first season and 71.4 kg/ha during the third season. Response to phosphorus was not significant.

The above study clearly established that only nitrogen need to be applied to pumpkin cultivated in similar soil types. The optimum dose is worked out to 74.2 kg/ha on an average. This could be applied half as basal application and the rest as top dressing in two split doses one month after sowing and two months after sowing. The cost of nitrogen was worked out to be Rs 329.50/ha.

Table 3

Mean performance for fruit yield (kg/pit) at different levels of N, P and K

Levels of nutrients	Seasons		
	Nov-Feb	Sept-Dec	Oct–Jan
N_0	25.33	8.65	4.44
N_1	46.94	12.03	10.25
N_2	47.81	13.07	9.80
P_0	36.37	11.73	7.24
P,	40.13	10.21	8.16
P_2	43.57	11.81	9.10
K_0	37.38	10.18	8.50
K_1	43.14	10.81	7.66
K_2	39 56	12.75	8.34
CD (0.05)	5.93	1.70	2.54

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തുടർച്ചയായി 3 കാലങ്ങളിൽ മത്തൻ കൃഷിയ്ക്കു ആവശ്യമായ പൊാകൃജനകം, ഭോവഹം, കൗഷാരം എന്നിവയെപ്പററി നടത്തിയ പഠനങ്ങളിൽ നിന്നും പൊകൃജനകത്തിനു മാത്രമാണു കൂടുതൽ വിളവു തരുവാൻ സാധിക്കുന്നതു എന്നു കണ്ടിരിക്കുന്നു. താഴ്ച

യുള്ളതും നീർവാഴ്ചയുള്ളതുമായ പശിമരാശി മണ്ണിലാണ് ഗവേഷണങ്ങം നടത്തിയത്. ഈ മണ്ണിൽ മത്തൻ കൃഷിയ്ക്ക് കൂടുതലായി നൽകിയ കഷാരത്തിനും ഭാവഹത്തിനും ഫലങ്ങം ഉണ്ടായില്ല. ഇതിന്റെ അടിസ്ഥാനത്തിൽ വർദ്ധിച്ച വിളവിന് ഒരു ഹെക്ടർ സ്ഥലത്തേയ്ക്ക് 74.2 കി. ഗ്രാം പാകൃജനകം മാത്രം നൽകിയാൽ മതിയെന്ന് കണ്ടു.

College of Horticulture   p. c. Rajendran
Vellanikkara 680654   P. K. Gopalakrishnan
Trichur, Kerala   T. R. Gopalakrishnan
                                                                     K V. Peter

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