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Short Communication

INFLUENCE OF INTERACTION EFFECT OF NPK ON NUMBER OF FRUITS PER VINE AND WEIGHT OF FRUIT IN CUCUMBER (*CUCUMIS SATIVUS* L.) CV. JAPANESE LONG GREEN

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Vegetables are important nutritive components of the daily diet because their nutritive value as a vital source of micronutrient has been well recognized. Vegetables play an important role in the balance diet by providing not only energy but also supplying vital protective nutritive higher importance in India as well as in the world due to their relevance in achieving nutritional security form emerging nutritional problems in human beings. Today, India is the second largest producer of vegetables in the world after China. According to recommendations given by Indian Council of Medical Research (ICMR) an average man with vegetarian or non-vegetarian food habit should consume (300g) vegetable per day, which include 125g leafy vegetable, 100g root vegetable and 75g other vegetables (Fagaria *et al*, 2002). In the year 2002, the total vegetable production of country was 97.5 million tonnes from 7.59 million hectare of land (IIVR, 2005). In the country, vegetable crops are grown only in 2.8% of total cultivated land and share 10% of the world's vegetable production with productivity of 13.6 tones/ hectare, which is quite low as compared to other advanced countries (Shanmugesundram, 2001).

The various vegetables grown in India, cucumber has high place in the diet as a rich source of carbohydrates, as a breakfast fruit and as ingredient of salads. The family cucurbitaceae is moderately large one, comprising about 117 genera and 825 species (Jeffery, 1983). It includes large number of vegetables such as cucumber, pumpkins, gourds and melons. Cucumber (*Cucumis sativus* L.) is one of the oldest amongst the cultivated vegetable crops and has been found in cultivation since 3000 to 4000 years. It is one of the most popularly grown cucurbitaceous vegetables. It is believed to be native of Asia and Africa. Some authorities claim that it originated in India from where it spread to Asia, Africa and Europe. It is one of quickest maturing vine vegetables crops. It is a warm season crop and grown mostly during kharif and summer seasons in all the parts of the country including hilly parts of North India.

It was, therefore, felt necessary to plan a nutritional trial on cucumber cultivar Japanese long green which is a recently released variety. It has been accepted by the growers because of its yield potential and quality. The produce has heavy demands from big cities like Mumbai and New Delhi because of its yellowish green colour even at full maturity and straight fruits.

The experiment was laid out in Factorial Randomized Block Design with three factors and 16 treatment combinations replicated three times. The treatment combinations were formulated by taking four levels of N (50, 100, 150, 200 kg/ha) and two levels (50 and 100 kg/ha) each of P and K.

A uniform basal dose of 0.5 kg of farmyard manure per plant was applied as a spot application before sowing of seeds. Nitrogen was applied in the form of

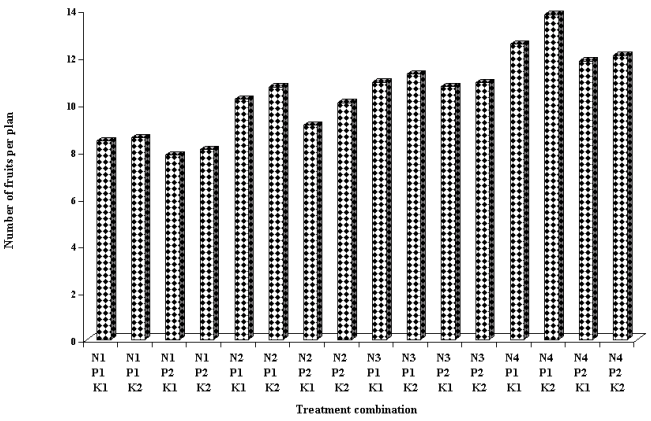

Fig.1. Interaction effect of different levels of nitrogen, phosphorus and potassium on number of fruits per plant of Cucumber (*Cucumis sativus* L.)

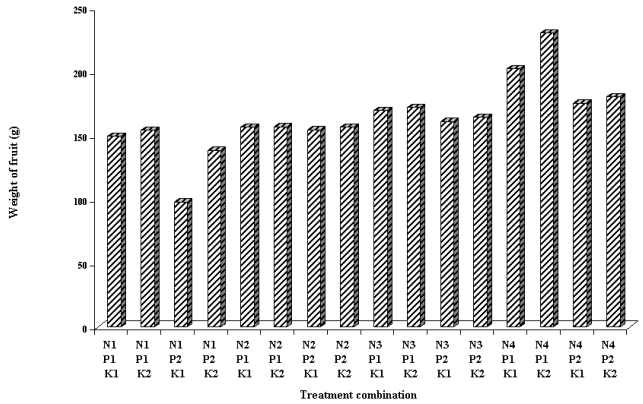

Fig. 2. Effect of different levels of nitrogen, phosphorus and potassium on weight of fruit (g) in cucumber (*Cucumis sativus* L.)

urea in three split doses, out of which 1/3rd at the time of planting and 1/3rd 21 days after germination and remaining 1/3rd 45 days from sowing. Phosphorus and potassium were applied in the form of single super phosphate and muriate of potash, respectively at the time of sowing. The fertilizers as per treatments were applied at the spot of planting in rings and were thoroughly mixed in the soil with the help of weeding hook.

Seeds of cucumber (*Cucumis sativus* L.) cv. Japanese Long Green were obtained from Indian Institute of Vegetable Research, Varanasi. The furrows were opened at 1.5 m distance and three seeds were dibbled 5 cm apart in a triangular fashion at 2 cm depth at each hill in a furrow at 0.3 m distance. Thinning of seedlings was done within a period of three weeks and a single healthy plant was maintained at each hill in a furrow. The culture practices such as irrigation, weeding and plant protection measures were carried out uniformly as and when required.

Fruit yield per hectare recorded under different treatments and their combinations shows that the fruit yield was significantly influenced by different levels of nitrogen, phosphorus, potassium and their interaction (Fig 1 & 2). N_4 (200 kg N ha^{-1}) recorded the maximum fruit weight (197.09 g) followed by 166.83 g with N_3 (150 kg N ha^{-1}), whereas, the minimum (134.94 g) remained with N_1 (50 kg N ha^{-1}). P_1 (50 kg P_2O_5 ha^{-1}) recorded the maximum weight of fruit (174.00 g), whereas, P_2 (100 kg P_2O_5 ha^{-1}) recorded the minimum (153.48 g). K_2 (100 kg K_2O ha^{-1}) recorded the maximum weight (169.13 g) while the minimum (158.35 g) was recorded with K_1 (50 kg K_2O ha^{-1}).

Interaction between nitrogen, phosphorus and potassium (N x P, P x K and N x K) significantly influenced the weight of fruit. Interacting combination N_4 P_1 K_2 (200 kg N ha^{-1} + 50 kg P_2O_5 ha^{-1} + 100 kg K_2O ha^{-1}) recorded the maximum weight of fruit (230.45 g) followed by 202.36 g with N_4 P_1 K_1 (200 kg N ha^{-1} + 50 kg P_2O_5 ha^{-1} + 50 kg K_2O ha^{-1}), while the minimum (97.76 g) remained with N_1 P_2 K_1 (50 kg N ha^{-1} + 100 kg P_2O_5 ha^{-1} + 50 kg K_2O ha^{-1}). Production of nucleoproteins, enzymes and high-energy bonds due to application of phosphorus as well as more auxin production in the presence of higher dose of nitrogen might have resulted in higher fruit weight of cucumber. Thompson (1949) and Pandey and Singh (1973) reported similar results.

An increase in size and weight of fruit due to application of higher doses of nitrogen may be attributed to synthesis of more food due to larger leaf area as induced by application of higher levels of nitrogen. The increase in mean weight of fruit due to application of 200 kg N ha^{-1} may also be attributed to increased length and diameter of fruit due to higher levels of application of nitrogen. The beneficial effects of nitrogen on fruit size and weight of many cucurbitaceous vegetables have been reported by Thompson (1949) and Pandey and Singh (1973). These

Table 1. Interaction effect of different levels of nitrogen, phosphorus and potassium on number of fruits per plant and weight of fruit (g) in cucumber

Treatment		Number of fruits/ plant	Weight of fruit (g)
T_1	N_1 P_1 K_1	8.44	149.54
T_2	N_1 P_1 K_2	8.56	154.18
T_3	N_1 P_2 K_1	7.84	97.76
T_4	N_1 P_2 K_2	8.07	138.29
T_5	N_2 P_1 K_1	10.21	156.71
T_6	N_2 P_1 K_2	10.72	156.86
T_7	N_2 P_2 K_1	9.10	154.33
T_8	N_2 P_2 K_2	10.06	156.49
T_9	N_3 P_1 K_1	10.93	169.76
T_{10}	N_3 P_1 K_2	11.28	172.15
T_{11}	N_3 P_2 K_1	10.74	161.07
T_{12}	N_3 P_2 K_2	10.91	164.34
T_{13}	N_4 P_1 K_1	12.55	202.36
T_{14}	N_4 P_1 K_2	13.81	230.45
T_{15}	N_4 P_2 K_1	11.84	175.27
T_{16}	N_4 P_2 K_2	12.06	180.27
	S. Ed. (±)	0.05	1.021
	C.D. at 5%	0.11	2.085

results are also in general agreement with those reported by Jassal *et al*. (1970), Randhawa *et al*. (1981), Deswal and Patil (1984), Flocker *et al*. (1965) and Singh and Chhonkar (1986).

From the results obtained, it was observed that application of phosphorus at lower level (50 kg P_2O_5 ha^{-1}) has shown significant influence on fruit characters namely length, diameter, core diameter, rind thickness and thereby numerically increased the length, diameter and mean weight of fruit. These results are in general agreement with the findings reported by Keskar (1971). Masui (1960) also reported similar results in muskmelon.

The increase in size and weight of fruit due to application of 100 kg K_2O ha^{-1} may be attributed to increased core size and rind thickness. The increased size and weight of fruit may also be attributed to availability of more food for development due to larger leaf area with 100 kg K_2O ha^{-1}. The beneficial effects of application of K_2O in respect of fruit characters were noticed by Ozaki and Ozaki (1955) in pepper. These results are also in agreement with those reported by Eysinga *et al*. (1982**)** who observed that K_2O application increased fur fruit size and weight in melons.

Nitrogen level N_4 (200 kg N ha^{-1}) recorded the maximum number of fruits per plant (12.57) followed by 10.97 with N_3 (150 kg N ha^{-1}) and the minimum (8.23) remained with N_1 (50 kg N ha^{-1}). P_1 (50 kg P_2O_5 ha^{-1}) recorded higher number of fruits per plant (10.81), whereas, P_2 (100 kg P_2O_5 ha^{-1}) recorded lower number of fruits per plant (10.08). Potassium level K_2 (100 kg K_2O ha^{-1}) recorded the higher number of fruits per plant (10.68) while the lower (10.21) was found with K_1 (50 kg K_2O ha^{-1}).

The number of fruits per plant was significantly influenced by interaction between nitrogen, phosphorus and potassium (N x P, P x K and N x K). The treatment combination N_4 P_1 K_2 (200 kg N ha^{-1} + 50 kg P_2O_5 ha^{-1} + 100 kg K_2O ha^{-1}) recorded the maximum number of fruits per plant (13.81) followed by 12.55 with N_4 P_1 K_1 (200 kg N ha^{-1} + 50 kg P_2O_5 ha^{-1} + 50 kg K_2O ha^{-1}), whereas, the minimum (7.84) remained with N_1 P_2 K_1 (50 kg N ha^{-1} + 100 kg P_2O_5 ha^{-1} + 50 kg K_2O ha^{-1}).

Higher number of fruits per plant was corresponding to the higher number of male and female flowers per plant, induced by the application of nitrogen, phosphorus and potassium.

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